

138

THE IRON AGE

VOL. LXXXVII.

JANUARY—JUNE, 1911.

729
4/3/30

NEW YORK:
DAVID WILLIAMS COMPANY,
239 West 39th Street.





640356
14.8.56

T
/
I 7
v. 87



INDEX.

Illustrated articles indicated by *.

A.

- Aberthaw Construction Company:
Repairing Concrete Floors, Apr. 20 p 987
- Accelerated Corrosion Test of Metals,
June 29 p. 1555
- Accidents:
And Safeguards in England, Mar. 23 p 703
- Anti-Accident Inspection Service,
Feb. 2 p 288
- Compensation and Conciliation, Apr. 13 p 883
- Compensation in Minnesota, Mar. 2 p 551
- Compensation Legislation in New Jersey and Ohio, Apr. 6 p 825
- Cream City Preventer,* May 4 p 1103
- Employers' Liability and Compensation Systems, Feb. 23 p 498
- European Methods of Prevention and Relief, Mar. 16 p 667
- First Aid a Ground for Damages,
June 29 p 1553
- Frick Coke Company's Safety Committee, May 18 p 1216
- In Industrial Plants, Jan. 19 p 214
- Industrial Inspection and Prevention,
Mar. 30 p 760
- Industrial Safety Association, Mar. 9 p. 587
- Inspection System to Prevent Industrial, Feb. 2 p 290
- Mechanical Engineer and Prevention of,* Feb. 16 p 434
- Model Compensation Code, Feb. 23 p 498
- New York Compensation Law Void,
Mar. 30 p 794
- New York Workmen's Compensation Decision, Mar. 30 p 759
- Prevention in the Machine Shop,*
May 18 p 1204
- Private Relief System, Morgan, Jan. 12 p 159
- Safety Devices for Iron Mine Workmen, June 22 p 1539
- Septic Poison's Needless Cost in Works, Jan. 12 p 121
- Suggestive Anti-Accident Epigram,*
Apr. 27 p 1035
- Workmen's Compensation in Seven States, Apr. 6 p 842
- Works Insurance, Apr. 6 p 818
- Acheson Lubricants, Apr. 13 p 931
- Acid Fume Removing Devices, Obermann,* Mar. 16 p 667
- Acme Blueprint Machine,* Feb. 2 p 329
- Acme Core Machine Company:
Core Machine,* Jan. 5 p 88
- Acme Machine Tool Company:
Combination Turret Lathe,* Jan. 26 p 283
- Adams Company:
Farwell Squeezer Molding Machines,*
Jan. 5 p 83
- Adell Bros. Mfg. Company:
Paramount Indestructible Steel Clamp,* Apr. 6 p 867
- Administration as a Constructive Science, Works, Jan. 26 p 248
- Advisory Board, Concentrated, May 4 p 1055
- Aerial Craft, Metal Frames for, Apr. 6 p 819
- Aetna Foundry & Machine Company:
Billet and Scrap Hauls,* Apr. 13 p 933
- Large Multiple Punch,* Apr. 6 p 860
- African Copper, Jan. 26 p 245
- African Mines, Underground Shops in South, Mar. 30 p 759
- Air Compressor Regulation,* June 22 p 1536
- Air Compressor, Roberts Motor,* Jan. 12 p 164
- Air Cooling System for Sheet and Tin Plate Mills, May 4 p 1069
- Air Furnace Dimensions, Calculation of,
May 25 p 1257
- Air Furnaces, Oil Fuel for, June 15 p 1465
- Ajax Mfg. Company:
Hot Saw and Burring Machine,* Feb. 2 p 318
- Huge Forging Machine,* Mar. 30 p 800
- Alabama Consolidated Coal & Iron Co.:
Southern Companies May Merge, Apr. 6 p 825; Apr. 13 p 907
- Alabama, Pig Iron Costs in, May 11 p 1124
- Alaska Copper Coming, Apr. 6 p 823
- Alexander, John:
Machine versus Hand Molding, June 29 p 1569
- Algoma Steel Company:
Coke Plant,* Apr. 20 p 982
- Allan, A., & Son:
Novel Use of Bronze,* June 15 p 1478
- Allen-Bradley Company:
Electrical Products, Apr. 21 p 1041
- Allied Machinery Company of America:
To Market American Machinery Abroad, May 25 p 1239
- Allis-Chalmers Company:
Edison Giant Roll Patents Sustained,
June 22 p 1520
- Allner-Boswell Radius Planer Attachment,* Apr. 27 p 1038
- Alexander, John:
Experience with Molding Machines,
Jan. 12 p 156
- Alliance Machine Company:
Crane Business, Mar. 9 p 627
- Foundry Cranes,* Jan. 5 p 91
- Allis-Chalmers Company:
Life of Electrical Apparatus, Jan. 12 p 122
- Alloys:
Castings from Nonferrous, Jan. 12 p 154
- Outerbridge Silicon, Jan. 5 p 44
- Titanium, on Slags, Effect of, Mar. 16 p 657
- Almond, T. R., Mfg. Company:
Tool Holder,* Mar. 23 p 742
- Alumaloyd Products Company, Feb. 9 p 373
- Alvey-Ferguson Company:
Removal, May 4 p 1107
- American Blower Company:
Business Outlook, Feb. 2 p 305
- Electric Forge Blowers,* June 29 p 1576
- Reversible Window Ventilating Device, May 25 p 1281
- Special Centrifugal Blower,* June 1 p 1327
- Ventura Disk Fan,* May 18 p 1222
- American Boiler Manufacturers' Meeting, June 22 p 1530
- American Brass Company:
Annual Report, Feb. 23 p 497
- American Can Company:
Annual Report, Feb. 23 p 499
- American Electric Furnace Company:
Electrical Steel Production at Dommeldingen, May 11 p 1126
- American Electrochemical Society:
Convention Programme, Mar. 30 p 815
- Electric Furnace Discussion, Jan. 26 p 261
- American Foundrymen's Association:
Convention Programme, May 18 p 1197
- Convention Registration, May 5 p 1121
- Convention Proceedings, May 25 p 1250; June 1 p 1328
- American Gas Furnace Company:
Automatic Temperature Controlling Instrument,* June 8 p 1418
- American Institute of Mining Engineers:
Convention Programme, May 11 p 1157
- Dr. R. W. Raymond Resigns, Apr. 6 p 821
- Fall Meeting, June 22 p 1512
- Officers, Mar. 2 p 534
- To Change Its Name, June 1 p 1361
- American Iron & Steel Association:
Our Record Production of Steel in 1910, Mar. 23 p 704
- American Iron & Steel Mfg. Company:
Annual Report, Feb. 16 p 423
- American Iron and Steel Institute:
Announcement, April 27 p 1018
- Annual Meeting, May 4 p 1056
- Considers Welfare Work, May 4 p 1056
- Officers, June 1 p 1297
- American Iron, Steel & Heavy Hardware Association Convention,
June 1 p 1297
- American Machinery In Europe, May 18 p 1198; June 15 p 1481
- American Mining Congress:
Coal Miners' Compensation Plan,
Mar. 16 p 661
- American Motor Truck Company:
Important Commercial Automobile Consolidation, Mar. 30 p 777
- American Pulley Company:
Pulleys with Cork Set in Faces,* May 11 p 1167
- American Radiator Company:
Annual Report, Mar. 16 p 679
- American Rolling Mill Company:
Equipment of Hagan Furnaces, Mar. 9 p 606
- American Sheet & Tin Plate Company:
Air Cooling System, May 4 p 1069
- Announcement, June 8 p 1423
- Apollo Galvanized Sheets for Culverts, Mar. 2 p 535
- Apollo Sheet Steel Calendar, Jan. 12 p 146
- Starts Gary Plant, June 8 p 1399
- American Society for Testing Materials:
Announcement, Feb. 2 p 313
- Coming Convention, Apr. 27 p 1035
- Convention Programme, May 4 p 1078; June 1 p 1297
- American Society of Engineer Draftsmen, June 1 p 1346
- American Society of Mechanical Engineers:
Convention Proceedings, June 1 p 1308; June 8 p 1411*
- Monthly Meeting, Feb. 9 p 374
- Spring Meeting Announcement, Mar. 2, p. 545; Apr. 27 p 1033
- American Specialty Stamping Company:
Obermann Acid Fume Removing Devices,* Mar. 16 p 667
- American Spiral Pipe Works:
Large Sizes of Lap Welded Pipe,*
Feb. 2 p 324
- American Steel Foundries:
Davis Cast Steel Car Wheel,* May 4 p 1090
- Large Castings in Fast Time, June 29 p 1588
- American Steel & Wire Company:
Museum of the Wire Industry,* June 22 p 1522
- American Supply & Machinery Manufacturers' Association:
Bureau of Promotion, Feb. 16 p 406
- Convention Announcement, Feb. 2 p 323
- Convention Proceedings, April 6 p 840; April 13 p 904

American Tobacco Decision, June 1 p 1296
 American Tool Works Company:
 High Duty Lathe,* June 1 p 1363
 Lathes,* Mar. 2 p 546
 American Wire Brush Company:
 Purchased by the Osborn Mfg. Company, Apr. 13 p 900
 Analyses:
 Lake Superior Iron Ore, Apr. 13 p 906
 Standard for Foundry Coke, June 22 p 1515
 Analysis Books of Lake Superior Ores, Mar. 9 p 573
 Andrews Side Frame Patent Sustained, June 1 p 1347
 Angle Steel Tool Company:
 Tool Truck,* June 29 p 1575
 Annealing Malleable Castings, Mar. 23 p 726,* April 20 p 948
 Anniversary, Notable, April 13 p 883
 Anthony, Prof. Gardner C.:
 Time Factor and Clearance in Punching Plates,* June 15 p 1480
 Anti-Boycott Decision, Noteworthy, Jan. 26 p 232
 Anti-Trust Cases, Feb. 23 p 458
 Anti-Trust Cases, Reason in, May 18 p 1780
 Anti-Trust Decisions, Application of the, June 8 p 1378
 Apprenticeship:
 Demand for Broad Foundry Training, Feb. 2 p 311
 Navy Yard, April 6 p 850
 Novelty in Systems, Mar. 9 p 571
 Pennsylvania Railroad Company, Apr. 6 p 851
 Westinghouse System,* April 6 p 848
 Arcade Mfg. Company:
 Molding Machines,* Jan. 5 p 88
 Molding Thin Castings on a Jarring Machine,* April 20 p 980
 Rotary Sand Sifter,* April 27 p 1042
 Arctic Circle, Iron Mining Beyond the,* Mar. 9 p 608
 Ardelt, R.:
 Cast Iron Pipe Molding,* May 4 p 1098
 Ardrey, R. L.:
 Chicago Iron Trade in 1910, Jan. 5 p 60
 Arendals Power Company:
 Electric Iron and Steel in Norway, Feb. 2 p 291
 Armstrong-Blum Mfg. Company:
 High-Speed Saw with Automatic Stock Feed,* June 1 p 1364
 Association of American Steel Manufacturers:
 Annual Meeting, Mar. 9 p 595
 Atherton, L. M.:
 Copper Trade in 1910, Jan. 5 p 63
 Atha Tool Company:
 Automatic Handle Sander,* May 18 p 1218
 Atlantic City Railway Convention Exhibits, June 22 p 1518
 Atlas Car & Mfg. Company:
 Foundry Cars,* Jan. 5 p 92
 Auel, C. B.:
 Machine Tool Arrangement, May 25 p 1278
 Auto Sand Mixer,* Jan. 5 p 112
 Autogenous Welding Company:
 High Duty Polishing Machine,* Mar. 23 p 735
 Autogenous Welding Equipment Company, Jan. 5 p 49
 Automatic Transportation Company:
 Electric Freight Truck,* May 11 p 1161
 Automobiles:
 Advantages of Worm Drive, May 4 p 1070
 An Economic Good, Jan. 19 p 175
 German Depreciation and Repair Cost, May 11 p 1151
 Growing Use of the Industrial, Jan. 12 p 121
 Important Commercial Consolidation, Mar. 30 p 777
 Making Duplicate Parts,* Mar. 9 p 606

New Art in Building, May 11 p 1124
 Notes on Motor Truck Performances, Jan. 12 p 145
 Standardization by Automobile Engineers, Apr. 6 p 857

B.

Babbitt Metal Formula, "Original," May 18 p 1202
 Babcock & Wilcox Company:
 Battleship Delaware Boiler Accident, Mar. 30 p 783
 Badge, F. J.:
 Oilstone Holder,* Apr. 13 p 931
 Bailey Sheet Furnace Equipment, May 25 p 1258
 Baily, Thaddeus F.:
 Electric Furnace,* May 4 p 1094
 Baird Machine Company:
 Improved Tumbling Barrel,* Feb. 23 p 489
 New Ball Burnishing Barrel,* Apr. 27 p 1033
 Baker, W. J.:
 Hammer Flue Cleaner,* May 25 p 1274
 Baldwin, A. S., & Co.:
 Reilly Friction Clutch,* Feb. 23 p 490
 Baldwin Locomotive Works:
 Annual Report, Mar. 30 p 777
 Labor Troubles, June 15 p 1463; June 29 p 1593
 Locomotives Built in 1910, Jan. 12 p 151
 New Incorporation, June 29 p 1577
 New Interests In, May 11 p 1165
 Ball Burnishing Barrel, New Baird,* Apr. 27 p 1033
 Bands and Boxes, Diamond Slip-Over,* Jan. 5 p 115
 Baraboo District; Iron Ore in Hundreds of Millions of Tons,* Mar. 9 p 618
 Barb Wire Machine, Blashill & Gray,* Jan. 5 p 53
 Barnes Drill Company:
 Motor-Driven Gap Lathe,* Jan. 26 p 281
 Interesting Application of a Tapping Machine,* June 29 p 1580
 Barnes, W. F. & John, Company:
 Special Horizontal Drilling Machine,* Mar. 9 p 617
 Barrel, New Baird Ball Burnishing,* Apr. 27 p 1033
 Barrow Hematite Steel Company, Ltd.:
 British Steel Companies Not Prosperous in 1910, Mar. 16 p 658
 Barry & Zecher Company:
 Zecher Cupola,* Jan. 5 p 98
 Bartlett, C. O., & Snow Company:
 Mechanical Coke Quencher,* June 22 p 1531
 Bars and Shapes from Waverly Warehouse, Extras on, May 11 p 1143
 Bassett-Presley Company:
 Purchased by Carnegie Steel Company, June 15 p 1465
 Bath Grinder Company:
 Duplex Internal Grinders,* Mar. 23 p 736
 Batteries, Storage, Feb. 23 p 474
 Battleship Delaware Boiler Accident, Mar. 30 p 783
 Battleship Maine, Raising the,* June 8 p 1430
 Bayonne Steel Casting Company:
 Features of a Modern Steel Foundry,* April 6 p 852
 Bates Machine Company:
 Improvement in Feed Water Heating,* June 29 p 1592
 Bauer and Wetzel:
 Injuries to Tender Wheel Tires Through Strong Local Cold Work,* June 29 p 1577
 Beaman & Smith Company:
 Machine for Boring Engine Valves,* May 25 p 1282
 Bearing, Hill Rolling Mill,* Jan. 5 p 49
 Belgian Iron and Steel Production in 1910, June 29 p 1567

Belgian Supplies of Iron Ore, May 18 p 1202
 Bellows, Osborn Molders', Mar. 2 p 548
 Belt Factory at Passaic, N. J., Dick, May 18 p 1207
 Bench, Oliver New Universal Saw,* Jan. 5 p 109
 Bender and Straightener, New Underwood Power,* Mar. 9 p 596
 Bender, Wallace Hand Power Bar,* Mar. 30 p 792
 Benjamin Electric Mfg. Company:
 Tungsten Mill Cluster,* Feb. 2 p 331
 Berg, P. T.:
 Improved Cinder Car,* Mar. 23 p 739
 Berger Mfg. Company:
 Raydiant Sidewalk Lights for Interior Use, Feb. 2 p 306
 Berlin, American Association of Commerce and Trade, Apr. 27 p 1040
 Bessemer & Lake Erie Railroad:
 Tonnage, Mar. 9 p 585
 Best, W. N.:
 Oil Fuel for Air Furnaces, June 15 p 1465
 Bethlehem Steel Company:
 Duplex Process,* Mar. 30 p 784
 Bethlehem Steel Corporation:
 Annual Report, Apr. 6 p 845
 Bettendorf Axle Company:
 Enlarged Steel Car Plant,* Apr. 6 p 858
 Interesting Curtis Turbine Installation,* Feb. 23 p 492
 Betterment of Steel Works Labor Conditions, May 11 p 1144
 Betton, J. M.:
 Drucklieb Multiple Injector Sand Blast,* Apr. 13 p 923
 Drucklieb Sand Blast Specialties,* Jan. 5 p 103
 Bickford Machine Company:
 New Automatic Tap Fluter,* May 25 p 1281
 Billet and Scrap Hauls, Aetna,* Apr. 13 p 933
 Binders for Foundry Cores, May 11 p 1140
 Birkinbine, John:
 Forty Years' Progress in Pig Iron,* June 22 p 1516
 Birmingham District, Steel Corporation Construction in the, May 4 p 1089
 Blackwell, Geo. G., Sons & Co., Ltd.:
 Titanium in Steel and Iron, Apr. 20 p 992
 Blair Engineering Company:
 Open Hearth Furnaces with Magnetite End Blocks, Mar. 23 p 716
 Blaisdell Machinery Company, May 11 p 1126
 Blashill & Gray:
 Barb Wire Machine,* Jan. 5 p 53
 Blast Furnaces:
 See Furnaces, Blast.
 Blast Pressures, Sand, Feb. 9 p 350
 Blast, Sand, Drucklieb Multiple Injector,* Apr. 13 p 923
 Bliss, E. W., Company:
 Straight Sided Press of Unusual Proportions,* Jan. 5 p 45
 Block, Patterson Six Sheave Steel,* Jan. 5 p 47
 Blooming Mill with Novel Features, Feb. 2 p 310
 Blowers:
 American Electric Forge,* June 29 p 1576
 Buffalo Steel Plate Pressure,* Feb. 2 p 331
 Connersville Applied to Vacuum Cleaning,* May 11 p 1166
 Connersville Rotary Positive,* Jan. 5 p 102
 Economy Tests of a Turbine-Driven Furnace, May 4 p 1070
 Green Foundry,* Mar. 9 p 621
 Special Centrifugal,* June 1 p 1327
 Sturtevant Foundry,* Jan. 5 p 101
 Turbine Driven Gas, Apr. 13 p 933
 Blowing Engine Practice, Future in, June 15 p 1463
 Blueprint Machine, Acme,* Feb. 2 p 329

- Boedwicker, G. A.:
Metal Rolling in the United States,
Apr. 20 p 960
- Boiler Accident, Battleship Delaware,
Mar. 30 p 783
- Boiler and Machine Shops of Improved
Construction,* Jan. 19 p 216
- Boiler Feed Records, Analysis of,* Jan.
12 p 170
- Boilermakers' Association, International
Master:
Convention Proceedings, June 8
p 1383
- Boiler Manufacturers' Meeting, Amer-
ican, June 22 p 1530
- Boiler Performance, Remarkable, May
25 p 1238; June 22 p 1500
- Boiler Repair Bolts, Diamond,* Feb. 9
p 388
- Boiler Shop and Dipping Tank, Cam-
bridge, Mar. 10 p 608
- Boiler Tubes, Process of Manufacturing
Locomotive,* May 4 p 1104
- Bolling & Lowe:
British Iron Trade in 1910, Jan. 5 p
20
- Bollman-Wilson Foundry Company:
Punch with a 48,000-lb Body Casting,*
June 20 p 1571
- Bolt, Nut and Rivet Men Done To-
gether, Mar. 2 p 518
- Bolts:
Diamond Boiler Repair,* Feb. 9 p 388
Diamond Expansion Toggle,* Mar. 9
p 506
- Bond, Vivian, & Co.:
Pittsburgh Business, Apr. 20 p 987
- Bork Ketchum:
Analysis of Paints and Painting Ma-
terials, Jan. 26 p 235
- Applications Industrielles de l'Electri-
cité (Industrial Applications of
Electricity), Mar. 16 p 645
- A Practical Guide to Iron and Steel
Works Analyses, Mar. 23 p 705
- Backbone of Perspective, Feb. 9 p 370
- Chemistry for Beginners, May 25 p
1260
- Drop Forging, Die Sinking and the
Machine Forming of Steel, Mar.
9 p 573
- Dynamo Electric Machinery, Mar. 23
p 705
- Electric Railway Dictionary, June 29
p 1570
- Elementary Practical Mechanics, Feb.
10 p 407
- Engineering Directory for 1911, Mar.
9 p 573
- Engineering Index, Annual, 1910,
Mar. 16 p 645
- Fowler's Mechanics' and Machinists'
Pocket Book and Diary for 1911,
Jan. 12 p 122
- Homestead: the Households of a Mill
Town, Mar. 30 p 798
- Hydroelectric Practice, May 25 p 1259
- Industrial Plants: Their Arrangement
and Construction, Feb. 23 p 460
- Introduction à la Métallographie Mi-
croscopique (Introduction of Mi-
croscopic Metallography), Jan. 12
p 122
- Inventors and Inventions, Apr. 6 p 836
- Iron Ore Manual of the Lake Super-
ior District, May 25 p 1260
- Machine Shop Primer, Feb. 16 p 407
- Mechanical Engineers' Pocket-Book,
May 4 p 1070
- Mechanics for Engineers, Mar. 23 p
705
- Metal Statistics, Feb. 16 p 407
- Monoplanes and Biplanes, June 29 p
1570
- Motion Study, May 25 p 1260
- Outlines of Iron and Steel Metallurgy.
(Grundzüge des Eisenhüttenwe-
sens), Jan. 26 p 235
- Pocketbook of Mechanical Engineer-
ing, Jan. 26 p 235
- Popular Handbook for Cement and
Concrete Users, Feb. 23 p 460
- Practical Alloying, Feb. 9 p 370
- Practical Stamp Milling and Amalga-
mation, Feb. 9 p 370
- Production of Malleable Castings,
May 25 p 1259
- Scientific American Cyclopedia of
Formulas, Jan. 26 p 235
- Scientific Management and Railroads,
Mar. 30 p 799
- Smoley's Parallel Tables of Loga-
rithms and Squares, Mar. 9 p 573
- Statistics of the American and For-
eign Iron Trades, Jan. 19 p 177
- Textbook of the Elements of Machine
Work, Apr. 6 p 836
- Testing for Metallurgical Processes,
Feb. 9 p 370
- Textbook of the Principles of Ma-
chine Works, Apr. 6 p 836
- The Aeroplane, Mar. 9 p 573
- The Iron Ores of Lake Superior, May
18 p 1215
- The Life and Life Work of Charles
B. Doolittle, May 25 p 1270
- The Steel Workers, Mar. 30 p 798
- Welding, Feb. 9 p 370
- Bope, Henry P.:
Pittsburgh's Position in Steel, Feb. 2
p 302
- Boring, Drilling and Milling Machine,
Special Fosdick Horizontal,* May
4 p 1107
- Boring Mills:
Cincinnati Planer Company,* Jan. 26
p 1212
- Cleveland Horizontal,* Jan. 5 p 47
- Colburn Motor-Driven,* Mar. 9 p 617
- Dresses Vertical, New,* Apr. 27 p 1025
- Universal No. 3,* Mar. 30 p 790
- Borings, Briquettes from Cast, Jan. 12
p 1212
- Borings, Briquetting Metal,* June 1 p
1344
- Boston, Congress of Technology at,
Mar. 9 p 592; Mar. 16 p 686; Mar.
30 p 788; Apr. 20 p 967
- Bounties, Canada's Iron and Steel, Apr.
13 p 921
- Bounties May be Renewed, Canada's
Steel, Feb. 16 p 424
- Boxes and Bands, Diamond Slip-Over,*
Mar. 5 p 117
- Boycott, Bill to Legalize the, Feb. 16 p
123
- Boycott Suit to be Retried, Famous
Danbury Hat, Apr. 13 p 900
- Bracket, Patterson Adjustable Electric
Light,* Apr. 20 p 981
- Bradlee & Co.:
Chain Information, Jan. 5 p 67
- Bradley Mfg. Company:
Heating Furnace Doors,* Jan. 12 p 168
- Brake, Prony, May 25 p 1266
- Brandon, George R.:
Mechanical Charging of Cupolas,*
June 8 p 1426
- Brass Melting Furnace, M. R. V.,* Feb.
9 p 388
- Brass Melting Furnaces, Jan. 5 p 82
- Brass Mill, Electrically Driven,* Jan. 26
p 278
- Bray, Thomas J.:
President of the Republic Iron & Steel
Company, Mar. 23 p 704
- Brayshaw, S. N.:
Hardness of Quenched Tool Steels,*
May 25 p 1250
- Brazil, Itabora Iron Mines in, Apr. 27
p 1007
- Brazilian Iron Mines, British Interests
Acquire, Jan. 26 p 234
- Bridgeport Safety Emery Wheel Com-
pany:
No. 1/2 Motor-Driven Grinder,*
Mar. 30 p 803
- Bridges:
Essex-Merrimac Chain, May 4 p 1075
- Quebec, Feb. 2 p 313; Feb. 16 p 437;
Feb. 23 p 479; Apr. 13 p 901
- Special for Ladle Cars,* Apr. 27 p
1031
- Unique Draw at Portland, Ore., Jan.
5 p 81
- Briquettes from Cast Borings, Jan. 12
p 152
- Business Methods, Modern, Apr. 13 p
905
- Buyers' and Sellers' Bureau of Cleve-
land, Ohio, May 4 p 1101
- Buying, Two Influences in Machinery,
June 22 p 1499
- By-Product Coke Ovens in America,
June 8 p 1422
- By-Product Coking and Wood Preser-
vation, Jan. 5 p 3
- Bylesby, H. M., & Co.:
Convention, Feb. 2 p 305
- Briquettes, Iron Ore, Feb. 9 p 374
- Briquetting Metal Borings,* June 1 p
1344
- Briquetting Plant, Gröndal Iron Ore,
Mar. 9 p 574
- British Engineering Standards Commit-
tee:
Specifications for Cold Drawn
Weldless Steel Tubes, Apr. 27 p
1024
- British Interests Acquire Brazilian Iron
Mines, Jan. 26 p 234
- Bristol Company:
Class 111 Recording Thermometer,*
Jan. 19 p 213
- British Iron Trade, Jan. 5 p 29; Feb. 26
p 404; Mar. 16 p 661
- British Pig Iron Output, First Half of
1910, Jan. 12 p 122
- British Pig Iron Production in 1910,
May 25 p 1257
- British Steel Companies Not Prosper-
ous in 1910, Mar. 16 p 658
- British Steel Production in 1910, June
22 p 1499
- British Trade Conditions Less Favora-
ble, Apr. 13 p 901
- Brussels Exposition:
Machine Tool Awards, Feb. 16 p 424
- Broderick & Bascom Rope Company:
Wire Rope Trade Inquiry, Jan. 5 p 5
- Brombacher, Max H. C.:
Railroad Repair Shop Efficiency, Jan.
12 p 1212
- Welfare Work, May 25 p 1276
- Bronze Drum Casting, Huge,* Mar. 16
p 48
- Bronze, Novel Use of Allan,* June 15
p 1378
- Brooklyn Engineers Club's Exhibition,
May 4 p 1076
- Brown & Zortman Machinery Company:
Fire, June 1 p 1318
- Brown, Fordyce W.:
Heating Furnace Doors,* Jan. 12 p 168
- Brown Hoisting Machinery Company:
New Ore Unloading Plant,* Apr. 6 p
861
- Brown-Ketcham Iron Works:
Receivership, June 8 p 1425
- Brown, Richard P.:
Measurement of High Temperatures
in Modern Foundry Practice, Apr.
27 p 1025
- Browning Engineering Company:
Pile Driver,* Feb. 23 p 488
- Brussels, Belgium:
International Iron and Steel Confer-
ence, Feb. 23 p 471
- Brussels International Conference, June
22 p 1499
- Brymbo Steel Company, Ltd.:
Dry Air Blast at a British Furnace
Plant,* May 11 p 1157
- Buch's, A., Sons Company:
Combined Jarring and Squeezer Mold-
ing Machine,* June 8 p 1424
- Gravity Molding Machine,* Jan. 5 p 84
- Buffalo Coke Rates Hearing, Apr. 13
p 1001
- Buffalo Forge Company:
Fan 30 Ft. High,* May 18 p 1203
- Feed Water Strainer,* May 18 p 1222
- Large Order for Fans, Mar. 16 p 685
- New Type Slow Speed Exhaust Fan,*
June 29 p 1571
- Steel Plate Pressure Blower,* Feb. 2
p 381
- Buffalo Foundry & Machine Company:
Huge Bronze Drum Casting,* Mar. 16
p 681

Buffalo Steam Pump Company.
Self-Contained Vertical Sump Pump,*
June 8 p 1429
Building Material Exhibition, National,
May 18 p 1213
"Building Up" Impurities in Steel, Feb.
23 p 480; Mar. 2 p 537
Bullard Machine Tool Company:
New Vertical Turret Lathe,* June 1
p 1352
Bull, R. A.:
Protecting Metal from Superincum-
bent Slag, June 29 p 1554
Bunnell, Sterling H.:
Engineer as a Salesman, Jan. 19 p 200
Right Principles in Works Manage-
ment, May 4 p 1084
Selection of Factory Equipment, May
18 p 1100
Bureau of Standards:
Emery Testing Machines, May 4
p 1103
New Samples of Steel and Ore, Feb.
2 p 327
Burden to Labor, Ratio of, Apr. 20 p 965
Burgess, Charles F.:
Electrolytic Iron, Jan. 26 p 268
Burners, Hauck Portable Oil,* Jan. 5
p 98
Burt Mfg. Company:
More Filters for the Gary Works,
June 1 p 1365
Busch, J. C.:
Power Sprue Cutter,* Feb. 23 p 495
Business Administration as a Construc-
tive Science, Mar. 16 p 662; Mar.
23 p 722

C.

Calcium Chloride for Drying the Blast,*
May 25 p 1270
Calder, John:
Mechanical Engineer and Prevention
of Accidents, Feb. 16 p 324
California Metal Trades Association:
Annual Meeting, Feb. 2 p 311
Calorimeter, Doherty Gas,* Apr. 13 p
928
Calumet Engineering Works:
Crane Type Tumbler,* Feb. 2 p 330
Cupola,* Jan. 5 p 97
Cambria Paint & Color Company:
Improvements, April 6 p 841
Cambria Steel Company:
Annual Report, Mar. 9 p 591
Boiler Shop and Dipping Tank,* Mar.
16 p 668
New Wire Plant,* Mar. 23 p 730
Southwark Reversible Convertible
Simple or Compound Engine,*
Apr. 13 p 930
Cameron, A. S., Steam Pump Works:
Ingersoll-Rand Alliance, Jan. 19 p 222
Cammell, Laird & Co. of New York,
Feb. 2 p 317
Canada:
Blashill & Gray Barb Wire Machine,*
Jan. 5 p 53
British-Canadian Shipbuilding & Dock
Company—New Plant, June 15 p
1480
Duty on Re-rolled Rails, Jan. 26 p 261
Economic Upbuilding, Jan. 19 p 202
Handling Iron Ore with Electromag-
nets, Feb. 16 p 431
Heavy Rail Contracts, May 4 p 1101
Iron and Steel Bounties, Apr. 13 p 921
Iron and Steel Works Extensions,
Jan. 12 p 158
Manufacturers Oppose Reciprocity,
Jan. 10 p 211
Mineral Output in 1910, Mar. 23 p 729
Pig Iron Production in 1910, Feb. 23
p 502
Port Mann, the New City, Mar. 30 p
804
Quebec Bridge, Feb. 2 p 313; Feb. 16
p 437; Feb. 23 p 479; Apr. 13 p
901
Railway Club Meeting, Feb. 2 p 310
Reciprocity Agreement—Duties Nam-
ed, Feb. 2 p 313

Steel Bounties May be Renewed, Feb.
16 p 424
Steel Interests and Reciprocity, Feb.
2 p 310
Trade with the United States, Feb.
23 p 502
Wire Rod Trade, June 1 p 1317
Canals, New York Barge, May 4 p 1057
Canton Sheet Steel Company:
Bailey Sheet Furnace Equipment, May
25 p 1258
Cap Screw, Hart Hollow,* Feb. 9 p 389
Carborundum Company:
Some Remarkable Products,* Feb. 16
p 443
Carlin's, Thomas, Sons Company:
Contracts, June 29 p 1589
Carnegie Steel Company:
Buys Bassett-Presley Company, June
15 p 1405
Extras on Bars and Shapes from
Waverly Warehouse, May 11 p
1143
Publications on Steel Mine Timbers,
May 11 p 1142
Question of Extras in the Eastern
Jobbing Trade, Apr. 27 p 1007
Relief Fund, Feb. 9 p 363
Carnegie Technical School Lectures,
Feb. 2 p 330
Carpenter & Edwards:
Production of Castings to Withstand
High Pressures, Jan. 12 p 154
Carpenter, Prof. H. C. H.:
Growth of Cast Iron, Mar. 23, p 744;
June 1 p 1327
Carr, Clyde Mitchell:*
President Joseph T. Ryerson & Son,
Feb. 9 p 369
Cars
Atlas Foundry,* Jan. 5 p 92
Berg Cinder, Improved,* Mar. 23, p
739
Enlarged Bettendorf Steel Plant,*
Apr. 6 p 858
Ernst Wiener Foundry,* Jan. 5 p 97
Monarch Core and Annealing Oven,*
Jan. 5 p 95
Weimer Cinder, New,* Jan. 5 p 46
Number of Car Wheels, Apr. 20 p 947
Cast and Rolled Material, Competition
Between, June 1 p 1294
Cast Borings, Briquettes from, Jan. 12
p 152
Castings:
Annealing Malleable, Mar. 23 p 726;*
Apr. 20 p 948
Cylinder, Made on a Mumford Mold-
ing Machine,* Feb. 23 p 496
Experience with Permanent Molds,
June 8 p 1402
From Nonferrous Alloys, Jan. 12 p
154
Gas Cavities and Shot in Iron,* June
1 p 1339
Huge Bronze Drum,* Mar. 16 p 681
Huge Cast Iron Still,* May 11 p 1166
Large Steel in Fast Time,* June 29 p
1588
Molding Thin, on an Arcade Jarring
Machine,* Apr. 20, p 980
Ornamental, Made in Permanent
Molds,* Jan. 5 p 68
Proposed Malleable Plant,* Jan. 5 p 72
Shot Iron and Hard Shots in, Jan. 5
p 52
Use of Briquettes from Cast Borings,
Jan. 12 p 152
White Irons and the Prevention of
Growth in, Mar. 23 p 744
Cast Iron Car Wheel and the Grinding
Machine, Feb. 23 p 459
Cast Iron, Growth of, June 1 p 1327
Cast Iron Pipe Molding,* May 4 p 1098
Cast Iron, Vanadium in, June 8 p 1398
Cast Iron Pipe Prices from 1900 to
1910,* Mar. 2 p 534
Cast Iron Wheels, Ferromanganese in
Chilled, Apr. 6 p 820
Catalogues, Suggestions Wanted for
Size, Mar. 2 p 519

Cedar Rapids Foundry & Machine Com-
pany:
Gasoline Engine Speed Regulator,
Mar. 9 p 586
Center Finder, Sure,* Apr. 27 p 1031
Central Foundry Company:
Reorganized, May 18 p 1203
Central Station Welfare Work, Apr. 20
p 973
Chain Bridge, Essex-Merrimac, May 4
p 1075
Chain Information, Jan. 5 p 67
Chain Oil Feed, Spencer Universal,*
June 29 p 1587
Chandler & Farquhar Company:
Expansion, Feb. 2 p 317
Chandler & Taylor Company:
Molding Thin Castings on an Arcade
Jarring Machine,* Apr. 20 p 980
Changeezy and Delta Tramrail Trol-
leys,* Jan. 5 p 93
Charcoal Blast Furnace, New, May 4
p 1069
Charcoal Pig Iron for Chilled Car
Wheels, New, Mar. 9 p 605
Charging of Cupolas, Mechanical,* June
8 p 1426
Chelsea Piers, Fuel Handling on the,*
Feb. 23 p 497
Chemical Engineers:
Announcement of June Meeting, Feb.
2 p 317
Chemical Industry, Society of:
Treatment and Purification of Boiler
Feed Water, Mar. 2 p 533
Chicago Foundry Foremen's Associa-
tion, Jan. 26 p 249; Feb. 16 p 407
Chicago Iron Trade in 1910, Jan. 5 p 60
Chicago Metal Trades Annual Meeting,
Mar. 23 p 740
Chicago Municipal Exposition, Jan. 5 p
82
Chicago Perforating Company, June 15
p 1485
Chicago Pneumatic Tool Company:
Annual Report, Feb. 23 p 501
Contrast in Air Compressors,* May
18, p 1216
Pneumatic Sand Rammers, Jan. 5 p
107
Chicago Railway Equipment Company:
Annual Report, Mar. 9 p 596
Chicago Railways Company:
Novel Application of Motor Drive to
Machine Tools,* May 4 p 1088
Chilean Buyers in New York, May 11
p 1150
Chilled Rolls with Passes Cast in,* May
25 p 1200
Chloride for Drying the Blast, Calcium,*
May 25, p 1270
Chokio Water Works Bids, May 4 p
1081
Chromium, Determination of Manganese
in the Presence of, May 11 p 1156
Chucks:
Garvin Automatic,* Mar. 9 p 626
Moller Oval,* Jan. 5 p 52
Murchey Revolving,* Feb. 23 p 496
Weaver Roller Jaw,* Jan. 19 p 223
Church, A. Hamilton:
Distributing Expense Burden, June 1
p 1325
Cincinnati Foreman's Club, Mar. 16 p
057
Cincinnati Foundry Foremen, May 4 p
1085
Cincinnati Gasket & Packing Company:
Triple and Trinity Gaskets,* Jan. 19
p 222
Cincinnati Gear Cutting Machine Com-
pany:
No. 5 Gear Cutter,* Apr. 27 p 1039
Cincinnati Iron Trade in 1910, Jan. 5 p
62
Cincinnati Planer Company:
Boring Mill,* Jan. 26 p 270
Distributing Factory Operating Costs,*
June 15 p 1479
Shop Cost Accounting,* Mar. 2 p 554
Cincinnati Pulley Machinery Company:
Heavy Duty Pulley Lathe,* Apr. 27 p
1041

- Cincinnati Punch & Shear Company
Leighton Combination Punch and,*
Shear, Mar. 10 p 680
- Cincinnati Shaper Company:
Shaper with Job Crane,* Mar. 23 p 729
- Cincinnati's Industrial Development,
Mar. 30 p 797
- Cinder Notch, Rifle Shots Open a
Chilled, Feb. 2 p 311
- Clamp, Paramount Indestructible Steel,*
Apr. 6 p 807
- Clapp, E. D., Mfg. Company:
Improvements, Jan. 5 p 81
- Clark, W. A.:
Iron Ore Docks on the Lakes,* Apr.
20 p 972
- Claussen, Oscar, Engineering Company:
Chokio Water Works Bids, May 4 p
1081
- Clayton Air Compressor Works:
Motor Driven Air Compressors,* Apr.
20 p 975
- Cle-Gal-Co Pattern Shop and Foundry
Supplies,* Jan. 5 p 114
- Cleats and Press, Kant-Leak,* Mar. 16
p 675
- Cleveland Crane & Engineering Com-
pany:
Monorail Grab Bucket Coal Hoist,*
Mar. 2 p 550
- Cleveland, Erie Railroad Ore Docks in,
Mar. 23 p 729
- Cleveland Galvanizing Works Company.
Cle-Gal-Co Pattern Shop and Foundry
Supplies,* Jan. 5 p 114
- Cleveland Machine Tool Works:
Horizontal Boring Mill,* Jan. 5 p 47
- Cleveland Nickel Works:
Superior Tumbling Mills, Jan. 5 p
104
- Cleveland, Ohio, Buyers' and Sellers'
Bureau at
- Cleveland Pneumatic Tool Company:
Pneumatic Hammers and Rammers,*
Jan. 5 p 107
- Portable Pneumatic Grinder,* Jan. 12
p 162
- Cleveland Steel Tool Company:
Hydromatic Water Valve,* May 18 p
1219
- Cleveland Superintendents and Fore-
men, Mar. 23 p 717
- Climax Hoist Company:
Spur Geared Chain Hoist,* Apr. 6 p
860
- Clough, R. M.:
Vertical Combination Bench Miller
and Drill,* May 25 p 1273
- Clutch, Reilly Friction,* Feb. 23 p 490
- Coal:
Analysis by Consumers, June 1 p 1317
A Thousand an Acre for Connellsville,
June 15 p 1447
Miners' Compensation Plan, Mar. 16
p 661
Production of, in 1910, May 18 p 1207
- Coal Distillation Company:
Collins By-Product Coke Oven, Feb.
23 p 513
- Cobb, John W.:
Corrosion of Iron, June 8 p 1417
- Coils, Westinghouse Air-Cooled Choke,*
June 29 p 1576
- Coke:
Algoma Steel Company's Plant,* Apr.
20 p 982
Bartlett & Snow Mechanical Quench-
er,* June 22 p 1531
Buffalo Rates Hearing, Apr. 13 p 901
By-Product Ovens and Conservation,
Feb. 9 p 374
By-Product Ovens in America, June
8 p 1422
Collin By-Product Oven, Feb. 23 p 513
Connellsville Interests and Railroad
Discrimination, Mar. 2 p 519
Connellsville Output in 1910, Jan. 12
p 133
Foundry, June 22 p 1515
Koppers Ovens, June 29 p 1554
New Rates, Apr. 6 p 838
Oven Gas in Open Hearth Furnaces,
Feb. 2 p 318; May 18 p 1232; June
22 p 1501
- Ovens at Lorain, Ohio, Mar. 9 p 588
- Producers' Association, Mar. 23 p 734
- Size of Charge for a Cupola, June 29
p 1555
- Cooking, Wood Preservation and By-
Product, Jan. 5 p 3
- Cold Rolling of Standard Sections,
Forming Special Shapes by,* May
18 p 1215
- Collars for Emery Wheels, Safety, Mar.
30 p 804
- Collin By-Product Coal Oven, Feb. 23
p 513
- Collburn Machine Tool Company:
Motor Driven Boring Mill,* Mar. 9
p 997
- Collector, Morse Dust,* Jan. 5 p 101
- Collins, Fletcher:
Standards for the Various Kinds of
Pig Iron, June 8 p 1400
- Columbia Steel Foundry,* Jan. 12 p 160
- Columbia Tool Steel Company:
Salesmen, Jan. 5 p 18
- Commercial Bureau Company:
Export Assisting Plan, May 25 p 1260
- Commercial Engineers' Association, Chi-
cago, May 4 p 1121
- Commercial Vehicles, Advantages of
Long Stroke Motors for, Mar. 23
p 744
- Compensation:
And Conciliation, Accident, Apr. 13 p
883
And Liability Systems, Employers',
Feb. 23 p 498
Coal Miners' Plan, Mar. 16 p 661
Constitutional Law, June 1 p 1319
Employers' Liability and, Apr. 20 p 968
Essential Cost Factor of, Jan. 12 p 121
In Ohio, Feb. 16 p 433
In Seven States, Apr. 6 p 842
Legislation in New Jersey and Ohio,
Apr. 6 p 825
Model Code, Feb. 23 p 498
New York Decision, Mar. 30 p 759
New York Law Void, Mar. 30 p 794
Ohio Law, June 22 p 1539
Workingmen's, Feb. 23 p 499
- Complaints of Subordinates, Checking
Unfair, Mar. 16 p 643
- Compressor Regulation, Air,* June 22 p
1530
- Compressors:
Clayton Motor Driven Air,* Apr. 20 p
975
Contrast in Air,* May 18 p 1216
General Electric Turbine-Driven,*
Mar. 2 p 538
Roberts Motor Air,* Jan. 12 p 164
- Concrete Floors, Repairing, Apr. 20, p
987
- Concrete Patterns, Experience with, Feb.
9 p 305
- Concrete, Pittsburgh Standard Rein-
forcement for, March 23 p 725
- Concrete Shafts of Record Size, Jan. 5
p 30
- Cone Pulley, Molding, on an Interna-
tional Turn-Over Machine,* May
11 p 1158
- Congress of Technology at Boston, Mar.
9 p 592; Mar. 16 p 686; Mar. 30 p
788; Apr. 20 p 967
- Connellsville Coal, a Thousand an Acre
for, June 15 p 1447
- Connersville Blower Company:
Applied to Vacuum Cleaning,* May 11
p 1160
Rotary Positive Blower,* Jan. 5 p 102
- Constitutional Compensation Law, June
1 p 1319
- Construction, New Iron and Steel
Works, Jan. 5 p 34
- Contracts, Securing Foreign Govern-
ment, May 4 p 1074
- Controllers:
Cutler-Hammer Alternating Current
Motor Speed,* Mar. 2 p 549
Cutler-Hammer Reversible Direct-
Current Drum,* June 29 p 1581
- Conventions:
American Electrochemical Society,
Mar. 30 p 815
American Foundrymen's Association,
May 25 p 1250; June 1 p 1328
American Institute of Mining Engi-
neers, June 22 p 1512
American Iron, Steel & Heavy Hard-
ware Association, June 1 p 1297
American Society of Mechanical En-
gineers, June 1 p 1308; June 8 p
1411
American Supply and Machinery Man-
ufacturers' Association, Apr. 6 p
840; Apr. 13 p 904
International Master Boilermakers'
Association, June 8 p 1383
National Association of Jobbers of
Wrought Iron Pipe and Fittings,
Mar. 16 p 658; Mar. 23 p 726
National Association of Manufactur-
ers, May 18 p 1182; May 25 p 1258
National Association of Stove Manu-
facturers, May 18 p 1232
National Gas and Gasoline Engine
Trades Association Programme,
Apr. 13 p 927
National Machine Tool Builders' As-
sociation, May 25 p 1252
National Metal Trades Association,
Apr. 13 p 904; Apr. 20 p 976
National Supply and Machinery Deal-
ers' Association, Apr. 6 p 840;
Apr. 13 p 904
Pittsburgh Foundry,* June 1 p 1328
Railway Master Carbuilders' Associa-
tion, June 22 p 1518
Railway Master Mechanics' Associa-
tion, June 22 p 1518
Society for Promotion of Engineering
Education, June 22 p 1530
Southern Supply and Machinery Deal-
ers' Association, Apr. 6 p 840;
Apr. 13 p 904
Steam Engineers, June 15 p 1477
Tariff Commission, Jan. 19 p 207
United Metal Trades Association, Apr.
27 p 1007
- Converter with Double Door Bottom,
Tropenas, Apr. 27 p 1018
- Conveyor for Handling Kegs,* May 11
p 1165
- Cooper, C. & G. Company:
Engine Contracts, Feb. 23 p 502
- Co-operation and Government Over-
sight, Trade, Mar. 16 p 642
- Co-operation, E. H. Gary on, June 8 p
1408
- Copenhagen Polytechnic Plan, Feb. 9 p
349
- Copes Boiler Feed Regulator:
Analysis of Boiler Feed Records,*
Jan. 12 p 170
- Copper:
African, Jan. 26 p 245
Alaska Copper Coming, Apr. 6 p 823
Conservative Market of 1910, Jan. 12
p 121
Consumption, Jan. 26 p 267
Hardened, Mar. 9 p 589
December Production and Stocks,
Jan. 12 p 147; Production and
Stocks, January, Feb. 16 p 442;
February, Mar. 16 p 666; March,
Apr. 13 p 884; April, May 11 p
1150; May, June 15 p 1462
Trade in 1910, Jan. 5 p 63
World's Production in 1910, Mar. 30
p 815
- Core Bench Jolt Rammer,* June 1 p 1340
- Core Machines:
Acme,* Jan. 5 p 88
Elmira Roll-Over,* Jan. 5 p 89
Grimes Roll-Over,* Apr. 27 p 1024
- Core Room Management and Materials,
Mar. 16 p 664
- Core Wash and Parting Compound, Jan.
5 p 117
- Cores, Binders for Foundry, May 11 p
1140
- Corey, William E.:
Resigns, Jan. 5 p 7
- Cork Set in Faces, Pulleys with,* May
11 p 1107

Cornell, J. B. & J. M., Company.:
 Assets Sold, June 15 p 1463
 Corporations, Federal Regulation Proposed, Apr. 27 p 1025
 Corporations, New Jersey's Governor on, Jan. 19 p 174

Corrosion:
 And Pitting in Metals, June 15 p 1485
 Of a Steel Beam Protected by Terra Cotta and Concrete, Serious,* Feb. 23 p 486
 Of Iron, June 8 p 1417
 Of Unprotected Steel Work, Feb. 2 p 366
 Potassium Chromate as Metal Protection Agent, June 29 p 1579
 Sulphur in the Air, June 29 p 1589
 Test of Metals, Accelerated, June 29 p 1555

Costs of Producer Gas Plants, Operating, June 29 p 1570

Corse, W. M.:
 Brass Melting Furnaces, Jan. 5 p 554
 Cost Accounting, Shop,* Mar. 2 p 554
 Cost of Living, Legislation and a Lower, Feb. 9 p 350

Costs, Distributing Factory Operating,* June 15 p 1479

Covel Mfg. Company:
 Automatic Circular Metal Saw Sharpener,* Apr. 6 p 866

Cranes:
 Alliance Foundry,* Jan. 5 p 91
 Pawling & Harnischfeger, in a Material Yard,* May 18 p 1214
 Shepard Electric Foundry,* Jan. 5 p 95
 Special Maris Foundry,* Jan. 5 p 92
 Cream City Accident Preventer,* May 4 p 1113

Crescent Forgings Company:
 New Cresco Monkey Wrench,* Mar. 16 p 679

Crescent Machine Company:
 Variable Feed Planer,* Jan. 5 p 110
 Cresco Monkey Wrench, New,* Mar. 16 p 679

Cresson, George V., Company:
 In Receiver's Hands, Feb. 16 p 407; Mar. 9 p 607

Crucible Steel Company of America:
 Buys Midland Steel Company, Feb. 2 p 203
 Finances, Apr. 20 p 960
 Further Strengthens Its Position, Feb. 24 p 473
 Secures Controlling Interest in Halcomb Steel Company, Feb. 16 p 406

Crusher, Gardner, Apr. 13 p 927

Cuban Coal Trade, New Vessel for the, Apr. 13 p 925

Cuban Iron Ores, Exploration of,* Apr. 13 p 914

Cupolas:
 Barry & Zecher Company,* Jan. 5 p 98
 Calumet Engineering Works,* Jan. 5 p 97
 Mechanical Charging of,* June 8 p 1429
 Newton, Northern Engineering Works,* Jan. 5 p 100
 Size of Coke Charge for a, June 29 p 1555
 Whiting Foundry Equipment Company,* Jan. 5 p 99

Cupror Company:
 Cupror, Mar. 9 p 584

Curtis & Co. Mfg. Company:
 Air Hoists,* Jan. 5 p 91

Custer, Edgar A.:
 Experience with Permanent Molds, June 8 p 1492

Customers, Specialized Seeking for New, Feb. 9 p 349

Customs Decisions:
 Airtight Metal Cans, Feb. 9 p 371
 Automobile Horns, May 18 p 1109
 Automobile Parts, May 11 p 1164
 Barbers' Hair Clippers, Apr. 6 p 851; May 4 p 1079
 Bayonets, Apr. 20 p 949
 Cast Iron Statues, Mar. 30 p 774
 Chiropodists' Knives, Mar. 9 p 590

Embossing Machines, Jan. 12 p 151
 Empty Ammonia Drums, May 4 p 1078
 Engravers' Printing Presses, June 1 p 1302
 Erasers with Fixed Blades, Feb. 16 p 419
 File Testing Machines, Feb. 23 p 461
 Forged Iron Ladles, Apr. 20 p 949
 Galvanized Steel Wire Rope, Feb. 23 p 401
 Hand Brick Presses, Jan. 12 p 151
 Ignition Cable, Jan. 5 p 67
 Iron Drums or Containers, Feb. 9 p 371
 Jute Machinery Parts, May 11 p 1164
 Lawn Mowers, June 1 p 1362
 Lead Contents of Type Metal, Feb. 9 p 371
 Machine Repair Parts, Feb. 9 p 371
 Machines for Making Igniters for Miners' Lamps, May 4 p 1078
 Mantel or Fireplace Castings, May 18 p 1109
 Metal Cans, Mar. 9 p 590
 Miners' Rescue Appliances, Mar. 9 p 509
 Nut Locks, Apr. 20 p 949
 Old Broken Electrotypes, May 4 p 1078
 Plow Parts, Jan. 12 p 151
 Plumbago Crucibles, Jan. 5 p 67
 Rolls for Rolling Mills, Apr. 6 p 851
 Sewing Machines, Feb. 16 p 419
 Silico-Spiegel, Feb. 23 p 461
 Spinning Gears, May 4 p 1079
 Steel Railroad Ties, Jan. 12 p 151; Feb. 16 p 419
 Vegetable Cutters, Apr. 6 p 851

Cutler-Hammer Mfg. Company:
 Alternating Current Motor Speed Controllers,* Mar. 2 p 549
 New Magnetic Separator,* June 29 p 1581
 Reversible Direct-Current Drum Controllers,* June 29 p 1581
 Solenoid Operated Valve,* Mar. 16 p 680
 Thomas Meter,* Mar. 16 p 676
 Unloading Pig Iron with Lifting Magnets, Apr. 6 p 895

Cutters:
 Busch Power Sprue,* Feb. 23 p 495
 Shuster Sprue,* Jan. 5 p 117
 Standard Sprue,* Jan. 5 p 116
 Cutting Worm Gear on Gear Hobbing Machine, June 29 p 1573
 Cuyuna Iron Range, New Find on the, Feb. 23 p 502
 Cuyuna Range, First Ore from the, May 25 p 1258

D.

Dallas Coal, Iron & Steel Company, Jan. 19 p 211

Dalton Adding Machine Company:
 New Factory, Mar. 9 p 625

Damascus Bronze Company:
 Copper, Mar. 9 p 606

Dartmouth College:
 Conference on Scientific Management, May 4 p 1087

Davis-Bournonville Company:
 Steel Cutting with the Oxy-Acetylene Torch,* Mar. 9 p 622

Davis, J. C.:
 Cast Steel Car Wheel,* May 4 p 1090

Davis, W. P., Machine Company:
 Turret Lathe, 26-in.,* Mar. 30 p 800

Dawson Hardened Copper Company:
 Hardened Copper, Mar. 9 p 589

Deane Steam Pump Company:
 Sand Sifters,* Jan. 5 p 111

Dearborn Drug & Chemical Works:
 Feed Water Treatment Abroad, Jan. 19 p 226

Decision, American Tobacco, June 1 p 1219

Decisions, Application of the Anti-Trust, June 8 p 1378

Decisions of Interest to Manufacturers, Judicial, Jan. 5 p 17; Feb. 2 p 343; Mar. 9 p 595; Mar. 30 p 771; June 22 p 1514

Deere & Co.:
 Reorganization, Apr. 6 p 851

De Laval Steam Turbine Company:
 Turbine Reducing Gear,* Apr. 13 p 919

De Leeuw, A. L.:
 Milling Cutters and Their Efficiency,* May 11 p 1152
 Delta and Changezy Tramrail Trolleys,* Jan. 5 p 93

Depreciation of Unprotected Steel Work, Feb. 2 p 366

"Depreciation," What It Means, Mar. 9 p 572

Des Moines Rapids Hydroelectric Plant, Mar. 30 p 771

Detroit Engine Works:
 Kerosene Engine,* Apr. 6 p 867

Detroit Foundry Supply Company:
 Annual Meeting, Feb. 2 p 292

Detroit Steel Products Company:
 Annual Meeting, Feb. 2 p 292
 Fenestra Solid Steel Window Sash, Mar. 16 p 684; Apr. 13 p 929

Detroit Stoker Company:
 Stoker,* Feb. 9 p 384

Devens, Richard:
 Mechanical Handling of Materials, Apr. 27 p 1022

Diamond Clamp & Flask Company:
 Slip-Over Boxes and Bands,* Jan. 5 p 115

Diamond Expansion Bolt Company:
 Boiler Repair Bolts,* Feb. 9 p 388
 Toggle Bolt,* Mar. 9 p 596

Dick, R. & J., Ltd.:
 Belt Factory at Passaic, N. J., May 18 p 1207

Dickson, Wm. B.:
 Employers' Liability and Workmen's Compensation, Apr. 20 p 968
 Resignation, Mar. 23 p 727

Die-Casting Machine,* Apr. 27 p 1026

Die Head, Landis Solid Adjustable,* Mar. 2 p 556

Die Head, New Self-Opening,* June 1 p 1581

Die Machine, Wiley & Russell Combination Opening,* Mar. 2 p 554

Differdange Steel Works:
 Calcium Chloride for Drying the Blast,* May 25 p 1270

Diller, H. E.:
 Foundry Coke, June 22 p 1515

Dille & McGuire Mfg. Company:
 Expansion, Apr. 6 p 821

Dilworth, Porter & Co., Inc.:
 General Electric Apparatus, May 4 p 1289

Direct Current of 1500 Volts for a Railroad, June 29 p 1501

Distributing Expense Burden, June 1 p 1325

Distributing Factory Operating Costs,* June 15 p 1479

Dobson, William:
 Molders' Tools,* Jan. 5 p 117

Dock, New Marquette Ore, Jan. 26 p 284

Docks on the Lakes, Iron Ore,* Apr. 20 p 972

Dodd, James M.:
 Conservation of Human Effort, Mar. 9 p 588

Dodge Mfg. Company:
 Quarter Century Club, Feb. 16 p 418
 Transmission Rope Splicing,* Apr. 27 p 1032

Doherty Gas Calorimeter,* Apr. 13 p 928

Dominion Steel Corporation:
 Wire Rod Trade, June 1 p 1317

Donnelly-McArdle Case, Apr. 27 p 1007

Doors, Heating Furnace,* Jan. 12 p 168

Dougherty, John W.:
 President Pittsburgh Crucible Steel Company, Mar. 2 p 535

Douglass, W. & B.:
 Contractors' Diaphragm Pump,* Jan. 5 p 53

Dow, George E., Pumping Engine Company:
 Very Large Triplex Pump,* May 11 p 1104

Dow Wire & Iron Works:
 Ornamental Castings Made in Permanent Molds,* Jan. 5 p 68

Drafting Room Expense, June 22, p 1500
 Draftsmen, American Society of Engineer, June 1 p 1346
 Drees Machine Tool Company:
 New Vertical Boring Machine,* Apr. 27 p 1025
 Screw Machine, 1-in., Jan. 5 p 39
 Dresser, Frank F.:
 Accidents in Industrial Plants, Jan. 19 p 214
 Drill Table, Morris Swiveling Radial,* Jan. 5 p 49
 Drilling and Reaming Jig, Wood & Spencer,* Mar. 2 p 556
 Drilling Machines:
 All-Geared Multi-Spindle,* Jan. 26 p 268
 Barnes Special Horizontal,* Mar. 9 p 617
 Frontier Heavy Pattern,* June 8 p 1433
 Gang Sensitive Radial,* May 4 p 1102
 Harrington Belt-Driven Flue Sheet,* June 29 p 1572
 Henry & Wright Radial, New,* May 11 p 1150
 Kane & Roach Radial,* May 18 p 1203
 Lamb Portable Electric Radial,* Apr. 6 p 866
 Midland 30-in. Radial,* May 4 p 1108
 Moline Multiple Spindle, New,* Apr. 6 p 855
 Prentice Ball Bearing, New,* Apr. 27 p 1042
 Reed High Speed Sensitive, New,* May 4 p 1003
 Rockford 14-in., New,* Mar. 30 p 793
 Rockford Positive Geared Feed,* June 15, p 1485
 Sibley Four-Spindle,* June 1 p 1347
 Sibley 24-in. Stationary Head,* May 4 p 1089
 Townsend High-Speed Drill Press,* June 29 p 1580
 Drilling, Milling and Boring Machine, Special Fosdick Horizontal,* May 4 p 1107
 Drive, Motor, Novel Application to Machine Tools,* May 4 p 1088
 Drucklieb Multiple Injector Sand Blast,* Apr. 13 p 923
 Drucklieb Sand Blast Specialties,* Jan 5 p 103
 Dry Air Blast at a British Furnace Plant,* May 11 p 1157
 Dry Air Blast, Results With,* Feb. 2 p 308; Feb. 9 p 368
 Dry Blast Method, New, May 25 p 1236
 Dry Blast Process Tested, New,* June 1 p 1354
 Dryer, Pangborn Ideal Sand,* Jan. 5 p 112
 Drying the Blast, Calcium Chloride for,* May 25 p 1270
 Du Charme Wrench & Novelty Mfg. Company:
 Removal, Mar. 16 p 657
 Dudley, P. H.:
 Elongation and Ductility Rail Tests, April 6 p 839
 Duff Mfg. Company:
 Another Jack Improvement, Jan. 5 p 71
 Jacks at Buenos Aires, Feb. 23 p 494
 Ratchet Jacks at Panama,* Jan. 12 p 167
 Duggan, Thomas R.:
 Treatment and Purification of Boiler Feed Water, Mar. 2 p 533
 Duplex Process at Bethlehem Steel Company's Plant,* Mar. 30 p 784
 Durham Coal & Iron Company, Jan 26 p 249
 Dust Collector, Morse,* Jan. 5 p 101
 Dust Exhausting System, Unusual,* May 18 p 1220
 Dynamiters, Alleged Structural Steel, April 27 p 1005

E.

Edison Electric Illuminating Company:
 Coal Analysis, June 1 p 1317
 Edison Giant Roll Patents Sustained, June 22 p 1520
 Editorials:
 A Thousand an Acre for Connellsville Coal, June 15 p 1447
 Accident Compensation and Conciliation, Apr. 13 p 883
 Accidents and Safeguards in England, Mar. 23 p 703
 Alleged Structural Steel Dynamiters, Apr. 27 p 1005
 America and the Foreign Patent, Mar. 9 p 571
 American Workingman, May 4 p 1055
 Anti-Accident Inspection Service, Feb. 2 p 288
 Anti-Trust Cases, Feb. 23 p 458
 Application of the Anti-Trust Decisions, June 8 p 1378
 Automobile an Economic Good, Jan. 10 p 175
 Awakening to the Danger of Fire, Apr. 13 p 883
 Beating Down Machinery Prices, June 1 p 1296
 Better Outlook for the British Iron Trade, Feb. 16 p 404
 British Insurance Against Unemployment, Feb. 9 p 349
 Business Outlook, June 22 p 1498
 Cast-Iron Car Wheel and the Grinding Machine, Feb. 23 p 459
 Checking Unfair Complaints of Subordinates, Mar. 16 p 643
 Competition Between Rolled and Cast Material, June 1 p 1294
 Concentrated Advisory Board, May 4 p 1035
 Confusion Over Non-Cancellation Clauses, Jan. 5 p 4
 Conservative Copper Market of 1910, Jan. 12 p 121
 Copenhagen Polytechnic Plan, Feb. 9 p 349
 Country's Minimum Iron Requirements, May 18 p 1181
 Drafting-Room Expense, June 22 p 1500
 Economic Crime of Increasing Productive Capacity, June 22 p 1498
 Efficiency and Its Broader Application, Mar. 16 p 642
 Efficiency in Railroad Management, Jan. 5 p 3
 Electric Furnace and Electrical Engineering, Feb. 23 p 459
 Engineer in Steel Foundry Practice, Feb. 16 p 405
 English and American Labor Conditions, Apr. 27 p 1005
 Essential Cost Factor of Compensation, Jan. 12 p 121
 First Aid a Ground for Damages, June 20 p 1553
 Foundry Features of This Issue, Jan. 5 p 2
 Freight Rate Decisions, Mar. 2 p 516
 Gary Idea in the International Steel Trade, Feb. 9 p 348
 Geared Turbine and Its Lessons, Apr. 6 p 819
 Government Regulation of Prices, Apr. 20 p 947
 Growing Pre-eminence of the Mesaba Range, Apr. 20 p 946
 Growing Use of the Industrial Automobile, Jan. 12 p 121
 Government Hydraulic Testing Plant, Feb. 2 p 289
 Heavy Section High Carbon Rails, Jan. 26 p 232
 Higher Machine Tool Prices, June 8 p 1380
 Increasing Machinery Exports, Jan. 26 p 233
 Industrial Education Evangelist, Apr. 27 p 1005
 Intensive Production, June 8 p 1379
 Iron and Steel in the World's Railroads, June 29 p 1552

Judge Gary as a Witness, June 15 p 1449
 Lathe or Turning Machine? June 29 p 1553
 Leaders in Pig Iron Production, Feb. 2 p 289
 Limits of Large Marine Oil Engine Units, Feb. 2 p 289
 Long Life of American Machine Tools, May 4 p 1055
 Machinery Exhibit That Paid, Mar. 9 p 572
 Massachusetts Eight-Hour Bill Invalid, May 25 p 1237
 Metal Frames for Aerial Craft, Apr. 6 p 819
 Navy an Industrial School, Apr. 27 p 1004
 Navy Department Perplexity, Mar. 16 p 644
 New Art in Automobile Building, May 11 p 1124
 New Dry Blast Method, May 25 p 1236
 New Free List, Apr. 20 p 947
 New Jersey's Governor on Corporations, Jan. 19 p 174
 New Metal Perforating Process, Mar. 16 p 643
 New Steel Capacity in Germany and at Home, May 4 p 1054
 New Work for the Efficiency Engineer, Feb. 23 p 459
 New York Machinists' Strike, May 4 p 1054
 New York Workmen's Compensation Decision, Mar. 30 p 759
 Open-Hearth Furnace Capacities, June 22 p 1499
 1910 an Unusual Year in Rails, Feb. 23 p 458
 Noteworthy Anti-Boycott Decision, Jan. 26 p 232
 Novelty in Apprentice Systems, Mar. 9 p 571
 Number of Car Wheels, Apr. 20 p 947
 Official Lists of Machine Tool Builders, Jan. 26 p 234
 Ore Prices and Pig Iron Prices, Mar. 2 p 517
 Our Trade Balance Due to Our Manufactures, May 25 p 1236
 Perennial Rail Problem, Mar. 30 p 758
 Pig Iron Costs in Alabama, May 11 p 1124
 Price Concessions on Export Trade, May 11 p 1125
 Private Industrial Museums, Jan. 26 p 233
 Proposed Machinery Exposition, June 1 p 1295
 Railroad Educational Bureau, Mar. 9 p 570
 Railroad Securities as Investments, Feb. 16 p 405
 Rate Decisions and Other Price Questions, Mar. 9 p 570
 Readers of *The Iron Age*, Apr. 13 p 882
 Reason in Anti-Trust Cases, May 18 p 1180
 Reciprocity Agreement with Canada, Feb. 2 p 288
 Record Iron and Steel Exports, June 8 p 1378
 Reduction in Lake Iron Ore, Apr. 27 p 1004
 Rods a Finished Steel Product, June 20 p 1553
 Septic Poison's Needless Cost in Works, Jan. 12 p 121
 Specialized Seeking for New Customers, Feb. 9 p 349
 Standard Lengths for Wire Test Pieces, Feb. 23 p 459
 State Control of Women's and Minors' Wages, June 29 p 1554
 Steel Corporation Production, 1901-1910, Feb. 16 p 404
 Steel Corporation's Exports in 1910, Jan. 26 p 233
 Steel Corporation's Output in 1910, Jan. 12 p 120
 Steel Corporation's Production Statement, Mar. 23 p 702

- Steel Manufacturers and Prices, Jan. 19 p 174
- Tariff Hysteries and Industry, Apr. 27 p 1004
- The Outlook, Jan. 5 p 2
- To Amend the German Patent Laws, Jan. 12 p 120
- Trade Co-operation and Government Oversight, Mar. 16 p 642
- Two Influences in Machinery Buying, June 22 p 1499
- Underground Shops in South African Mines, Mar. 30 p 759
- Unexpected Addition to the Free List, June 1 p 1295
- Unreliable Export Agents, Mar. 2 p 517
- Wood Preservation and By-Product Coking, Jan. 5 p 3
- Workmen Appreciate Technical Publications, Apr. 13 p 884
- Works Accident Insurance, Apr. 6 p 818
- Education Evangelist, Industrial, Apr. 27 p 1005
- Education, Industrial, Feb. 9 p 349
- Education, Promotion of Engineering, June 22 p 1530
- Edwards & Carpenter:
Production of Castings to Withstand High Pressures, Jan. 12 p 154
- Efficiency and Its Broader Application, Mar. 16 p 642
- Efficiency Engineer, New Work for the, Feb. 23 p 459
- Efficiency Figures, Skeptic on Some, Apr. 6 p 820
- Efficiency in Shop Operations, Standards of, Jan. 19 p 204
- Efficiency Methods of the Tabor Mfg. Company, Apr. 13 p 902
- Efficiency, Railroad, and Labor Unions, Mar. 23 p 724
- Efficiency, Railroad Repair Shop, Jan. 5 p 31
- Efficiency Specialist, Work of the, Mar. 30 p 760
- Ehrhardt & Sehmer:
New Gas Engine,* Jan. 5 p 50
- Electric Controller & Mfg. Company:
Magnetic Switch Motor Starters,* Apr. 6 p 847
- Electric Freight Truck, Automatic,* May 11 p 1161
- Electric Furnace Company:
Baily Electric Furnace,* May 4 p 1094
- Electric Furnaces:
See Furnaces, Electric
- Electric Iron and Steel in Norway, Feb. 2 p 201
- Electric Smelting of Swedish Iron Ore, Feb. 16 p 419
- Electric Steel from Basic Pig Iron, Germany Making, Jan. 5 p 39
- Electric Steel Production at a German Works, May 4 p 1079; May 11 p 1126
- Electric Tool Factory, Modern,* May 4 p 1106
- Electrical Apparatus, Life of, Jan. 12 p 122
- Electrically Driven Brass Mill,* Jan. 26 p 278
- Electrically-Driven Jarring Machine,* June 1 p 1338
- Electricity and Fence-Wire Rust, Feb. 9 p 369
- Electricity in the Machine Shop,* Jan. 26 p 274
- Electricity on a Plantation, Feb. 2 p 328
- Electric Furnace Discussion, Jan. 26 p 261
- Electrolytic Iron, Jan. 26 p 268
- Electrochemical Society, American:
Convention Programme, Mar. 30 p 815
- Electromagnets, Handling Iron Ore with, Feb. 16 p 431
- Electroplaters' Association, National, Feb. 16 p 424
- Electroplating, Some Unsolved Problems in, Apr. 27 p 1019
- Elevator Machine, Speidel Ceiling Electric,* Jan. 12 p 165
- Elevators, Ridgway Foundry,* Jan. 5 p 96
- Eliminator, Wyoming Automatic,* Apr. 13 p 918
- Elmira Foundry Company:
Roll-Over Core Machine,* Jan. 5 p 89
- Elwell, C. F.:
Electric Furnaces of the Induction Type—Costs, Apr. 20 p 961
- Emerson, Harrington:
Standards of Efficiency in Shop Operations, Jan. 19 p 204
- Emery & Schwedtmann:
European Methods of Accident Prevention and Relief, Mar. 16 p 667
- Emery Testing Machines at the Bureau of Standards, May 4 p 1103
- Emery Wheel Hood, Kirk & Blum Adjustable,* Apr. 13 p 933
- Emery Wheels, Safety Collars for, Mar. 30 p 804
- Emmert Mfg. Company:
Noyes T Square,* Feb. 9 p 387
- Empire Iron & Steel Company:
Iron Roof Still Good After 40 Years, Mar. 30 p 777
- Empire Steel & Iron Company:
General Electric Turbine-Driven Compressor,* Mar. 2 p 538
- Employers' Liability and Compensation Systems, Feb. 23 p 498
- Employers' Liability and Workmen's Compensation, Apr. 20 p 968
- Employers' Liability in New York State, May 11 p 1126
- Employers' Liability Insurance—Metal Trades, Apr. 13 p 912
- Employers' Responsibilities, Apr. 13 p 930
- Employment Bureau of Pittsburgh Manufacturers' Association, Mar. 9 p 575
- Engineer as a Salesman, Jan. 19 p 200
- Engineer in Steel Foundry Practice, Feb. 16 p 405
- Engineer, Mechanical, and Prevention of Accidents,* Feb. 16 p 434
- Engineering in the Foundry, Progress of Mechanical,* Jan. 5 p 76; Jan. 12 p 147
- Engineering Education, Promotion of, June 22 p 1530
- Engineers, American Society of Mechanical:
Convention, June 1 p 1308; June 8 p 1411
- Engineers' Association, Chicago Commercial, May 4 p 1121
- Engineers' Club's Exhibition, Brooklyn, May 4 p 1076
- Engineers' Convention, Steam, June 15 p 1477
- Engineers' Meeting, Joint Electrical and Mechanical, Feb. 23 p 501
- Engineers, Mining:
(See American Institute of)
- Engineers' Programme, Mechanical, May 4 p 1078
- Engineers' Spring Meeting, Mechanical, Mar. 2 p 545
- Engines:
Detroit Kerosene,* Apr. 6 p 867
- Ehrhardt & Sehmer Gas, New,* Jan. 5 p 50
- Gas Producer-Gas Engine Plants,* Mar. 16 p 682
- General Electric Blowing, Feb. 9 p 375
- Herrick Rotary Tests, Jan. 5 p 71
- Limits of Large Marine Oil Units, Feb. 2 p 289
- Mesta Blowing, Rapid Construction of, Mar. 23 p 738
- Southwark Reversing Convertible Simple or Compound,* Apr. 13 p 930
- Svea Caloric Test,* Jan. 5 p 33
- Engines, Blowing:
Future in Practice, June 16 p 1463
- Ensley Furnaces, Remarkable Records at, May 11 p 1165
- Ensley Rail Mill Closed Down, May 4 p 1071
- Enterprise Foundry & Machine Company:
Asa W. Whitney Car Wheels, Mar. 23 p 716
- Epwright, A. W.:
New Pennsylvania Railroad Track Scale,* Apr. 13 p 924
- Equipment, New Railroad, Jan. 12 p 146; Jan. 19 p 202; Jan. 26 p 279; Feb. 2 p 292; Feb. 9 p 368; Feb. 16 p 431; Feb. 23 p 485; Mar. 2 p 534; Mar. 16 p 660; Mar. 23 p 735; Mar. 30 p 776; Apr. 13 p 900; Apr. 20 p 974; May 4 p 1093; May 11 p 1156; May 18 p 1197; June 1 p 1341; June 8 p 1433
- Equipment, Selection of Factory, May 18 p 1196
- Erie Canal Terminals on Lake Erie, Apr. 27 p 1021
- Erie Railroad Company:
Ore Docks in Cleveland, Mar. 23 p 729
- Essex-Merrimac Chain Bridge, May 4 p 1075
- Eureka Snap Flask, New,* Jan. 5 p 116
- Europe, American Machinery in, May 18 p 1198; June 15 p 1481
- Europe, Workmen's Insurance in, Mar. 9 p 502
- European Methods of Accident Prevention and Relief, Mar. 16 p 667
- European Steel Syndicates, Jan. 26 p 273
- Evangelist, Industrial Education, Apr. 27 p 1005
- Exeter Machine Works:
Economy Tests of a Turbine-Driven Furnace Blower, May 4 p 1070
- Exhausting System, Unusual Dust,* May 18 p 1220
- Exhibits, Atlantic City Railway Convention, June 22 p 1518
- Exhibit That Paid, Machinery, Mar. 9 p 572
- Exhibitions:
Brooklyn Engineers' Club's, May 4 p 1076
- First West Siberian, Feb. 2 p 312
- Machine Tool Awards at Brussels, Feb. 16 p 424
- Municipal, Chicago, Jan. 5 p 82
- National Building Material, May 18 p 1213
- Pratt Institute, May 25 p 1269
- Proposed Machinery, June 1 p 1295
- Turin International, May 4 p 1071
- Expense Bureau, Distributing, June 1 p 1325
- Export Agents, Unreliable, Mar. 2 p 517
- Export Assisting Plant, May 25 p 1260
- Export Association, American Manufacturers, Mar. 2 p 519
- Export Methods, American, Apr. 27 p 1021
- Exports and Imports of Iron and Steel in 1910, Feb. 9 p 376
- Exports and Imports of Iron and Steel, Monthly, November, Jan. 12 p 158; January, Mar. 9 p 594; February, Mar. 30 p 779; March, May 4 p 1086; April, June 8 p 1401
- Exports in 1910, Steel Corporation's, Jan. 26 p 233
- Exports Increase Heavily, Feb. 23 p 491
- Exports, Increasing Machinery, Jan. 26 p 233
- Exports, Record Iron and Steel, June 8 p 1378
- Extras in the Eastern Jobbing Trade, Question of, April 27 p 1007
- Extras on Bars and Shapes from Waverly Warehouse, May 11 p 1143
- Export Trade, Price Concessions on, May 11 p 1125
- F.**
- Factory Equipment, Selection of, May 18 p 1196
- Faeth Iron Company:
Enlargement, Feb. 9 p 401
- Fafnir Bearing Company, Mar. 16 p 684
- Failures, Steel Rail,* Mar. 30 p 780

- Fans:
Buffalo New Type Slow Speed Exhaust,* June 29 p 1571
Buffalo, 30 Ft. High,* May 18 p 1203
Special Massachusetts Drives,* Apr. 13 p 932
Ventura Disk,* May 18 p 1222
- Farrell, James A.:
Our Trade with Latin-America, Feb. 16 p 422
Steel Corporation President,* Jan. 12 p 123
- Farrell, Kemp & Gushe Company, Feb. 10, p 410
- Farwell Squeezer Molding Machine,* Jan. 5 p 83
- Federal Immigration Commission:
Labor Conditions in Iron Mining, Feb. 2 p 320
- Fenestra Solid Steel Window Sash, Mar. 16 p 684
- Ferracute Machine Company:
Labor-Saving Staybolt Press,* May 25 p 1266
Small Punching and Riveting Press,* Mar. 16 p 685
- Ferro Machine & Foundry Company:
Improvements, Mar. 9 p 575
- Ferromanganese in Car Wheel Iron, Mar. 16 p 644
- Ferromanganese in Chilled Cast Iron Wheels, Apr. 6 p 820
- Ferrosilicon Imports to the United States, Mar. 2 p 535
- Ferrosilicon Syndicate, Jan. 19 p 176
- Ferrotitanium Rails, New York Central, Feb. 2 p 292
- Filtration for Industrial Purposes, Water, Jan. 26 p 271
- Findlay Motor Company:
Important Commercial Automobile Consolidation, Mar. 30 p 777
- Fire, Awakening to the Danger of, Apr. 13, p 883
- Fire, Safeguarding Against, Apr. 20 p 948
- Firth-Sterling Steel Company:
Handbook, Apr. 27 p 1038
Poster, Apr. 6 p 837
- Flanders Mfg. Company, Jan. 26 p 284
- Flask, New Eureka Snap,* Jan. 5 p 116
- Flask Pin Holes, Standardizing,* Jan. 26 p 234
- Flasks, Sterling,* Jan. 5 p 115
- Floor Failure, Story of a,* Feb. 23 p 486
- Floors, Repairing Concrete, Apr. 20 p 987
- Floors, Shop,* Feb. 9 p 378; Feb. 16 p 426
- Flue Cleaner, Baker Hammer,* May 25 p 1274
- Fluorspar in 1909, Production of, Mar. 30 p 799
- Fluter, New Automatic Tap,* May 25 p 1281
- Flywheel, Large High Speed,* Feb. 16 p 431
- Foreign Government Contracts, Securing, May 4 p 1074
- Foreign Trade Makes a New Record, Our, Jan. 19 p 203
- Foremen's Club, Cincinnati, Mar. 16 p 657
- Forging and Bending Press, Haniel & Leug Steam-Hydraulic,* Jan. 5 p 48
- Forging Machine, Huge Ajax,* Mar. 30 p 800
- Forging Press, Steam-Hydraulic,* June 15 p 1471
- Forging with a High Speed Hydraulic Press,* Jan. 26 p 282
- Fosdick Machine Tool Company:
Special Horizontal Boring, Drilling and Milling Machine,* May 4 p 1107
- Foster, Walter H., Company:
All-Geared Multi-Spindle Drill,* Jan. 26 p 268
- Foundry:
Atlas Cars,* Jan. 5 p 92
Binders for Cores, May 11 p 1140
Brass Melting Furnaces, Jan. 5 p 82
Columbia Steel,* Jan. 12 p 160
- Conditions in the Trade, Mar. 23 p 728
- Continuous Operation, Jan. 5 p 76*;
Jan. 12 p 147
- Demand for Broad Training, Feb. 2 p 311
- Ernst Wiener Cars,* Jan. 5 p 97
- Efficiency in the, June 8 p 1395
- Engineer in Steel Practice, Feb. 16 p 405
- Exhibits at the Pittsburgh Convention, June 1 p 1334
- Features of a Modern Steel,* Apr. 6 p 852
- Green Blowers,* Mar. 9 p 621
- Handling Sand,* June 8 p 1422
- Hart-Parr Company's New, Apr. 13 p 900
- Modern Equipment,* Jan. 5 p 83
- Pawling & Harnischfeger Grab Bucket,* Jan. 5 p 90
- Progress in Heated Mixers, June 1 p 1349
- Progress of Mechanical Engineering in, Jan. 5 p 76*;
Jan. 12 p 147
- Quaker City Supply Exhibit, Feb. 2 p 318
- Recent Tendencies in the Industry, Jan. 5 p 66
- Sound Business Methods in, Jan. 5 p 74
- Steel Practice, Mar. 30 p 778
- Sturtevant Blowers,* Jan. 5 p 101
- Very Complete Trolley System,* Feb. 23 p 493
- Foundry Conventions, Pittsburgh,* May 25 p 1250; June 1 p 1328
- Foundry Foremen:
Chicago, Jan. 26 p 249; Feb. 16 p 407
Cincinnati, May 4 p 1085
Philadelphia, Feb. 16 p 406; Mar. 16 p 638; May 11 p 1127; June 22 p 1501
- St. Louis, Jan. 19 p 176
- Foundrymen Report on Pig Iron Stocks and the Outlook, Mar. 9 p 594
- Foundrymen's Associations:
American—
Announcements, Mar. 30 p 794; Apr. 13 p 933; May 18 p 1197
Convention Proceedings, May 25 p 1250; June 1 p 1328
Newark, N. J., Jan. 12 p 155; Feb. 9 p 366; Apr. 13 p 884; May 11 p 1157; June 15 p 1480
New England, Jan. 19 p 203; Feb. 16 p 445
Philadelphia, Jan. 12 p 155; Feb. 9 p 386; Mar. 9 p 588; Apr. 13 p 918; May 11 p 1149; June 15 p 1464*
Pittsburgh, Jan. 12 p 155; Mar. 9 p 573; Apr. 6 p 821; May 4 p 1083; June 15 p 1462
Programme of German, May 18 p 1213
- Fowler, Samuel B.:
Mechanical Handling of Freight, Jan. 5 p 33
- Free List, Unexpected Addition to the, June 1 p 1295
- Freight Cars Idle, Fewer, June 8 p 1429
- Freight, Mechanical Handling of, Jan. 5 p 33
- Freight Rates:
Buffalo Coke Rate Hearing, Apr. 13 p 901
Connellsville Coke Interests and Railroad Discrimination, Mar. 2 p 519
Decisions and Price Questions, Mar. 9 p 579
Decisions by Interstate Commerce Commission, Mar. 2 p 516
New Coke Rates, Apr. 6 p 838
Railroad Rebates on Iron Ore, May 4 p 1100
Railroad Shippers' Service, May 11 p 1151
Story of the Hearing, Mar. 23 p 717
Suit to Test the 80-Cent Ore Rate in Minnesota, Jan. 26 p 284
- Frick, H. C., Coke Company:
Safety Committee, May 18 p 1216
Will Not Reduce Wages, Feb. 2 p 303
- Wright and Brown:
Potassium Chromate as Metal Protection Agent, June 29 p 1579
- Frontier Iron Works:
Heavy Pattern Drill Press,* June 8 p 1433
- Fuel Efficiency of the Blast Furnace, June 29 p 1554
- Fuel Handling on the Chelsea Piers,* Feb. 23 p 497
- Fume Removing Devices, Obermann Acid,* Mar. 16 p 667
- Furnaces:
Brass Melting, Jan. 5 p 82
Calculation of Air Furnace Dimensions, May 25 p 1257
Heating Furnace Doors,* Jan. 12 p 168
M. R. V. Brass Melting,* Feb. 9 p 388
Oil Fuel for Air Furnaces, June 15 p 1475
- Furnaces, Blast:
And Coke Oven Gases, May 18 p 1194
Calcium Chloride for Drying Blast,* May 25 p 1270
Data for Piping,* Mar. 23 p 740
Dry Air Blast at a British Furnace Plant,* May 11 p 1157
Eastern Wage Reductions, Jan. 19 p 227
Fuel Efficiency, June 29 p 1554
Inland Steel Company Will Build Another, Feb. 23 p 460
Monthly Statement,* Jan. 5 p 6; Feb. 9 p 352; Mar. 9 p 574; Apr. 6 p 822; May 4 p 1058; June 8 p 1382
New Charcoal, May 4 p 1069
New Dry Blast Process Tested,* June 1 p 1354
Problem of Efficiency, Jan. 5 p 5
Remarkable Records at Ensley, May 11 p 1105
Results with Dry Air, Feb. 2 p 308*;
Feb. 9 p 368
Rifle Shots Open a Chilled Cinder Notch, Feb. 2 p 311
Study of, June 8 p 1429
Utilizing Wastes, June 8 p 1397
- Furnaces, Electric:
And Electrical Engineering, Feb. 23 p 459
Baily,* May 4 p 1094
Girod Progress, Jan. 19 p 225
Heroult 15-Ton, at South Chicago,* Jan. 26 p 262
Induction Type—Costs, April 20 p 961
New Hering,* June 15 p 1464
Power Requirements of, Feb. 2 p 322
Reliability of, Jan. 26 p 266
- Furnaces, Open Hearth:
Capacities, June 22 p 1499
Large Basic, Jan. 19 p 201
Use of Coke-Oven Gas in, Feb. 2 p 318; May 18 p 1232; June 22 p 1501
With Magnesite End Blocks, Mar. 23 p 716

G.

- Gale, C. H.:
Titanium for Malleable Iron, June 1 p 1323
- Gang, William E., Company:
Sensitive Radial Drill,* May 4 p 1102
- Ganschow, William, Company:
Cut Gear Exhibition, Feb. 23 p 473
- Gardner Crusher Company:
Crusher,* Apr. 13 p 927
- Gardner General Foundry Company:
Six-Wheel Grinder,* Mar. 16 p 674
- Gardner Machine Company:
Patternmaker's Disk Grinder,* Jan. 5 p 108
- Garrett & Amberg Company:
Forming Special Shapes by Cold Rolling of Standard Sections,* May 18 p 1215
- Garrigus Machine Company:
Surface Grinder,* June 29 p 1578
- Garrison, A., Foundry Company:
Double-Acting Press, 400-Ton,* Jan. 12 p 159
- Garvin Machine Company:
Automatic Chuck,* Mar. 9 p 626
- Gary, E. H.:
As a Witness, June 15 p 1446
Co-operation, June 8 p 1408

Dinner to Steel Manufacturers, Jan. 19 p 208; May 11 p 1144
 Idea in the International Steel Trade, Feb. 9 p 348
 Testimony at Steel Corporation Investigation, June 8 p 1404; June 15 p 1400
 Gary, Ind.:
 Five New Merchant Mills,* Mar. 9 p 507
 Suggestive Anti-Accident Epigram, Apr. 27 p 1035
 Universal Plate Mill, 60-in.,* June 22 p 1520
 Gary Screw & Bolt Company:
 New Plant, Feb. 9 p 373
 Gas Cavities and Shot-in Iron Castings,* June 1 p 1339
 Gas, Coke-Oven, in Open-Hearth Furnaces, Use of, Feb. 2 p 318; May 18 p 1232; June 22 p 1501
 Gas Engines (See Engines)
 Gas Plants for Bituminous Coals, Holbeck,* May 18 p 1217
 Gas Plants, Operating Costs of Producer, June 29 p 1570
 Gases, Blast Furnace and Coke Oven, May 18 p 1194
 Gas, Essential Factors in the Formation of Producer, May 4 p 1071
 Gas in 1909 and 1910, Natural, Feb. 16 p 437
 Gas Producers:
 Experiments, Mar. 30 p 792
 Gas Engine Plants,* Mar. 16 p 682
 Hilger Revolving Grate,* Mar. 3 p 537
 Kupperts,* June 22 p 1534
 Gaskets, Triple and Trinity,* Jan. 19 p 222
 Gates, John W.:
 Testimony at Steel Corporation Investigation, June 1 p 1309; June 8 p 1406
 Gauge, Wood & Spencer Adjustable Snap Thread,* Mar. 9 p 621
 Gayley, James:
 Results with Dry Air Blast, Feb. 2 p 308*; Feb. 9 p 368
 Story of a Grain of Iron, May 4 p 1097
 Testimony at Steel Corporation Investigation, June 15 p 1470; June 22 p 1532
 Gear Cutters:
 New Gould & Eberhardt,* Feb. 2 p 325
 No. 5 Cincinnati,* Apr. 27 p 1039
 Gear, De Laval Steam Turbine Reducing,* Apr. 13 p 910
 Gear Exhibition, Ganschow Cut, Feb. 23 p 473
 Gear, Harris Transmission,* May 18 p 1212
 Gear Hobbing Machine, Cutting Worm Gear on, June 29 p 1573
 Gear Pattern Cutter, Newark,* Feb. 2 p 310
 Gears, Cutting Worm, with a Fly Cutter,* May 25 p 1268
 General Electric Company:
 Annual Report, Apr. 27 p 1006
 Apparatus for Dilworth, Porter & Co., Inc., May 4 p 1086
 Blowing Engine, Feb. 9 p 375
 Bonds, May 11 p 1190
 Electric Locomotive, 35-Ton, June 22 p 1515
 Interesting Curtis Turbine Installation,* Feb. 23 p 492
 New Indicating Boiler Flow Meter, June 22 p 1531
 Turbine-Driven Compressor,* Mar. 2 p 538
 General Fire Extinguisher Company:
 Handling Sand in the Foundry,* June 8 p 1422
 Generators:
 New Westinghouse Interpole Direct Current,* Apr. 27 p 1037
 Westinghouse Type E Alternating Current,* Feb. 9 p 377
 Gerdau, Barthold:
 Visits This Country, June 1 p 1350

Germany:
 American Association of Commerce and Trade, Berlin, Apr. 27 p 1040
 Ardel, R., & Sons Cast Iron Pipe Molding,* May 4 p 1098
 Automobiles, Depreciation and Repair Cost, May 11 p 1151
 Blast Furnace and Coke Oven Gases, May 18 p 1194
 Calcium Chloride for Drying the Blast at Differdange Steel Works,* May 25 p 1270
 Iron Market (See Proper Heading Under Trade Reports Each Week)
 Iron Ore Production in 1910, Apr. 20 p 992; Apr. 27 p 1023
 Kupperts Gas Producer,* June 22 p 1534
 Le Gallais, Metz & Cie Electric Steel Production, May 4 p 1079; May 11 p 1120
 Machine Tools, Feb. 23 p 501
 Making Electric Steel from Basic Pig Iron, Jan. 5 p 39
 New Ehrhardt & Schmer Gas Engine,* Jan. 5 p 50
 New Steel Capacity in Germany and at Home, May 4 p 1054
 Programme of Foundrymen's Association, May 18 p 1213
 Steel Production in 1910, Apr. 13 p 911
 Steel Shipments Slightly Less, Mar. 2 p 531
 Steel Trade Problems, Apr. 13 p 920
 To Amend the Patent Laws, Jan. 12 p 120
 Gerstle, William L.:
 What Union Labor Is Doing for San Francisco, Feb. 16 p 420
 Geuder, Paeschke & Frey Company:
 Cream City Accident Preventor,* May 4 p 1103
 Gillette, George M.:
 Accident Compensation in Minnesota, Mar. 2 p 551
 Industrial Accident Inspection and Prevention, Mar. 30 p 760
 Girder:
 Carting a 60-ton, Mar. 9 p 572
 New York City's Largest, Mar. 23 p 716
 Girod Electric Furnace Progress, Jan. 19 p 225
 Globe Malleable Iron Company:
 Sly Tumbling Mills,* Jan. 5 p 104
 Gobeille, Joseph Leon:
 Experience with Concrete Patterns, Feb. 9 p 365
 Gore Wire Rope,* Apr. 20 p 975
 Gould & Eberhardt:
 New Gear Cutter,* Feb. 2 p 325
 Goulds Mfg. Company:
 Chilean Buyers in New York, May 11 p 1150
 Efficiency of Coney Island Fire Pumps, June 15 p 1462
 Enlarged Plant, June 8 p 1410
 Government Contracts, Securing Foreign, May 4 p 1074
 Government Regulation of Prices, Apr. 20 p 947
 Grab Bucket, Pawling & Harnischfeger Foundry,* Jan. 5 p 90
 Grain of Iron, Story of a, May 4 p 1097
 Grant Mfg. & Machine Company:
 Multiple Spindle Rivet Spinner,* Jan. 26 p 279
 Great Britain:
 Accidents and Safeguards, Mar. 23 p 703
 Better Outlook for the Iron Trade, Feb. 16 p 404
 British Interests Acquire Brazilian Iron Mines, Jan. 26 p 234
 Dry Air Blast at a Furnace Plant,* May 11 p 1157
 Howell & Co., Ltd., Super-Vitrite High Speed Steel, Jan. 26 p 282
 Insurance Against Unemployment, Feb. 9 p 349
 Iron and Steel Institute—Annual Meeting Programme, Apr. 20 p 980

Iron Market, Jan. 5 p 29; Mar. 16 p 661; Apr. 13 p 901
 Pig Iron Output, First Half of 1910, Jan. 12 p 122
 Pig Iron Production in 1910, May 25 p 1257
 Specifications for Cold-Drawn Weldless Steel Tubes, Apr. 27 p 1024
 Steel Companies Not Prosperous in 1910, Mar. 16 p 658
 Steel Production in 1910, June 29 p 1555
 Unemployment Insurance, May 4 p 1072
 Welsh Tin Plate Trade, Jan. 12 p 157
 Great Lakes Engineering Works:
 Two 617-Ft. Ore Vessels Ordered, Feb. 9 p 374
 Great Northern Iron Ore Properties:
 Annual Report, Mar. 23 p 725
 Ore Mining on, June 29, p 1569
 Gregg Mfg. Company:
 Oscillating Sand Sifter,* June 22 p 1525
 Grieves, W. A.:
 Mutuality, Apr. 13 p 908
 Griffith, D. M.:
 Algoma Steel Company's Coke Plant,* Apr. 20 p 982
 Grinding Machines:
 Bath Duplex Internal,* Mar. 23 p 736
 Bridgeport Motor-Driven, No. 1/2,* Mar. 30 p 803
 Cleveland Portable Pneumatic,* Jan. 12 p 102
 Gardner Patternmaker's Disk,* Jan. 5 p 108
 Gardner Six-Wheel,* Mar. 16 p 674
 Garrigus Surface,* June 29 p 1578
 North Wales 8-In. Head,* Feb. 9 p 386
 Pratt & Whitney Automatic Cylindrical Sizing,* Jan. 5 p 54
 Springfield Dry, New,* Mar. 23 p 743
 Swinging Frame,* June 1 p 1341
 Grinding Car Wheels Without Removing Them, Mar. 9 p 620
 Grinding Machine and the Cast Iron Car Wheel, Feb. 23 p 459
 Gröndal Iron Ore Briquetting Plant, Mar. 9 p 594
 Growth in Castings, White Irons and the Prevention of, Mar. 23 p 744
 Growth of Cast Iron, June 1 p 1327
 Guggenheim, Daniel:
 Copper Consumption, Jan. 26 p 267

H.

Hagan, George J.:
 American Rolling Mill Equipment of Furnaces, Mar. 9 p 606
 Hagar, Edward M.:
 Utilizing Blast Furnace Wastes, June 8 p 1397
 Halcomb Steel Company:
 Crucible Steel Company of America Secures Controlling Interest, Feb. 16 p 406
 Hammer of the Helve Type, New Welch,* May 25 p 1273
 Hammers, Pneumatic:
 Cleveland,* Jan. 5 p 107
 Pittsburgh Chipping,* Jan. 5 p 106
 Handling of Materials, Mechanical, Apr. 27 p 1022
 Handy Slitting Shear,* Apr. 6 p 866
 Haniel & Lueg:
 Steam-Hydraulic Forging and Bending Press,* Jan. 5 p 48
 Hanna Engineering Works:
 Sand Sifters,* Jan. 5 p 110
 Hansell, N. V.:
 Iron Mining Beyond the Arctic Circle,* Mar. 9 p 608
 Harbison-Walker Refractories Company:
 Study of the Blast Furnace, June 8 p 1429
 Hardness of Quenched Tool Steels,* May 25 p 1256

- Harrington, Edwin, Son & Co., Inc.:
Belt-Driven Flue Sheet Drill,* June 29 p 1572
Extension Lathe,* Feb. 23 p 481
Harrington, Robinson & Co.:
Steel of Great Torsional Strength,* June 29 p 1575
Harris Transmision Gear * May 18 p 1212
Hart, H. C., Mfg. Company:
Hollow Cap Screw,* Feb. 9 p 389
Hart-Parr Company:
New Foundry, Apr. 13 p 906
Haskell & Barker Car Company:
Steel Car Plant, May 11 p 1127
Hauck Mfg. Company:
Oil Fuel Burners in the Foundry, June 1 p 1316
Portable Oil Burners,* Jan. 5 p 98
Havana Coal Company:
New Vessel for the Cuban Coal Trade, Apr. 13 p 929
Hayti, National Railway of, May 4 p 1086
Heating, Bates Improvement in Feed Water,* June 29 p 1592
Hecksher, Richard & Sons Company:
Special Bridge for Ladle Cars,* April 27 p 1031
Heinle Company:
New Method of Making Square Tubing,* June 29 p 1587
Henneberry Company:
Suggestions Wanted for Catalogues, Mar. 2 p 510
Henry & Wright Mfg. Company:
New Radial Drilling Machine,* May 11 p 1159
Hermes, Edward:
Steel Foundry Practice, Mar. 30 p 778
Hering, Carl:
New Electric Furnace,* June 15 p 1464
Heroult Furnace at South Chicago, 15-Ton,* Jan. 26 p 262
Herrick Engine Company:
Rotary Engine Tests, Jan. 5 p 71
Hesse, G. Emil:
Svea Caloric Engine Test,* Jan. 5 p 33
Hess Steel Castings Company:
New Foundry, May 11 p 1127
Hickey, Michael J.:
Value of System, Jan. 12 p 121
Hickman, Williams & Co.:
Conditions in the Foundry Industry, Mar. 2 p 533
Foundrymen Report on Pig Iron Stocks and the Outlook, Mar. 9 p 594
High Pressure Sand Blast Company:
Kelly High Pressure Sand Blast,* Jan. 5 p 106
High Speed Steel, Super-Vitrite, Jan. 26 p 282
Hilger Revolving Grate Gas Producer,* Mar. 2 p 537
Hill Clutch Company:
Rolling Mill Bearing,* Jan. 5 p 49
Hill, W. W.:
Rail Fastener for Steel Ties,* June 29 p 1501
Hisey-Wolf Machine Company:
Modern Electric Tool Factory,* May 4 p 1106
Hogaboom, George B.:
Some Unsolved Problems in Electroplating, Apr. 27 p 1019
Hoists:
Climax Spur Geared Chain,* Apr. 6 p 860
Curtis Air,* Jan. 5 p 91
For Foundry and Shop, Mar. 23 p 741
Monorail Grab Bucket Coal,* Mar. 2 p 550
Yale & Towne Mfg. Company,* Jan. 5 p 94
Holbeck-Riverside Gas Power Company:
Gas Plants for Bituminous Coals,* May 18 p 1217
Holt, J. C.:
Ferromanganese in Chilled Cast Iron Wheels, Apr. 6 p 820
Hood, Kirk & Blum Adjustable Emery,* Apr. 13 p 933
Hooper-Falkenau Engineering Company:
Announcement, Apr. 20 p 986
Continuous Pouring Spout,* May 25 p 1267
Hooper, George K.:
Progress of Mechanical Engineering in the Foundry,* Jan. 5 p 70; Jan. 12 p 147
Housing Problems to be Considered, City, June 1 p 1355
Howard, George M.:
Storage Batteries, Feb. 23 p 474
Howell & Co., Ltd.:
Super-Vitrite High Speed Steel, Jan. 26 p 282
Hughes, Charles H.:
Raising the Battleship Maine,* June 8 p 1430
Hulbert, William R.:
Thermites, June 22 p 1538
Hungerford, Churchill:
Water Filtration for Industrial Purposes, Jan. 26 p 271
Hydraulic Machine Company:
Plant Purchased by R. D. Nuttall Company, Mar. 16 p 658
Hydraulic Testing Plant, Government, Feb. 2 p 289
- I.
- Ideal Sand Dryer, Pangborn,* Jan. 5 p 112
Illinois Steel Company:
Heroult Furnace, 15-Ton,* Jan. 26 p 262
New Structural Mill,* June 15 p 1472
Immigrant Workmen, Our, Feb. 23 p 478
Immigration, Recent, Apr. 13 p 808
Imports and Exports of Iron and Steel:
November, Jan. 12 p 158; December, Feb. 9 p 376; January, Mar. 9 p 594; February, Mar. 30 p 779; March, May 4 p 1086; April, June 8 p 1401
Imports, Ferrosilicon, to the United States, Mar. 2 p 535
Improved Equipment Company:
Doherty Gas Calorimeter,* Apr. 13 p 928
Impurities in Steel, "Building Up," Feb. 23 p 480; Mar. 2 p 537
Indiana Steel Company:
Five New Merchant Mills at Gary,* Mar. 9 p 597
Suggestive Anti-Accident Epigram,* Apr. 27 p 1035
Indianapolis Elbow Company:
Handy Slitting Shear,* Apr. 6 p 866
Indianapolis Industrial Suburb, New, Mar. 2 p 554
Indiana Steel Company:
Five New Merchant Mills,* Mar. 9 p 597
Suggestive Anti-Accident Epigram, Apr. 27 p 1035
Universal Plate Mill, 60-In.,* June 22 p 1526
Induction Type Electric Furnaces—Costs, Apr. 20 p 961
Industrial Operation, Scientific, Apr. 13 p 922
Industrial Safety Association, Mar. 9 p 587
Industrial Works:
Catalogue, June 15 p 1464
Infallible Man, The, May 18 p 1195
Ingersoll-Rand Company:
Cameron Pump Alliance, Jan. 19 p 222
Ingot Treatment, Steel,* May 25 p 1262
Inland Steel Company:
Will Build Another Blast Furnace, Feb. 23 p 460
Inspection Service, Anti-Accident, Feb. 2 p 288
Inspection System to Prevent Industrial Accidents, Feb. 2 p 290
Insurance:
Against Unemployment, British, Feb. 9 p 349
Employers' Liability—Metal Trades, Apr. 13 p 912
In Europe, Workman's, Mar. 9 p 592
In Great Britain, Unemployment, May 4 p 1072
Italian Workmen's Prizes, Mar. 16 p 685
Works Accident, Apr. 6 p 818
International Acheson Graphite Company:
Lubricants, Apr. 13 p 931
International Association for Testing Materials, Mar. 9 p 590
International Conference, Brussels, June 22 p 1501
International Harvester Company:
Annual Report, May 4 p 1069
Another Ore-Washing Plant in Minnesota, June 29 p 1567
Expansion, Feb. 9 p 372
Tractor Works,* June 29 p 1582
International Iron and Steel Conference, Feb. 23 p 471
International Machine Tool Company:
Libby 18-In. Turret Lathe,* Apr. 27 p 1034
International Master Boilermakers' Association Convention, June 8 p 1383
International Molding Machine Company:
Announcement, Mar. 23 p 728
Molding a Cone Pulley,* May 11 p 1158
Mower Part Molding Machines,* June 15 p 1484
International Steel Trade, Gary Idea in the, Feb. 9 p 348
Iron:
Corrosion of, June 8 p 1417
Electrolytic, Jan. 26 p 268
Growth of Cast, June 1 p 1327
Mining Beyond the Arctic Circle,* Mar. 9 p 608
Story of a Grain of, May 4 p 1097
Vanadium in Cast, June 8 p 1398
White, and the Prevention of Growth in Castings, Mar. 23 p 744
Iron and Steel Institute:
Annual Meeting Programme, Apr. 20 p 980
Iron and Steel Institute, American:
Officers, June 1 p 1297
Iron and Steel Production for Twenty-five Years,* Jan. 19 p 206
Iron and Steel, Titanium in, June 1 p 1322
Iron and Steel Works Construction, New, Jan. 5 p 34
Iron Castings, Gas Cavities and Shot in,* June 1 p 1339
Iron City Spring Company:
New Plant, Jan. 19 p 176
Iron Ore:
(See Lake Superior)
Belgian Supplies of, May 18 p 1202
Briquettes, Feb. 9 p 374
Electric Smelting of Swedish, Feb. 16 p 419
Handling with Electromagnets, Feb. 16 p 431
Production in 1909 and 1910, Jan. 26 p 284
Production in 1910, German, Apr. 27 p 1023
Railroad Rebates on, May 4 p 1100
Receipts at Lake Michigan Ports, Feb. 2 p 323
Reserves Underestimated, May 4 p 1080
Exploration of Cuban,* Apr. 13 p 914
Iron, Steel & Heavy Hardware Association, American:
Convention, June 1 p 1297
Isolated Plant Protective Association, Jan. 19 p 201
Itabira Iron Mines in Brazil, Apr. 27 p 1007
Italian Workmen's Insurance Prizes, Mar. 16 p 685
Italy's Greatest Steel Plant, Mar. 30 p 761

J.

- Jackman, E. S., & Co.:
Firth-Sterling Steel Poster, Apr. 6 p 837
- Jacks:
Another Duff Improvement, Jan. 5 p 71
Duff Ratchet at Panama,* Jan. 12 p 167
Jackson, William B.:
What "Depreciation" Means, Mar. 9 p 572
- Jameson, A. H.:
"Building Up" Impurities in Steel, Feb. 23 p 480; Mar. 2 p 537
- Jamieson Coal & Coke Company:
Annual Report, June 1 p 1324
- Jarring and Squeezer Molding Machine, Combined,* June 8 p 1424
- Jarring of Other Machinery, Machine Tool Work Disturbed by, June 22 p 1519
- Jefferson Union Company:
Union Elbows,* June 1 p 1365
- Jeffrey Mfg. Company:
Betterment of Industrial Conditions, Apr. 13 p 908
Handling Sand in the Foundry,* June 8 p 1422
Wire Cable Conveyor for Handling Kegs,* May 11 p 1165
- Jenks, Jeremiah W.:
Causes for High Prices, Mar. 2 p 549
- Johnson, C. W.:
Electricity in the Machine Shop,* Jan. 26 p 274
- Joliet Rolling Mill Company, June 8 p 1433
- Jolt Rammer, Core Bench,* June 1 p 1340
- Jones & Laughlin Steel Company:
Another Rod Mill, Mar. 16 p 697
Improvements, Mar. 2 p 519; May 4 p 1059
Ore Operations, Feb. 9 p 369
Sales Department Changes, June 29 p 1571
- Jones, John T.:
Step Process, May 18 p 1195
- Judicial Decisions of Interest to Manufacturers, Jan. 5 p 17; Feb. 2 p 343; Mar. 9 p 595; Mar. 30 p 771; June 22 p 1514

K.

- Kane & Roach:
Radial Drill,* May 18 p 1203
- Kant-Leak Kleets and Press,* Mar. 16 p 675
- Kegs, Wire Cable Conveyor for Handling,* May 11 p 1165
- Kelly High Pressure Sand Blast,* Jan. 5 p 106
- Kemp Smith Mfg. Company:
New Plant,* Feb. 23 p 482
- Kent, F. C.:
Machine Tool Arrangement, May 25 p 1279
- Keokuk & Hamilton Motor Power Company:
Des Moines Rapids Hydroelectric Plant, Mar. 30 p 771
- Kerr Turbine Company:
Turbo-Generators in the New York Post Office,* Apr. 27 p 1040
- Keystone Bronze Company, Mar. 30 p 795
- Keystone Foundry Supply Company:
Compound and Core Wash, Jan. 5 p 117
- Keystone Steel Casting Company:
Succeeds Keystone Steel Foundry Company, Mar. 9 p 605
- Kimball, W. W., Company:
Machine Molded Piano Plates,* Mar. 2 p 542
- Kirk & Blum:
Adjustable Emery Wheel Hood,* Apr. 13 p 933
Unusual Dust Exhausting System,* May 18 p 1220
- Kloman Mining Company:
Jones Step Process, May 18 p 1195
- Knickerbocker Company:
Morse Dust Collector,* Jan. 5 p 101
- Knoepfel, C. E.:
Efficiency in the Foundry, June 8 p 1395
- Knox Pressed & Welded Steel Company, June 15 p 1464
- Koenig, A.:
German Automobiles, May 11 p 1151
- Koppers, H.:
By-Product Coke Ovens and Conservation, Feb. 9 p 374
Ovens Built and Building, June 29 p 1554
- Kridler System:
Railroad Shippers' Service, May 11 p 1151
- Krupp-Midvale Suit Dismissed, Feb. 16 p 424
- Küppers Gas Producer,* June 22 p 1534

L.

- La Belle Iron Works:
Improvements Deferred, Apr. 27 p 1018
- La Belle-Wheeling Steel Merger Off, Apr. 6 p 837
- Labor:
Accident Compensation and Conciliation, Apr. 13 p 883
Accident Compensation in Minnesota, Mar. 2 p 551
Accidents in Industrial Plants, Jan. 19 p 214
Alleged Structural Steel Dynamiters, Apr. 27 p 1005
American Workman, May 4 p 1055
Anti-Accident Inspection Service, Feb. 2 p 288
Betterment of Steel Works Conditions, May 11 p 1144
Bill to Legalize the Boycott, Feb. 16 p 423
British Insurance Against Unemployment, Feb. 9 p 340
Carnegie Steel Company Relief Fund, Feb. 9 p 363
Central Station Welfare Work, Apr. 20 p 973
Coal Miners' Compensation Plan, Mar. 16 p 661
Compensation Legislation in New Jersey and Ohio, Apr. 6 p 825
Conditions in Iron Mining, Feb. 2 p 326
Conviction Under the Sherman Anti-Trust Law, Feb. 2 p 327
Constitutional Compensation Law, June 1 p 1319
Dual Usefulness of the Mill Nurse, Feb. 23 p 460
Eastern Blast Furnace Wage Reductions, Jan. 19 p 227
Eight-Hour Day for New York Machinists, Feb. 2 p 292
Employers' Compensation and Liability Systems, Feb. 23 p 498
Employers' Liability and Workmen's Compensation, Apr. 20 p 968
Employers' Liability in New York State, May 11 p 1126
Employers' Liability Insurance—Metal Trades, Apr. 13 p 912
Employers' Responsibilities, Apr. 13 p 930
Employment Bureau of Pittsburgh Manufacturers' Association, Mar. 9 p 575
English and American Conditions, Apr. 27 p 1005
Essential Cost Factor of Compensation, Jan. 12 p 121
Famous Danbury Hat Boycott Suit to Be Retried, Apr. 13 p 900
First Aid a Ground for Damages, June 29 p 1553
Frick Coke Company's Safety Committee, May 18 p 1216
Frick Coke Company Will Not Reduce Wages, Feb. 2 p 303
Immigrants in Iron and Steel Industry, Jan. 19 p 227
Industrial Education Evangelist, Apr. 27 p 1005
- Inspection System to Prevent Industrial Accidents, Feb. 2 p 290
- Italian Workmen's Insurance Prizes, Mar. 16 p 685
- Machinists' Strike in New York and New Jersey, May 11 p 1126
- Massachusetts Eight-Hour Bill Invalid, May 25 p 1237
- Mechanical Engineer and Prevention of Accidents,* Feb. 16 p 434
- Model Compensation Code, Feb. 23 p 498
- Modern Shop Management, Apr. 20 p 970
- Molders' and Stove Founders' Conference, Jan. 19 p 203
- New York Compensation Law Void, Mar. 30 p 794
- New York Machinists' Strike, May 4 pp 1054 and 1076; May 11 p 1126; May 18 p 1233
- New York Workmen's Compensation Decision, Mar. 30 p 759
- Notes, Mar. 30 p 777
- Noteworthy Anti-Boycott Decision, Jan. 26 p 232
- Ohio Workmen's Compensation Law, June 22 p 1539
- Our Immigrant Workmen, Feb. 23 p 478
- Private Accident-Relief System, Jan. 12 p 159
- Recent Immigration, Apr. 13 p 898
- Railroad Efficiency and the Unions, Feb. 23 p 476
- Railroad Efficiency and the Unions, Mar. 23 p 724
- Railroad Repair Shop Efficiency, Jan. 5 p 31
- Ratio of Burden to, Apr. 20 p 965
- Results of Iron Molders' Strikes in 1910, Jan. 12 p 155
- Right Principles in Works Management, May 4 p 1084
- Safety Devices for Iron Mine Workmen, June 22 p 1539
- Septic Poison's Needless Cost in Works, Jan. 12 p 121
- Speeding Under Scientific Management, Apr. 13 p 884
- Standards of Efficiency in Shop Operations, Jan. 19 p 204
- State Control of Women's and Minor's Wages, June 29 p 1554
- Troubles at Baldwin Locomotive Works, June 15 p 1463
- Unemployment Insurance in Great Britain, May 4 p 1072
- Welfare Work, May 25 p 1276
- Welfare Work of Electric Lighting Companies, June 8 p 1398
- What Unions Are Doing for San Francisco, Feb. 16 p 420
- Workmen's Compensation, Feb. 23 p 499
- Workmen's Compensation in Ohio, Feb. 16 p 433
- Workmen Appreciate Technical Publications, Apr. 13 p 884
- Workmen's Accident Compensation in Seven States, Apr. 6 p 842
- Workman's Insurance in Europe, Mar. 9 p 502
- Works Accident Insurance, Apr. 6 p 818
- Lackawanna Steel Company:
Annual Report, Mar. 2 p 536
- Laclede Steel Company, Apr. 6 p 857; June 15 p 1501
- Laidlaw-Dunn-Gordon Company:
Additions to Plant,* Feb. 9 p 383
Cylinder Castings,* Feb. 23 p 496
- Lake, E. F.:
Automatic Temperature Controlling Instrument,* June 8 p 1418
Die-Casting Machines,* Apr. 27 p 1026
- Lake Superior Iron & Chemical Company:
Properties Owned, Jan. 12 p 147
- Lake Superior Iron Mining Veterans, May 18 p 1221
- Lake Superior Iron Ore Association:
Ore Analyses, Apr. 13 p 906

Lake Superior Ore:

- Analyses, Apr. 13 p 906
 Analysis Books, Mar. 9 p 573
 Concrete Shafts of Record Size, Jan. 5 p 30
 Explorations, June 22 p 1533
 First Ore from the Cuyuna Range, May 25 p 1258
 Growing Pre-eminence of the Mesaba Range, Apr. 20 p 916
 In Hundreds of Millions of Tons,* Mar. 9 p 618
 Iron Ore Docks on the Lakes,* Apr. 20 p 972
 Iron Ore List with Lake Superior Map, Feb. 16 p 420
 Iron Ore Receipts at Lake Michigan Ports, Feb. 2 p 323
 Iron Ore Reserves Underestimated, May 4 p 1080
 Jones & Laughlin Ore Operations, Feb. 9 p 309
 Mining Conditions, June 8 p 1396
 Mining Curtailment, June 22 p 1537
 Mining on the Great Northern Properties, June 29 p 1569
 New Find on the Cuyuna Iron Range, Feb. 23 p 502
 New Marquette Ore Dock, Jan. 26 p 284
 New Minnesota Ore Road, Feb. 16 p 418
 Prices and the Furnaceman's Situation, Apr. 20 p 948
 Railroad Rebates on Iron Ore, May 4 p 1100
 Reduction in Iron Ore Price, Apr. 27 p 1004
 Shipments from the Hill Mine, June 1 p 1326
 Shipments in 1910, Mar. 9 p 595
 Shipments in April, May 11 p 1127
 Shipments for May, June 15 p 1484
 Steel Corporation Payments for Hill Ore, Jan. 12 p 163
 Two 617-Ft. Vessels Ordered, Feb. 9 p 374
 Vermilion Iron Ore Explorations,* Apr. 20 p 990
 Lamb Electric Company:
 Portable Electric Radial Drill,* Apr. 6 p 866
 Landis Machine Company:
 Solid Adjustable Die Head,* Mar. 2 p 556
 Lane, H. M.:
 Binders for Foundry Cores, May 11 p 1140
 Core Room Management and Materials, Mar. 16 p 664
 Shop Floors,* Feb. 9 p 378; Feb. 16 p 426
 Lang, George:
 Influence of Manganese on Soft Steel, Apr. 13 p 913
 Langelier Mfg. Company:
 Swaging Machine,* May 25 p 1201
 Lathe or Turning Machine? June 29 p 1553
 Lathes:
 Acme Combination Turret,* Jan. 26 p 283
 American High Duty,* June 1 p 1363
 American Tool Works Company, New,* Mar. 2 p 546
 Barnes Motor-Driven Gap,* Jan. 26 p 281
 Bullard Vertical Turret, New,* June 1 p 1352
 Cincinnati Heavy Duty Pulley,* Apr. 27 p 1041
 Davis 26-In. Turret,* Mar. 30 p 800
 Harrington 16 to 32-In. Extension,* Feb. 23 p 481
 Libby 18-In. Turret,* Apr. 27 p 1034
 Morris Attachments, New,* Jan. 12 p 169
 Morris 20-In. Cone Head,* Jan. 19 p 224
 Ransom Buffing,* May 15 p 1485
 Reed Heavy Duty Engine,* Jan. 26 p 280
 Remington Bench,* Mar. 30 p 802
 Robbins Patternmakers,* Feb. 2 p 321

- Schellenbach Geared Head, 16-In.,* Jan. 12 p 166
 Warner & Swasey Combination Turret,* June 8 p 1424
 Latin-America, Our Trade with, Feb. 16 p 422
 Lauck, W. J.:
 Labor Conditions in Iron Mining, Feb. 2 p 320
 Our Immigrant Workmen, Feb. 23 p 478
 Interesting Labor Inquiry on Immigrants, Jan. 19 p 227
 Recent Immigration, Apr. 13 p 898
 Lead and Spelter Production in 1910, May 4 p 1056
 Leber, E.:
 Briquettes from Cast Borings, Jan. 12 p 152
 Legislation and a Lower Cost of Living, Feb. 9 p 350
 Lehigh Coal & Navigation Company:
 Great Power Development in Eastern Pennsylvania, Mar. 16 p 660
 Leighton, George F.:
 Combination Punch and Shear,* Mar. 16 p 680
 Leshner, Paul T.:
 Data for Blast Furnace Piping,* Mar. 23 p 740
 Lewis, James, & Son:
 African Copper, Jan. 26 p 245
 Lewis, Wilfred:
 An Object Lesson in Efficiency, Apr. 13 p 902
 Liability and Workmen's Compensation, Employers', Apr. 20 p 968
 Liability in New York State, Employers', May 11 p 1126
 Liability Insurance, Employers'—Metal Trades, Apr. 13 p 912
 Libby 18-In. Turret Lathe,* Apr. 27 p 1034
 Lighting, Steel Mill,* Apr. 6 p 862
 Linde Air Products Company, Growth, Feb. 9 p 373
 Liquid Weigher, New,* June 8 p 1432
 Loan Evil, Salary, June 1 p 1318
 Lockport Stamping Company:
 Important Commercial Automobile Consolidation, Mar. 30 p 777
 Lockwood, Greene & Co.:
 Depreciation of Unprotected Steel Work, Feb. 2 p 306
 Locomotive Boiler Tubes, Process of Manufacturing,* May 4 p 1104
 Locomotives, Repair Equipment for Engine Houses, June 22 p 1519
 London, W. J. A.:
 Steam and Exhaust Pipe Size Charts,* Feb. 23 p 500
 Longmuir, Percy:
 Sulphur in the Air and Metal Corrosion, June 29 p 1589
 Lord, E. C. E.:
 Rust-Proof Slag Paint, May 11 p 1167
 Lozier Motor Company:
 New Plant at Detroit, Apr. 6 p 837
 Lubricators:
 Osgood Valveless Force Feed,* Mar. 9 p 625
 Richardson Mechanical,* Feb. 2 p 320
 Spencer Universal Chain Oil Feed,* June 29 p 1587
 White Star Individual-Continuous,* May 11 p 1160
 Luty, B. E. V.:
 Sheet and Tin Plate Trades in 1910, Jan. 5 p 64
 Lyman, James:
 Electric Furnace for the Manufacture of Iron and Steel, Feb. 2 p 322
 Lyon, Tracy:
 Scientific Industrial Operation, Apr. 13 p 922

M.

- McArdle-Donnelly Case, Apr. 27 p 1007
 McBride, R. C.:
 Accelerated Corrosion Test of Metals, June 29 p 1555
 McCleary, Hon. James T.:
 Secretary American Iron and Steel Institute,* Jan. 19 p 177

- McConway & Torley Company:
 Car Wheel,* Mar. 30 p 789
 McKee, Arthur G.:
 Nelson Hot Blast Stove, Feb. 9 p 368
 McNeil, James, & Bro. Company:
 Steel Stack for 10,800-hp. Boiler Plant,* May 18 p 1221
 McWane Pipe Works:
 Handbook for Cast Iron Pipe Users, Jan. 26 p 273
 M. & L. Engineering & Machine Works:
 Acme Blueprint Machine,* Feb. 2 p 329
 Maben, J. C.:
 Pig Iron Conditions, Mar. 16 p 656
 Machine Shops:
 And Boiler Shops of Improved Construction,* Jan. 19 p 216
 Accident Prevention in,* May 18 p 1204
 Electricity in,* Jan. 26 p 274
 In Ritz-Carlton Hotel,* Mar. 16 p 681
 Machine Tool Builders' Association, National:
 Announcements, Apr. 13 p 884; May 4 p 1093
 Convention, May 25 p 1252
 Machine Tool Builders, Official Lists of, Jan. 26 p 234
 Machine Tools:
 Arrangement, May 25 p 1278
 Awards at Brussels Exposition, Feb. 16 p 424
 German, Feb. 23 p 501
 Long Life of American, May 4 p 1055
 Novel Application of Motor Drive to,* May 4 p 1088
 Machinery:
 American, in Europe, May 18 p 1198; June 15 p 1481
 Beating Down Prices, June 1 p 1296
 Buying, Two Influences in, June 22 p 1499
 Ethics of Selling, June 15 p 1448
 Exhibit that Paid, Mar. 9 p 572
 Increasing Exports, Jan. 26 p 233
 Proposed Exposition, June 1 p 1295
 To Market American Abroad, May 25 p 1230
 Machine Tool Work Disturbed by Jarring of Other Machinery, June 22 p 1519
 Machinists, Eight-Hour Day for New York, Feb. 2 p 292
 Machinists' Strike, New York, May 4 p 1054 and 1070; May 11 p 1126; May 18 p 1233
 Magnesite End Blocks, Open Hearth Furnaces with, Mar. 23 p 716
 Magnetic Separator, New Cutler-Hammer,* June 29 p 1581
 Magnets, Unloading Pig Iron With Lifting,* Apr. 6 p 865
 Maine, Raising the Battleship,* June 8 p 1430
 Maintenance of Way Convention, Mar. 30 p 770
 Malleable Castings, Annealing,* Mar. 23 p 726; Apr. 20 p 948
 Malleable Castings Plant, Proposed,* Jan. 5 p 72
 Management, Modern Shop, Apr. 20 p 970
 Management, Right Principles in Works, May 4 p 1084
 Manganese and Silicon in Foundry Practice,* June 1 p 1348
 Manganese in the Presence of Chromium, Determination of, May 11 p 1159
 Manganese on Soft Steel, Influence of, Apr. 13 p 913
 Manhattan Perforated Metal Company, May 18 p 1183
 Manufacturers, Association of American Steel:
 Annual Meeting, Mar. 9 p 595
 Manufacturers Confer on Trade Conditions, Steel, Jan. 19 p 208
 Manufacturers, National Association of:
 Convention Call, Apr. 20 p 988
 Convention Proceedings, May 18 p 1182; May 25 p 1258
 Manufacturers, Steel, Consider Welfare Work, May 4 p 1056

- Manufacturing Equipment & Engineering Company:
- Twentieth Century Steel Stock Rack,* Jan. 19 p 226
- Manufactures, Foreign Tariff Work of Bureau of, May 18 p 1214
- Manufactures in Utah, May 4 p 1057
- Manufactures, Our Trade Balance Due to Our, May 25 p 1236
- Marine Congress, Merchant, Jan. 19 p 223
- Maris Brothers:
- Special Foundry Crane,* Jan. 5 p 92
- Massachusetts Eight-Hour Bill Invalid, May 25 p 1237
- Massachusetts Fan Company:
- Special Fan Drives,* Apr. 13 p 932
- Massachusetts Institute of Technology:
- Desires More Liberal State Aid, Jan. 19 p 202
- Notable Anniversary, Apr. 13 p 883
- Mathews, Robert:
- Efficiency Figures, Skeptic on, Apr. 6 p 820
- Labor-Speeding Under Scientific Management, Apr. 13 p 884
- Mechanical Engineer and Prevention of Accidents,* Feb. 16 p 434
- Mechanical Engineers:
- Announcements, Mar. 2 p 545; Apr. 27 p 1033; May 4 p 1078
- Convention Proceedings, June 1 p 1308; June 8 p 1411
- Monthly Meeting, Feb. 9 p 374
- Mechanical Handling of Materials, Apr. 27 p 1022
- Merchant Marine Congress, Jan. 19 p 223
- Merger, Proposed Southern, Apr. 13 p 907
- Merger Rumors, Iron and Steel Company, Mar. 2 p 518
- Mesaba Range, Growing Pre-eminence of the, Apr. 20 p 946
- Messerschmidt:
- Briquettes from Cast Borings, Jan. 12 p 152
- Mesta Machine Company:
- Haniel & Lueg Steam-Hydraulic Forging and Bending Press,* Jan. 5 p 48
- Large High Speed Flywheel,* Feb. 10 p 431
- Rapid Construction of a Blowing Engine,* Mar. 23 p 738
- Forging and Bending Press Catalog, June 29 p 1587
- Steam-Hydraulic Forging Press,* June 15 p 1471
- Metal Perforating Process, Smith,* Mar. 16 p 672
- Metal Prices for the Period 1898-1910 in Carloads, Fluctuations in,* Jan. 19 p 212
- Metal Rolling in the United States, Apr. 20 p 906
- Metals, Two New, Mar. 9 p 589
- Metal Trades Associations:
- California Annual Meeting, Feb. 2 p 311
- Chicago Annual Meeting, Mar. 23 p 740
- Cleveland, Boston and Cincinnati Annual Meetings, Mar. 9 p 589
- National Convention, Apr. 13 p 901; Apr. 20 p 976
- New National Officers, Mar. 23 p 727
- New York and New Jersey Branch, Apr. 13 p 907
- Pacific Coast Convention, Apr. 27 p 1007
- Worcester Annual Meeting, Mar. 16 p 666
- Meters:
- General Electric Boiler Flow, June 22 p 1531
- Thomas,* Mar. 16 p 676
- Uehling Waste,* June 29 p 1574
- Mexico, Oil Developments, May 4 p 1083
- Michigan Stove Company, Annual Meeting, Feb. 9 p 382
- Midland Machine Company:
- Radial Drill, 30-In.,* May 4 p 1108
- Roll-Over Core Machine,* Apr. 27 p 1024
- Midvale Steel Company:
- Annual Report, Apr. 6 p 845
- Krupp Suit Dismissed, Feb. 16 p 424
- Midland Steel Company:
- Purchased by Crucible Steel Company of America, Feb. 2 p 293
- Miles, John B.:
- New Dry Blast Process Tested,* June 1 p 1354
- Mill Lighting, Steel,* Apr. 6 p 862
- Mill Nurse, Dual Usefulness of the, Feb. 23 p 460
- Miller, August A.:
- Philadelphia Iron Trade in 1910, Jan. 5 p 58
- Milling Cutters and Their Efficiency,* May 11 p 1152
- Milling Machines:
- Clough Vertical Combination Drill and Bench,* May 25 p 1273
- Fosdick Horizontal Milling, Drilling and Boring,* May 4 p 1107
- Newton Duplex, No. 1,* Feb. 16 p 432
- Pratt & Whitney Thread, Some Adaptations of,* Jan. 26 p 272
- Rockford Vertical,* Mar. 2 p 552
- Mills, A. P.:
- Essex-Merrimac Chain Bridge, May 4 p 1075
- Mills:
- Five Gary Merchant,* Mar. 9 p 597
- Gary 60-in. Universal Plate,* June 22 p 1520
- Motors for Driving Main Rolls of,* Feb. 16 p 438
- Milwaukee Transit & Car Company, June 1 p 1343
- Miners' Compensation Plan, Coal, Mar. 10 p 661
- Mines, Bureau of:
- Essential Factors in the Formation of Producer Gas, May 4 p 1071
- Mines in Brazil, Itabira Iron, Apr. 27 p 1007
- Mines, Underground Shops in South African, Mar. 30 p 759
- Mine Timbers, Carnegie Publications on Steel, May 11 p 1142
- Mine Workmen, Safety Devices for Iron, June 22 p 1539
- Mining Beyond the Arctic Circle, Iron,* Mar. 9 p 608
- Mining Engineers (See American Institute of)
- Mining, Labor Conditions in Iron, Feb. 2 p 326
- Minimum Iron Requirements, The Country's, May 18 p 1181
- Mixers:
- Auto Sand,* Jan. 5 p 112
- Paxson Grooved Roller Sand,* May 4 p 1101
- Progress in Heated Foundry, June 1 p 1340
- Sellers Centrifugal Sand,* Jan. 5 p 113
- Standard Sand,* Jan. 5 p 114
- Moldenke, Dr. Richard:
- Briquetting Metal Borings,* June 1 p 1344
- Recent Tendencies in the Foundry Industry, Jan. 5 p 66
- Molders' and Stove Founders' Conference, Jan. 19 p 203
- Molders' Strikes in 1910, Results of Iron, Jan. 12 p 155
- Molding, Cast Iron Pipe,* May 4 p 1098
- Molding Machines:
- Arcade Mfg. Company,* Jan. 5 p 88
- Buch Combined Jarring and Squeez-er,* June 8 p 1424
- Buch Gravity,* Jan. 5 p 84
- Capabilities of, June 29 p 1569
- Edward A. Pridmore,* Jan. 5 p 86
- Experience with, Jan. 12 p 156
- Farwell Squeezer,* Jan. 5 p 83
- For Piano Plates,* Mar. 2 p 542
- Four New Osborn,* June 1 p 1342
- Pridmore, Henry E., Jan. 5 p 87
- Henry E. Pridmore Electrically Driven Jarring Machine,* June 1 p 1338
- Henry E. Pridmore, With Stripping Plate,* May 25 p 1274
- International Mower Part,* June 15 p 1484
- International Turn-Over,* May 11 p 1158
- New Tabor Jarring and Roll-Over,* Jan. 5 p 86
- Osborn Mfg. Company,* Jan. 5 p 85
- Molding Thin Castings on an Arcade Jarring Machine,* Apr. 20 p 980
- Molders' Tools,* Jan. 5 p 117
- Molds, Experience with Permanent, June 8 p 1402
- Molds, Ornamental Castings Made in Permanent,* Jan. 5 p 68
- Moline Tool Company:
- New Multiple Spindle Drill,* Apr. 6 p 855
- Moller, J. A.:
- Oval Chuck,* Jan. 5 p 52
- Monarch Engineering & Mfg. Company:
- Core and Annealing Oven Cars,* Jan. 5 p 95
- Monorail Grab Bucket Coal Hoist,* Mar. 2 p 550
- Moore, C. F.:
- Remarkable Boiler Performance, June 22 p 1500
- Morgan Construction Company:
- Private Accident-Relief System, Jan. 12 p 159
- Morris, John B., Machine Tool Company:
- Cone Head Lathe, 20-in.,* Jan. 19 p 224
- Lathe Attachments, New,* Jan. 12 p 160
- Schellenbach Geared Head Lathe, 16-In.,* Jan. 12 p 166
- Swiveling Radial Drill Table,* Jan. 5 p 49
- Morrison & Co.:
- Chilean Buyers in New York, May 11 p 1150
- Morse Dust Collector,* Jan. 5 p 101
- Motor Drive, Novel Application to Machine Tools,* May 4 p 1088
- Motors for Commercial Vehicles, Advantages of Long Stroke, Mar. 23 p 744
- Motors for Driving Main Rolls of Mills,* Feb. 16 p 438
- Motor Starters, Magnetic Switch,* Apr. 6 p 847
- Motor Truck Performances, Notes on, Jan. 12 p 145
- Mount Savage Firebrick Works:
- To Enlarge, June 22 p 1517
- Mumford Molding Machine Company:
- Core Bench Jolt Rammer,* June 1 p 1340
- Cylinder Castings,* Feb. 23 p 496
- Municipal Congress and Exposition, Chicago, Jan. 5 p 82
- Munnoch, P.:
- Size of a Coke Charge for a Cupola, June 20 p 1555
- Murphy Machine & Tool Company:
- Motor Driven Pipe Threader,* Apr. 27 p 1036
- Revolving Chuck,* Feb. 23 p 496
- Museum of Safety Chartered, American, June 1 p 1346
- Museum of the Wire Industry,* June 22 p 1522
- Museums, Private Industrial, Jan. 26 p 233
- Mutuality, Apr. 13 p 908
- Myers, Edward A.:
- Advantages of Long Stroke Motors for Commercial Vehicles, Mar. 23 p 744

N.

- Name Plates on American Machinery, Mar. 2 p 518
- National-Acme Mfg. Company:
New Self-Opening Die Head,* June 1 p 1351
- National Association of Jobbers of Wrought Iron Pipe and Fittings:
Convention, Mar. 16 p 658
- National Association of Manufacturers:
Convention Call, Apr. 20 p 988
Convention Proceedings, May 18 p 1182; May 25 p 1258
- National Association of Stove Manufacturers:
Convention, May 18 p 1232
- National Building Material Exhibition, May 18 p 1213
- National Cash Register Works:
Unusual Dust Exhausting System,* May 18 p 1220
- National Electric Light Association:
Central Station Welfare Work, Apr. 20 p 973
- More Water Power Development Needed, Jan. 26 p 246
- National Electroplaters' Association, Feb. 16 p 424
- National Founders' Association:
Results of Iron Molders' Strikes in 1910, Jan. 12 p 155
- National Gas and Gasoline Engine Trades Association:
Convention Programme, Apr. 13 p 927
- National Machine Recorder Company:
Recorder,* Feb. 16 p 425
- National Machinery Company:
Semi-Automatic Nut Tapper,* June 1 p 1302
- National Radiator Company:
Eastern Plant, Apr. 20 p 949
- National Tube Company:
Coke Ovens at Lorain, Ohio, Mar. 9 p 588
- Pittsburgh Railway Club Visits the, May 4 p 1083
- Visited by National Gas Association of America, May 25 p 1255
- View in National Works,* June 8 p 1416
- Natural Gas in 1909 and 1910, Feb. 16 p 437
- Nau, J. B.:
Progress in Heated Foundry Mixers, June 1 p 1342
- Naval Additions Proposed, Mar. 2 p 519
- Navy an Industrial School, Apr. 27 p 1004
- Navy Department Perplexity, Mar. 16 p 644
- Navy Tool Steel, Revised Specifications, June 29 p 1568
- Navy Yard Apprentices, Apr. 6 p 850
- Nelson Hot Blast Stove, Feb. 9 p 368
- Nelson Valve Company:
New Works, June 1 p 1350
- Nevin, A. Parker:
Workingmen's Compensation, Feb. 23 p 490
- Newark Foundrymen's Association, Jan. 12 p 155; Feb. 9 p 366; Apr. 13 p 884; May 11 p 1157; June 15 p 1480
- Newark Gear Cutting Machine Company:
Gear Pattern Cutter,* Feb. 2 p 319
- New England Foundrymen's Association, Jan. 19 p 203; Feb. 16 p 445
- New Jersey Foundry & Machine Company:
Delta and Changeezy Tramrail Trolleys,* Jan. 5 p 93
- Very Complete Foundry Trolley System,* Feb. 23 p 493
- Newport News Shipbuilding & Dry Dock Company:
Large Castings in Fast Time,* June 29 p 1388
- Newport Rolling Mill Company:
Rust-Resisting Iron, Mar. 9 p 639
- Newten Cupola,* Jan. 5 p 100
- Newton Machine Tool Works, Inc.:
Duplex Miller, No. 1½,* Feb. 16 p 432
- New Cold Saw,* Mar. 30 p 795
- Rotary Planer,* Mar. 16 p 686
- New York Barge Canals, May 4 p 1057
- New York City's Largest Steel Girder, Mar. 23 p 710
- New York Foundation Company:
Concrete Shafts of Record Size, Jan. 5 p 30
- New York Metal Exchange:
Election, Apr. 6 p 855
- New York State, Employers' Liability in, May 11 p 1126
- New York State Steel Company:
Annual Meeting, Feb. 23 p 497
- New York's Municipal Building, Feb. 23 p 485
- Nichol Syndicate:
Pneumatic Handling of Sulphuric Acid,* Mar. 9 p 616
- Nicholson, W. H., & Co.:
Wyoming Automatic Eliminator,* Apr. 13 p 918
- Noble, Warren:
Advantages of Worm Drive for Automobiles, May 4 p 1070
- Noncancellation Clauses, Confusion Over, Jan. 5 p 4
- Nonferrous Alloys, Castings from, Jan. 12 p 184
- Norris, George L.:
Vanadium in Cast Iron, June 8 p 1398
- North Wales Machine Company:
Geared Power Hack Saw,* Feb. 16 p 443
- Grinder Head, 8-In.,* Feb. 9 p 386
- Northern Engineering Works:
Newton Cupola,* Jan. 5 p 100
- Tumbling Barrel,* Feb. 2 p 327
- Northern Equipment Company:
Copes Boiler Feed Regulator,* Jan. 12 p 170
- Northern Iron Company:
Rifle Shots Open a Chilled Cinder Notch, Feb. 2 p 311
- Norway, Electric Steel and Iron in, Feb. 2 p 291
- Norway, Iron Mining Beyond the Arctic Circle,* Mar. 9 p 608
- Northwestern Iron Company:
Gröndal Iron Ore Briquetting Plant, Mar. 9 p 594
- Noxon, Frank W.:
The Rate Decision and Railway Credit, Mar. 23 p 717
- Noyes T Square,* Feb. 9 p 387
- Nurse, Dual Usefulness of the Mill, Feb. 23 p 460
- Nut Tapper, National Semi-Automatic,* June 1 p 1302
- Nuttall, R. D., Company:
Buys Hydraulic Machine Company's Plant, Mar. 16 p 658
- Nutter & Barnes Company:
Automatic Saw Sharpener,* June 1 p 1350
- O.
- Obermann, A. W.:
Acid Fume Removing Devices,* Mar. 16 p 667
- Obituary:
Airedale, Lord (Sir James Kitson),* Mar. 30 p 775
- Alberger, Louis R.* Feb. 9 p 367
- Barnes, George A., Apr. 6 p 846
- Barnett, James, Jan. 19 p 199
- Bickley, Mortimer H., Apr. 6 p 846
- Bishop, George H., Apr. 20 p 964
- Bovard, David, Jan. 19 p 199
- Branch, Richard C., Feb. 23 p 472
- Breslin, Thomas, May 4 p 1073
- Brown, Alexander E.* May 4 p 1082
- Brown, Col. Lewis T., Mar. 23 p 721
- Brunsmann, Anthony G., Mar. 23 p 721
- Rush, Harry W., May 11 p 1138
- Carry, James J., May 4 p 1073
- Coleman, Harry W., Feb. 9 p 367
- Connelly, Daniel, Mar. 2 p 533
- Corbett, William H., Mar. 2 p 533
- Corey, Alfred A., Sr., Jan. 5 p 18
- Corrigan, John, Mar. 9 p 586
- Cribben, Henry, Apr. 13 p 897
- Dederick, Peter K., Feb. 9 p 367
- Dempsey, Daniel, Feb. 9 p 367
- Dick, Charles S., Mar. 16 p 660
- Dilworth, Lawrence, June 15 p 1449
- Dreyfus, Achille A., Apr. 27 p 1020
- Duff, Alfred B., May 25 p 1259
- Edwards, Mahlon C., Feb. 9 p 367
- Evinger, E. R., June 29 p 1567
- Fifield, George W., Feb. 9 p 307
- Fleming, Wm. Kennedy, Feb. 23 p 472
- Galvin, Thomas H., Apr. 6 p 846
- Gardner, Robert J., Jan. 19 p 199
- Goodyear, Charles W., Apr. 27 p 1020
- Gorton, William S., Apr. 20 p 964
- Grammes, Lewis F., May 4 p 1073
- Grippin, William A., Mar. 9 p 586
- Guild, Curtis, Sr., Mar. 16 p 660
- Hammett, A. Fred, June 1 p 1317
- Hanna, E. E., Jan. 12 p 146
- Heath, W. C., May 25 p 1259
- Henning, Gustavus C., Jan. 5 p 18
- Hogan, Martin J., Feb. 23 p 472
- Holmes, E. M., Mar. 2 p 533
- Hooker, John D., June 8 p 1381
- Hughes, John P., Apr. 20 p 964
- Hunt, Charles W., Mar. 30 p 775
- Jackman, Frank S., May 11 p 1138
- Johnson, J. E., May 4 p 1073
- Johnson, Tom L., Apr. 13 p 897
- Johnston, Samuel, Apr. 27 p 1020
- Kahn, Lehman S., May 25 p 1259
- Keenan, Jeremiah J., Feb. 2 p 312
- Keyes, Jay H., June 8 p 1381
- King, Charles C., Mar. 2 p 533
- Kissick, J. F., June 1 p 1317
- Kitson, Sir James (Lord Airedale),* Mar. 30 p 775
- Kjellin, Dr. F. A., Feb. 9 p 367
- Lappan, James, June 15 p 1449
- Layng, Frank S., Mar. 16 p 660
- Lee, William W., June 22 p 1513
- Leibert, Owen, Apr. 6 p 846
- Liveright, Benjamin K., Feb. 2 p 312
- Lord, Nathaniel W., May 25 p 1259
- McDonald, John B., Mar. 23 p 721
- Manning, Edward B., Jan. 26 p 246
- Maus, Frederick K., Mar. 9 p 586
- Miller, Walter G., Jan. 26 p 246
- Milliken, Andrew, Mar. 2 p 533
- Mitchell, Charles E., Mar. 23 p 721
- Moore, Samuel H., Feb. 23 p 472
- Morgan, Charles H.,* Jan. 12 p 150
- Nash, James M., Feb. 2 p 312
- Nesbitt, Frederick, June 29 p 1567
- Orcutt, Calvin B., Feb. 2 p 312
- Paxton, William H., May 4 p 1073
- Peebles, Robert, Feb. 16 p 418
- Perkins, Simon, June 8 p 1381
- Poulson, Niels, May 11 p 1138
- Poulterer, Joseph C., Jan. 19 p 199
- Reed, Joseph B., June 22 p 1513
- Rhodes, Charles R., Feb. 16 p 418
- Richardson, John, Feb. 9 p 367
- Rickard, Thomas, Apr. 6 p 846
- Saunders, Leslie M., Jan. 12 p 146
- Seaver, John W.,* Jan. 19 p 199
- Sly, W. W., May 25 p 1259
- Spaulding, Jay E., Jan. 12 p 146
- Spencer, A. N., May 25 p 1259
- Smith, Ephraim, Mar. 23 p 721
- Spearman, John J., June 8 p 1381
- Stevenson, Thomas F., Apr. 27 p 1020
- Taylor, Harry S., Mar. 2 p 533
- Thayer, Nathaniel, Mar. 23 p 721
- Tupper, Jonas C. H., Apr. 6 p 846
- Upson, Andrew S.,* Apr. 6 p 846
- Vanduzen, E. W., Apr. 6 p 846
- Wallace, Robert, Mar. 16 p 660
- Wardwell, Edward H., Apr. 27 p 1020
- Wessel, Augustus, June 1 p 1317
- Wetherill, James P., May 4 p 1073
- White, Leroy S., Feb. 23 p 472
- Wilfong, Millard F., Apr. 27 p 1020
- Wolff, Ludwig, Apr. 20 p 964
- Oglebay, Norton & Co.:
Iron Ore List with Lake Superior Map, Feb. 16 p 420
- Ohio Sand Blast Tumbling Barrel,* Jan. 5 p 103
- Ohio, Workingmen's Compensation in, Feb. 16 p 433

- Ohio Workmen's Compensation Law, June 22 p 1539
- Oil Burners, Hauck Portable,* Jan. 5 p 98
- Oil Developments, Mexican, May 4 p 1083
- Oil Feed, Spencer Universal Chain,* June 20 p 1587
- Oil Fuel for Air Furnaces, June 15 p 1405
- Oiling System, White Star Individual-Continuous,* May 11 p 1160
- Oilstone Holder, Badge,* Apr. 13 p 931
- Oiler, Osgood Valveless Force Feed,* Mar. 9 p 625
- O. K. Tool Holder Company:
Test of O. K. Tools,* Feb. 23 p 491
- Oliver Machinery Company:
New Universal Saw Bench,* Jan. 5 p 109
- Olympic, Mechanical Equipment of the, June 29 p 1535
- Open-Hearth Furnaces:
(See Furnaces, Open-Hearth)
- Operating Costs, Distributing Factory,* June 15 p 1479
- Ore:
(See Iron Ore)
(See Lake Superior Ore)
- Orenstein-Arthur Koppel Company:
Fuel Handling on the Chelsea Piers,* Feb. 23 p 497
- New Plant, May 25 p 1267
- Ore Unloading Plant at Cleveland, Pennsylvania Railroad's New, Mar. 30 p 799
- Ore Unloading Plant, New Brown,* Apr. 6 p 861
- Ore-Washing Plant in Minnesota, Another, June 29 p 1567
- Orient Coke Company, June 1 p 1317
- Oriskany Ore & Iron Company:
Property Changes, June 15 p 1464
- Osborn Mfg. Company:
Buys American Wire Brush Company, Apr. 13 p 900
- Four New Foundry Machines,* June 1 p 1342
- Molders' Bellows,* Mar. 2 p 548
- Molding Machines,* Jan. 5 p 85
- Osborne, Charles G.:
15-Ton Heroult Furnace at South Chicago,* Jan. 26 p 262
- Osgood, J. L., Lubricator Company:
Valveless Force Feed Oiler,* Mar. 9 p 625
- Ottawa's Advantages, May 18 p 1195
- Otto Gas Engine Works, Feb. 9 p 365
- Outerbridge, Alexander E., Jr., Ferromanganese in Car Wheel Iron, Mar. 16 p 644
- Manganese and Silicon in Foundry Practice,* June 1 p 1348
- Silicon Alloy, Jan. 5 p 44
- Oven Cars, Monarch Core and Annealing,* Jan. 5 p 95
- Ovens, Koppers Coke, June 29 p 1554
- Oxy-Acetylene Torch, Steel Cutting Ovens, Koppers Coke, June 29 p 1554
- Oxy-Acetylene Torch, Steel Cutting with the,* Mar. 9 p 622
- P.
- Pacific Coast Metal Trades Convention, Apr. 27 p 1007
- Packing Machine, Stirling,* Jan. 19 p 225
- Paint, Rust-Proof Slag, May 11 p 1167
- Pangborn, Thomas W., Company:
Ideal Sand Dryer,* Jan. 5 p 112
- Papyrus Artificial Paper Mfg. Company:
Paper Rope, Mar. 30 p 799
- Paramount Indestructible Steel Clamp,* Apr. 6 p 867
- Parsons, C. A.:
Geared Turbine and Its Lessons, Apr. 6 p 810
- Parting Compound and Core Wash., Jan. 5 p 117
- Patent America and the Foreign, Mar. 9 p 571
- Patent Laws, To Amend the German, Jan. 12 p 120
- Patterns, Experience with Concrete, Feb. 9 p 305
- Patterson Tool & Supply Company:
Adjustable Electric Light Bracket,* Apr. 20 p 981
- Patterson, W. W., Company:
Six Sheave Steel Block,* Jan. 5 p 47
- Pattison, Wallace M.:
Modern Business Methods, Apr. 13 p 905
- Pawling & Harnischfeger Company:
Cranes in a Material Yard,* May 18 p 1214
- Foundry Grab Bucket,* Jan. 5 p 90
- Paxson, J. W., Company:
Foundry Supplies, May 25 p 1257
- Grooved Roller Sand Mixer,* May 4, p 1101
- Outerbridge Silicon Alloy, Jan. 5 p 44
- Quaker City Foundry Supply Exhibit, Feb. 2 p 318
- Runout Stopper,* Jan. 5 p 116
- Peck, W. A.:
Sure Center Finder,* Apr. 27 p 1031
- Pelton-Francis Water-Wheels, Notable Installation of,* May 18 p 1221
- Pels, Henry, & Co.:
Deep-Throated Power Punch,* Feb. 9 p 389
- Pennsylvania, Great Power Development in Eastern, Mar. 16 p 660
- Pennsylvania Railroad Company:
Apprentices, Apr. 6 p 851
- Freight Stations in Philadelphia, Feb. 16 p 445
- New Electric Locomotives, Mar. 9 p 593
- New Ore Unloading Plant at Cleveland, Mar. 30 p 799
- New Railroad Track Scale,* Apr. 13 p 924
- Pennsylvania Steel Company:
Annual Report, May 11 p 1150
- Carting a 60-Ton Girder, Mar. 9 p 572
- Perforating Plant in Chicago, New, June 15 p 1485
- Perforating Process, Smith Metal,* Mar. 16 p 672
- Perkins, George W.:
Trade Co-operation and Government Oversight, Mar. 16 p 642
- Perley, Ward B.,* May 4 p 1077
- Permanent Molds, Ornamental Castings Made in,* Jan. 5 p 68
- Petroleum Iron Works Company:
Contracts, Apr. 20 p 989
- Petroleum Production in 1910, United States, Jan. 19 p 226
- Philadelphia Foundry Foremen, Feb. 16 p 406; Mar. 16 p 658; May 11 p 1127; June 22 p 1501
- Philadelphia Foundrymen's Association, Jan. 12 p 155; Feb. 9 p 386; Mar. 9 p 588; Apr. 14 p 918; May 11 p 1149; June 15 p 1404*
- Philadelphia Iron Trade in 1910, Jan. 5 p 58
- Philadelphia, Pennsylvania Railroad Freight Stations in, Feb. 16 p 445
- Philadelphia Pig Iron Prices for 10 Years,* Apr. 13 p 885
- Philadelphia's Ore Imports, Handling, Apr. 20 p 973
- Philadelphia Roll & Machine Company:
Chilled Rolls with Passes Cast In,* May 25 p 1266
- Huge Cast Iron Still,* May 11 p 1166
- Piano Plates, Machine Molded,* Mar. 2 p 542
- Pig Iron:
British Output, First Half 1910, Jan. 12 p 122
- British Production 1910, May 25 p 1257
- Costs in Alabama, May 11 p 1124
- Forty Years' Progress,* June 22 p 1516
- Foundrymen Report on Stocks and the Outlook, Mar. 9 p 594
- Germany Making Electric Steel from Basic, Jan. 5 p 39
- Germany's Production in 1910, Apr. 20 p 992
- Leaders in Production, Feb. 2 p 289
- Monthly Statement,* Jan. 5 p 6; Feb. 9 p 352; Mar. 9 p 574; Apr. 6 p 822; May 3 p 1058; June 8 p 1382
- New Charcoal for Chilled Car Wheels, Mar. 9 p 605
- Output in Two Panics,* April 6 p 824
- Output the Criterion,* May 25 p 1239
- Philadelphia Prices for 10 Years,* Apr. 13 p 885
- Production in Canada, 1910, Feb. 23 p 502
- Record of 1910, Feb. 2 p 306
- Soaring in Russia, June 8 p 1421
- Standards for Various Kinds, June 8 p 1400
- Steel Making in 1910, June 1 p 1341
- Unloading with Lifting Magnets,* Apr. 6 p 865
- Pile Driver, Browning,* Feb. 23 p 488
- Pipe and Plumbing Jobbers' Conventions, Mar. 23 p 726
- Pipe:
Cast Iron Molding,* May 4 p 1098
- Cast Iron Prices from 1900 to 1910,* Mar. 2 p 534
- Large Sizes of Lap Welded,* Feb. 2 p 324
- Murphy Motor-Driven Threader,* Apr. 27 p 1036
- New Toledo Threading Tool,* Feb. 9 p 386
- Steam and Exhaust Size Charts,* Feb. 23 p 500
- Williams 12-in. Steam-Driven Threader,* May 18 p 1218
- Piping, Data for Blast Furnace,* Mar. 23 p 740
- Pittsburgh Crucible Steel Company:
John W. Dougherty, President,* Mar. 2 p 535
- Pittsburgh Emery Wheel Company:
Swinging Frame Grinding Machine,* June 1 p 1341
- Pittsburgh Foundry Conventions, May 25 p 1011; June 1 p 1328*
- Pittsburgh Foundrymen's Association, Jan. 12 p 155; Mar. 9 p 573; Apr. 6 p 821; May 4 p 1083; June 15 p 1462
- Pittsburgh Gage & Supply Company:
White Star Individual-Continuous Oiling System,* May 11 p 1160
- White Star Oil Filter Orders, May 18 p 1183
- Pittsburgh Iron Trade in 1910, Jan. 5 p 50
- Pittsburgh Machine Tool Company:
New Plant, Mar. 2 p 553
- Pittsburgh Manufacturers' Association, Employment Bureau of, Mar. 9 p 575
- Pittsburgh Pneumatic Company:
Chipping Hammer,* Jan. 5 p 106
- Pittsburgh Railway Club at Ellwood City Tube Plant, May 4 p 1083
- Pittsburgh Steel Company:
Annual Report, Apr. 20 p 974
- Pittsburgh Steel Products Company:
Standard Reinforcement for Concrete, Mar. 23 p 725
- Pittsburgh, Traffic Club of, Apr. 6 p 825
- Pittsburgh-Westmoreland Coal Company, Apr. 13 p 907
- Pittsburgh's Position in Steel, Feb. 2 p 304
- Planers:
Allner-Boswell Radius Attachment,* Apr. 27 p 1038
- Crescent Variable Feed,* Jan. 5 p 110
- Newton Rotary,* Mar. 15 p 686
- New Triumph Drive for,* June 29 p 1573
- Plate Mill, Gary 60-in. Universal,* June 22 p 1526
- Plates, Time Factor and Clearance in Punching,* June 15 p 1480
- Plumb, Fayette R., Inc.:
Expansion of,* Feb. 2 p 314

- Plume & Atwood Mfg. Company:
Electrically Driven Brass Mill,* Jan. 20 p 278
- Polishing Machine, Autogenous Welding Company's High Duty,* Mar. 23 p 735
- Polishing Machine, Robinson Automatic,* May 4 p 1097
- Pollock, William B., Company:
Improved Berg Cinder Car,* Mar. 23 p 739
- Porcelain Stove Company, May 11 p 1151
- Porter, John J.:
Fuel Efficiency of the Blast Furnace, June 29 p 1554
Problem of Blast Furnace Efficiency, Jan. 5 p 5
- Portland, Ore., Unique Drawbridge, Jan. 5 p 81
- Positive Clutch & Pulley Company:
Improved Transmission Appliances,* May 11 p 1163
- Potassium Chromate as Metal Protection Agent, June 29 p 1579
- Potter & Johnston Machine Company:
Making Duplicate Automobile Parts,* Mar. 9 p 666
- Potts, Horace T., & Co.:
Swedish Tool Steel Agencies, Feb. 9 p 380
- Pouring Spout, Hooper Continuous,* May 25 p 1267
- Praken, H.:
Hoists for Foundry and Shop, Mar. 23 p 741
- Pratt & Whitney Company:
Automatic Cylindrical Sizing Grinder,* Jan. 5 p 54
Some Adaptations of the Thread Miller,* Jan. 26 p 272
- Pratt Institute Exhibition, May 25 p 1269
- Precision Instrument Company:
Simmiance-Abady Co., Recorder,* May 11 p 1162
- Prentice Brothers Company:
New Ball Bearing Drill,* Apr. 27 p 1042
- Pressed Steel Car Company:
Annual Report, Feb. 23 p 475
- Presses:
Bliss, Straight-Sided, of Unusual Proportions,* Jan. 5 p 45
Ferracute Labor-Saving Staybolt,* May 25 p 1266
Forging with a High-Speed Hydraulic,* Jan. 26 p 282
Frontier Heavy Pattern Drill,* June 8 p 1433
Garrison 400-Ton Double-Acting,* Jan. 12 p 159
Haniel & Lueg Steam-Hydraulic Forging and Bending,* Jan. 5 p 48
Kant-LeLak Kleets and Press,* Mar. 16 p 675
Large Toledo Single Crank,* May 4 p 1087
Mesta Steam-Hydraulic Forging,* June 15 p 1471
New Standard Reducing,* Jan. 12 p 163
Small Ferracute Punching and Riveting,* Mar. 16 p 685
Unusual Standard Installation,* Feb. 23 p 494
Waterbury Cam Pillar,* Apr. 27 p 1036
Watson-Stillman Handy Hydraulic,* June 29 p 1578
- Pressures, Sand Blast, Feb. 9 p 350
- Prices:
And Steel Manufacturers, Jan. 19 p 174
Beating Down Machinery, June 1 p 1296
Cast Iron Pipe, from 1900 to 1910,* Mar. 2 p 534
Cause for High, Mar. 2 p 549
Fluctuations in Iron and Steel Products, for 13 Years,* Jan. 5 p 28
Fluctuations in Metal for 1898-1910,* Jan. 19 p 212
- Government Regulation of, Apr. 20 p 947
- Higher Machine Tool, June 8 p 1380
- Lake Ore and the Furnaceman's Situation, Apr. 20 p 948
- Ore and Pig Iron, Mar. 2 p 517
- Philadelphia Pig Iron, for 10 Years,* Apr. 13 p 885
- Rate Decision and Other Questions, Mar. 9 p 570
- Steel Reduced, June 1 p 1296
- Pridmore, Edward A., Company:
Molding Machines,* Jan. 5 p 86
- Pridmore, Henry E.:
Electrically Driven Jarring Machine,* June 1 p 1338
Molding Machine with Stripping Plate,* May 25 p 1274
Molding Machines,* Jan. 5 p 87
- Prinzess Irene, Large Castings in Fast Time,* June 29 p 1588
- Probert, R. Hastings:
Ornamental Castings Made in Permanent Molds,* Jan. 5 p 68
- Producers, Gas:
Engine Plants,* Mar. 16 p 682
Essential Factors in the Formation of Gas, May 4 p 1071
Experiments, Mar. 30 p 792
Hilger Revolving Grate,* Mar. 2 p 537
Küppers,* June 22 p 1534
Operating Costs of Plants, June 29 p 1570
- Producers' Coke Company, Mar. 9 p 588
- Production, Intensive, June 8 p 1379
- Production Statistics:
Belgian Iron and Steel 1910, June 29 p 1507
British Pig Iron Output First Half 1910, Jan. 12 p 122
British Pig Iron 1910, May 25 p 1257
British Steel 1910, June 29 p 1555
Coal 1910, May 18 p 1207
Connellsville Coke Output 1910, Jan. 12 p 133
Copper, Jan. 12 p 147; Feb. 16 p 442; Mar. 16 p 666; Apr. 13 p 884; May 11 p 1150; June 15 p 1462
Fluorspar 1909, Mar. 30 p 799
Germany, Iron Ore, 1910, Apr. 20 p 992; Apr. 27 p 1023
Iron and Steel for 25 Years,* Jan. 19 p 206
Iron Ore in 1909 and 1910, Jan. 26 p 284
Lead and Spelter 1910, May 4 p 1056
Leaders in Pig Iron, Feb. 2 p 289
Natural Gas 1909 and 1910, Feb. 16 p 437
Our Record of Steel in 1910, Mar. 23 p 704
Pig Iron in Canada 1910, Feb. 23 p 502
Pig Iron Record of 1910, Feb. 2 p 306
Rails 1910, Feb. 23 p 461
Steel Corporation 1901-1910, Feb. 16 p 404
Steel Corporation's Statement, Mar. 23 p 702
Steel 1910, Mar. 30 p 782
Steel in Germany 1910, Apr. 13 p 911
Steel Making Pig Iron in 1910, June 1 p 1341
United States Petroleum 1910, Jan. 19 p 226
World's Copper Production 1910, Mar. 30 p 815
- Productive Capacity, Economic Crime of Increasing, June 22 p 1498
- Promotion of Engineering Education, June 22 p 1530
- Prony Brake, May 25 p 1266
- Protective Association, Isolated Plant, Jan. 19 p 201
- Pulley, Cone, Molding on an International Turn-Over Machine,* May 11 p 1158
- Pulleys with Cork Set in Faces,* May 11 p 1167
- Pumps:
Buffalo Vertical Sump,* June 8 p 1429
Douglass Contractors' Diaphragm,* Jan. 5 p 53
- Efficiency of Coney Island Fire, June 15 p 1492
- Pratt Rotrex,* May 18 p 1211
- Very Large Dow Triplex,* May 11 p 1164
- Punches:
Aetna Multiple, Large,* Apr. 6 p 860
Leighton Combination Punch and Sheer,* Mar. 16 p 680
Pels Deep-Throated Power,* Feb. 9 p 389
Queen City 48,000 lb. Body Casting,* June 29 p 1571
Schatz Combination Punch and Shear,* Apr. 6 p 856
Time Factor and Clearance in Punching Plates,* June 15 p 1480
Whitney Ball Bearing Rotary Hand,* Mar. 2 p 544
- Putnam, W. P.:
Annealing Malleable Castings,* Mar. 23 p 720
- Q.
- Quebec Bridge, Feb. 2 p 313; Feb. 16 p 437; Feb. 23 p 479; Apr. 13 p 901
- Queen City Punch & Shear Company:
Punch with a 48,000 Lb. Body Casting,* June 29 p 1571
- Quenched Tool Steels, Hardness of,* May 25 p 1256
- Quincy, Manchester, Sargent Company:
Grinding Car Wheels Without Removing Them, Mar. 9 p 620
- Quinlan Boiler Company:
Punch with a 48,000 Lb. Body Casting,* June 29 p 1571
- Quix Pneumatic Hose Coupling Strainer,* Jan. 5 p 45
- R.
- Rack, Twentieth Century Steel Stock,* Jan. 19 p 226
- Railroads:
Double-Track Mileage Is Small, Feb. 23 p 487
Educational Bureau, Mar. 9 p 570
Efficiency and Labor Unions, Feb. 23 p 476; Mar. 23 p 724
Iron and Steel in the World's, June 29 p 1552
New Construction and Equipment, Jan. 5 p 30
Rebates on Iron Ore, May 4 p 1100
Repair Shop Efficiency, Jan. 5 p 31
Securities as Investments, Feb. 16 p 405
Shippers' Service, May 11 p 1151
World's Mileage in 1909, June 15 p 1461
- Rails:
An Unusual Year, 1910, Feb. 23 p 458
Canadian Duty on Rerolled, Jan. 26 p 261
Elongation and Ductility Tests, Apr. 6 p 839
Heavy Canadian Contracts, May 4 p 1101
Heavy Section High Carbon, Jan. 26 p 232
National Railway of Hayti, May 4 p 1086
New York Central Ferrotitanium, Feb. 2 p 292
Perennial Problem, Mar. 20 p 758
Production in 1910, Feb. 23 p 461
Steel Failures,* Mar. 30 p 780
Railway Convention Exhibits, Atlantic City, June 22 p 1518
Railway Steel Spring Company:
Annual Report, Mar. 9 p 591
- Rammers:
Chicago Pneumatic, Jan. 5 p 107
Cleveland Pneumatic,* Jan. 5 p 107
Core Bench Jolt,* June 1 p 1340
- Ransom Mfg. Company:
Buffing Lathe,* June 15 p 1485
- Rateau Steam Regenerator Company:
Installations, Mar. 23 p 735
- Ratio of Burden to Labor, Apr. 20 p 965
- Raymond, Dr. R. W.:
Resigns, Apr. 6 p 821
- Readers of *The Iron Age*, Apr. 13 p 882

- Ready Tool Company:
Boring and Internal Threading Tool,
June 20 p 1573
- Rebates on Iron Ore, Railroad, May 4
p 1100
- Ready Tool Company:
Roughing Tool for High-Speed Steel*
June 1 p 1351
- Reaming and Drilling Jig, Wood &
Spencer,* Mar. 2 p 556
- Reciprocity Agreement with Canada,
Feb. 2 p 288
- Reciprocity Agreement with Canada:
Duties Named, Feb. 2 p 313
- Reciprocity and Canadian Steel Inter-
ests, Feb. 2 p 310
- Recorder Machine Time: National Ma-
chine Recorder Company,* Feb.
10 p 425
- Recorder, Precision Simmance-Abady
Co., May 11 p 1102
- Records, Analysis of Boiler Feed,* Jan.
12 p 170
- Records at Ensley Furnaces, Remark-
able, May 11 p 1105
- Redfield, Wm. C.:
American Export Methods, Apr. 27 p
1021
- Reed, Francis, Company:
New High Speed Sensitive Drills,*
May 4 p 1003
- Regulation of Corporations Proposed,
Federal, Apr. 27 p 1025
- Reis, John,* May 4 p 1077
- Reliance Electric & Engineering Co.:
Novel Application of Motor Drive to
Machine Tools,* May 4 p 1088
- Reed, F. E., Company:
Heavy Duty Engine Lathes,* Jan. 26
p 280
- Reilly Friction Clutch,* Feb. 23 p 490
- Relief Fund, Carnegie Steel Company,
Feb. 6 p 305
- Remington Tool & Machine Company:
Bench Lathe,* Mar. 30 p 802
- Repair Equipment for Engine Houses,
June 22 p 1510
- Repair Shop Efficiency, Railroad, Jan. 5
p 31
- Republic Iron & Steel Company:
Blast Furnaces All Active, Mar. 16 p
660
- Blooming Mill with Novel Features,
Feb. 2 p 310
- Bray, Thomas J., President,* Mar. 23
p 714
- Handbook, Feb. 9 p 370
- New Plant, Apr. 6 p 836
- New Tube Works,* Jan. 5 p 41
- Operations, June 1 p 1308
- Semiannual Report, Jan. 26 p 247
- Rice, Richard H.:
General Electric Turbine-Driven Com-
pressor,* Mar. 2 p 538
- Richardson-Phenix Company:
Model M Lubricator,* Feb. 2 p 320
- Richmond Forgings Corporation:
New Plant,* May 18 p 1210
- Ridgway, Craig, & Son Company:
Foundry Elevators,* Jan. 5 p 96
- Right Principles in Works Management,
May 11 p 1181
- Rio Janeiro, Shipyard for, Mar. 2 p 555
- Risdon Iron & Locomotive Works:
Purchased by the Steel Corporation,
May 11 p 1112
- Ritz-Carlton Hotel, Machine Shop in,*
Mar. 10 p 681
- Riveter, Shuster Special,* Mar. 16 p 678
- Robbins Machine Company:
Patternmakers' Lathe,* Feb. 2 p 321
- Roberts Motor Company:
Motor Air Compressor,* Jan. 12 p 164
- Roberts, Percival, Jr.:
Testimony at Steel Corporation Inves-
tigation, June 15 p 1469
- Robins Conveying Belt Company:
Automatic Reversing Trippers, Feb. 2
p 201
- Robinson Automatic Machine Company's
Automatic Polishing Machine,* May 4
p 1007
- Rochester Iron & Metal Company:
Growth, Apr. 20 p 992
- Rockford Drilling Machine Company:
New 14-In. Drill,* Mar. 30 p 793
- Positive Geared Drill Feed,* June 15
p 1485
- Rockford Machine Tool Company:
Shaper Down Feed,* Mar. 30 p 796
- Vertical Miller,* Mar. 2 p 552
- Rods a Finished Steel Product, June 20
p 1553
- Roebbling's, John, Sons Company:
Wire Rope of Exceptional Type,* Feb.
10 p 444
- Rogers, Brown & Co.:
Exhibit,* June 1 p 1338
- Thirtieth Anniversary, Jan. 26 p 277
- Rogers-Brown Iron Company:
Annual Report, Apr. 20 p 981
- Rogers-Brown Ore Company:
First Ore From the Cuyuna Range,
May 25 p 1258
- Roll-Over Core Machine,* Apr. 27 p 1024
- Rolled and Cast Material, Competition
Between, June 1 p 1294
- Rolling, Metal, in the United States,
Apr. 20 p 966
- Rolling Mill for St. Louis, New Steel,
Apr. 6 p 857
- Rolling Mill, Standard Motor-Driven,*
Apr. 20 p 988
- Rolls with Passes Cast In, Chilled,* May
25 p 1269
- Roof, Iron, Still Good After 40 Years,
Mar. 30 p 777
- Rope:
Gore Wire,* Apr. 20 p 975
- Paper, Mar. 30 p 799
- Transmission Splicing,* Apr. 27 p 1032
- Wire, of Exceptional Type,* Feb. 16
p 444
- Rotrex Pump,* May 18 p 1211
- Roughing Tool for High-Speed Steel,*
June 1 p 1351
- Runout Stopper, Paxson,* Jan. 5 p 116
- Russian Pig Iron Soaring, June 8 p 1421
- Rust, Electricity and Fence Wire, Feb.
10 p 290
- Rust-Proof Slag Paint, May 11 p 1167
- Ryan, Thomas F.:
Electricity on a Plantation, Feb. 2 p
388
- Ryerson, Joseph T., & Son:
Annual Meeting, Jan. 26 p 234
- S.
- St. Louis Foundry Foremen's Associa-
tion, Jan. 19 p 176
- St. Louis, New Steel Rolling Mill for,
Apr. 6 p 857; June 22 p 501
- Safety Association, Industrial, Mar. 9 p
587
- Safety Collars for Emery Wheels, Mar.
30 p 804
- Safety Devices for Iron Mine Work-
men, June 22 p 1539
- Salary Loan Evil, June 1 p 1318
- Salesman, Engineer as a, Jan. 19 p 200
- Salesmen Seeking for New Customers,
Feb. 10 p 340
- San Francisco, What Union Labor is
Doing for, Feb. 16 p 420
- Samuel, Lionel:
Securing Foreign Government Con-
tracts, May 4 p 1074
- Sand Blast:
Drucklieb Multiple Injector,* Apr. 13
p 727
- Drucklieb Specialties,* Jan. 5 p 103
- Kelly High Pressure,* Jan. 5 p 106
- Pressures, Feb. 9 p 350
- Tilghman Tumbling Barrell,* Jan. 5 p
105
- Sand Blending Machine, Standard,* Jan.
8 p 114
- Sand Dryer, Pangborn Ideal,* Jan. 5 p
112
- Sander, Atha Automatic Handle,* May
18 p 1218
- Sand in the Foundry, Handling,* June 8
p 1429
- Sand Mixers:
Auto,* Jan. 5 p 112
- Paxson Grooved Roller,* May 4 p
1101
- Sellers Centrifugal,* Jan. 5 p 113
- Sand Sifters:
Arcade Rotary,* Apr. 27 p 1042
- Deane,* Jan. 5 p 111
- Gregg Oscillating,* June 22 p 1525
- Hanna,* Jan. 5 p 110
- Saw and Burring Machine, Ajax Hot,*
Feb. 2 p 318
- Saw Bench, Oliver New Universal,*
Jan. 5 p 109
- Saws:
Armstrong-Blum High-Speed,* June 1
p 1304
- Covel Automatic Sharpener,* Apr. 6 p
866
- Newton Cold,* Mar. 30 p 795
- North Wales Geared Power Hack,*
Feb. 16 p 443
- Nutter & Barnes Automatic Sharpen-
er,* June 1 p 1350
- Scale, New Pennsylvania Railroad
Track,* Apr. 13 p 924
- Schaffer, Charles:
New Charcoal Blast Furnace, May 4
p 1000
- Schatz Mfg. Company:
Combination Punch and Shear,* Apr.
6 p 856
- Schellenbach Geared Head Lathe, 16-in,*
Jan. 12 p 166
- Schellenbach, W. L.:
Cincinnati's Industrial Department,
Mar. 30 p 797
- School, Navy an Industrial, Apr. 27 p
1004
- Schuchardt & Schütte:
Cutting Worm Gear on Gear Hobbing
Machine, June 20 p 1573
- Cutting Worm Gears with a Fly Cut-
ter, May 25 p 1218
- Schwedtmann & Emery:
European Methods of Accident Preven-
tion and Relief, Mar. 16 p 667
- Science, Business Administration as a
Constructive, Mar. 16 p 662; Mar.
23 p 722
- Scientific Industrial Operation, Apr. 13
p 1022
- Scientific Management, Conference on,
May 4 p 1087
- Scientific Management, Labor-Speeding
Under, Apr. 13 p 884
- Scientific Management—Taylor's Book,
June 22 p 1520
- Scott, Roscoe:
Steel Mill Lighting,* Apr. 6 p 862
- Screw, Hart Hollow Cap,* Feb. 9 p 389
- Screw, Hart Hollow Cap,* Feb. 9 p 389
- Scullin-Gallagher Iron & Steel Company:
Andrews Side Frame Patent Sustained,
June 1 p 1347
- Sellers' and Buyers' Bureau at Cleve-
land, Ohio, May 4 p 1101
- Sellers, Wm., & Co.:
Centrifugal Sand Mixers,* Jan. 5 p
113
- Selling Machinery, Ethics of, June 15 p
1448
- Separator, New Cutler-Hammer Mag-
netic, June 30 p 1581
- Shafts of Record Size, Concrete, Jan. 5
p 30
- Shapers:
Cincinnati, with Jib Crane,* Mar. 23 p
728
- Rockford Down Feed,* Mar. 30 p 796
- Steptoe 24-in. Back-Geared with Speed
Box,* Mar. 2 p 545
- Stockbridge 16-in. Single-Geared,*
May 18 p 1213
- Shapes by Cold Rolling of Standard
Sections, Forming Special,* May
18 p 1215
- Sharon Steel Hoop Company:
New Band Mill, June 29 p 1566
- Sharpener, Covel Automatic Circular
Metal Saw,* Apr. 6 p 866
- Shears:
Handy Slitting,* Apr. 6 p 866
- Leighton Combination Punch and,*
Mar. 10 p 680
- Schatz Combination Punch and,* Apr.
6 p 856

- Sheet Steel, Needed Standard for, June 22 p 1535
- Shenango Steamship Company:
Two 617-Ft. Ore Vessels Ordered, Feb. 9 p 374
- Sheet and Tin Plate Trades in 1910, Jan. 5 p 64
- Shepard Electric Crane & Hoist Company:
Electric Foundry Crane,* Jan. 5 p 95
- Sherman Anti-Trust Law Muddle, May 25 p 1272
- Sherman, P. Tecumseh:
Workmen's Accident Compensation in Seven States, Apr. 6 p 842
- Shipyards, New Work at Lake, Jan. 26 p 285
- Shop Efficiency, Railroad Repair,* Jan. 5 p 31
- Shop Floors,* Feb. 9 p 378; Feb. 16 p 426
- Shop Management, Modern, Apr. 20 p 970
- Shop Operations, Standards of Efficiency in, Jan. 19 p 204
- Shops of Improved Construction, Machine and Boiler,* Jan. 19 p 216
- Shops in South African Mines, Underground, Mar. 30 p 759
- Shot and Gas Cavities in Iron Castings,* June 1 p 1330
- Shuster, F. B., Company:
Special Riveter,* Mar. 16 p 678
- Sprue Cutters,* Jan. 5 p 117
- Siberian Exposition, First West, Feb. 2 p 312
- Sibley Machine Tool Company:
Four-Spindle Drilling Machine,* June 1 p 1347
- Stationary Head Drilling Machine, 24-in.,* May 4 p 1089
- Sifters:
Deane Sand,* Jan. 5 p 111
- Gregg Oscillating Sand,* June 22 p 1525
- Hanna Sand,* Jan. 5 p 110
- Silicon and Manganese in Foundry Practice,* June 1 p 1348
- Silicon Alloy, Outerbridge, Jan. 5 p 44
- Simmance-Abady CO₂ Recorder, Precision,* May 11 p 1162
- Slag, Protecting Metal from Superincumbent, June 20 p 1554
- Slags, Effect of Titanium Alloy on, Mar. 10 p 657
- Slip-Over Boxes and Bands, Diamond,* Jan. 5 p 115
- Slocum, Charles V.:
Titanium in Iron and Steel, June 1 p 1322
- Sloss-Sheffield Steel & Iron Company:
Annual Report, Mar. 23 p 728
- Sly, W. W., Mfg. Company:
Tumbling Mills,* Jan. 5 p 104
- Smith, Andrew:
Metal Perforating Process,* Mar. 16 p 672
- Smith, Charles G.:
Safety Collars for Emery Wheels, Mar. 30 p 804
- Smith & Caffrey Company:
New Eureka Snap Flask,* Jan. 5 p 116
- Smith, Charles L.:
Cincinnati Iron Trade in 1910, Jan. 5 p 62
- Smith, J. D., Foundry Supply Company:
Drucklieb Sand Blast Specialties,* Jan. 5 p 103
- Snyder, F. T.:
Reliability of Electric Furnaces, Jan. 26 p 266
- Societa Anonima Ilva:
Italy's Greatest Steel Plant, Mar. 30 p 761
- Souther, Henry, Engineering Company:
Laboratory, Feb. 16 p 418
- Souther, Henry:
Needed Standard for Sheet Steel, June 22 p 1535
- Southern Companies May Merge, Apr. 6 p 825; Apr. 13 p 907
- Southern Supply and Machinery Dealers' Association, Feb. 2 p 323; Apr. 6 p 840; Apr. 13 p 904
- Southwark Foundry & Machine Company:
Reversing Convertible Simple or Compound Engine,* Apr. 13 p 930
- Spang, Chalfant & Co., Inc.:
Annual Meeting, Jan. 19 p 176
- Specifications for Cold Drawn Weldless Steel Tubes, British, Apr. 27 p 1024
- Speculators, Instructive Reading for, May 18 p 1195
- Speidel, J. G.:
Ceiling Electric Elevator Machine,* Jan. 12 p 105
- Speller, F. N.:
Process of Manufacturing Locomotive Boiler Tubes,* May 4 p 1104
- Spelter and Lead Production in 1910, May 4 p 1056
- Spencer Wire Company:
Universal Chain Oil Feed,* June 29 p 1587
- Spinner, Grant Multiple Spindle Rivet,* Jan. 26 p 279
- Splicing Transmission Rope,* Apr. 27 p 1032
- Spout, Hooper Continuous Pouring,* May 25 p 1207
- Springfield Mfg. Company:
New Dry Grinder,* Mar. 23 p 743
- Sprue Cutters:
(See Cutters)
- Square, Noyes T.* Feb. 9 p 387
- Stack, Steel, for 10,800-hp. Boiler Plant,* May 18 p 1221
- Standard for Sheet Steel, Needed, June 22 p 1535
- Standard Machinery Company:
New Reducing Presses,* Jan. 12 p 163
- Sprue Cutter,* Jan. 5 p 116
- Unusual Press Installation,* Feb. 23 p 494
- Standard Mfg. Company:
Motor-Driven Rolling Mill,* Apr. 20 p 988
- Standard Oil Company:
Tin Plate Purchase, Jan. 19 p 206
- Standard Reinforcement for Concrete, Pittsburgh, Mar. 23 p 725
- Standard Samples of Steel and Ore, New, Feb. 2 p 327
- Standard Sand & Machine Company:
Sand Blending Machine,* Jan. 5 p 114
- Standard Scale & Supply Company:
Eclipse Concrete Mixers at Chicago Cement Show, Feb. 9 p 376
- Large Contract for Scales, May 18 p 1194
- Standard Screw Company:
Annual Report, May 25 p 1275
- Standardization by the Automobile Engineers, Apr. 6 p 857
- Standardizing Flask Pin Holes,* Jan. 26 p 234
- Standards, Bureau of:
Emery Testing Machines, May 4 p 1103
- Standards for the Various Kinds of Pig Iron, June 8 p 1400
- Stanwood, James B.:
Ratio of Burden to Labor, Apr. 20 p 965
- Starters, Magnetic Switch Motor,* Apr. 6 p 847
- Staybolt Press, Labor-Saving,* May 25 p 1266
- Stead, J. E.:
Steel Ingot Treatment,* May 25 p 1262
- Steam and Exhaust Pipe Size Charts,* Feb. 23 p 500
- Steam Engineers' Convention, June 15 p 1477
- Steam-Hydraulic Forging Press,* June 15 p 1471
- Steam, Long Distance Transmission, Feb. 23 p 496
- Steel:
And Iron Production for 25 Years,* Jan. 19 p 206
- Association of American Manufacturers, Annual Meeting, Mar. 9 p 595
- "Building Up" Impurities in, Feb. 23 p 480; Mar. 2 p 537
- Capacity in Germany and at Home, New, May 4 p 1054
- Castings in Fast Time,* June 29 p 1588
- Depreciation of Unprotected, Feb. 2 p 300
- Electric, Production at a German Works, May 4 p 1079; May 11 p 1120
- European Syndicates, Jan. 26 p 273
- Features of a Modern Foundry,* Apr. 6 p 852
- From Basic Pig Iron, Germany Making Electric, Jan. 5 p 39
- Hardness of Quenched Tool,* May 25 p 1250
- Ingot Treatment,* May 25 p 1262
- Manufacturers Confer on Trade Conditions, Jan. 19 p 208
- Mill Lighting,* Apr. 6 p 862
- Navy Tool, Revised Specifications, June 29 p 1568
- Our Record Production in 1910, Mar. 23 p 704
- Prices Reduced, June 1 p 1296
- Production in 1910, Mar. 30 p 782
- Rail Failures,* Mar. 30 p 780
- Soft, Influence of Manganese on, Apr. 13 p 913
- Super-Vitrite High-Speed, Jan. 26 p 282
- Tests of, at Watertown,* May 18 p 1200
- Titanium in Iron and, June 1 p 1322
- Works Labor Conditions, Betterment of, May 11 p 1144
- Stenotype, Feb. 9 p 375
- Stephens-Adamson Mfg. Company:
Automatic Reversing Trippers, Feb. 2 p 291
- Offices, Jan. 19 p 215
- Steptoe, John, Shaper Company:
24-In. Back Geared Shaper with Speed Box,* Mar. 2 p 545
- Sterling Steel Foundry Company, May 4 p 1081
- Sterling Wheelbarrow Company:
Flasks,* Jan. 5 p 115
- Stevens, Charles J., Company:
Modern Steel Products Warehouse,* June 29 p 1500
- Stimpson, H. F.:
Business Administration as a Constructive Science, Mar. 16 p 662; Mar. 23 p 722
- Work of the Efficiency Specialist, Mar. 30 p 760
- Works Administration as a Constructive Science, Jan. 26 p 248
- Stirling, Robert R.:
Packing Machine,* Jan. 19 p 225
- Stockbridge Machine Company:
16-In. Single Geared Shaper,* May 18 p 1213
- Stoker, Detroit,* Feb. 9 p 384
- Stopper, Paxson Runout,* Jan. 5 p 116
- Storage Batteries, Feb. 23 p 474
- Stove Founders' and Molders' Conference, Jan. 19 p 203
- Stove Manufacturers, National Association of:
Convention, May 18 p 1232
- Strainers:
Buffalo Feed Water,* May 18 p 1222
- Quix Pneumatic Hose Coupling,* Jan. 5 p 45
- Straub, Theo. D.:
Large Basic Open-Hearth Furnaces, Jan. 19 p 201
- Street, A. L. H.:
Judicial Decisions of Interest to Manufacturers, Jan. 5 p 17; Feb. 2 p 343; Mar. 9 p 595; Mar. 30 p 771; June 22 p 1514
- Strong Steel Foundry Company, May 25 p 1201
- Studding Machine, New Metal,* Apr. 20 p 987
- Sturtevant, B. F., Company:
Foundry Blowers,* Jan. 5 p 101
- Sullivan Machinery Company:
Changes in Officers, Feb. 9 p 389
- Sulphuric Acid, Pneumatic Handling of,* Mar. 9 p 616

Sulphur in the Air and Metal Corrosion, June 20 p 1589
 Sump Pump, Buffalo Self-Contained Vertical,* June 8 p 1429
 Super-Vitrite High-Speed Steel, Jan 26 p 282
 Superintendents and Foremen, Cleveland, Mar 23 p 717
 Superior Charcoal Iron Company:
 New Charcoal Pig Iron for Chilled Car Wheels, Mar. 9 p 695
 Supply and Machinery Convention, Triple:
 Announcements, Feb. 2 p 323; Feb. 16 p 406; Mar. 30 p 788
 Convention, Apr. 6 p 840; Apr. 13 p 904
 Superior Tumbling Mills,* Jan. 5 p 104
 Sure Center Finder,* Apr. 27 p 1031
 Svea Caloric Engine Test,* Jan. 5 p 33
 Swaging Machine, Langelier,* May 25 p 1261
 Swaine Mfg. Company, Fred J.:
 Kant-Leak Kleets and Press,* Mar. 16 p 675
 Swank's, Hiram, Sons:
 New Fire Brick Plant, Apr. 20 p 992
 Swayne, Noah H., 2d:
 Pig Iron Output in Two Panics,* Apr. 6 p 824
 Swedish Iron & Steel Corporation:
 Unusual Stock of Swedish Steel, June 1 p 1305
 Swedish Iron Ore, Electric Smelting of, Feb. 16 p 419
 Swift-Waters Mfg. Company:
 Plant to Be Sold, May 18 p 1217
 Syndicates, European Steel, Jan. 26 p 273
 System, Value of, Jan. 12 p 121

T.

Tabor Mfg. Company:
 Efficiency Methods, Apr. 13 p 902
 New Jarring and Roll-Over Molding Machines,* Jan. 5 p 86
 Taft Plan to Lease Water Power, Feb. 9 p 373
 Tapping Machine, Interesting Application of a Barnes,* June 29 p 1580
 Tariff:
 Commission Convention, Jan. 19 p 207
 Foreign Work of Bureau of Manufactures, May 18 p 1214
 Hysteries and Industry, Apr. 27 p 1004
 New Free List, Apr. 20 p 947
 Reciprocity Agreement with Canada, Feb. 2 p 288
 Revision Begun, Apr. 20 p 974
 Unexpected Addition to the Free List, June 1 p 1295
 Taylor, Ellsworth M.:
 Sound Business Methods in the Foundry, Jan. 5 p 74
 Taylor, Frederick W.:
 Skeptic on Some Efficiency Figures, Apr. 6 p 820
 Technology, Congress of, at Boston, Mar. 9 p 592; Mar. 16 p 686; Mar. 30 p 788; Apr. 20 p 967
 Temperature Controlling Instrument, Automatic,* June 8 p 1418
 Tennessee Coal, Iron & Railroad Company:
 Ensley Rail Mill Closed Down, May 4 p 1071
 Remarkable Records at Ensley Furnaces, May 11 p 1165
 Terminals, Erie Canal, on Lake Erie, Apr. 27 p 1021
 Terry Steam Turbine Company:
 Turbine Driven Gas Blowers, Apr. 13 p 933
 Test of O. K. Tools, Recent,* Feb. 23 p 401
 Test, Svea Caloric Engine,* Jan. 5 p 33
 Testing Machines at the Bureau of Standards, Emery, May 4 p 1103
 Testing Materials, American Society for Feb. 2 p 313; Apr. 27 p 1035; June 1 p 1207
 Testing Materials, International Association for, Mar. 9 p 590

Testing Plant, Government Hydraulic, Feb. 2 p 289
 Tests:
 Elongation and Ductility Rail, Apr. 6 p 839
 Herrick Rotary Engine, Jan. 5 p 71
 Steel at Watertown,* May 18 p 1200
 Turbine Driven Furnace Blower, May 4 p 1070
 Thermites, June 22 p 1538
 Thermometer, Bristol Class 111 Recording,* Jan. 19 p 213
 Thomas, E. P.:
 President United States Steel Products Company, Feb. 2 p 293
 Thomas, Prof. Carl C.:
 Meter for Measuring Gases,* Mar. 16 p 676
 Threaders:
 Murchey Motor-Driven Pipe,* Apr. 27 p 1036
 William 12-In. Steam-Driven Pipe,* May 18 p 1218
 Ties, Hill Rail Fastener for Steel,* June 20 p 1501
 Tilghman-Brooksbank Sand Blast Company:
 Sand Blast Pressures, Feb. 9 p 350
 Sand Blast Tumbling Barrel,* Jan. 5 p 105
 Tin Plate and Sheet Trades in 1910, Jan. 5 p 64
 Tin Plate Purchase, Standard Oil, Jan. 19 p 206
 Tin Plate Trade, Welsh, Jan. 12 p 157
 Tires, Cause of the Shelling of Wheel,* June 29 p 1577
 Titanium Alloy Mfg. Company:
 Titanium in Steel, Mar. 16 p 657
 Titanium Alloy on Slags, Effect of, Mar. 16 p 657
 Titanium for Malleable Iron, June 1 p 1323
 Titanium in Iron and Steel, June 1 p 1322
 Tobacco Decision, American, June 1 p 1296
 Toby, S. T.:
 Ethics of Selling Machinery, June 15 p 1448
 Toledo Electric Welder Company:
 Automatic Welding of Hoops, May 25 p 1269
 Exceptionally Small Electric Welding Machine,* Apr. 27 p 1038
 Practical Side of Electric Spot Welding,* May 18 p 1208
 Toledo Machine & Tool Company:
 Large Single Crank Press,* May 4 p 1087
 Toledo Pipe Threading Machine Company:
 New Pipe Threading Tool,* Feb. 9 p 386
 Tool Factory, Modern Electric,* May 4 p 1106
 Tool for High-Speed Steel, Roughing,* June 1 p 1351
 Tool Holder, Almond,* Mar. 23 p 742
 Tools and Appliances, New, Jan. 12 p 133; Feb. 2 p 332; Feb. 9 p 300; Mar. 9 p 628; Mar. 16 p 687; Mar. 23 p 745; Mar. 30 p 773; Apr. 6 p 848; Apr. 13 p 896; May 4 p 1100; May 25 p 1251
 Tool Steel, Navy, Revised Specifications, June 29 p 1568
 Torrance Malleable Iron Company:
 Very Complete Foundry Trolley System,* Feb. 23 p 493
 Townsend, H. P., Mfg. Company:
 High-Speed Drill Press,* June 20 p 1580
 Track Scale, New Pennsylvania Railroad,* Apr. 13 p 924
 Tractor Works, International Harvester,* June 29 p 1582
 Trade Balance Due to Our Manufactures, Our, May 25 p 1236
 Trade of the United States with Canada, Feb. 23 p 502
 Trade with Latin-America, Our, Feb. 16 p 422
 Traffic Club of Pittsburgh, Apr. 6 p 825

Transformers, Triumph, Type L,* Feb. 2 p 330
 Transmission Appliances, Positive Improved,* May 11 p 1163
 Transmission Gear Company:
 Harris Transmission Gear,* May 18 p 1212
 Trink, Prof. C. L. W.:
 Future in Blowing Engine Practice, June 15 p 1463
 Trippers, Automatic Reversing, Feb. 2 p 291
 Triumph Electric Company:
 New Drive for Planers,* June 20 p 1573
 Type L Transformer,* Feb. 2 p 330
 Trolleys:
 Delta and Changeezy Tramrail,* Jan. 5 p 93
 Yale & Towne Mfg. Company, Jan. 5 p 94
 Tropenas Converter Company:
 Converter with Double Door Bottom, Apr. 27 p 1018
 Truck, Automatic Electric Freight,* May 11 p 1161
 Truck, Angle Steel Tool,* June 29 p 1575
 Tube Works, Republic Iron & Steel Company's, New,* Jan. 5 p 41
 Tubes, British Specifications for Cold Drawn Welded Steel, Apr. 27 p 1024
 Tubes, Process of Manufacturing Locomotive Boiler,* May 4 p 1104
 Tubing, New Heinle Method of Making Square, June 29 p 1587
 Tufts, C. G.:
 Coke-Oven Gas in Open-Hearth Furnaces, June 22 p 1501
 Tumbling Barrels:
 Baird Improved,* Feb. 23 p 489
 Calumet Crane Type,* Feb. 2 p 330
 Northern Engineering Works,* Feb. 2 p 327
 Ohio Sand Blast* (Drucklieb), Jan. 5 p 103
 Sly,* Jan. 5 p 104
 Superior,* Jan. 5 p 104
 Tilghman,* Jan. 5 p 105
 Tungsten Mill Cluster Lamp, Benjamin,* Feb. 2 p 331
 Tupper, C. A.:
 Air Compressor Regulation,* June 22 p 1536
 American Machinery in Europe, May 18 p 1198; June 15 p 1481
 Name Plates on American Machinery, Mar. 2 p 518
 Turbine and Its Lessons, Geared, Apr. 6 p 819
 Turbine-Driven Furnace Blower, Economy Tests of a, May 4 p 1070
 Turbine-Driven Gas Blowers, Apr. 13 p 933
 Turbine Installation, Interesting Curtis,* Feb. 23 p 492
 Turbine Reducing Gear, De Laval,* Apr. 13 p 919
 Turbines and Reduction Gears for a Naval Vessel, Westinghouse, May 18 p 1232
 Turbines in the New York Post Office, Kerr,* Apr. 27 p 1040
 Turin International Exposition, May 4 p 1071
 Turpentine, Government Asks for a Substitute for, May 18 p 1209
 Twentieth Century Steel Stock Rack,* Jan. 19 p 226

U.

Uehling Instrument Company:
 Waste Meter,* June 29 p 1574
 Underwood, Congressman, Oscar W.:
 Tariff Views, Jan. 19 p 198
 Underwood, H. B., & Co.:
 Allner-Boswell Radius Planer Attachment,* Apr. 27 p 1038
 New Power Bender and Straightener,* Mar. 9 p 506
 Unemployment Insurance in Great Britain, May 4 p 1072
 Union Elbows, Jefferson,* June 1 p 1365

- Union Steel Casting Company:
Equipment, Mar. 30 p 781
Extensions, Apr. 6 p 825
- United Engineering & Foundry Company:
Blooming Mill with Novel Features, Feb. 2 p 310
Buys Another Plant, Jan 5 p 29
Forging Press Catalogue, June 15 p 1449
Forging with a High Speed Hydraulic Press,* Jan. 26 p 282
- United Iron Works:
Pneumatic Handling of Sulphuric Acid,* Mar. 9 p 616
- United Shoe Machinery Company:
Country Club for Employees, Jan. 12 p 159
- United States Metal Products Company,
Mar. 30 p 783
- United States Steel Corporation:
A Thousand an Acre for Connellsville Coal, June 15 p 1447
Additions to Fleet, Feb. 23 p 495
Air Cooling System for Sheet and Tin Plate Mills, May 4 p 1069
And the Administration, June 15 p 1462
Annual Meeting, Apr. 20 p 949
Annual Report, Mar. 23 p 718
Buys Bassett-Presley Company, June 14 p 1465
Buys Coal Lands, June 8 p 1380
Buys Risdon Works, May 11 p 1142
Changes in Officers, Feb. 2 p 293
Construction in Birmingham District, May 4 p 1089
Earnings in 1910, Feb. 2 p 292
Exports in 1910, Jan. 26 p 233
Five New Merchant Mills at Gary,* Mar. 9 p 597
Investigation, June 1 p 1309; June 8 p 1404; June 15 p 1466; June 22 p 1532
Iron Ore in Hundreds of Millions of Tons,* Mar. 9 p 618
Official Changes,* May 4 p 1077
Output in 1910, Jan. 12 p 120
Payments for Hill Ore, Jan. 12 p 163
Policy of Publicity, June 15 p 1448
President Corey Resigns, Jan. 5 p 7
President Farrell,* Jan. 12 p 123
Production, 1901-1910, Feb. 16 p 404
Production Statement, Mar. 23 p 702
Quarterly Statement, Apr. 27 p 1006
Safety Devices for Iron Mine Workmen, June 22 p 1539
Steel Prices Reduced, June 1 p 1296
To Be Investigated, May 18 p 1193
Unfilled Orders, Jan. 12 p 147; Feb. 16 p 442; Mar. 16 p 666; Apr. 13 p 906; May 11 p 1124; June 15 p 1463
Vice-President Dickson's Resignation, Mar. 23 p 727
- United States Steel Products Company:
E. P. Thomas, President, Feb. 2 p 293
- United Vacuum Appliance Company:
Connersville Blower Applied to Vacuum Cleaning,* May 11 p 1166
- Universal Boring Machine Company:
No. 3 Boring Machine,* Mar. 30 p 790
- Universal Saw Bench, Oliver New,* Jan. 5 p 109
- University of Wisconsin:
Long Distance Transmission of Steam and Its Effect on Power Plant Economies, Feb. 23 p 496
- Unloading Pig Iron With Lifting Magnets,* Apr. 6 p 865
- Unloading Plant, New Brown Ore,* Apr. 6 p 861
- Utah, Manufactures in, May 4 p 1057
- Utilizing Blast Furnace Wastes, June 8 p 1397
- V.
- Vacuum Cleaning, Connersville Blower Applied to,* May 11 p 1166
- Valves:
Cutler-Hammer Solenoid Operated,* Mar. 16 p 680
Hydromatic Water,* May 18 p 1219
- Machine for Boring Engine,* May 25 p 1282
- Van Alstyne, David:
Modern Shop Management, Apr. 20 p 970
- Vanadium in Cast Iron, June 8 p 1398
- Vanadium Mines Company, May 25 p 1260
- Vanadium Sales Company of America, June 8 p 1432
- Vehicles, Advantages of Long Stroke Motors for Commercial, Mar. 23 p 744
- Venezuela, Public Works of, June 29 p 1593
- Ventilating Device, Reversible Window,* May 25 p 1281
- Ventura Disk Fan,* May 18 p 1222
- Vermillion Iron Ore Explorations,* Apr. 20 p 990
- Victor-Balata & Textile Belting Company, May 11 p 1142
- Vitrolite Company:
Improvements, June 8 p 1432
- Vulcan Detinning Company:
Annual Report, May 11 p 1127
- W.
- Wallace Supply Company:
Hand Power Bar Bender,* Mar. 30 p 792
- Walker, Robert A.:
Pittsburgh Iron Trade in 1910, Jan. 5 p 56
- Warner & Swasey Company:
Combination Turret Lathe,* June 8 p 1424
- Warwick Iron & Steel Company:
Annual Report, Feb. 9 p 368
- Water Filtration for Industrial Purposes, Jan. 26 p 271
- Water Heating, Bates Improvement in Feed,* June 29 p 1592
- Water Power, Taft Plan to Lease, Feb. 9 p 373
- Water Power Development Needed, More, Jan. 26 p 246
- Water, Treatment and Purification of Boiler Feed, Mar. 2 p 533
- Water-Wheels, Notable Installation of Pelton-Francis,* May 18 p 1221
- Waterbury Company:
Gore Wire Rope,* Apr. 20 p 975
- Waterbury Farrel Foundry & Machine Company:
Cam Pillar Press,* Apr. 27 p 1036
- Watertown, Tests of Steel at,* May 18 p 1200
- Watson-Stillman Company:
Handy Hydraulic Press,* June 29 p 1578
- Watters, Thomas C.:
Determination of Manganese in the Presence of Chromium, May 11 p 1156
- Waverly Warehouse, Extras on Bars and Shapes from, May 11 p 1143
- Weaver Mfg. Company:
Roller Jaw Chuck,* Jan. 19 p 223
- Webber, William O.:
Gas Producer—Gas Engine Plants,* Mar. 16 p 682
Remarkable Boiler Performance, May 25 p 1238; June 22 p 1500
- Webster Mfg. Company:
Improvements, Feb. 2 p 309
New Plant, Mar. 9 p 616
- Weigher, New Liquid,* June 8 p 1432
- Weimer Machine Works Company:
New Cinder Car,* Jan. 5 p 46
- Welch Hammer & Machine Company:
New Hammer of the Helve Type,* May 25 p 1273
- Welding Company, Jan. 5 p 49
- Welding Machine, Exceptionally Small Torpedo Electric,* Apr. 27 p 1038
- Welding of Hoops by Toledo Welder, Automatic, May 25 p 1269
- Welding, Practical Side of Electric Spot,* May 18 p 1208
- Welfare Work, May 25 p 1276
- Welfare Work, Central Station, Apr. 20 p 973
- Welfare Work of Electric Lighting Companies, June 8 p 1398
- Welfare Work, Steel Manufacturers Consider, May 4 p 1056
- Welsh Tin Plate Trade, Jan. 12 p 157
- Western Electric Company:
Annual Report, Mar. 30 p 776
Fiscal Year, Jan. 12 p 169
- Western Steel Corporation:
Improvements, Jan. 12 p 145
- Westinghouse Electric & Mfg. Company:
Air-Cooled Choke Coils,* June 29 p 1570
Annual Report, June 15 p 1461
Apprenticeship System,* Apr. 6 p 848
Direct Current of 1500 Volts for a Railroad, June 22 p 1501
New Interpole Direct Current Generators,* Apr. 27 p 1037
New Pennsylvania Electric Locomotives, Mar. 9 p 593
Type E Alternating Current Generator,* Feb. 9 p 377
- Westinghouse Machine Company:
Apprenticeship System,* Apr. 6 p 848
Turbines and Reduction Gears for a Naval Vessel, May 18 p 1232
- West Penn Steel Company:
Extensions, Apr. 20 p 979
- West, Thomas D.:
American Foundry Practice and Its Demands, Feb. 2 p 311
Gas Cavities and Shot in Iron Castings,* June 1 p 1339
Shot Iron and Hard Spots in Castings, Jan. 5 p 52
- Wheeler, C. H., Mfg. Company:
Rotrex Pump,* May 18 p 1211
- Wheeler Condenser & Engineering Company:
Large Condenser Installations, Apr. 20 p 947
- Wheeling-La Belle Steel Merger Off, Apr. 6 p 837
- Wheels:
Asa W. Whitney Car, Mar. 23 p 716
Cast Iron, and the Grinding Machine, Feb. 23 p 459
Davis Cast Steel Car,* May 4 p 1090
Ferromanganese in Car Wheel Iron, Mar. 16 p 644
Ferromanganese in Chilled Cast Iron, Apr. 6 p 820
Grinding Car, Without Removing Them, Mar. 9 p 620
Kirk & Blum Adjustable Emery Hood,* Apr. 13 p 933
McConway Car,* Mar. 30 p 789
New Charcoal Pig Iron for Chilled Car, Mar. 9 p 605
Number of Car Wheels, Apr. 20 p 947
- Wheel Tires, Cause of the Shelling of,* June 29 p 1577
- White, Albert E.:
Iron Ore Briquette Specifications, Feb. 9 p 374
- White Irons and the Prevention of Growth in Castings, Mar. 23 p 744
- White Star Individual-Continuous Oiling System,* May 11 p 1160
- Whiting Foundry Equipment Company:
Cupola,* Jan. 5 p 99
- Whitney, Asa W.:
Car Wheels, Mar. 23 p 716
- Whitney Metal Tool Company:
Ball-Bearing Rotary Hand Punch,* Mar. 2 p 544
- Wiener, Ernst, Company:
Foundry Cars,* Jan. 5 p 97
- Wilbraham-Green Blower Company:
Green Foundry Blowers,* Mar. 9 p 621
- Wiley & Russell Mfg. Company:
Combination Opening Die Machine,* Mar. 2 p 554
- Wiley, Brent:
Motors for Driving Main Rolls of Mills,* Feb. 16 p 438
- Williams, Franklin:
Quix Pneumatic Hose Coupling Strainer,* Jan. 5 p 45

Williams, Henry:
Navy Yard Apprentices, Apr. 6 p 850

Williams, John S.:
Federal Regulation of Corporations
Proposed, Apr. 27 p 1025

Williams Tool Company:
12-In. Steam-Driven Pipe Threader,*
May 18 p 1218

Wilson, Governor Woodrow:
Corporations, Jan. 19 p 174

Wire:
Cable Conveyor for Handling Kegs,*
May 11 p 1165
Cambria Steel Company's New Plant,*
Mar. 23 p 730
Museum of the Industry,* June 22 p
1522
Rope of Exceptional Type,* Feb. 16 p
444
Rope Trade Inquiry, Jan. 5 p 5
Standard Lengths for Test Pieces,
Feb. 23 p 450

Wire Machine, Blashill & Gray Barb,*
Jan. 5 p 53

Wire Specialty Works:
New Metal Studding Machine,* Apr.
20 p 987

Wisconsin Engine Company:
Its New Management, Mar. 9 p 593

Wise, J. B.:
M. R. V. Brass Melting Furnace,*
Feb. 9 p 388

Women's and Minors' Wages, State
Control of, June 29 p 1554

Wood & Spencer Company:
Adjustable Snap Thread Gauge,* Mar.
9 p 621
Reaming and Drilling Jig,* Mar. 2 p
550

Wood, Alan, Iron & Steel Company:
Special Bridge for Ladle Cars,* Apr.
27 p 1031

Wood, H. I.:
Standardizing Flask Pin Holes,* Jan.
26 p 234

Wood, Henry M.:
Accident Prevention in the Machine
Shop,* May 18 p 1204
Safeguarding Against Fire, Apr. 20 p
948

Woodbridge, Dwight E.:
Exploration of Cuban Iron Ores,*
Apr. 13 p 914
Iron Ore in Hundreds of Millions of
Tons,* Mar. 9 p 618
Iron Ore Reserves Underestimated,
May 4 p 1080
Vermillion Iron Ore Explorations,*
Apr. 20 p 990

Worcester Metal Trades Annual Meet-
ing, Mar. 16 p 666

Works Administration as a Construc-
tive Science, Jan. 26 p 248

World's Railroad Mileage in 1909, June
15 p 1461

World's Railroads, Iron and Steel in
the, June 29 p 1552

Worm Drive for Automobiles, Advan-
tages of, May 4 p 1070

Worm Gear on Gear Hobbing Machine,
Cutting, June 29 p 1573

Worthington, Henry R.:
New Liquid Weigher,* June 8 p 1432

Wrenches, New Cresco Monkey,* Mar.
16 p 679

Wyoming Automatic Eliminator,* Apr.
13 p 918

Y.

Yale & Towne Mfg. Company:
Hoists and Trolleys,* Jan. 5 p 94
Will Establish a Canadian Plant, Apr.
6 p 841

York Mfg. Company:
Machine and Boiler Shops of Im-
proved Construction,* Jan. 19 p
216

Youngstown, Ohio, Greater Activity at,
Feb. 9 p 366

Youngstown Sheet & Tube Company:
Will Build Open-Hearth Steel Plant,
June 15 p 1448

Yuba Construction Company, Feb. 16 p
419

Z.

Zecher, Cupola,* Jan. 5 p 98

THE IRON AGE

Established
1855

New York, January 5, 1911

VOL. 87: No. 1

Published Every Thursday by the
DAVID WILLIAMS COMPANY

14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.00 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MELANCHOLIC EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.	

CONTENTS.

Editorial:	PAGE.
Pig Iron Output, 27,250,000 Tons.....	1
The Outlook.....	2
Foundry Features of This Issue.....	3
Efficiency in Railroad Management.....	3
Wood Preservation and By-Product Coke.....	3
Confusion Over Noncancellation Clauses.....	4
Correspondence.....	5
A Wire Rope Trade Inquiry.....	5
Pig Iron Production, Illustrated.....	6
President Corey Resigns.....	7
The Iron and Metal Market Reports.....	8 to 17
Iron and Industrial Stocks.....	17
Judicial Decisions of Interest to Manufacturers.....	17
Personal.....	18
Obituary.....	18
Columbia Tool Steel Company's Salesmen.....	18
The Machinery Market Reports.....	19 to 27
Fluctuations in the Prices of Iron and Steel Products for Thirteen Years. (With Supplement.).....	28
The United Engineering & Foundry Company Buys Another Plant.....	29
The British Iron Trade in 1910.....	29
Concrete Shafts of Record Size.....	30
New Railroad Construction and Equipment.....	30
Railroad Repair Shop Efficiency.....	31
The Mechanical Handling of Freight.....	33
Svea Caloric Engine Test, Illustrated.....	33
New Iron and Steel Works Construction.....	34
The Dresses 1-in. Screw Machine, Illustrated.....	39
Germany Making Electric Steel from Basic Pig Iron.....	39
The Republic Iron & Steel Company's New Tube Works. Illustrated.....	41
The Outerbridge Silicon Alloy.....	44
A Bliss Straight Sided Press of Unusual Proportions. Illus. The Quix Pneumatic Hose Coupling Strainer, Illustrated.....	45
A New Welmer Cylindrical Car, Illustrated.....	46
The Patterson Six-Sheave Steel Block, Illustrated.....	47
The Cleveland Horizontal Boring Mill, Illustrated.....	47
Haniel & Lueg Steam-Hydraulic Forging and Bending Press. Illustrated.....	48
The Morris Swiveling Radial Drill Table, Illustrated.....	49
The Hill Rolling Mill Bearing, Illustrated.....	49
The Welding Company.....	49
A New German Gas Engine, Illustrated.....	50
The Moller Oval Chuck, Illustrated.....	52
Shot Iron and Hard Spots in Castings.....	52
The Blashill & Gray Barb Wire Machine, Illustrated.....	53
The Douglas Contractors' Diaphragm Pump, Illustrated.....	53
The Pratt & Whitney Automatic Cylindrical Sizing Grinder. Illustrated.....	54
The Pittsburgh Iron Trade in 1910.....	56
The Philadelphia Iron Trade in 1910.....	58
The Chicago Iron Trade in 1910.....	60
The Cincinnati Iron Trade in 1910.....	62
The Copper Trade in 1910.....	63
The Sheet and Tin Plate Trades in 1910.....	64
Recent Tendencies in the Foundry Industry.....	66
Customs Decisions.....	67
Chain Information.....	67
Ornamental Castings Made in Permanent Molds, Illustrated Another Duff Jack Improvement.....	71
Herrick Rotary Engine Tests.....	71
A Proposed Malleable Castings Plant, Illustrated.....	72
Sound Business Methods in the Foundry.....	74
The Progress of Mechanical Engineering in the Foundry. Illustrated.....	76
The E. D. Clapp Mfg. Company's Improvements.....	81
Unique Drawbridge at Portland, Ore.....	81
Brass Melting Furnaces.....	82
A Municipal Congress and Exposition.....	82
Modern Foundry Equipment, Illustrated.....	83 to 117
Current Metal Prices.....	118

Pig Iron Output, 27,250,000 Tons

Last Year's Record Far Beyond That of 1909

Many More Furnaces Blown Out—Little Buying of Finished Material

Pig iron output was sharply cut down in December, and on January 1 the number of furnaces in blast, 188, was 27 less than at the beginning of December. The December production of coke and anthracite pig iron was 1,774,817 tons, or an average of 57,252 tons a day, as against 63,659 tons a day in November. The December output was thus only slightly above that of December, 1908, an indication that the restriction of output may be approaching if it has not already crossed the line representing ordinary wear and tear consumption.

Steel works blast furnaces were responsible for almost all the reduction of 6400 tons from the daily rate of pig iron production in the previous month, the output of merchant furnaces in December being only 900 tons a day less than in November. The country is now producing pig iron at a yearly rate of about 19,700,000 tons, as against a rate of 31,600,000 tons in February of last year. The total pig iron production in 1910 was in excess of 27,250,000 tons, or more than 1,450,000 tons beyond the best previous record—namely, 25,795,000 tons in 1909.

Developments of the week in finished material have been meagre, but sentiment is rather more hopeful, the disposition being to look forward to the outcome of present forbidding conditions, having in mind the well-known tendency of the iron trade to overdo its depressions as well as its booms. There is little expectation of a large movement in the first quarter of the year, and manufacturers adhere to the view that price reductions now would not meet such a response as came in the spring of 1909. Much is made in the lake ore market of the fact that furnaces with large supplies of ore on hand do not favor a reduction in the price for 1911. Similarly at Chicago the implement manufacturers are reported to favor the maintenance of present prices on bars, even though a reduction would carry a revision on their contracts. They fear the effect on the market for their own product.

Pittsburgh reports inquiry for Bessemer, basic and foundry irons, including one lot of 5000 tons and another of 2500 tons of Bessemer for the first half. At Chicago the price of No. 2 Northern iron, nominally \$16 for some time, is now generally \$15.50. Some sales of Southern foundry iron have been made at \$11, Birmingham, and this has been shaded on Tennessee iron for early delivery.

The general tendency to weakness in all pig iron markets has found no check as yet in the cutting down of output. A number of large buyers are waiting for signs of low point, but such buyers recall that their pur-

chases one year ago were made too soon and are accordingly cautious.

At Chicago rather better inquiry is reported from railroads, and at Pittsburgh car inquiries are coming up more encouragingly, including 3500 for the Buffalo, Rochester & Pittsburgh, 3000 for the Pennsylvania, 3000 for the Kanawha and 2000 each for the Wabash Pittsburgh Terminal and the Pittsburgh, Shawmut & Northern.

Billet prices have been shaded at Pittsburgh. At Chicago forging billets, in which there has been close competition for some time, as low as \$25 being reported some weeks ago, are now held at \$31.

Buyers of finished material appear to attach a marked significance to the meetings of manufacturers in New York next week, but these are not expected to result in immediate price changes.

The outlook for structural steel is a good feature of the situation. In New York City the Pennsylvania Terminal post-office work, 6200 tons, was taken by the George A. Fuller Company, and the Sloane warehouse, 2500 tons, by Levering & Garrigues. The New York Central has asked bids on 5400 tons of bridge and pier work.

The competition of iron bars is still cutting in on the business of the steel bar mills. Some fair orders have been placed for hard steel bars for concrete work.

Pig tin is still soaring, and this week has reached 39.55 cents, under considerable buying for consumption. The advance in this metal in the past year has been 6.40 cents, whereas copper, spelter and the other metals have all declined 1 cent or more since early 1910.

The Outlook

Seldom has the iron trade entered upon a year more beset with uncertainties than is 1911. It was said in these columns one year ago that of no year had larger expectations been entertained at its beginning than iron and steel manufacturers had of 1910. Moreover, in spite of disappointment and reaction, these expectations were, in some measure, realized, for 1910 was a year of record production of pig iron and steel ingots. Presumably there was a record domestic consumption also, though it is to be considered that some of the product was stocked—in pig iron, probably three-quarters of a million tons was added to stock—also that our exports of iron and steel were greater than ever. Prices of finished products were such as gave most manufacturers a profitable year, though some saw their earnings cut considerably in the second half by lack of full employment, and the blast furnace industry, as a whole, suffered both from low prices and diminished sales.

But 1910 is of comparatively small interest now; the question of moment is what 1911 has in store for the iron trade. For four months the shrinkage of new orders has been pronounced and the opening of the new year shows nothing near at hand to change that tendency. Yet it is familiar history that the point is reached in the abstention of buyers where even the wear and tear of the country are not being satisfied, except as stocks are drawn upon. All through 1910 the volume of consumption has been difficult to measure. It has been accepted in a general way that it was exceeded by the output of the mills in the late months of 1909 and the early months of 1910—a period when con-

sumers all along the line were carrying stocks more in conformity with the expansion of the iron industry and all the infinitely ramifying lines dependent upon it, after running on small margins for months following the panic. Now, we have the reverse operation and the interesting question is how far new orders and mill output have fallen below the country's actual use of iron and steel.

The iron trade would like to know how soon the present halt in buying will give way again to a free movement, and the answer involves a good deal of perplexity. For the present the industry is involved with all others in a reactionary movement which seems not yet fully to have run its course. Railroad buying for this year, as far as outlined by railroad officers, does not promise much increase, if any, over that for 1910, but pending questions may be settled in a way that will improve this outlook before the year is far advanced. So far as rails are concerned, a repetition of the 1910 tonnage would mean more than is generally appreciated. The leading interest rolled more rails in 1910 than in any previous year, though this could not be said of any other company.

It is evident that 1911 will be, in all lines, a year for the absorption of manufacturing capacity already provided, rather than for important additions through new enterprises or the expansion of those existing. The iron trade, for example, contributed much to the volume of its own business in 1909 and 1910, though less than in 1906 and 1907, by the construction work it had under way. Almost entirely the new construction of 1911 will represent the completion of that overhanging from 1910 and 1909.

In addition to the influences which affect all industries, iron and steel products have to reckon with the result of the present deadlock over prices. It is the habit of consumers to buy on a rising market or because of the prospect of an advance. Such an incentive to buying is not now in sight, and manufacturers are not yet persuaded that prices should go down in order that later they may go up. The price situation, therefore, conspires with other factors to make the first half of 1911 a period of moderate demand. In general, the disposition among the leaders in the trade is to look for a reversal of the course of 1910, and thus to expect that conditions at the end of 1911 will be considerably more favorable than at the beginning.

Foundry Features of This Issue

Without omitting the matter commonly forming a part of the first issue of *The Iron Age* in a new year, special attention has been given this week to foundry topics. Whatever may have been said 20 years ago or even 10 years ago about the backwardness of the foundry industry and the favoritism always shown the machine shop in spending money for equipment, that form of introduction to every article on a foundry subject has passed out of vogue. The foundry, with the help of a good number of talented men who have been working hard on its problems, has been finding itself, and it is by no means the object of commiseration uninformed persons still think it to be. It is not so long ago that the making of sand molds for the casting of iron was referred to as a trade for which the labor supply was increasingly inadequate. The outlook seemed to be for a more complete domina-

tion of the industry by a strong and unprogressive labor union. As far as the preparation of the metal itself was concerned, "scientific" mixing and melting were held to be more or less of an iridescent dream. In the new foundry movement the mechanical advance has been greater than the metallurgical, perhaps because the labor side of the problem was most pressing, but there is a very high and growing respect for foundry metallurgy.

Mechanical engineering found the foundryman in the grip of an apprentice ratio that was putting him more and more in the hands of the Shop Committee. Machines have sprung up, and the ratio between workers and total output has been revised without waiting for a union referendum. Naturally this side of modern foundry development is given large space in the articles prepared for this issue. These show that the most recent results with the molding machine have opened up possibilities that even five years ago were not considered as at all within reach. Along with this advance in the machine has been a most important one in foundry construction. As new shops have been laid out the designer has provided for the employment of mechanical handling, not only of molding materials, but of molds to iron or iron to molds, and we hear more of continuous pouring and of continuous core making and carrying and baking, as in the article elsewhere on "The Progress of Mechanical Engineering in the Foundry."

Of recent improvements not only in molding machines, but in other foundry equipment, interesting details are given in a group of illustrated articles on other pages, while special contributions deal with "Recent Tendencies in the Foundry Industry," "Sound Business Methods in the Foundry," "Brass Melting Furnaces," "Ornamental Castings in Permanent Molds" and "A Proposed Malleable Castings Plant." In the flood of foundry literature in the past few years, through foundrymen's associations and otherwise, some questions have become hackneyed, but our contributors have succeeded well in bringing out what is of immediate and vital interest.

Secretary Moldenke of the American Foundrymen's Association compresses into a sentence the hopeful situation of the industry to-day in saying that it has never shown better defined tendencies toward advancement—a condition he attributes to the fact that in technical equipment the present generation of foundrymen has never been equaled.

Efficiency in Railroad Management

Our readers will find much food for thought in the article presented elsewhere in this issue by Max H. C. Brombacher on "Railroad Repair Shop Efficiency." The operation of repair shops is recognized as a most important part of the general administration of railroad management. Unless they are conducted efficiently a railroad company can suffer seriously in the cost of maintaining its train service. The attention of the public having been turned in this direction it was believed that an excellent field for investigation was presented, and we accordingly commissioned Mr. Brombacher to make careful inquiry into the subject. He had previously introduced himself to the readers of *The Iron Age* by his excellent articles on efficiency in shop management, and it was believed that he was

well qualified to present this subject in its true condition, both accurately and judiciously. His investigations and analyses, as presented in the article referred to, are startling. Such wide variations are shown in the cost of railroad repairs in a comparatively small number of railroad shops that the question naturally arises whether a much wider investigation would not show that a low rate of efficiency prevails in entirely too many of the railroad shops of the country. The facts and figures in Mr. Brombacher's article speak for themselves, and it is unnecessary here to enter into a further discussion of the matter.

Wood Preservation and By-Product Coking

Viewpoints upon a number of economic subjects have been changing rapidly. To the widespread interest of two years ago in conservation of natural resources is succeeding an intense interest in the reduction of manufacturing costs. To the rosy expectations of enormous expenditures for railroad improvements, as, for instance, along the line of replacing wood ties with steel ties, has succeeded the question whether the railroads will be able to make both ends meet and maintain their ability to handle expeditiously the business offered.

These trends in the course of public thought come together at curious points, and it is not uninteresting to observe that while a few years ago the interest of the iron and steel industry in the advancing cost of wood lay chiefly along the line of steel ties and steel mine timbering, occasion is now being made for the industry to take an interest in the growth of wood preservation.

Rapid progress has been made of late in the study of wood preservation, so that definite ideas are being formulated as to methods to be followed and results to be expected. Outside of some methods calculated only to prolong slightly the life of timber, and involving only a small cost, there are two general methods; one is by the use of creosote and the other by the use of zinc chloride, while the methods are differentiated in that the use of salts is very objectionable when the wood is likely to be subject to a leaching action through the presence of water. This naturally leaves the larger part of the field, including that of railroad ties in particular, to creosote.

Of the different creosotes the coal tar creosote is preferred, it being as yet uncertain whether the oil tar creosote is as good. As far as commercial trends may be taken as representing the working out of scientific information, the coal tar creosote is by far the preferable, as is illustrated by the fact that much oil tar creosote is sold as coal tar creosote, and the further fact that about three-fourths of the creosote used in the United States is imported.

The aspect of our importing creosote for wood preservation, chiefly from Germany, is very peculiar. It is a by-product in coke manufacture; and while we do practice by-product coking in the United States it is only in a relatively limited way as to tonnage, and in a very limited way as to the degree to which the development of the by-products is carried. The large production of creosote in Europe is encouraged, if not caused, by the importance of the aniline dye industry, creosote being a convenient product when the final end in view is the production of these dyes. So far

as tonnage of coke is concerned, our coke industry is more than double the size of Germany's, and it is neither pleasant nor encouraging to observe our going to Germany for creosote.

In another respect the bringing together of the United States and Germany in the matter of wood preservation is peculiar. We remain more or less familiar with the pronouncements of two or three years ago with regard to the probable duration of our forests. Recalling the data for a moment, as summed up in a Government publication, "The Drain Upon the Forests," issued November 30, 1907, we find the estimates for the probable duration of our timber supply ranged from 9 to 33 years; the estimate of time depends upon the assumptions, whether one should take the largest or the smallest estimate of the amount of standing timber, the largest or smallest estimate of annual consumption, and the existing rate of consumption or increasing rate of consumption as had been shown.

With this startling prospect of timber exhaustion in the United States a very curious fact remains, and that is this: Germany has a total forest area of 35,000,000 acres and a population of about 65,000,000. Without depleting the forests but rather getting them to produce more timber from year to year, Germany has been able to supply five-sixths of her domestic demand, so that as the actual proportion is 0.54 acre per capita, with 0.65 acre per capita Germany could supply her domestic requirements indefinitely. The United States, on the other hand, has between 500,000,000 and 600,000,000 acres of standing timber and 92,000,000 of population—say, 6 acres per capita.

In these conditions we are confronted with timber exhaustion, and are drawing upon another country for material to preserve wood. That other country can supply its wood requirements indefinitely on one-tenth as much forest land per capita as we have; while of the coke, whose manufacture involves the preservative as a by-product, that country makes less than half as much as we do.

The suggestion might possibly be made that Germany has advanced farther in the substitution of iron and steel for wood and that we merely need to let things take their course until we shall in the natural progress of events reach the same point. That suggestion would be wide of the mark. Germany in nine months of this year exported 3,576,000 metric tons of iron and steel and imported 410,000 tons, a net balance of 3,166,000 tons. In the same period the German production of pig iron was 10,923,000 tons. Allowing for the balance of exports to represent somewhat more pig iron than the actual weight, this is at the rate of domestic pig iron consumption of 10,000,000 metric tons a year, and at 65,000,000 population this figures out 340 lb. per capita.

Such bewildering changes have occurred in the pig iron production of the United States that a per capita estimate of consumption is different. We made more than 25,000,000 tons of pig iron in a calendar year as far back as 1906, but in the calendar year 1908 less than 16,000,000 tons; in the twelvemonth ended June last we made almost 30,000,000 tons, but at present we are making only about 21,000,000 tons. Making a random guess at 25,000,000 tons, and neglecting exports as offering an entirely useless refinement in computation, we have a per capita consumption of pig iron of 600 lb., with 92,000,000 population.

Thus we consume something like twice as much pig iron per capita as Germany, and with 10 times the forest acreage per capita which Germany needs for maintaining her supply we are faced with exhaustion in a decade or a quarter century.

What we find in this cursory analysis tends to enforce the preachment so often heard these days, that our economic position needs improvement. The argument in favor of by-product coking is obvious, but to many in the iron and steel industry by-product coking means no more than retort instead of beehive coking. The retort, however, is only the beginning. With the refinements shown to be feasible and profitable on the Continent, the coke may be called the by-product and the various distillates and other manufactured commodities the main product. The prospect of a large market for the so-called by-products of coke manufacture has expanded in a striking way in very recent years. In addition to the call for creosote for wood preservation there is the call for tar products to treat macadamized roads and the opportunity to use the gas profitably, through the developments in gas engines and electric machinery, whereby the gas from the retort can be converted into electric power to be offered in power markets some distance removed from the point of coking, if local requirements do not exhaust the entire supply.

Confusion Over Noncancellation Clauses

Considerable readjustment of selling agreements between machinery manufacturers and dealers is in progress, and noncancellation clauses are occupying much attention, as there are diverse views on the subject. The adoption of noncancellation clauses is not confined to the machine tool builders, who have taken action to that end through their national body, but manufacturers of other classes of mechanical equipment are giving much thought to the subject.

For self-protection many dealers in metal working equipment have recently had printed on their business letter heads the stipulation "no cancellations accepted," but occasions arise when it would be impracticable for them to adhere strictly to that policy. When such occasions arise dealers are wondering whether under new conditions they will be obliged to carry the burden of the expense involved. Some manufacturers who have of late adopted a policy of not accepting cancellations are flat-footed in their statements that they will not take back machinery when it is once ordered by a dealer, nor will they defer collections for the equipment. Others are more lenient, and are willing to meet the dealer half way by accepting a part payment for the equipment and carrying the remaining charge on their books until the dealer can dispose of the returned machinery.

There are times when it is exceedingly unwise for a seller to insist on delivering a machine when the order has been canceled. For instance, when a buyer has been badly crippled through a fire in his plant and has no immediate use for the equipment ordered, it would be disastrous to a dealer to insist on delivering the material and then wait for insurance adjustments only to learn that his customer was also financially damaged through the loss of his plant. In such an event it would seem rather hard on the dealer to have to pay the manufacturer before he could dispose of

the machine where in many cases the maker could find other customers for it. Nevertheless, some manufacturers have taken the absolute stand that they will under no conditions accept cancellations or compromise in any way. They declare that they will bill dealers, although the latter are practically their agents, 30 days after delivery and will expect prompt payments.

Recently a machine tool maker forwarded a machine to an automobile supply manufacturer through a dealer who had an exclusive sales territory agreement covering the community where the automobile supply plant was located. The customer found his credit in bad shape, and as business fell off rather suddenly he canceled the order. The dealer having knowledge of the supply man's lack of funds cheerfully accepted the cancellation, but the manufacturer, when notified of the facts in the case, refused to accept the returned machine. He called the dealer's attention to the inflexibility of the noncancellation clause and insisted on collecting from the dealer who was obliged to carry \$4000 worth of machinery in stock until he could find a customer.

In cases where special machinery is made to order or machine tools have special scales, such drastic measures as this might be permissible, but otherwise the advisability of such a policy is open to question. It is true that loosely constructed selling agreements, such as formerly existed between manufacturers and dealers, in some cases have brought hardship on the maker through the cancellation of orders for specially constructed machines.

It has been the custom for manufacturers of mechanical equipment in many lines to ship dealers a reasonable amount of machinery for stock and await payment until a sale is made. Under the new conditions some machinery makers have announced that they will provide no machines for stock until they are paid for. In some instances, at least, the manufacturers' line of machinery is a very desirable one for dealers to handle, and many of them are seriously debating the question of acceding to the makers' demand. They foresee that if they do other manufacturers will adopt the same policy, which to them appears arbitrary. Other machinery makers have agreed to accept part payment for machines ordered by dealers for stock. On the other hand, many manufacturers claim that dealers frequently exercise little judgment in ordering for stock and place requisitions indiscriminately, regardless of their prospects for disposing of the equipment.

Correspondence

The Problem of Blast Furnace Efficiency

To the Editor: I have been very much interested in your editorials and in Mr. Brombacker's letters upon various phases of efficiency engineering. It is surprising what wide interest has suddenly developed in this line of work since the recent rate hearings, and I believe the industrial world will some time come to realize its debt to Mr. Brandeis and Mr. Emerson for bringing this important subject so prominently to the public notice.

There is one field for efficiency work which, so far as I know, is thus far practically untouched. I refer to the manufacture of iron, which, although it is not one of the least efficient industries, still offers many opportunities for economy, particularly in the South, where the materials are more varied and the practice less

standardized. During the last few years I have had the opportunity of making some investigations along this line and am confident that in nearly all cases some saving could be made, running up in a few instances to as high as \$1 per ton. A few examples which have come to my notice may serve to emphasize this statement.

At a brown ore mine the sand screened out and wasted ran higher in iron than the ore which was shipped. In some instances the ores used contain an excessive amount of slate, which could be easily removed by means of a picking belt. The saving in fuel would far more than offset the cost of picking. The coke is often unnecessarily high in ash, due to poor practice in washing the coal and to excessive drafting of the ovens. The blast temperature is frequently not as high as could be obtained and used because of incomplete combustion of the gas and general bad handling of the stoves. Excessive leakage of steam in the engine room introduces an unnecessarily large amount of moisture into the furnace.

The chief item of cost in the manufacture of iron in the South is fuel, and any successful efficiency system must take this into consideration. In this connection we are immediately up against the difficulty of determining the efficiency with which fuel is used in the blast furnace, the various factors which influence fuel consumption, and the quantitative effect of each. I hope in the near future to publish a paper setting forth a scientific basis by means of which these problems may be worked out.

In conclusion, I wish to assert my belief that under the present system of organization it is rarely possible for any one man to accomplish all that should be done along this line. Certainly it is not in the power of the usually overburdened furnace superintendent. What is needed is an efficiency organization independent of the operating department, but comparable, as Mr. Emerson has pointed out in his delightful book on "Efficiency," with the staff of the modern military system:

JOHN JERMAIN PORTER.

UNIVERSITY OF CINCINNATI, December 27, 1910.

A Wire Rope Trade Inquiry

The Broderick & Bascom Rope Company, manufacturer of wire rope, St. Louis, Mo., addressed sixty or more of its agents scattered throughout the country, taking in every State, asking for their views concerning the outlook for trade for 1911. A summary of the replies has been printed by the company. These replies, with very few exceptions, take an exceedingly hopeful view of business for the coming year. The wire rope trade is regarded by the company as a fair barometer of the general commercial condition from the fact that it is not confined to any one line, wire rope being largely used in lumber and logging camps and by oil well drillers, mining companies and boat builders, elevator builders, contractors, &c., so that consumers' interests are much diversified. The tenor of these replies is radically different from the views of James J. Hill, published by the Associated Press about December 1, which caused the inquiry to be made by the company. The Broderick & Bascom Rope Company states its opinions that 1911 will be a banner year unless trade should be interfered with by tariff tinkering, adverse railroad legislation or general labor troubles.

The Nelson Valve Company, Chestnut Hill, Philadelphia, Pa., has got out a danger sign for the use of men working around steam and electrical machinery. It is intended to be placed on an engine or machine when it is undergoing repairs, so that there will be no excuse for accidents occurring because a throttle was opened or a switch was closed while repairs were being made. These signs are of red cardboard, 6 in. in diameter, and have on both sides a skull in white and the legend "Danger—Hands Off" in large red letters on a white background. All persons who can make use of a supply of these signs can secure them by addressing the company.

Pig Iron Production

Sharply Cut Down in December

Daily Rate 6400 Tons Less Than in November

The production of coke and anthracite iron fell off greatly in December, the total being 1,774,817 tons, against 1,909,780 tons in November. There was a net loss of 27 in the list of active furnaces, leaving 188 in blast January 1 against 215 December 1. The average daily production last month was 57,252 tons, or about 6400 tons less than the daily average in November. The falling off was almost entirely in output of steel works furnaces, merchant furnace output declining less than 900 tons a day.

It is now possible to approximate the pig iron production of 1910. We estimate it to be in excess of 27,250,000 tons, as against 25,795,471 tons in 1909, an increase of more than 1,450,000 tons. The following table shows the production in gross tons by half years since 1907:

	1907.	1908.	1909.	1910.
First half.....	13,478,044	8,918,004	11,022,346	15,012,392
Second half.....	12,308,317	9,018,014	14,773,125	*12,250,000
Totals.....	25,786,361	15,936,018	25,795,471	.....

* Estimated

The above estimate of 12,250,000 tons for the second half of 1910 is based on an estimated production of 160,000 tons of charcoal iron. This figure may be exceeded.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with December, 1909, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.			
	Steel works.	Merchant.	Total.
December, 1909.....	57,058	27,964	85,022
January, 1910.....	57,200	26,948	84,148
February.....	57,876	27,740	85,616
March.....	56,113	28,346	84,459
April.....	55,663	27,129	82,792
May.....	52,235	24,867	77,102
June.....	51,637	23,879	75,516
July.....	47,183	22,122	69,305
August.....	46,534	21,429	67,963
September.....	47,007	21,536	68,542
October.....	45,794	21,726	67,520
November.....	41,427	22,232	63,659
December.....	35,909	21,343	57,252

December Output by Districts

The table below gives the production of all coke and anthracite furnaces in December and the four months preceding:

Monthly Pig Iron Production, Gross Tons.					
	August. (31 days)	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)	Dec. (31 days)
New York....	158,666	148,999	147,894	142,610	142,674
New Jersey....	19,177	18,773	19,115	18,284	15,437
Lehigh Valley..	63,878	63,919	69,327	62,161	68,531
Schuylkill Val.	64,926	60,689	61,673	54,642	51,466
Lower Susquehanna and Lebanon Val.	54,442	53,750	54,072	50,370	51,888
Pittsburgh dis.	510,352	505,342	507,508	445,083	397,379
Shenango Val.	113,500	108,114	112,026	82,904	82,706
West. Penn....	116,117	115,622	126,098	87,568	81,957
Md., Va. and Kentucky....	76,477	68,398	67,926	58,772	61,045
Wheeling dis.	68,341	74,143	76,581	84,390	74,225
Mahoning Val.	211,575	201,986	202,667	180,717	162,349
Central and North. Ohio..	122,960	111,958	117,902	108,599	112,662
Hocking Valley, Hanging Rock and S W Ohio.	32,490	27,657	24,029	25,008	28,759
Mich., Minn., Mo., Wis., Col., Wash.	66,096	63,935	72,825	78,927	68,313
Chicago dis....	258,145	259,672	246,504	239,469	197,340
Alabama.....	140,015	148,755	160,077	165,512	148,625
Tenn., Georgia and Texas....	29,690	24,563	26,897	24,764	29,461
Totals.....	2,106,847	2,056,275	2,093,121	1,909,780	1,774,817

Among furnaces blown out in December were one Lock Ridge in the Lehigh Valley, one Steelton (banked) and one Lebanon in the Susquehanna Valley, three Carrie, one Edgar Thomson, Clinton and one Aliquippa in the Pittsburgh district, Hall in the Shenango Valley,

Bellefonte and Punxy in western Pennsylvania, one Sparrows Point in Maryland, two Mingo in the Wheeling district, one Hubbard in the Mahoning Valley, Jisco in the Hanging Rock district, one Joliet, three South Chicago and one Gary in the Chicago district, one Colorado at Pueblo, one Zug Island and the Detroit Furnace Company stack (banked) at Detroit, one Pioneer, Trussville, two Ensley and one Vanderbilt in Alabama. Among furnaces blown in were one Bethlehem in the Lehigh Valley, one McKeesport in the Pittsburgh district, one Cambria at Johnstown and Rockdale in Tennessee.

Capacity in Blast January 1 and December 1

The following table shows the daily capacity of furnaces in blast January 1 and December 1. These figures are based largely on the performance of the furnaces in the past two months, and include the capacity of furnaces merely banked during part of the holidays:

Coke and Anthracite Furnaces in Blast and Capacity.—Gross Tons.

Location of furnaces.	Total number of stacks.	January 1.		December 1.	
		Number in blast.	Capacity per day.	Number in blast.	Capacity per day.
New York:					
Buffalo.....	17	12	4,034	12	4,067
Other New York....	7	3	568	3	565
New Jersey.....	1	2	502	2	508
Spiegel.....	2	..	..	..	..
Pennsylvania:					
Lehigh Valley.....	23	11	2,062	11	1,942
Spiegel.....	3	1	84	1	81
Schuylkill Valley..	10	6	1,660	6	1,762
Low. Susquehanna..	7	4	690	5	861
Lebanon Valley....	10	5	710	6	820
Pittsburgh district..	50	29	11,890	34	13,686
Spiegel.....	3	1	134	1	120
Shenango Valley....	20	8	2,541	9	2,623
West. Penn.....	27	11	2,763	12	2,769
Maryland.....	4	2	530	3	710
Wheeling district....	14	5	1,725	7	2,675
Ohio:					
Mahoning Valley...23	15	5,286	16	5,705	
Central and North..22	10	3,455	10	3,620	
Hocking Val., Hang- ing Rock and S.					
W. Ohio.....	15	7	910	8	984
Illinois and Indiana..31	13	5,605	18	7,705	
Spiegel.....	3	1	175	1	100
Michigan, Wisconsin and Minnesota....	10	5	1,104	7	1,476
Colorado, Missouri and Washington.....	7	2	708	4	1,085
The South:					
Virginia.....	23	8	893	8	879
Kentucky.....	5	2	320	2	344
Alabama.....	46	16	3,794	21	5,096
Tenn. and Georgia..20	9	904	8	896	
Totals.....	415	188	53,047	215	61,079

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies.—Gross Tons.

	Pig		Total production		Spiegeleisen and ferromanganese.	
	1908.	1909.	1908.	1909.	1908.	1909.
January.....	664,415	1,117,823	1,773,201	12,325	19,778	19,778
February.....	745,802	1,073,363	1,820,539	10,946	21,766	21,766
March.....	841,502	1,110,553	1,739,212	23,743	25,691	25,691
April.....	725,548	1,009,992	1,636,898	22,178	22,194	22,194
May.....	759,674	1,256,448	1,613,283	20,834	23,520	23,520
June.....	717,689	1,365,527	1,549,112	16,516	27,680	27,680
July.....	798,639	1,508,762	1,462,689	17,613	22,924	22,924
August.....	897,052	1,560,391	1,442,572	12,313	25,756	25,756
September.....	933,514	1,690,839	1,416,221	28,148	15,151	15,151
October.....	996,481	1,769,094	1,419,624	25,384	8,500	8,500
November.....	981,167	1,689,994	1,212,804	23,376	9,032	9,032
December.....	1,090,339	1,768,799	1,113,174	20,791	12,178	12,178

Graphic Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:



Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to January 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron Delivered at Chicago.

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.		1908.		1909.		1910.	
January	71,149	33,718	71,149	33,718	57,975	84,148	84,148	84,148
February	73,038	37,163	73,038	37,163	60,976	85,616	85,616	85,616
March	71,821	39,619	71,821	39,619	59,232	84,459	84,459	84,459
April	73,885	38,289	73,885	38,289	57,962	82,792	82,792	82,792
May	74,048	37,603	74,048	37,603	60,753	77,102	77,102	77,102
June	74,486	36,444	74,486	36,444	64,656	75,516	75,516	75,516
July	72,763	39,287	72,763	39,287	67,793	69,305	69,305	69,305
August	72,594	43,851	72,594	43,851	72,546	67,963	67,963	67,963
September	72,783	47,300	72,783	47,300	79,507	68,476	68,476	68,476
October	75,386	50,554	75,386	50,554	83,856	67,520	67,520	67,520
November	60,937	52,595	60,937	52,595	84,917	63,659	63,659	63,659
December	39,815	56,158	39,815	56,158	85,022	57,252	57,252	57,252

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou.	Loc.	Sou.	Loc.	Sou.	Loc.	Sou.	Loc.
	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
	Cin.	Chi.	Cin.	Chi.	Cin.	Chi.	Cin.	Chi.
Jan.	26.00	25.85	16.15	18.45	16.25	17.35	17.25	19.00
Feb.	26.00	25.85	15.75	18.16	16.13	16.75	17.06	19.00
March	26.00	26.10	15.50	17.85	15.05	16.50	16.30	18.30
April	25.06	26.35	15.20	17.73	14.25	16.50	15.37	17.50
May	24.25	26.85	14.75	17.63	14.50	16.50	15.00	17.06
June	24.10	26.60	15.25	17.73	14.70	16.50	14.85	16.75
July	23.85	25.55	15.00	17.55	15.75	17.00	14.75	16.56
Aug.	23.00	24.85	15.25	17.35	16.38	17.13	14.31	16.50
Sept.	21.50	24.10	15.65	17.05	17.35	18.70	14.25	16.40
Oct.	20.95	22.45	15.75	16.85	17.88	19.00	14.25	16.06
Nov.	19.50	20.66	16.00	17.10	17.75	19.00	14.25	16.00
Dec.	17.00	18.80	16.25	17.35	17.45	19.00	14.25	16.00

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.		1908.		1909.		1910.	
January	2,205,607	1,045,250	2,205,607	1,045,250	1,797,560	2,608,605	2,608,605	2,608,605
February	2,045,068	1,077,740	2,045,068	1,077,740	1,707,340	2,397,254	2,397,254	2,397,254
March	2,226,457	1,228,204	2,226,457	1,228,204	1,832,194	2,617,949	2,617,949	2,617,949
April	2,216,558	1,149,602	2,216,558	1,149,602	1,738,877	2,483,763	2,483,763	2,483,763
May	2,295,505	1,165,688	2,295,505	1,165,688	1,883,330	2,390,180	2,390,180	2,390,180
June	2,234,575	1,092,131	2,234,575	1,092,131	1,930,866	2,265,478	2,265,478	2,265,478
July	2,255,660	1,218,129	2,255,660	1,218,129	2,103,431	2,148,442	2,148,442	2,148,442
August	2,250,410	1,359,831	2,250,410	1,359,831	2,248,930	2,106,847	2,106,847	2,106,847
September	2,183,487	1,418,998	2,183,487	1,418,998	2,385,206	2,056,275	2,056,275	2,056,275
October	2,336,972	1,567,198	2,336,972	1,567,198	2,599,541	2,093,121	2,093,121	2,093,121
November	1,828,125	1,577,854	1,828,125	1,577,854	2,547,508	1,909,780	1,909,780	1,909,780
December	1,234,279	1,740,912	1,234,279	1,740,912	2,635,680	1,774,817	1,774,817	1,774,817

J. A. Farrell, president of the United States Steel Products Company, has returned from Europe.

President Corey Resigns

Announcement is made of the resignation of William E. Corey, who has been president of the United States Steel Corporation since 1903. The following statement has been given out by Chairman Elbert H. Gary, on behalf of the corporation:

After more than seven years of faithful service as president of the United States Steel Corporation, William E. Corey has tendered his resignation, to take effect at the pleasure of the Board of Directors. The resignation will be presented to the board for consideration and action in due time, and the Finance Committee will then present its recommendations concerning the subject matter.

It is the present opinion of the members of the Finance Committee that there should not be elected a successor as president in the immediate future, if at all. The experience and talents of Mr. Corey have best fitted him to take charge of the manufacturing and commercial departments, and his attention has been largely confined to that service. However, as the manufacturing companies are all thoroughly equipped with the very best talent, including such as the above mentioned branches need, the strength of the organization will not be diminished. The Finance Committee may recommend the election of a vice-president or two vice-presidents, who will be expected to take special charge of different departments, and it is intended to strengthen the whole organization in every respect practically and useful.

The relations between Mr. Corey and the members of the board and of the Finance Committee, respectively, as well as all the officers of the United States Steel Corporation and subsidiary companies have been most pleasant and agreeable. Mr. Corey severs his connection with a feeling of loyalty to, and friendship for, the corporation and its interests, and takes with him the best wishes of all who are connected with the companies above referred to.

Mr. Corey has discharged his duties with signal ability. Under his administration the efficiency of the great plants owned by the corporation has not only been maintained at the highest standard of excellence, but their productive capacity has been largely augmented on lines which have added greatly to the earnings and profits of the corporation.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

PIG IRON, Per Gross Ton:	Jan. 4, 1911.	Dec. 28, 1910.	Dec. 7, 1910.	Jan. 5, 1910.
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$19.00
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	17.25
Foundry No. 2, local, Chicago..	15.50	16.00	16.00	19.00
Basic, delivered, eastern Pa....	14.75	14.75	14.75	18.75
Basic, Valley furnace.....	13.25	13.25	13.50	17.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh.....	13.90	13.90	13.90	17.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	19.50

BILLETS, &c., Per Gross Ton:	23.00	23.00	23.00	27.50
Bessemer billets, Pittsburgh....	23.00	28.00	....	31.00
Open hearth billets, Philadelphia	25.40	25.40	25.50	30.60
Wire rods, Pittsburgh.....	28.00	28.00	28.00	33.00

OLD MATERIAL, Per Gross Ton:	15.50	15.50	16.00	20.00
Iron rails, Chicago.....	17.00	17.00	18.00	20.50
Iron rails, Philadelphia.....	13.00	13.50	13.50	18.50
Car wheels, Chicago.....	13.00	13.00	13.75	17.50
Heavy steel scrap, Pittsburgh....	13.50	13.50	13.75	18.00
Heavy steel scrap, Chicago.....	11.50	12.00	12.25	16.00
Heavy steel scrap, Philadelphia.	12.50	12.50	12.75	17.00

FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.32½	1.32½	1.35	1.65
Common iron bars, Chicago.....	1.30	1.35	1.35	1.60
Common iron bars, Pittsburgh..	1.35	1.35	1.40	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York...	1.56	1.56	1.56	1.71
Beams, Pittsburgh.....	1.40	1.40	1.40	1.55
Angles, tidewater, New York...	1.56	1.56	1.56	1.71
Angles, Pittsburgh.....	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh.	1.25	1.25	1.25	1.50
Skelp, sheared steel, Pittsburgh.	1.30	1.30	1.30	1.60

SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.15	2.40
Wire nails, Pittsburgh*.....	1.70	1.70	1.70	1.85
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.85
Barb wire, galv., Pittsburgh*...	2.00	2.00	2.00	2.15

METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	13.00	13.00	13.00	14.00
Electrolytic copper, New York..	12.75	12.75	12.87½	13.75
Spelter, New York.....	5.55	5.60	6.00	6.30
Spelter, St. Louis.....	5.40	5.50	5.85	6.15
Lead, New York.....	4.50	4.50	4.50	4.70
Lead, St. Louis.....	4.35	4.35	4.35	4.65
Tin, New York.....	39.55	38.45	37.95	33.40
Antimony, Hallett, New York...	7.55	7.75	7.75	8.25
Tin plate, 100-lb. box, New York	\$3.84	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast on 80c. on plates, structural shapes and sheets, No. 11 and heavier: 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ½ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.40c. to 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1,

1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¾-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.	Steel.	Black.	Galv.	Iron.	Black.	Galv.
1½, 1¼, ¾ in.....	72	58	68	54			
1½ in.....	75	63	71	59			
¾ to 1½ in.....	79	69	75	65			
2 to 3 in.....	80	70	76	66			
	Lap Weld.						
2 in.....	76	66	72	62			
2½ to 4 in.....	78	68	74	64			
4½ to 6 in.....	77	67	73	63			
7 to 12 in.....	75	59	71	55			
13 to 15 in.....	51½						
	Butt Weld, extra strong, plain ends, card weights.						
1½, 1¼, ¾ in.....	69	59	65	55			
1½ in.....	74	68	70	64			
¾ to 1½ in.....	78	72	74	68			
2 to 3 in.....	79	73	75	69			
	Lap Weld, extra strong, plain ends, card weight.						
2 in.....	75	69	71	65			
2½ to 4 in.....	77	71	73	67			
4½ to 6 in.....	76	70	72	66			
7 to 8 in.....	69	59	65	55			
9 to 12 in.....	64	54	60	50			
	Butt Weld, double extra strong, plain ends, card weight.						
1½ in.....	64	58	60	54			
¾ to 1½ in.....	67	61	63	57			
2 to 3 in.....	69	63	65	59			
	Lap Weld, double extra strong, plain ends, card weight.						
2 in.....	65	59	61	55			
2½ to 4 in.....	67	61	63	57			
4½ to 6 in.....	66	60	62	56			
7 to 8 in.....	59	49	55	45			

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld { Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in. Lap Weld {
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2½ in.	61	43
2½ in.	63	48
2½ to 5 in.	69	55
6 to 13 in.	61	43
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, \$28; open hearth and chain rods, \$28.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, January 4, 1911.—(By Telegraph.)

Pig Iron.—There is some inquiry for Bessemer and basic iron for first half, but as yet none of this business has gone through. One lot of 5000 tons of Bessemer and another of 2500 tons are wanted. A local interest has bought 2000 tons of No. 2 foundry for first half at \$13.75 to \$14. Valley furnace, and there is an inquiry out for 3000 tons of gray forge for second quarter delivery, on which \$13. Valley furnace, has been quoted. Pig iron is still piling up in the valleys and further restriction in output seems imperative. A meeting of basic pig iron makers was held in Cleveland on Monday, but so far little progress has been made toward uniting the basic furnace interests in the two valleys. One large maker has so far refused to join, and without his co-operation the movement is hardly likely to be successful. Prices are largely nominal, as not enough is being sold to test the market. We quote Bessemer iron nominally at \$15; basic, \$13.25; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13, all at Valley furnace, with a freight rate of 90 cents a ton to Pittsburgh.

Steel.—Consumers of billets and sheet and tin bars are taking in only such quantities as are required to meet current needs. We note a sale of 1500 tons of open hearth billets to a local consumer at \$23, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Several of the leading steel mills report that actual orders for structural material, plates and bars sent to the mills in December for rolling were slightly larger than in November. This is the only encouraging feature of the situation that can be reported this week. The fact remains that consumers are not buying more than what they actually must have. The announcement that the leading steel manufacturers would hold a series of meetings in New York, commencing January 9, has probably served to increase the uncertainty that exists in the trade relative to the maintenance of present prices. It is known that a number of consumers were ready to place some good sized orders this week, but most of them will hold off until the meetings are over. Operations among the steel mills are not over 50 per cent. of capacity and probably slightly less. The Carnegie Steel Company blew out three Carrie furnaces, one Edgar Thomson and two Mingo furnaces during December and may blow out more this month. The average price of Bessemer pig iron in December is given as \$15, and basic \$13.40 at Valley furnace, but hardly enough pig iron was sold last month to establish a market. The regular Bessemer and open hearth billet prices are being shaded by several outside mills. Coke and scrap are dull, with prices weak.

Ferromanganese.—In the absence of sales, we quote foreign 80 per cent. at \$38, Baltimore, for delivery through first half of this year, the freight to Pittsburgh being \$1.95 a ton.

Ferrosilicon.—There is no new inquiry, and no actual sales have been reported in this market for several weeks. We quote 50 per cent. for delivery over first half at \$54 to

\$55, and for prompt delivery at \$55 to \$55.50. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent., \$24; 12 per cent., \$25, f.o.b. cars Jisco and Ashland furnaces.

Skelp.—A sale of upward of 2000 tons of narrow grooved steel skelp by a pipe mill is reported on the basis of 1.25c., delivered buyer's mill. Consumers are pretty well covered over the next three months, some of them on sliding scale contracts. We quote grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Rods.—New inquiries are light and only for small lots. Specifications against contracts, especially from the chain manufacturers, have not been coming in at a satisfactory rate for several months. We quote Bessemer and open hearth rods at \$28, and it is stated that this price can be shaded.

Muck Bar.—We quote best grades of muck bar, made from all pig iron, at nominally \$29, Pittsburgh. No sales have been made in some time.

Steel Rails.—The Carnegie Steel Company has received several fairly large orders for standard sections from frog and switch companies for delivery over 1911, and also taken several contracts for standard section rails for export. The same company has also sold 50,000 pairs of splice bars for reasonably prompt shipment to the Louisville & Nashville Railroad. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Plates.—Some good sized inquiries for steel cars are in the market, in addition to those noted in this report last week. The Kanawha & Michigan Railroad is inquiring for 3000, the Wabash-Pittsburgh Terminal for 2000, the Pennsylvania for 3000, Pittsburgh, Shawmut & Northern for 2000, and the Buffalo, Rochester & Pittsburgh for 3500. It is stated that the Pennsylvania Railroad will soon have inquiries out for a much larger number than mentioned above. Last week the Baltimore & Ohio placed orders for 1000 steel underframe cars, 500 going to the American Car & Foundry Company and 500 to the Haskell & Barker Car Company. M. A. Hanna & Co., Cleveland, have recently placed contracts for an ore boat, the plates and shapes, about 3500 tons, going to the Carnegie Steel Company. Inquiries have not yet come out for the plates and shapes for the two boats to be built by the Pittsburgh Steamship Company. We quote ¼ in. and heavier plates, both in narrow and wide sizes, at 1.40c., Pittsburgh.

Structural Material.—New inquiries are light. The McClintic-Marshall Construction Company has taken 800 tons for a new steel building for the Standard Sanitary Mfg. Company at New Brighton, the material to be furnished by the Bethlehem Steel Company. The Cambria Steel Company has taken about 300 tons for an extension to a steel building for the Westinghouse Air Brake Company at Wilmerding, Pa. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Sheets.—The sheet trade is better, in that prices are being well-maintained, but the new demand has not shown improvement. Some of the mills report they are operating close to full capacity, while others are running only from 50 to 60 per cent. Roofing sheets are particularly quiet, as outside building operations are practically at a standstill. The full schedule of prices is printed on a previous page.

Tin Plate.—Little new business is being placed, this being the off season in the tin plate trade. The leading makers state that specifications on the large contracts booked within the last two months from the meat packers and can makers are coming in quite freely. We quote \$3.60 per base box for 100-lb. cokes, f.o.b. Pittsburgh.

Bars.—Inquiries for hard steel bars for concrete reinforcement purposes are heavy, the consumption of bars for this purpose steadily increasing. The new demand for soft steel bars and common iron bars is quiet, but specifications are coming in fairly well. We quote soft steel bars at 1.40c. and common iron bars at 1.35c., base, f.o.b. Pittsburgh.

Hoops and Bands.—The trade is still placing only small orders to meet current needs, and specifications against contracts are only fair. We quote hoops at 1.50c.; bands, 1.40c. in carload and larger lots and 1.45c. in small lots, the latter carrying extras as given in the steel bar card dated September 1, 1909.

Cotton Ties.—The season is practically over and shipments on contracts have about been finished. The general price on cotton ties is 78½c. per bundle.

Spikes.—No large orders for railroad spikes have been placed in the past week. Several leading Western roads are

THE IRON AND METAL MARKETS

figuring on their requirements for 1911 and are expected to be in the market shortly. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c. for local trade. We quote small railroad and boat spikes at 1.60c. to 1.65c., base, in carload and larger lots.

Spelter.—Offers of spelter to local consumers in the past few days at 5.30c., East St. Louis, have been turned down. We quote prime grades at 5.25c., East St. Louis, equal to 5.37½c., Pittsburgh.

Merchant Steel.—New orders and specifications against contracts in December were only fair, but may show betterment this month, a good many consumers having asked that shipments be held up until after inventory period. Prices are fairly strong. We quote, f.o.b. Pittsburgh: Iron finished tire, 1½ x ½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Shafting.—Specifications against contracts are coming in a little better from automobile makers, but are still slow from the implement trade. New orders run to small lots only to meet current needs. Regular discounts on cold rolled steel shafting are 57 per cent. off in carload and larger lots and 52 per cent. off in small lots delivered in base territory.

Rivets.—Users of rivets are placing orders only in small lots, and specifications against contracts are not very satisfactory. It is stated that prices are being fairly well maintained.

Wire Products.—The new demand for wire nails and wire is light, being only for small lots to meet current needs and to help distributors to keep up stocks. It is expected that in the latter part of January the demand will materially improve in anticipation of the opening up of spring trade. It is said that prices are being well maintained. We quote galvanized barb wire at \$2; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

Merchant Pipe.—Current new business in merchant pipe is fairly good, but shipments by the mills in December show a falling off as compared with November. The Tri-State Gas Company is reported as about to come in the market for a fairly large gas line to be laid in northern Pennsylvania. The Louisiana Gas Company, Shreveport, La., has placed a contract with a local mill for 20 miles of 8-in. pipe. Stocks held by jobbers are very low, and it is therefore expected that the demand will shortly improve. Discounts on both iron and steel pipe are stated to be quite well maintained.

Boiler Tubes.—The mills have recently entered some nice locomotive tube orders and more are in sight. Merchant tubes are dull and discounts are still being more or less shaded.

Iron and Steel Scrap.—Little material was sold by dealers to consumers in the last half of December, and shipments against contracts were largely held up, owing to inventory period. It is expected that the demand will show betterment this month. Prices are without change, but are weak. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$13.50 to \$13.75
No. 1 foundry cast.....	13.50 to 13.75
No. 2 foundry cast.....	12.75 to 13.00
Bundled sheet scrap, at point of shipment.....	9.00
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.75 to 15.00
No. 1 railroad malleable stock.....	13.00 to 13.25
Grate bars.....	11.25 to 11.50
Low phosphorus melting stock.....	17.25 to 17.50
Iron car axles.....	24.00 to 24.50
Steel car axles.....	20.25 to 20.50
Locomotive axles.....	24.00 to 24.50
No. 1 busheling scrap.....	12.25 to 12.50
No. 2 busheling scrap.....	8.75 to 9.00
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.75 to 16.00
Cast iron borings.....	7.90 to 8.00
Machine shop turnings.....	8.60 to 8.75
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.50 to 14.75
Stove plate.....	14.50 to 14.75
Heavy steel axle turnings.....	10.25 to 10.50

Coke.—No large inquiries for blast furnace or foundry coke are in the market. We note a sale of about 25 cars of high grade 72-hour foundry coke for shipment over the next three months at \$2.25 per net ton at oven. The output in the Upper and Lower Connellsville regions last week was about 295,000 tons, a slight increase over the previous week. We quote standard makes of furnace coke for spot shipment at \$1.40 to \$1.50 per net ton at oven, while for delivery over first half of 1911 from \$1.75 to \$2 is quoted.

Best makes of 72-hour foundry coke for spot shipment are held at \$1.90 to \$2 per net ton at oven, and for first half of the year at \$2.25 to \$2.50.

Chicago

FISHER BUILDING, January 4, 1911.—(By Telegraph.)

The question of prices is now foremost in the minds of buyers as well as sellers of steel products in this territory. The leading buyers of bars are opposed to any reduction at the present time in their line, as their yearly contracts run from July to June. A reduction now would mean a heavy loss to them, as the price guarantee in their contracts does not apply to any tonnage already specified. In the case of structural material and plates the enormous amount of business in prospect is a sustaining factor. In view of these conditions the leading men in the Chicago market do not expect any redudement to a lower basis. Car inquiries are coming out a little better. The railroads are beginning quietly to place orders for track supplies for spring requirements and rail orders are ready to be placed with the mills from large Western roads. A curious movement in prices in this market may have some bearing on the immediate future of prices for finished materials. During the first half of 1910 there was a shortage of billets in this territory and none of the Chicago mills would authorize the quotation of a market price. During the last half of the year, billets were sold freely and open hearth forging billets went as low as \$25, Chicago. The leading interest begins the year with a quotation of \$31, Chicago, as the base price of forging billets, representing a sharp advance over prices quoted last month. This, in part, is due to a revision of extras on account of the large discard in making forging billets. Structural steel business in Chicago is still held in suspense, as the new building code has not yet become effective. Fabricators in this territory apparently feel assured of the future. There were only two bids on a 900-ton bridge which was advertised recently at Peoria, Ill. The authorities in charge returned these two bids unopened and will divide the work into separate contracts for the foundation and superstructure in the hope of obtaining more competitive bids.

Pig Iron.—Several fair inquiries were reported for Southern iron last week. One buyer inquired for 3000 tons, which is not reported closed, and two others inquired for 1000 tons each, which went at \$11, Birmingham, for first half. There have been doubts whether the \$11 price would hold, but these inquiries were of a character which gave the market a good test and did not develop any lower price on Alabama iron. A few lots of spot iron from Tennessee furnaces have been sold at slight concessions. On the whole, however, trading in pig iron amounts to a small tonnage for this market and not much business is expected until buyers begin to cover for second and third quarters. Stocks at Southern furnaces are estimated at 270,000 tons with a slight increase in the past two months. Authorities in this market do not confirm reports of lower prices on lake Superior charcoal, but Northern coke iron begins the year with a lower quotation of \$15.50 to \$16, Chicago, for No. 2 foundry and malleable Bessemer, or \$15 at furnace for any round tonnage for first quarter or first half. The local furnaces, however, are obtaining higher prices for smaller lots. The necessity of using ore that is under contract has stood in the way of curtailment of production by local furnaces, and the melt of malleable Bessemer has been restricted by the lack of railroad orders in the malleable foundries. The following quotations are for January, February and March shipment, Chicago delivery.

Lake Superior charcoal.....	\$18.00 to \$18.50
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	18.40 to 18.90
Jackson Co. and Kentucky silvery, 8%.....	19.40 to 19.90
Jackson Co. and Kentucky silvery, 10%.....	20.40 to 20.90

(By Mail.)

Billets.—The leading interest has revised the price of forging billets in this territory and quotes \$31, base, Chicago.

Rails and Track Supplies.—Western railroads have prepared specifications for a large tonnage of standard rails but are still holding back the placing of this business with the mills. Bookings last week were nominal, consisting of a few miscellaneous lots. The delay in placing contracts for track supplies may prove embarrassing to the railroads as

THE IRON AND METAL MARKETS

they may not be able to get necessary materials on the ground when their tracks thaw out in the spring. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.20c. to 2.30c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Structural Material.—The American Bridge Company has taken a contract amounting to 8000 tons from the Oregon Railway & Navigation Company for a bridge at Portland, Ore., over the Willamette River. This is a double deck bridge, with a lift span supported on towers. The American Bridge Company has also booked 600 tons of bridge work from the Northern Pacific. The Milwaukee Bridge Company has taken the Union avenue bridge at Pueblo, Colo., 400 tons. Important railroad work is expected to be let the coming week and hopes are entertained that this will open an active season for fabricating contracts. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Car builders are encouraged by recent inquiries which give a more favorable tone to the market for car material. The Pennsylvania Lines West are inquiring for about 1000 cars and the Pennsylvania Railroad Company for another 1000. There is also an unidentified inquiry in the market for 2000 cars. The plate mills have had less new business in recent months than any other finishing department, but the car business that is coming out will afford them good specifications. We quote prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—New business during the holidays has been very light, and the mills do not expect much until later in the month. Prices are firm, considering the light volume of trade. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The largest buyers of soft steel bars in the West are very frank in expressing the hope that prices will not be reduced. They are all covered by yearly contracts which run to June 30. Most of them are in lines of business in which they make up large stocks during the winter for their spring trade, and a reduction in steel prices would have a depressing effect on the values of their finished stocks that would far outweigh any advantage to be gained now by lower prices. A few months later, when annual contracts come up for renewal, these large buyers of bars will be very keen to secure lower prices, but at present all their influence is exerted to sustain the market. Bar iron continues weak, although railroad buying is increasing. The price of 1.30c., Chicago, is only made on desirable lots for prompt shipment, and the mills are reluctant to quote on any inquiries for deferred specifications. The market for hard steel bars is very quiet. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.40c. to 1.45c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The financial market editors have not troubled the wire business with talk of lower prices. The wire mills are doing very well on new business and prices are firmer than they were last fall. While many jobbers and dealers are holding back specifications, the condition of the hardware trade is so favorable that a normal demand is expected for all jobbing wire products. The fence fabricators expect the usual growth this spring in the demand for woven fence. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

Merchant Steel.—Specifications were very satisfactory during December. Merchant steel seems to be immune from the depressing influences that have worked their will with other finished products. The falling off in specifications from the automobile trade has been made up by an increase in the demand for agricultural steel.

Cast Iron Pipe.—Western cities have been somewhat slow in making up their specifications for water pipe, as this business is easily controlled by the banking interests, since it depends on the sale of bonds. The foundries, however, expect to book a large tonnage before spring, although prices are low and unsatisfactory. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in. \$25; 6 to 12 in., \$24; 16-in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—The holiday stagnation has forced scrap prices to a lower level than was quoted at any time last year. The general level of the market is almost as low as during the first half of 1908, and the low points touched in the spring of 1909. Mills, foundries and practically all other consumers are carrying good stocks and dealers can

only place the broken lots they have in transit by making concessions. Railroad malleable scrap and short rails used by malleable foundries have declined less than other lines in the liquidation in the past two months. The spot price of heavy melting steel varies from \$11.50 to \$12 delivered, according to grades. Carefully graded stock will bring \$12, but mills which are not so particular regarding specifications only offer \$11.50. Cast scrap has declined \$1 in two months. Rerolling rails were sold by railroads for \$16 in October, but are now purchased by the mills from dealers as low as \$13.50. Decreased consumption has been the principal factor in this depression. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

Old iron rails.....	\$15.50 to \$16.00
Old steel rails, rerolling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	13.00 to 13.50
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.75 to 18.25
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel truckles and rollers.....	11.25 to 11.75
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.50 to 9.00
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.50 to 11.00
Pipes and flues.....	8.75 to 9.25
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, January 4, 1911.—(By Telegraph.)

Pig Iron.—A few fair-sized inquiries have come out during the holiday season. A central Ohio melter is asking for 1000 to 1500 tons of No. 2 Northern foundry, and a Missouri stove maker wants about 2000 tons of Southern foundry, both for first half shipment. The past week's sales include two lots of No. 2 Southern foundry for first half shipment, booked at \$11, Birmingham. One of these was for 1200 tons for a Northwestern consumer, and the other called for 1000 tons for an Indiana manufacturer. A few small orders for foundry and one for gray forge were also booked, practically all for spot shipment. It is predicted that the next 30 days will show a shifting to activity among the foundries. Several that have been busy lately are now experiencing a dull period, while others who have been almost idle are reported to have secured contracts that will keep them operating for some time ahead. All sales agencies state that foundry stocks are much lower now than on January 1 of last year, but the difference is not enough to offset the increased tonnage piled on furnace yards. The settlement made with the local Iron Molders' Union last week provided for an increase of 5 per cent. in wages and averts a strike that was to have been called this week, which would probably have inconvenienced the stove manufacturers in this section more than any other class of foundries. Prices remain at \$11, Birmingham, and \$14, Ironton, for Southern and Northern No. 2 foundry for first quarter delivery, and quite a number of producers are willing to take on first half business at these figures. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75 to \$15.25
Southern coke, No. 2 foundry.....	14.25 to 14.75
Southern coke, No. 3 foundry.....	13.75 to 14.25
Southern coke, No. 4 foundry.....	13.50 to 14.00
Southern coke, No. 1 soft.....	14.75 to 15.25
Southern coke, No. 2 soft.....	14.25 to 14.75
Southern gray forge.....	13.00 to 13.50
Ohio silvery, 8 per cent. silicon.....	18.20 to 18.70
Lake Superior coke, No. 1.....	15.70 to 16.20
Lake Superior coke, No. 2.....	15.20 to 15.70
Lake Superior coke, No. 3.....	14.70 to 15.20
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	19.50 to 20.50

(By Mail.)

Coke.—It is known that quite a number of foundry contracts are expiring, but the foundries are extremely slow in making new contracts just now and most of them are buy-

THE IRON AND METAL MARKETS

ing just enough to carry on their work. Prices remain unchanged in all fields and the premium for spot furnace in the Wise County district, previously reported, is not now being obtained. Furnace coke from Connellsville, Wise County and Pocahontas ovens is quoted around \$1.45 to \$1.55 for immediate shipment and at \$1.65 to \$1.85 on contracts. Foundry coke is still available at \$2 for spot shipment and around \$2.25 on contracts in all three fields. These prices are per net ton at oven.

Finished Material.—The holiday season has cut in this branch of business and there is very little doing in any line, although inquiries are coming in and the outlook for this year is very good. Buyers seem disposed to wait on the result of the proposed manufacturers' conference in New York January 11. Warehouse prices on structural material remain around 1.75c. to 1.85c. Some small hoop and band business was booked last week.

Old Material.—The situation has not improved and local scrap dealers do not anticipate any change until there is an advance in pig iron. It is rumored that some dealers are shading prices, but this action does not seem to have brought them any business. Prices for delivery in dealers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 12.00
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	22.50 to 23.50
Old car wheels, gross ton.....	12.00 to 13.00
Heavy melting steel scrap, gross ton.....	12.00 to 12.50

Philadelphia

PHILADELPHIA, PA., January 3, 1911.

While some good business is pending in pig iron, sales have been confined mostly to small lots. Little new business has come out in finished materials, buyers awaiting further developments. No price concessions are heard of in this district. There has been little movement in old material. Moderate coke transactions are reported, principally for spot shipment, for which prices are easier.

Iron Ore.—Importations at this port during 1910 aggregated 1,165,961 tons, valued at \$3,416,199, exceeding all previous records. One cargo of low phosphorus ore has been recently taken by a producer in this district, who is understood to be in the market for a further quantity. Generally speaking, however, the market is extremely dull.

Pig Iron.—Transactions have been on a rather small scale. The inquiry reported last week from the Pennsylvania Railroad is still unclosed, although expected to be placed before the week end. The only other large inquiries are from the cast iron pipe foundries, one being in the market for 10,000 tons, while another would take a somewhat smaller amount. Producers, however, are disinclined to take orders for large blocks of iron for forward delivery at the ruling level, although perfectly satisfied to accept orders at current prices for shipment during the next 30 or 60 days. Further curtailment of pig iron production is being considered. One Alburts stack of the Thomas Iron Company was blown out during the week. According to statistics of the Eastern Pig Iron Association, which held its regular monthly meeting last week, stocks on hand at the close of the year were double the amount at the beginning of the year, representing, however, but a trifle less than two weeks' output of the entire capacity of the furnaces represented by the membership of the association. Sales of both eastern Pennsylvania and Virginia foundry irons have been light. There has been no movement reported in forge iron. Little demand for steel making grades has come out. The same interest which has recently been in the market for basic, at a price, would buy if its views were met, but producers will make no concessions from \$14.75, delivered, for forward shipment, although a moderate lot of prompt basic might be had at a slightly lower figure. Several sales of small lots of low phosphorus iron are reported at the market. The following range of prices is named for standard brands, delivered in buyers' yards in this vicinity, during the first quarter and in instances the first half of the year:

Eastern Pennsylvania, No. 1 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.00 to 15.25
Virginia, No. 2 X foundry.....	15.50 to 16.00
Virginia, No. 2 plain.....	15.50 to 16.00
Forge.....	14.25 to 14.50
Basic.....	14.75
Standard low phosphorus.....	22.00 to 22.50

Ferroalloys.—Consumers of ferromanganese in this territory show practically no interest in the market. Prices for 80 per cent. are nominally quoted at \$38.25 to \$38.50, Baltimore, according to delivery. A sharper demand for 50 per cent. ferrosilicon is reported, both in small prompt

lots and moderate quantities for extended shipment. For prompt shipment it commands \$56, Philadelphia, while for forward delivery \$55 or less might be done.

Billets.—Little new business comes out except in small lots for prompt shipment. Prices are unchanged, not enough business developing to test the market. Basic open hearth rolling billets are quoted at \$25.40, delivered in this district, with ordinary forging billets at \$28, Eastern mill. By a transposition in the type last week an error was made in quoting rolling billets at \$24.50, the correct price having been \$25.40.

Plates.—Few inquiries of any size are reported, consumers coming into the market, as a rule, for small immediate requirements. Mills in this territory report prices for ordinary plates as being firmly maintained at 1.55c., delivered in this vicinity.

Structural Material.—The current demand is small. Several propositions of moderate size are under negotiation, but show no haste in closing. Quotations of Eastern makers are unchanged, the 1.55c. minimum for plain shapes delivered in this territory being maintained.

Sheets.—Mills in this vicinity have, for the most part, resumed operations on orders accumulated during the holiday suspension, but will have to depend largely on a continued demand, as order books are not in very good shape. Eastern mills hold prices firmly, the following range being quoted for early shipment: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Business has been light and the market shows little indication of immediate betterment. Prices of either refined iron or steel bars show little change, the former being quoted at 1.32½c. to 1.42½c., and the latter 1.55c., delivered in this vicinity.

Coke.—Recent purchases have been principally confined to prompt lots. Several moderate quantities of furnace coke for January delivery have been taken by Eastern furnaces at \$1.45, at oven, although forward coke is held at \$1.50 to \$1.65. Prompt foundry coke is easy at \$2, at oven, while \$2.20 to \$2.35 is quoted for forward shipment. The following range of prices per net ton, delivered in buyers' yards in this district, extending over the first half of the year, is named:

Connellsville furnace coke.....	\$3.75 to \$3.90
Foundry coke.....	4.20 to 4.40
Mountain furnace coke.....	3.35 to 3.50
Foundry coke.....	3.85 to 4.05

Old Material.—The market has been practically at a standstill. Occasional carload and smaller lots have been sold, usually material that had to be moved, and in many grades not enough business has been done to establish a market. Quotations therefore are to a large extent nominal. The following range, however, about represents sellers' ideas of the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap and crops.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	15.50 to 16.00
Low phosphorus.....	18.00 to 18.50
Old steel axles.....	19.50 to 20.00*
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	17.00 to 17.50*
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.75 to 16.25
Wrought iron pipe.....	12.25 to 12.75
No. 1 forge fire.....	11.00 to 11.50
No. 2 light iron.....	7.00 to 7.50
Wrought turnings.....	8.00 to 8.50
Cast borings.....	8.00 to 8.50
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.50
Grate bars.....	11.00 to 11.50
Stove plate.....	10.00 to 10.50

Nominal.

Birmingham

BIRMINGHAM, ALA., January 2, 1911.

Pig Iron.—The business transacted in this market the past week was not of sufficient volume to indicate definitely any change in the attitude of any parties concerned. Report was made only of the sale of carloads to lots of 100 tons for prompt shipment, with the aggregate engaged very limited. A schedule of prices based on \$11, Birmingham, is being adhered to for prompt shipments or deliveries during the first quarter, with an advance of 50c. per ton over that basis generally asked for second quarter shipments. It has been rumored that certain of the leading producers have revised quotations to a basis of \$11 for deliveries to cover the entire first half, but such reports cannot be confirmed through the regular sources. It is not improbable, however, that round tonnage offers at such figures would be accepted by the majority of producing interests. The reports concerning a concession from \$11 in a strictly cash transaction for

THE IRON AND METAL MARKETS

prompt or comparatively early deliveries are given credence, with the tonnage available under those conditions understood to be in the hands of one interest only. At this time no figures are available to show the aggregate of stocks on hand as of January 1, and by reason of the changes in operations during December an estimate cannot be arrived at with accuracy. It is understood that an additional furnace, not heretofore mentioned, is to be blown out at an early date, with only 12 stacks in the Birmingham district proper now being operated on foundry iron. The operations on basic iron have been reduced to two stacks in this district. The resumption of operations at foundries closed for the holidays has been quite equal to expectations so far and a very heavy movement from furnace yards is already under way.

Cast Iron Pipe.—No announcement has yet been made as to the dates for lettings of tonnage now considered in sight and because of the season the requirements for maintenance work are very light. The producing interests have been chiefly interested the past week in the taking of inventories, &c., and little interest in market conditions has been manifested. From the data so far in hand it is judged that the aggregate of stocks on hand January 1 will be considerably larger than that shown for January 1, 1910, although the outlook is considered more favorable than at this time one year ago. Without evidence to the contrary, we quote nominal prices as unchanged, as follows per net ton, f.o.b. cars here: 4 to 6 in., \$19 to \$19.50; 8 to 12 in., \$18 to \$18.50; over 12 in., average \$17, with the usual \$1 per ton extra for gas pipe.

Old Material.—This market does not show signs of an improvement, with all parties concerned apparently content to await further developments. The transactions reported for the past week consisted of the sale of a lot of 250 tons of light cast to a manufacturer of agricultural implements and 25 tons of stove plate to a local foundry. A local mill is understood to be in the market for 250 tons of wrought scrap, but the price offered is not considered satisfactory. We quote dealers' asking prices as follows per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.00 to 12.50
Old steel axles.....	14.00 to 14.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.00 to 9.50
No. 1 country.....	7.50 to 8.00
No. 2 country.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.00
No. 1 steel.....	10.00 to 10.50
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.00 to 10.50
Light cast and stove plate.....	7.50 to 8.00

Cleveland

CLEVELAND, OHIO, January 3, 1911.

Iron Ore.—The movement in favor of the maintenance of 1910 prices on Lake Superior ores during 1911, which appears to have originated among Eastern consumers, is meeting with a great deal of approval from furnace companies in the Central West. In fact, it can be quite safely said that the only advocates of lower prices on ores among the consumers are those interests, few in number, that did not over buy last year, and consequently will have only a small tonnage of ore on hand at the opening of navigation May 1. A reduction in prices would work to the advantage of such consumers as compared with furnace companies that will have enough 1910 ore to last them through the greater part of the present year. It is estimated that there will be enough 1910 ore left over after May 1 to fill 40 per cent. of the requirements of the consumers for the season of 1911, and furnacemen see an immense loss in value of their stocks should a price reduction of even 50 cents a ton be made. Some of the furnacemen believe not only that last year's prices should be maintained, but that the ore firms should get together at once and fix prices at last year's basis. Such action, it is claimed, would not only dispose of the uncertainty about prices, but would also tend to strengthen the pig iron market. Ore firms, however, show no disposition to change their policy of refraining from taking action on prices until consumers get ready to buy, which is not expected to be for the next two or three months, at least. One statement regarding the 1911 prices can be made quite positively, and that is that whenever the ore companies decide to fix the prices they will be firmly maintained throughout the season. In other words, what is regarded as a mistake made in 1907, when it was announced late in the year that the price of that year would be maintained the following year, but a decline of 50 cents a ton became effective when actual buying started the next spring, will not be repeated. In spite of a published denial, the report that was made in *The Iron Age* of December 22, that some reservation of 1911 ore had been made, was correct, such

reservations coming from independent concerns having no affiliation with ore companies. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Only a few sales of small lots are reported. New inquiries, also, are scarce and for small tonnages. Some inquiries that came out during December are still pending, purchasing having been deferred until after the first of the year, and these are expected to result in the placing of some business during the next two weeks. The foundry trade is not active and it is believed that many consumers who have not already bought for their first quarter or first half requirements will wait until they see how business is going to start up in the new year before coming into the market. Local furnaces are adhering to \$14, at furnace, for local delivery, but this price is being shaded for outside shipment. Shipments from furnaces are still somewhat light owing to hold-up orders during inventory taking. For prompt shipment and the first half we quote, delivered Cleveland, as follows:

Bessemer.....	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.90
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—No local inquiries for furnace coke are pending, and consumers of foundry grades are nearly all under contract for the first half. Prices remain about stationary. We quote standard furnace coke at \$1.45 to \$1.50 per net ton, at oven, for spot shipment, and \$1.75 to \$1.85 for the first half. Best grades of Connellsville 72-hour foundry coke are held at \$2 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—While some of the selling agencies report about as good a volume of orders as during the few preceding weeks, consumers generally are holding off as much as possible, and about all of the new orders and specifications are for immediate requirements. With the possibility of lower prices, only a limited amount of business is looked for until after the conference of steel manufacturers in New York January 11. Selling agencies are firmly maintaining prices on steel bars, structural material and plates. The demand for sheets is so light that prices have not been tested in this market recently and regular quotations are being generally adhered to. Some new structural work is being figured on and reports indicate that some fabricators are quoting very low prices. A large amount of structural work is in prospect in this vicinity, a considerable portion of which will probably be contracted for before spring. Bids have been received for an addition to the Y. M. C. A. building and for the Peninsular Savings Bank building in Detroit, each requiring about 400 tons. Contracts are expected shortly from Ohio fabricators for about 2000 tons for bridge work. The Detroit & Cleveland Navigation Company will be built this year and completed in time for operation at the opening of the 1912 season. The demand for iron bars continues light, but local mills are getting enough orders to keep them running at somewhat over half their full capacity. We quote iron bars at 1.30c. to 1.35c., at mill.

Old Material.—The market continues dull and prices generally are weak. Owing to the absence of sales during the past two or three weeks, quotations on a number of grades are only nominal. Dealers claim that Canton and Sharon mills refuse to pay over \$13.50 for heavy melting steel, and a reduction of 25 cents a ton on this grade is noted. It is expected that the embargo on scrap that has been in force by the Otis Steel Company for the past month will be lifted this week. Railroad lists this week include the Pennsylvania Lines, and the Erie to close January 5, and the Wheeling & Lake Erie on which bids were received January 3. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.75 to \$14.25
Old iron rails.....	15.50 to 16.00
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.50 to 12.75
Old car wheels.....	12.00 to 12.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.75 to 12.00
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 7.00
Steel axle turnings.....	8.75 to 9.00
No. 1 bushelling.....	11.00 to 11.50
No. 1 railroad wrought.....	12.50 to 13.00
No. 1 cast.....	11.50 to 12.00
Stove plate.....	10.00 to 10.50
Bundled tin scrap.....	11.00 to 11.50

THE IRON AND METAL MARKETS

San Francisco

SAN FRANCISCO, December 28, 1910.

The attention of merchants and manufacturers is occupied at present with stock-taking. A fair tonnage was booked in some departments during the week before Christmas, but in general the market was quiet throughout December. The outlook for 1911 is felt to be rather uncertain, and buying is likely to continue on a conservative scale for at least a month or two. Some anxiety is felt over the absence of rain in California, and buyers are also inclined to hold off until they feel more definitely assured as to the tendency of prices. There are many favorable features, however, as supplies on this coast have been greatly reduced in the last few months, while conditions in the oil, mining and other large industries are better than for some time. Municipal improvements are planned on a large scale by most cities, and there are prospects of some increase over 1910 in building.

Bars.—The movement throughout the year has been somewhat below expectations, yet preparations for stock-taking show that supplies in the hands of merchants are not burdensome. One firm, which has received considerable foreign material recently, has about the only large stock carried here. There is little demand, and while some business of a sorting-up nature is expected after the first of the year, buyers are disposed to hold off from the market for a month or two. By that time it is believed that the Western Steel Corporation, Seattle, will be able to ship all sizes of bars. The outlook for soft steel appears a little uncertain for the early part of the year, but reinforcing material should be in good demand. Local merchants have again reduced their prices and now quote bars from store, San Francisco, at 2.10c. for iron, and 2.30c. for steel.

Structural Material.—Fabricators are disappointed at the tonnage booked in December for work in San Francisco and vicinity, as the letting of large contracts has been greatly delayed, and it is unlikely that anything of any moment will come out until next week. The bid on the Lowell High School was rejected, and some changes will be made in the plan, and the Masonic Temple contract is being held over from week to week. The general contract has been let on a court house at Sacramento, Cal., but the steel work has not been awarded. Excavation plans have arrived for the Oakland city hall, and an inquiry for the steel is expected within a few weeks. The situation has also been rather quiet at other coast points, but there will be considerable figuring at Los Angeles next month. A number of new plans are announced for San Francisco and Oakland, but little of the work is actually in sight. The contract on Hale Bros.' department store, however, is fairly certain to be let shortly. Plans have been filed for a large building for Lipman, Wolfe & Co.'s department store at Portland, Ore. Arrangements are being made for the erection of the new Tivoli Theatre in San Francisco. A site has been purchased for a large armory for the National Guard of California, and the building will probably be erected in 1911. Plans have been accepted for a large eight story building for the German societies of San Francisco. The Guaranty Trust & Savings Bank of Sacramento will let contracts next spring for a \$125,000 building. A large bridge is to be erected shortly at Tacoma, Wash. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.60c.

Rails.—The movement has been fairly well sustained for the year-end period, though no especially large business has been transacted in the last few weeks. A few of the smaller roads in this district are taking figures on their prospective requirements, and a few substantial orders are expected during the first quarter, though the principal tonnage, aside from the material used by the transcontinental lines, will be required in small lots for logging and other short lines. There is a possibility, however, that business may materialize shortly on some of the projected interurban lines in central California. Plans are being made for a three-mile railway along the ocean beach in San Francisco. Following a change in control, considerable development work is expected on the lines of the Oakland Traction Company and the Key Route in Oakland. The Southern Pacific is now actively at work on the survey of a new line over Tehachapi Pass, and is also surveying for a number of branches in northern California, to tap numerous mines, quarries and timber districts.

Plates and Sheets.—There is a renewal of inquiry for tank plates, sheet pipe, &c., for oil and gas interests. The Independent Oil Producers' Agency is making arrangements for a large increase of storage capacity on the part of its members, and one of the largest oil interests has made financial arrangements which will enable it to proceed on a large scale with projected storage and pipe line projects. A number of the gas companies in southern California have been consolidated, and are preparing to add materially to the

capacity of their plants. R. D. Wood & Co. have taken a contract to erect a gas holder of 6,000,000 cu. ft. capacity for the Los Angeles Gas & Electric Company. The city of Walla Walla, Wash., has taken bids on 6000 ft. of 20-in., 14-gauge sheet steel pipe.

Merchant Pipe.—The recent movement in northern and central California has been entirely of a distributive nature, and there is little demand at the moment. Most of the jobbers have reduced their stocks, however, and a general sorting-up movement is expected during the next month, though dealers are not disposed to buy on a very large scale. Increasing inquiries are coming from southern California and the oil fields, and some large orders both for casing and line pipe are expected. The production of oil is still curtailed and will be until greater storage and transportation facilities can be provided, though new development work is more active than for some time. The absence of rain has made delivery to the oil fields possible at a much later date than usual.

Cast Iron Pipe.—According to plans now being formed by southern California interests, a heavy tonnage of gas pipe will be required during the year. The city of Los Angeles is working on plans for a high pressure system, similar to that being installed in San Francisco, but will not be ready to place its order for some time. Several northern gas plants have been acquired by the Byllesby interests of Chicago, and preliminary arrangements are being made for many extensions. The town of Vallejo, Cal., will shortly be in the market for 1120 lengths of 12-in. and 340 lengths of 8-in. pipe. The city of Portland, Ore., will receive bids January 10 for about 5792 tons of pipe, of which 1383 tons will be 30-in., 745 tons 16-in., and 485 tons 12-in. Fifty tons of specials will also be required.

Pig Iron.—The local market on foundry pig iron has been without feature, as current requirements are small and melters show no inclination to buy anything until some time in January. As far as can be learned, no business has yet resulted from the recent inquiry for basic iron. Prices are entirely nominal and unchanged.

Old Material.—No large transactions have been closed recently, and steel melting scrap is the only line which receives much attention. A number of good inquiries for this material have come up, and some large contracts for delivery through the year are expected early in January. The price is nominally as before, \$12.50 per gross ton, but there is a very firm undertone to the market. Cast scrap is quiet, but firmly held at \$18 per net ton. Wrought scrap is quoted at \$13.50 and rerolling rails at \$15, both per net ton.

The Union Iron Works Company, San Francisco, will move its downtown offices January 1 from 320 Market street to the Insurance Building, California and Battery streets.

St. Louis

ST. LOUIS, Mo., January 2, 1911.

In common with other centers, the attention of St. Louis manufacturers, wholesale merchants and brokers has mainly been engrossed with inventories and accounts, and but little new business in any line was booked the past week. The receipts of pig iron at St. Louis for the year 1910 were 321,070 tons; of coke, 191,190 tons, as shown by railroad statistics.

Pig Iron.—Not much in the way of new business was expected of the closing week of the year and but one house had anything to report. Specifications on contracts have come along quite freely and we hear of no requests to hold shipments, whereas at the corresponding time a year ago there were quite a number of such requests, owing to over-buying. There has been considerable hand-to-mouth buying during the past two or three months, and sellers predict upon this, together with free shipment on contracts, that an improvement in the demand can reasonably be expected early in the present month. Some of the leading houses are inclined to feel firmer in their views from the tenor of advices from the furnaces which they represent. On the other hand, merchant sellers believe that the spread between spot shipment and first half contract iron will increase in order to induce buyers to take that delivery. We continue our quotations for Southern No. 2 foundry, for shipment over the first half, at \$11, Birmingham, though \$11.25 is asked by some sellers for second quarter delivery, and concessions are reported for spot shipment.

Coke.—A leading seller reports inquiries from four or five large consumers aggregating 150 cars of Connellsville foundry coke, which likely will be closed during the next 10 days. There is no complaint of shortage of cars, and contract specifications are being furnished satisfactorily. We

THE IRON AND METAL MARKETS

quote standard 72 hr., Connellsville foundry, at \$2 to \$2.25 per net ton, f.o.b. oven, according to quantity and delivery.

Old Material.—Owing to the weakness of the market through lack of demand, cancellations of contracts failing of shipment according to agreement are being experienced. There are no features of interest to report other than the two small offerings by local railroads as follows: Missouri-Pacific, 500 tons; St. Louis & San Francisco, 250 tons, miscellaneous scrap. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$12.00 to \$12.50
Old steel rails, rerolling.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, sub-	
ject to inspection.....	24.00 to 24.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart..	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings..	8.50 to 9.00
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.50 to 9.00
Railroad sheet and tank scrap.....	8.50 to 9.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

The St. Louis Terminal Electric Railway has increased its capital stock from \$1,000,000 to \$2,000,000. The extra capital is required in the construction of six miles of track-age to Venice and Granite City, Ill. This is the McKinley system, which is incorporated in Missouri for the development of its plans on this side of the river. Bonds will be issued to cover the additional requirements on both sides.

Buffalo

BUFFALO, N. Y., January 3, 1911.

Pig Iron.—Passive conditions continue to prevail, with little interest manifested by buyers and deliveries on contracts still held up on account of inventories. It is stated that the market has been cleared of the resale malleable which was offered recently, the last of it having been taken by a malleable iron castings concern in Buffalo territory, and no malleable is now being offered here at under \$14.50. The aggregate of inquiry for all grades for the week between the two holidays did not total more than 5000 tons, and the only sales made were in carload to 100-ton lots. So little business was done that it is difficult to fix a definite schedule of prices; but the figures given below closely approximate the market for first quarter and half delivery, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.50 to \$15.00
No. 2 X foundry.....	14.25 to 14.75
No. 2 plain.....	14.25 to 14.50
No. 3 foundry.....	14.00 to 14.25
Gray forge.....	14.00 to 14.25
Malleable.....	14.50 to 15.00
Basic.....	14.50 to 15.00
Charcoal.....	17.50 to 18.25

Finished Iron and Steel.—Most mills and agencies report current business as of small volume, with light inquiry in all lines, with the exception of structural material, in which there is some demand. There is also some inquiry for reinforcing bars for concrete construction. In general lines all orders that can be held off by purchasers are kept back awaiting definite developments in the price situation, and no one seems willing to close contracts at the present time, although many buyers are anxious to have the price basis determined speedily so that business can be proceeded with. The agency of the leading interest reports the latest mails are bringing increased inquiry, showing a little more encouraging outlook. The same agency also states the aggregate sales of the office for 1910 were the largest of any year in its history. Canadian buyers, although purchasing more freely than the domestic trade, are now to some extent holding off to see what price conditions develop in the United States. In structural lines quite an amount of new business is developing. Plans are on the boards, and figures will soon be received for a 14-story office building to be erected here for the Buffalo General Electric Company, calling for a good sized tonnage of steel. Plans are also being prepared for a 9-story office building for the New York Telephone Company in this city. An agreement has been signed by the Buffalo Grade Crossings Commission and the Erie Railroad for elimination of grade crossings in the

northern section of the city, taking about 2000 tons of structural steel, besides large quantities of concrete reinforcing material. In Toronto the citizens are voting this week on the proposition to construct a steel viaduct across Rosedale Ravine, for which a large tonnage of structural material will be required. Bids are soon to be received for steel for Jess Brothers' store and office building, Lockport, N. Y., for which a small tonnage will be required, and a steel frame church at Syracuse. The Rochester Structural Steel Company has received contract for steel for R. T. French & Co.'s warehouse, Rochester, 180 tons, and the Seneca Engineering Company for a small tonnage for the Sigma Nu Fraternity Building, Cornell University, Ithaca.

Old Material.—The market is absolutely stagnant, practically no demand having developed in any line during the week, and only a limited delivery being accepted on contracts. Prices are unchanged and almost entirely nominal. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$11.75 to \$12.25
Low phosphorus steel.....	17.00 to 17.50
No. 1 railroad wrought.....	15.00 to 15.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles.....	18.50 to 19.00
Old iron axles.....	23.00 to 23.50
Old car wheels.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.25
Boiler plate.....	9.75 to 10.25
Locomotive grate bars.....	10.50 to 11.00
Pipe.....	9.75 to 10.00
Wrought iron and soft steel turnings...	7.00 to 7.50
Clean cast borings.....	6.50 to 6.75

New York

NEW YORK, January 4, 1911.

Pig Iron.—Occasionally an important buyer asks for a price, but the attitude of most large consumers is one of great caution. It is admitted that prices are low and that some furnaces are at their cost line or below, but the stability of the price structure as affected by raw material costs for next year is a factor to which many are giving consideration. Small foundries as a rule have all the iron they need, and some of them are noticing rather more shrinkage in their own business. Two cast iron pipe companies are reported in the market for a total of 16,000 tons. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15.25 to \$15.50.

Finished Iron and Steel.—There has been practically no change in the situation in the last two weeks. All lines are especially quiet during the closing of the year's business. Buyers have taken only what was absolutely needed to replenish stocks, and the placing of new business has been deferred on the possibility that the new year might bring lower prices. Thus far no changes have been made and there is little to indicate that any will be made; however, within the next two weeks a decision will probably be reached. At present prices in this territory are claimed to be firmly maintained. The returns for the year 1910 are not all in, but they will unquestionably show a falling off as compared with 1909, due principally to the decline in the latter half of the past year. Some manufacturers in certain lines may show a slightly increased tonnage for the year, but the lower average price at which it was sold will still bring the year's total receipts below those of 1909. Regardless of whether or not the near future will bring a readjustment of prices, the feeling is quite general that little improvement is to be looked for before February 1, and perhaps not then. It is hoped that railroad rate matters will be satisfactorily disposed of shortly and that more extended buying on the part of the railroads will result. They have not been very prominent in the market for some time and it is felt that they have need for considerable material. The New York Central has lately taken bids on several contracts, but no decisions have been reached on those most recently opened. Inquiry for an additional 1000 tons is now before the trade and bids will be received until January 9. About 600 tons of this material is to be used in a suburban station adjacent to the new terminal. The Boston & Maine also has an additional inquiry for about 600 tons of bridge material. The Quebec Bridge Commission has been unable to agree and the award is indefinitely postponed. A new board of experts is to be formed to pass upon the points under dispute, as important questions of design are involved. Payne Brothers were low bidders and it is reported have been awarded the Perth Amboy power house for the Public Service Electric Company. Between 800 and 1000 tons of steel will be required. Levering & Garrigues have the contract for the Sloane warehouse building at Fifth avenue and Forty-seventh street, which will require about 2500 tons. Whitworth was low bidder on the Appraiser's Store in Boston, but the price exceeds the appropriation and the building is

THE IRON AND METAL MARKETS

likely to be redesigned and the bids readvertised. Present price quotations are as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.45c. to 1.50c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—Conditions in this branch of trade continue quiet. Carload lots of 6-in. are quoted nominally at \$22 per net ton, tidewater.

Old Material.—Transactions are exceedingly light and the market is weak. Quotations per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting.....	\$9.50 to \$10.00
Heavy melting steel scrap.....	9.50 to 10.00
Relaying rails.....	20.50 to 21.50
Standard hammered iron car axles.....	20.50 to 21.00
Old steel car axles.....	15.00 to 15.50
No. 1 railroad wrought.....	11.75 to 12.25
Wrought iron track scrap.....	10.75 to 11.25
No. 1 yard wrought, long.....	10.50 to 11.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	5.00 to 5.50
Cast borings.....	5.50 to 6.00
Wrought turnings.....	5.25 to 5.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.50 to 12.00
No. J heavy cast, broken up.....	11.50 to 12.00
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	12.00 to 12.50

Crocker Brothers, 99 John street, New York, with offices also in Philadelphia, Pittsburgh and Boston, have been appointed exclusive sales agents, effective January 2, for the distribution of the several grades of foundry and forge pig iron produced by the Central Iron & Coal Company, Tuscaloosa, Ala.

Metal Market

NEW YORK, January 4, 1911.

THE WEEK'S PRICES

		Copper.		Lead.		Spelter.	
		Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
Dec.	Lake.						
29.....	13.00	12.75	38.35	4.50	4.35	5.55	5.40
30.....	13.00	12.75	38.45	4.50	4.35	5.55	5.40
31.....	13.00	12.75	....	4.50	4.35	5.55	5.40
Jan.							
3.....	13.00	12.75	39.40	4.50	4.35	5.55	5.40
4.....	13.00	12.75	39.55	4.50	4.35	5.55	5.40

Large sales of pig tin have been made this week at higher prices than at any time in 1910. The demand for copper is so light that prices are decidedly nominal. Spelter continues to decline. Lead is firm but in little demand.

Copper.—Copper buyers seem to be entirely out of the market. Holders show no great desire to sell, and consumers are indifferent. Lake copper is being offered at 13c. and electrolytic can be had at 12.75c. It is probable that these prices might be shaded if a good sale was in sight. L. Vogelstein & Co. furnish the figures of German consumption of foreign copper, 157,088 tons as compared with consumption during the same period in 1909 of 136,403 tons. In London to-day spot copper was sold for £56 15s., and futures for £57 10s. The sales amounted to 350 tons of spot and 200 tons of futures. The market closed steady.

Pig Tin.—On the strength of statistics showing smaller Straits shipments and larger deliveries during December, the London market advanced sharply yesterday and at the close prices were £4 17s. 6d. higher than when the market closed last Friday. There was active buying here the latter part of last week by consumers who were forced to purchase by their actual needs. On Wednesday afternoon and Thursday it is estimated that about 700 tons of pig tin was bought for January and February delivery. Sales were made yesterday and to-day at a higher price than at any time in 1910. There is an absence of speculation in this market, as many traders seem to think that regardless of the favorable statistics quotations are somewhat inflated. Figures compiled by C. Mayer of the New York Metal Exchange show that the total visible supply on December 31 was 3724 tons below that of December 31, 1909. Available stocks in this country are still concentrated and there is no relief in sight for the buyer for at least 30 days. Pig tin sold in New York this afternoon for 39.55c. In London to-day the market closed with spot tin selling at £180 12s. 6d. and futures at £179 15s. The sales amounted to 420 tons of spot and 840 tons of futures. The market closed strong.

Tin Plates.—The tin plate situation is unchanged. The price for 100-lb. coke plates is \$3.84.

Lead.—Prices are firm both here and in St. Louis, but demand is light. Outside sellers are meeting the quotation established by the leading interest in St. Louis but are asking from 3 to 5 points higher in this market. The price in New York is 4.50c., and in St. Louis, 4.35c.

Spelter.—The publication of the Government report on spelter tended to weaken the market, as it was a direct contradiction of the reports that the production of spelter had decreased. The statistics show that about 12,000 tons more was produced in 1910 than in 1909, while the consumption was 20,000 tons less. The statistics arrived a little earlier than had been expected and they occasioned no little chagrin among sellers who had previously declared stocks to be scarce. Buyers are taking so little interest in the market that prices are practically nominal. The market to-day was quoted about 5.55c., New York. By shopping about, spelter could possibly be picked up at less than that price. The Government figures show that the stocks on hand amounted to about 20,170 tons December 15.

Antimony.—Prices are lower. Cookson's is quoted at 7.55c.; Hallett's at 7.55c.; Chinese brands, 7.25c.; Hungarian grades, from 7c. up.

Old Metals.—Transactions are light. Dealers' selling prices are nominally as follows:

	Cents.
Copper, heavy cut and crucible.....	12.25 to 12.50
Copper, heavy and wire.....	11.75 to 12.00
Copper, light and bottoms.....	11.00 to 11.25
Brass, heavy.....	8.25 to 8.50
Brass, light.....	7.00 to 7.25
Heavy machine composition.....	11.00 to 11.25
Clean brass turnings.....	8.00 to 8.25
Composition turnings.....	9.00 to 9.50
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.30 to 4.40

Metals, St. Louis, January 2.—Lead is quiet, quoted at 4.37½c.; spelter is firmer, with a range in price from 5.35c. to 5.45c., both at East St. Louis. Zinc ore is held at \$38 to \$40 per ton, Joplin base. Tin is stronger at 38.65c. per pound; antimony (Cookson's) unchanged at 7.85c.; lake copper ditto at 13.22½c.; electrolytic ditto at 13.05c., all at St. Louis. The demand for finished metals was seasonably quiet during the past week.

Metals, Chicago, January 4.—Several sales of casting copper were made last week at 12½c. Tin is higher. Spelter is somewhat steadier. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 13c., in carloads, for prompt shipment; small lots, ¼c. to ⅝c. higher; pig tin, carloads, 40c.; small lots, 42c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10½c.; copper clips, 12c.; red brass, 11c.; yellow brass, 9c.; lead pipe, 4¼c.; zinc, 4¼c.; pewter No. 1, 24½c.; tin foil, 30c.; block tin pipe, 33c.

New York Metal Market in 1910

The year's trading in the New York metal market in all non-ferrous metals in 1910 was not entirely satisfactory. With the exception of sensational advance in pig tin, resultant of a London corner combined with a close concentration of stocks in this country during the latter part of the year, and an interesting series of manipulations in the spelter market, the trade has had but little to occupy its attention in the way of price fluctuations.

Copper

Copper buying was sporadic. The history of the year's trading has been a series of buying movements, followed by deadlocks between sellers and consumers. There were few material changes in copper quotations, the year closing with quotations on lake and electrolytic copper exactly 1c. per lb. lower than at the beginning of 1910. In keeping with the industrial boom in January, lake copper, which had been hovering around 13.75c., sharply advanced to 14c. and electrolytic was put to 13.75c. On January 13 lake copper went to the high price of the year, 14.12½c., and electrolytic was put to 13.87½c. There was an absence of buyers, as many consumers had stocked up late in 1909, and regardless of the general industrial optimism the market sagged. This condition existed through February, and no actual demand occurred until early in March, when in a single week 25,000,000 lb. was bought. The copper producers and sellers very wisely did not attempt to boost prices, and these transactions were made at 13.75c. for lake and 13.37½c. for electrolytic. The publication of the statistics of the Copper Producers' Association, which was inaugurated in June, 1909, seemed to have little effect on the market, although about this time the statistics were showing a decrease in stocks, and exports were especially good. Toward the end of March the market sagged and prices fell off until about the middle of April, when lake went down to

THE IRON AND METAL MARKETS

13c. and electrolytic was correspondingly low. Consumers assumed a sudden change of front, and there was a rush to buy. Liberal orders were booked, amounting probably to 50,000,000 lb. during April, but the market went up only ¼c. and promptly fell back to 13c. until early in May, when the report again showed decreases in stocks and induced consumers to trade, but the buying was not very heavy. The market then weakened, until in June lake was down to 12.75c. and electrolytic to 12.50c. Again consumers bought heavily, and it appeared plain to the sellers that those using the metal were in a measure in command of the situation and would buy only at a low price. The buying movement lasted no more than 10 days, and July saw a period of dullness, during which the metal went to the low price of the year, lake being freely offered at 12.62½c. A great deal of copper was bought about that time, and the buying continued into August even against a rising market, as lake was gradually advanced to 13c. Consumers refused to take it at that price in quantities of any account, and during September there was so little buying that the market was practically nominal and slid back to 12.75c. for lake. In October the producers' report showed a decrease in stocks, and the market began to improve steadily and conservatively. It reached 13c. again for lake in November and remained at that price for the rest of the year. Not in a number of years has there been such an absence of speculation in copper. It is apparent that the publication of the producers' statistics has at least tended to put the market on a firmer basis.

Pig Tin

The history of the pig tin movement can be briefly told. There was a succession of advances during which the price went from 33.15c. on January 3 to 38.45c. at the end of the year, which was a rise of 5¼c. on the price at the beginning of 1910. This was due largely to the operations of the London syndicate which had consumers entirely at its mercy. Since late in August available stocks in this country have been closely concentrated and in consequence consumers bought small quantities and only when they were driven by their needs. All things considered, the market here was an unsatisfactory one to both dealers and consumers. The leading consumer several times during the year lent its assistance toward putting the market on a fair basis for buyers. It even went so far as to offer its holdings for sale with a view to keeping prices down, and on two occasions exported stocks to Europe with the effect of weakening the London operator's hold. Pig tin reached the high price of the year December 16 when it was quoted at 40c. a lb., but that quotation was merely nominal as there were but few transactions.

Spelter

Manipulation in the spelter market went far toward keeping the consumers off, so that buying was more or less desultory all the year. The closing down of a number of spelter plants in the Kansas gas field in the fall of the year was given as one reason for a succession of advances in quotations, but consumers did not seem to accept the explanation and refused to buy at prices set by those who had the metal to sell. In keeping with quotations on other metals, except tin, spelter was at its high point early in the year. It was sold for 6.30c., New York, and 6.15c., St. Louis in January, but because of a decided lack of demand prices gradually declined until early in August when quotations

went down to 5.20c., New York, and 5.05c., St. Louis. Then came the talk of shut downs in the Kansas gas fields, and within five weeks the metal went to 5.60c., New York, and a corresponding price was established in St. Louis. There was much talk of 6c. spelter. The producers declared that they could not sell the metal at a profit less than that price. A deadlock ensued which lasted until early in December. Then the sellers began to make concessions. Quotations gradually slid off and the year closed with spelter being offered at around 5.60c., New York, and 5.40c. to 5.45c., St. Louis, with few takers at those prices.

Lead

The lead market carried little interest during 1910. Prices were kept fairly steady, the market being only 20 points lower on the last business day of the year than it was in January. It opened at 4.70c. and gradually went down to 4.35c., the low point of the year, which was reached in May. From that time on the leading interest took charge of the market here, but outside sellers were in control in St. Louis. The American Smelting & Refining Company set its price at 4.40c., New York, in August and that was maintained until November 18 when a further advance of 10 points was made. The year closed with lead selling at 4.50c., New York, and 4.40c., St. Louis. There is talk at this time of a scarcity of lead which seems to be borne out by the statements of leading producers.

Iron and Industrial Stocks

NEW YORK, January 4, 1911.

The stock market has reversed its form since last week's report, and prices have quite uniformly moved upward, although the volume of transactions has been light. The course of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm. com.	81 1/2	Pressed St. pref.	92 1/2	93 1/2
Allis-Chalm. pref.	29	Railway Spr. com.	31	32
Beth. Steel. com.	28 1/2	Railway Spr. pref.	91 1/2	92
Beth. Steel. pref.	57	Republic com.	30	30 1/2
Can. com.	8 1/2	Republic pref.	92 1/2	92 3/4
Can. pref.	76	Sloss com.	49 1/2	49 1/2
Can & Edy. com.	49	Pipe com.	50 1/2	50 1/2
Can & Edy. pref.	114 1/2	Pipe pref.	50 1/2	52
Car & Edy. pref.	43	U. S. Steel com.	70 1/2	73 1/2
Steel Foundries.	30	U. S. Steel pref.	116 1/2	117
Colorado Fuel.	151	Westinghouse Elec.	65 1/2	66
General Electric.	56 1/2	Am. Ship. com.	75	75 1/2
Gr. N. ore cert.	109	Chi. Pneu. Tool.	41	42
Int. Harv. com.	122	Cambria Steel.	42 1/2	42 1/2
Int. Harv. pref.	39 1/2	Lake Sup. Corp.	28 1/2	29 1/2
Int. Pump. com.	85	Warwick.	10 1/2	10 1/2
Int. Pump. pref.	36	Crucible St. com.	74 1/2	75 1/2
Locomotive. com.	107 1/2	Crucible St. pref.	74 1/2	75 1/2
Locomotive. pref.	29 1/2	Harb.-W. Ref. pref.	94	94

Dividends.—The Pittsburgh Coal Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable January 25.

The E. W. Bliss Company has declared the regular quarterly dividends of 2½ per cent. on the common and 2 per cent. on the preferred stocks, both payable January 3.

The Chicago Pneumatic Tool Company has declared the regular quarterly dividend of 1 per cent., payable January 25.

The Hooven, Owens & Rentschler Company, Hamilton, Ohio, paid a dividend January 1 of 1½ per cent. on its preferred stock.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Patent Invalidated by Prior Sale of Device.—A patent for a machine is invalidated by the fact that the inventor sold one of the machines, without restriction upon its use, more than two years before he applied for the patent.—United States Circuit Court of Appeals, Second Circuit, National Cash Register Company *vs.* American Cash Register Company, 178 Federal Reporter 79.

Infringement of Patents.—That there were two applications for patents pending in the Patent Office and before the same examiner at the same time, and no interference was declared, is evidence that they were not for the same invention, and that one patent does not anticipate the other. The Beckwith patent, No. 787,425, for a reservoir for stoves and ranges, claim 11, is not void for indefiniteness, nor for anticipation, but discloses patentable invention.—United States Circuit Court, Eastern District, Wisconsin, Beckwith *vs.* Malleable Iron Range Company 174 Federal Reporter 1001.

Loss of Rights by Delay in Applying for Patent.—One who, after inventing a device, postpones for five or six years

application for a patent, and after the same device is patented by another, cannot assert his patent against the second inventor.—United States Circuit Court, Northern District of Illinois, Curtain Supply Company, *vs.* National Lock Washer Company, 174 Federal Reporter 45.

Priority of Patents.—A patent for a mechanical combination is not anticipated by a drawing in a prior patent which incidentally shows a similar arrangement of parts, where such arrangement is not essential to the first invention and was not designed, adapted, or used to perform the function which it performs in the second invention, and where the first patent contains no suggestion of the way in which the result sought is accomplished by the second inventor. One patent is not anticipated by other patents which had not been granted when application for such patent was filed, though the other patents were prior in date.—Gray Telephone Pay Station Company *vs.* Baird Mfg. Company, 174 Federal Reporter 417.

Grounds for Reissue of Patent.—Before one is entitled to reissue of a patent, inadvertence, accident or mistake must be established, and the application therefor must be made without unreasonable delay. While the claims may be restricted or enlarged, they must be comprehended by the invention as specified in the original patent.—United States Circuit Court, Middle District, Pennsylvania, Bertels *vs.* Trethaway, 175 Federal Reporter 971.

Personal

E. T. Pardee, who has been for some years the district sales manager of the Allis-Chalmers Company for New England, with headquarters at Boston, was recently transferred to Milwaukee, where he will fill a much larger position.

The Toledo Machine & Tool Company, Toledo, Ohio, announces that G. M. Acklin is no longer connected with the company in the official capacity of secretary and treasurer.

J. K. Dimmick has accepted the presidency and active management of the Dimmick Pipe Company, Birmingham, Ala., manufacturer of cast iron pipe, effective January 1. Mr. Dimmick is senior partner in the pig iron and coke firm of J. K. Dimmick & Co., whose headquarters are in the Land Title Building, Philadelphia, Pa., with branch offices at Uniontown, Pa., and Cincinnati, Ohio.

F. P. Huston, sales manager of the Kempsmith Mfg. Company, Milwaukee, Wis., has left for an extended trip through Europe in the interests of the company.

The Pennsylvania Railroad Company announces that B. C. Wurthmann has been appointed freight solicitor, with office at 2 Beaver street, New York.

Edgar Lowenthal of Lowenthal & Co., Buffalo, N. Y., representatives of Vickers Sons & Maxim's Elco high speed steel, has returned from a six weeks' visit at the works in Sheffield. While abroad he also called at several of the other interests of the company throughout England.

Announcement is made by the Pittsburgh Coal Company and Colonial Coke Company that James McDonald has been appointed Western manager and H. J. Elliot Western sales agent, with offices in the Old Colony Building, Van Buren and Dearborn streets, Chicago.

R. C. Coombs, who for many years has represented the Stark Rolling Mill Company and the Berger Mfg. Company in Chicago, has severed those connections and is now engaged to take occupation with the Inland Steel Company, whose offices are in the First National Bank Building, Chicago. He will continue to care for his city trade and in addition will visit the large manufacturing and jobbing interests in the northern part of Illinois and the State of Iowa.

William C. Towns, master mechanic of the Wickwire Steel Company at its Buffalo plant on the Niagara River, was presented with a diamond ring by the employees of the plant December 31.

Ethan Viall, Western editor of *Machinery*, with offices in the First National Bank Building, Cincinnati, Ohio, has resigned his position to accept a place on the *American Machinist* as associate editor. With the resignation of Mr. Viall, the publishers of *Machinery* have decided to discontinue their Cincinnati office.

The Republic Iron & Steel Company will open a sales office in Buffalo, N. Y., about January 15, at 1007 White Building, to be conducted by M. E. Gregg, under the direction of D. C. Guthrie of the Cleveland sales offices of the company. Mr. Gregg has been the company's sales representative in the Buffalo district for some time.

Herbert L. Beeler, advertising manager of the R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, has resigned that position, having acquired an interest in the John B. Morris Machine Tool Company, Cincinnati, of which he becomes general manager. Henry C. Pierle, who has been in the employ of the LeBlond Company for some time, will succeed Mr. Beeler as advertising manager.

William L. Schellenbach, formerly with the John B. Morris Foundry Company, Cincinnati, has resigned to accept a position as special mechanical engineer with the Lodge & Shipley Machine Tool Company.

The Carnegie Steel Company, Pittsburgh, Pa., announces that upon the retirement on December 31 of Samuel A. Benner, formerly general manager of sales, from his connection with the company, it was decided

that H. P. Bope, first vice-president, would also assume the title and duties of general manager of sales.

Charles M. Schwab sailed for Europe January 3 for a short vacation trip, proposing to return on the same vessel.

Alfred Broden, general manager of the blast furnace department of the Reading Iron Company, Reading, Pa., was elected president of the Eastern Pig Iron Association at its regular monthly meeting in Philadelphia December 28.

Langdon Lea was admitted to the firm of J. Tatnall Lea & Co., iron and steel commission merchants, 1016 Stephen Girard Building, Philadelphia, Pa., January 2.

Obituary

ALFRED A. COREY, SR., died, December 29, at Thornedale, Chester County, Pa., where he had been living for two years on the old President Buchanan homestead, an extensive farm given to him by his son, William E. Corey, president of the United States Steel Corporation. Mr. Corey was 71 years old and was born near Braddock, Pa. For 20 years he was in business with his cousin, James B. Corey, a coal operator, but 18 years ago the partnership was dissolved and he retired from active business. He leaves a widow, two daughters and two sons, William E. Corey and Alfred A. Corey, Jr., superintendent of the armor plate mill at the Homestead Steel Works of the Carnegie Steel Company.

GUSTAVUS CHARLES HENNING died at his home in New York City, December 30, aged 55 years. He was born in Brooklyn, N. Y., and educated at the Brooklyn Polytechnic. In 1876 he was graduated at Stevens Institute, thereafter becoming inspector of material under the late William Hildenbrand on the Brooklyn Bridge. He traveled extensively abroad, introducing American testing machines, including many that were his own inventions. He was a member of the International Association for Testing Materials of Construction, the Iron and Steel Institute of Great Britain, the American Iron and Steel Institute, the American Society for the Advancement of Science, the American Geographical Society, the American Society of Mechanical Engineers, and the American Institute of Mining Engineers.

Columbia Tool Steel Company's Salesmen.—The salesmen for the Columbia Tool Steel Company celebrated their annual home coming at Chicago and at Chicago Heights December 29 and 30. The company had recently completed the beautiful new clubrooms at the works, where dinner was served to 18. The dining room is decorated in the old German style, one rather unusual feature being a piano for the use of the employees. A banquet was tendered them in the evening at the Chicago Athletic Club by Frank Matthiessen, vice-president of the company. Prizes were awarded for the best selling records and pledges made for the coming year. The company reports a very satisfactory year, the increase in sales being 34 per cent. over the amount for the year before.

The Lackawanna Steel Company announces that after January 19 its general offices, now at 2 Rector street, New York City, will be located at its works at Lackawanna, Erie County, N. Y., where all correspondence and communications for the president, vice-president and general manager, secretary, treasurer, general sales department and traffic department should then be addressed. The office of the assistant to the president will remain at 2 Rector street, New York City, where the company will also maintain a district sales office.

The Schuylkill Haven Rolling Mill Company, Schuylkill Haven, Pa., after a long idleness, resumed operations January 4. J. S. Hauscher, formerly of Wilmington, Del., will be in charge as general manager.

The Machinery Markets

So much inventory work is being done just now by manufacturers that buying details are being neglected. Another week will see the end of most of this work, and machinery purchasers will then be able to give more attention to quotations received against inquiries they have out. In the East the outlook for business is goods, as there are many enterprises in sight which will call for good expenditures. Specifications out in New England indicate that some good trading will come forward there, as three fair sized lists are in that market, while two other companies are expected to buy generously in the near future. Business is gradually improving in Cleveland. In Detroit there is an excellent outlook for a good call for machinery from the automobile industries. Reports from other markets are encouraging, and it is expected that within a week or so they will take on a more definite tone.

The New York Market in 1910

NEW YORK, January 3, 1911.

The year 1910 in the machinery trade was characterized by periods of unusual activity interspersed with seasons of depression. Never in the history of the trade was the market so sensitive to business changes as it was during the year just passed, and this condition led to some important readjustments in methods of selling equipment.

The year opened with many plans for factory expansion well under way, while a great deal of new construction work was planned for, and as a result of over confidence orders were placed more or less indiscriminately. Some classes of machine tools were ordered months ahead. Then came the first reaction of sentiment, followed by cancellations which were liberally accepted for a time. A succession of dull periods brought about a change of front on the part of manufacturers, and after much agitation in association circles many of them adopted stringent non-cancellation clauses. The result leaves the machinery market steadier at least, and buyers are now specifying closer to their actual needs.

At the beginning of the year there was a good volume of railroad business, and machinery manufacturers who did not own their own foundries had great difficulty in placing orders for castings. The foundrymen were so confident of a good year that they, as a rule, refused to accept contracts covering anything more than three months' supply. The leather belting manufacturers raised their prices 10 per cent. and encouraged by this many machinery manufacturers made slight advances in their quotations. The American Locomotive Company came into the market in January with requisitions for \$500,000 worth of machinery for expansions; and later called for \$150,000 worth for its automobile plant. Railroad lists, which had been absent from the market, began to appear and early in February New York machinery houses were bidding against inquiries for \$1,000,000 worth of general machinery. Engine and boiler builders advanced their prices from 5 to 10 per cent. during that month and machine tools and special machinery were raised from 10 to 15 per cent. in price. Within a week, toward the latter end of February, orders were placed in the New York market for half a million dollars' worth of machinery covering a wide range of requirements. A great deal of this business was placed by the railroads and there were lists out from the carrying companies still to be heard from. The Bethlehem Steel Company contributed to the general prosperity during February and March by purchasing against an extensive list of machine tools, amounting approximately to \$300,000. Machinery making plants were running to full capacity about this time and many of them were ordered up months ahead.

The Business Reaction

In April the trade saw something of a reaction and many inquiries were withdrawn, but the railroads continued to buy against lists issued earlier in the year. No new lists appeared, however, and the New York Central Railroad adopted a policy of sending out specifications for single machines instead of including its requirements in one list. Later other roads followed suit and to-day many of them are issuing duplicate pages, each devoted to specifications of a single machine. Some dealers get several of these sheets while others are favored with only one or two.

Although the railroads continued active during May, the demand from the general manufacturing trade fell off. A great deal of complaint arose over cancellations, and the matter was taken up at the spring meeting of the National Machine Tool Builders' Association, and many members declared their intention of accepting no further orders without the stipulation that cancellations would not be accepted.

The Delaware, Lackawanna & Western Railroad came out with a large list of machinery, but later announced that the business would not be closed for several months. Machine tool builders, who had been informing the trade that

they could accept no orders for certain classes of tools over seven or eight months delivery, announced that they were in a position to deliver anything called for within three or four months. Late in June a number of railroads withdrew inquiries they had issued and declared that they intended to buy very sparingly because of the freight rate agitation and other legislation affecting the carrying companies. There was a sudden reversion of sentiment, and the machine tool business especially became decidedly dull. Many manufacturers who early in the year were turning down orders for machines for early delivery were out seeking business, as inquiries fell off perceptibly.

This condition continued throughout August. About that time the automobile manufacturers, who had been liberal purchasers, withdrew from the market, and the automobile supply trade suffered accordingly. A good export trade developed during September, and this helped to support the market, but there was almost a total absence of railroad buying.

The only branch of trade that did not seem to be affected was the second-hand business for which a good call continued and on which prices were well maintained. Business began to pick up in November and the Delaware, Lackawanna & Western Railroad began to buy against the large list issued early in the year. There was a short period of buying, and confidence had just about been renewed when there came another sudden slump. The market drifted along. Foundrymen, who early in the year had refused to make long time contracts for furnishing machinery castings, in many instances found their plants nearly idle, and the machinery manufacturers were just as unwilling to talk business as the foundrymen had been the first of the year. This condition continued until three weeks ago when the market again took an upward trend. It slowly gathered in strength, and last week there was about \$50,000 worth of business in sight in the New York market, which was a larger volume of live inquiries than had been before the trade at any time during the previous two months.

The Outlook for the Future

The year opens with far less business in sight than there was at the beginning of 1910, but the market has an encouraging outlook. Many projects planned early last year were abandoned during the depression of the summer months and with a revival of trade they may reappear. It may be remembered that the year 1909 opened very dull in the machinery trade and closed decidedly strong. Conditions in 1910 were exactly the reverse, with the exception that the market to-day is in a better condition than it was eight weeks ago. Considering that the railroads and many manufacturers have adopted a decidedly conservative buying policy, it is thought that the gradual growth of business now under way may develop a firm and good machinery market.

Railroads Will Buy Sparingly

The strict policy of economy adopted by the railroads will be closely adhered to this year, according to present indications. A careful canvass of the important railroads, inquiring as to their machinery needs during the coming year, made by *The Iron Age*, has elicited replies from most of them which were by no means encouraging to the machinery trade. Out of more than 100 railroads addressed, no less than 55 have declared that they will make no improvements of any consequence, while a few others are undecided. In instances where reasons are given, legislation adverse to railroad interests is blamed for what is termed their enforced economy. The most important improvements contemplated are as follows:

The Great Northern is planning additions to its shops at Everett, Wash., which will require about \$100,000 to complete. The additions will provide for a plant for building and repairing both freight and passenger cars.

The Pennsylvania will probably extend its electrical zone from its present Manhattan transfer at Harrison, N. J., about 30 miles further into that state, and the Hudson

THE MACHINERY MARKETS

& Manhattan which has taken over part of the right of way of the Pennsylvania into Newark, expects to complete its rapid transit line to Newark before the fall of 1911. The two companies are working in conjunction and it is expected that when the Pennsylvania is relieved of its Newark traffic it will carry out its electrification plans. The Pennsylvania will also buy for replacement in its Altoona, Pa., shops, and its large shops at Ilion, N. Y., but as yet the company has planned nothing in the way of extension to its shop system.

The Alabama Great Southern will extend its car repair shops at Gadsden, Ala., but with the exception of purchasing bolt machinery it has no plans for adding to its mechanical equipment.

The Chicago & Northwestern is building an addition to its Chicago shops, for which mechanical equipment has been provided, and the company states that it has nothing in contemplation for the new year with the exception of ordinary replacements.

The Delaware & Hudson, with main offices at 32 Nassau street, New York, has plans under way for considerable enlargements to its shop plants, but will hardly be in the market for machinery before 1912.

The Pittsburgh, Shawmut & Northern will extend its line 65 miles in the Pittsburgh district and will buy 30 engines and 2200 coal freight cars. The company also expects to reconstruct a portion of its shops for which plans are now being prepared.

The New York, Chicago & St. Louis Railroad Company will build a 28 stall roundhouse at Conneaut, Ohio, at an expense of \$84,000, and a 9 stall addition to its roundhouse at Stony Island, which will cost approximately \$27,000. The company has made an appropriation for shop tools amounting to \$8500, which will be used for replacements and will add to its manufacturing facilities.

Some Forthcoming Enterprises

One of the largest projects calling for machinery expenditures expected to come before the trade this year is that of the General Electric Company, Schenectady, N. Y., which is establishing a large plant at Erie, Pa. The company has owned a tract of land at Erie for several years, and it now has a large foundry and other smaller buildings there. It is expected eventually to erect a general machine shop, and inquiries now out indicate that the company's plans will mature before the year is over.

The International Nickel Company has plans under way for an extensive plant at Roosevelt, N. J., near Elizabethport, where it has purchased 110 acres of land which will probably be used by the Orford Copper Company, a branch of the International Nickel Company. The Orford Copper Company is exploiting Monel metal, composed of copper and nickel, and it is said that the new plant will be devoted to the making of Monel metal sheets and castings.

A good demand for machinery is expected to develop from the enterprise of the Ottoman-American Development Company, which has been organized by interests closely connected with the MacArthur Brothers Company, of New York. The company has obtained concessions from the Turkish Government and will spend about \$60,000,000 in the construction of a number of railroad lines and for the development of mining properties in Turkey.

The Corn Products Refining Company, 26 Broadway, New York, is expected to be a good customer in the machinery market during the year as the company is arranging to make extensive additions to its large Argo works in the suburbs of Chicago. The company has about 100 acres of land there, 25 acres of which are now occupied by buildings. The plans under way will provide for structures to practically cover the rest of its property. In addition to buying a large amount of power equipment the company will purchase a great deal in the way of special machinery.

The Gillette Safety Razor Company, Boston, Mass., which bought a large tract of land on Frelinghuysen and Evergreen avenues, Newark, N. J., expects to erect a building for the manufacture of frames for safety razors and safety razor blades at a cost of \$200,000. The first building to be erected will be 81 x 200 ft. and will be of saw tooth construction. The company proposes to install a power plant of 500 hp. in addition to special steel making and grinding equipment.

The Week's News

The week's trading in the New York market has been devoid of developments. Buyers placed orders against a good volume of scattered inquiries but the holiday season naturally interfered with trading to some extent. The railroads are out of the market in this territory. Inquiries increased yesterday and to-day and most of them are of a nature to indicate that a good business will follow. Second-hand machinery continues in unusually good demand and used machine tools especially are bringing high prices.

The Union Tool Steel Company, with principal offices at Plainfield, and works at Annandale, N. J., has been organized to succeed to the business of George W. Astle of Annandale, manufacturer of mill picks and facing hammers. The new company will continue the manufacture of these tools, together with brick masons' trowels, brick hammers, stone masons' tools and cement workers tools. A 40-ft. extension has been made to the hammer shops, a 20-ft. addition to the grinding shop and a new engine and boiler house has been erected. The machinery installed includes a 45-hp. Chandler & Taylor engine, one 60-hp. Ames return flue boiler, one C. C. Bradley & Son compact hammer, one double column polishing and buffing lathe and a power hack saw. No further improvements are contemplated at present. T. F. Budlong, who for 20 years was secretary and treasurer of the Taylor Iron & Steel Company of High Bridge, N. J., is president of the company, George W. Astle vice-president and L. R. Budlong secretary and treasurer.

The Bayonne Launch Company, Bayonne, N. J., has been incorporated with \$10,000 capital stock to manufacture launches and power boats. The company is erecting a building, 40 x 60 ft., clear story, at the foot of Thirty-sixth street and New York Bay, which will be equipped with the most modern woodworking machinery, operated with electric power. L. R. Schellenberger is secretary and treasurer.

The Marsh Valve Company, Dunkirk, N. Y., has been incorporated, with \$250,000 capital stock, to manufacture a patented quick opening, double seal radiator valve. The company has opened a sales office in the Flatiron Building, New York. Its general offices are located at 305 Central avenue, Dunkirk.

City Engineer E. A. Fisher, Rochester, N. Y., is preparing plans and specifications for garbage disposal plant to be constructed by the city and for which the Common Council has appropriated \$100,000.

Health Officer Dr. Charles F. Clowe, of the city of Schenectady, N. Y., has recommended the construction of a garbage disposal plant by the city, and action upon the matter is to be taken at once.

The Fireproof Film Company of Rochester has contracted for the erection of a factory 55 x 520 ft., three stories, at Dewey and Ridgeway avenues, which will cost approximately \$100,000. Henry Kuhn is president of the company.

Anthony Mosher & Son, carriage manufacturers, 397 Sheridan avenue, Albany, N. Y., are having plans prepared for a two-story brick factory building which they will erect on Sheridan avenue early in the spring.

The Buffalo Receptacle Company, Buffalo, N. Y., has been incorporated with a capital stock of \$150,000, and will establish a plant in that city for the manufacture of garbage cans and refuse receptacles. Considerable machinery will be required in the way of shears, punches, presses, riveters, &c. Gustave Steinwachs, 1047 Genesee street, is manager.

The Pure Carbon Company, Wellsville, N. Y., has been incorporated and will erect and equip a factory building at Wellsville adjoining the Kerr Turbine Company's plant at South Main and Dyke streets.

The city of Batavia, N. Y., is contemplating the construction of a garbage incineration plant, plans for which have been completed by city engineer R. A. Wentworth and will be submitted to the Board of Aldermen January 11.

The Delaware & Hudson Company is completing plans for the erection of extensive repair shops at Albany which, with the requisite equipment, will call for the expenditure of between \$1,500,000 and \$2,000,000. It is expected that when the new shops are completed all of the company's heavy repair work for cars and locomotives will be centralized at Albany.

The Augustine Rotary Engine Company, 738 Ellicott Square Building, Buffalo, N. Y., has completed plans for additions, 50 x 100 ft., three stories, and 25 x 50 ft., two stories, which it will make to its plant at Elmwood avenue and the International Bridge branch of the Erie Railroad. Work will be commenced early next spring.

The Ramapo Iron Works, Hillburn, N. Y., has let contract to the Turner Construction Company, New York, for construction of a one-story and gallery building for the manufacture of frogs and switches, which it will add to its plant at a cost of \$30,000.

The Beverwyck Brewing Company, Albany, N. Y., will erect and equip a two-story bottling works, contract for the building, to cost \$25,000, has been let.

The factory building of the Electrolytic Products Company, Buffalo, N. Y., is approaching completion on the company's two-acre site at Elmwood and Hertel avenues, and manufacturing operations will be commenced as soon as the equipment is installed. The principal product of the company at the outset will be a seamless and solderless radiator for automobiles, made by the electrolytic process, under patents of Henry Porzel, the company's superintendent. Henry C. Steul is president and Frank A. Abbott secretary.

THE MACHINERY MARKETS

Chicago

CHICAGO, ILL., January 3, 1911.

The year opens with a very satisfactory volume of inquiries in the hands of dealers, who are encouraged to hope for an upward swing in their business in January. The railroads are figuring quietly on a considerable amount of business, without sending out inquiries or making their wants known to more than a few favored interests. In the manufacturing field of machine tool buyers there is a very encouraging growth in the volume of inquiries. A large proportion of this business is of a tentative character. Buyers are getting prices and investigating but in many cases they explain frankly that they will not actually place the business until there is a definite turn in affairs, or until they feel more confidence in going on with improvements and extensions which will necessitate the purchase of new tools. This waiting state has been quite general among industrial interests in the West during the past six months. Everyone has been waiting for someone else. During the fall the bankers were very conservative and advised against any preparations for an increase in production but now that money is becoming easier there is a general expectation that the turn in the tide is not so far ahead. The unexpected growth in the automobile trade two years ago contributed very largely to the demand for machine tools in 1909. The automobile people kept on buying during the first half of 1910 but cancellations of their orders during the summer and fall practically wiped out this market for the machinery dealer and proved a great disappointment. The depression in the railway equipment industries has also been a factor in the market. It will require considerable growth in the general market for machine tools to offset these losses. During December, however, conditions have been more encouraging than for a long time.

The Lalor Wagon Company, Chicago, has been incorporated with \$200,000 capital stock. The incorporators are M. W. Lalor, D. K. Lindout and J. C. K. Lindout.

The Standard Oil Company proposes to expend \$2,000,000 for improvements at the refining plant at Wood River, Ill. Work on a new building will be started in January, and the present working force will be increased to 700 men when the improvements are completed. The company, since its location at Wood River six years ago, has already expended nearly \$3,000,000. It has seven filtering plants and 24 crude oil stills in operation.

Philadelphia

PHILADELPHIA, PA., January 3, 1911.

Purchases of machine tools or general equipment during the holiday week were, as might be expected, very meager. The month of December was a dull one, both with manufacturers and merchants, but from incomplete reports the volume of the year's business will probably not show up as badly as would seem to be indicated by that done in the second half. Manufacturers in many lines had a very satisfactory trade during the first six months of 1910, a good share of which was carried over into the second half and enabled them, even though the demand fell off sharply during the latter period, to maintain fairly active conditions during a good part of the last six months. In a few cases, particularly makers of special tools, the volume of business for the year is reported to have been in excess of that in 1909. It is difficult at this time to give any definite idea regarding the prospects for business in 1911. While a number of good propositions are under consideration, prospective buyers are for the most part making haste slowly, and, until the general iron and steel business shows some indication of greater activity, purchases will likely be made on a conservative basis.

The Elwood Ivins Tube Works has taken quite as much business in 1910 as in the previous year, and is now well fixed with orders. This concern has made a number of improvements to its plant during the past year and contemplates further extensions this year, although their exact nature has not yet been definitely decided.

The Pennsylvania Shafting Company, Spring City, Pa., reports a much more satisfactory year in 1910 than in the year previous. A new plant was erected during the past year for the manufacture of cold rolled flats, squares and hexagon bars. While current orders are not quite so large business is said to be satisfactory. One of the buildings of the company's plant was destroyed by fire on December 24. Rebuilding will be started at once and it is probable that in the process of reconstruction, the efficiency of the plant will be increased.

The Hilles & Jones Company, Wilmington, Del., has re-

ceived orders for the punching and shearing machinery to be installed in the new structural shop of Dietrich Brothers, Baltimore, Md., also for three boiler shop equipments for the Missouri Pacific Railway at Falls City, Kansas City, and Hoisington. An order for large plate shears for export to Australia has also been recently taken. Inquiries which have recently been received, lead this company to believe that business early in 1911 will be fair.

Current reports that the United Gas Improvement Company would erect a pipe mill at West Conshohocken, Pa., are erroneous. The company has purchased land at that place, with a view that when it had outgrown the present facilities of its Merion & Radnor Gas & Electric Company's plant at Ardmore, Pa., a new plant might be erected at West Conshohocken, to supply the Merion, Radnor and Conshohocken districts.

Revised plans are in preparation, it is said, for the new plant to be erected for the S. S. Wenzall Machine Company at Fiftieth street and Parkside avenue, while bids on revised plans for an eight-story manufacturing building, to be erected for John H. Smaltz, at Eleventh and Race streets, are being taken.

Joseph F. Hasskarl, acting director. Department of Wharves, Docks and Ferries, city of Philadelphia, will take bids until January 20 for the construction of a superstructure on Vine street pier, Delaware River. The estimated cost of the work is \$400,000, although but \$200,000 is now available, and the contractor will be obliged to enter into supplementary contract or contracts to complete the work. Plans and specifications may be had from the Department of Wharves, Docks and Ferries, Bourse Building.

Plans are about completed by Ballenger & Perrot, engineers, for a four-story garage, 80 x 105 ft., to be erected for Douredore Brothers at 2314, 2316, 2318 Market street. Estimates will be asked for early in the year.

Cincinnati

CINCINNATI, OHIO, January 3, 1911.

January, 1911, is the beginning of a year that is claimed by most machinery manufacturers and dealers in this section to hold out a more promising future than did 1910 at its commencement. However, actual business booked during the latter part of 1910 was somewhat disappointing in many lines. Automobile manufacturers were the best machine tool customers during the early part of the year, and when this business slumped off tool builders had to turn to the general trade for support, as the railroads bought only sparingly. For 1911 a large railroad business is anticipated, as it seems an impossible proposition, for several of the larger lines, especially, to keep out of the market much longer.

Lately a number of machine tool builders have been accumulating stocks, although a small number of them have picked up enough business to keep running on average time without having to resort to this to any great extent, and stocks on hand now would probably not exceed those carried at the corresponding period of last year.

Many additions were made to manufacturing plants in the Cincinnati district during the past 12 months. Among the latest completed factories is that of the Cincinnati Bickford Tool Company in Oakley, in which is now being installed the necessary equipment moved from the company's two old Cincinnati locations. Other Oakley plants that have been put in operation include that of the Cincinnati Planer Company, Triumph Electric & Mfg. Company, the Cincinnati Milling Machine Company and the Incandescent Light & Stove Company. The Victor Safe & Lock Company's Norwood factory, just completed, is one of the largest of its kind in the world. On Eastern avenue the Charles Boldt Glass Company and the R. K. Le Blond Machine Tool Company have both made large additions to their manufacturing facilities, and the latter company now has under construction a building that will be used mainly in the manufacture of its milling machines. In the West End section the Lunkenheimer Company is now occupying a new addition, giving it 200,000 sq. ft. more floor space. The Hissey-Wolf Machine Tool Company is moving into its new home on Colerain avenue, and farther out the Cincinnati Grinder Company and the M. L. Andrews Company are jointly occupying a recently constructed building. The American Valve & Meter Company will soon move to its new quarters on Spring Grove avenue, and almost opposite is a large addition just built by the Ohio Pattern Works. The United States Electrical Tool Company has under way a new plant that will greatly increase its output. The Lodge & Shipley Machine Tool Company built a pattern shop and the Schacht Mfg. Company will soon have in full operation a strictly modern factory for turning out automobiles and trucks. The John

THE MACHINERY MARKETS

B. Morris Foundry Company recently completed shops in which it will manufacture the Schellenbach lathe. From a construction standpoint, 1910 shows up well, and indications are that the improvements for the present year will at least equal those of the year just passed.

Kirk & Blum, Cincinnati, sheet metal workers, have decided to double their present plant's capacity and are working on plans for a building that will be two stories 40 x 150 ft., and of brick construction. The site has not been selected.

The Cincinnati Bickford Tool Company has practically all of its machinery moved into its new plant at Oakley, and will probably have it in full operation within the next 30 days.

At a stockholders' meeting December 31, the name of the Rahn Carpenter Company, Cincinnati, manufacturer of machine tools, was changed to the Rahn-Larmon Company. John Rahn, Jr., was elected president and general manager, and A. J. Larmon, secretary and treasurer.

The American Tool Works Company, Cincinnati, is making a number of inside improvements to its plant, among them is a concrete wood-covered floor for its assembling room.

The annual stockholders' meeting of the Mowry Car Wheel Works, Cincinnati, will be held at the company's offices 2401 Eastern avenue, January 10. Five directors are to be elected.

To mine coal, the Wilsonburg Fuel Company has been incorporated at Grafton, W. Va., with \$25,000 capital stock, by D. E. Brown, A. J. Glenn, L. B. Stevens and A. G. Bartlett, all of Clarksburg, W. Va., and E. C. Feather, of Newburg, W. Va.

The Crane & Breed Mfg. Company, Cincinnati, manufacturer of undertakers' supplies, is now occupying its new plant addition. The new structure is of steel and concrete construction, five stories and cost over \$250,000 to build.

Woolcott Brothers, Winchester, Ky., expect to commence work early in the spring on a four story brick flour mill, to be erected at Lexington, Ky.

The Dentler Mfg. Company has been incorporated at Wheeling, W. Va., with \$10,000 capital stock, by W. L. Dentler, Jacob Loomis, Charles E. Lynn, S. M. Noyes and A. B. Woodruff, all of Wheeling. It is the announced purpose of the company to do a general foundry business, including the manufacture of grate bars.

It is stated that the local branch of the Iron Molders' Union has effected a settlement with employers whereby an increase of 5 per cent. in wages is allowed. This agreement will last for one year and will quiet all talk of a strike on the part of the molders, which is understood, was to be called the first week in January.

New England

BOSTON, MASS., January 3, 1911.

Review of the Year

The past year in New England was characterized by varying experiences. No even depression developed, neither were conditions uniformly good. Some lines averaged an excellent twelve months, while others fell below the normal. Even in the same industry, where manufacturers or dealers are in direct competition, the individual curves of sales crossed and recrossed, up and down. The market lacked consistency. The average was neither very high nor discouraging. Omitting November and December, the figure should be fully normal.

The year opened well. Business everywhere in the metal lines enjoyed an excellent spring trade. The summer was not altogether disappointing, until the automobile industry entered into its slump. The early autumn saw some revival, and September and October were fair months with many houses. Experiences for November varied widely. December was dull, with indications of improvement during its closing fortnight.

The partial collapse of the automobile trade was the principal factor of the year. It affected the builders more than it did the New England dealers, because there are not many automobile factories in this territory. Shops that were running to full capacity were suddenly confronted with numerous cancellations, which under the custom then prevailing, they were compelled to accept. A complete reversal of the market came as a bolt out of the clear sky.

The automobile business should come back to some extent during 1911. The builders of pleasure cars are readjusting themselves to the new conditions. Curtailment is the rule, but at the same time the effort is being made to secure the most economical methods of production, which means replacements. The commercial car is a promising proposition

for the immediate future, in the probable effect upon the machinery trade. The market is growing rapidly. The commercial car is being taken up by the builders of pleasure vehicles, and developed as a department of its own. So special has become the machinery used in automobile factories that equipment for the heavier vehicles will have to be purchased, much of that used in manufacturing light cars being ill adapted to the new purpose.

The railroads are coming into greater prominence as buyers. The men who as salesmen for railroad supplies are closest in touch with the trade assert that the companies are beginning to buy closer to their requirements, and have no stocks of supplies of any sort. In New England a large amount of machinery will be purchased, notably by the Boston & Maine system, during the new year.

The supply business has exceeded all records, including the big year, 1906, the former high mark. This feature of the trade is the more promising because of the fact that the stockrooms of customers are still practically empty. With machine tools the year's totals are well below the previous big year. Where the two lines are combined in one house, the machine tool end has pulled down the total to a good average business.

Of large customers, the electric business is fairly active in all of its varied lines, some of which are very busy. Shoe machinery has played an interesting role during the year, in the establishment of a great competing company, which was later sold out to the United Shoe Machinery Company. The corporation is now further concentrating the industry at Beverly, Mass., where large extensions are planned. The textile machinery people found business somewhat unsatisfactory during the last half of the year, and the same is true of paper machinery. The steam engine builders are not doing a rushing trade. Certain special lines of machinery that go chiefly to the export trade are normally busy. Export trade generally seems to be improving.

The year has seen an average amount of shop and mill construction, and announcements already made, coupled with plans not yet given to the public, indicate that 1911 will see an even greater growth of New England's industries, including machinery.

The trade is watching with eager interest the developments of the coming two months, in the hope that signs already noted will prove harbingers of a return of general industrial activity.

A sufficient number of favorable indications have come to light within the past week or two to give the machinery people greater confidence in the future. Current orders are not of large volume, naturally, in the face of the holidays and inventory taking. Inquiries are good, however, several lists being out, including those of the Lamson Consolidated Store Service Company, 161 Devonshire street, Boston; the Lake Torpedo Boat Company, Bridgeport, Conn.; and the Guiler Engineering Company, 10 Broad street, Boston.

The Week's News

Marcus Mason & Co., Worcester, Mass., manufacturer of coffee and sugar machinery, which is controlled by the Guiler Engineering Company, 10 Broad street, Boston, is in the market for a considerable list of equipment, including a three ton electric travelling crane; a 36-in. pulley lathe, 36-in. engine lathe, with 14-ft. bed; 16-in. turret lathe; 18-in. engine lathe, with 12-ft. bed, 48-in. planer, with three heads; 6-ft. boring mill; horizontal boring mill; three spindle 20-in. gang drill, disc grinder, combination punch and shear, horizontal punch, 8-ft. rolls, bending machine, mortising machine, tenon machine, patternmaker's lathe and a 24-in. rotary planer. The company has acquired 7½ acres of land at South Framingham, where its new plant is under construction, the foundation being practically completed, while the erection of the steel work will begin within a fortnight. The initial unit of the works will consist of two buildings, each 70 x 175 ft., set together so that one heavy fireproof wall serves for both. One building will be devoted to the machine shop and plate department, the other to woodworking shop, shipping department, &c. The offices will have a building of their own. The present shops on Union street, Worcester, are inadequate, the business has grown very rapidly since it came into the possession of the Guiler Company four years ago. Full equipments for the cultivation and preparation of coffee and sugar are produced. The new plant will quadruple manufacturing capacity. The equipment at Worcester will be moved to South Framingham. The company plans to do a general machine business as well as to take care of its own lines. The matter of power is still under consideration.

The Gurney Heater Company, Franklin and Pearl streets, Boston, will not complete its new works at South Framingham until the warm weather. The plant will be a very large one, the plans calling for 175,000 sq. ft. of manufacturing space. The entire equipment will be new and nothing but the electrical apparatus has been contracted

THE MACHINERY MARKETS

for. In the spring the company will be in the market for a long list of machinery of various sorts, including machine tools, and also for cranes and other apparatus for the economical handling of the product.

The plans of the Ames Plow Company, Boston and Worcester, Mass., for its works in the immediate neighborhood with the Marcus Mason & Co., and the Gurney Heater Company, call for a general manufacturing building 200 x 325 ft. and one story; a building to be divided to give a space 60 x 180 ft. for the foundry and a similar area for the forgeshop; and a storehouse which will be two stories in the beginning, but arranged to go higher when the need shall demand additional space. The company has an adequate engine, but will require electrical equipment, as well as a considerable amount of machine tools and other manufacturing machinery.

The Lake Torpedo Boat Company, Bridgeport, Conn., manufacturer of submarine torpedo boats, will be in the market for a horizontal cylinder boring machine, a turret lathe, boring mill, universal milling machine and lathes, and possibly for a small punch and an angle shear. The company has just completed an enlargement of its plate shop, making the structure 40 x 160 ft., and is now adding a 50 x 79 ft. extension to its machine shop.

The Brunelle Boiler Company, 10 Coburn avenue, Worcester, Mass., manufacturer of steam and hot water heaters and heating specialties, has been incorporated, with some change of management, and proposes to increase the capacity of its works in the near future. F. X. Brunelle is the president, and J. A. Gervais, treasurer.

New England is directly interested in the organization of the National Boat & Engine Company, because the West Mystic Mfg. Company, West Mystic, Conn., is one of the companies which will be consolidated under the plans of the promoters. Allen H. Thompson, secretary and treasurer of the West Mystic Company, is a director of the new corporation, which, according to the statement, will take full ownership of the various properties.

The Windham Handle Company, South Windham, Conn., manufacturer of handles for axes, picks, hammers and edge tools, will remove the business to Willimantic, where a factory building has been secured. W. F. Maine, the proprietor, states that a considerable amount of pulleys, supplies, &c., will be required. A complete equipment of individual motors has been purchased.

The Peck Clark Company, Inc., Brookfield, Vt., has taken over the business of the Peck-Clark Company, which was established in Brookfield in 1835, and has purchased the French-Watson property at Hartford, Vt., and will remove there in the spring. No new factory will be erected. The company manufactures forks, hoes, rakes, can dogs and timber carriers.

The Hartford Automobile Parts Company, Hartford, Conn., has increased its capital stock by \$48,600, to take care of investments already made and to provide additional working capital.

The Williams Sealing Corporation, Waterbury, Conn., manufacturer of bottle and jar caps, has increased its capital stock from \$100,000 to \$150,000. The new money will be used for the purpose of additional machinery, orders for which have been placed. The present factory has space to permit of the installation of the equipment.

L. M. Linnell, West Gardiner, Me., states that the 1300 acres of land in Canaan and Skowhegan, Me., which he proposes to submit to mining operations, is rich in brown ore, used only for the manufacture of iron. He plans to establish a shipping mine in the near future and believes that the location will render cost of production and shipping charges much less than in some Western localities where ore is mined.

Cleveland

CLEVELAND, OHIO, January 3, 1911.

Local machine tool and machinery dealers look for a gradual improvement in the volume of orders. A decided revival is not expected during the next two weeks but the fair volume of inquiries that came in during December, the greater part of which are still pending, will result, it is believed, in considerable business during the latter part of the month. During the week the market was exceedingly quiet, few orders coming out except for single tools, as is usual during the holiday season. Manufacturers are busy taking inventories and a number of plants were partially shut down during the week.

The outlook for a good demand for heavy handling machinery is quite promising. Some good sized work in the line of coal and ore handling plants is in prospect and is expected to come out early in the year, not yet having reached the point of asking for bids. While the past year had a

quiet ending in most metal working lines manufacturers generally take an optimistic view of the situation and, basing their belief on the general conditions throughout the country, look for satisfactory year during 1911.

A new plant in the rubber industry in Akron, Ohio, to be known as the Federal Waterproofing Company, will be established early in the year. The company has been incorporated with a capital stock of \$100,000 by H. B. Ball, W. H. Miller, F. S. Nash, H. H. McClosky and R. A. Carroll. It is stated that the plant will be located in one of the new additions at the plant of the Goodyear company.

The Cleveland office of the Detroit Stoker Company reports the receipt recently of the following orders for Detroit automatic stokers: Harvey Brothers, Cleveland, stokers for two 250-hp. boilers, for heating and lighting plant; Glidden Varnish Company, Cleveland, for 150-hp. boiler; Wellman-Seaver-Morgan Company, Cleveland, for a 300-hp. boiler; the Rauch & Lang Carriage Company, Cleveland, for 250-hp. boiler; the Great Lakes Engineering Works, for four 450-hp. boilers for its new Ashtabula plant, and four stokers for public school buildings in Cleveland.

The Brown Hoisting Machinery Company, Cleveland, reports the outlook good for orders for ore and coal handling machinery during the early part of the new year, several contracts now being in prospect. This company has recently secured an order for a coal handling plant to be erected at Tobata, Japan, this to be a duplicate of one built by the Brown company at the same point a few years ago.

The West Steel Casting Company, Cleveland, will enlarge its present foundry by an extension that will enable the company to double its present capacity. When installing its original equipment provision was made for an enlarged capacity and the addition will provide the additional floor space required. No new equipment will be purchased.

The Columbus Machine Company, Columbus, Ohio, has under consideration the removal of its plant to some more desirable location in a smaller city.

To provide room for further plant extensions as they are needed, the Silver Mfg. Company, Salem, Ohio, has purchased a 2½ acre tract of land immediately adjoining its present plant.

The Limbert Mfg. Company, Springfield, Ohio, has been organized with a capital stock of \$20,000 to manufacture a flue blower, the invention of S. H. Limbert, who will be the president of the company. Offices have been opened in the Bushnell Building.

The Niles Iron & Steel Roofing Company, Niles, Ohio, formerly doing business under a partnership arrangement, has been incorporated with \$40,000 capital stock. The incorporators are W. H. Pritchard, P. E. Pritchard, Ruth Naylor, Annie E. Pritchard and Olive V. Pritchard.

Baltimore

BALTIMORE, MD., January 3, 1911.

As far as the machine tool trade is concerned, neither manufacturers nor merchants, as a rule, offer very optimistic reports, either as to the past month's business or that for the entire year. Buying was fairly active early in 1910, but declined rapidly during the second half, and in the last quarter was almost at a standstill. In other lines identified with the iron and steel trades more favorable conditions are noted, although the decline in activity during the last three or four months was almost universal. Building work in Baltimore was extensive, particularly of the large office building and warehouse classes, resulting in a very satisfactory business for structural materials, power installations, elevator and smaller machinery equipment. Fabricators of structural material had a record year. A large amount of work was carried over from 1909, which together with a fair amount of new work, kept plants operating at utmost capacities during the greater part of the first eight months; as the decline became sharper, operative work decreased, and at the close of the year represented on an average about 50 per cent. of the capacity. It is estimated that during 1910 the aggregate tonnage of structural work placed in Baltimore and nearby, was from 40,000 to 50,000 tons. Merchants report a very fair business in boiler and engine work, a good share of which has been power equipment in buildings. From this same source there developed an unusual demand for heating and ventilating work, and engineers in that branch of the trade have exceeded all previous records in volume of business taken. Machine shop supplies have been in irregular demand throughout the year, but the aggregate business will, it is believed, about equal the average. Contractors' supply and equipment merchants report a rather quiet business, due to a large extent to inactivity of the railroads. Conditions varied considerably in the foundry trade. The light demand for machinery resulted in makers

THE MACHINERY MARKETS

of that class of work operating below normal capacity, while the heavy demand for castings entering into building construction kept foundries producing castings of that class pretty fully occupied. Municipal work of various kinds contributed a good share of business to the different branches of the trade, and there is a good prospect for further activity during 1911 from the various city departments. The year has not been without difficulties between labor and employer. Iron molders and pipe fitters, among others, made demands for wage advances. The molders' strike is still on, although foundries are in no way inconvenienced; in other branches of the trade, arbitration prevailed, after delays of various periods.

Proposals will be taken during the week for a central power plant, comprising boilers, engines and generators, as well as heating and ventilating systems for a new Blind Asylum being erected at Overlea, Baltimore county, Md. Charles L. Reeder, Baltimore, Md., is the engineer.

Stein Brothers are erecting an addition to the plant of the Joseph Kavanaugh Company, coppersmith, Pratt street and Central avenue. The new building will be two stories, 14 x 60 ft.

The Baltimore Siegwart Beam Company has been incorporated with a capital stock of \$150,000. Land covering an area of about six acres has been acquired at Curtis Bay, and plans are under way for the erection of a plant to manufacture the Siegwart beams, which are of hollow reinforced concrete construction.

The Ellicott Machine Works reports business during 1910 to have been up to the normal average. The plant has been operated on a fairly even basis and considerable work in heavy dredging machinery is now in prospect. This concern materially increased in machine shop facilities during the year.

Proposals are being made on a new Young Men's Christian Association building to be erected in Columbia, S. C. About 250 tons of structural steel work will be required. Strand & LaFaye, Columbia, S. C., are the architects and engineers.

Bids for a new factory for the Canton Box Company, manufacturer of wooden boxes, will be taken to-day. The building is to be of structural steel frame, requiring about 120 tons of material.

John Dadt has taken a number of orders for special machinery recently, principally, however, for tobacco manufacture. Some good business in elevator and general machine work is pending. Continued activity throughout the year is reported, although the largest volume of business was done during the first eight months of the year. An average business is reported in machine shop and general supplies.

Plans have been practically completed for the new power house for the Union Power Company, Hagerstown, Md., and the engineer, O. G. Keilholtz, Continental Building, Baltimore, Md., will, it is stated, be ready to take bids at an early date.

The Baltimore Retort & Fire Brick Company reports a very satisfactory volume of business during the past month, exceeding that for a like period in 1909. Recent orders include two benches of gas retorts for the Orlando Gas Light & Fuel Company, Orlando, Fla., and one bench of retorts for the Lock Haven Gas Light & Power Company, Lock Haven, Pa., as well as a large number of orders for special and general fire brick shapes. The year's business shows an average increase over that for 1909.

The award of contract for the erection of the proposed new building for the Baltimore Bargain House has been temporarily held up, pending some changes in plans and revision in estimates.

The T. C. Bashor Company reports a record volume of business during the year, even though the closing months have been rather inactive. In heating and ventilating engineering work business was extremely heavy. A fair business in boiler and tank work is reported, while a very satisfactory trade in engines has been done. Recent orders for tank work include some good contracts for acid tanks for the Atlantic Fertilizer Works, Baltimore, Md.

The Crook-Kries Company has the contract for the heating and power plant for the new addition to the Mercy Hospital. Two Erie Ball engines, direct connected with electric generators, will be supplied. A number of contracts for general heating installations have also been booked. This concern reports a very satisfactory volume of business during the year and is carrying considerable work over into 1911.

The Department of Public Improvement, sub-department of the city engineer, Baltimore city, will take bids until January 11 for a quantity of supplies and materials to be furnished during 1911. Separate proposals will be received, among others, for tools and hardware, paints and oils, sewer traps, inlet covers, cast iron manhole covers and frames and miscellaneous materials. Specifications may be obtained from B. T. Fendall, city engineer.

Bartlett, Haywood & Co. have had a normal year. While

general business fell off at times, a number of large orders enabled the various departments of the plant to maintain about an average rate of production. This firm still has under consideration a material addition to its machine shop, both in the way of buildings and equipment, but, in view of decreased business activity toward the close of the year, is holding the matter in abeyance.

The Commissioners of the District of Columbia, Washington, D. C., will receive bids until January 10 for the construction of a central heating plant and boiler house at M Street High, Simmons and Douglass Schools in that city. Information may be obtained from the chief clerk, Engineering Department, Room 427, District Building, Washington, D. C.

Sealed proposals will be received on February 1, 1911, by F. W. Keating, superintendent of the Maryland Asylum and Training School for the Feeble Minded, Owings Mills, Baltimore county, Md., for the erection of a number of buildings in connection with that institution, including a manual training and assembly building, a single and a double dormitory and day room building, and a dining room and dormitory building, according to plans by Ellicott & Emmart, architects, Union Trust Building, Baltimore, Md., from whom plans may be obtained on payment of a small deposit.

The Baltimore Bridge Company reports the past year to have been the largest in point of tonnage output which it had ever had. A large amount of work was carried over from 1909, which together with new business kept all departments exceedingly active during the greater portion of the year. During the closing months of the year, however, business dropped off considerably, and during December the plant was operated at about 50 per cent. of capacity, with sufficient work on the books to keep it so engaged for several months ahead. Among recent orders taken by this company was one for a 150 ft. bridge span for export to Costa Rica.

The Chesapeake Iron Works has recently taken contracts for structural steel work for a new bottling house for the Fred. Bauernschmidt Brewing Company, Baltimore, Md., and a moderate structural job for a new hotel at Silver Springs, Md., together with a fair amount of miscellaneous work. On the whole the volume of business taken during December was about normal and larger than that of the previous month. The output for the year was the largest in the history of the plant, although the bulk of the business was done during the first nine months of the year. Increased facilities completed during the year by the Chesapeake Iron Works increased its facilities for production fully 50 per cent.

Dietrich Brothers have been awarded contracts recently for structural steel work for a new building for the National Casket Company, this city, for a new plant for Becker Brothers & Son, and for an addition to the department store of the Hutzler Brothers Company. Each of these will require about 100 tons of material. They have also received a contract for the structural and ornamental iron work for the new building for the Riverside & Dan River Cotton Mills, Danville, Pa., and for the structural work for a new library known as the No. 15 Pratt Library in this city. The new office building of Dietrich Brothers, previously mentioned, is about under roof, while work is progressing rapidly on the new additions to their structural and ornamental iron shops. The bulk of the equipment for these new additions has been purchased, although they are still in the market for small punches and for drilling machines. Business during 1910 with this concern will largely exceed in volume that of the previous year.

The Charles J. F. Steiner Mantle Company, Baltimore, Md., has plans for new buildings to be erected at Monument and Eleventh streets. The main building will be one story, 80 x 160 ft., of brick and concrete, and there will also be a dry kiln, 40 x 85 ft. and a power house, 32 x 40 ft., mill construction. When completed the plant will cover two city blocks. All the buildings will be of modern construction, and each will be separated from the other by a 20-ft. alley. Charles J. F. Steiner, 403 Builders' Exchange, is president of the company.

St. Louis

ST. LOUIS, January 2, 1911.

Only a fair run of business has been done here the past week, but the movement in the way of new small enterprises, noted once or twice before, still continues and there seems to be a pretty well defined undercurrent of increased confidence. Some very good orders have been placed recently for the lighter manufacturing equipments, such as automatic screw machines, &c., of which St. Louis is gradually becoming a greater consumer. Machines driven by individual motors seem to be rapidly gaining approval, and a much larger pro-

THE MACHINERY MARKETS

portion of such machines is being sold all the time. A rather interesting order reported is for half a dozen motor-driven machines, including several made by the American Tool Works Company, to go into the private garage of a local capitalist. There has been some movement of second-hand machines, but most dealers do not look for much activity in that department until the spring season opens. Good stocks are being carried by several of the St. Louis dealers.

Albert B. Bowman, St. Louis, states that there are now seven live machine tool houses in this city. His own firm carries constantly in stock upward of 50 sample machines and high grade machine shop equipment.

The Radio Gas Producer Company, St. Louis, has been incorporated, with a capital stock of \$50,000, one half paid. The incorporators are J. W. Kolar, A. J. Cunningham, M. C. Burgman and others. The company will engage in the manufacture of electrical apparatus, &c.

The plant of the St. Louis Machinery Company, 606-608 South Vandeventer avenue, St. Louis, was partially destroyed by fire December 29. The loss is estimated at \$12,000.

A portion of Walter Vanstines furnace and sheet metal works at Kansas City, Mo., was wrecked by dynamiters December 30, causing considerable loss.

The Kahoka Flour Mills at Kahoka, Mo., will hereafter be known as the Baldwin Milling Company, Kahoka. It is the intention of the new company to at once make improvements in the mill.

The Pioneer Iron & Steel Company, Kansas City, Mo., has been incorporated with a capital stock of \$10,000. The incorporators are D. S. Rettig, L. C. Rettig and M. Andrews.

The Sheffield Sash Weight & Mfg. Company, Kansas City, Mo., has increased its capital stock from \$7500 to \$10,000.

The Williams Motor Car Company, Kansas City, Mo., has been incorporated. The capital stock is \$10,000. The incorporators are W. A. Williams, Norman Wilson and W. H. Blodd.

The Siloam Spring Ice & Cold Storage Company's plant at Siloam Springs, Ark., was destroyed by fire December 22, causing a loss of \$150,000 with \$50,000 insurance.

The plant of the Mulberry Cotton Oil Company, Mulberry, Ark., was destroyed by fire December 18, entailing a loss of \$80,000, fully covered by insurance.

The sawmill of the Homan Lumber Company, at Homan, Ark., was destroyed by fire December 21, resulting in a loss of about \$35,000, with insurance of \$25,000. It is announced that the plant will be rebuilt at once.

The Hayton Pump Company, Hannibal, Mo., has been incorporated to manufacture turbo-centrifugal high pressure pumps. The pumps are the invention of T. R. Hayton, and it is claimed they show a large gain in efficiency over many others now on the market, the gain ranging from 20 to 50 per cent. The company has made arrangements with the Leader Foundry Company, Quincy, Ill., for the manufacture of the pumps.

The Wellsville Light, Power & Water Company has been incorporated at Wellsville, Mo.

The Empire District Electric Company, Joplin, Mo., has, in addition to plants mentioned last week, acquired the plant of the Columbus Electric Company, Columbus, Kan., which has a capacity of 125 kw., and will make it a substation of its Riverton plant, with corresponding alteration of the equipment.

Milwaukee

MILWAUKEE, Wis., January 2, 1911.

Reports received from all of the manufacturing cities of Wisconsin, coupled with a compilation carefully made in Milwaukee, demonstrate that, notwithstanding the dragging trade of the last five or six months, the past year has been one of extraordinary growth in every branch of manufacturing. This is inclusive of machinery building, foundry output, bridge and structural steel fabricating, sheet and ornamental metal shaping and metal working generally. More new plants have been built, more extensions made, more machinery added or replaced and more operating economies effected than in any previous period of the same length. In the interior of the State and among the industrial suburbs of Milwaukee the development has been especially pronounced.

A noteworthy feature of construction during the year, and one of particular interest to the machinery and supply trade, is the number of light manufacturing buildings, furnished with electric motor drive, steam heating, sprinkler or other fire extinguishing systems, forced ventilation, &c., which have been erected in the business districts of Milwaukee and other cities of Wisconsin. For nearly all of

these a high grade of equipment has been specified. The selection of the apparatus is frequently left entirely to the supervising architects, and their knowledge of what constitutes true economy has been strengthened remarkably within the year, having, in many cases, been formerly an almost negligible quantity.

In current business there is the usual holiday dullness, and, while most concerns are taking account of stock, there will not be much buying. By the middle of the month, however, things will undoubtedly liven up, and every indication points to a good run of sales preceeding spring construction.

A plant for the manufacture of steering gear for automobiles and motor trucks will be established by the Universal Mfg. Company, Racine, Wis., which was recently incorporated by Wallace McGregor and others. The machinery needed has already been contracted for, and a factory which was vacant is being fitted up for the company's use. Later on a plant especially adapted to its work will probably be built.

The contract for the electrical work in the new plant on Commerce street, Milwaukee, of the Milwaukee Grains & Feed Company, has been let to the Herman Andrae Electrical Company.

The enormous new foundry to be operated here by the International Harvester Company is now well under way, and construction will be pushed to early completion.

A new industry in Racine is that of the Reliance Wrench Mfg. Company, which has made a contract with the Racine Foundry Company for castings and with the Belle City Mfg. Company for other work exclusive of assembling, which will be done in its own shop. These arrangements are, however, only preliminary to the erection of the company's own plant, which will be built as soon as the conditions warrant. The officers of the company are Andred Matson, president; Nels Christianson, treasurer, and William H. Hartig, secretary. The wrench to be manufactured is of a quickly adjustable type adapted to a wide range of service.

Preliminary plans have been made for the buildings of the Home Brewing Company, including power plant, refrigerating system, &c., which are to be erected at North Milwaukee, Wis., and the matter of construction will soon be decided upon, followed by the purchase of machinery and other equipment. A bottling house, with modern automatic apparatus, will form part of the establishment.

Plans have been completed at Bayfield, Wis., for the new boiler house to be erected in connection with the municipal power and pumping plant. The work will not, however, be started until spring.

Bids on the construction of the Hummel & Downing Company's new factory in Milwaukee, including power and coal handling plant, will be taken in separate parts within the next few weeks, and the purchase of machinery will shortly be considered.

The Peck-Hamre Mfg. Company, Berlin, Wis., is remodeling its power system. Work on a new building, in which a boiler and engine will be installed, was recently started, and changes will be made in the factory equipment.

Extensive steam generating and power equipment, as well as operating machinery, will be required for a new plant, which the Hansen Malting Company is to erect on the outskirts of Milwaukee, near the new works, of the Globe Seamless Steel Tubes Company. F. L. Bader of this city is preparing the plans.

The project of installing a new pumping engine of 1,500,000 gal. daily capacity at the Sparta, Wis., water works, which has been hanging fire for the past eight months, recently reached the stage where definite action has been determined upon. Bids on the unit and other necessary equipment are now being taken.

From Superior, Wis., which is the seat of Douglas County, it is reported that the Board of Supervisors will purchase a rock crushing plant to furnish material for improvement of the roads.

The contract for a very complete steam heating system to be installed in the factory of the Holeproof Hosiery Company, Milwaukee, has been placed with the Independent Power, Heating & Plumbing Company.

The Morehead Mfg. Company, Detroit, through its local representative, the Alliance Engineering & Sales Company, will furnish the tilting return steam traps for the new buildings of Albert Trostel & Sons Company, Milwaukee. Contracts for other equipment are now being placed. A modern oil storage and pumping system is to be installed, but the details of this have not yet been taken up.

An addition is being made to the manufacturing plant of the Ahnapee Veneer & Seating Company, Birchwood, Wis., and new machinery will be required.

The city of Manitowoc, Wis., is endeavoring to acquire the local water works, and in the event that it does so the pumping plant will be enlarged.

Plans for a five-story light manufacturing plant, to be

THE MACHINERY MARKETS

erected by Jacob Wellauer in this city, are being prepared by H. Messmer & Son, Milwaukee.

An electric power and lighting plant is to be installed at Horicon, Wis., by the Horicon Light & Power Company, whose main office is at Beaver Dam, Wis.

The Standard Mfg. Company, Appleton, Wis., has under construction an addition to its plant. All of the equipment, with the exception of some minor details, has been contracted for.

The report has recently been current that a further extensive hydroelectric development would be undertaken at Hatfield, Wis., in consequence of the sale of the power plant there, now owned and operated by the La Crosse Water Power Company, to the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company; but there appears to be no truth in this statement.

A repair shop will be installed by the Buick Motor Company in connection with a large garage to be erected shortly at Marinette, Wis.

A new power house is about to be built to furnish steam heat and electric current for the Mendota Insane Asylum, which is under the direction of the State Board of Control, Madison, Wis.

It is reported from Appleton, Wis., although without direct confirmation, that considerable new machinery will be required by the Appleton Chair Company, in consequence of a fire which destroyed its old factory just as it was about to remove the equipment to a manufacturing plant recently built.

The Ashland Light, Power & Street Railway Company, Ashland, Wis., is about to proceed with its plans for another hydroelectric development on the Bad River near Copper Falls.

The South

NASHVILLE, TENN., January 2, 1911.

For the year that has just closed the industrial record of this section was one not only gratifying in itself but also replete with promise for the future, and in all lines of production the feeling at present is optimistic.

A Corliss engine and two triplex pumps of about 2,000,000 gal. daily capacity each will be among the requirements of the new water works station at Aiken, S. C., the plans for which are now being drawn.

Wythe M. Peyton, engineer of the Isothermal Traction Company, Rutherfordton, N. C., is completing plans for the construction of the electric railroad line which that company proposes to build from Gastonia to Asheville, N. C., and to operate by means of hydroelectric power. It will be some time, however, until the purchase of machinery needs to be considered.

Arrangements are now in progress for the erection of a plant, with buildings 50 x 50 and 20 x 30 ft., designed for 50 tons daily capacity, by the Claremont Carbonate Lime Company, Claremont, Va.

M. E. Melvin, Port Gibson, Miss., is considering the installation of a small power and lighting plant to serve a local institution.

The purchase of equipment will need to be taken up by the Alabama Traction Company, Montgomery, Ala., in the near future, as work on its new electric railway line will be started at once. C. G. Abercrombie, president, is actively in charge. The project is one of considerable importance to the industrial development of that section.

The Trenton electric light plant, operated by Keenan & Wade, Trenton, Tenn., which has a present capacity of 100 kw., is to be acquired and enlarged by the Trenton Electric Light Company, incorporated for the purpose.

A city pumping plant has been decided upon at Jonesboro, N. C.

The Business Men's Club, Memphis, is reported to be negotiating with John F. Walsh, of Pittsburgh, Pa., for the location in that city of a branch factory for the production of automobile trucks.

J. J. Brophy, whose address is given as Pittsburgh, Pa., is organizing three electric traction companies to operate lines between St. Augustine and Tampa, Fla.

The erection of a plant for the manufacture of onyx products is being planned by the Crystal Onyx Company, Candler Building, Atlanta, Ga. E. W. Torrance represents the company.

The city of Alexandria, La., through its Progressive League, is making an effort to secure new industries and solicits correspondence on the subject.

The Gadsden Car, Foundry & Machine Company, Gadsden, Ala., is completing additions to its buildings and equipment which will give it considerably enlarged facilities for the work of the coming year.

The Mandeville Electric Lighting Company, Mandeville, La., is reported to have under consideration the extension of its system to Abita Springs, with consequent provision for enlarged equipment.

The town of Roberta, Ga., will take bids about January 20, through W. J. Marshall, Lizell, Ga., for the construction of an electric power and pumping plant, water distribution system, &c., together with the necessary equipment. Knoxville, Ga., will also be supplied from the same plant.

The Excelsior Foundry & Machine Company, Columbia, Miss., which was incorporated in November, has completed the equipment of a plant, with the exception of machinery that will be needed later for the manufacture of certain specialties. For the present its operations will be confined to general jobbing and repair work.

The New South Pittsburg Light & Power Company, South Pittsburg, Tenn., will remodel and enlarge its 150-kw. plant.

C. B. Parsons and others of Detroit, Mich., are reported to contemplate erecting a plant at New Orleans, La., for the manufacture of power boats, and are about to visit that city for the purpose of selecting a suitable location.

North Pacific Coast

SEATTLE, WASH., December 30, 1910.

Machinery houses here who have recently been going over their prospect files, find that there is a very satisfactory amount of business requiring attention at the beginning of 1911. It covers a wide range and appears to be distributed among the various industries of this section about in the order of their relative importance, indicating a sound, healthy development, without abnormal features. This augurs well for a steady continuance of the demand in the several lines of trade. The most pronounced increase appears to be shown in the requirements of metal and woodworking plants, the latter being considerably in the lead so far as volume of investment is concerned, but closely followed by the former in percentage of gain.

The Vulcan Iron Works, Seattle, is preparing models of machinery, showing its more important specialties, to be installed in the exhibit room of the Seattle Chamber of Commerce, where it will make a very comprehensive display. None so elaborate has ever before been attempted here.

A large new generating plant will be erected in Chehalis, Wash., by the Twin City Light & Traction Company, which now operates an engine-driven station of 350 k. w. capacity. The headquarters of the company are in the Fenton Building, Portland, Ore.

The Gilbert Hunt Company, successor to the Gilbert Hunt Manufacturing Company, Walla Walla, Wash., has received a contract from the United States Reclamation Service for steel headgates to be installed in the works necessary for the Boise project.

A plant for the distribution of electric power in the district above Springfield, Ore., is to be erected by the Northwestern Corporation, whose generating station is located at Eugene, Ore. It has not yet been decided, however, how soon this project will be carried out. When it is, additional power units will probably be required at Eugene, with transformers, &c., at Springfield.

The properties of the West Coast Mines Company at Bohemia, Ore., have been sold to new interests, and a large sum of money will be expended in making improvements. It has not been announced whether any change will be made in the style of the company.

The system of the Portland Gas & Coke Company, Portland, Ore., is to be enlarged and improved, the directors having authorized an expenditure of \$750,000 for the purpose.

The Northwest Coal Company, George S. Rankin, president, North Yakima, Wash., will install mining machinery and other equipment for the development of its coal land between Ellensburg and Thorpe, Wash., where considerable preliminary work has already been done, opening up a 14-ft. vein at 250 ft. depth.

It is reported from Eugene, Ore., that the Barr Brothers-Rogers Cutlery Company of that place will build a plant at Palo Alto, Cal.

Frank S. Ernest, Spokane, Wash., has acquired mining properties in the vicinity of Chewelah, Wash., and will install an air compressor, drills, hoist, pump and power machinery for their development.

The Stayton Electric Light Company, A. L. Shreve, manager, has acquired the site for a hydroelectric plant, capable of developing about 3600 kw. on the Stayton River, about three miles above the town. Work on this development will probably begin before fall. The company is at present operating a plant of moderate capacity in which a Westinghouse generator is driven by an S. Morgan Smith Company's turbine.

A bond issue of \$30,000 for the construction of water works has been authorized at Falls City, Ore.

The contract for an auxiliary steam power plant in Portland, with complete equipment, has been placed with C. E. Moore & Co. by the Mt. Hood Railway & Power Company, Portland, Ore.

THE MACHINERY MARKETS

The International Lime Company, Kendall, Wash., whose headquarters are located in the Alaska Building, Seattle, is preparing to install the machinery for its new plant.

The growing importance of the market for power and electrical equipment in the far north is shown by advices from Dawson, Yukon territory, to the effect that a 10,000-hp. steam plant has just been completed on Coal Creek by the Northern Light & Power Company, and that one of the same capacity is just being finished by A. N. C. Treadgold of the Granville Mining Company. The power is to be used in both cases largely for dredging operations.

Indianapolis

INDIANAPOLIS, IND., January 3, 1911.

Thomas L. Green & Co., Indianapolis, have been incorporated, with \$40,000 capital stock, to manufacture bakers' machinery. The directors are T. L. Green, A. P. Green, L. T. Sereinsky and J. H. Green.

The Diamond Chain & Mfg. Company, Indianapolis, has called in its preferred stock for redemption.

The Union Trust Company, receiver for the Parry Auto Company, Indianapolis, has been instructed to sell the plant January 10. The prospects are there will be at least two bidders for the plant, the creditors and a company represented by W. C. Teasdale, Jr., vice-president of the Parry Company. The court has set a minimum price of \$50,000. The plant was appraised at \$139,000 as a going concern.

The Peru Electric Company has been incorporated at Peru, Ind., with \$100,000 capital stock, to manufacture electrical supplies. The incorporators are William H. Zimmerman, J. N. Miller and J. Kramer.

The Park Furniture Company, Rushville, Ind., has let the contract for an extension, 58 x 113 ft., to the plant.

George R. Harper has been appointed receiver of the Goshen Rubber Works, Goshen, Ind., with instructions to sell the real estate and personal property. The plant was abandoned several years ago.

The Laporte Meter Company, Laporte, Ind., has been incorporated, with \$150,000 capital stock, to manufacture gas meters. The directors are V. P. Wilkins, Emmet Scott and Emmet H. Scott.

S. D. Rowland has purchased the electric light plant of Mitchell, Ind., which has been a losing venture ever since the city constructed it 15 years ago. Mr. Rowland has been granted a franchise for furnishing water.

The Security Trust Company, Indianapolis, has been instructed to sell at commissioners' sale, the plant of the United States Cement Company at Bedford, Ind. A minimum price of \$115,000 has been set. The bondholders, whose holdings are \$225,000, are expected to be bidders.

The Corning Draft Gear Company, Hammond, Ind., has been incorporated with \$150,000 capital stock. The company will manufacture iron and steel specialties, devices used by railroads, draft gears, &c. The company's Chicago office is located in the Fisher Building, room 206.

The Dean Forging Company, Muncie, Ind., has issued \$100,000 of preferred stock, but advises that it is not contemplating any improvements.

Farther Central West

OMAHA, NEB., January 2, 1911.

Considering merely the trade actually in sight for the midwinter season about to open, there does not seem to be very much of a definite character for dealers to count upon, apart from regular routine custom, but with the quantity of construction work, improvements, &c., planned for the coming spring, a fairly good business at least may reasonably be anticipated.

The Omaha Structural Steel Works, Omaha, Neb., now has under construction at Forty-eighth and Leavenworth streets, a steel frame brick plant, 75 x 288 ft., the equipment for which will be purchased at an early date. A full line of modern fabricating tools, pattern making, blacksmith work, &c., is required.

The construction of an incineration plant, which it is estimated will cost about \$100,000, has recently been taken under consideration by the authorities at Omaha, and action by the Common Council is expected shortly.

The Dodd Steel & Iron Works, Des Moines, Iowa, is to be operated this year by a new company, including G. W. Newell and L. H. Hixon of that city, who have formed a new corporation of considerable financial strength and will be in a position to maintain the business on a very favorable basis. Mr. Newell is an expert in structural work, including the engineering details essential to its successful accomplishment.

A bond issue of \$7000 has been voted at Whittemore, Ia.,

to cover the cost of a municipal pumping plant and water works system.

A portion of the manufacturing plant of the Great Western Cereal Company at Fort Dodge, Ia., has been destroyed by fire and will probably be replaced by more extensive structures, fitted throughout with electric drive.

Bonds have been sold at Corydon, Ia., for the installation of a water works system.

An election is to be held at Cortland, Neb., to decide upon the construction of a municipal pumping plant.

The authorities at Tabor, Ia., are preparing to install pumping machinery to distribute water from a new artesian well.

The city officials at Cheyenne, Wyo., are investigating mechanical filtration systems, with a view to the installation of one there.

The Allen Company, Boulder, Colo., is arranging for the equipment of a new concentrating mill, to be completed by early spring, which will be used for the treatment of tungsten ore.

Funds will be provided early in the coming year at Coggon, Ia., for an electric plant to serve the community, a special tax for the purpose having been voted. The matter of equipment is now under consideration, but no purchase will be made until later.

It is reported from Eldora, Ia., that Lundy & Wood, who are developing the water power there, will build dams at three additional points on the Iowa River, making possible a larger hydro-electric plant at Eldora than was originally intended.

It is proposed at Belle Plaine, Ia., to build a new pumping station on the outskirts of the city and furnish water from additional wells.

The erection of a smelter will be commenced shortly by the Copper Belt Mining Company, Lusk, Wyo., midway between its Copper belt and Michigan mines, the latter having recently been acquired. New steam hoists and air compressors are also to be provided by the company for more extensive development work.

An appropriation has been made at Lovell, Wyo., for the installation of an electric lighting plant.

An electric power and pumping station will be constructed at Atlantic, Ia., where a fund of \$50,000 has been set aside for the purpose. The project was delayed for some time and is now to be pushed to completion.

Government Purchases

WASHINGTON, D. C., January 3, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids January 17 for one air compressor, schedule 3236; 18 generator sets, schedule 3832; and 6 sets of gasoline propelling machinery, schedule 3233.

The Paymaster General, Navy Department, Washington, will open bids January 10, under schedule 3187, class 13, for one 2-kw. constant speed motor generator and one 2-kva. open-core wireless telegraph transformer, and under schedule 3208, class 53, for one upsetting bolt heading and forging machine and class 54, for one steam winch.

The Isthmian Canal Commission's canal circular 614, calls for bids to be opened February 25 for machines, motors and limit switches to operate the Stony Gate valves and cylindrical valves for controlling the culverts of the locks at Gatun, Pedro Miguel and Miraflores.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids December 27, as follows:

Schedule 3099, class 1.—For one power pump—Bidder 2, Allis-Chalmers Company, Milwaukee, Wis., \$1875; 3, American Steam Pump Company, Battle Creek, Mich., \$3870; 26, R. P. Clark Company, Washington, D. C., \$2560 and \$2470; 39, De Laval Steam Turbine Company, Trenton, N. J., \$2310 and \$2790; 42, George E. Dow Pumping Engine Company, San Francisco, Cal., \$1153, \$1305, \$1460 and \$2245; 65, Henshaw, Bulkley & Co., San Francisco, Cal., \$1105; 66, Harron, Ricard & McCone, San Francisco, Cal., \$3278; 75, Kenney Mfg. Company, Boston, Mass., \$4000; 114, Pratt Iron Works Company, Dayton, Ohio, \$1450, \$1609, \$1500, \$1775, \$1865, \$1575, \$2025, \$2100, \$2075, \$3200, \$2326 and \$2666; 115, Perrine Machinery Company, Seattle, Wash., \$1475; 141, United Iron Works, Oakland, Cal., \$918; 148, H. F. Worthington, New York, \$1350, \$1800 and \$2100; 156, Byron Jackson Iron Works, San Francisco, Cal., \$1500 and \$1100.

Class 11.—One No. 2 condenser ferrule machine—Bidder 10, Brown & Sharpe Mfg. Company, Providence, R. I., \$1160; 101, Manning, Maxwell & Moore, New York, \$2120.

Class 51.—One traveling crane—Bidder 8, Alfred Box & Co., Philadelphia, Pa., \$1800; 14, Brown Hoisting Machinery Company, Cleveland, Ohio, \$2450; 101, Manning, Maxwell & Moore, New York, \$1950; 105, Niles-Bement-Pond Company, New York, \$2590; 158, Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$1645.

Class 61.—One tool and cutter grinder—Bidder 10, Brown & Sharpe Mfg. Company, Providence, R. I., \$815.75; 22, Cincinnati Milling Machine Company, Cincinnati, Ohio, \$779.30; 50, Fairbanks Company, Washington, \$585; 101, Manning, Maxwell & Moore, New York, \$700.

Class 62.—One vertical cylinder press—Bidder 7, P. Kemp, Baltimore, Md., \$793.50 and \$918.25.

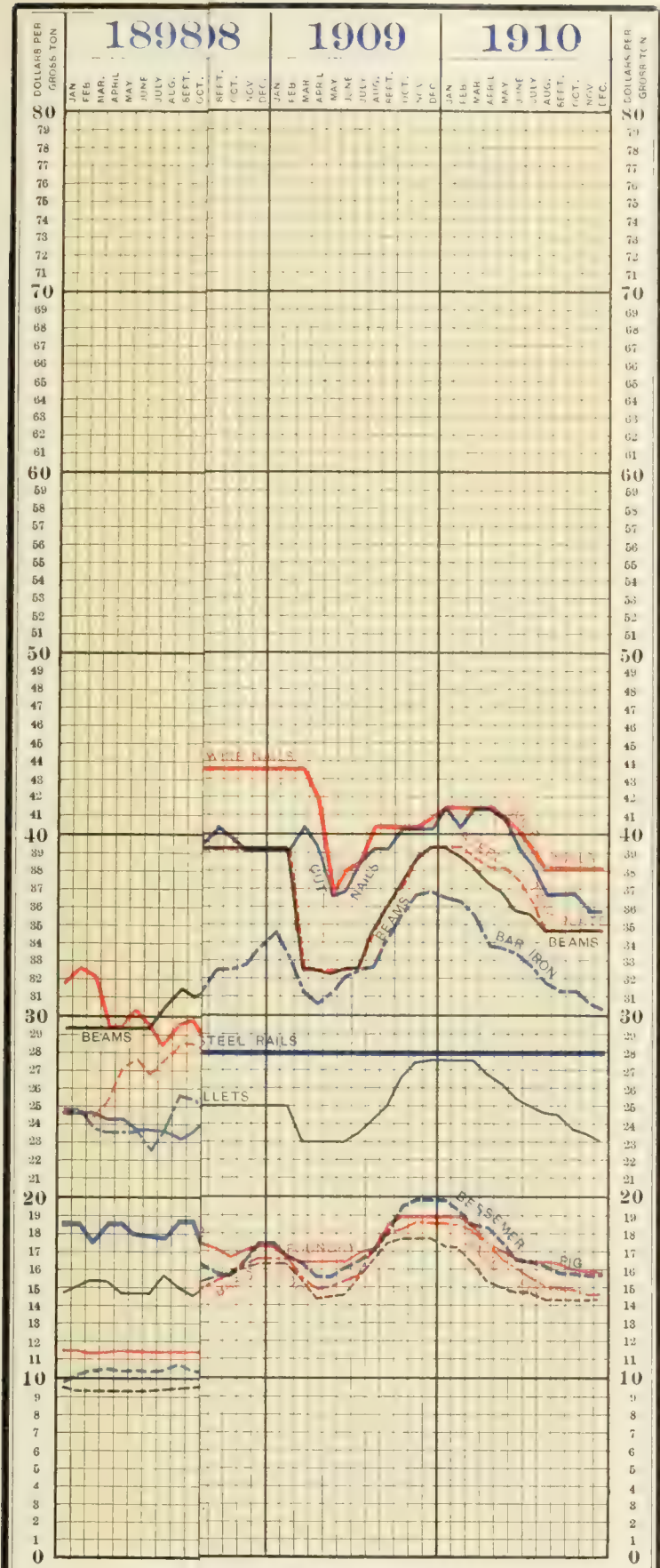
Fluctuations in the Prices of Iron and Steel Products for Thirteen Years

Monthly Averages Computed from the Weekly Market Quotations of "The Iron Age" in the Period 1898-1910

(With Supplement.)

Accompanying this issue of *The Iron Age* is our annual chart, in which lines are plotted to indicate the course of prices for pig iron, Bessemer steel billets and the leading forms of finished iron and steel in the 13 years ending with 1910. The diagrams are based on monthly averages of prices given week by week in our market reports from the leading selling centers. The figures on the margin of the chart stand for dollars and the black, red and blue lines represent prices per gross ton. The table below gives the monthly average prices:

Accompanying this issue of <i>The Iron Age</i> is our annual chart, in which lines are plotted to indicate the course of prices for pig iron, Bessemer steel billets and the leading forms of finished iron and steel in the 13 years ending with 1910. The diagrams are based on monthly averages of prices given week by week in our market reports from the leading selling centers. The figures on the margin of the chart stand for dollars and the black, red and blue lines represent prices per gross ton. The table below gives the monthly average prices:										Months.	Bessemer pig, Pittsburgh.	Steel billets, Pittsburgh.	Basic pig, Philadelphia.	So. No. 2 four- dry, Cincinnati.	Local No. 2 four- dry, Chicago.	Cut nails, Pittsburgh.	Tank plate, Philadelphia.	Beams, Phila- delphia.	Ref'd bar iron, Philadelphia.	Wire nails, Pittsburgh.
1903																				
Jan....	22.15	29.60	....	21.65	23.45	2.07	2.10	1.78	1.93	1.89	1.89								
Feb....	21.45	29.87	....	21.50	23.35	2.10	2.05	1.75	1.93	1.92	1.92								
Mar....	21.85	30.62	....	21.37	23.22	2.10	1.94	1.75	1.94	2.00	2.00								
April....	21.28	30.25	....	20.15	22.87	2.15	1.85	1.74	1.93	2.00	2.00								
May....	20.01	30.37	....	18.87	20.72	2.15	1.80	1.73	1.86	2.00	2.00								
June....	19.72	28.7	....	17.75	19.85	2.15	1.78	1.73	1.79	2.00	2.00								
July....	18.89	27.60	....	16.15	18.25	2.15	1.77	1.73	1.69	2.00	2.00								
Aug....	18.35	27.00	....	15.19	17.22	2.15	1.78	1.73	1.60	2.00	2.00								
Sept....	17.22	27.00	....	14.75	16.41	2.15	1.78	1.73	1.60	2.00	2.00								
Oct....	16.05	27.00	....	13.50	15.70	2.15	1.78	1.73	1.50	2.00	2.00								
Nov....	15.18	24.00	....	12.00	15.10	1.90	1.78	1.73	1.40	1.97	1.97								
Dec....	14.40	23.00	....	12.05	14.81	1.90	1.77	1.73	1.35	1.87	1.87								
1904																				
Jan....	13.91	23.00	13.90	12.37	14.47	1.77	1.73	1.73	1.35	1.89	1.89									
Feb....	13.66	23.00	13.73	12.12	13.91	1.70	1.73	1.73	1.36	1.90	1.90									
Mar....	14.25	23.00	13.78	12.10	14.05	1.72	1.73	1.73	1.45	1.91	1.91									
April....	14.18	23.00	14.00	12.50	14.35	1.74	1.73	1.73	1.48	1.90	1.90									
May....	13.60	23.00	13.81	12.25	13.85	1.75	1.73	1.73	1.48	1.90	1.90									
June....	12.81	23.00	13.53	11.80	13.70	1.75	1.73	1.73	1.48	1.90	1.90									
July....	12.40	23.00	13.04	11.81	13.60	1.72	1.73	1.73	1.48	1.89	1.89									
Aug....	12.81	23.00	12.81	12.00	13.60	1.65	1.73	1.73	1.48	1.71	1.71									
Sept....	12.63	20.00	12.73	12.00	13.85	1.60	1.57	1.57	1.45	1.60	1.60									
Oct....	13.10	19.50	13.21	12.81	14.10	1.60	1.53	1.53	1.43	1.60	1.60									
Nov....	14.85	20.25	14.56	15.19	15.98	1.62	1.53	1.53	1.47	1.62	1.62									
Dec....	16.65	21.20	15.75	15.85	16.95	1.73	1.57	1.57	1.60	1.73	1.73									
1905																				
Jan....	16.85	22.75	16.50	16.25	17.85	1.75	1.63	1.63	1.65	1.75	1.75									
Feb....	16.41	23.50	16.50	16.25	17.85	1.79	1.66	1.66	1.68	1.80	1.80									
Mar....	16.35	24.00	16.69	16.25	17.80	1.80	1.73	1.73	1.73	1.80	1.80									
April....	16.35	24.00	16.75	16.25	17.60	1.80	1.73	1.73	1.73	1.80	1.80									
May....	16.16	23.50	16.56	15.81	17.60	1.80	1.73	1.73	1.71	1.80	1.80									
June....	16.65	22.00	16.00	14.65	17.00	1.80	1.73	1.73	1.63	1.74	1.74									
July....	14.85	22.00	15.33	13.94	16.47	1.80	1.73	1.73	1.63	1.70	1.70									
Aug....	15.20	24.00	15.15	14.40	16.60	1.66	1.73	1.76	1.63	1.70	1.70									
Sept....	15.91	25.00	15.81	14.37	16.60	1.60	1.73	1.88	1.66	1.74	1.74									
Oct....	16.54	25.62	17.19	15.31	17.66	1.65	1.73	1.87	1.78	1.80	1.80									
Nov....	17.85	26.00	17.55	16.60	19.15	1.65	1.73	1.83	1.83	1.80	1.80									
Dec....	18.35	26.00	17.81	16.75	19.60	1.71	1.73	1.83	1.83	1.80	1.80									
1906																				
Jan....	18.35	26.25	17.89	16.75	19.60	1.75	1.73	1.83	1.86	1.85	1.85									
Feb....	18.35	26.50	17.89	16.75	19.41	1.79	1.73	1.83	1.78	1.85	1.85									
Mar....	18.28	26.70	17.81	16.65	19.35	1.80	1.73	1.83	1.73	1.85	1.85									
April....	18.19	27.00	17.86	16.63	19.10	1.80	1.73	1.83	1.66	1.85	1.85									
May....	18.10	26.40	17.59	16.75	18.90	1.80	1.73	1.83	1.63	1.85	1.85									
June....	18.23	26.63	17.58	16.44	18.54	1.75	1.73	1.83	1.63	1.85	1.85									
July....	18.41	27.25	17.58	16.06	18.60	1.75	1.73	1.83	1.63	1.84	1.84									
Aug....	19.00	27.80	18.02	17.30	19.45	1.75	1.73	1.83	1.67	1.82	1.82									
Sept....	19.54	28.00	18.56	18.69	20.16	1.80	1.73	1.83	1.76	1.86	1.86									
Oct....	20.35	28.00	19.56	20.00	21.48	1.90	1.73	1.83	1.83	1.85	1.85									
Nov....	22.85	28.88	21.15	23.38	24.70	1.93	1.73	1.83	1.83	1.88	1.88									
Dec....	23.75	29.50	22.75	25.00	25.85	2.05	1.99	1.83	1.83	2.00	2.00									
1907																				
Jan....	23.15	29.40	23.70	26.00	25.85	2.05	2.13	1.83	1.91	2.00	2.00									
Feb....	22.85	29.50	24.38	26.00	25.85	2.05	2.13	1.83	1.93	2.00	2.00									
Mar....	22.85	29.00	24.44	26.00	26.10	2.05	2.13	1.83	1.93	2.00	2.00									
April....	23.35	30.12	24.00	25.06	26.35	2.05	2.03	1.83	1.91	2.00	2.00									
May....	24.01	30.30	24.65	24.25	26.85	2.05	1.94	1.83	1.83	2.00	2.00									
June....	24.27	29.62	24.06	24.10	26.60	2.05	1.91	1.84	1.83	2.00	2.00									
July....	23.55	30.00	22.33	22.85	25.55	2.05	1.85	1.85	1.84	2.00	2.00									
Aug....	22.90	29.25	20.65	23.00	24.85	2.10	1.85	1.85	1.85	2.00	2.00									
Sept....	22.90	29.37	19.09	21.50	24.10	2.11	1.85	1.85	1.81	2.05	2.05									
Oct....	22.00	28.20	18.40	20.95	22.45	2.07	1.85	1.85	1.75	2.05	2.05									
Nov....	20.65	28.00	17.81	19.50	20.66	2.01	1.85	1.85	1.75	2.05	2.05									
Dec....	19.34	28.00	17.38	17.00	18.80	2.00	1.85	1.85	1.75	2.05	2.05									
1908																				
Jan....	19.00	28.00	17.10	16.15	18.45	2.00	1.85	1.85	1.65	2.05	2.05									
Feb....	17.90	28.00	17.25	15.75	18.16	2.00	1.85	1.85	1.65	2.05	2.05									
Mar....	17.86	28.00	17.25	15.50	17.85	1.90	1.85	1.85	1.65	2.05	2.05									
April....	17.49	28.00	17.25	15.20	17.73	1.90	1.85	1.85	1.55	2.05	2.05									
May....	16.93	28.00	16.38	14.75	17.63	1.89	1.85	1.85	1.45	2.05	2.05									
June....	16.90	25.75	15.50	15.25	17.73	1.79	1.78	1.78	1.40	1.97	1.97									
July....	16.83	25.00	15.10	15.00	17.55	1.75	1.75	1.75	1.35	1.95	1.95									
Aug....	16.23	25.00	15.00	15.25	17.35	1.76	1.75	1.75	1.40	1.95	1.95									
Sept....	15.90	25.00	15.44	15.65	17.05	1.80	1.75	1.75	1.45	1.95	1.95									
Oct....	15.71	25.00	15.80	15.75	16.85	1.77	1.75	1.75	1.45	1.95	1.95									
Nov....	16.59	25.00	16.19	16.00	17.10	1.75	1.75	1.75	1.47	1.95	1.95									
Dec....	17.40	25.00	16.70	16.25	17.35	1.75	1.75	1.75	1.51	1.95	1.95									



BeamBessemer Pig, Pittsburgh ————
Low Nails, Pittsburgh —————

Steel

will be
of a

ondon.

ivance
of the
close.
a sus-
as the
come
es oc-
move
was a
ained
much
out for
er the
d that
United
which
f Eng-
ar has
fluence
meas-
oubles.
more
ers are
ks for
Scotch
elivery
under
healthy
place
plates

direc-
s to be
ported,
of this
ce lost

ng the
illings
e look
settled.

by no
een re-
off in
e vari-
rs. A
or dis-
of the
growth
tomers
nyang
South
India
doubt
ay add
ny.
perity,
end of
55 tons
a were

condi-
n. An
owing
of the

Horse-
aws of
ue the
Horace
sident,
asurer.

THE IRON AGE

Fluctuations in the Prices of Crude and Finished Iron and Steel
from January 1, 1898, to January 1, 1911 Gross Tons.

Months.	Pig iron, Pittsburgh	Steel billets, Pittsburgh	Basic pig, Philadelphia	No. 2 foundry, Cincinnati	Local No. 2 foundry, Chicago	Cast nails, Pittsburgh	Tank plate, Philadelphia	Recess, Phila- delphia	Refined bar iron, Philadelphia	Wire nails, Pittsburgh
1909										
Jan...	17.34	25.00	16.75	16.15	17.35	1.75	1.75	1.75	1.54	1.95
Feb...	16.78	25.00	16.56	16.13	16.75	1.75	1.75	1.75	1.48	1.95
Mar...	16.25	23.00	15.60	15.05	16.50	1.80	1.45	1.45	1.39	1.95
Apr...	15.78	23.00	15.00	14.25	16.50	1.75	1.45	1.45	1.36	1.87
May...	15.84	23.00	15.13	14.50	16.50	1.64	1.45	1.43	1.39	1.65
June...	16.05	23.00	15.50	14.70	16.50	1.65	1.45	1.45	1.43	1.70
July...	16.46	23.50	15.88	15.75	17.00	1.71	1.46	1.46	1.45	1.72
Aug...	17.03	24.13	17.06	16.38	17.13	1.75	1.55	1.55	1.45	1.80
Sept...	18.05	25.00	18.13	17.35	18.70	1.75	1.62	1.61	1.52	1.80
Oct...	19.53	26.25	18.38	17.88	19.00	1.80	1.66	1.66	1.58	1.80
Nov...	19.90	27.13	18.75	17.77	19.00	1.80	1.74	1.74	1.64	1.80
Dec...	19.90	27.50	18.75	17.45	19.00	1.80	1.75	1.75	1.65	1.85
1910										
Jan...	19.90	27.50	18.75	17.25	19.00	1.85	1.75	1.75	1.62	1.85
Feb...	19.34	27.50	18.56	17.06	19.00	1.80	1.75	1.74	1.61	1.85
Mar...	18.60	27.50	18.25	16.30	18.30	1.73	1.73	1.70	1.57	1.85
April...	18.27	26.75	17.56	15.37	17.50	1.85	1.70	1.68	1.51	1.85
May...	17.52	26.12	16.69	15.00	17.06	1.82	1.70	1.65	1.50	1.82
June...	16.60	25.30	16.10	14.85	16.75	1.75	1.67	1.60	1.49	1.80
July...	16.40	25.00	15.68	14.75	16.56	1.70	1.61	1.59	1.46	1.75
Aug...	16.09	24.62	15.12	14.31	16.50	1.65	1.55	1.55	1.42	1.70
Sept...	15.90	24.40	15.00	14.25	16.40	1.65	1.55	1.55	1.40	1.70
Oct...	15.90	23.75	15.00	14.25	16.06	1.65	1.55	1.55	1.40	1.70
Nov...	15.82	23.36	14.75	14.25	16.00	1.60	1.55	1.55	1.37	1.70
Dec...	15.90	23.00	14.75	14.25	16.00	1.60	1.55	1.55	1.34	1.70

In plotting the lines, those representing finished material have been derived by multiplying the market prices of finished material per pound by 2240, so that the traversing lines would show the exact price relation between gross tons of all products. In the table above, however, while pig iron and steel billet prices are in dollars per gross ton, those for finished material are stated in the usual way—namely, in cents per pound. In the case of local No. 2 foundry iron, Chicago, the prices given are f.o.b. Chicago district foundries, a 35-cent switching charge having been added to the prices at furnaces in that district.

The prices used in plotting the curves are in all cases those for early delivery. The 13 years are a most interesting period in the iron trade of the country, beginning with 1898, the year in which the depression following the panic of 1893 produced its culminating effect upon iron and steel prices. The rapid advances of 1899 give a remarkable peak, which is the spectacular feature of the chart. Almost equally noteworthy are the declines of 1900. In 1901 prices were fairly steady, with advances in the latter part of the year, bringing another series of high points in 1902, though these are moderate in comparison with 1899. The sharp decline of 1903 is distinctly shown; the slight further decline extending over nine months of 1904, with advances in the latter part of the year; some reaction in 1905, followed by advances in the latter part of the year and a comparatively stable level for the first half of 1906. Then came a strong movement upward, carrying prices to substantially the levels of 1902, followed by recessions after the middle of 1907. The price maintenance movement modified the decline in the depression of 1908, and in the spring of 1909 came some abrupt declines, which stimulated buying and gave the strong upward curve of the second half of 1909. In general, 1910 was a year in which the price movement reversed that of 1909, pig iron reaching again its low points of 1909, while finished materials only retraced part of the distance to the bottom touched after the open market declaration of February, 1909.

The United Engineering & Foundry Company Buys Another Plant.—A deal for the sale of the plant of the American Roll & Foundry Company, Canton, Ohio, to the United Engineering & Foundry Company, Pittsburgh, has been consummated, and the Canton plant will hereafter be operated as a branch plant, with no change in the local management.

Agreements have been signed by the Erie Railroad Company and the Grade Crossing Commission of Buffalo for the elimination of a number of grade crossings in

the northern part of the city, the cost of which will be considerably over \$1,000,000, and involve the use of a large tonnage of structural steel.

The British Iron Trade in 1910

From the annual review of Bolling & Lowe, London, the following extracts are taken:

A decided improvement on 1909 and a general advance in prices in many directions sums up the record of the position of trade for the year now drawing to a close. The progress, however, has been intermittent, and a suspension has several times occurred. At no time was the improvement in the nature of a boom, but at the commencement of the year various increases in prices occurred, which were regarded as signs of a general move forward. In the early summer, however, there was a marked cessation of activity, although prices remained fairly firm. . . . It is fair to assume that a very much brighter condition of things would have resulted but for the strikes which have thrown such a gloom over the commercial world. It may be incidentally remarked that these strikes have by no means been limited to the United Kingdom, as witness the prolonged Bilbao strike, which dislocated the Spanish ore trade. In the North of England, however, and in South Wales, a stubborn war has been waged, and the singular resistance to any influence from the trade union leaders toward conciliatory measures becomes an increasing danger in these labor troubles.

The railroad companies bear testimony to the more prosperous condition and many of the manufacturers are doing well, having plenty of orders on their books for some time to come. In October it was stated that Scotch steel makers had booked over 200,000 tons for delivery over a year, and although much of this was taken under current prices it nevertheless showed signs of a healthy condition. At that period several advances took place and an abnormal demand had set in for sheets and plates for all purposes.

We have, however, sustained a setback in one direction. For the first time we have allowed ourselves to be outstripped by Germany in the quantity of steel exported, and however sanguine we may be that a reversal of this is probable, the difficulty of regaining ground once lost is universally conceded.

The pig iron market has kept fairly steady during the past year, prices having varied little more than 2 shillings 6 pence per ton over the whole of this period. We look for an advance, now that the strike in the North is settled.

There is little to record in rails, and that little by no means cheerful. This section of the trade has been remarkably quiet, and there has been a great falling off in the tonnage exported. Prices have undergone little variation and there has been a singular dearth of orders. A greater evil, however, than want of business or labor disputes seems to threaten not so much the existence of the syndicate as its prosperity, through the increasing growth of competitors who may snatch away important customers with every likelihood of retaining them. The Hanyang Works at Hankow, the Lithgow Works in New South Wales and the Kalimati Steel & Iron Works of India have joined the ranks of producers, and will no doubt meet with plenty of local encouragement, and we may add to this the important Dominion Iron & Steel Company.

Galvanized sheets have also shared in the prosperity, although prices have kept fairly equable. To the end of November 548,060 tons were exported, against 441,455 tons for the same period in 1909. The exports to India were nearly 40 per cent. over those of 1909.

This year there has existed in South Wales a condition of trade in tin plates almost equal to a boom. An unprecedented amount of buying has taken place, owing to enormous developments in the canning trades of the world.

The Weller Hardware & Foundry Company, Horseheads, N. Y., has been incorporated under the laws of the State of New York, to take over and continue the business of an existing firm of the same name. Horace J. Weller is president, Frank L. Matthews vice-president, William W. Myers secretary and H. J. Weller treasurer.

Concrete Shafts of Record Size

The Section Thirty Mine—Menominee Range Activity

MARQUETTE, MICH., December 31, 1910.—What is declared to be the largest concrete mining shaft ever constructed has been completed at Hibbing by the New York Foundation Company. It was sunk for the Tod-Stambaugh Company at its Morton mine, which it is expected will develop into one of the largest underground shippers on the Mesaba range. The walls are 4 ft. thick and the inside diameter is 21 ft. The shaft is bottomed at 185 ft. Work was begun over a year and a half ago. It took nearly three months to sink the last 9 ft. Since commencing operations at the Morton property the New York Foundation Company has completed shafts of similar kind at the Scranton mine at Hibbing, the Woodbridge at Bhul, the North American at Tower, the Hill mine at Marble and one at Deerwood, on the Cuyuna range, in addition to the shaft it has sunk or is sinking in the Marquette and Swanzy districts. At the Morton mine drifts will be run at once, and it is expected that it will be a prominent shipper next season. The Tod-Stambaugh Company has a fine machine shop at the mine, as well as a modern office building and a considerable village of cottages, and it is well equipped for operations on an extensive scale.

The Section Thirty Mining Company, operating the famous section 30 property on the Vermilion range, will ship 225,000 tons of ore in 1911, its second year, as compared with 52,000 tons last season. An Eastern furnace company has contracted to take the season's output, which is estimated at this time at the amount mentioned. The company is hoisting 500 tons a day and it is figured that there will be 125,000 tons in stock at the opening of navigation. A fine quality of ore is produced. Recent assays have averaged 67.40 per cent. in metallic iron. Work underground is being pushed vigorously. At the present time 230 men are employed. G. A. St. Clair and Alfred Merritt of Duluth control the Section Thirty Company, and the fee owners are Lon Merritt, R. H. Fagan, L. C. Harris, the Eaton Estate of Duluth and George J. Lonstorf of Milwaukee.

The stripping of the Longyear property at Hibbing, a contract for which is about to be awarded by the Jones & Laughlin Steel Company, will require fully two years to complete. The tract consists of 80 acres. Directly to the east is the Nassau property, also a possession of the Jones & Laughlin interests, having been purchased from the Pittsburg Iron Ore Company a few months ago. The two tracts combined would make a large mine, but it is understood that the stripping contemplated does not at this time include the Nassau. The Nassau is listed by the State Tax Commission as containing 4,000,000 tons of ore. The Longyear is listed at 3,000,000 tons.

Oglebay, Norton & Co. are to sink a big, new shaft at their Bristol mine, at Crystal Falls, Menominee range. It will be located on the north side of the property and close to the banks of Briar Hill Creek. It will be of four compartments, 6½ x 22 ft. inside of timbers, and will contain two skipways, a cageway and a ladder and pipe compartment. The shaft will extend to a depth of 1000 ft., or to the bottom of the present workings. The work will be done by one gang sinking from surface and two gangs raising from different points underground. By this arrangement it is expected that the shaft will be speedily finished and will be of some use the coming season. The Bristol is a large property and has been a heavy producer and a valuable one to its owners.

In the past few years no district in the Lake Superior iron region, the Mesaba country alone excepted, has witnessed greater development than that in the Iron River field at the western end of the Menominee range. It was not so long ago that mining in that territory was confined to a small area along the banks of Iron River. Now the operations extend over a wide radius and are steadily being expanded. The mining companies at work in the district have increased from less than half a dozen

to more than twice that number, and the annual output has grown to upwards of 1,000,000 tons. There were 11 shippers on the list the past season—the Baker, Baltic, Berkshire, Caspian, Chatham, Dober, Fogarty, Hiawatha, James, Youngs and Zimmermann. There will be at least four more the present year and still others in 1912.

New Railroad Construction and Equipment

The annual statistics of the *Railway Age-Gazette* show that new railroad built in 1910 was 4122 miles of main line, as compared with 3748 miles in 1909. In Canada new construction amounted to 1844 miles, as compared with 1488 miles in 1909, and in Mexico reports show 138 miles in 1910 and 281 miles in 1909. The mileage built in the United States in the past 18 years is as follows:

1893.....	3,024	1899.....	4,569	1905.....	4,388
1894.....	1,760	1900.....	4,894	1906.....	5,623
1895.....	1,428	1901.....	5,368	1907.....	5,212
1896.....	1,692	1902.....	6,026	1908.....	3,214
1897.....	2,109	1903.....	5,652	1909.....	3,748
1898.....	3,265	1904.....	3,832	1910.....	4,122

Cars and Locomotives Built and Ordered

The same journal gives each year statistics of cars and locomotives built in the preceding 12 months and also of cars and locomotives ordered. The reports of new cars built last year in the United States and Canada show a total of 185,357, as compared with 96,419 in 1909. The total of locomotives built in the United States and Canada was 4755 in 1910, against 2887 in 1909. The record of cars built in the past 12 years is as follows. It will be noticed that the total for 1910 was more than for 1909 and 1908 together:

Year	Freight.	Passenger.	Total cars built.
1899.....	119,886	1,305	121,191
1900.....	115,631	1,636	117,267
1901.....	136,950	2,055	139,005
1902.....	162,599	1,948	164,547
1903.....	153,195	2,007	155,202
1904.....	60,806	2,144	62,950
1905*.....	165,155	2,551	168,006
1906*.....	240,503	3,167	243,670
1907*.....	284,188	5,457	289,645
1908*.....	76,555	1,716	78,271
1909*.....	93,570	2,849	96,419
1910*.....	180,945	4,412	185,357

* Includes Canadian output.

The figures for locomotive construction in the past 18 years are given in the table below:

Year.	No. built.	Year.	No. built.	Year.	No. built.
1893.....	2,011	1899.....	2,475	1905*.....	5,491
1894.....	695	1900.....	2,475	1906*.....	6,952
1895.....	1,101	1901.....	3,384	1907*.....	7,362
1896.....	1,175	1902.....	4,070	1908*.....	2,342
1897.....	1,251	1903.....	5,152	1909*.....	2,887
1898.....	1,875	1904.....	3,441	1910*.....	4,755

* Includes Canadian output.

The record of cars and locomotives ordered last year is much less favorable than that of cars and locomotives built. The new car orders were considerably less than in 1909 and very much below the unprecedented records made in 1905 and 1906. For the past 10 years the tabulated statement of new cars and locomotive orders is as follows:

Year.	Locomotives ordered.	Passenger.	Freight.
1901.....	4,340	2,879	193,439
1902.....	4,665	3,459	195,248
1903.....	3,283	2,310	108,936
1904.....	2,538	2,213	136,561
1905.....	6,265	3,289	341,315
1906.....	5,642	3,402	310,315
1907.....	3,482	1,791	151,711
1908.....	1,182	1,319	62,669
1909.....	3,350	4,514	189,360
1910.....	3,787	3,881	141,204

The Canadian Pacific Railway Company, in its new shops, has been boring up to 35 car wheels per day per machine in its latest type boring mills. After equipping them with Davis expansion boring tools with micrometer adjustment, the output of each mill was increased to 119 wheels per day of 10 hours.

Railroad Repair Shop Efficiency

Great Variations Shown in Shop Costs of Different Companies

BY MAX H. BROMBACHER, NEW YORK.

At the late hearing before the Interstate Commerce Commission relative to the proposed advance in freight rates by the railroads, the latter were asked December 9 to furnish the commission with their piecework prices, or cost to them, of several operations which are continually being carried on their repair shops in respect to locomotives. These operations are not isolated ones, occurring infrequently, but virtually the same kind of work is being carried on, day in and day out, in every railroad shop in the country. Practically none of the answers came in before the hearing closed, and not all of the answers are in at this time. But the answers as they came in are, so far as they relate to the questions asked, embraced in about 17, and I have endeavored, in the accompanying table, to put them, as far as possible, on an even basis. Information was sent in which the questions asked did not call for, and in other instances information asked for was not sent in. I have tabulated the questions and the answers, which embrace nine railroad shops in all.

Some Comparisons of the Figures Received

Neither time nor space permits at this writing anything like a thorough analysis of the contents of the tabulation; suffice it to say that the figures speak for themselves. Even a cursory glance at them discloses that shop No. 1 is the lowest of the nine shops in respect of operations Nos. 3, 4, 9, 10, 13, 14, 15 and 17—eight in all—and that it breaks even in respect to the lowest on operations Nos. 6 and 7 and is highest on none of the 17 operations; that shop No. 2 is lowest on operation No. 5; that shop No. 3 is lowest on operation No. 11 and highest on operation No. 14, and that it breaks even in respect to the highest on operation No. 16; that shop No. 4 is lowest on operation No. 1 and breaks even in respect to the highest on operation No. 16; that shops No. 5 is lowest on operation No. 8 and breaks even in respect to the highest on operation No. 16, but breaks even on operation No. 12 in respect to the lowest cost; that shop No. 6 is lowest on operation No. 16, breaks even in respect to the lowest cost on operation No. 12, but is highest on operation No. 1; that shop No. 7 is lowest on no operation, but is highest on operations Nos. 2, 3, 12 and 15; that shop No. 8 is lowest on no operation and highest on operations Nos. 7, 9, 10 and 17; that shop No. 9 is lowest on nothing, breaks even in respect to the lowest on operation No. 6 and is highest in operations Nos. 2, 3 and 4. Perhaps the tabulation immediately below will make the relative status of the nine shops more clear. The numbers on the horizontal line represent the nine shops; the numbers in the perpendicular column represent the first four operations, as shown in the answers. Now shop No. 4 is lowest on operation No. 1, so a 1 is placed immediately under the shop number; shop No. 1 is second lowest, so a 2 is placed immediately under shop No. 1, and as shop No. 6 is highest on operation No. 1, a 9 is placed immediately under its number, as that shop is ninth in order of cost on that operation. This will make the tabulation clear:

Operation.	Shop No. 1	Shop No. 2	Shop No. 3	Shop No. 4	Shop No. 5	Shop No. 6	Shop No. 7	Shop No. 8	Shop No. 9
No. 1.....	2	3	7	1	4	9	8	6	5
No. 2.....	3	5	4	2	1	7	6	8	9
No. 3.....	1	5	4	2	3	8	7	6	9
No. 4.....	1	4	7.5	7.5	2	5	6	3	2
Totals.....	7	17	22.5	12.5	10	29	27	23	52

By dividing the total of shop No. 1 into the total of any of the shops, it will be found how much more efficient is that shop. For instance, shop No. 1 is 143 per cent. more efficient than its nearest competitor, shop No. 5, and 457 per cent. more efficient than its furthest competitor, shop No. 9.

Shop No. 1 is evidently the most efficient of the nine on this showing, with its record of eight lowest costs, no higher cost, and an even break in respect of lowest costs on two operations. When I use the phrase "most efficient" here I have reference to lowest costs. The visible sign of efficiency in the real sense is that shop which gets its output at lowest cost to itself and with highest earnings of its operators per hour per month, compared with its competitors. The competitors in the case at hand would be the other eight shops. In the absence of any information as to wages earned per hour per month at the prices which these nine shops pay, we cannot get a line on the "real efficiency," comparatively speaking, of shop No. 1 to the other eight shops. It is to be regretted that the Interstate Commerce Commission did not accompany its questions for prices with a request for the earnings per hour per month of the operators at the prices named by the nine shops. It would have been most interesting to have been in position to trace whether the operators in the shops which paid the highest prices earned the highest rate per hour per month; and, on the other hand, to see if the operators in the shops which paid the lowest prices earned the lowest rate per hour per month. The percentage of difference between the cost of a given operation between certain of the shops is startling, but if we had the rate per hour per month earned by the operators before us I think that the showing would be still more startling. By and large, I think it would show that the operators in shops whose costs were highest earned less per hour per month than those in the shops whose costs were lowest.

Lack of Some Desirable Data

There are two other questions concerning the data furnished by railroad shops, the answers to which would be illuminating as well as educational. One question is, in how many of the railroad shops is the accounting department supreme in respect of this matter of shop cost? I am not implying that any accounting department formulates, initially at least, the piece work schedule. My reference is to that department's requiring all data to be sent to it in detail, right from the inspector's hands and to the department's retaining custody thereafter of the data both in detailed as well as in tabulated form. It is a fact that such a rule is in effect the custom in some shops, and that this rule does not apply in other shops is also a fact. My observation of its workings satisfy me that it almost invariably tends to an amplification of detail, which is both unnecessary as well as expensive, and, what is of infinitely greater importance, that it inevitably tends toward keeping from the shop head that knowledge which, to a shop head desirous of obtaining results, is as necessary as is a chart to a navigator of a vessel. I am aware that in theory this knowledge is accessible to a shop head; if he asks for it he will receive it—some day, perhaps. I am also aware that by the time it reaches him it is quite likely to be of only mortuary interest. The navigator needs a chart before his vessel goes on the rocks, not after; the chart is of only mortuary interest to the navigator after his vessel has gone on the rocks; and a shop head, be he master mechanic or be he general foreman, is a very real navigator in more senses than one.

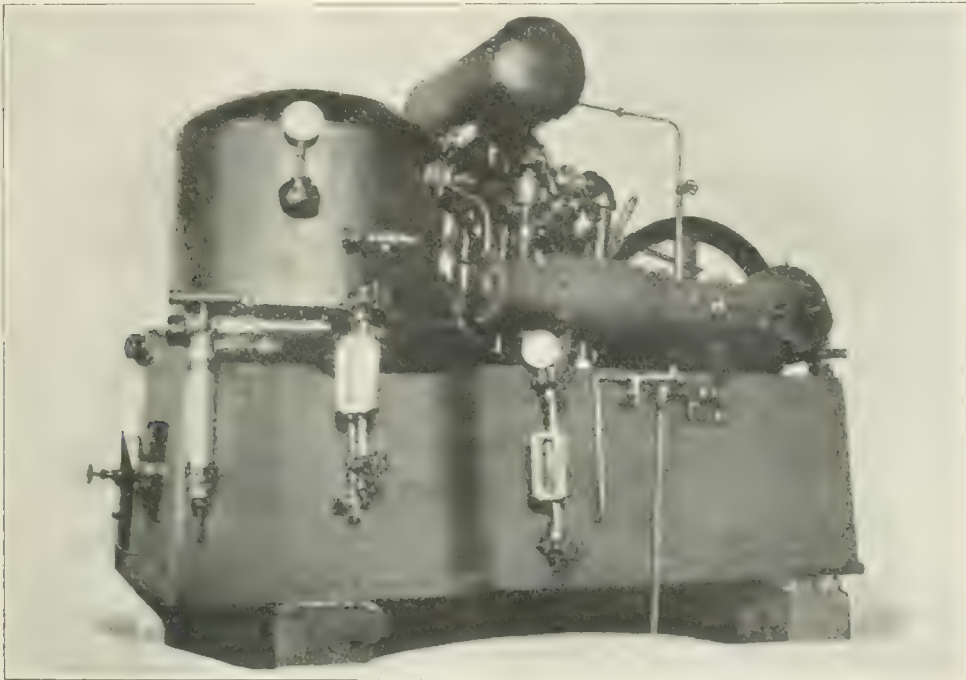
The other question is, in how many of these railroad shops is the head of the road in question afflicted with the college degree microbe? There is an idea prevalent among railroad men that on certain roads the lack of a college degree operates as a dead line in respect of any position carrying a salary or earnings of more than \$100 per month. This alleged rule is said to apply to the shop department of railroads; it does not apply to the operating department. The inherent humor of this rule

In conclusion the writer is not unaware of the fact that all these figures are not conclusive in respect of which shop is really most efficient as regards getting its repairs done at least cost, even that they are but indicative. He is aware that one road might be considerably higher than other roads in respect of an item or items, the aggregate of which in one year would be so small as to make the difference in costs really a negligible quantity; and that, on the other hand, a road which was low on some item of no importance might be very high on some item whose aggregate in a year might mean a large sum; hence in which a cost only 5 per cent. greater than that of competitors might be anything but a negligible quantity. To arrive at which road really operated its shops the most economically in comparison with other roads would therefore necessitate a knowledge of what the aggregate cost of repairs was for each road per annum, and per shop per annum and of how many cars and how many locomotives repaired this sum covered. For the purpose of ascertaining whether an increase in

Svea Caloric Engine Test

An illustrated description of the Svea caloric engine, invented by G. Emil Hesse, New York City, appeared in *The Iron Age*, March 16, 1905. The results of tests made on a 2-hp. engine, which show a remarkable economy in the amount of fuel consumed, have been recently made public. This engine differs from the ordinary types of hot air engines now on the market in the rate of heat transfer. In the existing models it is said that this rate is very slow, as the air is heated by the rising of warm layers into the stationary cooler layers above, while in the Svea engine the cool air is split up into thin sheets and passed over heated plates, from which it absorbs heat by radiation.

In the operation of the engine, cool air is drawn into the rear cylinder at each stroke, and on the return stroke is forced through the heater. Here it is broken up into thin layers absorbing heat from the hot plates and from there it passes to the power cylinder, from which it is



The 2 Hp. Svea Caloric Engine. Invented by G. Emil Hesse, New York City.

freight rates were advisable or just, the aggregate of all the roads' expenditures for repair shop would require to be ascertained. Having ascertained that one road gets its repairs done at an average saving of say 30 per cent. less, all things considered, than its competitors, it would be easy to figure what a saving of 30 per cent. on the total for all the roads amounted to and what proportion this 30 per cent. bore to the estimated aggregate resulting from the proposed increase of rates.

The Mechanical Handling of Freight.—A paper on this subject by Samuel B. Fowler of Boston will be presented at the New York meeting of the American Society of Mechanical Engineers, 29 West Thirty-ninth street, on Tuesday evening, January 10. The subject will be discussed by railroad officials and by officers of large industrial establishments, where the handling of great quantities of freight is a serious problem. Lack of adequate terminal facilities, increase of net income and higher or lower freight rates present problems, the solutions of which are vital to the transportation company, shipper and consignee alike. The capacity of present terminals can be increased by handling larger unit loads and moving them at greater speed, as well as by increasing the floor areas by the use of freight sheds of more than one story. This is made possible by the substitution of mechanical devices for manual labor and hand trucks.

exhausted into the atmosphere after expanding and doing its work.

The following table gives the principal results of the test:

Diameter of cylinders, air and power, inches.....	4 1/4
Length of stroke, inches.....	4 7/8
Air pressure, pounds.....	40
Temperature of air, degrees F.....	450
Speed, revolutions per minute.....	200
Indicated horsepower.....	2.4
Brake horsepower.....	1.7
Fuel per brake horsepower-hour, pounds.....	4.9

When it is taken into consideration that a steam engine of the same size would require from 10 to 15 lb. of fuel per horsepower-hour, the economy of this new engine is at once apparent. The engine tested uses air at a pressure of 40 lb. and at a temperature of 450 degrees F., but it planned to build a 100-hp. engine designed for a pressure of 250 lb. and a temperature of 700 degrees F. In this engine it is expected that 1 hp.-hour will be developed from 1 lb. of fuel, or possibly less.

The Iroquois Iron Company, Chicago, has increased its capital stock from \$3,000,000 to \$5,000,000. The additional \$2,000,000 of stock has been taken by the old stockholders in proportion to their original holdings. The two new furnaces which this company has under construction were financed last summer by a bond issue of \$2,300,000, the company having had no bonded debt until then.

NEW IRON AND STEEL WORKS CONSTRUCTION

A SUMMARY OF WORK COMPLETED IN 1910 OR THAT IS NOW UNDER WAY

Eighteen Blast Furnaces Building or Planned, with Annual Capacity of 2,220,000 Tons—No New Steel Capacity Projected Beyond That Announced One Year Ago

The statements below summing up new construction now under way in the iron and steel industries is noteworthy chiefly in that it contains comparatively little that was not announced in these columns one year ago. Our issue of January 6, 1910, gave an impressive recital of new capacity under construction or on which work would go forward in 1910. It showed that 19 coke blast furnaces, with an annual capacity of 2,650,000 tons, were then building, or were planned; also that open hearth steel plants were then projected or under construction which would have a capacity of 2,850,000 tons of steel a year. Beyond a few small additions to steel foundries, not a ton of new steel making capacity has been built or arranged for that was not scheduled in our article of January, 1910. Work has been done on all the projects then spoken of, however, except that of the Ohio Iron & Steel Company, Lowellville, Ohio. There is no present prospect that this will be carried out. Much less than one-third of the 2,850,000 tons of new open hearth capacity referred to a year ago was put in operation in 1910.

Below is given a statement of blast furnace and steel works construction on which work is now in progress or will soon be undertaken. One year ago we enumerated 19 coke blast furnaces which were building or planned, their rated annual capacity being 2,650,000 tons. Of these the following were completed and blown in in 1910: Indiana Steel Company, two (one blown in), 300,000 tons; Bethlehem Steel Company, one, 150,000 tons; Jones & Laughlin Steel Company, two, 350,000 tons; Youngstown Steel & Tube Company, one, 175,000 tons; Worth Brothers Company, one, 120,000 tons; Corrigan, McKinney & Co., one, 120,000 tons; Wickwire Steel Company, one, 120,000 tons; Detroit Iron & Steel Company, one, 95,000 tons. Total, 1,430,000 tons. To-day 18 coke furnaces are building or planned. They are as follows, with estimated annual capacity:

	No.	Capacity, Gross tons.
American Steel & Wire Company	1	160,000
Minnesota Steel Company	2	280,000
Inland Steel Company	1	125,000
Republic Iron & Steel Company	1	160,000
Bethlehem Steel Company	2	300,000
Worth Brothers Company	1	125,000
Corrigan, McKinney & Co.	2	240,000
Pittsburgh Steel Company	2	250,000
Rogers Brown Iron Company	2	240,000
Iroquois Furnace Company	2	240,000
Duluth Furnace Company	1	100,000
Alan Wood Iron & Steel Company	1	(Alternate)
Totals	18	2,220,000

The state of the iron trade will determine in part how much of this capacity will become active in 1911; present indications are that much less than half of it will be blown in this year. Two years ago the United States Steel Corporation had 10 blast furnaces under construction, including six at Gary; last year it had three building, including two at Gary; to-day it has three—one at Cleveland and two at Duluth—with annual capacity of 440,000 tons. Two years ago the independent steel companies had practically no new blast furnace work on hand. One year ago they had 1,375,000 tons in annual capacity under construction and to-day 960,000 tons.

UNITED STATES STEEL CORPORATION

The year 1910 has seen the practical completion of some of the new construction which the United States Steel Corporation subsidiaries have had on hand for the past two years, while there has been progress in several new undertakings of importance, particularly

those of the American Steel & Wire Company in the Birmingham district, the American Sheet & Tin Plate Company and the American Bridge Company at Gary and the Minnesota Steel Company at Duluth. In addition to what is referred to below of iron and steel works construction, work has been in progress on an extension to the cement plant at Buffington, Ind., which will increase the capacity by 4,000,000 barrels a year, bringing the annual capacity of the cement plants of the Universal Portland Cement Company in that district to 10,000,000 barrels.

Indiana Steel Company

Nos. 5 and 6, the last two blast furnaces of the eight belonging to the first two groups at Gary, were completed in 1910. No. 6 was blown in March 16, but No. 5 has not yet been operated. The third group of 14 60-ton open hearth furnaces was brought practically to completion and could soon have been made available if required. Of the four blocks of by-product coke ovens, 140 ovens each, probably half will be started in 1911 and more will be ready if needed. The gas from the coke ovens will be used for the soaking pits and the reheating furnaces at the steel mills. The building is under construction for a second power house, known on the company's plans as No. 1. Machinery and equipment are under contract for six power units, each of 3000 kw., consisting of electric generators and gas engines using blast furnace gas, similar in general construction to the engine and generator units in the plant which now furnishes all the power for the Gary mills. The building for the 60-in. universal plate mill is practically completed, and the mill, motor and equipment are being installed. The 18-in. merchant mill was started December 16, 1909. The 14-in. mill was completed and started April 1, 1910. Construction work is still under way on two 12-in. mills and one 10-in. bar mill. These will be ready for operation early in 1911. The axle mill was completed in July, 1910, and operated about a month, closing down in August for lack of orders for commercial operation. A description of this mill appeared in *The Iron Age* of August 18, 1910.

Illinois Steel Company

The new light structural mill of 24-in. and 18-in. stands, with capacity of 15,000 tons a month, announced one year ago, is not yet completed, but will be ready for operation in the early part of 1911. It will be electrically driven, power being supplied by two low pressure steam turbines, using exhaust steam from the present structural mill engines. The new mill will be next to the large structural mill at the north end of the plant. The company has let contracts for a new power plant at the Joliet mills and work on the foundation is under way. This plant will have three gas-electric units of 3000 kw. each, using blast furnace gas; they will be similar in general design to the generators and gas engine units at the Gary mills and the South Works.

Carnegie Steel Company

Only preliminary work, including the laying of two tracks, has been done on the site of the projected mills at Girard, Ohio, for rolling steel bars, hoops and small shapes. These mills will be electrically driven, power being supplied from blast furnace gas engines at the Ohio works.

National Tube Company

A continuous skelp mill at the Lorain, Ohio, works, and two butt weld mills for small pipe, have been practically completed and could soon be put in operation if required.

American Steel & Wire Company

Work has been actively prosecuted in the past year on the new wire plant in the Birmingham district, located about a mile southwest of the Ensley steel works. The entire wire plant will be electrically driven, but a departure is being made from the original plan for utilizing coke oven gas in gas engines. Low pressure turbines using steam for the reciprocating engines at the Ensley blooming and rail mills in one case and at the blast furnaces in another will make about 10,000 kw. available for transmission to the rod and wire mills and to the coke works. The new plant will have an output of about 400 tons of wire products a day. Gas from the coke ovens of the Tennessee company, now under construction at Wylam, will be used in the heating furnaces either at the wire plant or at Ensley.

The new 500-ton blast furnace, the fourth at the Central works at Cleveland, which was authorized a year ago, is well advanced toward completion.

Tennessee Coal, Iron & Railroad Company

The two 75-ton open hearth furnaces which were added to meet the steel requirements of the new American Steel & Wire Company plant have been finished, giving a total of eight large furnaces, four on each side of the converting plant. Work on the storage reservoir, which will contain 2,500,000,000 gal. of water, the supply being secured by damming Village Creek, will be completed in the coming year, together with the 25,000,000-gal. pumping station. The 280 by-product coke ovens at Wylam are expected to be in operation in 1911.

The American Sheet & Tin Plate Company

The steel buildings are up and the work of equipping the mills is well under way at the new plant at Gary. It consists of two 72-in. plate mills, 4 jobbing mills and 16 sheet mills, together with galvanizing department and auxiliary facilities. Electric power will be used exclusively, derived from the power stations at Gary and South Chicago.

American Bridge Company

The new plant at Gary, Ind., is nearing completion and is expected to be ready for operation in March, 1911. The capacity will be 10,000 tons per month of fabricated material. Additional units will be provided to meet future requirements. The full operation of the plant may be delayed somewhat, pending the erection of dwellings for workmen.

Minnesota Steel Company

A large amount of foundation and other work has been done at the site of the proposed steel plant at Duluth. The two blast furnaces will be 22 x 95 ft. The steel plant will have seven 75-ton basic open hearth furnaces, and there will be a 600-ton metal mixer. The rolling mills consist of a 40-in. blooming mill, 28-in. combined rail and structural mill, one combined merchant mill, with nine stands of roughing and seven stands of finishing rolls. The capacity will be 225,000 tons a year of rails, bars and structural shapes.

INDEPENDENT STEEL COMPANIES

Bethlehem Steel Company

Extensive improvements and additions have been made at the works of this company at South Bethlehem, Pa., the new construction completed, as well as that in course of erection representing an outlay of \$7,500,000.

NEW WORK OF 1910 AT THE LEHIGH PLANT.

Blast furnace D, 22 x 90 ft., with five stoves of the McClure type, 22 x 100 ft. each, was completed and put in blast in April. Blast furnaces B and C were relined, thoroughly remodeled and put in blast. Five 75-ton broad gauge locomotives and two 40-ton 3 ft. gauge locomotives were added to the yard equipment.

In the iron foundry were installed and placed in service one 2000-ft. motor-driven air compressor, two motor-driven cupola blowers and two new cranes of 20 tons and 75 tons capacity respectively. A water cinder mill was also installed.

To the crucible department were added a cold drawing outfit and straighteners for cold drawing from 1/4 in. to 3 in. The hammer shop and melting furnace buildings were rebuilt and enlarged, two 36-pot crucible melting furnaces and one annealing furnace being added. A new crucible steel warehouse has also been provided.

Considerable expenditures were made in the armor plate, forge and projectile departments. A 75-ton crane was added in the armor plate machine shop. In the treatment department the tempering plant was enlarged and there was also built a machine shop, 60 x 206 ft., for cutting out and machining test bars from forgings. Two 30-ton cranes were installed here. New facilities were also provided for straightening and finishing special alloy steel bars. Changes were made in the drop forge department which doubled the capacity of the hammer shop. Several new 3500-lb. steam drop hammers, trimming dresses and a new heading machine were added. In the die sinking end a number of tools were added. The machine shop facilities of the projectile department have been more than doubled. A wing 61 x 159 ft., and annex, 39 x 140 ft., containing \$150,000 worth of machine tools, have been added to the original machine shop building, which was 42 x 180 ft. The facilities for treating projectiles were more than doubled, the treatment building being considerably enlarged. A new saw repair shop has been erected and provided with new equipment.

At No. 2 shop, which is the largest of the company's machine shops, an annex was built on the north side, 60 x 1225 ft., in which over \$500,000 worth of machine tools was installed, giving large additional capacity for the machining of guns of all sizes. This shop before the addition was 117 1/2 x 1522 ft. A new building, 390 x 75 ft., with 50 ft. clear height, was completed, known as No. 6 machine shop, which is to be devoted entirely to the erection of gas engines. Over \$500,000 worth of machine tools and two 75-ton cranes have been installed. New office buildings were built for the projectile department, steel casting department and yard department.

NEW WORK OF 1910 AT SAUCON PLANT.

There was finished and put in operation a well equipped repair machine shop (0 x 400 ft., to take care of both mechanical and electrical repairs, also the turning of rolls for the rail, structural and billet mills. To the equipment of open hearth plant No. 2 38 double truck mold cars were added. A rail loading crane, equipped with magnets, was added at the rail mill, and the rail finishing department was extended to permit of the manufacture of 60-ft. rails. The structural shop was materially enlarged by an annex on the north side. These extensions included a new template shop as well as a shop office. A new general office building for the Saucon plant was erected and occupied.

NEW WORK UNDER WAY AT THE LEHIGH PLANT.

Two blast furnaces, F and G, 22 x 90 ft. each, equipped with five stoves of the McClure type, 22 x 100 ft. each, also two large dry dust catchers and three Steinbart gas washing towers per furnace, are nearing completion and will be put in service early in 1911. A Heyl & Patterson casting machine is being installed. A 6000-hp. boiler plant will burn blast furnace gas. The company is building nine single gas driven blowing engines, to be placed in a new blowing engine house, 100 x 310 ft., equipped with a 40-ton crane. Added equipment for the existing electric power station will be three 1500-kw. gas driven power engines, also being built by the company. To wash the gas for this entire gas engine equipment, in addition to the gas washing apparatus which is part of each blast furnace installation, there will be a complete gas washing plant, consisting of five spraying towers and five Theisen rotary scrubbers, each of 7500-hp. capacity, with three pressure blowers.

In connection with the two large new blast furnaces there are also being built two new sets of Hoover & Mason coke and ore bins, with the automatic weighing scale cars. Old blast furnace A is being dismantled, with the idea of erecting on its site a new and complete modern blast furnace. When all of these improvements

are completed the company's blast furnace plant will consist of seven furnaces, with a monthly capacity of 75,000 tons of pig iron.

At the No. 1 rolling mill the small bar mills are to be completely remodeled and changed to electric drive. The improvements to be made will result in making this virtually a new department. In the press forge department a new heating furnace is being installed, together with a 60-ton crane to serve it. A new repair shop and engine house will also be provided for this department. In the No. 2 and No. 3 machine shops steam engines are to be taken out and electric drives substituted, which will result in all of the machine shops in the entire Lehigh plant being completely electrically driven. In fact, when these improvements are completed, the entire Lehigh plant will be electrically driven, with the single exception of the forging tools.

NEW WORK UNDER WAY AT THE SAUCON PLANT.

A complete Bessemer plant is being installed, including two 20-ton vessels, a 400-ton mixer, also a bottom and mixing house, &c., which will be used in connection with the No. 2 open hearth department for making steel by the duplex process. This Bessemer plant is rapidly nearing completion, and will be placed in service early in 1911. For blowing the converters there is being installed a 46 and 84 x 84 x 60-in. Southwark cross-compound blowing engine. The Bessemer plant will be equipped with a 60-ton ladle crane, and a new 125-ton ladle crane is to be installed in No. 2 open hearth department to take care of the increased output. A new mold yard and a new scrap reclaiming plant are being provided to take care of both the open hearth and Bessemer plants. In addition the stripper has been relocated, bringing it in direct proximity to the open hearth plant.

A new central pumping station to serve both Lehigh and Saucon plants, and a new electric power station have also been built. Moreover, the additional capacity has made necessary an extensive interchange railroad yard, which is rapidly nearing completion.

COKE PLANT.

The Didier-March Company, a German corporation, with American headquarters in the Hudson Terminal Building, 30 Church street, New York City, is now constructing, in immediate proximity to the Bethlehem Steel Company's property, a \$5,000,000 coke plant, to have an ultimate capacity of 7500 net tons of coke a day, as well as a plant for reclaiming the resultant by-products. Practically the entire output of coke from this plant will be sold to the Bethlehem Steel Company for use in its operations. The coke plant, however, will be constructed and operated by the Didier-March Company, entirely independent of the Bethlehem Steel Company.

Crucible Steel Company of America

For its Atha Works, at Harrison, N. J., the Crucible Steel Company of America is now taking bids for a large steel structure to cover its new electric and open hearth furnaces, also for the enlargement of its gun and projectile buildings, together with the construction of a new office building upon the property recently acquired adjoining the present plant. In addition the company is installing a 1500-ton press in a large new building. It is the intention in the coming year also to install at this works a low pressure steam turbine system to convert a large amount of exhaust steam into electric power, securing in this way some 1500 kw.

At the Park mill, Pittsburgh, the company has recently installed a large crane runway capable of taking care of 20,000 tons of billets and scrap through the use of three traveling cranes with magnets attached. It is planned to erect at this plant in the coming year a new boiler plant of 5000 hp. capacity.

At the Norwalk, Ohio, plant it is planned to build a crane runway to handle the output of the mill through the use of magnets.

For more economically handling the billets coming into the Singer works at Pittsburgh the company is finishing the erection of a pneumatic lift, which is a new

departure in connection with the handling of such raw material.

The third open hearth furnace has just been completed at the Crescent plant, Pittsburgh, and new electric charging machines and other necessary equipment have been provided to handle more economically the output of the three furnaces.

Republic Iron & Steel Company

Carrying out the programme announced in the latter part of 1909, the Republic Iron & Steel Company is now building at Youngstown, Ohio, a blast furnace to be known as Haselton No. 4, and on the opposite side of the Mahoning River an open hearth plant consisting of eight 60-ton furnaces, with blooming mill and billet and sheet bar mills. The new tube plant of the company at Youngstown, completed in 1910, is described and illustrated elsewhere in this issue.

Jones & Laughlin Steel Company

The three blast furnaces at the new Aliquippa plant which were referred to one year ago have all been in operation in 1910, though only one is now in blast. There has also been completed and put in operation at Aliquippa in the past year a tin plate plant with 12 hot mills, a rod mill and wire and nail works. New construction at Aliquippa yet to be completed includes four Talbot open hearth furnaces with a daily capacity of 250 tons each, a 38-in. blooming mill and a 20-in. billet mill. On the latter sheet bars and small billets will be rolled. At present the steel used at Aliquippa in the tin plate and wire plants is shipped from the South Side works in Pittsburgh.

Lackawanna Steel Company

At the plant of the Lackawanna Steel Company, South Buffalo, N. Y., work is now in progress on a continuous merchant mill containing one 6-stand 12-in. continuous roofing train and four 2-stand 10-in. finishing mills, having a total annual capacity of 100,000 tons of small squares, rounds, ovals and shapes. In the past year the company has made extensive improvements at rail mills No. 2 to enable it to roll tie plates, rounds, &c.

Cambria Steel Company

The rod mills and wire mills on which work has been in progress at the Cambria plant, Johnstown, Pa., in the past year will be ready for operation in the first half of 1911. The rod mill will probably be operated in March and the wire mills by May. In the past year the new 18-in. continuous billet mill has been put in operation. It was described in *The Iron Age* of May 5, 1910, page 1072. Four 50-ton open hearth furnaces have also been added at the Cambria plant. At the Gautier Works semi-continuous 8 and 12-in. mills were added in 1910. An important piece of construction now under way is the Quemahoning dam and pipe line, which will greatly increase the company's water supply.

Pennsylvania Steel Company

The following improvements and additions to the plant of the Pennsylvania Steel Company at Steelton, Pa., are now under construction, and will be completed in the coming year: 3000 hp. of boilers; additional stove equipment and new pumps for blast furnaces; a new car repair shop; a gantry storage crane; additional pit heating furnaces for the slabbing mill, which now has six pit furnaces; also a new building, with crane and other equipment for breaking up scrap.

Inland Steel Company

The principal new construction planned for 1911 by the Inland Steel Company, Chicago, is the building of a second blast furnace, 19½ x 85 ft., at Indiana Harbor, Ind.

The company completed important additions to its mills at Indiana Harbor, which were reviewed at length in *The Iron Age* of October 20, 1910. Eight new hot sheet mills were added to the 10 already in operation in the sheet department, three new mills being started in July. Two new open hearth furnaces of 60 tons capacity were completed and were started in August, making eight

open hearth furnaces at this plant. A new billet mill was also completed last year in connection with a sheet bar mill which is operated in the same train, the billet and sheet bar mills being operated alternately and receiving blooms from the blooming mill. The company has also added an extensive equipment of special machinery for making roofing, siding and other commercial forms of sheets.

Worth Brothers' Company

Worth Brothers Company, Coatesville, Pa., blew in in the past year its No. 1 blast furnace. At its plate plant two heating furnaces were built and additional heating capacity was provided at the Valley mills. The No. 2 blast furnace, 18½ x 85 ft., a duplicate of No. 1, is still under construction. Additional heating capacity is to be provided for the No. 3 mill and Valley mills and a new stockhouse will be built at the Viaduct works. All of this new construction will probably be finished by the early summer of 1911. Repairs are being made preliminary to the operation of two additional small trains of rolls at the Valley works, which have not been in use for several years.

Eastern Steel Company

The two open hearth furnaces of 50 tons capacity each which were under construction at the Pottsville, Pa., plant of the Eastern Steel Company one year ago, were completed in 1910, but owing to trade conditions only one has been in operation so far. The capacity of the plant is now 22,000 to 25,000 tons of steel a month.

Maryland Steel Company

At Sparrows Point, Md., the Maryland Steel Company completed in 1910 five 50-ton tilting open hearth furnaces, referred to in this review one year ago. The plant is equipped so that steel can be manufactured either by the straight open hearth or the duplex process. Plans are under way to replace blast furnace A with a new stack, with skip hoist, and to build the necessary stock bins.

Pittsburgh Steel Company

Announcement was made in December that the Pittsburgh Steel Company had decided to build two blast furnaces at Monessen, Pa., to supply basic pig iron for its 12 60-ton open hearth furnaces. The rod mill at Monessen has a capacity of 150,000 tons a year.

Sharon Steel Hoop Company

A new wide band mill is now under construction at the works of the Sharon Steel Hoop Company, Sharon, Pa., and will be ready for operation in the late spring of 1911. The additions made in the past year include a 35-ton basic open hearth furnace and the reconstruction of a small acid furnace into a 35-ton basic furnace, giving the plant three acid and three basic furnaces. A 350-hp. Stirling boiler was also added.

Upson Nut Company

The new steel plant of the Upson Nut Company, Cleveland, Ohio, is nearing completion. The plant will consist of four open hearth furnaces and a 34-in. blooming mill, which will be ready for operation about March 1, and a bar mill, which will be finished about May 1. The blooming mill will be driven by a 46 x 60 in. reversing engine.

Wisconsin Steel Company

The International Harvester Company's steel making subsidiary, the Wisconsin Steel Company, has no plans for additions in 1911 other than to continue the construction of coke ovens in connection with its coal mining developments in Harlan County, Ky. The plant will consist of 300 beehive ovens, with the necessary shops and equipment and dwellings for the employees.

Lukens Iron & Steel Company

At the Coatesville, Pa., plant of the Lukens Iron & Steel Company a 750-kw. turbine generator of the Rateau-Smoot type was installed in the past year. The company added also a number of electric traveling cranes

and special machines. A new departure is that for the manufacture of trolley poles from steel plates, which are pressed into rectangular form with a view to greater strength and resistance than is given by the tubular form. The company has been manufacturing the Jacobs-Shupert patent locomotive firebox, but this will be taken over shortly by a separate company in which it has a large interest.

Inter-Ocean Steel Company

Organized in 1908 with \$3,000,000 capital, the Inter-Ocean Steel Company, Chicago, began operations in 1910 at its new plant at Chicago Heights, Ill. Construction work was begun in April, 1909. A 40-ton acid open hearth furnace was completed in April, 1910. A second furnace of the same size was completed about November 1, 1910. This plant has special rolling equipment for making circular or ring forms of steel, including locomotive tires, shells and rings for mining machinery, flanges for hydraulic pipe and other products of this character, which require a special quality of low phosphorus steel. The metal from the open hearth furnaces is poured in cylindrical ingots. After the ingots have cooled they go to slicing lathes which cut them into drum shaped sections or "cheeses." The "cheese" is heated in a continuous furnace and is put under a 5000-ton hydraulic press which serves the purpose of a blooming mill, producing an annular bloom. Three trains of special rolls convert the bloom into finished product. The first train enlarges the hole and breaks down the bloom. The bloom then passes to the tire rolling mill, which rolls it down and forms the flanges of locomotive tires. The third stand of rolls is the finishing mill, which completes the rolling operation. The tires or rings then go to the machine shop, where they are turned on boring mills to give the necessary machine finish.

Youngstown Sheet & Tube Company

The third blast furnace of this company was finished and blown in at Youngstown last year, and another bridge was provided for the handling of ore. Light sheet mills were completed and put in operation in 1910.

Southern Iron & Steel Company

Some future construction work is in view for the plants of the Southern Iron & Steel Company, but definite details cannot be announced as yet. The new rod and wire mills at Alabama City were completed and put in operation last year, the capacity being about 400 tons of rods a day. There are three billet heating furnaces. Additional washer capacity was installed at the company's brown ore mines at Bartow, Ga.

Halcomb Steel Company

In the past year the Halcomb Steel Company, Syracuse, N. Y., has made a 60 x 80 ft. extension to its wire mill for a pickling room, also an addition, 44 x 141 ft., to the melting building, giving room for two more 24-pot crucible furnaces, one of which is now building. An extension, 100 x 105 ft., to the rolling mill was necessary to provide for a new eight-stand 12-in. mill for rolling hand rounds. This mill is driven by a motor and rope drive and is one of the most complete hand round mills extant. The capacity of several departments of the plant has been overtaxed in the past year.

John A. Roebling's Sons Company

At its Roebling, N. J., works, the John A. Roebling's Sons Company now has under construction an additional wire mill and new buildings for wire cloth manufacture. In the town of Roebling about 100 additional dwellings are in course of erection. Illustrations of the work the company has done in this direction have already appeared in these columns. At the Trenton works of the company the changes in the past year have been in the provision of additional and improved equipment.

West Penn Steel Company

At its plant at Brackenridge, Pa., this company built in 1910 a second 50-ton open hearth furnace. It also added three sheet mills.

Forged Steel Wheel Company

This subsidiary of the Standard Steel Car Company, Butler, Pa., completed last year an open hearth plant containing six 50-ton furnaces. It was started up in September.

American Rolling Mill Company

The American Rolling Mill Company, Middletown, Ohio, reported one year ago as having under construction four 65-ton open hearth furnaces, with blooming and other rolling mills, will have the new furnaces completed in the next three months. The new annealing furnaces are well along and a conveyor system has been practically completed. A large new warehouse is under roof and will be ready for occupancy shortly.

MERCHANT BLAST FURNACES

Contracts will be let shortly for a new blast furnace to be built by the Zenith Furnace Company, Duluth, Minn., and the work of erection will start in the spring. This stack will be 18-ft. 6 in. x 75 ft., and will have a daily capacity 300 tons. Arthur G. McKee, Rockefeller Building, Cleveland, Ohio, is the engineer in charge.

The Iroquois Iron Company, Chicago, broke ground in August, 1910, for two new blast furnaces, which when completed will give the company four furnaces, with a total daily output of 1200 tons. The iron work is now nearly finished on the two new stacks and is in progress on the eight stoves. The new furnaces will be ready for operation in the summer of 1911. A new feature is the use of steam turbine blowing engines, three of which will be installed, two for regular operations and one in reserve.

The Rogers-Brown Iron Company will complete in 1911 the two furnaces it has had under construction at South Buffalo at its Susquehanna plant. They will have a capacity of 350 tons a day each.

Work is well advanced on two new blast furnaces that are being built by Corrigan, McKinney & Co., one at Cleveland, Ohio, alongside the River furnace completed in the past year, and the other at Josephine, Pa. Each of these furnaces will be 20 x 85 ft., and will have a daily capacity of 350 tons. It is expected that the Cleveland stack will be ready to blow in February and the Josephine stack about May 1.

The Alan Wood Iron & Steel Company, Philadelphia, will build an alternate blast furnace stack at its Heckscher furnaces Swedeland, Pa. The new furnace will have a capacity of 350 to 400 tons a day and will only be in operation when one of the two existing furnaces is out, as no new blowing capacity is being provided.

Federal Furnace Company, Chicago, completed and put in operation in August, 1910, a pig casting machine.

The Andrews & Hitchcock Iron Company, Youngstown, Ohio, put in blast last year its rebuilt No. 1 Hubbard furnace, on which work was in progress in 1909. The company is now installing a new William Tod Company vertical, long cross head, high pressure blowing engine, with 49-in. cylinder, 60-in. stroke and 96-in. blowing tube, and will have it in operation soon.

The Hudson Iron Company expects to complete its improvements at its Secaucus, N. J., furnace in the first half of 1911. These include the building of four stoves, the installation of two 400-hp. boilers and a new boiler furnace stack.

Among the improvements made at the furnace of the Girard Iron Company, Girard, Ohio, last year was the installation of a steam pipe breaker designed by Ladd & Baker, Inc., Philadelphia. The machine is supplied with pigs in frames by an overhead crane, but an innovation is that the breaking is done when the pigs are in a horizontal position. The machine is very heavy and in design and construction is simple, all motions being produced directly by steam cylinders. Four pigs and the attached sow are broken at each stroke, the broken iron passing by gravity through a chute into railroad cars.

The Wellston Steel & Iron Company, Wellston, Ohio, completed a new blast furnace last year to replace one of its three stacks. Two new blowing engines and four Rust boilers were installed.

The new furnace of the Dayton Coal & Iron Company, Ltd., Dayton, Tenn., which has been under construction in the past year, is now completed and is expected to blow in this week. It replaces the old No. 1 furnace.

The Lake Superior Iron & Chemical Company, Detroit, Mich., has made plans for replacing the kiln process of charcoal production at all its furnaces by modern retort construction. This will make it possible to recover all the by-products and will afford the maximum of economy. The company has six furnaces, which are located at Ashland, Wis., and at Manistique, Newberry, Chocoma, Boyne City and Elk Rapids, Mich. Four of these furnaces are in operation at present. It is the expectation to reconstruct the Newberry plant first, and this work will be completed by July 1, 1911. The reconstruction of the other plants will require five years' time, and the expense of the work will be about \$1,500,000. The company is also building a modern saw mill at its Newberry plant to convert the best part of its forest products into lumber and the inferior into wood, thus eliminating a very expensive operation, that of cutting raw material in the woods.

The new charcoal furnace of the East Jordan Furnace Company, East Jordan, Mich., was completed early in 1910, and was blown in January 17. It is 10 x 60 ft. and has a capacity of 24,000 tons a year.

ROLLING MILLS AND STEEL FOUNDRIES

The De Forest Sheet & Tin Plate Company, Niles, Ohio, added last year to its pickling and cold rolled department facilities for the manufacture of full pickled and cold rolled and full finish sheets and automobile body and furniture steel. The outlay was about \$50,000.

The Highland Iron & Steel Company, Terre Haute, Ind., purchased in August the mill at Blue Island, Ill., of the Blue Island Rolling Mill & Car Company. After general repairs and the completion of a puddling and lushing furnace the mill was started up by the new owners October 31.

The Stoughton Engineering Company, 165 Broadway, New York, is designing a crucible steel melting furnace for the manufacture of steel castings for the Calumet & Hecla Mining Company at Calumet, Mich.

The Interstate Iron & Steel Company, Chicago, added a 22-in. bar mill to its plant at East Chicago. This is a mill with two stands of rolls adapted for rolling large sizes of bar iron. It began operation in April. This company now has 22-in., 16-in., 12-in., 9-in. and 8-in. mills for rolling bar iron.

New sheet mill construction apart from that spoken of above in connection with the new work of steel companies, included the completion of eight mills by the Canton Sheet Steel Company, Canton, Ohio; four by the Massillon Rolling Mill Company, Massillon, Ohio; one by the National Rolling Mill Company, Mansfield, Ohio; eight by the Phillips Sheet & Tin Plate Company, Weirton, W. Va.; one by the Stark Rolling Mill Company, Canton, Ohio; five by the Thomas Steel Company, Niles, Ohio. Follansbee Brothers now have two sheet mills under construction.

The McKeesport Tin Plate Company, McKeesport, Pa., is adding two tin plate mills, which are nearly completed. It built 10 new mills in 1910. The Phillips Sheet & Tin Plate Company completed 12 tin plate mills at Weirton, W. Va., last year; the Carnahan Tin Plate & Sheet Company, one at Canton, Ohio, and the Wilkes Rolling Mill Company, one at Sharon, Pa.

The Crucible Steel Casting Company, Lansdowne, Pa., has contracted for the installation of a 2-ton electric furnace of the Roechling-Rodenhauser induction type.

In the crucible steel department of its Chicago plant the Simonds Mfg. Company, Fitchburg, Mass., installed last year a Girod electric furnace, the first of this type to be built in the United States. In the transfer of the company's Chicago plant to Lockport, N. Y., where new construction is now under way, the Girod furnace was removed to be re-erected at Lockport, and ultimately it is expected further electric furnace capacity will be provided there.

The Dreeses 1-in. Screw Machine

One of a New Line Having Friction Back Gears

A line of friction back geared screw machines has been developed by the Dreeses Machine Tool Company, 227 West McMicken avenue, Cincinnati, Ohio. Four sizes in all of tool are built, to take $\frac{3}{4}$, 1, $1\frac{1}{4}$ and $1\frac{1}{2}$ in. stock through the wire feed, the 1-in. machine being the size illustrated. It has an automatic chuck and wire feed, friction back gears, positive acting quick change feed gears, power feed for the turret slide, separately adjusted automatic stops for each hole in the turret and a fine longitudinal adjustment for the cross slide.

The headstock is cast in one piece with the bed and its design makes provision for adequate protection of the feed and back gearing. The spindle is driven by a three-step cone pulley.

The back gear frictions are of the toggle joint type and their design is such that the entire operating mechanism can be removed and put back without taking out the spindle. The spindle bearings are lined with high grade babbit metal, which is upset in their seats. The spindle nose construction is of an improved type, providing two blank cylindrical portions on each side of thread fitting the thimble or face plate. There is no bearing on the thread itself and it serves merely to hold the chuck on and has no effect upon the alignment. A very short nose brings the work close to the spindle bearing. The

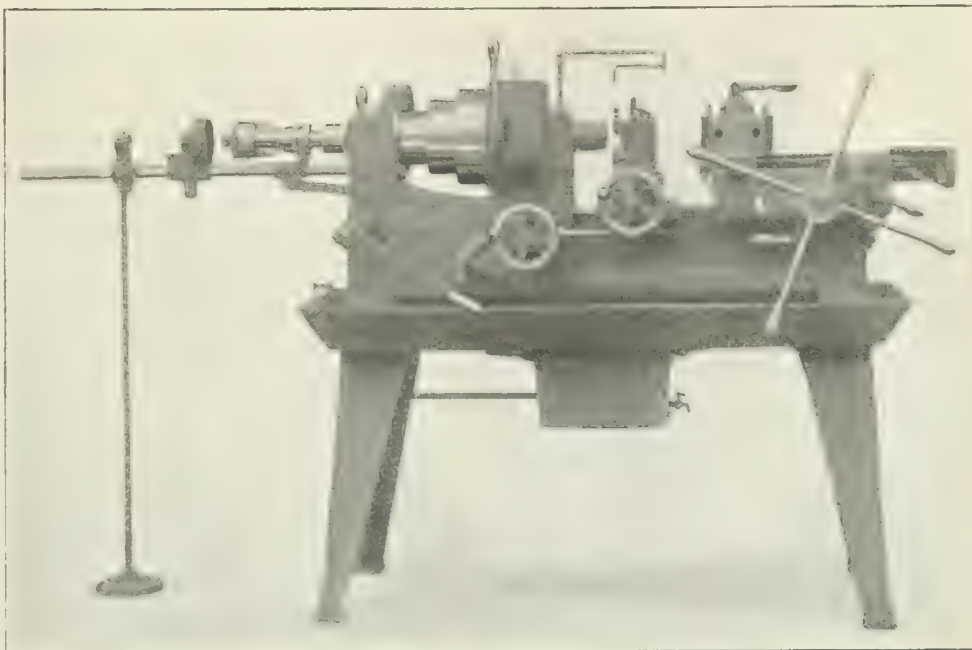
inner rear housing of the head takes up the thrust, thus allowing play in the front bearing for elongation, due to temperature changes, while at the same time the overhang and length of the front bearing are materially reduced from that which would be necessary if the thrust were taken up there.

Like the $1\frac{1}{2}$ -in. screw machine illustrated in *The Iron Age* February 10, 1910, the chuck and stock feeding device is of the maker's standard type, but the operating mechanism has been simplified. The operating lever has been placed in a position where the operator can exert the greatest force with his left hand with the least exertion, and the split hub and clamp nut enable the position of this lever to be changed to correspond with the build and strength of the operator. The thimble spreading the chuck fingers at the rear end of the spindle has steps which enable stock, the diameter of which varies considerably, to be used without stopping the machine for readjustments.

The turret index ring is as nearly the full diameter as is practicable and is held in place by a long, square gibbed locking bolt. In this way the surface of the turret and the slide is not interrupted by the locking bolt and no particles of metal, caused by the wear of this member in its seat, can abrade the surface. The wear of the turret on its stem is also taken care of. Six stops, one for each of the holes in the turret, are located on a bracket in the turret slide base. This stop mechanism is placed in front of and on the outside of the top slide and is operated by a cam placed at the bottom of the turret. The abutment or stop dog makes about one-quarter of a revolution and can be easily put out of action so as to clear all six stops by an automatic lock-

ing plug. The bracket in which the stop screws are placed slides in a dovetail on the turret slide bed and when the stop dog strikes one of these screws it moves the bracket forward, thus knocking off the power feed. A slight additional movement can be given when desired for taking a finishing cut on a shoulder and for cleaning out the chips left by the tools by operating the turret by the pilot wheel. Four changes of geared power feed are rendered available by the small crank handle shown beneath the headstock, the mechanism being placed on the rear of the bed.

The hand wheel, bevel gears and adjusting screw give the cutting-off rest a longitudinal movement on the bed. The cross feed screw has a graduated dial on the hand wheel. An improved design of tool post is used, which opens at the left side, thus permitting them to be adjusted close to the face of the chuck. The wedges under the tools have a single dovetail to keep them back in



A New Screw Machine with Friction Back Gears Built by the Dreeses Machine Tool Company, Cincinnati, Ohio.

position and they are shifted to adjust the tools to the proper height by knurled thumb screws.

A very deep pan mounted under the bed of the machine provides for a large supply of cutting oil or compound and the reservoir is hinged to the pan, so that it can be readily cleaned. The interior of the reservoir is divided into two chambers, in the first of which the grit and dirt are separated and deposited before passing into the second chamber, from whence the pump draws clean oil and delivers it to the tools and the work. The leg at the tail end of the tool has a hinged joint, so that a three-point bearing support is secured, and the alignment is not disturbed by irregularities in the pull. The weight of the tool is about 1300 lb.

Germany Making Electric Steel from Basic Pig Iron.—Our German correspondent gives the following interesting information: From Luxemburg comes news of an important transaction in the steel trade. The Eicher Hüttenverein Le Gallais-Metz & Co. of Dommeldingen, which has recently begun to make steel directly from basic pig iron by means of the electric furnace, has entered into a community-of-interest arrangement with the Becker Steel Works, a concern that has just closed its first business year. The purpose of the arrangement is to turn over the electric steel of the Eicher Company to the Becker mills for rolling into commercial forms and marketing it. It is said that the Eicher establishment is the first in the world that has applied the electric furnace for the immediate conversion of the blast furnace product into steel. It obtains its current at low cost from gas engines driven by the furnace gases.

Fig. 1. General Arrangement of the New Tube Works of the Youngstown & Steel Company at Youngstown, Ohio.



The Republic Iron & Steel Company's New Tube Works

An Important Addition to Its Finishing Mills in the Youngstown, Ohio, District

The completion last year of the new tube works of the Republic Iron & Steel Company marked a further diversification of the finished product of this company and the entrance into the wrought pipe trade of another producer having raw materials and plant to control all the processes from the ore to the finished product in both Bessemer and open hearth steels. In 1908 and 1909 the company had increased its skelp production by building and putting in operation a 10-in. continuous and a 20-in. semicontinuous skelp mill at its Brown-Bonnell works at Youngstown, and reconstructing its 60-in. sheared plate mill. In May, 1909, its Executive Committee authorized the construction at Youngstown of a tube

the open hearth plant. From the city of Youngstown the company secured the vacation of certain portions of streets, in low lying territory along the river, and agreed in return to build a viaduct across the low land. The tube works site is about a mile down the river from the Brown-Bonnell and Bessemer plants. The open hearth plant is still farther down. The Haselton furnaces, the Bessemer and Brown-Bonnell works, the open hearth works and the tube works are connected together by the company's own railroads and bridge, permitting cheap inter-departmental movement of hot metal, billets, skelp, &c. The site also has connections, either direct or through one of the other plants of the company, with

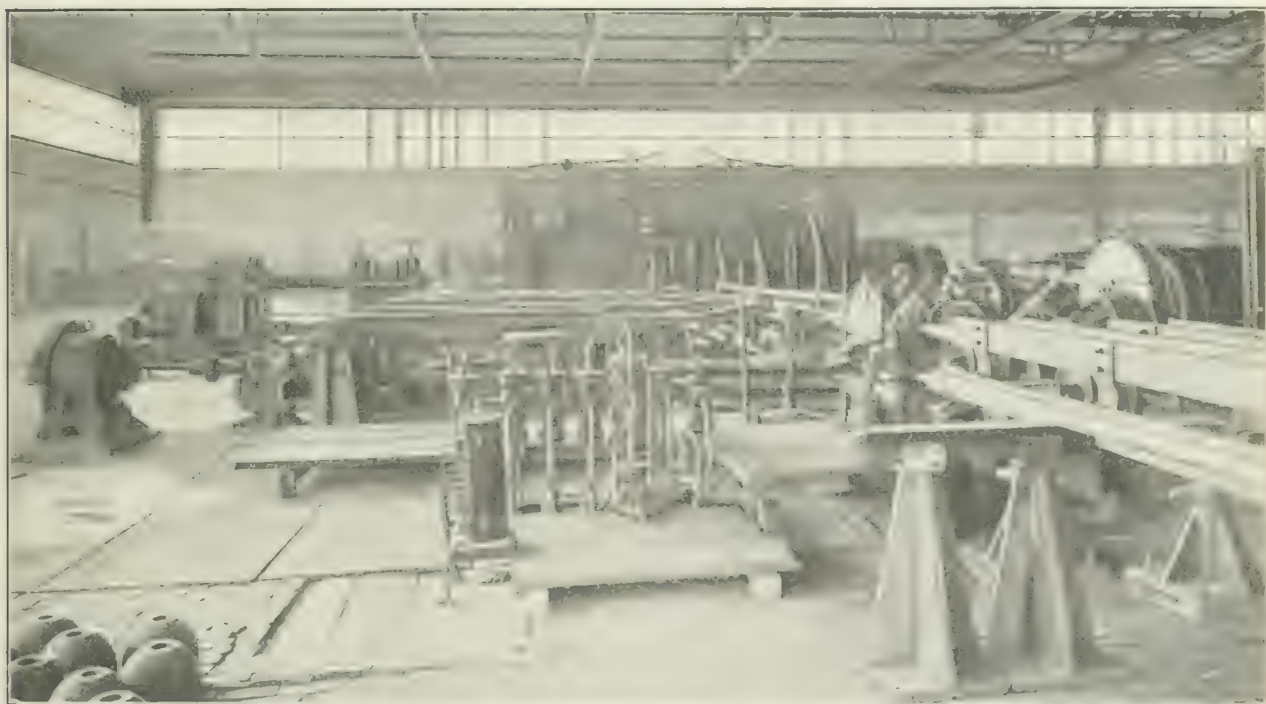


FIG. 2. LAY-OUT OF PLANT.

works consisting of two butt weld and two lap weld mills to make merchant and line pipe, casing and other welded tubular goods from $\frac{1}{4}$ in. in diameter up to 12 in. in diameter, the two butt weld mills to be designed to cover between them the range of sizes from $\frac{1}{4}$ to 3 in., inclusive, and the two lap weld mills to cover between them the range of sizes from 2 to 12 in., inclusive.

Important New Construction

While providing in this way an outlet for much of its Bessemer steel, the company started to put itself in position to furnish open hearth steel bars, for which the demand had been growing, and in October, 1909, announced a large programme of new construction at its properties on both sides of the Mahoning River, between Haselton and the downtown section of Youngstown, where the Brown-Bonnell plant is located. This included a new 450-ton blast furnace alongside the three of the Haselton group. On the opposite side of the river from the blast furnaces, and on the same side as the tube works—the company's river frontage being about $1\frac{1}{4}$ miles—a site was selected for a new steel plant, blooming mill and continuous mill. Plans were made also for a bridge over the river for taking hot metal from the blast furnaces to

all railroads in the Youngstown district, which include the Pennsylvania Lines, Lake Shore, Baltimore & Ohio and Erie railroads. The proximity of the site chosen to the Republic Iron & Steel Company's other operations made unnecessary the construction of any large power plant at the tube works. All power for the plant is electric current generated from blast furnace gas at the Haselton blast furnaces by an extension of the existing steam power plant there, the employment of steam in the tube works being confined to blowing the producers, heating the finishing departments and a few minor uses.

An Unusual Record for a New Plant

Immediately upon the authorization of construction the work of designing, building and organizing the tube plant was prosecuted vigorously, and in April, 1910, the first butt weld mill was put in operation. The other mills followed and by July, 1910, all departments had been operated and all sizes of merchant pipe within the above limits had been made. The plant has now been producing all sizes of pipe for about six months, shipping its product regularly to the trade. There have been no breakdowns and practically no starting up troubles, while the product has been very satisfactory and the scrap loss

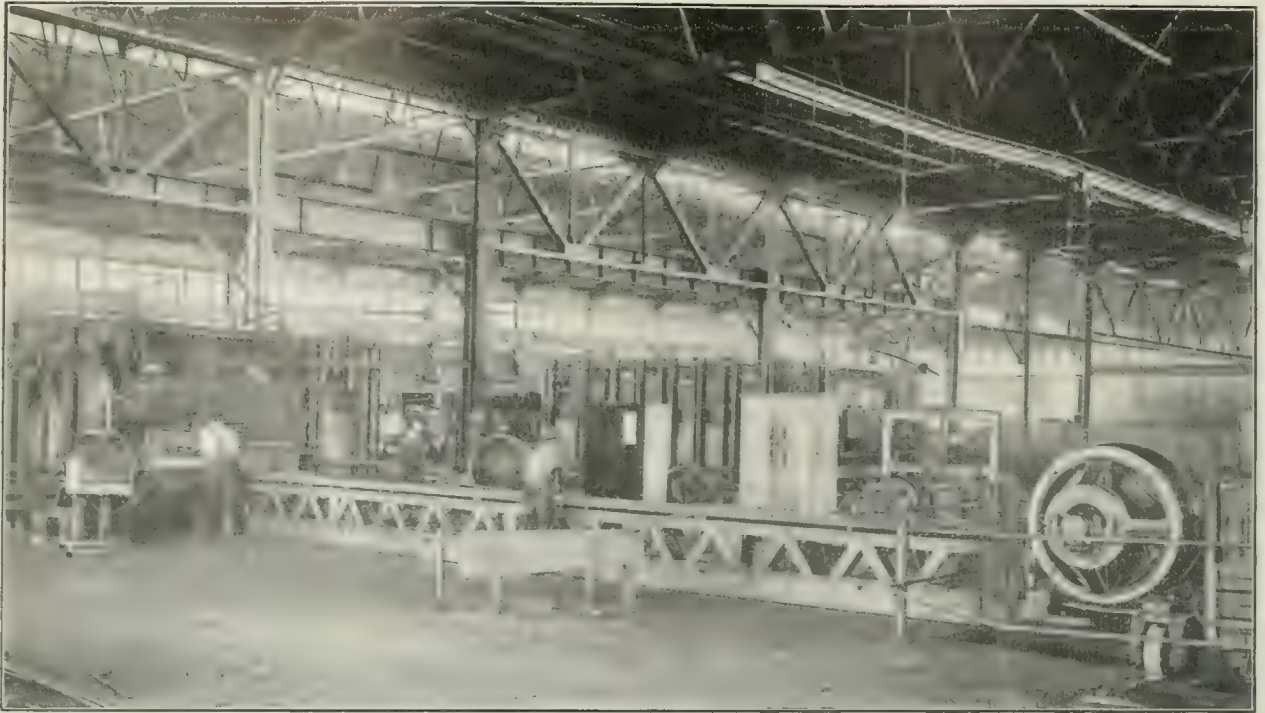


Fig. 3.—Butt Weld Furnace.

low. The results thus far attained indicate a probable production of 10,000 to 12,000 tons a month under good demand and full operation.

All machinery in the tube works is driven by individual direct connected direct current electric motors, and particular care was taken to install motors amply large for the service and to use as many duplicate motors as possible. Flywheels are provided on the motors at the welding rolls and on other machines where heavy loads of short duration occur. So far as possible the motors were placed in positions where they could be easily taken care of and away from the heat of the furnaces. The total number of motors used in the plant was 129, totaling 2450 hp.

In the design and construction of the plant every effort was made to properly protect the machinery to avoid accidents or personal injuries. Gear covers and geared railings were provided at all exposed points and

the plant was inspected by the company's corps of accident inspectors for risks before starting up.

Arrangement of the Plant

Fig. 1 shows the general layout of the plant, which was designed with a view to the best use of the property available and to permit of indefinite extension. Figs. 2 to 7 are various interior views. The main buildings consist of four parallel bays, a skelp bay, a furnace bay, a threading bay, containing at one end the galvanizing department, and a shipping bay or warehouse. This plan permits of the addition of units without interference to operation. The skelp and furnace bays are high, roomy buildings of the ordinary rolling mill type, of steel construction, with ample air space to insure as far as possible comfortable working conditions in summer at the furnaces. The threading bay and shipping bay are lower steel frame buildings of the factory type, with

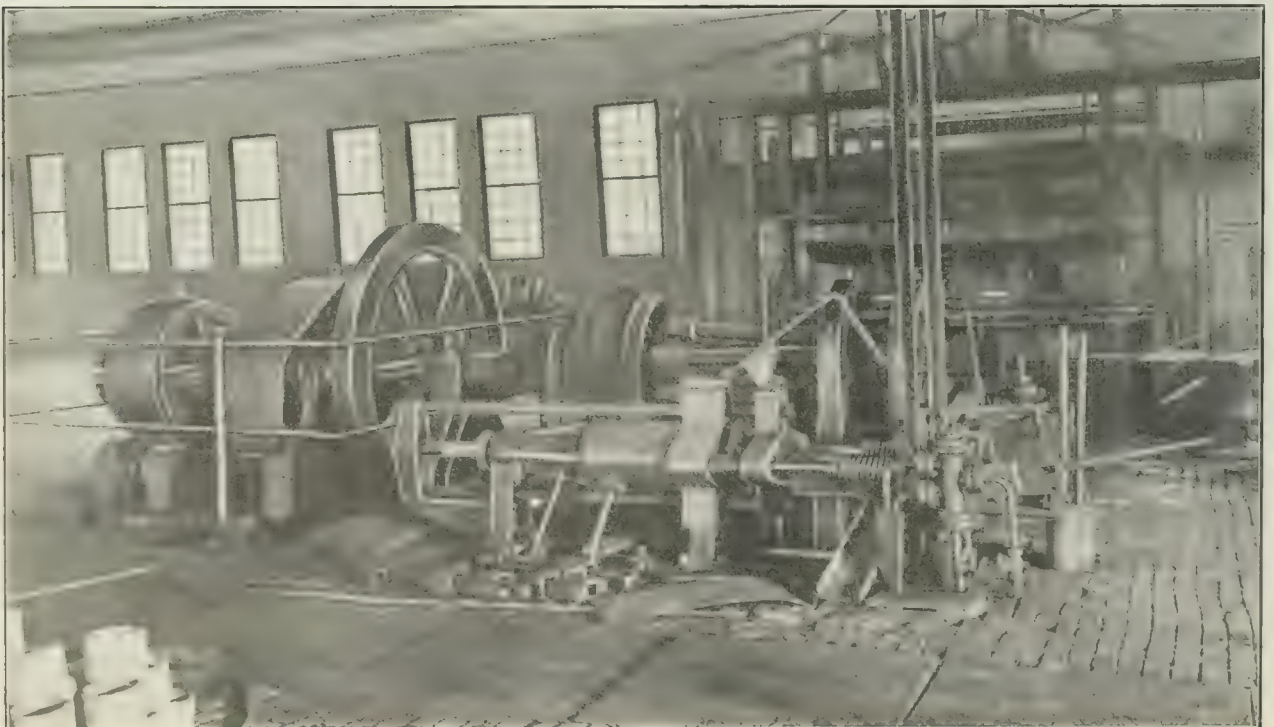


Fig. 4.—Coupling Rolling Machine.



Fig. 5. Socket Shop.

brick sides, so as to be more easily heated in winter. The skelp bay, threading bay and shipping bay are well provided with electric cranes and the furnace bay with separate electrical trolleys at all points where necessary. Space was left between the furnace bay and the threading bay to permit good ventilation of the former during hot weather.

The subsidiary buildings, consisting of the machine shop, socket shop, producer building, office, &c., are placed, as shown on the plant, either out of the line of extension of the main buildings or at a reasonable distance from them. The total area of buildings under roof is about 5 acres; of the warehouse alone about 54,000 sq. ft.

The furnace equipment consists of two butt welding furnaces for the two butt weld mills and two bending and two lap welding furnaces for the two lap weld mills, together with two socket furnaces. All of these are of

the ordinary Siemens regenerative type, strongly built, with large regenerator areas. Gas is furnished by 18 water seal gas producers housed in a steel building equipped with complete crushing, elevating and distributing machinery, providing for the economical handling of fuel.

Movement of Material

Taking up the general plan of the works, it will be noted that the general movement of the lap weld material is as follows: It is delivered from the rolling mill on the track shown under the crane in the skelp bay. It is handled by this crane and placed at the skelp charging machines; is charged, heated, scarfed and bent. It rolls down into the pit of the welding furnace, is charged by machine, is welded in the welding rolls and transferred to the sizing rolls; it is sized and then straightened in the cross rolls, cools, and is delivered from the



Fig. 6.—Threading Floor.

cooling rack into the threading bay by conveyor, where it is handled by cranes during the various finishing operations of cutting off, threading, testing, &c. At all times the material is either under traveling cranes, where it can be handled in bulk, or on an electric charging machine, transfer or conveyor, where it can be handled economically by the piece. The general movement of butt weld pipe is similar in principle, but with changes due to the difference in the processes.

Finishing and Auxiliary Departments

Each mill is fully equipped with motor driven cutting-off, threading, coupling screwing on machinery and hydraulic testing benches, so that each can be run as a separate unit if necessary; the arrangement is such that the material can move promptly through the various operations from the skelp bay to the warehouse or shipping bay as promptly as possible and without the accumulation of unfinished pipe. Hydraulic testing is done by water pressure furnished by motor driven pumps working against a hydraulic accumulator. The various pressures necessary are secured from the pressure water by individual intensifiers at the testing

in the upkeep of the plant and in making the necessary taps, dies, &c.

The plant was designed, built and organized by the operating and engineering department of the Republic Iron and Steel Company, no outside engineer being employed.

The Outerbridge Silicon Alloy.—A. E. Outerbridge, Jr., foundry chemist and metallurgist of Wm. Sellers & Co., Inc., Philadelphia, Pa., has completed arrangements with the J. W. Paxson Company of the same city, for the sale of Outerbridge silicon alloy, as covered by patents owned by him. This alloy makes gray iron castings softer, stronger, cleaner and more homogeneous; it also reduces shrinkage, cracking and blowholes and increases ductility. The iron can be poured at a greater distance from the cupola. It controls the character of the iron drawn from the cupola as perfectly as a governor controls the revolution of an engine, and, moreover, enables one to vary the grade of iron in individual ladles to suit special castings. It drives the dirt and slag to the top, when it can be skimmed off. Castings can be machined much

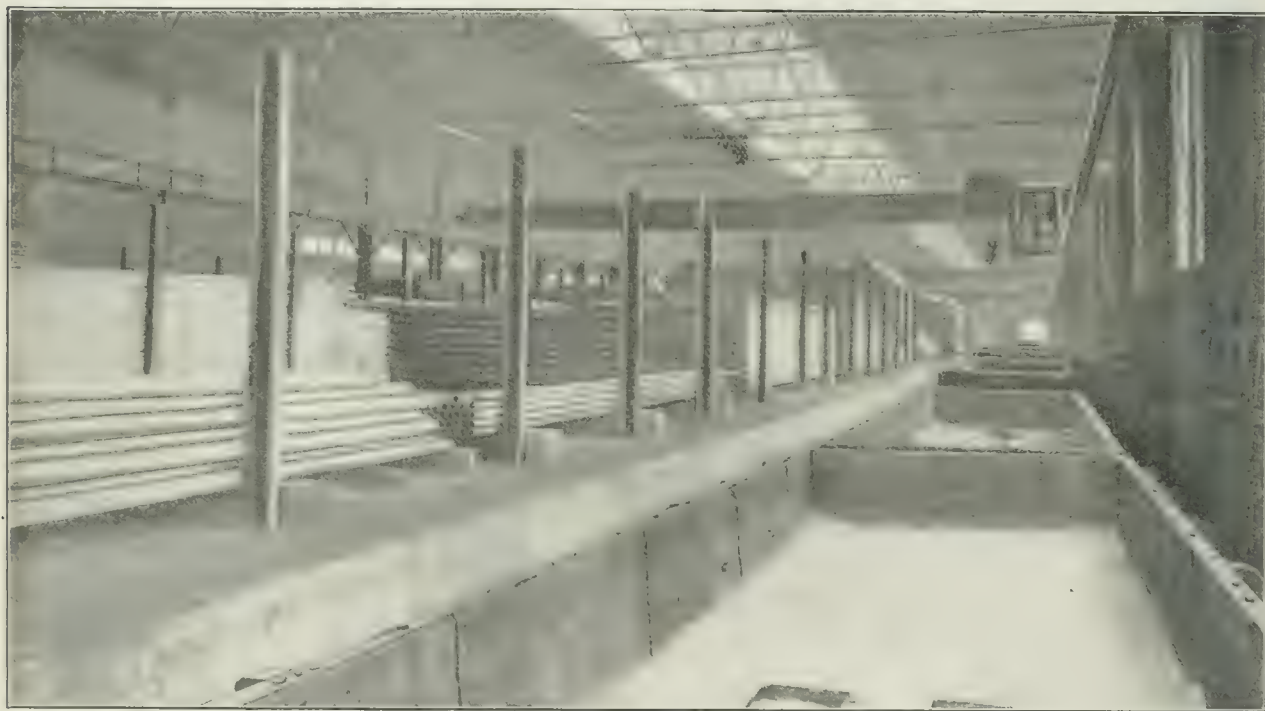


Fig. 7.—View in Warehouse.

benches. By this system all pipe tested receives a definite test pressure, irrespective of anything which the operator at the testing bench can do, and there are thus certain advantages in definiteness over the ordinary individual steam pumps. All service water for the plant is taken by means of motor driven pumps from the river, pumped over a stand pipe and distributed where needed.

The galvanizing department of the plant is situated at one end of the threading bay and consists of one galvanizing pot, with its complement of acid and water tanks, threading machinery, testing machines, &c., and is covered by an electric traveling crane.

At all points in the plant, where necessary, scales are placed so that the amount of material charged and finished may be accurately determined and that the furnace scrap and other losses may be kept for accounting purposes.

In the coupling shop small sockets up to $\frac{3}{4}$ -in. are made and finished from solid bars on automatic screw machines. The larger couplings are made from socket iron on roller welding machines and tapped on vertical multiple spindle machines. A complete oil distributing and recovery system is installed in the coupling shop.

There is a well equipped machine shop in which the tools are motor driven. This and the blacksmith and pattern shops, in the same building, are kept employed

faster, as they are softer. No expert or chemist is required to direct its use, as it is only necessary to drop a small quantity of the finely ground alloy on the bottom of the ladle before tapping. Mr. Outerbridge has had a long and varied experience in the treating and testing of metals. He was the first to introduce ferromanganese in the treatment of car wheel metal to regulate the chill and to increase the strength and ductility of the gray iron forming the plate or body of the wheel.

The Marion Steam Shovel Company, Marion, Ohio, which has been in business for 26 years, brought suit against the Marion Shovel & Dredge Company, recently incorporated, seeking to restrain the latter from the use of its name on the ground of the similarity being likely to lead to the diversion of trade. The court decided adversely to the suit, holding that the name of the new company is a sufficiently distinct designation.

The Seamless Pressed Steel & Mfg. Company, Redkey, Ind., is installing a plant and will in the near future be in position to turn out welded steel product by the oxy-acetylene process, including boilers, vats, tanks and irregular shapes. The company will also manufacture automobile and truck frames by assembly welding.

A Bliss Straight Sided Press of Unusual Proportions

The E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y., has recently built a straight sided single crank press of unusual size. This press is the largest of its type ever built by this company, exceeding by 26,000 lb. the press illustrated in *The Iron Age* January 6, 1910, which was the largest up to this time. This new press is interesting as showing a continually increasing tendency toward the building of larger and heavier presses, for manufacturing heavy sheet metal stampings to replace articles previously made of castings, or for such heavy stampings as were formerly made in hydraulic presses, the crank press giving a more uniform production, coupled with economy in manufacture. Fig. 1 is a front view of the press, while Fig. 2 shows the rear and gives an idea of the arrangement of the gearing.

The press is of the built-up type, and the four large vertical tie rods receive all the strain and relieve the frame columns of the pressure exerted in operating the tool. The cross sectional area of these columns is very large and they serve to impart great rigidity to the entire

steel gears and pinions, each of the large main gears weighing about 13,000 lb.

A lever operating a powerful friction clutch of a new type, especially designed for heavy duty, controls the machine. By the use of this clutch the press is always under instant control and can be stopped and started at any point of the stroke. A safety coupling attached to the wheel acts as a safety guard in case the press is

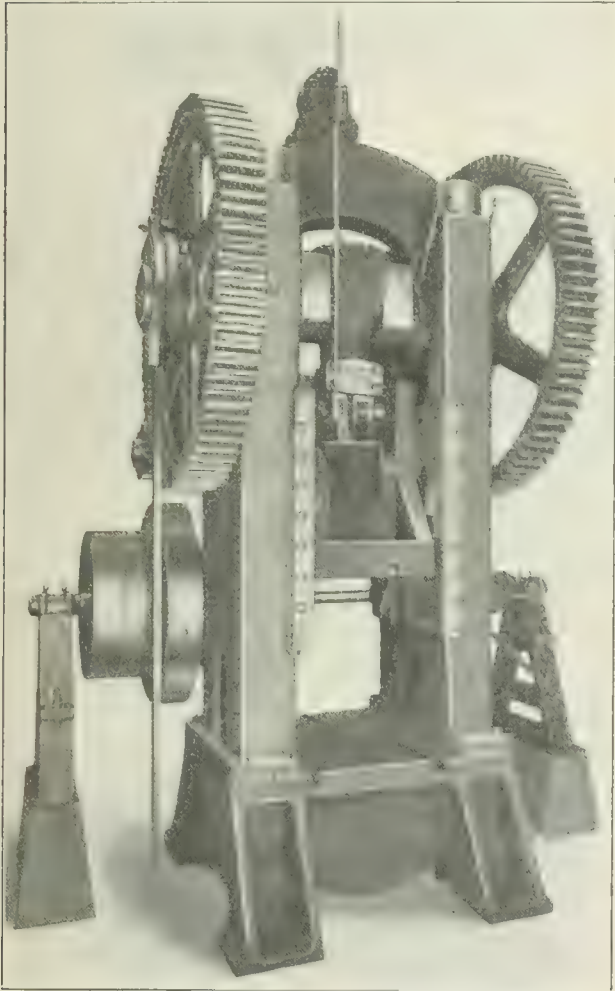


Fig. 1.—An Exceptionally Large No. 80 1/2 Press Built by the E. W. Bliss Company, Brooklyn, N. Y.

press. The crank shaft is 16 in. in diameter and weighs 9500 lb. The press previously described had only a 15-in. shaft. Power is transmitted to the shaft at both ends, thus greatly reducing the bending strain on the shaft and equalizing the pressure on the journals and gears. On account of the great size and weight of the slide a 4-hp. electric motor mounted on top of the press is employed to raise and lower it, the power being transmitted from the motor to the worm and worm wheel adjustment through a vertical shaft fitted with knuckle joints. When the tools are doing their work the slide is practically guided throughout its entire length in the gibs. The press is triple geared and the train is made up of cut

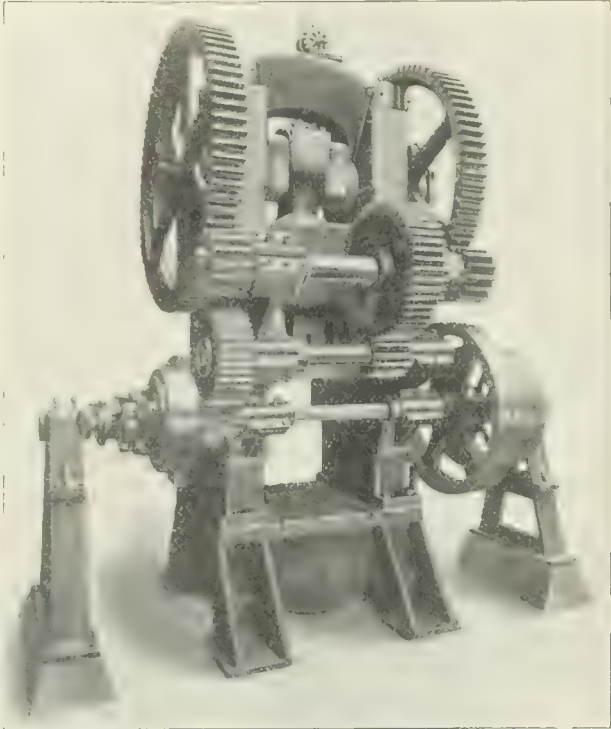


Fig. 2.—Rear View, Showing the Arrangement of the Gears.

subjected to a pressure greatly in excess of that for which it is designed.

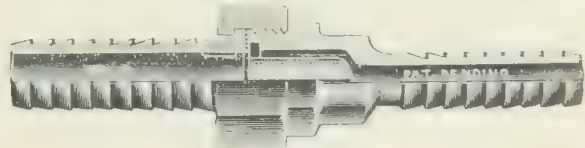
The following table gives the principal specifications and dimensions of the press:

Width of bed, inches	50
Depth of bed, inches	62
Overall height, inches	235
Floor space, inches	200 x 120
Diameter of crank shaft, inches	16
Weight of crank shaft, pounds	9,500
Weight of main gears, pounds	13,000
Weight of press, pounds	190,000

This machine is fitted with a cam actuated bottom knockout, which is not clearly shown in the engravings.

The Quix Pneumatic Hose Coupling Strainer

In the use of pneumatic tools considerable difficulty has been experienced in permitting loose pieces of foreign matter to enter their delicate mechanism. To overcome this loss of time and expense of repairs the Quix combination hose coupling strainer was designed as a safe-



The Quix Pneumatic Hose Coupling Strainer.

guard. It is a substantially made brass hose coupling (3/4 x 1/2 in.), fitted with a renewable and easily cleaned wire strainer. The strainer is deep and cup shaped, with ample area between its sides and the inner walls of the male end, so that an accumulation of dirt will not reduce the air current until the strainer is nearly filled. It is manufactured by Franklin Williams, manufacturer of engineering specialties, 39 Cortlandt street, New York.

A New Weimer Cinder Car

The latest product in cinder car construction, designed by Edgar A. Weimer and built by the Weimer Machine Works Company, Lebanon, Pa., is the result of experiments conducted at the several furnaces of the Carnegie Steel Company by the designer, with the co-operation of the steel company's engineers. Special attention has been given to the sources of weakness developed by experience and the construction has been made such as to resist heavy wear as well as the rough usage received at the hands of cinder bank labor. The car frame, as shown in Fig. 1, consists of two end and two side castings mortised into each other and securely bolted together. The removal of parts is thus possible without difficulty when repairs are made. The racks are of an improved type and are separate steel castings, bolted to the end frames. The bale is fitted to two heavy gear wheels, which have very large self-cleaning teeth and are slipped over spuds on the bale. This gives practically a solid steel casting, with the advantage of being able to remove the parts subject to wear. The trucks are of extra heavy construction, with rolled steel wheels, McCord dust proof journal boxes, Simplex bolsters, Ajax brake beams, and the latest Westinghouse air brake rigging, with a brake shoe on each wheel. Sterling automatic couplers are used in connection with Westinghouse friction draft gear.

The dumping mechanism is the well-known Edgar A. Weimer patent, which gives control of the ladle in its

the dumping mechanism is that the ladle can be made to dump from either side, as shown in the positions of the cylinder in Figs. 2 and 3, and provision is made so that it is impossible to tilt it backwards or in the wrong

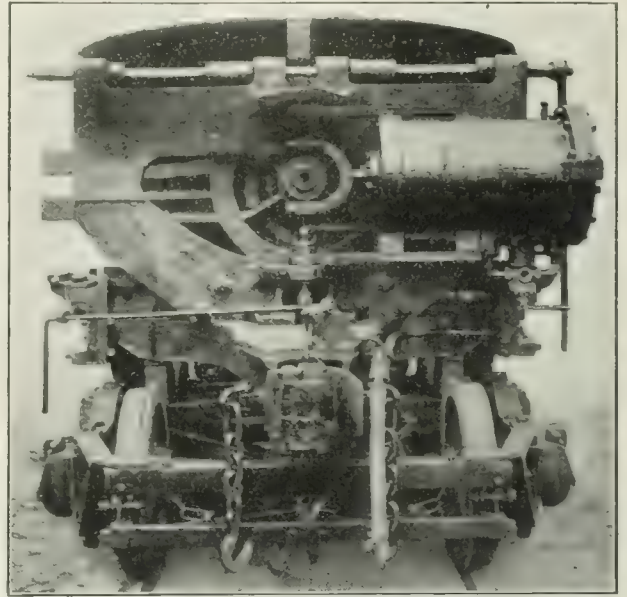


Fig. 3.—End View with Mechanism in Position for Dumping to the Left.

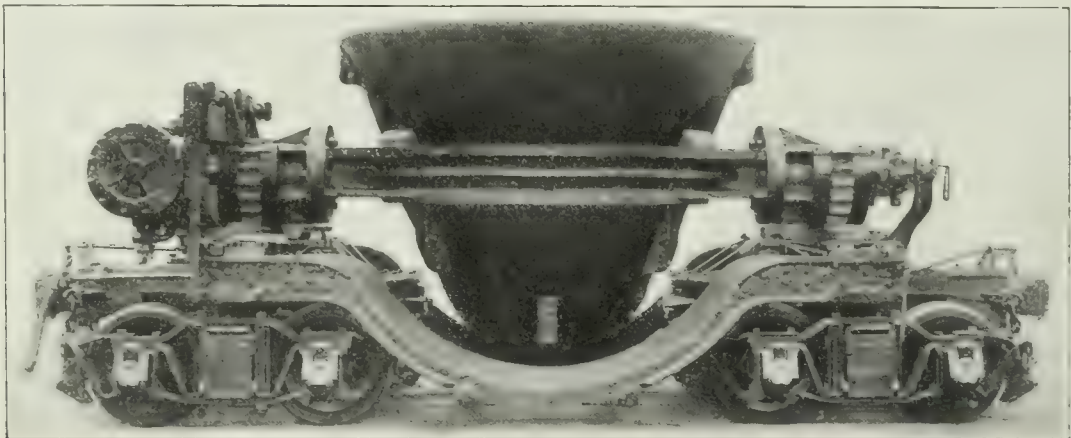


Fig. 1.—The New Weimer Cinder Car.

different dumping positions, only the moving of a valve lever being required for the operation. A feature of

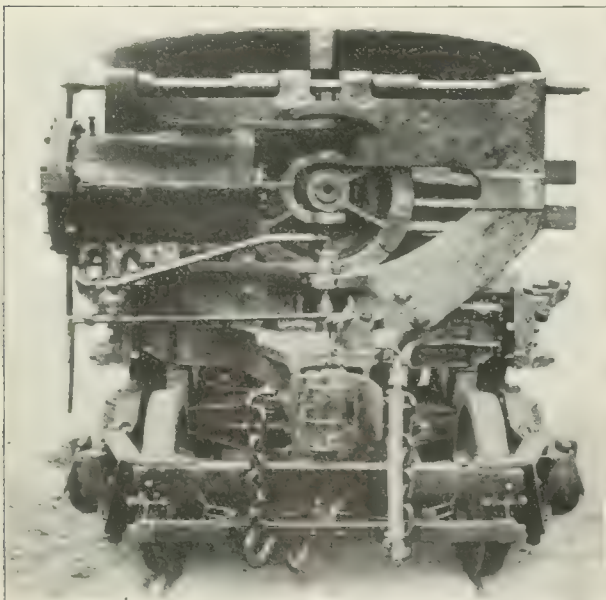


Fig. 2.—End View Showing Mechanism in Position for Dumping to the Right.

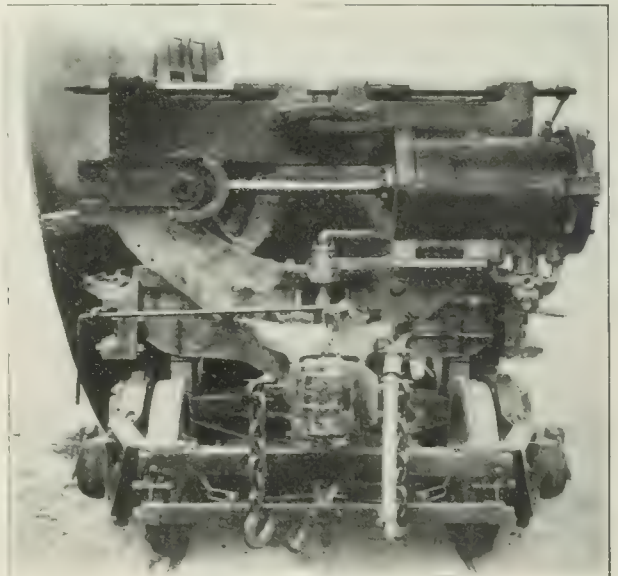


Fig. 4.—Ladle Dumped to the Left.

direction while the mechanism is being changed. This change can be made in 30 seconds and requires the use of no tools or wrenches. The ladle is locked securely by a simple device, automatic in action, and without the

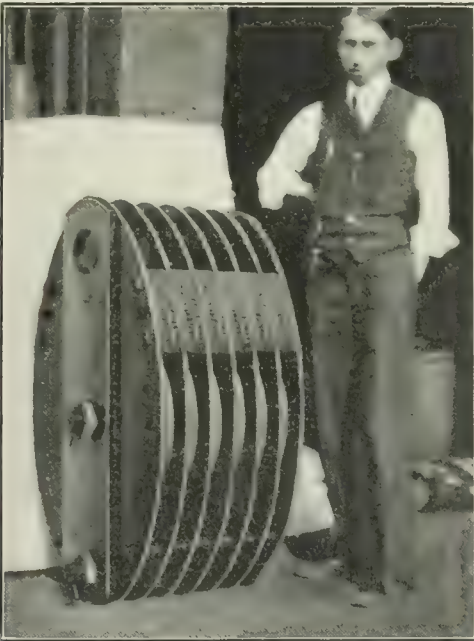
use of springs or weights. The final dumping position, the ladle being thrown well outside the track, is shown in Fig. 4.

The ladle has a capacity of 260 cu. ft. of cinder when filled to within 6 in. of the top. It can be easily removed from the car frame, being provided with lugs with holes for crane hooks. This removable feature is particularly of value in open hearth steel operations, as any number of ladles may be placed in tripods at the furnaces and filled with slag from numerous tappings, then picked up by the crane and placed on the cinder cars to be hauled to the dumping ground. The new Weimer car is of sufficiently heavy design to enable it to handle chilled as well as liquid cinder. Hoods are placed over the tilting and controlling mechanism of the car when in service, for the general protection of those parts, but they have been left off in the accompanying illustrations so that the construction of the working parts may be shown. The car of which views are given is one of a number being built for the Duquesne furnaces of the Carnegie Steel Company.

The Patterson Six Sheave Steel Block

The W. W. Patterson Company, 54 Water street, Pittsburgh, Pa., has recently completed what is said to be two of the strongest and heaviest six-sheave blocks ever made. Aside from the great strength of the blocks, the safe working load being 125 tons, another special point of interest is the record time made in furnishing them, which was one week.

These blocks were furnished for the Seaboard Construction Company, Philadelphia, Pa., and are to be used for the topping lift of a large derrick car having a capacity of 50 tons. As the length of mast was 20 ft. and the boom 50 ft., it was necessary to attach a standard triple block to the bottom of each of these six-sheave



A Six-Sheave Steel Block Made by the W. W. Patterson Company, Pittsburgh, Pa.

blocks, thus giving the effect of two nine-sheave blocks, which is a novel way of reaving up tackle.

All the plates in the blocks were $\frac{1}{2}$ in. thick, and the side straps are $\frac{3}{4}$ x 8 in. in section. No shackles are furnished with the blocks, but they are attached to the car by head pins $4\frac{1}{2}$ in. in diameter. The diameter of the sheave pin is 3 in., and that of the bottom bolt to which the triple block is attached is $2\frac{1}{2}$ in. The sheaves are bushed with Metalline and are grooved for $\frac{7}{8}$ -in. plow steel cable. The weight of each block is 1804 lb.

Musconetcong Furnace of the Musconetcong Iron Works, Stanhope, N. J., is being relined.

The Cleveland Horizontal Boring Mill

Recent improvements made by the Cleveland Machine Tool Works, Cleveland, Ohio, in its horizontal boring, milling and drilling machine, which was illustrated in *The Iron Age* July 1, 1909, include the lengthening of the bed and the equipping of the machine with a constant

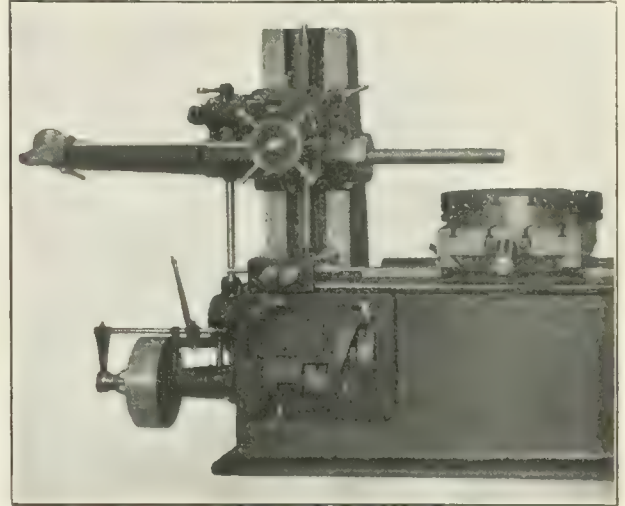


Fig. 1.—Front View of the Horizontal Boring Mill Built by the Cleveland Machine Tool Works, Cleveland, Ohio.

speed motor drive. Fig. 1 is a front view of the machine and Fig. 2 is a rear view showing the application of the motor drive. The principal feature of the machine aside from its simplicity of design is the convenience with which it may be operated. All of the handles are located within easy reach of the operator from his usual working position and only one handle is moved in making a complete change in either the feed or the speed.

The box bed, which is very deep, is reinforced by internal ribs, which make a foundation unnecessary. In

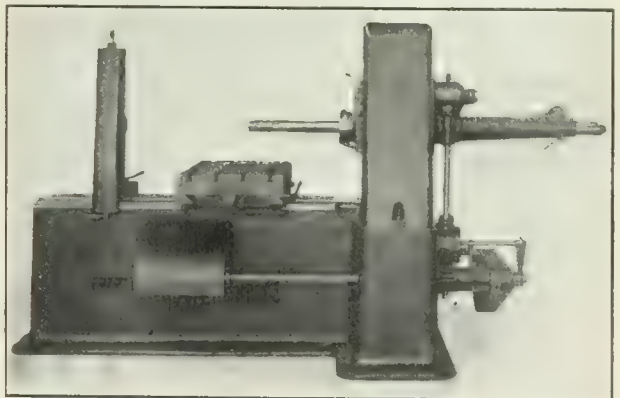


Fig. 2.—Rear View of the Combined Boring, Drilling and Milling Machine, Showing Arrangement of Motor Drive.

the new machine the maximum distance from the face plate to the outboard support is 6 ft. 10 in., which is 28 in. longer than in the previous machine. The motor supplied is a 3-hp. constant speed motor running at 1135 rev. per min., the necessary speed changes being accomplished through the gear box at the left end of Fig. 1.

The Van Dorn & Dutton Company, Cleveland, Ohio, has opened a Canadian sales office in Montreal. The office is located in the Eastern Townships Bank Building and is in charge of R. E. T. Pringle, who will look after the sales of the company's various products, which include hard service electrically operated drills and reamers, street railroad supplies, including the Van Dorn gears and pinions for all standard types of street railway motors, and armature, field and induction motor coils and commutators. The company expects to cover the Canadian territory more thoroughly than it has in the past.

Haniel & Lueg Steam-Hydraulic Forging and Bending Press

American Manufacturing Rights Acquired by the Mesta Machine Company

For many years hydraulic power has been used in an increasing number of ways in industrial and other plants. Many different branches of industries have been extended and made profitable by the use of new and improved appliances operated by hydraulic power. Haniel & Lueg, Dusseldorf, Germany, are well-known manufacturers of steam-hydraulic forging and bending presses and they have recently made arrangements with the Mesta Machine Company, Pittsburgh, Pa., whereby the latter secured the exclusive manufacturing rights for the United States and Canada. Fig. 1 shows one of these presses with the overhead steam intensifier and Fig. 2 is a view of a bending press with two movable cross heads, while Fig. 3 shows a dishing press for handling circular or other shapes of plates.

The special advantages claimed for these presses are a constant power connection between the steam intensifier and the press ram, the production of accurate work, high efficiency, ability to vary the pressure and a simple and compact arrangement of the various parts. The first of these is the most important and gives the presses their name—steam-hydraulic. The press cylinder and the hydraulic balance cylinders are kept filled with water from the reservoir tank by compressed air. In this way the steam pistons and the piston rod of the steam intensifier are forced back to their highest initial position after each stroke, avoiding clearance and unnecessary steam consumption. The rod of the steam piston serves as the press ram, and as it rests on water, which is kept

fluence of this steam the piston rod compresses the water and produces the high hydraulic pressure, which is transmitted to the forging by the large ram. Pressures up to 10,000 lb. per square inch can be generated in this way, and the design of the press is such that the pressure can be regulated within these limits. With this design the generating of the high hydraulic pressure and its transmission to the press ram takes place in a closed space, thus doing away with any necessity for high pressure pipes or valves. On the completion of the work the press ram is lifted by admitting steam into the drawback cylinder. As a result of the constant power connection between the steam intensifier and the press ram.

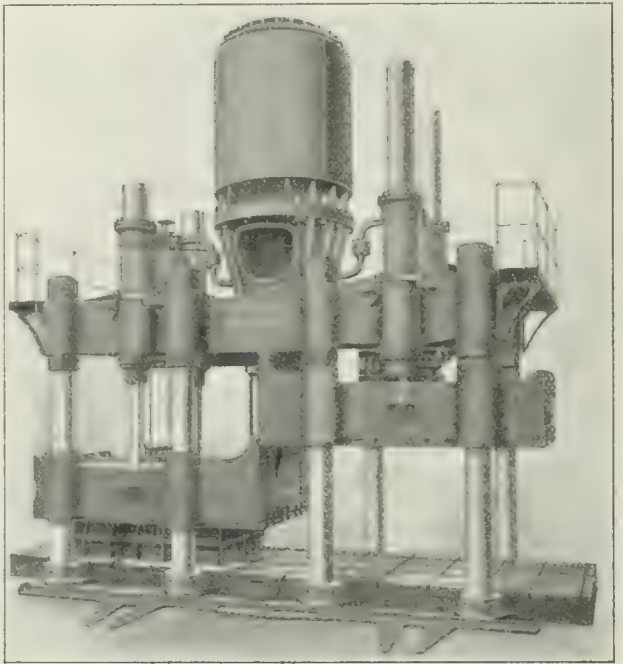


Fig. 2.—The Steam Hydraulic Bending Press with Two Crossheads.

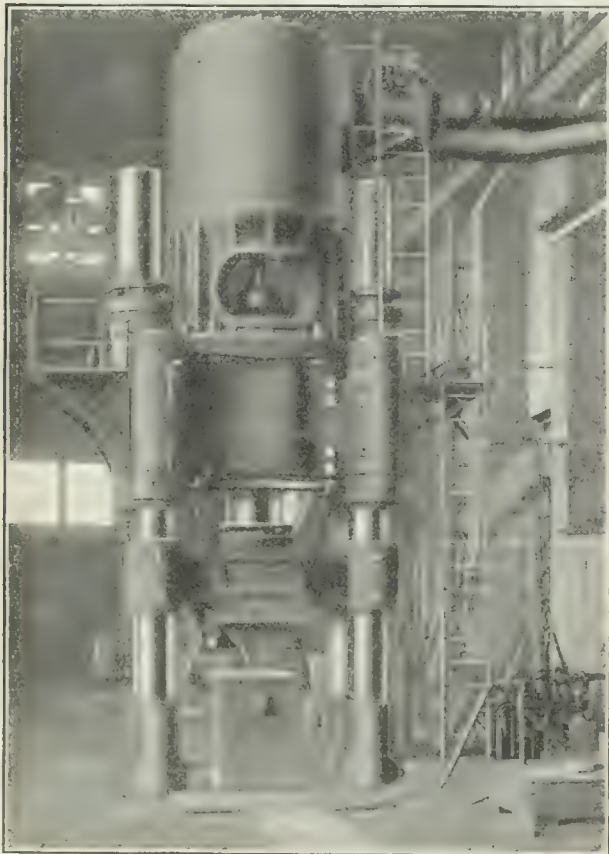


Fig. 1.—The Haniel & Lueg Steam Hydraulic Forging Press Built by the Mesta Machine Company, Pittsburgh, Pa.

under a constant pressure, any advance of the piston causes the ram to move simultaneously.

The movement of the press ram toward the work is produced by discharging steam from the drawback cylinder, while at the same time steam is admitted into the intensifier. As the steam piston advances under the in-

fluence of the steam consumption is small, while the movement of the ram is easy and can be readily controlled. The water used to produce the hydraulic pressure always remains within the press chamber. This feature possesses the advantage of not requiring new water supply, and the liquids which may be placed therein to prevent freezing are not lost.

Although Fig. 1 shows the press with an overhead steam intensifier, if the height of the forge shop is not enough to enable this type to be erected presses can be furnished with the steam intensifier located at the side, although the former arrangement is preferred on account of space economy. The working of both types of presses and the efficiencies are the same. The standard sizes in which these presses are built range from 100 to 15,000 tons pressure, with a steam pressure of 100 to 150 lb. per square inch, but other sizes to operate at other pressures can be built. This type of press can be used for all forging work and more especially for large pieces, such as guns, armor plate, marine engine shafts and also for manufacturing large shells.

Other types of presses built include a steam-hydraulic bending press, shown in Fig. 2, for making stampings up to 33 ft. long. This press has two movable cross heads, which can be coupled together or operated separately. The dishing press, shown in Fig. 3, embodies in its construction the same principles as the other two presses and is designed for flanging the entire circumference of circular or other shaped plates, such as steam boiler rims, firebox, flue and smokebox sides for locomotives, at one pressure. Specially shaped dies enable the ends to be made exactly the required shape and size. When the press is to be used for flanging out flue and fire door frames a special hydraulic cylinder is fitted below the lower press table and works upward. While the presses illustrated are intended for handling large work, a smaller press, known as the Express forging

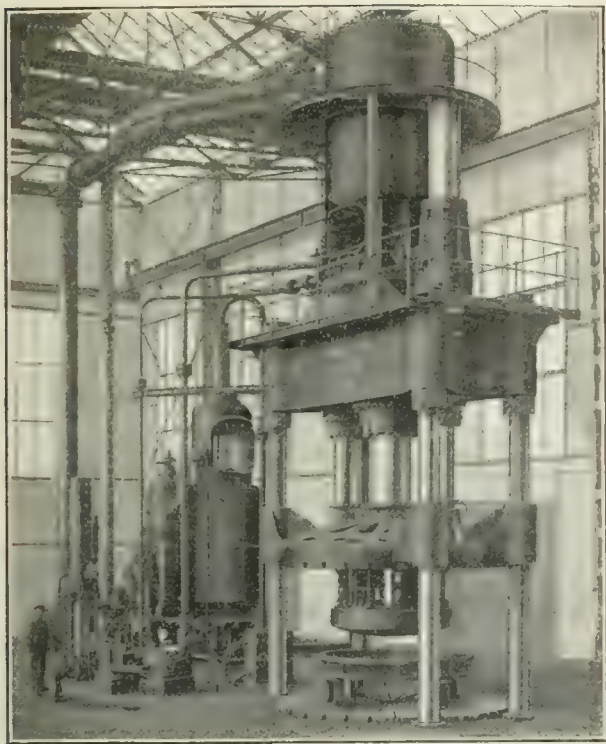


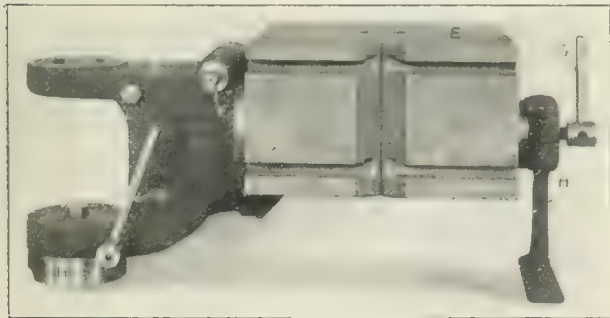
Fig. 3.—Dishing Press for Plates.

press, which is not shown, is built for small forging and die work. The frame of this press is of the overhung type, which gives it the advantage that freedom of motion in operation is not hindered by columns. This press is built in five sizes, ranging from 100 to 500 tons pressure.

The Morris Swiveling Radial Drill Table

A worm swiveling table is regularly supplied by the John B. Morris Machine Tool Company, Cincinnati, Ohio, to its line of plain radial drills.

The lower end of the radial column supports the upper lug of the forked casting A, which is bored to fit on it, while the lower end of the casting is supported on the plug B, which is doveled and bolted to the base of the machine in correct alignment with the column. The plug and that portion of the casting which bears upon the column of the drill are made in halves, both parts being bolted together, while the stud and lever D clamps



A Worm Swiveling Table for Radial Drills Made by the John B. Morris Machine Tool Company, Cincinnati, Ohio.

the casting A and keeps it from swinging with the column. The box table E swivels upon this forked casting and is adjusted in position by the worm formed upon F, this worm engaging with the worm wheel secured to the box table which has a circular portion graduated from both sides of zero to 90 degrees. A V is planed in one side of the swiveling table for convenience in clamping cylindrical work and the top of the table is bored in the middle to receive a circular table. After the swiveling table has been set in its proper position it may be securely locked by the clamp handle G. To prevent the outer end of the table from deflecting when heavy strains

are imposed upon it the stand H, bearing upon the base of the machine, is provided.

The Hill Rolling Mill Bearing

The Hill Clutch Company, Cleveland, Ohio, has recently added the rolling mill type of bearing, which is made in sizes ranging from 6 to 14 in., to its line of

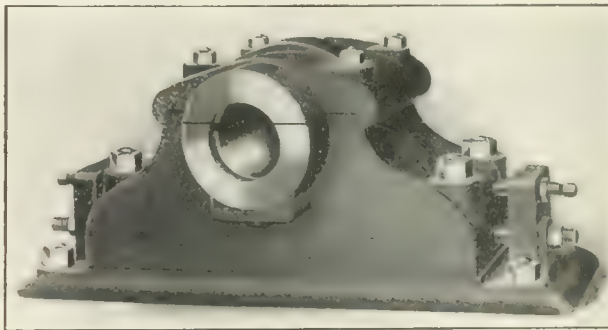


Fig. 1.—The New Rolling Mill Bearing Made by the Hill Clutch Company, Cleveland, Ohio.

heavy power transmission machinery. Fig. 1 shows the bearing complete, while Fig. 2 is a view with part of the covering broken away, showing the manner of lubricating it.

These bearings are constructed for any kind of heavy duty service and are designed to give correct bearing length, large area and great oil reservoir capacity. In this bearing a fixed collar is used instead of depending upon a loose ring or chain to convey the oil to the journal. The lubricant, which is stored in large reservoirs

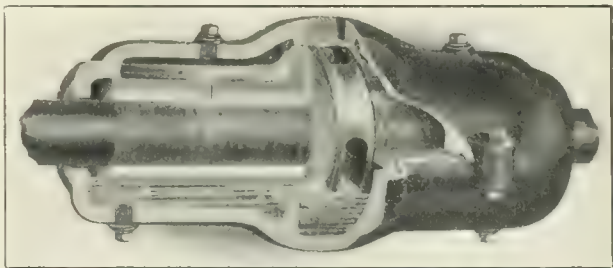


Fig. 2.—The Hill Collar Oiling Bearing.

in the bottom, is elevated continuously and positively to the top of the reservoirs by a heavy split collar clamped to the shaft, and from this point the oil flows by gravity over the entire bearing surface. The bottom reservoirs have partitions, which insure the settlement of any dirt or grit, and the oil can be drained off by removing the screw plugs. After only a few revolutions of the shaft the bearings are flooded with oil, while with other types of line shaft bearings it is claimed that if is necessary for the shafting to be in operation for some time before enough oil is conveyed into the journal to lubricate it, and during this period the wear on the babbitt metal is excessive and the power loss is large.

The Welding Company.—The Autogenous Welding Equipment Company, Springfield, Mass., has recently opened plants for the repair of broken parts of all descriptions, making a specialty of automobile work, such as frozen cylinders and broken aluminum cases, at 62½ Church street, Hartford, Conn., and at Southampton street, junction with Massachusetts avenue, Boston, Mass. The three plants are to be operated on a uniform condition, and as all bills will be rendered from the home office at Springfield there will be a uniform system of charging and a uniform guarantee on the work. These plants are also headquarters for the sale of the Davis-Bournonville Company's high pressure positive mixture welding equipments. Owing to the difficulty of remembering the word "autogenous," the company has adopted as an abbreviation or trade name "The Welding Company."

A New German Gas Engine

Details of the Double-Acting, Four-Cycle Engine Built by Ehrhardt & Sehmer*

Ehrhardt & Sehmer, Schleifmühle, near Saarbrücken, Germany, have developed a new double-acting four-stroke gas engine, the design of which closely follows that of a steam engine, as will be noticed from the longitudinal section given in Fig. 1. Like the gas engine built by this firm for the Cargo Fleet Iron Works, described in *The Iron Age* August 9, 1906, the main parts of the engine are concentrically fitted together, which distributes the stresses evenly and parallel to the main axis of the cylinder. Another advantage of this arrangement is that

but copper caulking is also provided in the joint, which can be renewed without having to dismantle the cylinder. The jacket band is forged and in two parts. It is light in weight and easily removed. Externally this cylinder looks like the one-piece cylinders formerly used, and as its general dimensions are the same it is readily interchangeable with them. Compared with the cylinder, of which a half is shown at the right of Fig. 2, and has no inner sleeve, this new cylinder has the advantage that its joint is caulked perfectly by the shrunk inner sleeve,

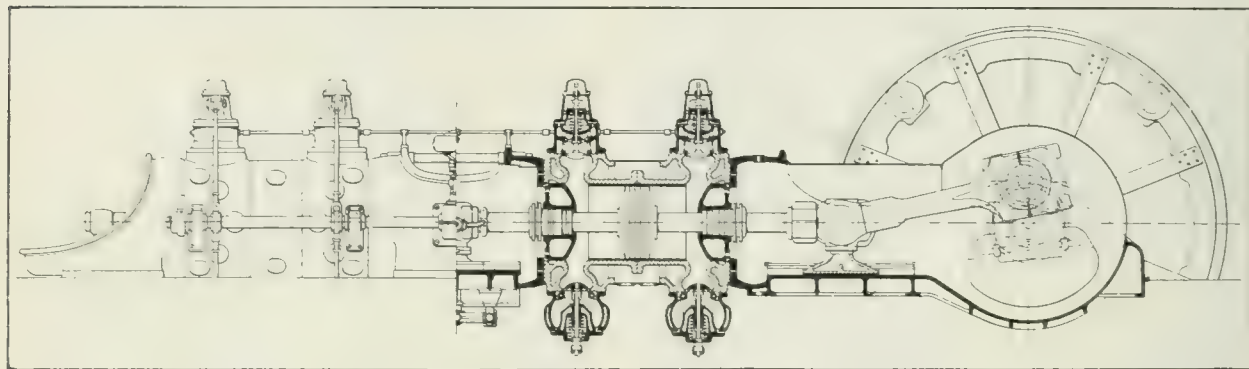


Fig. 1.—Longitudinal Elevation, Partly in Section, of the New Four Cycle Gas Engine Built by Ehrhardt & Sehmer, Germany.

all parts are readily accessible, which facilitates examining the engine and the proper working of all its parts. Care has been taken to make it easy to clean or replace those parts of the engine which are likely to suffer from dust or dirt.

The cylinder casting is in two parts, as shown in Fig. 2, to eliminate casting and heating strains, which is always impossible in a one-piece cylinder, and is thus better able to meet the demands peculiar to the operation of gas engines. Within the cylinder is a steel sleeve

and that the connecting bolts of the two halves of the cylinder are easily accessible. Both types have advantages in comparison with a one-piece double walled cylinder. For example, the half of the cylinder shown in Fig. 2 is double walled only for the distance a , which is about one-sixth of the total length, and only the portion

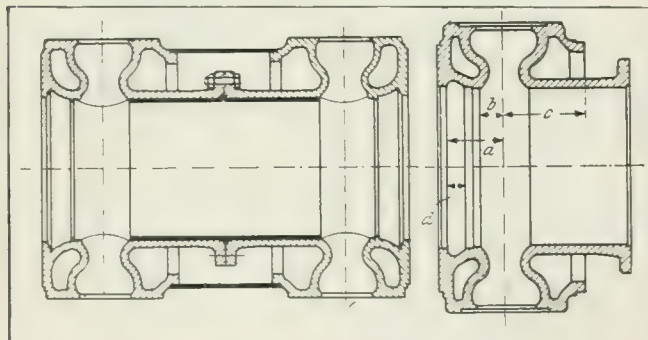


Fig. 2.—Details of the Cylinder Construction.

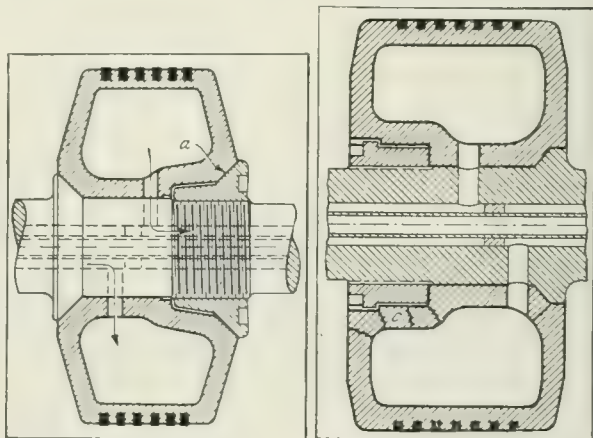


Fig. 3.—The Latest Form of Piston. Fig. 4.—An Older Form and One of Its Defects.

forming the piston rubbing surface, and a second steel sleeve around the outside at the middle incloses the water jacket. The inner sleeve is held in place by a flange between the two connecting flanges of the cylinder castings. The sleeve is of hard material, to resist wear, but when it does become worn it can be replaced easily and at little expense. The bolts joining the two halves of the cylinder are easily accessible by removing the jacket sleeve. These bolts have to withstand the same forces as the cylinder head bolts, but, for the sake of safety, they are made stronger.

The caulking of the joint is principally effected by the shrunk fit between the inner sleeve and the castings,

b becomes warmer than the same section of the outer covering. In the part c the outer and the inner walls are completely separated, and consequently can expand and contract independently of one another. By this construction and also by the decidedly lessened weight, which is not half that of a one-piece cylinder, the casting and heating strains are materially decreased, and there is the added advantage that if a break occurs in one half it is not necessary to replace the entire cylinder.

Where the inner cylinder joins the head the strength is further increased in the construction shown by leaving the rough skin on the casting on the part d ; in earlier construction this part was machined when the cylinder was turned, and considerable was cut away for the cyl-

inner cover bolt holes. In the new construction these are placed in a special flange. The greater simplicity of the one-piece, double-walled cylinder is more than offset by its disadvantages. The new two-piece cylinder in operation has fulfilled expectations. It is especially noteworthy that the greater heating of the inner cylinder compared with the outer one has been reduced, because the steel inner wearing sleeve serves as a protection. Actual operation has, moreover, shown that the explosion pressures cause no visible movement at the junctions of the jacket covers. From a comparison of these observations it may be concluded that the unequal expansions, due to heat changes, impose greater strains on the cylinder than the explosion pressures do in cylin-

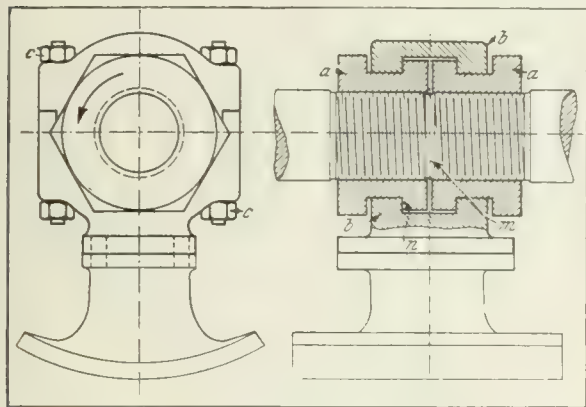


Fig. 5.—Details of the New Piston Rod Coupling

ders made in several parts. In smaller engines, where these strains and the heat expansion are of relatively less importance, the one-piece cylinder is the proper type.

If larger units than hitherto customary are needed in gas engines, or if greater efficiency is required from the cylinders, the use of steel instead of cast iron is recommended for the cylinder halves. Experience has demonstrated that with proper molding steel has been

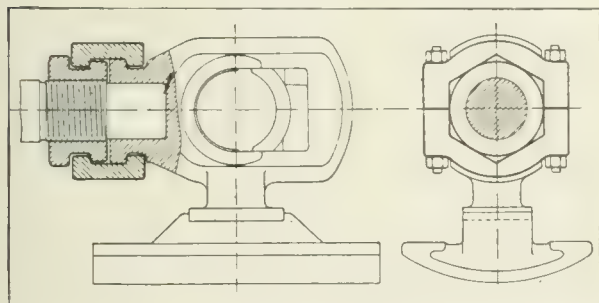


Fig. 6.—Details of the New Connecting Rod Coupling and Cross Head.

proved by tests to be very suitable for the cylinders of gas engines.

In the endeavor to make the piston as short as possible a new type, shown in Fig. 3, has been developed. The clamping surface of the piston is at *a* and is counter-bored to correspond in form with the taper of the clamping nut. By this construction all sharp corners are avoided; the head being strong and powerful, without superfluous metal, and the piston itself being firmly secured without any increase of length. The broad tapered shoulders on the piston rod and this nut now effectively support the cross bars *c*, Fig. 4, which hitherto were weakened by incisions and were not supported.

The piston rod coupling now used between cylinders by Ehrhardt & Sehmer is shown in Fig. 5. It consists of two nuts *a*, into which are fixed two half couplings *b*, concentric with the nuts and held together by bolts *c*. The two nuts are first screwed up on the piston rods and then the rods are pushed together, so that they touch. The two half couplings are next placed around the nuts

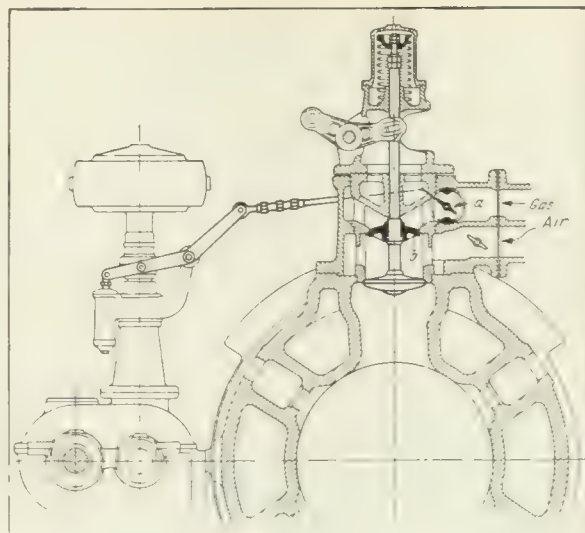


Fig. 7.—Details of the Governor and Regulating Valves

a and *a*, and are clamped together by the bolts *c*. To give this joint the necessary tension, which is the first condition of the strength of such a coupling, one of the nuts is turned in the direction of the arrow; the surfaces *m* and *n* are thereby brought into close contact and the coupling is complete. It is opened by turning one of the nuts *a* in the opposite direction, and then removing the two half couplings.

The special advantages claimed for this coupling are a minimum number of threads, easy and quick joining and separating, and a short length, as there is only one single nut of normal length on each rod. The bolt *c* may be comparatively light, because there is no great stress upon it from any tendency of the two coupling parts to separate.

The cross-head connection shown in Fig. 6 is similar to the piston rod coupling, and its application is apparent from the illustration, without further comment.

The most efficient engines burn the fuel mixture in very small space, and therefore in the shortest possible time. The time of burning is reduced by the intimate mixture of gas and air, and the best results are obtained if the gas and air are evenly introduced into the machine during the entire suction stroke. In the construction of gas engine governors it must be borne in mind that the four-stroke gas engine should have at its disposal

gas and air in the desired quantity, and the only natural means of attaining as perfectly as possible the desired composition of the mixture is the throttling of the gas and air. In contrast to the steam engine, practically no loss of energy results from this throttling in the gas engine, because the latter is supplied with chemical, not mechanical, energy. In addition, care must be taken with the gas engine that no undesired mixtures of gas and air take place during the pauses between strokes. During this time the conduits must therefore be separated from each other. In order that the governor may be able to properly fulfill its function, the back pressure of the governor must be as small as possible and the adjusting gear always free.



Fig. 8.—Exhaust Valve.

The requirements for the design of a suitable gas engine governor are in short: Throttling through the entire suction stroke, separation of the gas and air conduits from each other during the intervals between strokes and the avoidance of high back pressure and of the catching of the adjusting gear. In most governors hitherto constructed the regulation of the volumes to be mixed and the separation from each other of the two conduits are combined in a single instrument. This seems to be

very simple, but the reverse is the case. A governor of this kind is illustrated in Fig. 7, the construction of which is extremely simple. For regulating the quantity of gas to be conducted to the cylinder there is a throttle valve, *a*, controlled by the governor. The gas and air conduits are separated from each other by the valve *b*, placed on the spindle of the main inlet valve. This governor, it is said, fulfills its object as efficiently as any other, however complicated and expensive. The special mixing valves, situated beside or behind the inlet valve, with their more or less complicated motion derived from the actuating shaft, and the rods which cannot be watched, have been eliminated.

In operating with this governor gas engines driving electric generators, great regularity in running, hitherto only attained in exceptional instances, is secured in cases of change of load; the governor immediately responds, since it is absolutely free from back pressure, and the masses to be moved are small. With this governor on gas blowing engines, even small machines, it is possible to reduce the speed to extents that were formerly impracticable. A 900-stroke gas blowing engine can be set for 22 to 110 rev. per min. without there being at hand either a gas receiver or other special contrivance.

With the increase in the size of the engines Ehrhardt & Sehmer have gradually extended the use of a special type of uncooled exhaust valve, which is shown in Fig. 8. As far back as 1905 2000-hp. tandem gas engines were equipped with exhaust valves of the same type as the inlet valves, which have given satisfactory service.

The Moller Oval Chuck

For the elliptical turning of dies, hubs, chucks, molds and patterns, such as there is particular use for in the manufacture of sheet metal articles, J. A. Moller, New Rochelle, N. Y., has developed an interesting oval chuck for lathes. It is especially constructed to meet the requirements of manufacturers of kitchen utensils, silver ware and fancy goods. Fig. 1 is a view of the chuck as it appears on a lathe and Fig. 2 the chuck partly unassembled.

Referring to Fig. 2, the part still shown on the lathe is the stationary fixture and the part laid over on the bed of the lathe is the part which, in turning, revolves and presents the work to the cutting tool. In designing this chuck the inventor has sought to construct one with which an oval can be turned as quickly as a round. The

has a supporting ring at the back, which gives additional bearing surface, contributing to rigidity and well enabling it to handle work which frequently weighs as much as 200 lb.

By turning the hand wheel, Fig. 1, or the crank, Fig. 2, the amount of eccentricity can be varied by moving the

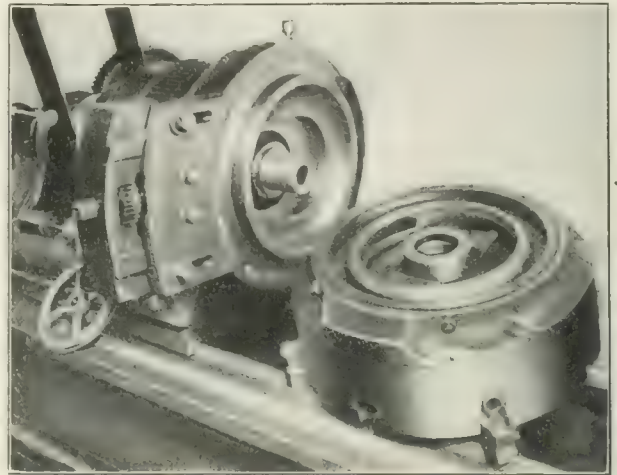


Fig. 2.—The Moller Oval Chuck Partly Unassembled.

eccentric ring on the cross slide through the screw and worm gear arrangement shown. By this means a difference between the major and minor axes of an ellipse can be obtained of anything between 0 and 4 in. The chuck itself is 15 in. in diameter and has four independent face plate jaws. The anchor slide with the gear box and the eccentric slide, straddles the spindle, has long bearings and is rigidly constructed. The worm screw shaft protrudes from the gear box parallel with the main spindle of the lathe and is arranged for either hand or power feed. With this adjustment geared to the lathe spindle oval forms with irregular surface contours can be turned, requiring, of course, simultaneous manipulation of the longitudinal feed of the lathe carriage. This is especially valuable in turning out dies with different ovals and obtaining a geometrically perfect shape of the design.

Within the revolving part of the chuck is a plate having lateral movement, which is threaded to fit the nose on the lathe spindle. This part obviously remains concentric with the spindle while the chuck revolves. Transversely to the movement allowed this plate and in the same plane is another movement, so that there is effected a universal joint allowing the drive to be transmitted to the face plate jaws while they revolve in elliptical paths. The central plate of the chuck being held concentric with the spindle and the back plate of the chuck eccentric with it, by the contact of its recessed ring fitting the projecting ring on the eccentric cross slide, through the universal joint connection before described, the outer part of the chuck carrying the face plate jaws is given the eccentric motion. So substantial is the construction and so simple the mechanism that the chuck can be revolved at comparatively high speed and elliptical work turned with practically the same speed as round work. Adjusting the eccentric slide so that it is concentric with the spindle transforms the chuck into an ordinary round turning chuck.

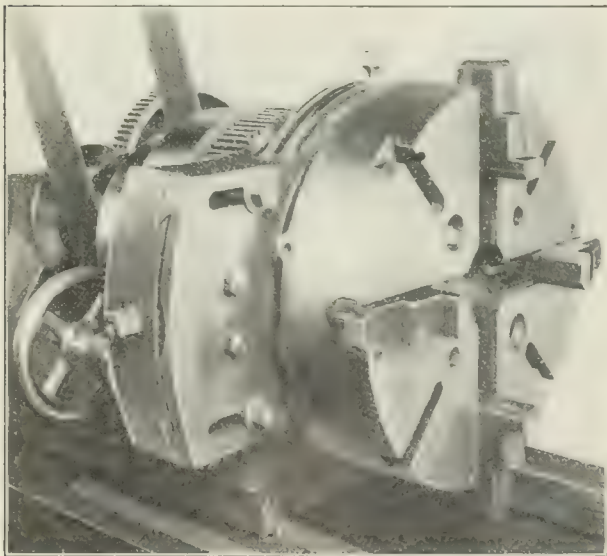


Fig. 1.—A New Lathe Chuck for Turning Elliptical Work Invented and Made by J. A. Moller, New Rochelle, N. Y.

same chuck without being removed from the lathe can be converted into a plain round chuck and in that condition is declared to have some advantage over an ordinary independent chuck. This lies in the fact that the chuck

Shot Iron and Hard Spots in Castings.—In *The Iron Age* of October 6, 1910, page 800, it was stated that Thos. D. West, 10,511 Pasadena avenue, Cleveland, Ohio, solicits specimens of iron castings containing globules in gas cavities, solidly incased shot iron, white iron inside of gray or soft iron, and hard streaks or spots. As these phenomena are rare and more specimens are desired, the time for their receipt has been extended to March 1, 1911. A paper on this subject will be presented by Mr. West to the American Foundrymen's Associations convention at Pittsburgh in the week of May 23, 1911. Where requested, the names of firms sending specimens will not be mentioned in the paper.

The Blashill & Gray Barb Wire Machine

A new type of machine for manufacturing barb wire has been placed on the market by Blashill & Gray, London, Canada. The product of this machine is a single strand coiled spring wire, with the barb coiled around it instead of the two-strand twisted type, where the barb is held in place between the strands. Fig. 1 is a general view of the machine and Fig. 2 shows the machine with the barb feeding mechanism swung back, while Fig. 3 is a front view of the main rolls with the barb feeding

barbs are crossed by the hard steel disks J. The thin, hard steel disk K spreads these points further apart, while the roll L, acting against the roll E, completes the wrap, and the two finishing rolls press the barbs solidly on the flattened spot on the strand, thus giving an extremely simple and perfectly continuous motion.

The Douglas Contractors' Diaphragm Pump

W. & B. Douglas, Middletown, Conn., has designed a self-contained pumping outfit for the use of contractors

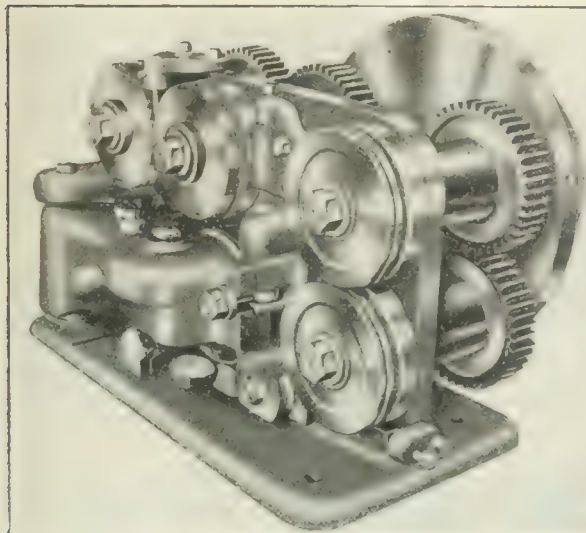


Fig. 1. General View of the Machine.

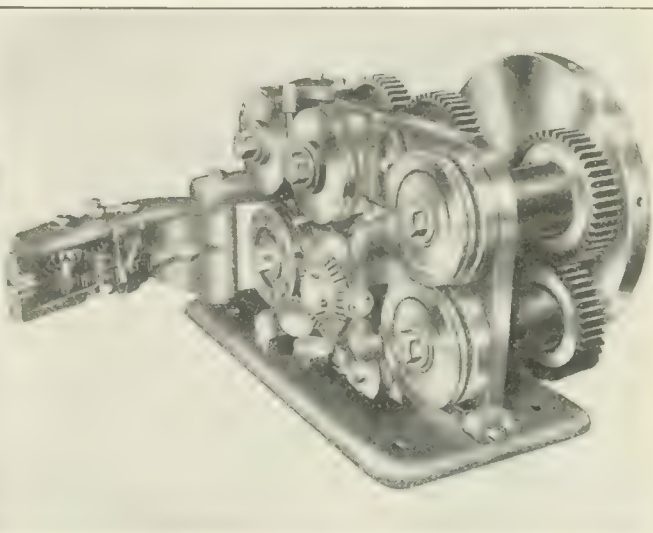


Fig. 2. Barb Feeding Mechanism Swung Back.

Two Views of a High Speed Rotary Barb Wire Machine Made by Blashill & Gray, London, Canada

rolls removed. The principal point of difference between the product of this machine and the other types now on the market is that the required length of barb is first cut, which is contrary to common practice, formed afterward as it passes through the machine, and is finally pressed solidly home between rollers of a special form. In this way the barb itself requires very little wire, as it is made with one wrap only and pressed into special shape to hold it solid.

In the operation of this machine the strand of wire passes between the rolls A and B, Fig. 3, which flatten it slightly at intervals to form seats for the barbs. The cutters C act against a stationary cutter on the barbing feed roll arm. The piece of wire for forming the barb is next forced by the strand wire into the pockets and the grooves G of the roll E by the tongue F on the roll D, which causes the barbs to assume the form of a

or as a bilge pump for vessels. It is also used extensively by public service corporations for drainage and sewage work and where pumps of large capacity are operated by unskilled labor. The special feature of the pump is its ability to move large quantities of gritty water at a low price and to make the unit easily movable from place to place it is mounted on a frame that can be easily

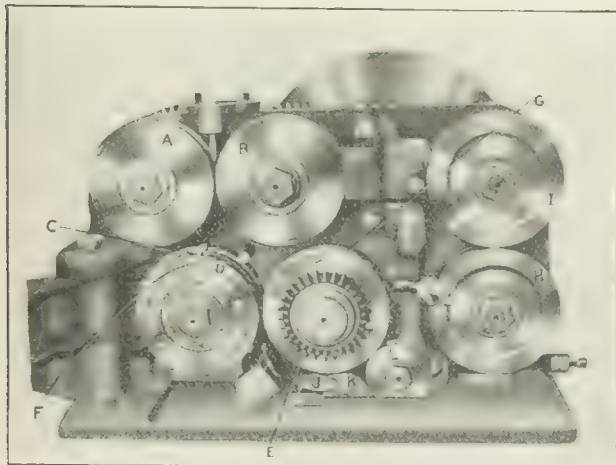
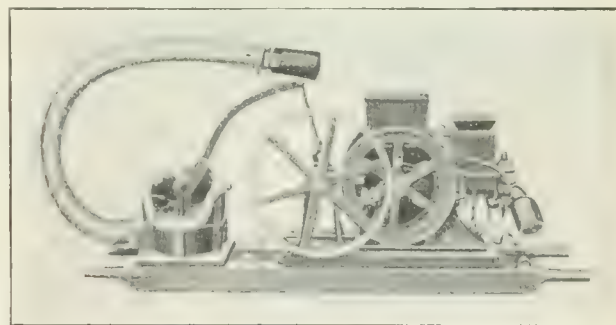


Fig. 3.—Front View of Main Rolls with Barb Feeding Rolls Removed.

staple. The strand carries these staple shaped barbs in the pockets in the roll E for half a revolution and then passes between the finishing rolls H and I. In their passage around the rolls the legs of the staple shaped



A Self-Contained Gasoline Driven Diaphragm Pump Made by W. & B. Douglass, Middletown, Conn.

handled by four men. The pump is of the diaphragm type and is driven by a gasoline engine. Its capacity is 3000 gal. per hour and it is said to operate on a gallon of fuel per day. All the parts of the engine are inclosed and the gasoline tank, water jacket, carburetor, muffler, batteries, spark coil and switch are all grouped around the engine. The weight of the pump and engine when crated for shipment is 650 lb.

The Scott-Madden Iron Works Company, Rushville, Ind., has signed a contract with the Marion Commercial Club, Marion, Ind., by the terms of which it agrees to combine its two plants now located at Keokuk, Iowa, and Rushville, Ind., into one central plant in Marion, providing the citizens of that city will subscribe for preferred stock in the company to the amount of \$30,000. At the present time the two plants are manufacturing brick and tile machinery, but it is proposed to embark in the manufacture of steam shovels and dredges.

The Pratt & Whitney Automatic Cylindrical Sizing Grinder

Rapid Production of Accurate Work Coupled with Convenience in Operating Is the Keynote of the Design

Grinding machines, considering the length of time that they have been in use, have developed more than any other machine tool. Two large groups of these machines are in use at the present time. One of these is the surface grinder and the other is the cylinder grinder, both of which have been developed by the machine tool builders of this country. The latest machine to be turned out by the Pratt & Whitney Company, Hartford, Conn., is an automatic sizing cylindrical grinder, in which a number of devices have been embodied to produce accurate work rapidly and conveniently. Fig. 1 is a general view of the machine, while Figs. 2, 3 and 4 show the three principal automatic devices. These are the wheel feed and automatic sizing device shown in Fig. 2, a separate view of the latter being given in Fig. 3, and

located on the rear of the machine. The sliding key controlling the engagement of the different gears is actuated by levers which are located at the front of the grinder, within easy reach of the operator. These feeds are entirely independent of either the wheel or the work

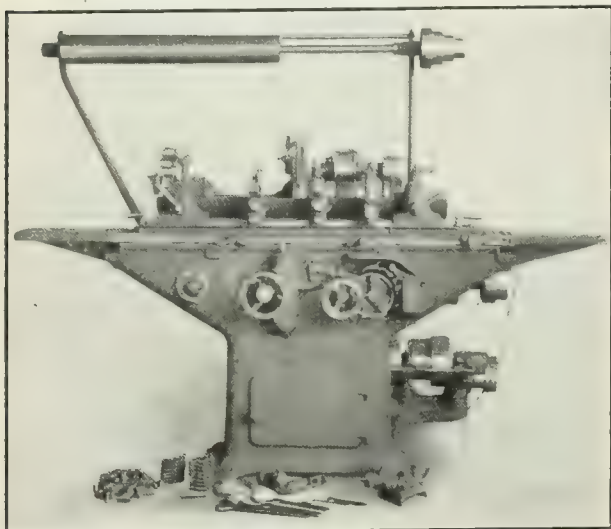


Fig. 1.—The Automatic Cylindrical Sizing Grinder Built by the Pratt & Whitney Company, Hartford, Conn.

the back rest, which is designed to follow the work as its diameter is reduced, illustrated in Fig. 4.

The Machine in Detail

The bed is massive and reinforced by internal bracing, while at the same time the design is compact and the various units are located so as to be readily accessible. It has wide bearing surfaces of both the V and flat types, which are oiled by rolls from reservoirs located in the body of the bed. A pan of liberal dimensions for collecting the water and receiving the chips surrounds the rear of the bed. It is easily accessible for cleaning and there is a cabinet in the base for the reception of the various appliances when they are not in use.

Like the vertical surface grinder which was illustrated in *The Iron Age* December 29, 1910, the work table is of the traveling type, and as it is slightly longer than the bed the traveling action tends to keep the alignment secured by the use of masters unchanged. To guard against inaccuracy, due to the table not traveling over the entire bed at all times, the former has been made very heavy and is ribbed to prevent warping and to resist torsional strains. The bearings are lubricated by rolls in the same manner as those in the bed and are protected at all times by guards. A pan cast integral with the table serves to collect and convey the water to the one surrounding the rear of the bed. Six changes of table feed are provided through a gear box which is

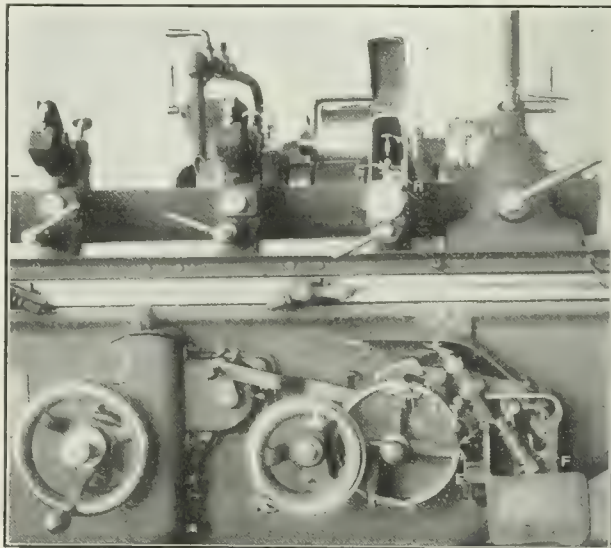


Fig. 2.—The Wheel Feed and Automatic Sizing Devices.

speeds and are instantly available while the machine is in operation. The reversing mechanism is also of the same type as that employed in the company's 6-ft. vertical surface grinder.

A swiveling table which is used for grinding tapers is furnished. The various attachments used with the grinder are clamped to this table, and the surface to which they are attached has a flat top with angular sides and is accurately made. A hardened and ground stud fitting a hardened and ground bushing in the work table and binders with handles conveniently located at either end maintain its relation to the main work table. Graduations are provided for grinding tapers, and the swiveling of the table is accomplished by a micrometer screw and dial. In use the head and tail stocks can be moved to accommodate the various positions of the table,

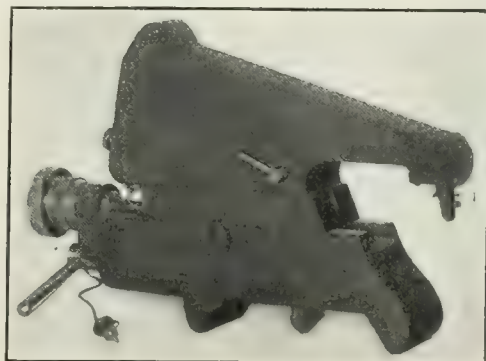


Fig. 3.—Side View of the Automatic Sizing Device.

without in any way disturbing the accuracy of the attachments clamped thereon.

The wheel base is stationary and is mounted upon the bed by dove tail bearings, having a taper gib to compen-

sate for wear. Although the wheel base is very heavy, it is nevertheless sensitive. Back lash in the feed screw is prevented by using a weight mounted on a roller, so as to secure the desired result without affecting the sensitiveness of the slide in any way. The overhead belt drive which tends to lift the base from its seat and also interferes more or less with the free action of the wheel slide has been eliminated in this grinder, giving a construction in which the slide is mounted directly upon the bed, which forms a direct support for the wheel. The wheel spindle is of hardened tool steel and the bronze bearing boxes are mounted in conical seats, so as to be easily accessible for adjusting, while at the same time they are both water and dust proof. The self-contained wheel mount holds the wheel firm and true and the spindle end has a key for positively driving the wheel mount. An endless belt with an automatic tightener is used for driving the spindle which possesses the advantages of doing away with the upward pull of the belt, while at the same time the backward pull keeps the spindle tight against the inward side of the boxes and prevents the wheel from digging in if too large a lubricating space has been allowed. A two-step cone pulley on the base of the machine provides for two different wheel speeds. The downward pull of the belt transmitting the power to the endless belt while it tends to arrest the lifting action of the wheel base at the

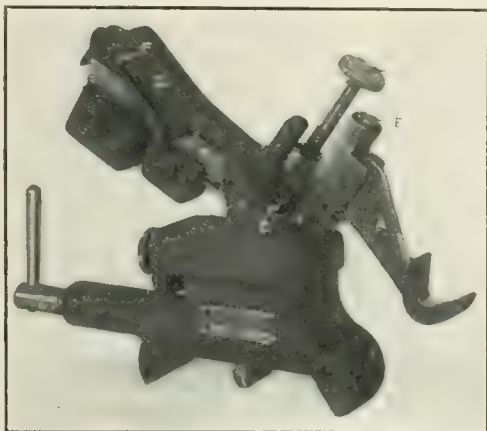


Fig. 4.—The Back Rest, Which Is Designed to Follow the Work as It Is Reduced.

same time does not interfere with the free movement of the base, as the pressure is absorbed by a novel device, which consists of a hardened and ground roll in the slide traveling on a hardened and ground parallel in the bed.

The Automatic Sizing Device

The most important feature of the machine is the automatic sizing device, which will automatically grind any number of pieces regardless of the wear of the wheel. Both the roughing and finishing feeds are controlled and utilized, a feature that greatly increases the productive capacity of the machine and insures more accurate and uniform work, while at the same time one workman can operate two machines without the slightest difficulty. The wheel feed proper can be operated entirely independently of the automatic sizing device. The transverse movement of the wheel slide is obtained through a large screw and nut, and is accurately controlled by the feeding device through incased spur gears located on the back of the machine. The wheel feed can be operated either by hand or automatically and either in conjunction with or without the sizing device. When hand operation is used an adjustable stop assists the graduations on the feed hand wheel in controlling the movement of the slide. Separate feed pawls operating upon a ratchet control both the roughing and the finishing automatic feeds, and while these pawls are entirely independent of each other, they derive their rotating action from the same connecting lever. The feed movements range from one-half to 12 notches, corresponding to a reduction in the diameter of the work of from 0.000125 to 0.003 in., the exact amount being regulated by conveniently located adjusting screws. In order that the finishing pawl may take a one-half-

notch feed when desired, it is made double. Both of these automatic feeds can be instantly engaged or disengaged by a knob or by the automatic sizing device.

In using the automatic wheel feed the roughing pawl A, Fig. 2, is set to feed any desired number of notches, and the finishing pawl B is also set. After this the disengager C is so located as to throw the roughing pawl out when the work has been reduced to within 0.001 in. of the finished size. In setting the disengager for the roughing pawl the set screw D should come against the stop E on the disengager, which has the effect of automatically maintaining the relation between the roughing and finishing pawls, so that the amount left for the finishing feed always remains the same regardless of the wear of the wheel. When the roughing pawl has been disengaged the finishing pawl continues to feed until disengaged by the magnet F, which is operated by a dry battery and disengages the fine feed pawl when the work has been reduced to the desired diameter. The automatic sizing device is operated electrically and the magnet remains inoperative on account of a break between the points G and H. The sizing lever I carries on the small projection shown in Fig. 3 a smooth pointed diamond, which bears against the work. As the diameter of the piece is reduced the lever drops until the points G and H, Fig. 2, are forced together. This completes the circuit and the fine feed pawl is instantly disengaged by the energizing of the magnet F, which releases the disengaging trip J. The sizing device is then put in its upper position, while new work is being placed in the machine. In setting this device it is only necessary to grind a piece to the required size, after which the proper adjustment of the sizing lever is determined by the micrometer screw and the dial governing the transverse adjustment of the device. This device is self-contained and its nature is very simple. It can be located in any position of the bed, as wire and outlets for the reception of the connecting plug on the front of the table are provided.

The head and tail stocks are clamped to the table by an eccentric binder. The work revolves on hardened and ground dead centers, the work driver being driven by gears. The piece may be stopped or started instantly by a clutch in the headstock, through which the driver is governed independently of the belt. Four speeds are provided by the four-step cone pulley and drum and are entirely independent of the table or wheel speeds. The cone pulley and the drum are finished very accurately and balanced, which eliminates vibration. The drum belt is tightened and loosened by a conveniently located belt tightener on the headstock. The tailstock spindle is operated by a rack and pinion and is kept under spring tension, which is controlled for the various classes of work by a nut.

The Backrests

Backrests of the automatic positive feeding type of entirely new and original design are used. The operation of the backrest will be understood from an examination of Fig. 4. The arm A, which supports the work, is held in contact with it by the weighted lever B, fulcrumed in the frame, against the adjusting screw D at the point C and causes the arm to slide in an upward direction on the pin E. As the lever B is depressed a roller, F, travels down into the V-shaped space formed by the upper surface of the lever and the lower surface of the casting G, this roller preventing any upward movement of the lever and as a consequence any movement of the backrest away from the work. Both radial and vertical adjustments are made by adjusting screws and the backrest may be very easily removed from the bed by a slight inward pressure on the eccentric binder, which serves to release the binding clamp.

The following table gives the principal dimensions and specifications of the grinder:

Maximum distance between centers, inches.....	30
Swing over bed, inches.....	4
Maximum taper, inches per foot.....	2
Diameter of grinding wheel, inches.....	12
Minimum width of grinding wheel, inch.....	1 1/2
Maximum width of grinding wheel, inches.....	1 3/4
Diameter of hole in grinding wheel, inches.....	5
Maximum diameter of wheel spindle bearing, inches.....	1 3/4

Minimum diameter of wheel spindle bearings, inches...	13 1/4
Length of wheel spindle bearings, inches.....	5
Number of grinding wheel feeds.....	2
Minimum grinding wheel speed, revolutions per minute..	1,890
Maximum grinding wheel speed, revolutions per minute..	2,980
Number of work speeds.....	4
Minimum work speed, revolutions per minute.....	100
Maximum work speed, revolutions per minute.....	384
Diameter of countershaft pulleys, inches.....	12
Width of countershaft pulleys, inches.....	5 1/4
Belt width, inches.....	3
Speed of countershaft, revolutions per minute.....	410
Number of table feeds.....	6
Minimum table feed, inches per minute.....	21
Maximum table feed, inches per minute.....	101
Minimum wheel feed, inches.....	0.000125
Maximum wheel feed, inches.....	0.003
Floor space, inches.....	128 x 46 1/4

Net weight, pounds.....	4,000
Domestic shipping weight, pounds.....	4,350
Foreign shipping weight, pounds.....	5,100
Capacity of box, cubic feet.....	180

The equipment regularly furnished with the machine includes an automatic sizing device, one emery wheel, one wheel truing device, a center grinding attachment, two universal backrests, 36 backrest shoes (two for each 1/4 in. from 1/4 to 2 1/4 in.) and 16 work dogs, having the same variation and the same range, a set of wrenches and a countershaft.

The overhead shafting has been done away with in this machine, and if desired it can be furnished with a motor base to accommodate any 5-hp. constant speed standard motor.

The Pittsburgh Iron Trade in 1910

BY ROBERT A. WALKER.

It would be hard to imagine a greater difference than that found in the condition of the iron trade at the close of 1909 and at the end of 1910. Mills and manufacturing plants all over the country closed the year 1909 with a greater volume of business on their books than ever before in their history, and hopes were high that 1910 was going to be one of the best years in every way that the iron trade had ever known. How badly those hopes were blighted is now a matter of history. The activity that marked the closing months of 1909 was short lived and the year just closed has been one of the most trying the trade has ever known, particularly the last half. Two reasons are given for the unsatisfactory year; first, the restricted purchases by railroad companies, and, second, the fact that the country was not able to absorb the heavy increase in the output of iron and steel arising from the large additions that had been made to producing capacity. In the last half of 1910 there was a steady slowing down of operations and the year closed with the mills working to about 50 per cent. of their capacity. All through the year distributors and consumers were placing orders cautiously, and only for such quantities of materials as were necessary to maintain stocks and fill current needs. There was little disposition to buy ahead, except by agricultural implement manufacturers, and 1910 closed with consumers' stocks of all kinds of manufactured iron and steel probably lower than ever before in the history of the iron trade. In the last half of the year orders were almost invariably accompanied with the request to ship out promptly, showing the low condition of stocks.

In spite of the restricted buying, and the fact that all the mills through the year were keen for orders, prices on finished iron and steel were fairly well maintained by reason of co-operation between the leading producers until the last three or four months of the year, when they commenced to give way to some extent. This resulted in a series of meetings of makers of sheets, tin plates, bars, plates and structural steel in Pittsburgh in December, at which it was decided to try to hold present prices, the belief being that early in 1911 the demand would show material betterment.

There were no important failures in the iron trade in 1910, and the year was almost entirely devoid of labor troubles. The strike in the sheet and tin plate mills of the American Sheet & Tin Plate Company was officially declared off on August 27 by the Amalgamated Association, and all the company's plants are now on a nonunion basis. The bar iron, sheet and tin plate scales of the Amalgamated Association were settled in 1910 without any trouble, but this labor organization has its scales signed by very few mills in the Pittsburgh district. It has lost ground steadily for some years.

Pig Iron

The decline in the price of pig iron was about \$4 per ton, the greater part of which came in the second half of the year. In the Pittsburgh district proper there was on December 31, 1909, a total of 50 blast furnaces, all of which were then in blast, while at the end of 1910, out of 53 furnaces (three new ones having been added by the Jones & Laughlin Steel Company), 13 were idle and several others were preparing to go out. Indications are that there will be a further marked decrease in the output of pig iron not only in the Pittsburgh district, but in other pig iron centers as well.

The year 1910 opened with an active demand for Bessemer iron, with prices ruling firm, at \$19, Valley furnace. In this report all prices named are at Valley furnace, the freight rate to Pittsburgh being 90 cents a ton. Early in February a decline started and the month closed with the price weak, at \$18. In the first week in April the price was \$17.50, a decline of \$1.50 a ton in the first three months. By July 1 Bessemer iron had reached \$15.50, and from that time on the market held fairly steady until October, in which month the price went to \$15. In November some sales were made for delivery in the first half of 1911 at \$14.60, but this price prevailed only for a week or two, the Valley furnacemen holding a meeting in Cleveland early in November and decided to maintain the market at \$15. Stocks of pig iron in the valleys are heavy.

Basic iron began the year at \$17 and closed with the market ruling \$13 to \$13.25. The demand in the first half of the year was fairly heavy, but in the last six months was dull, and several times the market went under \$13, at furnace, sales having been made as low as \$12.85 and \$12.90.

In January, 1910, No. 2 foundry was held at \$17, this being the high price of the year. On April 1 the market had declined to about \$15.75, and when July 1 was reached the price was weak, at \$14.50, at furnace. In October the price had declined to \$14. During November and early December this grade of iron sold as low as \$13.50, and the year closed with dealers and furnaces quoting about \$13.75.

Only a comparatively small tonnage of gray forge iron is used in the Pittsburgh district, as there are few puddling plants in this city, most of the forge iron used here coming from the valleys, while some comes from Kittanning and Dunbar. The year opened at about \$16.50, but the price steadily declined through the year, and in November and December sales were made at \$13.

The table given below shows average monthly prices of Bessemer, basic, No. 2 foundry and gray forge iron, f.o.b. Valley furnace, as follows:

Average Pig Iron Prices f.o.b. Valley Furnace, in 1910.

(Add 90 cents per ton for delivery in Pittsburgh district.)

Month.	Bessemer.	Basic.	Gray forge.	No. 2 foundry.
January	\$19.00	\$16.87	\$16.50	\$17.00
February	18.44	16.41	16.12	16.62
March	17.70	16.00	15.25	16.10
April	17.38	15.94	15.18	15.62
May	16.62	15.19	15.00	15.25
June	15.70	14.70	14.25	14.70
July	15.50	14.50	13.62	14.31
August	15.15	14.10	13.35	14.15
September	15.00	13.62	13.25	13.75
October	14.94	13.15	13.25	13.67
November	14.92	13.20	13.15	13.85
December	15.00	13.37	13.00	13.75

Steel Billets

In the first half of 1910 the demand for steel billets and sheet and tin bars was fairly active, but in the second half of the year the finishing mills slowed down their operations, owing to the falling off in business, and as a result the demand for steel also fell off, prices showing a steady decline. There were no material additions to steel capacity in the Pittsburgh district during 1910, it becoming evident very early in the year that the capacity for making both Bessemer and open hearth steel was amply large enough to meet the demand.

The year 1910 opened with prices on Bessemer billets ruling at \$27.50 and open hearth at \$28, while sheet and tin bars for the first quarter were \$29 and forging billets about \$31. These prices continued in effect until early in April, when the market commenced to decline, Bessemer billets then ruling at about \$27 and sheet and tin bars \$28 to \$28.50. At this time open hearth billets were scarce and were commanding a premium of about \$2 over Bessemer, being held firmly at about \$29. Pittsburgh. Prices continued to rule on this basis during the second quarter, but by the first week in July Bessemer billets had declined to \$25, sheet and tin bars \$26, open hearth billets \$27 and open hearth sheet and tin bars \$28. By the first week in October Bessemer billets had declined to \$24 and open hearth to about \$24.50, while Bessemer and open hearth tin bars were held at about \$25. By November 15 Bessemer and open hearth billets were being freely offered at \$23.50 and Bessemer and open hearth sheet and tin bars at \$24.50.

In the early part of December the leading steel mills held a meeting and fixed prices of Bessemer billets at \$23 and Bessemer and open hearth sheet bars at \$24.50, f.o.b. Pittsburgh, full freight to destination added. This price basis was afterward changed to \$23 on Bessemer and open hearth billets and \$24 on Bessemer and open hearth sheet bars, Pittsburgh or Youngstown, freight to destination added. Forging billets ruled in the last week in December at \$28. The year closed with these prices in effect, but with very little steel moving. In the last two months of the year there was a marked slowing down in steel operations, and the year closed with the output about 60 per cent. or less of the billet capacity.

Finished Iron and Steel

The year 1910 in the steel rail trade was a distinct disappointment, orders received from the leading railroads being much smaller than expected and fewer in number. The year opened with standard sections ruling at \$28, and this price was maintained until November 1, at which time the leading rail companies decided to quote rails on the per pound basis, the price of standard sections being fixed at 1.25 cents, equal to \$28 per gross ton of 2240 lb., the old figure. The same arrangement was made in prices of light rails, 12-lb. rails being quoted at 1.25 cents, 16, 20 and 25 lb. at 1.21 cents, 30 and 35 lb. at 1.20 cents and 40 and 45 lb. at 1.16 cents, these prices being f.o.b. at mill, plus freight to point of delivery. At no time during 1910 was the Carnegie Steel Company able to operate in full its three Edgar Thomson rail mills at Bessemer, operations ranging during the year from 30 to 50 per cent. of capacity.

The demand for other kinds of finished material during the first half of 1910 was fairly active, but in the second half was dull, declining steadily in the last three

or four months. Concessions in prices were being freely made in October and November, and it became evident some concerted action would be necessary to hold the market, as previously referred to. The consuming trade felt that conditions were artificial to some extent and for this reason bought very cautiously during the last half of the year, placing orders only for what was absolutely wanted to meet current needs.

Prices on beams and channels up to 15-in. in January were 1.55 cents at mill, and this price ruled until the first week in March, when the market softened to about 1.50 cents. This price continued in force until late in June, at which time it declined to 1.45 cents. In July the price declined to 1.40 cents and held at this figure for the remainder of the year, with intimations that in exceptional cases, and to meet competition in certain districts, 1.40 cents was shaded as a basing price.

The demand for plates in the first half of the year was fairly active, there being considerable carbuilding, but in the second half there was a steady decline and in the last three months the market was very dull. In the first week in January ¼-in. and heavier plates were quoted at 1.55 cents, and this price held fairly well until about the first week in May, when they were quoted at 1.50 cents, but were weak at this price. In the first week in June the price declined squarely to 1.45 cents, and in the latter part of that month to 1.40 cents. This price on ¼-in. and heavier plates held fairly strong for the remainder of the year, being shaded only in exceptional cases.

When the year opened the new demand and specifications on contracts both for iron and steel bars were heavy and all the mills were more or less behind in shipments. In many cases steel bars for prompt delivery were bringing a premium. This condition continued practically through the first half of the year, some of the leading makers of steel bars being at times three to four months back in shipments. In the last half of the year the demand slowed down and specifications against contracts fell off to some extent, so that the mills were able to catch up on back deliveries. In January steel bars ruled at about 1.45 cents, at mill, for forward delivery, while for prompt shipment 1.50 to 1.55 cents was being quoted. Common iron bars at this time were firm, at 1.65 to 1.70 cents. In the early part of August weakness in prices developed, steel bars being then quoted at 1.40 cents and iron bars at 1.45 cents. This price on steel bars was shaded to some extent during October and November, but about December 15 the makers held their meeting and decided to hold to 1.40 cents, and the year closed with this price ruling. On common iron bars, however, prices declined, and at the close of the year they were selling as low as 1.35 cents.

The year began with the demand for black and galvanized sheets very active, while on blue annealed and electrical sheets the mills were much behind in deliveries, and these grades were bringing premiums of \$2 to \$3 a ton over regular prices for prompt delivery. In the first week in January No. 28 black sheets were quoted at 2.40 cents and No. 28 galvanized 3.50 cents. These prices held firmly until about July, but at this time the demand had fallen off and the mills were actively seeking orders, No. 28 black sheets being quoted as low as 2.25 cents and No. 28 galvanized as low as 3.25 cents. In the first week in September No. 28 black sheets had declined to 2.15 cents and No. 28 galvanized to 3.20 cents. In the latter part of November the sheet trade was in very unsatisfactory condition, the demand being light, and prices were freely shaded. On No. 28 black as low as 2.10 cents was being done, and on No. 28 galvanized 3.20 cents. On

December 7 the meeting of makers of black and galvanized sheets was held and it was decided to make a strong effort to maintain the market on the basis of 2.20 cents for No. 28 black, one-pass cold rolled sheets, and 3.20 cents for No. 28 galvanized. At the close of the year all the mills were quoting these prices, and the tone of the market was firm, but there was no improvement in demand.

The market on tin plate, both as regards demand and maintenance of prices, probably made a better record than any other form of finished iron and steel. The

year opened with 100-lb. cokes selling at \$3.00 per base box, for delivery through the first half of the year. In September the tin plate trade commenced to feel the effects of the depression in other lines and there was a slowing down in demand and in specifications. The price of \$3.60 was still in effect, but it was claimed that on some very desirable contracts placed in November it was not strictly observed. At the meeting of the tin plate makers in December the price of \$3.60 was reaffirmed. In the latter part of November and early in December some very large contracts were made with the meat packers and can makers for delivery through the first half of 1911. During the year there was a very material addition to tin plate capacity. The Jones & Laughlin Steel Company completed and put in operation 10 hot mills at Aliquippa; the Phillips Sheet & Tin Plate Company completed its new plant at Weirton, W. Va., containing 10 mills, and later added 10 more mills, making a total of 20, and the McKeesport Tin Plate Company added 10 mills to its plant at McKeesport, Pa. The American Sheet & Tin Plate Company also started work in the summer on its new plant at Gary, Ind., which will contain upward of 60 hot sheet and tin plate mills.

The demand for hoops and bands was fairly active through the year. Prices were well maintained, hoops being quoted in the first week in January at 1.50 to 1.55 cents for forward delivery and 1.60 to 1.65 cents for prompt shipment. Steel bands were 1.45 to 1.50 cents. These prices were practically unchanged until the summer, steel hoops being quoted in the first week in July

at 1.50 to 1.55 cents and bands at 1.40 to 1.45 cents. The year closed with these prices still in effect. The only increase in new capacity in the Pittsburgh district was made by the Sharon Steel Hoop Company, which added some new mills in the latter part of the year.

The year from all standpoints was fairly satisfactory in the merchant pipe trade, the demand being quite active through the whole year. Some very heavy contracts for large pipe for gas and oil lines were placed. A new card of Pittsburgh basing discounts was put in effect January 1, and was well received by the trade. On October 1 the leading makers issued a new card of Pittsburgh basing discounts, the main changes involving a material reduction in extra strong and double strong pipe and a smaller reduction in butt weld merchant pipe, and a slight increase on some sizes on lap weld pipe. In the early part of October the makers of iron pipe issued a new card of discounts which was four points lower than on steel pipe, or, in other words, an advance of \$8 a ton on iron pipe was asked over steel. Indications are that there will be a very heavy demand for large pipe for oil and gas lines during 1911, as a good many projects are now under way, some of which, no doubt, will soon materialize. During the year the Youngstown Sheet & Tube Company made some large additions to its pipe mill capacity and added two new butt weld furnaces and a new lap weld furnace. In June the Republic Iron & Steel Company started up a lap weld furnace in its new plant at Lansingville, near Youngstown, and later on started a second.

The Philadelphia Iron Trade in 1910

BY AUGUST A. MILLER.

The iron trade entered 1910 under most auspicious circumstances. Production was at an unprecedented rate, orders in hand were heavy and a record breaking year was anticipated. Induced by the extreme activity in the demand at the close of the previous year, productive capacity was being largely increased, only to have a most distressing influence on trade conditions later, when developments showed that expectations as to the year's volume of business were not to be realized. Even at the beginning of the year there was a growing belief that we were going at too rapid a pace, unless consumptive requirements grew proportionately, and with legislative action unfavorable to corporate interests, particularly the railroads already under way, this was thought by conservative interests improbable.

The production and prices of both crude and finished materials showed a steady decline throughout the year, although at times unsuccessful efforts to stem the downward movement were made. As the year advanced and prices went steadily downward, curtailment in production was plainly the only remedy, but it was late in the spring before any decided action was taken. Blowing out of furnaces under existing conditions was not an easy task. Heavy purchases of ore, made in anticipation of a continued demand, had to be taken care of, and it was not until late in the year when Eastern consumers were able to defer heavy shipments of foreign ore that furnaces were able to restrict production to any marked extent and check the further accumulation of stocks on furnace banks.

The steel works and rolling mills, having heavy orders on their books early in the year, did not feel the full effect of the depressed conditions until toward summer, when many of the contracts on hand were about to expire. As the hoped for betterment failed to be realized in the fall there was a gradual reduction in activity and toward the close of the year few plants were able to maintain a rate better than 50 per cent. of their full capacity.

Iron Ore

Notwithstanding curtailments in deliveries of foreign ore, by which a large portion of the purchases made for this year's shipment will be carried over into 1911, the importations at the port of Philadelphia will exceed previous records. Statistics completed for arrivals during 51 weeks of the year show a total importation of 1,133,245 tons, valued at \$3,315,423, as compared with 992,036 tons, valued at \$2,559,760, in 1909. Curtailments and cancellations of orders for foreign ore, due to arrive at this port during 1910, for consumption largely by Eastern producers of pig iron, have been roughly estimated at 300,000 tons. During the last half of the year ore buying was practically at a standstill.

Pig Iron

At the beginning of the year practically every furnace available in this district was in operation, with production establishing new records. During the first six months the productive rate varied, decreasing, however, in the second quarter. In the last half, and particularly the last quarter, the decline was more rapid. Eastern merchant furnaces were able to maintain a fairly active rate of operation, owing to large sales early in the year, covering deliveries well into the third quarter. As these became gradually cleaned up curtailment became more rapid. The statistics of the Eastern Pig Iron Association show that the orders in December of this year were a little less than one-half of the total unfilled orders in January, the usual result of a falling market. The stocks of iron on hand increased from a little over 50,000 tons to about 100,000 tons at all the furnaces represented. While these figures show an increase, it is interesting to note that the total stocks in January, 1910, amounted to just one week's capacity, and that those in December are a trifle less than two weeks' output of the entire capacity of the furnaces represented by membership of the association. The Virginia Pig Iron Associa-

tion statistics, covering 21 furnaces in that district, show a decline of about 42 per cent. in unfilled orders in December, as compared with January; stocks on furnace yards increased practically 27 per cent. during the same period.

In January standard brands of eastern Pennsylvania No. 2 X foundry iron were quoted at \$19, delivered in this vicinity, with the full 50-cent differential for No. 2 plain grades. Basic was moving freely at \$18.75, delivered, for second and third quarter shipment. Gray forge iron commanded \$17.75 and standard low phosphorus \$22.75 to \$23.25, delivered. In February lower prices were available and checked heavy buying. Consumers for some time made purchases only for near future needs. Southern iron was freely offered, but at prices so close to those of Northern brands that buying was at no time particularly active. During the first half of the year the average minimum price for No. 2 X eastern Pennsylvania foundry iron declined \$2.35, basic \$2.65 and gray forge \$2.65 a ton; standard low phosphorus pig, the production of which is confined to but a few furnaces, showed an average decline of but 19 cents during the same period. In the second half price fluctuations were less pronounced. From July to December eastern Pennsylvania No. 2 X foundry showed a decline of \$1.15; Virginia No. 2 X, 85 cents; basic, \$1.35; forge, \$1.27, and standard low phosphorus, 60 cents. Toward the close of the year buying dragged, and the amount of iron sold for forward delivery was extremely light. Producers reached a point late in the year at which the average orders on hand no longer showed a profit, and little effort was made to force business. Buyers of basic iron will, in many cases, carry considerable over from purchases for third and fourth quarter delivery and, therefore, showed little interest in further purchases for early 1911 requirements, although some little prompt iron was bought late in the year, in order to reduce average costs for crude materials.

The accompanying table shows the average range of minimum prices by months for the principal grades of pig iron delivered in buyers' yards, eastern Pennsylvania and nearby points:

Average Prices of Pig Iron Delivered in Buyers' Yards, Eastern Pennsylvania and Nearby Points, in 1910.

	Pennsylvania No. 2 X foundry.	Virginia No. 2 X foundry.	Standard gray forge.	Basic.	Low phos- phorus.
January	\$19.00	\$19.00	\$17.75	\$18.75	\$22.81
February	18.69	18.50	17.50	18.50	23.00
March	18.00	18.10	16.90	18.25	23.00
April	17.75	17.94	16.62	17.56	23.00
May	17.00	17.19	16.00	16.88	23.00
June	16.65	16.75	15.65	16.10	22.90
July	16.25	16.37	15.37	15.69	22.56
August	16.00	16.06	15.00	15.12	22.50
September	16.00	16.00	14.75	15.00	22.50
October	15.81	16.00	14.50	15.00	22.50
November	15.69	15.90	14.38	14.75	22.50
December	15.50	15.80	14.25	14.75	22.40

Finished Iron and Steel

Quite a large amount of plate business was carried over from 1909; prices were well maintained, and early in the year makers were not inclined to contract heavily for forward shipment. As the demand became easier prices were reduced \$1 per ton, from 1.75 cents for ordinary plates, delivered in this territory. In April better deliveries were available, and the demand, following a further reduction of \$1 per ton in June, became more active, but was not maintained. More reductions in price followed. In July prices were lowered \$1 and in August \$1 more, to 1.55 cents, minimum, but failed to bring out aggressive buying, consumers purchasing largely for prompt delivery only, or for business in hand. While mills showed a trifle more activity during the summer months, the demand fell off gradually, and toward the end of the year few of the Eastern mills averaged better than 50 per cent. of normal capacity. After August practically no change in quotations was made, although reports of possible concessions were occasionally heard. At the close of the year business was practically at a standstill, with consumers looking for price concessions after the turn of the year.

Prompt deliveries of plain structural shapes were hard to get at the opening of the year, owing to mills being fully engaged and well sold ahead. Prices during the first quarter were well maintained at 1.75 cents, delivered here, for plain shapes. Early in the second quarter producers became more anxious for business and price concessions were made, settling to 1.60 cents in June. In August 1.55 cents, delivered, was quoted and fairly well maintained to the year end. Production was gradually decreased after the second quarter, with mills operating at about 50 per cent. of capacity toward the close of the year. Prices of fabricated material have been generally low, owing to sharp competition for business of that character offered.

Quite an active demand for sheets prevailed early in the year, a good share of the business coming from distant markets, but the demand later became irregular. Eastern makers' prices, which in January were on a 2.70 cents basis for Nos. 18 to 20 gauge, were advanced in February to a 2.80 cents basis, which was maintained until midsummer. Prompt deliveries at times commanded a sharp premium. About August 1 prices receded, but only brought out small lot buying, which a further cut, in September, to a 2.50 cents basis, did not improve. During the last half of the year mills operated irregularly.

A firmness in prices of bars prevailed early in the year, but was not long maintained. Refined iron bars, which were quoted in January at 1.70 cents minimum, delivered in this vicinity, declined in February to 1.60 cents. Efforts to hold prices met with little success, and the decline was gradual throughout the year, fluctuations being irregular, due to conditions of individual mill order books. In June refined iron bars were quoted at 1.50 cents; in September, 1.40 cents. Several months later 1.35 cents, delivered, was quoted, while at the close of the year 1.32½ cents, delivered here, represented about the minimum.

Prices of steel bars showed little variation in prices; at the beginning of the year 1.65 to 1.70 cents, delivered here, was quoted, declining to 1.60 cents in March, when mills began to feel the need of business. This price was maintained until September, when 1.55 cents was named and maintained by leading producers to the year end, although concessions were at times available from independent producers.

Coke

With prospects of a large demand, producers held prices firmly during the early months of the year, but before the first quarter was ended prices had receded. Consumers bought largely in small lots for near future needs, as spot coke could generally be had at a concession over that for forward delivery. During the greater part of the year the market was irregular and, while makers of established brands were well sold up and maintaining quotations, business in the less well-established brands was freely transacted at lower price levels. Some fair sized lots of furnace coke for first half delivery were sold late in the year, but foundry grades were not active. Business at the close of the year was dull. The accompanying table shows the average minimum per net ton for each month for deliveries in this territory:

Average Monthly Prices of Coke, Delivered in Eastern Pennsylvania, in 1910.

	Per Net Ton.			
	Connells- ville furnace.	Connells- ville foundry.	Mountain furnace.	Mountain foundry.
January	\$4.75	\$5.25	\$4.35	\$4.85
February	4.30	5.08	3.90	4.68
March	4.95	4.80	3.65	4.40
April	3.90	4.75	3.50	4.35
May	3.90	4.59	3.50	4.19
June	4.00	4.50	3.60	4.10
July	4.00	4.50	3.60	4.10
August	4.00	4.50	3.60	4.10
September	4.00	4.50	3.60	4.10
October	3.96	4.48	3.56	4.08
November	3.85	4.35	3.48	3.96
December	3.87	4.20	3.50	3.85

Old Material

A downward movement, both in demand and values, occurred throughout the year. Mills entered 1910 well

stocked with old materials and were well bought ahead. Deliveries for a time were freely taken, but were curtailed as the supply became greater than the consumptive needs of the mills. Early in the year a large amount of foreign steel scrap arrived on purchases made during the previous fall. The principal Eastern steel mills participated in the associated buying arrangement until early spring, when one mill withdrew, but later resumed relations with the other interests, and the plan was continued until late in September, when, after an investigation by the Government, the plan was discontinued and the mills again made purchases in the open market.

Heavy melting steel scrap declined steadily in price. In September there was a temporary stiffening and a trifle higher prices prevailed, largely on merchant buying to fill contracts. Prices soon drifted back, however, and were lowest at the close of the year. The other principal grades of steel mill scrap closely followed the general

movement in heavy melting steel. Rolling mill grades were irregular throughout the year. Early in July a buying arrangement in which a number of Eastern bar iron mills participated began making purchases through a common buyer, along lines similar to those adopted by the steel mills, but the plan was short lived, being in existence but a few months. Cast scrap followed more closely the movement of the iron market, declining steadily in price. Old stove plate, however, maintained a fairly even range of prices, due to the demand for this grade from consumers outside the immediate district. The year end found the market weak and purchases largely of the bargain lot order. The range of quotations, showing the monthly average minimum price for the leading grades, delivered in buyers' yards in this territory, taking a freight rate ranging from 45 cents to \$1.35 per gross ton from Philadelphia, is given in the accompanying table.

*Average Prices of Old Material, Delivered in Buyers' Yard in Eastern Pennsylvania, in 1910,
Per Gross Ton.*

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
No. 1 steel scrap and crops.....	\$17.00	\$16.62	\$16.50	\$16.12	\$14.75	\$14.45	\$14.12	\$13.75	\$13.85	\$13.81	\$13.50	\$12.65
Low phosphorus.....	22.94	22.62	22.30	21.37	20.75	20.10	19.25	19.00	19.00	19.00	18.75	18.00
Old iron rails.....	20.50	20.12	20.30	20.50	20.00	19.80	18.62	18.00	18.00	18.00	18.00	17.20
Old car wheels.....	17.50	16.81	16.75	16.06	15.12	14.90	14.25	13.94	13.75	13.75	13.50	13.25
No. 1 railroad wrought.....	19.56	18.94	19.00	18.69	17.50	16.70	16.00	15.37	16.10	16.19	16.00	15.90
Wrought iron pipe.....	16.62	16.22	16.15	15.37	15.00	15.00	14.12	13.50	13.40	13.00	12.75	12.35
Wrought turnings.....	14.38	13.50	12.80	11.44	9.94	9.65	9.62	8.81	8.75	8.62	8.50	8.15
Cast borings.....	12.22	11.50	11.20	10.38	8.94	8.80	9.50	9.31	9.25	9.06	8.50	8.15
Machinery cast.....	17.00	16.12	16.00	15.87	15.06	15.00	14.94	14.25	14.00	14.00	14.00	14.00
Railroad malleable.....	16.75	16.31	16.00	15.94	14.75	14.50	14.12	13.75	13.50	13.50	13.50	13.20
Stove plate.....	13.31	12.87	12.30	11.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

The Chicago Iron Trade in 1910

BY R. L. ARDRFY.

The year began with very bright prospects for the steel industry in this territory. The mills were all oversold, and in the case of bars, structural material and plates they were three to six months behind in deliveries. The casual buyer of steel met with the greatest difficulty in finding a mill that would accept an order for any near delivery. The large producers found it necessary to exercise influence in the direction of preventing further advances in prices, as they foresaw the reaction that would follow a period of high prices.

Features of the Heavy Demand in Early Months

The congestion in the mills was most pronounced in the case of soft steel bars. The agricultural implement manufacturers and other large users of steel bars had bought heavily early in 1909, when prices were low, and the merchant mills were not able to make shipments that would satisfy the demand during the first quarter of 1910. Structural material also commanded premiums for prompt shipment during the first quarter of the year. The plate mills did not get so far behind in deliveries. The wire mills were taxed to their full capacity, but chiefly because there had been heavy speculative buying by jobbers during the preceding six months, when there was a steady advance in wire prices.

In the fall of 1909 rail contracts were taken for 1910 delivery to cover six months' rolling at the new Gary mill and nine months at the South Works of the Illinois Steel Company. During the first quarter of 1910 additional contracts were booked, which practically covered the capacity for 1910 of the South Works on Bessemer rails and the available capacity at Gary. While the Gary rail mill can roll a much larger tonnage, it has only been operated at 40,000 tons per month, as all the finishing departments of the Illinois Steel Company needed billets and about half of the hot metal produced at Gary was apportioned to the billet mill.

During the first half of 1910 there was an actual

shortage of crude steel in the Chicago district, and none of the mills here would sell billets. A few old established forging plants obtained their supplies from local steel works, but buyers who relied upon the open market had to depend upon occasional offerings from Eastern mills. An Indiana plant which uses rolling billets, and is located a short distance from Gary, purchased 50,000 tons of rolling billets from a seaboard mill.

Jobbing Interests Greatly Benefited

The large jobbing interests in Chicago reaped a harvest during the first half of the year in large orders from store for mill products in quantities usually sold direct from the mills. Sales of bars from store were unusually heavy, owing to the fact that the mills were so far behind in deliveries. A leading plow manufacturing company at Moline, Ill., had placed its bar contract for the year with the steel mill in Chicago controlled by the harvester interest. Both of these interests found that their requirements for bars were far in excess of their original estimates for their trade year. The plow manufacturer had to purchase 10,000 to 15,000 tons from other mills and from store, and the harvester interest found it necessary to purchase an equally large amount from outside sources to cover its requirements.

The automobile industry was insatiable in its demands for material and parts. Every factory in the country which had equipment and capacity to make automobile parts was levied upon to supply the demand for this voracious young industry. In many cases the automobile manufacturer employed inspectors to watch day and night the factories supplying parts, to obtain prompt shipments. Mills producing certain lines of steel for the automobile trade were six to nine months behind in deliveries. In every line of finished materials the country seemed to have entered upon a period of prosperity which was in remarkable contrast to the two dull years that followed the panic of 1907.

A buying movement in scrap, which began in the

summer of 1909, had carried prices to a high level before the beginning of 1910, and there was a great deal of discussion of the possibilities of a famine in scrap. Figures which were compiled showed that the enormous increase in the capacity of open hearth furnaces could not be supplied with scrap. Foundries had to pay higher prices for ordinary cast scrap than the cost of the pig iron which had been purchased for delivery during the first quarter.

The recession of activity did not reach the finishing departments of the steel mills until the middle of the year, but it began in pig iron about the first of the year. The fundamental cause was restriction of railroad purchases.

The Pig Iron Trade

During September and October of 1909 the foundries and other buyers of pig iron in Chicago territory had covered their requirements for the first quarter of 1910. In November and December the market was quiet and the price receded. The furnace interests generally expected another buying movement in January or February for the second and third quarter, but were disappointed, and prices further receded during the spring and summer. Owing to unfavorable indications in the financial world, along with the general receding tendency in prices, more buyers than ever before adopted the plan of purchasing small lots for near deliveries, instead of making contracts for their requirements six or nine months ahead.

In January and February the principal malleable foundries seemed to feel assured of the future of their business and bought a large tonnage for their requirements for the last half of the year. This movement was accelerated by a reduction in freight rates from southern Ohio furnaces to points west of Chicago. The curtailment of operations in the malleable foundries proved disappointing, especially in the last half of the year, and in some cases the buyers made cash settlements with the furnaces to cancel deliveries of the iron which they had bought.

The average for the year, \$17.10 for Northern No. 2 foundry and malleable Bessemer, is the lowest average since 1904. The average for Southern No. 2 foundry for Chicago delivery, \$16.30 for the year, is also the lowest average since 1904. In the past 10 years only 1901 and 1904 show lower averages for Northern and Southern iron.

The scrap market has shown a general declining tendency through the year. From July to November heavy melting steel held steady and had a steadying influence on other grades of scrap which are mixed in open hearth charging, but in December this and practically all other grades of material reached the lowest values of the year.

Comparison of Prices

The following tables show the course of prices in the Chicago market, compiled from the weekly reports in *The Iron Age*:

Average Chicago Prices of Pig Iron, 1910.

	Northern coke No. 2.	Lake Superior charcoal.	Southern coke No. 2.
January	\$19.00	\$19.50	\$18.35
February	19.00	19.50	18.35
March	18.38	19.38	17.60
April	17.50	19.00	16.60
May	17.06	18.63	16.23
June	16.75	18.50	15.85
July	16.56	18.50	15.85
August	16.50	18.50	15.35
September	16.38	18.38	15.35
October	16.06	18.12	15.35
November	16.00	18.00	15.35
December	16.00	18.00	15.35
Average for year.....	\$17.10	\$18.67	\$16.30
Average for 1909.....	17.49	19.50	17.30
Average for 1908.....	17.57	20.24	16.76
Average for 1907.....	24.50	26.56	24.47
Average for 1906.....	20.43	20.72	19.44
Average for 1905.....	17.65	17.99	16.66
Average for 1904.....	14.37	15.50	13.92
Average for 1903.....	19.25	22.13	18.31
Average for 1902.....	20.86	23.50	20.10
Average for 1901.....	15.38	17.50	14.60
Average for 1900.....	19.47	22.00	18.35

Average Chicago Base Prices of Finished Iron and Steel, 1910.

	Common bar iron. Cents.	Soft steel bars. Cents.	Structural shapes. Cents.
Month.			
January	1.60	1.68	1.78
February	1.60	1.68	1.78
March	1.55	1.65	1.75
April	1.52	1.63	1.73
May	1.49	1.63	1.68
June	1.46	1.63	1.68
July	1.40	1.63	1.60
August	1.39	1.59	1.58
September	1.37	1.58	1.58
October	1.35	1.58	1.58
November	1.35	1.58	1.58
December	1.35	1.58	1.58
Average for year.....	1.45	1.62	1.66
Average for 1909.....	1.43	1.50	1.59
Average for 1908.....	1.56	1.66	1.82
Average for 1907.....	1.78	1.77	1.87
Average for 1906.....	1.71	1.68	1.86
Average for 1905.....	1.65	1.65	1.78
Average for 1904.....	1.41	1.50	1.71
Average for 1903.....	1.65	1.72	1.75
Average for 1902.....	1.71	1.73	1.75
Average for 1901.....	1.58	1.58	1.70
Average for 1900.....	1.75	1.75	2.00

Average Chicago Prices of Old Material, 1910.

	No. 1 Old iron rails. Gross ton.	Heavy railroad cast wrought. Net ton.	H'vy melt. ing steel scrap. Net ton.	Old steel rails. Gr. ton.
Month.				
January	\$20.00	\$14.88	\$14.88	\$16.00
February	19.25	14.69	14.88	15.50
March	19.00	14.45	14.50	15.00
April	18.50	14.19	13.69	14.44
May	17.62	12.87	13.13	13.56
June	17.00	12.75	13.00	13.15
July	16.75	12.44	13.00	12.38
August	16.25	11.94	12.75	12.25
September	16.00	11.94	12.75	12.25
October	16.00	11.75	12.50	12.25
November	16.00	11.94	12.50	12.25
December	15.70	11.65	12.30	12.10
Average for year.....	\$17.34	\$12.99	\$13.32	\$13.43
Average for 1909.....	18.31	13.76	13.79	14.45
Average for 1908.....	16.60	12.45	12.69	12.45
Average for 1907.....	22.47	14.63	17.26	15.08
Average for 1906.....	23.04	15.62	14.55	14.74
Average for 1905.....	20.18	16.14	13.50	13.97
Average for 1904.....	16.56	12.45	10.95	10.72
Average for 1903.....	20.29	16.07	14.75	15.50
Average for 1902.....	23.91	19.68	15.03	17.37
Average for 1901.....	19.50	15.00	11.25	.....
Average for 1900.....	17.90	15.00	11.00	.....

The Outlook

The most encouraging feature in the steel trade at the close of the year is the enormous amount of business pending for the fabricating interests and the mills which supply them. In Chicago the mills recently figured on 70,000 tons of material for bridges and large buildings in this city, and the work in the hands of engineers and architects throughout Western territory, from Chicago to the Pacific Coast, is estimated at 300,000 tons. This represents, to a considerable extent, work which has been held back by the difficulty during the last half of the year in obtaining funds to finance large building projects. The financial situation has become easier and is not expected to retard work in the immediate future.

In Chicago only a few large steel buildings have been erected the past year, but about 20 are now under consideration for the coming year. A new building code was pending for about a year, which would reduce the cost slightly in erecting a steel skyscraper, by making a reduction in the strength required in the columns. This code was finally adopted by the City Council in December. Several of the buildings that had been held back were planned to conform with the provisions of the new code.

The actual production of steel in the Chicago district the past year has exceeded former records of the mills of this territory, owing to the increase in the output at Gary. While the falling off in new business in recent months is disappointing, and has resulted in lower prices, general confidence is expressed in the future. The West has been very prosperous. The corn crop was the largest ever grown, and other crops made a fair average. There have been no upheavals in the labor world to disturb the course of business, and conditions are favorable for a renewal of activity in the iron and steel industry when the railroads resume purchases on a normal basis.

The Cincinnati Iron Trade in 1910

BY CHARLES L. SMITH.

The new year opens with conditions very much different from those existing at the beginning of 1910. Stocks of pig iron are conceded to be nearly double, and prices are from \$3 to \$3.50 per ton lower than the quotable figures of January a year ago. Consumption has fallen off, though in some lines a fair average has been maintained. For instance, the quarterly report issued December 15 by Secretary Manley of the Cincinnati Branch, National Metal Trades Association, shows that the machine tool builders were working up to 91 per cent. of capacity, taking June, 1907, as standard, which was in the midst of the busiest season ever known in this territory.

Influences Adversely Affecting the Iron Trade

A great deal has been said about the steam railroads delaying the purchase of tools and rolling stock, of which it is known they have been in great need, and which lack of action has undoubtedly had a bad effect on the iron market. But there is another factor that should not be overlooked and which has also affected the market to some extent. During the years of 1905, 1906 and 1907 there was an immense amount of construction work under way for electric railroads. The stock market was flooded with securities of all kinds, for promoting suburban lines, a large percentage of which was built, thus causing a rather unusual demand for rails, cars and other equipment, into whose construction a large amount of metal entered. This naturally helped out the iron market, but when a few of these electric lines proved failures and others did not pay the dividends expected, capital became timid and many projected roads were unable to carry out construction plans. The arrested development in this particular has, without doubt, lessened the consumption of iron enough to have been felt, and the entire blame should not be placed on the steam railroads.

Another matter that might be mentioned is the phenomenal demand from the automobile trade for machine tools and supplies, which was such a feature of 1908 and part of 1909. Naturally this branch of manufacturing had to reach a limit some time, and 1910 has seen the weeding out of a large number of undercapitalized companies that had been good customers for machine tools. As automobile manufacturers are now turning their attention to the commercial truck line, a healthy demand for tools may open up from this source at no distant date.

Apart from the above, overproduction and unwise political agitation are the two causes generally given for present low prices and dull business.

Review of the First Six Months

January opened with an increasing number of inquiries and with a strong feeling that there would be an advance of at least 50 cents per ton before the month was over. It closed with prices the same and with order books fairly well filled for both Northern and Southern iron. Malleable was also a good seller. The month was a decided improvement over January, 1909, and the books of one company showed increased sales of 17,000 tons of Southern iron alone over the corresponding month of the previous year.

February started out all right, but before the middle of the month was reached there was a lull in buying and a softening in prices and the tonnage booked was far below that of January. The month was generally unsatisfactory, but was still ahead of February, 1909. It is notable that local scrap dealers commenced curtailing purchases of scrap, although prices only dropped a trifle.

The first week of March was a period of uncertainty. Southern iron was weak and the trade indifferent. A drop of 50 cents per ton in both Northern and Southern quotations brought out considerable business, and the

month wound up very satisfactorily as to volume of business, though the last week showed still further shading in Southern iron prices. In comparison with 1909, one firm reports its sales of Southern iron as exceeding March of that year by over 19,000 tons. Northern producers also experienced about the same ratio of gain. A résumé of the first quarter of 1910 places sales far above the same period of 1909, in spite of the fact that February, 1910, was a very dull month.

There were many rumors of further cuts in Southern prices in the early part of April, and before that month closed the average price had taken another drop, including both Northern and Southern iron. In spite of the rather unstable conditions, sales during April averaged up well, but were far behind those of the corresponding month of 1909. Malleable and basic were especially active. The pipe interests also ordered a larger tonnage than usual. Toward the end of the month bad weather conditions were blamed for a let-up in buying, and May was ushered in with the market very dull. Scrap prices also weakened and there was a reported stagnation in this commodity. A further softening of pig iron prices took place in May, and it was not at all a satisfactory month. One erratic feature is that while the tonnage placed during May was small it was reported as a much better month than May, 1909, while, as stated above, April, 1909, was far ahead of April, 1910.

In June there was considerable competition over a lot of foundry business offered, and there were also some nice sized sales of high silicon iron. Both Northern and Southern foundry prices settled and Southern foundry No. 2 was freely quoted, toward the end of the month at \$11.50, Birmingham basis, and Northern foundry No. 2 at \$15, Ironton.

Review of the Last Six Months

July started out with a more aggressive feeling, so far as Southern producers were concerned. During the first two weeks some fair sized lots of steel making iron changed hands, and the foundry business also showed up well. The latter part of the month developed a weakness, and Southern foundry went to \$11 flat, Birmingham, for spot shipment. Sales in July, 1909, were much heavier than those of July, 1910, and the books of one agency showed an excess of 14,000 tons in favor of the first named month.

In the latter part of August the situation gave signs of clearing up, but almost immediately settled back into the same old rut, and this was another month that was badly beaten out in the matter of tonnage booked in August, 1909.

During September the local foundries experienced a little spurt of activity, but sales were light, and for the last quarter Southern iron settled to \$11, Birmingham, although some sellers still adhered to \$11.50 for that delivery.

October moved up somewhat in the matter of tonnage booked by local agencies, and there was a decline in Northern foundry to \$14, at furnace, which figure was quoted the remainder of the year. With practically all agencies October, 1910, was a much better month than October, 1909.

November opened with a buying movement that surprised some interests, but this did not keep up the entire month. Open offers of \$11, Birmingham, for Southern foundry, and \$14, Ironton, for Northern, deliveries to run through the first quarter of 1911, were freely made, and some furnaces were said to be willing to take business for the first half at the same figures. Sales during November footed up better than for the same month of 1909.

December, always a dull month, was exceptionally so, and during the latter part very little business was taken. Prices remained the same, although there were reports

that some furnaces were willing to take on spot business at a few cents below the market quotations.

Range of Prices

Below are given the average prices per month on both Northern and Southern iron, delivered f.o.b. cars Cincinnati, and in the same table are included Cincinnati quotations on different grades of scrap material:

	Southern		Northern		No. 1 railroad wrought.	No. 1 cast scrap.	Heavy melting steel.
	No. 2.	No. 2.	No. 2.	No. 2.	Net ton.	Net ton.	Gr. ton.
January	\$17.25	\$18.20	\$15.56	\$13.87	\$15.37		
February	17.06	18.20	14.12	12.75	14.44		
March	16.12	17.57	13.50	12.50	14.00		
April	15.37	17.01	12.87	12.50	13.56		
May	15.00	16.45	12.37	12.12	12.12		
June	14.85	16.20	11.40	11.10	11.40		
July	14.75	16.20	11.50	11.12	11.50		
August	14.31	15.70	12.25	11.50	12.00		
September	14.25	15.70	12.50	11.50	12.00		
October	14.25	15.32	12.50	11.50	12.00		
November	14.25	15.20	12.50	11.50	12.00		
December	14.25	15.20	12.50	11.50	12.00		

During the latter part of 1910 old material dealers made an attempt to hold prices on scrap somewhat firmer,

as practically all of them have large stocks on hand. Few sales were made, as most consumers could afford to use pig iron at present market prices.

Through the courtesy of a local firm we are enabled to give herewith the average price each month at which its Southern pig iron was billed out. In other words, these figures represent the average invoice price, and have no bearing on the sales price, but represent the average on shipments moved, covering all grades of Southern iron only:

January	\$13.76	July	\$12.68
February	13.55	August	12.06
March	13.40	September	11.97
April	12.70	October	11.64
May	12.67	November	11.70
June	12.50		

In conclusion, it may be said that there is a general belief that the early spring will see considerable improvement in the situation. Business men are getting over their fears of radical legislation from Washington, as it is generally recognized that lawmakers are becoming more conservative and not so ready to fight corporate interests without due investigation as to their methods of conducting business.

The Copper Trade in 1910

BY I. M. ATHERTON.*

The year 1910 will go down in history as one of disappointment to the copper producing interests. Following the unsatisfactory conditions prevailing in the trade during 1909, the opening of 1910 was looked forward to with the hope that better things were coming. General business had shown satisfactory recovery from the 1907 panic, copper being practically the only industry which seemed to be unable to get on its feet. Indeed, in January, with a refinery output of 116,000,000 lb. of copper and domestic and export deliveries aggregating the enormous total of 160,000,000 lb. the United States surplus decreased over 43,000,000 lb., the price of the metal touched 14 cents and producers took fresh courage. The turn in the tide was only temporary, however, and for the next five months the metal piled up until the world's surplus of copper reached the alarming total of 401,000,000 lb.

Broke Production Records When the Market Was Glutted

Here was presented the spectacle of the two largest producing interests in the country apparently striving to break all production records at a time when the market was glutted with copper. The price of the metal touched 12½ cents, and consumers stood aloof and bought from hand to mouth. Arrayed on one side of the fight were the Amalgamated-Cole-Ryan interests, and on the other side Guggenheims, with their American Smelting & Refining and Utah Copper Company affiliations. This was the battle of giants, either side attacking the other whenever opportunity offered, and at the same time pursuing diametrically opposite tactics in regard to sales of the metal.

The Guggenheims, fortified with the rapidly increasing output of the porphyry mines—Utah and Nevada consolidated—dumped their copper on the market as fast as it could be refined, larger sales being made as low as 12½ cents. On the other hand, the United Metals Selling Company accumulated the metal, and at one time was carrying over 100,000,000 lb. The reasoning that dictated this policy was that consumption was rapidly approaching volume of production and ought to exceed it when the United Company would hold the only large available supply of spot copper.

Evidently the warring factions came to the conclusion that a continuation of the then existing policy was sui-

cidal. At any rate, in the latter part of July their representatives met in London—quite by chance—reason supplanted personal feeling and curtailment was inaugurated.

Curtailment of Production Put in Force

The curtailment was intended to amount to about 15 per cent., but has been about 10 per cent., or about 13,000,000 lb. per month. Since the programme was adopted, therefore, there has probably been withheld from the market the equivalent of 75,000,000 lb. of refined copper. Even with this restriction the output of United States refineries for 1910 will reach a new total at very close to 1,448,000,000 lb. Thanks, however, to a new high record of deliveries both for domestic and foreign consumption the American surplus for the year ought to show a decrease of at least 22,000,000 lb., as will be seen from the following tabulation, partly estimated:

Movement of Copper in 1910, in Pounds.

Stocks, January 1, 1910.....	141,766,111
Production	1,448,000,000
Domestic deliveries.....	768,000,000
Exports	702,000,000
Total deliveries.....	1,470,000,000
Excess deliveries.....	22,000,000
Stocks, January 1, 1911.....	119,766,111

An encouraging feature of the statistical position of the metal at present is the practically uninterrupted decrease in the foreign visible supply. In March the foreign accumulation reached the total of 254,000,000 lb., but in the face of continued large shipments from this country is now down to approximately 187,000,000 lb. This decrease in foreign stocks has, of course, assisted materially in keeping the world's visible supply at an equilibrium. For the year the world's visible will have been decreased about 79,000,000 lb., as per the following table, a portion of the figures being estimated as before:

The World's Stocks of Copper, in Pounds.

	United States.	Foreign.	Total.
Stocks January 1, 1910.....	141,766,111	244,205,800	385,971,911
Stocks July 1, 1910.....	168,276,017	232,863,680	401,139,697
Stocks January 1, 1911.....	119,766,111	187,000,000	306,766,111
Decrease for year.....	22,000,000	57,205,800	79,205,800

The natural result of the above noted improvement in the statistical position of the metal should have been a stronger tone in its price. This has been true to a certain extent, although the rebound in price has been less

* Of the Boston News Bureau.

than was the decline when the surplus was accumulating. For example, the average price for electrolytic declined from 13.62 cents in January to 12.215 cents in July, or nearly $1\frac{1}{2}$ cents; while in no month since July has the average touched 13 cents, and the tendency at the moment is downward rather than up. The average for the year will be not far from $12\frac{3}{4}$ cents, comparing with 13 cents in 1909.

The Porphyry Producers

One very striking development must be recorded in any review of the copper industry for 1910, and that is the prominent position to which the porphyry producers have attained. For a long period the vein miners were disposed to discredit the assertions as to output and costs claimed by the porphyry mines, and in fact the treatment of low grade ores at anything like a cost of 8 cents per pound for the copper contents was ridiculed. The fact remains, however, that two of the most notable porphyries, Utah Copper and Nevada Consolidated, have, during the past year, in spite of a voluntary restriction during the latter months, made a combined output of 154,000,000 lb. of copper. The total cost of this copper was probably not over 8 cents per pound according to the methods employed by the porphyry bookkeepers. There has been some criticism that the porphyry miners were not including in their operating account sufficient sums to represent the depreciation of equipment, the charges for stripping surface waste and, what is still more important, the exhaustion of the mine itself.

Some of the most able engineers in the copper mining industry, however, are identified with the porphyry properties, and the record which has been made by the larger mines of this description constitutes a most remarkable achievement. During the next year Miami, Ray Consolidated and Chino will be added to the list of porphyry producers, but, including these three properties, together with an estimated increase of 20,000,000 lb. from the Utah Copper, it is improbable that exceeding 65,000,000 lb. of new product will issue from the Eastern refineries in marketable shape, so that in reality there is nothing very apprehensive to be feared from the new producers during the next 12 months.

Looking to the other side of the account, however, there is to be considered the disastrous showing of some of the vein mines during the year. The two most recent

examples are Granby and Utah Consolidated which produced 6,000,000 lb. less in 1910 than in 1909. It is problematical whether Utah Consolidated will ever again produce 7,000,000 lb. in a year. The rejuvenation of Granby, although well in progress, is bound to be slow. North Butte and Calumet & Arizona, two other disappointments in the vein mines, are also being energetically developed, but may not soon be expected to attain high mark productions.

During the year much has been done in the way of consolidations, notably the bringing of the Amalgamated-Anaconda properties under the dominion of the latter, the acquisition of the Clark properties in Butte by the Amalgamated, the acquisition of a controlling interest in Nevada Consolidated by Utah Copper, and the merger of Calumet & Arizona and Superior & Pittsburgh.

The Outlook

The outlook for the coming year is one of great uncertainty. Everything depends upon the general state of business. The maintenance of present unsatisfactory business conditions means a considerable shrinkage in copper meltings during the next 12 months, and the prevailing market prices can only be sustained through a still further curtailment of output unless orders for the metal come in faster than they are now doing. Efforts are being made, however, to bring the largest interests in the copper industry, who have been heretofore antagonistic, into some sort of harmonious co-operation with respect to production and sales. Several "copper dinners" have recently brought together warring interests heretofore bitterly competitive, and there is thought to be on foot some scheme whereby selling may be centralized in the hands of one strong agency in which all the participating companies may have a financial interest based upon the output contributed.

No sound economic criticism can be advanced against the wisdom of conserving our copper resources. They are not inexhaustible, and the 10 to 15 per cent. curtailment programme which has been tacitly agreed to by several of the important factors in the trade, if honestly lived up to, should do much toward keeping from the market a burdensome surplus as well as preventing the needless exhaustion of ore reserves at a time when the selling price is much nearer the cost of production than has been the case for many years.

The Sheet and Tin Plate Trades in 1910

BY R. E. V. LUTY, PITTSBURGH.

Another memorable year has passed in the sheet and tin plate trades. Not only have former production records been broken; they have been broken badly. A year ago it was with some diffidence that this review asserted that all records for sheet production were broken in 1909 by a comfortable margin, for the feeling in the producing trade at that time was evidently not that any new tonnage record had been made. With more confidence it can now be asserted that the records of 1909 have been exceeded in 1910 by a large margin. We append our estimates for 1910 to the statistics available:

Sheet and Black Plate Production.—Gross Tons.

	Sheets, 13 and lighter.	Black plates for tinning.	Total.
1905.....	983,437	507,587	1,491,024
1906.....	1,074,525	576,079	1,650,604
1907.....	1,084,700	504,072	1,588,772
1908.....	864,901	513,771	1,378,672
1909.....	1,248,404	606,844	1,855,248
1910.....	1,400,000	700,000	2,100,000

Our estimate of sheet production in 1910 is only intended as a rough approximation; the estimate of black plate production claims more accuracy. In the case of

black plates the official statistics are likely to fall nearer to 725,000 than 700,000 tons. Our estimate of a year ago for tin andterne plate in 1909 was 600,000 gross tons, with the qualification: "This is a round figure, and we should expect the official statistics to exceed rather than fall short of it." The official statistics showed 612,951 gross tons of tin andterne plate in 1909.

Prior to 1905 there were no statistics of sheet production, except for a few years in the nineties. Statistics of tin plate production have been available, through one channel or another, since the establishment of the industry. We give the figures in gross tons for selected years, appending our estimate of 1910, which is not made larger than the forecast for black plates for tinning for the reason that it is assumed a larger tonnage of black plate stock is being carried now than a year ago:

Tin and Terne Plate Production.—Gross Tons.

1891.....	999	1907.....	514,775
1895.....	113,666	1908.....	537,087
1900.....	302,665	1909.....	612,951
1905.....	493,500	1910.....	700,000
1906.....	577,562		

There is every prospect that, given anything like

normal conditions in 1911, the output of both sheets and tin plates will exceed that of 1910.

The Number of Mills

In the past two years there has been much new erection in both the sheet and tin plate branches. Following the custom established in this report a year ago, a mill is called a sheet mill unless it really produces black plates for tinning. Thus a "tin" mill may be a sheet mill, while a mill making black plates for tinning is a tin mill. The fact is that in mill parlance the fundamental distinction between a sheet mill and a tin mill is the wage scale paid, not the character of the equipment. There is the sheet mill scale and the tin mill scale, and the way to change a sheet mill to a tin mill is to notify the men that the tin mill scale is going to be paid. The difference is simply that the tin mill scale involves lower rates per ton than the sheet mill scale, but does not allow the rolling of material over a certain size without an extra. For the purposes of this review, the only tin plate mills are in those plants which have tin houses attached. Others are sheet mills, although they may make tin mill sizes of black material.

At the beginning of 1909 there were in regular operative condition about 184 sheet mills. During the year there was a net addition of about 23 mills, making about 207 at the beginning of 1910. During 1910 the following new sheet mills were completed, all being additions to existing sheet mill plants, except the Phillips addition, which is an addition to a tin plate plant at Weir City, W. Va., and the Canton Sheet Steel Company, which has an entirely new plant, practically completed at the close of 1910:

New Sheet Mills Completed in 1910.

Canton Sheet Steel Company.....	8
Inland Steel Company.....	8
Massillon Rolling Mill Company.....	4
National Sheet Steel Company.....	1
Phillips Sheet & Tin Plate Company.....	8
Stark Rolling Mill Company.....	1
Thomas Steel Company.....	5
West Penn Steel Company.....	3
Youngstown Sheet & Tube Company.....	8
Total.....	46

The National Enameling & Stamping Company increased its tinning operations at Granite City during the year, justifying the transfer of five mills from the sheet to the tin plate classification. The Granite City plant is now classified as operating 15 tin plate mills, tinning the product, and nine sheet mills (of which four are regular sheet mills and five the so-called "tin" mills), while the St. Louis plant of the company contains six sheet mills. Deducting the five mills from the 38 listed above makes a net increase of 41 mills, which, added to the 207 at the beginning of 1910, makes a total of 248 sheet mills at the close of 1910.

Several plants, long inoperative, are not included in this total of 240 mills, which involves only mills which ran for a considerable part of 1910 and mills just completed.

Among sheet mills being built are 10 by the American Rolling Mill Company and two by the Follansbee Bros. Company.

New Tin Plate Mills

At the beginning of 1909 there were about 87 regular tin plate mills in the country, in regular operative condition, and actually tinning their product. Net additions in 1909 amounted to about nine, making 96 at the beginning of 1910. During the year there were completed:

New Tin Plate Mills Completed in 1910.

Carnahan Tin Plate & Sheet Company.....	1
Jones & Laughlin Steel Company.....	12
McKeesport Tin Plate Company.....	10
Phillips Sheet & Tin Plate Company.....	12
Wilkes Rolling Mill Company.....	1
Total.....	36

Counting the five mills deducted from the sheet mill list on account of increased tinning operations at Granite City, and deducting the three-mill Alcania plant, which closed in the spring for an indefinite period, the net addition in 1910 was 38 mills, making 134 regular tin

plate mills, in operative condition, at the close of 1910. Besides this there is an idle plant at Greencastle, Ind., and a plant at Marietta, which is classed as a sheet plant. It made a small tonnage of tin plate in 1910, but the interest now operating it does not contemplate conducting tinning operations.

The McKeesport Tin Plate Company is adding two mills, which are nearly completed.

The Leading Interest

The American Sheet & Tin Plate Company has made no important changes in its mills in the past two years. It has 184 sheet and jobbing mills, besides two light plate mills. On its tin mill list it has 235 mills, the seven-mill Anderson plant having been abandoned some time ago. In the 235 mills, however, are included the seven-mill Cambridge plant, which has no tinhouse, and the 11-mill United States plant, which conducts galvanizing besides tinning operations.

In July the American Sheet & Tin Plate Company awarded contracts for 16 sheet and four jobbing mills, to be erected at Gary, Ind., and at another time contracts for two 72-in. plate mills to be a part of the Gary unit.

The Market in 1910

The demand in 1910 for both sheets and tin plates was eminently satisfactory from a tonnage standpoint, as compared with previous years, for there was a large gain in the requirements. There was, however, also a large gain in the productive capacity, and this made it difficult for all the sheet mills to fill up. While the new erection has been rather large in the past two years, the increase in capacity is materially greater than is indicated by the number of mills added, for the output per mill has undergone a large increase in the past few years. Sheet and tin mills used to be operated in rather timid fashion, but the size of the rolls, the strength of the housings and the engine power have been greatly increased, and the most successful mills are those which are pushed hard.

The year opened with No. 28 black sheets at 2.40 cents and No. 28 galvanized at 3.50 cents, closing with black sheets at 2.20 cents and galvanized at 3.20 cents. The decline was rather irregular, and the lowest prices, which prevailed more or less continuously from August to November, were a dollar or two a ton below the closing prices. Corrugated roofing opened the year at \$1.70 per square for painted and \$3 for galvanized, closing prices being \$1.55 and \$2.75, respectively.

The prices of 2.40 cents and 3.50 cents, showing a spread of \$1.10 per 100 lb. between black and galvanized sheets, were made by the advance of November 12, 1909, previous prices having been 2.30 cents and 3.35 cents, so that the spread was increased by 5 cents per 100 lb. The average price of spelter at East St. Louis in November, 1909, was 6.25 cents. Late in November, 1910, when the spread between black and galvanized sheets was hardly more than \$1, spelter reached its high point after the decline of early in the year, touching 5.90 cents for a few days. The pinch upon the galvanized sheet branch was then severe.

The tin plate market made a record for itself in 1910, as there was no deviation from the price of \$3.60, which had been established by the 10-cent advance of November 12, 1910. No other important steel product, with the sole exception of standard sections of steel rails, made such a record in 1910, as all other products declined.

There was a total decline of about \$4 a ton in sheet bars during the year. The margin between sheet bars and sheets was close at the opening of the year and as the declines were about on a parity there was a small margin to the sheet manufacturers all year. The tin plate mills fared much better, as there was no decline in their finished product, and the only set-off to the decline in sheet bars was the advance in pig tin. This averaged a trifle over 38 cents in New York in December, or about 5 cents higher than in December, 1909, adding in round figures 10 cents a box to the cost of making tin plate, while the decline in sheet bars deducted about 20 cents. On the whole 1909 and 1910 were both good years for the tin plate manufacturers, accustomed as they have become to very small margins.

Recent Tendencies in the Foundry Industry

Machinery Has Done Much and Must Be Utilized Increasingly—The Future of the Molder

BY DR. R. MOLDENKE.*

One of the pleasant reminiscences of the Detroit convention of the American Foundrymen's Association, held in June, 1910, was a visit with a kindly old gentleman from a prairie city of the extreme Middle West. Himself the owner of a progressive foundry, and father and grandfather of foundrymen, his comparison of conditions as he had left them when going West in his youthful days, with the magnificent display of progress in the exhibition, was truly inspiring.

The writer has helped many a foreign visitor to access to our best establishments, and in discussing European and American practice with them on their return, as contrasting former methods with present accomplishments, has invariably had confirmed his own impression that no single advance stands out so clearly in shop improvement as the development of the molding machine. In a more general way, side by side with this advance, stands the spread of information on the metallurgy of cast iron which is making our great specialty foundries so potent a factor in the conservation of national resources in their particular direction. Two things which our broad minded men of affairs would like to see realized—and modern tendencies in the foundry industry are working that way—are the payment of a premium for brains in the works and the elimination of that killing labor which is the bane of the molder's existence.

Machinery Must More and More Be Used

The molding machine is not developed sufficiently to fit with these two desiderata. Subsidiary apparatus must be added and a higher grade of men employed to bring about ideal conditions. To get right at the root of the matter, just step into any ordinary foundry which has an equipment of molding machines, and note the heavy labor the man in charge of the machines has still to perform. The handling of the sand, the tucking in that may be necessary, the lifting of the molds—all mean the continued bending of the back and exerting the muscles of that region to an extent which leaves exhausted men at quitting time. All this should be accomplished by machinery, and the molder should only look after the fine points of adjustment and finish, and thus bring the proprietor the full return for his invested capital. It is high time that the myth of a molder having to pour his own work be done away with, for from personal observation and experience, a specially trained pouring gang can do far better. Nevertheless, men cannot be blamed for wishing to shorten the molding hours somewhat by doing their pouring and shaking out to some extent, so long as molding operations are so severe physically.

A still worse feature is the lot of the laborer attached to the molding machine outfit. Who has not seen this individual carry the prolific output of a good machine with an easy pattern pretty nearly over a quarter of an acre of ground? With heavy molds this is man-killing, and the molding machine fraternity should bend its energies in the direction of means, pneumatic or otherwise, to handle the molds as fast as completed—whether by sliding along or conveying—without lifting them in any way until they are dumped. It is then only that the proprietor can properly enforce the maximum capacity of the installation. As it is at present, results are only obtained at the cost attending a change in perhaps 150 per cent. per annum of the operatives about a busy molding machine plant.

The Advance of the Jarring Machine

The development of the molding machine along the lines of the jarring machine, with the big castings that

can now be made with this, is a hopeful sign, for it will go a great way toward solving the problem of the molder. With sand conveying and facilities for handling the molds rapidly the tonnage of a foundry can be greatly increased. That this is the modern tendency is shown by some of our large works in which the above mentioned objection to laborers carrying molds long distances is partly overcome by dumping close to the machine, through gratings in the floor, the sand being retempered in the cellar. Naturally continuous pouring is essential to such a plan.

Even in the smaller establishments, notably jobbing shops with some special line of machinery castings as part of the daily output, the jarring machine is being installed, and large castings thus cared for rapidly and with comparatively few men. Space is economized and the specially good men can be put at other molding work.

There is a tendency toward conveying machinery in the foundry as never before. Shops are beginning to equip themselves in this direction, to be independent of fluctuations in the labor market as well as to get good returns on the investment. One great foundry has practically everything run by conveyors and the results are reported excellent.

Continuous and Intermittent Pouring

The great advantage of molding machinery as adapted to large work has really not yet been much touched upon. With molds closed up much faster than formerly, good ventilating systems, sand handling and tempering machinery, it becomes an easy matter to so adapt continuous pouring in the jobbing shop that molding proper may continue all day long. Only those who know the capabilities of the ordinary cupola for intermittent melting can see this readily; but it is actually an easy matter to begin pouring at 7 a.m. and, stopping for a few hours at a time all day long, to have molten iron available almost on tap for each big mold as completed. Wind off, draining out, draft shut off, and what can happen to the cupola until the wind is put on again when iron is wanted? Proper charging and attention to conditions so that gases do not get into the pipes and blower which may ignite explosively is all that is required. With a good pouring gang, molding should go on all the time and foundry skilled labor remains in the greatest measure productive.

That the advantages of continuous pouring are appreciated is attested by the great number of foundries looking into the question at the present time. Progress is, however, essentially slow, as continuous pouring is complicated by questions of smoke, hot sand and the like, which must be taken into account at the same time. However, as our foundries are growing in tonnage, one by one they are extending their pouring time, it being a common occurrence already to have the blast go on after dinner. Necessarily molding must continue until quitting time, with extra help for pouring, otherwise the shop cost would become excessive if run along the old lines of work.

The Permanent Mold

Finally, the question of the iron mold is becoming an acute one. The advantages are so manifest where duplication work is the rule that there is little wonder in regard to the many inquiries that are constantly made. Gradually foundrymen are learning to appreciate the principles underlying the exchange of metal for sand as the container for molten iron, and the future will see the introduction of this new method of casting developed quite rapidly.

* Secretary American Foundrymen's Association.

The Foundry Labor Problem

There is a feeling of unrest pervading the industry in regard to the skilled molder. Unquestionably there are not enough of them to go around, and too few new ones are being trained. Attention is therefore being given to the materials used in the foundry more than heretofore has been the case. Competition is gradually cutting down profits in given lines and hence economy must be practiced in every direction. There is a study of the tonnage that can be produced with a given molding sand as compared with other varieties; also of facings and blackings to help cut down discounts and enhance the selling quality of castings. And finally, melting methods are being looked after in foundry after foundry in order to remove any uncertainties—fortunately not altogether so much to cheapen as to get full value for the expenditure incurred.

What has been written above is reflected in the correspondence of the writer with foundrymen all over the civilized world, as well as seen by him in frequent travels about this and other countries. Perhaps, also, the secretaryship of the American Foundrymen's Association offers unique opportunities for observation. At any rate, what follows may be taken as having been observed by the writer and many others. Passing through shop after shop, and often remaining some time professionally to assist in overcoming troubles, one is struck with the unencouraging aspect of the employees as a whole. The young men seem to hurry through their work to get at the evening's enjoyment, and the older ones dream of pay day while they pound sand. In many shops, on being asked to compare notes with the foremen in regard to possibilities for advancement of men to assistant foremanships, not a single man could be picked out that seemed to care. In such shops they look for foremen outside and this only accentuates the trouble.

We all know of shops the young men of which are snapped up as fast as they care to leave. This while creditable to the concerns on the alert for good workmen is not a fair deal in a way, as the burden of training youth for the foundry should be equitably distributed. However, it emphasizes a tendency which has developed into foremen's associations for educational work only, an effort wisely encouraged in some of our industrial cities by the fullest co-operation of foundry employers.

In general it may be said that at no period of the foundry industry have we faced better defined tendencies for advancement than now, and this may be credited to a higher equipment along technical educational lines on the part of the present generation of foundrymen than was ever the case before.

Customs Decisions

Ignition Cable

The Board of United States General Appraisers has handed down a ruling affecting the classification of ignition cable, composed of rubber and wire. The importation in question was made by the Packard Motor Car Company. Duty was assessed at the rate of 40 per cent., under the provisions of paragraph 135 of the tariff act of 1909, which specifies "telegraph, telephone, and other wires and cables composed of metal and rubber, or of metal, rubber, or other materials." The importer set up the contention that the merchandise is in chief value of India rubber and therefore dutiable at only 35 per cent., under paragraphs 463 or 464. General Appraiser Fischer, who writes the decision, says it is clear to the customs tribunal that the wire or cable here in question, composed of metal and rubber, falls directly within the express terms of the above cited provision. The assessment is affirmed and the protest overruled.

Plumbago Crucibles

The Transcontinental Freight Company has been unsuccessful before the board in an effort to reduce the duty on merchandise invoiced as plumbago melting crucibles. It was assessed for duty as articles composed of earthy or mineral substances under the appropriate

provision in the tariff act of 1909. It is claimed in the protest that the merchandise is entitled to free entry as plumbago under paragraph 654. Judge Hay states in his decision for the board that the protest was submitted without testimony and that there is nothing before the board to justify a disturbance of the collector's action, which he says is presumptively correct. The protest is therefore overruled.

Chain Information

Bradlee & Co., Empire Chain Works, 726 Richmond street, Philadelphia, Pa., have issued a pamphlet entitled "The Care and Use of Chain." Two important tables are presented. One of these gives the pitch, weight per foot, outside width and breaking proof and working strains of chain running from $\frac{1}{4}$ to 3-16 in.; the other gives dimensions of chain links running from 3-16 to 3 in., covering the outside length and outside width. Directions are given how to find from these tables the weight a chain will lift when rove as a tackle; to find the size of chain necessary to lift a given weight, and to find the outside length of any number of links. The following are a few extracts from the pamphlet which will be found of interest by users of chains:

The life of a chain can be greatly increased by frequent annealing and lubricating, and when the wearing is not uniform throughout the length the chain should be cut and pieced where partially worn, so that when finally discarded every link shall have done its full share of work, without overstepping the limit of perfect safety. Hoisting and sling chains should be annealed once a year at least, and carefully examined before being taken into use again. The chain of hydraulic machinery should be oiled with a brush, once a week or oftener if the machines are worked much, and, to effect this, they should be slacked in order to get the oil well between the links. The strength of a chain is the most essential matter connected with it, and the best is none too good. For this reason great care and watchfulness must be bestowed in the endeavor to obtain good material, good welds and, what is so essential, properly formed links, and few buyers understand what cost is thus entailed.

The diameter of sheaves or drums should not be less than 30 times the diameter of chain iron used.

Hooks and rings should be made from the best hammered iron and will appear clumsy and out of proportion to the size of chain, when made to equal its strength; for instance, a hook for $\frac{3}{4}$ -in. chain should be made from $2\frac{1}{4}$ -in. iron and weigh 20 lb., and the ring, if less than 6 in. in diameter, should be made from double the size of iron in the chain, and if greater in diameter the size of iron must exceed this proportion. We would recommend in the construction of hooks, where it is possible, that the shank be made long in order to avoid acute angles, and to facilitate the handling of the hook without risk of injury to the hand of workman. Chains for hoisting purposes should be made of short links in order to wrap snugly around drums without risk of bending, and have oval sides, so that when the chain surges each link will act as a spring, yielding a trifle.

Among the papers to be read at the annual convention of the Indiana Engineering Society, to be held at the Denison Hotel, Indianapolis, January 12, 13 and 14, will be: "Individual Electrical Drives Applied to Textile Mills," C. A. Tripp, Indianapolis; "A 40-Foot Reinforced Concrete Girder," F. A. Kattman, Brazil; "The Use of Upsets and Loop-Eyes on Steel Rods in Bridges," Malverd A. Howe, Rose Polytechnic Institute, Terre Haute; "The New McKinley Bridge Over the Mississippi River," J. D. Knapp, Venice, Ill.; "The Manufacture of Cement," C. W. Boynton, Chicago.

The two-story and basement addition, 70 x 110 ft., which is being built at the plant of the Field Force Pump Company, Elmira Heights, N. Y., is practically completed, and new machinery is being installed.

Ornamental Castings Made in Permanent Molds

Details of the Practice Developed at the Dow Wire & Iron Works—The Mixture, the Molds and the Economies of Production

BY R. HASTINGS PROBERT.*

The production of high-class work in permanent iron molds in connection with the continuous melting process is a commercial success. In the past three years the writer has been investigating permanent cast iron molds for high-class gray iron castings, and the results obtained are entirely successful.

Ornamental Castings

At the plant of the Dow Wire & Iron Works, Louisville, Ky., ornamental gray iron castings are now made in permanent molds, and the character of the product is

the unequal thicknesses of the castings and their rapid cooling around the bars, has been successfully overcome, and ways have been found of making the castings tough, durable, strong and soft enough to machine.

Separate Castings Cored

Ornaments are also being cast separately and cored out the exact sizes to fit the members or bars they are intended for. They leave the mold perfectly clean and are easily drilled and tapped for fastening them into place. The cores are made from soft steel bars or rods

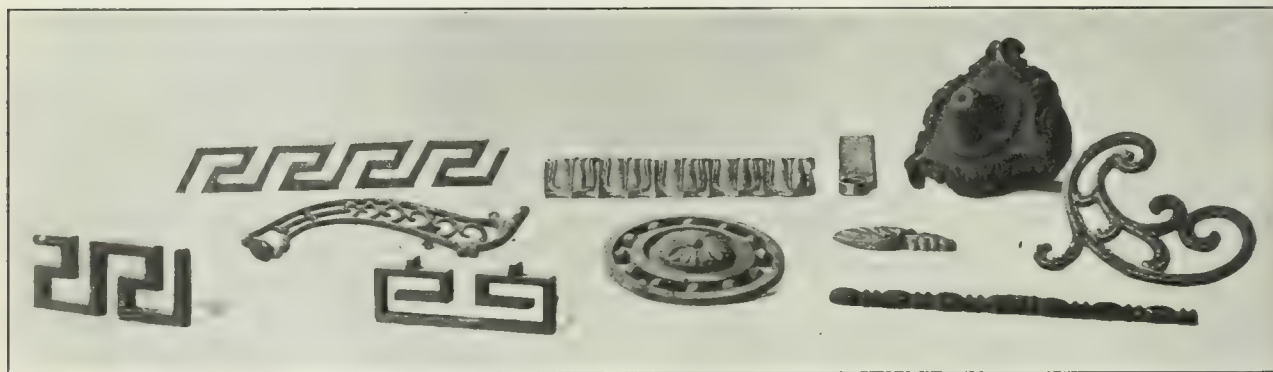


Fig. 1.—Ornamental Gray Iron Castings Made in Permanent Molds.



Fig. 2. Cored Castings as Made in Permanent Molds.

shown in Figs. 1 and 2. The first experiments were made in casting ornaments, such as are fitted on wrought iron bars, as shown in Fig. 3. These ornamental parts are separators, buttons, balls, spear points, pickets, corner pieces, borders, molding, panel pieces which are used in the manufacture of structural work, building materials and ornamental iron work. The casting of these ornaments directly on the particular bar or member to which they belong is a large saving in the shop cost. There are many contracts for which the ornaments can be so constructed instead of separately casting them in green sand, or turning them in the lathe out of a solid bar, with the additional work of filing, fitting, drilling and tapping, or pinning them separately on to their individual members, which is a longer and much more costly process. The possible cracking open of these castings when shrinking, in cooling on the wrought bars, owing to the different natures of the two metals,

for the small castings, and cast iron cores are used for the larger castings. In Fig. 2 the ornaments *a*, *b* and *c* are cored with wrought cores, and the ornaments *d* and *e* are cored with cast iron cores. The castings *f*, as shown in Fig. 2, are parts of grinding machines, for grinding corn, coffee, spices, &c. These for years have been generally known as "chilled burrs for grinding" and have been made more hard than tough—really too hard, and not tough enough to prevent their chipping and spawling off when in use in grinding. They are successfully made in iron molds, with the teeth in their grinding surfaces clear, sharp, tough and strong, their hardness is sufficient to prevent wear in reasonable time, as the quality of these or any other castings can be regulated to any degree of hardness or toughness required when casting them in iron molds.

Ornamental Balusters

In Fig. 3, *g*, *h*, *i* and *j*, are cast iron fluted balusters of Greek resin, made in a permanent mold for the main

* Superintendent Dow Wire & Iron Works, Louisville, Ky.

stairway in a new office building for the Louisville Water Works Company. There were only 250 balusters to make for this special job, so the price of the mold had to be considered, as in all probability it would not be needed a second time. To build the mold large to overcome possible hard castings, meant considerable expense for so small a number of castings. So it was designed and made to weigh 294 lb. The ratio of weight of mold to castings was 21 to 1, as the balusters average 14 lb. each. The mold was made in four parts. The sides were hinged to the bottom, with the top movable, and the whole mounted on a temporary frame trunnioned on stanchions set into the foundry floor.

Owing to the different angles or pitch in the sections

ladles were used, pouring the mold at both ends at the same time.

Overcoming Hardness

As the balusters had to be drilled and tapped at the ends for the connecting screws to the hard railing (Fig. 5) they had to be soft enough to machine. This was accomplished by making a soaking pit in the foundry floor close to the molding frame. The pit was made about 2 ft. 6 in. deep, 3 ft. wide and 4 ft. long. It was lined with one thickness of fire brick and fitted with a No. 12 gauge sheet iron cover. When the balusters were poured they were quickly taken out of the mold at a bright cherry-red heat and laid flat, one upon the other, in the

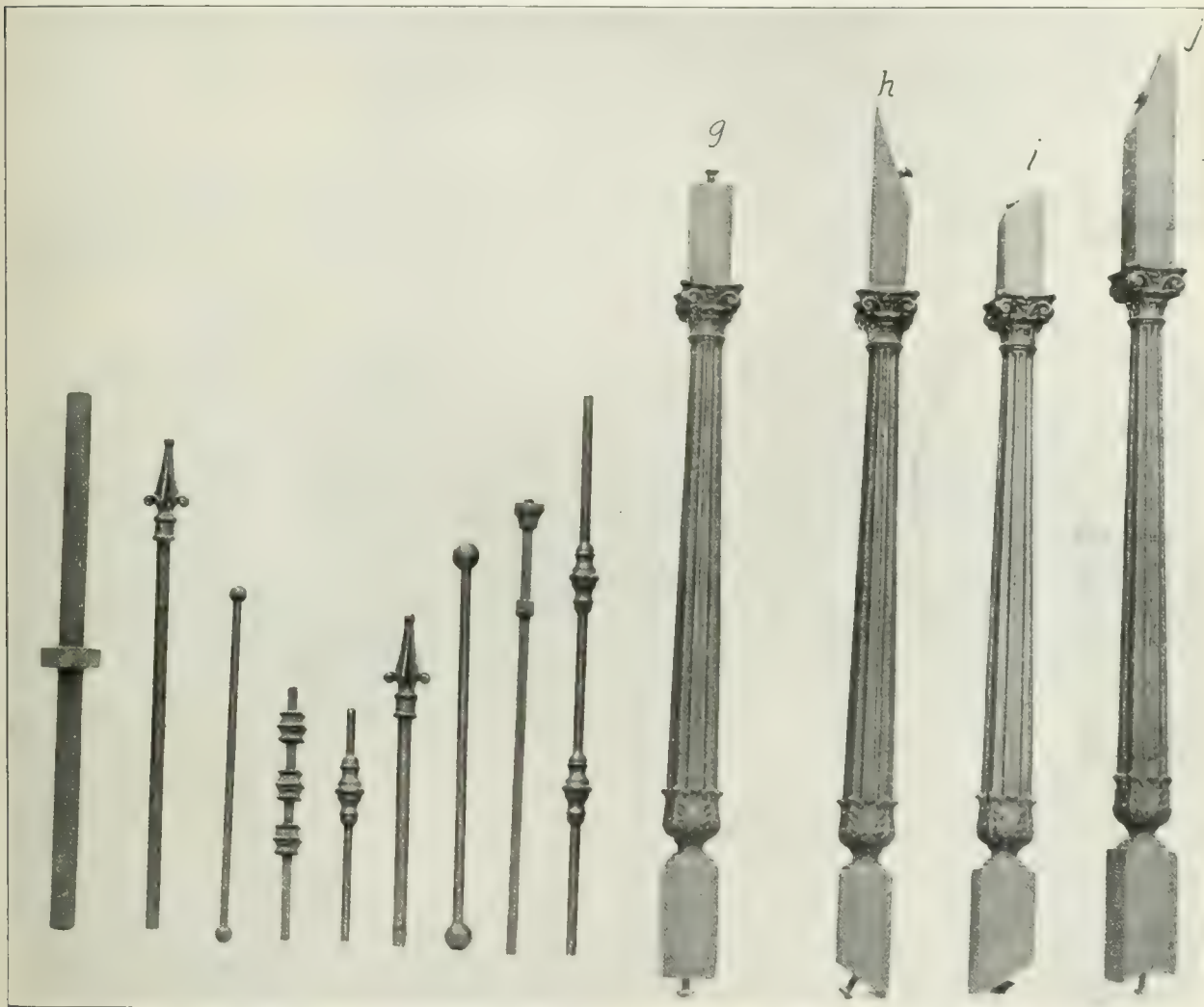


Fig. 3.—(At the Left) Ornaments Cast on Wrought Iron Bars.—(At the Right) Cast Iron Fluted Balusters.

of railing, the balusters varied in length from 2 ft. 2½ in. to 2 ft. 8 in. Notwithstanding this difference in length they were all cast in the one mold, this being made long enough to provide for adjusting the detachable rake pieces *k, l, m, n, o, p*, Fig. 4, to the required length of the balusters, after ascertaining the exact amount of the shrinkage. At *s* is the slotted gauge used for holding the rake piece in place in the mold.

Gates and Vents

A few of the first balusters were poured on end, but this was not a success; the castings did not fill out in the rakes, and the fluted body was seamed or segregated. The mold was then placed horizontally on its frame with vents and gates as shown at *t* and *v*, Fig. 4. The gates were made large, being bell-mouthed on top so as to give a fair sized riser. From the first this was successful. The sharp edges of the rakes were doubtful at first, but it was found that the expansion of molten metal crowded the metal up into the extremely sharp knife edges of the rake, as shown at *g, h, i, j*, Fig. 3.

The metal was poured as hot as possible. Two hand

soaking pit. No fuel was used; all the heat required was supplied by the hot balusters themselves, excepting a small sprinkling of powdered charcoal between the layers. The entire mass was allowed to cool down together and when taken out the product was found to be tough, easily machined and filed, with no scale and as clean as when the pieces left the mold. The molding frame and pit being close together permitted the man operating the mold to place the balusters in the pit without any additional help. The cost of the soaking pit was quite small, and the results obtained were excellent. The castings were not twisted or warped in the least.

Character of the Mixture

The cupola charges were as follows:

250 lb. Rockford pig iron.
150 lb. heavy machinery scrap.
100 lb. No. 2 foundry pig.

500 lb. Total.

Rockford pig is fluid, soft and carries scrap. It runs 2.25 to 2.75 per cent. silicon, .015 to .03 sulphur, 1.40

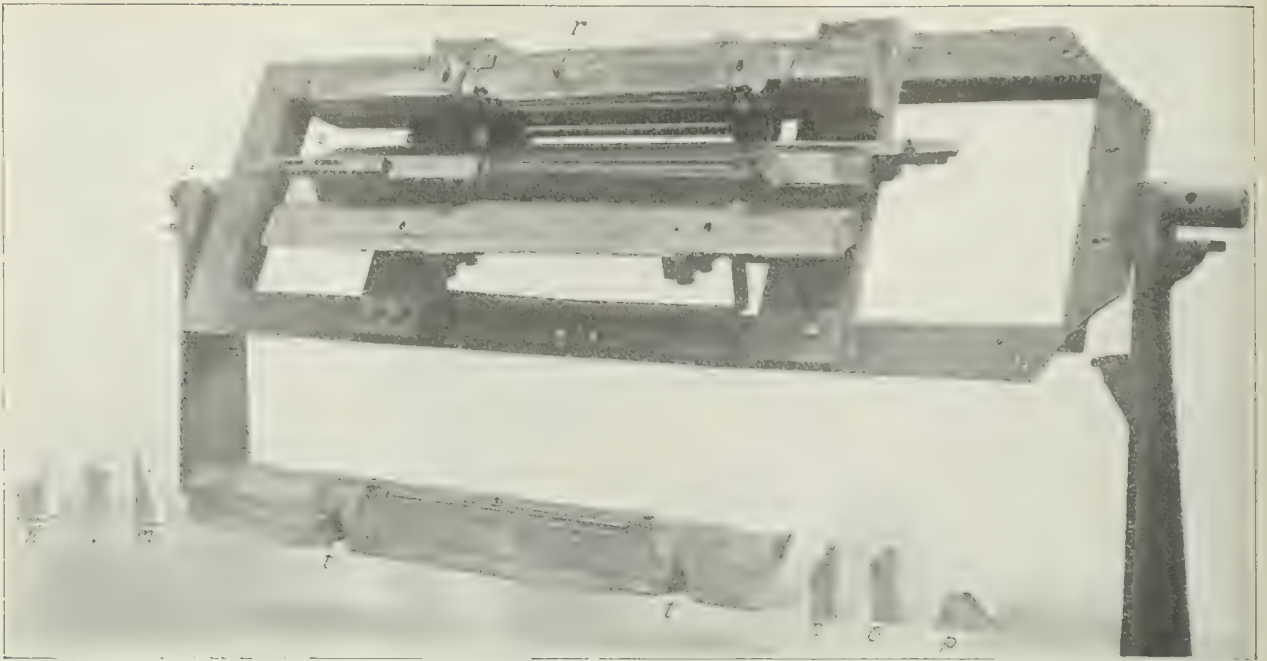


Fig. 4. The Mold on Its Frame, with Gates and Vents. Detachable Rake Pieces.

phosphorus and 0.45 manganese. The analysis of the balusters after they were taken from the mold showed 2.43 per cent. silicon, 0.66 sulphur, 1.42 phosphorus, 0.98 manganese, 0.42 combined carbon and 2.91 graphitic carbon. The fracture showed a fine close grained iron.

The hand ladles each held 25 lb. of metal and to this was added $2\frac{1}{2}$ oz. of 80 per cent. ferromanganese, which was well stirred and skimmed before pouring, giving the very best results. The iron flowed freely and filled out into all the projections and undercuts of the ornamental parts.

Preparation of the Molds

All permanent iron molds should be properly proportioned to prevent them warping, twisting and opening at the joints. To prevent the castings sticking in the molds a mixture of graphite and machine oil should be lightly smeared over the cavity, but put on freely around the gates. Very few of our molds are machined in the cavities, but all the surfaces and the joints are planed or milled smooth and true. The cavities are carefully cleaned with the "skin" left on, as they stand up to the molten metal better. However, good results are obtained with the molds even when their cavities are machined all over. Iron molds are easily made, but care should be taken in molding them. We use a strong, tough, grained iron, with a facing varying in strength according to the size of the mold made.

Output

As stated, the balusters averaged 14 lb. each, and they were cast at the rate of 12 per hour, which amounts to 1680 lb. of castings in one working day of 10 hours in one mold. Considering that the rake pieces had to be set in and adjusted to make the various lengths required, and considering the high grade class of work when made in duplicate and in large quantities, such an output is remarkable, and made at the lowest possible shop cost. If these balusters were a standard product, the mold would have been equipped with quick locking device and the rake pieces fitted up with quick acting lever attachments. On small castings a greater output can be produced, and when there are no adjustments or changes the castings can be made as quickly as the molds are poured and emptied. The molds and cores work easier and better after they are heated up by the first few castings poured into them. Care must be taken to have the molds and cores perfectly dry and free from moisture. The cores work best when slightly smeared over with the graphite mixture.

An interesting fact was brought out when at first trying to pour the balusters on their ends. The molten metal in falling the length of the mold (about a 2-ft.

drop), slightly wore away a projection on the head or capital of the balusters. A piece of Blue Chip tool steel was dovetailed into this part and no further trouble was experienced. It may be well to mention here that we have in constant daily use a pair of permanent molds, in which are made castings that have square sharp cornered ribs, raised up about the surface of the casting. The part of the mold that forms these ribs is made from Blue Chip steel, as cast iron will not stand up any length of time on the square sharp corners, and so far the Blue Chip steel is the best material we have yet found.

Cost of Molding

All the labor is unskilled, as any ordinary workman can be taught to operate the molds in a few hours, and on some small plain molds without cores in a few minutes. The castings require no tumbling or cleaning, excepting that around the gate ends these are sometimes slightly scaled and need cleaning occasionally. The difficulty of getting skilled workmen and keeping them satisfied is eliminated. Unskilled labor is easier to get



Fig. 5.—Section of Railing with Ornamental Balusters Connected to Channel Bar for Mahogany Hand Rail and to Flat Bar to Connect with Stringer.

and control, and in most cases more effective, when given a regular job or machine, with opportunities of promotion ahead.

There is the saving of flasks, sands and facings, with the labor of handling them, besides the cost of repairs on flasks, core boxes, fallow boards, molding machines, expense of core ovens, core making, &c. On most of our work a master pattern is made with double shrinkage allowed. From this is made a plaster pattern and from the plaster pattern the permanent mold is molded. There is but slight wear on these patterns. That for the balusters was modeled on one quarter or side only, the other three quarters were plain, so the cost of making the master and the plaster cast patterns amounted to little, considering the high class work made. Fine thin castings and castings of a superior nature are made by this process. The range and possibilities of the permanent iron mold in connection with continuous melting in the cupola are tremendous. It has proved to me a commercial success and in the near future will result in some very great changes in the present foundry practice and methods, especially for duplicate-work on large quantities, as thousands of castings can be made in a single mold. The cost of the mold is little, considering the tonnage that

It is the sole manufacturer of Barrett's automatic lever jacks, Duff ball bearing screw jacks, Duff-Bethlehem forged steel hydraulic jacks, geared ratchet lever jacks, automobile and motor truck jacks, telescope screw jacks, oil well jacks, pipe forcing jacks, motor armature lifts, traversing bases, &c.

Herrick Rotary Engine Tests

In a description of the rotary engine invented by Gerardus P. Herrick and controlled by the Herrick Engine Company, 74 Broadway, New York City, which appeared in *The Iron Age* June 2, 1910, an account was given of tests on a single cylinder pattern of the engine of about 20 hp. Since that time a double piston type Herrick balanced rotary engine has been built of 100 hp. capacity and tested at the Stevens Institute of Technology, Hoboken, N. J., by Prof. Frederick L. Pryor. The new engine differs from the earlier one not only in being larger, but in having two rotors, or revolving pistons, geared together so that their combined power is taken from one shaft. The action is similar to the earlier engine and the two pistons are served by a single

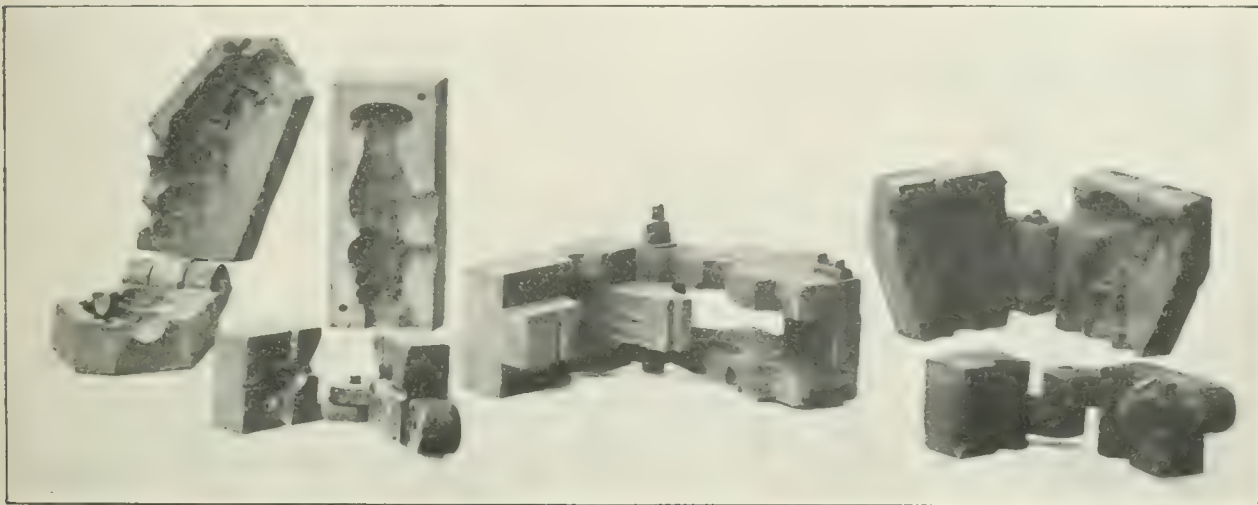


Fig. 6.—Dismounted Molds.

can be turned out on regular standard lines of work; in fact, the mold cost would only amount to the fraction of a cent per pound of the castings made.

Another Duff Jack Improvement

A patent granted December 6 to Charles H. Hylander for an improvement on jacks has been assigned to the Duff Mfg. Company, Pittsburgh, Pa., one of the leading makers of jacks in the country. Mr. Hylander, who is a designing engineer in the employ of the company, perfected a novel device for the improvement of lifting jacks of the trip pattern. It prevents the trip lever from dropping in and releasing the raise bar before it is desired. Other patents, applied for by the company, now pending in the Patent Office, cover other improvements in its various jacks.

The standard type of Duff trip jack has a lifting capacity of 10 tons. The leverage is compound, double acting, lifting the load half a notch on both upward and downward strokes. The load can be instantly dropped from any elevation at the will of the operator. This is possible because of the trip lever. While the jacks are in great demand and are of the highest type, the manufacturer desired to make them even safer and more dependable, and the Hylander device was perfected and patented. Attached to the trip lever it prevents it from dropping back, so that the operator has absolute control of the jack and the load it is lifting all times. The trip jack is especially valuable in track work, although adaptable in many other ways. It has many features and has numerous types.

The Duff Company manufactures every kind of lifting jack used in any business. Almost 30 years have been devoted to the development and manufacture of jacks.

valve chamber. As will be remembered, the main feature of the Herrick engine is the balancing of the rotor by steam admitted under it, so that there is no unbalanced thrust on the shaft in the first half of the stroke while the working pressure is on one side of the shaft.

The best steam consumption obtained with the 20-hp. engine running noncondensing and supplied with steam at 145 lb. was 50.7 lb. per horsepower per hour and when exhausting into a vacuum of 19.52 in. with a steam pressure of 115.2 lb. the steam consumption was 44.2 lb.

The 100-hp. double piston engine has lately been tested driving a 75-kw. 120-volt direct current Allis-Chalmers generator. The engine is rated at 100 hp. at a speed of about 800 rev. per min. when operating with dry steam at 110-lb. pressure and with a free atmospheric exhaust. In the tests the conditions nearest to these were: Steam pressure, 116.1 lb.; speed, 815 rev. per min.; brake horsepower, 114.9, at which the steam consumption per horsepower-hour was 38.4 lb. The lowest consumption was obtained with a steam pressure of 106.5 lb., a vacuum of 20.9 in., a speed of 816 rev. per min., and a brake-horsepower of 128, at which the steam consumption was 32.4 lb. per horsepower per hour. It will be seen that this is about 25 per cent. overload, according to the rated capacity. The efficiency of the engine increased from its smallest to its highest capacity. When operated at about half capacity, or 52.1 brake-horsepower, the steam consumption, running noncondensing, was 50.1 lb. per horsepower per hour. At 85.3 hp., somewhat over three-quarters load, the consumption was 41.6 lb., when running noncondensing.

Within the next two or three months the Herrick Engine Company expects to complete arrangements for manufacturing the engine and is now ready to negotiate with engine builders with regard to rights to its use.

A Proposed Malleable Castings Plant

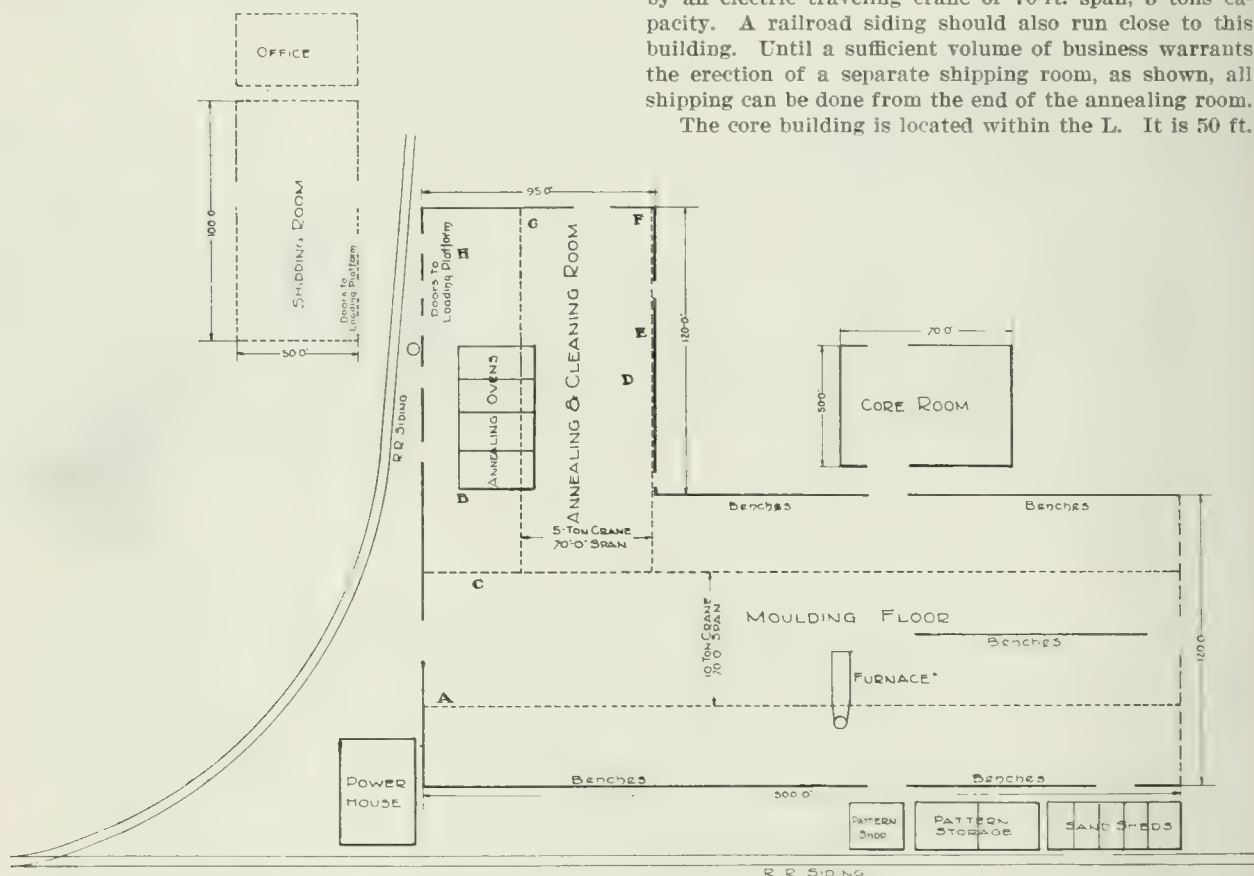
Layout, Construction and Disposition of Equipment in a Customs Foundry, Designed to Secure a Maximum Economy in Manufacture

BY "REAUMUR."

Often one reads of a new malleable foundry, "up to date in construction and fully equipped with the most modern and labor saving devices." But a visit to the plant will almost invariably reveal the old "rutty" construction and antiquated machinery. Where we usually find the best equipment is in the old plants of poor construction and arrangement. Of course all will not agree with the following plans and suggestions for a customs malleable foundry, but such a one, while the initial cost of construction and equipment is greater, will economize on labor sufficiently to easily pay interest on any extra outlay. Moreover, the company building it will be in

and handled so that from the raw to the finished product is a continuous and forward movement, there being no unnecessary handlings and no "going and coming back." For a one furnace plant, with sufficient molding space to take care of two, the foundry proper is 120 ft. wide by 300 ft. long, commanded by an electric traveling crane, 70-ft. span, 10 tons capacity. This building is paralleled by the railroad siding, along which should be plenty of space for yard storage. One end of the foundry, shown by dotted line, may be closed up only temporarily, thereby readily permitting extension. The annealing room is the wing of the L, 95 ft. wide and 120 ft. long, controlled by an electric traveling crane of 70-ft. span, 5 tons capacity. A railroad siding should also run close to this building. Until a sufficient volume of business warrants the erection of a separate shipping room, as shown, all shipping can be done from the end of the annealing room.

The core building is located within the L. It is 50 ft.



General Arrangement of a Proposed Malleable Foundry Aiming at Maximum Economy in Handling and Manufacturing.

position to secure and care for a larger volume of business, because of lower cost of manufacture and a better finished product.

There is certainly no excuse for the old wooden structures, and no foundry should be built of anything but steel frame work. This gives a plant indestructible by wear or fire and is necessary when cranes are to be installed. The roofs should be of matched material and a good heavy ply of guaranteed and fireproof composition roofing. The walls of the foundry should be at least 16 ft. The roof of brick for the first 4 ft., and the remainder almost solid windows if molding benches are to be installed. The windows should be of wired glass set in steel sash; those in the cupola pivoted to swing. All buildings should be put up of material as fireproof as possible, especially the power plant and pattern storage, two vital points of any plant.

General Layout

The plant is laid out, as shown in the accompanying plan, in the form of an L, and all material is unloaded

wide by 70 ft. long and two stories. The mixing of sand, storing of material and stocking of cores are done on the lower floor, and core making and drying on the upper, an elevator being the means of carrying from one to the other. This is an especially good arrangement when girl core makers are employed, insuring privacy for them.

The pattern making and pattern storage buildings are located as shown, each of absolutely fireproof construction. In many plants owning and using patterns for specialties these are placed each night on rack cars and taken into the storage building. The power plant is located at the end of the foundry building, close to the railroad—i. e., coal supply—though by all means a boiler should be attached to the stack of the melting furnace and the waste heat there utilized. The power plant should be equipped so that each machine or each set of machines is controlled individually by motors, a most profitable and sensible arrangement.

The office is located near the shipping end, its size and arrangement depending a great deal on the officers who will locate there, the method of doing business, &c.

No well equipped plant should be without a laboratory and at least a machine for transverse and deflection tests.

One thing of importance is sand storage sheds. These are next the siding and parallel the foundry building. They should be large enough for several months' supply of all kinds of sand, fireclay and firebrick, and built substantially enough to permit of being heated in winter to prevent freezing.

Equipment and Working Space

We will now consider the arrangement of equipment and working space. The foundry is purposely built wide, to allow molding stalls along each side and a double row down the center, on the far side of the melting furnace from the standpoint of the annealing room. This will make each floor 25 ft. deep and 10 ft. wide (this width preferred when casting only once a day), with a 10-ft. gangway.

The center benches are omitted on the opposite side of the furnace and that space used for floor molding, heaviest work nearer the annealing room. The melting furnace is situated about 130 ft. from the permanently closed end of the foundry and far enough in the shop to be controlled by the crane, and with a door from the stock yard near it.

The hard iron tumblers, in a single file at A, are so built as to enmesh singly and connected with a dust arrester. The dust arrester is put in a dead space near both hard and soft tumblers, a good place being about 6 ft. above the floor at B. At C are the hard iron sorting benches, and here is one place usually considered so unimportant in a shop that no attention is paid to it. But the benches should be raised, with a series of chutes at the back end. The sorter throws the castings and scrap into the proper chutes and spends no time or energy turning to the side or completely around. The chute leads to a barrel or a box with lugs and is taken away by the foreman or price checker, so that the sorter can be kept busy all the time. The writer has seen one sorter with such an arrangement take the place of three under the old method.

The packing of castings for annealing is done in front of the oven to be charged, an advantage of the wide annealing room. The ovens, four in a battery, have their charging ends under the control of the 5-ton electric crane. The soft iron rattlers are located opposite the ovens at D, arranged similar to the hard iron file, and the sorting is done as in hard iron on benches at E. At F can be located a straightening and test machine, small drill, &c. The grinding is done at G and the sorting and shipping at H.

For all work requiring sharp edges or to be plated, tinned, japanned or galvanized, a sand blast tumbler of approved type should be installed, and the finish thus obtained will secure a sufficiently higher price to more than pay for the equipment.

How the Economies Work Out

We will now follow the actual making of castings to learn the benefits of costly equipment, and the reasons for location of machinery, &c. Through each door runs an industrial truck operating throughout the stock yard. To set on small cars are iron bodies of 1 ton coal capacity, with one hinged dropping side; also heavy flat bodies of 5 tons pig iron capacity. In the iron car is shoveled a quantity of molding sand. It is pushed into the building far enough to permit the crane to pick it up, then distributed to the points desired. So all sand, fireclay, &c., are handled.

The pig iron is loaded on the buggies, run on a scale and set on the furnace by the crane. The sprues, having been collected from the ends of molding floors and taken to their tumblers by the crane, are dumped into the furnace by the crane. This manner of charging can be completed in 10 min. by the furnace labor alone, and thereby does away with the 10 to 20 chargers and their half hour's time. All bungs, too, are handled by the crane. The coal for the melting furnace is brought in 1 ton at a time, weighed and set on the horses, so that the fireman shovels direct from it, the side having been

dropped, into the furnace, a great saving in space around a spot always too crowded.

The fuel for the power house and the annealing ovens is unloaded, so that it is practically ready to be fired, and no handling at these points is required.

The sand for the corerom is taken by track and crane in the large buckets, so that the labor is very little on this item.

After pouring, the castings are knocked from the gates into piles at the end of the floors. But now, instead of a wheelbarrow or tale boxes, again the crane comes into use. A box about 14 in. deep by 4 x 6 ft. of good, stout lumber, is carried to the pile of castings and the latter are forked into it. So they (and the sprue mentioned before, which is cleaned as castings) are carried to the rattlers (one box having the capacity of a tumbler) and emptied in direct. The wooden box is placed beneath the mill and when the castings are cleaned they are dumped into it. The box is lifted by the crane and taken to C, where its contents are dumped on the benches. When sorted, chipped and counted or weighed they are taken in their containers to the packing floor. Here the pot bottoms have been placed in position by the crane. Now the first pots are brought from the pile at the end of the ovens or a newly dumped pile by the crane, and the packing goes on. When ready to load into the oven the pots, three and four high, are carried to the front, whence they are put in place by means of a steam truck or a specially designed hand truck, which can be run by three men. The oven door is of steel frame, lined with firebrick; it is set in place by the crane, daubed up, and the oven fired. It is really deserted looking in such an equipped annealing room, for so few laborers can handle the work ordinarily requiring many.

When annealed the pots are set out to be dumped in the same manner as put in, in front of D. The pots are lifted off the bottoms by chains, castings knocked out and the pots at once taken to be refilled or to the storage pile. The castings are forked direct into the tumblers and when cleaned are dumped into boxes and taken to E. Thus practically endeth the trip of the material—short and quick?

The cores are stacked in the first floor, as close as possible to the doorway, and loaded on racks set on a car. A large number of trays can then be carried at once into the foundry and distributed there, by hand or trolley. The core benches are set against the walls, in which are sufficient windows to give a good light.

Provision for Additions

The plant thus outlined can be added on to until finally the foundry occupies three sides of a hollow square and the annealing room the fourth. Hence the need for a separate shipping room. The corerom is in the center of the foundry; the supplies can all be handled economically, and the shop is—that important desideratum—a unit.

One point to be emphasized is to build with an abundance of light and air and suitable lavatories and hygienic conditions for all employed; also to install a heating system. These all mean expense, but the firm will benefit by greater outputs from the employees, whose health is not broken by dust and darkness; by saving the losses due to ruined work done in shadows, and, finally, by having a satisfied, steady and loyal organization.

The British Government has just placed a contract with Cammell Laird & Co., Ltd., Sheffield, England, for building complete, including armor plate and armament, one dreadnought battleship, which will be the largest and most formidable of the battleships in the British navy. The cost will exceed \$10,000,000. The displacement will be 24,000 tons and the engines will probably be of not less than 27,000 hp. Cammell Laird & Co., Ltd., have a branch in New York at 34 Cliff street, where they carry a complete stock of high speed, carbon and automobile steels.

The Screw Machine Products Corporation, Providence, R. I., will open a branch office in Detroit, Mich., January 9. John J. Flaharty, hitherto at Providence, is to represent the company as manager of the Western office.

Sound Business Methods in the Foundry

The One Great Need of the Industry—A Summary of Foundry Cost Elements with Illustrations of Their Application

BY ELISWORTH M. TAYLOR.

In presenting this subject for discussion I do not wish to convey the impression that foundrymen do not know their business. On the contrary, it has been my privilege to look into the inside workings of a sufficient number of foundries in several sections of the country to be able to say that our foundrymen as a rule certainly do know their business, speaking solely of their ability to produce good castings.

But in every business proposition there is something else to be considered besides the ability to produce a good article, and that is the ability to market the good article at a profit. To accomplish this with any degree of certainty the foundryman must have adequate knowledge of sound business methods. My experience leads me to believe there is no other one thing which causes more inequalities in the status of different foundries than the lack of appreciation of "sound business methods."

I am well aware of the publicity the subject has received in the past few years, and I know foundrymen as a body have given and are giving the matter their serious attention. But it is hard for many of us to get out of a rut; and usually something has to give us a good hard jolt before we force ourselves to adopt measures which we have felt for a long time would be good for us.

A Hereditary Industry

It is easy to understand why this is exemplified in the foundry industry. Until within a very few years many were in it through inheritance. Information of the trade was passed along from father to son for generation after generation. Outsiders were not received with open arms. In his training the son, as was the case with the father, was taught practical things. He learned how to use his hands, to mix sand, to make a mold, to melt pig iron and to make a good casting, many times with practically loose boards for a pattern. Thus throughout his apprenticeship his attention was directed to physical things, and he learned to master the materials nature gave us for making castings—those elements which he could see and grasp with his hands. This, then, was the foundryman's world, his education and primarily his business. And beyond this line he had very little opportunity or desire to roam.

The Old Way of Making Prices

When it came to making a sale or putting in a bid for business he lived up to his training; and in deciding on the selling price he used those things which he could see and grasp with his hands. He knew approximately how long it would take to make the mold, what he had paid for his pig iron and possibly one or two other items which he could see. He added these amounts together, and then he hesitated, because he had reached the dividing line between those elements in the business which he could see and grasp and those which he knew existed and must be considered, but which his training had never taught him how to grasp with his hands and hold right up before his eyes. And then he did what any other mortal man would do under similar circumstances. He added to the cost of those elements which he could see, some arbitrary amount which he hoped would cover the items he was unable to grasp, and give him a profit. Or perhaps he was told that Smith would make the casting for 3 cents a pound. So he said: "All right, if Smith can make the casting for 3 cents a pound I guess I can. Give me the order."

This was the situation for years. The men in the foundry industry who knew how to produce good cast-

ings formed a sort of close corporation to see that no outsiders should get the information, and then turned around and sold their good product at practically whatever they could get for it.

Finally, the great growth in the machine shops and mills of the country forced the shop man either to build his own foundry or to take a greater interest in the affairs of foundries already established. In this way men were brought into the foundry industry who were not in the habit of selling goods at any price they could get for them. They wanted information as to the soundness of an investment in the foundry industry; and they were forced to the conclusion that the great body of foundrymen had very little knowledge of those things which directly affect the financial end of the business, and were making prices which not only endangered the prosperity of their particular properties, but also the livelihood of every other foundryman in their immediate vicinity.

An Educational Influence

After a time, as if in answer to the need, there sailed into view on the horizon a staunch little craft with the name "American Foundrymen's Association" written across her bows and the flags of publicity and knowledge floating from her masthead. As a result of the advent of this little ship, the foundry industry has been greatly benefited. Among other things the foundryman has been compelled to give attention to sound business methods, with which he was formerly not on very good terms. He has learned that there is such a thing as the true cost of castings, and that all the elements which go to make up this cost may be reduced to tangible form and held right up before his eyes so that he may see and grasp them.

But in spite of the wide publicity which this phase of the subject has received there are still too many foundrymen who are taking orders at any price, and who stick to arbitrary "rule of thumb" methods of arriving at it. Down in their hearts they know these methods are wrong or inadequate, but, like the foundryman of old, they hesitate when they reach the point of dealing with those elements which they cannot see or grasp, or else are satisfied to delude themselves into the belief that these elements do not affect the results.

Losses Stopped by Cost Study

If I could do so consistently I would like to give here some of the facts which have developed in foundries where all the elements of costs have been reduced to concrete figures and a comparison made between the true costs of the product built up therefrom and the old costs, which had been made up from erroneous or distorted elements or by some clairvoyant method. However, it may be stated that in every case that has come to my attention it has been proved that, even though the foundry, continuing in the old way, might have made some money on its entire year's operations—and this has not always been the case by any means—there were certain orders or period contracts on which it was steadily losing money in amounts running from hundreds to thousands of dollars annually. In many instances as soon as the facts were incontrovertibly established it has been possible to reduce the losses to a minimum figure or to eliminate them altogether.

Some Modern Instances

Take, for example, the case of a jobbing foundryman doing a fair volume of business, and far-sighted enough

to see there is likely to be a great demand for a certain line of castings, due to the unprecedented growth of a large industry. Suppose this foundryman should go ahead and perfect his physical processes to a point enabling him to produce the line in time to meet the demand, and his product from the standpoint of workmanship and quality is second to none. Along comes the manufacturer and says: "Those castings are beauties. I want some of the same kind. How much?" "Four cents a pound," replies the foundryman, basing his price on misunderstood cost elements. Then he takes steps to find out what the real cost factors are and finds that every pound of those beautiful castings actually costs him 6 cents.

Take another foundryman who has the chance to contract for a large tonnage over an extended period, and who thinks if he can only get that order he will be able to add a few hundred dollars to his profit. He is not sure of his elements of cost, but lands the business, and later on finds he has loaded up his foundry with a loss on every ton that goes over his scales.

Take the case of the foundryman who has a representative number of customers. Some of his contracts are made on a flat rate for the entire tonnage sold; some on a variable scale according to weights and classes of castings; some at fixed amounts for individual patterns, and some at a fixed percentage of "profit" to be added to the cost of the castings produced. Suppose such a foundryman is not operating his property in accordance with sound business methods; suppose he does not know what his true cost elements are and how to use them; what is likely to happen to him?

Instances like these make a man stop and think, and I have seen enough of the inside workings of foundries to know that many a good casting to-day goes over the scales for which the foundryman never receives the true cost of production, and probably never will until he changes his business methods. Strange, is it not, that an owner or manager will rush out into the foundry and tear things to pieces because some one has spoiled a casting by using too small a core, and then will go back to his office and pat himself on the back for getting an order when he has actually charged less than the castings cost? Which is the more culpable—to lose a casting once in a while or to be so indifferent to true cost factors and methods that it is only a stroke of luck if you do not happen to sell the best casting ever made for less than the cost of production?

I want to say that it is the duty of every foundry owner and manager to know what his castings actually cost. It is a duty which the foundryman owes not only to himself but also to the molders, the laborers and all others whose livelihood and welfare depend upon the permanency of the industry of which he is the responsible head.

Not Red Tape

Perhaps some foundrymen regard sound business methods as red tape. If they were red tape, as they are not, I should unhesitatingly advise foundrymen to go in for all the red tape they can get their hands on. If there must be a day of reckoning, it is much better to be able to blame the catastrophe on red tape than to be compelled to admit that we do not know how it happened.

As a matter of fact, sound cost methods are within the reach of all foundrymen. When once we get to know them we wonder how it was that they ever escaped our notice. When the ordeal of a formal introduction is over we learn to regard them as earnest, sincere, efficient friends. They save us from many a false step, and they are simple and direct. They can be understood and grasped by the average intelligence when once we are put on the right track.

I know of an instance where a concern engaged primarily in the foundry business installed a sound cost system which made each department stand on its own feet. The methods were made so simple that it was possible for a clerk in the establishment, who was only indirectly connected with the installation, to elucidate

them in a magazine article as a sample of sound practical methods—the same as if he had conceived the scheme and had recommended similar methods over an extended period.

Elements in a Sound Cost System

Now let us give attention to the elements of sound foundry cost methods themselves. A few years ago our old friend, the American Foundrymen's Association, gave some attention to these matters, deeming them of vital importance to the foundry industry. A committee composed of men representing various branches of the industry met together and as a result a formula was adopted setting forth in proper order the elements which go to make up the true cost of a casting, and showing how the facts must be applied if a foundryman desires to know what he is doing. Possibly some foundrymen may be helped by going over the data, and I will accordingly repeat herewith the recommendations which this committee made, combined with a memorandum which was submitted at the same time:

SUMMARY OF FOUNDRY COST ELEMENTS

1. Total good castings produced.
2. Cost of metals used.
3. Cost of direct labor.
 - Molders.
 - Molders' helpers.
 - Apprentices.
 - Coremakers.
 - Coremakers' helpers.
 - (And all similar labor capable of direct charge to any particular order.)
4. Cost of indirect items divided into—
 - (a) Burden items to be distributed on basis of weight of good castings:
 - Cupola costs.
 - Molding supplies.
 - Flask costs.
 - Yard charges.
 - Cleaning costs.
 - Core supplies and expense.
 - (And all items of a similar nature.)
 - (b) Burden items to be distributed on basis of cost of direct labor in a casting:
 - Office and clerical charges.
 - Foremen, &c.
 - Miscellaneous foundry labor and expenses.
 - Rent, &c.
 - (And all items of a similar nature.)
5. Total cost of output.
6. Commercial costs. Selling expenses of every nature, including advertising, &c.
7. Gross cost of output.
8. Net cost of metals used per pound of good castings (obtained by dividing item 2 by item 1).
9. Burden charge to be distributed to individual costs on a basis of per pound of good castings (obtained by dividing item 4a by item 1).
10. Burden charge to be distributed to individual costs on a basis of per cent. of direct labor (obtained by dividing item 4b by item 3).

The examples given in this schedule illustrate the classification of costs necessary for all kinds of foundries. It is absolutely essential that every foundryman should know and use these elements in estimating his costs. It is necessary, of course, in some instances to modify the arrangement to meet individual foundry conditions. But all sound foundry cost methods are built upon the elements set forth in this schedule. They may be enlarged upon or subdivided to meet the requirements of the most exacting nature, which is some times a good thing to do, but in any event the correct principles are there, and that is the essential feature.

Application of the Cost Schedule

In closing, let us show briefly how the foundryman may use this schedule. Suppose he wants to know:

- (a) What is the gross cost of production? See items 5 and 7.
- (b) How should we figure the cost of an individual casting? Multiply the weight of casting by item 8. Get the cost of the direct or applied labor used to produce the casting. Multiply the weight of casting by item 9. Multiply the direct labor by the percentage rate obtained by item 10. The total of these amounts is the cost of the casting up to the shipping office door. Add the proper proportion of item 6.

In apportioning the commercial cost to the classes into which the product may be divided, the unit of distribution should be made up on a basis of equity, taking into consideration the real conditions governing the sale of

each class, such as the amount of sales, the costs up to the "Commercial Cost Section," the difficulty in making sales, the volume of advertising, &c.

The total is the gross cost of the casting.

(c) Suppose it is desired to divide the production into two or more classes: say, for example, "heavy work" and "light work," so that we may obtain the average cost of these classes without getting the detail cost of each casting. Separate item

1 into "heavy work" and "light work." Keep a record of amount of item 3 used for each class. Then proceed exactly as outlined for (b).

(d) Suppose it is desired to secure the cost of Smith's work, Jones' work and Brown's work, to find out which is the most profitable, and without getting the detail cost of each casting. Separate item 1 according to customers. Keep a record of amount of item 3 used for each customer. Then proceed exactly as outlined for (b).

The Progress of Mechanical Engineering in the Foundry

With Special Reference to the "Continuous Pouring" or "Mechanical Handling" System—Some Malleable Foundry Improvements

BY GEORGE K. HOOPER.*

Such progress has resulted from the attention given to mechanical engineering, as applied to foundry necessities, that it is probable that few large foundries are now constructed which do not embody to a considerable extent the substitution of machinery for manual labor in some processes; and practically all large manufacturing concerns are remodeling their iron foundries for operation on what is designated the continuous pouring or mechanical handling system. At the risk of going over

and from a pouring point, usually at or near the cupola, coupled with which conveying is sufficient time allowance for cooling to enable the casting to be shaken out without injury. Means are also furnished for shaking out the mold, with a separation of sand, casting and flask; means for cleaning, cooling and tempering the sand and returning it then to the molding machines or floors; means for taking the flasks back to the molding machines and floors, and means for removing, cooling and often of mechanically cleaning the castings.

In this way are successfully made pipe fittings in both gray and malleable iron, small sanitary ware, valve bodies, plow shares, radiator loops and many similar lines of iron castings; and this method bids fair soon to be extended to brass work, such as car journals, while by simple modifications of it are made car wheels, ingot molds, soil pipe and cast iron pipe.

Two arrangements of this type are illustrated in Figs. 1 and 2. These differ in the following particulars: Fig. 1 shows all of the operations located in a one-story

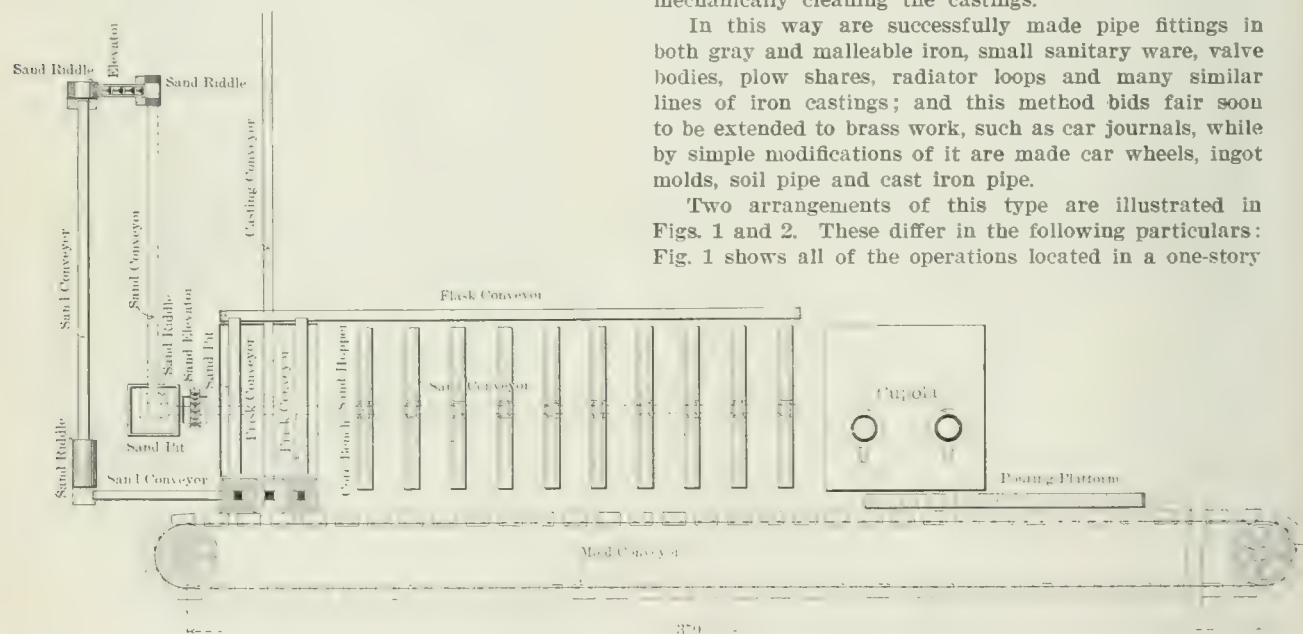


Fig. 1.—Arrangement of a One-Story Continuous Foundry in Which the Molds Are Carried to the Iron.

old ground, I will say that this system comprises the melting and pouring of iron throughout the entire working day, with the handling of sand, molds, flasks, cores and castings by means of conveying machinery.

The "Continuous" Foundry in Which the Molds Are Carried to the Iron

The continuous foundry has embodied itself naturally in two types, the first being that most advantageously used by manufacturers of a specialty in which a few standard flasks may be made to accommodate all of the patterns which are run, and the second and later development, that in which a large number of flasks of differing size are necessary and the castings produced vary considerably in pattern and size.

The development of the first type, or that in which the molds are carried to the iron, has been fairly well standardized. It comprises means for carrying flasks to

building, the product being so bulky and heavy that it is not well suited to handling by gravity from an upper story to lower floors. Fig. 2 shows an arrangement with the foundry operations on the second story of a two-story building. The product is such that it may safely drop by gravity to the ground floor for subsequent operations and storage, and the saving in handling offsets profitably the excess cost of a two-story over a one-story building. It is obvious that such a foundry might, as is frequently the case, be placed on the upper story of a building of sufficient number of stories to suitably house all the operations required by the product.

The "Continuous" Foundry in Which the Iron Is Carried to the Molds

The second type, or that in which the iron is carried to the molds, has not so far been well understood as a type and therefore has not met with the favor which should belong to it. Attempts have been made to adapt it without suitable study of its requirements and limita-

* Consulting Engineer, 165 Broadway, New York.

tions and there has been consequent disappointment in results. Such a foundry comprises molding floors suitably arranged and provided with overhead travelers for handling large and heavy flasks and castings; tracks for

above, the serious congestions involved in making molding floors too narrow for the work and in having passages clogged by conflicting currents of filled and empty ladles, cores, castings, patterns and flasks.

Pump parts and transformer cases are being made in this way, with attempts at other forms of castings, but many changes are necessary in this type before it

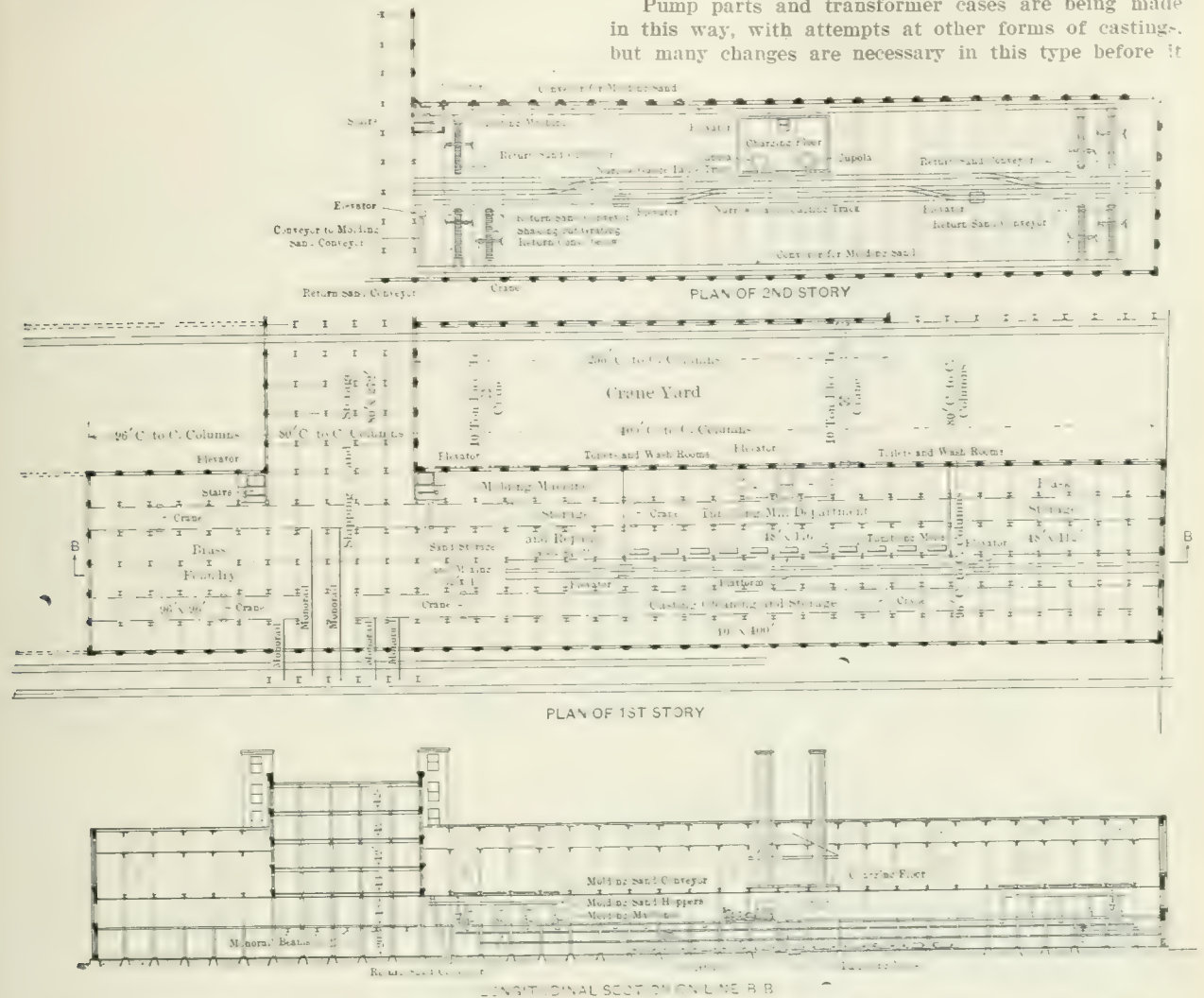


Fig. 2.—A Two-Story Continuous Foundry, Making Cupola Malleable Castings, in Which the Molds Are Carried to the Floor.

bringing molten iron from the cupola to the floors; gratings in the floors on which the castings may be shaken out, and means for collecting the shaken out sand and returning it to the molders or molding machines.

This type of foundry has not yet reached its best development, and, as it has heretofore been constructed, involves a serious cost for labor and overhead cost for building; but it is a meritorious step in the right direction, and it is very probable that the next few years will see a considerable number of iron foundries of this type installed, with some if not all of the present faults corrected. These have been, in addition to those mentioned

realizes all of the advantages which belong to it. Some of the changes predicted are: Mechanical handling of sand to save room and labor; different proportions of story height to make much otherwise wasted space available, saving thus carriage, labor and room; better proportions of molding floors and gangways to prevent conflicting currents of work and material, and sufficient mechanical means of handling full and empty ladles to and from the floors. An improved arrangement is shown in Fig. 3, which is a design recently made for a well-known concern.

Future progress in mechanical engineering in the gray iron foundry seems to lie in the direction now being successfully tested, of permanent molds. Here the skill of the engineer and metallurgist combines to reduce materially the labor and cost of manufacture, while an improvement in the physical characteristics of the product results as well. In some measure this change in physical characteristics will extend the field of the gray iron casting, making it available for other uses where previously a different and more expensive form of metal would be necessitated.

Mechanical Handling in Malleable Foundries

No attempt has yet been made to apply either of the forms of the continuous foundry to the production of malleable iron as melted in the reverberatory furnace, but there is reason to believe that this can be successfully done when the furnaces can be so proportioned to the work that the heats may be drawn off from one furnace after another with a fair degree of continuity. An attempt has been made at mechanical handling in the malleable foundry in the production of journal boxes

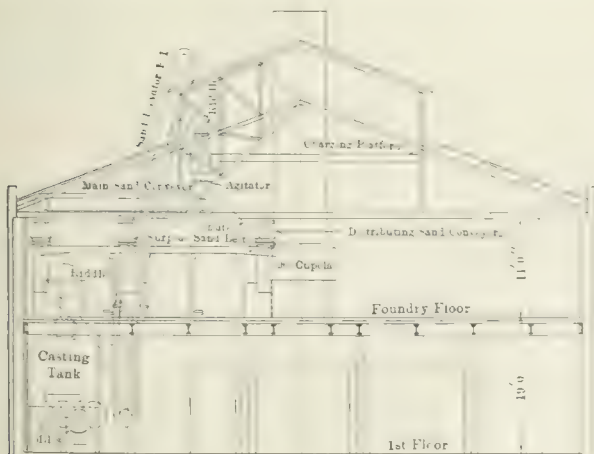


Fig. 3a.—Cross Section of Carrier Foundry Shown in Fig. 3.

driven charging machines, enabling a saving not only in handling cost and space, but as well enabling the size of annealing ovens to be increased, thus further saving space.

The mechanical handling of annealing scale seems also to be now an assured success, and complete systems have been developed for this work, comprehending the catching of the hot scale as it is shaken out of the pots and stacks, removing the dust and dirt from it, crushing the lumps and distributing it in suitable overhead bins, whence it may flow by gravity for further use in packing castings. The old annealing room, with small ovens, heaps of scale dust and heat, is practically a thing of the past.

For handling the heated scale a new type of conveyor has made its appearance, involving no moving parts, no axles and wheels, no sprockets and chain and no buckets, promising thus a minimum of maintenance expense; moreover, its power consumption is low.

With the large annealing oven has come the generation of the necessary heat by means of pulverized coal, and this system may be accounted a success for this purpose. The question of air pressure and proper fineness of the pulverized fuel are well worked out, and no reason exists why this system should not be widely extended for this work.

For the steel foundry the mechanical development of the small converter into sectional form has won success, rendering this device available for a greater number of heats with a smaller time out of service for relining, this assisting as well to reduce plant cost by rendering duplication of converting equipment unnecessary.

Continuous Core Making

For foundries of any type making large numbers of cores of sizes not greater than can be easily carried by one man or youth there is available the core carrying conveyor, which takes green cores from the benches to the ovens, and thence, after cooking, to storage racks and washing equipment, returning then the empty plates, driers or core boxes to the benches for further use. Such a core making and conveying plant is shown in Figs. 6 and 7. Surprisingly little breakage to green cores results from this handling and the economy of labor is great.

With such carrying systems are used continuous ovens of types shown in Figs. 8 and 9. The first of these is best adapted to the use of waste heat from annealing or other furnaces. The second is fired directly by oil or gas, as best serves. The second type possesses the advantage of having no machinery in the heated space, and requires no power to drive; it also has the great advantage of enabling any core to be withdrawn when properly baked, saving thus in time and controlling the baking of cores, while not in the least detracting from the continuity of operation.

The Jarring Type of Molding Machine

The importance of the molding machine to the foundry has been greatly enhanced by the study given to the development of the "jarring" machine, and the improvements made in the type by the studies of an eminent mechanical engineer. He has produced a machine, which in addition to absorbing all of its energies within itself, has also increased the efficiency of operation of the type. It has long been recognized that the condition of the mold made upon the jarring machine is superior to and more nearly approaches the ideal condition of a sand mold

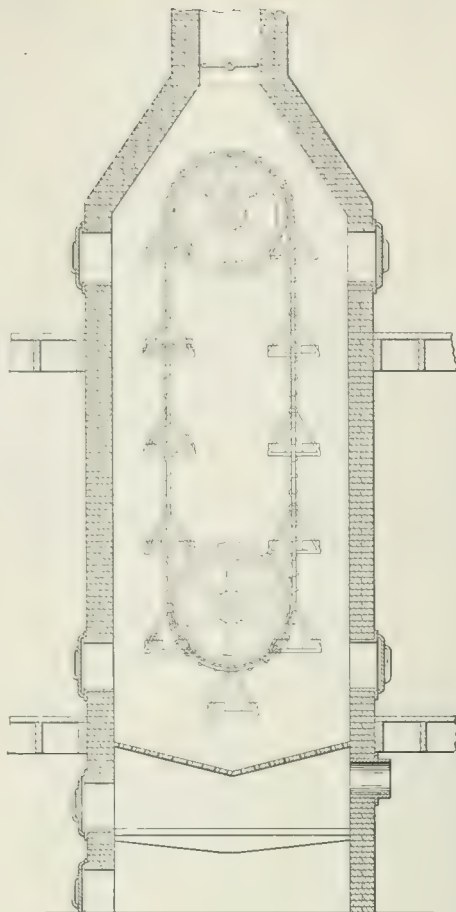


Fig. 8.—Continuous Core Oven Adapted to the Use of Waste Heat.

than that produced by any other method of ramming; in addition to this, the ramming operation is more quickly and cheaply performed than by other mechanical methods.

The shockless jarring machine gives us now all of

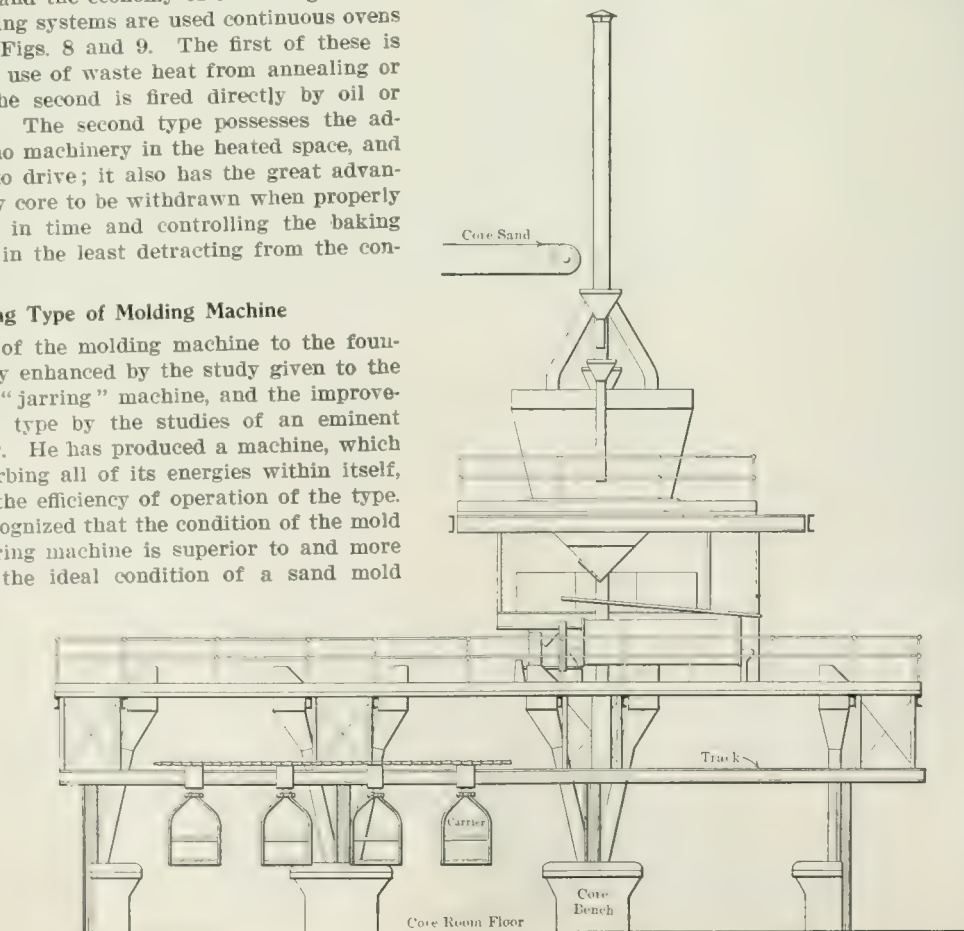


Fig. 7.—Elevation of Core Carrying Conveyor.

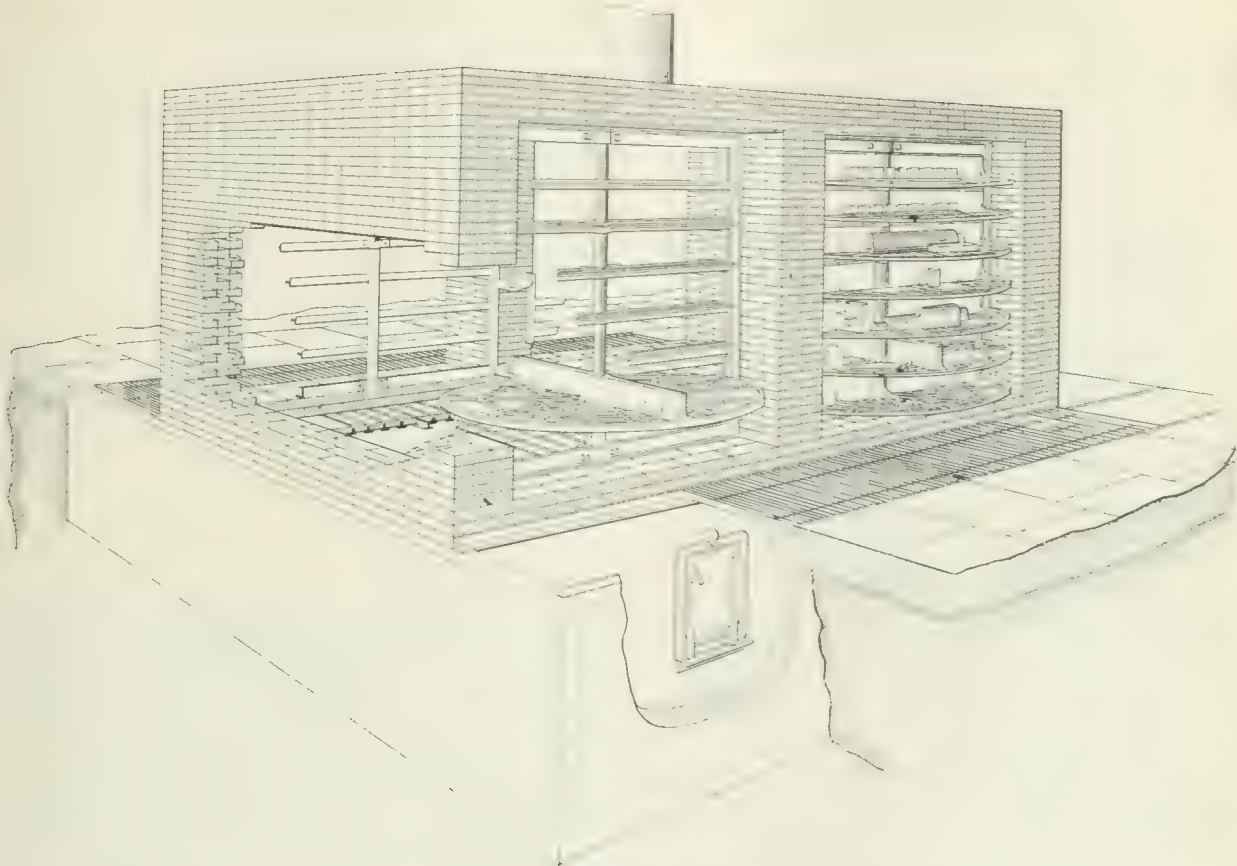


Fig. 9. Continuous Core Oven, Oil or Gas Fired.

these efficiencies in a form adapted to more general use than any of the other forms upon the market, and without the considerable limitation which has existed with them of requiring a massive foundation.

The E. D. Clapp Mfg. Company's Improvements

The E. D. Clapp Mfg. Company, Auburn, N. Y., one of the pioneer drop-forging concerns of the country, has recently completed a series of comprehensive improvements in accordance with the most modern forging practice. The company's shops are located in the western section of Auburn, on a plot of land sufficiently large to allow for the erection of additional buildings whenever necessary. At present they occupy over 2 acres of floor space.

To insure thorough ventilation and a maximum of light, a new monitor roof has been added to the forge shop, equipped with Lovell window operators furnished by the G. Drouvé Company, Bridgeport, Conn. A number of new, heavy drop hammers, designed and built in the company's shops, have been installed, as well as two new geared Bliss presses for use in connection with the heavier class of forgings. A Pels heavy armor plate bar cutter for heavy round and square stock, supplementing two alligator and one guillotine pattern shears now in use, completes the addition to the forging department. A separate concrete and brick pickling room for removing scale from forgings, a concrete room for dies, large sheds for bar and wire stock and two scrap sheds have also been erected.

Special attention has been devoted to the finishing departments, where a great variety of drilling, tapping, drawing, swaging, threading and milling operations is carried on. New Excelsior swaging machines and thread rollers have been installed, as well as a second Houser freight and passenger elevator.

A General Electric high voltage motor of sufficient capacity to drive the forge shop, and connected with Niagara Falls power, insures continuous operation of the hammers in the event of a breakdown in the company's power

plant. Plans are now being made for completely electrifying the plant on the group drive system.

This company, which virtually operates three departments, devoted respectively to the carriage, automobile and general manufacturing trades, is entering on its forty-seventh year with excellent prospects, and under the management of the same family by whom it was founded in 1864, the officers being Delamer E. Clapp, president and general manager; William S. Lee, vice-president and secretary, and E. Donaldson Clapp, treasurer and sales manager.

Unique Drawbridge at Portland, Oregon

One of the most interesting structural projects of the new year is a bridge to be built at Portland, Ore., across the Willamette River. This will be a double deck bridge, the upper deck carrying a highway and street car tracks, while the lower deck carries the tracks of the Harriman railroad lines. The bridge will require 8000 tons of steel, although the length of the structure proper is only 800 ft. A novel feature is in the arrangement of the lift span to permit the passage of shipping. The upper deck is high enough to allow the passage of practically all shipping except full rigged sailing vessels. The lower deck, which carries the railroad tracks, would interfere with shipping to such an extent that the bridge has been designed so that the lower deck will remain raised at all times except when it is lowered for the time necessary to permit the passing of a train. It is raised and lowered without disturbing the upper deck. When a full rigged sailing vessel demands passage, the entire draw span, carrying both the upper and lower decks, will be raised on towers to the necessary height. By this unique construction the deck which carries the street car tracks and the highway will be raised only at long intervals, thus permitting steady use of the bridge for these purposes. The lift span will have a clear opening of 206 ft.

Belfont Furnace, at Ironton, Ohio, which has been out of blast for repairs since July, will be blown in this week.

Brass Melting Furnaces

Varying Adaptations and Efficiencies of the Five Classes Now in Use

BY W. M. CORSE.

From my experience with brass melting furnaces, I would say that it is only within the last 10 years that anyone considered seriously any type of furnace except the crucible pit furnace, either coal or coke fired, and operating with natural or forced draft. The direct cause of the interest shown in the various types of brass melting furnaces at present on the market was the introduction of the open flame oil-burning furnace of the Schwartz or Charlier type. The troubles which many brass foundrymen had with these furnaces made them realize that the melting part of their business was not such a simple matter after all. The investigation of the causes of these troubles brought to light many facts which formerly had been passed by as unimportant, or had not been known to the majority of foundrymen.

The wonderful results prophesied for the new types of furnaces led many to believe that much money could be saved by their introduction, and it was not until actual tests had been made over a period of months that the fallacy of some statements became apparent. Instead of the type of furnace being the panacea for all melting ills, both metallurgical and financial, it was soon found that the same thing held true here as in other branches of manufacture, viz.: that each type of furnace is best adapted for certain kinds of work.

That zinc could be volatilized to the tune of 45 per cent. during the process of melting was a revelation to many founders. The laboratory was brought into play, and through it many valuable data were obtained. The net result of all this discussion and experiment was a large amount of practical information on the melting of brass and bronze, which was paid for by that famous personage known as the "ultimate consumer." Some gentlemen can tell you to-day wonderful stories of how fast profits can be made to disappear into spelter smoke. The industry was, however, immensely benefited by all this, and we find to-day a better knowledge of melting conditions than ever. Of course, there is still a great diversity of opinion, but I think it is pretty generally conceded that our friends, the crucible makers, are not going out of the business, even though their faces were a little long for a while.

The Five Classes of Furnaces and Their Efficiencies

The furnaces in use to-day come under five classes:

1. Stationary crucible furnaces, coke or coal fired, using natural or forced draft.
2. Stationary crucible furnaces, oil fired.
3. Tilting crucible coke furnaces.
4. Tilting crucible oil furnaces.
5. Tilting open flame oil furnaces, without crucibles.

The quality of the metal from Class 1, with natural draft, cannot be excelled if the stack is operating with a good draft. By the latter I mean at least 2 or 3 in. of suction in the main flue, as shown by a water gauge. Many batteries of these furnaces are operating inefficiently because of poor draft conditions. Lack of intensity of draft is a common fault. If the coke consumption is between 25 and 40 lb. per 100 lb. of metal melted, I would consider the practice good, figuring on a red brass melt. Different alloys will vary this somewhat. The difficulty of regulating the temperature of this type of furnace is one of its faults.

Using Professor Richards' figures of 1 lb. of coke for 54 lb. of metal melted as 100 per cent. efficiency, we get $100 \div 54$ or 1.85 lb. of coke per 100 lb. metal melted. This makes the average efficiency of a good battery of coke furnaces $1.85 \div 40 = 4.6$ per cent. to $1.85 \div 25 = 7.4$ per cent.

In Class 2 the quality of the metal depends somewhat on the air pressure used, as well as on the design of the furnace. Generally speaking, the lower the air pressure the better the metal. Low air pressures—that is, below 4 oz.—seem to give metal fully as good as that from the natural draft coke or coal furnaces. Computing the efficiency from Professor Richards' figures again, we find that 1 part of oil will melt 88 parts of metal. As oil generally weighs $7\frac{1}{2}$ lb. to the gal., we find that 1 gal. of oil will melt $7\frac{1}{2} \times 88$, or 660 lb. of metal at 100 per cent. efficiency, or 0.15 gal. to 100 lb. of metal melted. The average oil furnace takes 2.0 to 3.5 gal. to melt 100 lb. of metal, so its efficiency will be between $0.15 \div 3.5 = 4.3$ per cent. to $0.15 \div 2.0 = 7.5$ per cent.

In Class 3 we get a much faster melting time with a coke consumption of 12 to 20 lb. per 100 lb. of metal melted. The efficiency here would be then between $1.85 \div 20 = 9.07$ per cent and $1.85 \div 12 = 15.4$ per cent. We have, however, what is considered by some the disadvantage of double pouring, which may affect the quality of the metal.

In Class 4 we have the same efficiency as in Class 2, with the double pouring factor.

In Class 5 we get the same efficiency as in the other oil furnaces, with the double pouring factor also. Besides we have the danger of excessive oxidation, due to the fact that the flame comes into direct contact with the metal. The speed of melting, however, may offset some of the disadvantages. The ease of handling and the low labor cost of operating are certainly advantages.

Further Gains in Efficiency to Be Expected

I have tried to state the facts about the various classes of furnaces as I have gained them from my experience, with a view of interesting foundrymen in the study of the subject, and think that the figures are substantially correct for average practice. If any type of furnace excels these average figures, it is certainly worth investigating. In view of the rapid advance in furnace design during the last 10 years, we may expect still more interesting developments in the future, and the purpose of this paper has been accomplished if sufficient interest has been aroused to incite further endeavor along these lines. Such a result can best be accomplished by cooperation between the manufacturer and the user, a policy which I think should be followed wherever practicable.

As the price of fuel varies in the different localities, no attempt has been made to estimate the cost of melting, but with the data given above, one can figure for himself the comparative costs of the different classes of furnaces mentioned, with respect to the fuel item.

A Municipal Congress and Exposition

An International Municipal Congress and Exposition will be held in Chicago, September 18 to 30, 1911. The announcement of this enterprise states that it is expected to be the world's greatest exploitation of municipal progress. It will cover all matters of interest to all branches of municipal service. On each day of the congress papers will be read and discussed by prominent municipal officers, and the leading municipalities of this country and foreign countries will have attractive exhibits of undertakings in which they excel. Manufacturers of municipal appliances will also have exhibits of an appropriate character.

The exposition will be held in the Coliseum, Armory and Exposition grounds. Edward H. Allen, 1107-1108 Great Northern Building, Chicago, is general manager. John MacVicar has been selected for the position of commissioner general. He has been in active service in municipal work for more than 20 years. Upon the organization of the League of American Municipalities, 15 years ago, he was made president, and has since been actively connected with that organization, serving as secretary for the past 10 years. He is now superintendent of streets and public improvements, Des Moines, Iowa.

* Works manager Lumen Beating Company, Buffalo, N. Y. Secretary American Brass Founders' Association.

MODERN FOUNDRY EQUIPMENT

EXAMPLES OF IMPROVED MACHINERY EMPLOYED IN THE PRODUCTION OF IRON, STEEL AND BRASS CASTINGS

MOLDING AND CORE MACHINES

The Farwell Squeezer Molding Machines

The first molding machine built by the Adams Company, Dubuque, Iowa, was the plain Farwell squeezer. Its design was inspired by the need of an easy to operated machine for making light hardware, but in later years squeezers have come to be used on a great variety of work that was originally considered beyond their range. The squeezer, first built in 1897, has since been improved

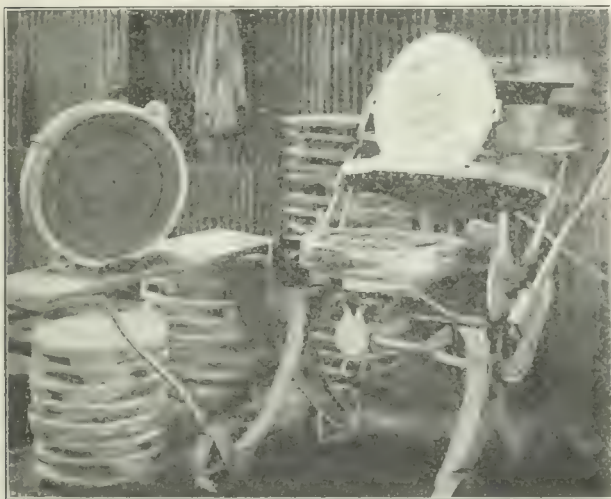


Fig. 1.—The Farwell Squeezer Molding Machine Made by the Adams Company, Dubuque, Iowa.

by making the bearings self-oiling, providing a chilled sliding block for the crank shaft, having a vertical movement in the slots through the legs, and by attaching a side shelf to take the place of a separate table. Various parts have been strengthened, and the links connecting the rocker shaft with the squeezer top are now made straight.

These machines were first used with gated patterns and sand matches, squeezing the drag on the match and then squeezing the cope on the drag, but in recent years match plates have gained in popularity and many plants are now equipping all patterns in this way, except for jobs to be made in small lots and which will not stand the extra shrinkage caused by casting the aluminum match plate. One movement of the lever brings the squeezer top into position and squeezes the mold, while the lever is in a horizontal position and the molder can rest his weight upon it.

The success of this simple machine led to designing the Farwell automatic molding machine. About 10 years ago this machine gave great promise, and the builder went to considerable expense to develop it, but the high cost of maintenance due to the rapidity with which parts wore out showed conclusively that it could not compete with the plain squeezer in output or cost per mold. The automatic machine must be equipped with a match plate pattern, whereas the squeezer will use any kind, but the match plate gives the maximum output.

The next addition to the company's line was the Farwell Universal molding machine. This squeezes the mold and lifts the mold from the pattern, either with or without a stripping plate. The universal machine can also be used as a plain squeezer with any of the types of patterns

adapted for these machines, since the lift table and mechanism are all out of the way, and the main table is the same as on the squeezer. Stripping plate machines are ordinarily used to make only a half mold, and where cope and drag are not identical a separate machine is required to put up the other half, but in the universal machine a cope and drag can be made side by side on the same machine, the drag half of the mold being stripped and the cope lifted off without the use of a stripping plate.

After the universal machine came the Farwell stool plate molding machine. This is designed for more complicated stripping plate work, which must be accurately guided and which calls for stooling. Although it can be operated as an ordinary drop machine, it is best to mount the pattern rigidly upon the machine and raise the stripping plate instead of dropping the pattern, if the mold is to be squeezed. This machine, like the Farwell squeezer and the universal, is made in 30, 34, 38 and 60 in. sizes, either stationary or portable.

Fig. 1 shows the Farwell squeezer as made to-day and equipped with the most approved appliances. The cast aluminum match plate resting against the tool shelf is squeezed between the cope and drag, making a complete mold with one squeeze. The Adams pneumatic rapper, attached below the table and operated by the molder's knee, produces ample vibration for any ordinary work. The real problem in getting a big output from these machines is the pouring of the iron, as a man can easily put up more molds in a day than he can pour off without assistance. For malleable iron and brass foundries the Farwell squeezer is supplied with stationary legs. Another style of these squeezers, for



Fig. 2. The Heavy Duty Farwell Squeezer

use where floor space is limited, or metal is poured several times a day, is the wall type or bracket squeezer, described in *The Iron Age* June 2, 1910. A few foundrymen desire to straddle the sand heap with a portable machine and for these a broad gauge type is built. Another type of Farwell squeezer is a low-down portable machine, and if so ordered the stationary machines are built low-down.

The heavy duty Farwell squeezer, Fig. 2, is similar to the low-down portable squeezer, but much heavier,

and the top is counterbalanced by an adjustable spring, making it operate easily. The illustration shows a basket grate in an 18 x 22 in. roll-up flask with irregular parting line. Contrary to common belief match plates are adapted for irregular as well as straight parting lines, and on a job like this are superior to other types of patterns. By using a roll-up flask the pattern can be removed without taking the cope away, thus enabling one man to finish the mold ready to be set on the floor. When the

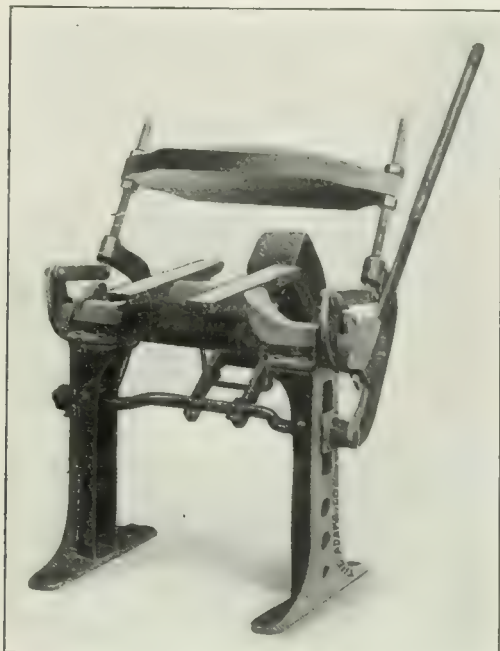


Fig. 3. The New 24-In. Farwell Squeezer.

cope is rolled up its weight is supported by the drag, which would break away from the sand but for special provision to support this weight. On the job illustrated the drag has lugs on the inside resting upon the bottom board. If the pattern could not be rolled out of the drag the match plate would be fitted with ears and drawn straight on pins attached to the drag; the cope having no ears to fit these pins could be rolled up, as shown in the engraving.

The latest Farwell squeezer is the 24-in. machine shown in Fig. 3. This is a little lower than the regular 30-in. machines, commonly used in malleable foundries, and is designed for light work where rapid operation is important, and floors are not large enough to call for a portable machine. The table is raised higher above the rocker shaft than on the other machines to permit handling a larger flask in proportion to the width of the machine, while the long radius upon which the top swings makes it possible to clear the mold without dropping down far enough to make it hard to pull forward again.

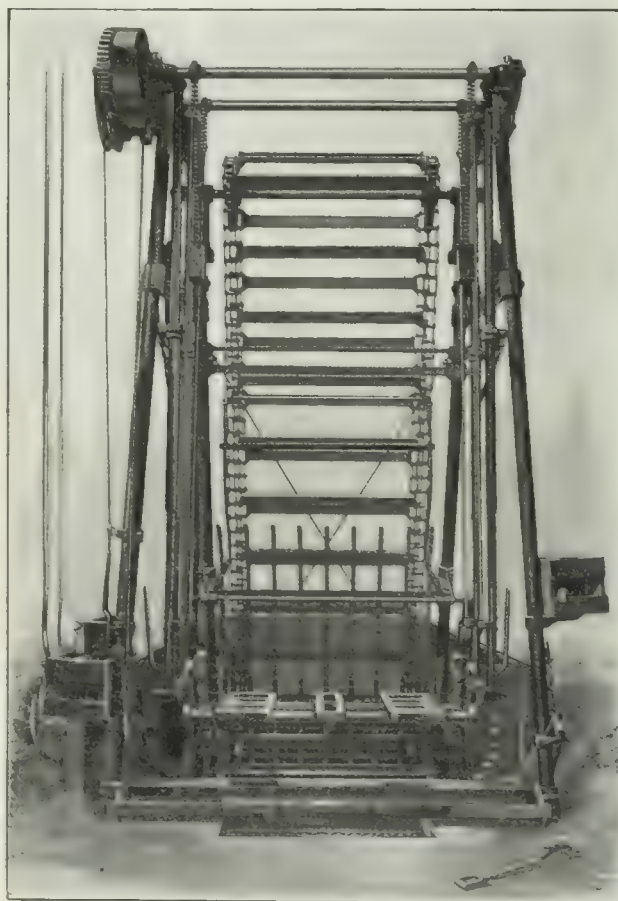
The only Adams machine that can strictly be classed as a roll-over machine is the Farwell pneumatic, described in *The Iron Age* May 5, 1910. This is recommended only for work that cannot be made by the match plate method on squeezers, as any roll-over or stripping plate machine makes only a half mold at a time, whereas a squeezer with a match plate pattern makes a complete mold. The Farwell squeezer can be equipped with a match plate pattern in a roll-up flask, with pins on the drag to guide the pattern instead of rolling it out. Lugs inside of the drag rest upon the bottom board and support the weight of the cope. It is easier to roll up the cope and roll it back into position again than to lift it off and place it on the side shelf while the pattern is drawn and then pick it up and replace it, so this method has decided advantages where it can be used. Squeezer jobs that cannot be rolled up on account of practically straight draft, such as wheels, gear blanks, pulleys, &c., are sometimes made on stripping plate or drop machines, similar to the Farwell stool plate machine, but only a half mold can be made at a time, and when both cope and drag are made from the same half pattern any error in placing the pattern or fitting the

pins is doubled in the casting. Therefore, such work should be done on match plates whenever possible. To get good results the flask pins and ears must be accurately fitted and the match plate provided with adjustable V-blocks on the ears, milled to fit the flask pins. This guiding of the pattern while it is drawn is another advantage of match plate molding, and makes possible more uniform castings than when a loose pattern is rapped with a bar.

The Adams Company builds 72 styles and sizes of molding machines, but the plain squeezer herein principally referred to has the largest field. It is desirable to provide facilities for handling the iron, as a man on a squeezer can usually put up more molds than he is able to pour. If trolleys will enable the man to pour his own floor, better results are obtained than when he is given help not familiar with the molds to be poured.

The Buch Gravity Molding Machine

The gravity molding machine built by the A. Buch's Sons Company, Elizabethtown, Pa., is based on the fact that after packing or compressing sand into bodies of the proper size and shape such bodies can be uniformly packed into the flask to any degree of firmness desired by dropping them a comparatively short distance. It was found after much experimenting that a drop of 11 ft. was ample for any class of work. Further experiments, how-



The Gravity Molding Machine Built by the A. Buch's Sons Company, Elizabethtown, Pa.

ever, demonstrated that to practice such a method successfully it was necessary to accomplish the following:

1. To compress or pack the sand into bodies or strips as long or longer than the width of the flask, but of such thickness that a series of such bodies are required to fill a flask.
2. To provide controllable means for automatically compressing the bodies or strips of sand to the degree of firmness necessary.
3. To provide a practical mechanism for elevating and for discharging the bodies of sand from a sufficient height to cause them to pack uniformly together around the patterns in the flask.
4. To provide suitable means for moving the flask back and forth across the line of fall of the bodies of sand to

cause them to be discharged into the flask in their proper relation to each other so as to ram up the mold uniformly throughout.

The Buch gravity molder automatically riddles the sand and compresses it into properly shaped bodies; the flasks are automatically filled with a series of these compressed unitary bodies of sand, and the same operation which automatically fills the flask simultaneously rams up the mold uniformly throughout, regardless of the depth of the flask or the size and shape of the patterns. It strikes off the surplus sand from the top of the filled flask, and it automatically draws the pattern perfectly straight from the mold without the aid of stripping plates and without breaking down the sand on the most intricate or difficult work, except gears, on which the use of stripping plates is advocated.

In operating the machine, the sand is ordinarily tempered at night and placed in two large heaps, one on each side of the machine. When the machine is started, a roller feeder at the bottom of the hopper feeds the sand in an even stream from the hopper to the elevator, and it is carried by the buckets of the elevator and discharged at the top into the flask below, which is supported on a swinging cradle. While it is being elevated, each bucketful of sand is engaged by a compressor which automatically compresses or packs the sand in the buckets. The pressure exerted by this compressor can be instantly adjusted so as to pack the sand in the buckets to any degree of firmness desired, by which means the molds can be made hard, soft or medium, as may be required. The flasks are rammed up by a succession of compressed bodies or strips of sand falling beside each other until a layer is formed across the entire area of the flask, after which additional layers are built up in the same manner until the entire mold is formed of some solid mass of sand of the same degree of firmness throughout. As these bodies of sand are discharged very rapidly, but a few moment's time is required to ram up a large sized flask.

These machines are used for making a general line of castings. Letters from foundrymen are published by the company, which show that castings are being satisfactorily made weighing up to 1500 lbs. each. Quite difficult castings are mentioned by them as being successfully molded.

The height of the machine is 14 ft. 10 $\frac{1}{4}$ in. above the floor, and it extends 5 ft. 6 in. below the floor. The No. 2 machine has a total width of 9 ft. and weighs 12,000 lb.; the No. 3, a width of 11 ft. and a weight of 15,000 lb.; the No. 4, a width of 13 ft. and a weight of 20,000 lb.

Osborn Molding Machines

A new molding machine for turning out green sand drags and dry sand cores, made by the Osborn Mfg. Company, Cleveland, Ohio, was first introduced at the National Foundrymen's convention at Detroit last summer, where it attracted considerable attention. Since then it has demonstrated its practical advantages in a large class of actual foundry work, particularly in the turning out of automobile castings, such as crank cases, gear cases, &c., and for a large variety of castings for electrical work.

The construction of the machine is simple, as may be seen from Fig. 1. It consists of a rigid skeleton framework, a frame for holding the flask and pattern, and the drawing table, which is pivoted at one side so as to swing in below the flask, or out again at right angles to the machine. This table has an automatic leveling device, which instantly accommodates itself to any unevenness of bottom boards or drier plates. The drawing mechanism is simple. A half-turn of the crank gives the full draft of 7 $\frac{1}{2}$ in.

After the flask or pattern is attached to the frame and rammed, and the bottom board or drier plate clamped in position, the frame is rolled over on its horizontal axis by hand, the drawing table swung into position, and the clamps removed. A half-turn of the crank draws the mold, which is then swung out free from the machine, ready to be lifted off. After the complete mold is drawn the table can be swung back into position, and the ma-

chine will print back with infallible certainty. One man, not necessarily a skilled molder, will easily turn out two or three times as much work with the machine as two skilled molders can working on the floor, and the quality of the work is superior and the accuracy of the draw means a large increase in the percentage of good castings.

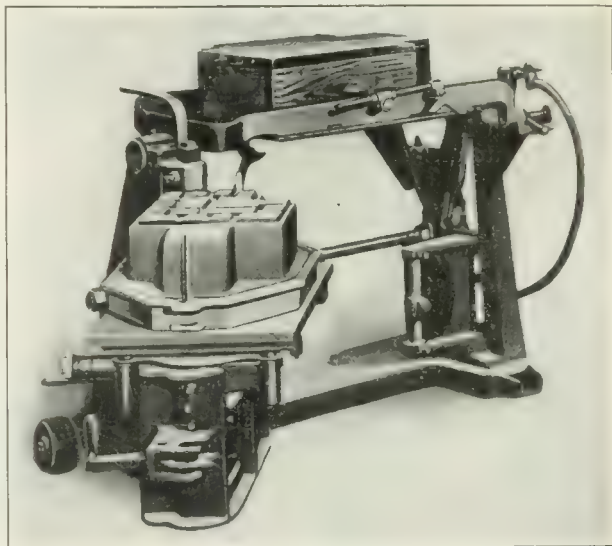


Fig. 1.—The Direct Draw Roll-Over Molding Machine Built by the Osborn Mfg. Company, Cleveland, Ohio.

The Osborn No-Shock jolt machine involves a new principle. As may be seen from Fig. 2, the shock is absorbed by a massive cast iron bedplate or anvil; the one illustrated weighs about 6 tons, while the jolt itself is of a size to ram molds up to about 7500 lb. A set of large springs below the anvil effectually prevents any transmission of shock to the soil, and an upper set prevents the rebound which tends to jar the sand loose in the mold and interferes with the process of ramming.

The only foundation necessary is a few inches of concrete to which the heavy oak frame supporting the

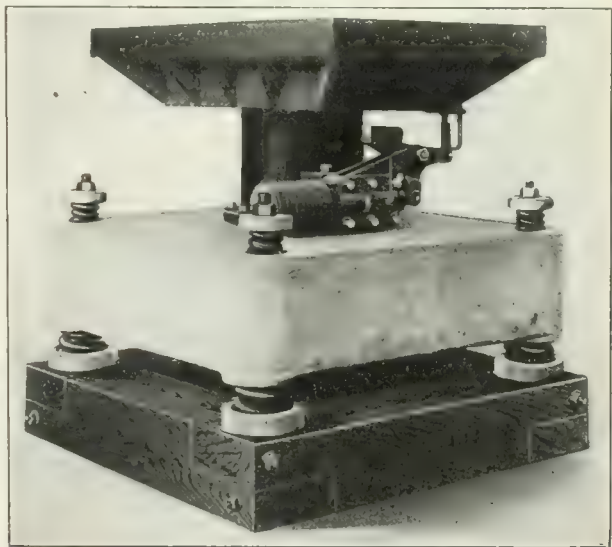


Fig. 2.—The Osborn No Shock Jolt Molding Machine

anvil is bolted. Even in the most unfavorable soils this will prove ample, as has been demonstrated in a foundry in Cleveland, where the ground wave was not perceptible to one standing close by the machine, although it could be distinctly felt from a much smaller machine of another type 60 or 70 ft. distant. This latter machine was ramming a mold that was, approximately, 200 lb., while the Osborn No-Shock machine was carrying a load of nearly 4 tons. Very large and deep foundations are generally necessary, sometimes many feet square and several yards deep, and then often the ground wave is not eliminated.

The heavy ribbed table, large cylinders and jolting

mechanism are the same as in the Osborn plain jolt molding machine. All of its advantages are retained, including perfect regulation of the length of stroke and force of blow, with any air pressure sufficient to operate the machine.

Edward A. Pridmore Molding Machines

Two of the most popular molding machines manufactured by the Edward A. Pridmore Company, Chicago, Ill., are shown in Figs. 1 and 2. The second is the type T stripping plate design, and is made in 14 different sizes. They are so constructed that each size is adapted for use with a large variety of flasks. The draw of the machine, which at its maximum is 52 in., can be instantly adjusted to the amount required for the pattern to be molded. The yoke which carries the pattern travels in one set each of upper and lower adjustable guide ways, this construction insuring an absolutely true pattern draw. The machine is very low to facilitate ramming, and is substantial and rigid, the upper and lower frames to which both sets of ways are attached being cast in one. These machines, fitted for molding street car brake shoes, have the parting of the pattern on the curve of the shoe, formed by building parting pieces up on one of the stripping plates and making corresponding recesses or depressions on the other plate. This is much quicker and cheaper than making curved stripping plates to conform with the parting line of the pattern. The necessity of using a cut flask is also obviated.

The machine illustrated in Fig. 1 is of the turn-over

to be drawn. Machines of this design are made to be operated by hand or power, depending upon the size of the work to be molded. One of the great advantages is that there is practically no limit to the amount of pattern draw which can be secured. Stock sizes are made with draws of from 6 to 14 in. The pattern carrying frame operates on parallel uprights, which are set and finished accurately to insure an absolutely true and even pattern draw. Adjustable counterbalancing devices operate automatically in conjunction with all working parts, so that the heaviest mold can be turned over and the pattern withdrawn from the mold with facility. The flask receiving device is unique in that it is adjustable

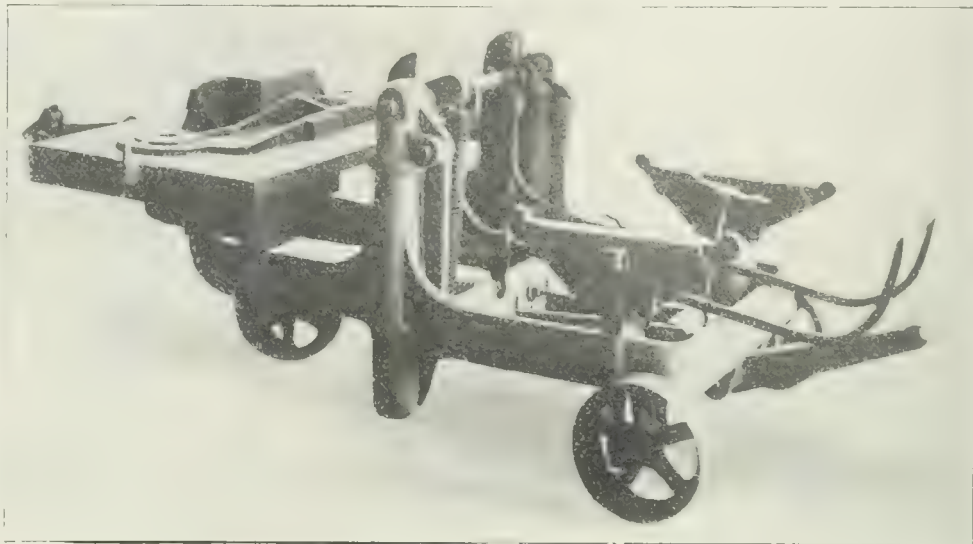


Fig. 1.—The Type R Edward A. Pridmore Turn-Over Machine with 14 In. Draw

in every direction. The flask rods are fitted with adjustable screws, so that flasks of various depths can be used on the same machine without blocking up. All working parts are away from the sand and are carefully protected from dust. Several sizes of these machines have been designed especially for molding cores.

The New Tabor Jarring and Roll-Over Molding Machine

In one of its latest products the Tabor Mfg. Company, Philadelphia, Pa., has combined a 6-in. shockless jarring machine and a 20-in. roll-over machine. The pattern drawing cylinder gives a straight draft of 12 in. In Fig. 1 a flask is shown clamped to the pattern plate

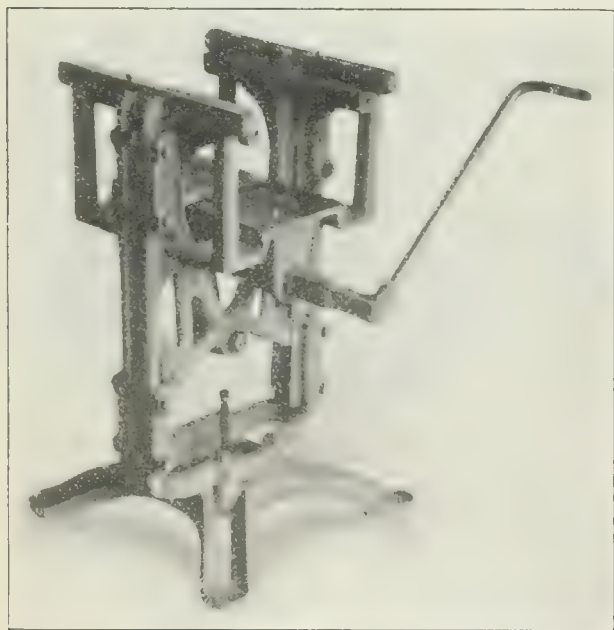


Fig. 2.—The Type T Molding Machine Built by the Edward A. Pridmore Company, Chicago, Ill.

draw design, known as type R. The machine is shown fitted with the pattern ready for the flask to be set on. The mold is rammed up and clamped with the bottom board to the pattern carrying frame, after which it is turned over on the receiving device ready for the pattern

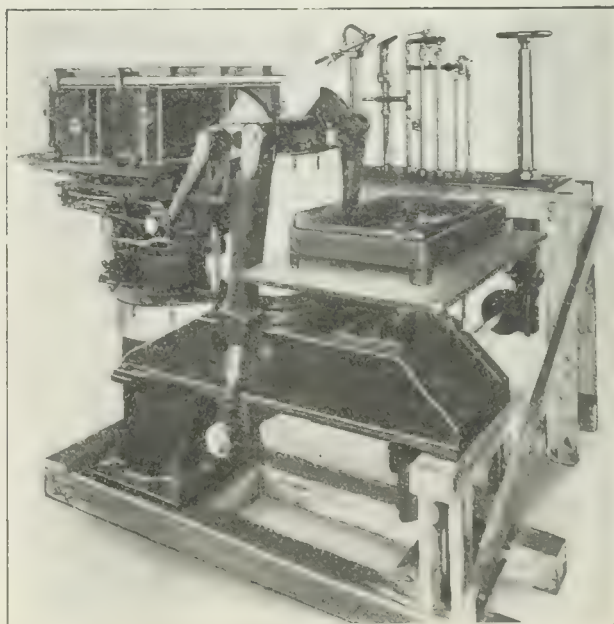


Fig. 1.—The Combination Jarring and Roll-Over Molding Machine Made by the Tabor Mfg. Company, Philadelphia, Pa.

and resting on the jarring table with the bottom board secured preparatory to rolling over. This is accomplished by admitting compressed air to the roll-over cylinder, whereupon the arms of the hinged frame come in contact with the pattern plate lifting the flask clear of the table before it begins to roll over. An eccentric on the trunnion shaft actuates locking bolts, which secure the pattern plate to the hinged frame and hold it firmly when inverted. Finally the flask is lowered upon the receiving table, which adjusts itself to the inequalities of the bottom board, and the clamps are removed from the pattern plate permitting the pattern to be drawn. The receiving table is adjusted vertically for different depths of flask by the hand wheel shown in the upper right corner of the illustration.

After the pattern is drawn it is rolled back upon the jarring table, as shown in Fig. 2, ready to receive another flask. The flask being filled with sand the starting valve is depressed and jarring continues automatically until the valve is released. During jarring no shock is transmitted to the hinged frame or any other part of the



Fig. 1 A Round-Tipped Stripping Plate Machine Built by Henry E. Pridmore, Chicago, Ill.

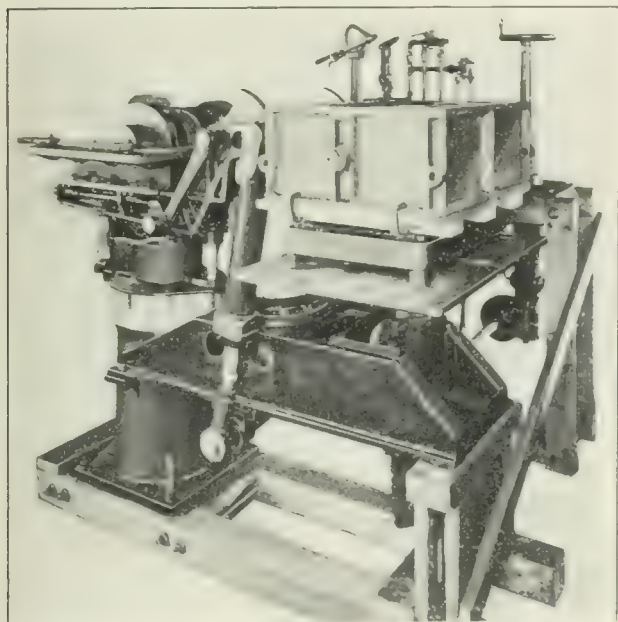


Fig. 2 The Machine with the Flask Rolled Over and the Pattern Drawn and Rolled Back

machine, except the jarring table and its anvil. The latch lever at the left of the controlling devices in the illustrations regulates the stroke, which can be varied while the mold is being rammed from 1 to 4 in. A few short strokes at the start liberate the entrained air in the sand, and with a longer stroke the remainder of the work can be done more effectively and quicker.

Among other molding machines made by the Tabor Mfg. Company is the plain shockless jarring machine described in *The Iron Age* June 9, 1910.

Pridmore Molding Machines

A very large variety and range of sizes of molding machines are built by Henry E. Pridmore, Nineteenth and Rockwell streets, Chicago, Ill. In the entire line are machines suitable for practically all foundry purposes, and a number are specially adapted for producing molds for automobile castings. Among them three have been selected for mention in the present article, including the tripod stripping plate machine, of which an example is shown in Fig. 1, double shaft stripping plate machine, Fig. 2, and the rockover molding machine, of which no illustration is given, since several appeared as recently as November 10, 1910. A more complete description of the double shaft stripping plate machine was also presented in *The Iron Age*, September 1, 1910.

The tripod stripping plate machines are made in 17 different designs and 450 sizes, ranging in the square type from 7 x 12 in. to 58 x 90 in., and in the round type

from 10 in. diameter to 64 in. diameter. The double shaft machine, shown in Fig. 2, has mounted upon it a 52-in. gear pattern, and will accommodate round flasks up to 6 ft. diameter and square flasks up to 5 x 12 ft. The rockover machines are made in sizes from 14 x 12 x 8 in. up to 20 x 24 x 12 in. The Pridmore rockover drop machines are also used extensively for molding cores of various sizes and shapes. An illustrated description of the machine adapted to this use was given in *The Iron Age* July 7, 1910. Both the rockover drop and the stripping plate machines are also built with power ramming attachments.

Frequently the number of castings required for certain patterns is not sufficient to necessitate separate machines for those patterns, and in such instances one machine suitable in size and type for molding several different jobs is selected. When the rockover drop machine is used it is very simple, and requires only a few minutes to attach and remove the pattern plates. Often a machine is used when as few as five castings are required

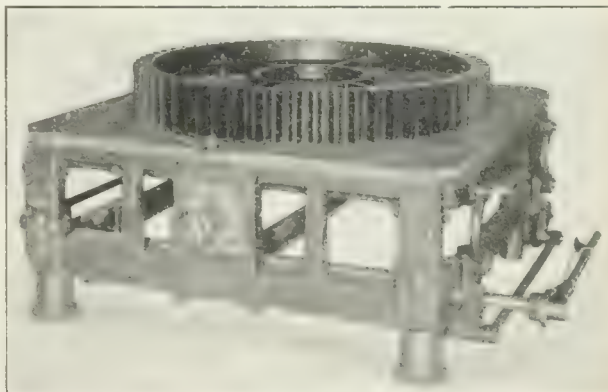


Fig. 2 A Square Pridmore Heavy Double Shaft Stripping Plate Machine with a 52-In. Gear Pattern.

from a pattern. The frames of the square stand stripping plate machine are left open at the end so that patterns several inches longer than the machines may be used. The single and double stand rockover machines differ from the rockover drop design mainly in that they have no pattern drawing mechanism, consequently all patterns fitted to them must have sufficient draft to be rocked over without breaking the mold. The rockover

drop machines are fitted with automatically adjustable self-locking flask rests, the height of which can be regulated to the depth of flask to be used. The operation of rocking over is facilitated by balance springs, which are capable of rapid adjustment. Adjustable clamping rods are used to clamp the bottom board and flask to the rock-over frame, rather than loose clamps, not only to save time, but because after the flask is rocked over and the rod released all parts of the mold are freed at the same time.

The Acme Core Machine

A core machine of the type which forces sand through dies by means of revolving screws or reciprocating plungers, produces what are known as stock cores. Such cores are of uniform cross section, but can be of any form that will go through a die. Screw machines are more limited than plunger machines in this respect, as the screw tends to feed a cylindrical body of sand, while with the other

of the plungers and are attached to a stationary yoke back of the crosshead, as shown in Fig. 1. The crosshead carries a rack bar which engages a pinion on the side of the sand hopper, and this in turn operates a sand feed that insures a regular supply of sand in front of the plungers. By varying the position of the plungers forward or back the amount of packing can be regulated and the machine adjusted to work mixtures which vary greatly. This makes it possible to work any ordinary bench mixture in the core machine. It is also possible to use mixtures that contain no oil. It is necessary, however, to oil the core pans to prevent the cores from sticking when baked.

Another advantage which the plunger machine possesses is that it is possible to make exceedingly small cores with the core machine by properly arranging the dies and plungers. The rate of feed of a core through the die depends upon its diameter, the smaller the die the smaller the feed, but the output of the machine depends both on the rate of feed and the number of dies, and hence in case of small cores where a large number of

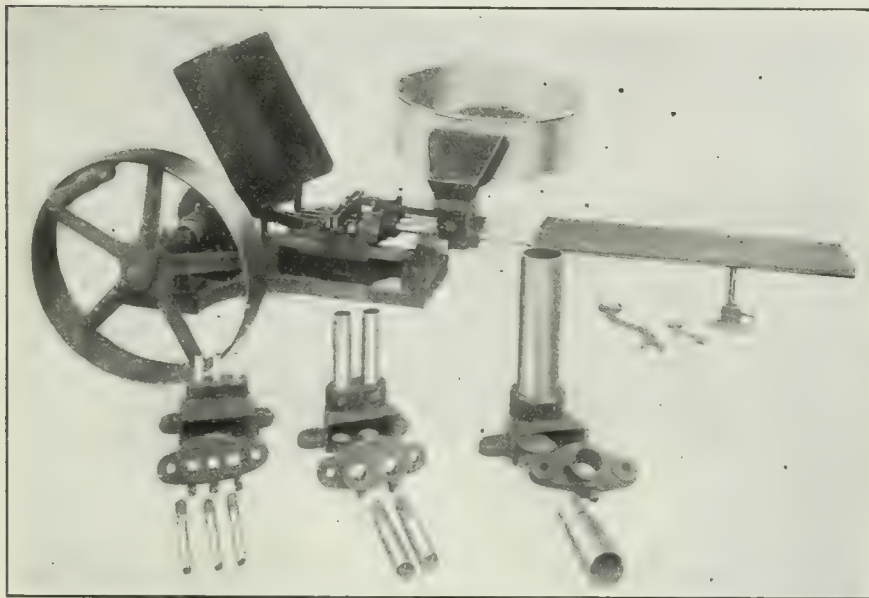


Fig. 1.—The Three-Die Plunger Type Core Machine Made by the Acme Core Machine Company, Cuyahoga Falls, Ohio.

machines, by properly forming the plunger, any irregular shape may be made.

For many years the objection to plunger machines was that the reciprocating plunger tended to form partings in the core and thus weaken it. F. C. Francisco, who developed the machine made by the Acme Core Machine Company, Cuyahoga Falls, Ohio, adopted the plunger type on account of its greater range in form of dies, and also the greater latitude in the nature of mixtures used. The general form of the Acme core machine is shown in Fig. 1, this being one of the three-die machines. For making the larger cores a single die is used, together with a single plunger, while for the smaller cores multiple dies are resorted to, the tubes being so spaced that they feed the cores on to the corrugated core pans, so that each core lies in the center of one of the corrugations. To overcome the objection of the plunger forming partings in the core Mr. Francisco patented a form of plunger with a cupped face, as shown in Fig. 2, which represents a section of the face of the plunger. The vent rod passes through the central opening *a*. The face of the plunger proper is recessed, as shown at *b*, so as to form a cup at the end. The sand has a tendency to pack in this cup, forming a sand face on the end of the plunger, which becomes thoroughly attached to the plunger, advancing and receding with it. This in effect gives the plunger an irregular sand ramming face, as shown by the dotted line *c*. The result is that there is no parting line in the core, extensive experiments having failed to reveal any such weakness.

The plungers for feeding the sand through the dies are attached to a reciprocating crosshead back of the sand hopper, and the vent wires pass through the centers

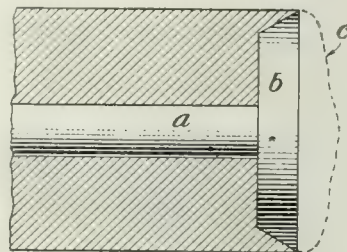


Fig. 2.—Detail of the End of the Plunger.

small dies are used the total output is very great, the increased number of dies more than compensating for the smaller feed of the mixture. The wear on the dies of a core machine when the adjustments are properly made is exceedingly slight, and in a plunger machine it is almost imperceptible. The plungers are made smaller in diameter than the dies, and, as already

stated, the face of the plunger is in effect a sand face, hence there is practically no wear on the plungers. As a consequence the parts of the plunger machine do not grind out, but will last almost indefinitely.

Arcade Molding Machines

After nearly five years experimenting in its own works, the Arcade Mfg. Company, Freeport, Ill., has introduced its automatic molding machine. It is capable of turning out from 50 to 100 molds an hour, depending upon the class of work, and is especially adapted for shallow work, such as valves and fittings. The castings are very exact duplicates, which means a considerable saving by avoiding overweight. One of the machines is shown in Fig. 1. Its dimensions are height, 13 ft.; width, 4½ ft., and extreme length, including one section of trough, 18 ft. Each additional section of trough adds 8 ft. The total weight is about 3800 lb.

Patterns are handled on the machine similarly as on the company's Modern molding machine. Split patterns are used, and both halves of the mold are formed at the same time. The sand is fed into the hopper by a belt conveyor, which is in turn supplied by a reciprocating drag conveyor working in a trough extending to any required distance along the floor. The sand is delivered into the hopper through a special screen, and a chute carries off the lumps and foreign matter. When the pattern plates are attached the table is turned face up and the two halves of the flask are placed in position. Pulling a lever causes the sand to drop from the hopper about 3 ft. into the flasks, which assists in tucking the sand into place. Another lever brings a cut-off into ac-

tion which carries the surplus sand into the conveyor. The cope board and bottom boards are then put in their positions, and the flask rolled over and squeezed. When the proper density is reached the pneumatic vibrator starts automatically and continues until the patterns are

machines, has a number of other types of molding machines, among which a comparatively new one is the Norcross three-cylinder jolting machine, which was described in *The Iron Age* October 20, 1910. One recently built for the General Electric Company has 27½-in. cylinders, and a lifting capacity of at least 75,000 lb.

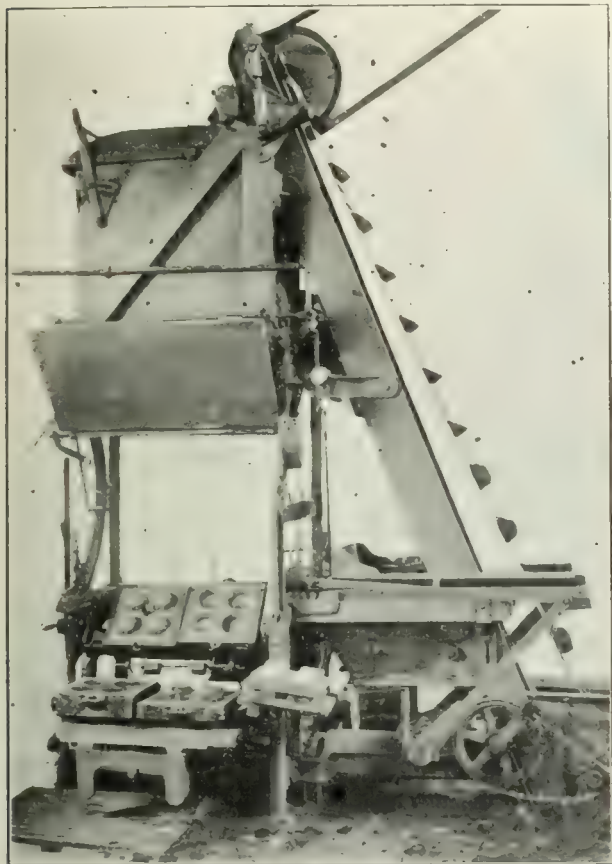


Fig. 1.—The Automatic Power Molding Machine Built by the Arcade Mfg. Company, Freeport, Ill.

free of the molds. The table on which the completed molds rest runs out automatically, so that the operator can close the mold easily. It is then carried away by a helper, who also keeps the drag conveyor supplied with sand. Most of the machine's movements are operated by compressed air, which gives rapidity and flexibility, and enables the parts to be protected from the sand.

Fig. 2 shows a new Arcade core jolting machine, which is designed for handling very large cores. It has a capacity of approximately 1500 lb., and has been tested successfully in plants making such large cores. The machine weighs about 1100 lb., and is operated by an 8-in. pneumatic cylinder, usually under 80 lb. pressure. This gives a lifting capacity of about 1250 lb. The table is 24 x 30 in. The machine is designed to be used as a part of the bench in the coreroom, although a concrete

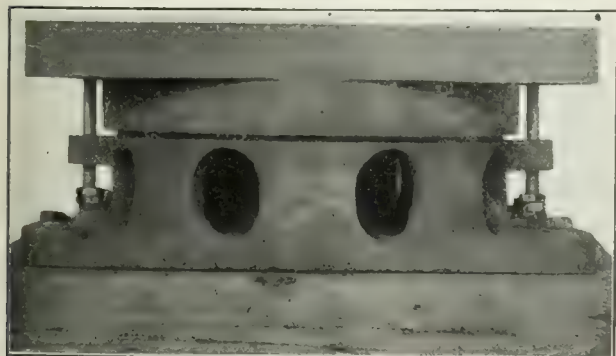


Fig. 2.—A New Arcade Core Jolting Machine.

foundation will give the best results. It will ram the core very rapidly and thoroughly, and in tests made of it the cores were found to be exceptionally accurate.

The Arcade Mfg. Company, in addition to these new

The Elmira Roll-Over Core Machine

Original features in connection with the new power ramming roll-over core molding machine, built by the Elmira Foundry Company, Elmira, N. Y., are the devices for venting and pasting the cores. As shown in Fig. 1 the ramming cylinder is above the platen. The core box or boxes, if two halves are made at once, are fastened to boards having hook cleats on the bottom by which they are quickly secured to the cradle by a special clamping device. The machine can be set up for different core boxes very quickly, and the board K with tucking blocks corresponding to them can also be very quickly interchanged, being secured with wing nuts. The machine has very long draft to handle very deep cores rapidly and accurately, and is capable of turning out intricate or difficult core work better than is possible by hand.

When the empty box is in the position shown in Fig. 1 the ramming head is swung back, as in Fig. 2, and the box filled with sand. The head is then drawn over and air admitted into the cylinder to ram the sand. When the air is exhausted the plunger is returned by springs. Usually after the first squeeze two or more blows are struck by sharp admissions of air to better compact the sand, and the tucking blocks on the board K insure uniform density. With the head again swung back the mold

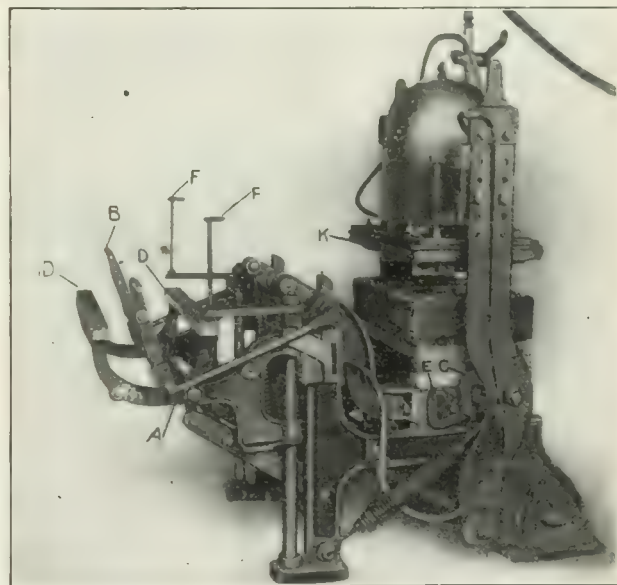


Fig. 1.—The Power-Ramming Roll Over Core Machine Built by the Elmira Foundry Company, Elmira, N. Y.

is struck off and a special venting rig applied. This consists of a plate with guide pins engaging the box to properly locate the vents, and strips and points erected on the plate to form the vents when squeezed into the mold.

The core plate is next placed in position on top of the mold and secured to it by swinging over the clamping bail A, so that the hooks B engage the latches C. The cradle is then rolled over to the position shown in Fig. 2, where projections E connected to the latches C encounter the posts F and release the clamping bail, which drops down as in Fig. 2. This automatically starts the vibrator G, and by depressing a foot treadle the table is lowered drawing the cores from the bottom. This table and the cradle have counterbalancing springs to facilitate their movement. The cores are left resting on the core plate on the supports D, Fig. 1, and the box returned to its first position to repeat the operation. Adjustments

are provided throughout for different sizes and shapes of core boxes.

The pasting device consists of a wooden box, through the bottom of which is cut the form of the paste strip. This box floats on about $1\frac{1}{2}$ in. of paste in a tank, and the core is laid in the box and guided to position by lugs in the bottom. When the box is pressed down into the

the hook of any crane of sufficient capacity, no special hoisting apparatus being necessary. It is manipulated entirely by the crane and the single tripping line, and may be attached to or removed from the crane hook in an instant, with no more trouble than the ordinary load, leaving the crane free for other work.

Fig. 1 shows the bucket lowered, ready to pick up its load. The bucket is carried on two wire ropes which are deadened in an equalizer fixed to the framework. From the point of fastening the ropes lead downward around the pulleys in the block and then up again, terminating in a heavy cast steel bail, which is placed over the crane hook. When the crane hoists, with the bucket in the position shown in Fig. 1, the main bucket pivot moves upward, relative to the fixed framework carrying the springs, and the jaws of the bucket close of their own weight, with the load. A linkwork causes the block to move up in practically a straight line.

As the bucket is lifted it assumes the position shown in Fig. 2. In this position it, with its load, may be raised or lowered or carried about from place to place by the crane. To empty the load the line attached to the tripping lever, seen at the right in the engravings, is pulled, thus disengaging a hook which connects the main bucket pivot to the block, allowing the pivot center to descend and the bucket to open into the

position shown in Fig. 3, discharging the load. In this position the empty bucket may be carried about, raised, lowered, &c., by manipulating the crane.

When the bucket is lowered to the ground, as soon as the lips strike, the stress on the block is relieved, and as the crane tackle continues to descend the block descends, describing an arc until the hook on the under side of the block again catches the main pivot center which restores the mechanism to the position shown in Fig. 1. Heavy chains seen in Figs. 1 and 3 limit the opening of the jaws and are connected at the top to spiral springs which absorb the slight shock incidental to opening the bucket.

The capacity of the bucket illustrated is $1\frac{1}{2}$ cu. yd. Empty it weighs about 2 tons, loaded about 4 tons. When the bucket is spread open it covers a floor space 6 x 6 ft. The bucket will work in considerably less headroom than the ordinary type of grab bucket and is of very durable construction throughout.

The Pawling & Harnischfeger Company also builds a complete line of cranes and hoists for all classes of service. The cranes used in foundries are the electric travel-

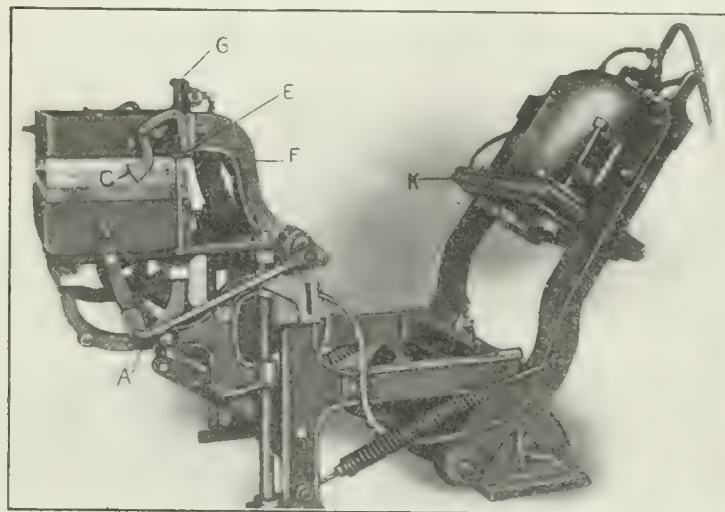


Fig. 2 — The Machine with the Ramming Head Swung Back and the Cradle Rolled Over.

paste just enough rises through the opening and adheres to the parting side of the core. Usually it is sufficient to paste only one-half of the core, the other being secured to it when laid upon it. This means of applying the paste is quicker than a brush, wastes no paste and cannot accidentally fill the vents.

The machine is the joint development of John Gow of the General Electric Company and A. M. Loudon of the Elmira Foundry Company.

HANDLING EQUIPMENT

The Pawling & Harnischfeger Foundry Grab Bucket

A grab bucket designed especially for foundry service, used for handling sand to and from the pile and for cleaning up the floor, is built by the Pawling & Harnischfeger Company, Milwaukee, Wis. The bucket can be used upon

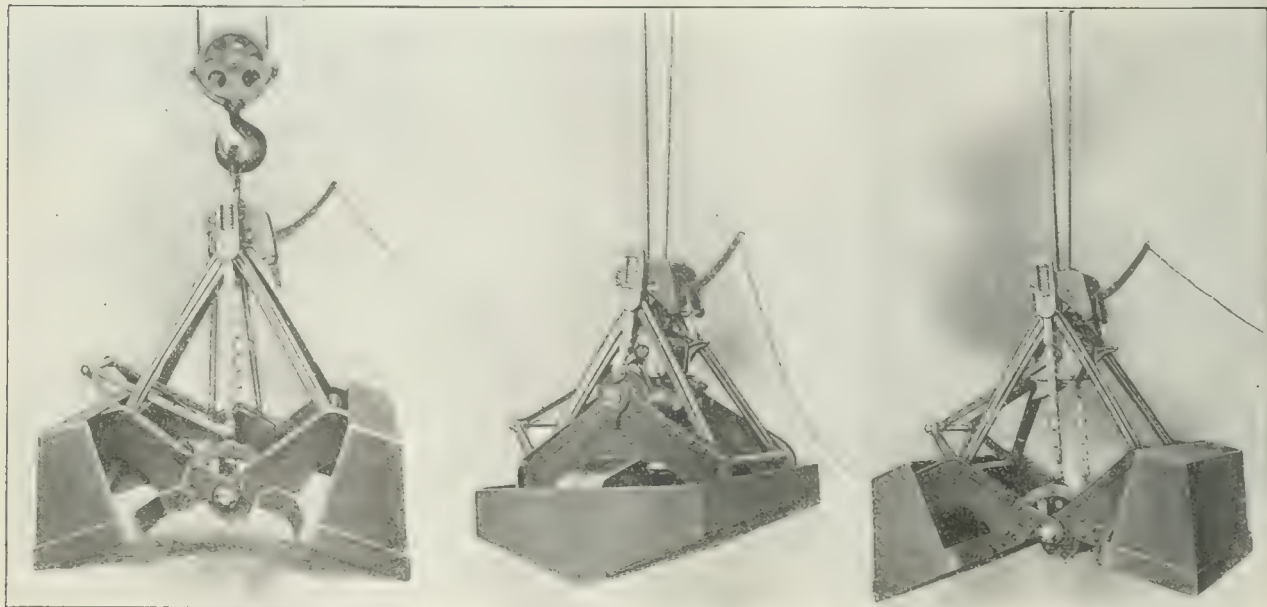


Fig. 1 — Loading.

Fig. 2 — Carrying.

Fig. 3 — Dumping.

A Foundry Grab Bucket Made by the Pawling & Harnischfeger Company, Milwaukee, Wis.

ing bridge and cantilever wall types and over traveling jibs, traveling bridge and one and two leg gantry cranes. Electric trolley hoists are used for handling flasks, patterns, castings, &c., from and to the molding floor.

Alliance Foundry Cranes

In the extensive line of cranes and other machinery built by the Alliance Machine Company, Alliance, Ohio, for use in the iron and steel industries, are the two types herewith illustrated as typical for their classes of foundry service.



Fig. 1.—A Single-Leg Gantry Foundry Stockyard Crane Built by the Alliance Machine Company, Alliance, Ohio.

Fig. 1 shows a single leg gantry crane for the stock yards of foundries. An advantage inherent in the type is that it does not require the erection of runways, if it is provided for when the building is erected. It happens that the installation shown was made in connection with an old building. Ordinarily the inner run-



Fig. 2.—An Alliance Wall Crane Installed in a Foundry.

way is secured to the frame of the building. The outer runway for the single gantry leg is merely a rail laid on ties in the ground, as for any gantry crane. The cranes are also made with a cantilever extension, so as to unload and load material from cars on tracks outside the gantry leg. The construction of the crane itself is standard throughout.

Fig. 2 shows a wall crane the important advantage of which in a foundry is that it can be used on individual jobs which require the service of a crane for a considerable length of time, leaving the overhead cranes free for general transporting work up and down the shop for which they are particularly adapted. Wall cranes are built also with a swinging jib, so that the jib can be swung back against the wall when not in use.

Curtis Air Hoists

Through its success in controlling the action of air cylinders the Curtis & Co. Mfg. Company, St. Louis, Mo., has rendered available an inexpensive power capable of wide application in the field of hoisting. The regulators and air cushions used in the hoist are controlled by a straight line motor.

The Curtis air hoist is manufactured in two classes, pendant and horizontal, with several types and a number of sizes in each class. There are the single and double acting in the straight air or class A type, and the G or balanced pressure type. The illustrations are of rope geared hoists where considerable hook travel is required in comparatively low head room. Fig. 1 shows stationary hoist with single hoisting rope, and Fig. 2 a traveling hoist with two hoisting ropes. Being of all steel construction the hoists are considerably stronger and lighter than the average cast iron hoist. For a given capacity the steel hoist, being lighter, there is less

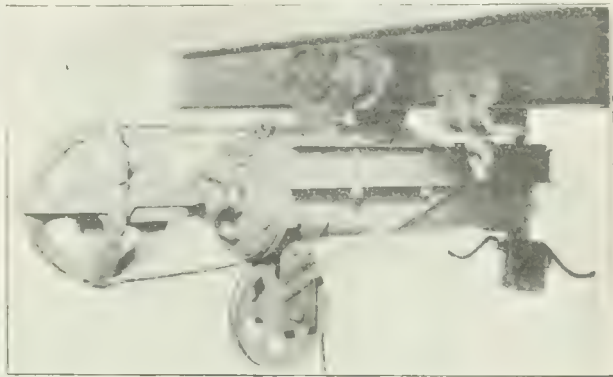


Fig. 1.—A Class B Double-Acting Rope-Geared Air Hoist Made by the Curtis & Co. Mfg. Company, St. Louis, Mo.

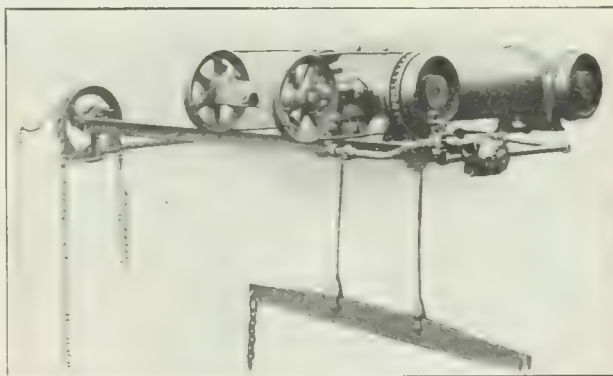


Fig. 2.—A Class L Curtis Hoist Mounted on a Hand-Propelled Trolley.

weight suspended from the trolley, and the load can be moved with greater ease.

The pneumatic hoist in the straight air class is used for ordinary hoisting where delicacy of control is not required, but the air balanced type is adaptable for use where the most delicate hoisting is required; it will not jump or jerk, and can be used for such work in foundry practice as drawing patterns, closing molds, setting cores, pouring molten metal, &c. It is fitted with an automatic safety device that prevents the load from dropping should the air hose break or the air supply fail, and it will hold its load positively at any point of the stroke whether hoisting or lowering.

In these hoists the upper head and lower ring are screwed to the cylinder, and should it be necessary to remove the piston, all that is required is to unbolt the lower head from the lower ring, when the piston can be withdrawn without having to dismantle the hoist, break a pipe connection or even take down the hoist. The operating valve has an equalizing spring, which returns it to neutral position immediately upon the hand chains being released, thus effectively holding the load. By this arrangement the operator requires one hand only to op-

erate the hoist, leaving the other free to direct the load.

Other products of the Curtis & Co. Mfg. Company of interest to foundrymen are air compressors, sand blasts, pneumatic elevators and pneumatic bridge cranes.

Atlas Foundry Cars

A new design of industrial locomotive that is expected to meet with much favor for handling castings is now being brought out by the Atlas Car & Mfg. Company, Cleveland, Ohio. This is a storage battery locomotive equipped with a crane, as shown in Fig. 1. The capacity of the car is 8 tons, and the crane has a capacity of 2 tons. The crane is mounted on a simple truck consisting of a steel frame, well braced, carried on four wheels, the journals of which run in roller bearings. The motor is spring suspended from the frame at one end and connected to the driving axle by reducing gears. A spring suspended angle iron cradle carries the battery trays.

At the operating end of the truck are the controller, brake charging receptacle, cut-off switch and voltmeter. A step and draw bar head are provided at each end. All of the machinery is below the top of the frame and is covered by a heavy wooden deck for carrying the load which is made in removable sections, to give access to the parts beneath.

The crane is electrically operated by the motor shown, and is under perfect control. All of the gears are steel. The swivel operates on roller bearings, making it easy to rotate the crane by hand with its maximum load.

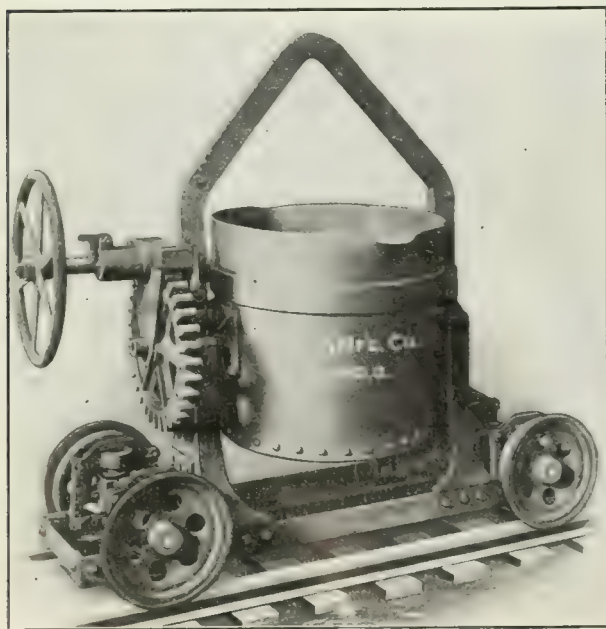


Fig. 2.—A New Atlas Ladle Car.

The crane is equipped with a band brake. The principal dimensions of the crane locomotive are as follows:

Width over all, feet and inches.....	12 7
Length over all, feet and inches.....	8
Capacity of car, tons.....	2
Deck dimensions clear of crane, feet and inches.....	3 4 x 6 4
Wheel base, feet and inches.....	3 9
Speed of car without load, forward and reverse, on level, feet per minute.....	125, 250, 375, 500
Speed of car, forward and reverse, on level, with 8-ton deck load, feet per minute.....	75, 150, 225, 300
Track gauge, inches.....	21½

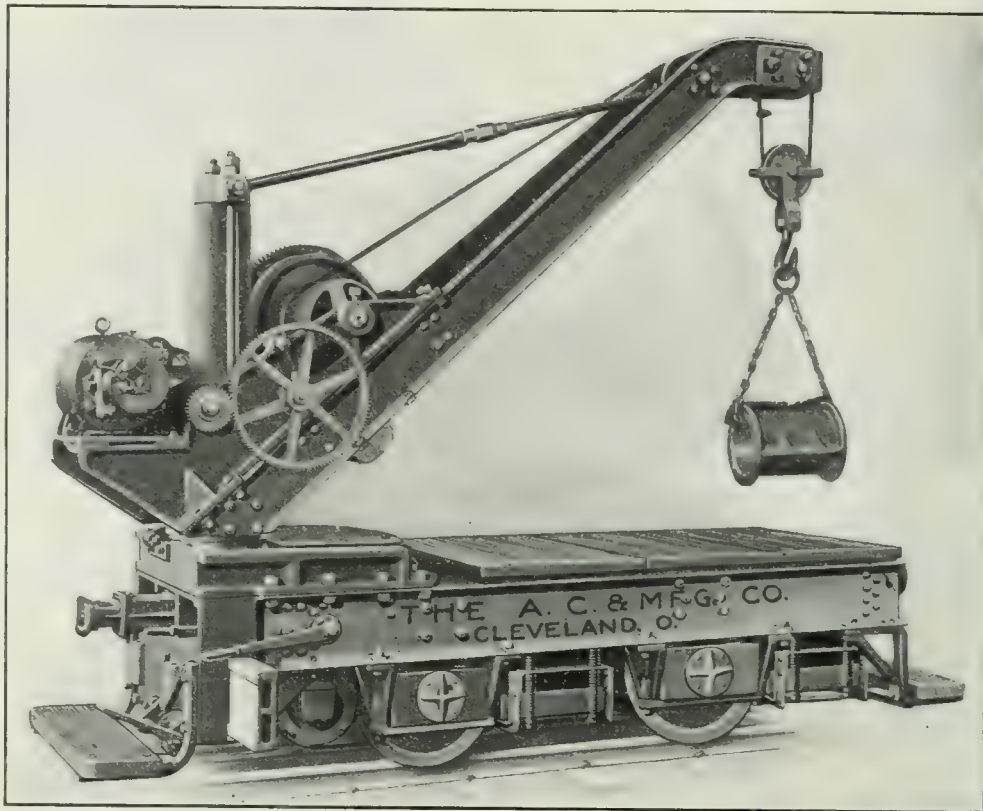


Fig. 1. An Industrial Storage Battery Locomotive Crane Built by the Atlas Car & Mfg. Company, Cleveland, Ohio.

Maximum height of lift above track, feet and inches.....	6 3
Height from top of rail to top of car platform, inches.....	28½

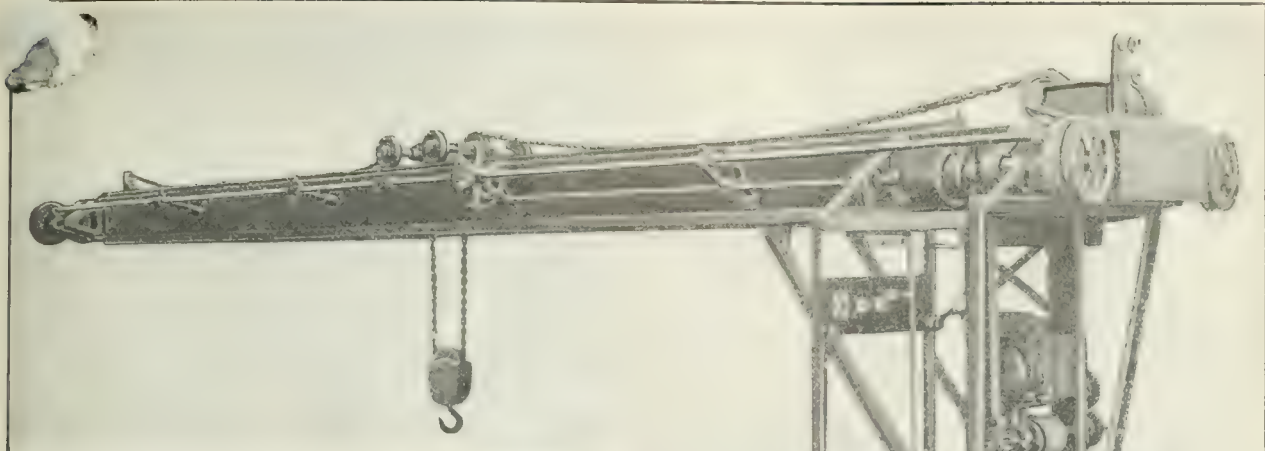
A storage battery locomotive or car with a flat top, designed for both carrying and hauling, is also built without the crane in capacities up to 40 tons, and in various gauges. When loaded themselves to secure adhesion they are capable of hauling from one to two times their capacity. In connection with its electrical locomotives, the company makes a full line of industrial cars.

Among other new products of the company is the ladle car shown in Fig. 2. These cars are built very rigid and permit the easy pouring of metal. Various capacities can be furnished of either plain or geared ladles. Other cars especially adapted to foundrymen's use, include those for handling coke, coal, ashes, sand, &c., as well as core oven cars. The company also makes a full line of portable track, curves, crossings, turntables, switches, wheels, axles, &c.

A Special Maris Foundry Crane

Maris Brothers, Philadelphia, Pa., makers of electric and hand cranes of various kinds, have a special foundry crane for use where the headroom is limited and it is necessary to lift a ladle of metal or other objects hoisted as high as possible above the floor. As may be seen in the illustration the hoisting mechanism, motors, &c., are placed at one end so that the heat from the molten metal will not affect them when the ladle is close up to the bridge.

All hoisting and traversing rigging is within easy access of the operator, and the controllers are placed to one side so as to allow a clear view of the load being hoisted. The hoisting rig is spread in a vertical direction



A Special Foundry Crane for Limited Headroom Built by Marls Brothers, Philadelphia, Pa.

to give as great a travel of the trolley as possible, and also to give as long a distance from the drum to the idler sheave at the end of the bridge as can be obtained, so as to reduce the angle at which the chain winds on the drum.

Where it is desired to have a very slow motion for drawing patterns of drums or other long forms, a band brake is attached, operated by hand, by which the load on the girder can be so regulated as to give the speed desired. The bridges are built of I-beams or girders, the truck wheels have chilled treads and all sheave wheels are bushed. Since the crane is built for steady hard usage all parts are simple in construction and all complications have been avoided.

The Delta and Changezy Tramrail Trolleys

Among the improved devices on trolley systems for foundry and other work are the Changezy and Delta adjustable trolleys, and a trailing or automatic switch, made by the New Jersey Foundry & Machine Company, 90 West street, New York City. The trolleys are shown in Figs. 1 and 2. The Delta I-beam trolleys are made both plain and geared, and the Changezy trolleys embody all of the features of a plain and geared trolley in a single piece of apparatus, and both Delta and Changezy trolleys are adjustable. In outward appearance the Delta geared trolley, Fig. 2, is similar to the Changezy trolley, which was described in *The Iron Age*, May 26, 1910.

Both types of trolleys are made with steel side plates and roller bearing wheels, with hardened axles. The side plates are connected so as to provide flexibility between the two plates, allowing the wheels on each side of the beam to adjust themselves to irregularities in the track, so that under any and all conditions each of the four wheels will carry a uniform load. The adjustability of the trolleys allows of a ready change, so that the trolley will fit any weight of three sizes of I-beam, as carried in stock, or any corresponding width of channels or

angle irons placed back to back. This limitation to three sizes of beam with their various weights and various widths in which they are rolled applies to standard stock trolleys only, but trolleys of any desired adjustability can be shipped from the factory stock with delay of assembling only. I-beams also wear out, and very often have a material amount of variation depending on the condition of the rolls with which they were rolled, but

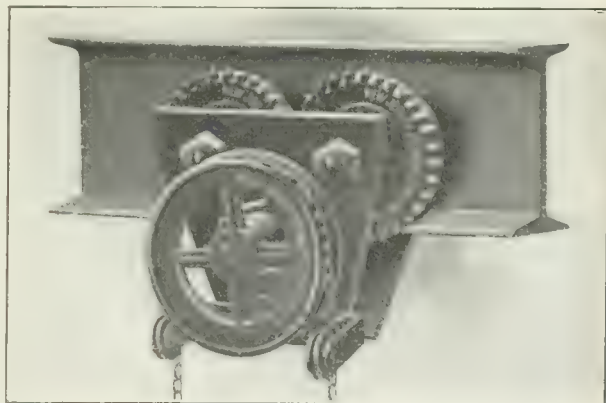


Fig. 2.—The Delta Geared Trolley.

this adjustability allows of the arrangement of the trolley with a proper clearance to the width of beam or flange to be used.

The Delta geared trolley has two of the wheels geared and connected by a shaft and pinions for operation from the floor by a pendant hand chain. The Changezy trolley is both a plain and geared trolley possessing all the advantages of both, and the change from one to another is instantaneous and accomplished entirely by pulling on the hand chain. The gear wheels in this trolley are connected by a pinion in identically the same manner as an ordinary geared trolley, but this pinion can be thrown in and out of gear by pulling the hand chain. This trolley can be used as a geared trolley when handling heavy loads, and as a plain trolley when handling light loads or no load.

The Delta automatic switch is a combination of an automatic switch operating device when the trolley is traveling in a certain direction, and a substitute for a trolley stop under all conditions. Where two lines are

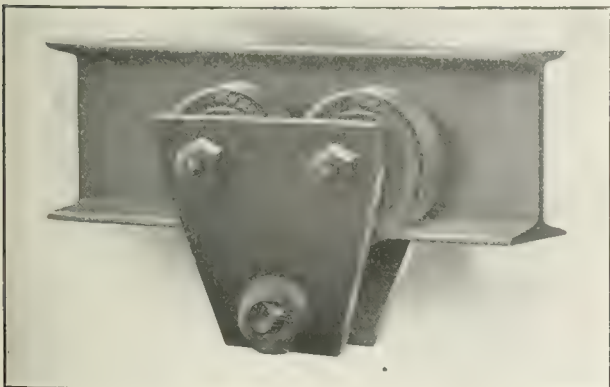


Fig. 1.—The Delta Plain Trolley Made by the New Jersey Foundry & Machine Company, New York.

brought by a switch to a single line the trolley in approaching the single line throws the switch into the proper position. The only time it is necessary for the operator to set the switch is when he is coming on the single line and wishes to go to one of the branch lines and the switch is set for the other branch, but in no case does the trolley come to a dead stop, the switch being set for the proper beam when traveling in one direction, or automatically setting itself to the trolley when traveling in the other direction. This not only saves the time required to stop and set the switch, but in foundry work is especially important, as it does away with the danger of spilling hot metal if an operator does not happen to notice that a switch is set against him and runs into a positive stop.

These trolleys and switches are only a few of the more recent improvements in the extensive line of overhead carrying devices manufactured by the New Jersey Foundry & Machine Company.

Yale & Towne Hoists and Trolleys

Its adaptability and economy in the foundry has led many to adopt a system of overhead tracks, equipped with trolleys and either hand operated or electrically driven hoists. For satisfactory operation it is essential that a load be hoisted easily and steadily, and that the operator have it under perfect control at all times. This may be accomplished with a chain block with spur gearing, giving high efficiency, and a friction brake, giving absolute control, or an electric hoist with direct connected motor and a graduated speed controller. Both types of hoist are made by the Yale & Towne Mfg. Company, Stamford, Conn.

Fig. 1 shows one of this company's Triplex chain blocks in use in a foundry. The sustaining mechanism is separate from the hoisting mechanism and does not augment the resistance to be overcome in hoisting. Fig. 2 shows an electric hoist designed to give uninterrupted service and operate at minimum cost. The hoisting gears are so arranged that, even if the brake is removed, the load will be sustained, while the controller is equipped with a large number of contacts arranged to give graduated speed.

The trolley to convey the hoist and load along the track, as made by this company, is exceptionally strong and easy running. One of them used in connection with a chain block is shown in Fig. 3. The trolley operates

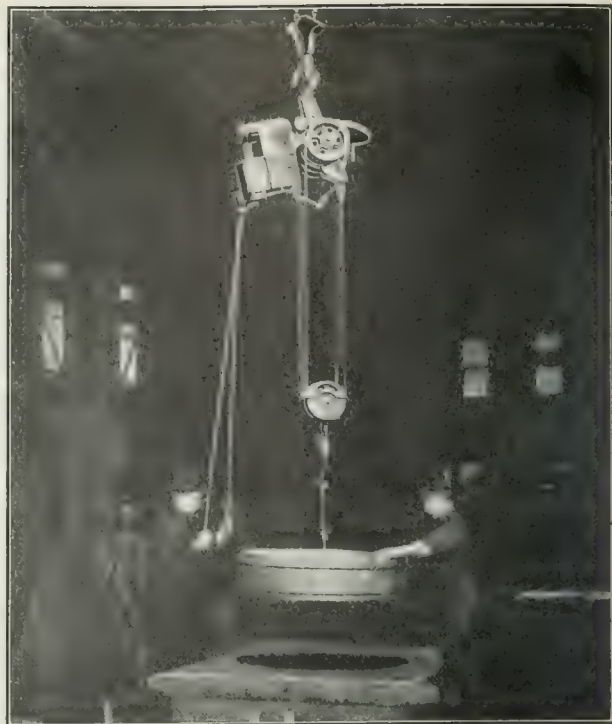


Fig. 2 A Yale & Towne Electric Hoist as Used in a Foundry



Fig. 3 A Yale & Towne Triplex Chain Block and Trolley for Inter-Works Transporting.

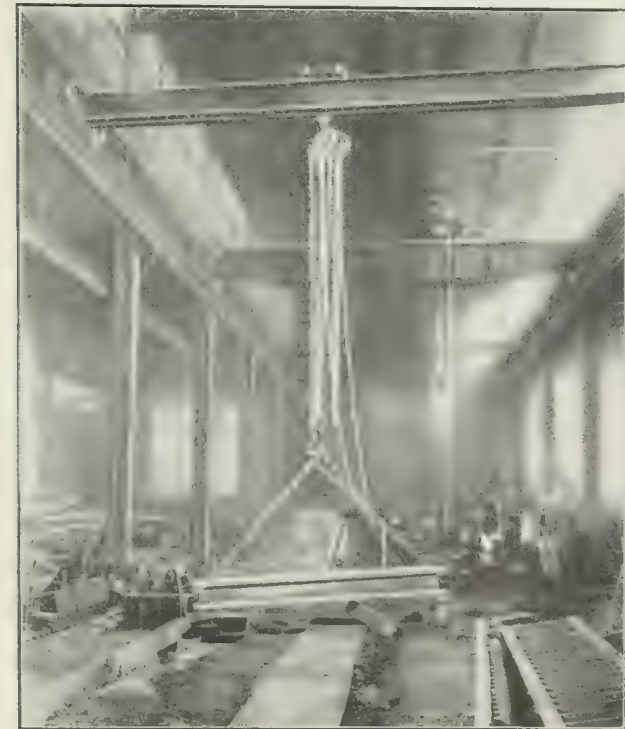


Fig. 1.—A Foundry Crane with a Triplex Chain Block Made by the Yale & Towne Mfg. Company, Stamford, Conn.

freely because each wheel inclines at a right angle to the running surface of the track, and each axle is pressed into the wheel and supported at each end in a bronze bearing, which is self-adjusting, dustproof and self-oiling. Each wheel adjusts itself to the track independently of the others, which facilitates easy movement and steady running on sharp curves as well as straight track. These trolleys run as easily after many years of service as when new.

For the track a light section I-beam is especially suitable, for it gives lateral stiffness as well as transverse strength, and the supports can be placed at considerable distance apart. The standard size of beam to use for a carrying capacity of 1 ton is 6 in., 12 $\frac{1}{4}$ lb. per ft., with supports not more than 13 ft. apart. I-beam track may be suspended by bolting directly to timbers with hanger bolts keyed to the I-beam, as in Fig. 3, or where there is a drop between the supporting beams, and the tracks special brackets or hangers may be used.

Tracks can be so laid that nearly the entire area of the floor is covered, and a system well planned and carefully erected will increase the output of a plant as well as decrease labor expense.

Shepard Electric Foundry Cranes

The following describes a typical foundry installation of a fully inclosed overhead electric traveling crane, built by the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. Although the motors and other electrical parts are wound for alternating current, this installation has proved entirely satisfactory in the most exacting requirements of a gray iron foundry. The plant, the Frontier Iron Works, Buffalo, N. Y., manufactures a line of large and small castings varying in weight from a small automobile or marine motor cylinder to a bed plate or frame of a large machine tool weighing up to 15 tons. The crane is used for all the work from the rough, quick unloading of pig, coke, sand, &c., to the careful, delicate work of closing molds, drawing pat-

terns, &c., including handling the ladle for pouring. Its most severe service is shaking out castings. In two years' use no repairs have been needed, and no signs of wear are evident. All working parts are inclosed from dust and grit in a solid cast iron frame, which forms their support as well as covering, and all gearing, shafts, &c., run in oil, so that very little cleaning and lubricating attendance is required.

The trolley is arranged to keep this axis constant under all conditions, so that all shafts have a constant position in their bearings. Similarly all gear teeth retain their original adjustment, thus distributing the stresses which they carry and the wear incident to their operation over the entire tooth surface.

The hoist is equipped with both a mechanical or load brake and an electric or motor brake, either capable of holding the load at any position. The load brake acts directly on the driving shaft, and sets immediately upon stopping the motor. It is located within the hoist frame or shell and runs in oil, insuring uniform braking power, irrespective of the load handled and rapid radiation of heat. The electric brake is keyed to the armature shaft and stops it the moment current is cut off from the motor. Its braking surfaces also run in oil.



A Crane in the Frontier Iron Works, Buffalo, N. Y. Built by the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

The illustration shows the crane at one end of the foundry about to place the cope on the mold. At the other end the runways extend out of doors where the crane has no other covering than the hoist frame, which forms the housing for the gearing as well as its protection from the weather. Outside the machine is used for unloading coke, which is shoveled into a bucket suspended from the hook, then carried into the foundry and dumped into storage bins.

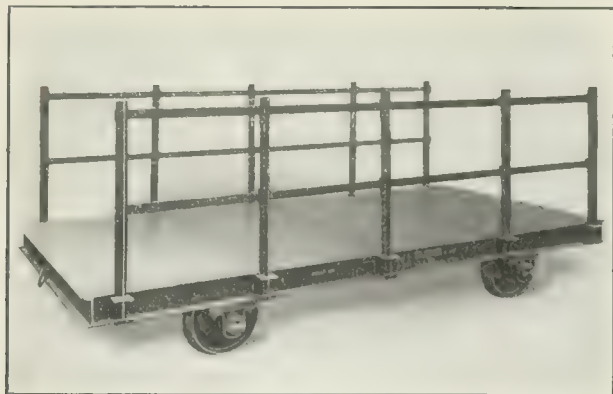
Planetary gearing is employed throughout the hoisting element of the crane. The gearing and all its related shafts and bearings are kept in perfect alignment, because the bearings are bored in the hoist frame and bushed with hard bronze. The torsional movement, which occurs in the frames of crane trolleys, due to inequalities of the track or runway or wear of truck and trolley wheels and their bearings, has no injurious effect upon the Shepard trolley, because all the hoisting mechanism has a common axial position; the frame of

The trolley drive is inclosed in its own gear case. The gearing runs in an oil bath, and the bearings are ring oiled. The bridge drive with its brake is also inclosed in a dust tight case. The gear and pinion run in oil as well as the bearing surfaces of the brake. The truck wheel gears are protected from dust and dirt by cast iron cases, but owing to their slow motion it is not necessary to run them in oil.

Although the crane is so fully inclosed the working parts are accessible. By removing six square head cap screws the hoist head may be removed, after which each part may be taken from the hoist without the use of tools. One man with a helper can completely disassemble and reassemble one of the largest crane trolleys in from 45 to 60 min. with a monkey wrench and screw driver.

Monarch Core and Annealing Oven Cars

The name of the Monarch Engineering & Mfg. Company, Baltimore, Md., is identified among foundrymen with the Steele-Harvey crucible melting and refining furnace, using oil or gas for the melting of metals, which has heretofore been described and illustrated in these columns. One of its features is the retention of the crucible in the furnace and thus the lengthening of its life as compared with use in pit furnaces. The company



Monarch Core and Annealing Oven Car with Detachable Sides.

is also designer and manufacturer of the Monarch portable tilting furnace, the Monarch nontilting crucible furnace and the stationary furnace designed for melting in foundries making light castings where hot fluid metal is required for quick pouring in molds.

Among other equipment manufactured by this company is a metal car for core and annealing ovens. As shown in the illustration this car has detachable sides. It is furnished with dustproof boxes, and may be arranged with fire brick tops for carrying molds to be placed under tilting furnaces for direct pouring. The company's name is also identified with the Monarch core oven, portable heater, fuel oil burner and positive pressure blower.

Ridgway Foundry Elevators

Getting stock up to the cupola is perhaps the most important single operation in a foundry. For many years all devices for elevating materials to the cupola were so troublesome and uncertain that it was common to use

wheelbarrows on inclined runways from the yard to the cupola platform. While this was slow and expensive it was absolutely sure. In recent years an elevator has been evolved for foundrymen by William H. Ridgway of the Craig Ridgway & Son Company, Coatesville, Pa., which seems to fill the exacting requirements of foundry cupola service.

The history of the Ridgway elevator is interesting as it was the foundrymen who really brought it into existence. The company was manufacturing a balanced hydraulic crane operated by steam, which became popular in foundries. This led to requests for and the development of a cupola elevator working on the same principle, and to-day the present perfected Ridgway steam-hydraulic elevator is widely known among foundrymen.

The elevator consists primarily of two cylinders, one the lifting cylinder and the other the water cylinder, the latter a little larger than the former. The two cylinders are connected by a valve controlled pipe and the water cylinder is similarly connected to the steam supply. Figs. 1 and 2 show two common styles of machine, such as are used for taking stock up to cupola platforms.

To operate the elevator, steam is admitted to the water cylinder, and, being prevented from coming in contact with the water by a body of air between them, instead of condensing, forces the water to the lifting cylinder at the steam pressure and moves the piston or ram as the case may be. To lower the elevator the steam is exhausted, and the pressure being relieved the water flows back to the water cylinder. The same water is used over and over. The speed of the elevator is regulated by a hand cable from the cage, and the machine is under perfect control at all times.

A device in the top of the water cylinder called a spreader distributes the steam over the top of the air, while a device on the side of the cylinder maintains the air space between the steam and the water. The air being twice as heavy as the steam will remain next to the water, and being a nonconductor of heat insures the prompt action of the elevator.

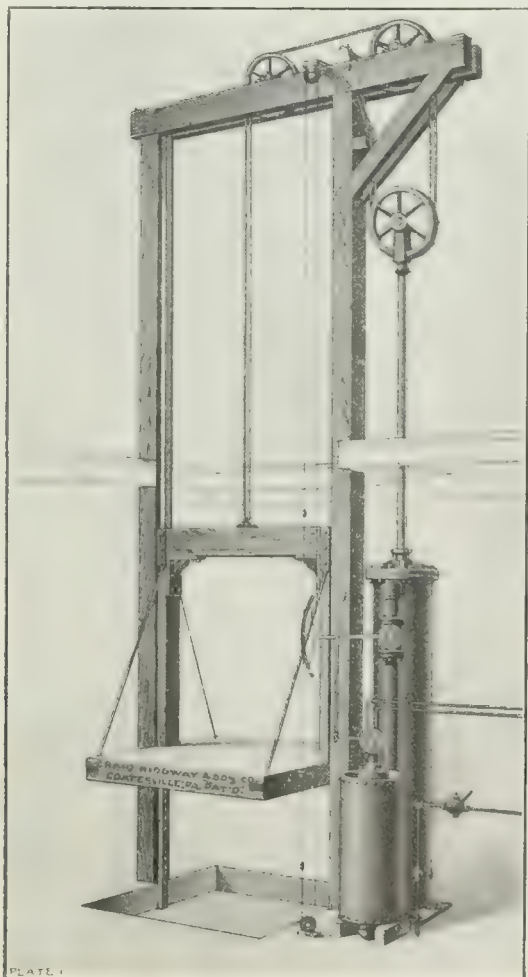


Fig. 1.—Double Geared Elevator.

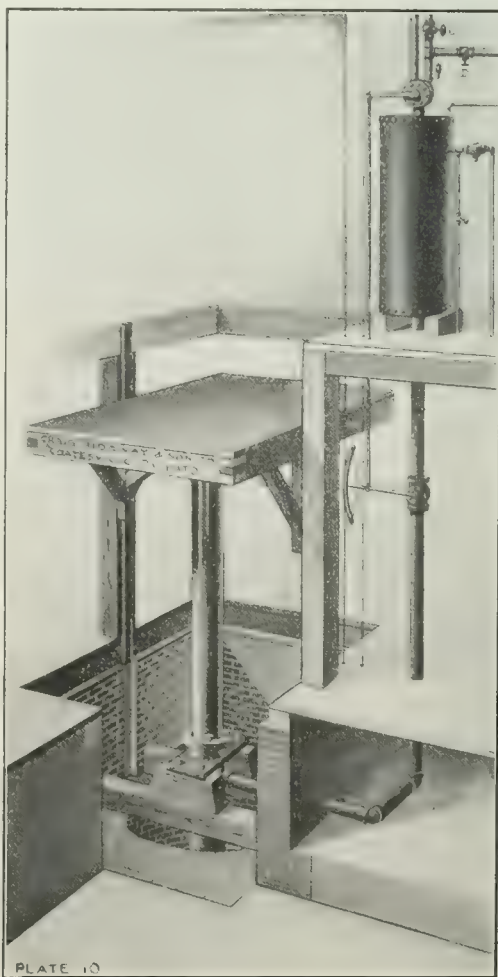


Fig. 2.—Direct-Acting Elevator.

Two Types of Foundry Elevators Built by the Craig Ridgway & Son Company, Coatesville, Pa.

Ernst Wiener Foundry Cars

Industrial railroad systems provide economical means for handling sand, lime, coke, pig iron, molten iron, castings, &c. A typical installation comprises track of 16-lb. rails, mounted on steel ties, switches made up in the

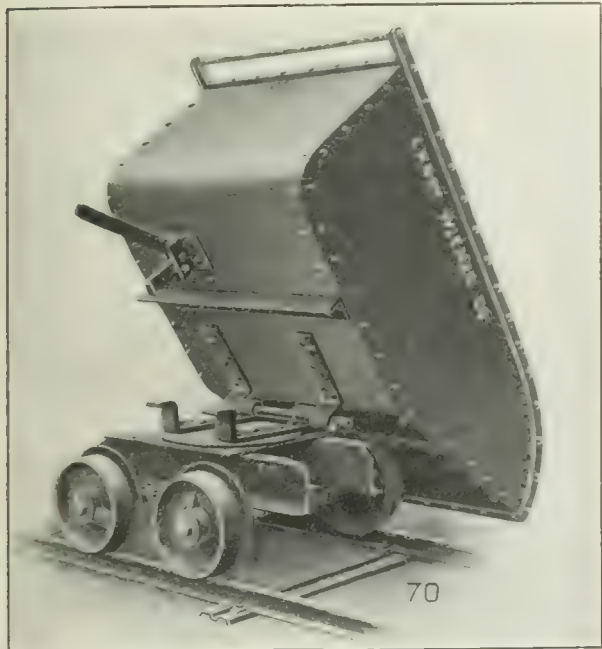


Fig. 1. —A Dumping Car Suitable for Sand Conveying Made by the Ernst Wiener Company, New York.

same manner and turntables of design to suit requirements, steel double side or rotary dumping cars, ladle cars and steel top flat cars. No matter from where or what part of the plant materials are to be transported the track system is always ready, while other conveying

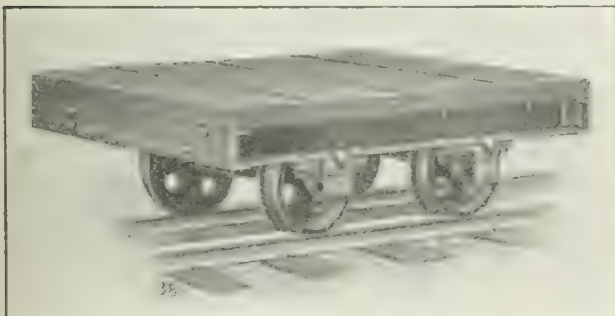


Fig. 2.—A Flat Car, Also Made with Steel Top.

systems may be busy at some other part of the shop, thus delaying the workman and losing considerable time. Even in a small foundry a track system is a valuable addition for handling material in course of manufacture, and its usefulness in foundries is generally almost without limit.

The practical application of industrial railroads in

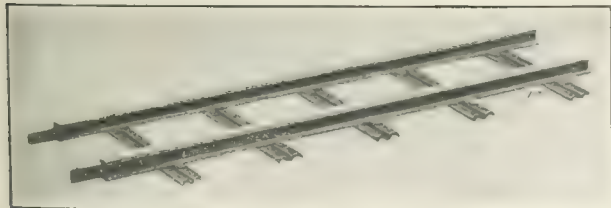


Fig. 3.—A Section of Portable Track.

foundries has been given special consideration by the Ernst Wiener Company, 50 Church street, New York City. For conveying sand from the storage pile to the various points where it is used, this company recommends

the car shown in Fig. 1. For handling flasks and finished product cars, such as is shown in Fig. 2, but with steel tops, are used. The all-steel double side dump car is often used for transporting various materials and has proved very satisfactory. The preferred form of track for foundry use is illustrated in Fig. 3.

The Ernst Wiener Company specializes in the manufacture of industrial railroad equipment of all kinds, including a great variety of cars and locomotives.

CUPOLAS AND OIL BURNERS

The Calumet Cupola

A thick lining at the melting zone and the proper ratio between tuyere area and cupola area are features of the design of the Calumet cupola of the Calumet En-

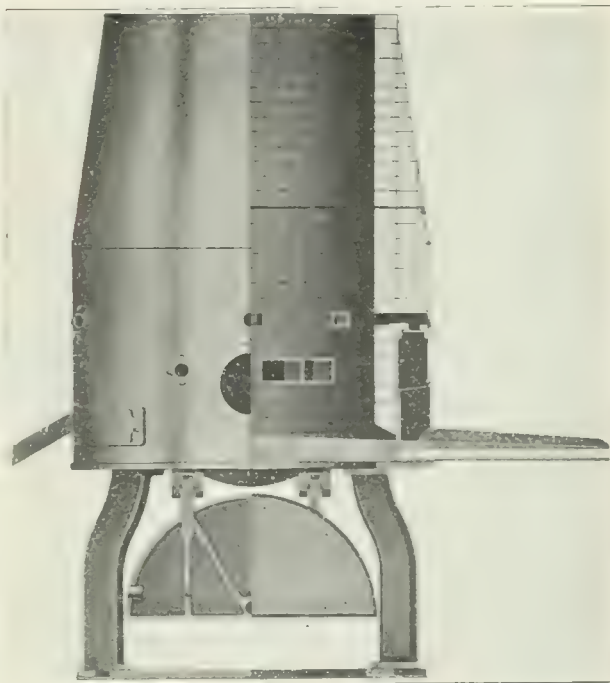


Fig. 1.—Furnace Section of the Calumet Cupola.

gineering Works, Harvey, Ill. The lining at the melting zone is 9 to 12 in. on smaller cupolas, and 14 to 15 in. on the larger sizes. To insure an even distribution of blast to the tuyeres two blast entrances are provided, one directly opposite the other. The thick lining at the melting zone is designed to reduce to the smallest degree

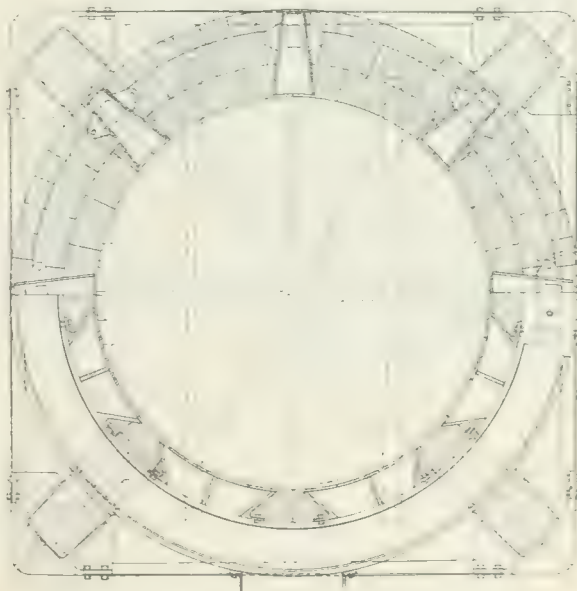


Fig. 2.—Cross Section at the Tuyeres.

the loss of heat by radiation. The tuyeres are of the rectangular expanded type, proportioned both to the cupola area and to the outline of standard blowers. The upper tuyeres, which serve their usual function of furnishing an air supply for more complete combustion, are equipped with dampers so that they may be closed when desired. A safety tuyere near the slag spout prevents the molten iron from rising and flowing through the lower tuyeres. In the larger cupolas there are eight upper and eight lower tuyeres. The wind box is placed on the inside of the main shell of the cupola. This prevents loss of blast and permits outside inspection of the main body sheet. While the cupola is fitted with two blast nozzles a single blast entrance may be used, having a partition wall in the center, so as to divide the blast and distribute it equally around the tuyere area. The greater thickness of lining, besides preventing loss of heat by radiation, protects the shell from the effects of high temperatures.

Fig. 1 shows the construction of the furnace section

spout of the safety overflow removed. All of these parts also are machined.

There is one upper and one lower row of tuyeres in the cupola. The upper row has gates allowing any or all of the tuyeres to be closed if desired. The tuyeres are flaring in shape and admit the blast through a small area in the shell which is expanded into a large horizontal opening inside of the cupola. The air is thus permitted to reach the fire through an area nearly double that through which it enters the tuyeres.

The cupola stack, not shown, is made of steel plate riveted in sections with downward joints, and is convenient for erection. It also has the advantage of shedding water and keeping it out of the joints, preventing rust of shell and damage to the lining. The lining supports are cast iron placed inside the stack, and wide and strong enough to support the brick lining above them. One shelf is placed just above the charging doors and one about every 10 ft. above this point. Another is placed immediately above the air chamber allowing that

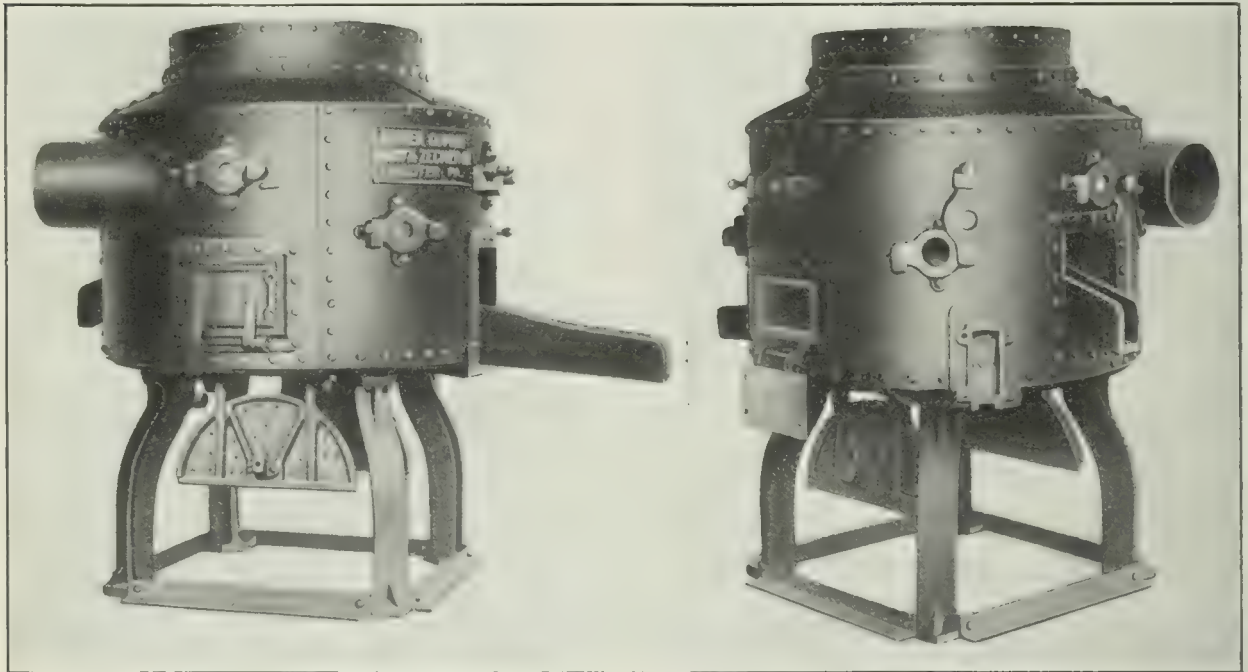


Fig. 1.

Fig. 2.

Two Views of the Body Section of the Zecher Cupola Built by the Barry & Zecher Company, Lancaster, Pa.

of the cupola, and Fig. 2 is a horizontal section through the tuyeres.

The Zecher Cupola

A new line with the Barry & Zecher Company, Lancaster, Pa., is the Zecher cupola declared to be the heaviest and strongest made. Among the points of advantage are that the cleaning doors are hinged so that when open they will hang down, and both frames and doors are machined so that when closed and bolted they will be air tight, and a safety tuyere is provided having an overflow on the outside of cupola, which makes it impossible for any iron to get into the air chamber. Another improvement is the use of compression springs to keep the peep-hole covers tight against the frame so that no air can escape. At the same time the cover can be easily opened when necessary and can be kept partially opened if desired. The slag spout is also of improved design and does not require lining. These cupolas are made in all standard sizes from 36 to 102 in. in diameter, inclusive.

Fig. 1 is a side view of the body section showing the hinged cleaning door and the peep-hole frames and covers. These parts are all machined, making the cupola air tight and securing the full benefit of the blast pressure. Fig. 2 is a view of the other side of the body section and shows the cleaning door and peep-hole cover open, and the

portion of the lining below to be repaired or replaced without removing the upper portion.

With each cupola is furnished a blast gauge to be attached to the air chamber for registering the pressure of the air blast. The blast pipe nozzle is arranged to enter the air chamber on a tangent forcing the blast around the shell. If desired two blast pipe nozzles may be used, one on each side of the cupola. The tapping spout is of cast iron, and furnished in any length desired.

Hauck Portable Oil Burners

For lighting cupolas, drying molds and ladles, preheating and general heating operations a variety of types of oil fuel burners are made by the Hauck Mfg. Company, 140 Cedar street, New York City. One of these applications, cupola lighting, is shown in Fig. 1, indicating the method of applying the burner. Use of shavings or other kindling wood is entirely eliminated and with it the smoke nuisance. The burner is placed in the spout at the tap hole or breast or at a specially cut hole. The flame is directed by compressed air against the coke bed producing ignition without injuring the cupola lining, enabling the fan blast to be started in a short time and insuring clean hot iron, since no ashes are present. It is claimed that the expense saved in lighting cupolas this way will pay for the burner in

one to six months. The same burner can also be used for drying ladles and skin drying cores and molds. For drying ladles it is usual to attach the burner to a pipe extending into the ladle. The flame is conducted to the bottom of the ladle and heats the bottom and sides evenly without injuring the lining. Small hand ladles

without, and applied to the melting of soft metals such as babbitt, &c., stationary brazing forges equipped with a burner and tank complete for use, and portable brazing forges with a portable burner attached to be used as a blow torch.

The Whiting Cupola

The latest improvements in the design and construction of the cupola built by the Whiting Foundry Equipment Company, Harvey, Ill., are shown in the illustrations. Fig. 1 is a body section of the standard cupola and shows the four foundation plates, one under each column connected by angle bars. The columns are

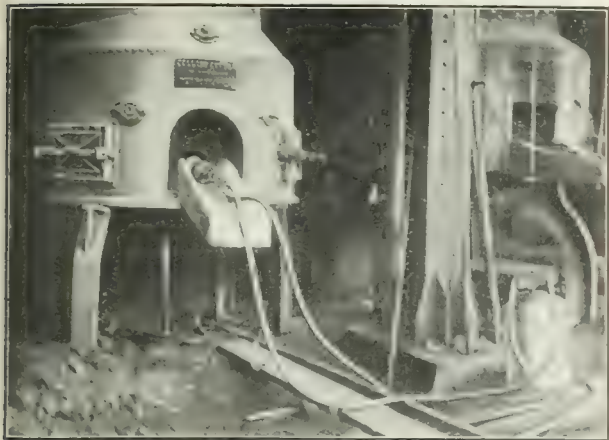


Fig. 1—Firing a Cupola with the Portable Oil Burner Made by the Harack Mfg. Company, New York

can be placed over the top of the large ones and dried at the same time with the escaping heat.

Another interesting application of the burners is shown in Fig. 2, this being in connection with repairing defective castings. It shows the method of applying the burner to preheat the defective part if necessary to the melting point, allowing the fluid metal to amalgamate with the casting more readily without undue expansion and possible cracking. The burners are also used only to preheat the metal, the welding being accomplished with an oxy-acetylene blow-pipe. This burner is of the



Fig. 2—Preheating a Defective Casting with a Portable O. Burner Preparatory to Repairing.

same general type and may also be used for skin drying molds. It offers the advantages of time saved, since the burners can be instantly lighted, and of more uniform work, since the soft blue flame can be easily regulated to spread over a large area or with a small pointed flame to be concentrated on a limited area.

Often in baking molds the flame from the burner is driven into specially constructed sheet iron boxes, lined with asbestos, so that the heat is reflected to the molds under the boxes. Two general classes of burners are made, one operated with compressed air, which is the preferred type where air is available, under any pressure from 5 to 100 lb., and an independent self-contained type having a hand air pump fastened to the tank. Any grade of fuel, crude or kerosene oil may be used.

The company also makes lead melting portable furnaces, which can be used either with compressed air or

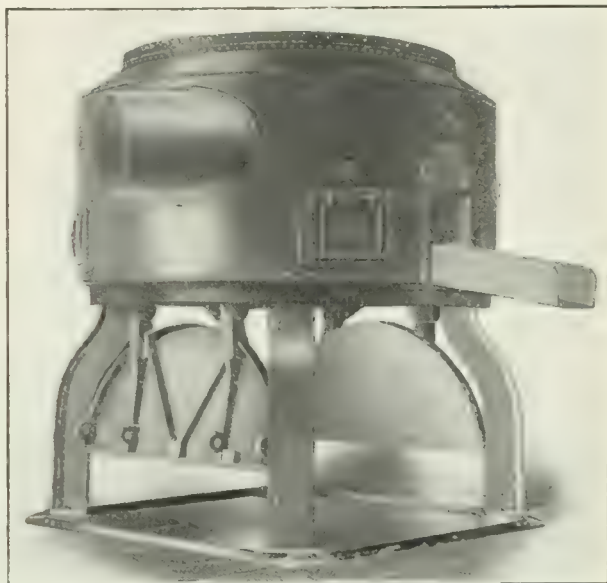


Fig. 1.—Body Section of the Standard Cupola Built by the Whiting Foundry Equipment Company, Harvey, Ill.

curved, allowing clearance for swinging the bottom doors and are of heavy T section. The bottom plate is a new design with a heavy vertical rib, and the bottom doors are also heavily ribbed and have vent holes as shown. All of the larger cupolas are fitted with lugs for the lever arm used in connection with a bottom door hoist.

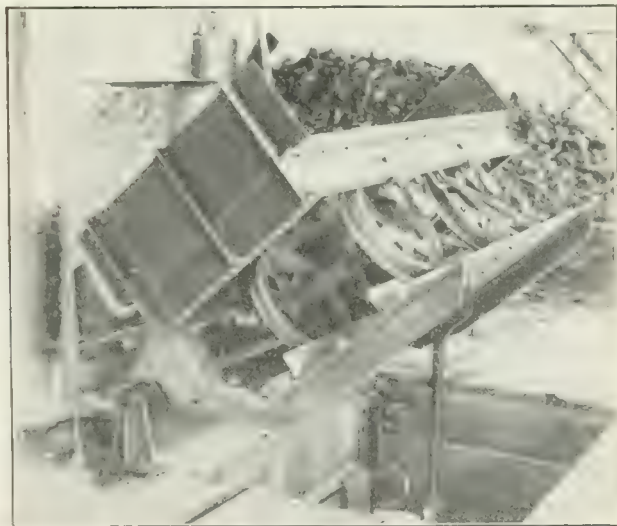


Fig. 2—A Whiting Cupola Dumping Charging Machine for Large Cupolas.

At the bottom, the wind box, which is of large capacity, is bolted to a flange on the bottom plate and is joint cemented. Its top is formed of flanged plates and riveted to the shell, all joints being calked air tight. The tap and slag hole frames are cast iron and are

bolted to the shell and wind box plate and are also joint cemented. The cleaning doors are large and readily opened for inspection. The blast entrance is tangential to the wind box.

The tuyere system is of the flaring design, the lower tuyeres forming practically an annular inlet inside of the lining, which provides equal distribution throughout the area of the cupola and softens the blast, insuring greatest life to the lining. The height of the lower tuyeres is adjustable for different classes of work, and the upper tuyeres are bolted to the shells and are fitted with independent gates. One of the lower tuyeres has a safety device consisting of a funnel formed in the bottom plate, to which is fitted a slide having an opening closed with heavy paper. If metal or slag overflows the tuyere it drops into the funnel and burns out the paper, giving warning to the cupola tender. The upper and lower tuyeres have peep hole frames and covers with machined joints.

Heavy plates are used in the shell, and the body section is extra heavy with close rivet spacing. Brick lined, cast iron, or screen charging doors are furnished. Shelf angles are bolted to the shell at proper intervals to support the lining, and at the top of the stack is an angle to keep the weather out between the lining and the shell.

The Whiting cupolas are made in 16 sizes, with capacities ranging from $\frac{1}{4}$ to 30 tons per hour. The No. 12, having a 108-in. diameter shell, is the largest size standard cupola manufactured. In it a structural steel frame work with a steel plate is substituted for the cast iron bottom plate, and the legs are columns of special design. Charging machines, as illustrated in Fig. 2, may be furnished for the larger cupolas. These are great labor savers and operate by compressed air as shown, or by an electric motor.

Other products of the Whiting Company, which can only be mentioned for lack of space, are tumblers, core oven equipment, overhead trolley systems, converters, malleable furnaces, annealing ovens and cranes of all kinds as well as air hoists.

The Newten Cupola

In the construction of the Newten cupola the Northern Engineering Works, Detroit, Mich., has given special attention to economizing the blast by preventing leakage of air around the blast chambers. To this end the blast chamber or air box is steel calked to remain practically air tight under all conditions. It is placed on the outside, where it is accessible from all sides, and the bottom is raised above the bottom plate to permit inspecting the bottom of the cupola shell. The safety tuyere is also noteworthy and the adjustability of the tuyeres whereby they may be raised or lowered to suit different conditions of work. Among special advantages cited for the cupola are rapid continuous melting, high fuel economy, saving in wear on the lining and ability to handle a wide range of work. Fig. 1 shows the furnace section of the cupola, and Fig. 2 a horizontal section through the lower tuyeres.

In Fig. 2 it will be seen that the main tuyeres are of the expanded type and of large area to insure the transmission of sufficient air to the furnace. The main tuyeres each have two supporting ribs placed at an angle, slightly contracting a small portion of the blast, to force it toward the proportionately smaller area at the center of the furnace, while the expanded blast supplies the larger area nearest the lining resulting in a differential blast covering the entire area of the furnace. The lower tuyeres are adjustable vertically several inches to suit either a deep or a shallow bed of fuel, adapting the furnace to either coke or coal or to any change in the inside diameter to suit different classes of work. One tuyere has a low spout connected with a soft metal plug in the cleaning door. This is burned out and gives warning if the molten metal rises too high. On cupolas larger than 36 in. in diameter there are several additional upper tuyeres of much smaller area, supplying air to assist combustion and utilize the escaping gases.

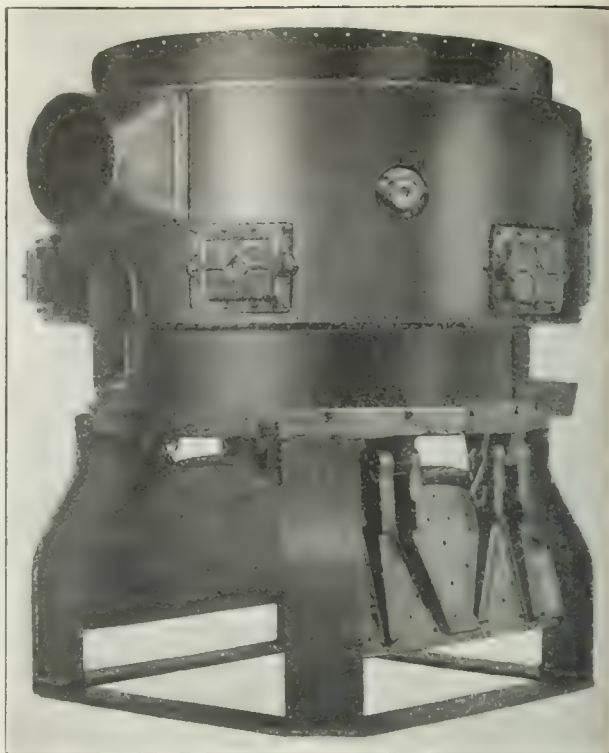


Fig. 1.—Rear View of the Furnace Section of the Newten Cupola Built by the Northern Engineering Works, Detroit, Mich.

These tuyeres have dampers to close them if desired, as the main tuyeres have ample area for the required capacity.

Fig. 2 also shows the cleaning doors, through which is afforded access for cleaning and inspecting, and the peep holes opposite each tuyere. The blast entrance divides to evenly distribute the blast on both sides of the furnace. Both the cleaning doors and the peep holes have planed and fitted joints with adjustable fastenings. The charging door is extra large, and its frame has a heavy iron slide or apron at its base protecting the lining. Two charging openings are provided on all cupolas larger than 72 in. The stack is extra heavy steel riveted in sections and having down-opening joints. Angle

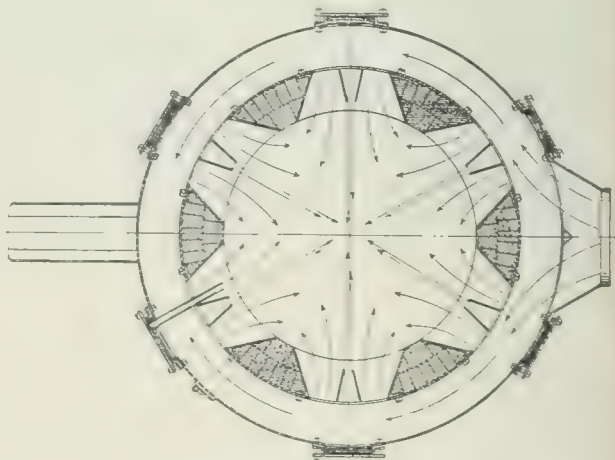


Fig. 2 Horizontal Section Through the Lower Tuyeres of the Newten Cupola.

shelves riveted inside the stack a suitable distance above the melting point and at frequent intervals beyond support the lining during repairs. The Newten cupolas are made in all sizes from 30 to 108 in. diameter of shell.

Other products of the Northern Engineering Works of interest to foundrymen are electric and hand cranes of all types, hoists and tumbling barrels. The largest of the latter is $4\frac{1}{2}$ ft. in diameter, 7 ft. long and extra strong for tumbling heavy work.

BLOWERS AND DUST COLLECTORS

Sturtevant Foundry Blowers

The size of the cupola, the air pressure required and the duration of the melts determine largely whether the centrifugal or the positive type of blower is most suitable. The first is a high speed machine and its pressure is limited, being seldom more than 16 oz., making it best adapted for medium and small cupolas requiring moderate pressures. On account of its high speed it is not as satisfactory for long and continuous melts as a slow speed positive blower. The latter is also best adapted to large cupolas and where forcing is necessary requiring high pressures. The B. F. Sturtevant Company, Hyde Park, Mass., makes both types of blowers. At the higher pressures the power required to drive the positive blower is somewhat less than that required to drive the centrifugal blower of the same capacity, which is another point in its favor.

In general appearance the steel pressure blower, Fig.

core attached to either end plate and divided at its center into two parts. In the annular space between this and the casing the impeller revolves. This consists of three diamond shaped blades, a central web and a hub keyed to a steel driving shaft. The impeller web revolves in a space between the two sections of the internal core and the blades; shell and core inclose three separate pockets which carry the air from the inlet to the discharge. The idler revolving in the smaller cylinder of the casing successively provides chambers for the return of the impeller blades to the low pressure side.

The pressure of the air presents no resistance to the rotation of the balanced idler, which is revolved at the same speed as the impeller through spur gears. These blowers have adjustable bearings with ample lubrication provision, and for foundry use are equipped with relief valves which may be adjusted for any pressures within the capacity of the blowers. These blowers are made in seven sizes, and, operated at different speeds, are suitable for cupolas melting from 1 to 30 tons of iron per hour.

Among other products of the company which have

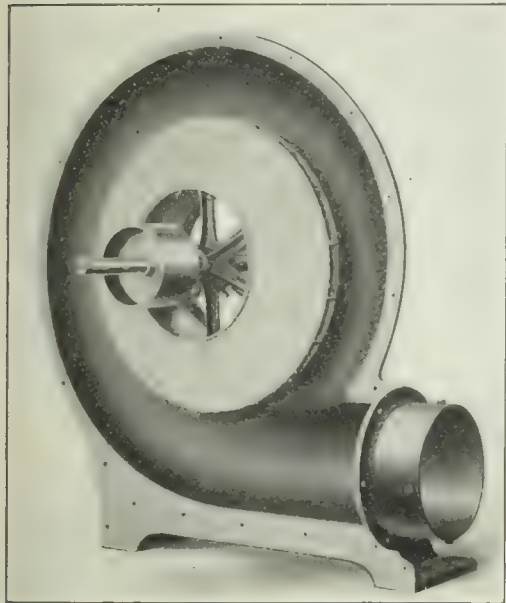


Fig. 1.—Steel Pressure Blower.

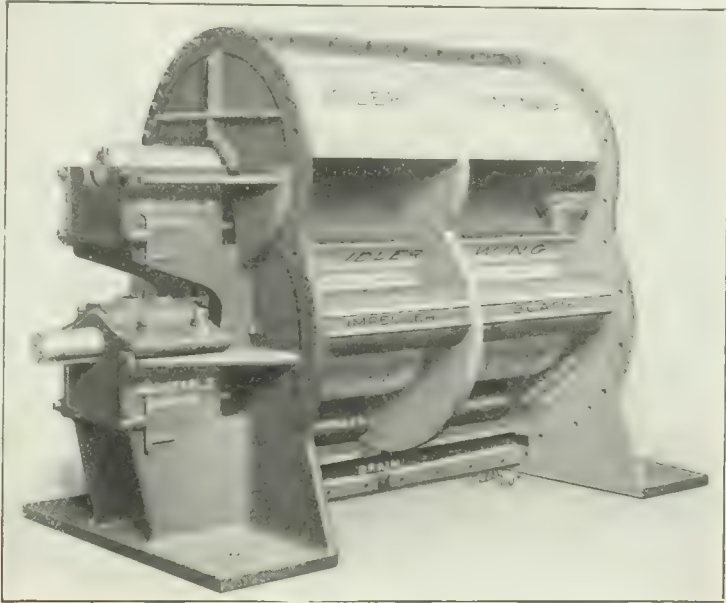


Fig. 2.—High Pressure Blower.

Interior Views of Two Types of Foundry Blowers Made by the B. F. Sturtevant Company, Hyde Park, Mass.

1, does not differ greatly from other centrifugal blowers, but its perfected details of design and construction are claimed to give it exceptional durability and efficiency. The efficiency depends largely upon the form and proportion of the blast wheel and casing. In this blower the casing is cast iron, eliminating chance of leakage, and securing a more perfectly proportioned scroll. It is cast in two parts, which may be separated for inserting the wheel.

The blast wheel is galvanized thin steel plate. Its blades are strengthened by flanging and are curved, giving them additional strength. Being accurately balanced it runs smoothly, even at high speed. The bearings are dustproof, extra long, easily adjustable, lined with Sturtevant white metal and positively lubricated by an oil cup and wick. These blowers are made in a number of sizes, and are adaptable to a wide range of cupola capacities by being operated at suitable speed.

The positive or high pressure blower, Fig. 2, differs radically from others in that the entire work of compression is done by the impeller on the main driving shaft. The other rotor serves only to pass the impeller blades from the high to the low pressure regions without loss of compressed air. The power required to drive it at its slow speed is negligible.

Between the rotors and between them and the casing is sufficient clearance to prevent their coming in contact, avoiding the necessity of frequent adjustment. The casing is cast iron in the shape of two hollow cylinders partially intersecting. The larger one contains a hollow

application in the foundry are its exhausters for connection to tumbling mills and its heating and ventilating equipment.

The Morse Dust Collector

A dust collector operating on the partial vacuum system, and hence given the name Rarefied, is manufactured by the Knickerbocker Company, Jackson, Mich. It has been designed especially for use in connection with foundry tumbling mills, sand blasts and emery wheels.

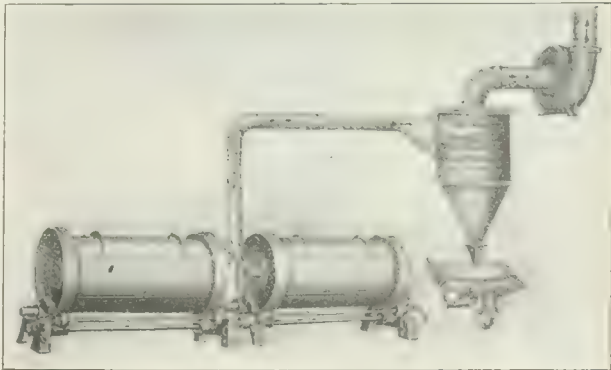
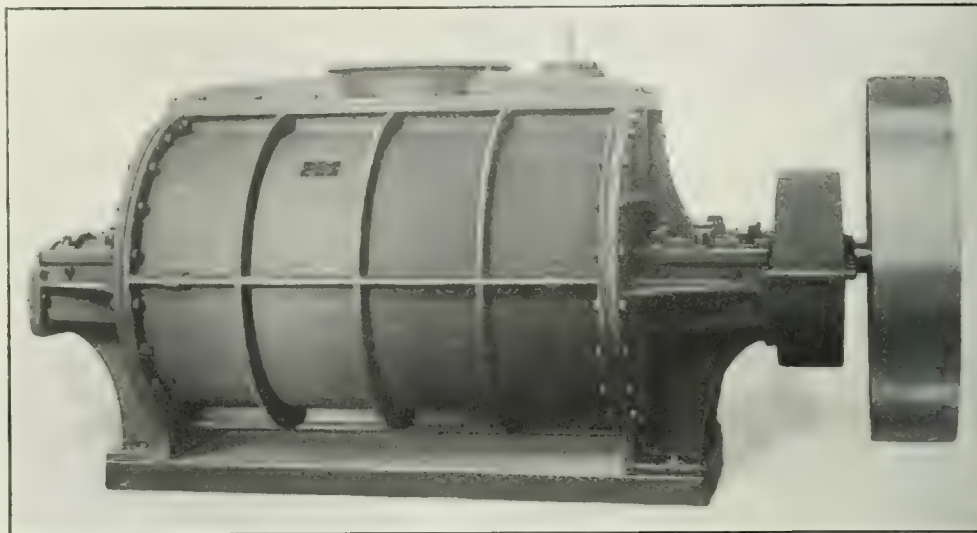


Fig. 1.—The Morse Rarefied Dust Collector Connected to Tumbling Barrels.

The collector, as shown in Fig. 1, is located between the fan and the dust producing mechanism, the fan drawing air through the collector and maintaining a constant vacuum tendency in the collector casing. Thus a separation of the fine particles from the air current is secured before the air reaches the fan, and thus the abrasion of metallic or flinty products on the fan parts is largely eliminated without undue wear on the collector parts.

Referring to Fig. 2, the dust spout is connected to the collector at the tangential inlet A, while the fan inlet is connected with an exhaust pipe opening in the collector at J. The fan establishes an air current through the exhaust outlet, creates a rarefied air condition in the areas B, C, and D, and draws the material laden air into the casing at the tangential inlet A. The centrifugal action causes the heavier material particles to be projected toward the inner dividing casting E, where they pass through the skimmer F into the rarefied chamber C. A lighter grade of dust travels along the walls to the chamber B, and the very light dust which has not sufficient momentum to overcome immediately the draft of the air current, passes toward the center with the inwardly flowing air and escapes to the rarefied or vacuum chamber D, which is open to the air wheel. The purified air passes out of the collector through the axial exhaust pipe at J and thence through the fan. As the material accumulates in the chambers B, C and D, it will fall to the bottom and discharge of its own weight through the automatic trap G.



A Rotary Positive Blower for Foundry Use (Horizontal Type S. F.) Made by the Connersville Blower Company, Connersville, Ind.

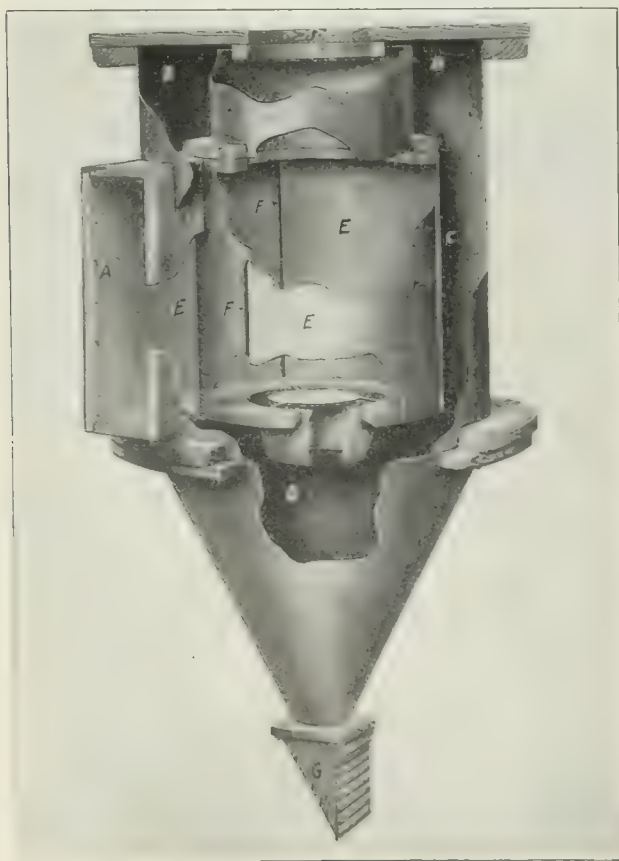


Fig. 2.—Interior of the Morse Dust Collector.

The inner casing E of the collector is of steel and readily renewable. The axial air escape and the vacuum principle reduce wear inside the collector to a minimum. Grinding action of material against the walls is avoided. The greatest suction is at the center of the whirl, which is the axis of the casing. The outer areas being rarefied act as cushions for receiving the centrifugally expelled dust, thus greatly reducing casing friction.

Connersville Rotary Positive Blowers

After the coke and iron have been measured and weighed into a cupola the operator should have some accurate means of determining the amount of oxygen sup-

plied. In this respect a positive blower is most advantageous, for it discharges a known volume of air per revolution and can be speeded for the quantity of iron to be melted. The certainty and reliability with which melting proceeds also enable the foundryman to know the time required for certain heats and thus make a saving in labor. When the charges into a cupola are of fine material or the tuyeres become clogged, the resistance is increased and the amount of air entering the furnace diminished unless a positive blower is used. With the latter running at a constant speed there is a constant volume of air forced into the cupola, regardless of changing resistance and thus the melting is not retarded. Rotary blowers now in operation on foundry cupolas have had the pressure during a heat go up from 10 to 24 oz., and the melting proceed at a constant rate.

The illustration shows a positive pressure rotary blower built by the Connersville Blower Company, Connersville, Ind. It is equipped with the company's quarter box ring oiling adjustable bearings, and is designed especially for foundry use. The ring oiling feature combined with rigidity permit its being run at much higher speed than is customary with most rotary blowers built for this purpose, and at the same time not at a speed so high as to be objectionable from a standpoint of efficiency and noise.

The impellers do not touch each other nor the cylinders in which they revolve, but are made with as little clearance as possible. All the parts being well designed and made rigid enough to hold their exact shape and position when running under pressure, the clearance can be made very small. There are two impellers only, each cast in a single piece, strongly ribbed on the inside and planed all over. The contact surfaces are formed on mathematically correct lines and finished accurately with two cuts. This construction permits the impellers to revolve together with uniform clearance. There are no waste spaces or pockets between these impellers and no sharp corners or edges on them to produce sound vibrations. The impellers being symmetrical with respect to the shaft centers are balanced at all speeds.

CLEANING EQUIPMENT

Drucklieb Sand Blast Specialties

The Drucklieb sand blast specialties herewith illustrated comprise the injector sand blast apparatus and a sand blast tumbling barrel.

The sand blast apparatus, shown in Fig. 1, has proved itself durable and effective, working either under high or low air pressures. Designed to take advantage of the well-known injector principle, the air supply is so subdivided and controlled by one operation of a three-way cock that it draws the sand evenly from the sand tank, mixes it and then forces it out of the mixing chamber, thoroughly incorporated with the air at its maximum velocity. All mixing of air and sand is done in the mixing chamber and not in the hose, which simply acts as

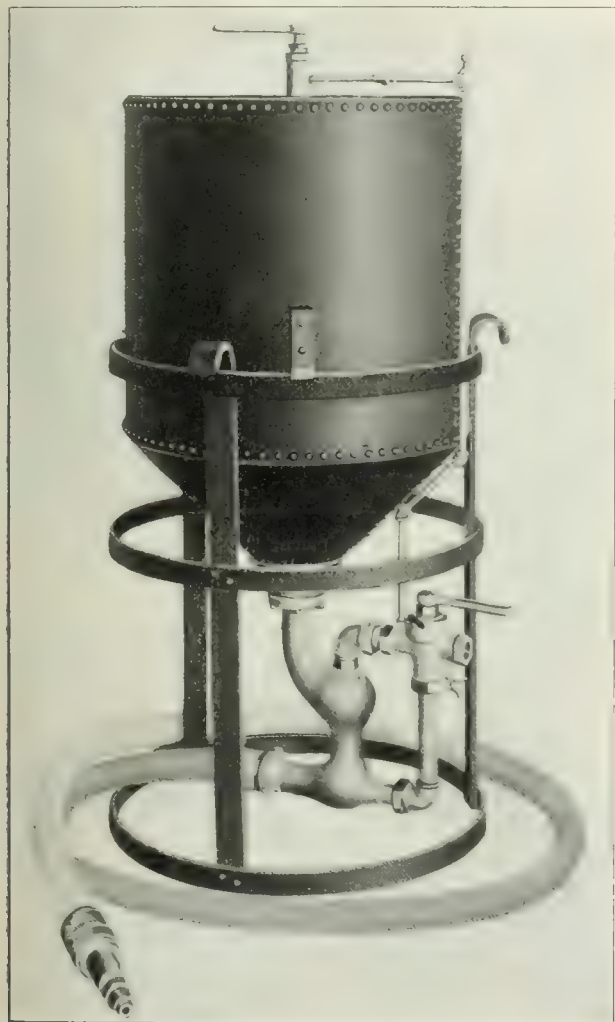


Fig. 1.—The Drucklieb Injector Sand Blast Made by J. M. Betton, New York.

the conduit through which the abrasive mixture is conveyed to the work. In the foundry, all kinds of castings are thoroughly cleaned in the quickest possible time, the air pressure being varied to suit the work in hand. In the shop, sheet steel is cleaned, all scale, rust, dirt and grease being entirely removed in preparing for enameling, japanning, galvanizing, &c. Many of these machines have been used for cleaning steel bridges and other steel structures, as well as stone and brick work, and for surfacing concrete structures. The Drucklieb injector sand blast apparatus is made and sold by J. M. Betton, 178 Washington street, New York City.

In the Ohio sand blast tumbling barrel, shown in Fig. 2, all bearings and trunnions are placed without the housing, away from the action of dust and sand. All wearing parts are designed to be easily and inexpensively renewed in the shortest time, without dismantling the barrel, and all trunnions and bearings are so mounted that there can be no warping or spreading. The barrel

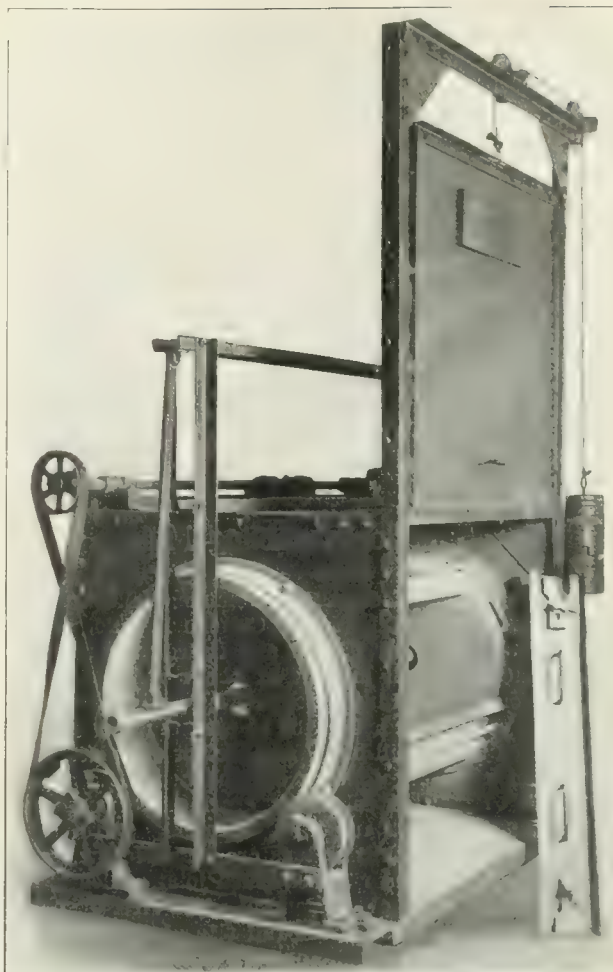


Fig. 2.—The Ohio Sand Blast Tumbling Barrel Made by J. M. Betton and the J. D. Smith Foundry Supply Company, Cleveland, Ohio.

rests on four trunnions, and is revolved by power, slowly, only three revolutions per minute being required to clean all the surfaces of its contents by the sand blast, and not by friction or tumbling.

The blast is led into the barrel at each end through two horizontal pipes, as shown in Fig. 3, which are swung constantly by power, across the line of revolution of the barrel, a sufficient number of times to remove all sand and scale from the castings. These nozzles are connected to a Drucklieb injector sand blast and are operated preferably under low air pressures, from which excellent results are obtained.

The barrel is made of two end castings, to which are

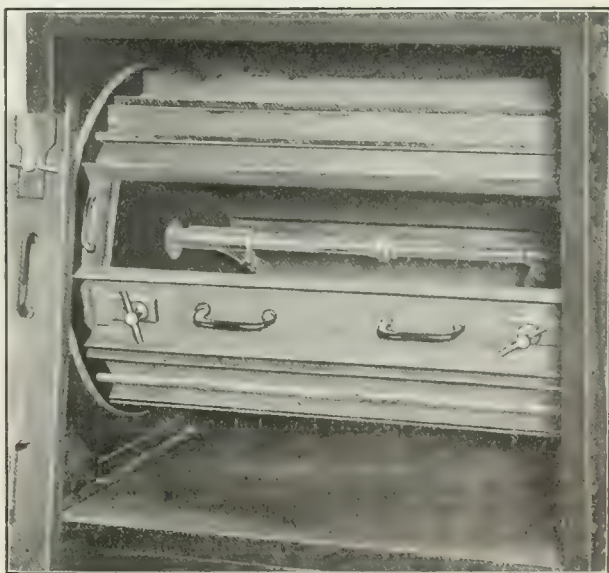


Fig. 3.—Interior of the Ohio Tumbling Barrel Showing the Drucklieb Sand Blast Nozzles.

bolted steel staves of standard shapes, spaced to allow the sand to fall through to the bottom of the housing. Four trunnions with roller bearings support the barrel and insure easy running and the least friction and wear. The housing is of sheet steel and suitable provision is made at the rear for a connection to an exhaust fan to remove the dust.

With this barrel, brass castings of difficult design and coring, to the amount of 250 lb., were cleaned in 10 min. with air pressures from 20 down to 10 lbs. Their surfaces, angles and edges were uninjured, and it could not be determined by careful examination whether the castings had been cleaned in bulk in the barrel or singly, by hand. Gray iron and crucible steel castings of various forms were cleaned in 15 min. under low air pressures, and with very satisfactory results. The barrels are made in several sizes by J. M. Betton, above mentioned, and the J. D. Smith Foundry Supply Company, Cleveland, Ohio.

Superior Tumbling Mills

The Superior steel exhaust tumbling mills made by the Cleveland Nickel Works, Cleveland, Ohio, are arranged to be quickly opened and closed, and require a comparatively small amount of power for their drive. The accompanying illustration shows two mills, one open and the other closed. It will be seen that the journals are bolted to the mill heads and are not one piece, hence it is not necessary to take out the head to replace a journal. Babbitted self-oiling bearings are used, and all shafts have split couplings. The stands are cast in one piece and the shifting lugs are bolted to the leg. A dust box is provided with a packed joint, which is self-adjusting for wear of the journal. The steel dust plate attached to the head is the full size of the head. All parts are interchangeable, and an automatic sand trap is provided. The covers of all round mills are made to fit the opening and to be flush on the inside of the mill, while a steel strap frame attached to the barrel covers the joint. This construction allows the doors to be made very light and hence easily handled. Square mills are arranged so that they can be loaded from either side. The company makes a very wide range of sizes and styles of mills suitable for all kinds of tumbling work.

Another product interesting in this connection is the

emptied out at convenient intervals. The dust is shaken down from the screens as they rotate by pivoted hammers, which are tripped by projections on the periphery of the screens.

The Superior cinder mill is another product of the Cleveland Nickel Works, and is used for reclaiming iron and coke from cupola cinder. It grinds the cinder and separates the coke and iron from the dirt in one operation.

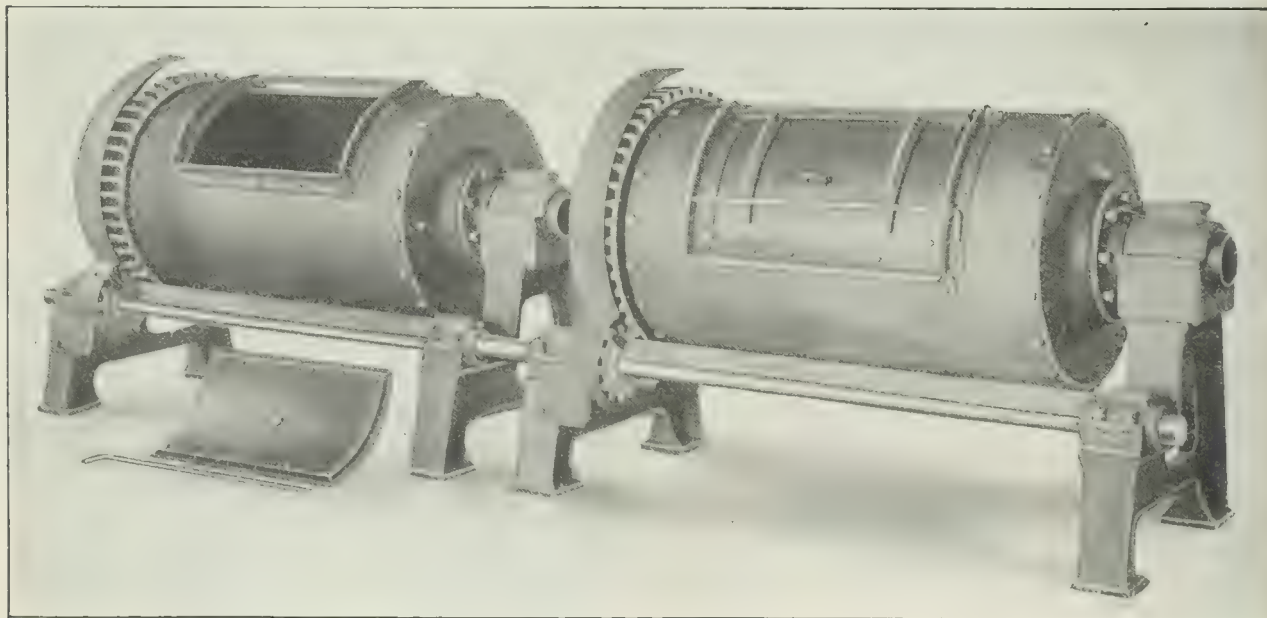
The Sly Tumbling Mills

Proper equipment in the cleaning room is as essential as in any other part of a foundry for economical operation. The W. W. Sly Mfg. Company, Cleveland, Ohio, specializes in the making of cleaning mill equipment,



Fig. 1.—Tumbling Mill Equipment in the Globe Malleable Iron Company, Syracuse, N. Y., Installed by the W. W. Sly Mfg. Company, Cleveland, Ohio.

and furnished the installation shown in Fig. 1 at the Globe Malleable Iron Company, Syracuse, N. Y. The mills are designed so that none of the cast iron parts of the barrel are exposed to wear. The shells are made



Two Superior Steel Exhaust Tumbling Mills Made by the Cleveland Nickel Works, Cleveland, Ohio.

Glassford dust arrester, which consists of a wooden case and a battery of rotary screens attached on a horizontal hollow square shaft mounted on journals at each end, one journal being open and the other closed. The fan exhausts the case through the screens through which the dust cannot follow, but remaining in the case can be

of flanged steel and all parts are machined to template and designed and constructed for durability and effectiveness.

The dust and dirt from the mills is exhausted through a dust arrester, where it is retained and does not reach the exhaust fan. The latter is thereby saved from the

cutting action of the dust, otherwise its blades would soon be worn away. Prevention of the escape of dust not only means a cleaner plant, but the protection of all the machinery in the plant. The case of this arrester is of heavy steel made weatherproof, and can be placed anywhere out of doors—on the roof of a building, or

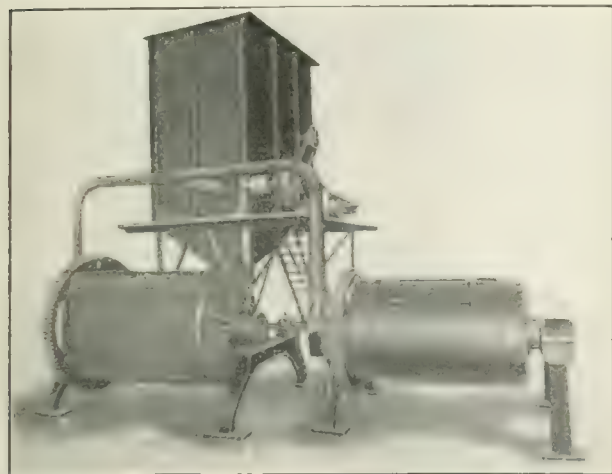


Fig. 2.—Typical Arrangement of Two Sly Mills Piped to a Dust Arrester.

wherever convenient. The dust remains in the arrester until it is withdrawn through the hopper at the bottom. Fig. 2 shows a typical arrangement of two mills properly piped to a dust arrester.

One of the great losses in a foundry is the refuse from the cupola drop and gangway scrapings. Attempts to pick the largest pieces of iron out by hand and sieve the balance recover considerable, but there is still a large waste. The Sly cinder mill, another of the products of this company, makes it possible to recover all of the iron from the cupola drop. The dump is loaded into the mill and a centrifugal pump circulates water through the mill washing out the coke and dirt, leaving the iron behind. This residue is ready to go back into the cupola, and will make as good castings as sprue scrap and better than machinery scrap. The coke which is recovered can be used in core ovens, base burners, &c.

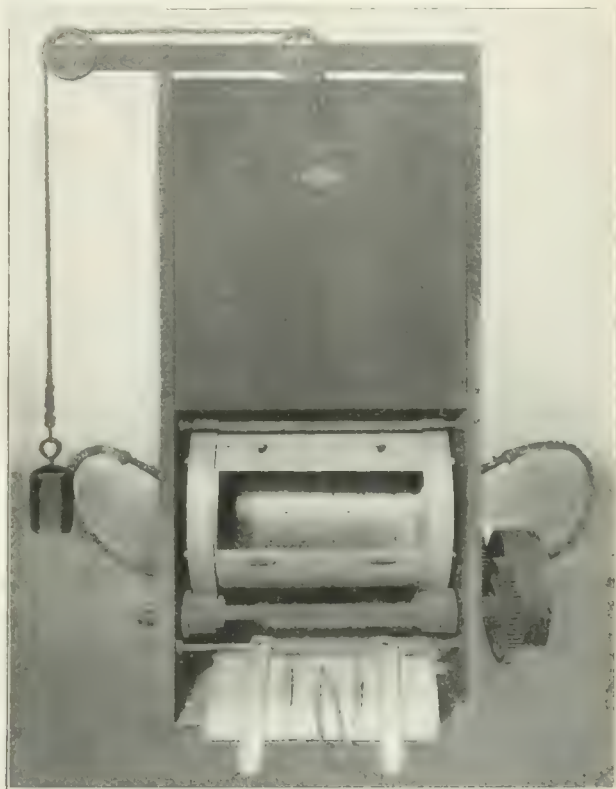
The Tilghman Sand Blast Tumbling Barrel

Study of the most suitable air pressures for use with sand blast apparatus has been prominent in the work of the Tilghman-Brooksbank Sand Blast Company, Philadelphia, Pa. In general its experience has indicated that low or moderate pressures are more economical than high pressures both in the service of the sand blast equipment itself and in the labor cost. The actual pressure found best to use in given cases depends upon the nature of the work treated. Generally from 10 to 20 lb. is the range of pressure recommended by this company for cleaning castings and forgings. The company has also given considerable attention to the designing and adapting of sand blast machinery to special requirements.

One of the Tilghman products particularly of interest to foundrymen is the sand blast tumbling barrel. The illustration shows it with the door raised and the cover off the barrel, exposing the interior. The barrel is rotated by small rolls keyed to shafts, driven by the gears at the right of the casing. The sand blast nozzles are attached to the sides of the casing at an angle to distribute the blast over the contents of the barrel, and play through openings at the centers of the heads of the barrel. As the barrel slowly revolves, 3 or 4 rev. per min., all the different faces and angles of the articles within it are exposed to the action of the blast, and the molding sand and other foreign substances adhering to them are completely removed, even from the sharp angles

and cores of small castings. The slow rotation of the barrel prevents injury to sharp edges of articles and very much reduces the breakage. No stars, jacks or shot are required, and under the action of the blast the work is done in less than half the time necessary with an ordinary tumbling barrel. The barrel is perforated to permit the spent sand, the core and molding sand and the scale removed from the work to fall through into a receptacle beneath.

In the top of the casing is an opening to admit air into the barrel. This air, bearing the dust generated by the operation, is drawn downward by an exhaust and deposited in a receptacle provided for the purpose. Behind the barrel, so that it does not appear in the illustration, is a sand blast machine, to which the two nozzles are connected by rubber hose. Often for continuous operation another barrel is placed on the other side of the machine, with its back to it, so that while one is in operation the other can be unloaded and recharged. The only interruption is the brief time necessary to remove the nozzles from one barrel and insert them in the other. The barrels are built in three sizes, 30 in. in diameter by



The Sand Blast Tumbling Barrel Made by the Tilghman-Brooksbank Sand Blast Company, Philadelphia, Pa.

24 in. long, 30 in. in diameter by 36 in. long and 36 in. in diameter by 42 in. long. Other sizes are built to order.

The sand blast machine is the regular one furnished for general sand blasting, and is cylindrical in form, with upper and lower chambers. Through the upper one by the manipulation of sand valves new charges of sand can be introduced without cutting off the supply of air to the lower part from which the sand is discharged. In the lower chamber the sand is mixed with compressed air and delivered to the flexible hose. Other valves control the sand and air in this part of the machine to regulate the quantities according to the work being done. These machines are built in four sizes.

The Tilghman-Brooksbank Company makes a specialty of complete sand blast plants with automatic sand elevator and dust separator, air washer and ventilating fan. This provides for the automatic separation of the spoiled sand and dust from the good sand and the prevention of the escape of sand and dust about the works, where it might be a nuisance and positive menace to machinery, and also makes the conditions under which the operator works more comfortable and safe.

The Kelly High Pressure Sand Blast

An extended description of the Kelly high pressure sand blast machine and nozzle made by the High Pressure Sand Blast Company, 20 Broad street, New York City, was given in *The Iron Age*, February 10, 1910, so that it suffices at this time to recite briefly their more important features. Those of the machine are a slotted baffle plate at the intake which arrests moisture in the air insuring a supply of dry air; a cock at the bottom of the tank through which the condensation may be drawn; an accumulating tank in the lower section of the machine so that when it is operated at some distance from

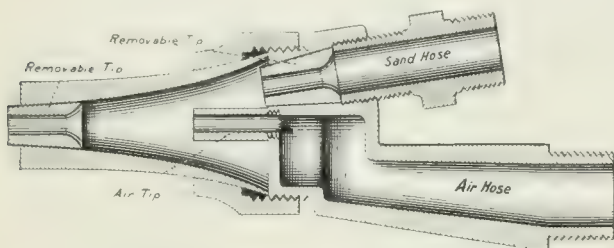


Fig. 1.—Longitudinal Section of the Kelly Sand Blast Nozzle Made by the High Pressure Sand Blast Company, New York.

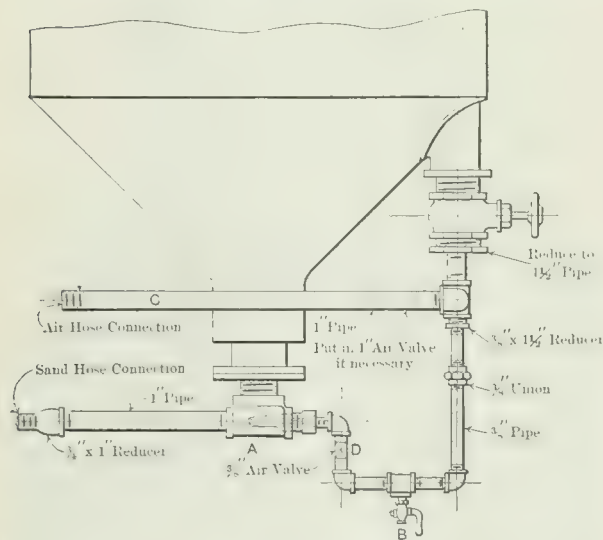


Fig. 2.—A Low-Pressure Sand Blast Machine Adapted to the Kelly High Pressure System.

the compressor or accumulating tanks a reserve volume is furnished close to the work; perfect control of the flow of the sand by the air jet, eliminating wear from the machine proper and insuring a steady supply of sand with the least possible air; the sand being carried by one line at a low velocity to the nozzle, reducing wear on the hose; and means of carrying full pressure of air to the nozzle with the least loss from friction, attendant upon propelling sand and air at a high velocity through a single line. The features of the Kelly nozzle, a section of which is shown in Fig. 1, are that it can only consume a given volume of air at a given pressure, regardless of the enlargement of the tip by sand erosion; that the wear of the sand is taken up by removable tips of negligible cost; that the body of the nozzle is protected from wear by the removable tip, and that it gives uniform nozzle pressure. It is claimed that the nozzle gives the highest efficiency at the lowest cost of air and sand. The nozzle is adaptable to old style single hose systems.

Fig. 2 shows how a low pressure machine of other make may be converted to the Kelly system. After removing the entire elbow from under the machine, a flange connection of steel plate is substituted, having pipe connections for a $\frac{1}{4}$ -in. Kelly ejector, indicated at A in the engraving, a $\frac{3}{4}$ -in. sand hose, and a 1-in. air hose. The cock B serves to blow out condensation, and should always be opened when starting operation to allow moisture to escape and to keep it out of the sand hose. The free ends of the two hoses are connected to the Kelly

nozzle. The Kelly ejector will reduce the amount of air used through the sand hose and may be regulated by the $\frac{3}{8}$ -in. cock D, and will also reduce the wear and tear on the hose. This cock will do better service if attached at E instead of as in Fig. 2, as it will permit all moisture to be drained before air is admitted to the sand hose.

The removable tip at the sand hose connection will last about 15 to 20 hours, according to the pressure used and the sharpness of the sand. Proper care should be taken to remove this tip when worn. Otherwise the sand will destroy the nozzle proper which should last indefinitely, and too much sand will get in the cone. The end tips will last from 45 min. to 1 hour, according to the pressure used. Care should be taken to screen the sand through a 10-mesh sieve. This will prevent any pebbles or foreign matter from clogging the nozzle. The aperture of the sand tip being only $\frac{1}{4}$ in., is easily clogged by a pebble or bagging or some such substance.

PNEUMATIC TOOLS

Pittsburgh Chipping Hammers

Being of shorter stroke and consequently much higher speed than a valved hammer of corresponding power, the chipping hammers made by the Pittsburgh Pneumatic Company, Canton, Ohio, are considered to be particularly well adapted for foundry work. It has been found in foundries that the sand wears the ferrule very rapidly where the chisel shank enters. This in a valved hammer results in a loose fitting chisel, and consequent loss of air, which detracts from the efficiency of the hammer. In the Pittsburgh hammer, since live air is never admitted to the forward end of the piston for return, the chamber at the forward end being open to the atmosphere, any leak around the shank

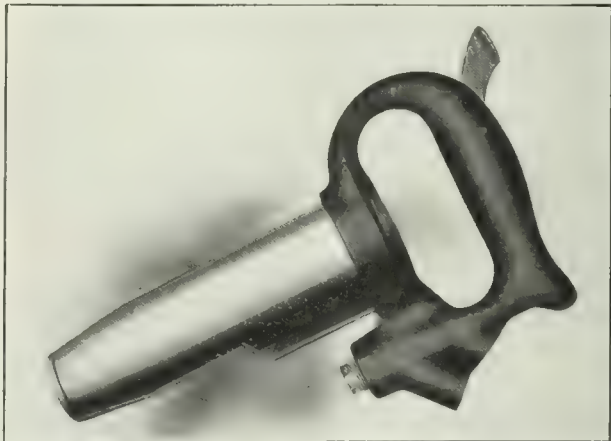


Fig. 1.—The Chipping Hammer Made by the Pittsburgh Pneumatic Company, Canton, Ohio.

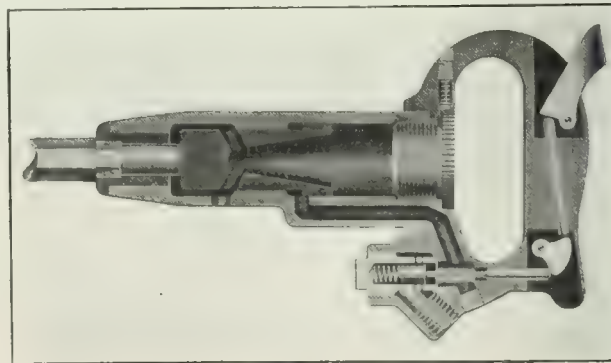


Fig. 2.—Sectional View of the Pittsburgh Chipping Hammer.

of the chisel will not alter the efficiency of the hammer.

Fig. 1 shows the exterior of the hammer and Fig. 2 a sectional view. It will be seen from the latter that the hammer is valveless in the sense that the piston is

itself the valve. In the position shown, the piston has just made a forward stroke, and is about to be returned by the pressure of air against the shoulder of the enlarged diameter of the piston reacting against the close-fitting cylinder around the smaller diameter of the piston. When the piston returns the ports in its forward end register with the air inlet, and the air flows through the piston to the rear chamber, driving the piston forward again. The air is cut off at about one-quarter stroke and acts expansively the remainder of the stroke, which economizes the air consumption. When the piston passes into the enlarged chamber at the front of the hammer body the air is exhausted through the port on the under side of the barrel.

The hammer has only one moving part and its air control mechanism is equally simple. It is a matter of but a few moments to take the hammer completely to pieces by unscrewing the head at the handle end of the barrel. The piston on its return stroke is not stopped by the sudden admission of compressed air, but is cushioned by the air pocketed after the ports in the piston leave the exhaust space. This considerably reduces the vibration. The hammers have drop forged steel handles and hardened and ground steel cylinders. They are made in 10 sizes, weighing from $6\frac{1}{2}$ to $12\frac{1}{4}$ lb.

Cleveland Pneumatic Hammers and Rammers

The Cleveland Pneumatic Tool Company, Cleveland, Ohio, has added to its line of pneumatic hammers a chipping hammer especially designed for steel casting work.

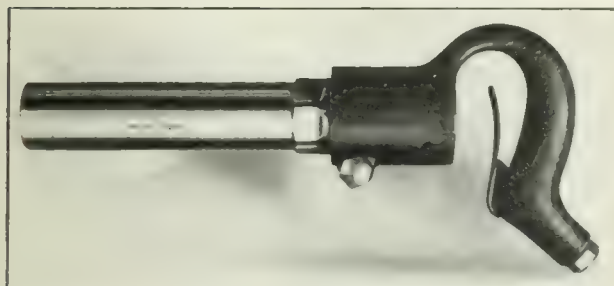


Fig. 1. —A Steel Casting Chipping Hammer Made by the Cleveland Pneumatic Tool Company, Cleveland, Ohio.

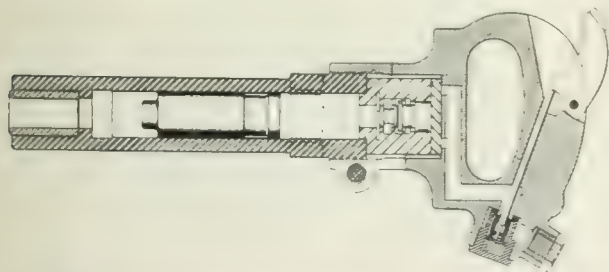


Fig. 2. —Sectional View of the Cleveland Steel Casting Chipping Hammer.

It is made with both an inside and outside throttle lever. The main cylinder of the hammer is exceptionally heavy for this severe work, and all other parts are in proportion. Fig. 1 shows an exterior view of the inner latch hammer, and Fig. 2 a sectional view of the outer latch hammer.

The controlling valve is a two-stage type, giving a graduated opening and permits delicate control. When the main throttle lever is partially depressed a small amount of air is admitted to the main valve, and when further depressed the full supply is gradually admitted. The piston does not travel through the main valve, the valve being placed at the rear of and in line with the piston. Upon the return stroke of the piston a leakage of live air is allowed, upon which the piston cushions. This cushion also throws the valve, reversing the motion of the piston. On its forward motion a certain clearance is left for the piston beyond its normal stroke. If this

extra stroke is exceeded, the piston closes off the supply ports and stops. This prevents the piston striking the forward end of the hammer barrel and in time crystallizing it. When the material chipped is very hard, the recoil of the hammer is great and it is difficult to keep the hammer against the chisel or working tool. Then, unless the air is cut off by the piston at its forward stroke,

the piston will strike the nose end of the hammer and in time break it off.

The Cleveland steel casting chipping hammers are made in six sizes, ranging from $1\frac{1}{4}$ to 5 in. stroke. The general specifications are similar to those of this company's line of chipping, caulking and beading hammers. The outside latch handle is drop forged carbon steel, heat treated, and the inside latch handle is a steel casting of high tensile strength. The throttle valve is of air balanced type, and the main valve is of tool steel, the solid type, hardened and ground. The plunger is of special tool steel; also hardened and ground. All parts are interchangeable.

Another new product of the Cleveland Pneumatic Tool Company is a foundry sand rammer and concrete tamping, of which Fig. 3 shows the exterior and Fig. 4 a cross section. The action of the rammer and some of the features of its construction are similar to those of the chipping hammer. If the operator should not hold the rammer in proper position for tamping and should allow too great a stroke of the piston, the latter is prevented as before from coming in contact with the forward end of the barrel. The piston

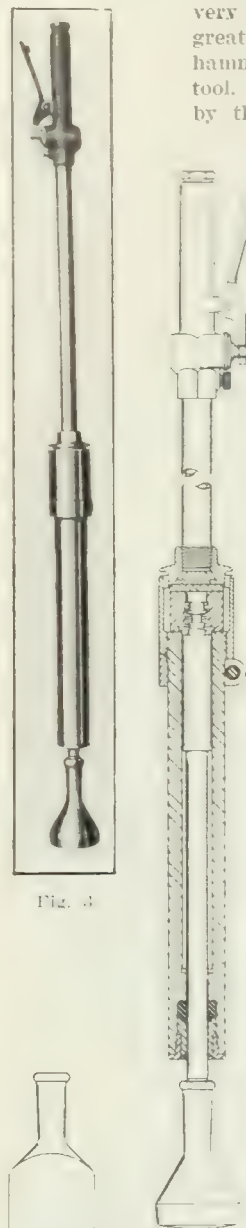


Fig. 3. Exterior and Sectional Views of the Cleveland Pneumatic Rammer.

bearings are so arranged that any dirt or grit getting on the piston rod is wiped off and not carried into the piston chamber. These machines are made in sizes suited to all classes of work.

Chicago Pneumatic Sand Rammers

Some months ago the Chicago Pneumatic Tool Company, Chicago, Ill., introduced a specially constructed sand rammer, operated by air, for putting up steel ingot molds, which had hitherto been done by hand. These ingot mold rammers have now been adopted, and are in extensive use at the works of the Illinois Steel Company, at the Cambria Steel Company's plants, and elsewhere for this class of work, and experience has demonstrated their economy, rapidity and the excellence of the work produced.

These rammers are made on the same basic principles as the company's other tools of this nature, but have special features added not necessary in the regular rammers for floor and pit work. In all the sand rammers, the matter of rapid wear has been given special attention, in the selection of most suitable material to withstand

the rough usage unavoidable in a foundry. For instance, extended use has demonstrated that a cast iron lining in the cylinder of such a tool is preferable to one of hardened steel, with the added advantage that when it is so worn as to impair the efficiency of the tool, it may be reamed and fitted with an oversize piston, so prolonging the life of the tool materially.

In the matter of design, the conditions under which the tools must work have been considered, and the wearing parts so made as to be quickly and economically removed and replaced. The packing has this desirable feature, and the valve is easy of access and so constructed that it will withstand excessive wear without impairing its efficiency.

Protection is provided to the working parts of these rammers to exclude dirt and dust.

PATTERN SHOP EQUIPMENT

Gardner Patternmaker's Disk Grinder

The patternmaker's disk grinder, manufactured by the Gardner Machine Company, Beloit, Wis., has a number of features which make it as effective a tool in wood-



Fig. 1.—Patternmaker's Disk Grinder.

working as the disk grinder has long been in metal work. The universal work table, as shown in Fig. 1, is one of these. It may be tilted at any angle with the face of the wheel, and one turn of a hand nut locks it in the required position. The design of the axis bearing or tilting axis is such that the inside edge of the work table remains close to the face of the wheel, regardless of its angular or lateral position. The table is counterbalanced by a weight within the base of the machine, connected by a steel cable passing over a grooved pulley at the top. Included in the equipment of the No. 17 machine, which is shown, are the work table, universal angle gauge, circular core print gauge, dust hood and countershaft. The spindle pulley is 10 in. diameter by 5 in. face. A 5 hp. drive is sufficient for all requirements, the speed of the wheel being 6000 ft. per minute. The trimmer can be practically dispensed with, and the grinder also does much lathe, bandsaw, jointer and drum sander work, besides reducing the amount of hand planing, carving and sanding knots, cross grains, end

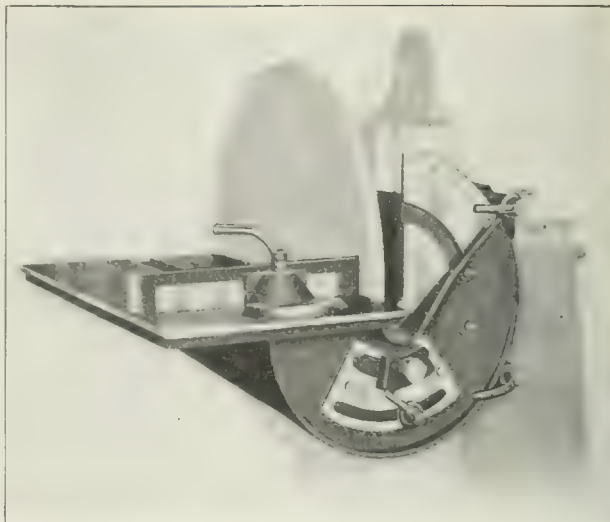


Fig. 2.—End View Showing Universal Angle Gauge.

grains and projecting nails and screws are worked without difficulty.

The universal angle gauge or protractor head is of great convenience in squaring pieces and producing angles and draft. For the preparation of segments the universal duplicating gauge is employed. An example of its work is given in Fig. 3. The pattern is 52 in. in diameter, each segment being 17 in. long. By tilting the work table and using the duplicating gauge each of the

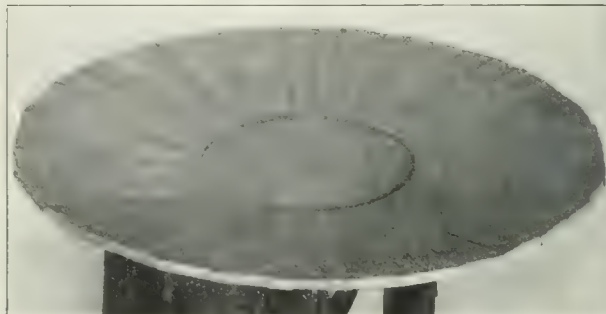


Fig. 3.—Concaved Plate Pattern Made Up of Tapered Segments.

44 pieces was accurately beveled on the sides, this being required because of the concavity.

Fig. 4 illustrates the production of gear teeth. The blocks 8 in. long by 2½ in. wide by 3 in. high, were first made parallel on the universal duplicating gauge and then squared up on end by using the universal angle gauge. A simple wooden fixture was made for holding the blocks. By using the circular core print gauge, with the pin at the proper radius, this fixture with the block in place was swung against the wheel, the work table was tilted ½ degree to produce the required draft. The stop screw made it possible to make the 96 gear teeth exact duplicates. It is estimated that the time was one-tenth of that required by the old method. In some shops the majority of the machine work on large gear

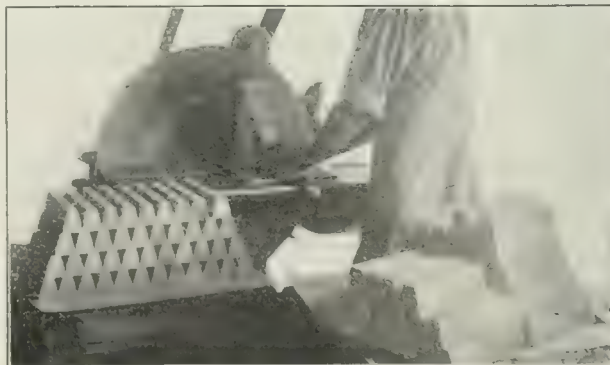


Fig. 4.—Producing the Curve of Gear Teeth.

patterns is done on the disk grinder. All of the segments used in the outside rim are ground parallel to size and glued up on the face plate before being put on the lathe. All pieces in the spokes are made parallel and squared up on the grinder before the gluing operation. Round hubs, plates and core prints are ground with a taper, the circular core print gauge being used. All wood fillets and angles were also fitted on the grinder.

The Oliver New Universal Saw Bench

An accurate and adaptable saw bench is an important part in the equipment of a pattern shop. The No. 60 universal double arbor saw bench, built by the Oliver Machinery Company, Grand Rapids, Mich, is interesting in this connection on account of certain notable recent improvements. Fig. 1 shows a general view of this tool

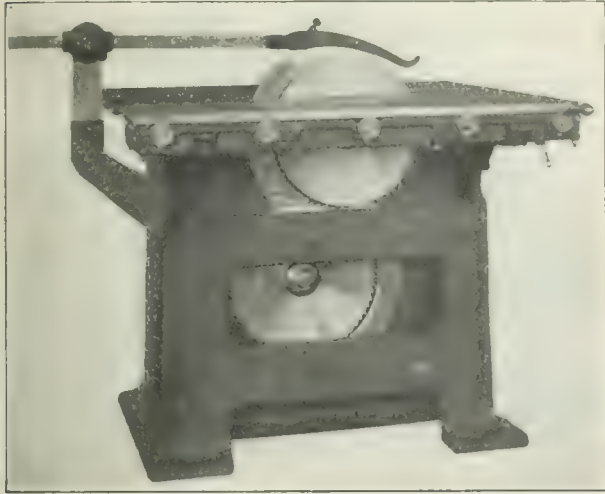


Fig. 1.—The Improved No. 60 Universal Saw Bench Built by the Oliver Machinery Company, Grand Rapids, Mich.

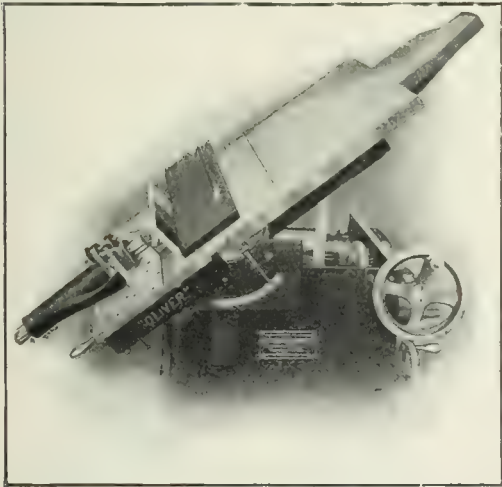


Fig. 2.—The Table Tilted to 45 Degrees and the Universal Ripping Gauge in Use at the Left of the Saw.

in its most commonly used position, and the two saw arbors, one carrying a rip saw and the other a crosscut saw. Both arbors are located upon a swinging yoke, which will bring either saw in operation even while the machine is in full motion. This arrangement and the tilting table make it impossible to apply the ordinary safeguards, but the safety features now installed are effective and unique.

In the rear of each saw is a steel blade conforming with the periphery of the saw and serving as a splitter, doing away with chance of the work jumping back, due to the teeth coming in contact with the work after it has been ripped. The saw guard proper is mounted upon a steel rod, held by an eccentric lever clutch over a saw splitter that in turn is held rigidly at the rear of the main column of the machine, making the saw guard in-

dependent of the tilting of the table. The eccentric lever clutch provides easy adjustment of the guard over the saw, as the saw is vertically adjusted for depth of cut.

The machine itself has been thoroughly redesigned. The main column is divided by a cast iron partition, which receives the front disk bearing of the swinging



Fig. 3.—View Showing the Face of the Table and the Use of Cut-off Gauges in Sawing Compound Angles.

yoke, and also prevents sawdust from getting into the mechanism. The rolling section of the table is now carried on two sets of large frictionless rolls, all located on a subbase, which is adjustable for keeping the rolling section of the table in line with the solid section. This provides a constant distance from the center of each roller to the base of the rolling table and makes it easy to operate the table. The table is tilted by an entirely inclosed self-locking worm and worm gear device. The rocker seat of the table is solid with the main column, and is bored in line with the main bearings of the swinging yoke. Both the rocker and rocker caps are machined.

The swinging yoke has undergone some radical changes. The self-locking worm and worm gear device for revolving it has been moved to the outside of the main column, allowing easy access to the bearings. The worm gear is fastened to the rear of the swinging yoke by a large cap screw with fine threads for adjustment. The saw arbors are ground on Brown & Sharpe grinders, and have fiber washers to give double frictional surface for end motion; all end play is taken by large threaded collars. All bearings are of the capillary self-oiling

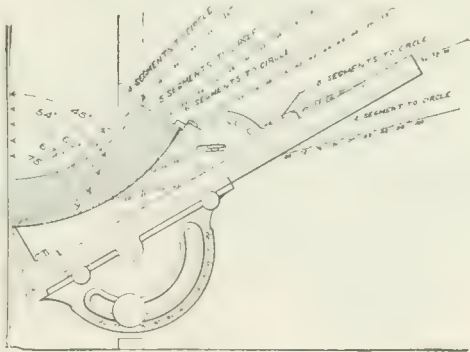


Fig. 4.—Diagram of the Use of the Gauge for Sawing Segments.

type, with oil wells and brass oil cups. The idler pulleys are now rigidly fastened upon machine ground shafts, which run in self-lubricating bearings.

The ripping gauge has been made entirely universal and can be located at either side of the saw. Its position on the left-hand side is illustrated in Fig. 2. The ripping fence tilts down to 45 degrees, and is adjustable to and from the operator so that its relative position to the saw may be kept constant, whether the saw is toward the

front or the rear of the table. The gauge may be set at any angle to the saw, which is especially desired for making large core boxes, is located on the table by tapered pins and secured by a hand clamping knob, and may be moved across the table quickly by hand or set accurately by a micrometer adjustment.

Fig. 3 shows the table tilted and the universal gauges located for cutting compound angles, such as for hopper boxes. The two universal gauges regularly furnished have graduations showing the exact angular relation to the saw line. These may be operated in the grooves on the table at either side of the saw, and when not used the grooves may be filled by steel strips. Universal gauges are useful for many operations, among others inside and outside miter cutting at one handling of the material. The top of the table is graduated across its main portion to act as a gauge in determining width of cut, and on an arc on the rolling part so that the miter cut-off gauge may be set at any angle to the saw from 30 to 135 degrees. Eight important positions of this gauge are located by pins in tapered holes. When the machine is so ordered it is also graduated in the main part for cutting segmental work. This graduation and segment cut-off gauge is illustrated in Fig. 4. By its use four to twelve segments may be cut for circles from 10 to 105 in. in diameter.

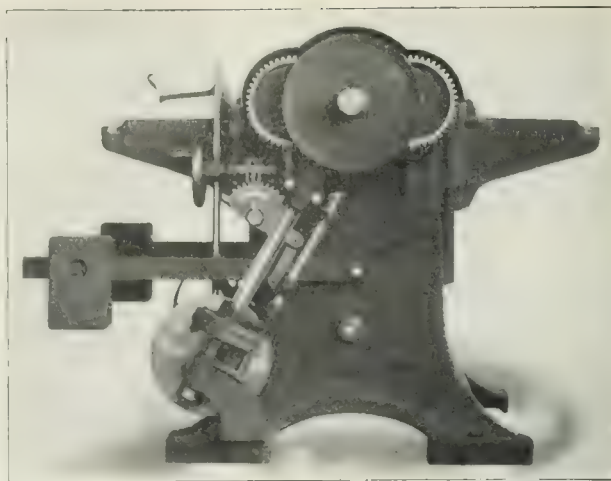
This machine may be driven either by a countershaft placed on or below the floor, or by an individual motor placed on a bracket bolted to the frame of the machine. As manufactured to-day the machine is in every way universal. Using the gauges either straight or angular ripping may be done up to 24 in. wide, and either straight or angular cross cutting up to 36 in. wide. Any compound angles may be cut. Core boxes may be made by setting the ripping gauge at an angle. Either straight or angular dado work up to $4\frac{1}{4}$ in. may be easily accomplished. Light moldings up to 2 in. wide may be produced by the use of a cutter head. Column jointing and dovetail fitting, corner locking, panel raising, spiral grooving to produce worms, bevel and miter cutting and many other important operations are easily accomplished. It is really a combination of four machines in one.

Crescent Variable Feed Planer

In the line of woodworking machinery made by the Crescent Machine Company, Leetonia, Ohio, a machine of considerable utility in the pattern shop is the planer here illustrated. The new feature of this planer is the provision of a variable friction feed driven direct by belt from the head. By turning the hand wheel shown the changes can be readily made while the machine is running. The slowest speed is 12 lineal feet per minute and the fastest 50 ft. per minute. A pointer or scale indicates the feed being used. When ordinary work is being done a few turns of the hand wheel will give a fast feed and a marked saving of time will result, and when extremely smooth work is desired a few turns of the hand wheel in the opposite direction will give a slow feed and the work produced will be of the desired smoothness. When the rough lumber to be surfaced is not uniform in thickness there is an advantage in using a slow feed for the thicker pieces. Thus it is not necessary to shut down the machine until the belts begin to slip. The feed is varied according to the thickness of the cut being taken and the width of board being passed through.

A throw-off lever at the side of the table can be used for stopping the feed entirely without stopping the machine. The front upper roll is hung with weights. In other respects these planers are similar to the regular line built by this company.

Two sizes of the variable feed planer are built, Nos. 218 and 224, respectively. The first will plane $17\frac{3}{4}$ in. wide by 6 in. thick, the second $23\frac{3}{4}$ in. wide by 6 in. thick. The floor spaces occupied are 44 x 43 in. and 44 x 49 in., and the weights 1400 and 1500 lb., respectively. It will be noticed from the illustration that the machine is especially compact, which is a point of considerable importance in a machine to be installed in a pattern



A Wood Planer with Variable Feed Built by the Crescent Machine Company, Leetonia, Ohio.

shop. Strength is contributed to by the fact that the machine is cast in one piece and the bed is gibbed directly to the body of the frame. This construction, being easily adjusted, prevents the bed from rocking and avoids clipping the ends of the lumber. The chip breaker and pressure bar are placed as close to the knives as clearance will allow, so that extremely short stock may be worked. The head is milled from a solid bar of steel, is carefully balanced and carries two knives.

SAND TREATING EQUIPMENT

Hanna Sand Sifters

Quite an extensive line of power sand screening equipment is made by the Hanna Engineering Works, 2095 Elston avenue, Chicago, Ill. The sand shakers even when as large as that shown in Fig. 1 are easily portable and the revolving riddle, of which one is shown in Fig. 2, can be mounted on wheels if desired. Portability is an advantage, since it enables screening to be done at the mold, saving the expense of wheeling the sand to and from a stationary screening equipment.

The screen box of the large pneumatic tripod shaker is 2 ft. wide by 3 ft. long, is entirely of steel, and can be fitted with screens of any mesh. The changing of screens

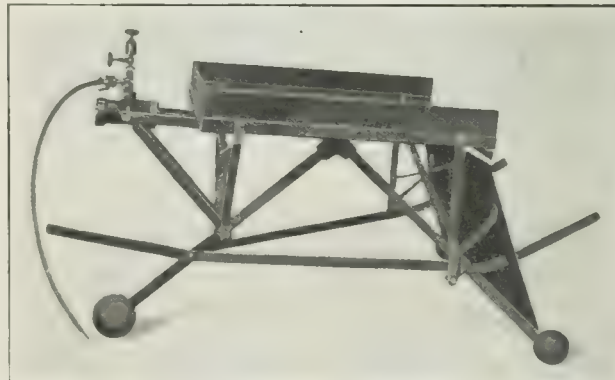


Fig. 1.—A Large Tripod Shaker Made by the Hanna Engineering Works, Chicago, Ill.

is accomplished by removing a single nut at the end of the piston rod. The box is slightly inclined, with the lower end open, so that the discard is continuously discharged over the sheet iron apron at the end. The up-rights of this box are arranged so that the incline of the screen may be adjusted to different angles to control the speed at which the material is discharged. The capacity of this shaker is about double that of the small Hanna tripod shaker, and the air consumption approximately 35 cu. ft. per minute. In malleable foundries the

machine is of advantage for screening annealing ore, as the large pieces which are used discharge freely over the end of the screen box and the fine stuff sifts through.

Smaller tripod shakers, not illustrated, are made, accommodating an ordinary 18-in. round foundry riddle, held in place by a steel band and quick clamping de-

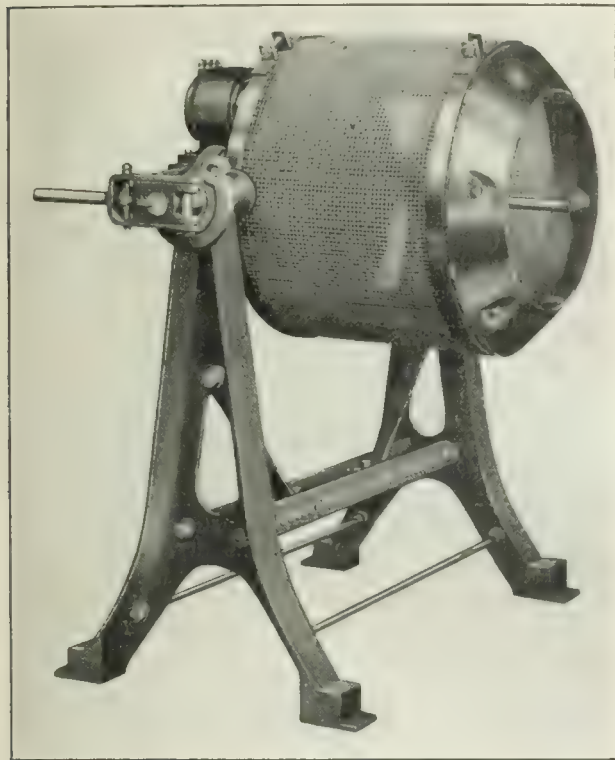


Fig. 2.—The Hanna Revolving and Dumping Riddle.

vice, so that it may be removed instantly to dump out the rejection. The vibrating speed is controllable and the shaker will operate at any air pressure over 20 lb. At 80 lb. pressure, with the valve turned on full and the riddle loaded, approximately 25 cu. ft. of free air per minute is required. The machine is as useful in the corerom as on the molding floor and may be moved about easily and freely. A similar shaker is made in post pattern, with a frame which can be fitted in sockets fastened to the posts or walls wherever screened sand is required. Frequently shakers of this type are operated by steam. A swivel post shaker is specially designed for bench work and molding machines. It swings on a vertical shaft held in brackets fastened to the wall or posts and is furnished with an automatic valve, which admits air to the cylinder for starting the machine as it swings into place over the flask and cuts off the air when swung back out of the way. The screen box is rectangular and screens of different mesh can be used, being easily interchangeable. It can be dumped clear of the coarse material by lifting one end off the frame while the other swings on two bolts. In operation the loose end of the box is held in place by a spring catch. This shaker is convenient for applying facing sand, the screen box containing enough sand for several molds, thereby avoiding the fatigue incident to lifting a full riddle above the flask for each mold when riddling by hand.

The revolving dumping riddle is especially adapted for screening and mixing heavy material and where difficulty is experienced in screening lumpy and sticky core sand. The placing of a few chunks of scrap in the barrel will materially aid in breaking up the lumps and keeping the meshes of the screen open. The barrel has a cast iron solid back head and open front head held by six rods inside of the barrel, protected from wear by pipe separators. It is 23½ in. in diameter and 18 in. long and is supported in the dumping bracket by a steel shaft. Heavy galvanized wire cloth is stretched over the barrel and the ends fastened together by metal belt lacing. The wire cloth is clamped in place by steel bands and is

easily removed and replaced with one of another mesh by unbolting the band and slipping it over the front head. The drive is from a specially designed motor of either alternating or direct current type, geared directly to the screening barrel. The motor is mounted on the dumping bracket on which the screening barrel rotates and counterbalances the weight of the barrel, so that it is easily turned to dump the rejection, and swings back of itself to operating position. The machine is of advantage in the corerom for mixing core sands with compounds, or screening rejections from the cupola, molding sand, &c.

Deane Sand Sifters

Sand sifting is a small item of foundry expense, nevertheless, a very considerable saving is possible by using an efficient mechanical sifter operated by compressed air, steam, belt or an electric motor. The Deane Steam Pump Company, Holyoke, Mass., has applied the principle of its single steam pump with certain modifica-



Fig. 1.—A Pneumatic Sand Sifter Made by the Deane Steam Pump Company, Holyoke, Mass.



Fig. 2.—The Deane Motor Driven Sand Riddler.

cations as required for the service in the sand sifter shown in Fig. 1. This is suitable for operation on compressed air or steam, and the construction of the valve mechanism is such as to give a quick, snappy reversal to the riddle at each end of the stroke. This makes it efficient, and accounts for the large quantity of sand handled by this sifter at a small expenditure of power. The machine is substantially built for hard, continuous service without expert attention. Its weight is within the limits of ready portability, allowing the riddling to be done wherever temporary convenience may require.

Sand is excluded from all working parts, preventing wear from the cutting action of the sand. The machine is always ready to start, and requires only the opening of the air valve.

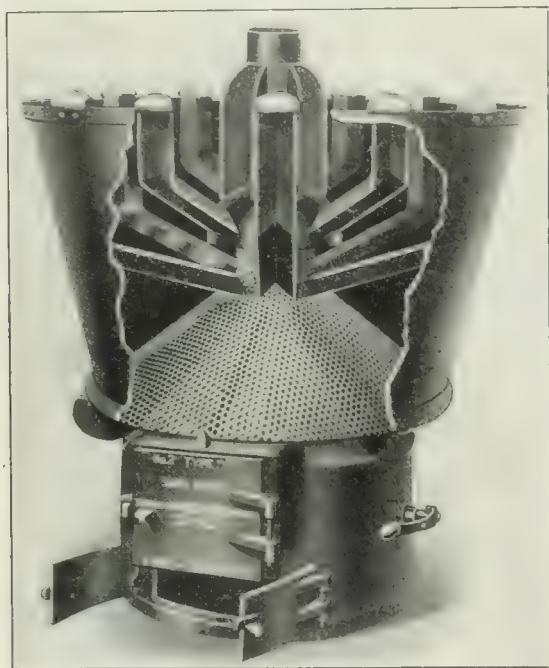
The illustration shows the standard type of machine for the general run of work, such as sifting core and molding sand, and screening the sand used in sand blast, but the company builds various modifications of this design for special purposes, such as screening gangway and scratch room refuse, fixed frames for molding machines, a post attachment for permanent location, &c.

Fig. 2 shows a riddle operated by a small, high speed electric motor of the wholly inclosed type. The machine can be furnished to operate on a crane or lighting circuit of either direct or alternating current.

It will perform in 15 to 20 minutes the work which requires a day for a man to accomplish with a hand riddle.

The Pangborn Ideal Sand Dryer

The purpose in the design of the Ideal sand dryer, made by the Thomas W. Pangborn Company, 90 West street, New York, was to provide inexpensive, efficient apparatus for quickly and economically drying sand



Broken View of the Ideal Sand Dryer Made by the Thomas W. Pangborn Company, New York.

without rendering it friable. Means were needed to take care of the moisture in the sand and at the same time prevent the burning or calcining of the sand, which in many cases destroys its value and usefulness.

The dryer is claimed to be not only the quickest portable dryer for the floor space occupied, and fool-proof as to the possibility of burning the sand, but the most economical fuel user as well. The main principle is to keep the wet sand from direct contact with the firebox and to carry away the moisture from the sand during the drying process by air currents. It is accomplished by using a perforated screen, as shown in the illustration, which has the shape of an inverted funnel, the neck of which surrounds the chimney, while the diameter of the conical part, being greater than that of the firebox, makes an air space between the two. This perforated screen supports the damp sand away from the firebox and allows the heated air to pass freely from the firebox and under the sand, carrying away the moisture. The sand as it becomes dry drops through the perforations of the screen and runs rapidly down the inclined surface of the firebox to the floor. As sand will resist the passage of air and heat a number of inverted angle flues project from the firebox through the sand, extending to the top of the hopper into the open

air. This allows the hot air to absorb the moisture of the sand in the interior of the hopper and discharge through these flues.

To secure greatest fuel economy advantage is taken of the fact that heat transmitted through an iron wall is obtained in greatest volume from rough surfaces. The inside of the firebox has a number of concentric rings projecting toward the fire, and radial ribs on the outside radiate the heat under the perforated screen. As the sand is supported at all times away from the firebox, coming in contact only with the heated air, it is impossible to burn the sand even with the firebox red hot. Obviously the sand can be dried with greater rapidity by bringing the firebox to a higher heat than is allowed by any other construction. The heat being transmitted to the sand without contact with solid surfaces prevents caking or baking. Small doors in the hopper allow for readily removing material that will not pass through the perforated screen. Either hard or soft coal, coke or wood can be used as fuel, or the dryer can be equipped with oil or gas burners.

In operation the green or wet sand is shoveled into the hopper and requires no further attention. The capacity of the dryer depends entirely upon the moisture and foreign matter in the sand and the degree of heat to which the stove is brought. It is not necessary that the sand be clear before being put into the dryer. While clay will bake and not discharge, earth or any granular material is handled freely by the dryer. The dryer stands 4 ft. from the floor to the top of the hopper and the hopper is 4 ft. in diameter at the top and 37 in. at the bottom. The base is 30 in. in diameter and the height from the floor to the top of the firebox is 18 in. The weight of the dryer is about 1400 lb.

The dryer is of special utility in foundries for preparing the various sands used that require drying for proper manipulation and to secure the greater abrasive efficiency of sand blast sand. Use can be made of it not only to dry the sand, but to heat the sand blast room in winter.

Other products of the Pangborn Company of interest to foundrymen are blowers, exhausters, core machines, core ovens, core chamfering machines, iron and brass foundry equipment, foundry supplies, sand blast equipment, tumbling barrels, sand mixing machinery, sand sifters and magnetic separators.

The Auto Sand Mixer

A traction sand cutting and mixing machine is a recent development of the Sand Mixing Machine Company, 220 Broadway, New York City, especially adapted for large foundries in which the preparation of molding sand is especially laborious. A prolific cause of the loss of castings and the failure to secure clean, smooth castings is imperfectly tempered sand. Sand properly wet, cut by the Auto sand mixer will be in perfect condition because the knives make a cut every $\frac{1}{2}$ in. from top to bottom of the heap, crushing all lumps and leaving the heap uniform in temper throughout. In appearance and texture it is like a heap of riddled sand. Hand cut sand is always more or less uneven. One Auto sand mixer at a labor cost of from \$2 to \$2.50 per day for an operator and about 25 cents per day for electric current will cut the sand for about 100 molders. The sand can be cut at night, causing the molders no delay. Because of the thorough aeration and blending of the sand it will often be found possible to mix with the sand regularly used a liberal percentage of lower grade sand and still get an equally good result. The new sand periodically added to the heap can be so thoroughly mixed with the old as to be completely lost in one cutting by the machine.

Fig. 1 shows a front view of the driving side of the mixer and Fig. 2 a rear view of it in operation. The cutting cylinder makes 75 rev. per min. Each blade cuts off a small quantity of sand, throws it up in the air behind the machine, breaking all the lumps and separating the grains. The sand is quickly and thoroughly cooled, all of the steam and gas is blown out, and the sand is

left loose and light from top to bottom. Such sand will shovel easier, riddle faster, ram more uniformly, tuck under bars better and is much less likely to cause blow holes, because it is uniform, both on the surface of the pattern and throughout the mold.

The electric motor operating the machine, both driving it forward and revolving the knives, is usually of 5 to 7½ hp., depending upon the size of the sand heap to

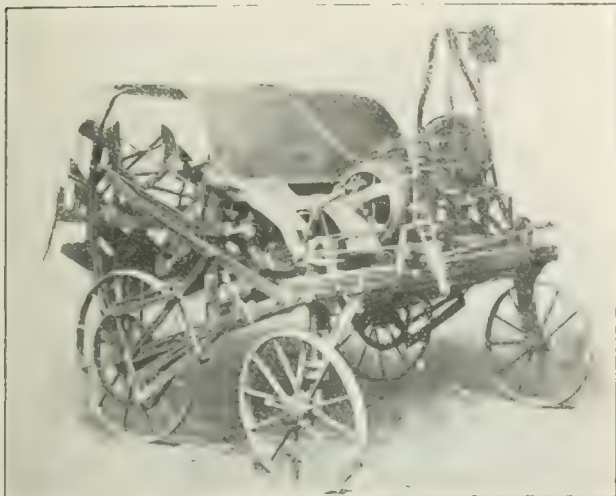


Fig. 1.—The Auto Sand Mixer Built by the Sand Mixing Machine Company, New York.

be cut, and is supplied with current through a flexible cable plugged into a wall socket and carried on an automatic take-up reel, which pays it out and takes it up with no attention from the operator. Clay floors once leveled will remain level because the machine does not dig them up in cutting as the shovel does. The cutting knives are controlled by a multiple disk clutch, which is set so it will slip and prevent breakage in case the knives strike a casting left in the sand.

The machine is designed for cutting sand for all kinds of light and medium side floor molding, stationary or

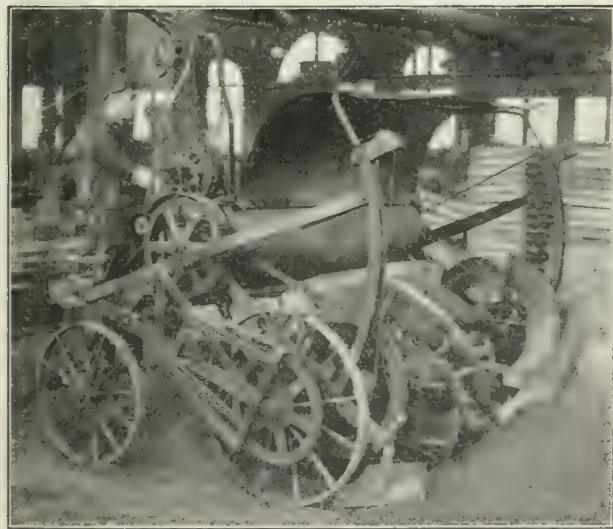


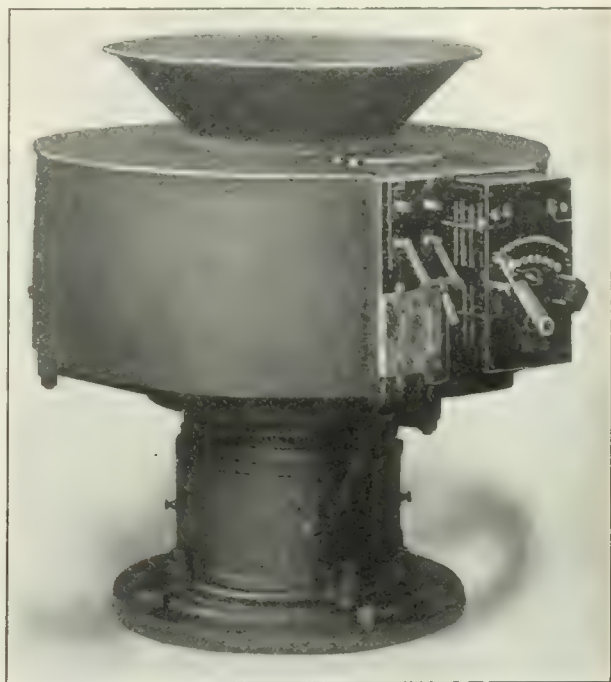
Fig. 2.—Rear View of the Auto Sand Mixer, Showing the Cutting Blades.

traveling bench molding and for light and medium machine molding. It will leave the sand in the usual long heap for floor molding or will throw it back in a heap by a squeezer or stationary bench. The machines are built only to order, and of types and sizes depending upon the requirements. It is 6½ ft. long, about 7 ft. high, and the width varies from 4 to 6½ ft. between the wheels, according to the work to be done. The extreme width is 12 in. greater than the width between the wheels. The machine will turn in very small space, and will straddle castings or other objects and can be successfully handled in cramped places.

Sellers Centrifugal Sand Mixers

For mixing all kinds of foundry sand, core oil and compounds, William Sellers & Co., Inc., Philadelphia, Pa., build a line of centrifugal sand mixing machines. The illustration shows one of motor driven pattern. All of the machines will disintegrate lumpy sand and will thoroughly and evenly mix all kinds of molding sand, core sand and foundry mixtures economically and quickly.

The machine consists essentially of a rapidly revolving table having on its top surface a number of prongs projecting upward. Sand is fed into the hopper at the top of the machine from which it falls upon a revolving table and is thrown by centrifugal force from prong to prong and out again to the inside of the hood. It emerges from beneath the hood in a fine shower, free from lumps and thoroughly mixed. In mixing core sand containing flour and coal the effect of once passing through the mixer is strikingly apparent. The ingredients are so thoroughly intermingled that the black and white of coal and flour entirely disappear. Core oil or core compound can be thoroughly mixed with sharp sand by passing the mixture twice through the mixer. For



A Self Contained Motor-Driven Sand Mixer Built by Wm. Sellers & Co., Inc., Philadelphia, Pa.

this purpose and for heavy core mixtures the machine can be run at a slower speed than for green sand. The treatment of mixing strengthens the sand and increases its porosity.

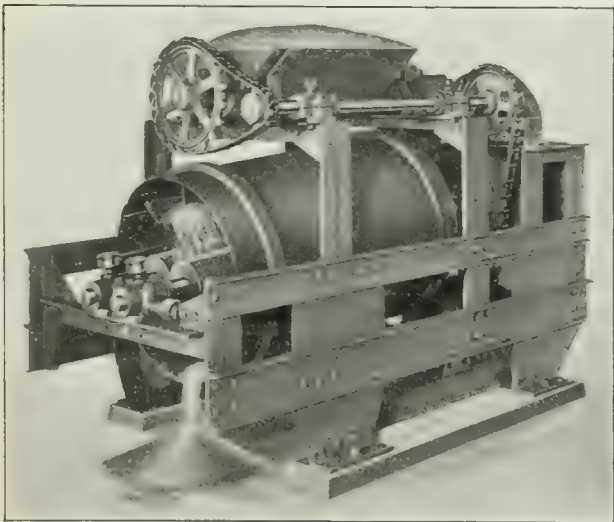
The motor driven type of machine is portable and may be carried about and placed convenient to the sand pile, using a flexible cable to obtain current from the nearest line connection. The machine is driven by a direct current electric motor inclosed within the housing, where it is thoroughly protected from sand and dirt. A controller provides speed variation. In the stationary patterns the machine is built for drive from an underneath pulley or from a pulley on a line shaft or an overhead motor. In the latter form there is a top stand and guide pulley, so that the machine may also be driven from a motor on the floor. The under driven machine has the table spindle, spindle pulley and bearings inclosed in the housing of the base, so as to protect these parts from sand and dirt. A removable door or cover at the front of the housing gives access to the spindle or bearings for cleaning or lubricating. For molding sand the machines are driven at about 1200 rev. per min., and for core mixtures 800 to 900 rev. per min. The machines are built both with sheet steel aprons, as here illustrated, and with cast iron aprons. The hopper can be lifted off for

cleaning the prongs and removing stones, nails, &c., which may not pass between them. Sand that contains such articles should be first screened before being passed through the machine. Roughly the capacity of the machine is about 10 tons per hour, but its actual capacity is limited only by the facility with which the sand can be delivered to and removed from it. As an adjunct to the sand mixing machine the company furnishes when desired a pneumatically vibrated sifter mounted on the hood over the hopper. The sieve so placed and operated at the same time as the mixer makes a combination that does the work of sieving and mixing with but one handling.

The Standard Sand Blending Machine

A new machine for rolling, blending and mixing core, facing, heap and new sands is being introduced by the Standard Sand & Machine Company, Cleveland, Ohio. This machine is built in various sizes and capacities and provides for a repeated rolling of the material with a single set of rolls. The rolls are horizontal, and one has springs to regulate the pressure between them. A variable speed of one roll is provided if desired for a greater crushing and abrasion. The number of times that the same material is passed through the rolls is controlled by the pitch of the drum, which is adjustable to give from 6 to 100 passes. One type of the machine showing the material passing from the drum is herewith illustrated.

The machine has an automatic feeding hopper, from which the material is delivered by a screw conveyor through a spout to the upper end of the drum. The latter revolves on trunnions, entirely independent of the rolls. A series of buckets inside of the drum extend its length and repeatedly return the material to the rolls. The machine can also be equipped with an automatic propor-



A Machine for Rolling and Mixing Sand Built by the Standard Sand & Machine Company, Cleveland, Ohio.

tioning hopper, which gives complete control of the quantities of the various materials used.

Especially is the machine designed for steel foundry work, taking the place of dry pan mills for preparing core and facing sand. It is claimed to be superior to the dry pan mill in that the rolling and blending of material is even and regular, and it does not crush the natural grain of the material. The style or shape of the rolls can be made to meet various requirements. As compared with other means the cost of the first installation is declared to be less and the capacity and efficiency more, the horsepower for operation being from 50 to 75 per cent. less, or not more than 1 hp. per ton per hour.

The machine is made in five sizes with 6, 8, 10, 12 and 16 in. rolls, with capacities ranging from 3 to 15 tons per hour. The length of the rolls ranges from 3

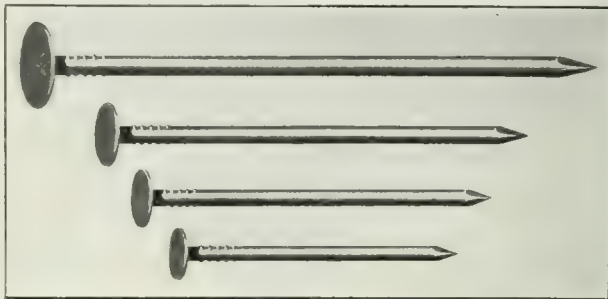
to 6 ft. All bearings are phosphorus bronze; all gears cast steel, and the rolls are also cast steel.

The Standard Sand & Machine Company also manufacture a full line of sand mixing, screening and conveying machinery for foundries.

MISCELLANEOUS

Cle-Gal-Co Pattern Shop and Foundry Supplies

Specialties manufactured by the Cleveland Galvanizing Works Company, Cleveland, Ohio, for use in pattern shops and foundries, include die cast white metal pattern letters and figures, brass pattern letters and figures, Fit-Well brass dowels, Fit-Well rapping plates, Hold-



The Large Head, Small Shank Foundry Nails Made by the Cleveland Galvanizing Works Company, Cleveland, Ohio.

Fast pinch dogs, Precision leather fillets, Precision wood fillets, Precision shrinkage rules, Cle-Gal-Co foundry nails and Cle-Gal-Co chaplets.

The points of superiority in the white metal pattern letters are a consequence of the composition of the metal, which is tough and malleable, permitting brads to be driven through the letters and the letters to be bent to fit rounded patterns, yet strong enough to stand considerable use and abuse, and the method of their manufacture by die casting. Particularly due to the latter is the fact that they show no tool and file marks, requiring none for their finishing. The letters are also absolutely uniform in height and thickness, which is important where they are lined up on a pattern. Correct draft is provided, so that they will draw readily from the sand. The letters are made very accurately as to size, the greatest deviation being scarcely a hundredth of an inch, and their outline is correct, according to the best accepted standards, so that they present a neat appearance. The outlines on the back of the letters are also true and the back surface is perfectly flat. The letters are made in a number of styles, including Roman, sharp face gothic, round face gothic, flat face, thin and slightly thicker gothic, hair line gothic, condensed thin Roman, antique, pointed or fancy, and for branding letters there are made reversed gothic, deep and very deep. In the various sizes of any one style of letters there is a corresponding graduation of thickness.

The company's brass letters cannot be made by the die casting process, due to the higher melting point of the metal, but are carefully made, so that they have the features of uniformity of height, draft, accuracy to size, graduation of thickness, &c. They match exactly with the white metal letters, so that a damaged letter on a brass pattern can be replaced by filing off the old letter and soldering on a brass one. Red pattern brass is the metal used, which is very tough and easily bent, but not brittle.

Closely akin to the pattern letter business is that of making foundry marks, so that users can place some distinguishing mark on the castings they make for job work and their own use. These are in the form of a monogram, initial, or some special trademark. The company has executed numerous designs for different foundries, the patterns of which it retains and uses exclusively for its customers. Each individual design is the property of the customer and used for no one else. The designs are made from customer's drawings or the

company will submit sketches of designs. Any one design can be made in various sizes to make them applicable to any style pattern and can be furnished in both white metal and brass.

Precision leather fillet is offered as an economical means for filleting patterns, considering the time required. It makes the best job, is not affected by moisture, will not shrink out of place and is easily adjustable to any shape or angle. The Precision fillet is claimed to be cut extremely smooth, slick and true, to be absolutely uniform and made from oak tanned hide and put up in convenient shape for handling. Precision wood fillet is supplied for straight and regular patterns and is less expensive. The back is cut slightly obtuse, so that when it is applied the feather edges adhere tightly to the pattern. It is made from selected white pine, kiln dried, and free from knots and blemishes, and comes in 4-ft. lengths and in bundles of 25.

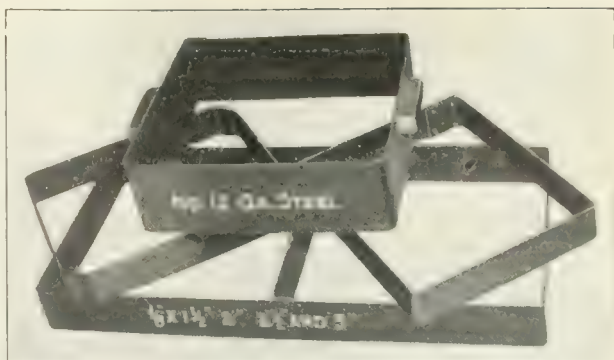
The illustration shows four sizes of the Cle-Gal-Co foundry nails, from which their distinguishing characteristics are plainly evident—*i. e.*, large heads and light shanks, with no fillet under the head. These nails are made especially for foundry use, being of little value to carpenters, and are offered as a decided improvement on common wire nails. While they cost more, weight for weight, than common nails, it requires only about two-thirds as many for a given piece of work on account of the greater size of the head. They are also easier to insert, being of smaller diameter shank, and for the same reason they are more easily removed from the finished castings, reducing the cost of cleaning and improving the appearance of the castings. Including initial expense, labor of inserting and labor of cleaning castings, it is estimated that the cost of using these nails is less than half that of common wire nails. The nails are carried in stock in 6, 8, 10 and 20 penny sizes.

The most recent addition to the company's lines are its single head forged, single head plate fitted, double head forged, double head plate fitted chaplets and chaplet stems. A higher than usual grade of stock is said to be used and extreme precaution exercised in their production. The metal is low fusing and is tinned with pure tin and not a mixture of half tin and half lead.

The fitted plate chaplets are constructed with an ample shoulder on the under side and are riveted so as to leave the top plate perfectly flush, yet tight enough so that chaplets can be bent to any radius to correspond with the curve of the core. A large quantity of the principal sizes of the standard styles is carried in stock, and special sizes can be made up promptly to order. Tin chaplets are always furnished unless otherwise specified. The single head forged chaplets have heads which are uniform in thickness, perfectly round and perfectly centered over the stem. Chaplet stems can be supplied where the user desires to fit various size plates himself. The single head plate chaplets are always furnished with square plates unless otherwise ordered, as they are preferred in the majority of instances. The company is prepared to furnish chaplets of any size, with plates to fit the diameter of the core, with the stems pointed. Double head chaplets are fitted with either square or round plates, plain or tinned. Square plates are furnished unless otherwise specified. Special size chaplets are made to order.

Diamond Slip-Over Boxes and Bands

A group of steel bands and slip-over boxes, manufactured by the Diamond Clamp & Flask Company, Richmond, Ind., is herewith illustrated. The jackets are made of No. 12 steel, with wood handles, so that they can be handled when hot. The bands are made of $\frac{1}{4}$ -in. band steel, and small enough to drop into the flask and be rammed up with the mold. Steel bands have the advantages over cast iron bands in that they do not have to be handled carefully in shaking out, and that they can be thrown in a heap and will not break or get out of shape, saving considerable time on the part of the molder. They are made to fit any mold, and are braced if required.



A Group of Slip-Over Boxes and Bands Made by the Diamond Clamp & Flask Company, Richmond, Ind.

The company also makes the Diamond automatic and plunger type core machines, Diamond flask clamps, Diamond wood and metal flasks in a great variety of types, and molder's tools. The latest additions to its lines are snap and plain flasks made of pressed steel. They combine lightness and strength, and it is predicted that they will come into very extensive use.

Sterling Flasks

Flasks, wheelbarrows and carts are the products for foundry use made by the Sterling Wheelbarrow Company, Milwaukee, Wis. Although the company makes an all-



Fig. 1.—The Style E Rolled Steel Snap Flask Made by the Sterling Wheelbarrow Company, Milwaukee, Wis.

steel snap flask, its style E, shown in Fig. 1, it specializes in the manufacture of tight flasks. A round flask is shown in Fig. 2 and is known as style B. The whole line of flasks, including a wide range of sizes and shapes, is new, and the material from which the flasks are made is a special rolled steel section controlled exclusively by the company. The section, as can be seen from the illustrations, is a ribbed channel, and the design has been

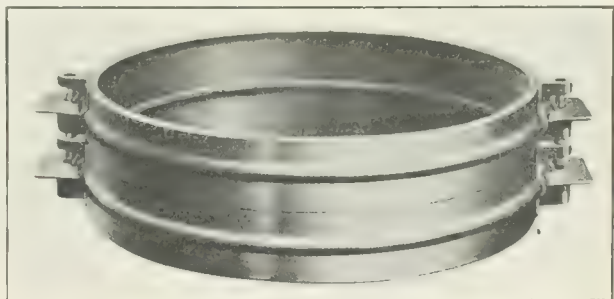


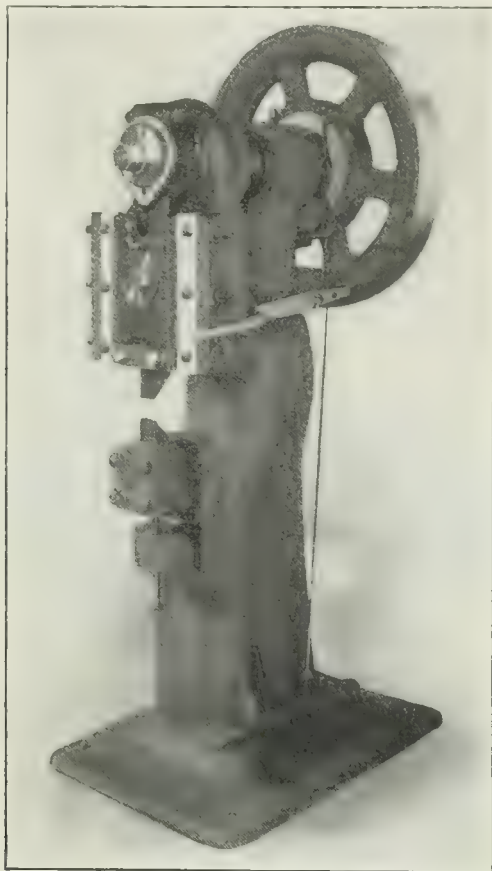
Fig. 2.—The Sterling Style E Rolled Steel Round Flask.

patented. The company feels that it has an especially good material for flasks—better than wood, because it will burn, better than castings because they break, better than sheet steel because it springs. The flask sides are made of a continuous piece bent or curved to shape, with pin holders riveted to place and fitted with pins in such a manner as to enable the foundryman to change his flasks to as many parts as he desires. The pin holders are malleable iron and the pins are cold rolled steel machined, and are removable and interchangeable.

able. Some of the flasks, as for instance, the style E, Fig. 1, have V-shaped adjustable pins and pin holders, and some are made with reinforced corners, which add greatly to their strength and rigidity.

A Standard Sprue Cutter

A redesigned sprue press, known as the No. 3D, has been brought out by the Standard Machinery Company, Providence, R. I. As shown in the illustration, the machine is furnished with a treadle or hand lever. The cutters start automatically at the highest part of the stroke, so that the operator has both hands free to hold and guide the work. The cutters are made of high grade carbon tool steel, 2 in. square in cross section. This



The No. 3 D Sprue Cutting Press Built by the Standard Machinery Company, Providence, R. I.

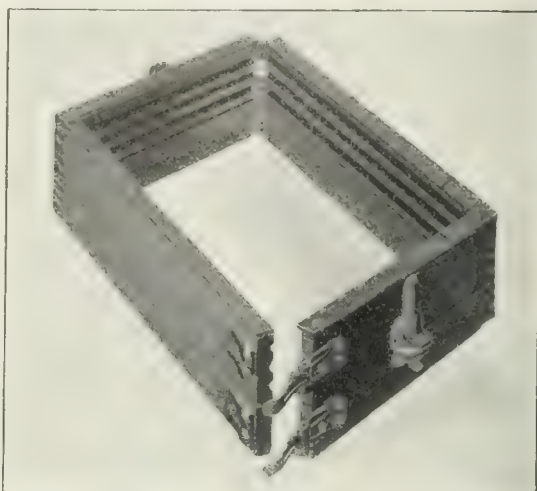
form was adopted because it does away with expensive machine work and fitting. The cutters can be set at right angles to the press if it is found more convenient. The lower cutter has screw adjustment from below and the upper one has a clamping adjustment from above; the knives can therefore be set to cut off without touching each other, thereby saving their cutting edges. The eccentric adjustment on the crank shaft is furnished when desired.

The machine is equipped with an instantaneous roller friction clutch and can be run either continuously or stopped at the end of each stroke. This clutch allows less than 1-32 in. travel of the periphery of the flywheel after it is engaged, insuring a saving of power and friction.

The net weight of the machine is 2500 lb. and of the wheel alone 500 lb. The wheel is 30 in. in diameter and has a face of $4\frac{1}{2}$ in. The overall height of the machine is 6 ft. The length of stroke is $1\frac{1}{4}$ in., the distance between the ways $7\frac{3}{4}$ in., the depth of throat 8 in. and the floor space required 30 x 36 in. The frame is extra heavy and of rigid design and is constructed so as to allow extra working space and convenience for handling work. The overhanging construction of the frame permits large and irregular shaped castings to be handled with comparative ease. The machine is built both plain and back geared.

The New Eureka Snap Flask

A specialty with the Smith & Caffrey Company, Syracuse, N. Y., as successor to C. H. Green & Co., is the new Eureka snap flask. It is made of kiln dried red oak

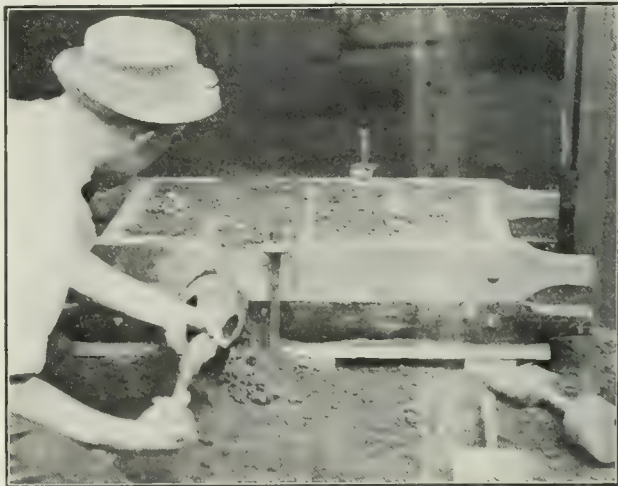


The New Eureka Snap Flask Made by the Smith & Caffrey Company, Syracuse, N. Y.

with machine lock corners and malleable iron trimmings. The company does not attempt to carry it in stock, inasmuch as requirements of foundrymen vary so in size, but is in position to ship any ordinary order the day following its receipt. The accompanying illustration shows a Eureka flask with the fastenings opened.

The Paxson Runout Stopper

A new handy foundry appliance is a device for stopping runouts in molds, being placed before the trade by the J. W. Paxson Company, Philadelphia, Pa., and shown in the illustration. It is extremely simple, consisting of a cylindrical cast iron casing, or bell, $4\frac{1}{2}$ in. in diameter and 3 in. deep, with a wrought iron pipe extension, a cast iron disk 4 in. in diameter, fitting in the casing, and



A Device for Stopping Runouts in Molds Introduced by the J. W. Paxson Company, Philadelphia, Pa.

a plunger stem attached to the disk and working through the pipe.

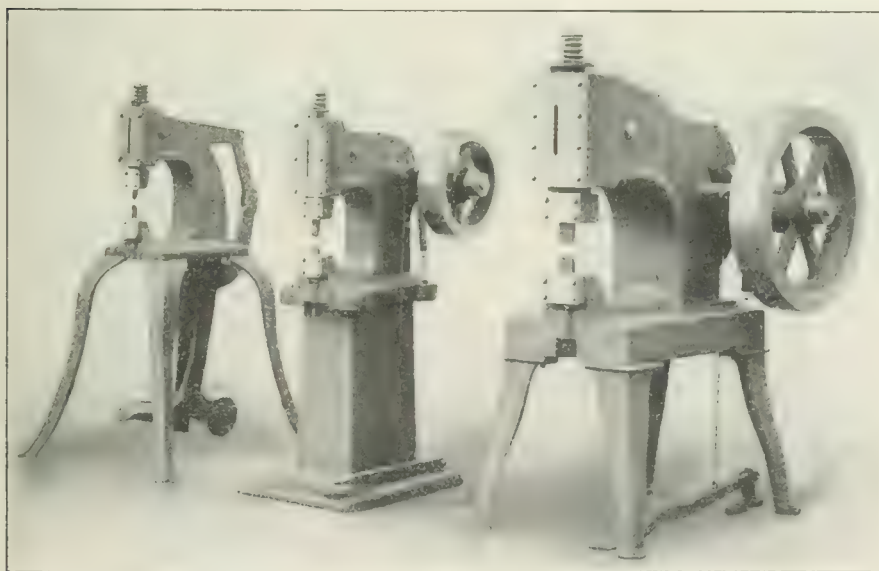
In operation the disk is brought to the rear of the casing, the casing filled with sand and then placed over the runout. Hand pressure on the plunger forces the sand against the flask and thus stops the flow of metal. The device is 22 in. long over all and can be hung on a post or kept any place convenient to the molding floor. Patterns are being made for an additional style with a rectangular casing, so that it may be applied for stop-plug runouts which extend for any length along the flask. Special shapes for various purposes are also made to order.



An Exhibit Board of Molders' Tools Made by William Dobson, Canastota, N. Y.

Shuster Sprue Cutters

The sprue cutters built by the F. B. Shuster Company, New Haven, Conn., are of very solid construction, adapted for severe work. All wearing parts are of selected material, and the knives are cast steel, ground to the proper taper. The foot power machine is made in one size only, cutting $1\frac{1}{2}$ in. square common yellow brass



Three Sizes of Sprue Cutters Built by the F. B. Shuster Company, New Haven, Conn.

as its largest size, while the power machine is made in three sizes, the largest size cutting $\frac{5}{8}$ x 2 in., or its equivalent. In connection with the foot lever of the smallest machine is a toggle-joint action, making it very powerful and easily operated. In the power machines the knife slide is actuated by a heavy lever driven from a cam on the flywheel shaft. The knife is started by a foot controlled clutch.

The machines are constructed so that the knives may be shaped according to the sprues to be cut, thus permitting of cutting odd shapes. They make clean cuts, and the castings seldom require grinding. One machine does the work of several men with hammer and chisel, and the labor saving is considerable. The machines are of generous proportions and the throats roomy, so that bulky

work may be handled conveniently. In the foot power and smallest power machines the throat depth is $10\frac{1}{2}$ in., and in the two larger power machines 18 in. The knives in the four sizes have widths of 1, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 in., respectively. The floor spaces are 34 x 39, 25 x 36, 26 x 41 and 32 x 49 in., and the weights, 500, 900, 1300 and 2200 lb., respectively.

Dobson Molders' Tools

The large variety of molders' trowels, lifters, slicks, spoons, &c., manufactured by William Dobson, Canastota, N. Y., is quite fairly represented by the exhibit board, shown at recent foundrymen's conventions, of which an illustration appears herewith. The Dobson tools are fashioned from designs furnished by molders from time to time, for the particular work for which they are adapted, and are forged from steel especially mixed for toughness and wear, hardened and tempered in oil, ground and finished to a proper weight, making them, it is claimed, perfect in shape, hang, temper and finish. The manufacturer specializes in these tools and his entire factory is devoted to this work. The business was established in 1886 in Detroit, Mich., and the tools were then made as the Detroit molders' tools, but since change of location have been given the maker's name. Special tools to customers' designs are made to order.

Parting Compound and Core Wash

In the extensive range of foundry facings and supplies handled by the Keystone Foundry Supply Company, Buffalo, N. Y., products it manufactures include Niagara and Mohawk parting compounds and Lion brand core wash and core compound. The Mohawk parting is offered as an improved substitute for charcoal, rosin, burnt sand, &c., and costs no more than charcoal. It is better than the latter, since it gives more perfect lifts and cuts out the need of patching molds. It can be used equally well on machine, bench and floor molding.

The Niagara parting is a new product for parting molds for brass, iron, bronze and aluminum castings. It is lighter in weight and lighter in color than any parting formerly offered. In its use it is easily seen how much of the material is being dusted over the pattern and the mold and it is also cleaner to handle than other parting compounds. It is claimed that it will neither cut, wash nor burn off the face of the mold. It prevents the sand from sticking to the pattern and produces sharp, clean molds, with every line, shape and conformation delineated precisely as in the pattern. It insures perfect lifts and draws and eliminates the necessity of patching the mold. Another consequence of its use is time and labor saved in the grinding, finishing and polishing departments. On

molding machine work it is claimed to increase the production of castings 20 to 30 per cent. Further, it contains nothing injurious to the health, is not inflammable, and leaves no residue in the bag. Its cost is practically the same as that for charcoal, so that it can be used on even common work.

The company is just now introducing its No. 3 combination blacking, which it claims is unsurpassed as a high grade core wash and will compare favorably with any plumbago on the market, and can be used as a bag blacking. The material contains about 75 per cent. graphitic carbon and is not made up of ground coke. It can be rubbed or brushed on a mold and is being used in shops making heavy machinery castings with very good results.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—

Redned Iron:	
1 to 1 1/2 in. round and square	per lb 1.75c
1 1/2 to 1 1/4 in. X 3/4 to 1 in.	per lb 1.85c
1 1/2 to 1 1/4 in. X 1 to 1 1/2 in.	per lb 1.85c
Rods—, and 1 1/2 in. round and square	per lb 1.85c
Angles:	
3 in. X 1 in. and larger	per lb 2.00c
3 in. X 1 in. and 1 in.	per lb 2.35c
1 1/2 to 2 1/2 in. X 1 in.	per lb 2.10c
1 1/2 to 2 1/2 in. X 3/4 in. and thicker	per lb 2.00c
1 to 1 1/4 in. X 3/4 in.	per lb 2.10c
1 to 1 1/4 in. X 1 in.	per lb 2.30c
3/4 X 1 in.	per lb 2.40c
5/8 X 1 in.	per lb 3.45c
1/2 X 3/4 in.	per lb 1.25c
Tees:	
1 in.	per lb 2.65c
1 1/4 in.	per lb 2.45c
1 1/2 to 2 1/2 in. X 1 in.	per lb 2.15c
1 1/2 to 2 1/2 in. X 3/4 in.	per lb 2.35c
3 in. and larger	per lb 2.65c
Beams:	
Channels, 3 in. and larger	per lb 2.00c
Rails—1 to 6 X 10 to No. 8	per lb 2.30c
"Burden's Best" Iron, base price	per lb 3.15c
"Burden's" H. B. & S. " from base price	per lb 2.95c
Norway Bars	per lb 3.60c

Merchant Steel from Store—

per lb	
Lesser Machinery	per lb 1.90c
Tool Steels, Tires, etc., Sheet, Shoe	per lb 2.50c to 3.00c
Best Cast Steel, base price in small lots	per lb 1.75c

Sheets from Store—

Black	One Pass, C.R.	R. G.
	Soft Steel.	Cleaned.
No. 16	per lb 2.55c	per lb 2.80c
No. 18 to 20	per lb 2.70c	per lb 2.90c
No. 22 and 24	per lb 2.75c	per lb 3.05c
No. 26	per lb 2.85c	per lb 3.10c
No. 28	per lb 2.95c	per lb 3.30c

Russia, Planished, &c.

Genuine Russia, according to assortment	per lb 12 @ 14 1/2
Patent, Planished, W. D. W. W. W.	per lb 10c; R. 9c net.

Galvanized.

No. 12 and 14	per lb 2.95c
No. 22 to 24	per lb 3.30c
No. 26	per lb 3.35c
No. 28	per lb 3.80c
No. 24 and lighter, 36 inches wide, 25 1/2 higher	

Genuine Iron Sheets— Galvanized.

Nos. 22 and 24	per lb 5.75c
No. 26	per lb 6.25c
No. 28	per lb 7.25c

Corrugated Roofing—

2 1/2 in. corrugated	Painted	Galv'd
No. 24	per 100 sq. ft. \$3.85	4.80
No. 26	per 100 sq. ft. 4.25	4.40
No. 28	per 100 sq. ft. 4.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IX, 14 X 20	per box \$0.35
IX, 14 X 20	per box 1.00
A. Charcoal:	
IX, 14 X 20	per box \$5.4
IX, 14 X 20	per box 6.5

American Coke Plates—Bessemer—

IX, 14 X 20	per box \$4.10
IX, 14 X 20	per box 5.40

American Terne Plates—

IX, 20 X 28 with an S 1 coat and 2	per box \$8.50
IX, 20 X 28 with an S 1 coat and 2	per box 10.50

Seamless Brass Tubes—

List November 11, 1908	base price 18c
------------------------	----------------

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908	base price 18c
------------------------	----------------

Copper Tubes—

List November 13, 1908	base price 21c
------------------------	----------------

Brazed Brass Tubes—

List August 1, 1908	195c @ 20
---------------------	-----------

High Brass Rods—

List August 1, 1908	143c @ 20
---------------------	-----------

Roll and Sheet Brass—

List August 1, 1908	143c @ 20
---------------------	-----------

Brass Wire—

List August 1, 1908	143c @ 20
---------------------	-----------

Copper Wire—

Base Price.	Carload lots mill 14 1/2
-------------	--------------------------

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. quantity lots	per lb 18 c
---	-------------

Sheet Copper Cold Rolled, 16 oz. quantity over 100	
--	--

Sheet Copper Polished 20 in. wide and under, 1c per square foot	
---	--

Sheet Copper Polished over 20 in. wide, 2c per square foot	
--	--

Planished Copper, 1c per square foot more than Polished.	
--	--

METALS— Tin—

Straits Pig	per lb 40 1/2 @ 40 1/2
-------------	------------------------

Copper—

Lake Ingot	per lb 14 1/2 @ 15 c
Electrolytic	per lb 14 1/2 @ 14 1/2
Casting	per lb 14 1/2 @ 14 1/2

Spelter—

Western	per lb 6 @ 6 1/2
---------	------------------

Zinc.

No. 9, base, casks	per lb 5 c; Open	per lb 5 1/2 c
--------------------	------------------	----------------

Lead.

American Pig	per lb 5 @ 5 1/2
Bar	per lb 5 @ 5 1/2

Solder.

1/2 A 1/2, guaranteed	per lb 23 1/2 @ 24 c
No. 1	per lb 21 1/2 @ 22 c
Refined	per lb 19 @ 19 1/2

Prices of Solder Indicated by private brand vary according to composition

Antimony—

Cookson	per lb 6 @ 6 1/2
Bureau's	per lb 6 @ 6 1/2
Other Brands	per lb 6 @ 6 1/2

Bismuth—

Per. lb	\$2.00 @ \$2.25
---------	-----------------

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting	per lb 23 1/2 @ 24 c
Rods & Wire	per lb 21 1/2 @ 22 c
Sheets	per lb 19 @ 19 1/2

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	per lb 11.00 @ 11.25
Copper, Heavy and Wire	per lb 10.75 @ 11.00
Copper, Light and Bottoms	per lb 9.75 @ 10.00
Brass, Heavy	per lb 7.25 @ 7.50
Brass, Light	per lb 5.75 @ 6.00
Heavy Machine Composition	per lb 9.75 @ 10.00
Clean Brass Turnings	per lb 7.25 @ 7.50
Composition Turnings	per lb 8.25 @ 8.50
Lead, Heavy	per lb 3 @ 3.75
Lead, Tea	per lb 3 @ 3.75
Zinc Scrap	per lb 4 @ 4.00

NICHOLSON
U.S.A.
TRADE MARK

NICHOLSON

NICHOLSON
U.S.A.
TRADE MARK

Time is not the only saving effected through the use of **Nicholson Files**.

Their hard cutting surface and perfect temper gives them a **lasting quality** that makes them by far the most **economical** of all files to use.

Our Catalog shows what styles to use. Our book, "File Philosophy," tells how best to use them.

NICHOLSON

COMPANY

FILE

PROVIDENCE,

R. I., U. S. A.

THE IRON AGE

Established
1855

New York, January 12, 1911

VOL. 87: No. 2

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.	

CONTENTS.

Editorial:	PAGE.
Iron and Steel Exports Keep Up.....	119
The Steel Corporation's Output in 1910.....	120
To Amend the German Patent Laws.....	120
The Growing Use of the Industrial Automobile.....	121
The Conservative Copper Market of 1910.....	121
An Essential Cost Factor of Compensation.....	121
Septic Poison's Needless Cost in Works.....	121
Correspondence	121
New Publications.....	122
The Life of Electrical Apparatus.....	122
British Pig Iron Output, First Half of 1910.....	122
Steel Corporation President. Portrait.....	123
The Iron and Metal Market Reports.....	124 to 132
Iron and Industrial Stocks.....	132
Notes on Prices.....	132
New Tools and Appliances.....	133
The Machinery Market Reports.....	134 to 144
Notes on Motor Truck Performances.....	145
The Western Steel Corporation.....	145
Personal	146
Obituary	146
New Railroad Equipment.....	146
The Apollo Sheet Steel Calendar.....	146
The Lake Superior Iron & Chemical Company.....	147
December Copper Production and Stocks.....	147
The Steel Corporation's Unfilled Orders.....	147
Continuous Foundry Operation.....	147
Trade Publications.....	148
Death of Charles H. Morgan. Portrait.....	150
Customs Decisions.....	151
Briquettes from Cast Borings.....	152
Castings from Nonferrous Alloys.....	154
The Results of Iron Molders' Strikes in 1910.....	155
The Newark Foundrymen's Association.....	155
The Philadelphia Foundrymen's Association.....	155
The Pittsburgh Foundrymen's Association.....	155
Experience with Molding Machines.....	156
The Welsh Tin Plate Trade.....	157
November Exports and Imports of Iron and Steel.....	158
Canadian Iron and Steel Works Extensions.....	158
The Garrison 400-Ton Double-Acting Press. Illustrated....	159
A Country Club for Employees.....	159
A Private Accident-Relief System.....	159
The Columbia Steel Foundry. Illustrated.....	160
A Cleveland Portable Pneumatic Grinder. Illustrated....	162
The New Standard Reducing Presses. Illustrated.....	163
Steel Corporation Payments for Hill Ore.....	163
The Roberts Motor Air Compressor. Illustrated.....	164
Spedel Ceiling Electric Elevator Machine. Illustrated....	165
The 16-In. Schellenbach Geared Head Lathe. Illustrated..	166
Duff Ratchet Jacks at Panama. Illustrated.....	167
Heating Furnace Doors. Illustrated.....	168
New Morris Lathe Attachments. Illustrated.....	169
The Western Electric Company's Year.....	169
An Analysis of Boiler Feed Records. Illustrated.....	170
Current Metal Prices.....	172

Iron and Steel Exports Keep Up

Large Tin Plate Order for the Oil Trade

Better Demand Expected from the Railroads, but Buyers Generally Hold Off

Export business in steel products has been unusually good of late, excellent as it was throughout 1910, and it is particularly welcome in the present halt of new demand at home. A significant order recently placed is for 250,000 boxes of tin plate for the export oil trade. Welsh tin plate, as is well known, has long been imported for this trade, but the crowded condition of Welsh mills and the consequent advances in tin plates abroad have temporarily thrown the business to American mills.

Another phase of the heavy export trade now coming to the United States is the inability of British manufacturers of plates, angles and shapes to take their usual share of the foreign trade in those lines. The ending of the British shipbuilding strike and the large accumulation of new work at the yards will call for all the ship steel British mills can deliver for several months. The result has been the turning of considerable inquiries from neutral markets to this country. Exports to Canada have kept up well; a recent order is for several thousand tons of structural material for a bridge over the Saskatchewan.

The meeting of steel manufacturers in New York this week is seemingly the pivot of the market; at all events it is the latest reason given for the holding off of buyers. Steel manufacturers are represented to be practically unanimous in favor of holding prices as they are, in view of the decline that has already taken place from the 1907 level, and the belief that there is no dammed up demand which lower prices would release.

Little has developed since the opening of the year to throw light on the ultimate outcome of the present situation except the better prospect for American steel abroad. Those who believe that the present price basis will be substantially maintained, not only temporarily but ultimately, count much on a larger railroad demand than has thus far been indicated for 1911.

From the railroad standpoint the immediate situation is considered to be better to the extent that 220 locomotives have been placed in the past week and that rail and bridge demand shows more promise. The acceptance of the Pennsylvania rail order for a total of 150,000 tons has been assured by an agreement on the price to be paid for the extra discard. The basis of the New York Central contract is also near adjustment, an extra price being asked by the mills for meeting the ductility requirements on high carbon open hearth rails. The Great Northern has bought 3800 tons of open hearth rails and an Eastern coal road with Western connections has bought 16,000 tons. An inquiry for 28,000 tons for a Western line and one for 25,000 tons for a Southern road are pending. The Gary rail

mill will start up next week, having orders for 20,000 tons for early rolling.

A favorable construction has been put in some quarters on the fact that the Steel Corporation's figures for orders unfilled December 31 showed a smaller decline in December than in November. Such a conclusion would be better founded had not both new orders and mill output been less in December than in November.

More inquiry for Southern pig iron is reported, but the \$11 Birmingham basis has been shaded 25c. or more on analysis iron equivalent to No. 2. In the East the slackness in the textile trade is reflected in the curtailment of forces by foundries and machine shops manufacturing textile machinery. The extent to which the business contraction is affecting foundry operations is a factor in the situation which pig iron producers are watching closely.

Two eastern Pennsylvania blast furnace companies announce a 10 per cent. reduction in wages. This action follows several months of pig iron prices on which Eastern makers have barely made their cost.

Chicago opened bids this week for 10,000 tons of water pipe, the leading producer being low bidder at about \$24, delivered, for 12 to 48 in. sizes. Pipe foundries have had some good inquiry of late from gas and water companies for their spring requirements.

Copper has declined ¼ cent in the past week, electrolytic now selling at 12½ cents, while lake is only nominally 12.75. There has been some fair buying on the decline.

The Steel Corporation's Output in 1910

The United States Steel Corporation made new records in the production of pig iron, steel ingots and rails in 1910. In pig iron and steel ingots this is but paralleling what was done by the country as a whole. Not so with the record in rails, for the independent mills did not approach last year their record total of 1906, when the output of the United States was 3,977,872 gross tons of steel rails. It is a safe estimate that the total of 3,023,845 tons in 1909 was exceeded last year, but not greatly. The Steel Corporation is understood to have produced more than 2,000,000 tons of rails in 1910, while its best previous record was 1,982,042 tons in 1906.

The pig iron production of the Steel Corporation last year, approximately 11,800,000 tons, is nearly 200,000 tons in excess of the best previous year's record, that of 11,618,350 tons in 1909. The statement of the pig iron output of the country in the past six years is given below, with the output and percentage in each year of the Steel Corporation. It shows that last year's percentage was less than in any year of the six, except 1907:

Pig Iron Production in 1905-1910.—Gross Tons.		
	Total for United States.	Steel Corporation.
1905.....	22,992,380	10,172,148
1906.....	25,307,191	11,267,377
1907.....	25,781,361	10,819,968
1908.....	15,931,018	6,934,408
1909.....	25,795,471	11,618,350
1910.....	27,275,000*	11,800,000

* Estimated.

The Iron Age's monthly pig iron statistics for 1910 and 1909 show that the steel companies made 18,062,329 tons of pig iron in 1910, against 17,036,285 tons in

1909, an increase of more than 1,000,000 tons. The increase of the independent companies was thus more than four times that of the Steel Corporation—accounted for in part, no doubt, by the fact that the Steel Corporation drew upon its pig iron stocks to a greater extent than its competitors.

The steel ingot production of the Steel Corporation was well beyond all records, exceeding that of 1909 by nearly 800,000 tons and that of its record year in steel, 1906, by 640,000 tons. A comparison with the production of previous years follows:

Production of Steel Ingots and Castings in 1905-1910.—Gross Tons.		
	Total for United States.	Steel Corporation.
1905.....	20,023,947	11,995,239
1906.....	23,398,136	13,511,149
1907.....	23,362,594	13,099,548
1908.....	14,023,247	7,838,713
1909.....	23,955,021	13,355,189
1910.....	.....	14,150,000

Per cent.
Steel
Corpo-
ration.

If the steel ingot and castings production of the country in 1910 should prove to have been 25,000,000 tons, as the increase in pig iron production of the steel companies and the Steel Corporation's ingot increase would seem to indicate, the Steel Corporation's percentage would be 56.6, or slightly more than the average of the three years previous.

To Amend the German Patent Laws

The German Government proposes radical changes in its patent laws, through the medium of a bill recently introduced in the Reichstag. While only meager details have been received here, the understanding of patent attorneys who have kept in touch with the situation in Germany is that the amendments, directly or indirectly, will take from the American patentees their singularly advantageous position in that country, as an answer to the protest that has gone up from German manufacturers and inventors. Under the existing agreement with the United States, the American patentee in Germany is exempt from the provisions of compulsory working, which holds with citizens of all other nations and with the Germans themselves. The treaty was made with the idea that the American laws were soon to be amended to include the compulsory working principle, which, however, has not been done, nor does such action now seem imminent, though it has many strong advocates. Naturally the Germans believe that the Americans have altogether the best end of it, though there is justice in the argument that while patentees of other countries are not compelled to work their American patents, that burden should not be imposed upon Americans in those other nations.

Undoubtedly the German Government has, as the most essential reason for the amendments, the wish to place its laws nearer the basis of those of other European countries, notably Great Britain. The British patent act has hit the Germans very hard. The bill, according to information received, provides the right to rescind a patent after three years in case the invention has been worked chiefly outside of Germany. Another provision would give the Government the power to compel a patentee to license another person to manufacture under the patent, should he not make use of it himself. Apparently the purpose of the legislation is to strengthen greatly the existing laws.

The Growing Use of the Industrial Automobile

The growing use of the industrial automobile is attracting attention in the metal working industries, not only because the increasing manufacture of auto trucks opens an excellent market for material and mechanical equipment, but also because of their adaptability to the requirements of manufacturing plants. For some years auto trucks have been gaining favor with the railroads and steamship companies for the transfer of baggage, and their use as a delivery medium by express companies and mercantile houses is becoming quite general. The adoption of auto trucks as part of the interior transportation systems of plants is a more recent development, and their use in that direction is growing. A number of manufacturers of mechanical equipment, including a large pneumatic machinery manufacturer and a gas engine building company, have recently begun the manufacture of auto trucks for this special purpose. Unlike most makers of self-propelled commercial vehicles, they did not take up the manufacture of industrial trucks as an adjunct to pleasure cars, but they entered the industry because of the possibilities it offers as a distinct enterprise. Under certain conditions the auto truck has its advantage over industrial railroads for use in factory plants. It affords a flexible carrying system, as a truck can be guided in and around a congested plant to pick up a load, while with a railroad in use the freight must be brought to the tracks.

There are now 100 auto truck builders in this country, as against one-third of that number four years ago. Many firms now in that line make industrial cars exclusively, and the type of low bodied trucks most adaptable for factory use is growing in favor. The increasing use of industrial vehicles is creating a call for material and machinery used in its manufacture that is in a measure making up for the decreased buying on the part of makers of pleasure cars. It is safe to assume that the possibilities of the auto trucks have not by any means been reached and the industry promises to be one of no small importance.

The Conservative Copper Market of 1910

Fluctuations in prices on both lake and electrolytic copper during the year 1910 were far less erratic than in previous years and the effect of speculation on the market was felt but little. Only once during the year did the New York quotation on lake copper go beyond 14 cents, and that was in January, when, because of a heavy demand for prompt shipment 14 $\frac{1}{8}$ cents was asked. The lowest price made on lake during the year was in July, when lots from second hands were offered at 12 $\frac{5}{8}$ cents. Thus it can be seen that there was not 2 cents a pound difference between the high and low price. It is to the credit of the sellers that no strong attempt was made to force the market upward at any time, but it was allowed to advance or recede according to the strength of the demand. There have been times in other years when the consumer of copper had been the plaything of the speculator; hence, last year's record was a creditable one to the trade. Whether the publication of the monthly statistics of the Copper Producers' Association contributed toward conservative trading it is hard to judge, but certainly the market during the year in this country was less

sensitive than that of London and was conducted on a more stable basis.

An Essential Cost Factor of Compensation

An element of workmen's compensation, little understood though of great moment, is the wide variation in cost to the employer, dependent upon the period of time following an accident during which no compensation is paid. Under all employers' rules governing the system, a certain period must elapse before the injured employee may begin to receive damages. In some cases it is a week, in others two weeks. A compilation prepared by an expert in employers' liability, based on the history of hundreds of accident cases, reveals the fact that, while with a one week limit 34 per cent. of industrial accidents produce disability enduring more than one week, the number is reduced to 20 per cent. when the limit is extended to two weeks. This means that a great number of injuries compel the victim to lay off more than seven days but less than 14 days. In the attempt to guide legislation in order that the proposed compensation laws of various States may be just to both the employer and the employee, these significant figures should be kept in mind. It will make an enormous difference in the cost of the system to the employer if he has to pay damages for 34 instead of 20 out of each 100 accidents.

Septic Poison's Needless Cost in Works

Some large employers of labor are giving careful consideration to the education of their working people, with a view to reducing the number of disabilities resulting from blood poisoning caused by negligence or ignorance in the care of injuries. It has been found that 10 to 20 per cent. of disabilities—depending on the nature of the employment—are absolutely unnecessary. If these cases were originally attended to properly, the wound would heal quickly, with little inconvenience to the sufferer. As it is, the workman disregards a slight trouble, such as a superficial cut, and in due time finds himself a victim of septic poisoning. A seeming trifle develops into a serious matter. Where compensation exists, the great number of these cases becomes an expensive burden to the manufacturer. Without regard to financial obligation, it is often costly to have men absent from their regular places, because the routine of production is disturbed. This species of disability is by no means confined to the more ignorant classes of labor. Men generally have a contempt for small ailments, often failing to realize their possibly serious and even dangerous consequences. The suggestion is made that all employees receive printed warnings of the danger of septic poisoning from slight wounds or abrasions.

Correspondence

The Value of System

To the Editor: The recent declaration of the wasteful methods of American railroads by Mr. Brandeis have done more to bring public notice to the industrial engineer than all the other discussions that have been held for many years. We are confronted to-day with the beginning of the interesting spectacle of the business world "house cleaning."

It may be well to attempt to define the one word that

is commonly used to describe the activities of the industrial engineer—"system." That word or term may be defined as a method or order of accomplishing a given task. Almost everybody who has paid any attention to the progress of the world knows of the word and its meaning, but, strange to say, the application of system to commerce and industry in this wonderful industrial nation is comparatively recent. In the early days of American railroads, when these systems of transportation were first stretching out their important branches, the main issue was their economic construction. Now we have come to the period when economy in operation is demanded, and to the time when it is necessary to economize on the cost of labor, as the chief item of operation.

This same condition also extends to and embraces every line of American industry. If we observe the conditions among the 3 per cent. of manufacturers who have now come to recognize the real value of scientific plant management—another way of saying "system"—we find that not only has system increased their production, but it has brought about an increase in the value of the assets that invariably follow, and in the 97 per cent. of manufacturing plants that have not installed any system worth mentioning, we find old-time, slipshod methods, the pitiful spectacle of a heavily handicapped business, and in not a few instances a closed factory or a commercial failure.

Many people have dilated at great length upon the harmful effect of modern combinations of business men, but few have spoken of the great lesson in the elimination of waste which these same corporations or combinations have given us. The direct aim of the great combination may be explained in two fundamental principles—namely, to manufacture or purchase at the least possible cost, and to sell at the highest price consistent with good business principles. If we take any of the existing combinations of business men into one corporation we immediately abolish a great number of presidential offices, &c.; thus we are reducing the cost of labor to the minimum of value, and bringing about a greater sense of efficiency by concentrating our activities and the responsibility for their outcome. While many such combinations have undoubtedly become dangerous, it will serve us well to take their lesson of the value of "system" into serious consideration for application to our national and local efforts at regulation of the dangerous activities of the same combinations. This indicates the true value of uniformity, or a standardized system for the nation as a whole, because 90 per cent. of the industry of the United States is officially classified as Interstate. The preponderance of Interstate over State or foreign commerce virtually eliminates the possibility of success in regulating its factors by diversified action of all the States in the Union.

It would not be a bad way of concluding my comments on the present and future value of "system" by quoting a statement attributed to Andrew Carnegie some years ago: "Take away all our factories, our trade, our avenues of transportation, our money, leave me our organization and system, and in four years I shall have re-established myself."

MICHAEL J. HICKEY.

BROOKLYN, N. Y., January 5, 1911.

The New Orleans Roofing & Metal Works, New Orleans, La., announces that Edgar A. Fordtran has acquired an interest in the company, and the property is now entirely controlled by Mr. Fordtran and A. S. White. Mr. Fordtran is a native of Texas, and was for 11 years or more secretary, treasurer and business manager of the Galveston *Tribune*. The business of the New Orleans Roofing & Metal Company was started 13 years ago by Mr. White, and grew to such proportions that three years ago the present large plant at Scott and St. Louis streets, on the line of the New Orleans Terminal Company, was built. It covers a square. The company owns an adjoining square not yet built upon. Its products are shipped all over the United States, Central America and Mexico, comprising decorated and lithographed cans; also corrugated iron, metal shingles, stove pipes, &c. The plant is equipped with the latest improved machinery, and employs 150 hands.

New Publications

Introduction a la Metallographie Microscopique (Introduction to Microscopic Metallography). 227 pages; 157 figures and 34 plates with 97 microphotographs. Published by A. Herman et Fils, Paris. Price, paper bound, 10 francs.

The book is a translation into the French by A. Corvisy of Professor Goerens's "Einführung in die Metallographie," the translation having been reviewed and augmented by F. Robin. It is divided into five parts: "Physical Properties of Matter," "The Practice of the Micrography of Metals," "Physical Mixtures," "Alloys," and "Metallography of the Iron Carbon Alloys." Most of the new matter has been added to the part on alloys, being details of the cooling curve diagrams, of binary and ternary alloys which have been studied since the original was written. With these exceptions the text of Goerens' well-known work has been carefully followed. The result is an excellent textbook for all students of metallography, especially valuable to those interested in alloys, or those who can read French more readily than German. An excellent English translation of Professor Goerens's book is published by Longmans, Green & Co., London and New York.

Fowler's Mechanics' and Machinists' Pocket Book and Diary for 1911.—Size 3¼ x 6 in.; pages 456. Bound in cloth. Price sixpence net. Published by the Scientific Publishing Company, Manchester, England.

This little hand book which is revised annually is a synopsis of practical rules for fitters, turners, millwrights, erectors, patternmakers, foundrymen, draftsmen, apprentices, students, &c. It is divided into 16 sections, each of which deals with some one line of interest to the various kinds of mechanics. Each of these sections has its own separate title page, and blank pages are bound at the end for memoranda. The first 37 pages are given over to handy references and tables followed by a section on measurement, geometry and trigonometry. Twenty-two pages are devoted to the use of logarithms and mechanical calculating devices. Following this in order are sections on materials used in machine construction, machine tool design and the proportion of machine tool parts, metal cutting tools, high speed tool steels, drilling and boring metal, screw cutting and taper turning and emery wheels. Another section of importance is that on shop practice which occupies 40 pages and contains a number of useful hints. The transmission of power by gears, belt and rope drives and shafting is discussed, and a section on wire rope and chains for hoisting completes the book.

The Life of Electrical Apparatus.—The Allis-Chalmers Company, Milwaukee, Wis., is distributing photographs showing two Bullock electric motors taken from the ruins of the Los Angeles *Times* Building. After the explosion and fire which recently destroyed this building, these motors were removed from the basement where they were lying in 5 ft. of water. The presses to which they were attached were completely destroyed and had no value except as scrap iron. The motors, however, were not badly damaged, although electrical apparatus is generally considered to be less rugged than some other classes of machinery. They were practically the only article of value saved from the ruins. The larger motor is 60 hp. and the smaller is 10 hp. They are now being rewound in the shops of the manufacturer, the Allis-Chalmers Company, and will be used to drive presses in the new building which is soon to be erected.

British Pig Iron Output, First Half of 1910.—The output of pig iron in Great Britain in the first half of 1910, as just published by the British Iron Trade Association, was 4,993,745 gross tons, an increase of 45,137 tons over that for the second half of 1909. The output of forge and foundry irons declined 185,000 tons, while that of basic iron increased 239,000 tons. The figures for Bessemer iron and for spiegeleisen and ferromanganese were about the same.

Steel Corporation President

James A. Farrell Unanimously Chosen

Chairman E. H. Gary of the United States Steel Corporation made the following announcement Tuesday afternoon, January 10:

"The Finance Committee of the United States Steel Corporation, after consulting individual members of the Board of Directors not on the committee, has unanimously decided to recommend to the board at its next regular meeting the election of James A. Farrell as president of the corporation. Mr. Farrel has been the president of the United States Steel Products Company ever since its organization in 1903, and as such has demonstrated great business capacity. He has been connected with the manufacturing and commercial departments of the iron and steel industry for more than 25 years, and is well qualified to fill the position. It is believed the selection will be gratifying to all of the officials of subsidiary companies and to every one connected with the industry."

Mr. Farrell's administration of the affairs of the United States Steel Products Company has produced one of the most noteworthy developments in the history of the Steel Corporation. The building up of a world-wide trade in American steel products involved problems for the working out of which precedents were not abundant, and the results represent to a high degree initiative and a talent for organization. To-day the Steel Products Company is directly represented at 55 foreign trade centers and its ramifications in the steel trade of the world are far more extensive than is commonly appreciated. In the movement for the maintenance of friendliness and co-operation among the steel manufacturers of competing countries Mr. Farrell has had an important part as was indicated by the public expressions of the foreign guests of the American Iron and Steel Institute at the New York meeting of last October. He is chairman of the Institute's Committee on Foreign Relations, and at the October meeting presented a paper under the title, "Foreign Relations," which dealt with the problems growing out of the competition of the principal producing countries for the world's trade in iron and steel. As indicating the attitude of the new president on the international questions which have assumed such importance in the industry in recent years, we quote from his New York paper as follows:

The problem of how to dispose of our products without demoralizing the markets of our competitors will, I believe, practically be solved by a policy of conciliation and consideration. It has often been said that steel is either a prince or a pauper. Under conditions of extreme competition the latter is inevitable, but experience has

proved that with co-operation as the guiding policy steel need never be a pauper, nor yet occasionally a prince, and normal conditions may be maintained to the benefit of manufacturer, merchant, consumer and laborer. . . .

A general adoption of the principle of co-operation in place of ruinous competition, resulting in more stable conditions in the steel industry, would naturally enable manufacturers to carry out plans for the betterment of labor, which the changeable conditions of the steel industry have heretofore impeded, such as pensions, insurance against accidents and amelioration of working conditions. It would lead to refinement of practice, improvement of plants and the installation of safety appliances. It would ultimately permit of reduction in costs, and it has been the history of every industry, including the steel industry, that reductions in cost of manufacture are invariably reflected in the prices to the consumer. Thus the consumer must eventually benefit, and without reducing the fair and normal profit to the manufacturer.

Mr. Farrell's early experience was in wire manufacture, and he has the rare combination of thorough acquaintance with both the operating and commercial sides of the steel industry. His first work as a boy of 16 was in a wire mill at New Haven, Conn. After nine years at New Haven he went to Pittsburgh, becoming assistant

superintendent, and later superintendent of the Oliver Wire Company. He took part in the organization of the Pittsburgh Wire Company in the early eighteen nineties, building the plant of this company at Braddock, which is now operated by the American Steel & Wire Company. Mr. Farrell was secretary and general manager of the company, and started its new plant early in 1892. On the organization of the original American Steel & Wire Company, which took over the Pittsburgh plant with others, Mr. Farrell was made general sales manager of the export trade, with headquarters in New York. On the formation of the United States Steel Products Export Company (now the United States Steel Products Company) in 1903, Mr. Farrell was made president. He has fre-



JAMES A. FARRELL.

quently gone abroad in the interest of that company, and is the best known of American steel manufacturers among the heads of the industry in Europe. He is in his forty-ninth year.

A recent performance in metal cutting with oxygen is reported by the British engineering papers. It is stated that one man employed by the Knowles Oxygen Company, Ltd., cut through 42 girders, 15 x 5 in. section, weighing about 40 tons, in 4¾ hours, with a consumption of less than 200 ft. of oxygen and 300 ft. of hydrogen. Reckoning labor at 1 shilling per hour the cost figured out 6 pence per cut.

The Thomas Iron Company, Hokendauqua, Pa., and the Empire Steel & Iron Company, Catasauqua, Pa., have reduced wages 10 per cent. Both companies operate blast furnaces in several localities.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Jan. 11, 1911.	Jan. 4, 1911.	Dec. 14, 1910.	Jan. 12, 1910.
FIG IRON, Per Gross ton :				
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$19.00
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	17.25
Foundry No. 2, local, Chicago..	15.50	15.50	16.00	19.00
Basic, delivered, eastern Pa....	14.75	14.75	14.75	18.75
Basic, Valley furnace.....	13.25	13.25	13.50	17.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh.....	14.15	13.90	13.90	17.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	19.50

BILLETS, &c., Per Gross Ton :				
Bessemer billets, Pittsburgh....	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh.....	28.00	28.00	....	31.00
Open hearth billets, Philadelphia	25.40	25.40	25.50	30.60
Wire rods, Pittsburgh.....	28.00	28.00	28.00	33.00

OLD MATERIAL, Per Gross Ton :				
Iron rails, Chicago.....	<i>14.50</i>	15.50	15.50	20.00
Iron rails, Philadelphia.....	17.00	17.00	17.00	20.50
Car wheels, Chicago.....	13.00	13.00	13.50	18.50
Car wheels, Philadelphia.....	13.00	13.00	13.25	17.50
Heavy steel scrap, Pittsburgh..	13.50	13.50	13.75	17.75
Heavy steel scrap, Chicago....	11.50	11.50	12.00	16.00
Heavy steel scrap, Philadelphia	12.50	12.50	12.50	17.00

FINISHED IRON AND STEEL,				
Per Pound :	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.32½	1.32½	1.35	1.65
Common iron bars, Chicago....	1.30	1.30	1.35	1.60
Common iron bars, Pittsburgh..	1.35	1.35	1.40	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York...	1.56	1.56	1.56	1.71
Beams, Pittsburgh.....	1.40	1.40	1.40	1.55
Angles, tidewater, New York...	1.56	1.56	1.56	1.71
Angles, Pittsburgh.....	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh.	1.25	1.25	1.25	1.50
Skelp, sheared steel, Pittsburgh.	1.30	1.30	1.30	1.60

SHEETS, NAILS AND WIRE,				
Per Pound :	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*.....	1.70	1.70	1.70	1.85
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.85
Barb wire, galv., Pittsburgh*...	2.00	2.00	2.00	2.15

METALS, Per Pound :				
Lake copper, New York.....	<i>12.75</i>	13.00	13.00	14.12½
Electrolytic copper, New York..	<i>12.50</i>	12.75	12.75	13.87½
Spelter, New York.....	5.55	5.55	5.85	6.25
Spelter, St. Louis.....	5.40	5.40	5.75	6.12½
Lead, New York.....	4.50	4.50	4.50	4.70
Lead, St. Louis.....	4.35	4.35	4.35	4.65
Tin, New York.....	40.25	39.55	38.55	32.85
Antimony, Hallett, New York...	8.00	7.55	7.75	8.25
Tin plate, 100-lb. box, New York	\$3.84	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.40c. to 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1,

1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c. base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; No. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		—Steel.—		—Iron.—	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
¼, ¼, ¾ in.....	72	58	68	54		
¾ in.....	75	63	71	59		
¾ to 1½ in.....	79	69	75	65		
2 to 3 in.....	80	70	76	66		
Lap Weld.						
2 in.....	76	66	72	62		
2½ to 4 in.....	78	68	74	64		
4½ to 6 in.....	77	67	73	63		
7 to 12 in.....	75	59	71	55		
13 to 15 in.....	51½	..	..	..
Butt Weld, extra strong, plain ends, card weights.						
¼, ¼, ¾ in.....	69	59	65	55		
¾ in.....	74	68	70	64		
¾ to 1½ in.....	78	72	74	68		
2 to 3 in.....	79	73	75	69		
Lap Weld, extra strong, plain ends, card weight.						
2 in.....	75	69	71	65		
2½ to 4 in.....	77	71	73	67		
4½ to 6 in.....	76	70	72	66		
7 to 8 in.....	69	59	65	55		
9 to 12 in.....	64	54	60	50		
Butt Weld, double extra strong, plain ends, card weight.						
¼ in.....	64	58	60	54		
¾ to 1½ in.....	67	61	63	57		
2 to 3 in.....	69	63	65	59		
Lap Weld, double extra strong, plain ends, card weight.						
2 in.....	65	59	61	55		
2½ to 4 in.....	67	61	63	57		
4½ to 6 in.....	66	60	62	56		
7 to 8 in.....	59	49	55	45		

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in... Butt Weld (Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.)
 2, 2½ to 4 in... Lap Weld (Will be sold at two (2) points lower basing (higher price) than the above discounts.)
 The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2¼ in.	61	43
2½ in.	63	48
2½ to 5 in.	69	55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, \$28; open hearth and chain rods, \$28.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, January 11, 1911.—(By Telegraph.)

Pig Iron.—A sale of 1000 tons of gray forge is reported, this being the first transaction in that grade for some time. The price named is \$13.50, Valley furnace, and it is for first half delivery. More inquiries are in the market. Some demand is developing for basic. Bessemer pig iron is quiet. Small transactions have occurred in foundry iron. We quote Bessemer iron nominally at \$15; basic, \$13.25; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.25 to \$13.50, all at Valley furnace, with a freight rate of 90 cents a ton to Pittsburgh.

Steel.—Buyers are waiting for the result of the steel makers' meeting in New York to-day. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

A great deal of business is undoubtedly being held up to await the action of steel manufacturers at the meeting in New York to-morrow (Wednesday), and it is believed, even if prices are not reduced, that at least a portion of it will then be placed. Some of it is for work that has to be done and therefore cannot be held up much longer. The merchant blast furnace operators in the valleys are still trying to work out a plan to put their interests on a better basis, but it is doubtful if anything will come of it. Operations among blast furnaces and steel works are now on a basis of not over 50 per cent. of capacity, and yet customers have no trouble whatever in getting prompt deliveries on the few new orders they are placing.

Ferromanganese.—A sale is reported of 75 to 100 tons of foreign 80 per cent. on the basis of about \$38, Baltimore. While the demand is dull, prices are fairly strong. Foreign 80 per cent. is quoted at \$38, Baltimore, for the first half, carrying a freight rate of \$1.95 a ton for delivery in Pittsburgh district.

Ferrosilicon.—No sales have been reported in this market for several weeks. Prices are only fairly strong and could probably be shaded on 50 per cent. on a firm offer. We quote 50 per cent. for delivery over first half at \$54 to \$55, and for prompt delivery at \$55 to \$55.50. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent., \$24; 12 per cent., \$25, f.o.b. cars Jisco and Ashland furnaces.

Skelp.—The mills have only a small amount of work on their books. The leading local buyer of iron and steel skelp is pretty well covered for first quarter and new in-

quiry is light. Prices are lower than they have been for several years. We quote grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Muck Bar.—The little new inquiry is only for small lots for prompt shipment. We quote best grades at nominally \$29, Pittsburgh. The A. M. Byers Company has completed the building of 42 new puddling furnaces at its plant at Girard, Ohio, but these have not as yet been started up. The output will be used by the company in the manufacture of iron pipe, its mills being located in this city.

Steel Rails.—The Cambria Steel Company has booked an order for 500 tons of standard sections for prompt delivery. Little is doing in light rails, new orders and specifications against contracts last week having been smaller than for some time. The Carnegie Steel Company has taken several fairly large orders for steel ties which are rolled at the Duquesne Works. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Plates.—The steel car interests are figuring on more car inquiries than for some time. So far but few have developed into actual orders, the railroads apparently waiting for the outcome of the steel makers' meeting before definitely placing contracts. The general plate trade is dull and none of the mills is operating at present to more than 50 per cent. of capacity. We quote plates, ¼-in. and heavier, in narrow and wide sizes, at 1.40c., Pittsburgh.

Structural Material.—A fair number of inquiries are in the market. It is stated that bridge work for a Western road, involving upward of 15,000 tons, has been placed with a local interest, but details are not yet ready to be given out. The Cambria Steel Company has taken two contracts for bridge work, involving about 400 to 500 tons. We continue to quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Sheets.—Another meeting of sheet manufacturers was held in this city January 7, at which J. A. Campbell of the Youngstown Sheet & Tube Company presided. Reports made at the meeting indicate that while new business in sheets is light, prices are being well maintained. No reduction was made. As a rule the sheet mills are working to 50 per cent. or less and have been for some time. The full schedule of prices on black, galvanized and roofing sheets is printed on a previous page.

Tin Plate.—Specifications against contracts are coming in at a fairly satisfactory rate, but new orders are light. Regular prices are being maintained, as a result of the meeting held here several weeks ago. We quote \$3.60 per base box, f.o.b. Pittsburgh, for 100-lb. cokes.

Bars.—Railroads are placing some fair sized orders for iron bars. Specifications against contracts for steel bars are only fairly satisfactory. We quote soft steel bars at 1.40c., and common iron bars at 1.35c., f.o.b. Pittsburgh.

Hoops and Bands.—Some good sized contracts for hoops and bands have lately been placed by the cooperage trade, on which specifications are now being received, but there are intimations that the regular price of 1.50c. has not in all cases been observed in making these contracts. We quote hoops at 1.50c.; bands, 1.40c. in carload and larger lots and 1.45c. in small lots, the latter carrying extras as given in the steel bar card dated September 1, 1909.

Spikes.—Some time ago inquiries came in the market from some of the leading Western roads for quite a heavy tonnage in spikes, but so far the business has not been placed. New orders are still for small lots to cover actual needs. All the spike makers are badly in need of more business. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c. for local trade. We quote small railroad and boat spikes at 1.60c. to 1.65c. base, in carload and larger lots.

Spelter.—Prices have firmed up somewhat in the past week and we now quote best grades of Western at 5.40c. to 5.42½c. East St. Louis, equal to 5.52½c. and 5.55c., Pittsburgh. The demand is reported as slightly better.

Merchant Steel.—So far this month new orders and specifications against contracts show a slight gain as compared with December. We quote, f.o.b. Pittsburgh: Iron finished tire, 1½ x ½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Shafting.—Some improvement is noted in new orders

THE IRON AND METAL MARKETS

and in specifications against contracts, mostly from the automobile builders, who are taking in a little more material now than for some time. Regular discounts on cold rolled steel shafting are 57 per cent. off in carload and larger lots and 72 per cent. off in small lots, delivered in base territory.

Rivets.—The demand is still confined to small lots to cover actual needs, and specifications against orders placed some time ago are not very satisfactory. Regular prices of 1.90c. on structural rivets and 2c. on boiler rivets are fairly well maintained.

Wire Products.—The new demand for both wire nails and wire is still confined to small lots to cover actual needs, but it is believed that before this month is out jobbers and retailers will be buying more heavily in view of the expected opening of spring trade at an early date. We quote galvanized barb wire at \$2; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

Merchant Pipe.—This being the dull season in the pipe trade, new orders are confined to small lots to cover actual needs of consumers or such as may be desired by jobbers to maintain their stock. Orders are often accompanied with the request for prompt shipment, showing that jobbers' stocks are very low; in fact, stocks of both mills and jobbers are reported to be lower than in a long time. Spang, Chalfant & Co. have taken an order for 13 miles of 16-in. pipe for one of the leading gas interests. It is stated that discounts on both iron and steel pipe are being fairly well maintained.

Boiler Tubes.—In the early part of last month several leading railroads came in the market with inquiries for quite a large tonnage of boiler tubes, but this business has not yet been placed. It is believed there will be a better movement shortly, as the boiler tubes for quite a large number of the locomotives recently ordered have not yet been bought. The demand for merchant tubes is very dull and discounts are more or less shaded.

Iron and Steel Scrap.—The market is almost stagnant as regards sales by dealers to consumers, but prices are fairly strong. The scrap lists of the Pennsylvania and the Southern railroads close to-morrow (Wednesday). The Pennsylvania list contained over 4000 tons of old rails, on which bidding by the dealers is reported to have been quite brisk. We note a sale of 300 tons of heavy steel scrap at \$13.50, delivered, and also sales of upward of 2000 tons of cast iron borings at \$8.75, delivered, equal to \$8.10, Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Folsom, Sharon, Monessen and Pittsburgh delivery.....	\$13.50 to \$13.75
No. 1 foundry cast.....	13.50 to 13.75
No. 2 foundry cast.....	12.75 to 13.00
Bundled sheet scrap, at point of shipment.....	9.00
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.75 to 15.00
No. 1 railroad malleable stock.....	13.00 to 13.25
Gate bars.....	11.25 to 11.50
Low phosphorus melting stock.....	17.25 to 17.50
Iron car axles.....	24.00 to 24.50
Steel car axles.....	20.25 to 20.50
Locomotive axles.....	24.00 to 24.50
No. 1 busheling scrap.....	12.25 to 12.50
No. 2 busheling scrap.....	8.75 to 9.00
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.75 to 16.00
Cast iron borings.....	8.00 to 8.10
Machine shop turnings.....	8.60 to 8.75
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.50 to 14.75
Stove plate.....	14.50 to 14.75
Heavy steel axle turnings.....	10.25 to 10.50

Coke.—New inquiries for either furnace or foundry coke are very scarce. The coke trade generally is in a very unsatisfactory condition. Efforts to form a co-operative selling arrangement to handle the output of a number of the independent coke interests are not meeting with much success. We quote standard makes of furnace coke for spot shipment at \$1.40 to \$1.50 per net ton, at oven, while for delivery over first half of 1911 from \$1.75 to \$2 is quoted. Best makes of 72-hour foundry coke for spot shipment are held at \$1.90 to \$2 per net ton, at oven, and for first half of the year at \$2.25 to \$2.50.

Chicago

FISHER BUILDING, January 11, 1911.—(By Telegraph.)

There has been a turn for the better in the market for finished materials this week. As a result the Gary rail mill will start up next week, orders having been taken within a few days for 20,000 tons of open hearth rails, one Western road wanting 4000 tons for immediate shipment. Orders for track supplies have been held back for a long time by the general embargo on railroad purchases, but since the first

of the year local mills have booked several thousand tons. The leading interest has practically withdrawn from the forging billet market in this territory by maintaining the quotation of \$31, which was reported last week, other mills taking at lower figures what little business is going. During the first half of last year that interest did not quote on billets in this territory, because the crude steel was needed in its own finishing departments, but during the last half low prices were made. The practical withdrawal at this time is taken as an indication that the capacity of the mills in this district will soon be required by the finishing departments. The closing of several good structural contracts in Chicago has been delayed awaiting the outcome of the conference of steel manufacturers in New York. It is expected that contracts amounting to about 20,000 tons will be let in Chicago before the end of the week. The actual improvement in the trade has been confined thus far to railroad purchases and has not extended to bars, sheets and other finished material. Prices are holding firmly, but buyers are apparently not satisfied and are purchasing only for immediate needs. Orders from store are more satisfactory, running into carload lots in bars, plates, structural shapes and galvanized sheets, with a good volume of small orders. There are good inquiries for fabricated material from store. The scrap market is steadier after the slump during the holidays.

Pig Iron.—There are more good inquiries for Southern iron this week than there have been for two months. A local stove manufacturer has purchased 1000 tons of Southern, half No. 2 and half No. 3, and is in the market for 400 tons of high silicon Southern and 1000 tons of Northern foundry. Several other sales have been closed of 1000 and 2000-ton lots of Southern. One lot of 1200 tons of high phosphorus Southern was sold last week to the leading harvester interest for delivery in Canada at an inside price. Prices have been weak for some time on high phosphorus iron from Tennessee furnaces. One brand running about 2 per cent. phosphorus has been offered at \$10.50, Birmingham, and one or two other brands running a little lower in phosphorus have been selling at \$10.75 for a No. 2 grade. Concessions have also been made on Alabama iron running a little below No. 2 in silicon analysis. There have not been enough sales below \$11 to justify a reduction in the market quotation, but \$11, Birmingham, for first half is now openly recognized on the standard brands. If inquiries continue at the rate they have been coming for two or three days there will be a fair buying movement under way, which will strengthen the market. There are several inquiries for Northern foundry, but buyers have not shown a disposition to close for round lots. A St. Louis interest is in the market for 5000 tons of basic, and there is also an inquiry pending for a round lot of low phosphorus steel-making iron. Railroads have been quiet purchasers of a considerable amount of charcoal and foundry iron. The following quotations are for January, February and March shipment, Chicago delivery:

Lake Superior charcoal.....	\$18.00 to \$18.50
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	18.40 to 18.90
Jackson Co. and Kentucky silvery, 8%.....	19.40 to 19.90
Jackson Co. and Kentucky silvery, 10%.....	20.40 to 20.90

(By Mail.)

Billets.—The leading interest maintains the quotation of \$31, Chicago, as the base price for forging billets and other mills selling here will revise their quotations on a corresponding basis, although the price is regarded as somewhat high under present market conditions.

Rails and Track Supplies.—The Gary rail mill will resume rolling next week and the prospects for rail orders are greatly improved. A Western road has ordered 4000 tons of open hearth rails for immediate shipment. A tentative order has been booked from an Eastern line for 16,000 tons of open hearth standard rails, the formal contract not having been signed as yet. Good orders have been taken the past week for bolts and track supplies. One of the orders booked was for 2500 tons of continuous joints. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.20c. to 2.30c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Structural Material.—The Waldheim building at Kan-

THE IRON AND METAL MARKETS

sas City, Mo., 1200 tons, was let last week to the Kansas City Structural Steel Company. The United National Bank building at Houston, Tex., 1500 tons, was let to the Noelke-Richards Company, Indianapolis. Three buildings in Chicago are in the hands of general contractors and are expected to be let this week. The steel for the Insurance Exchange building will amount to 13,000 tons, the general contract being held by the Thompson Starrett Company. The George A. Fuller Company has the general contract for the McNeil building, 1200 tons, and additions to the McCormick building, 1400 tons, which it is understood will be let immediately after the conference of steel manufacturers in New York. Bids are being asked this week on the Monroe building, about 3000 tons, at Michigan avenue and Monroe street. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—A fair lot of specifications has been received for car work. Other bookings for the plate mills are small, consisting of miscellaneous lots of boiler and tank plates and material going into structural work. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—The Inland Steel Company's sheet mill is running about 50 per cent., chiefly on specifications on old contracts. Prices continue firm and the leading mills in the sheet trade seem to be satisfied for the time to take their share of the business that is going. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Both new business and specifications for soft steel bars are below the normal volume. The agricultural implement manufacturers are somewhat slow in specifying on account of doubts regarding the maintenance of prices. This is the dull season of the year for hard steel bars. The bar iron mills continue to gain in production as the railroads are improving steadily in their specifications. Orders for 500 to 1000-ton lots, accompanied by specifications for prompt shipment, are becoming quite frequent. The mills are unwilling to make forward contracts on the present market, but very low inside prices are reported on large orders for prompt shipment. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.40c. to 1.45c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The wire mills are running about two-thirds of capacity, making a much better showing than anything else in the line of finished materials. The wire manufacturers expect more active buying from now on, as the trade season is somewhat late. The manufacturers of wire cloth, poultry netting and screen doors did not announce their prices until December 1, about a month later than usual, thus shortening the season in their lines, and jobbers and hardware dealers have been slow in specifying for spring shipments. Prospects in the distributing trade are very favorable and consumption is expected to be normal at least. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

Merchant Steel.—This is one line of finished material in which the mills have practically normal specifications on their books, the falling off in some special products being offset by the increase in the demand for agricultural steel.

Cast Iron Pipe.—The city of Chicago opened bids Monday for about 10,000 tons of water pipe, on which the United States Cast Iron Pipe & Foundry Company was the low bidder. The price of 12 to 48 in. sizes was about \$24, Chicago, delivered by teams. The same interest has booked a contract from a leading railroad for 1500 tons of culvert pipe to be specified during the year. Practically all of the leading gas companies in the West are negotiating for their requirements in gas pipe for the coming season, the total tonnage reaching a large aggregate. Portland, Ore., will consider bids to-night on 6000 tons of water pipe. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25; 6 to 12-in., \$24; 16-in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—Old iron rails have taken a drop, as there is no sale for them at present in this market. Re-rolling steel rails are weak. Heavy melting steel is a little firmer, as the drop last week was due to freight congestion at the leading buyer's mill. The improvement in the demand from the railroads for bar iron has encouraged the rolling mills to increase their stocks of scrap, but has not made any change in prices. Cast scrap is weak. There is no real demand from any source, as the market is overstocked with material in transit and buyers are taking ad-

vantage of the situation by forcing fractional concessions when they relieve the dealer of cars that arrive. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

Old steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard sections, subject to inspection	23.00 to 24.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Shoveling steel	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars	\$13.00 to \$13.50
Steel angle bars	14.00 to 14.50
Iron car axles	11.00 to 11.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	17.75 to 18.25
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	10.50 to 11.00
Locomotive tires, smooth	11.25 to 11.75
Steel axle turnings	17.00 to 17.50
Machine shop turnings	7.75 to 8.25
Cast and mixed borings	6.50 to 7.00
No. 1 cast scrap	5.00 to 5.50
No. 2 cast scrap	9.25 to 9.75
No. 1 boilers, cut to sheets and rings	7.25 to 7.75
Boiler punchings	8.50 to 9.00
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	12.00 to 12.50
Railroad malleable	10.25 to 10.75
Agricultural malleable	11.00 to 11.50
Pipes and flues	10.50 to 11.00
	8.75 to 9.25

Philadelphia

PHILADELPHIA, PA., January 10, 1911.

In some classes of finished materials business has been a shade better, due probably to specifications coming out which had been held up previous to the year end. Pig iron continues dull, with inquiries light and small in size. Definite orders received by the Baldwin Locomotive Works for 218 locomotives have had a buoyant effect on makers of materials entering into their construction, while inquiries for several thousand freight cars from the Pennsylvania Railroad have contributed to a better sentimental feeling in the plate and shape trade. A little better inquiry for steel billets is noted, but no business of importance has been placed.

Iron Ore.—Buying is at a standstill. Importations at this port the past week were confined to one cargo, 3600 tons, valued at \$9900.

Pig Iron.—The most important business the past week was the purchase by the Pennsylvania Railroad of 1600 tons of charcoal iron, and it has been decided to take the maximum tonnage of coke foundry iron inquired for, 1800 tons, the contract for which will probably be placed in a few days. Other transactions in foundry grades have been closely confined to small lots. Prices show practically no change, but there has not been enough demand recently to test the market. Off grade foundry irons, such as the ordinary Lebanon Valley makes, are, however, obtainable at less than the prices named for standard brands. Small sales of Virginia foundry iron have been made for shipments ranging from first quarter to first half of the year. Cast iron pipe makers are still looking around for pretty fair blocks of low grade iron, but their ideas of prices are still too low to interest producers. Buyers of foundry iron generally are proceeding cautiously, usually taking only sufficient quantities for near future requirements, as, from present indications, there is little chance of higher prices in the near future. A few inquiries for small lots of forge iron are out, but there is little indication of active buying. The steel making grades of pig iron are practically at a standstill. A few small sales of low phosphorus iron are reported. General quotations are unchanged, the following range of prices being named for deliveries running through the first quarter and half in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain	15.00 to 15.25
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.25 to 14.50
Basic	14.75
Standard low phosphorus	22.00 to 22.50

Ferroalloys.—A few small sales of ferromanganese to consumers in this district are reported at \$38.25 to \$38.50, Baltimore, but the demand is not active. Moderate sales of 50 per cent. ferrosilicon are also reported, at prices ranging from \$55 to \$56, seaboard, according to quantity and delivery.

Billets.—More inquiry for both forging and rolling

THE IRON AND METAL MARKETS

billets is noted, largely, however, makers contend, with a view of testing the market, as but little business has been placed. Leading Eastern producers are now quoting the Pittsburgh base for both rolling and forging billets, that for standard open hearth rolling billets being \$25.40, and ordinary forging billets \$30.40, delivered in this vicinity.

Plates.—Reports show varied conditions, mills in some instances having had a better run of orders, due probably to the releasing of business held up at the year end. A better feeling, however, is noted, with increasing business in sight from locomotive, car, tank, bridge and boiler work. Eastern makers are maintaining recent prices, 1.55c. minimum being quoted for ordinary plates, delivered in this territory.

Structural Material.—The contract for the structural work for the Packard Motor Car Company's new building in this city, requiring about 800 tons, one-half of which is Bethlehem shapes, has been let, but the bulk of the orders coming out are for small miscellaneous requirements. Prices are being maintained at 1.55c. minimum for ordinary shapes, delivered in buyers' yards in this territory.

Sheets.—Consumers continue to place orders in small lots and for prompt delivery, as a result of which mills have but little business ahead, but keep fairly active on day to day specifications. Prices are being firmly held, Eastern mills quoting the following range for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—While the leading producers of steel bars are maintaining the recent quotation of 1.55c., delivered in this territory, some makers of refined iron bars are still accepting orders at 1.25c., Eastern mill, equal to 1.32½c., delivered here, although others hold for a full tenth advance. The demand has not been active, the bulk of the business closed being confined to small and moderate lots for early delivery.

Coke.—The demand is irregular. Contracts for furnace coke for delivery over various portions of the year are still pending, while some little spot business has been done. A few fair inquiries for foundry coke are before the trade. Prices show little change, standard brands being firm, but quotations for less well-known makes are irregular. The following range about represents quotations per net ton, for deliveries in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$3.75 to \$3.90
Foundry coke.....	4.20 to 4.40
Mountain furnace coke.....	3.35 to 3.50
Foundry coke.....	3.85 to 4.05

Old Material.—Dullness characterizes the market. What little business is done has been confined to small lots for early shipment, not enough being offered in any grade to really test prices. Small sales of heavy melting steel at prices around \$12.50 to \$12.75 are reported, but mills do not buy more than small lots unless at bargain prices. Railroad lists this month are reported to be the lightest for a long period. A waiting market prevails, with quotations largely nominal. The following range, however, about represents sellers' ideas of the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap and crops.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	15.50 to 16.00
Low phosphorus.....	18.00 to 18.50
Old steel axles.....	19.50 to 20.00*
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	17.00 to 17.50*
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.75 to 16.25
Wrought iron pipe.....	12.25 to 12.75
No. 1 forge fire.....	11.00 to 11.50
No. 2 light iron.....	7.00 to 7.50
Wrought turnings.....	8.00 to 8.50
Cast borings.....	8.00 to 8.50
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.50
Grate bars.....	11.00 to 11.50
Stove plate.....	10.00 to 10.50

* Nominal.

The Alan Wood Iron & Steel Company on January 3 blew in its No. 2 Heckscher Furnace at Swedeland, which has been undergoing repairs. It will produce low phosphorus iron.

Cleveland

CLEVELAND, OHIO, January 10, 1911.

Iron Ore.—The desire expressed by some of the furnace interests that ore prices be fixed for the coming season at once is not meeting with much favor among merchant ore shippers. The latter contend that should action be taken now reaffirming last season's prices, as wished by some of the consumers, such action would not be regarded as conclusive, and many would look for a cut later, and should a

price reduction be made nobody would buy ore now anyway. Giving the above as their reasons, the ore firms seem determined to defer any action on prices until consumers are ready to buy. When that time comes they say they will be guided by the conditions as they then exist, and for the present they are unwilling to express views regarding the matter that may be taken either as indicative of price reduction or price maintenance. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—The only sales reported are a few small lots. The only new inquiry of any size is from a Massillon cast iron pipe company for 1000 tons of No. 3 foundry iron and 1000 tons of No. 4. An inquiry for 1000 tons a month of No. 3 foundry for delivery through the entire year that came from the Coshocton plant of a cast iron pipe company late in December is still pending, efforts to secure prices lower than have recently been quoted having so far apparently proved unsuccessful. Many foundries have good sized stocks on their yards and have not yet renewed shipping orders that were suspended late last month. No change is noted in prices. No. 2 foundry is firm at \$14, furnace, for local delivery, and about \$13.75 for outside shipment. The stack of the Upson Furnace Company in Cleveland, which went out during the fall for repairs, was blown in on foundry iron January 7. As soon as the company's new steel plant is ready for operation this stack will go on basic iron. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.90
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—The market is very dull, no inquiries for lots of any size of either grade having developed since the first of the year. Prices remain stationary. We quote standard furnace coke at \$1.45 to \$1.50 per net ton, at oven, for spot shipment, and \$1.75 to \$1.85 for the first half. Connells-ville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—Orders generally are only for small lots for immediate requirements. Stocks of both jobbers and consumers are low. The only exception to the generally light demand is the agricultural implement trade. Implement makers in this territory did a record breaking business in 1910, and the volume of advance orders makes the outlook very promising for the present year. Liberal specifications for steel bars are coming from this trade. Buyers generally are holding off until after the New York conference of steel makers this week to see if any changes in prices are made. Steel bars and structural material are firm, at 1.40c., Pittsburgh, and the 1.40c. price on plates is now being maintained by local mills. The demand for sheets continues light, but there are no reports of shading. Forging billets are now firm, at \$28, Pittsburgh, there being some demand for carload lots. The structural situation is quiet, the new work that has come out requiring only small lots. Rivet prices remain stationary, concessions of \$2 a ton from regular prices fairly representing the present market. The demand for iron bars is not active; prices are steady, at 1.30c. to 1.35c., at mill.

Old Material.—The embargo placed on scrap December 1 by the Otis Steel Company was lifted Monday, and other consumers are taking some shipments on contracts. Owing to the absence of transactions during the past two or three weeks, dealers' quotations are largely nominal. Dealers with scrap on the track that they were anxious to dispose of during the past week were compelled to accept about 50 cents a ton less than recent quotations in order to move it. The Norfolk & Western Railroad will close January 18 on a usual sized list. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.75 to \$14.25
Old iron rails.....	15.50 to 16.00
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.50 to 12.75
Old car wheels.....	12.00 to 12.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.75 to 12.00
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 7.00
Steel axle turnings.....	8.75 to 9.00
No. 1 busheling.....	11.00 to 11.50
No. 1 railroad wrought.....	12.50 to 13.00
No. 1 cast.....	11.50 to 12.00
Stove plate.....	10.00 to 10.50
Bundled tin scrap.....	11.00 to 11.50

THE IRON AND METAL MARKETS

Cincinnati

CINCINNATI, OHIO, January 11, 1911.—(By Telegraph.)

Pig Iron.—A larger number of inquiries are coming in, and although they are principally for small amounts, there is a much better feeling. The inquiries range from carloads to 300-ton lots, with a sprinkling of requests for prices on larger tonnages. An Indiana company wants 1200 tons of either Northern or Southern No. 2 foundry, and there are several inquiries out for 500-ton lots of foundry iron from the Central Western territory. The Ohio stove maker wanting 1500 tons for first half delivery has not yet closed, but action is expected soon. Some early business is also looked for from the pipe interests. A nearby agricultural implement manufacturer is asking for 400 tons of malleable for shipment from January to April, inclusive. Recent sales include a fair sized tonnage of Southern iron to a Western melter and 1000 tons of Southern No. 2 to an Indiana consumer, both for first half delivery, at \$11, Birmingham. A central Ohio company took 500 tons of Northern No. 2 foundry for first quarter shipment at \$14, Ironton. Practically all agencies are willing to take on business based on \$11, Birmingham, for Southern, and \$14, Ironton, for Northern No. 2 foundry, for shipment through the first half, but a number of furnace operators discourage soliciting business at these figures for delivery extending beyond March. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	\$14.75 to \$15.25
Southern coke, No. 2 foundry	14.25 to 14.75
Southern coke, No. 3 foundry	13.75 to 14.25
Southern coke, No. 4 foundry	13.50 to 14.00
Southern coke, No. 1 soft	14.75 to 15.25
Southern coke, No. 2 soft	14.25 to 14.75
Southern gray forge	13.00 to 13.50
Ohio Silvery, 8 per cent. silicon	18.20 to 18.70
Lake Superior coke, No. 1	15.70 to 16.20
Lake Superior coke, No. 2	15.20 to 15.70
Lake Superior coke, No. 3	14.70 to 15.20
Standard Southern car wheel	25.25 to 25.75
Lake Superior car wheel	19.50 to 20.50

(By Mail.)

Coke.—There are some inquiries out for furnace coke that are expected to be closed soon. The aggregate tonnage asked for is around 20,000 tons per month, with deliveries running until July, and in one case through the entire year. Foundry coke is only a moderately good seller, and no long time contracts are reported, though there is a little spot business. There is considerable complaint against the railroads over delayed shipments, and coke moving from the Connellsville field appears slower in reaching its destination than from other sections. Several firms are doing a nice business in domestic coke, which commands a price of \$3.50 to \$4 per net ton at oven. Prices in all three fields are practically the same, furnace coke for spot shipment being obtainable around \$1.50 at oven, and on contract between \$1.65 to \$1.85. Foundry coke for spot shipment is quoted at \$2 and on contract around \$2.25 per net ton at oven.

Finished Material.—There is very little new business reported, but the inquiry both for steel bars and structural material is better than some agencies expected. It is positively denied that there has been any cut on steel bars below 1.40c., Pittsburgh, and what business has come in lately was booked on this basis. Warehouse orders are very light, and prices range from 1.75c. to 1.85c. on both structural material and steel bars.

Old Material.—The Southern Railway is offering approximately 4000 tons of different kinds of scrap. Foundries continue buying sparingly and only to fill immediate requirements. Prices for delivery in dealers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	\$12.00 to \$12.50
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	6.00 to 6.50
No. 1 cast scrap, net ton	11.00 to 12.00
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Old iron rails, gross ton	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton	22.50 to 23.50
Old car wheels, gross ton	12.00 to 13.00
Heavy melting steel scrap, gross ton	11.50 to 12.00

Birmingham

BIRMINGHAM, ALA., January 9, 1911.

Pig Iron.—The volume of inquiry in this market in the past week was quite satisfactory, general conditions considered, and the situation as a whole presents a more encouraging aspect. Sales since the first of the year are considerably larger than was expected, and in connection with these no figures lower than an \$11 Birmingham basis are mentioned. Lots of 1000, 500 and 300 tons for shipment in the next three months have been booked. An effort to secure 800 tons of No. 3 foundry iron for shipment in

January at 25 cents per ton below the \$11 schedule is known to have been unsuccessful, while it is reported that two offers of \$10.50 Birmingham have been refused for lots of 1000 tons each to be shipped promptly. The fact that stocks were reduced in December, notwithstanding the reduction in consumption, has been given serious consideration by the furnace interests, and in view of the present movement from furnace yards sellers predict the maintenance of an \$11 Birmingham basis. In a number of cases the requirements of leading melters for the first half have taken definite form, and it is believed that when the status of prices is definitely known a large amount of iron will be taken. The principal inquiries now pending are from the pipe manufacturers, who, it is understood, will soon be offered sufficient tonnage for several months operations. There has been but little trading in warrants in this market recently, the owners of such holdings being unwilling to meet current prices.

Cast Iron Pipe.—A portion of the gas pipe required for Portland, Ore., was placed with the United States Cast Iron Pipe & Foundry Company in the past week. The business taken by other manufacturers, it is reported, consisted of comparatively small lots; the Portland letting is estimated at 12,000 tons and producers insist that better figures than anticipated were received. A contract to cover 6000 tons of water pipe for Portland is to be placed January 10. This is part of a total of 24,000 tons of water pipe expected to be required in the next 60 days for Western points. Local quotations are unchanged, but are considered firmer than at last report. We quote water pipe as follows per net ton, f.o.b. cars here: 4 in. to 6 in., \$19; 8 in. to 12 in., \$18 to \$18.50; over 12 in., average \$17, with \$1 per ton extra for gas pipe.

Old Material.—Transactions of the past week indicate no improvement in conditions generally. The resumption of operations at local mills has not brought about a stronger demand and buying continues on the hand-to-mouth order. Asking prices of dealers are not changed, and we quote as follows, per gross ton, f.o.b. cars here:

Old iron axles	\$14.00 to \$14.50
Old iron rails	12.00 to 12.50
Old steel axles	14.00 to 14.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.00 to 9.50
No. 1 country	7.50 to 8.00
No. 2 country	7.00 to 7.50
No. 1 machinery	9.50 to 10.00
No. 1 steel	10.00 to 10.50
Tram car wheels	9.00 to 9.50
Standard car wheels	10.00 to 10.50
Light cast and stove plate	8.00 to 8.50

Announcement is made that the steel plant of the Tennessee Coal, Iron & Railroad Company, at Ensley, Ala., will be put in operation in the coming week. This plant was closed down December 23.

Buffalo

BUFFALO, N. Y., January 10, 1911.

Pig Iron.—Sales continue to run light, but an improvement in inquiry is noted. Probably 10,000 tons foundry grades are now under consideration by consumers in this territory, on which early decision as to closing is expected. A considerable portion of the inquiry comes from cast iron pipe makers, the bulk of it being from large interests. The price schedules reported last week are still maintained, as far as can be learned. We quote as follows for present and second quarter deliveries, f.o.b. Buffalo:

No. 1 X foundry	\$14.50 to \$15.00
No. 2 X foundry	14.25 to 14.75
No. 2 plain	14.25 to 14.50
No. 3 foundry	14.00 to 14.25
Gray forge	14.00 to 14.25
Malleable	14.50 to 15.00
Basic	14.50 to 15.00
Charcoal	17.50 to 18.25

Finished Iron and Steel.—The majority of the orders placed during the week were small, but they are coming along in fairly good volume. Specifications on tin plate contracts are commencing to come in a little more freely. The Canadian export trade is holding up well and orders of good size for billets and hoop iron have been placed recently. A notable degree of activity is being maintained in structural material. The Eastman Kodak Company, Rochester, is this week calling for figures for three additional factory buildings, requiring between 500 and 600 tons of steel. Bids are soon to be received for structural material for Erie Barge Canal contract No. 14, on the Mohawk River Division, which covers 1200 tons of bridge work, 1500 tons of iron and steel for dams, lock gates, and valves, besides a considerable quantity of concrete reinforcing bars and 135,000 lb. of chain; also bids for the steel work required for contract No. 80. The Belmont Iron Works, Philadelphia, has

THE IRON AND METAL MARKETS

been awarded the steel work, about 100 tons, required on contract No. 49. The Rochester Steel Company has the contract for structural steel for the factory to be erected by the Warsaw Improvement Company, at Warsaw, N. Y., for the Rochester Embury Company, about 100 tons, and the Buffalo Structural Steel Company was low bidder for the 300 tons for the first group of buildings for the Buffalo Orphan Asylum, for which bids were opened Wednesday of this week.

Old Material.—Some inquiry is noted for rerolling rails from outside districts. A few mills are now taking material a little more freely on contracts on which shipments were held up prior to the first of the year. Prices are practically unchanged on all grades except rerolling rails, which are now selling at about \$15. We quote, as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$11.75 to \$12.25
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	15.00 to 15.50
No. 1 railroad and machinery cast scrap.....	14.75 to 14.25
Steel rerolling rails.....	15.00 to 15.00
Old steel axes.....	18.50 to 19.00
Old iron axes.....	23.00 to 23.50
Old car wheels.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.25
Boiler plate.....	9.75 to 10.25
Locomotive grate bars.....	10.50 to 11.00
Pipe.....	9.75 to 10.00
Wrought iron and soft steel turnings.....	7.00 to 7.25
Clean cast bottoms.....	6.25 to 6.50

St. Louis

ST. LOUIS, January 9, 1911

The first week in the new year developed encouraging indications of an improvement in the demand for pig iron locally and in adjacent territory. An expansion in railroad development in the Southwest is now taking definite shape, mainly in Texas. The freight traffic of St. Louis for the past year approximated 51,961,190 tons, establishing a high record. The business of stove manufacturers for the past year was larger than for 1909.

Pig Iron.—A canvass of the leading sellers the past week developed the fact that while there was an improvement in the volume of inquiries, but one of the brokers secured important new contracts. Merchant sellers reported more doing in St. Louis territory, but the buying was of a hand-to-mouth character. The sales referred to above were 1200 tons of No. 1 soft Southern to an Iowa company; 1000 tons of No. 1 Northern to a stove manufacturer in St. Louis territory; 300 tons of high silicon Southern; all these contracts were for delivery over the first half. Another house sold various concerns 400 tons of No. 2 Southern foundry for shipment over the first half. No change in the market for Southern iron is noted, and we continue our previous quotations: No. 2 foundry for shipment over the first half, \$11; for shipment over the second quarter, \$11.25, f.o.b. Birmingham.

Finished Iron and Steel.—The leading interest reports an inquiry for 500 tons of standard rails. The inquiry for light rails is slower. For structural material the inquiry is confined to specific lots, both in local and St. Louis territory. There is a fair demand for steel bars, but the inquiry for track material is quiet.

Old Material.—There is no improvement of consequence in the demand. Such business as is passing is of a hand-to-mouth character and transactions among dealers. The St. Louis & San Francisco Railroad closed out a few cars of miscellaneous scrap and the Wabash Railroad a list of 700 tons. The market is unchanged from last week. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$12.00 to \$12.50
Old steel rails, rerolling.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	12.00 to 12.50
Rerolling rails, standard sections, subject to inspection.....	24.00 to 24.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axes.....	18.00 to 18.50
Steel car axes.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings.....	8.50 to 9.00
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.50 to 9.00
Railroad sheet and tank scrap.....	8.50 to 9.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

Coke. There is an improvement in the inquiry for coke, but not much new business developed during the past week except the sale of 1000 tons by one of the leading houses for shipment over the first half. The market is ruling steady, and we quote standard 72-hour Connellsville foundry at \$2 to \$2.25 per net ton, f.o.b. oven, according to quantity and delivery.

The German Iron Market

BERLIN, December 23, 1910.—The quiet tone has been observed in most lines of goods as the holidays approach. Trading on the Düsseldorf Exchange of a week ago brought no changes in prices. The calls for delivery of pig iron on order continue good, but the situation in the bar trade remains confused and therefore quiet. From the Luxemburg district the latest news is favorable; the tendency continues to improve slowly, with prices firmly held, and the export of pig to Belgium has gained somewhat in activity. From the Siegerland region an improvement is also reported. All the ore mines are working at full capacity, and the stocks of ores at the mines, which had reached considerable volume until quite recently, will soon be cleared off entirely. Above two-thirds of the 33 furnaces in that region are in blast, and several more will be blown in at the beginning of the new year. From the Essen district, too, an increase in the output of pig iron appears probable, it having been announced this week that the great Phönix Company has just blown in another new furnace at its Kupferdreh plant. A new turn in the pig iron market may be looked for if the news received from Siegen this week proves correct, according to which the furnaces in that region are again in negotiations with the Essen Syndicate in regard to joining it; it is even reported that the union will be effected within a few days.

From the Silesian district a quiet state of business is reported. Consumers of steel material are backward in sending in specifications. Business there in thin sheets is quite good, but the amount of work in heavy plates is much less than the mills can manage. The pig iron trade is in good shape, with hardly any accumulation of stocks.

The event of the week was a meeting of the Steelworks Union in Düsseldorf, December 20, to take action on petitions for an increase of the allotments in bars, plates, wire rods and wrought pipe. It was decided to add 10 per cent. to the allotments in pipe, but to make no change in the other lines mentioned. At this meeting the union gave out its usual monthly summary of the market situation. It says that the calls for delivery of goods in the home market remain satisfactory, and that the amount of orders taken for the first quarter of 1911 guarantees good shipments for that period. Specifications are coming in from abroad at a satisfactory rate, and better business is expected from the English shipbuilding industry, now that work has been resumed there in full. The union expresses grave doubt as to whether the Prussian railroad authorities will make the usual supplementary orders for rails and ties in January; and since the report was issued it has grown practically certain that such orders will not be placed. The foreign market continues to show a good demand for heavy rails, and further considerable amounts have been ordered, while negotiations are in progress for some large orders. In grooved rails some good home and foreign orders have been placed, although this is usually a very quiet season for that specialty. The trade in structural shapes is quieter, but greater activity is looked for within a month or two. The foreign market is ordering structural shapes in satisfactory amounts, and is also sending in specifications at a brisk pace.

Germany's exports of iron and steel in November suffered a considerable backset as compared with October. The November outgo amounted to 392,235 metric tons, which compares with 426,262 tons for October. The exports of pig iron, which had been unusually heavy for several months, also underwent a reduction in November, showing a total of 66,625 tons, or 8,172 tons less than for October. The net excess of exports over imports last month was smaller than for any other month since February; it was 342,300 tons, as compared with 375,718 tons in October.

For 11 months the exports of iron and steel amounted to 4,394,000 tons, against 3,617,000 tons last year; while imports reached 510,000 tons, against 418,800 tons. The export excess was 3,884,000 tons, against 3,198,000 tons last year.

BERLIN, December 30.—Only in certain sections of the trade where price cutting is going on does buying seem to be more active. This is true of the export business in bars, which is very brisk. At the beginning of October an export drawback of 6 marks a ton went into force, to hold till the end of March; and this, along with the cutting of prices, has caused a very active trade for export. It is understood that German bars of soft steel can now be bought, delivered on board ship, at 95 to 97.50 marks per ton. Business in

THE IRON AND METAL MARKETS

bars for home delivery, however, remains sluggish. A meeting is to be held about the middle of January to decide whether the price convention, which expires at the end of March, shall be prolonged.

The opinion appears to prevail that the last report given out by the Steel Works Union was too optimistic. It is pointed out that the union mills have for a long time been unable to dispose of more than 80 per cent. of their allotments in class A goods (billets, structural shapes and rails), and it is reported that various members are still trying to get increased allotments in other products, or to get some of their allotment in class A goods shifted to class B (including bars, plates, wire rods, tubes, &c.).

New York

NEW YORK, January 11, 1911.

Pig Iron.—More inquiry has come out in the past week with occasional purchases. A New England valve manufacturer has bought 800 tons, and the electric company that has been in the market for two months made further purchases for two plants. Three inquiries of 1000 tons are pending, one being for charcoal iron and another coming from a railroad supply company. Closer competition is reported on business out of Buffalo, quotations on shipments to the East having again gone below \$14 for No. 2. Reductions of wages at several eastern Pennsylvania furnaces are likely to be followed by others. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15.25 to \$15.50.

Finished Iron and Steel.—Internal affairs mainly have occupied the attention of the industries of late and little new business has been transacted. The prospect is quite generally believed to be good. Manufacturing consumers are busy, the railroads have need of considerable material and in structural lines a great deal of new work is planned, much is already financed, in many cases sites are cleared, and why orders are withheld is the question; but the commonest explanation is that lower prices are waited for. It is thought that many decisions will be reached after the results of the conference of steel manufacturers to-day become known. Meantime all lines are quiet. Iron bar orders are reported better the past week and plates seem to be in slightly better demand. The Southern Railway is in the market for 5000 kegs of spikes. The award on the plates for the battleship to be built in the New York navy yard is indefinitely held up. The act authorizing the building of the two battleships will have to be amended either to increase the appropriation for the building of the one by the Government or to allow both to be built by private builders. None of the principal contracts pending for structural work have been closed. The Jones & Laughlin Steel Company has taken a bridge of 450 tons for the Pittsburgh & Lake Erie and will also furnish 1200 tons of reinforcing bars for Panama Canal construction. Bids were received January 7 on 1400 tons for a factory building for the Edward Ford Plate Glass Company, at Rossford, near Toledo, Ohio; January 9 on 1400 tons for pier 14 for the New York Central, and on 800 tons for the Consolidated Gas Company for a building at Seventeenth street and Fifth avenue, and January 11 on about 300 tons for a warehouse for the Warner Sugar Refining Company, at Edgewater, N. J. The Philadelphia & Reading has taken bids on 400 tons for a coal pocket and ash pit at St. Clair, Pa. Present price quotations are as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.35c. to 1.40c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Ferroalloys.—There is an absence of demand for ferromanganese. It is quoted at \$38, Baltimore, for spot delivery, and \$38.50 for delivery over the first half. Some fair sized sales of 50 per cent. ferrosilicon have been made at \$55.50 to \$56, Pittsburgh.

Cast Iron Pipe.—Lowell, Mass., will open bids to-day on 350 tons of 8 to 10 in. water pipe. No other public lettings of importance have developed in this vicinity. Pipe manufacturers, however, are feeling much more cheerful as the result of increasing inquiries from private consumers, particularly gas companies, for spring delivery. Many more buyers of this character are in the market than two or three weeks ago. While carload lots of 6-in. can still be obtained at \$22 per net ton, tidewater, some of the manufacturers are firmer in their views and are not willing to meet this price.

Old Material.—While transactions are light, dealers manifest a somewhat better feeling, being inclined to the opinion that the extreme depression has passed. They look for an improved demand from this time forward. Cast scrap is doing a little better, with fair inquiries coming out. Stove plate is in rather better demand than heavy cast. Some inquiries are being received for wrought scrap. The only trans-

actions in heavy melting steel scrap have been purchases of small lots for filling in on old orders, and on such business better prices have naturally been obtained than would have been the case if the scrap had been forced on the market. As the inventory season is now over, consumers quite generally have ordered dealers to resume shipments on contracts. Quotations, per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting....	\$10.00 to \$10.50
Heavy melting steel scrap.....	10.00 to 10.50
Relaying rails.....	20.50 to 21.50
Standard hammered iron car axles.....	20.50 to 21.00
Old steel car axles.....	15.00 to 15.50
No. 1 railroad wrought.....	11.75 to 12.25
Wrought iron track scrap.....	10.75 to 11.25
No. 1 yard wrought, long.....	10.50 to 11.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	5.00 to 5.50
Cast borings.....	5.50 to 6.00
Wrought turnings.....	5.25 to 5.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.50 to 12.00
No. 1 heavy cast, broken up.....	11.50 to 12.00
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	12.00 to 12.50

Metal Market

NEW YORK, January 11, 1911.

THE WEEK'S PRICES

Cents Per Pound.

	Copper			Lead		Spelter	
	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
Jan. 5.....	13.00	12.75	39.60	4.50	4.35	5.55	5.40
6.....	12.87½	12.62½	39.25	4.50	4.35	5.55	5.40
7.....	12.87½	12.62½	39.45	4.50	4.35	5.55	5.40
8.....	12.87½	12.62½	40.30	4.50	4.35	5.55	5.40
9.....	12.80	12.60	40.50	4.50	4.35	5.55	5.40
10.....	12.80	12.60	40.50	4.50	4.35	5.55	5.40
11.....	12.75	12.50	40.25	4.50	4.35	5.55	5.40

Pig tin is higher than at any time since 1907. Copper is much weaker. Spelter continues weak, but its decline has for the time been checked. Lead is firm but dull. Antimony has advanced sharply.

Copper.—The report of the Copper Producers' Association, showing the increase in the December production, created a decidedly unfavorable impression and prices declined. Holders of copper are apparently becoming restless, and this morning electrolytic was freely offered at 12.50c., which is ¼c. less than was asked last week. Consumers are not anxious to buy, even at the reduced quotation. Prices on lake copper vary, but the majority of sellers are asking 12.75c., although certain brands cannot be had for less than 13c. The London market has also weakened. The exports of copper so far this month amount to 9493 tons. In London to-day spot copper sold at £55 7s. 6d. and futures at £56 3s. 7d.

Pig Tin.—Sales of pig tin have been made the past week at higher prices than at any time since 1907. A strong buying movement developed on Friday, when the market opened 30 points lower than on the previous day on the strength of a lower price cabled from London. Consumers immediately took advantage of the reduction and about 500 tons was bought at prices ranging from 39.25c. to 39.45c. It was largely for January and February consumption and it was apparent from the eagerness shown by the purchasers that many of them were very badly in need of a supply. There has been an absence of speculative buying between dealers, as most of them are afraid of the market. The market opened on Monday 85 points higher than the highest quotation of Friday, and yesterday the price went to a record figure—40.50c. for spot tin. Very little buying has been done since Monday. The impression prevails that higher prices may be looked for, as there are no signs of weakness in the London syndicate's hold on the market and stocks in America are closely concentrated. The arrivals of tin so far this month have been 1482 tons and there are 2031 tons afloat. Pig tin was sold in New York to-day for 40.25c. In London to-day spot pig tin was selling at £183 10s., and futures at £184.

Tin Plates.—As the result of the prevailing high price of pig tin, quotations on tin plates at Swansea, Wales, were advanced 3d., according to this morning's cable from London, now being 14s. 7½d. The market in domestic tin plates is quiet, but a demand from the can manufacturers is expected to develop in the near future. The quotation for 100-lb. coke plates is \$3.84.

Lead.—Consumers are taking no interest in the lead market, but prices are held firmly. The Price in New York is 4.50c., and in St. Louis, 4.35c.

Spelter.—Spelter prices remain unchanged, this being the first time in three weeks that there has been no decline. Buyers are taking no interest in the market and quotations are in a large measure nominal. A great deal of stocks have

THE IRON AND METAL MARKETS

been accumulating in the hands of sellers, but they show little disposition to make further concessions. On the other hand, many consumers are stocked up with metal bought at higher prices than now prevail, so that the market is an unsatisfactory one for both sellers and consumers. Quotations in New York are 5.55c., and offerings are made in St. Louis at 5.40c. These prices may be shaded.

Antimony.—A reaction has taken place in the antimony market, which has been in a neglected shape for the last three months. It was in bad condition last Thursday, and there were reports of offerings of round lots of both Hallett's and Cookson's at 7½c. The following day the sellers suddenly changed front. Hallett's was advanced to 8c. and Cookson's was put up to 8.25c. It is apparent that producers of antimony abroad have reached some understanding as the sellers here who advanced quotations admitted that they were acting under advices from Europe. Chinese brands are now offered at about 7.50c. and Hungarian grades from 7c. up.

Old Metals.—While the market is weak, dealers' selling prices are nominally unchanged, as follows:

	Cents.
Copper, heavy cut and crucible.....	12.25 to 12.50
Copper, heavy and wire.....	11.75 to 12.00
Copper, light and bottoms.....	11.00 to 11.25
Brass, heavy.....	8.25 to 8.50
Brass, light.....	7.00 to 7.25
Heavy machine composition.....	11.00 to 11.25
Clean brass turnings.....	8.00 to 8.25
Composition turnings.....	9.00 to 9.50
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.30 to 4.40

Metals, Chicago, January 10.—A fair amount of copper is being sold, chiefly for prompt delivery. The lead market is a little firmer, as outside smelters who have been shading heretofore have brought their prices up to the level of quotations by the leading interest. Spelter is a little stronger, but without changing the price quoted last week. Tin is so erratic that printed quotations are of little value as a guide to the market. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 13c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 41c.; small lots, 43c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter No. 1, 26c.; tin foil, 30c.; block tin pipe, 33c.

Metals, St. Louis, January 9.—Lead is steady at 4.37½c.; spelter is firmer, but unchanged, at 5.40c., both at East St. Louis. Zinc ore is steady at \$38 to \$40 per ton, Joplin base. There is some curtailment in the output. The new lead smelter at Webb City is now in operation. Tin is higher and quoted at 39.75c. per pound; antimony (Cookson's) unchanged at 7.85c.; lake copper is steady at 13.22½c.; electrolytic unchanged at 13.05c., all at St. Louis. The demand for finished metals the past week was quite satisfactory.

Iron and Industrial Stocks

NEW YORK, January 11, 1911.

The stock market maintained its strength until yesterday, and all prices from day to day showed quite a gain over the corresponding part of the previous week. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	8 - 8¼	Pressed St., com..	30¾ - 32¼
Allis-Chalm., pref..	27½ - 29	Pressed St., pref..	92¾ - 93½
Beth. Steel, com..	29¼ - 30¼	Railway Spr. com..	32 - 33¼
Beth. Steel, pref..	59 - 60¾	Republic, com....	31¼ - 32¾
Can. com.....	87 - 92	Republic, pref.....	93 - 93¾
Can. pref.....	77 - 79¼	Pipe, com.....	15
Car & Fdry, com..	51¼ - 52¾	Pipe, pref.....	50¼ - 52½
Car & Fdry, pref..	115 - 118	U. S. Steel, com....	73¼ - 75½
Steel Foundries...	44 - 45¼	U. S. Steel, pref..	117¼ - 118¾
Colorado Fuel....	31¾ - 32¼	Westinghouse Elec.	66¾ - 68¼
General Electric...	151 - 153¾	Y. I. C. & C.....	52 - 52½
Gr. N., ore cert....	56 - 58½	Am. Ship, com.....	76¼
Int. Harv., com....	111 - 112¾	Am. Ship, pref.....	110¼ - 110¾
Int. Harv., pref..	122¼ - 123	Chl. Pneu. Tool....	41¾ - 43
Int. Pump, com....	40¾ - 41¾	Cambria Steel....	42¼ - 45¾
Int. Pump, pref..	85 - 85¾	Lake Sup. Corp....	29 - 29¾
Locomotive, com..	39¼ - 40¼	Warwick.....	10
Locomotive, pref..	106¼	Crucible St., com..	12 - 12¾
Nat. En. & St., com.	17 - 17¼	Crucible St., pref..	74 - 75¾
Nat. En. & St., pref.	83¾ - 85	Harb.-W. Ref., pref.	95

Dividends.—The Harbison-Walker Refractories Company, Pittsburgh, has declared the regular quarterly dividend of 1½ per cent on the preferred stock, payable January 20. The Columbia Welding Machine Company, Pittsburgh,

has declared semi-annual dividends of 4 per cent. on the preferred and common stock, both payable January 20.

Notes on Prices

Rope.—Market conditions remain unchanged, buying being along conservative lines and in entire conformity with the needs of the trade. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8¾c. to 9c. per pound; second grade Manila, 7¾c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¾c. per pound; second grade, 6¼c. per pound; jute rope, ¼-in. and up, No. 1, 6c. to 6¾c. per pound; No. 2, 5½c. to 6c. per pound.

Linseed Oil.—The oil market is stronger in so far as higher prices are generally asked for spot oil in carload lots than the quotations made for two or three weeks previous. Foreign crops of flaxseed have not come up to the volume of former years nor up to this year's estimates. This has naturally caused an advance in the price of domestic seed. The following quotations represent New York prices in 5-bbl. lots or more:

	Cents.
State, raw.....	81
City, raw.....	81
Linseed, in lots less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon.	

Spirits Turpentine.—While there was an increase in demand at this point early last week, trading since that time has not been so active. Prices advanced slightly at this point and also at Savannah, where the larger interests have for some time been absorbing the bulk of the receipts in turpentine. New York quotations in 5-bbl. lots are as follows:

	Cents.
In oil barrels.....	82
In machine barrels.....	82½
Less than 5-bbl. lots, ½ cent advance per gallon.	

The announcement is made that *Cement Age* of New York, and *Concrete Engineering* of Cleveland, two of the leading monthly publications in the cement field, have been consolidated. Allen Brett, editor of *Concrete Engineering* for the past two years, will take the position as associate editor of the new publication, and Arthur E. Warner, formerly business manager of *Concrete Engineering*, will become Western manager. There will be no change in the present staff of *Cement Age*, Robert W. Lesley continuing as editor, Frederic F. Lincoln as president of the Cement Age Company, in charge of the New York office at 30 Church street and of the Eastern advertising field, and Edward A. Trego as associate editor.

A new Hower Building will be erected in Akron, Ohio, on the same site as the one destroyed by fire in 1909. It will be eight stories, of concrete and heavy steel construction. The first five floors have been leased by the Hardware & Supply Company, which will expend \$30,000 for interior furnishings, making it one of the best equipped storerooms of its kind in the State. The basement floor will be connected with a switch from the Belt Line Railroad so that cars can be run into it. The building will be equipped throughout with automatic sprinklers, and will be provided with a 5-ton freight and passenger elevator.

The Bureau of Manufactures of the Department of Commerce and Labor, Washington, D. C., is establishing a file of the names of American manufacturers and traders, for use in distributing the valuable information which reaches it from time to time in regard to foreign trade. Those who desire to avail themselves of the facilities thus offered for extending their trade abroad should send to the bureau their names and advise it as to the class of business in which they are engaged.

The Pittsburgh plant of the American Sheet & Tin Plate Company at New Kensington, Pa., containing eight hot mills, was started up on Tuesday, this week, after being idle for several months.

New Tools and Appliances

This is essentially a news department for which information is invited.

Thread Milling Attachment.—The Garvin Machine Company, Spring and Varick streets, New York City, is equipping its milling machine with a new thread milling attachment, which enables single and multiple threads within a wide range to be cut easily and rapidly. The spindle on the attachment runs in a long rigid bearing mounted on the machine table, and drive for the spindle is from the milling machine spindle through a sprocket and chain drive to the maker's standard gear box at the back of the machine. From the gear box power is transmitted through the usual universal joints and shafts to the table screw. Spindles for lathes and milling machines are forced on the taper nose of the attachment and supported by an adjustable steady rest. Two recent pieces of work handled were the threading of a milling machine nose $2\frac{1}{2}$ in. in diameter and $\frac{3}{4}$ in. long in $7\frac{1}{2}$ minutes, and another 5 in. in diameter and $1\frac{1}{4}$ in. long in 22 minutes, the number of threads being four per inch in each case.

Combination Bench and Pipe Vise.—The Armstrong Mfg. Company, 297 Knowlton street, Bridgeport, Conn., has placed on the market an improved design of quick adjusting combination bench and pipe vise. The pipe vise has four hardened steel serrated V-blocks, and the rear jaw is free to slide along the base and is held in position by a pin which engages holes in the base. These holes furnish three positions for the jaw, and when the pin is in the first hole the capacity of the vise is for pipes ranging in diameter from $\frac{1}{8}$ to 1 in. Moving the jaw to the second position increases the capacity up to 2 in., and when in the third position $2\frac{1}{2}$ or 3 in. sizes can be gripped. These changes are easily and quickly made. It also has sockets for legs, so that a stand can be made if desired.

A Ferracut Internal Notching Press.—For notching field laminations and other internal work, the Ferracut Machine Company, Bridgeton, N. J., is building a press for handling work as large as 24 in. in diameter. A special type of carriage is employed, and upon this a ring is mounted which is known as the ratchet holder and runs in adjustable bearings. Another ring, the internal diameter of which fits the outside of the disk to be notched is doveled to the ratchet holder. A pawl lever is attached to the carriage and rotates the work. Two sizes of ratchet holders are used with this machine, the smaller for work having an external diameter of from 6 to 15 in., and the larger for disks, the outside diameter of which ranges from 15 to 24 in.

The Garvin Worm Hobbing Attachment.—The Garvin Machine Company, Spring and Varick Streets, New York City, has developed a hobbing attachment for worm sectors which is intended to be applied to one of its milling machines. In operation the hob is mounted in the spindle of the milling machine and has geared to it a long worm of the same pitch and running at the same speed. This worm meshes with a worm wheel having the same diameter as the sector to be cut, and this wheel and the sector are mounted between centers on the same mandrel. At the commencement of the work the table of the milling machine is run in close to the column and a blank segment put on the mandrel. The machine is then started and the automatic cross feed thrown in. The taper hob enters the work gradually, and when the table has moved to the other extreme of its travel the work is finished.

Roll Grip Mandrels.—A recent product of the Jaeger & Sword Mfg. Company, Millbrook, N. Y., is a simple and ingenious mandrel, in which a roll is inserted and set so as to grip the work very positively. This form of mandrel possesses the advantage on such work as gear blanks, collars, bushings, pulleys, &c., of eliminating the tailstock on small pieces and permitting the work to be set up with the smallest possible delay. When machining work to a given length, these mandrels will allow the cutting tool to cut clear across.

The Firth-Sterling Steel Company, McKeesport, Pa., on December 31 placed the management of its Pittsburgh sales office in the hands of E. S. Jackman & Co., who have been its agents in all the States west of Pennsylvania for the past 10 years. D. G. Clark, of the firm of Jackman & Co., who has had charge temporarily of the company's sales office in the Westinghouse Building, will remain as resident manager, but with headquarters in the Henry W. Oliver Building. Mr. Clark has associated with him John Daker, Sr., A. E. Barker, W. R. King and W. P. Becker.

H. M. Bylesby & Co., Chicago, have acquired control of a number of additional public utility properties in California, including the electric and gas properties of the Stockton Gas & Electric Corporation, the electric light and power business at Richmond and the gas and electric properties at Eureka. The American River Electric Company and the Humboldt Gas & Electric Company are also included in the purchase. A new company known as the Western Gas & Electric Company has been formed to hold these properties.

The Alliance Engineering & Sales Company, incorporated for \$50,000, has been organized in Milwaukee, Wis., to acquire the patents and exclusive sales agencies of the Reliance Engineering & Equipment Company, and is now carrying on that branch of the business. F. G. Bolles, until recently commercial engineer of the Allis-Chalmers Company, is the principal stockholder. The consulting work will be retained by the old company under the management of C. A. Tupper.

Joint offices have been opened in the McCormick Building, Chicago, by the Detroit Seamless Steel Tubes Company, Michigan Malleable Iron Company and Monarch Steel Castings Company, all of Detroit, for the sale in the West and Southwest of Detroit locomotive flues, Detroit journal boxes and Monarch couplers. Walter E. Marvel, formerly manager of the St. Louis office of the Buda Company, has been appointed Western sales manager in charge of the Chicago offices.

The Eastern offices of the American Electric Fuse Company, which have been located at 116 Nassau street, New York City, for nearly 12 years, have been removed to more commodious quarters in the Hudson Terminal Buildings, room 1766. George B. Dusenberre, formerly in charge of the Cleveland branch, has been transferred to the New York office as manager, succeeding W. B. McCurdy, resigned.

The Treasury Department has issued regulations covering the allowance of the usual drawback in duties paid on steel shanks manufactured by John M. Carre-cabe, Boston, Mass., with the use of imported steel in strips of not less than No. 15 wire gauge, and on wire rope manufactured by the Pacific Wire Rope Company, Los Angeles, Cal., from imported steel wire.

Reports made at the annual meeting of the Burt Mfg. Company, Akron, Ohio, maker of ventilators, showed that the company did more business in 1910 than in any previous year in its history. The company has under consideration the building of a large fireproof warehouse, which will probably be erected in the spring. W. F. Warden was re-elected president and general manager.

Coke production in the Connellsville field for the past year made a new high record. The total output for 1910 was 20,168,012 net tons, as against the previous year's total of 17,783,832 tons. The year 1906 had held the record up to this time with an output of 19,999,326 tons.

The Crager Wire & Iron Works, Salt Lake City, Utah, has been incorporated with \$50,000 capital stock, to take over the business of the firm of the same name. The company manufactures ornamental wire and iron work.

The Machinery Markets

With the gradual clearing up of the extensive inventory work in most manufacturing plants, a better inquiry for equipment has developed in the machinery trade. The automobile shows in New York are bringing some business into that market, and there are some good lists out in New England that give promise of immediate orders. In Pittsburgh there is an increased demand for machinery used by public service corporations, and there is a good inquiry for electric equipment in the Cleveland market. Rather quiet conditions prevail in Cincinnati where inventory work is still affecting trade. In the South municipal contracts are attracting the attention of the machinery dealers. A few railroad inquiries have come out in the Chicago market, and the indications there are that the carrying companies will be obliged to buy soon, as their motive power is not in the best condition. Milwaukee dealers are delivering equipment against orders placed some time ago, for a number of plants now under construction and additional buying is expected on these accounts.

New York

NEW YORK, January 11, 1911.

The automobile show season is on in New York and many manufacturers of machine tools and other metal working machinery, in addition to makers of drop forgings and automobile parts, are visiting the city. This has brought some business into the New York market, as many of them have taken occasion to call on the trade here, and a number of fair orders have been placed for machinery. The automobile people are also buying a machine here and there for replacement, and there has been more selling from stock by New York houses during the last week than at any time during the last two months. Inquiries from other sources are not large, however, and so on the whole trading was not particularly good during the week. Most of the inventory work in manufacturing plants in this district has been concluded, and consequently a better demand for equipment is expected to develop within a short time. The railroads are buying very sparingly, picking up only an occasional tool for replacement. Business in the heavy power equipment line is not very satisfactory. It is stated that there has been some price cutting in that field of late by engine manufacturers who took orders at a minimum of profit with a view to keeping their plants busy.

The Westinghouse, Church, Kerr Company, 10 Bridge street, New York, has been awarded a general contract for the construction of a large extension to the plant of the Westinghouse Electric & Mfg. Company at Orange and Plane streets, Newark, N. J. The extension will consist of two L's, each 75 x 100 ft., and five stories. An addition will also be made to the present power house, and a large part of the space in the new structures will be devoted to warehouse purposes.

The Cockburn Company, Monmouth and Twelfth streets, Jersey City, N. J., has been incorporated, with an authorized capital stock of \$50,000, to take over the business of the Cockburn Barrow & Machine Company, manufacturer of contractors' machinery, with a plant at the address given above. J. S. Harris is president of the new company.

Bids will be opened January 18 by the Department of Water Supply, Gas and Electricity of the city of New York at its offices, 13 Park row, for furnishing portable engine driven air compressors and centrifugal pumping units. Forms for making estimates can be obtained at the office of the department.

The car and locomotive repair shops to be built by the Delaware & Hudson Company at North Albany will comprise a locomotive repair shop 275 x 300 ft., a blacksmith shop 100 x 300 ft., a boiler and tank shop, woodworking shop, car repair shop, testing laboratory, a 35-stall roundhouse, a general storehouse and an administrative building. The estimated cost of the improvements is about \$2,000,000.

The Buffalo Receptacle Company, Buffalo, N. Y., recently incorporated with a capital stock of \$150,000, has purchased a factory at 1490-1494 Jefferson street and will equip it for the manufacture of refuse receptacles, garbage cans and other sheet metal specialties. Gustave Steinwach, manager, 1047 Genesee street.

The Federal Motor Company, Buffalo, N. Y., is having a factory building erected at Main and Northampton streets, four stories, steel frame and brick, with 63,000 sq. ft. of floor space, which it will equip for the construction of motor trucks and commercial vehicles. E. E. Denniston is manager, 184 West Mohawk street.

The Cartridge Carbon Company has been incorporated at Rochester, N. Y., with a capital stock of \$100,000, to manufacture and deal in carbon paper, typewriter ribbons, &c. The incorporators are E. Bostwick, J. C. Stoll and F. B. Bishop, all of Rochester.

Chicago

CHICAGO, ILL., January 10, 1911.

It is a little early to get a definite line on machine tool business for 1911, as buyers are not all through checking their inventories and January business has hardly begun. The inquiries pending would make a fair amount of business if the parties figuring on new tools go ahead and close. A few of the large dealers have inquiries from railroads which are of an encouraging character. The motive power of Western railroads is generally in such bad condition that machinery men cannot give up hopes of a buying movement by the railroads which would prove an important factor in the market. The railroads, however, have disappointed all the prophets and no one knows how much longer they may be able to go with leaky and crippled engines and patched up cars. The car shops of the average railroad would furnish material for an embarrassing discussion, on account of their lack of modern tools and labor saving equipment, as many of them are still running with the equipment they bought 30 or 40 years ago, when the shops were built.

A more encouraging feature of the trade is the amount of inquiry from metal working manufacturers. Buyers of this class have been going slow for the past year, and their needs in the way of new tools have been accumulating.

Sealed proposals will be received by the city of Chicago, January 19, 1911, at Commissioner of Public Works office, City Hall Building, for furnishing and installing in place two 20,000,000-gal. centrifugal pumps and two 1000-hp. synchronous motors, together with piping, wiring, switchboard and other appurtenances, at the Twenty-second street pumping station.

The Ferguson & Lange Foundry Company, Chicago, has increased its capital stock from \$50,000 to \$100,000.

The Roth Mfg. Company, Chicago, has increased its capital stock from \$24,000 to \$100,000.

The Crown Electrical Mfg. Company, St. Charles, Ill., has about completed the erection of an addition to its foundry, for which the necessary equipment has been purchased.

The Peoria Metal Culvert Company, Peoria, Ill., recently incorporated with \$40,000 capital stock, has erected a new factory building and has its equipment installed ready for operation.

The Hunt-Helm-Ferris Company, Harvard, Ill., manufacturer of the Star line of hay tools, tank heaters, hand sleds, door hangers, &c., is considering the erection of a new factory, plans for which have not been worked out.

The Ville Engineering Company, Moline, Ill., has been incorporated with a capital stock of \$200,000. The incorporators are Willard L. Ville, Lawson M. Fuller and Otis E. Mansur. The company will engage in the manufacture of electric motors, engines, automobiles, &c.

The German-American Portland Cement Company, La Salle, Ill., has plans in progress and will probably start work early in the spring on a new cement plant to be erected at a probable cost of \$750,000.

A. H. Loeb, Chicago, vice-president Sears, Roebuck & Co., is having plans prepared by Jenney, Mundie & Jensen, 171 La Salle street, for a five-story manufacturing building which has been leased to the Troy Laundry Machine Company.

Pittsburgh

PITTSBURGH, PA., January 10, 1911.

With the opening of the new year a decidedly hopeful feeling prevails here. So much of the machinery used by public service corporations in the United States, Canada and Mexico, as well as elsewhere throughout the world, is manufactured in this district, that the situation has always been

THE MACHINERY MARKETS

very materially affected by the market for securities, and in this respect prospects for the immediate future are most encouraging.

Many extensions and plant improvements that are known to have been under consideration for the past few months will also be definitely determined upon this month, at the various directors' meetings to be held, and orders for equipment will follow. For some of these enterprises the selection of the apparatus needed has, however, already been made, subject to the granting of official authority for its purchase.

While no official announcement on the subject has been made, and the work will in each instance be taken up as a separate local development, it is known here that the West Penn Electric Company, whose operating offices are at Connellsville, Pa., has outlined extensive improvements and additions to be made to its various generating and distribution systems during the coming year. These cover an area much greater than that served by any other industrial power and lighting company in the world, and through its efforts the use of electric motors for driving machinery is being widely extended in the districts traversed by its lines. The communities served include Connellsville, Scottdale, Mt. Pleasant, Greensburg, Vanderbilt, Jeanette, Manor, Uniontown, Brownsville, West Brownsville, Charleroi, Lucyville, Bridgeport, Donora, Coal Center, Derry, California, Everson, Roscoe, Dawson, Elizabeth, West Elizabeth, Fairchance, Fayette, Latrobe, Monongahela, Monessen, New Haven, New Salem, Masontown, Finleyville, Youngwood, Youngstown, Stockdale, Speers, Allenport, McMahon, Allen, Belle Vernon, Carroll, Courtney, Dravosburg, Elco, Greenville, Irwin, Smithfield, West Newton and Pittsburgh itself, as well as towns adjacent and a number of street railway systems. The company's general offices are in the Bank for Savings Building in Pittsburgh.

The Baldwin Tool Works is preparing to remove from Columbus, Ohio, to the new plant at Parkersburg, W. Va., which will give it manufacturing facilities much more extensive than those heretofore available. The company has recently taken out a new charter, with capital stock of \$300,000.

There appears to be no truth in the statement recently given currency that the Baltimore & Ohio Railroad Company will proceed with plans for new repair shop facilities at Brooklyn, W. Va., in the near future. The improvement is, however, needed and will probably be taken up as early as practicable.

A compressor plant and distribution system will be constructed by the Tri-County Natural Gas Company, Pittsburgh, of which J. C. McDowell is general manager. The company is reported to be incorporated for \$1,200,000, and bonds for \$600,000 will be sold to provide the necessary equipment.

With the present ratio of gain in the demand for the reinforcing frames of which the Pittsburgh Steel Products Company, Pittsburgh, makes a specialty, increased shop facilities, including the electric plant for welding these frames, will need to be provided during the year.

The Backus Novelty Works, Pittsburgh, is reported to be planning the construction of a manufacturing plant at Smethport in McKean County, Pa.

Bids have just been taken by the Orenstein-Arthur Koppel Company on the new buildings for its works at Koppel, Pa., including a wood-working shop 50 x 100 ft., machine shop 75 x 75 ft., erection shop 50 x 220 ft., and heavy car shop 75 x 140 ft. There will also be an outside crane runway 40 x 275 ft. and a separate power plant. The company's chief engineer, whose office is in the Machesney Building, Pittsburgh, will be in charge of the construction, assisted by F. G. Rose, consulting engineer.

All of the electrical machinery and auxiliary apparatus for the 18,000 kw. power development of the Eastern Tennessee Power Company at Parksville, Tenn., will be furnished from the shops of the Westinghouse Electric & Mfg. Company, Pittsburgh.

Agitation for a municipal electric plant has been started here, and its adherents expect to bring the matter to an issue by spring. Should such a plant be constructed, the city will need to purchase a very extensive line of equipment in order to meet the needs of the service. No decisive action is, however, likely to be taken during the present year.

The Commercial Water Company, Beaver Falls, Pa., is preparing to build a dam across Dry Run and construct a pumping station for distributing the water thus impounded. A hydro-electric development may also result, although the city is at present supplied by the Valley Electric Company of New Brighton, Pa.

The Climax Mfg. Company, Corry, Pa., which builds an improved type of geared locomotives for industrial service, has experienced a good demand the past year from logging roads, particularly in the mountainous district, as its machines are especially adapted to steep grades, sharp curves

and uneven road beds. It is stated locally, although without direct confirmation, that a larger output will be provided for in 1911.

Work has been started at Youngstown, Ohio, on a shop of moderate capacity for the Youngstown Bronze & Foundry Company.

The J. F. Johnson Company, Huntington, W. Va., is preparing to erect a saw mill and power plant on a tract of timber which it owns.

Philadelphia

PHILADELPHIA, PA., January 10, 1911.

The first week of the new year was not very productive of fresh orders. Merchants generally report business quiet, a few scattering orders for small tools making up the bulk of that placed. While there is a fair amount of prospective business, little has been under immediate negotiation. There has been no further inquiry from railroad companies, and a canvass of the buyers by the trade fails to bring out any definite information as to when business beyond current demand for an occasional tool or a few tools for replacement purposes will develop. The larger industrial concerns do not promise any early buying of consequence, as in nearly all cases present equipment is not fully employed. Manufacturers continue to report business as irregular and maintain operations at an unchanged basis. Makers of special equipment are, as a rule, more actively engaged than those who are manufacturing the standard types of equipment.

The second-hand machine tool trade continues irregular and inclined toward quietness. Little new business is coming to the builders of engines, although those making equipment of the heavier type are somewhat better engaged. While there has been a shade better demand for steel castings, gray iron foundries, particularly those making a specialty of machinery castings, are not so actively engaged.

An application for a charter has been made under Pennsylvania laws by George B. Atlee, Mayer Schamberg, Morris Ebert, W. L. Allen, Wilson Woelppel and others for a corporation to be known as the Northeastern Street Railway Company to construct an electric street railroad from Frankford avenue and Bridge street, in Frankford, Philadelphia, to the county line or Poquessing Creek, passing through Bustleton, Sommerton and Byberry. The formal application will be made January 27.

The Weimer Machine Works Company, Lebanon, Pa., reports a very satisfactory growth in business in 1910, as compared with the previous year. Several large contracts in connection with water works equipment, which will take practically 12 months to complete, as well as numerous orders for cinder cars and blast furnace work, are on the books, and general business has been and is expected to continue in fair volume.

The Cook Linoleum Company, Trenton, N. J., has been incorporated under the laws of New Jersey, with a capital stock of \$2,000,000, and plans to erect a factory for the manufacture of linoleum, rubber and other goods. Detailed information is not available at this time.

The Philadelphia & Reading Railway, W. Hunter, chief engineer, will take bids January 17, under contract No. 49, for rails for permanent tracks between Seventeenth street and Indiana avenue and its Port Richmond branch; under contract No. 50, for special equipment in connection with it; under contract No. 53, bids for platforms and bridges over Percy street, Powers, Weightman & Rosengarten Company, and contract No. 54, coal pockets, Powers, Weightman & Rosengarten Company, will also be taken. Plans and specifications for these requirements, which are in connection with the company's new elevated road on Ninth street, may be obtained at the office of the chief engineer, 520 Reading Terminal.

While the Light Mfg. & Foundry Company, Pottstown, Pa., has plans and specifications completed for extensive modern additions to its foundry department, actual work on the improvement has been temporarily held up. In 1910 business in the aggregate showed a material increase over that of 1909, even though the demand decreased sharply toward the close of the year.

The Baltimore Siegwart Beam Company, Baltimore, Md., is having plans prepared by J. E. Laferty, in that city, for a steel and corrugated iron building to be erected in the Curtis Bay district, Baltimore, on a portion of a 6½-acre plot leased from the city, which will be equipped for the manufacture of Siegwart beams and patented concrete products. The president of the company is Daniel A. Leonard, Builders' Exchange Building, Baltimore; treasurer, Victor C. Bloede; secretary, S. A. Brooke, who together with S.

THE MACHINERY MARKETS

Franklin Bennett and F. M. Barrett constitute the Board of Directors. It is expected that contracts for the new plant will be let at an early date.

Considerable work under the direction of the Department of Wharves, Docks and Ferries, city of Philadelphia, is in prospect. Already bids are being asked for the superstructure of Vine street pier. Plans for a new pier at Dock street have been completed, while tentative plans have been made for a new pier at Allegheny avenue. Both these projects will have to await an appropriation by City Councils, however, before the work can be done. A municipal dredging plant has been acquired and will, it is expected, be increased in efficiency.

The Baldwin Locomotive Works was successful last week in taking two very satisfactory orders, as well as several smaller ones for various types of locomotives. The most important contract was for 196 engines, for the Harriman lines, while one for 22 freight engines for the Pittsburgh & Shawmut Railway was also closed. These orders, deliveries on which extend through the first half of the year, will enable the Baldwin Works to maintain about the present rate of activity, which is considerably below normal, during that period, although other moderate orders in sight are expected and, if received, will increase the productive rate. Many departments of the plant are operating on single turn, and in some short time has been in force.

The Keystone Multiple Parts Company is removing its plant from 314 North Seventeenth street to 1516 South Ninth street, where materially increased facilities are available. It will install several new machine tools and expects to be in full operation at the new plant by February 1.

The Jacobs-Schupert United States Fire Box Company, Coatesville, Pa., has applied for a charter under Pennsylvania laws. Those interested are A. F. Huston, Charles L. Huston and Joseph Humpton of the Lukens Iron & Steel Company, together with a number of officials of the Atchison, Topeka & Santa Fé Railroad. The company controls the patents and has erected and equipped a plant at Coatesville for the manufacture of the Jacobs-Schupert fire boxes for locomotives, invented by Henry W. Jacobs, assistant superintendent of motive power of the Santa Fé Railroad, and Frank W. Schupert.

Cincinnati

CINCINNATI, OHIO, January 10, 1911.

Many firms have not yet finished taking inventories and an accurate statement as to last year's business, including all machinery manufacturers in this section, is not yet available. While the latter part of 1910 was somewhat disappointing to the machine tool builders, present indications are that business this spring will be excellent. Deferred action on the railroad rate question has undoubtedly had a bad effect, and no matter which way the question is settled when the final decision is made it will show the railroad interests exactly where they stand and thus put an end to all the suspense that is blamed for holding up railroad orders.

Dealers in machinery supplies experienced quite a letup in business during the holiday season and the past few days do not show much improvement.

It is stated that two or three local foundries have made contracts on castings lately that will help them out considerably. At least two of these contracts were taken away from outside foundries. No general active movement is looked for just at the moment, but in almost every line there has been an increase noted in inquiries being received.

A good sized tonnage of structural steel and other material will be required for building the Carnegie Library, Hyde Park branch, Cincinnati, bids for which will be opened January 19. C. L. Stanley, clerk of the Board of Trustees, Public Library Building, Cincinnati, will furnish all details wanted.

The Factory Power Company, Oakley, Ohio, has recently made additions to its power plant, consisting of a 600-hp. Sterling water tube boiler and a 600-kw. generator direct connected to a Ball & Wood cross compound engine.

The Cincinnati Planer Company, Oakley, Ohio, has recently shipped one of its new 10-ft. boring mills to the American Bridge Company for its Gary, Ind., plant.

The Cincinnati Milling Machine Company's Oakley plant is running on full time and with practically a full force. It recently received some nice export orders.

Fairbanks, Morse & Co., have leased the six-story building at the corner of Main and Eighth streets, Cincinnati, and will move from their present location, 137 West Fourth street, some time during January.

The annual meeting of the Eureka Foundry Company, Cincinnati, was held January 2, and the following officers were elected: President, William H. Merten; vice-president,

Oscar Reimert; secretary, Emmet H. Daugherty, and treasurer, Oscar Reimert.

The Triumph Electric & Ice Machine Company, Oakley suburb, reports business on the increase. Most of its orders are coming from the general trade, but there are a considerable number of large municipal lighting plants planned for the present year.

Daniel Wright of the Henry & Wright Mfg. Company, Hartford, Conn., manufacturer of sensitive drills, was in Cincinnati last week for the purpose of investigating the city's manufacturing advantages. The company has tentative plans under way for moving its Hartford plant, and it now seems probable that if this action is taken Cincinnati will be the favored point.

Subject to a renewal of its charter, the Kenton Gas & Electric Company, Kenton, Ohio, will build a new plant that will cost about \$60,000. No plans have as yet been made up.

For the purpose of mining coal the Ferndale Coal Company has been incorporated at Fairmont, W. Va., with \$100,000 capital stock. The incorporators are Clyde E. Hutchinson, C. H. Jenkins, E. C. Currey, J. C. Wolfe and M. M. Abbott, all of Fairmont.

The extensive additions to the power plant of the University of Cincinnati are nearly completed. A new heating plant is also being installed.

Cleveland

CLEVELAND, OHIO, January 10, 1911.

Many manufacturers will not finish their inventories until the end of this week and until these are out of the way they are giving machine tool purchases no consideration. Two or three orders for fairly good lots of tools that had been pending for some time were placed during the week, but with these exceptions little business was done. Companies operating manufacturing plants in most cases hold their annual meetings during the first half of January, and at these meetings plans for plant extensions and the purchase of additional equipment are generally discussed and acted upon by the directors. Considerable business is now pending, inquiries being sent out in December in anticipation of action at the annual meetings authorizing the purchase.

Inquiries for electrical equipment in small and medium sized units have improved since the first of the year and the outlook for this line of equipment is quite promising. A large amount of building work is in prospect this year in this and other northern Ohio cities, which indicates an active demand for power equipment for buildings. Mining machinery is quiet. There is some inquiry for water wheels. Makers of agricultural implements in this territory generally report a record breaking year in the volume of their business during 1910, and orders for 1911 are so far very satisfactory. The inactivity of the railroads is responsible for a light demand for locomotive cranes and steam shovels, but the early spring is expected to bring an improvement in orders for this class of equipment.

The Wellman-Seaver-Morgan Company, Cleveland, reports the receipt of a number of orders recently, among them the following: A steam operated coal car dumper, with mule haulage system and sprinkling device, for the new Erie Railroad dock in Cleveland; a wheel blank manipulator for the Midvale Steel Company; an electric traveling scale car for the Columbia Chemical Company, Barberton, Ohio; a two-compartment steel head frame, 90 ft. high, with cages, skips, sheaves, &c., for Campana Minera d'Penoles, Makina, Mexico; two electric hoists with steam shell drums for Minas del Tago, Rasario, Mexico.

The Forest City Engineering Company, Cleveland, has prepared plans for a four-story brick and steel manufacturing plant to be erected at Clark avenue and West Fortieth street, Cleveland, by the Schultz-Ruck-Delfs Shoe Company. A 60-hp. gas engine will be bought and probably a generator for a lighting plant.

The Northern Ohio Power Company, Akron, Ohio, has been incorporated, with a capital stock of \$10,000. This company will build the new power house to be erected near Akron for the Northern Ohio Traction & Light Company. Engineers are now working on plans for the new plant.

The Union Metal Mfg. Company, Canton, Ohio, has purchased a building site in that city along the Wheeling & Lake Erie tracks, north of the workhouse, and will shortly begin the erection of a new plant. The company makes ornamental metal lamp posts and metal columns.

The Portage Rubber Company, Akron, Ohio, will enlarge its reclaiming plant at Barberton, Ohio, by the erection of a three-story building. It is also announced that the company will erect a manufacturing plant in the spring. At a

THE MACHINERY MARKETS

recent meeting of the stockholders the capital stock was increased from \$10,000 to \$1,000,000.

The Irwin-Boothe Cordage Company, Findlay, Ohio, has been incorporated, with a capital stock of \$10,000, by James W. Irwin and others, to handle cordage, cables, tools and other equipment used in the drilling of gas and oil wells.

The Kinsey Mfg. Company, Toledo, Ohio, has completed its new plant for the manufacture of automobile parts, which was thrown open for a public inspection January 4. The main building is three stories and 105 x 286 ft. Adjoining this is an L 65 x 75 ft., four stories and basement.

New England

BOSTON, MASS., January 10, 1911.

No material change has taken place in the machinery market. Store trade is a trifle stronger, but general business has not increased. Contracts have not been placed on the several lists of tools which have been given the dealers. The latest, and one of the most important, is that of the Lamson Consolidated Store Service Company, Boston, for its shops at Lowell, Mass., which totals some \$20,000 worth of machinery. The General Electric Company's plants at Lynn and Pittsfield, Mass., are running at about normal capacity. An exceptional department is the steam turbine shop at Lynn, which is very busy. Undoubtedly an immediate increase in production will be experienced at both these works, the present condition being influenced largely by the taking of inventory. Current rumor has it that a large machinery manufacturing house will replace large works located near Boston by an entirely new plant, which will require a long list of new equipment. The tool steel trade reflects the general trend of business, but the dealers in foreign steels are placing orders freely, in the belief that the spring business will be a good one.

The Vanadium Metals Company, East Braintree, Mass., will erect a foundry at Groton, Conn., 63 x 227 ft., of brick and steel. The company states that it will be in the market for machinery and other equipment later, but has reached no decision as yet. The products are Victor vanadium bronze, brass, aluminum, noncorrosive silver metal and antifriction metal.

The General Electric Company will add to its works at Pittsfield, Mass., a general storage and office building, 200 x 500 ft., and four stories. A building for the motor testing department is under construction, connecting buildings 26 and 28. The new punch and press building is completed and is now being occupied.

The directors of the Boston & Maine Railroad have appropriated \$190,000 for immediate use in strengthening the bridges between Wells River and Newport, Vt., and \$80,000 for a steel bridge at Bath, N. H.

The business of the Bay State Brass Company, Haydenville, Mass., manufacturer of brass fittings, will resume immediately, under the management of S. S. Cassard, who has represented creditors during the bankruptcy proceedings. The property was sold at auction last week, going as a unit to H. J. B. Willis, Nassau Bank, New York, for some of the creditors.

The Bridgeport Wire Goods Company, Bridgeport, Conn., is completing a new factory at Port Chester, consisting of a one-story building, 32 x 95 ft. The equipment has been purchased.

The M. B. Schenck Company, Meriden, Conn., has made a large increase in capital stock, and has tentative plans for extending its product.

The Steel & Johnson Mfg. Company, Waterbury, Conn., brass manufacturer, will erect a four-story building as an addition to its works, 43 x 134 ft., with elevator and stair tower. It will be of factory construction, and will connect with present buildings.

The Solderene Mfg. Company has been incorporated in Boston with authorized capital stock of \$100,000, to manufacture Solderene, a combination of solder and flux. The business was formerly carried on under a different management by a company of the same name which has gone out of existence. The new corporation is distinct from the old. The factory will be located in Boston. The incorporators are Walter R. Dame, Henry R. Luther, John W. Ogden and Alfred R. Hussey. Mr. Ogden's address is Malden, Mass.

Workman & Newman, 53 Clifford street, Providence, R. I., have purchased land at Chestnut and Bassett streets, and have general plans for the erection of a new factory building.

The Archibald-Guilford Wheel Company, Guilford, Conn., manufacturer of truck and heavy wagon wheels, largely for the export trade, has been chartered in Connecticut, with capital stock of \$30,000, to take over the business of the Guilford Wheel Company. While distinct from the Archi-

bald Wheel Company, a Massachusetts corporation, the stockholders are the same. Ralph O. Wells, Hartford, Conn., is the president; Warren Motley, Nahant, Mass., secretary; C. E. Hull, Guilford, treasurer. While no increase in capital stock has been made, the company expects to work at an increased capacity.

The National Perforating Machine Company, Kansas City, Mo., has purchased the Goodman factory, 167 Hapgood street, Athol, Mass., and will remove its business there. The company will manufacture a rotary perforating machine, a cut surfacer for surfacing the back of electric plates; a type high gauge for measuring the exact height of electro plates; a proof press; a roll and bag press for printing roll paper and bags, and an automatic feed cylinder job press. The line will be developed gradually into a complete outfit of printer machinery.

The Lamson Consolidated Store Service Company, 161 Devonshire street, Boston, has out a considerable list of machine tools for the works at Lowell, Mass., including milling machines, engine lathes, planer and a miscellaneous assortment of tools.

The Bradley Car Works, Worcester, Mass., builder of passenger and street railway cars, is building an addition to its new plant, 90 x 200 ft., which will be devoted to the bench department of the street railway work.

The United Shoe Machinery Company, Beverly, Mass., has formally taken over the business of the Bresnahan Shoe Machinery Company, Lynn, Mass. This action is in consequence of the purchase by the Beverly company of the Wonder Worker Shoe Machinery Company. The company's business will be concentrated at Beverly.

The Domestic Vacuum Cleaner Company, Worcester, Mass., has opened a factory at 28 Cherry street. The cleaner is of the portable type.

The Providence & Fall River Street Railway Company and the Newport & Providence Railway Company have effected an alliance, for the building of seven miles of new railway which will perfect a new rail route between Providence and Newport, R. I. The work will be done in the spring, if the necessary permission can be obtained from the towns interested.

A syndicate, headed by Charles F. Prichard, general manager of the Lynn Gas & Electric Company, Lynn, Mass., has plans for a large cold storage warehouse to be located in that city. It will be a brick and steel structure.

Detroit

DETROIT, MICH., January 10, 1911.

Toward the latter part of this month a lively trade seems practically certain to come out, as heavy buying will be necessitated by the projects now under way which have not hitherto reached the stage where purchases of equipment were imperative. The demand for special tools for early spring delivery will be one of the features of the midwinter trade, and in this line the manufacturers of automobile parts promise to be among the best customers of local houses. The growing use of hard, tough alloy steels and improvements made in the higher grades of tool steels have caused a variation in the demand from this source, as compared with previous seasons, and the increasing use of automatic or semi-automatic machinery for specialized work also has an important influence upon equipment details.

The foundry trade shows signs of becoming exceedingly brisk within the next few months. Makers of brass, bronze and aluminum castings are already very busy, and crucible steel foundries have been pretty well filled lately. In the heavier lines of iron and steel work the fall and early winter season closed dull, as usual, but prospects are good.

Bids on the construction and machinery equipment of the two-story addition to be made to the manufacturing plant of the Detroit Sulphite Fiber & Paper Company, Detroit, at a cost of about \$250,000, will be taken in the near future, as the plans ordered prepared by Albert Danielson, Kalamazoo, Mich., are now nearly ready. Electric power and lighting will be used throughout and the layout will be thoroughly modern in every respect.

The general construction and steam heating contracts have been let by the Pontiac Motor Cycle Company for its new manufacturing plant at Pontiac, Mich.

The Central Boiler & Supply Company, Grand Rapids, Mich., is having plans prepared for an addition to its manufacturing plant.

The Marine Boiler Works, Toledo, Ohio, will add extensively to its plant and provide equipment for operating on a considerably larger scale. This is in consequence of the

THE MACHINERY MARKETS

decision recently reached to build stationary boilers as well as those of the marine type.

To provide for the increase in its business and shop facilities the Detroit Gear & Machine Company has increased its capital stock from \$100,000 to \$150,000.

Notwithstanding the large additions recently made to the pumping equipment of the municipal water works system, it is estimated by the Water Board of Detroit that further extensions, to cost \$5,000,000 are necessary in providing for both present requirements and the city's natural growth during the next few years. Authority for a bond issue to raise that sum will be asked for from the legislature, with the understanding that the money is to be expended only as needed.

The four-story factory to be erected by the Continental Motor Mfg. Company, at Muskegon, Mich., will cover an area 70 x 100 ft., and bids on its construction will probably be taken this month. The preparation of plans was entrusted to Robinson & Campau of Grand Rapids.

The Tawas Paper Company, incorporated for \$150,000, has been organized at Tawas, Mich., to establish a mill for the manufacture of paper from wood pulp.

Authority has been granted by Congress to the city of Sturgis, Mich., to erect a power dam as part of the hydro-electric plant to be operated by the municipality, and the project will be pushed to completion.

A new plant will be erected in the spring at Coldwater, Mich., by the Western Reserve Condensed Milk Company. Meanwhile an old building will be remodeled and new power plant equipment, including a boiler, engine, &c., installed. The contract for the remodeling has been let to William Preston, Coldwater, Mich.

It is reported here that considerable equipment now in service will be displaced and new purchased at various communities in northern Ohio, along its lines, by the decision of the Western Ohio Railway Company, Lima, Ohio, to enter the commercial power field and sell current for lighting purposes to cities and villages. Manufacturers of electric sets and appliances are preparing to take advantage of the situation.

The Falcon Mfg. Company, Big Rapids, Mich., is arranging for the erection of a modern two-story and basement factory, about 50 x 115 ft., the plans for which were prepared under the direction of J. B. Martin of that place.

Funds for the installation of pumping machinery and a high duty water works system will be available this winter at Big Rapids, Mich., and preliminary plans and estimates are now in course of preparation.

The Industrial Works, Bay City, Mich., has a good many orders going through the shops at present and is putting on more men in the pattern making department.

C. T. Harvey, Grand Rapids, Mich., has ordered plans drawn for a three-story factory building to be erected there, which will be occupied by the Wolverine Pearl Button Company. Construction and equipment contracts will not be let for some weeks.

The Lansing Grinding Company, Lansing, Mich., has a good run of business in prospect for the coming year. Finishing crank shafts for automobiles is a feature of its work.

Work is starting on the new plant to be built in Detroit by the Puritan Machine Company, construction of which was recently contracted for.

A two-story addition, 30 x 160 ft., will be made to the pump-house of the Detroit Edison Company on Jefferson avenue, where increased capacity is needed.

The Board of Public Works at Holland, Mich., have ordered plans drawn for consideration this month, to cover the construction of a new pumping plant for the city water system. The supply is derived from wells, and these are also to be increased in number.

Bids are now being taken at Durand, Mich., on pumping machinery for the municipality.

The Severance Tank & Silo Company, Lansing, Mich., is erecting an addition to its plant, 20 x 70 ft.

The Briggs Mfg. Company, Detroit, Mich., maker of automobile bodies, trimmings and accessories, is having plans prepared for an addition to its factory, 90 x 500 ft., three stories, to be of brick and mill construction.

The Ignition Starter Company, Grand Rapids, Mich., has been incorporated with \$50,000 capital stock. The company will manufacture an ignition self-starter for automobiles and motorboats, and is having plans prepared for a factory building to be erected during the coming summer.

The Atlas Mfg. Company, Big Rapids, Mich., manufacturer of farm implements, expects to move its plant to Eaton Rapids, Mich., in the near future, and about the first of February will be in the market for a 36-in. lathe and a set of rolls for rolling roller drums.

The Korf Mfg. Company, Lansing, Mich., has been re-organized and will build a new two-story factory building. Besides the many articles now manufactured, the company

contemplates making a number of implements for truck gardening purposes.

The Bates Tractor Company, Lansing, Mich., has been incorporated, with \$200,000 capital stock, of which \$125,000 is paid in. The company will manufacture a 20-hp. engine designed for use on farms. The erection of a plant will be commenced as soon as possible.

The Bridge Mfg. Company, Detroit, Mich., has awarded contracts for the construction of a three-story factory building, 220 x 255 ft.

The Lake Superior & Ishpeming Railroad is planning the erection of a new ore dock in Presque Isle Harbor, Marquette, Mich. It will be located a short distance from the present dock and parallel to it.

The Cadillac Electric Mfg. Company, organized with \$20,000 capital stock, has been incorporated at Cadillac, Mich.

The Crescent Fixture Company, Grandville, Mich., whose plant burned some weeks ago, is arranging to rebuild on a larger scale.

Spier, Rohns & Gehrke, Detroit, will superintend the construction of a new boiler house, 48 x 80 ft., two stories, for the Stroh Brewing Company of this city.

The Rapid Motor Company, Pontiac, Mich., is adding largely to the force of men employed in its works, including machinists and tool makers, assemblers, &c., with a view to heavy production during the next few months.

The Russel Wheel & Foundry Company, Detroit, has the structural contract for the new foundry of the Buhl Malleable Company.

The Detroit Cedar & Lumber Company has decided upon the erection of a new timber cutting plant at Dollarville, Mich., in addition to one recently acquired there. Shingle-making machinery now in operation at another point is also to be removed there and provision for an enlarged output made.

The Gendron Wheel Company has had plans prepared by Langdon & Hohly, Toledo, for a new six-story building, to be used principally for storage purposes.

Mitts & Merrill, Saginaw, Mich., are making a specialty of machinery for cutting up the refuse from saw mills, so that it may be utilized in pulp mills, turpentine, chemical or other by-products plants. For all of these purposes there is a steadily growing demand.

The building contracts for the one-story manufacturing plant, 90 x 220 ft., to be erected in Detroit by the Bower Roller Bearing Company, have been let by Albert Kahn, whose office is in the Trussed Concrete Building, this city.

Kayser & Schmidt, 407 Wilkins street, Detroit, are arranging for the construction of a new power plant, 35 x 60 ft.

The Michigan Pressed Steel Company, Detroit, is adding to its force of men for sheet metal work, including die-makers.

The Bauer Metal Body Company, Detroit, Mich., has filed articles of incorporation to take over the business of the Bauer Steel Body Company, with an increase in capital stock from \$20,000 to \$130,000. The company is looking for a site on which to erect a factory to furnish additional manufacturing facilities. M. C. Bauer, the founder of the business, has retired from active connection with it, although he still retains an interest.

The Marshall Furnace Company, Marshall, Mich., states that the fire at its plant was confined to a small foundry building which it operated under lease through the busy season and that its loss does not exceed more than \$300 or \$400, as it was successful in saving most of its patterns. Operations were commenced in another foundry immediately.

Milwaukee

MILWAUKEE, WIS., January 9, 1911.

The chief interest of the machinery market at present centers in plants now under construction or recently completed, equipment for which has been mainly purchased but will be supplemented by additional apparatus to be installed in the spring or as soon as their owners feel warranted in making the necessary expenditures. All buying during the fall was, in these cases, done on the basis of minimum requirements; hence nearly every item printed in this report for some time past, with many that are still to be mentioned, constitutes a clue to much prospective business.

One of the most notable power plant improvements for industrial establishments is that of the Thomas B. Jeffrey Company, Kenosha, Wis., the equipment of which was furnished mainly by Milwaukee manufacturers. It includes new boilers with automatic stokers, engine-driven electrical

THE MACHINERY MARKETS

units more than doubling the previous capacity, and many additional motors for operating machinery in the shops, which comprise five new buildings. A thoroughly modern coal handling plant has been installed.

The new shop of the Northern Machine Company at Thirtieth street and North avenue, Milwaukee, which is 60 x 125 ft., will be completed early this year, giving it much needed additional facilities.

The gas engine perfected by P. J. Holm, Eau Claire, Wis., will be built in future by the Western Machine Company, incorporated in December. Operations are now being carried on in leased quarters, but a manufacturing plant is to be constructed before summer.

The Thilmany Pulp & Paper Company, Kaukauna, Wis., will soon begin the erection of a mill, electrically operated, of the most modern type. The cost of building and equipment is estimated at \$250,000.

The Webber Mfg. Company, West Allis, Wis., will erect a building on the Chicago and Northwestern Railway tracks between that city and Milwaukee and install planing mill machinery. No work is, however, to be done until spring.

The Advancement Association of Ashland, Wis., is endeavoring to have the new plant of the Kurz-Downey Company, now of Bayfield, Wis., erected in that city. This will replace one destroyed by fire in November. Better facilities for securing material and shipping the finished product are urged in behalf of Ashland.

Much interest has been aroused here in the projected high-pressure fire service system for the city of Boston, Mass., as the pumps, engines and heavy electrical motors for the majority of the systems now in successful operation in the cities of this country, together with the control apparatus, were furnished by Wisconsin manufacturers, who have made a special study of the problems involved.

The Superior Box Company, Superior, Wis., is completing a modern factory at South Superior, which later on will be increased in capacity.

Unless suitable arrangements are made for acquiring the plant of the Kaukauna Gas Electric Light & Power Company, Kaukauna, Wis., the municipality will build its own station, authority to issue bonds for the purpose having been granted at a special election. In either event, considerable machinery will need to be purchased, as the present plant is far inadequate to the requirements of the service.

The Sheboygan Fruit Box Company, Sheboygan, Wis., which has just completed a three-story addition, 50 x 98 ft., will provide some time this year for a further increase in capacity, having materially enlarged its working capital. Wood-working machinery and electric motors will be among future requirements.

The authorities at Walworth, Wis., have sold \$18,000 in bonds to cover the cost of projected water works improvements.

Machinery for a planing mill will be installed before spring by the Boyd Lumber & Improvement Company, Boyd, Wis.

The Appleton Chair Company, Appleton, Wis., is ordering machinery to take the place of the equipment recently rendered useless by a fire in its old plant. The new factory just completed will be put in operation as soon as the necessary tools can be installed.

The Orlo Power & Light Company, Manitowoc, Wis., has been incorporated, and will build a hydroelectric plant. L. O. Larson and Anton O. Anderson are the principal incorporators. The development will be one of moderate size.

Most of the right of way has been secured for the Milwaukee-Western Electric Railway, whose headquarters are in Milwaukee, and construction work will begin in the spring. This enterprise has good financial backing.

Sir Robert Hart of Sydney, Australia, recently spent some time at the Berlin Machine Works, Beloit, Wis., where an order was placed for considerable wood-working machinery to be installed in one of his plants in the antipodes.

The plans of the equipment of the large new mills to be built at Menasha, Wis., by the Lakeside Paper Company, have not yet been worked out. A large quantity of machinery, including electric power units, motors, shafting, &c., will, however, be required. For the principal contracts there promises to be spirited competition on the part of the leading manufacturers represented here.

The Wisconsin Bridge & Iron Company, Milwaukee, is putting up the steel work for the new plant at Detroit to house six large pumping engines for the municipal water works system, with boilers and auxiliary equipment. Three units, with a capacity of 90,000,000 gal. daily, will be installed as soon as the station is finished.

The new box factory of W. H. Rieckhoff & Co., Superior, Wis., has been erected, and the equipment is now being completed. Some additional machinery will be provided during the year.

The plant at Appleton, Wis., heretofore operated by Her-

man Bach, will be taken over by the Imperial Knitting Company, of which he is the leading incorporator, and enlarged. New machinery is to be provided.

The H. A. Stocker Machinery Company, Chicago, through its Milwaukee office, has closed a contract for the machine shop equipment of the Independent Electric Company of that city.

Toronto

TORONTO, January 9, 1911.

The demand is much less equable than it was. Instead of being uniformly good for almost every variety of plant, it is variable, being active for some classes of machinery and in various degrees of dullness in others. Orders for factory equipment reflect this unevenness, the inference being that in some lines of manufacturing the starting up of new businesses and the extending out of old have not been going on as before, but in other lines of manufacture the capacity gives every indication of further expansion. In fact, this seems to be the rule in the manufacturing business generally. Makers of agricultural implements appear to calculate upon a good year's trade, for they are running their works to the full limit. There are several contracts for large installations being worked upon by makers of plant, and others of importance are being figured on. These relate to power plants, pulp and paper mills, mine machinery, &c. It is stated that there will be a considerable quantity of mining machinery brought from England to the Porcupine gold district in northern Ontario.

North Vancouver, B. C., is installing a municipal telephone system. A 25-hp. motor generator is part of the system. Exclusive of building, the plant is to cost \$15,000.

The City Council of Edmonton, Alberta, has provisionally passed debenture bylaws to raise and expend \$456,000 on public works. These include \$167,000 for a bridge over the Saskatchewan River.

The Montreal Stock Exchange has received notice from the directors of the Montreal Steel Works, Ltd., that they have agreed to sell their stock to a syndicate on the following terms: Preferred shares at 137½ and common shares at 162½, and dividend now declared of 1¼ per cent. on the preferred and 7 per cent. on the common. The sale is made subject to the assent of 55 per cent. of the shareholders, and payment is to be made before March 25. It is stated that the syndicate desires to hand over control to Canadian car interests. The Montreal Steel Works, Ltd., manufactures steel castings, springs, railroad supplies, forgings and track tools.

The Canada Keg & Barrel Company has changed its plans for locating in St. Catharines, Ont., and has decided to go to Orillia, Ont., instead. In the latter town it has secured a five-acre site next to the new silver smelting works. It will manufacture the Sanford patent package.

Canada Motors, Ltd., incorporated recently with a capital stock of \$250,000, is arranging to build a plant in Galt, Ont., where at the outset it will confine its operations to the making of two passenger road cars. George Dabie is president of the company.

Speaking at a banquet given to the employees of the Canadian Brass Company, Galt, Ont., on December 29, 1910, Harry Leddin, the superintendent, said that three years ago five or six prominent manufacturing concerns in the United States had the first-class brass trade of Canada, but that this trade has now passed into the hands of Canadian manufacturers, who turn out an equally good article.

It is stated by the *Advertiser* of London, Ont., that a company is about to begin the manufacture of automobiles in that city.

The Western Clays, Ltd., is the name of a company that is preparing to manufacture brick on a large scale at Edmonton, Alberta. By the beginning of spring its plant will be ready to turn out 40,000 brick per day. The brickmaking outfit for the company has been shipped from England, and is now on the way.

In order to encourage the copper industry the Dominion Government has passed an order in Council providing that no royalty shall be charged on products of copper mining for 10 years, that is, up to the beginning of 1921. Of course, this relates only to copper produced from mines under Dominion jurisdiction and has no application to the output of mines under the jurisdiction of a province that owns the Crown lands within its bounds.

The Galt Foundry Company, which is building a foundry at Galt, Ont., expects to be turning out castings by the middle of January.

The Kemp Mfg. Company of Toronto, will henceforth be known as the Sheet Metal Products Company of Canada.

THE MACHINERY MARKETS

The headquarters will be as at present, the big works on Gerrard street, Toronto. With these works will be included in the new concern the works of the Macdonald Mfg. Company, Toronto, those of the Kemp Mfg. Company in Winnipeg, and those of the Kemp Mfg. Company in Montreal.

The City Council of Regina, Saskatchewan, has decided to place an order for a number of cars for the city street railroad. The Ottawa Car Company is expected to build the cars.

British manufacturers and exporters are showing more interest in Canadian trade, and in many cases are seeking to obtain connections through the appointment of Canadian agents. Canada's High Commissioner in London reports many inquiries there for the names of agents, high class firms, &c., in Canada through whom could be sold electrical switch gear, hydraulic and electric lifts, cranes and winches, hydraulic and sanitary plant, air compressors, steam engines, oil and gas engines, street railroad equipment, trucks, machine tools, mill furnishings, gas producers, marine engines, boilers, motors, motor craft, &c.

The Dryden Timber & Power Company, Dryden, Ont., contemplates the erection and equipment of a paper mill at that place to cost approximately \$1,000,000. Plans are being prepared. J. E. Fellows is president of the company.

The Steel & Radiator Company of Toronto, has secured a manufacturing site of 35 acres at St. Catharines, Ont., and will build a plant for the manufacture of boilers and radiators.

A flour mill having a capacity of 3000 barrels per day and an elevator having a capacity of 1,000,000 bushels, is to be erected at Toronto, Ont., by the Imperial Flour Mill Company on the site of the Alexander Brown Milling Company on the Esplanade.

The Canadian General Electric Company will construct a power house on the water works dam near Peterborough, Ont. Bids are now being received.

The engine room, boiler house and machine shop at the Bartlett Mine, Gowganda, Ont., were burnt down some nights ago and their contents destroyed. The engines, compressor, &c., destroyed cost \$30,000.

The International Contracting Company, with headquarters at Winnipeg, has been incorporated by Dominion authority, with an authorized capital stock of \$50,000,000.

The by-law to raise money for the installation of a municipal power and lighting plant in Dundas, Ont., was carried by the ratepayers January 2. The ratepayers of Chatham, Ont., voted to grant the Western Bridge & Equipment Company a site for an enlarged factory. Fergus, Ont., ratepayers voted to loan \$25,000 to an industry, to invest \$20,000 in the preferred stock of the projected People's Railway and to grant the company a franchise. The ratepayers of St. Catharines, Ont., approved a by-law to expend \$180,000 on waterworks extensions and new equipments. Toronto ratepayers approved by-laws providing for a total expenditure exceeding \$2,000,000 on specified works, half of this sum being for the construction of new street railway lines.

The Collier Electric Company, manufacturing electric heaters, arms, and other articles is removing its works from Peterborough, Ont., to Uxbridge.

R. L. Johnston is promoting a company to establish and operate rolling mills at Sydney, N. S.

The Canadian Electric Automatic Machines, Ltd., Ottawa, Ont., recently incorporated with \$225,000 capital stock, advises that it is undecided whether it will take up an existing plant or erect a new one. The matter is now under consideration.

Indianapolis

INDIANAPOLIS, IND., January 10, 1911.

The G. & J. Tire Company will erect a one-story brick addition to its plant at Indianapolis, with basement and sub-basement, to be used for press work. It will also build a fourth story to the main building for the manufacture of tires. Steel construction will be used in both improvements, which are to be fireproof. The cost will be \$50,000.

The John Dierdorf Piano Company has been incorporated at Indianapolis, to manufacture pianos. The capital stock is \$50,000. The directors are John Dierdorf, Fred Dierdorf and C. E. Haworth.

The Vincennes Bridge Company, Vincennes, Ind., has secured the contract for the construction of a bridge over the White River, near Edwardsport, Ind. The contract price is \$16,548.

Frank M. McKey of Chicago, Ill., receiver for the Black Mfg. Company, Chicago, has been appointed ancillary receiver in Indiana in order to have jurisdiction over \$24,000

of automobiles and parts at Elkhart, Ind., in possession of the Crowe Motor Car Company.

Representatives of the engineering department of Purdue University have tested the electric light plant at Portland, Ind., with a view to reporting as to improvements necessary.

By order of the court, receiver T. J. De la Hunt will sell the plant of the Rider-Lewis Motor Car Company, at Anderson, Ind., at private sale on or before February 1.

The two plants of the Western Motor Works, at Marion and Logansport, Ind., will be consolidated at the former city, with the exception of the foundry, which will remain at Logansport. The company makes the Ruetenber motor and employs 500 to 600 men.

Contracts have been let for the structural steel for the plant of Orton & Steinbrenner at Huntington, Ind., which will manufacture locomotive cranes. The company was brought from Chicago, citizens of Huntington taking \$40,000 of preferred stock.

The capacity of the cement mill at Speeds, Ind., belonging to the Louisville Cement Company of Louisville, Ky., is being doubled in capacity, to an output of 4000 barrels daily.

The central power plant of the Gas City Water & Electric Light Works, Gas City, Ind., was burned January 6, with \$40,000 loss. It is a municipal plant.

A Commercial Club has been organized at Daleville, Ind., with the object of inducing factories to locate there. The president is Frank J. McAllister; the secretary, Wilbur Polhemus.

The Motsinger Device Mfg. Company, Pendleton, Ind., manufacturer of devices for automobiles, will move its plant to Lafayette, Ind.

The City Council of Logansport, Ind., is considering the installation of an additional pump at the water works.

A new boiler room is being constructed at the round-house of the Baltimore & Ohio-Southwestern Railroad, Seymour, Ind., in which will be installed a new boiler and engine.

The South

NASHVILLE, TENN., January 9, 1911.

Municipal contracts are again becoming the most prominent feature of trade, and a large quantity of equipment of various kinds will be involved by contracts soon to be awarded. Manchester, Tenn., will enter upon the construction of a pumping plant and modern water works system as soon as permission for a bond issue is granted by the state legislature. The city of Crowley, La., is preparing to increase the capacity of its power plant, which now includes two engine-driven electric generators of 300 kw. Purchase of a 150 kw. unit and one of 75 kw. has been authorized. The city of Fayetteville, N. C., has awarded contracts for the construction and mechanical equipment of a filtration plant of 1,000,000 gal. daily capacity. A new pump is to be bought for the municipal water works at Napoleonville, La., and extensive remodeling of the system entered upon. Engineers have been engaged by the authorities at Smithfield, N. C., to plan an electric light plant and sewage system, with a pumping plant auxiliary to the present water works, and at Rome, Ga., a bond issue of \$75,000 has been voted for the improvement of the pumping station and water distribution system. Other work is mentioned below.

Arrangements will soon be completed by the Jacksonville Electric Company, Jacksonville, Fla., for the erection of the large new generating station to replace its present plant.

It is reported from Norfolk, Va., that the site of the plant formerly occupied by the Standard Box & Lumber Company, which burned, will be utilized for a new factory to be erected by the James Lumber Company of Durham, N. C. Direct confirmation of this has not been given.

Ladshaw & Ladshaw, Spartanburg, S. C., are completing plans for the large hydro-electric plant to be constructed by the Nolachucky Power Company on the Nolachucky River at Erwin, Tenn.

The municipal power plant at Gartersville, Ga., which is equipped with a Stanley G. E. generator of 200 kw., driven from an engine built by the Harrisburg Foundry & Machine Company, Harrisburg, Pa., will be enlarged in capacity, with the object of supplying current for commercial day load.

It is reported from Jackson, Miss., that a large factory site has been acquired in the new industrial suburb of that city, known as Duttoville, upon which to erect a branch manufacturing plant for the Trexler Lumber Company, Allentown, Pa.

The City Council of Charleston, S. C., has ordered pre-

THE MACHINERY MARKETS

liminary plans and estimates prepared for a new electric power and pumping plant to serve the municipality.

J. Newton Johnson, city engineer of Florence, S. C., has been engaged by the municipal authorities at Kingstree, S. C., to estimate the cost and outline a plan for water works there.

The Porter-Wadley Company, Cotton Valley, La., is proceeding with plans for a new plant to replace the saw mill destroyed by fire several weeks ago.

Bids are to be closed January 18 by the United States Engineer at Vicksburg, Miss., for a steel-hull, self-contained hydraulic dredge, steel pontoons, pipe line, &c., to be used in river service. The specifications include very complete equipment.

An extension of the power system of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., is contemplated.

It appears to be definitely settled that additional generating units will be provided by the present owners for the plant of the Citizens Light, Heat & Power Company, Montgomery, Ala., raising its capacity from about 1000 kw. to 7500 kw. Steam turbines have been selected as the prime movers to be used, and there will be a large line of auxiliary equipment.

It is reported from Ocala, Fla., that the Sumner Lumber Company of that place will build a new timber cutting plant at Zuber to replace one recently burned.

New bids are to be taken at Norfolk, Va., for the pumping machinery heretofore mentioned, as those submitted are said not to have complied fully with the specifications. Information can be obtained by addressing the city engineer.

The Ross-Meehan Foundry Company, Chattanooga, Tenn., which recently suffered from fire, is taking steps to repair the damage.

An electric power plant is to be erected for the Sayre Mining & Mfg. Company, Sayre, Ala., and other improvements of an extensive character made this year.

The Rowland Lumber Company, Bowdens, N. C., has provided for doubling the capacity of its plant, giving it two band mills and resawing machinery, with very complete auxiliary equipment.

Manchester, Tenn., contemplates issuing \$25,000 worth of bonds for construction of water works and electric light plant.

The Greenville Mantle & Mfg. Company, Greenville, S. C., has been incorporated to take over the business of the Cochrane Mantle & Novelty Company, Charlotte, S. C. The company will move its machinery and working force to its new building at Greenville, now in course of erection, and expects to be in full operation by March 15. The president of the new company is Albert Barnes; vice-president and treasurer, T. Q. Donalson; secretary, H. T. Sturtevant.

The Laurel Compress Company's plant, Laurel, Miss., was destroyed by fire December 17, causing a loss of about \$25,000.

The plant of the Alabama Marble Company, Sylacango, Ala., was destroyed by fire December 10. The loss of the company is estimated at \$500,000. John S. Sewell is the manager of the company.

The Great Southern Automobile Company, Birmingham, Ala., has increased its capital stock from \$100,000 to \$500,000, to provide for improvements in its factory equipment and to install a brass and iron foundry.

The Atlanta Utility Works, East Point, Ga., manufacturer of cotton oil and fertilizer machinery, is in the market for one 5, three 10 and one 20 hp. power induction 220-volt 60-cycle motors. Information as to condition, location, make, speed and price are desired. Address W. W. Rushton, secretary and treasurer.

St. Louis

ST. LOUIS, MO., January 9, 1911.

Considerable in the way of prospective business has appeared during the past week and machinery merchants feel that the outlook for 1911 promises well. There has been little in the way of actual orders since our last report. Some buyers from Nebraska were in town and bought a few light tools and a good inquiry has appeared from a new bridge shop starting in Omaha. Second hand machinery has been moving rather slowly and is not expected to show a good demand much before spring.

The acquisition by the Burlington Railroad of a solid block on North Second street is in line with the policy of the railroads to remove their freight house facilities from East St. Louis to the St. Louis side. The Missouri, Kansas & Texas is making rapid progress with its great freight house on North Broadway, the Cotton Belt has its new similar proposition well advanced, and the Rock Island is

also spending much money on terminal facilities in the same neighborhood. The Pennsylvania Railroad has given notice of its intention to move its freight house to the west side.

The Light, Power, Ice & Storage Company, Lee's Summit, Mo., has been incorporated. The capital stock is \$20,000. The incorporators are Charles M. Hanks, L. G. Morris, John H. Cook and others.

The reorganization of the St. Louis Car Company is making satisfactory progress, and John I. Beggs is reputed to contemplate increasing his investment from \$350,000 to \$750,000.

J. R. Johnson is erecting a stave mill at Delight, Ark. The mill, which is a large one, is located on Wolf Creek. He expects to have the plant in operation within 30 days.

J. A. Snyder, Third and Louisiana streets, Little Rock, Ark., is promoting a factory for the manufacture of cement tile.

The municipal authorities at Hopkins, Mo., have under consideration the construction of a modern, high-duty pumping plant and water distribution system.

It is reported from Hamburg, Ark., that the plant of the Missouri & Arkansas Lumber Company, which burned some time ago, will be rebuilt along the most modern lines. The company is to be in the market for power and operating machinery.

Interests identified with the Continental Power & Development Company, Sedalia, Mo., have acquired the site for a hydroelectric plant on the Niangua River, and will develop it for the purpose of furnishing current to Warsaw and vicinity for industrial power and lighting service.

Texas

AUSTIN, TEXAS, January 7, 1911.

It is anticipated that there will be a considerable increase in the demand for machinery in Texas, the Southwest and Mexico with the development of enterprises that are now being planned for the early part of the new year. There has been recently a noticeable increase in manufacturing projects in Texas, and while most of the new plants are of small size they are taken to be an indication of the dawning of a new era in this industrial line.

A shuttle block factory will be established at Nacogdoches, Texas, by L. C. Russell of Chicago and associates.

O. L. Williams of Dallas, representing a New York syndicate, is arranging to erect a meat-packing plant at Pecos, Texas.

Dr. E. S. Link of Crystal City, Texas, will build a furniture factory at that place. Mesquite timber will be used for the manufacture of high grade furniture. He will also install an electric power plant which will furnish power for operating the furniture factory and irrigation pumping plants in that section. A saw mill is to be operated in connection with the furniture factory.

Another gas main will be laid from the Petrolia gas field in Clay county to Wichita Falls by the North Texas Gas Company.

The South Houston Iron Works, South Houston, Texas, will be finished the early part of the year. C. H. Ruggles is interested.

The Foote-Rolaff Machine Company, San Antonio, was recently incorporated with a capital stock of \$10,000. The incorporators are W. G. E. Rolaff, George W. Foote and B. V. Samuel.

The new iron foundry of William Willig at San Angelo, Texas, was finished and placed in operation December 23.

Carter Smith of Tucumcari, N. M., and Fullwood Brothers, of Bard City, N. M., are erecting a broom factory at the former town. It will have a daily capacity of 40 dozen brooms.

J. D. Anderson of Amarillo, Texas, contemplates erecting a planing mill at Tucumcari, N. M.

The Flagstaff Lumber Mfg. Company will erect a planing mill and large box factory at Flagstaff, Ariz. The company recently completed the installation of a lumber mill of 100,000 ft. daily capacity at that place. It is also constructing a logging road from Flagstaff into a virgin tract of timber.

The Crystal Ice Company, Fort Worth, was recently incorporated with a capital stock of \$40,000. The incorporators are E. P. Meddow, H. L. Calhoun and George A. Calhoun, all of Fort Worth.

Natural gas will be piped into Mexico from the Reiser field, situated 28 miles from Laredo, Texas. The Mexican Government has granted a concession to Jose Maria Ramos and Erasmo Martinez of Nuevo Laredo, Mexico, to lay pipe lines for gas and construct distributing systems in the state of Tamaulipas. This concession is said to be part of a plan to erect a smelter at Nuevo Laredo. The project of

THE MACHINERY MARKETS

piping the gas to Monterey, in the state of Nuevo Leon, 150 miles south of Laredo, is also under consideration.

James Lewishohn of the city of Mexico, representing a syndicate of Americans, has been investigating the situation at Tampico, Mexico, with the view of establishing a large canning plant. It is stated that it is purposed to invest about \$50,000 in the enterprise.

The plant of the Taylor Water Company, Taylor, Texas, has been purchased by Andrew J. Zilker of Austin, Texas. The new owners take charge January 1, and will immediately inaugurate a programme of extensive improvements.

Lon C. Hill of Harlingen, Texas, has played orders for the new sugar refinery which is to be erected on the Hill plantation, and work will soon be started. The cost of the refinery will be \$600,000. Fifteen miles of standard gauge railroad, with equipment, will also be contracted for.

One of the roundhouses of the Texas Central Railroad Company at Walnut Springs, Texas, together with five locomotives, was destroyed by fire December 19, causing a loss exceeding \$50,000.

The construction of a system of water works at Rusk, Texas, which was provided for by the recent issue of \$18,000 of bonds, will soon be started.

The proposition of erecting a municipal electric light and power plant at Waco, Texas, is still under consideration by the municipal authorities. It is planned to issue \$250,000 of bonds for the purpose.

The Uvalde & Leon Valley Interurban Railroad Company, which now operates a gasoline motor car line between Uvalde, Texas, and Sansom, contemplates extending the road to Batesville, a distance of about 25 miles. If the proposed extension is made it is probable that the line will be operated by electric power. This would necessitate the erection of an electric power station.

Citizens of Fort Worth, Texas, have inaugurated a movement to have the city issue \$2,000,000 of bonds, the proceeds of which shall be used for the construction of extensive additions and improvements to the water works plant and other public works. The proposition is meeting with general favor, it is stated, and the bonds will probably be issued as soon as the necessary preliminary arrangements can be made.

To provide an ample supply of water for the city of El Paso, Texas, the City Council has taken steps toward the installation of an additional pump which will have a daily capacity of 4,000,000 gal.

G. W. Smith of Cleveland, Ohio, has purchased from Ed. C. Lasater of Falfurrias, Texas, the water works plant, electric power plant and lighting system and ice factory at the latter town. He will make important improvements and additions.

The City Council of Wichita Falls, Texas, has granted J. W. Culbertson of that place franchise for a natural gas distributing system, which will cover all the business and most of the residence streets. He will pipe the gas to Wichita Falls from the Clay County gas field, a distance of about 15 miles.

The Texas City Light, Sewerage & Water Company, which was recently organized for the purpose of installing an electric light plant, sewer system and water works at Texas City, Texas, has begun work on the sewer system.

The cold storage facilities of the Northern Produce Company at Guero, Texas, will be doubled. It will also install a 30-ton ice plant.

The Austin Street Railway Company, which was recently reorganized with a capital stock of \$1,250,000, will make important improvements and extensions to its property at Austin, Texas. The new incorporators are: R. C. Story of Boston, Mass., William G. Bell and W. H. Folts of Austin.

The Crystal Ice Company, Weatherford, Texas, has obtained authority from the secretary of state of Texas to manufacture gas, electric light and power.

The Weimer Water, Light, Ice & Cold Storage Company, recently organized, has taken over the electric light plant at Weimer, Texas, and will enlarge and improve it by installing additional machinery. The company will also install a water works plant, ice factory and cold storage plant. William Hillje is president of the company.

The Hope Community Irrigation Company will construct a large system of irrigation and install pumping machinery upon its land near Hope, Eddy county, New Mexico. About 20,000 acres of land will be reclaimed. W. P. Riley, W. J. Lewis, H. M. Gage and C. M. Botts are interested in the project.

Arrangements are being made by a French syndicate, represented by E. Brunel, French consular representative at Irapuato, Mexico, for the construction of an extensive system of interurban electric railways in the state of Guanajuato.

The Southwest

KANSAS CITY, Mo., January 9, 1911.

In making their estimates of business for the year that is before us, the leading manufacturers and distributors of the Southwest appear to be a unit in the expectation of liberal orders from all parts of the territory covered by their salesmen. For the past fortnight there has been the usual slowing down in trade, but, now that the holidays are over, it will undoubtedly come back in increased measure.

It is reported from Coffeyville, Kan., that the business interests of that city are endeavoring to secure the location there of the plant of the Eli Bridge Company, an Illinois corporation.

A battery of boilers, high duty pumping engine of 1,000,000 gal. daily capacity and a centrifugal pumping unit are included in the plans for water works improvements at Tulsa, Okla.

Much additional equipment is being installed at Clarks-ville, Ark., by the Arkansas Anthracite Coal & Land Company, Fremont Stokes, manager, giving it greatly enlarged capacity.

The Sherman Iron Works, Oklahoma City, Okla., has been awarded the contract for a sewage plant and system at Yukon, Okla.

A steam turbine power plant is now being installed at Wichita, Kan., by the Kansas Gas & Electric Company.

The Copper Queen Mining Company, Douglas, Ariz., is preparing for the installation of two turbo-generator sets to supply current for operating motor driven machinery.

T. S. Gill and others of Tishomingo, Okla., have organized the Tishomingo Native Granite Company and will install quarrying and handling machinery. Only moderate capacity is to be provided for at the offset, with an increase in equipment later.

Preliminary arrangements for the installation of a pumping plant and water works system are being made at Ralston, Okla.

It is proposed at Newton, Kan., to provide a steam-engine-driven electric unit of 150 kw., motor-driven well pumps and a pumping engine for water distribution in the municipal service plant at Newton, Kan., where a bond issue of \$50,000 for improvements has been authorized.

The Las Cruces Electric Light & Ice Company, Las Cruces, N. M., which is operating an engine-driven generating plant of about 125 kw., has arranged to extend its distribution system.

The Caddo Power Company has been organized at Caddo, Okla., to operate a public service plant.

A bond issue to cover the cost of a municipal pumping system is proposed at Elk City, Kan., where definite action in the matter will probably be taken before spring.

Interests identified with the Kansas City Pump Company, Kansas City, are planning the construction of a plant of considerable size for the manufacture of gasoline engines, ground for which has been acquired.

The Twin Peaks Mining Company, Clifton, Ariz., is planning the construction of a power plant at York station, from which electric current will be transmitted to operate its mining and concentrating machinery.

Two hydraulic rams with a capacity of 12,000,000 gal. daily, are included in the plans for water works extensions at Ada, Okla.

The Missouri Pacific Railway Company is reported to be planning the construction of extensive car building and repair shops at Lexa, Ark., to replace those now operated at Wynne, Ark. Official announcement of this has not, however, been made.

The proposed extension of the water works at Arkansas City, Kan., will not be carried into effect at this time, a bond issue for the purpose having been defeated.

Bids will be opened January 19 by the city of Douglas, Ariz., for the construction and equipment of a water works system. E. P. Archer & Co., Kansas City, are consulting engineers, and specifications may be obtained from them. The machinery required includes two crude oil engines of 110 hp. each, two power pumps of 750 gal. per min. capacity each, two belted air compressors, each delivering 200 cu. ft. of free air per min. at 50 lb. pressure, a five-ton hand crane for the engine room, valves, hydrants, &c.

Extensive plans for the equipment of its property, including the erection of a large ore reduction plant and hydro-electric power station, are reported to have been made by the Climax Mining Company, Prescott, Ariz., where a 10-stamp crushing mill was recently installed.

An oil storage system and steam hoist are being installed by the Mogollon Gold & Copper Company, Mogollon, N. M., and a machine shop for repair work will be built.

W. D. McBee, Clovis, N. M., is organizing a company to install an electric power plant and furnish current for

THE MACHINERY MARKETS

motor-driven centrifugal pumps used in irrigation service, the water being taken from wells.

The Tulsa Boiler & Mfg. Company, Tulsa, Okla., has been awarded the contract for the new bridges to be constructed in the county.

It is proposed at Francis, Okla., to issue bonds for water works.

The Mangum Electric Company, incorporated for \$20,000, has been organized at Mangum, Okla., to install and operate a public service plant.

Shelbina, Mo., is having plans prepared by Rollins & Westover, Kansas City, Mo., for the construction of a water works system at an estimated cost of \$40,000.

Bids will be received until January 26 by Kansas City, Mo., for the construction, delivering and erection of a horizontal shaft centrifugal pump direct connected to vertical cross compound engine of capacity to deliver 30,000,000 gal. of water to an elevation of 50 ft.

Moberly, Mo., is contemplating the construction of an electric light plant. L. G. Knapp & Co., Kansas City, are the engineers in charge.

It is reported that the Utah Light & Railway Company, Ogden, Utah, will enlarge its plant early in the spring.

The city council of Guthrie, Okla., is preparing to expend \$10,000 for extension of water mains.

The Muskogee Mfg. Company, Muskogee, Okla., is erecting a new plant and advises that it will need some new machines and general equipment for a wood working department. Included among the machines to be installed are a spoke and handle machine besides machines for general planing and mill work. The company will also install a complete dry kiln for which it will purchase the entire equipment.

The Oklahoma Railway Company, Oklahoma City, Okla., has plans under consideration calling for an expenditure of about \$200,000 for improvements to its electric light plant. The company contemplates interurban lines to Guthrie and El Reno.

A bill is to be introduced in the Kansas Legislature, which calls for the establishment of a State broom factory, to be installed either at the Lansing prison or the Hutchinson reformatory or both, much like the twine factory already in operation at Lansing, Kan.

The planing mill of J. E. Jones, McAlester, Okla., was destroyed by fire December 28, causing a loss of \$10,000 to \$15,000.

The Northwest

ST. PAUL, MINN., January 9, 1911.

Traveling men who were home for the holidays brought reports of a great deal of activity impending among the local industries of the sections regularly visited by them and left considerable future material for this report in the shape of construction items which can be published as soon as confirmed. It is evident that the States of Montana and Idaho will be the scene of greater activity, from an industrial standpoint, than has been known for at least some years, and the sections farther east are not likely to be any more backward.

George R. Griffith, Pipestone, Minn., will install an electric power plant, for lighting and industrial service, at Minneota, Minn., early in March. Equipment details are now being considered.

The Crown Iron Works, Minneapolis, has the contract for the structural work of the new public building to be erected in Aurora, Minn.

The authorities at Musselshell, Mont., are planning a modern system of water works.

It is stated that Consulting Engineer D. H. Maury recommends to the city of St. Paul the drilling of additional wells and the installation of motor-driven centrifugal pumps.

The installation of additional boilers, a centrifugal pumping unit and high pressure pump are recommended for the sewage plant at Minneapolis.

The woodworking plant of the Hardwood Door Company in St. Paul, which was destroyed by fire, will be rebuilt and improved, the work being transferred for the present to another plant which the company operates in Minneapolis.

The Ball Multi-Spark Plug Company, Minneapolis, has had a large and increasing volume of business during the past year, both in supplying the automobile trade and in filling the requirements of other lines utilizing gasoline engines.

The franchise for an electric plant at Berthold, N. D., is reported to have been granted to John K. Moore, Minot, N. D.

Arrangements are now being completed for the construction and equipment of the new dock of the Carnegie Fuel Company at Duluth, which is expected to be ready for operation by August 1. The vice-president of the company, C. F.

White, whose headquarters are in Minneapolis, is directing the enterprise.

The authorities at St. Lawrence, S. D., are considering means for the installation of an electric power plant to serve the community.

An engineer engaged for the purpose has prepared plans for a municipal pumping plant and water distribution system at Mandan, N. D., where the matter of equipment will be taken up as soon as the construction details have been definitely decided upon.

The Duluth & Iron Range Railroad Company, Duluth, recently let the contract for the steel to be used in the construction of new ore docks and is now making provision for the handling machinery and other equipment.

From Missoula, Mont., it is reported that the Northwestern Development Company will begin work in the spring on the large hydroelectric plant which it has arranged to build at Thompson Falls. Ed. Donlan, the president of the company, has the plans in charge. Surveys are also being made for transmission lines to Burke, Murray, Wallace and other mining districts in Idaho, to which it is proposed to supply operating power for mining and ore reduction machinery.

At Musselshell, Mont., Handel Bros., it is stated, are back of an enterprise to establish an electric power and lighting plant.

New woodworking machinery has been installed in the plant of the A. L. Jordan Company, Columbia Falls, Mont., and more will probably be needed in the spring.

A large electric power and pumping plant will be built in the spring by the Libby Waterworks, Electric Light & Power Company, Libby, Mont.

An air compressor, drilling machinery and other equipment will be installed in the spring by the Montana Ibex Mining Company, on its property not far from Dillon, Mont. The main office of the company is in Butte, Mont., August Heinbach being president, John Eckel vice-president and Robert Sweininger secretary-treasurer.

The planing mill of the Humbird Lumber Company, Sandpoint, Ida., is being remodeled and considerable new machinery will be installed.

The Idaho Consolidated Power Company, Pocatello, Ida., of which J. H. Brady is president, announces that its hydroelectric plant at American Falls, which is equipped with General Electric generators, of 3000 kw., driven by Leffel water turbines, will be supplemented by another development of about 24,000 kw., constituting the main plant of the system.

C. B. Pride, president of the Tomahawk Pulp & Paper Company, Tomahawk, Wis., has organized, with others, the Coeur d'Alene Paper Company, which will establish a manufacturing plant, to cost about \$200,000, in the vicinity of Coeur d'Alene, Ida.

The Virginia Foundry & Machine Company, Virginia, Minn., has purchased a factory site in West Duluth, Minn.

The Duluth Iron & Metal Company, Duluth, Minn., is contemplating the establishment of a branch plant, plans for which have not been prepared.

It is reported from Panama that a railroad ditching machine received from the American Hoist & Derrick Company, St. Paul, Minn., has just been placed in service on the canal. This, it is stated, operates over the tops of the flat cars of a work train and is self propelling, traveling on two portable track sections, which it transfers from one car to another as it proceeds with its work.

The Anoka-Minneapolis Suburban Railway, Anoka, Minn., will begin work in April on an electric line from Anoka to this city, via the U. S. military road.

Advices from Duluth, Minn., are to the effect that an expenditure of \$250,000 for new equipment and the extension of its electric transmission system has been decided upon by the directors of the Great Northern Power Company.

The timber-cutting plant of the Northern Idaho Pine Lumber Company at Lane, Iowa, which burned last month, will probably be rebuilt for larger capacity.

Plans for a hydroelectric plant of 2000 kw. or larger, are being made by the Salem Falls Light & Power Company, recently organized at Payette, Idaho.

At Westlake, Idaho, A. Krammers is building a saw mill. The MacGillis & Gibbs Lumber Company of Milwaukee, Wis., and Spokane, Wash., has established an office at Clarks Forks, Ida., where a large timber cutting plant, electrically operated, will be built shortly.

The County Board of Troy, Mont., has granted a franchise to R. E. Potterfield to install an electric light system.

St. Lawrence, S. D., has under consideration the installation of an electric light plant.

San Francisco

SAN FRANCISCO, CAL., January 3, 1911.

Business was dull during the latter half of December, and so far few new orders have come in, though dealers are

THE MACHINERY MARKETS

figuring on a large number of inquiries, and expect an almost immediate improvement over conditions of the last few months. The outlook for machine tools is hardly as good as in other lines, as there are hardly any inquiries for tools of the heavier types. Travelers in this line report a fair business in the north, but very little either here or in the oil fields. It is possible to get almost any kind of tools of moderate size second-hand at low prices, most of the articles offered having been used only a few years, and second-hand tools are being used quite largely in the improvements now under way.

Several recent developments are expected to have a highly beneficial effect on the general machinery market. The Byllesby interests of Chicago have entered the hydro electric and gas manufacturing business on a large scale in the interior of California and Oregon, acquiring several important mountain power sites, and are already putting in improvements at several points. The gas corporations around Los Angeles have consolidated, and plans are being made for a lot of new machinery in connection with the extension of the distributing systems. The extension of the Northwestern Pacific Railroad will require the boring of several tunnels and other work requiring a large amount of contractors' equipment, in addition to rolling stock, &c., required by this and other local railroads. This road has just received six large locomotives from the American Locomotive Company. Some of the larger oil companies have secured financial support which will enable them to proceed with contemplated improvements. Mining interests are in a better position than for several years, and a large amount of dredging machinery, for reclamation as well as mining purposes, will be required during the year.

Machinery dealers and manufacturers are greatly interested in the recent organization of the United Properties Company of California, with a capital stock of \$200,000,000. F. M. Smith, who controls the Oakland Traction Company and the San Francisco, Oakland & San Jose Railroad, and W. S. Tevis are at the head of the corporation, which was formed to carry out numerous improvements in the public utilities on the east side of San Francisco Bay.

The Oakland Traction Company is preparing to add a large number of new cars to its system. The San Francisco, Oakland & San Jose Railroad will require considerable equipment this year for the work of filling in its mole and dredging a basin, though most of this machinery will probably be constructed in its own shops.

The city of San Francisco has ordered all supplies for the construction of the Geary Street Municipal Railroad, and if the work proceeds as planned a number of cars will be required before the end of the year.

Creditors have filed a petition in the United States District Court asking that the Pacific Jupiter Steel Company be declared an involuntary bankrupt.

The Westinghouse Electric & Mfg. Company has been testing a new type of motor for oil-well drilling, and expects considerable business in this line in the Kern oil fields, into which a new power line is being extended.

Plans have been completed for the power house of the San Francisco Hospital, in which four steam turbine generators will be installed. The hospital will also require a lot of laundry machinery.

The Imperial Iron & Machine Company has been incorporated at Los Angeles, Cal., with a capital stock of \$25,000, by L. V. Boggs, J. A. Strugnell and W. P. Martin.

The Bradrick Machine Works, Porterville, Cal., is planning to start a factory for the manufacture of a new deep well pump.

Several new woodworking machines are to be added to the mill of J. N. Howard at La Mesa Springs, Cal.

The Butte County Pine & Hardwood Company, Oroville, Cal., is preparing to install some new veneer machines.

The Fort Bidwell Consolidated Mines Company, Fort Bidwell, Cal., which recently installed a five-stamp mill, is preparing to purchase a cyanide plant and a portable saw-mill.

C. E. Coggins is installing a new machine shop at Imperial, Cal.

The California Canneries Company is completely remodeling its plants at San Francisco and Napa, Cal., replacing its old equipment with sanitary canning machinery.

The Pacific Electric Company, Los Angeles, Cal., is preparing to open a rock quarry on the La Habra division.

The city of Sacramento, Cal., has adopted specifications for a steam pumping unit for the municipal waterworks.

The California Power Company is preparing plans for a new powder works at Antioch, Cal.

It is reported that the Standard Oil Company, which has a large refining plant at Richmond, Cal., will put up a plant of similar capacity at some point on the southern California coast.

The North American Petroleum Company has let a contract to R. C. Andre, San Bernardino, Cal., for 26 derricks and equipment.

North Pacific Coast

SEATTLE, WASH., January 6, 1911.

A development illustrating the changing conditions in this section is to be seen in the fact that the Vulcan Iron Works, Seattle, will practically go out of the supply business, in which it has long had a large and profitable trade. The accumulated stock of small tools, valves, packing, gauges, bolts, nuts, washers, rivets, nails, pipe, fittings and other material carried for quick delivery will be disposed of as soon as practicable, with the object of devoting the entire energy and facilities of the company to manufacturing and heavy repair work, including the production of structural steel and the handling of iron and steel, in which some large contracts have recently been taken. The company now has a thoroughly modern plant and is well equipped in every way for the work indicated.

Plans for extensive improvements at Auburn, about 20 miles south of Seattle, are generally understood here to have been made by the Northern Pacific Railroad, which will make that point a center for the handling of north coast freight. Repair shops, roundhouses, a fuel storage plant, and about 50 miles of yard trackage will be provided for, the total expenditure involving nearly \$1,000,000.

The Diamond Iron Works of Minneapolis, Minn., has opened a district sales office in the Realty Building, Spokane, Wash., to look after its growing trade in Eastern Washington, Oregon and Idaho.

William McIntyre, Western Representative of the McDonough Mfg. Company, who makes his headquarters at the Coeuer d'Alene Hotel, Spokane, Wash., is introducing to the trade a drop-forged dog, made of tool steel, which will fit any carriage knee now manufactured.

The Spokane Chamber of Commerce, Spokane, Wash., is considering means for securing additional industries, and it is proposed to have a tract of 1000 acres set aside by the city as the location of free sites to be offered to manufacturers who will establish new plants there.

The city of Raymond, Wash., has completed the installation of a large pumping unit to be used exclusively for fire protection.

The Pacific Tank & Silo Company, recently organized, is arranging for the construction of a manufacturing plant at Chehalis, Wash. W. A. Bricker is vice-president and will serve as manager.

It is reported from Pasco, Wash., that the erection of a large electric generating plant will be begun there shortly by the Pacific Power & Light Company.

The United States Blower Company, Seattle, installed its motor-driven blower systems, during the past year, in many of the larger plants on the Coast.

Improvements now being completed at the mill of the Weyerhaeuser Timber Company, Everett, Wash., include four new boilers from the shops of the Casey & Hedges Company, Chattanooga, Tenn., whose sales in this section during the past year have been considerably extended.

The Johnson Automatic Switch Company, Spokane, Wash., which has been incorporated with \$100,000 capital stock, is reported to be planning the erection of a manufacturing plant there and another in the East.

A saw mill and box factory are to be built during the year at Skamokawa, Wash., by the Matthews & Laughlin Company, in addition to the plant recently erected there for the manufacture of shingles.

The Bingen Mfg. Company, recently incorporated at Bingen, Wash., by Suskind Brothers, will install machinery for box making in a plant to be built for the purpose.

The Puget Sound Electric Railway, which operates the plant of the Tacoma Railway & Power Company, Tacoma, Wash., is planning to extend its system, thereby necessitating additional power. Current is now taken from the hydro-electric station of another company, but an auxiliary steam plant is maintained.

Arrangements are being made by Leavenworth, Wash., to establish a water works system at a cost of \$40,000.

The City Council of North Yakima, Wash., is considering the construction of a municipal water works system.

The Pacific Coast Power Company has under construction on the White River near Tacoma, Wash., a large hydro-electric power plant, in which will be installed the largest hydraulic turbines ever built. The plans call for the construction of a dam, intake canals and power house, and the installation of two power units, each of which consists of a 10,000-kw. generator direct connected to a 20,400-hp. reaction turbine. Provision is made for an ultimate total of six of these units.

Notes on Motor Truck Performances

In the pioneer use of motor trucks experiences were so often disappointing that the belief became firmly entrenched that they cannot compete with horse drawn commercial vehicles. Particularly in reliability and economy, the two principal considerations, they seemed to be then deficient, and it has required much in the way of arguments and demonstrations to combat the popular prejudice still persisting that motor trucks cost more to maintain and are more likely to break down than horses and wagons. Actual performances are the most impressive evidences of the fact that commercial motor vehicles have reached the stage of dependability and offer a reduced cost per ton-mile of material handled, and the following random instances of records made, furnished by the Publicity Department of the Commercial Vehicle Show, Chicago, are therefore interesting:

Coal and Ash Handling

A 5-ton motor coal truck in the service of the Syracuse University hauls an average of 45 tons of coal a day from the Delaware, Lackawanna & Western Railroad coal pockets in Syracuse, N. Y., to the university. The distance is 3 4-10 miles, and three-quarters of the distance is up grade, the average being 7 per cent. and the maximum 12 per cent. One man operates the truck, which is loaded by gravity from the coal pockets, and delivers its loads by gravity through a chute in the side of the steel body into underground coal bins through manholes. In one day recently the truck hauled 46 6-10 tons of coal to the university in nine loads, and in addition hauled two 5-ton loads from the coal pockets to the downtown building of the institution.

A 3-ton motor truck with self-dumping steel body has been used for some time in upper New York City in fulfilling a contract taken by McDonald & Barry to fill in a tract of low ground at Broadway and 204th street. The truck hauls loads of wet ashes from a power house about a mile away. Each load contains 7 cu. yd., or just double the load hauled in a horse-drawn wagon. The motor truck makes 10 to 12 trips a day, as compared with an average of five or six trips made in a working day with horses. Thus the power vehicle is doing the work of four horse-drawn wagons, and is hauling from 70 to 84 cu. yd. of material a day. In this case the saving in time is of especial importance, because the filled ground is to be used for the construction of buildings that are badly needed by the owners.

Large Barrel Trucks

Writing of the work done by two motor trucks fitted with special rack bodies of unusual cubic load capacity, J. B. Wagner of the Federal Cooperage Company, Yonkers, N. Y., says: "Our delivery expense has been considerably lessened since they have been installed. We find that we can accomplish as much work with two of these trucks as we previously could with four teams and with less trouble and anxiety. Heretofore we have had a stable of 10 horses, but since installing these trucks we have reduced that number to two and have eliminated our stable trouble, such as sick horses, &c."

Police Service

Six motor patrol wagons and ambulances have displaced 10 horse-drawn wagons and 36 horses in the Detroit Police Department. The efficiency of this branch of the department has been practically doubled since the installation was made, although considerable economy has resulted from the decreased number of drivers and helpers needed. Up to last September the first motor patrol wagon, which was placed in service last January, responded to 4203 calls and traveled 11,163 miles. The total expense incurred, exclusive of drivers' wages and depreciation, was \$731.85. Experienced police officers state that it would require 12 horses and two horse-drawn wagons, four patrolmen and one hostler to provide an equivalent service and that the cost for such an equipment for eight months would be practically \$4000.

Delivery Wagons

Averages compiled from actual records of 20 light motor express and delivery wagons operating in as many different lines of trade in Syracuse, N. Y., for periods of time ranging from 6 to 22 months, show annual operation and maintenance costs as follows: Fuel and oil, \$168; depreciation estimated at 20 per cent., \$180; repairs and replacements, exclusive of tires and ignition batteries, but including repairs due to accidents and drivers' carelessness, \$150; drivers' wages, at \$12 a week, \$624; tires, \$50; interest on investment at 5 per cent., \$45. This gives a total cost per wagon of \$1217 a year. The machines average 50 miles a day. Assuming that two single horse wagons could do the work of one of the motor wagons, and that the cost of stabling, shoeing, drivers' wagons and other items averaged \$22 a week, the horse service would cost \$2112 a year, or \$895 more than the motor wagon. Syracuse is subject to very severe winter conditions and in general has very poor pavements, while many streets are not paved at all. Hence the actual figure of \$13.25 per month per car for repairs arrived at by the records of a score of wagons in a variety of services is considered an excellent average upon which to base estimates for maintenance repairs for this particular type of power vehicle.

Six 1-ton motor delivery wagons used by the Chicago Public Library for distributing and collecting books among the branch circulating libraries in the city average 33 miles a day apiece. One has been in regular service since 1904, and several of the others have passed by several years the period for which depreciation was figured. Depreciation is generally estimated now at 20 to 25 per cent., giving the machine an assumed useful life of four or five years. The total annual cost for operation and maintenance is \$10,846.62, or an average of \$6 per working day per truck. At least 10 horses and wagons and four extra drivers would be needed to do the same work, figuring 20 miles a day as the horse's maximum day-in and day-out capacity. The difference in wages alone would amount to at least \$2000 a year. A large reserve equipment of animals would be required, necessitating additional cost for stabling.

Small Motor Trucks

Fourteen longshoremen with hand trucks have been displaced at the Hoboken, N. J., docks of the Hamburg-American Steamship Company, by a three-wheeled platform truck of 1-ton capacity, which has a low platform 5 x 12 ft., without sides, and can travel 24 miles a day on one charge at a rate of 4½ miles an hour. Two similar 1-ton trucks and two three-wheeled trucks with a carrying capacity of 4 tons are used for transferring castings and finished parts from one part of a factory in a large industrial plant to another and between factory buildings. They can be taken on freight elevators to any floor in the factory buildings. The four-motor industrial trucks, which operate independently of rails and have rubber tired wheels, are to-day doing the work of many horses formerly used and a large gang of men.

The Western Steel Corporation.—At its Irondale, Wash., works the Western Steel Corporation, Seattle, Wash., is just completing the installation of a 9-in. mill and the building of a continuous heating furnace in connection with it. A continuous ingot heating furnace is under construction for the 22-in. mill, and will be ready for operation in a few weeks. The No. 3 open hearth furnace is nearly completed, and a charging machine, built by the Wellman-Seaver-Morgan Company, is being installed. Recently added equipment includes additional shears and a Ryerson friction saw.

The O. K. Wheelock Company, now manufacturing brass and iron bedsteads in Cleveland, Ohio, has decided to remove to McKeesport, Pa., where it will erect a building, 82 x 250 ft., which will be equipped with much new machinery. The removal is made to be nearer the source of raw materials.

Personal

John B. Miles has retired from the engineering firm of Frank C. Roberts & Co., Real Estate Trust Building, Philadelphia.

O. P. Letchworth, president of the Pratt & Letchworth Company, Buffalo, has returned from a European trip.

Frank N. Wells has retired as superintendent and treasurer of the Humason & Beckley Company, New Britain, Conn., to become actively interested in the management of the Beaton & Corbin Company, Southington, Conn., of which his late father was president and of which he himself is vice-president, and his brother, A. R. Wells, secretary and treasurer.

Th. Hansen, formerly superintendent of the Chicago Brass Company, Kenosha, Wis., has identified himself with the Wire Specialty Works of Chicago as superintendent, making a feature of designing and building special automatic machinery.

H. A. Foster, an instructor in the engineering department, University of Cincinnati, Cincinnati, Ohio, has resigned, and on February 1 will take charge of the mechanical department of the Oliver-Schlemmer Company, Cincinnati.

Walter H. Whiteside, president of the Allis-Chalmers Company for the past five years, has resigned, and has been succeeded by D. W. Call, formerly assistant to the president of the American Steel Foundries.

John R. Magarvey, until recently manager of the Brooks plant of the American Locomotive Company at Dunkirk, N. Y., and now manager of the Schenectady plant of the same company, was last week presented with a gold watch by the heads of Dunkirk departments on the occasion of his leaving for Schenectady.

W. M. Lawton has severed his connection with the Lake Erie Nail & Supply Company, Cleveland, Ohio, of which he was sales manager, and has opened an office at 1227 Engineers' Building, Cleveland, where he will deal in machinery, transmission and steam specialties.

F. S. Bigler, who had been with the Upson Nut Company, Cleveland, Ohio, for more than three years, has returned to the Michigan Bolt & Nut Works, Detroit, as general manager, having formerly been with this company 20 years and had been its secretary for 10 years. E. T. Gilbert, who had been the manager for many years, died last August. Other officers of the company are now as follows: E. Y. Swift, president; L. L. Barbour, vice-president; H. MacLean, secretary and treasurer.

Vice-President J. F. Taylor of the Lake Superior Corporation, Sault Ste. Marie, Canada, has been appointed general manager and W. C. Franz has been made vice-president with charge of transportation interests. Consulting Engineer Ernst becomes general manager of the Algoma Steel Company, with C. E. Duncan as general superintendent.

E. C. Wallace, president of Milliken Brothers, Inc., has been elected a director of the National Park Bank, New York.

On the evening of December 31 a dinner was given at the Hotel Plaza, New York, to the heads of departments of Milliken Brothers, Inc., by E. C. Wallace, the president of the company. There were present, besides Mr. Wallace, F. Dykes, the general manager; J. M. Ellis, T. S. Fuller, J. M. Ryan, C. W. Eckhardt, F. H. Boyle, J. E. Jennings, H. M. Ward, S. J. Reeves, R. Harragan, W. T. Voegel, L. B. Loomis, C. R. MacCarey, J. P. Pittinger, G. M. Wambold, C. E. Buckton, McC. Reeves, N. W. Place, W. J. Sage, E. H. Frizell, J. C. English, H. K. Ryerson, G. B. Thorne, C. H. Zehnder, Guy Van Amringe, E. J. Kohler, L. F. Doyle, D. L. Hough, P. G. Brown, E. Barlow, C. R. Hedden, H. S. Manning, A. H. Larkin, H. Hodgkiss and J. M. Bowers.

The Philadelphia & Reading Railway Company is reported to have decided to build 23 passenger locomotives at its own shops at Reading, Pa., during the first half of the year.

Obituary

JAY E. SPAULDING, Winsted, Conn., died January 6 from injuries by a fall down a stairway, aged 64 years. He was born in New York City and removed to Winsted in 1866. He was president of the New England Pin Company, New England Knitting Company, Morgan Silver Plate Company and Carter & Hakes Machine Company, and was also connected with other local industries. He leaves a widow and a daughter.

LESLIE M. SAUNDERS, head of the firm of D. Saunders Sons, Yonkers, N. Y., manufacturers of machinery, died January 5, aged 69 years. His father founded the business.

E. E. HANNA, founder and formerly president of the Hanna Engineering Works, died January 5 at his residence in Chicago, aged 49 years. He was a member of the American Society of Mechanical Engineers.

New Railroad Equipment.—Announcement is made that the locomotive order from the Harriman lines, which has been pending for some weeks, has been awarded to the Baldwin Locomotive Works—185 being freight and 11 passenger locomotives. The Baldwin Works will also build 24 freight locomotives for the Pittsburgh, Shawmut & Northern. The Philadelphia & Reading will build 20 passenger locomotives at its Reading shops. The Canadian Pacific has ordered 75 locomotives from the Montreal Locomotive Works and its own shops. The New York, Ontario & Western has ordered 450 coal cars from the American Car & Foundry Company. The Santa Fe has ordered 500 refrigerator cars from the American Car & Foundry Company, and the St. Louis Southwestern will buy 500 refrigerator cars in addition to 1500 box and 500 furniture cars, heretofore reported. The Canadian Pacific recently ordered 2200 cars from its own shops and 1300 from car builders, and the Algoma Central & Hudson Bay is planning to buy 514 cars. The Great Northern, which recently bought 500 ore cars, has also ordered 75 tank cars.

The Apollo Sheet Steel Calendar.—The American Sheet & Tin Plate Company, Pittsburgh, Pa., is distributing the Apollo all-metal perpetual calendar. This is unique, being made entirely of the sheet steel products of the company. The back is made of an Apollo best bloom No. 28 galvanized sheet, 14 x 20 in. The date cards are made of No. 34 annealed sheets, enameled black with dates printed in aluminum. The calendar is handsomely lithographed in four colors, and has a bright chain hanger attached. While the company has given these calendars a wide distribution, the prospects are that a new edition will have to be brought out to meet the demand which has proved very great. It was the intention of the company to place one with every sheet metal shop, supply house and user of sheet and tin mill products in the country.

The Variety Iron & Steel Works Company, Cleveland, Ohio, has secured a contract from the Richard Heckscher & Sons Company, Philadelphia, for the new blast furnace, to be built at the Heckscher plant of the Alan Wood Iron & Steel Company at Swedeland, Pa. The new stock will have a capacity of 350 to 400 tons a day. Work will be started at once, it being the intention to have the stack ready for operation by the middle of summer. Julian Kennedy, Pittsburgh, Pa., is the engineer.

The fire which visited the plant of the Kansas City Bolt & Nut Company, Kansas City, Mo., January 6, completely destroyed the burring room, nutting room and the bolt and nut shipping department. A large part of the plant is of fireproof construction and was not affected. Temporary quarters are being established and shipments will be renewed in a few days. The loss on buildings and stock is about \$25,000, covered by insurance. Plans are already under way to replace the burned portions with modern fireproof buildings.

The Lake Superior Iron & Chemical Company

In connection with the recent offering in London of \$3,000,000 6 per cent. bonds of the Lake Superior Iron & Chemical Company, Detroit, Mich., a statement is made concerning the properties, based on a letter written by W. H. Matthews, vice-president and general manager. From this the following data are taken:

The company had previously issued \$3,500,000 of bonds, and the recent \$3,000,000 (of which \$2,000,000 has been applied for in England and Canada) makes a total of \$6,500,000 out of \$10,000,000 authorized. The preferred stock is \$1,625,000, and the common stock issued is \$8,375,000, out of a total of \$10,000,000 authorized. The properties acquired on the reorganization of the company July, 1910, are given as follows:

1. Six charcoal pig iron furnaces, four with chemical and charcoal plants, one with small charcoal capacity, one with long-term contract for charcoal. Pig iron capacity, 198,000 tons per annum.

2. 137,551 acres of hardwood land in fee (111,671 acres virgin forest), and contracts covering the cord-wood on 190,230 additional acres, assures the company a full supply of cord-wood for at least 30 years. Our policy, however, is to make stumpage contracts with outside parties and to hold intact the standing timber, which has great prospective value as lumber.

3. 47 miles of standard-gauge railroad with 90 cars, 11 locomotives, stock cars, boarding cars, &c. This railroad leads from two transcontinental lines and enables the company to operate the woodlands in connection with the various plants most economically.

4. Long lease of the Yale iron mine, which has now blocked out some 800,000 tons of ore, with a large additional amount still undeveloped. Also another only partly developed mine.

Independent Valuation, \$5,977,425, with \$2,675,000 New Cash for Improvements and Working Capital.

Furnaces and equipment.....	\$1,313,720
Chemical plants and equipment.....	619,186
Yale Mine (profits, ore blocked out).....	825,830
Woodlands, owned in fee.....	2,662,539
Stumpage contracts, advance payments.....	145,680
Railroad and equipment.....	265,069
Lumber camps and equipment.....	145,411

New Money provided—

Cash to remodel chemical plants.....	1,000,000
Working capital (cash).....	1,675,000

Concerning the plans for new construction and the expected production the letter says: "It is proposed that the four kiln plants now in use shall be at once rebuilt and remodeled, and a complete new plant built at Chocoma. At the new plants there should be procured between 10 and 12 gal. of wood alcohol from each cord of wood carbonized, instead of 4 gal. under the old method, and from 160 up to 190 lb. of acetate of lime per cord, instead of between 70 and 80 lb. Arrangements made with the Wood Products Company of Buffalo and the United States Industrial Alcohol Company insure preferential terms in this market, and make practically certain that our products will always be taken as rapidly as produced. The presence on the board of the president of the United States Industrial Alcohol Company and of a member of the firm of Rogers, Brown & Co., who have a large financial interest in the company, insures friendly co-operation. The Wood Products Company of Buffalo, which is a subsidiary of the United States Industrial Alcohol Company, handles about 95 per cent. of the wood alcohol made in the United States. Rogers, Brown & Co. (the largest sellers of pig iron in the United States) have undertaken the sale of the pig iron."

The estimated earnings after the remodeling of the chemical plants are given below:

Charcoal pig iron, 198,000 tons, at \$3.50 profit.....	\$693,000
Wood alcohol, 3,420,000 gal., at 23 cents per gallon, \$786,600; acetate of lime, 61,560,000 lb., at 1.6 cents per pound, \$984,960; total net selling value at plant, \$1,771,560; less additional fuel and labor costs at chemical plants, \$684,000.....	1,087,560

Total.....	\$1,780,560
Deduct 25 per cent. to cover possible shutdowns, slack trade, &c., Deb.....	445,140
and add net profits from Yale Mine, say 100,000 tons per annum, at 75 cents per ton, Cr.....	75,000

Total estimated net earnings before allowing for depreciation and interest charges.....\$1,410,420

The reports of net earnings, before deducting interest

or depreciation, show \$503,459 in 1905, \$626,494 in 1906, \$951,310 for the 16 months ending April 30, 1908, \$72,848 for the fiscal year ending in 1909, and \$463,503 for that ending in 1910. The low earnings in 1909 are attributed in part to the panic and in part to the disorganization following the death of the chief owner.

December Copper Production and Stocks

The Copper Producers' Association has issued its December report of production and stocks. The decrease in stocks during the month was 8,358,874 lb.; the increase in production was 3,985,756 lb.; the decrease in domestic deliveries was 17,207,974 lb.; the increase in exports was 20,699,759 lb. The report is as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States December 1.....	130,389,069
Production of marketable copper in the United States from all domestic and foreign sources during December	123,339,219
Deliveries of marketable copper during December:	
For domestic consumption.....	43,594,018
For export.....	88,104,075

Total.....	131,698,093
Stock of marketable copper of all kinds on hand at all points in the United States January 1, 1911..	122,030,195

The association has also issued a summary for the year 1910, which shows that the total production of copper was 1,452,122,120 lb., and the total deliveries were 1,471,858,036 lb., showing that the reduction in stocks during the year was 19,735,916 lb.

The Steel Corporation's Unfilled Orders

The monthly statement of unfilled orders on the books of subsidiaries of the United States Steel Corporation, given out January 10, showed that the total on December 31 was 2,674,757 tons, as compared with 2,760,413 tons on November 30, a falling off of 85,656 tons. While the statements for the past three months have shown amounts less than the 3,027,436 tons of September 30, 1904, which previously was the low point in unfilled orders, it is explained that on the present basis of computation the orders on hand September 30, 1904, would have been reported at 2,434,736 tons. At that time inter-company orders were included. The statement for December 31 compares with others of the past two years as follows:

December 31, 1910..	2,674,757	March 31, 1910....	5,402,514
November 30, 1910..	2,760,413	December 31, 1909..	5,927,031
October 31, 1910...	2,871,940	September 30, 1909..	4,796,833
September 30, 1910..	3,158,106	June 30, 1909.....	4,057,939
August 31, 1910....	3,537,128	March 31, 1909....	3,542,595
July 31, 1910.....	3,970,931	December 31, 1908..	3,603,527
June 30, 1910.....	4,257,794		

The unfilled orders at the close of the years preceding 1908 were as follows: 1907, 4,624,552 tons; 1906, 8,489,718 tons; 1905, 7,005,086 tons; 1904, 4,696,203 tons; 1903, 3,215,123 tons; 1902, 5,347,523 tons.

Continuous Foundry Operation.—In the article by G. K. Hooper in *The Iron Age* of January 5, page 76, two illustrations were given of the arrangement of foundries recently built in the United States, in which the molds are carried to the iron. The second of these was of a two-story foundry in which cupola malleable castings are made. While the context indicated clearly which illustration was meant, the titles of Fig. 2 and Fig. 3 were exchanged by an error in the make-up of the article. What was shown as Fig. 2 was, in fact, a plan and longitudinal section of a foundry in which the iron is carried to the molds.

The Roanoke Bridge Company, Roanoke, Va., recently incorporated, is planning to build a structural steel and bridge plant. The main building will be of steel construction, 35 x 140 ft., with an addition 25 x 90 ft. An office building will also be erected. The total cost of the plant, including machinery, is estimated at \$30,000. E. C. McComb is president of the company.

Trade Publications

Ice and Refrigerating Machinery.—The American Machine Company, 500 East Main street, Louisville, Ky. Catalogue. Describes with considerable detail the construction of the American absorption machine. Following this description of the general construction, each part of the machine is described with a view to calling attention to the manner of its construction and the duties it has to perform, the text being supplemented by the illustrations.

Dryers.—The Atlas Dryer Company, Cleveland, Ohio. Pamphlet, entitled "A Thesis on the Art of Drying." Describes the principles underlying the construction and operation of the Atlas dryer for all classes of material.

Compasses and Nautical Instruments.—E. S. Ritchie & Sons, 112 Cypress street, Brookline, Mass. Catalogue. Shows the Ritchie liquid compass, the distinctive feature of which is the attachment to the card of an air chamber that supports almost the entire weight of the card, thus reducing wear on the pivot and increasing the sensitiveness of the compass. The other instruments covered include various types of compasses, binnacles and azimuth and horizontal and vertical force instruments.

Unloading Car Chute.—The Quick Unloading Car Chute Company, Birmingham, Ala. Pamphlet. Concerned with a chute for quickly loading wagons from cars which was illustrated in *The Iron Age* October 7, 1909.

Ventilating Apparatus.—Henry Kroder Company, Passaic, N. J. Pamphlet. Contains a number of views of installations of the Yon-ree-ka ventilating apparatus, which is said to be the most improved gearing for operating monitor, segment and greenhouse sash. The special advantages claimed for this machine are the opening and closing of three times as many sash as any other device, faster operation and the consumption of less power.

Road Graders.—J. D. Adams & Co., Indianapolis, Ind. Several circulars. Refer to a number of pieces of road making and grading machinery, which includes the Road King, Little Roadster and Road King, Jr., graders, and the Peerless road drag. The special advantage claimed for these graders is adjustable leaning wheels on the land side which counteract the side pressure of the earth against the mold board and prevent all side slipping. The drag is said to be the original tilting blade road drag, in which the pitch of the blades is under perfect control and the angular travel on the road can be regulated.

Gasoline Engines.—Althaus, Ewing & Co., Bluffton, Ohio. Folder. Concerned with gasoline engines for small machine shops. Two sizes of engine, 1 and 4 hp., are built and the general features of their construction are described.

Bolt Cutters, Nut Tappers and Pipe Threaders.—Wells Brothers Company, Greenfield, Mass. Catalogue No. 28. Size 4½ x 7½ in.; pages 51. Illustrates and describes with full specifications the complete line of Little Giant bolt cutters, nut tappers and pipe threaders. An illustrated description of the Little Giant automatic die head appeared in *The Iron Age* April 28, 1910.

Grinding Machinery.—Buffalo Emery Wheel Company, 127 Ash street, Buffalo, N. Y. Several circulars. List a number of foot and belt power grinding machines as well as various styles and shapes of emery wheels.

Reinforced Concrete Construction.—The Turner Construction Company, 11 Broadway, New York City. Bulletin No. 9. Is descriptive of reinforced concrete construction for factories and warehouses and illustrates two typical contracts which were recently completed. Of special interest are two pages giving details for attaching shafting, piping, &c., to concrete.

Gas and Gasoline Engines.—Columbus Machine Company, Columbus, Ohio. Pamphlet. Points out the advantages of the Columbus engine for operation by gas, producer gas and gasoline. Special engines for operating electric generators, geared pumping and hoisting engines and a portable engine are shown, as well as an automatic suction gas producer.

Boiler Feed Pumps.—The Platt Iron Works Company, Dayton, Ohio. Bulletin No. 555. Relates to the Smith-Valle boiler feed pumps. The styles covered include packed piston, outside center packed plunger, outside end packed plunger and vertical packed pumps in both duplex and simplex types and automatic feed pumps and receivers, steam actuated general service pumps and triplex boiler feed and general service pumps. All the different styles of pumps are illustrated and there are a number of extensive dimension tables included.

Motor Trucks.—R. L. Morgan, Worcester, Mass. Folder. Gives brief description and specifications for a 5-ton truck.

Condensers.—C. H. Wheeler Mfg. Company, 1409th avenue and Eighth street, Philadelphia, Pa. Bulletin No. 12. Deals with the Wheeler surface and jet condensers and contains a number of illustrations of the various types.

Gas and Gasoline Engines.—C. H. A. Dissinger & Brother Company, Wrightsville, Pa. Two catalogues. The first,

A, relates to a line of stationary and portable gas and gasoline engines which are made in sizes ranging from 3 to 140 hp. The various engines are illustrated and the special features of all of them are illustrated and described at length. Catalogue B relates to the Capital gasoline traction engines, which are made with both single and double cylinders in sizes ranging from 18 to 80 hp. for a large number of speeds in both directions.

Cinder Cars.—Weimer Machine Works Company, Lebanon, Pa. Loose leaf circulars. Illustrations and descriptive matter explain the operation of a number of tilting cars for conveying cinders and molten metal. These cars can be furnished to operate either by hand power, steam, air or electricity. An illustrated description of one of these cars appeared in *The Iron Age* January 5, 1911.

Protective Paint for Iron and Steel.—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Booklet. Describes the latest Smooth-On product, which is known as Smooth-On Protective Paint for Iron and Steel. This paint is designed to permeate the pores of the iron or steel, thus furnishing a positive and lasting protection to the metal.

Lathes and Attachments.—Foster Machine Company, Elkhart, Ind. Circulars A to J, inclusive. Deal with various types of turret lathes of both the plain, geared friction and set over head types, and attachments such as die heads, knurling tools, slide rests and chucks. All of the various tools and attachments are illustrated and brief specifications are given.

Laboratory Appliances.—The Braun Corporation, 363 New High street, Los Angeles, Cal. Catalogue. Size, 6 x 9 in.; pages, 88. Pertains to a complete line of laboratory appliances, which includes pulverizers, crushers, ore samplers, furnaces of various types, burners, cupel and briquetting machines, cyanide plants and electrolytic outfits. Each of the various appliances is illustrated and a brief description with tables of dimensions is given.

Lathes.—Flather & Co., Nashua, N. H. Several circulars. Call attention to a line of change gear lathes, the swings of which range from 13 to 28 in., and a 13-in. engine lathe. The make up of all the circulars is the same, an illustration of the tool being given on an inside page, with specifications on the facing page.

Presses.—William R. Perrin & Co., Loomis and Forty-sixth streets, Chicago, Ill. Two catalogues. No. 9 points out the advantages of a line of filter presses for all kinds of industrial purposes. No. 10 gives general description and specifications for a number of hydraulic presses, capable of exerting pressures ranging from 20 to 300 tons.

Lathes.—Bradford Machine Tool Company, Cincinnati, Ohio. Catalogue. Size 6 x 9 in.; pages 80. Illustrated. Pertains to a line of lathes which includes the standard triple geared lathes, quick change gear lathes and tool room and turret lathes. The description of the features common to all the tools is given first and is followed by specifications of the different lathes which are given on the pages facing the illustrations.

Elevators.—Warsaw Elevator Company, Warsaw, N. Y. Loose leaf catalogue. Size 9 x 12 in. Describes and illustrates several types of passenger and freight elevators and electric elevator machines and plunger hydraulic sidewalk hoists.

Clay Working Machinery.—The Anderson Foundry & Machine Works, Anderson, Ind. Catalogue. Illustrated. Calls attention to the dry press system of making pressed building, front, ornamental and fire brick. The various machines required include a brick press, a disintegrator, a dry pan, clay pulverizers, mixers and feeders. All of these machines are described and brief tables of dimensions and specifications are included.

Gas and Gasoline Engines.—The Perkins Wind Mill Company, Mishawaka, Ind. Catalogue No. 52. Illustrates and describes a line of gas and gasoline engines which are made in both air and water cooled cylinder styles for portable and stationary use. The special features of these engines are illustrated and described and space is given to a number of accessories designed to be operated by these engines, such as pumps, hoists, feed grinders, saws, &c.

Gasoline Engines.—The National Engineering Company, Saginaw, W. S., Mich. Catalogue. Illustrates and describes the New Model and Michigan gas and gasoline engines, pumps and pumping jacks. The New Model engine is built in one size, 2 hp., in three styles, while 12 sizes of Michigan engine, ranging from 3½ to 50 hp., are constructed. If desired the New Model engine and the four smaller sizes of Michigan engine can be furnished equipped with deep well pumping attachments.

Corrugated Copper Gaskets.—Hampden Cornice Works, Springfield, Mass. Folder. Illustrates a line of circular and rectangular corrugated copper gaskets and gives prices for all the different sizes made.

Sewer Pipe.—Blackmer & Post Pipe Company, Wainwright Building, St. Louis, Mo. Catalogue. Illustrates a line of salt glazed vitrified sewer pipe of both standard and double strength, drain tile, wall coping and conduit tile, and fire clay

due lining, chimney pipe and chimney tops. Prices are given for all the different sizes of the various products and the special fittings used with each kind are illustrated.

Electric Light and Electric Appliances.—General Electric Company, Schenectady, N. Y. A pamphlet and three bulletins. The pamphlet, which is No. B-3006, is a reprint of a paper read before the National Electric Light Association on the subject of "Street Illumination." It compares the results obtained from the use of luminous and flaming arcs with those resulting from the use of open and closed carbon arcs and the subject which is discussed in detail is treated from the viewpoint of an illuminating engineer. There are numerous illustrations showing the illumination in various cities. Bulletin No. 4602-B is the third edition of the company's publication on automatic voltage regulators for direct current generators. No. 4782 illustrates and describes exciter panels for use in connection with alternating current generator panels when for any reason separate control of the exciter is desired. A complete description of these panels, together with a diagram of the wiring connections and table of dimensions is included. No. 4786 describes a simple motor signal having mechanism suitable for either two or three position operation in either of the upper or the lower quadrant. This mechanism is also applicable to either top or bottom mast operation with only slight modifications. Interior and exterior views of the signal and a detailed description of it and the apparatus used in connection with its operation are included.

Gas Furnaces.—The Westmacott Gas Furnace Company, Inc., Providence, R. I. Circular. Contains a number of illustrations of different styles of heating, annealing and muffle furnaces, brazing tables and shop forges. Brief specifications of the various types are given under the illustrations.

Furnace Reversing Valves.—The S. R. Smythe Company, Pittsburgh, Pa. Pamphlet. Refers to the Schild reversing valve for gas or air which is designed for use in steel, iron and glass furnaces and for all industrial purposes where it is necessary to reverse the direction of the gas or air flow. The special advantages of this valve over other types now in use are given at length and there are illustrations showing the construction of the valve.

Drawing Materials.—The Frederick Post Company, 214 South Clark street, Chicago, Ill. Catalogue and price list. Size 4½ x 5½ in.; pages 446. Describes with numerous illustrations a very complete line of drawing materials and mathematical instruments. A fairly comprehensive list of books on scientific subjects occupies 22 pages, and a 12-page alphabetical index completes the catalogue.

Metal Goods.—Acorn Brass Mfg. Company, Green, Fulton and Peoria streets, Chicago, Ill. Loose leaf catalogue. Covers an extensive line of metal goods made from brass, copper, steel, zinc, aluminum, bronze, German silver and nickel, which includes sight feed oil pumps, priming cups, brass connections for tubing; gasoline, pressure and storage tanks, and various kinds of stamped, drawn and spun metal goods.

Metal Sheets.—The Stark Rolling Mill Company, Canton, Ohio. Folder. Concerned with Alumatoyd sheets which are special steel sheets coated with an alloy of aluminum. One of the features claimed for these sheets is absolute freedom from rust and paint scaling.

Mining and Milling Machinery.—The F. M. Davis Iron Works Company, Eighth and Larimer streets, Denver, Colo. Five catalogues. No. 32 calls attention to a line of mine supplies including ore cars, ore and water skips, mining cages and track. No. 35 is devoted to power transmission machinery and contains a large number of dimension tables. No. 37 illustrates and describes various kinds of ore milling machinery, while No. 38 treats of smelter machinery. No. 43, relates to the Ferraris mill which is a modification of the standard type and is especially adapted to the wet crushing of ores for concentration, cyanidation, &c.

Pipe Threading and Cutting Machinery.—The Merrell Mfg. Company, Toledo, Ohio. Bulletins No. 14 to 21. Illustrations and descriptive matter explain the operation of an extensive line of pipe threading and cutting machinery. Among the different machines shown are pipe and nipple mills, portable hand machines, combined hand and power machines and motor and engine driven machines.

Refrigerating Machinery.—Buffalo Refrigerating Machine Company, 126 Liberty street, New York City. Bulletin No. 11. Shows a line of ice making and refrigerating machinery, ranging in capacity from 3 to 100 tons.

Drilling Machines and Saws.—Frontier Iron Works, Letchworth and Grant streets, Buffalo, N. Y. Loose leaf circulars. Cover a line of drilling and tapping machines and power hack saws. Illustrated descriptions of two of the tools, the Modern 20-in. drill press and a 16-in. high speed geared drilling and tapping machine, appeared in *The Iron Age* May 19 and October 27, 1910, respectively.

Steam Turbines.—The Ball & Wood Company, Elizabethport, N. J. Brochure. Size 6 x 9 in. Relates to the Rateau-Smoot impulse turbine which this company is building for high, low and mixed flow pressures. The special feature of the new

mixed flow type is the employment of a straight low pressure turbine with supplementary wheels so as to use high pressure steam economically by an automatically controlled governor.

Wire Lath.—Roebling Construction Company, Fuller Building, New York City. Pamphlet. Treats of the Roebling standard wire lath, which is made in a number of different meshes and shows some of the uses to which it may be put.

Cotton Ginning Machinery.—Gullett Gin Company, Amite, La. Catalogue, 9 x 12 in.; pages 56. Illustrations and descriptive matter explain the operation of a line of machinery for elevating, cleaning and baling cotton and handling the refuse. Drawings showing the way of locating and setting the complete ginning outfits are included.

Panel Boards and Cabinets.—Crouse-Hinds Company, Syracuse, N. Y. Catalogue. Size 9 x 12 in.; pages 80. Deals with a complete line of panel boards and cabinets. Each feature of their construction is tersely described and the listings and prices of individual and assembled parts are clearly presented. Panels and cabinets are listed separately and together so as to render estimating easy.

Rivet and Screw Machinery.—The E. J. Manville Machine Company, Waterbury, Conn. Four catalogues. C2 deals with a single stroke, open die header for wood screw blanks, rivets, headed pins, tire bolts, &c., which was illustrated in *The Iron Age* September 1, 1910. I pertains to a line of automatic wood screw pointing and threading machines for pointing and cutting the threads on common gimlet point wood screws. An illustrated description of one of these machines appeared in *The Iron Age* July 7, 1910. J describes and illustrates automatic screw blank pointers, while K is concerned with automatic shaving slotting machines for shaving and slotting wood and machine screws. An illustrated description of one of these machines appeared in *The Iron Age* December 1, 1910.

Motor Driven Grinders.—Ransom Mfg. Company, Oshkosh, Wis. Loose leaf circulars. Refer to a line of grinders driven by either direct or alternating current motors. Included among these is a 27-in. disk grinder, an illustrated description of which appeared in *The Iron Age* October 14, 1909.

Cold Storage Insulation.—The Union Fibre Company, Winona, Minn. Illustrates the use of various kinds of fiber and cork insulation for cold storage work.

Band Cut-off Saw.—Butterworth & Lowe, Grand Rapids, Mich. Circular. Describes a band cut-off saw for cutting off logs, timbers, &c., as a substitute for the circular and drag saw machines.

Lock Washers.—Hobbs Mfg. Company, Worcester, Mass. Catalogue and price-list. Shows the various types of the American lock washers and gives dimensions, code words and prices for the various sizes.

Steel.—Colonial Steel Company, Pittsburgh, Pa. Catalogue No. 9. Covers the various brands of crucible high grade open hearth steel made by this company. The special features of the various brands of steel are given, with hints on their treatment. The various sizes are priced and a number of tables of weights completes the catalogue.

Woodworking Machinery.—Baxter D. Whitney & Son, Winchendon, Mass. Three pamphlets. The first covers a line of wood planing machinery, the second is concerned with wood scraping and knife grinding machines, while the third describes the Whitney double spindle shaper and the Whitney back knife gauge lathe.

Gas Producers and Engines.—The Otto Gas Engine Works, Thirty-third and Walnut streets, Philadelphia, Pa. Bulletin No. 11. Refers to the Otto suction gas producer, which is made in sizes ranging from 10 to 300 hp., and engines designed to be operated by producer gas. The various types of engines and producers are illustrated and tables of dimensions are included.

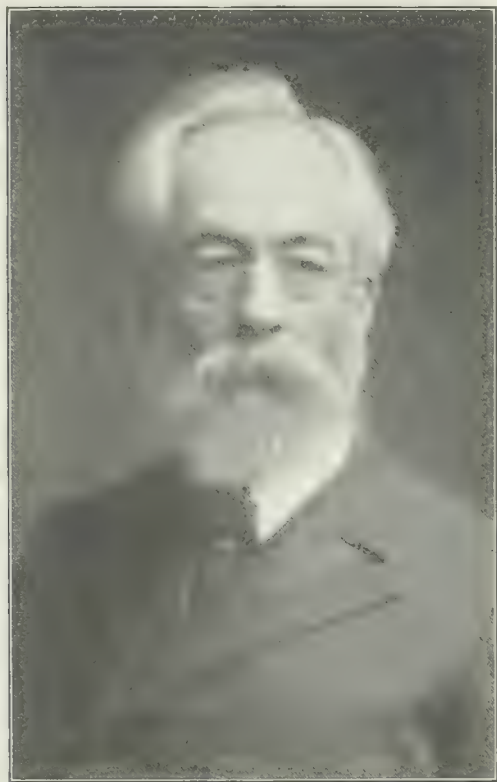
American Swiss Files.—American Swiss File & Tool Company, office at 24 John street, New York, and works at Elizabethport, N. J. Catalogue, 8 x 10 in.; pages 16. Covers the company's line of fine toolmakers' files, which is its specialty. These files are an exact reproduction of the best Swiss "files of precision," and are produced by improved methods with gas as a fuel in all heating processes. The catalogue gives full illustrations of the various styles and reproductions are given of the cutting surfaces of the ten different grades, showing the variations from the coarse No. 00 to No. 8. The No. 8 file is exceedingly fine. The styles shown comprise a very great variety, adapted to the exacting uses of toolmakers who desire accurately finished files for work requiring precision.

Attrition Mills.—The Buckeye Iron & Brass Works, Dayton, Ohio. Pamphlet. Describes and illustrates the American attrition mills, the special features of which include ring oiling bearings of ample proportions lined with high grade babbitt metal, bail thrust bearings and a quick release for allowing the disks to separate when necessary and return to their grinding position without disturbing the adjustment in any way. Seven sizes in all are built and a brief table giving the principal dimensions of the various sizes completes the pamphlet.

Death of Charles H. Morgan

Charles Hill Morgan, president of the Morgan Construction Company and the Morgan Spring Company, and one of the greatest of the world's inventors and developers of rolling mill and wire drawing machinery, died at his home in Worcester, Mass., January 10, aged 80 years. He was a man of remarkable talents. A great inventor, whose name is known as such everywhere that steel and wire are manufactured, he possessed, in combination rare with a creative mind, the power of a thoroughly capable business administration and the faculty of surrounding himself with a group of brilliant engineering assistants.

Charles Hill Morgan was born January 8, 1831, in Rochester, N. Y. His parents were of old New England stock, but the father being a mechanic of limited means the boy's education was that of the district schools of 70 years ago and of short terms in Lancaster Academy,



CHARLES H. MORGAN.

Lancaster, Mass. At 12 he was at work in a factory. At 15 he entered the machine shop of his uncle, J. B. Parker, Clinton, Mass., as an apprentice. When he was 17 years old he determined to learn mechanical drawing, and his efforts resulted in a class for the study of the subject, taught by the late John G. Hoarley, an honored member of the American Society of Mechanical Engineers, then the civil engineer of the Clinton Mills. Those few lessons, taken at night, after 12 hours of labor in the shop, constituted an all-important factor in Mr. Morgan's early mechanical career.

In 1852, at the age of 21, Mr. Morgan was placed in charge of the Clinton Mills dye house. He applied himself with much zeal to the study of chemistry and filled the position with entire success, gaining valuable experience in the management of subordinates. For a time he was draftsman for the Lawrence Machine Company, and from 1855 to 1860 served as mechanical draftsman for the distinguished inventor and manufacturer, Erastus B. Bigelow. The young man was brought in intimate contact with Mr. Bigelow and Charles H. Waters, the agent of the Clinton Wire Cloth Mills. It was an atmosphere of invention which was a stimulating influence toward the development into greater things. During this period Mr. Morgan introduced a system of designing and constructing cam curves for looms which proved of great value,

and was later the subject of a paper read before the Worcester Polytechnic Institute, and subsequently published by Mr. Morgan in pamphlet form. In 1860 he went to Philadelphia, where with his brother, Francis Henry Morgan, he was engaged for two years in the manufacture of paper bags. Here was developed the first automatic machine for making bags. After a few years the business was sold to good advantage.

Becomes Superintendent of Washburn & Moen Shop

In 1864 Mr. Morgan was recommended by friends to Ichabod Washburn, who was in need of a superintendent for his wire works at Worcester. Mr. Washburn engaged Mr. Morgan as superintendent of manufacturing for the firm of Washburn & Moen, and four years later when a joint stock company was organized he was made the general superintendent. For 11 years he was a director of the corporation. He made frequent trips abroad for the purpose of visiting the mills of England, Belgium, Germany, France and Sweden. From these experiences and from the study of publications devoted to wire manufacturing and of the patents issued both in Europe and America, he kept himself thoroughly informed of all changes or improvements. The direct fruits of this knowledge were the increased excellence, variety and amount of the company's products.

The Morgan Mill

The life of Charles H. Morgan was most conspicuously identified with the development of the continuous rolling mill, known the world over as the Morgan mill. The first of the type was designed and constructed by George Bedson, in Manchester, England. The Washburn & Moen Company purchased one of these mills and erected it in Worcester in 1869. It constituted a great advance over previous practice. Experience soon proved that the methods of handling the product of the mill were inadequate, and the first important step in the development of the process was the power reel invented by Mr. Morgan to replace the old hand operated reel. His second and very important contribution to the system—that, in fact, which marked the great difference between the Bedson mill and the Morgan mill—was the practical development of a continuous train of horizontal rolls. The Bedson mill had alternate sets of horizontal and vertical rolls. In the Morgan mill intermediate twist guides were provided, which gave to the metal the necessary quarter turn as it passed between the successive sets of rolls. The design proved so successful that it is the only type of continuous mill in use to-day. Nine years after the construction of the Bedson mill, a new type was built from Mr. Morgan's designs on the Belgium and continuous plans, and was known as the combination mill. The third improvement was the invention by Mr. Morgan of automatic reels, both of the pouring and the laying types, such as are now in common use in every rod mill in the world. They were completed and a successful test made March 10, 1886.

In 1887, after 23 very active years as general superintendent of the Washburn & Moen Works, Mr. Morgan was led by declining health to resign his office, with the purpose of taking up less arduous duties. Some years before, in 1881, he had founded, with his brother, Henry F. Morgan, the Morgan Spring Company, for the manufacture of springs, and was therefore a pioneer in a line of business now carried on by many concerns.

Forms the Morgan Construction Company

Manufacturers of steel products sought his advice in engineering problems, and his reputation as an engineer was widely extended by the new field of his activities. The work led directly to the formation in 1891 of the Morgan Construction Company, Worcester, manufacturer of rolling mill and wire drawing machinery. Mr. Morgan and his associates in the company have been most successful, and their designs and machinery have been widely adopted by appreciative manufacturers in this country and in Europe. The continuous rolling of such materials as billets, sheet bars, merchant bar, rods and hoops, together with the disposition of the product after it has been rolled, has been given special attention, and a

large number of important installations have been made. The continuous method of heating billets, while not strictly new in itself, has been skillfully developed and introduced culminating in the continuous gravity discharge furnace invented by Mr. Morgan.

In 1899, while he was in Europe, Mr. Morgan received a cablegram announcing his nomination to the presidency of the American Society of Mechanical Engineers, an office which he had never sought, and in the following December he was unanimously elected. In 1893 he was one of the Board of Judges of the World's Exposition at Chicago. He was a member of the American Institute of Mining Engineers, the Iron and Steel Institute, and the Engineers' Club of New York.

His Work in Behalf of Industrial Education

Mr. Morgan made a careful study of educational institutions and was closely identified with the establishment, growth and success of the Worcester Polytechnic Institute, having served as a member of the board of trustees from the establishment of the institution, 45 years ago, to his death; in fact, the life of the institute is closely woven into that of Mr. Morgan. In March, 1866, Ichabod Washburn made his gift which established the machine shop and working mechanical department of the school. This branch of the institution was unique in its day, for it was to all intents and purposes to be a business department and not a school. The coming of the students into the shop for instruction was to be an important factor of their curriculum, but this was a feature which was added to an establishment complete in itself without them. Much anxiety was felt as to the success of the plan. Mr. Washburn was old and in feeble health. There was nothing to pattern from. So far as the trustees could learn there had been no instance in this country, and few in the world where an institution of education had successfully conducted a manufacturing establishment unless the work was of the cheapest and simplest character. The Washburn shops were to make complicated machinery. Mr. Washburn recommended Mr. Morgan to the trustees as one of their associates, with the expectation that he would give the shop the advantages of his great mechanical genius and large experience. Mr. Washburn's death occurred before the building was completed, and Mr. Morgan took charge of the work and selected Milton P. Higgins, now president of the Norton Company and Norton Grinding Company, as the superintendent. Together they worked out the details to an eminently successful termination. Mr. Morgan's interest and active co-operation in the affairs of the mechanical department of the Institute have been of inestimable importance. He was one of the founders of Plymouth Church, Worcester, was the first superintendent of its Sunday school, and for many years served on the Board of Deacons. He was a large contributor to educational and religious institutions.

He was married twice, his first wife dying a few years after marriage, leaving one son, Charles Henry Morgan. His second wife is living, with two daughters and two sons, Paul B. Morgan of the Morgan Construction Company, and Ralph L. Morgan.

At the Baldwin Locomotive Works, Philadelphia, the number of locomotives built in 1910 was 1678. The number of men on the pay roll at the close of 1910 was 16,230, as compared with 16,400 in the late summer months, the latter being the highest figure reached since the panic of 1907. In 1906 these works built 2666 locomotives; in 1907, 2663; in 1908, 617, and in 1909, 1023. The maximum number of men employed in 1906 and 1907 was 19,000. In 1908 the minimum number was 4400; in 1909 the range was from 5000 to 11,000, and in 1910 from 11,000 to 16,400. Vice-President Johnson says of 1911: "We do not look for anything more than a moderate year in 1911, but we do not think business will get as low as it was in 1908 by any means."

The Robb Engineering Company, Ltd., has purchased the Robb-Mumford Boiler Works at South Framingham, Mass. The management and manufacturing organization

will be continued as at present. The company also operates works at Amherst, N. S., Canada.

Customs Decisions

Steel Railroad Ties

The Board of United States General Appraisers in overruling a protest filed by Joseph Blank holds that railroad ties of steel, cut to proper lengths and with bolt holes punched at both ends, are further advanced than the uncompleted forms of steel as material for which provision is made under paragraph 131 of the tariff act of 1909. The merchandise was assessed at the rate of 45 per cent. under the provision in the present tariff law for "manufactures in chief value of metal," whereas the importer alleged that it should be allowed to enter at a rate proportioned to the value under paragraph 131, as "steel not specially provided for." General Appraiser Fischer, who writes the decision for the board, discusses at considerable length the classification of the articles. Referring to the tariff act of 1897, he says:

The analogous provision in paragraph 131, Tariff Act of 1909, is "steel not specially provided for," and the change so made in the wording of the provision indicates beyond doubt that Congress had in mind by this catch-all clause only unfinished forms of steel as "material." This view would exclude therefrom finished steel, railroad ties, ready for special use, and such articles would find classification under paragraph 199, as herein assessed. The line as drawn between the steel as "material" and the article made therefrom requires no extended comment. The collector's assessments are affirmed and the protests overruled.

Plow Parts

It is held by the board that parts of plows cannot be given the same rate of duty under the tariff act of 1909 that is accorded to plows. W. White appears as the importer in the case, his entries of parts of plows being assessed at the rate of 45 per cent. under the tariff provision for "manufactures in chief value of metal." Objection is made by the importer to the rate assessed by the collector, it being alleged that that the goods should have been assessed under the provision of paragraph 476 of the Payne Tariff act which provides for "plows," with a duty of only 15 per cent. General Appraiser Fischer says in his decision for the board that it is admitted that the articles are parts of plows. Under these circumstances the board feels constrained to overrule the protests and affirm the action of the collector in assessing the higher rates.

Embossing Machines

A claim by the Enger-Kress Pocket Book Company regarding the classification of embossing machines was overruled. Duty was assessed on the merchandise at the rate of 45 per cent. under paragraph 199 of the Aldrich Tariff act, which provides for articles of metal. The contention of the importers was that the machines should be allowed to enter at 30 per cent. as "printing presses." The decision for the board, overruling the contention, states that the protestants failed to appear before the board and have offered no evidence in support of the claim as filed. According to the board, there is nothing in the record to warrant a disturbance of the collector's assessment. It is therefore affirmed.

Hand Brick Presses

The board has made a ruling regarding the classification of so-called hand brick presses imported by John Worley. A duty of 45 per cent. was exacted under the metal schedule, whereas the importer held that the articles fell under the provision in paragraph 197 for presses, by virtue of the provisions of paragraph 481, which is known as the similitude clause. Under the claim as filed by the importer, the rate of duty would have been 30 per cent., but this contention the board denies. The decision says: "There has been no proof offered that this brick press is dutiable directly under the provisions of paragraph 197, and it is not apparent how recourse can be had to the provisions of paragraph 481, to make it so dutiable since the machine is made of, or in part of, metal. The protest is overruled and the decision of the collector affirmed."

Briquettes from Cast Borings

Results from Their Use in Making Iron Castings, with Special Reference to Cupola Reactions—Unsatisfactory Experience with Unbriquetted Borings

Two articles on the manufacture and use of cast borings briquettes have appeared recently in *Stahl und Eisen* (pages 1759 and 2063 of Vol. 301, which are of sufficient importance to warrant extended notice, in view of the coming prominence of the matter in foundry circles in this country. The first one is by E. Leber, foundry superintendent and engineer of the firm of A. Borsig of Tegel, Berlin, who are financially interested in the Ronay method of briquetting cast borings, which is discussed in the article. He states that one of the interesting phenomena observed when melting these briquettes is the great drop in total carbon, thus bringing about results which are very desirable and not heretofore obtainable in the cupola. Evidently he has not thought of what steel scrap additions can do in this line. With this reduction in the total carbon, there is a similar action on the silicon and increase in the sulphur and—what seems to have escaped general notice—a slight increase in the manganese. The latter is contrary to the accepted understanding, manganese being supposed to burn out readily, thereby even protecting the silicon somewhat.

Theories in Explanation of Results

In order to account for the increased strength of castings where these briquettes are used, Mr. Leber passes by the effect of the lowered total carbon and credits it to the stationary or even increased percentage of manganese. This increased percentage of manganese one gathers to be the result of concentration in melting, taking into account the melting loss.

Tests made by a number of investigators with these cast borings briquettes have shown that they readily withstand disintegration in the cupola, when properly made, and that they melt just as pig iron. The specific gravity being 5.9, an open structure would be indicated, which Mr. Leber therefore holds permeable to gases in a very free way as soon as heating up expands them. He claims that in this way the loose graphite is burned away before melting takes place, and a porous structure results. Sulphur vapor striking through this structure unites with the iron, rapidly forming an iron sulphide, thus accounting for the increase in this element noted. It is therefore desirable to use low sulphur cokes. A further observation is on the comparatively short life of the metal in which these briquettes are used; for this reason very hot metal should be made in the first place. In order that the high sulphur may not prevent the formation of graphite in the casting in too great a measure, Mr. Leber recommends the addition of a little ferrosilicon in the ladle.

In discussing the probable action of these briquettes, Mr. Leber states that contrary to the opinion of R. Moldenke (who holds the prevalence of pin holes, gas pockets, &c., in the castings to be due to oxidation of the metal) these phenomena have now been proved to be due to sulphur only. The proofs are not given in the article, however. Sulphur lowering the melting point, giving off gases, thickening iron and deadening it—all are interesting points if entirely correct. In spite of this arraignment of the cast boring briquette, Mr. Leber states that since we have learned how to use it properly these bad results have been overcome and very fine castings have been obtained. He does not give details of "before using" and after, and hence one is tempted to think that he has overhauled his melting practice generally and put it on a better basis.

The balance of the article elaborates a somewhat vague theory on the behavior of the silicon in iron in the cupola, and the probable cause for the increase of manganese from 0.33 in the mixture to 0.50 in the result; the melting loss of the heat being considered 8 to 10 per cent. in these tests with 100 per cent. briquettes. In this coun-

try we would probably lose no further time with the matter until the analyses had been checked up—if this were still possible. The silicon dropped from 2.51 to 1.27 in the heat cited, which seems abnormal also.

Inasmuch as Mr. Leber overdraws the possibility of these briquettes being so porous, he is entirely off in his manganese deductions, and has yet to learn something about oxidation of metal in the cupola—the melting loss above noted being evidently partly due to bad melting practice—and, further, as these briquettes are really very fine, melt readily and without showing any greater troubles than good machinery scrap, one concludes that the article in question is another example of "save us from our friends."

The Use of Cast Borings in the Cupola

The second article, by Engineer Messerschmidt, is historical and deals with the development of the practice of using cast iron borings in the cupola. One of the oldest methods, and said to be quite satisfactory in every way, was the cutting of an opening in the lower part of the cupola at one point, attaching a hopper outside, and by means of a spiral conveyor forcing the borings into the cupola as wanted. The use of this material in crucibles and the air furnace is comparatively simple, the special precaution to be taken being to secure absolute dryness, so that there may be the least possible loss in temperature. This is seen more particularly when borings are added in the ladle. Unless perfectly dry small explosions occur, but, worst of all, the author has it, the steam formed decomposes into hydrogen and oxygen, the former uniting with the iron and causing all kinds of trouble. Silicon has a tendency to prevent this action and manganese aids in the hydrogen absorption. (The query might arise, Why does the hydrogen do this, and why not the oxygen of the steam, or does this go into the atmosphere?) Mr. Messerschmidt differs from Mr. Leber as above quoted, holding that the dissolved gases come out in setting and cause pin holes, &c., not through the sulphur present but the hydrogen. He even adds that the nitrogen of the atmosphere which the borings have absorbed is a very bad thing for the molten iron to which these have been added, not only making a casting porous but even brittle. Mottled and white pig iron contains 0.04 per cent. nitrogen and gray iron pigs 0.009 per cent. nitrogen, in addition to the bubbles observed in the surface of the metal. Hot melting prevents absorption of gases, whereas cold iron promotes it, and the addition of the borings in the ladle by cooling the metal is supposed to add nitrogen to the material. A further difficulty in adding the borings to molten metal in the ladle lies in the inability to mix uniformly, as well as allowing the graphite contained to be taken up by the upper metal in the ladle only, making it exceptionally high in total carbon as against the lower portions of the ladle content. A state of saturation takes place in the upper part of the molten metal, preventing further dissolving power on the part of the cupola metal and a very bad mess is the final result. There is, further, the heavy oxidation of the floating chips, which does not improve things. Wherever possible, material of this kind should be brought under a protecting cover of slag, as would be the case in the air furnace.

Heavy Melting Loss

Charging cast borings directly into the cupola brings with it an enormous melting loss. Tests made give this at about 50 per cent. G. Whitney's process in the United States, dating back to 1872, is next mentioned, the borings being charged into wooden boxes. The difficulty with this process is a self-evident one. If the cupola is run very hot the melting zone is fairly close to that portion

above where the ascending gases begin to give off enough of their heat to be effective in warming up the charges. Hence the wooden boxes have not far to go down before they get into the melting zone. Oftentimes the envelope had not been fully burned away before the loose borings would be in the midst of things, and in this case the results were fairly good. If, on the other hand, an excess of coke was used and the heats ran slow, the boxes would be burned away far up and have their contents emptied out into the cupola before they got anywhere near the melting zone. Between these uncertainties and the high price of wood, the process was not generally used. Cast iron and sheet steel boxes replaced the wooden ones, and the results were always better when the borings were thus treated. Of the many foundries trying this method out, all have abandoned it as unreliable. Another method was to use the "over iron" of a foundry and pour over borings previously put into the metal pig bed. This also proved unsatisfactory.

The Behavior of Briquetted Borings

The more recent methods consist in briquetting the loose chips under enormous pressures either direct or with the addition of a binder. Here a solid material is brought out which works perfectly in the cupola if handled properly, and may be regarded as a distinct advance in the art. There are two methods now in use. That of L. Weiss uses a binder of "limewater," which must strike us as odd considering the infinitesimal quantity of lime actually getting into the briquette. In the other process, that of Arpad Ronay, heavy pressure gradually applied to remove the air contained in the borings is used without any binder whatever.

The questions arise whether these briquettes go to pieces in the cupola, whether they melt in the proper zone or above it, and if so—by reason of an open structure—whether they absorb sulphur there, recourse must be had to practical results. Mr. Messerschmidt maintains that the actual melting in the cupola is not a gradual occurrence but exceedingly rapid; in fact, as soon as a sufficiently high temperature has destroyed the power of chemical combination the metal melts instantaneously. This he states he has proved for the cupola, the iron in the melting zone taking up all ascending heat within 0.3 second when the cupola is in good working condition. Since the briquettes are not masses of metal chemically combined, but only particles mechanically pressed together, they should melt in detail considerably above the normal position of the melting zone, and hence the briquette must go to pieces before getting into the hottest fire. On the other hand, the loss in graphite on the part of the borings is quite marked, for in machining castings the mechanically mixed flakes of graphite in the metal are loosened and to some extent blown away. This will have some effect on the melting as well as on the subsequent character of the castings. Where a large percentage of briquettes is used the sulphur goes up considerably, and also to some extent the phosphorous, the latter by concentration. The reduction in the total carbon by the use of the borings briquettes means the production of castings without using the so-called "quality" pig irons which are very high priced. This would not affect American conditions, as softness is paid for here rather than the stiff, hard, but eminently strong classes of work. The high sulphur question is, however, a serious one, and when castings run over 0.10 they cannot stand changes in temperature as readily as they should. Sulphur is apt to cause unsound spots, strains and shrinkages. Neutralizing this bad effect by adding steel turnings in the briquettes will help overcome the difficulty.

The two processes in question, by using about 35,000 lb. per sq. in. pressure, make briquettes of so dense a character that they retain their shape in the cupola perfectly and do not absorb as much sulphur as where lighter pressures are used. Investigations by the Royal Testing Bureau of Prussia have shown that the binder employed by Weiss is of so trivial a character that it might as well have been left out and hence the two systems are to some extent nearly identical. Hence also the patent war now going on in Germany in this connection.

The Chemistry of Cupola Practice

In regard to the sulphur absorption in the cupola an interesting test was made by Mr. Messerschmidt. He took a steel rod 1 in. in diameter and placed it in the center of the cupola when charging. After the heat was going and the lower portion of the rod could be thought melted off, the remnant was pulled up forcibly and analyses made of the surface for sulphur. For 40 in. above the point of melting off the sulphur began with 0.12 and went down to the original 0.02 per cent. of the rod. This would indicate the chances for contamination by sulphur. In the melting zone proper there is but little sulphur given up, for this is driven off and absorbed higher up.

As to the probable absorption of sulphur the following may be said: With sulphur in the coke at 1 per cent. and using the ratio 1 to 10 above the bed, the rise of the sulphur in the mixture will be 0.05 per cent. If the specific gravity of the briquettes should be taken as low as 5.0 and pig iron at 7.5, then the briquettes would be heated up proportionately sooner, and might be supposed to take up proportionately more of the sulphur, being in that atmosphere just so much longer. That is to say, the increase in the briquettes would be 0.075 per cent. instead of 0.05 per cent. As of course only a percentage of the heat is composed of briquettes this increase is not so very marked.

Mr. Messerschmidt scouts the idea of a manganese increase and cites tests of his own in which this was not the case. In one case the mixture running about 0.62 per cent. turned out castings with 0.48 per cent. manganese. The same tests also show that no silicon or manganese is oxidized until the briquette reaches the melting zone.

It is naturally an important point to keep the borings very clean, for if oil and waste be not kept out of them they may oxidize by spontaneous combustion, becoming red hot. The normal loss of the briquettes is about 6 per cent., but this refers to clean material. If cleanness is not watched the loss will creep up to 10 per cent. Regarding the cost of the processes the figures are hardly applicable to American conditions, and as they contain royalties they become still less so. When compared, however with the price of scrap, they show quite an advantage. Great stress is laid on the ability to cut out high priced irons, which also does not affect us, as we have advanced beyond the stage of dependence on special irons in our melting practice.

Borings Briquettes and Steel

Mr. Messerschmidt gives some interesting results with steel scrap additions in regular cupola practice, as contrasted with the use of briquettes. His results correspond with American practice in this regard and would indicate that the value of the briquette lies in the cheapening of the mixtures more particularly, inasmuch as quality can be obtained as well if not better by using steel in the mixture.

In trying to explain what actually happens when melting these briquettes, the author gives an interesting picture in which he reviews what has preceded, and lays great stress upon the sulphur absorption. This works antagonistic to the silicon, so that when the metal drops through the melting zone it will readily burn out. Unfortunately the theory is based upon but one experiment or two, and hence might be modified later when more experience is had. At any rate, he shows the importance of sound melting practice where good results are essential. In any case, he advises not to use more than 30 per cent. of these briquettes for the mixture and preferably less. His final suggestion, and a good one, is that sufficient lime be added to the briquettes in the making to counteract the sulphur absorption and thus take away the one uncomfortable feature of the otherwise excellent process.

R. M.

The Pioneer Iron & Steel Company, Kansas City, Mo., has been incorporated with \$10,000 capital stock. The company acts as manufacturers' agent, and takes over the business which has been conducted under the same title for the past six years, with offices in the R. A. Long Building.

Castings from Nonferrous Alloys

Their Production for Service Involving High Pressures

At the last meeting of the Institute of Mechanical Engineers, held in London, in December, 1910, a paper was read on "The Production of Castings to Withstand High Pressures," by Prof. H. C. H. Carpenter and C. A. Edwards. It contained details of an investigation under the auspices of the council of the institution. The object of the investigation was the production from nonferrous alloys of castings capable of withstanding high pressures—hydraulic, steam or gaseous. The following synopsis of the paper is given by the *London Times Engineering Supplement*:

The alloys in current use fall into one of two main classes: 1. Gun metals, the principal constituents of which are copper and tin. 2. Complex brasses with copper and zinc. The former usually contain zinc, and may also contain lead and manganese; the latter include iron, manganese, tin, and in some cases aluminum among their minor constituents. "Manganese bronze," as applied to the latter class, is a misleading term, and "manganese brass" much more nearly represents the facts.

Difficulties from the Alloys, the Pattern and the Mold

The difficulties that had to be overcome in order to produce a casting that would stand the hydraulic test are summarized under three main heads:

1. Those liable to be caused by the metal or alloy—(a) Dross or scum, due to oxidation. (b) Piping, due to the shrinkage of the fluid metal. (c) Pin holes or sponginess, due to the trapping of gas set free on solidification among the crystals. (d) Heterogeneity, due to the segregation, under certain conditions, of particular constituents, and resulting in brittle and sometimes unsound patches in the alloy. (e) Stresses, set up in the solid alloy by the unequal contraction of its structural constituents, sometimes leading to microscopic fractures. (f) Deterioration, due to structural or molecular changes in the alloy with lapse of time, leading to the so-called "crystallization" of the material, and resultant weakness.

2. Those liable to be caused by the pattern—(g) Stresses, set up during cooling by abrupt changes in thickness of section, for example, at the junction of flange and body. (h) Planes of weakness, if not actual fracture, caused by the crystals growing in a particular direction, for example, in rectangular castings.

3. Those liable to be caused by the mold—(i) Blow-holes, due to the mold being too hard, or too damp, or to the sand containing rust or scale.

Copper and Tin Alloy

The authors chose as the simplest case possible the casting of a cylinder in a chill mold. By doing this they reduced to a minimum the chance of encountering difficulties caused by the mold and the pattern, and were able to concentrate on the selection of a suitable alloy and the working out of the conditions of casting it. The mold, specially designed for the purpose, was made of gray cast iron. At the outset, experiments were made with a pure gun metal containing only copper and tin, in the proportions of 85 to 15. Metals of the highest commercial purity were used—electrolytic copper and Straits tin, containing 99.98 per cent. of the respective metals. The copper was melted under wood charcoal in a covered crucible. After the addition of tin, sufficient phosphorus, in the form of a copper phosphide, containing about 15 per cent. of phosphorus, was added so as to remove oxygen and leave not more than 0.1 per cent. of phosphorus in the cast alloy. After stirring well and skimming, the metal was poured. It was, of course, cast from the bottom. Under these conditions, the authors were able repeatedly to produce castings which were perfectly sound, and after being machined withstood, on an average, pressures of 18 tons before they burst. Previous to fracture there were no signs of leaking.

Aluminum Bronzes

Experiments with aluminum bronzes were then started. The first mixtures contained 91 per cent. of

copper and the remainder aluminum, and were prepared by melting the copper in a covered crucible and adding the aluminum to the fluid copper. A considerable amount of dross formed under these conditions. It was removed as far as possible by stirring and skimming. The temperature of the melt was taken in the crucible by a thermo-junction and direct-reading pyrometer. Each mixture was poured at 1125 degrees C., which was about 80 degrees above its freezing point. With one exception, the castings thus obtained were quite satisfactory. Some of them contained signs of dross, but this appeared to be confined to the surface and did not affect the soundness of the material. After machining they were tested up to 12 to 13 tons. At about this pressure the casting stretched slightly and water was forced through the valve joint. It was possible to raise the pressure to 14 to 15 tons by tightening up the joint. After this the material stretched again, and the process had to be repeated. At 18 tons none of the four sound castings had fractured. The tests were stopped here. This 9 per cent. aluminum bronze thus proved itself capable of holding gun metal, with the difference that it showed greater ductility.

Six casts of the same composition were then made in green sand molds. The metal was poured from the bottom and a large riser used. Three castings did not even pass the preliminary test. The remaining three appeared satisfactory and were then tested under higher pressures. The pressure was raised to 10 tons, when the joint opened, releasing the pressure. After tightening, it was raised to 13 tons, when it stretched again. By alternately stretching the casting and tightening the valve joint the pressure was ultimately raised to 19 tons. After this the walls of the cylinder were machined down to $\frac{3}{8}$ in. thickness over two-thirds of its length, and the pressure was taken up by stages to 18 tons without fracture. At this stage the walls had bulged so much that the outside of the cylinder had the appearance of a stressed test piece of the alloy. By the next day the recorded pressure had fallen to 16 tons. The wall thickness was then reduced to $\frac{1}{4}$ in., and the cylinder again tested. It passed through a similar series of tests and remained unbroken at the end. No doubt if this treatment had been sufficiently prolonged, the cylinder could have been fractured, but this would only have taken place after the hardening produced by the water pressure had raised the yield stress to the same figure as the ultimate stress. These tests showed that it is possible to cast cylinders of aluminum bronze both in chill and sand molds, which are not burst by water pressures of 18 tons per square inch. Their only drawback was that they began stretching at pressures of 10 to 12 tons, the sand castings giving the lower figure, as might have been expected.

A bronze containing 9.5 per cent. of aluminum was cast and tested. It stood up to 11 tons pressure before bulging, and then behaved similarly to the 9 per cent. bronze. A 10 per cent. bronze was cast. This was tested up to 12.5 tons before expanding. By alternately tightening the valve joint and exerting pressure, 18 tons were recorded. Next a 10.5 per cent. bronze was cast. This stood up to 14 tons before the joint had to be tightened, after which 18 tons pressure was obtained; the wall thickness was reduced to $\frac{3}{8}$ in., and on retesting the cylinder burst at 17 tons pressure. Finally an 11 per cent. aluminum bronze was cast. This withstood hydraulic pressure extremely well, and the pressure was taken up to 20 tons without any sign of leak. The wall thickness was reduced to $\frac{3}{8}$ in., and on retesting, 18 tons was recorded before the cylinder burst.

Summary

In summarizing the paper the authors said that conditions were worked out under which nonferrous hydraulic castings, capable of withstanding pressures varying from 14 to 20 tons, can be produced. Castings of the same composition would be capable of holding gas pressures of 2000 to 3000 atmospheres at the ordinary temperature. Special tests of the suitability of this material for use as high pressure steam valves have also been made. These results were obtained by the use of pure

copper aluminum bronzes containing from 9 to 11 per cent. of aluminum, according to the size and shape of the casting, and permitting considerable latitude as regards the degree of "stiffness" required. The largest casting experimented with weighed 36 lb., including the gate and riser. The most suitable compositions for these are the bronzes containing from 9 to 10 per cent. of aluminum. Higher percentages can be successfully employed only with small castings.

The following precautions have been found essential: (1) The alloy must be poured very slowly; (2) it should be cast at a temperature of not more than 50 to 80 degrees C. above that at which freezing begins; (3) the gate should be so arranged that the metal enters the mold at the lowest possible point. Broadly speaking, almost any form of gate will do, but it has been found advantageous to provide a sort of well at the bottom and to use rather a narrow opening; (4) in the case of green sand molds, care must be taken that the sand is not too damp, particularly in the lower parts where the metal rests on it. If a rather close sand is used it is far safer to dry the surface of the lower part of the mold; (5) in large castings the use of risers is essential to overcome the shrinkage of the alloy. If these conditions are observed, after sufficient practice, castings can be regularly made absolutely free from dross and nearly always sound. The average is not less than four clean, sound castings out of six. They appear to be perfectly satisfactory with regard to homogeneity, and their corrodibility is extremely slight, whether in fresh or sea water.

So far as the authors are aware this combination of properties is unequalled by any other bronzes, and they recommend their trial in cases where chronic difficulties are encountered with the use of gun metals, manganese bronzes, &c. In particular, the metal must be poured as quietly as possible, and every care taken to prevent it from being agitated, after it has entered the mold. In this way the dross is kept down to a minimum. Any departure from this principle means the laying up of trouble. The characteristic property of these molten bronzes of forming a tenacious film of alumina the moment a fresh metallic surface is exposed to the air, this film being irremovable by any deoxidizer or combination of fluxes, is really the key to the situation. It appeared originally as an enemy, and for a long time remained so. Such success as the authors have achieved is due to their having converted it into a friend, by utilizing its tenacity to protect the remainder of the fluid metal from oxidation.

The Results of Iron Molders' Strikes in 1910

A summary is given by the *Review* of the National Founders' Association for December, of the results of strikes of union molders in 1910, in foundries in the United States and Canada—all strikes in which the molders' union gave financial support to the molders and coremakers:

Foundries affected.....	137
Union members involved.....	3,426
Foundries involved in compromises.....	15
Union members involved in compromises.....	667
Foundries involved where strikes have been lost to union.....	104
Union members involved where strikes have been lost to union.....	2,556
Foundries involved where union has been successful.....	18
Union members involved where union has been successful.....	405
Foundries involved where strike benefits are still being paid.....	83
Union members involved where benefits are still being paid.....	2,175

In 101 of the 137 foundries involved, the strikes were begun in 1910; in 35 in 1909 (including 11 shops in Denver, Colo.), and in one in 1908. The largest number of molders who went on strike in one city was 350, in Troy, N. Y., where in most of the shops the disputes were compromised.

The J. W. Paxson Company, Philadelphia, Pa., manufacturer of foundry supplies, &c., has taken an interest in the Kiamensi Clay Company, Newport, Del., and in the future will sell its product, consisting of ground lump and prepared fire clays, fire mortar and kaolin, also steel molding sand, strong and coarse silica sands. Shipments can be made in bulk or bags by either rail or water routes.

The Newark Foundrymen's Association

Members of the Newark Foundrymen's Association, Newark, N. J., at a meeting January 4, listened to an address on "Employers' Liability for Accidents," by A. Parker Nevin, counsel for the National Association of Manufacturers. The speaker was introduced by Franklin Phillips of the Hewes & Phillips Iron Works, and president of the Foundrymen's Association, who explained that the subject was of immediate interest to the members, as a commission recently appointed by the Governor of New Jersey is considering the recommendation of an employers' liability law, fashioned along the lines of the Wainwright act now in operation in the State of New York. Mr. Phillips, who is also a member of a committee appointed by the Newark Board of Trade to offer recommendations to the commission, said that New Jersey manufacturers in general favor certain modifications to the law in force in New York, and explained further that under the New Jersey statutes the common law governing acts brought against employers for liability for action could not be abrogated.

Mr. Nevin gave an interesting outline of the compensation acts now in force in Germany and Great Britain, and stated that under our form of government they could not be practically applied. He reviewed the Wainwright act and declared that it had many points unfavorable to the employers. The speaker concluded by stating that the question has as yet been unsolved to the satisfaction of either the employer or employee. Mr. Phillips explained that the New Jersey commission intends making a canvass among manufacturers in that State in order to ascertain their views on the question of employers' liability, and that the association had decided to act as a body in replying to the list of questions to be contained in the commission's circular inquiry.

The Philadelphia Foundrymen's Association

The Philadelphia Foundrymen's Association held its regular monthly meeting at the Manufacturers' Club, in that city, on the evening of January 4, with President Thomas Devlin in the chair. The Committee on Arrangements for the trip to Boston, Mass., to attend the annual dinner of the New England Foundrymen's Association, reported that a special car would be provided and that a delegation of about 25 members of the association would attend.

The election of officers was held, with J. S. Hibbs acting as temporary chairman. There being no further nominations beyond those reported by the Nominating Committee, the following were unanimously elected to serve during 1911: President, Thomas Devlin, Thomas Devlin Mfg. Company; vice-president, E. E. Brown, E. E. Brown & Co.; treasurer, Josiah Thompson, J. Thompson Company; secretary, Howard Evans, J. W. Paxson Company; Executive Committee: Walter Wood, Thomas M. Eynon, H. L. Haldeman, Walter T. MacDonald, W. H. Bickley; official chemist, George C. Davis.

The paper for the evening's discussion was on "Machine Molding vs. Hand Molding," by John Alexander of the Harrison Safety Boiler Works, Philadelphia. A lengthy discussion followed, in which opinions as to the character of sand used, shape of flasks, methods of barring, and other details of foundry practice were brought out. A vote of thanks was extended to Mr. Alexander for his interesting paper.

The Pittsburgh Foundrymen's Association.—The monthly meeting of the Pittsburgh Foundrymen's Association was held in Engineers' Hall, Oliver Building, on the evening of January 9. A paper entitled "Micro-Structure of Cast Iron" was read by Albert Kingsbury, consulting engineer, and was illustrated by lantern slides.

The J. S. McCormick Company, foundry supplies, Pittsburgh and Mauch Chunk, Pa., has opened an office in the city of Milwaukee, Wis., in charge of Joseph Harrison, a well-known foundryman. The office is located at 318 Walker street.

* From a paper read before the Philadelphia Foundrymen's Association, January 4, 1911.

seconds, no matter whether your mold is 800 or 2000 lb. The whole operation is controlled by one small lever. We have flasks that are used on one of those 30-in. machines that range from 26 x 26 x 14 in. drag by 6-in. cope, 30-in. round flasks, and others varying in sizes up to 38 x 45 x 7½ in. drags and 6½-in. copes, and really we don't know how we could get along without it. We can safely say we run from 60 to 90 per cent. better on a great variety of our work than we did three years ago under the old hand method, and the castings were not so uniform and weighed considerably more.

Gravity Molding Machine

This has its own peculiarity of ramming a mold, and care has to be exercised in moving the cradle with flask and pattern in it, so that the wads of sand which fall by gravity will back against each other properly. I can't say very much about its practical efficiency, but four firms using it in and near Philadelphia say they are making out all right. I know two of them have installed their second machine. Being a later development in molding, and having its own special construction of flasks and so on, it may take a little while yet ere it comes to be recognized as the older machines are. Anyhow, users say they can produce from 40 to 60 per cent. more and better work by far than by hand methods.

Jarring Machine

The plain jarring machine is adapted to a broad field of work, although not universal, and there must be judgment and discrimination when patterns are being made, as the sand must flow chiefly vertically. For uniformity in ramming, I know of no machine or hand method that compares with it. The ramming is densest at the surface of the pattern where you want it, and decreases as you go away from the pattern, thus allowing a freer escape for the gases. I have seen molds of varying sizes, weighing from 400 to 15,000 lb, rammed in a few minutes, when it used to take a number of hours to do the same operation; and when patterns were drawn from the machine molds the molder found he had very little to do to soft spots, as well as very few bars to finger or patch; in fact, nothing as compared with hand ramming and the hard work attached to it. Then, again, this same machine can be used to play a considerable part in making of cores.

Combination jarring machines, which jar ram the mold, roll over, vibrate and then draw the pattern, have a great advantage over all the others where there is a multiplicity of work, and pay well on their investment where conditions warrant it. Another machine jar rams and then squeezes the mold, doing away with the sometimes necessary butt ramming before bottom board or plate is put on.

Shockless Jarring Machine

The term shockless applies only to the foundation or supports on which the machine stands. The jar ramming of the mold is done while the table or platen is descending, coming in contact with the ascending anvil in a suspended position, thus eliminating all shocks to the foundation. We need have no fear of any pulsating variation in floor load while operating it; in fact, no more than in the operation of a power squeezer. I believe one thing that had kept the jarring machines from coming more to the front was the cost for foundations to combat the floor shock or load.

Shockless Combination Jarring Machine

Machines that jar ram, roll over, vibrate and draw, and machines that jar ram and squeeze, other conditions being the same as in the regular "shockless," merit all the credit given to them, and when we see and hear of these machines doing 75 to 250 per cent. more work on green and dry sand molds or half molds up to 50,000 lb. than had been done by hand work, we realize their great importance. What it might cost to equip a machine to accomplish some of these results it is almost impossible to say, but for many classes of machines this is a minor consideration when compared with the output, the life of your patterns and flasks and the weight of metal you save.

Results from Machines

Some of the benefits of the molding machine may be stated in brief: Castings are much truer to pattern; they weigh less, and weights are more uniform. Castings being truer, require less finishing in machine shop. There is a greater output for cost entailed, therefore castings cost less per unit. Patterns last a considerably longer time.

I may say that in 39 of the foundries I have visited of late, I found a total of 717 molding machines in daily operation, handled by skilled molders and unskilled help, making an average of about 19 to each foundry. It may surprise some of you to know that in 16 foundries in Philadelphia there is an average of 11 per foundry. If mechanical engineers or designers of machinery would give a little more attention to the foundry and change or modify their designs, doing away with projecting brackets, lugs, journal shaft boxes and so on, and belt them on where practical, molding by machinery would make a wonderful advance in the next few years.

The Welsh Tin Plate Trade

Under the title, "Tin Plates and Tariffs," the London *Economist* of December 24 prints the following interesting article relative to the status of the Welsh tin plate trade:

The rise in the exports of British tin plates during the present year has been one among many important signs of reviving trade. For the 11 months to November our exports from South Wales have amounted to 445,000 tons, compared with 402,600 tons in the corresponding period a year ago, and 370,000 tons in 1908, and it is hardly to be doubted that the home market has shown a similar tendency. This expansion has caused the erection of new mills with a capacity of 110,000 tons per annum—a fact which is very significant when it is remembered that practically no new mills have been erected since 1893, owners having hitherto been content to reopen the mills which had been closed owing to the McKinley tariff and the enormous overproduction in Wales in 1889.

For the last 10 years production has been unusually steady in this country, but the building of some 60 new mills in the present and coming year is a sign of great confidence in the future of the trade. It is a fact which has attracted considerable attention that exports to the United States have increased by over 11,000 tons this year, but *The Iron Age* of New York hastens to damp any enthusiasm our producers might be tempted to feel on this score by pointing out the unusual nature of the demand and by encouraging American makers to recover the drawback trade, which is all that remains to English exporters.

The foreign purchaser of canned American goods has been free from the incidence of the tin plate tariff, while the home trade has had to pay the higher prices maintained by the tariff. Past experience suggests that if the canning industries continue to insist on cheap material to safeguard their export trade, the Welsh makers will easily hold their own in this branch. But in any case there are large openings elsewhere for our manufacturers. The use of tin cans for motor spirit all over the world is largely responsible for the anticipated boom, while the general extension of the use of the material is evidenced by the widespread market which has grown up in recent years. Our exports to-day show the following comparison with 20 years ago:

	1889. Tons.	1909. Tons.
To the United States.....	336,692	64,475
To other countries.....	93,931	435,336

Whatever may have been the case in the past, it is evident that the tin plate trade to-day is no longer at the mercy of the tariff makers of the United States.

At the annual meeting of the Diebold Safe & Lock Company, Canton, Ohio, January 2, E. G. Bockius retired from the office of secretary-treasurer. John Rundt was elected secretary and F. G. Baehrens was made treasurer.

November Exports and Imports of Iron and Steel

According to the report of the Bureau of Statistics of the Department of Commerce and Labor, a considerable increase occurred in both exports and imports of iron and steel in November, as compared with October. The value of the November exports of iron and steel and manufactures thereof, not including iron ore, was \$18,593,806, against \$17,452,085 in October. The value of similar imports in November was \$3,329,919, against \$2,497,754 in October.

The November exports of commodities for which quantities are given, show a very heavy increase, being much greater than for any previous month in the year. The figures for each month of last year, up to November, are given in the following table:

Months.	Gross tons.	Months.	Gross tons.
January	11,000	July	128,055
February	110,224	August	104,996
March	112,000	September	109,378
April	117,918	October	129,322
May	135,744	November	154,723
June	120,700		

Details of the exports of such commodities for November and for the 11 months ending with November, are as follows, compared with corresponding periods of the previous year:

Exports of Iron and Steel.			
— November. — 11 mos. ending Nov. —			
	1910.	1909.	
Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	20,875	9,168	115,966
Scrap	2,555	820	21,957
Bar iron.....	949	628	16,483
Wire rods.....	1,857	3,362	21,293
Steel rods.....	3,682	7,631	99,324
Billets, blooms and plates	17,695	2,715	47,350
Steel rails.....	28,263	34,569	311,587
Iron sheets and plates.	9,660	7,344	94,169
Steel sheets and plates.	16,190	10,327	157,306
Tin andterne plates.	2,455	740	11,402
Structural iron and steel	8,000	7,842	133,403
Barb wire.....	10,134	6,730	72,904
Wire	10,337	5,778	85,125
Cut nails.....	1,155	1,432	7,633
Wire nails.....	2,692	2,905	38,610
All other, including tacks	1,103	497	9,436
Pipe and fittings.....	10,212	13,028	142,480
Totals.....	154,723	115,516	1,385,580

The imports of commodities for which quantities are given were as follows for each month of the year up to November:

Months.	Gross tons.	Months.	Gross tons.
January	58,308	July	42,326
February	44,519	August	306,478
March	57,150	September	30,360
April	51,448	October	31,454
May	45,021	November	40,584
June	31,010		

The details of the imports of such commodities for November and for the 11 months ending with November are as follows, compared with the corresponding periods of the previous year:

Imports of Iron and Steel.			
— November. — 11 mos. ending Nov. —			
	1910.	1909.	
Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	20,427	34,707	217,322
Scrap	1,293	15,902	70,143
Bar iron.....	2,849	2,554	35,726
Billets, bars and steel forms n.e.s.....	5,677	1,030	44,784
Sheets and plates....	299	898	5,967
Tin andterne plates.	8,059	8,047	63,530
Wire rods.....	1,983	430	18,924
Totals.....	40,584	63,577	456,396

The imports of iron ore in November were 197,833 gross tons, against 219,571 tons in October. The total importations of iron ore for the 11 months ending with November were 2,417,321 gross tons, against 1,472,348 tons in the corresponding period of the previous year and 652,559 tons in the corresponding period of 1908. Of the November imports of iron ore, 97,206 tons came from Cuba, 31,145 tons from Sweden, 25,041 tons from Canada, 21,889 tons from Spain, and 22,552 tons from other countries.

The total value of the exports of iron and steel and the manufactures thereof, not including ore, for the 11 months ending with November, was \$182,970,193, against \$142,005,148 in the corresponding period of the previous year. Similar imports were respectively \$36,267,671 and \$27,079,199.

Canadian Iron and Steel Works Extensions

President J. H. Plummer of the Dominion Steel Corporation, Sydney, N. S., has contributed to the *Toronto Globe* a review of conditions in the iron industry of Canada. He says that the consumption of iron and steel in Canada is growing rapidly, and that while plants have made large extensions these will scarcely overtake the demand. In the past year the reaction in the United States has affected the Canadian steel market. With reasonable tariff conditions, Mr. Plummer thinks the iron industry of Canada should grow until it holds relatively as important a position as that of the United States. He considers that the bounties on iron and steel, which were first paid in 1902 and are now terminated, were merely the diversion to the steel plants of the revenue they themselves created. He estimates the expenditures in developing iron and steel and related industries in Canada from 1887 to 1910 as follows: Construction and extension of iron and steel plants, \$35,146,000; acquisition and development of iron mines (in Canada and Newfoundland), \$5,302,000; acquisition and development of coal properties directly connected with iron and steel plants, \$18,500,000. These figures relate only to manufacturers of pig iron and steel, and do not take in rolling mill and other industrial operations in which the production of the larger companies is used as raw material. Summarizing the recent new construction at important iron and steel plants in Canada, Mr. Plummer gives the following:

"In the East the Dominion Iron & Steel Company is just completing a large block of coke ovens and a new blast furnace, while contracts have been entered into for still another furnace, both being of the standard size adopted at the plant, with a capacity of 250 to 300 tons daily. The steel end of the plant is being reinforced by two open hearth furnaces so large as to represent as great a capacity as the 10 existing furnaces, so that the company can, if necessary, double its present production of open hearth steel. A new merchant and rod mill is also under way.

"The Nova Scotia Steel Company has devoted its attention chiefly to 'balancing' its plant, for which purpose two large finishing mills were erected in New Glasgow during the year. It, too, has put in low pressure turbines to utilize exhaust steam, and it has done a large amount of equipment and development work at its mines in Wabana.

"In the West equal activity is seen. The iron and steel plant at Sault Ste. Marie is being greatly enlarged. A blast furnace of 450 tons capacity has been built, and will be blown in next month. By-product coke ovens are in process of erection, which will supply the blast furnaces with coke made from slack coal brought by water from Lake Erie ports, an addition which will round up the property in a department which is essential to its economical and profitable operation. The company is also building two merchant mills, in which structural material, bar steel, &c., will be rolled, and it is also installing a large gas engine power plant of 17,600 hp. in the aggregate. Its mines, furnaces and mills have all been run steadily and successfully during the year, and its output in rails shows an increase in the year of over 30,000 tons, the total being 218,655 tons.

"The Canada Iron Corporation has put up a new blast furnace at Midland, which is now in operation."

Coal shipments from the port of Buffalo for the season of 1910 were 3,629,368 tons, a gain of 586,662 tons over 1909.

The Garrison 400-Ton Double Acting Press

A 400-ton drawing press for very heavy work, which is a radical departure in this line of machinery, has recently been built by the A. Garrison Foundry Company, Pittsburgh, Pa. Fig. 1 is a front view of the press, while Fig. 2 shows the opposite or rear side. The press is a very heavy tool weighing about 175,000 lb., and is adapted for such work as can be handled on a bottom platen, the area of which ranges from $48 \times 64\frac{1}{2}$ in. to $54 \times 64\frac{1}{2}$ in.

The novel feature of the press is the mechanism by which the blank holding device is operated. This consists of a pair of mutilated gears, which engage in and are driven by two racks connected to a frame, that in turn is actuated by means of a pitman and crank, the latter being keyed to the main shaft. These mutilated gears have an arm cast in one piece with the gear wheel. When the blank holder is down this arm bears against an adjustable face on the rack frame and is held in that position by a latch, which slides upward and over the face of the arm, as the rack frame rises and the racks leave the teeth of the gears. One merit of this particular form of construction is that the blank holder has an unusually large movement. In this particular machine the lift of the blank holder is 20 in., while the stroke of the ram is 28 in. This permits a longer interval and more room for the insertion of the blank. The main advantage, however, is that on account of the construction the dwell of the blank holder is absolute (levers are not thrown on their centers as is usual); not only does all action cease, but the crank shafts which lift the blank holder are held rigidly, being clamped in a vertical position by the latch and arm, as shown in Fig. 1. By reason of this construction the length of the dwell of the blank holder

In the drawing presses now in general use the knockout is usually operated by a lever and rod connecting one of the blank operating shafts with a lever operating under the bed of the machine. In this machine the blank holder itself carries two rods, which pass down through the frames, as is shown in the engravings, and these rods in turn carry a cross arm, through which the

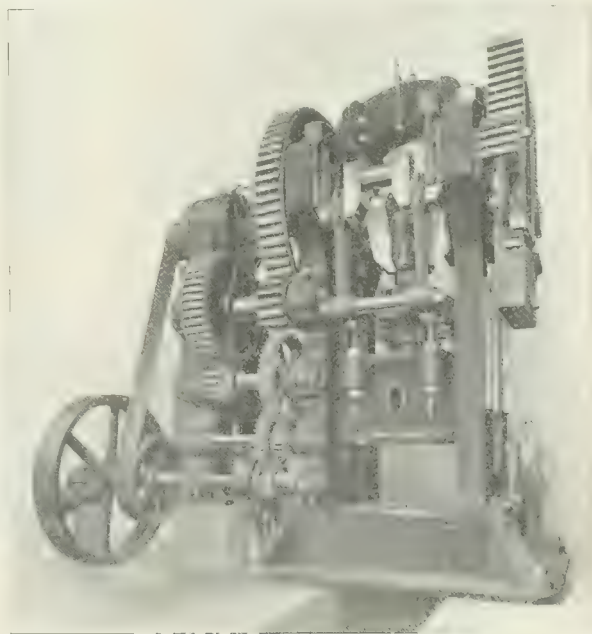


Fig. 2.—Rear View of a 400-Ton Double Acting Press, Showing Drive.

knockout bar passes, being supported at the bottom by a steadiment in the foundation, and at the top by passing through a bushing in the bed plate.

This arrangement for ejecting the blanks is said to have at least four times the mechanical efficiency of the usual appliance, and is of marked advantage where the work is heavy and where blanks of unusual thickness have to be forced upward through large dies. The stroke of the knockout rod is adjustable from 20 in. down to as little as desired. For convenience the raising and lowering of the ram is effected by a small motor located on the ram and the power of a 100-hp. motor is all utilized in driving this machine when doing its heaviest work. The machine is rated most conservatively and the factor of safety is large. This will be noted in the size of the main shaft, which is of nickel steel $14\frac{1}{2}$ in. in diameter.

A Country Club for Employees.—The United Shoe Machinery Athletic Association has formally opened its new Country Club, the gift of the employing corporation, the United Shoe Machinery Company, Beverly, Mass. The building is a handsome structure, containing 14,000 sq. ft. of floor space, with lounging room, writing rooms, a well-stocked library room, billiard room with four tables, card room, a hall seating 450 persons with a stage for theatricals, and the usual conveniences of locker rooms and baths. The house is adjacent to a large athletic field, and is on a river, where boating will be enjoyed. While in the country the property is not distant from the works.

A Private Accident-Relief System.—The Morgan Construction Company, Worcester, Mass., has adopted a workmen's compensation system known as the Industrial Accident-Relief for Employees. The system is modeled on that of the American Steel & Wire Company, varying in a few essential details. The period after an accident where no relief is paid is shortened to five days, as compared with the 10 days of the American Steel & Wire Company, and the maximum amount of relief that shall be paid to married men is placed at \$2.50 per day instead of \$2.

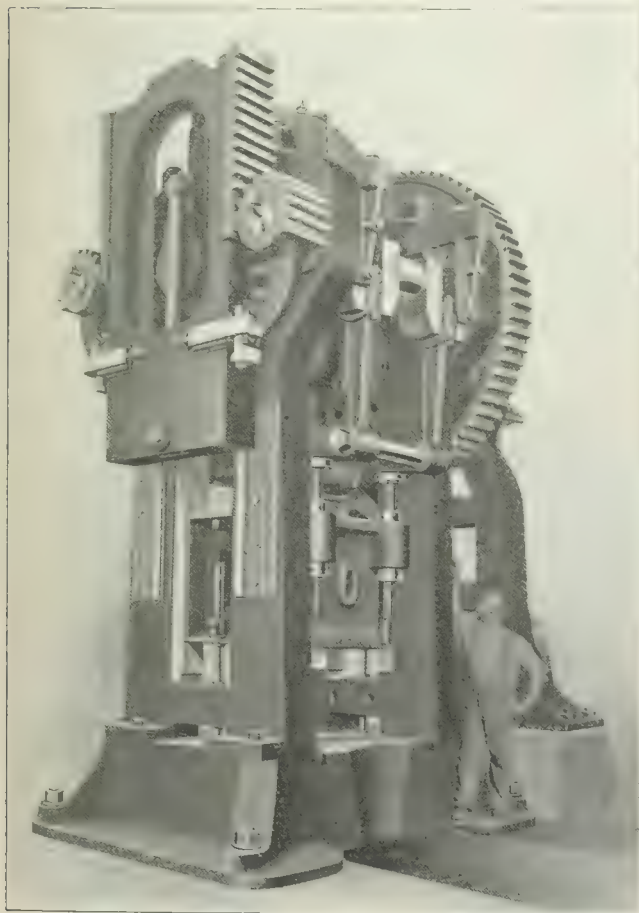


Fig. 1.—Front View of a Large Drawing Press Built by the A. Garrison Foundry Company, Pittsburgh, Pa.

is independent of the stroke of the ram, and cannot only be made any desirable fraction of the cycle of operation, but also the length of the cranks may be varied and the height of the blank holder may be changed correspondingly.

The Columbia Steel Foundry

Details of a Recently Opened Pacific Coast Open Hearth Steel Castings Plant

In the Eastern section of the country the starting up of one more steel foundry is not a very important event. On the Pacific Coast, however, quite the reverse is the case. Recently the Columbia Steel Company, with the main office at 503 Market street, San Francisco, Cal., which heretofore has been operating a converter plant at Portland, Ore., started its new basic open hearth plant at Black Diamond, Cal., a small town at the head of San Francisco Bay. The equipment of the foundry and its arrangement are thoroughly modern, as is shown in the partial plan reproduced in Fig. 1.

The property owned by the company comprises 20 acres, having a water frontage of 800 ft., and railroad connections with the Southern Pacific and the Santa Fé systems, and also direct boat service to San Francisco, Stockton, Sacramento and intervening points on the San Joaquin River. On account of the advantageous location it is possible to make quick deliveries to points on the tidewater and in the great valleys of California.

The Buildings

The buildings consist of the main foundry, which is a steel structure throughout, 130 ft. wide by 200 ft. long, with a craneway extending through the end of the building, permitting the transfer of flasks, castings, &c., with the least possible amount of handling. The walls of this building are largely composed of glass so that the entire shop is practically as light as out doors.

The pattern shop is a brick building, 30 x 50 ft., with trussed roof and lighted on all four sides with spacious windows. Next to this is the pattern storage building, a two-story brick structure, 30 ft. wide by 100 ft. long, which is arranged with a system of shelving for storing patterns so that any desired one may be located readily by simply referring to the pattern index.

The laboratory is another brick building which is subdivided into a chemical department, a weighing department and a testing machine department. This is a very complete and well arranged laboratory, and in it minute records are kept of the chemical and physical properties of the steel turned out in each heat. The office building is located close by, and is subdivided into a general office and separate rooms for the officials and various departments.

General Plant Equipment

A dock is built about the middle of the water front, and standard gauge tracks run from the yards to this dock for the transfer of material coming or going by water. A pipe line extends from this dock to the oil tanks, as the fuel used throughout the plant is oil, and the most economical way of handling it is by pumping it from the oil vessel to the large storage tanks located near the water front. A line running from these tanks to the power house supplies the pumps furnishing the burners of the boiler, open hearth furnaces, ovens, &c., with fuel.

A modern locomotive crane of 10 tons capacity serves the yard for transferring cars, loading castings and unloading pig iron, scrap and other raw material by a powerful magnet. This crane is also fitted with a grab bucket for unloading cars of sand, limestone, fluorspar and other supplies.

For fire protection this plant is probably as well equipped as any. A large underwriters' pump, located in the power house, pumps direct from the river through 6-in. mains surrounding the entire plant. In addition to this a reserve tank containing 50,000 gal. of water is located close to the main building on a steel tower 70 ft. high.

The Foundry

The equipment of the foundry proper, an interior view of which is given in Fig. 2, is all very modern. The bay is 60 ft. wide and a 30-ton crane, as well as two 10-ton auxiliaries, travel its entire length and out into the yard. The whole arrangement of the shop is such that the molding is done at one end, and when the molds are made they are carried to the drying ovens, which are shown in Fig. 3. After drying they are immediately placed in front of the open hearth furnace where they are poured. As soon as the castings are broken out of the molds, they continue on their way to the cleaning department. After being cleaned they go

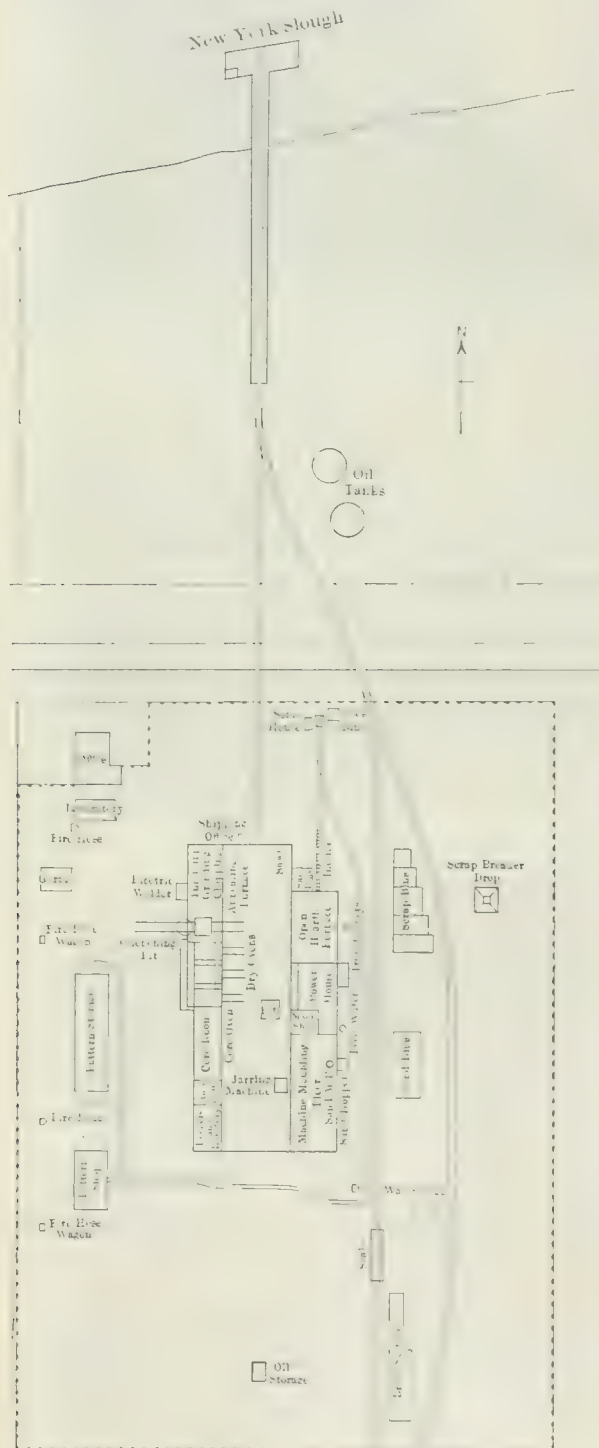


Fig. 1.—Plan Showing Location of Buildings and Tracks at the Foundry of the Columbia Steel Company, Black Diamond, Cal.

to the shipping department and out of the building to rail or boat, as the case may be.

The furnace which is shown in Fig. 5 is of the open hearth basic type, and was designed by S. T. Wellman.

ing floor, which is built entirely of 12-in. channels riveted together with the flanges resting on the I-beams of the floor construction, while the web forms a smooth floor. Immediately in front of the charging doors the steel is

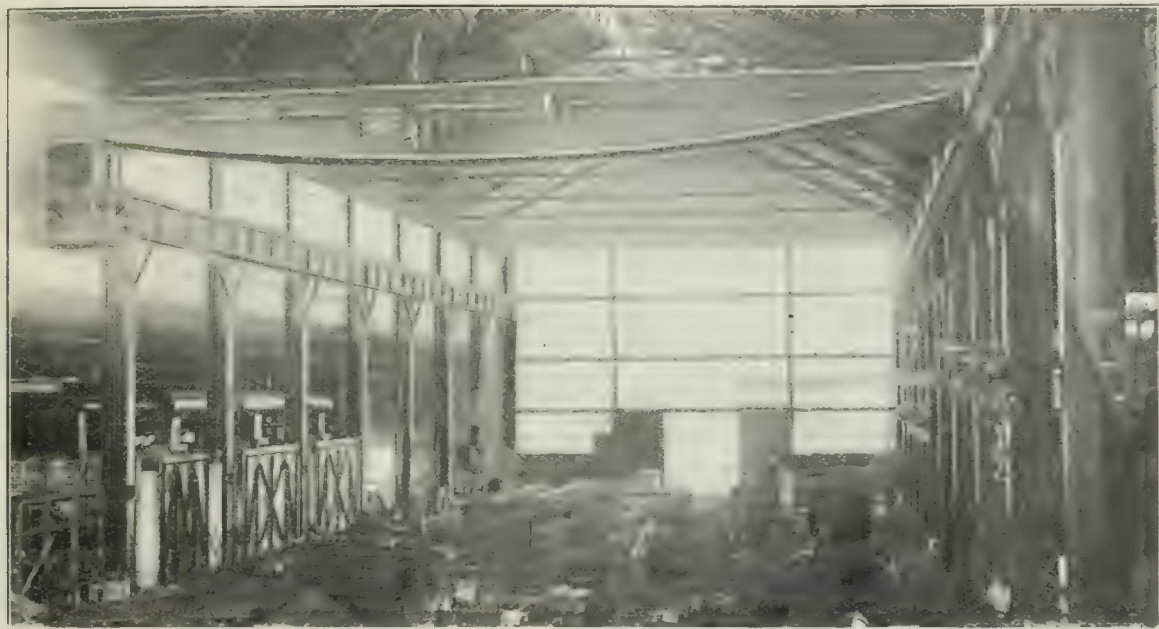


Fig. 2.—Interior of the Foundry Looking Toward the Cleaning Department

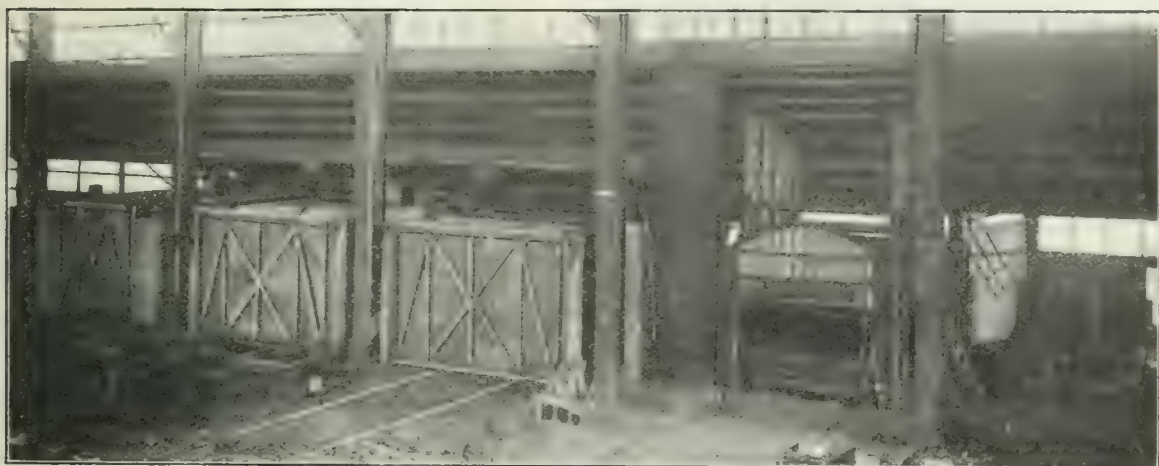


Fig. 3.—View of the Drying and Annealing Ovens.



Fig. 4.—View Showing the Furnaces, the Charging Floor and the Charging Machine.

the company's consulting engineer. Although nominally rated at 15 tons, this furnace is capable of melting 25 tons at a single heat. It is served by a high frame charging machine, running the full length of the charg-

bricked over to give a firm footing for the melters when shoveling or rabbling. Fig. 4 shows the furnace, the charging floor and the charging machine.

The molding floor occupies the southern half of the

building; next is the drying oven department and the pouring floor, and finally the chipping department where the castings are prepared for shipment. Jib cranes swing-



Fig. 3.—The Open Hearth Furnaces as Seen from the Pouring Floor.

ing from every other column throughout the length of the shop as well as the traveling cranes serve the shop so efficiently that delays in handling are reduced to a minimum. Modern pneumatic molding machines and core machines complete the floor equipment.

The annealing department is also an interesting feature of this plant, as it is arranged not only for handling

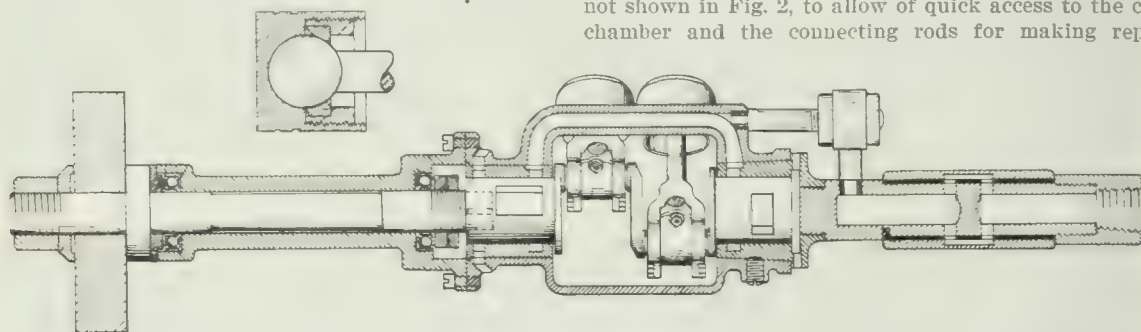


Fig. 2.—Axial Section of the Cleveland Portable Pneumatic Grinder and Detail of the Piston and Rod Connection.

mild steel castings but also manganese steel with a special peel machine, which takes the castings out of the annealing furnace and transfers them while hot to the tempering department for subsequent treatment.

The cleaning department is equipped with direct connected electric driven grinders, swing grinders, cold saws and draw shapers. There is also a sand blast room set apart from the main cleaning department with a car running into it from the main shop, so as to reduce handling to a minimum.

Electricity is used as power for driving the numerous cranes and tools. This is purchased on a long time contract from one of the large power companies who generate alternating current at a potential of 60,000 volts back in the mountains and transmit it to the Coast, where it is stepped down to 4400 volts at substations for local distribution. At the plant of the Columbia Company the current is again stepped down in the ratio of 10 to 1, and is distributed at 440 volts about the plant for operating the cranes and the motor driven tools or for furnishing power to air compressors or hydraulic presses.

A Cleveland Portable Pneumatic Grinder

A portable pneumatic emery grinder and castings cleaner, known as Style A, is a new product of the Cleveland Pneumatic Tool Company, Cleveland, Ohio. Fig. 1, is an exterior view of the grinder, and Fig. 2 a sectional view.

The grinder has two pairs of pistons working at right angles. At opposite ends of the main cylinder casing and in direct alignment are two handles, one surrounding the emery wheel arbor and the other, rotatable, controlling the throttle. By this manner of handling, the machine is practically balanced, and is considered to be more

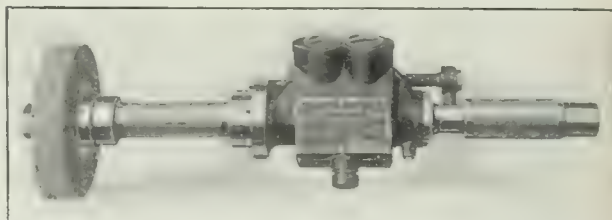


Fig. 1.—The Style A Portable Emery Grinder Made by the Cleveland Pneumatic Tool Company, Cleveland, Ohio.

convenient for the operator than if the handles were at right angles to each other. Twisting the throttle handle to right or left starts or stops the machine. The emery wheel arbor has ball bearings, and is connected by a key directly to the main crank shaft.

The four pistons of the motor are single acting, and are connected in pairs to opposed throws of a double crank shaft. The end bearings of the crank shaft serve also as valves and run in bronze bushings; one controls the supply and the other the exhaust to the various cylinders. The connecting rods and crank are drop forged. The rods are each in one piece, an especially strong construction, and the piston end is in the form of a ball, which allows universal motion in the piston itself. In the piston any wear of the connecting rod may be taken up.

The main body of the machine is a one-piece steel casting, provided with hand hole openings, which are not shown in Fig. 2, to allow of quick access to the crank chamber and the connecting rods for making repairs.

By having the crank trunnions act as valves the number of parts is considerably decreased, making the machine simpler and allowing the placing of the throttle handle and emery wheel arbor in alignment.

The Cleveland grinder will drive up to a 6-in. emery wheel with a 1½-in. face. It is adapted to grinding off fins and risers from iron and steel castings, trimming weld seams and countersunk rivets or uneven edges of steel plate in structural or ornamental iron work. By locking it in a vise it becomes a grinder for edging small tools. A multiple disk scaling wheel can be used in place of an emery wheel for removing rust or scale from iron or steel. Disk plates can be quickly removed by unscrewing the nut from the hub of the wheel and disks replaced when worn out. A wire wheel brush can be used for cleaning castings and for removing blistered paint from metal and wood surfaces, and a felt wheel can be used for buffing and polishing bright metal surfaces.

The Hercules Steel Company, Portland, Ore., recently incorporated with \$100,000 capital stock, states that its plans are not fully matured.

The New Standard Reducing Presses

The new line of reducing presses built by the Standard Machinery Company, 7 Beverly street, Providence, R. I., consists of three sizes. These are known as the No. 4-R, the No. 7-R and the No. 9-R respectively. The

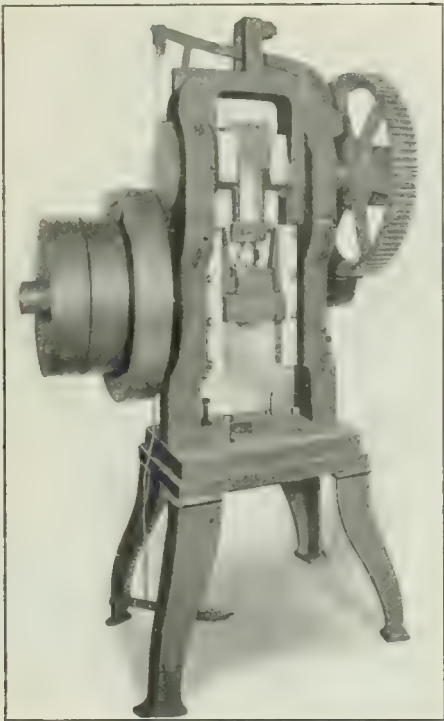


Fig. 1.—The No. 4-R Reducing Press Built by the Standard Machinery Company, Providence, R. I.

two former presses are of the general design shown in Fig. 1, while the other, which is a heavier machine, is shown in Fig. 2. These presses are used for drawing, broaching and reducing metal, and the largest size is particularly adapted for the manufacture of seamless tubing of brass, gold, silver and other metals, and can also be used for making sockets, large shells and other sheet metal work requiring drawing. The construction of all the machines is heavy and powerful.

The smallest size, the No. 4-R, has a single train of gears and is built either with or without back gears,

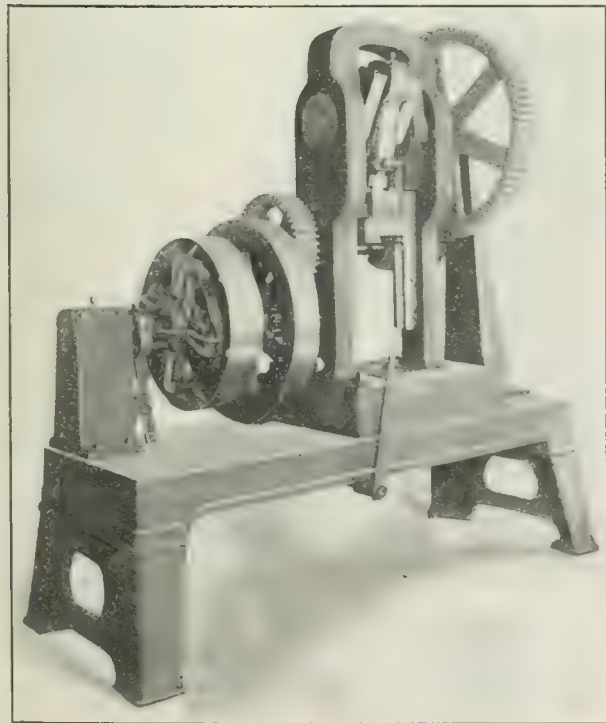


Fig. 2.—The Heaviest Machine of the New Line.

while the No. 7-R is back geared, with single train. Both of these presses have a balance wheel and a tight and loose pulley drive. The No. 9-R has a double train of cut gearing, with a balance wheel and Hill friction clutch. Where extreme sensitiveness is required in the depression of the treadle a compound lever arrangement is furnished, a mechanism often necessary in drawing tubes or sockets with a shoulder and in broaching operations where an intermittent stroke is employed. The machines may be equipped with dial feeds, giving them a capacity of feeding two holes at each revolution, or with an automatic cam knock out for sheet work.

The machines have extra long ways, slides with long bearings and ball and socket connections. The crankshaft is of extra heavy drop forged steel, fitted with the company's adjustable wedge on the clutch side. The special type of brake, employed on the largest machine, is operated by a bell crank lever motion in connection with the shipper and treadle handle, which throws in the clutch. The driving power is taken direct on the clutch and pulley so that the balance wheel is without a belt. All back gear bearings are fitted with cap boxes and are babitted.

The following table gives the principal dimensions and specifications of the three presses:

	No. 4-R.	No. 7-R.	No. 9-R.
Minimum stroke of slide, inches.....	6	10	14
Maximum stroke of slide, inches.....	12	17	18
Adjustment of slide, inches.....	4	4	4
Distance between uprights, inches....	19	19	19
Size of bottom of slide, inches.....	10 x 7	12 x 8	13 x 8
Gear ratio.....	5 to 1	3 to 1	2 1/2 to 1
Diameter of flywheel, inches.....	34	38	36
Face width of flywheel, inches.....	5	5 1/4	5 1/4
Weight of flywheel, pounds.....	500	700	700
Diameter of tight and loose pulleys, in.	24	24	..
Face width of tight and loose pulleys, inches.....	5 1/8	5 1/8	..
Diameter of clutch pulley, inches....	..	..	30
Face width of clutch pulley, inches....	..	..	7
Overall height, inches.....	90	102	108
Floor space, inches.....	64 x 42	67 x 50	96 x 45
Net weight of press, pounds.....	4,300	6,800	10,500

The equipment regularly furnished with these presses includes all the accessories ordinarily supplied with a tool of this character.

Steel Corporation Payments for Hill Ore

It was announced last week that the payment about to be made by the United States Corporation in royalties in iron ore mined from the Hill, or Great Northern, properties on the Mesaba range will amount to \$2,856,000, representing 3,000,000 tons at 95.2 cents royalty. This statement is not exact, as the royalty stated is for the base Hill ore, an ore containing 59 per cent. iron. Variations from this content will mean either additions to or subtractions from the base rate. The contract made in 1906 calls for a payment of \$1.65 per ton for the ore delivered at Lake Superior dock. Of this, 80 cents represents the freight rate. The royalty of 85 cents on the ore increases 3.4 cents each year. There have been three increments since 1907. Referring to the work done by the Steel Corporation on the Hill properties, Dwight E. Woodbridge writes in the *Engineering and Mining Journal* as follows:

"Work of the year in the Mesaba region has been unproductive of good ore, and what has been found is mostly in small deposits. The so-called 'Hill deal,' made between the United States Steel Corporation and the Great Northern Railway, in 1907, has been unsatisfactory to the lessee company, so far as known, in that the tonnage developed in addition to that shown prior to the execution of the lease is less than anticipated. Royalty rates on this ore, for the base of 59 per cent. iron, will be 98.6 cents a ton in 1911, and the minimum tonnage that the Steel Corporation will be compelled to turn over to the Great Northern road will amount to 3,750,000 tons this year and 4,500,000 tons in 1912. In order to deliver so much to the road the Oliver Iron Mining Company has been busy opening and developing mines on Hill lands, and now has several of them already shipping or about ready for the coming season of navigation. In order to care for the ore from other mines with which it has hauling contracts and this Oliver ore, the Great Northern will add to its dock and track facilities during the winter."

The Roberts Motor Air Compressor

A Light Compact Outfit for Portable and Stationary Use

A light portable outfit suitable for supplying air for all purposes for which it is ordinarily required is being built by the Roberts Motor Company, Sandusky, Ohio. The special features of the latest type are a gear driven mechanical oiler, which starts and stops simultaneously with the operation of the motor, a rigid timer which it is said will not get loose and a noiseless carbureter. Figs. 1 and 2 show the oiling and carbureter sides of the compressor, respectively, while Fig. 3 is a view showing it mounted on a truck for use by contractors and for other service where a portable machine is required.

In building this compressor the intake valve has been eliminated, and ports in the wall of the cylinder through which the air is drawn have been substituted. These ports are uncovered by the piston at the end of the downward stroke. These machines are of the two-stage type, which enables them to pump to pressures of 200 lb. per square inch without loss of time, while at the same time they are said require less power to operate than a single-stage compressor. If an air compressor is to operate efficiently the air must be cooled in its passage from the low to the high pressure cylinder, and the latter as well as the former must be cooled. Ordinarily the receiver or intercooler is more or less bulky, and is located at the side of the cylinder. In the Roberts compressor it is made in the shape of a horseshoe and contained in the water space surrounding the cylinder. Its shape is such that it nearly surrounds the high pressure cylinder, thus giving a large cooling surface and at the same time a large capacity. In this way the compressor is very compact, and the weight of an exterior intercooler which is generally excessive is avoided.

The valves are readily accessible for cleaning, as any one together with its spring can be removed by simply

being the low pressure and the upper the high pressure. On its downward stroke all the valves are closed, and a vacuum is produced in the low pressure cylinder. Just before the piston reaches the bottom of its stroke the air inlet ports in the cylinder wall are uncovered and the air

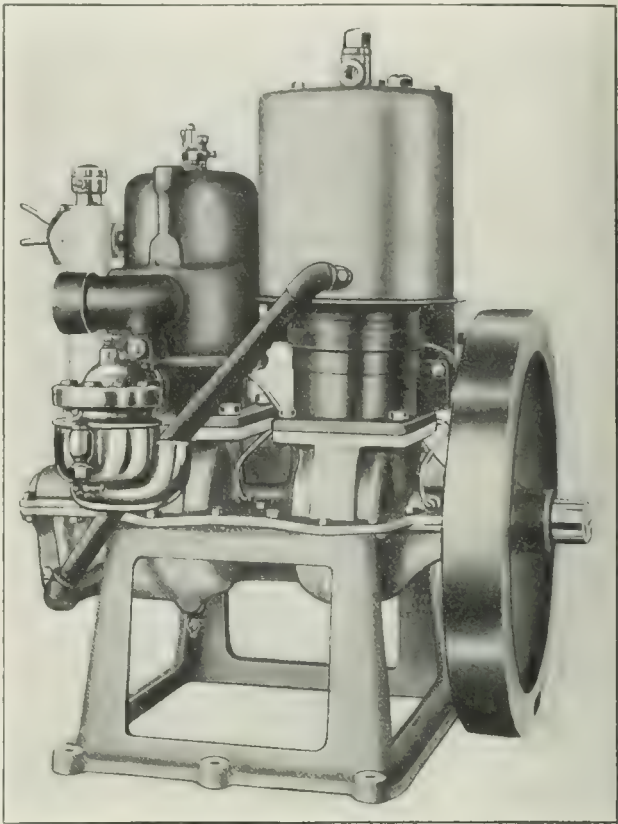


Fig. 2.—The Carbureter Side of the Compressor.

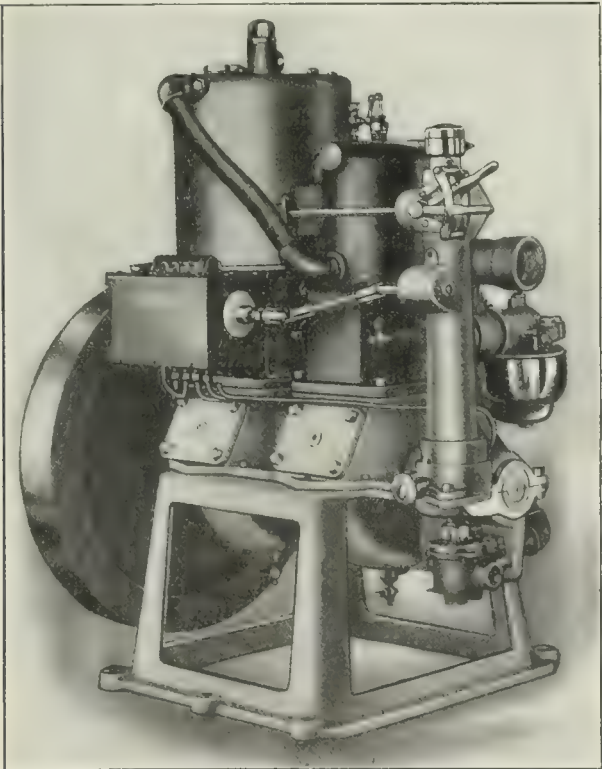


Fig. 1.—The Oiling Side of a New Air Compressor Built by the Roberts Motor Company, Sandusky, Ohio

unscrewing one cap without in any way disturbing any other part of the compressor. The valve seats are also detachable since they form a part of the valve cage, which can be easily unscrewed after taking off the cap without disturbing any other part.

The compressor piston is double, the lower portion

rushes in to fill the cylinder. The up stroke serves to compress the air and drive it into the intercooler from which it is drawn into the high pressure cylinder. The water jacket is held in place by one set of studs and nuts at the top, and can be readily removed by unscrewing the water connection and removing the nuts from the six studs that hold it in place without disturbing any part of the valve except the connection to the high pressure outlet. Removing a hand hole cover gives access to the connecting rod bolt for making adjustments.

The engine supplying power to the compressor is of the valveless two-cycle automobile type. The cylinder is carefully ground to size, and the crank shaft is of 0.4 per cent. carbon steel. All the bearing surfaces are ground to size, and the bearings are of die cast nickel bronze which can be readily replaced in case of wear. The piston pin is of case hardened and ground low carbon steel and turns in a phosphor bronze bushing. The motor has jump spark ignition and a helical gear drives the timer as well as the pump which furnishes a supply of cooling water.

The following table gives the principal dimensions and specifications of the compressor:

Diameter of engine cylinder, inches.....	4½
Length of engine stroke, inches.....	5
Speed, revolutions per minute.....	600
Horsepower	6
Area low pressure cylinder, square inches.....	17.54
Area high pressure cylinder, square inches.....	6.21
Length of stroke, inches.....	5
Air consumption, cubic feet per minute.....	30
Length, inches.....	27½
Width, inches.....	19
Height, inches.....	34½
Weight with iron base, pounds.....	400
Weight with aluminum base, pounds.....	350

The compressor is furnished complete with carbureter, timer, mechanical lubricator, gear driven pump for cooling water, muffler, spark plug and coil, dry battery, switch, wire, starting handles, set of wrenches, oil can and complete book of instructions.

The portable type of compressor illustrated in Fig.

3 was originally made for the use of contractors laying water pipe. It is capable of supplying two ordinary caulking hammers, and it is stated that when used in this way the capacity of each caulker is quadrupled. The heavy galvanized steel tank has a capacity of 8 cu. ft., and can be filled with air at 100 lb. pressure within 3 minutes from the time the motor is started. The heat is

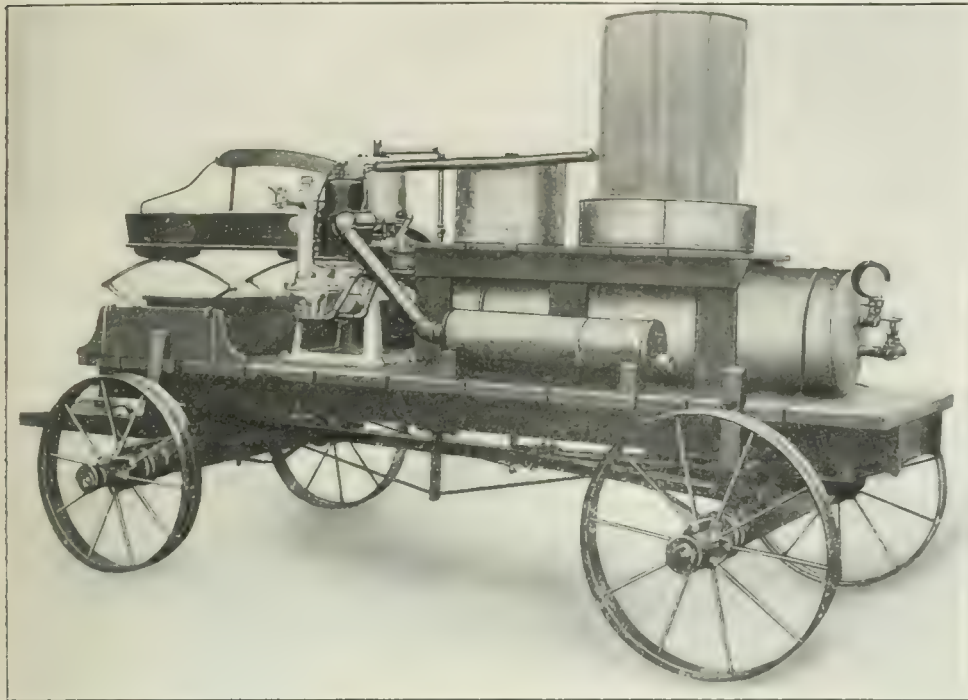


Fig. 3. The Compressor Mounted on a Truck for Contractors' Use.

radiated by burlap kept moist by a pail of water every 2 or 3 hours. The gasoline tank furnished has a capacity of 6 gal., which is sufficient for a run of 10 hours. Metal wheels having a tread of 56 in. are used. The truck has an open platform with trussed sills to prevent warping and is also furnished with a tongue.

The equipment furnished for the portable type is the same as that for the stationary one with the following additions: Gasoline tank, burlap radiator, 200-lb. gauge, blow-off valves, air tank, two globe valves with hose connections and a tool box. The weight of the portable compressor complete is 1540 lb., and it can be readily moved from place to place by a single horse.

The output of the iron and steel works of the Dominion Steel Corporation in 1910 was as follows: Pig iron, 255,000 tons; steel ingots, 304,000 tons; steel blooms, 268,000 tons; steel billets, 88,000 tons; steel rails, 140,000 tons; wire rods, 79,000 tons. The Nova Scotia Steel & Coal Company made the following output: Pig iron, 66,000 tons; steel ingots, 75,000 tons; steel billets, 59,000 tons; bars and plate, 49,000 tons; axles, 34,000 tons. Both companies largely increased their production as compared with results accomplished in 1909.

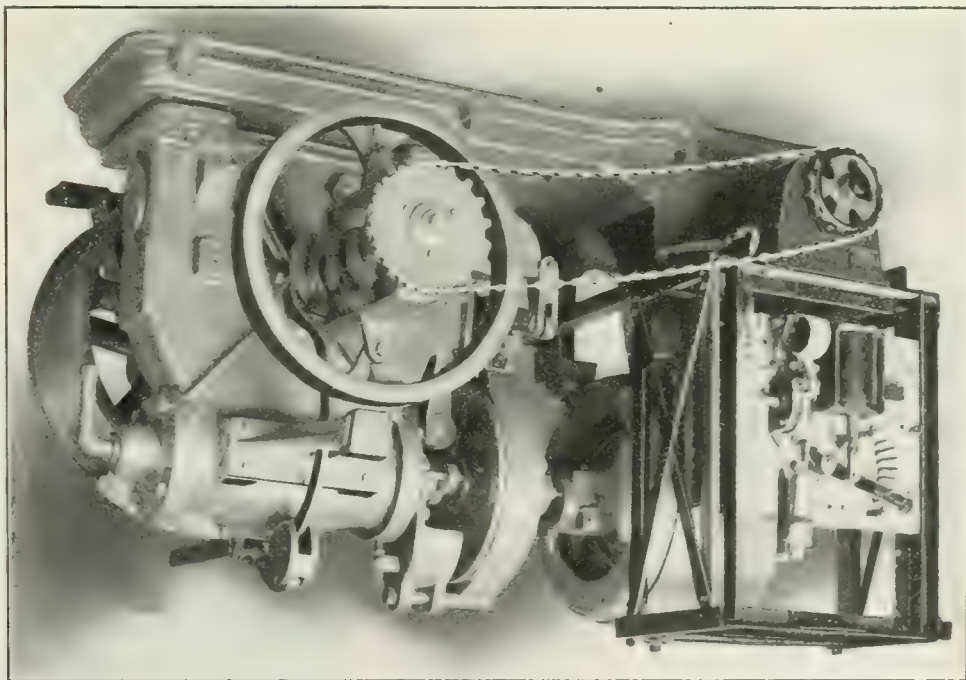
Speidel Ceiling Electric Elevator Machine

A new type of direct connected electric ceiling elevator winding machine is being manufactured and placed on the market by J. G. Speidel, Reading, Pa. This machine is self-contained, the winding machine, motor, controller

and reversing switch being mounted on a single heavy cast iron base, and is handled and put in position on the ceiling as one piece. This is an improvement over the old style, where each component part of the apparatus had to be suspended separately, an arrangement requiring considerable additional space, more labor and the constantly recurring difficulty of keeping the different parts tight and in alignment.

The winding machine proper is of strong and durable construction. The worm gear is of the Hindley type and is cut from solid blanks. The forged steel worm runs in a bath of oil, contained in a dust-proof casing. The end

thrust is taken up on both ends by large hardened steel thrust bearings, which have heretofore been successfully used on other styles of the builder's winding machines, thus reducing the friction and saving power and care in keeping the worm central. The machines have automatic top and bottom stops and automatic slack cable stops that shut off the power auto-



The New Direct Connected Ceiling Electric Elevator Winding Machine Built by J. G. Speidel, Reading, Pa.

matically should the cable break or become slack from any obstruction to the car while descending.

The motor is directly connected to the winding machine. The controller and reverse switch are attached to the side of the base plate and the motor. The reverse

switch is on top of the controller and is operated by an endless chain running over sprocket wheels from a shifting wheel on the drum shaft of the machine, which is operated by a cable extending through the various floors which the elevator serves.

The new machine is made in four different sizes, ranging from $\frac{1}{2}$ to 3 tons capacity, and is sold as a separate machine to builders not manufacturing their own machines, or in connection with complete elevators built by the manufacturer.

The 16-In. Schellenbach Geared Head Lathe

A Semi-quick Change Gear Box Interchanging with Screw Cutting Attachment Is a Special Feature

The John B. Morris Machine Tool Company, Cincinnati, Ohio, is equipping its standard 18 and 20 in. lathes with the builder's semi-quick change gear box. Either

while both the cross and longitudinal feeds are driven through frictions and are reversible in the apron. The rack is used for the rough chasing of all screw pitches shown in the index as a positive feed is provided, thus relieving the lead screw of excessive wear. The rack pinion can be disengaged from the rack and also has an adjustment to compensate for wear. The carriage can be quickly locked to the bed for facing by the eccentric lever at the right of the apron. The chasing indicator, which is located at the right end of the carriage, is so made that its worm wheel can be disengaged from the threads in the lead screw when it is not in use. The apron and tailstock handwheels are counterbalanced and the steady rest can be faced in either direction.

Referring to the headstock, the construction of which is shown in Figs. 2 and 3, the driving pulley *a* is keyed to a bronze sleeve, which bears directly upon the lathe spindle, and also has a hardened pinion, *b*, keyed to it. The outside diameter of this pinion is the same as that of the bronze pulley sleeve. The hardened nickel steel cone gear *c* is splined to slide upon this bronze sleeve

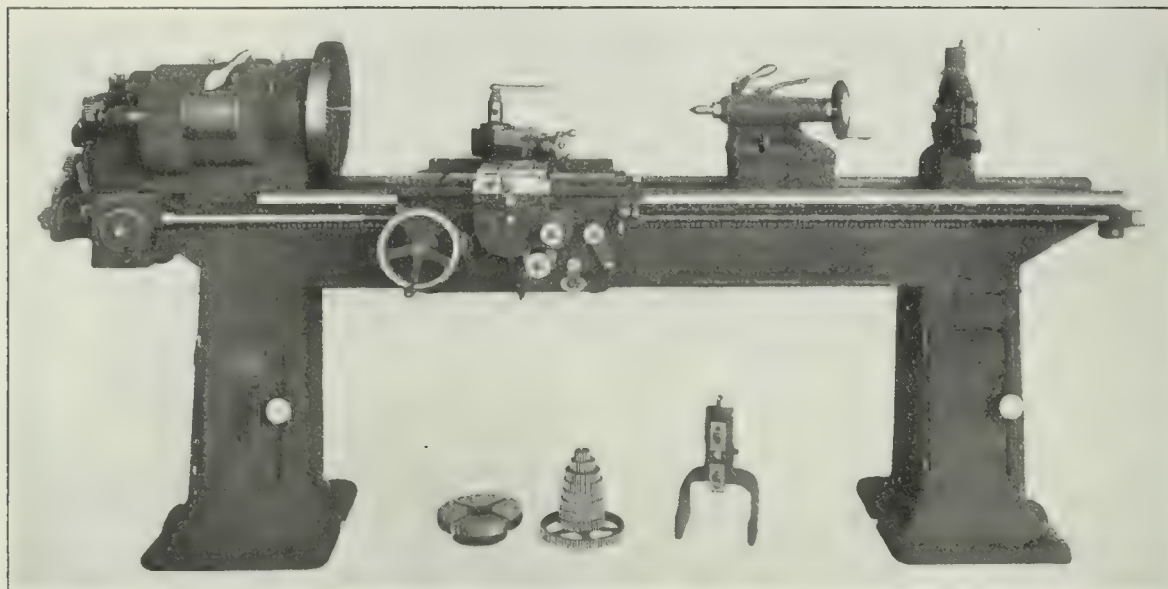


Fig. 1.—The Schellenbach 16-In. Lathe with an 8-Ft. Bed Made by the John B. Morris Machine Tool Company, Cincinnati, Ohio.

the gear box or the quick change screw cutting attachment with which it is interchangeable can be applied by the purchaser at any time after the machine leaves the factory if desired. Fig. 1 is a general view of the standard 16-in. lathe, with an 8-ft. bed, and Figs. 2 and

and the pinion, its longitudinal movement being controlled by the handle *d* on the shaft *e*, the sector *f* and the sliding fork *g*. The desired longitudinal position of this cone gear is determined by the pointer of the handle *d* and an index plate which gives a list of diameters to

be turned at various cutting speeds in feet per minute, the diameters corresponding to the various gear combinations of the driving train. In Fig. 3 the cone gear is shown in its extreme left position, which exposes the pinion *b*, and allows the rocker gear *h* to mesh with it. Moving the cone gear to either of the two intermediate positions to the right brings the cone gears into proper alignment with the rocker gears *h*, the pinions of which mesh with the internal

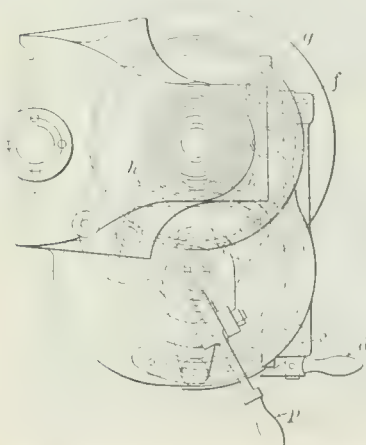


Fig. 2.—End Elevation of the Headstock.

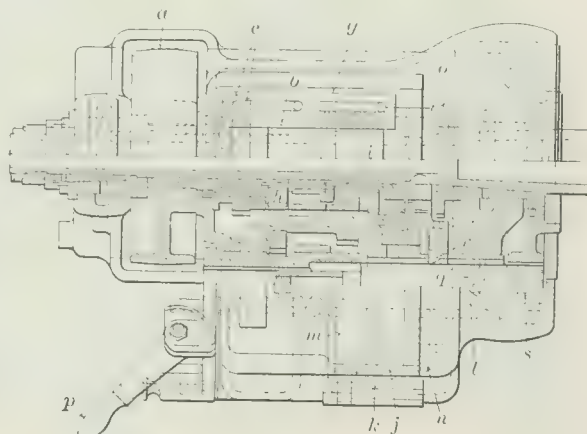


Fig. 3. Sectional Plan View of the Geared Headstock.

3 are an end elevation and sectional plan view respectively of the geared headstock.

Three changes of feed for every change of gears are provided by the gear box. The change gear quadrant is mounted upon and swings directly from the gear box, which permits this part to be manufactured as a separate and independent unit. The feed for the apron is through a splined screw and a steel sliding double bevel pinion,

gear ring *m*. In the extreme right position the cone gear is clutched positively to the sleeve *i*, which revolves loosely upon the lathe spindle. The clutch teeth on this sleeve are formed to receive the teeth of the smallest gear of the cone *c* and the gear formed upon the sleeve meshes with the gear *j*, which is doweled and screwed to the flanged casting *k*. This casting is splined to the main driving pinion *l* and carries the in-

ternal gear ring *m*, previously mentioned. The flanged casting also drives the friction ring, shown in Fig. 3, which locks the gear *n* and the gear *j* by the longitudinal movement of the driving pinion *l* through the rack and lever *p* at the left of the headstock housing. The gear *n* meshes with the gear *o*, which is keyed to the spindle and has the same number of teeth as the loosely mounted gear *i*. The spindle will be driven at its maximum speed, which is that of the driving pulley, when the cone gear *c* is clutched to the gear *i* and the gears *j* and *n* are locked together by the friction. It will thus be seen that when the lever *p* is moved to the left the friction becomes disengaged and the pinion *l* slides upon and engages the steel face gear that is mounted on the outside of the front spindle bearing, thus giving a positive drive. The friction is operated by a dog or plug, *q*, in the pinion *l*, and this plug engages the lever *r* in the friction. The screw *s*, which can be adjusted from the front of the headstock, gives an adjustment for the friction.

When the cone gears *c* are disengaged from the clutch of the gear *i*, the rocker gears *h* can be engaged with a selected gear on the cone. The two rocker gears *h* and the manner of mounting them upon the rocker casting are clearly shown in Fig. 2. When the drive is through the cone gear *c* to either of the rocker gears, power is transmitted to the spindle either through the gears *n* and *o* or through the pinion *l* in the face gear. Fourteen changes of speed, all of which are available when the machine is running, can be obtained when the driving pulley is running at a constant speed. An oil bath is provided for the gears, none of which are loose and none exposed, and all of the gears which are thrown in and out of engagement are made of hardened nickel steel. If desired the lathe can be supplied with motor drive, in which case a bracket is mounted on the headstock and a gear substituted for the driving pulley. It is also possible for a silent chain drive to be used, the motor being mounted beneath the headstock.

Duff Ratchet Jacks at Panama

While several hundred jacks have been furnished to the Isthmian Canal Commission under contract for the construction for the Panama Canal probably the most important single shipment consisted of 276 ratchet jacks

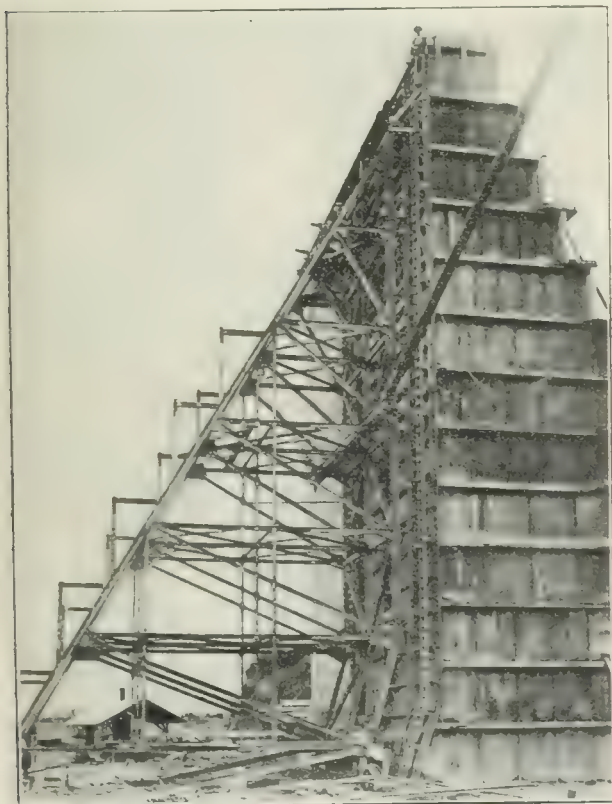


Fig. 1.—The Steel Plate Lock Form Which Is Lined Up by Ratchet Jacks Made by the Duff Mfg. Company, Pittsburgh, Pa.



Fig. 2.—Section of Frame and Plate Showing Jacks in Position.

of special construction, made by the Duff Mfg. Company, Pittsburgh, Pa. These jacks are being used in the construction work on the lock walls along the line of the canal, and were especially built for this work on an entirely new model. Fig. 1 shows the jacks in use for lining up the form for the lock walls, while Fig. 2 is a detail showing how the jacks are placed in position.

The jacks are of the double screw type, there being a right-hand screw on one side and a left-hand screw on the other with a ratchet between. They are used to line up and hold in position the large steel plate which serves as a form behind which the concrete dam sets. These plates are bolted to a huge A frame of structural steel, which is in the shape of a right angled triangle 78 ft. 4 in. high, 24 ft. wide and 40 ft. deep at the ground. As these jacks are tightened they spread the plate which is forced against the water side of the concrete dam. It is estimated that the pressure against each frame which is borne by the jacks is 1000 tons.

Twelve of these A frames are in use and operate on tracks so that they may be shifted from one section of a lock to another. The solid steel plate that is attached to each is as high and wide as the frame or traveler, and is placed on the inside where the concrete wall is to be constructed. As the concrete is set in the forms behind this steel plate, the jacks which are installed at the top and bottom and every horizontal member of the frame except the second from the top are tightened, thus forcing the traveler plate against the forms and lining up and holding in position the newly set concrete.

The aggregate weight of the shipment is over 23 tons and its total capacity 4500 tons. Two hundred and fifty-six of the jacks weighed 165 lb., and had a capacity of 15 tons, and the balance of the jacks each weighed 220 lb. and had a capacity of 30 tons. Three of these larger jacks are placed in the traveler near the ground where the pressure is the greatest, while 30 15-ton jacks are placed on the outside and center trusses of the traveler. In this way 8 of the 12 travelers can be operated with jacks at the same time.

The Aluminum Goods Mfg. Company, Manitowoc, Wis., has not decided on a location for its new plant, but expects to do so early in February.

Heating Furnace Doors

How a Modification in Their Design Stopped Air Leaks

BY FORDYCE W. BROWN, SPRINGFIELD, ILL.

In any furnace where the internal pressure exceeds the external, as in blast and malleable iron practice, the problem of securing an air tight fit on the charging door is an important one. To the writer was recently assigned the task of remedying several glaring faults in the design of a door attached to a large malleable iron furnace

the door and casing were red hot most of the time during a heat. In addition to the excessive waste of coal, this caused the small hinge bolts to burn out every three or four days, filled the furnace room with smoke and gas to such an extent as to render it almost uninhabitable, and made the handling of the charging door decidedly uncomfortable. A hood was placed above the door to carry away the smoke and gas, but its work was of an indifferent sort.

Finally it was decided to put in a new door and casing and the one illustrated in Fig. 2 was designed. The casing *d* was made in the form shown, having a thickness from $\frac{3}{8}$ in. to 1 in., and stock was left around the edges of the mouth for machining along the line *c f*.

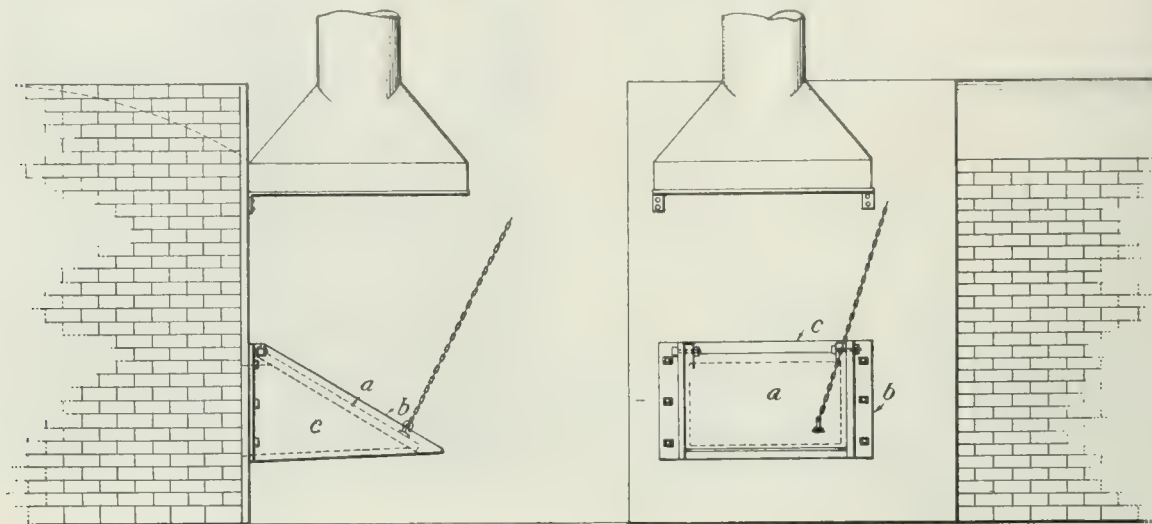


Fig. 1.—End and Front Elevations of the Original Door on a Heating Furnace at the Bradley Mfg. Company, Bradley, Ill.

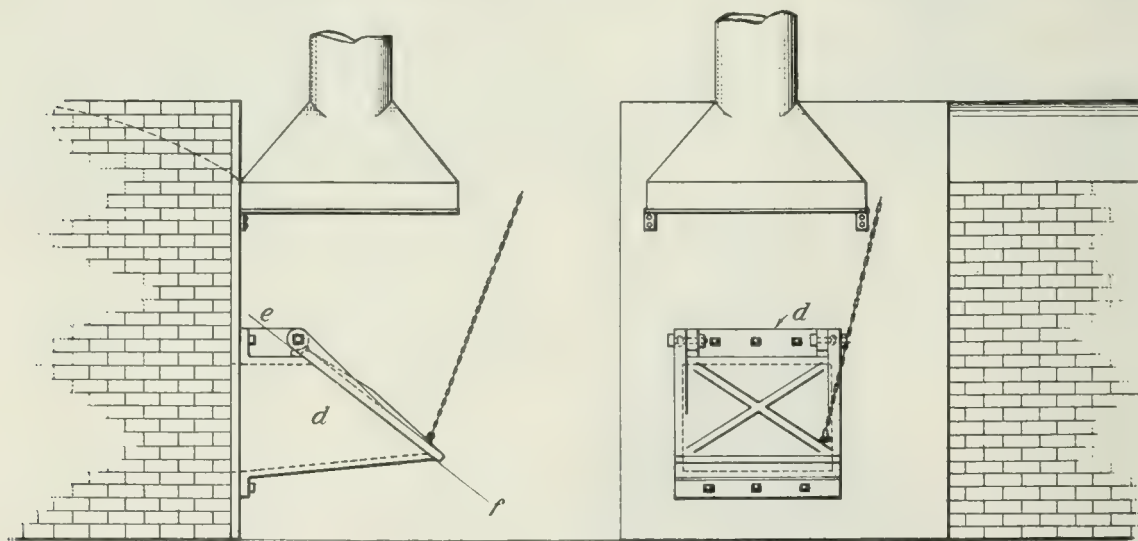


Fig. 2.—End and Front Elevations of a New Heating Furnace Door Designed by Fordyce W. Brown, Springfield, Ill.

in the works of the Bradley Mfg. Company, Bradley, Ill., where he was employed. This particular furnace was fired at one end, the door being about a foot from the floor line.

The original design called for a door and casing, as shown in Fig. 1. The casing was of the ordinary pattern, except that the door *a* fitted down between the two projecting parts *b b* of the casing *c*. No provision was made for machining either the door or its seat on the casing. Two small projecting lugs on the door served to accommodate two 5-16-in. bolts, by which it was hung in place. The casing was bolted to the front plate of the furnace by three bolts on each side, as shown, the bolts being $\frac{1}{2}$ in. in diameter. Both the door and casing were approximately $\frac{5}{8}$ in. to $\frac{3}{4}$ in. thick, and the door was a plain surface.

On inquiry from the furnace men it was learned that it was impossible to prevent flames and gas from leaking around edges when blast was on, and consequently

The door was made 1 in. in thickness, braced with 7-16-in. diagonal ribs, as shown, and hung with $\frac{7}{8}$ -in. bolts. Stock was also left around the edges for machining. It also will be noticed from the drawing that the hinge bolts were located 7 in. from the front plate of furnace, and that the lugs for receiving same are cut under to clear fire door. The casing was bolted to the front plate by eight $\frac{3}{4}$ -in. bolts, five in upper flange and three in lower. After the castings were made each was machined along the contact faces until a very close fit was produced, and after being clamped together holes for hinge bolts were drilled. The front plate of furnace was badly warped, and this necessitated considerable chipping and calking with fire clay when the casing was fitted to furnace, but after the door was hung and the blast turned on at the following heat it was found that a nearly perfect joint existed, there being no leakage noticeable. There also was no heating of the door, nor burning out of hinge bolts, and the discharge of smoke and gas into the fur-

nace room ceased. The foreman of the department since stated that from 400 to 500 lb. of coal less was used on each heat than formerly, which, when multiplied by two heats per day and 300 days per year, would amount to something in the course of a year.

New Morris Lathe Attachments

Three new lathe attachments have been developed by the John B. Morris Machine Tool Company, Cincinnati, Ohio, and are being regularly furnished as a part of the equipment of its engine lathes. These are the new turret slide shown in Fig. 1, the engine lathe turret illustrated in Fig. 2 and the draw-in attachment and spring collets shown in Fig. 3.

This turret slide is intended to be used without power feed, and is moved by hand through the pilot shaft and pinion in the customary way. The turret is revolved and

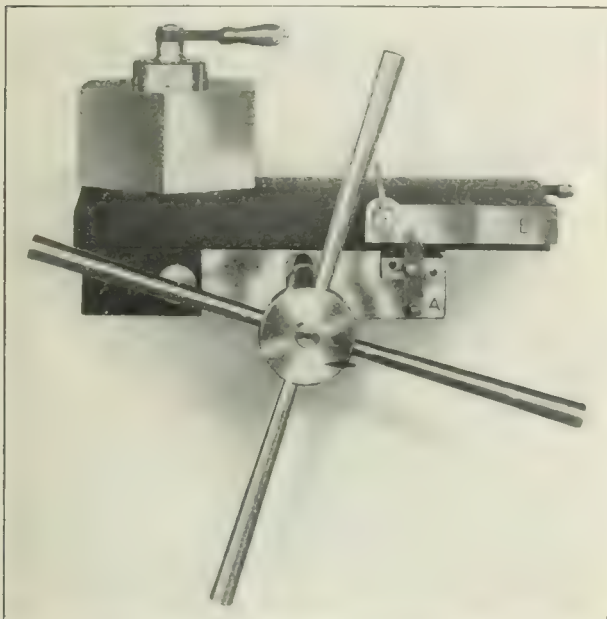


Fig. 1.—New Turret Slide Made by the John B. Morris Machine Tool Company, Cincinnati, Ohio.

locked either automatically or by hand, and the devices for automatic revolution can be disengaged for hand operation. If desired the turret slide can be supplied with power feed and an automatic stop, a gear box being mounted on the pad A. The driving gear of the train contained in this gear box is splined to the lead screw, and the driven one is keyed to the pilot shaft, an arrangement which gives the same number of rates of feed as there are changes of feed or for screw cutting. Where the power feed is supplied an automatic stop is also furnished, and in this case the top slide has a T-slot at B to receive the adjustable stop dog operating a latch that disconnects the gear feed train. The size of turret illustrated is for a 16-in. lathe and has a 12-in. traverse when operated by hand and one 3 in. less when revolved

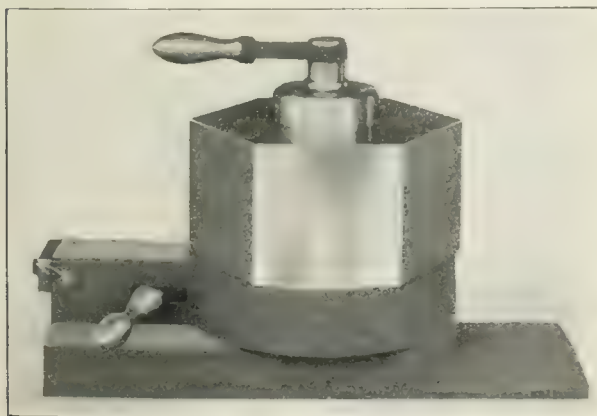


Fig. 2.—The Latest Type of Morris Engine Lathe Turret.

automatically. The hexagon measures 5 in. in height and 9 in. across the flats, and will clear tools the diameters of which are not in excess of $5\frac{1}{2}$ in.

The turret shown in Fig. 2 is intended to be applied to the carriage of engine lathes, and is made interchangeable with the compound rest. It contains a bronze nut for engaging the cross feed screw of the carriage, and has a bracket which can be bolted to the back of the carriage and acts as a positive stop for the turret by reason of the adjustable stop screw with which it is provided. The lock pin which is of hardened tool steel is controlled by the lever A and engages an index ring of the same material, the wear of the pin being taken up by a tapered gib which is adjusted by the screw B. This turret has the same height and distance across the flats as that shown in Fig. 1.

The draw-in attachment and spring collets illustrated in Fig. 3 are intended for attachment to the maker's 14-in. lathe, although it can be supplied as an extra attachment on all sizes. The holes in the collets for this particular size of tool vary by sixteenths from $\frac{1}{8}$ to 1 in., but the larger machines enable large size collets to be used. The bore of the chuck A fits the nose of the lathe spindle and threads on the periphery of the former screw

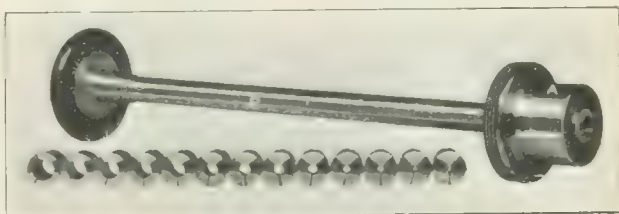


Fig. 3.—A New Draw-In Attachment and Spring Collets.

directly into the face gear mounted outside of the front spindle bearing. A ring of hardened and ground tool steel is forced into a counterbore in the front end of the chuck and receives the tapers of the collets which are tightened on the stock by the tube B that extends through the spindle and has a hardwood handwheel keyed to it. To prevent the collets from turning a bushing fits into the spindle taper, and has a bore containing a key to receive the keyseats on the collets.

The Western Electric Company's Year

The Western Electric Company, Chicago, has changed its fiscal year to end December 31, instead of November 30. For the thirteen months ending December 31, 1910, its sales were approximately \$66,000,000, as compared with \$45,000,000 for the 12 months of the previous year. These sales for 1910 compare with \$69,000,000 for 1909, which was the largest year in the history of the company.

The increase over 1909 was well distributed over the various lines of merchandise which the company handles, such as telephones, cables, motors, generators and electric light supplies, and the increase in the business has been quite general throughout the country.

The Western Electric Company has some 20 houses located at various points in the United States, through which it distributes its electric manufactures and supplies. During the past year it has continued its policy of concentrating the manufacturing at Hawthorne, Ill., and several million of dollars have been spent there in new buildings. The latter part of 1910 more new buildings, to cost \$1,000,000, were authorized, which will still further increase the capacity of the plant. The company now employs upward of 24,000 men.

The Standard Chain Company, Bailey-Farrell Building, Pittsburgh, Pa., has been awarded a contract by the Third Lighthouse Department, Tompkinsville, Ga., for 570,000 lb. of $1\frac{1}{8}$ -in. chain for light vessels to Government specifications, the iron for which is being rolled in its own mills at Columbus, Ohio. The Standard Chain Company demonstrated to the department that it can exceed the specifications in every requirement, although extremely severe as to elastic limit, elongation, contraction of area and cold bend tests.

An Analysis of Boiler Feed Records

How the Copes Boiler Feed Regulator Helps to Prevent Fluctuations in Water Level

The installation of recording instruments in power boiler plants provides an excellent means for determining the efficiency of the boiler, the feed water heater, the economizer and the other auxiliaries. The graphical records obtained from these instruments are very valuable in determining the efficiency and reliability of boiler feed regulators. Venturi meter records also serve as an

constructed automatic boiler feed regulator would have maintained these water levels within a fraction of an inch of the normal height and regardless of the load, the rate of feed to each boiler would have been in proportion to the rate of evaporation. It would thus have been possible not only to avert burning out and straining the tubes from low water, as well as excess moisture in the steam because of high water, but numerous other economies would also have resulted. The use of automatic regulators, which feed in proportion to the rate of evaporation, eliminates labor, smooths out the operation of the boiler room and results in securing very high temperature for the boiler feed water.

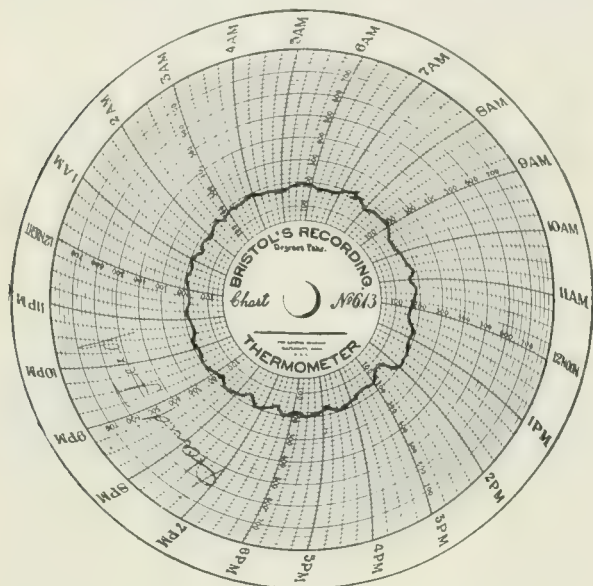


Fig. 1.

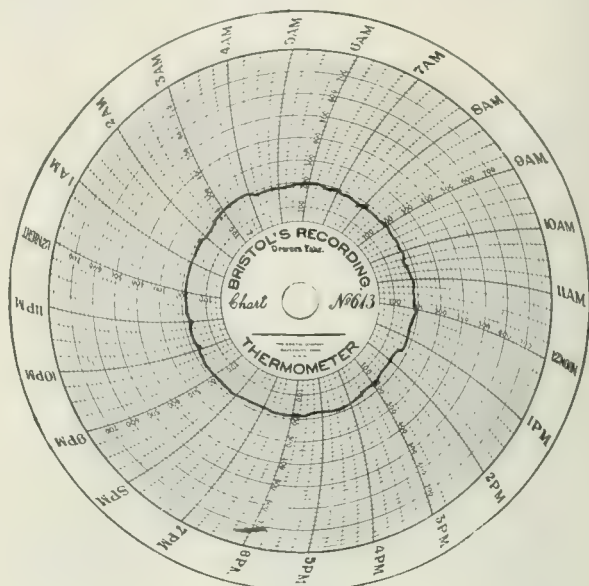


Fig. 2.

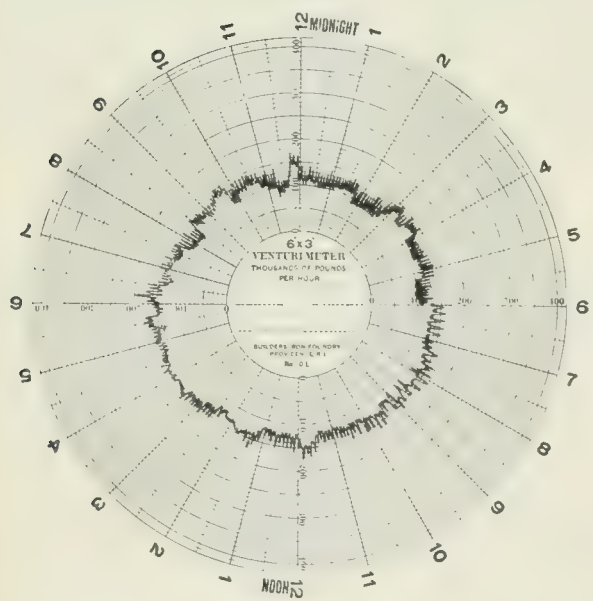


Fig. 3.

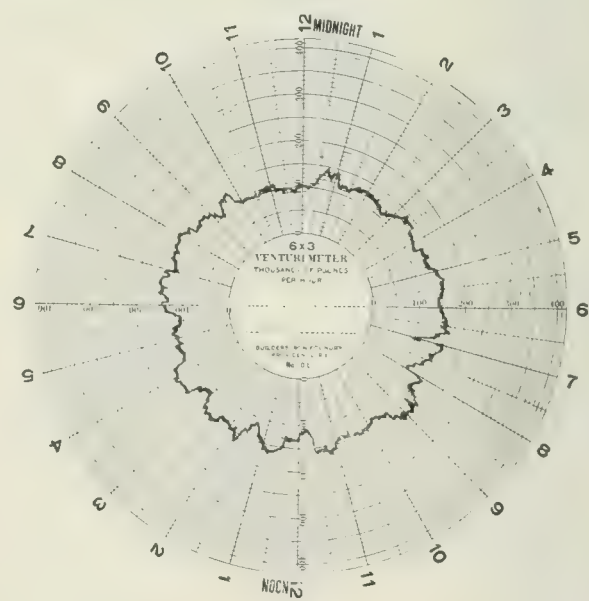


Fig. 4.

Charts Showing How Variations in the Temperature and Quantity of Boiler Feed Water Are Reduced by the Copes Boiler Feed Regulator.

absolute check on the rate of feed and the reliability and efficiency of the regulator. The charts and records which are reproduced were obtained in large boiler plants, and an analysis of them tends to show the value of a boiler feed regulator in economical operation of the boiler room, and shows some of the results secured by the use of the Copes boiler feed regulator, which is manufactured by the Northern Equipment Company, Chicago, Ill.

In recently visiting a large boiler plant where careful records of temperatures, coal consumption, steam pressure, load, &c., are kept it was noticed that in 15 different boilers the water level varied from no water in the glass to 1 in. from the top of a 16-in. gauge glass, and an hour later the range was from 1 in. from the bottom to 3 in. from the top of the gauge glass. Using a properly

Figs. 1 and 2 show the importance of proper feed water regulation with regard to feed water temperature, the former being taken in a plant equipped with an open feed water heater, from which the supply of feed water was drawn and fed to the boiler by hand. In the case of Fig. 2 an automatic boiler feed regulator was used and the effect of feeding in exact proportion to the rate of evaporation is clearly shown in the constant high temperature of the feed water. This is explained by the fact that in addition to the feed being in proportion to the rate of evaporation it is also in proportion to the load on the boiler and the entire plant, and consequently in proportion to the rate at which exhaust steam is supplied to the open heater from the auxiliaries.

In the earlier type of boiler feed regulator the op-

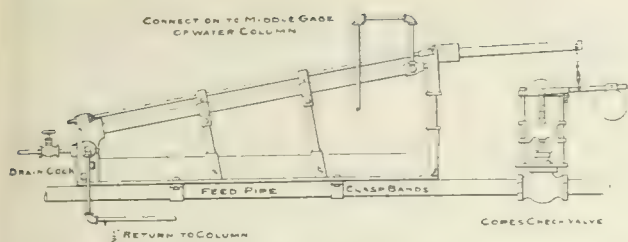


Fig. 5.—The Copes Boiler Feed Regulator Made by the Northern Equipment Company, Chicago, Ill.

erating element was a float, which rested upon the surface of the water in the boiler and opened or closed a feed valve through a system of levers, its motion corresponding to the changes in the water level. This same principle is used at the present time in many regulators with special adaptations in the form of pilot valves and diaphragms, or the use of electro-magnetic control to operate the valve in the supply line, due to changes in water level, an arrangement which is sluggish and unsatisfactory for high rates of evaporation. This is due to the fact that on account of its weight there must be a considerable change in water level before the additional water displaced by the float can cause it to rise, a condition which is also complicated by the resistance of the levers connecting the float with the pilot valve. In this way it is possible that the water level in the boiler may rise several inches before the pilot valve is closed and the supply of feed water stopped.

This action can probably be best understood by comparing Figs. 3 and 4, which are Venturi meter charts of the water supplied to a large boiler. The first chart was taken when the boiler was equipped with a regulator operating on the float and pilot valve principle, while the

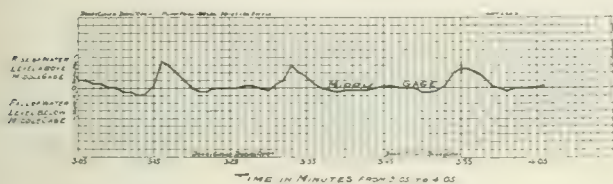


Fig. 6.—Diagram Showing Variation in Water Level of a 400-Hp. Boiler.

latter was taken from the same boiler when the regulator had been changed to one of the Copes automatic boiler feed regulators, which is shown in Fig. 5. It will be noticed in Fig. 3 that the rate of feed for 24 hours fluctuates in a very spasmodic manner, while that in Fig. 4 is smooth and nonfluctuating, varying in accordance with the load on the boiler plant.

As will be noticed from Fig. 5 the feed valve consists of an ordinary check valve connected by a system of levers to a long tube, which expands and contracts in accordance with changes in temperature that in their turn depend upon the height of the water level in the boilers. This long tube is known as the expansion tube, and connected to its top is a smaller tube running to the middle of the water column. The bottom of the expansion tube is connected to the drain pipe at the bottom of the water column by a small tube. When the water in

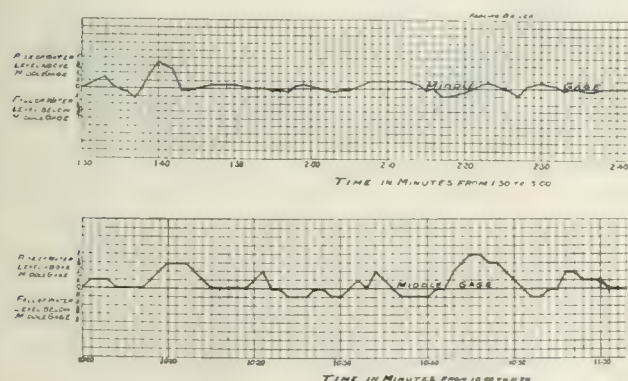


Fig. 7.—Chart Giving Readings of Water Level in a Lighting Plant Boiler.

the boiler is above the normal point the expansion tube is filled with water which circulates slowly, and as the heat is radiated its temperature and that of the tube containing it falls, thus causing contraction and forcing the feed valve to close. When the water level is below normal steam flows into the expansion tube and maintains its temperature at that of the steam regardless of the amount of radiation. This occurs because as soon as any steam is condensed to supply the heat lost by radiation more steam flows into the tube to take its place, and consequently the steam filled tube expands and allows the check valve in the feed line to open and admit water to the boiler. With a constant boiler load water and steam would alternately flow through the expansion tube, thus maintaining the temperature at a mean point. The length of the expansion tube is also a mean and the check valve in the feed line opens far enough to supply water to the boiler in proportion to the rate of evaporation. Increasing the load on the boiler causes the water level to fall as the feed valve is not opened far enough to meet the increased rate of evaporation, and this fall in water level reduces the amount of water flowing through the expansion tube, and increases the supply of steam, with the result that the expansion tube causes the check valve to open further and increases the rate of feed.

The expansion tube shown in Fig. 5 is of the maker's special construction and is designed for very heavy service. The braces are heavy and prevent any lateral or longitudinal strains or distortion, and the metal used in the construction of the tube combines a high coefficient of expansion with a high compressive strength. No large load, however, comes upon the tube, as the work of closing the feed valve is accomplished by a toggle motion and weighted lever attached to the valve bonnet, the only actual work performed by the expansion of the tube being to lift this small weight against gravity. Contraction of the expansion tube, due to the rise of the water level in the boiler, causes the weight to fall and close the feed valve through the toggle lever.

The accuracy with which it is possible to maintain a constant water level by an expansion tube boiler feed regulator is shown in Figs. 6 and 7. Fig. 6 is a series of gauge readings obtained in the plant of the South Side Elevated Railroad Company, Chicago, Ill., and it will be noticed that although the load on the 400-hp. boiler fluctuated considerably, running as high as 511 hp. in one instance, the water in the boilers remained within less than an inch of the middle gauge. Fig. 7 shows a series of similar readings obtained at the plant of the St. Joseph Railway, Light & Power Company, which were taken on a large boiler equipped with automatic stokers. In this instance the load was considerably above the rated capacity of the boiler, and was especially so around 2:30, a circumstance which was not shown by the difference in water level at that time, and, in fact, throughout the whole period the maximum change in level was less than 1 in. In the lower chart the readings were obtained while the boilers were operating under a light load and the doors alternately opened and closed. An inspection of the chart fails to reveal any appreciable difference in the water level.

The report of the Tennessee Coal, Iron & Railroad Company's earnings, recently filed with the New York Stock Exchange in connection with the listing of additional bonds, showed that for the 10 months ended October 31, 1910, the balance of earnings and income after depreciation and interest charges was \$2,028,258. The surplus added to the \$1,555,845 surplus of December 31, 1909, was \$3,498,392. In 1907 the net profits after allowances for depreciation and extraordinary replacements and \$855,552 in net interest charges on bonded and floating debt were \$1,426,684.

The Swedish Government recently asked bids on 20,000 tons of rails for the state railroads. Two firms, both British, responded, but the lowest bid £5 18s. 2d., was considered too high and the award has been postponed awaiting a lower price. The last purchase was made from the German Steel Syndicate at the equivalent of £5 13s.

CURRENT METAL PRICES.

The following are prices for small lots, New York. Wholesale prices are given in our weekly market report.

IRON AND STEEL -		Genuine Iron Sheets -		METALS -	
Bar Iron from store—		Galvanized.		Tin—	
Refined Iron:		Nos. 2 and 2 1/2		Straits Plate	
1 to 1 1/2 in. round		Corrugated Roofing—		Copper—	
1 1/2 to 2 in. round		Nos. 24		1 to 2 in. round	
1 1/2 to 2 in. square		Tin Plates—		2 to 3 in. round	
1 1/2 to 2 in. hexagon		American Charcoal Plates (per box.)		Spelter—	
1 1/2 to 2 in. octagon		A. Charcoal:		Weston	
1 1/2 to 2 in. round		American Coke Plates—Bessemer—		Zinc.	
1 1/2 to 2 in. square		1 to 1 1/2 in. round		Lead.	
1 1/2 to 2 in. hexagon		1 to 1 1/2 in. square		Solder.	
1 1/2 to 2 in. octagon		American Terne Plates—		Antimony—	
1 1/2 to 2 in. round		Seamless Brass Tubes—		Bismuth—	
1 1/2 to 2 in. square		Brass Tubes, Iron Pipe Sizes—		Aluminum—	
1 1/2 to 2 in. hexagon		Copper Tubes—		Old Metals.	
1 1/2 to 2 in. octagon		Braided Brass Tubes—		Dealers Purchasing Prices Paid in New York	
1 1/2 to 2 in. round		High Brass Rods—		Copper, Heavy cut and suitable	
1 1/2 to 2 in. square		Roll and Sheet Brass		Copper, Heavy and Wire	
1 1/2 to 2 in. hexagon		Brass Wire—		Copper, Light and Bottoms	
1 1/2 to 2 in. octagon		Copper Wire—		Brass, Heavy	
1 1/2 to 2 in. round		Copper Sheets—		Brass, Light	
1 1/2 to 2 in. square		Sheet Copper Hot Rolled, 1602 quantity		Heavy Machine Composition	
1 1/2 to 2 in. hexagon		Sheet Copper Cold Rolled, 1 1/2 in. advance over H. 1		Clean Brass Turnings	
1 1/2 to 2 in. octagon		Sheet Copper Polished 2 in. wide and under, 1 1/2		Composition Turnings	
1 1/2 to 2 in. round		Sheet Copper Polished over 20 in. wide, 2 1/2 square		Lead, Heavy	
1 1/2 to 2 in. square		Planished Copper, 1 1/2 square foot more than Polished		Lead, Tea	
1 1/2 to 2 in. hexagon				Zinc Scrap	
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2 to 2 in. hexagon					
1 1/2 to 2 in. octagon					
1 1/2 to 2 in. round					
1 1/2 to 2 in. square					
1 1/2					

THE IRON AGE

Established
1855

New York, January 19, 1911

VOL. 87: No. 3

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building
Pittsburgh, Park Building
Boston, Compton Building
Chicago, Fisher Building
Cleveland, American Trust Building
Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.

CONTENTS.

Editorial:	PAGE.
A More Hopeful Outlook.....	173
The Steel Manufacturers and Prices.....	174
New Jersey's Governor on Corporations.....	174
The Automobile an Economic Good.....	175
The Iron Age Index.....	175
The Ferrosilicon Syndicate.....	176
The St. Louis Foundry Foremen's Association.....	176
The Iron City Spring Company's New Plant.....	176
Hon. James T. McCleary. Portrait.....	177
New Publication.....	177
The Iron and Metal Market Reports.....	178 to 187
Iron and Industrial Stocks.....	187
Notes on Prices.....	187
The Machinery Market Reports.....	188 to 198
Congressman Underwood's Tariff Views.....	198
Obituary. Portrait.....	199
Personal.....	199
The Engineer as a Salesman.....	200
Large Basic Open Hearth Furnaces.....	201
Isolated Plant Protective Association.....	201
Canada's Economic Upbuilding.....	202
The Massachusetts Institute of Technology Desires More Liberal State Aid.....	202
New Railroad Equipment.....	202
The New England Foundrymen's Association.....	203
Our Foreign Trade Makes a New Record.....	203
Molders' and Stove Founders' Conference.....	203
Standards of Efficiency in Shop Operations.....	204
The Standard Oil Company's Tin Plate Purchase.....	206
Iron and Steel Production for Twenty-five Years. Illus.....	206
The Tariff Commission Convention.....	207
Steel Manufacturers Confer on Trade Conditions.....	208
The Dallas Coal, Iron & Steel Company.....	211
Canadian Manufacturers Oppose Reciprocity.....	211
Fluctuations in Metal Prices for the Period 1898-1910 in Carloads. (With Supplement.).....	212
The Bristol Class III. Recording Thermometer. Illus.....	213
Accidents in Industrial Plants.....	214
Stephens-Adams Office.....	215
Machine and Boiler Shops of Improved Construction. Illus.....	216
The Ingersoll-Rand and Cameron Pump Alliance.....	222
The Triple and Trinity Gaskets. Illustrated.....	222
The Weaver Roller Jaw Chuck. Illustrated.....	223
The Merchant Marine Congress.....	223
The Morris 20-In. Cone Head Lathe. Illustrated.....	224
The Girod Electric Furnace.....	225
The Stirling Packing Machine. Illustrated.....	225
The Twentieth Century Steel Stock Rack. Illustrated.....	226
United States Petroleum Production in 1910.....	226
Dearborn Feed Water Treatment Abroad.....	226
An Interesting Labor Inquiry.....	227
Eastern Blast Furnace Wage Reductions.....	227
Trade Publications.....	228
Current Metal Prices.....	230

A More Hopeful Outlook

Rail Orders from Mexico and Argentina

Pig Iron Sales Increase, But at the Expense of Prices

The steel manufacturers met expectations at their New York conference last week in the unanimity with which they favored holding present prices. Apart from pig iron producers, who saw no early prospect of betterment in their industry, those who attended found reason for taking a more hopeful view of the situation. This feeling has been communicated to sales organizations and has been reinforced by better buying in some lines, with the result that the net balance of the week's developments in finished lines is on the side of improvement.

The position of the steel manufacturers is that prices for their products have already been sufficiently readjusted and should not go lower except as there is a general reduction in commodities and labor. They contend further that cutting prices at this time would not increase business. At the same time there is no new evidence of absolute adhesion to a price or that the slight irregularities that have existed for weeks have disappeared.

The chief item in the rail trade is the closing of three export contracts. Argentine lines have taken 15,000 tons from the Maryland Steel Company and 5600 tons from the Steel Corporation, and the latter has closed 5000 tons for a Mexican line.

New domestic rail orders are light, but there are several good inquiries. The Tennessee Company's mill has started rolling on the Louisville & Nashville order of 30,000 tons already announced, but the report of 42,000 tons additional for the same line is a fiction. The Gary rail mill has also started up, while the South Chicago rail mill has closed down.

Plate mills are counting on a slightly better rolling schedule as the result of recent car orders. The Pennsylvania Lines West placed 1030 cars and the Pennsylvania Railroad Company bought 1000 cars for its eastern lines. The Missouri Pacific orders were for 1000 refrigerator cars and 1000 steel hopper cars.

In structural work the West has made a good showing, though no single contract was for more than 1000 tons. On the 6000 tons for the Bureau of Printing at Washington, a Boston firm was low bidder. The Lehigh Valley is taking bids on five bridges.

The reflection in the market here of strong conditions abroad is a factor that will bear watching. British tin plates have advanced 6 pence a box in two weeks and the placing of further re-export business with American mills is not unlikely. Canadian inquiry for tin plate in this country is also more active.

Pig iron has been bought more freely but, as has happened over and over in the past year, where the volume of sales has grown prices have shrunk.

In eastern Pennsylvania, following recent purchases of 10,000 tons of basic at \$14.25, delivered, a 5000-ton was taken by a steel company which also bought 3000 tons of Bessemer and is in the market for 3000 tons of low phosphorus iron. A St. Louis steel foundry bought 5000 tons of basic iron in Ohio and another St. Louis melter bought a smaller amount through Chicago.

Pittsburgh reports considerable pig iron inquiry. A pipe foundry in western Pennsylvania is said to have bought 30,000 tons of gray forge from a nearby furnace. An Eastern pipe company took 10,000 tons, half No. 4 Southern iron, on which the price was \$10, Birmingham.

Buffalo furnaces have inquiries for 25,000 tons of foundry iron and have made sales of 10,000 tons, mostly at concessions. An eastern Pennsylvania foundry has closed for 5000 tons, and good-sized lots are under negotiation by a New Jersey and a New England foundry.

The city of Portland, Ore., awarded 6000 tons of water pipe to the leading cast iron pipe interest, which also took 10,000 tons at Chicago, and made total bookings for the week of 20,000 tons.

Late sales of ferromanganese have been made for delivery throughout the year at \$38.50, Baltimore, the lowest price in several years for shipment so far forward.

Copper declined steadily last week, sales being made as low as 12.37½c. for electrolytic. Buying was sufficient to bring a recovery to 12.55c. Tin has gone to 41.75c. The advance in the past 12 months has been 10c., representing 25c. on a 100-lb. box of tin plates.

The Steel Manufacturers and Prices

In discussing recently considerations on both sides of the question of reducing or maintaining prices of steel products, three important differences between the conditions in the steel trade to-day and those in early 1909 were mentioned in these columns. These were, in brief: First, that the financial condition of the steel companies is now much stronger than at the opening of 1909, and hence there is not as great anxiety to get business; second, that then the country was bare of steel, after 15 months of stock consumption, and was ready, as it is not now, to stock up again in response to lowered prices; third, that the gap between selling prices of finished material and the cost of raw materials and labor is less now than at the close of 1908.

In the light of the spirit in which the steel manufacturers of the country are now co-operating, as made clear by their expressions at the New York dinner of last week, a fourth important consideration should be added to those above, namely, the confidence the manufacturers have in each other. It is unusual, to be sure, to catalogue what in one view of it is purely a sentiment, among the economic influences affecting commodity prices. But if the feeling of friendliness and of regard for mutual interests, to which Chairman Gary gave expression in addressing his guests, is shared by them in the same measure, it must be given a high appraisal in any estimate of the future of the steel trade. That such a feeling exists among the heads of the 55 companies which had part in the tribute to Chairman Gary in October, 1909, there is strong evidence. Cer-

tainly distinct progress has been made in the past three years toward realizing the Gary idea that "actual friendship may be continuously applied to competitive business."

Chairman Gary's remarks, as reported elsewhere, are of peculiar interest for the light they throw on the present situation in iron and steel. It has been common to say that there is a "controlled market" for steel products. The form of control that exists, as the author of the plan describes it, is, to say the least, unique among all co-operative movements of manufacturers. That it is vastly stronger than any agreement ever entered into, reinforced by whatever penalties, scarcely need be said. That it will be a factor, and an important one, in determining the course of the steel trade in 1911 is also evident.

It is easier to ask than to answer the question, how the stronger confidence the steel manufacturers have in each other will ultimately express itself. It does not mean that under no circumstances will present prices be changed, though it evidently points to a postponement, at least, beyond the time roundly indicated in some predictions, of any change from the present level. The manufacturers evidently have not lost sight of the possibility of a readjustment involving a general reduction of wages; but their purpose to resist to the utmost any further reduction in the price of their products, as long as the present level is maintained for raw materials and labor, cannot be mistaken.

The argument that has seemed conclusive to the manufacturers is that a lowering of prices would not bring the much desired revival in demand. There is in this the implied reservation that a time may come when demand would gather force if the buyer were offered unusual inducements. Yet such a juncture, from the manufacturers' standpoint, is a matter of the indefinite future. Meantime the hope underlying the decision to maintain conditions as they are is that at a time not far distant the turn in the tide will show itself so plainly that the whole trade will move on without the necessity of any further readjustment.

New Jersey's Governor on Corporations

Governor Woodrow Wilson's inaugural address, as was expected, scored the State of New Jersey severely for its laxity in indiscriminately issuing charters to corporations. He urges "the imperative obligation of public policy and of public honesty we are under to effect such changes in the law of the State as will henceforth effectually prevent the abuse of the privilege of incorporation which has in recent years brought so much discredit upon our State." No defense can be made to the charge here made, as for some years it appeared to be possible to secure a New Jersey charter for any kind of a corporation, authorizing it to engage in any function whatever. Latterly, however, the officers transacting this part of the business of the State have proceeded with much more circumspection, as other States, with similarly lax incorporation laws, have been sought out by those who were not anxious to have their projects for incorporation too closely inquired into. But while Governor Wilson proposes to make the New Jersey corporation laws more stringent, so as to safeguard the public in raising the standard set for new applicants for corporate privileges, he goes further in his recommendations. He says:

Such scrutiny and regulation ought not to be confined to corporations seeking charters. They ought also to be extended to corporations already operating under the license and authority of the State. For the right to undertake such regulation is susceptible of easy and obvious justification. A modern corporation—that is, a modern joint stock company—is in no proper sense an intimate or private concern. It is not set up on the risk and adventure of a few persons, the persons who originate it, manage it, carry it to failure or success. On the contrary, it is set up at what may be called the common risk. It is a risk and adventure in which the public are invited to share, and the hundreds, perhaps thousands, who subscribe to the stock do in fact share in it, oftentimes without sharing also, in any effectual manner, in the control and development of the business in which their risk is taken. Moreover, these modern enterprises, with their exchequers replenished out of the common store of the savings of the nation, conduct business transactions whose scope and influence are as wide as whole regions of the Union, often as wide as the nation itself. They affect sometimes the lives and fortunes of whole communities, dominate prices, determine land values, make and unmake markets, develop or check the growth of city and of countryside. If law is at liberty to adjust the general conditions of society itself, it is at liberty to control these great instrumentalities which nowadays, in so large part, determine the character of society. Wherever we can find what the common interest is in respect of them, we shall find a solid enough basis for law, for reform.

The principle here laid down is eminently correct. We must have the corporate form for the transaction of modern business, in its great scope, its huge ramifications and its large units of operation. The corporation cannot be abolished, nor can a limit be set to its size, so far as capitalization goes. It is possible that the future may see even larger corporations than any now in existence, required by the still greater commercial and manufacturing developments of more greatly expanded trade. We have become accustomed to corporations, although many are now very large, and, as Governor Wilson says, they "are no longer hobgoblins which have sprung at us out of some mysterious ambush." But they must be so regulated and controlled that the fact will be apparent to the public or the animosity now existing against corporations because of the past vicious practices of some of them may take destructive form. Not only New Jersey, but some other States need to reform their corporation laws.

The Automobile an Economic Good

Progress in the development and use of small internal combustion engines has been remarkable in the past 10 years. So important have small gasoline engines become to the farmer that manufacturers have scarcely been able to keep pace with the demand. Motor boats are finding a large field for commercial use. Small manufacturing plants are supplied with power at a nominal cost by gasoline engines. In thousands of small mining operations, where the cost of transporting coal would be prohibitory, the gasoline engine supplies cheap power. In fact, engines of this class have become an important factor in the production of wealth.

While the pleasure automobile has been generally regarded as a destroyer of capital, possibly the money spent by users of pleasure cars may be merely the price the country has paid for the development of a new agency of production. The gasoline engine 10 or 15 years ago was erratic and uncertain, and one of the great problems in the development of the automobile has been to perfect it so that its owner would not be stranded far from home. The builders of gasoline engines for all other purposes have profited by the millions expended by the automobile manufacturer.

While manufacturers whose materials and products are shipped in carloads are almost universally located

on railroad sidings, an enormous amount of traffic remains to be moved by teams in the cities. A recent estimate of this traffic in New York City alone places it at 54,000,000 tons annually. When a complicated machine of any kind is placed in the hands of the public, an enormous amount of capital is necessarily sunk in failures and experimental work. It has been estimated that the development of modern harvesting machines cost upward of \$100,000,000 in the failures of companies that built imperfect machines. The builders who survived profited by the mistakes of those who failed, which seems to be necessary in the evolution of any complex machine subjected to hard usage.

A motor truck is subject to more severe strains and abuse than a harvesting machine. It requires an evolution in the materials used in its construction, as well as in the design of its machinery. To manufacture trucks economically requires a large investment in plant, and if the perfecting of a motor truck were carried on by itself, the capital invested would be exposed to an unusual hazard. The pleasure car manufacturers have rendered an economic service to the country by leading the way into this unknown field of enterprise. Their profits have been large and they have been able to carry the cost of experimental work and losses due to imperfect construction. They have overcome at least 90 per cent. of the hazards that would confront an investment in the manufacture of trucks.

Even the steel industry has profited by the demands made upon it by the automobile manufacturer. The severe strains developed in the frame of a car traveling rapidly over rough or uneven roads called for new discoveries and applications of alloy steels. The machine tool manufacturer has found that these alloys are superior to any material used heretofore for certain parts of his machines, and their use will undoubtedly extend into many other fields. A durable motor truck could not have been built with the materials to be had 10 years ago, but the pioneer work of the manufacturer of pleasure cars has mastered practically all the difficulties in materials.

The usefulness of the motor truck may extend far beyond the paved streets of the city. While the statisticians who figure the cost of moving farm products from the field to the railroad may sometimes exaggerate, there is no doubt that farmers will invest in motor trucks when the capital and maintenance cost bring them within their reach. The cost of living has not been increased so much by the advance in wheat and common commodities as in the hundred and one little things that the modern consumer demands. Whatever saves time and cost in bringing these minor products to market and distributing them will be of enormous economic value to the people. It would seem, on the whole, that the automobile has merely distributed among a large number of people a burden of pioneer expenditure that might otherwise have been concentrated in the form of enormous losses to manufacturers who ventured into this new field of mechanical development.

The Iron Age Index

The index to Volume 86 of *The Iron Age*, July 1 to December 31, 1910, has been compiled and printed and will be mailed to subscribers applying for it. A list of those who have received the index heretofore is

kept in this office, and to all such the latest one will be mailed without notice from them. Additional names will be put upon this list on request.

The Ferrosilicon Syndicate

Confirming the statements made in *The Iron Age* some weeks ago concerning an arrangement among European makers of ferrosilicon, the January 6 issue of the *Iron and Coal Trades Review*, London, says: "Following on negotiations which have been in hand for some months past the necessary steps for the formation of an international syndicate of ferrosilicon producers are about to be taken at a meeting, to be held at Mannheim, Germany, during the next few days. It is stated that the syndicate will comprise all the ferrosilicon producers on the Continent, and will be organized for a period of five years. It is also announced that a special contract has been arranged with the Berner Kraftwerk Gesellschaft of Berne, in accordance with which this company will cease to manufacture ferrosilicon, in return for which it will receive an annual indemnity from the syndicate."

Spang, Chalfant & Co., Inc.—The annual meeting of Spang, Chalfant & Co., Inc., operating the Etna Iron & Tube Works, Pittsburgh, Pa., was held in that city January 10. The following officers were re-elected: Henry Chalfant, president; D. B. McClelland, vice-president and treasurer; A. M. Bell, assistant treasurer, and W. C. Heath, secretary. The first three named, together with D. E. Park and C. H. Spang, were re-elected directors. The company had a very prosperous year in 1910, and has plans under way for the concentration of its machine shops. It will build a new machine shop and pattern shop, expected to be finished about March 1, for which all tools have been purchased.

On Monday, January 16, the Ohio Works of the Carnegie Steel Company, at Youngstown, Ohio, resumed operations in full in the open hearth and Bessemer departments with four of the blast furnaces in operation and two idle. The Bessemer plant of the Republic Iron & Steel Company and nearly all the finishing mills at its Brown-Bonnell and Mahoning Valley works, also at Youngstown, started up the same day to practically full operation. The industries in the Youngstown district are working to fuller capacity this week than for some time.

Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, England, whose chief American office and warehouse is at 434 West Randolph street, Chicago, announce that agency arrangements have just been completed with the following named firms at whose warehouses large and comprehensive stocks of Allen's high speed and carbon tool steels will be carried: Roehm & Davison, Detroit, Mich.; J. L. Osgood, Erie County Bank Building, Buffalo, N. Y.; John J. Greer & Co., Inc., 207 West Pratt street, Baltimore, Md.

Owing to increasing pressure of business and to the necessity for night work which has existed for some time at the Remington Typewriter Works, Ilion, N. Y., the works are to be given a largely increased capacity by the erection of a new administration building which, when completed, will make all of the factory floor space available for manufacturing, and will clear the way to further additions which are being planned.

The Pittsburgh Emery Wheel Company, Pittsburgh, Pa., held its annual meeting in that city January 12, at which the following officers were elected: President, Chas. G. Smith; vice-president, J. Walter Hetzel; secretary and treasurer, Albert W. Smith. The officers presented a very encouraging report, business having shown a steady growth since the formation of the company.

The St. Louis Foundry Foremen's Association

It was with pardonable pride that on the occasion of the first annual meeting and banquet of the St. Louis Foundry Foremen's Association, which took place on the evening of January 14, at the Missouri Athletic Club, the originators and organizers, few in number as usually is the case, of the association saw over 100 members and guests seat themselves in the banquet hall. It would doubtless better represent the aim of the association to reverse this comment, since the slogan of the body is comradeship. And this spirit is so full and so broad that the presence of interested proprietors of St. Louis foundries is welcome not only at the festive board but also at the regular meetings of the association.

After the *menu* had been discussed, former president, J. P. Pero, superintendent of the Missouri Malleable Iron Company, who acted as toastmaster, introduced the newly elected president, W. E. Whitman, superintendent of the Whitman Agricultural Company, who responded to the toast, "The St. Louis Foundry Foremen's Association." He was followed by Eugene W. Smith, foundry superintendent of the Crane Company, Chicago. Mr. Smith being a past president of the Associated Foundry Foremen, he was selected to respond to the toast, "The Associated Foundry Foremen." In introducing Mr. Smith, Toastmaster Pero availed himself of the opportunity of thanking that gentleman in behalf of the association for having been instrumental in starting the St. Louis Association and for his valuable aid and counsel. The next speaker was Geo. F. Steedman, president of the Curtis & Co. Mfg. Company. Ferd. Messmer, president of the Ferd. Messmer Mfg. Company; Geo. Rogers, president of the Excelsior Foundry Company of Belleville, Ill.; Charles Barker of the S. Obermayer Company, and E. E. Squire, Jr., of E. E. Squire & Co., also made short addresses. The evening wound up with a vaudeville entertainment, a complimentary affair tendered the association by the supply men, who are eligible as honorary members.

The association was organized April 30, 1910, and has now on its roll 61 members. Its membership is not confined to St. Louis, but takes in the neighboring manufacturing districts. The officers for the ensuing year are as follows: President, W. E. Whitman; secretary, G. Roy Rook; treasurer, W. S. Gemmer.

The Iron City Spring Company's New Plant.—For some years this company operated a plant at 510 Allegheny avenue, but some time ago secured a site at 2920 Smallman street, Pittsburgh, and has completed a new steel building, 80 x 120 ft., equipped with a 60-hp. Mertes duplex gas engine, and has installed a complete line of machinery for the manufacture of wagon, truck and auto springs. Frank B. Nimick is president; W. D. Taylor, secretary and treasurer, and Mark M. Foster, general manager. The new plant was started last week. In addition to the above named products the company will repair springs. For the present it will handle all sales from the work's offices.

T. Coleman Ward, resident manager of Hickman, Williams & Co., Oliver Building, Pittsburgh, has been appointed receiver of the Enterprise Foundry Company of the same city. The plant, which makes small castings, will be continued in operation under the management of the receiver.

The Stark Rolling Mill Company, Canton, Ohio, reports a good demand for Toncan metal sheets, orders being sufficient to keep its plant running near full capacity. Among orders recently received by this company was one for 5000 tons of Toncan metal for shipment to South Africa.

Reports that a six-day week plan had been put in operation at the blast furnaces of the Youngstown Sheet & Tube Company, Youngstown, Ohio, are incorrect.

Hon. James T. McCleary

Secretary of the American Iron and Steel Institute

At the dinner given in New York, January 11, by Chairman E. H. Gary to the steel manufacturers, announcement was made of the appointment of Hon. James Thompson McCleary as secretary of the American Iron and Steel Institute. Mr. McCleary was introduced to the gathering and made a brief address. His selection as secretary of the institute is in pursuance of the policy outlined at the annual meeting in New York, May 27, 1910, at which it was decided to broaden the work of the organization. In addition to the bringing out from time to time of papers dealing with important developments in iron and steel manufacture, it was planned to have the institute's activities include the relations of



JAMES THOMPSON MCCLEARY.

the industry in the United States to producers in other countries; the relations of employers and employees as involved in accident compensation, relief and pension systems and hours and other conditions of labor; the collection of statistical and other information; commercial conditions, contract obligations, &c. On Mr. McCleary's assumption of this important work some account of his career is appropriate.

He was born and educated in Canada. Coming to the United States as a young man he taught school for several years in Wisconsin. In 1881 he resigned the superintendency of the Pierce County, Wis., schools to become professor of history and political science in the State Normal School at Mankato, Minn. After 11 years in this position he was elected to Congress in 1892, and was repeatedly re-elected, serving 14 years continuously.

In March, 1907, on the completion of his service in Congress, Mr. McCleary was appointed by President Roosevelt Assistant Postmaster-General in charge of the transportation of the mails on land and sea, controlling expenditures of about \$87,000,000 a year. In September, 1908, he resigned this position to accept his ninth nomination for Congress. Again, as in 1906, he was defeated for election because of his uncompromising stand in favor of protection to all American industries.

Mr. McCleary's committee service in Congress covered a wide range. Among his principal committees were those on Banking and Currency, Labor, Appropriations and Ways and Means. For eight years he was chairman

of the Committee on the Library, which has jurisdiction over all bills relating to the Congressional Library, the Botanical Garden and Public Art. Among his predecessors in this position were John Quincy Adams and Rutherford B. Hayes. During his service in this position more was accomplished in providing national memorials in honor of historic men and events than in any similar period. Among these were memorials in Washington to Rochambeau, Pulaski, Von Steuben, Christopher Columbus, John Paul Jones and Commodore John Barry; memorials at the battlefield of King's Mountain, N. C.; Princeton, N. J., and New Orleans, La.; one in Brooklyn, N. Y., in honor of the prison martyrs, and one at Provincetown, Mass., to mark the first landing place of the Pilgrim Fathers.

In 1905 Mr. McCleary was sent to Europe by the Abraham Lincoln Memorial Commission appointed by Congress—of which Wm. H. Taft, then Secretary of War, was Chairman—to get ideas for a national memorial. On his return he recommended as the most suitable memorial to Lincoln a magnificent highway, "the finest in the world," from the White House, in Washington, to the battlefield of Gettysburg, Pa. A bill to carry out this idea was introduced by Senator Knox, now Secretary of State. It passed the Senate, but did not pass the House. Another bill for this purpose is now pending.

On February 12, 1896, Mr. McCleary delivered in the National House of Representatives a speech against free silver, which became the leading document in the Presidential campaign of that year, its circulation reaching many millions. Mr. McKinley regarded this speech as the most potent factor in securing the victory for sound money. In recognition of this, he personally desired in 1897 to appoint Mr. McCleary Secretary of the Treasury. But outside pressure prevailed with him to appoint Mr. Gage.

Mr. McCleary is the father of the most noteworthy feature of the existing tariff law—the minimum and maximum provision, which furnishes our Government what it never had before, a means of compelling other countries to give us fair treatment on tariff matters—he having introduced the first bill presented to Congress for that purpose.

New Publication

Statistics of the American and Foreign Iron Trades.

Part II. of the Annual Statistical Report for 1909 of the American Iron and Steel Association. Pamphlet, 6 x 9 in.; pages, 24. Price, \$2. Published by the American Iron and Steel Association, 261 South Fourth street, Philadelphia, Pa.

Part II. of the annual report prepared by James M. Swank contains valuable information which could not be included in the report published in July, 1910. It contains the statistics of sheets and tin plates, production of merchant bars and all forms of rolled products of iron and steel, production of cut and wire nails, summary of iron and steel statistics for 1908 and 1909, production of pig iron in the United States for 100 years, production of steel ingots and castings and finished rolled iron and steel in Canada in 1909.

The committee appointed to examine the sale sheets on iron bars for November and December of the Republic Iron & Steel Company and Union Rolling Mill Company found that the average price was 1.35 cents, which fixes the price of puddling for January and February on the basis of \$5.87½ per ton. The wages for sheet and tin plate mills for January and February will be on the same basis as for the two preceding months.

The Garry Iron & Steel Company, Niles, Ohio, has begun the construction of a puddling mill in connection with its plant, to comprise six double puddling furnaces and muck bar mill. This will enable the company to manufacture puddled iron sheets.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Jan.18, 1911.	Jan.11, 1911.	Dec.21, 1910.	Jan.19, 1910.
PIG IRON, Per Gross ton:				
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$19.00
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	17.25
Foundry No. 2, local, Chicago..	15.50	15.50	16.00	19.00
Basic, delivered, eastern Pa....	14.25	14.75	14.75	18.75
Basic, Valley furnace.....	13.25	13.25	13.25	17.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh.....	14.15	14.15	13.90	17.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	19.50

BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh....	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	31.00
Open hearth billets, Philadelphia	25.40	25.40	25.50	30.60
Wire rods, Pittsburgh.....	28.00	28.00	28.00	33.00

OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago.....	14.50	14.50	15.50	20.00
Iron rails, Philadelphia.....	17.00	17.00	17.00	20.50
Car wheels, Chicago.....	13.00	13.00	13.50	18.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	17.50
Heavy steel scrap, Pittsburgh..	13.50	13.50	13.50	17.50
Heavy steel scrap, Chicago.....	11.50	11.50	12.00	16.00
Heavy steel scrap, Philadelphia	12.50	12.50	12.50	17.00

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.32½	1.32½	1.35	1.60
Common iron bars, Chicago.....	1.30	1.30	1.35	1.60
Common iron bars, Pittsburgh..	1.35	1.35	1.40	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York....	1.56	1.56	1.56	1.71
Beams, Pittsburgh.....	1.40	1.40	1.40	1.55
Angles, tidewater, New York....	1.56	1.56	1.56	1.71
Angles, Pittsburgh.....	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh.	1.25	1.25	1.25	1.50
Skelp, sheared steel, Pittsburgh.	1.30	1.30	1.35	1.60

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*.....	1.70	1.70	1.70	1.85
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.85
Barb wire, galv., Pittsburgh*...	2.00	2.00	2.00	2.15

METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.75	12.75	13.00	14.00
Electrolytic copper, New York..	12.50	12.50	12.75	13.75
Spelter, New York.....	5.55	5.55	5.75	6.25
Spelter, St. Louis.....	5.40	5.40	5.65	6.10
Lead, New York.....	4.50	4.50	4.50	4.70
Lead, St. Louis.....	4.35	4.35	4.35	4.60
Tin, New York.....	41.75	40.25	37.90	32.75
Antimony, Hallett, New York...	7.87½	8.00	7.75	8.25
Tin plate, 100-lb. box, New York	\$3.84	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full

extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼ in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; No. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel.	Black. Galv.	Iron.	Black. Galv.
1, 1½, 2 in.....	.72	58	68	54
1½ in.....	.75	63	71	59
¾ to 1½ in.....	.79	69	75	65
2 to 3 in.....	.80	70	76	66
Lap Weld.				
2 in.....	.76	66	72	62
2½ to 4 in.....	.78	68	74	64
4½ to 6 in.....	.77	67	73	63
7 to 12 in.....	.75	59	71	55
13 to 15 in.....	.51½			
Butt Weld, extra strong, plain ends, card weights.				
1, 1½, 2 in.....	.69	59	65	55
1½ in.....	.74	68	70	64
¾ to 1½ in.....	.78	72	74	68
2 to 3 in.....	.79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.....	.75	69	71	65
2½ to 4 in.....	.77	71	73	67
4½ to 6 in.....	.76	70	72	66
7 to 8 in.....	.69	59	65	55
9 to 12 in.....	.64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
1½ in.....	.64	58	60	54
¾ to 1½ in.....	.67	61	63	57
2 to 3 in.....	.69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.....	.65	59	61	55
2½ to 4 in.....	.67	61	63	57
4½ to 6 in.....	.66	60	62	56
7 to 8 in.....	.59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.
1 to 1½, 2 to 3 in., Butt Weld Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in., Lap Weld
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three to five points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2½ in.	51	45
2½ in.	63	48
2½ to 5 in.	69	55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, 828; open hearth and chain rods, \$28.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; 5/8 in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, January 18, 1911.—(By Telegraph.)

Pig Iron.—The Standard Sanitary Mfg. Company is asking prices on 6000 to 8000 tons or more of Nos. 2 and 3 foundry iron for delivery at its Louisville, New Brighton and Pittsburgh plants. As low as \$13.50, Valley furnace, has been quoted on this inquiry on No. 2, while some furnaces quote \$13.75 and as high as \$14. A steel casting interest is inquiring for 2000 to 3000 tons of basic for delivery at Alliance, Ohio.

While \$15, Valley furnace, is still the nominal price of Bessemer, sales are reported of 3000 to 4000 tons at less than this figure. Reports of sales of 4000 tons of basic at \$13.65, Valley furnace, are absolutely denied. We quote Bessemer iron nominally at \$15; basic, \$13.25 to \$13.50; No. 2 foundry, \$13.75, and gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—We note several small sales of Bessemer and open hearth billets at the regular price of \$23, base, and also a sale of 400 tons of open hearth sheet bars at \$24. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

There is a decidedly better feeling this week, and the large steel interests believe that the tide has turned. One leading interest reports that its bookings show a decided increase over the same period in December, and others state that new orders show a slight increase with inquiries very much better. The feeling is strong that the bottom of the market has possibly been reached, and that there will be freer buying in the future. In spots prices are stronger. Some fairly large inquiries for pig iron are out, one for 6000 to 8000 tons of foundry, another for 1000 tons of basic and several for smaller lots of Bessemer and gray forge. Specifications against contracts for billets and sheet bars are a little better, with indications of further improvement. The orders for steel cars noted in this report have given encouragement to the plate makers, who believe that the long deferred equipment in the placing of cars orders has at last started. Prices on several grades of scrap are stronger, and the feeling in coke is better.

Ferromanganese.—Sales of 700 to 750 tons of foreign 80 per cent. have been made for delivery over all of 1911 at \$38.50, Baltimore. This is the lowest price at which ferromanganese has sold for delivery so far ahead for several years. The price for prompt delivery is lower, 80 per cent. foreign for such shipment being quoted at \$38. The freight rate for delivery in the Pittsburgh district is \$1.95 a ton.

Ferrosilicon.—Prices continue weak, and there is not much new inquiry. A sale of 60 tons of 50 per cent. for forward delivery has been made at \$55, Pittsburgh. For prompt delivery the price is lower and we quote at \$54. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent. \$24, and 12 per cent. \$25, f.o.b. cars, Jisco and Ashland furnaces.

Skelp.—The market is firmer and 1.25c. on grooved steel

skelp is now being named only on very large contracts and for prompt specifications; several makers will not sell below 1.30c. A local pipe mill recently placed a contract for 2000 tons of wide plates to be made up into large sized pipe for a gas line. We quote grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Muck Bar.—The A. M. Byers Company has started up 37 of its 42 new puddling furnaces at Girard, Ohio. It now has a total of 86 puddling furnaces there, being the largest puddling plant in the Central West. The puddling plant of the Kittanning Iron & Steel Company, at Kittanning, Pa., has been shut down since January 1. We quote muck bar nominally at \$29, Pittsburgh, in the absence of any recent sales.

Steel Rails.—The Carnegie Steel Company has recently taken some fairly large orders for rails for export. Orders received by this company for steel ties during 1910 were considerably heavier than in 1909, with the outlook for a still larger demand this year. The coal mining concerns are placing fairly large orders for light rails, but very little business is coming from the lumber interests. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Plates.—Some good sized orders for steel cars were placed in the past week and more are pending. The Pennsylvania Lines West has placed orders for 400 box cars of 100,000 lb. capacity each, 600 G. R. A. composite gondolas and 30 flat cars with the Pressed Steel Car Company. The Pennsylvania Railroad Company, Lines East, has contracted for 600 steel hopper cars with the Cambria Steel Company, 150 with the American Car & Foundry Company and 250 with the Pressed Steel Car Company. The Missouri Pacific Railroad has placed 1000 refrigerator cars and 1000 steel hoppers with the American Car & Foundry Company. Active inquiries in the market include 1500 steel gondolas for the Buffalo, Rochester & Pittsburgh and the same number for the Shawmut & Northern. The Wabash-Pittsburgh Terminal has not yet placed contracts for 2000 steel hoppers, but will do so as soon as certain legal matters have been adjusted. Makers of plates are much encouraged by the activity in steel car orders. The general demand for plates is also showing betterment. Prices are firm, and we quote ¾ in. and heavier plates, in narrow and wide sizes, at 1.40c., Pittsburgh.

Structural Material.—The Oregon Railroad & Navigation Company has placed a contract for the Willamette River bridge with the American Bridge Company calling for about 9000 tons of material. Waddell & Harrington were the engineers. The local situation is quiet but a good deal of big work is coming up, some of which is likely to be placed in a short time. There is, however, a good deal of complaint over the low prices being made on fabricated work. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Sheets.—Makers of sheets report that both new demand and specifications against contracts are showing betterment and that prices are being maintained more closely than for some time. The American Sheet & Tin Plate Company is operating to about 50 per cent. of its sheet mill capacity. The full schedule of prices on the different grades of sheets is printed on a previous page.

Tin Plate.—While the demand for tin plate is rather lighter at present, specifications against the heavy contracts placed in November and early December are now coming in freely, and mill operations are on a heavier scale now than for some time. The American Sheet & Tin Plate Company is operating this week close to 75 per cent. of its tin mill capacity. The Jones & Laughlin Steel Company expects to start work soon on the building of 12 more hot tin mills at Aliquippa, having had this number in operation for some time. Regular prices are reported as being well maintained, and we quote 100 lb. cokes at \$3.60 per base box f.o.b. Pittsburgh.

Steel Bars.—New orders and specifications for steel bars are not very active at present, but railroads are specifying more liberally on their contracts for iron bars. The demand for hard steel bars for concrete purposes is lighter than for some time. We quote soft steel bars at 1.40c. and common iron bars 1.35c., f.o.b. Pittsburgh.

Hoops and Bands.—Some heavy contracts for hoops and bands, mostly from the cooperage trade, have lately been placed, specifications against which are now being received. The hoop and band mills are operating at present

THE IRON AND METAL MARKETS

to about 50 per cent. of capacity. We quote hoops at 1.50c.; bands, 1.40c. in carload and larger lots and 1.45c. in small lots, the latter carrying extras as given in the steel bar card dated September 1, 1909.

Spikes.—Several good sized inquiries from Western roads for railroad spikes are in the market. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c. for local trade. We quote small railroad and boat spikes at 1.60c. to 1.65c. base, in carload and larger lots.

Spelter.—The market continues firm. While there is some inquiry, actual sales are mostly small lots. We quote prime grades of Western at 5.40c., East St. Louis, equal to 5.52½c., Pittsburgh.

Merchant Steel.—New orders continue to be confined to small lots, but specifications against contracts are heavier so far this month than in the same period last month. Prices are fairly firm, and shipments by the mills in January will probably be heavier than in any one month for some time. We quote, f.o.b. Pittsburgh: Iron finished tire, 1½ x ½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; polished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Shafting.—Specifications on shafting from the automobile trade are heavier than for some time, and an improvement is also noted in the demand from the implement makers. Prices are reported as being well maintained. The discounts on cold rolled steel shafting are 57 per cent, off in carload and larger lots and 52 per cent, in small lots, delivered in base territory.

Rivets.—The demand is still confined to small lots to cover actual needs, consumers not being disposed to contract ahead. Specifications against orders are only fairly satisfactory. These prices are reported as being well maintained on the basis of 1.90c. for structural rivets and 2c. for boiler rivets.

Wire Products.—Makers of wire nails and wire report that new orders are fair and only for small lots to cover actual needs. Specifications against contracts are not satisfactory, which is disappointing, as it had been believed that by this time the demand would be heavier. Prices are reported as being quite well maintained. We quote galvanized barb wire at \$2; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

Iron and Steel Scrap.—A good deal of the heavy steel scrap of the Pennsylvania Lines West, bids on which were opened last week, went to the American Steel Foundries at Alliance, Ohio. Dealers are not trying to force sales of scrap at present, as they believe prices may improve in the near future, while consumers are taking in only such material as they absolutely need. There has been a fairly heavy movement in bundled sheet scrap in the last few days, and prices have advanced from 75c. to \$1 a ton. A local dealer reports a sale of bundled sheet scrap at \$10 at loading point. We also note sales of 150 tons and of 300 tons of heavy melting scrap at \$13.75, delivered, and dealers state that very little scrap can be picked up at less than that price. A sale is also reported of 600 tons of cast iron borings on the basis of \$8 Pittsburgh. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$13.50 to \$13.75
No. 1 foundry cast.....	13.00 to 13.25
No. 2 foundry cast.....	12.00 to 12.25
Bundled sheet scrap, at point of shipment.....	9.75 to 10.00
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.75 to 15.00
No. 1 railroad malleable stock.....	12.75 to 13.00
Grate bars.....	10.75 to 11.00
Low phosphorus melting stock.....	17.00 to 17.25
Iron car axles.....	24.00 to 24.50
Steel car axles.....	20.25 to 20.50
Locomotive axles.....	24.00 to 24.50
No. 1 busheling scrap.....	12.25 to 12.50
No. 2 busheling scrap.....	8.75 to 9.00
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.75 to 16.00
Cast iron borings.....	8.00 to 8.10
Machine shop turnings.....	8.60 to 8.75
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.50 to 14.75
Heavy steel axle turnings.....	10.25 to 10.50

Merchant Pipe.—A few small inquiries ranging from 2 to 5 miles of line pipe are in the market, but new demand is light, and only for small lots. Stocks of pipe held by jobbers and mills being lighter at this time than at any period for some months, it is expected that new buying will be heavier in a short time. The larger mills are reported as operating on the basis of 60 to 65 per cent. of capacity.

We are advised that discounts on iron and steel pipe are being fairly well maintained.

Boiler Tubes.—The railroads are showing more disposition to place orders for boiler tubes than for some time, and some fairly large inquiries are in the market. The new demand for merchant tubes continues dull, and discounts on boiler tubes are still more or less demoralized.

Coke.—The Connellsville *Courier* estimates the output of coke in the Upper and Lower Connellsville regions in 1910 as 18,926,491 tons, against 17,785,832 tons in 1909. There are no important inquiries in the market at present for either furnace or foundry coke, but the tone of prices is possibly a little stronger. On Monday the H. C. Frick Coke Company fired up 100 ovens in the Connellsville and Klondike region which have been idle since the holidays. We quote standard makes of furnace coke for spot shipment at \$1.40 to \$1.50 per net ton, at oven, while for delivery over first half of 1911 from \$1.75 to \$2 is quoted. Best makes of 72-hour foundry coke for spot shipment are held at \$1.90 to \$2 per net ton, at oven, and for first half of the year at \$2.25 to \$2.50.

Chicago

FISHER BUILDING, January 18, 1911.—(By Telegraph.)

The favorable indications which appeared in the Chicago market last week have not grown into a buying movement or any marked improvement. The railroad rate cases and the Supreme Court decisions at Washington are nearing a definite conclusion, and after having waited so long buyers are disposed to wait a little longer before committing themselves on contracts for deferred deliveries. However, there is some improvement in railroad buying. No new rail orders of moment are reported, but orders for track supplies are coming out more freely. These are all for prompt shipment. Specifications for bar iron for prompt shipment are also growing, and there are more car inquiries in the market. In the structural field several important contracts of moderate size were let last week in Western cities, and early action is expected on large building contracts pending in Chicago. The smaller fabricating shops are picking up good orders, making a good demand from store as well as from mill for small lots of material. Miscellaneous plate orders are also showing up a little better. The sheet business is confined chiefly to carload orders for prompt shipment. The wire mills are doing better and expect a very satisfactory run of business during the next two or three months, as stocks in distributors' hands are light, and jobbers and retail dealers have been late in placing orders for spring shipment. The pipe foundries booked about 20,000 tons of new business last week, including large lettings in Chicago and Portland, Ore. Municipal bonds are selling better than for a long time, and this will enable Western cities to take up deferred plans for improvements. This improvement in the bond market will soon bring results in the demand for other forms of iron and steel which go into bonded projects. The scrap market continues stagnant, the trading being confined to forced sales of material in transit, on which dealers have to make concessions.

Pig Iron.—Several good inquiries were pending a week ago, but hopes among the iron men of a general buying movement have been disappointing. There is some improvement in the demand for small foundry lots of Northern iron for prompt shipment. The minimum price quoted by local furnaces on round lots is \$15.50, Chicago, for No. 2, with a slight advance asked on small lots. They are reluctant to sell for deferred deliveries, and concessions have been limited to sales for prompt shipment. An Ohio furnace has sold 5000 tons of basic to a steel foundry interest at St. Louis, and another steel foundry interest has purchased a smaller lots of basic from a Chicago furnace. The demand for low phosphorus iron for steel foundries is steadier than for malleable or foundry grades. The melt in malleable foundries has been decreased owing to lack of railroad orders, but the steel foundries are steady buyers, usually in small lots for prompt shipment or short delivery periods. Southern iron is weak in spots, but \$11, Birmingham, is generally maintained on Alabama iron, for current quarter or first half, with \$11.50 asked for second quarter, but buyers are not taking much interest in forward deliveries. Only a few inquiries have come out thus far for the second and third quarter. As a rule buyers are covered for the current quarter and many of them have enough iron bought to carry them well into the second quarter. The prospective requirements of pipe foundries have made the lower grades of Southern iron a little stronger, and several furnaces which have recently sold No. 4 at \$10 have raised their quotation 25c. The furnaces realized an average price of \$12, Birmingham, or better, on iron delivered in this territory the past year, and they are not pressing the market at present to make forward sales at current quotations. The

THE IRON AND METAL MARKETS

following quotations are for January, February and March shipment, Chicago delivery:

Lake Superior charcoal.....	\$18.00 to \$18.50
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.35 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%..	18.40 to 18.90
Jackson Co. and Kentucky silvery, 8%..	19.40 to 19.90
Jackson Co. and Kentucky silvery, 10%.	20.40 to 20.90

(By Mail.)

Billets.—The leading interest continues to quote \$31 as the minimum base price on forging billets, but independent mills have made sales at \$27 to \$28 the past week.

Rails and Track Supplies.—No important rail orders have been closed since those mentioned in last week's report. The railroads are placing good orders for track supplies for prompt shipment, taking this plan of obtaining supplies for immediate use without placing their usual annual contracts. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.20c. to 2.30c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Structural Material.—A marked improvement is shown in the number of structural contracts let. The Sanitary District of East St. Louis has bought three bridges, amounting to 500 tons, from the Joliet Bridge & Iron Works. The Chicago & Northwestern Railroad has let to the King Bridge Company, Cleveland, Ohio, a contract for three bridges, amounting to about 300 tons. The Webster Mfg. Company, Chicago, has awarded to the Toledo Bridge & Crane Company, Toledo, factory construction at Tiffin, Ohio, amounting to about 1000 tons. A smelter at El Paso for the Arizona Copper Company, 300 tons, was let to the Minneapolis Steel & Machinery Company. No awards are reported here on the large buildings that are pending in Chicago, but the tonnage in sight is increasing steadily and all the pending projects are backed by strong interests. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Local mill interests have no advices to confirm the report that the Missouri Pacific has placed an order for 2000 cars. Specifications for plates from the general trade are a little better this week, but the business continues unsatisfactory. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—There is an increase this week in carload buying. Jobbers show no inclination at present to place contracts for round lots of sheets for deferred deliveries, but there are more current orders for prompt shipment. Prices continue firm. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are; No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The railroads continue to buy bar iron steadily in round lots for prompt shipment, but the business has not grown to a volume that would enable the mills to get better prices. In other directions the bar trade is quiet as there is very little new buying of either soft or hard steel bars. While there has been a considerable decline in prices of re-rolling rails the past two or three months, the mills cannot afford to follow this decline in making prices on bars as they are generally carrying large stocks of rails which will average \$2 to \$3 higher in cost than the present market quotation. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.40c. to 1.45c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Bookings of wire orders for the past three or four months, although sufficient to keep the mills going at about two-thirds capacity, have been below the normal tonnage for this trade. This is not due to any lack of consumption, but was caused by the hesitation of hardware dealers and jobbers in placing orders for spring shipment. During November and December hardware jobbers only booked about half the amount of business for spring shipment that they have been accustomed to take in the past 10 years. It is expected that this condition will result in very active buying during the next two or three months. Spring trade in retail distribution has already opened in the South on a satisfactory basis. Agricultural conditions are so favorable that it is generally believed that the consump-

tive demand will be normal in all the common wire products, including field fence, poultry netting, wire cloth, &c. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

Cast Iron Pipe.—The contract for 10,000 tons of water pipe for the city of Chicago, which was mentioned last week, was awarded to the United States Cast Iron Pipe & Foundry Company. The same interest was awarded 6000 tons of water pipe at Portland, Ore., and booked other orders which would aggregate 20,000 tons for the week. This is the active season for the sale of both water and gas pipe and good bookings are expected in the next 30 days. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25; 6 to 12-in., \$24; 16-in. and up, \$23.50, with \$1 extra for gas pipe.

Merchant Steel.—Specifications are coming in at the usual rate from the agricultural trade and there is also some new business, although the yearly contracts in this trade are usually made in the early summer. Jobbers are placing fair orders.

Old Material.—The market continues very quiet. Consumers are carrying good stocks and are disinclined to take on additional tonnage now except when dealers offer bargains. About the only material being sold is scrap in transit, which was purchased from railroads and other sources in November and December. These sales usually result in a loss to the dealer, since the decline during the holidays. A Western road recently sold 400 tons of car wheels at \$13.50 per gross ton, Chicago. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	13.00 to 13.50
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart..	11.50 to 12.00
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.75 to 18.25
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	11.25 to 11.75
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings..	8.50 to 9.00
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.50 to 11.00
Pipes and flues.....	8.75 to 9.25

Jacob J. Cohen has opened an office at 1726 Republic Building, Chicago, as a broker in scrap iron, steel and metals.

Philadelphia

PHILADELPHIA, PA., January 17, 1911.

A more pronounced buying movement in pig iron has developed, but mostly in special grades. As a result of recent sales, one Eastern furnace will probably soon blow in on basic iron. While specifications are somewhat heavier for steel plates, new business continues of an irregular nature. An Eastern builder has a contract for 600 steel cars, part of an order for 1000 placed by the Pennsylvania Railroad. The Chesapeake & Ohio has placed its contract for 15,000 tons of rails, half going to an Eastern and half to a Western mill, while the Southern Railway has an inquiry out for 27,000 tons. A trifle better movement in steel scrap is reported. Iron bars are dull, while heavier specifications are noted for steel bars.

Iron Ore.—No fresh demand has developed. Arrivals of foreign ore at this port during the week aggregated 9650 tons, valued at \$26,538.

Pig Iron.—More activity has developed than has been the case for some weeks, and while transactions have been largely confined to specialties and steel-making irons, several very fair inquiries for standard brands of foundry iron have come out. Several sales of basic iron, effected quietly, have just come to light, both buyers and sellers being disinclined to make public the facts regarding these transactions. Sev-

THE IRON AND METAL MARKETS

eral 5000-ton lots of basic iron for deliveries ranging from one to four months have been sold at prices ranging from \$14.25 to \$14.40, delivered in this vicinity. One round lot was also sold to an Eastern mill on a readjustment basis against unfilled orders still due at a higher price. One sale of 1000 tons of off basic is also reported. A transaction involving 3000 tons of Bessemer iron, sold at a low price, in competition with other grades, is also noted. Negotiations are practically closed for a lot of 3000 tons of low phosphorus iron, for a consumer in this city. Several moderate lots of low phosphorus iron have been sold at prices ranging from \$21.50 to \$22, depending on the grade, although carload lots have been moved at prices ranging up to \$22.50, delivered here. In foundry grades the cast iron pipe makers have been the most active buyers, one Delaware River interest taking 5000 tons of Southern iron for delivery over the next four months, at a basis of \$10, Birmingham, for No. 4 foundry; the same purchaser took 5000 tons of Northern iron at prices ranging from \$14.25 to \$14.50, delivered, according to analysis, while another maker is negotiating for a block of 5000 tons. Malleable iron makers are in the market for several fair sized blocks of iron, and a sale of one lot of 1000 tons of coke malleable has been made at a price lower than recently quoted. A sale of 500 tons of charcoal iron to a malleable foundry is also reported. A more active demand is noted for higher grades of foundry iron, particularly from some of the larger buyers, one interest being in the market for 5000 tons of No. 2 plain and No. 3, while several inquiries are out for 1000 ton lots of various foundry grades. While no sales of forge iron of importance have transpired, inquiries are in hand for several lots, in quantities up to 500 tons; in the absence of sales, it continues to be quoted nominally at \$14.25 to \$14.50, delivered in this vicinity. Much of the recent business has been done at the expense of prices, particularly for basic iron, but quotations for standard brands of foundry iron are unchanged. The following range of prices is named for standard brands delivered in buyers' yards in this vicinity, shipment during the first quarter or half of the year:

Eastern Pennsylvania, No. 2 X foundry	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain	15.00 to 15.25
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.25 to 14.50
Basic	14.25 to 14.50
Standard low phosphorus	21.50 to 22.00

Ferromanganese.—Small lot buying continues, although the demand is by no means active. While some sellers are firm at \$38.25 to \$38.50, Baltimore, for 80 per cent., small sales for prompt delivery are reported at \$38.

Billets.—Consumers show more interest in the market, but continue to place orders in small lots for early delivery. Efforts to get price concessions are still being made; but, it is stated, without success, and makers look for a better volume of business in the near future. Quotations are being maintained at \$25.40, delivered in this territory, for rolling billets, and \$30.40 for ordinary forging billets.

Plates.—Specifications have been coming out more freely and frequently for larger quantities, particularly from the railroads. New business, however, continues of an irregular nature, consumers buying merely for their immediate requirements. Prices are unchanged, 1.55c., minimum, being quoted for ordinary plates delivered in this vicinity.

Structural Material.—The most important contract which will be closed in the near future is that for the superstructure of the new Vine street pier in this city, requiring about 3000 tons. Several other fair sized propositions are pending, but the bulk of the immediate orders are for small quantities. Specifications, however, are reported as coming out more freely. Prices for plain shapes are being firmly maintained at 1.55c. minimum, delivered here.

Sheets.—A better run of orders is coming to the mills, although not sufficient to keep them fully engaged. Consumers usually place orders for small lots for immediate consumption, rather than contract for forward requirements. Manufacturers expect a more active demand in the near future. Quotations are unchanged, Eastern mills naming the following range of prices for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—While the demand is not active, specifications, particularly for steel bars from agricultural implement makers, have been in larger volume. Fresh orders have been confined to small lots, which are being taken at unchanged prices. Refined iron bars are quoted at 1.32½c. to 1.42½c., delivered in this vicinity, according to tonnage and grade; steel bars are firmly held by leading producers at 1.55c., delivered.

Coke.—Negotiations for fair sized lots of furnace coke and moderate quantities of foundry coke are under way, but few sales of importance are reported. In instances prices are a trifle firmer, furnace coke being quoted at \$1.50 to

\$1.65 per net ton at oven, with foundry coke at \$2 to \$2.25 at oven, dependent on quality, tonnage and range of delivery. The following range of prices is named for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$3.75 to \$3.90
Foundry coke	4.25 to 4.50
Mountain furnace coke	3.35 to 3.50
Foundry coke	3.85 to 4.10

Old Material.—The market still drags. Slightly heavier sales are reported in some lines, but the demand lacks snap. Several thousand tons of No. 1 heavy melting steel have been taken at about \$13, delivered, although small lots can still be picked up at \$12.50 to \$12.75. Low phosphorus scrap has been sold at \$17.50, delivered in this vicinity. Railroad wrought has been sold at \$15.50, delivered, although better than that figure was paid for recent railroad offerings. More active buying of turnings and borings has stiffened prices for those grades and quotations are a trifle higher. A waiting market prevails in nearly all grades and quotations are to a large extent nominal. The following range, however, about represents sellers' ideas of the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap and crops	\$12.50 to \$13.00
Old steel rails, rerolling	15.50 to 16.00
Low phosphorus	17.50 to 18.00
Old steel axes	19.50 to 20.00*
Old iron axes	26.00 to 27.00*
Old iron rails	17.00 to 17.50*
Old car wheels	13.00 to 13.50
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	12.25 to 12.75
No. 1 forge fire	11.00 to 11.50
No. 2 light iron	7.00 to 7.50
Wrought turnings	8.25 to 8.75
Cast borings	8.25 to 8.75
Machinery cast	14.00 to 14.50
Railroad malleable	13.00 to 13.50
Grate bars	11.00 to 11.50
Stove plate	10.00 to 10.50

* Nominal.

The blast furnace of the Delaware River Steel Company, Chester, Pa., it is reported, will blow in at an early date on basic iron.

The name of the corporation, Sloan, Howell & Co., 1520 Real Estate Trust Building, Philadelphia, iron, steel and supply merchants, which had recently been changed to Sloan & Co., has been further changed to Burrows, Sloan & Co., owing to the fact that there is in existence in the same city another firm under the style of Sloan & Co. There has been no change in the personnel of the corporation officers or officials.

L. H. Hoskins, who for the past nine years has been connected with Crocker Brothers, pig iron and coke merchants, and during the past five years as salesman with their Philadelphia office, has been placed in charge of sales for the same firm in the Cincinnati territory, with headquarters in Cincinnati, Ohio. C. R. Dimmer, who has been connected with the Philadelphia office for some years, succeeds Mr. Hoskins in that territory.

Cincinnati

CINCINNATI, OHIO, January 18, 1911.—(By Telegraph.)

Pig Iron.—The market appears somewhat steadier. A fairly well scattered inquiry is being received, but mostly for small tonnages and short time delivery, although there are several orders pending for larger lots. The St. Louis territory has furnished some business for local agencies, which came principally from agricultural implement and stove manufacturers, and there are yet some inquiries being worked on from that district. A central Ohio melter is in the market for 1000 tons of foundry iron running 2 per cent. and over in silicon. A nearby company is asking for 500 tons of either Northern or Southern foundry. Several small inquiries from Indiana are also receiving consideration. Consumers needing iron are generally proceeding slowly and are only ordering small amounts to fill immediate requirements. While there have been rumors of a cut below \$11 at furnace for Southern iron for spot shipment, strictly graded No. 2 foundry is said not to be obtainable at any concession from this figure. Several local foundries have slim stocks on hand, but most of the jobbing foundries have lately been running light and at the present rate of consumption could go much longer before making any purchases. The pipe interests are understood to have bought freely in other markets. A number of requests for prices on deliveries extending through the third quarter have been coming in, but furnace operators are not in so receptive a mood as they were recently and are generally declining to quote beyond July 1. For first half shipment we quote No. 2 foundry at \$11, Birmingham, and \$14, Ironton, and malleable around \$14 to \$14.25, Ironton, with only small lots being

THE IRON AND METAL MARKETS

moved. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75 to \$15.25
Southern coke, No. 2 foundry.....	11.25 to 14.75
Southern coke, No. 3 foundry.....	13.75 to 14.25
Southern coke, No. 4 foundry.....	13.50 to 14.00
Southern coke, No. 1 soft.....	14.75 to 15.25
Southern coke, No. 2 soft.....	14.25 to 14.75
Southern gray forge.....	13.00 to 13.50
Ohio silvery, 8 per cent. silicon.....	18.20 to 18.70
Lake Superior coke, No. 1.....	15.70 to 16.20
Lake Superior coke, No. 2.....	15.20 to 15.70
Lake Superior coke, No. 3.....	14.70 to 15.20
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	19.50 to 20.50

(By Mail.)

Coke.—More interest is taken in furnace coke than in foundry grades, and another inquiry is reported to be out from a Northern furnace for about 7000 tons per month for first half delivery. However, the furnace operators are extremely slow in closing contracts. In both the Pocahontas and Wise County fields there has been a stiffening in prices for spot shipment, which is due to the curtailment in production inaugurated by several operators and not to any increased demand. Some brands of furnace coke that could have been bought at \$1.50, and possibly a little lower 30 days ago, are now not obtainable below \$1.65 to \$1.75 per net ton at oven in the Wise County and Pocahontas districts. Foundry coke is available in all three fields at \$1.95 to \$2 for spot shipment and at \$2.15 to \$2.25 per net ton at oven on contracts running through the first half.

Finished Material.—Plans that are being made up for rebuilding the numerous structures that have lately been destroyed by fire in Cincinnati indicate that the present year will be a good one for disposing of a large tonnage of beams, channels and reinforcing concrete bars. No change in prices has been made, and 1.40c. for steel bars and structural material still governs, with warehouse prices around 1.75c. to 1.90c.

Old Material.—Business seems to have revived somewhat, and some round lots of scrap have lately been taken by the rolling mill interests. There is also a better inquiry from the foundry trade. The Norfolk & Western Railroad Company has a list out offering about 5000 tons of scrap. Offerings are expected from some of the other roads operating in the South. Prices for delivery in dealers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 12.00
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	22.50 to 23.50
Old car wheels, gross ton.....	12.00 to 13.00
Heavy melting steel scrap, gross ton.....	11.50 to 12.00

Birmingham

BIRMINGHAM, ALA., January 16, 1911.

Pig Iron.—A lot of 500 tons of No. 2 soft for first half delivery was sold the past week at \$11, Birmingham, and two lots of 100 tons each of No. 2 foundry for shipment during the next four months brought the same price. The sale of a small lot of high silicon iron is reported at about \$12, and forge and mottled grades in carload lots brought a No. 4 foundry price. An aggregate of 1250 tons of charcoal iron was sold at \$22.50, at furnace. The reported sale of a round tonnage of low grade foundry iron to a leading pipe manufacturer cannot be confirmed in this market, and by reason of the scarcity of such grades it is quite probable that the tonnage was placed elsewhere. Negotiations for 1000 tons of Nos. 2 and 3 foundry for shipment during the first half have not been closed, but 500 tons of analysis iron for comparatively early shipment will no doubt be placed to-day. The inquiry from all quarters of the trade has improved materially and in practically all cases requirements are being submitted in definite form. One of the most attractive tonnages recently offered was to cover the requirement of a leading Southern melter for the whole of this year. It is not believed that any selling interest would name a price for shipments further advanced than the first half, and even for second quarter deliveries it is not improbable that an advance of 50c. per ton over the \$11 schedule will become effective. The disposition to speculate at present prices has become general with the merchant interests, but the tonnage recently added to such holdings is very small. It is noted that none of the cash offers at a price below an \$11 basis for spot shipments has been accepted, and that the demand for warrants is decidedly stronger. One of the smaller producers has practically withdrawn from the market for any delivery, and another concern now offers only such tonnage as is on furnace yards and not applicable to orders.

A leading producer will not accept additional contracts for first quarter shipment, owing to the condition of the order book when compared with the present rate of production, and is making no preparations for an increase in the active producing capacity. The capacity for the production of basic will be increased early in February.

Cast Iron Pipe.—In addition to the tonnage recently mentioned as required for Western points, the city of Kansas City, Mo., is soon to place a contract for 2000 tons of water pipe. Production has been reduced by the closing down of two local plants for repairs. It is understood that they will be out of commission for some two months and that by reason of the suspension the surplus stock is really very small. An advance in quotations has recently been made and the revised quotations have become established for small orders. We quote as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$20 to \$20.50; 8 to 12 in., \$19.50 to \$20; over 12-in., average \$18, with \$1 per ton extra for gas pipe.

Old Material.—There is more demand, but the matter of prices is still undetermined. Dealers are disposed to treat all inquiries individually and the buying interests are following a very conservative course. The consumption is considerably larger than for a month past, but the stock in consumers' hands has not been reduced to an appreciable extent. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.00 to 12.50
Old steel axles.....	14.00 to 14.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.00 to 9.50
No. 1 country.....	7.50 to 8.00
No. 2 country.....	7.00 to 7.50
No. 1 Machinery.....	9.50 to 10.00
No. 1 steel.....	10.00 to 10.50
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.00 to 10.50
Light cast and stove plate.....	8.00 to 8.50

The plant of the Dimmick Pipe Company at North Birmingham, Ala., has been closed down for repairs.

The soil pipe plant of the Beggs Pipe & Foundry Company at North Birmingham, Ala., is again in operation after a suspension of some weeks.

The plant of the Smith Mfg. Company at Bessemer, Ala., has been leased by the Bessemer Castings Company and will be operated in the production of stoves.

Cleveland

CLEVELAND, OHIO, January 17, 1911.

Iron Ore.—Some inquiry for small lots came out during the week and it is expected that these will result in the placing of contracts within a few days. Sellers will arrange with buyers to pay the price that may be established later. It will probably be several weeks before any definite action is taken on prices. Ore shipments from docks are light but about normal for this season of the year. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Inquiries for foundry iron show considerable improvement, and the general feeling is somewhat brighter. While sales during the week were limited to small lots, sellers are now looking for a better volume of orders. New inquiries have come largely from the Pittsburgh district, the largest being for 5000 tons. A Cleveland foundry wants about 1000 tons of Southern for the first half and a northern Ohio consumer is in the market for 500 tons of gray forge. In order to clean up a portion of its yards, a local furnace interest has sold some small lots of foundry iron at a concession from ruling prices for spot shipment, but these quotations have now been withdrawn. Prices for local delivery are firm at \$14, at furnace, for No. 2 for the first half. For outside shipment, however, quotations as low as \$13.50 are being made by local furnaces for No. 2 for the same delivery. Southern iron is not firm at \$11, Birmingham, for No. 2, some selling agencies quoting \$10.75 for the first half. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	14.00
Southern foundry, No. 2.....	\$15.10 to 15.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—The demand for foundry grades shows improvement. Some contract business that has been pending for several weeks has been placed and a few foundries that have been holding off have come into the market with inquiries for first half delivery. Prices remain stationary. We quote standard Connellsville furnace coke at \$1.45 to \$1.50 per

THE IRON AND METAL MARKETS

net ton, at oven, for spot shipment, and \$1.75 to \$1.85 for the first half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—A decided improvement is observed, orders being more numerous and for larger tonnages. The greater part of these orders have been new business. It is too early to determine, however, whether the revival will be permanent or only a spurt due to holding off from placing orders during inventory time, and until it was known whether prices would be reduced as a result of the recent conference in New York. The better demand is mostly in steel bars and structural material. Some good orders for light rails were also placed, coming from coal mining companies. The structural situation has improved somewhat, several inquiries now being figured on for building work requiring about 1000 tons. None of the prospective work requiring large tonnages has reached the point of asking for bids. Prices on steel bars, plates and structural are firm, at 1.40c., Pittsburgh. While sheet prices appear to be maintained by most of the mills, an inquiry from an Ohio stove manufacturer for a 300-ton lot is said to have brought out concessions from ruling quotations. The demand for iron bars is only moderate. Prices are unchanged, at 1.30c. to 1.35c., at mill.

Old Material.—The market continues very dull. Consumers are taking some material on contracts, but very few sales are being made. Dealers generally are holding their scrap for better prices, but the light demand has caused further weakness and several quotations have been reduced from 25c. to 50c. a ton. The Michigan Central Railroad received bids January 17 on a small list. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.75 to \$14.25
Old iron rails.....	15.00 to 15.50
Steel car axles.....	18.50 to 19.00
Heavy melting steel.....	12.00 to 12.50
Old car wheels.....	12.00 to 12.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.75 to 12.00
Railroad malleable.....	12.75 to 13.00
Light bundled sheet scrap.....	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 7.00
Steel axle turnings.....	8.75 to 9.00
No. 1 bushelling.....	10.50 to 11.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 cast.....	11.50 to 12.00
Stove plate.....	10.00 to 10.50
Bundled tin scrap.....	11.00 to 11.50

Harry O. Price, formerly manager of the Pittsburgh office of C. H. Lewis & Co., has opened an office under the name of Price & Co., at 711 Citizens Building, Cleveland, for the sale of pig iron and coke. Mr. Price has been appointed selling agent of the Globe Iron Company, Jackson, Ohio, for the Cleveland and Pittsburgh territories.

Buffalo

BUFFALO, N. Y., January 17, 1911.

Pig Iron.—The week has shown a large increase in inquiry and the development into orders of a good proportion of the previous week's inquiries, the sales reaching a total of nearly 10,000 tons. Some of this business was brought about by price concessions. The aggregate of new inquiry totaled about 25,000 tons, made up principally of foundry grades, desired by pipe works, agricultural implement makers and electrical interests, including one inquiry for several thousand tons from a New England concern for foundry irons. Very little is being done in malleable. In basic, the only business reported is for small lots. A good deal more charcoal iron is being bought than for some time, quotations on which now range from \$17.25 to \$17.75, f.o.b. Buffalo, which are a little under recent prices. Most items of the price schedule have been scaled down somewhat from the figures which the furnacemen have been endeavoring to maintain, with less price variation between the regular grades, there being practically not more than 50c. per ton difference between the highest and the lowest grade in foundry irons, and only 25c. per ton between No. 2 X and gray forge, quotations being based not so much upon the regular grades as upon the special requirements of the buyer for his particular use. We quote as follows, f.o.b. Buffalo, for prompt and first half deliveries:

No. 1 X foundry.....	\$14.50 to \$15.00
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	14.00 to 14.25
No. 3 foundry.....	13.75 to 14.00
Gray forge.....	13.75 to 14.00
Malleable.....	14.25 to 14.75
Basic.....	14.50 to 15.00
Charcoal.....	17.25 to 17.75

Finished Iron and Steel.—The agency of the principal interest reports a perceptible increase in inquiry since the meeting of steel manufacturers and a better volume and more varied line of orders, including, in addition to miscellaneous bar products, 2800 tons of steel rails, large orders for special track material for traction lines (intersection cross overs and other built-up work), girder rail sections, &c., also for Canada a large tonnage of billets, with negotiations pending for a much larger quantity, and a large tonnage of axles and steel wheel equipment for two traction lines and one steam road. An active movement in tin plate is a feature of the Canadian market, inquiries for several thousand tons being out for delivery over the first half of the year, and orders for some of this will, it is expected, be placed during the coming week. There is a strong probability that contracts for much of this tonnage will come to United States makers, owing to the fact that Welsh makers are busily engaged on contracts for European markets and have recently advanced their prices. In structural lines a fair amount of business is being done. Walter Bradley & Co., Fulton, N. Y., have been awarded contract No. 80 on the Oswego branch of the Erie Barge Canal, which includes about 250 tons of structural steel—principally for lock gates—and the Crowell-Sherman-Stalter Company, Cleveland, Ohio, has taken contract No. 48, covering work near Lyons, which includes 200 tons of steel for bridge work and 500 tons for lock gates and about 50 tons of concrete reinforcing bars. The Phoenix Iron Company has been given contract for a small tonnage of steel for the Eastman Kodak Company's factory Building, No. 31, at Rochester. Bids for the 600 tons for the larger building, the Eastman Company, is to erect are held over until next week, as the substitution of reinforced concrete is under consideration, as well as for an additional small building. Bids are being received for steel for an additional mill for the Rome Wire Works, Rome, N. Y., and for a large steel frame factory for the Loritz-Tensch Company, Utica, N. Y.

Old Material.—Very little new inquiry is noted except in machinery cast scrap which shows some improvement in demand and on which the price is slightly higher. Mills continue to take in shipments more freely on current contracts. Since the embargo has been lifted at Pittsburgh on borings and turnings, shipments are moving somewhat more freely in this commodity. For most of the list prices remain practically unchanged. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.00 to \$12.25
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	15.00 to 15.50
No. 1 railroad and machinery cast scrap.....	14.00 to 14.50
Old steel axles.....	18.50 to 19.00
Old iron axles.....	23.00 to 23.50
Old car wheels.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.25
Boiler plate.....	10.00 to 10.25
Locomotive grate bars.....	10.50 to 11.00
Pipe.....	9.75 to 10.00
Wrought iron and soft steel turnings.....	7.00 to 7.25
Clean cast borings.....	6.25 to 6.50

St. Louis

ST. LOUIS, Mo., January 16, 1911.

Satisfactory evidence of the progress of general business in this section toward a better basis is shown by the fact that bank clearings in this city, Kansas City and St. Joseph were in excess of the corresponding week of 1910. The outlook in the pig iron market is for a better demand in the near future, though there is no improvement in prices. Railroad purchases of finished metals are increasing. Building operations for the spring season are developing rapidly. The Southwest reports of new enterprises in manufacturing show a good increase since the turn of the year.

Pig Iron.—While the leading sellers report an increasing interest in the pig iron market, as evidenced by numerous inquiries, the result in sales is disappointing. There is some difference in opinion respecting the requirements of consumers in St. Louis and vicinity for the near future, but it would seem that large local consumers are pretty fully stocked. In St. Louis territory, however, there is considerable business expected to develop from these inquiries. The merchant sellers are putting out their traveling salesmen and the volume of trade is expected to gradually increase from now forward. One of the leading brokers reports inquiries for Southern foundry iron aggregating 2500 tons, with sales of 500 tons of No. 2 foundry for shipment over the first half. An Illinois car wheel company purchased 300 tons of Northern charcoal iron and is in the market for 500 tons of coke iron. The representative of a leading Birmingham interest reports the sale of 500 tons of Southern No. 2 foundry for shipment over the first half. While \$11, Birmingham, is regarded as the market for Southern No. 2 foundry for shipment over the first half and \$11.25 to \$11.50 for the second quarter only, offers of

THE IRON AND METAL MARKETS

less than the first named price are reported to have been taken by some furnaces, but this shading is claimed to be growing less frequent. Shipments on contracts are being freely made.

Coke.—Though inquiries for coke are more frequent than for some weeks, business is of a hand-to-mouth character. Specifications on contracts are coming in satisfactorily. The market is ruling steady to firmer. Best selected 72-hour Connellsville foundry is held at \$2.25 to \$2.35, per net ton; standard grades, \$2.10 to \$2.25, f.o.b. oven.

Finished Iron and Steel.—The leading interest reports the demand for standard rails quiet, but a fair inquiry for light rails. Structural material is dull. For bars there is a good inquiry from wagon manufacturers and agricultural implement makers. With jobbers the stock taking period had held up the demand. The call for track material is light.

Old Material.—Dealers report more business in sight from consumers, though for the time being the demand is limited. The only railroad list for the past week was that of the Cotton Belt, about 250 tons. The market is fairly steady. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$12.00 to \$12.50
Old steel rails, rerolling.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, subject to inspection.....	24.00 to 24.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart..	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushing.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings..	8.50 to 9.00
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.50 to 9.00
Railroad sheet and tank scrap.....	8.50 to 9.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

Harry Benjamin has taken offices 727-728 Central National Bank Building and will engage in the business of handling scrap iron, steel and relaying rails, together with railroad equipment, under the style of the Harry Benjamin Equipment Company. Mr. Benjamin was connected with the Block-Pollak Iron Company, which has recently given up its office in St. Louis, for upward of 30 years. H. J. Keiner, who was also connected with the Block-Pollak Iron Company, will be associated with the new company on February 1.

The officials of the Burlington Railroad are entertaining a proposition for building new terminal facilities at Quincy, Ill., which will involve an outlay of \$500,000.

P. B. Hanson, manager of the Johns-Manville Company of Texas, has announced that the company will erect a fire-proof building, of probably six stories or more, in the near future at Dallas, Texas.

The William Barr Dry Goods Company, St. Louis, is completing arrangements for the construction of a 20-story building to cover the whole block bounded by Olive, Locust, Sixth and Seventh streets.

San Francisco

SAN FRANCISCO, CAL., January 11, 1911.

It is still too early in the year for any general activity, though mill representatives are figuring on numerous inquiries and a substantial volume of business is expected before the end of the first quarter. Distributive trade has improved materially in several lines of finished materials. Underlying conditions have been greatly improved by a timely general rain, though the crop outlook is not yet assured. The building situation is encouraging, and some expansion is noted in several manufacturing industries.

Bars.—For soft steel bars there is some inquiry of a fairly important nature. Few of the local merchants are carrying heavy supplies and considerable buying for stock is expected within the next month. Some jobbers are buying in small lots to cover immediate requirements, the aggregate tonnage being larger than for some time, as assortments were fairly complete up to the end of the year. As far as can be learned, there is less disposition to order foreign material than there was a year ago. Numerous inquiries, both large and small, are coming out for reinforcing

bars, and while foreign material is extensively used for this purpose, representatives of American mills expect to book a very fair tonnage. A large amount of concrete construction is planned and the movement of cement is much heavier than usual at this season. The city of Los Angeles has taken bids on about 45,000 round steel bars. Bars from store, San Francisco, are quoted at 2.10c. for iron and 2.30c. for steel.

Structural Material.—The official record of building values in San Francisco for December, though somewhat below that of a year ago, shows a gain of nearly \$500,000 over the preceding month, and local fabricators anticipate a gradual improvement for the next nine months. The December record of \$4,715,420 at Portland, Ore., was due to the new building code which went into effect January 1 and is not a true index to conditions there, though the outlook for the year is very favorable. Records in other coast cities show a seasonable decrease, but many important plans are coming up for figuring, especially at Los Angeles. The Vulcan Iron Works, Seattle, Wash., has a contract for about 800 tons for the Bon Marche department store at that city. The only local contract of any consequence is the Terminal Hotel building, about 400 tons, to be fabricated by Dyer Bros. The Mortenson Construction Company of this city has a small order for a bridge at San Luis Obispo, Cal., and it is reported that the steel has been ordered for the Sacramento Court House. Figures are about to be taken on a new drawbridge at Sacramento, Cal. Buildings on which figures will be taken shortly include the Van Nuys Building at Los Angeles and another addition to the Court House at Portland, Ore. Plans have been completed for Pier 32, San Francisco, which will require considerable fabricated material, in addition to reinforcing bars, &c. It is possible that the new St. Luke's Hospital building may be started within the year. The California Agricultural Society is planning a large steel grandstand and building at Sacramento. At Portland, Ore., plans have been filed for a 10-story building for T. B. Wilcox, and figures are being taken on the Lincoln High School. The Masons at Salem Ore., are planning a \$100,000 lodge building. Several prospective local jobs are in about the same position as previously reported. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.60c.

Rails.—Few orders of consequence have been placed since the first of the year, though there have been a number of more or less tentative inquiries in the market for some time. A fair amount of small business has been booked and the outlook for the next three or four months is favorable, as many logging concerns are coming into the market for their year's requirements. There have been several reports of projected extensions of new lines from the Middle West into California, and the Western Pacific interests are said to be figuring on a line through the San Joaquin Valley. The demand for light rails is limited at the moment, but there is some inquiry from mining interests and an active movement is expected during the spring. The city of San Francisco is in the market for about 10,000 tons of supplies, including plates, rods, poles and wire, for the Geary street line.

Plates and Sheets.—A substantial tonnage of tank plates has been ordered recently for new gas holders, &c., the demand in southern California being especially active. There are still a number of inquiries for this class of work and considerable business in the oil fields is in prospect. Riveted pipe is also in general demand all over the coast. The distributive movement of black and galvanized sheets is about normal for this season. Merchants are carrying light supplies, but are buying only for immediate requirements, expecting to get lower prices on large orders. The Pacific-American Fisheries is planning to erect a large oil tank at Bellingham, Wash. It is reported that the Standard Oil Company will erect a large refining plant, similar to that at Richmond, Cal., in southern California. The American Beet Sugar Company will erect a 35,000-bbl. oil tank at Oxnard, Cal.

Merchant Pipe.—The small jobbing movement remains rather quiet and only a moderate demand is expected during the first quarter. Dealers are buying from hand to mouth, with little stock in reserve, and show no inclination to alter their policy. A fair tonnage has been booked in the oil fields and the inquiry from that quarter is increasing, though the rain is likely to delay deliveries. There is a prospect of some large orders from gas interests in southern California. The city of Los Angeles has taken bids on 18,500 small fittings and 6500 nipples. There is an active demand for valves and hydrants.

Cast Iron Pipe.—While figures are being taken on a number of large inquiries, the January business so far has been confined to small lots. The Long Beach Consolidated Gas Company has ordered 700 tons of large pipe and will be in the market for more. An order is also expected from the city of Los Angeles for 1000 tons. The Pacific Gas &

THE IRON AND METAL MARKETS

Electric Company is planning large extensions at several points and is likely to be a large buyer throughout the year. It is now taking figures on about 8 miles of pipe. The town of Vallejo, Cal., will take bids January 23 for a lot of water pipe, and the town of Brawley, Cal., is in the market for a considerable tonnage. The Bay Cities Water Company is preparing to start work on its system in Alameda and is negotiating for a yard for the storage of pipe. The San Francisco Bridge Company is taking figures on a lot of cast iron pipe, in addition to other supplies, for the dry dock at Pearl Harbor, T. H.

Pig Iron.—While some large inquiries for castings are coming up, the work of local foundries is mostly of a small nature and limited in quantity. It is difficult to interest local melters in foreign pig iron for future delivery, and the spot market is quiet, though the movement is a little larger than last month. Arrivals of foreign iron have been light for some time, the only recent cargo being 700 tons from Rotterdam. Southern foundry iron is quoted at \$21.50 to \$22, with very little demand. English and Continental foundry iron is held at about \$22. The San Francisco Bridge Company is in the market for a heavy tonnage of special castings, principally iron, for the Government dry dock at Pearl Harbor, but it is very doubtful whether the contract will be placed here.

Old Material.—Cast iron scrap finds a little more demand, but the movement is not heavy, offerings of good material being small. Steel melting scrap is in good demand, with some new contracts for extended delivery. Other lines remain quiet. Prices are quoted as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, \$12.50, per gross ton; wrought scrap, \$13.50, per net ton; rerolling rails, \$15, per net ton.

New York

NEW YORK, January 18, 1911.

Pig Iron.—Inquiry has increased since the opening week of the year, but where buying has followed it has been at new concessions in price. The largest transaction reported is for 5000 tons of foundry iron, taken by an eastern Pennsylvania interest. Deliveries extend over three months, beginning with February. A New Jersey buyer closed for 1000 tons of charcoal iron and some sales of charcoal grades were made for eastern Pennsylvania delivery. A valve company is inquiring for 1000 tons and a New Jersey inquiry for several thousand tons has gone the rounds for several weeks without a purchase. The General Electric Company has closed for a part of the iron it has been considering for some weeks. Only one considerable sale of basic iron has been made—about 5000 tons—since three lots, amounting to 10,000 tons, were closed two weeks ago at about \$14.25, delivered in eastern Pennsylvania. Pipe companies have been ready to take bargain lots and are hunting for several thousand tons. One sale of 5000 tons of Southern No. 4 has been made at \$14.20, delivered on the Delaware River. Virginia sellers have not been aggressive since the marketing of the cheap iron that came from that quarter in December. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Steel Rails.—Small lot business is all that the mills of the leading interest have actually booked in the past week—less than 2000 tons for three mills. Some fair sized inquiries are pending. The Norfolk & Western's order for 1911 was largely rolled in the latter part of 1910, but several thousand tons taken by an Eastern mill is yet to be rolled. Export business has been good, a 15,000 ton and a 5600 ton order having been booked for lines in the Argentine Republic and 5000 tons for Mexico.

Ferroalloys.—Sales of good round lots of 50 per cent. ferrosilicon have been made in the New York market at \$56, Pittsburgh. New York dealers' quotations are more uniform. Those who were asking \$55.50 have raised their quotations to \$56, while others who were high have made reductions. Sellers of foreign ferrosilicon are apparently readjusting their affairs to meet the new condition caused by the selling agreement made among European producers and some of them are not particularly desirous of making sales at this time. Ferromanganese is inactive and is generally quoted at \$38, Baltimore, for spot delivery.

Finished Iron and Steel.—Although business has not improved to any noticeable extent, sellers appear to be encouraged by the outlook and confident that further waiting for price reductions will be abandoned. Stocks are low and material for new work is needed, and some deferred orders must soon be released, but buying so far is practically all for immediate requirements. Specifications on steel bars have not been liberal, but the implement trade has been doing exceedingly well, and from this quarter good contracts

should be forthcoming. Local offices of steel bar mills report better business in the last week or two than in the previous two or three months. Bar iron orders are reported a trifle better than a week ago, but there is still no marked activity. The week has developed little in structural lines and few decisions have been reached on contracts pending. No award has been made on the bids for the Bureau of Printing and Engraving at Washington, D. C. Woodbury & Layton were low bidders and the highest bid was over \$1,000,000 more than theirs. It has been definitely announced that the Appraiser's Store in Boston will be redesigned, for it will be remembered that all of the bids exceeded the appropriation. The New York Central has made no important awards on its contracts and has come into the market for a few more small bridges. The Boston & Maine has awarded a 300-ton bridge to the McClintic-Marshall Construction Company. The Norfolk & Western has made an award on one of its contracts, 800 tons, to the Phoenix Bridge Company, and 1600 tons to the Virginia Bridge & Iron Company, leaving still to be placed by this road between 8000 and 9000 tons. The American Bridge Company has submitted a bid on 2400 tons for a building for the Corn Products Company in Chicago. Prices remain unchanged, as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.35c. to 1.40c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—Angola, N. Y., has awarded the contract for construction of its water works to Mahoney & Swanson, Jamestown, N. Y. The plant will cost \$55,000, including pumping equipment, and about 900 tons of cast iron pipe will be required. Public lettings are still few in number. Private companies, however, continue to make inquiries for their season's requirements and some buying is being done by such interests. Carload lots of 6 in. are quoted at \$22 per net ton, tidewater.

Old Material.—Shipments are now regularly going forward to fill contracts, consumers taking the full quantities thus covered. Dealers are feeling rather hopeful, believing that while current buying is light the demand must shortly improve. The volume of business is so far showing but a small increase, the demand being most marked for cast scrap and old car wheels. The low prices now prevailing are causing holders to refrain from pressing scrap on the market. The railroad companies are showing a strong disposition to avoid sacrificing their old material, as in some instances the bids received on the monthly lists were not accepted. Quotations per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting	.....	\$10.00 to \$10.50
Heavy melting steel scrap	.....	10.00 to 10.50
Relaying rails	.....	20.50 to 21.50
Standard hammered iron car axles	.....	20.50 to 21.00
Old steel car axles	.....	15.00 to 15.50
No. 1 railroad wrought	.....	11.75 to 12.25
Wrought iron track scrap	.....	10.75 to 11.25
No. 1 yard wrought, long	.....	10.50 to 11.00
No. 1 yard wrought, short	.....	10.00 to 10.50
Light iron	.....	5.00 to 5.50
Cast borings	.....	5.50 to 6.00
Wrought turnings	.....	5.25 to 5.75
Wrought pipe	.....	9.50 to 10.00
Old car wheels	.....	11.50 to 12.00
No. 1 heavy cast, broken up	.....	11.50 to 12.00
Stove plate	.....	9.50 to 10.00
Locomotive grate bars	.....	8.50 to 9.00
Malleable cast	.....	12.00 to 12.50

Metal Market

NEW YORK, January 18, 1911.

THE WEEK'S PRICES

		Copper—Cents per Pound, for Early Delivery.				Lead—		Spelter—	
		Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.	New York.	St. Louis.
Jan.	Lake.								
12.....	12.75	12.50	{ 39.75 }	4.50	4.35	5.55	5.40		
			{ 39.95 }						
13.....	12.75	12.50	40.15	4.50	4.35	5.55	5.40		
14.....	12.75	12.50	...	4.50	4.35	5.55	5.40		
16.....	12.62½	12.37½	40.90	4.50	4.35	5.55	5.40		
17.....	12.75	12.40	41.60	4.50	4.35	5.55	5.40		
18.....	12.75	12.50	41.75	4.50	4.35	5.55	5.40		

Good copper buying yesterday strengthened its price. Pig tin prices continue to soar because of excited speculation in the London market. Antimony is unsettled and weaker than last week. Lead is softer. Spelter is quiet but steady.

Copper.—A decline in the copper market which resulted in establishing the price of 12.37½c. for electrolytic copper and around 12.62½c. for lake was checked yesterday through a buying movement, which resulted in liberal bookings. Before the day was out the market had advanced ½c., and it opened strong this morning with consumers still making inquiries. It is not known what amount of buying was done during the trading yesterday, but it easily reached 5,000,000 lb. Orders were placed for copper for delivery over February, March and April, but a large amount of the buying was for spot supplies and a great deal of it was for domestic consumption. A feature of the day's trading was

THE IRON AND METAL MARKETS

the fact that prices advanced $2\frac{1}{2}$ points at a time. This is unusual in the copper market, as invariably the price advances or recedes $\frac{1}{8}$ c. at a time. Electrolytic copper is firm to-day at 12.50c., and lake at 12.75c. Some brands of lake cannot be had under 12.87 $\frac{1}{2}$ c. The exports of copper so far this month have been good, amounting to 17,485 tons. In London to-day spot copper sold at £56 and futures at £56 17s. 6d. The sales amounted to 500 tons of spot and 800 tons of futures. The market closed dull. Sales of electrolytic copper were reported in New York this afternoon at 12.55c.

Copper Averages.—The Waterbury average for December was 13c. The average price, New York, for lake copper for that month was 13c., and the average price for electrolytic copper was 12.87 $\frac{1}{2}$ c.

Pig Tin.—Wild speculation in the London market has resulted in further advances of pig tin prices here. Private cables to New York houses with London connections advise that those in charge of the syndicate are now calling for rights to purchase additional supplies of spot tin under agreements made a couple of months ago, when they placed orders with the reservation that they be allowed later on to duplicate their buying at the price agreed upon at that time. This has obliged a number of traders to go into the market to purchase spot tin, and as the syndicate operators are largely in control of the available stocks many dealers who have been caught short are attempting to effect a settlement. This condition resulted in an advance of £7 in the London market during the trading on Monday and Tuesday and a new record figure was established in the New York market. Local transactions are light. Prices here closely follow the London movements, advancing accordingly, but both consumers and dealers are afraid of the market. The syndicate operators are guarding their movements and no one can tell when they may decide that they have squeezed enough out of their operations. Tin in New York this morning was quoted at 41.60c. So far this month 2707 tons have been imported and there are 3116 tons afloat. Pig tin was sold in New York this afternoon for 41.75c. At the close of the London market to-day spot tin was being sold at £190 12s. 6d. and futures at £190 15s. The sales amounted to 200 tons of spot and 500 tons of futures. The market was steady.

Tin Plates.—Quotations on foreign tin plates again advanced 3d. to-day because of the prevailing high quotations on pig tin. Consumers' stocks are said to be low in Great Britain, and an excellent demand exists there for tin plates. The market in domestic tin plates is quiet, but inquiries are being received from can manufacturers. The quotation for 100-lb. coke plates is \$3.84.

Lead.—Lead is softer in tone in the New York market, but the price has not changed from 4.50c. There are reports from St. Louis to the effect that offerings are being made there at 4.32 $\frac{1}{2}$ c., but these are said to be resale lots. Most St. Louis dealers are asking 4.35c.

Spelter.—Consumers of spelter and those who have it for sale seem to be deadlocked. A few prospective buyers who felt the market in New York this week were unable to obtain any concessions on prices made a week ago. Dealers who are loaded down with stocks declare that they will carry them for several weeks rather than accept any lower figure than the prevailing quotations, which are 5.55c., New York, and 5.40c., St. Louis.

Old Metals.—Not enough buying is being done to establish values. Dealers' selling prices are nominally unchanged, as follows:

	Cents.
Copper, heavy bar and crucible.....	12.25 to 12.50
Copper, heavy and wire.....	11.75 to 12.00
Copper, light and bottoms.....	11.00 to 11.25
Brass, heavy.....	8.25 to 8.50
Brass, light.....	7.00 to 7.25
Heavy machine composition.....	11.00 to 11.25
Clean brass turnings.....	8.00 to 8.25
Composition turnings.....	9.00 to 9.50
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.30 to 4.40

Antimony.—Rumors regarding the formation of a syndicate among the European manufacturers of antimony have greatly unsettled the market which, after having been devoid of interest for several months, has assumed a lively tone reminiscent of other years when speculation in antimony was more prevalent. Following the sudden advance of last week, when Cookson's went to 8.25c. and Hallett's 8c., Hungarian grades advanced accordingly and transactions in that class of antimony were made at 7.50c., which was $\frac{1}{2}$ c. higher than the metal has been selling for in some time. There was a slight recession in Hallett's and Hungarian grades on Saturday and Monday. The prevailing price for Hallett's is about 7.87 $\frac{1}{2}$ c. It might be obtained from some dealers at $\frac{1}{8}$ c. lower than that. The Hungarian grades are from 7.25c. to 7.50c. and Chinese grades are offered at around 7.50c. to 7.75c.

Metals, St. Louis, January 16.—Lead is quiet, at 4.35c. to 4.37 $\frac{1}{2}$ c. Spelter is stronger and held at 5.40c. to 5.45c., both at East St. Louis. Zinc ore is quoted at \$40 to \$43 per ton, Joplin base. With favorable weather the output will be increased. Tin is higher, quoted at 40.85c. per pound; antimony (Cookson's) stronger, at 8.60c.; lake copper weaker, at 13.10c.; electrolytic, 12.98c., all at St. Louis. The demand for finished metals is gaining in volume and a feature is the increase of business with railroads and railroad supply houses.

Metals, Chicago, January 17.—A fair amount of business is being done, principally for spot or prompt delivery. Casting copper in second hands has been selling recently a shade below the figures maintained by the leading producers, but there has not been enough of this business done as yet in Chicago to establish the market at a lower quotation. Tin is being purchased only for immediate requirements, but is quoted higher. Spelter is dull, with no change in the price. We quote Chicago prices as follows: Casting copper, 12 $\frac{1}{2}$ c.; lake, 13c., in carloads, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{8}$ c. higher; pig tin, carloads, 41 $\frac{1}{2}$ c.; small lots, 43c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10 $\frac{1}{4}$ c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12 $\frac{1}{4}$ c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10 $\frac{1}{2}$ c.; yellow brass, 9c.; lead pipe, 4 $\frac{3}{8}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter No. 1, 26c.; tin foil, 30c.; block tin pipe, 33c.

Iron and Industrial Stocks

NEW YORK, January 18, 1911.

Another week of firm and advancing prices is to be chronicled, although transactions have been light. The range of prices on active iron and industrial stocks since Wednesday of last week and Tuesday of this week was as follows:

Allis-Chalm., com....	7 $\frac{3}{4}$ - 8	Pressed St., pref....	93 - 94 $\frac{1}{2}$
Allis-Chalm., pref.....	28	Railway Spr., com....	31 - 33
Beth. Steel, com....	29 - 30 $\frac{1}{2}$	Republic, com....	31 $\frac{1}{4}$ - 32 $\frac{1}{2}$
Beth. Steel, pref....	50 $\frac{1}{2}$ - 60	Republic, pref....	93 - 94 $\frac{1}{2}$
Can., com.....	9 - 9 $\frac{1}{2}$	Sloss, com.....	51 - 51 $\frac{1}{2}$
Can., pref.....	77 $\frac{1}{4}$ - 79 $\frac{1}{2}$	Pipe, com.....	15 - 16
Car & Fdry, com....	51 - 53 $\frac{1}{2}$	Pipe, pref.....	50 - 51
Car & Fdry, pref.....	118	U. S. Steel, com....	73 $\frac{3}{4}$ - 78 $\frac{1}{4}$
Steel Foundries....	44 - 46	U. S. Steel, pref....	117 $\frac{1}{2}$ - 118 $\frac{1}{2}$
Colorado Fuel....	31 $\frac{1}{4}$ - 33	Westinghouse Elec.	65 $\frac{1}{2}$ - 67
General Electric....	149 $\frac{1}{2}$ - 152	Va. I., C. & Coke.....	49 $\frac{1}{2}$
Gr. N. ore cert....	57 $\frac{1}{2}$ - 58 $\frac{1}{2}$	Am. Ship. com.....	75
Int. Harv., com....	112 $\frac{1}{4}$ - 114	Chi. Pne. Tool....	41 - 42
Int. Harv., pref....	123 - 123 $\frac{1}{2}$	Cambria Steel....	44 - 45
Int. Pump, com....	40 - 41 $\frac{1}{2}$	Lake Sup. Corp....	28 $\frac{1}{2}$ - 29 $\frac{1}{2}$
Int. Pump, pref....	84 $\frac{1}{2}$ - 85 $\frac{1}{2}$	Pa. Steel, pref.....	106 $\frac{1}{2}$
Locomotive, com....	38 $\frac{1}{2}$ - 40 $\frac{1}{2}$	Waukegan.....	93 $\frac{1}{2}$ - 10 $\frac{1}{2}$
Locomotive, pref....	110 - 110 $\frac{1}{2}$	Crucible St., com....	12 - 12 $\frac{1}{2}$
Nat. En. & St., com....	17	Crucible St., pref....	74 - 76
Pressed St., com....	30 $\frac{1}{2}$ - 32 $\frac{1}{2}$	Harb.-W. Ref., com.	33 $\frac{1}{2}$ - 34

Dividends.—The American Steel Foundries has declared the regular quarterly dividend of $1\frac{1}{4}$ per cent., payable February 15.

Notes on Prices

Rope.—The demand continues along moderate lines, being commensurate with the requirements of the trade. Manufacturers are looking forward to a larger general demand for cordage by the middle of February, while others are expecting it earlier. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8 $\frac{3}{4}$ c. to 9 $\frac{1}{4}$ c. per pound; second grade Manila, 7 $\frac{3}{4}$ c. to 8 $\frac{1}{4}$ c. per pound; hardware grade, 7 $\frac{1}{4}$ c. to 7 $\frac{3}{4}$ c. per pound; pure sisal of the highest grade, 6 $\frac{3}{4}$ c. per pound; second grade, 6 $\frac{1}{4}$ c. per pound; jute rope, $\frac{1}{4}$ -in. and up, No. 1, 6c. to 6 $\frac{1}{4}$ c. per pound; No. 2, 5 $\frac{1}{2}$ c. to 6c. per pound.

Linseed Oil.—A reduction in the estimates of the Argentine flaxseed crop resulted in the world's seed markets advancing beyond the former basis of oil prices, and an increase of 1 cent. per gallon in the price of raw oil followed. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
State, raw.....	94
City, raw.....	94
Linseed, in lots less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon.	
Spirits Turpentine. —The market has advanced at this point in sympathy with higher prices at Savannah, where consumers are paying a higher price owing to the shortage of stocks and light receipts. New York quotations in five-barrel lots are as follows:	
In oil barrels.....	85 $\frac{1}{2}$
In machine barrels.....	86
Less than 5 bbl. lots, 1 cent advance per gallon	

The Machinery Markets

Inquiries for machinery are coming in more freely in a number of machinery markets. A good single tool business is being done in New York, where automobile manufacturers are buying for replacements. Export business is excellent in that market, as well as in New England, where there are also indications that the settlement of the railroad rate question will result in some good railroad buying. Machine tool makers in Philadelphia report a better demand. Some good purchasing is expected from the electric railroads in the Pittsburgh market. Reports from Cleveland indicate an improvement in the automobile trade, and business is steadily improving in Cincinnati. The Kansas City & Southern Railroad is reported to have closed an order in St. Louis for \$75,000 worth of tools, the bulk of the business being placed with a New York machinery firm. The railroads are buying quietly in Chicago, and the International Harvester Company has purchased about \$80,000 worth of tools in that market. Railroad business is better in the Farther Central West. On the North Pacific Coast business in the metal working industries is reported to be in a flourishing condition and there is a big demand for power equipment.

New York

NEW YORK, January 18, 1911.

Inquiries are coming out in better volume in the New York market and most of them are of a nature indicating that they will result in buying in the near future. There is one small list out which is the forerunner of a larger inquiry. Some good sales were made by local dealers during the week to automobile manufacturers, and three railroads placed orders for single tools to be installed in the place of equipment that is antiquated. The demand in this market covers a general line of machinery and business is pretty well scattered. Foundrymen who cater to the machinery trade are doing a better business and the market has taken on an encouraging tone all round. The call for second-hand equipment continues excellent and good prices are being obtained for used machines.

The Delaware & Hudson Railroad Company has applied to the Public Service Commission of New York for permission to issue \$7,000,000 worth of bonds, part of which will be used for the erection of new car shops at Watervliet, N. Y. The buildings there will include a locomotive repair shop, 275 x 300 ft.; a blacksmith shop, 100 x 300 ft.; boiler and tank shop, woodworking shop, car repair shop and a testing laboratory. The company also proposes to build a large cold storage plant and round house at Carbondale and a coal transfer plant at Glenville.

The Simms Magneto Company, 1780 Broadway, New York, has issued a list covering part of the mechanical requirements for its plant at Watsessing, N. J. The factory, construction work on which is well under way, is to be 150 x 300 ft. in size. It is understood that the company proposes to spend about \$30,000 and the list now before the trade calls for expenditures amounting to perhaps \$5000. Bids on the remainder of the machinery requirements will be asked in a few days.

The Wright Piano Company, 485-489 Greenwich street, New York, is having plans prepared by William A. Tilton, 76 Montgomery street, Jersey City, for a five-story factory building, 75 x 90 ft., to be erected at Johnson and Halliday streets, Jersey City. Charles W. Wright is president of the piano company. None of the necessary machinery equipment has as yet been purchased.

The plant of the New York Motor Boat Company at City Island, N. Y., was destroyed by fire January 16. The company occupied a large building and all of its manufacturing equipment, together with 20 complete motor boats, was destroyed.

The New York Central Railroad Company has completed plans for the construction of a plate girder bridge 800 ft. in length over the Oswego River at Oswego, N. Y., the estimated cost of which is \$125,000.

The Geer Hydroelectric Company, Albion, N. Y., has awarded contract to Sutherland & Kelly, Troy, N. Y., for construction of a 41-in. steel flume to convey water from Smart Pond to a power house on Burden Pond, to provide power for operating mills in Albion.

The construction of a garbage disposal plant is under consideration by the Board of Village Trustees, Lestershire, N. Y., and bids will soon be asked for.

The Thurstone Moving Picture Machine Company, Jamestown, N. Y., has been incorporated to manufacture moving picture apparatus and supplies. The incorporators are C. A. Johnson, L. L. Thurstone and A. Venman, all of Jamestown. The capital stock is \$50,000.

The Marcellus & Otisco Lake Railway Company, Jno. Stewart, manager, will receive bids February 1 for the construction of a three-story concrete factory and power building, 100 x 250 ft., which it will erect at Syracuse, N. Y.

About \$10,000 worth of machinery and equipment will be installed.

The Greyhound Motor Company has been incorporated at Buffalo, N. Y., with a capital stock of \$50,000, to manufacture motor vehicles, engines, meters, &c. W. C. Chadeayne, G. A. Getter and F. G. Baker are the incorporators. The company has established works and offices at 1443 Niagara street, in the Ross Mfg. Company's building.

Chicago

CHICAGO, ILL., January 17, 1911.

The Chicago machinery market shows a little improvement the past week, although the activity is not yet broad enough to keep all the dealers busy. There is quite a notable improvement in miscellaneous inquiry and a fair amount of this class of business is being done. There has also been some railroad buying of a quiet character, but not a very large amount. Altogether the trade shows improvement over December, but there is still a good deal of hesitation among buyers and a broad market is not expected until difficulties in the railroad and financial world are cleared up.

The Kansas City Southern is closing this week on a list of tools for new shops at Shreveport, La.

The Kansas City Terminal is in the market for a small list of tools on which the inquiries seem to have been scattered, as dealers have the opportunity to bid only on inquiries which come back to them on lines which they control.

The Big Four Railroad has bought two boring mills and a number of other tools for its shops at Beach Grove, Ind.

The International Harvester Company, Chicago, has made purchases of machine tools amounting to about \$80,000 for shops at Milwaukee, Wis.; Springfield, Ohio, and other plants of this company. The inquiries of this company are usually sent direct to the manufacturers, but a good share of the business was taken by Chicago dealers. Included in the purchases were 15 or 20 upright drills, five radial drills and a number of lathes.

The Marcus Bridge & Iron Works, Peoria, Ill., has been incorporated with \$50,000 capital stock to manufacture and deal in structural and ornamental iron and steel work. The incorporators are James V. Marcus, John J. Marcus and Katherine Marcus.

The Great Lakes Mfg. Company, North Chicago, Ill., suffered a loss by fire on the night of January 4, estimated at about \$15,000. The company manufactures hardware specialties and will rebuild its plant at once.

The Johnson-Bevington Company, Chicago, has been incorporated with \$10,000 capital stock to deal in machinery, tools and supplies. The incorporators are M. A. Johnson, B. L. Bevington and F. B. Macomber.

The Bentley-Snyder Company, North Aurora, Ill., has been incorporated with \$75,000 capital stock to manufacture and deal in metals, electricity and electric furnace products. The incorporators are Wilton Bentley, Frederick T. Snyder and James V. Cunningham.

The Farrell, Kemp & Gushe Company, Joliet, Ill., has been incorporated with \$12,000 capital stock to do general sheet metal work, furnace heating and hardware business. The incorporators are Clayton S. Farrell, William B. Kemp and Henry G. Gushe.

The Vellie Engineering Company, Moline, Ill., has been granted a license to incorporate with \$200,000 capital stock. The company will operate a new factory recently erected at a cost of \$160,000. Electric motors, engines and automobiles will be manufactured.

The plant of the Aiton Brick Company, Alton, Ill., was destroyed by fire January 7. There were six buildings,

THE MACHINERY MARKETS

some of which were equipped with expensive machinery. The loss exceeds \$100,000.

The Ehman Mantel & Door Works, Decatur, Ill., including \$75,000 worth of new machinery just installed, was burned January 8. The loss is estimated at \$200,000.

The Earlville Electric Light & Ice Company, Earlville, Ill., has been incorporated, with a capital stock of \$25,000. The incorporators are John A. Dupee, C. A. Frank, A. C. Sadler and others. The company will engage in the manufacture of electricity, gas and steam heat and ice.

The Illinois Shale Tile Company, Coal City, Ill., has been incorporated, with a capital stock of \$75,000. The incorporators are D. A. Haeger, John K. Newhall and John M. Raymond. The company will engage in the manufacture of brick, tile and other clay products. Construction will begin at once.

The H. V. Finkelstein Machinery & Iron Company, Peoria, Ill., has been incorporated. The capital stock is \$50,000. The incorporators are H. V. Finkelstein, I. R. Meyers and Joseph A. Weil.

The plant of the Joliet Wheel Mfg. Company, Joliet, Ill., was burned January 13.

Philadelphia

PHILADELPHIA, PA., January 17, 1911.

Little has developed during the week to stimulate the market for machinery or general equipment. In many cases a better business has been done than during the corresponding period last month. Buying during the week has been confined to single tools or small lots, for the most part required for prompt delivery. Inquiries of any size are still very scarce, little coming from the railroads or industrial establishments; while some of the latter have taken on considerably more business, particularly locomotive and car builders, present equipment will in nearly every case more than take care of the work in hand. Manufacturers of machine tools, with whom new business was very quiet during December, report a trifle better demand, although in practically all lines purchases have been very irregular. Engine builders are fairly active, and while there is a moderate amount of new business pending, orders close slowly. A moderate business continues to be transacted in special tools. Makers of pulleys, hangers and general supplies report a decided improvement in the demand since the first of the year.

Steel casting makers have been taking a shade more business, but the demand for gray iron castings for machinery and tools continues quiet.

The Lackawanna Cold Storage Company, Scranton, Pa., has taken bids, through Edward Langley, architect, Connell Building, that city, for a seven-story brick and steel fireproof cold storage plant. Bids for the construction of the building were due January 7.

The Cunningham Piano Company contemplates the erection of a five-story brick and concrete addition to its manufacturing plant at Fiftieth street and Parkside avenue. Plans are being prepared by J. J. Hill, architect.

The Standard Pressed Steel Company notes quite an improvement in the demand for pressed steel shaft hangers and similar equipment. The demand from New England and the West shows the most consistent gain. An increased number of orders have been taken for export, several large ones coming from Australia, India, England and Canada. So far this month local orders taken exceed the volume of those received during the entire month of January, 1909. The company has completed improvements to its plant under way last fall and is running all departments full capacity, with a marked increase in production.

Ballinger & Perrot, architects and engineers, received bids for the erection of a brick and concrete garage, four stories, about 105 x 120 ft., for Douredoure Brothers, on January 17.

An application will be made for a charter under the laws of Pennsylvania on January 26 for the Delaware River Railway Equipment Company, Chester, Pa., to engage in the manufacture and sale of railroad supplies. W. I. Hibbs, Chester, Pa., is the solicitor.

Bids are being taken for the erection of a three-story warehouse, 40 x 115 ft., at 2107-2109 Vine street, Philadelphia, to replace that formerly occupied by the Haynes-Thompson Company, plumbers' supplies, which was recently destroyed by fire. William Anderson, 108 South Twentieth street, is the owner.

D. T. Homan, vice-president of the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., and sales representative in the Pennsylvania territory, stated that, while business was dull during December, a decided improvement since the first of the year is to be noted, a number of pending contracts having been closed, including one for four

electric driven floor grinders for the new Easton, Pa., plant of the Treadwell Engineering Company. Orders have also been taken for a No. 7 floor grinder for the Hendrick Mfg. Company, Carbondale, Pa.; 15 No. Q buffing lathes for the United States Aluminum Company, New Kensington, Pa.; one No. 7 floor grinder for the American Steel Foundries, Alliance, Ohio, and a 100-in. automatic knife grinder for the Diamond Rubber Company, Akron, Ohio.

The Newton Machine Tool Works, Inc., reviewing the past year's business, states that during the first four months business averaged far in excess of normal; there was a steady decrease during the second half, except in November, when a gain was reported, followed by a sharp falling off in December. On an average, however, shipments during 1910 were 10 per cent. better than the best previous year and the volume of business was double that in 1909. Many improvements were made to the plant during 1910, greatly facilitating productive capacity. A complete rearrangement of machine tools in the plant is further contemplated, as well as purchases of additional equipment, which, together with a proposed modernizing plan, will increase the plant capacity 50 per cent. Machines shipped during the past year were about equally divided between bridge, locomotive, structural and general machine shop and steel foundries, covering horizontal chord boring machines, vertical eye bar boring machines, cold saw cutting-off machines, horizontal milling machines, boring, drilling and milling machines, slotting machines, &c. Heavy export shipments were made of cold saws for Japan, milling machines for Australia, and portable slotting machines, boring machines and milling machines to Germany. A greater disposition to specialize in the types of machines built by this company is noted. This is specially true of cold saw cutting-off machines, which are now manufactured in certain types in lots of 25.

Cleveland

CLEVELAND, OHIO, January 17, 1911.

The local machinery market is still quiet, but the outlook is more favorable, as both dealers and builders of machine tools report some improvement in the volume of inquiries since the first of the year. Sales by dealers during the week were limited largely to small lots of medium sized and small tools and single tools. Most of this business comes from small concerns that are opening new shops. A number of inquiries that have been pending for several weeks have not yet resulted in the placing of orders, but business is expected to develop from some of these before the end of the month. Crane builders report an improvement in inquiries. Manufacturers of sheet metal products are fairly busy, reporting a good volume of business in some of their departments. Reports indicate an improvement in the outlook in the automobile trade and a good year is expected. Business is somewhat quiet with makers of automobile parts, a large share of manufacturers not yet having placed orders for their requirements in these lines. The general manufacturing situation in metal working lines looks brighter than for a number of weeks and manufacturers feel that there will be a steady improvement in business.

In the foundry trade the demand is still somewhat light, but there has been an improvement in orders since the first of the year.

The Chisholm & Moore Mfg. Company, Cleveland, which recently acquired a portion of the plant formerly occupied by the Garry Iron & Steel Company, adjoining its own plant, will shortly fit it up for an addition to its malleable iron foundry, increasing the capacity of that department 66 per cent. The company will install modern sand blast equipment, for which it is now in the market. One new 15-ton malleable furnace will be built. The company reports that it is well filled with work in its malleable castings department and that it is getting a good volume of orders for hoists.

The plant of the Canton Mfg. Company, Canton, Ohio, has changed hands, the ownership having been acquired by the Multiplex Filing Device Company. The company is now being reorganized and its capital stock will be increased to \$200,000. The name of the Canton Mfg. Company will be retained. The new company will make a specialty of architectural sheet metal products. It will also make metal filing cabinets and some of the lines formerly made by the Canton Mfg. Company, including metal ceilings, skylights, ventilators, cornices and fireproof doors and windows. A number of changes are being made to the plant. A machine shop has been put in and a woodworking plant will be installed, for which some woodworking machinery will be purchased.

The Union Metal Mfg. Company, Canton, Ohio, has completed plans for the erection of a new plant, one-story, 48 x 156 ft., of tile construction, and an office building, 30 x 37 ft.

THE MACHINERY MARKETS

The old plant will be used as a finishing and shipping department. Some new equipment will be purchased, including a shaper, lathe and press and small sheet metal working tools. The company makes metal columns and ornamental lamp standards for streets and building entrances.

The Berger Mfg. Company, Canton, Ohio, reports a very good demand for metal furniture and prospects for a good year's business in all of its departments. While this company has no plant additions under consideration for the present year some shears, brakes and other new equipment will probably be added.

An ice making plant will be built in Ashland, Ohio, early this season, with a daily capacity of 15 tons. A. R. Eyster of Loudonville, Ohio, is one of the men interested in the project.

The Pulverizing Plow Company, Wellington, Ohio, has been incorporated with a capital stock of \$4000 to manufacture plows. Among the incorporators are Freeborn Bedee, E. F. Garrett and John W. Wright.

The Canton Art Metal Company, Canton, Ohio, expects shortly to enlarge its plant to provide more room for its metal furniture department. The company reports a large amount of work on hand in this department, this including several large contracts for complete equipment for new court houses.

Sealed proposals will be received by the Secretary of the Director of Public Safety, Cleveland, January 26, for a rectangular steam pressure disinfector and sterilizer for the municipal tuberculosis sanitarium.

The Bottomley Machine Company, Alliance, Ohio, will build a new plant 36 x 60 ft. as soon as a site is secured.

The plant of the Snyder Mfg. Company, Wapakoneta, Ohio, maker of furniture and mill work, was destroyed by fire January 5, causing a loss of \$25,000. The engine, boilers and considerable wood working machinery were rendered worthless. It is expected that steps will be taken at once to rebuild the plant.

The Kelly Reamer Company, Cleveland, expects to shortly add to its machine tool equipment, the present capacity of its plant being inadequate to meet the demands of its growing volume of business.

The Delphos Mfg. Company, Delphos, Ohio, is planning the establishment of a branch galvanizing plant, having under consideration a site in Knox, Ind., and one or two other points near Chicago.

The Buckeye Ice & Coal Company, Findley, Ohio, is contemplating the erection of an artificial ice plant.

The Bradner Machine & Foundry plant, Bradner, Ohio, has been purchased by W. C. Speaker, who, it is stated, will organize a company for the manufacture of a gas generator for use particularly in the country districts and by farmers.

The Kenton Gas & Electric Company, Kenton, Ohio, has applied for an extension to its franchise, as it contemplates making extensive improvements to its plant.

Cincinnati

CINCINNATI, OHIO, January 17, 1911.

Inquiries for machine tools are coming in freely, but actual business booked is rather light, although it shows some improvement over the first week in January. The large inquiry, which is principally from the general trade, shows that many tools are needed all over the country. Local banks are reported to be loosening up on loans, and if this move is general some improvement in the business situation may be hoped for soon.

Machinery dealers are having practically the same experience as the manufacturers and report many requests received for prices on different tools, but few orders developing. However, a few milling machine and smaller sized lathes have been shipped lately.

Second-hand dealers do not note any marked improvement, although some sales of woodworking machinery were recently reported. The situation with the foundries is unchanged.

The Cincinnati Branch, National Metal Trades Association will hold its regular annual meeting March 2. Officers for the ensuing year will be elected and arrangements consummated for attending the national convention that will be held in New York in April.

Robert Wuest, commissioner of the National Metal Trades Association, and H. C. Hunter and J. M. Manley, respective secretaries of the New York and Cincinnati branches, left Cincinnati January 16 for a lecture tour through the central West. The purpose of the trip is to stimulate interest in the work of the National Association, especially that part of it having in view the proper development of industrial education along the lines followed by the Cincinnati Continuation School.

The Paul Stewart Company is a new incorporation in Cincinnati, with an authorized capital stock of \$50,000, to

deal in electrical and power apparatus. The company has acquired a five acre site at Redbank, a Cincinnati suburb, on which will be erected warehouses and shop buildings. Work has already commenced on one steel and concrete structure, which will be 50 x 100 ft. Paul Stewart, formerly with the John A. Stewart Electrical Company, is president of the new company; George Gano, vice-president and treasurer, and Colter Rule, secretary.

The Lexington Machine Works, Lexington, Ky., is a new incorporation with \$12,000 capital stock. The incorporators are E. B. Drake, Y. Alexander, S. E. Drake and J. P. Glenn.

Schumacher & Boye, Cincinnati machine tool builders, report a good volume of inquiries coming in and also a fairly satisfactory number of orders booked recently. Their plant is running on full time.

The National Rolling Mill Company, Mansfield, Ohio, has increased its capital stock from \$100,000 to \$150,000.

On January 10 fire practically destroyed the Chamber of Commerce Building, Cincinnati. Tentative plans are already under way for erecting a large steel building on the old site.

A fire destroyed one of the car barns of the Cincinnati Traction Company, Brighton station, January 12. The loss is estimated at \$20,000 and rebuilding plans are reported to be already under way.

The Saunders Faucet Company has been incorporated at Elyria, Ohio, with \$10,000 capital stock to manufacture faucets and valves. The incorporators are H. W. Ingersoll, H. A. Dyman, F. Beebe, Chas. B. Tucker and L. J. George.

The Fairmont & Clarksburg Traction Company, Fairmont, W. Va., has commenced work on a one-story car repair shop, 80 x 80 ft., which will be of steel and brick construction.

The Toledo Electric Welder Company, Cincinnati, has recently received a large number of domestic orders for its welding machines, and also reports some unsolicited export business.

The Roberta Coal Company, Ashland, Ky., to mine coal and manufacture coke, was recently incorporated under West Virginia laws, with \$100,000 capital stock. The incorporators are John F. Hager, L. S. Wilson, B. E. Whitman, S. S. Willis and W. E. Eldridge, all of Ashland.

The Clark Gear Company, Elkins, W. Va., is a new incorporation with a nominal capital stock of \$3000 to manufacture reverse gears. P. E. Clark, R. Chaffey, Mary Clark and L. C. Dyer, all of Hambleton, W. Va., are named as incorporators.

It is reported that the Toledo Biscuit Company, Toledo, Ohio, will build a five-story reinforced concrete factory to take the place of its structure recently destroyed by fire.

The Ford Plate Glass Company, Rossford, Ohio, has plans completed for several new buildings.

The Limbert Mfg. Company is a new incorporation at Springfield, Ohio, with \$20,000 capital stock. The incorporators are O. C. Clark, C. L. Steele and S. H. Limbert. The company will manufacture a new flue cleaner.

The Cincinnati Wood Preserving Company, Cincinnati, has been incorporated with \$20,000 capital stock. The company owns a plant in the western part of the city, to which some extensive additions are planned for next summer. Its officers are: H. H. Beers, president; F. W. Cherrington, general manager, and J. M. Stirnkorb, secretary and treasurer.

Indianapolis

INDIANAPOLIS, IND., January 17, 1911.

The Hardegan Axle Company, Indianapolis, has been incorporated, with \$10,000 capital stock, to manufacture automobile parts and accessories. The directors are E. C. Hardegan, Elmer W. Stout and M. H. Miller.

The purchasers of the Parry Auto Company, Indianapolis, which went into the hands of a receiver, have reorganized as the Motor Car Mfg. Company, with \$75,000 capital stock. The directors are William C. Teasdale, Jr., formerly vice-president of the Parry Company; Fred C. Dorn, Wayne K. Bromley, G. O. Simon and Frank H. Teagle. The purchase price of the Parry Auto Company was \$50,000. G. O. Simon, who has been connected with an automobile company in Dayton, Ohio, will be the manager. About 1000 cars will be made this season. The company will give its first attention, however, to filling orders for parts that have accumulated during the receivership.

Hentherington & Berner, iron manufacturers, Indianapolis, have increased their capital stock from \$27,000 to \$81,000.

W. W. Prigg has been appointed receiver for the Newcastle Automatic Wrench Company, Newcastle, Ind., on petition of one of the dissatisfied stockholders.

The Evansville Sand & Gravel Company, Evansville, Ind., will expend \$50,000 in building a dock of concrete, 500

THE MACHINERY MARKETS

ft. long, on the Ohio River front. It will be used largely for transferring Pittsburgh coal from boat to rail.

The La Porte Meter Company, La Porte, Ind., has been incorporated, with \$150,000 capital stock, to take over the unincorporated business of the La Porte Gas Meter Company. No change in management or improvements are contemplated.

The Peru Electric Company, Peru, Ind., incorporated with \$100,000 capital stock, has acquired the property at receiver's sale of the Peru Electric Mfg. Company. Extensive improvements have been made to the plant and additional machinery installed.

The Electric Light & Power Company of Lebanon, Ind., has increased its capital stock \$50,000.

The Advance Auto & Machine Company, Evansville, Ind., has been incorporated, with \$10,000 capital stock, to manufacture automobiles. The directors are H. Kollker, J. W. Wheeler and J. Diers.

The Seymour Public Service Company, Seymour, Ind., has enlarged its purposes to include the right to deal in gas and electrical appliances. The capital stock has been increased from \$100,000 to \$250,000.

The American Seeding Company is adding another factory building to its plant at Richmond, Ind. A large warehouse was recently completed and an office building may be erected in the spring. Over 1000 men are employed and many departments are working overtime.

Since the opening of the new year the Vincennes Bridge Company, Vincennes, Ind., has received contracts to the amount of \$80,000. In 1910 the company secured 1200 contracts, all that it was able to take care of. It is considering the advisability of doubling its capacity.

New England

BOSTON, MASS., January 17, 1911.

The machinery builders report an increasing foreign demand, and in a few cases works are running normal because of orders received for export. Dealers find the situation unchanged. In spite of the immediate dullness of trade, manufacturers are making vigorous efforts to perfect their forces of skilled workmen. The local press of the New England centers contain more than a few requests for good men, specialists seeming to be in best demand. The release of high class mechanics by the automobile builders of the Middle West has been taken advantage of in this section, where the scarcity of good labor has been keenly felt. Apparently, the machine tool builders are preparing themselves for much different conditions of business, which seem to them to be not very distant.

The Trumbull Electric Mfg. Company, Plainville, Conn., manufacturer of electrical supplies, has completed plans for large additions to its factory. The main buildings will be four stories, one 40 x 106 ft., the other 63 x 72 ft., an elevator tower 10 x 25 ft., and a vault 19 x 23 ft. A new boiler house will be 43 x 44 ft., and an enginehouse room 25 x 40 ft. Skylights, sprinkler system, two freight elevators and an electric system will be installed. The power equipment has been contracted for.

The Arcade Malleable Iron Foundry, Worcester, Mass., manufacturer of malleable iron castings, will build an annealing room 50 x 100 ft. The business has grown rapidly, until additional facilities have become imperative.

The International Radiator Company, New Haven, Conn., with works at 453 Chapel street, has incorporated with a Connecticut charter, to manufacture automobile radiators and do a general repair business. The incorporators are Salvatore Gargiulo, Louis Scoppa, Oreste Balzano, Stefano Campagnano, Achille Capecelatro, Girolamo Arcucci, Giulio Cioffi, Luigi Esposito, Louis Rubano and Peter Balzano, all of New Haven. The company states that it is not at present in the market for equipment.

The sporting goods factory of Draper & Maynard, Plymouth, N. H., was burned January 16, with a loss of \$125,000.

The Frisbie-Heft Motor Company, Middletown, Conn., has changed its name to the Frisbie Motor Company.

The F. E. Reed Company, Worcester, Mass., is putting on the market a new line of heavy duty, double back geared engine lathes of which the 18-in., 20-in., 22-in. and 24-in. sizes are ready and the 27-in. and 30-in. machines will follow later. They are designed especially for railroad shops and other plants requiring heavy work.

The National Printing Machinery Company, Inc., 167 Hapgood street, Athol, Mass., is in the market for a planer 36 x 54 in. by 10 ft., with two heads, and a Brown & Sharpe, or other make as good, automatic gear cutter for bevel and spur gears up to 16 in. in diameter. In explanation of the planer requirement the company states that the unusual width is demanded by the work, but that the ma-

chine need be no heavier than the standard 18 x 18 in. by 10-ft. type. Second hand tools will be considered.

The Boston & Maine Railroad officially announces that the great repair shops for which \$2,500,000 has been appropriated will not be located at East Somerville, Mass., where the running repair shop is nearing completion. The decision is to locate the larger works somewhat farther from Boston on the system, and a site near Lowell has been considered. No decision as to location has been made, however.

A power project of unusual magnitude is proposed for the Moosehead Lake waters, by a syndicate headed by Chase & Harriman, Inc., Boston, who promoted the Connecticut River Power Company, which is now supplying power in Central Massachusetts. The Maine plans call for the development of about 100,000-hp. which, it is stated, will be distributed within the limits of that state.

The West Haven Mfg. Company, New Haven, Conn., manufacturer of hack saw blades and machines has increased its capital stock from \$50,000 to \$100,000.

Derby & Hall, Bellows Falls, Vt., is erecting an addition which will house machinery for the manufacture of scythe snaths or handles.

The stove manufacturing business of Oscar G. Thomas, Taunton, Mass., has been incorporated as the Oscar G. Thomas Company, with capital stock of \$50,000. The incorporators are Oscar G. Thomas, Howard W. Thomas and Richard W. Whitmarsh.

Pittsburgh

PITTSBURGH, PA., January 17, 1911.

The Southern Cambria Railway Company, Johnstown, Pa., which was originally intended to be built as far as Ebensburg, is to be completed to that point this year, and the Johnstown Chamber of Commerce is reported to be giving active aid to the project.

In a letter from Morgantown, W. Va., it is stated that plans for a new electric generating plant will soon be put in execution at that place by the Morgantown & Dunkard Valley Railroad Company. J. A. Morgan, the general manager, is also chief engineer and purchasing agent. An extension of the company's system is under consideration.

The Pennsylvania Power Company, which supplies current for motor drive and lighting service in Ellwood City, Wampum, Zelenpole and West Pittsburgh, from a plant at Ellwood City, equipped with Allis-Chalmers steam turbine units, will add to its system a hydroelectric development, having contracted with the Westinghouse Electric & Mfg. Company for two alternating current generators of 600 kw. each, and with the S. Morgan Smith Company for hydraulic turbines of corresponding capacity for operating them. Considerable auxiliary apparatus is also being ordered and more will be required later.

The Carbondale Machine Company, Carbondale, Pa., will install an exhaust steam absorption plant for the Geo. G. Fetter Lighting & Heating Company, Louisville, Ky., to be used in connection with a refrigeration system.

The Carter Iron Company contemplates the construction of a hydraulic power plant in the vicinity of its furnaces at Ivanhoe, Va., to furnish electric current for operating machinery. No definite plans have, however, been approved.

Plans are now stated to be practically complete for the five new buildings to be added to the manufacturing plant of the Westinghouse Electric & Mfg. Company, Pittsburgh, which will be of brick construction, with saw-tooth roofs.

Extensive development work, for which power, timber cutting and other machinery will be needed, is to be entered upon in the spring by the Guyan Lumber Company, recently organized, with \$200,000 capital stock, at Herndon, W. Va.

Additional power equipment, including a battery of boilers, is to be installed at Bluefield, W. Va., by the Norfolk & Western Railway. The present plant building will be enlarged for the purpose.

Advices from Steelton, Pa., are to the effect that the Steelton Light, Heat & Power Company, which now buys current from the York Haven Water & Power Company, is about to erect its own electric generating plant. The present system takes about 1500 kw.

Manufacturers here will bid on the electrical equipment of a large new textile mill, calling for about 2000 hp. in motors, which Lockwood, Greene & Co., Boston, are designing for construction at Greenville, S. C.

It is stated here, without direct confirmation, that a transfer of real estate recently made in this vicinity is for the account of the Linde Air Products Company of Buffalo, N. Y., to be used as the site of a new manufacturing plant.

The Blairsville Foundry Company, Blairsville, Pa., has been incorporated for \$10,000.

It is reported from McKeesport, Pa., that the Home Light Company has been organized there with the object of con-

THE MACHINERY MARKETS

structing an electric plant for public service. Simon F. Loeb, Henry Firestone and Jacob Roth are named as the incorporators.

The Martinsburg Power Company, Martinsburg, W. Va., is arranging for the enlargement of its power plant.

Among contracts recently taken by the Erie City Iron Works, Erie, Pa., for pumping machinery, is one covering two motor driven centrifugal units to be installed in the plant of the Keithsburg Drainage District, Keithsburg, Ill., which has been an object of much interest in engineering circles as a type of many similar projects to be undertaken in the low sections lying along the rivers of the Middle West.

The Union Iron Works, Erie, Pa., is preparing to make an interesting installation in a large public building at Los Angeles, Cal., consisting of marine boilers equipped with oil burning furnaces of the Morrison corrugated type and having the so-called Cyclone fronts for spraying the fuel.

H. J. Koontz, manufacturers' agent and dealer in new and second-hand machinery and equipment, has moved his office to 1102 Farmers' Bank Building, Pittsburgh.

St. Louis

ST. LOUIS, Mo., January 16, 1911.

A good deal of machinery is being figured on, but not many orders are being placed. A few rather heavy tools have been inquired for, but the dull first half of January is not worrying any one, since this is simply repeating history, which shows that people do not get down to machinery purchases until some little time after the turn of the year.

The Kansas City Southern Railway is reported to have just closed an order for about \$75,000 worth of tools, of which the bulk went to a large New York house.

The city is preparing to let contracts for the wrecking of seven solid blocks of buildings to make way for the west side approach for the new municipal bridge. This has resulted in a number of manufacturing concerns having to arrange for new plants.

The railroads are gradually encroaching on the machinery district by buying land for freight house purposes. The most recent purchase is the block on which is located the Fulton Iron Works, by the Burlington.

A new company, to be known as the National Oil Cloth Company of St. Louis, is being organized by leading St. Louis men. It will be incorporated soon, with a capital stock of \$75,000. The factory will be located on the M. A. Seed Dry Plate Company's property on the Wabash Railroad. William Nesbit, who will be the president of the new company, states that machinery for the plant will be ordered at once. The building of the Seed Dry Plate Company, which is to remove to Rochester, N. Y., has been leased, with an option for its purchase.

The Bates County Gas Company, Carthage, Mo., has been incorporated. The capital stock is \$50,000. The incorporators are T. W. Connelly, J. S. Connelly and J. C. Gibson.

The Vesuvius Mining Company, Webb City, Mo., will erect a 300-ton mill which will cost from \$10,000 to \$15,000.

Detroit

DETROIT, MICH., January 17, 1911.

One of the most interesting of recent developments in the machinery trade is the announcement that the National Boat & Engine Company, organized at Muskegon, Mich., last fall, has formally taken over the plants of the Racine Boat & Mfg. Company of that place, the Truscott Boat Mfg. Company, St. Joseph, Mich., and the Pioneer Boat & Pattern Company, Bay City, Mich., as well as the Pope Boat Company, Fond du Lac, Wis.; Outing Boat Company, Ashland, Wis.; Inland Lakes Boat Company, Lake Geneva, Wis.; Shell Lake Boat Company, Shell Lake, Wis.; Western Launch & Engine Works, Michigan City, Ind., and others comprised in the combine which are located at a distance. The aggregate buying of equipment and supplies for the account of these various concerns each year has been very considerable. The headquarters of the company, having been established at Chicago, there will probably be corresponding changes in the basis of purchasing.

The Chalmers Detroit Motor Company, Detroit, is arranging for the construction of a new boiler plant as a part of its plan for a more comprehensive power system for the works.

The city of Flint, Mich., has retained a consulting engineer and will proceed at once with the execution of the plans recently outlined for a new pumping station, filtration plant and other water works improvements.

The manufacturing facilities of the Grand Rapids Book Case Company, Grand Rapids, Mich., are to be enlarged,

an increase in the company's capital having recently been provided in order to keep pace with the growth of the business.

Harry E. Perrault and Wm. J. Brand have organized the Simplex Differential Clutch Company and incorporated it for \$25,000, to operate a plant in Detroit. The mechanism is for use on automobiles.

It is reported from Lansing, Mich., that the Kerff Company of that place will build a machine shop and plating establishment. Further details are lacking.

The Hupp Motor Car Company, Detroit, has doubled its capital stock.

John Beyster, Detroit, is having plans drawn for a two-story plant, 50 x 200 ft., to be used in the manufacture of motor cars and parts. Spier, Rohns & Gehrke, Detroit, will have charge of the construction.

A. F. Bartlett & Co., Saginaw, Mich., have kept their foundry and machine shops busy during the past year on orders from all parts of the country, and the outlook for the future is good. Lath mill machinery is their specialty.

The Eastern Michigan Power Company will build a dam across the Au Sable River, near Saginaw, Mich., and install hydraulic turbines, direct connected to alternating current generators, for the purpose of furnishing commercial power to woodworking plants and other industrial establishments in Saginaw and Bay City and vicinity.

The Electric Welding Company, Detroit, will provide enlarged shop facilities, probably by the erection of a new plant.

Plans have been completed and work will start early in the spring on the new four-story factory building of the Continental Motor Mfg. Company, Muskegon, Mich., the designing of which has been in the hands of Robinson & Campau, Grand Rapids, Mich. Communications are best addressed in their care.

The new Lansing & Grand Lodge Railroad, Lansing, Mich., construction of which will begin in the spring, has decided not to erect its own power plant.

Manufacturers and dealers in this district will figure on the equipment of a new plant for the H. W. Clark Company at Mattoon, Ill., for the manufacture of various appliances used in water distributing systems, including meter boxes. Brassworking tools are reported to be among the requirements.

A two-story and basement factory, 125 x 130 ft., is to be built at Hastings, Mich., by the Barber Chair Company. The equipment will comprise power and woodworking machinery.

The Monroe Body Company, Detroit, which was organized some time ago by R. F. Monroe, Pontiac, Mich., to take over the Detroit and Pontiac plants of the Yeomans Body & Box Company, is planning to enlarge the Detroit factory and provide facilities for the production of metal bodies for motor cars. J. M. Parker, Pontiac, is secretary of the company, and Charles R. Talbot of the National Bank of Commerce, in Detroit, is treasurer, Mr. Monroe being the president and general manager.

From East Tawas, Mich., it is reported that Chief Engineer L. O. Pettys of the Detroit & Mackinac Railway will start work on the line to the new industrial town of Calcite, Mich., thereby opening up an important field to manufacturing enterprises.

Lowrie & Robinson, River Rouge, Mich., contemplate making a large addition to their plant.

Fuller Claffin of Lansing, Mich., is the principal incorporator of a new company, known as the Steel Bar Flanging Company, which it is reported will establish a plant in Detroit. The capital stock is \$25,000, with \$13,000 paid in.

Fritz Beitner, Traverse City, Mich., has organized a company which will remodel the old Beitner saw mill at Beitner Siding, near that place, install new machinery and start operations in the spring.

The Paige-Detroit Motor Car Company of this city has increased its capital stock from \$100,000 to \$250,000.

The Detroit plant of the Chicago Pneumatic Tool Company is working day and night, with orders enough on the books, it is stated, to keep it running for some time ahead, while new business continues to come in freely. The increased facilities about to be provided here, including a shop addition, 92 x 145 ft., will enable a considerably larger output to be maintained.

The Northern Construction Company, Detroit, is reported to have recently awarded contracts for the initial construction work of a hydroelectric plant of 24,000 kw. for the Georgia Power Company, which will eventually be doubled in capacity.

Plans are maturing for the new manufacturing plant to be erected by the Central Boiler & Supply Company, Grand Rapids, Mich.

The public lighting plant at Standish, Mich., operated by the Citizens' Mfg. Company, has been acquired by new interests and will be improved. Its present electrical equip-

THE MACHINERY MARKETS

ment, of 125 kw., consists of Ft. Wayne generators driven from Erie engines.

The Detroit Bridge Company, Detroit, will be prepared in the near future to let contracts for the construction of a new three-story fabricating plant, 220 x 255 ft., which it is arranging to build.

The Seager Engine Works, Lansing, Mich., is proceeding with plans for the extension of its plant.

The Interchangeable Fixture Company, Grand Rapids, Mich., incorporated with \$30,000 capital stock, has secured a plant, fully equipped, which it now has in operation. Some small tools and light machinery will probably be purchased at a later date.

The Lansing & Northwestern Railway will erect a substation at Owosso, Mich. The company has taken over the Owosso & Corunna electric line, which it will operate in conjunction with an interurban line which is now nearly completed, between Lansing and Owosso.

Details of the new steam power plant to be erected by the Eastern Michigan Edison Company, Rochester, Mich., near Amy, Mich., have not been completed.

The Golden Rule Hay Press Company, Kalamazoo, Mich., is negotiating for a site on which it will erect a factory in the near future.

The Leisen & Henes Brewing Company, Menominee, Mich., will rebuild in the spring its plant, which was recently destroyed by fire. About \$50,000 will be expended by the company in buildings and machinery.

Milwaukee

MILWAUKEE, WIS., January 16, 1911.

Business here for the new year is opening up more slowly than had been generally anticipated. At nearly all of the larger manufacturing plants of the city and its suburbs, conditions are generally dull. There are, however, some exceptions to the rule, with the prospect that increasing activity will be visible from now on.

One line which shows up uncommonly well is the sale of refrigerating machinery, including the engines, motors and other power equipment which they usually comprise. Orders recently from the South, Southwest and foreign countries with tropical climates have been liberal.

The dairy and condensed milk industries are also beginning to play a prominent part in the demand for mechanical and electrical equipment. Beginning with the furnaces and boilers, practically all of the plants now being planned or erected are of a thoroughly modern character, with apparatus to correspond. This is a field which machinery houses will find well worth cultivating, at least in Wisconsin and northern Illinois.

The Christiansen Engineering Company, Milwaukee, manufacturer of gasoline engines, compressors, &c., has had plans drawn for a new shop building 65 x 110 ft., to be added to its plant at the Chicago, Milwaukee & St. Paul Railway crossing on Thirtieth St. The business of this company has been steadily expanding, even during the recent dull period, and increased facilities are urgently needed.

Plans for a new wood-working plant, with the most modern equipment, will be proceeded with at once by the Layton Park Woodwork Company, Milwaukee, to replace that burned.

It is reported from La Crosse, Wis., but without direct confirmation, that the new plant of the Reliance Engine & Iron Company, now of Racine, has been definitely secured for that city.

Bids will be taken by the city purchasing agent, Milwaukee, on a motor-driven crusher, conveyor, hoist, &c., for handling clinker at the municipal incineration plant on Jones Island. The engineer in charge has just prepared the necessary specifications.

A new company in which United States Senator Isaac Stephenson, of Marinette, Wis., is reported to be heavily interested, will take measures to construct a large water power plant at Chappie Rapids, to supply electric current to the Marinette & Menominee Paper Company, Marinette, Wis., and other industries in that part of the State, as well as across the river in Michigan. Definite plans for the project have not been worked out, but an engineer will probably be engaged for the purpose shortly.

Boiler capacity aggregating 500 h. p. and power machinery, including an electric generator, will be required in March or April for a milk condensing plant to be built at Elkhorn, Wis., by John Harris and others interested in the Wisconsin Butter & Cheese Company.

A crushing plant 50 x 75 ft., manufacturing building 60 x 80 ft., and an extension of the boiler house will be constructed shortly at the plant of the United States Glue Company, Carrollville, Wis. Some additional equipment will be required.

The Bloomer Electric Light & Power Company, Bloomer,

Wis., which was recently incorporated for \$25,000, will install a plant sufficiently large to supply industrial power as well as lighting service.

A new boiler of 100 h. p. or larger will be installed this spring in the water works plant at Sharon, Wis., where plans for enlarging the building are now being made. The Freeman type is preferred.

Thirty four-cylinder planing machines from the Berlin Machine Works, Beloit, Wis., together with 22 trim saws, two band resaws and a complete line of box-making machinery, will be included in the equipment of the immense new plant which is being built at Bogalusa, La., by the Great Southern Lumber Company. All machinery will be operated by electric motors supplied with current from an exhaust steam turbine plant previously supplied by the Allis-Chalmers Company, Milwaukee.

The Hustisford Electric Light & Power Company, recently organized at Hustisford, Wis., has been granted a franchise for public service and will install the necessary machinery.

The Board of Public Works at Escanaba, Mich., has been authorized by the City Council to have plans prepared for a municipal gas plant. A bond issue of \$30,000 for its construction has been voted.

The authorities at Oconomowoc, Wis., have under consideration the installation of new boilers in the municipal power plant.

The Vilter Mfg. Company, Milwaukee, among recent orders, has taken the contract for a 22 x 58 x 38 in. compound Corliss engine, equipped with its new valve gear, and a 350-ton refrigeration plant to be installed by the P. Schoenhofen Brewing Company, Chicago, Ill.

The Wisconsin Telephone Company will construct a repair shop in Milwaukee and furnish it with very complete equipment for use in connection with the material needed in the maintenance of its system. The definite plans for this have not yet, however, been announced.

The Columbia County Light & Power Company, Wycena, Wis., which recently purchased the electric plant of the Duck Creek Light & Power Company, equipped with hydraulic turbine, gasoline engines and alternating current generators of 75 kw. will enlarge its capacity by installing new machinery. Transformer substations are also to be erected in Pardeeville and Rio, Wis., and transmission lines run to those places. Both commercial power and lighting service will be furnished in all three cities. B. C. Keeley, manager of the old company, remains in charge of the new, but will make his headquarters in Pardeeville, Wis.

A report from Lena, Wis., is to the effect that the United States Mfg. Company will purchase a power plant equipment, including a gas producer engine unit.

The J. I. Case Threshing Machine Company, Racine, Wis., is providing more extensive facilities for the production of the boilers used with its machines. A new warehouse building, equipped with traveling crane, hoists, &c., was recently completed, and the existing storage plant remodeled for use as a machine shop until additional buildings can be erected.

The Cleveland Mining Company, Hazel Green, Wis., is arranging to equip its property with power and concentrating machinery.

The Worden-Allen Company, Milwaukee, is exhibiting some very interesting photographs showing the steel work for a covered runway and electric lumber carrier designed for the Gulf Lumber Company, Fullerton, La. This class of work is opening up a new field to fabricators and erectors of structural steel, as well as manufacturers of the conveying systems for such plants.

The City Council of New Lisbon, Wis., has voted to establish a municipal lighting plant.

Toronto

TORONTO, January 14, 1911.

The machinery business has not yet quite found its pace for the year, but operations are being resumed with briskness at many large shops, where the lull for stock taking and repairs was rather pronounced while it lasted. Reports are generally to the effect that there is no reaction in sight, and to machinery manufacturers and dealers the outlook is particularly encouraging. The expectations are that business throughout 1911 will be as good as it was throughout 1910. Some of the manufacturers express the opinion that the downward tendency in the prices of iron and steel will be beneficial to trade in articles made from those materials. The chance of keener competition from the United States as a consequence of some degree of depression there and of possible reciprocal favors to that country is referred to by some Canadian machinery manufacturers as

THE MACHINERY MARKETS

one to be taken account of. But there are many large plans laid out and financially provided for which will make a market for a considerable machinery output in the present year. Contractors' outfit, mining plant, factory equipment, power works, &c., will be required for many new undertakings.

The Western dry dock, at Port Arthur, Ont., is nearly completed. The equipment and general machinery are pronounced by O. J. Fish, secretary of the American Shipbuilding Company, who visited it this week, to be as near to perfection as possible. Shipbuilding is to be carried on there as well as ship repairing.

The Canadian Coal & Coke Company has been incorporated by Dominion authority. Its capital stock is \$15,000,000 and head office is at Montreal.

The Dominion Power & Transmission Company will spend \$100,000 on new substations at Hamilton, Ont.

The J. B. Hicks Gas Engine Company has entered into an arrangement to establish works in Sarnia, Ont.

The rate payers of Fort Frances, Ont., approved the by-law in favor of the Shevlin-Clarke Company, which will at once begin the construction of its large mills in the town.

Listowel, Ont., will spend \$5000 upon equipment of its electric light plant.

The Massey-Harris Company, Toronto and Brantford, Ont., is adding to its list of articles it manufactures steam plows and gasoline engines, both of which classes of machinery it will have on the market this year.

The Sawyer-Massey Company, Hamilton, Ont., is preparing to build a large warehouse at Regina, Saskatchewan.

The Canadian Automatic Transportation Company has secured a site for a factory in Welland, Ont.

A permit has just been taken out by the Winnipeg Electric Railway Company for the construction of a turbine power building on Mill street, Winnipeg, Man. A modern steam turbine plant of 12,000 nominal horsepower is to be installed. This can be raised to 18,000 actual horsepower, as machines guaranteed to carry 50 per cent. overload are to be put in. It is estimated that the cost of this new power plant will be at least \$500,000.

The Maritime Engineering Company, Truro, N. S., is now in operation. A 60-hp. engine has just been turned out as the first product of the new works.

James A. Moore, president of the Western Steel Corporation, which is operating a plant at Irondale, Wash., has from time to time for some years back been credited by newspapers in British Columbia with great steel projects for that province. It is stated in the Vancouver *Province* of January 6 that a company of which he is said to be the head will spend about \$2,000,000 upon the construction and equipment of steel works on the south side of the Fraser River, opposite Annacis Island. The location is about 5 miles from the city of New Westminster, B. C. According to the *Province*, 300 acres of land have been acquired for the purpose.

In the nine months ending with December, which are the first nine months of the current fiscal year, Canada imported 2121 motor cars from the United States, the value being \$2,474,462. During the whole of the last fiscal year only 1457 motor cars were imported from the United States, the value being \$1,816,164.

Premier Richard McBride of British Columbia says that in the next four years \$100,000,000 will be applied to development enterprises in that province. Of this he estimates that \$50,000,000 will be used in railroad construction, that \$20,000,000 will be expended by the Provincial Government itself upon public works, and that \$30,000,000 will be put into mining, timber and other resources by private capitalists. Large minor crops of capital applications will be planted on the soil that is thus prepared by the main exploiters.

The contract for the construction of the municipal dam and power house in Sherbrooke, Que., has been awarded to Morrow & Beatty, Peterborough, Ont.

The Industrial Commissioner of Port Arthur, Ont., is negotiating with Barr Bros. of Eugene, Ore., for the purpose of inducing them to establish a branch of their cutlery works in Port Arthur.

The City Council of Montreal has under consideration the submitting of by-laws to the rate payers to authorize the issue of 40-year debentures for \$12,000,000, the money to be applied to the installation of a municipal electric lighting plant, the construction of a filtration plant, the laying and equipment of underground conduits, and the building or improving of other public works.

Several large manufacturing concerns are locating on the south bank of the Fraser River, B. C., at the point the Canadian Northern Railway is to touch. Port Mann is expected to become a great industrial center.

It is said that the Canadian railroad companies that have important construction contracts to place this year find American firms more eager than ever to undertake the

work. This is accounted for by the falling off in railroad building operations in the United States.

It is announced that arrangements have been completed for the establishing at Windsor, Ont., of a Canadian branch of the Maloney Electric Company, St. Louis, Mo. The company manufactures electric transformers and is said to have already \$500,000 of Canadian orders on its books.

The Canadian Steel Foundries, Ltd., has been federally incorporated with a capital stock of \$5,000,000, with headquarters at Montreal. It is understood that it is in this new concern the Montreal Steel Company and the Ontario Iron & Steel Company are to be merged. The Montreal Steel Company is now building a large modern plant at Lougue Pointe, Montreal. The Ontario Iron & Steel Company's works are at Welland, Ont. A syndicate has obtained a controlling proportion of the stock of each of the companies, and is believed to be behind the persons who applied for the incorporation of the Canadian Steel Foundries, Ltd.

The McClary Mfg. Company, stoves and tinware, London, Ont., has purchased 23 acres of land in the south end of the city, on which buildings are to be erected in connection with the company's business. It has also prepared plans for additions to its uptown plant.

The Western Bridge & Equipment Company has been granted a site by the city of Chatham, Ont., on which it will build an enlarged plant.

A company organized by W. J. Reid and Frank Reid of London, Ont., and Hugh Kennedy of Galt, Ont., will build an automobile factory at London, Ont., to manufacture the K-r-i-t runabout.

The Canada Motors Company, Ltd., has been incorporated at Galt, Ont., with a capital stock of \$250,000, to manufacture motor vehicles. Geo. Dobbie has been elected president; A. U. Edwards, vice-president; C. Jansen, secretary; E. J. Getty, treasurer, and D. R. Perry, manager. A manufacturing plant is to be erected and equipped as soon as possible, but temporary quarters have been engaged for the production of the 1911 model.

The South

CHATTANOOGA, TENN., January 16, 1911.

A matter of considerable interest to machinery houses in the Southern trade is the report from Memphis, Tenn., that the shops of the Yazoo & Mississippi Valley Railroad Company will be removed from Vicksburg to Memphis and provided with considerable new equipment for repair work.

The Chattanooga Machinery Company of this place has been awarded the contract for an 8-ft. band mill of special design and auxiliary apparatus for an addition to the plant of the Otis Mfg. Company, New Orleans, La.

Plans have been completed by the Chattanooga Armature Works, Chattanooga, Tenn., for a large new shop building of brick construction, which will considerably extend its facilities for electrical work.

The Casey & Hedges Company, Chattanooga, Tenn., will soon have a new steel frame building to replace the portion of its plant that was destroyed by fire, and is otherwise improving its facilities for production during the current year.

The Columbian Iron Works, Chattanooga, Tenn., has effected many improvements in existing types of saw mill machinery, including quick receding set works, automatic, triple acting steel dogs and other patented devices, that enable it to start the new year with very favorable prospects.

The Chattanooga Coal Company, Durham Coal & Coke Company, Fox Coal Company and Hamilton Coal Company have been merged in a new organization, known as the Durham Coal & Iron Company, which will proceed at once to develop more extensively the properties of all three, with the object of doubling their present output. This calls for the buying of considerable equipment, to be installed at intervals during the year.

The Montgomery Light & Water Power Company, Montgomery, Ala., will increase the capacity of its hydraulic power station at Tallassee, Ala., which now has a capacity of 3500 to 4000 kw. New units increasing the output to 10,000 kw. may be installed.

Geo. E. Bushnell, general manager of the Tennessee Traction Company, Memphis, Tenn., is completing arrangements for construction work on the new electric railway to be built by that company.

Chas. J. Harris, who operates a leather factory at Dillsboro, N. C., will install electric power for his own use and public lighting.

Jesse L. Malcolm and others of Nashville, Tenn., have incorporated the Standard Brass & Metal Works.

The Cleveland Machine Works, Cleveland, Tenn., is to be enlarged and additional equipment installed for the manufacture of woodworking machinery. New interests have

THE MACHINERY MARKETS

become associated with D. S. Myers in the ownership of the business, which will be extended in scope and volume.

The Woodlawn Ice Company, Birmingham, Ala., incorporated with \$23,000 capital stock, will establish an ice plant. W. J. Worthington is president of the company and R. S. Mauchine secretary.

The Consumers' Ice Company, Birmingham, Ala., is being organized with \$160,000 capital stock by G. G. Maass, M. M. Chaddock and Julius Marx.

Harrison Brothers have purchased a site in North Lone Oak, Tenn., on which they will soon erect a cotton gin. It is their intention to install five gin stands and other machinery which will give the gin large capacity.

The sugar house at the Destrahan plantation in St. Charles Parish, La., was destroyed by fire January 7. The owners are the Destrahan Planting & Mfg. Company. The loss, estimated at over \$100,000, is partially covered by insurance. The capacity of the house was 500 tons daily.

The Salisbury Marine Construction Company, Salisbury, Md., recently incorporated with \$25,000 capital stock, has acquired the property of the Salisbury Marine Railway Company at that place and will establish a plant to build yachts and other boats. A number of improvements are being made to the plant, including a marine yacht building shop, 70 x 120 ft., two stories; joiner building, 45 x 50 ft., two stories; storehouse and machine shop, 20 x 20 ft., two stories; paint shop and a power house equipped with an electric generator for lighting buildings and supplying power for portable and stationary tools. The new company will continue the operation of the marine railway.

The Southwest

KANSAS CITY, Mo., January 16, 1911.

An election will probably be called next month at Kansas City, Kan., to vote on bond issues, including \$350,000 for a municipal electric plant and \$50,000 for two refuse incinerating stations.

Construction work will begin by or before summer on a new traction line to be built by the Manhattan City & Interurban Railway Company, plans for which have been prepared by C. M. Buck, formerly city engineer of Manhattan, Kan. The details of power equipment have not yet been worked out. Bonds in support of the enterprise have been voted by communities that will be benefited. Purchases of material will be in charge of Joseph T. West, Manhattan, Kan.

Work has been begun at Falls City, Kan., on the new machine shop for the Atchison Railway. Light & Power Company of Atchison, Kan.

An electric generating unit and modern pumping machinery will be purchased in the near future by the city of Moberly, Mo., if the present plans of the municipal authorities are carried through. Current for city lighting and industrial purposes is now supplied by the Moberly Gas & Electric Company, which has a plant of 375 kw. capacity.

Three new boilers supplied by the Casey & Hedges Company, Chattanooga, Tenn., and a Corliss engine from the works of the Filer & Stowell Company, Milwaukee, Wis., with other improved machinery, are being installed by the Arkansas Lumber Company, Warren, Ark.

New steam turbine units of 2000 kw. are to be installed in the main generating station of the Oklahoma Railway Company, Oklahoma City, Okla., in accordance with a decision recently reached. A Westinghouse set is at present in service. New substation equipment will also be added.

The report of an engineering expert, recommending extensive improvements in the pumping and water distribution systems at Oklahoma City, Okla., has been approved by the City Council, and an election on issuing \$125,000 in bonds for the purpose will be held.

It is reported from Tucson, Ariz., that work will begin in the spring on new shops there for the Southern Pacific Railway, although this is not officially confirmed.

A plant for the manufacture of creosoted paving blocks is to be erected in the vicinity of Little Rock, Ark., by the Ayer & Lord Tie Company of Chicago and Memphis.

An election is to be held this month at Duncan, Okla., to vote on bonds for water works extensions, including additional pumping machinery.

The management of the San Juan Water & Power Company, Durango, Colo., which operates hydroelectric and steam power plants having a combined capacity of 5000 kw., contemplates extending its system to Farmington, N. M. This plan involves replacements and additions to machinery now in service.

The Flagstaff Lumber Mfg. Company, Flagstaff, Ariz., which has the most modernly equipped sawmill in the Far Southwest, is planning the installation of planing and box making machinery.

A steam driven generating set of 1000 kw. will probably

be installed in a power plant to be erected in Tulsa, Okla., by the Tulsa Corporation.

A bond issue for the construction of water works has been sold at Hoisington, Kan., and the purchase of the necessary equipment will be made at an early date.

A power and pumping plant of large capacity is to be built by the Arkansas Natural Gas Company in the vicinity of Vivian, La., to supply pipe lines now being laid to Little Rock and other places in Arkansas. Air compressors will be used.

The Sheffield Sash Weight & Mfg. Company, Kansas City, has increased its capital stock to provide for the growth in the business.

A large stove mill is to be built at Waldo, Ark., by the Gulf Cooperage Company of that place and power machinery provided.

The Oklahoma Short Line Railway Company has been incorporated at Oklahoma City, Okla., by Leroy Paddock and others, to build an electric traction line from Oklahoma City to Joplin, Mo. None of the details of construction and equipment has, however, as yet been worked out. It is also proposed to build from Shawnee, Okla., to Denison, Tex., and the site for a power plant has been selected at a point near Shawnee.

The plant which was established at Marked Tree, Ark., by the Woodruff-Kroy Company, for the manufacture of staves, is proving inadequate to the demand made upon it and will be enlarged. Additional machinery is required.

The Eagle Mfg. Company, Kansas City, Mo., has signed a contract with the Muskogee Development Company, Muskogee, Okla., for the removal of its plant to that city. Work on the construction of a plant is to be commenced by March 1 and completed and ready for occupancy by July 1.

Britton, Okla., will expend \$30,000 for the construction of a water works system.

The Elevator of the Rea-Patterson Milling Company at Lenapah, Okla., together with the Missouri-Pacific depot there, was destroyed by fire January 6, causing a loss of \$10,000.

An election has been called by the city of Cherokee, Okla., to take place January 31, for the purpose of voting \$5000 in municipal bonds for water works extension and sewage disposal.

The Cherokee Ice Company's plant has been sold to John Harris and R. B. Ash for \$25,000. The new owners will make extensive improvements prior to the opening of the summer season.

The Northwest

MINNEAPOLIS, MINN., January 16, 1911.

A representative of the Barnett & Record Company of this city states that while few new contracts of importance are at present in sight, it is his judgment that business as a whole during 1911 will be much better than in 1910. R. R. Howell & Co., Minneapolis, who furnish complete equipments of their own manufacture for saw mills, from the smallest to the largest sizes, also look upon the situation as favorable to future business.

A representative wood-working concern, the Osgood & Blodgett Mfg. Company, reports trade good for the year, and from interviews with other firms in similar lines it is evident that that industry will call for a great deal of machinery equipment during 1911.

Bids will be taken early in February at Huron, S. D., on a pumping plant of 2,000,000 gal. daily capacity, to be operated by steam, gas or oil engines. The type of apparatus to be selected has been left open and alternate bids will be invited. The system is also to include a steel tower and tank of 200,000 gal. capacity.

The Minnesota & Ontario Power Company, of Minneapolis, has completed plans for the erection of a large timber-cutting plant at International Falls, Minn., and let the contract for the principal machinery.

G. L. Hunt, chief engineer of the Minneapolis, St. Paul, Rochester & Dubuque Traction Company, Minneapolis, is reported to be working on plans for a power plant in South Minneapolis.

The Minneapolis General Electric Company, Minneapolis, is taking immediate measures to remedy the loss incurred by an explosion at its steam power plant in this city; but the plans in detail have not yet been worked out.

The Cloquet Electric Company, Cloquet, Minn., which is equipped with three alternating current generators of 600-kw. capacity, engine driven, will provide for enlarged power facilities during the present year and extend its transmission lines to other communities.

The new electric generating plant of the Otter Tail Power Company, at Wahpeton, N. D., is nearly completed, and extensions of the service, involving the gradual pur-

THE MACHINERY MARKETS

chase of considerable auxiliary equipment, will be made within the next few months.

The plans of the Idaho National Harvester Company, Moscow, Ida., for a works addition to double its present output, are reported to be practically complete.

The plant of the Somers Lumber Company, at Kalispell, Mont., is to be overhauled and new machinery installed, preparatory to a heavy run in the spring.

It is reported from Troy, Mont., that an electric power and pumping plant and water supply system will be installed there by R. E. Porterfield, under the terms of a franchise recently granted by the county board.

The City Council of Tower, Minn., will submit to the voters of that city the proposition of voting bonds to build a power plant at Pike River Falls.

The village of Argyle, Minn., will vote on a bond proposition for the installation of a water works system.

It is reported that the Pioneer Tractor Company, Winona, Minn., is planning the erection of an extensive machine shop, power house, test shop and foundry.

Texas

AUSTIN, TEXAS, January 14, 1911.

The development of fruit and truck growing in south Texas is causing the establishment of numerous ice and cold storage plants. One of the most important departures connected with the shipment of these perishable products is the proposed erection by the St. Louis & San Francisco Railroad of a number of pre-cooling plants at points on its lines in the lower Rio Grande and Gulf Coast territory. Chairman B. F. Yoakum is giving his personal attention to the establishment of these plants. The first to be erected will be located at San Benito and will cost about \$50,000. The object is to remove the natural heat from the vegetables and other products before they are placed in refrigerator cars for shipment to market.

J. B. Cochran has purchased the ice plant of the People's Ice Company at Houston from P. B. Timpson, trustee for the bondholders. The plant will be rehabilitated and considerable new machinery installed.

Charles A. Alexander of Marble Falls, Texas, and associates, who are erecting a dam across the Colorado River at that place and installing a hydroelectric plant of about 30,000-hp. capacity, contemplates installing similar plants at Austin and at some other point on the Colorado River. They will soon begin the construction of electric power transmission lines to a number of towns and industrial centers situated within a radius of about 100 miles of Marble Falls.

The San Benito Sugar Mfg. Company will erect a sugar mill at San Benito, Texas, at a cost of \$400,000. S. A. Robertson of San Benito is at the head of the project. The mill will be finished in time to care for next season's cane crop in that section.

The Provident Land Company will erect a large fig preserving plant at Provident City, Texas. This company is interested in the proposed installation of an electric light plant at that place.

The City Council of Marlin, Texas, is advertising for bids for the construction of a garbage crematory.

J. E. Baker of Killeen, Texas, has purchased the water and light plant at Lometa, Texas, from E. R. Goodson. He will make enlargements and other improvements.

The Marfa Electric Light & Ice Company, Marfa, Texas, will install a complete gas engine equipment.

The Travis Gin Company, Travis, Texas, will erect a cotton gin. O. E. Davis is at the head of the company.

The Valley Gin Company, Somerville, Texas, has been organized for the purpose of erecting a cotton gin. R. A. Brantley is one of the men interested.

The plant which the Sixela Fire Brick, Pottery & Coal Company will erect at Texline, Texas, will cost about \$100,000. It will have a daily capacity of 60,000 brick.

The Texas Company, is planning for the removal of its extensive shops from Sour Lake to Houston if an available site is obtained at the latter place. It is stated that the shops will be enlarged and that a plant will be installed for the manufacture of supplies for pipe line purposes. The cooperage factory will also be enlarged.

The brick making plant which will be erected at Victoria, Texas, by the Southwestern Cement, Brick & Tile Company will have a daily capacity of about 25,000 brick. Those interested in the project are James F. Welder, Theodore Buhler and John Stoffels. Mr. Stoffels is manager.

V. S. Meinly, secretary and treasurer of the Corpus Christi Street & Interurban Railway Company, Corpus Christi, Texas, contemplates the construction of an electric street railway in Palestine, Texas. The proposed line may also be extended to suburban towns.

Andrew J. Zilker, of Austin, who recently took over the water works system at Taylor, Texas, will install a new pumping plant there. He has also agreed to increase the present storage capacity; to replace the wrought iron mains, both in the town and on the pumping line that runs to the plant on the San Gabriel River, with cast iron mains; to install 10-in. instead of 6-in. mains, and to install additional and larger pumps.

The plant of the Alamo Iron Works at San Antonio, Texas, is to be remodeled and enlarged. Several new buildings will be erected, a large blacksmith shop installed, and the entire plant equipped with the latest machinery. The output will be increased about 50 per cent, by the additions that are to be made. Eugene Holmgreen is secretary and treasurer.

The Farmers' Mfg. & Supply Company recently broke ground for five factory buildings which it will erect at Southton, a suburb of San Antonio, Texas. One of these factories will be devoted to the manufacture of wire fencing, wire buckets and baskets, screens, concrete reinforcements, &c., another will manufacture various articles from tin and sheet metal, particularly cisterns and tanks; the third will be devoted to the manufacture of plows and other farm implements and machinery; the fourth will turn out machinery for laundries, creameries and other kinds of industries; the fifth will be a large cotton-seed oil mill. The company has already erected a large cement block plant and cotton gin on its grounds. E. F. Anderson of Denver, Colo., is largely interested in the enterprise. C. H. Halt is president and general manager. In addition to the erection of these several manufacturing plants the company is building a new town at Southton.

J. S. Douglas of Douglas, Ariz., and W. H. Propphy of Bisbee, Ariz., have been granted a franchise to install a water works plant at Benson, Ariz.; also for the furnishing of the town with electric light and power. The electric current will be transmitted to Benson from the power plant at Douglas.

Leoncio Hernandez will install a hydroelectric plant near Pachuca, Mexico, having recently obtained a concession from the government for the purpose.

The Canadian Colonization Company, which has its headquarters at Victoria, B. C., is arranging to expend about \$3,000,000 in the construction of a large system of irrigation and the making of other extensive improvements on its 1,000,000-acre tract of land in the state of Guerrero, Mexico. It will construct many miles of irrigation canals, install pumping machinery, build a short line of railroad and dredge a deepwater harbor at the mouth of the Petatlan River. The project also involves the construction of two large dams across that stream for the purpose of storing water to be used in irrigating.

J. H. Hodson of New Orleans, La., will erect a large lumber mill in the vicinity of Llano Grande, state of Durango, Mexico.

The Eller Wagon Works, Houston, Texas, has increased its capital stock from \$20,000 to \$40,000.

The Foote-Rolaff Machinery Company, San Antonio, has been incorporated, with a capital stock of \$10,000. The incorporators are W. G. E. Rolaff, Geo. W. Foote and B. V. Samuel.

E. F. Glaze of the Goliad Water & Light Company, Goliad, Texas, has plans ready for the erection of an ice plant, work on which is to begin at an early date. As soon as this is completed a poultry packing plant will be erected.

The Paul Garrett Milling Company will erect at San Angelo, Texas, a new flour mill on the site of the one recently destroyed by fire. The building will cost about \$10,000 and the machinery \$15,000. An elevator will also be built at a cost of \$15,000.

Farther Central West

OMAHA, NEB., January 16, 1911.

Information from dealers in construction material, whose trade is a good indication of prospective activity in the various lines of shop, mill and factory equipment, is to the effect that an excellent spring business is in prospect. Railroad buying also promises to be much heavier than last year.

Among orders recently entered by the Clinton Bridge & Iron Works, Clinton, Iowa, is one for the construction of two steel spans over the Rock Island River for the city of Rock Island, Ill.

The C. Shengkurg Company, Sioux City, Iowa, will build in the vicinity of Third and Douglas streets, a new power plant, 50 x 86 ft., two stories, with a 125-ft. stack. The machinery to be installed will provide electric power and lighting, with sufficient boiler capacity to furnish heat for the company's entire establishment.

THE MACHINERY MARKETS

K. C. Kastberg, city engineer of Boone, Iowa, will be in charge of the extensive water works system to be constructed there, a bond issue of \$180,000 for which has been voted. The purchase of modern high duty pumping units, with much auxiliary equipment, will be involved in due course.

Bids will be taken about February 25 at Atlantic, Iowa, for remodeling and equipping the city power and pumping station.

Tenders are reported to have been invited for an elevated steel tank to be erected for Newton, Iowa.

The A. R. Flick Box Company, Dubuque, Iowa, whose woodworking plant burned about three weeks ago, will replace it with a thoroughly modern factory, to be operated by electric motors.

It is reported from Bonaparte, Iowa, that S. E. Irish, who recently purchased the dam there, resides at Keosauqua, Iowa, and that Geo. H. Craig of that place has been retained to prepare plans for a hydroelectric plant of 900 to 1000 kw. It is also stated that the financial arrangements will be in charge of J. A. Johnson, Bonaparte, Iowa.

The City Council at Hamilton, Iowa, has under consideration the project of constructing a pumping plant.

Funds for building an electric power and pumping station and laying suitable service systems will be provided shortly at Giltner, Neb.

The Inter-Mountain Bridge & Construction Company, Tecumseh, Neb., now has in hand the contract for a complete water works system, to be constructed for the municipality of Stratton, Neb.

At Fairbury, Neb., the city has secured control of the 300-kw. power plant of the Fairbury Electric Light & Power Company, which was long a matter of litigation, and, in addition to some minor improvements already made, will spend about \$35,000 for betterments to the system.

To install a public service plant at Valparaiso, Neb., which is now without one, the Valparaiso Electric Company has been organized.

W. P. Robinson, manager of the Denver Union Water Company, Denver, Colo., has had plans drawn for the proposed auxiliary pumping station, of 5,000,000 gal. daily capacity, to be erected in University Park.

The Martin Mfg. Company, Mason City, Iowa, advises that the report recently circulated throughout the country to the effect that its plant was destroyed by fire is false. The company has had no loss of any kind by fire and its plant is being operated to full capacity.

Bids will be received by Atlantic, Iowa, March 1, for improving the electric light and power plant and uniting it with the water works system at a probable cost of \$40,000.

Whittmore, Iowa, will expend \$7000 for the construction of a water works system.

Gordon, Neb., is preparing estimates for a water works system to be constructed at a cost of \$12,000.

The power house, two machine shops and the sheds of the Mason City Brick & Tile Company's plant, Mason City, Iowa, were burned December 30, involving a loss of \$25,000.

A large ore smelting plant is to be erected at Alma, Colo., by the Moose Smelting & Refining Company, recently incorporated for \$5,600,000. Henry W. Scott, of the Scott, Bond & Mortgage Company, New York City, who is one of the principal owners of the Moose mine at Ada, will be the managing director. The plans of the enterprise call for an initial expenditure of about \$3,000,000 for buildings, equipment, trackage and various details of construction work.

It is reported at Dubuque, Iowa, that a site has been secured there by the Brunswick-Balke-Collender Company for a factory guaranteed, under the terms of a bonus raised by local business interests, to employ at least 500 men. Work upon it will begin next month.

Announcement is made of a one-story extension, 40 x 80 ft., of the Waterloo Malleable Iron Company's works, Waterloo, Iowa, a three-story factory, 47 x 60 ft. for the Waterloo Plaster Company and a further addition to the plant of the Waterloo Drop Forge Company, the plans for which are said to be not yet complete.

From Hamburg, Iowa, it is reported that in consequence of a franchise granted last month, E. B. Hillman of Peoria, Ill., will build an electric generating plant for public service.

The new factory which has been planned for erection in Des Moines, Iowa, by the Farley & Loetscher Company, Dubuque, Ia., will be operated under the name of a new concern, known as the Loetscher-Jeager Company, in which W. C. Jeager of the Jeager Mfg. Company, Des Moines, is interested. Machinery for the manufacture of sashes, doors, &c., together with electric power equipment, will be required.

The Pitts-Matthews Carriage & Auto Company, Des Moines, incorporated for \$10,000, will construct a building 45 x 132 ft. for motor-car repairs and finishing.

A five-story factory, 100 x 150 ft., which will probably be equipped with its own power plant, electric motors, &c., will

be erected in Sioux City, Iowa, by the Johnson Biscuit Company.

The Rice-Dayton Mfg. Company, Cedar Rapids, Iowa, will start work in the spring on an addition to its plant.

A three-story building, 65 x 70 ft., with motor-driven equipment, will be added to the plant of the R. Hurni Packing Company, Sioux City, Iowa.

A new sub-station, equipped with power-transformers, rotary converter, &c., will be erected in Iowa City, Iowa, by the Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Iowa, and other improvements effected in the system. An expenditure of \$80,000 for this purpose has been decided upon for the coming year. The company has a generating plant of 3500-kw. capacity at Cedar Rapids, Iowa, to which an exhaust steam turbine unit may be added, and also maintains a well-equipped repair shop there.

The large shoe factory of Bentley & Olmsted, Des Moines, Iowa, has been destroyed by fire and will be rebuilt.

A new elevator will be constructed at Gruver, Iowa, by Henry Rippe, of that place, and Fairmont, Minn., to replace one that burned.

Machinery will be purchased by the Red Oak Canning Company, Red Oak, Iowa, early in the coming month, for an extension doubling the capacity of its plant.

Bids will be taken about February 24, or a little later, for the improvements recently mentioned at Atlantic City, Iowa, which will take the form of remodeling the municipal power and pumping plants so as to bring them under one operating control and increase their capacities.

The installation of a municipal water works system is being planned at Steamboat Rock, Iowa.

The Minneapolis Threshing Machine Company, of Minneapolis, Minn., is planning the construction of a branch, 40 x 200 ft., at Mason City, Iowa, to be used for assembling and storage, as an aid to the prompt delivery of its apparatus on orders from that section.

The City Council of South Omaha, Neb., has granted the Union Stockyards Company and packers of that place a franchise to construct their own pumping plant and water system.

It was recently decided at Stratton, Neb., to install an electric plant for municipal service and the work will be proceeded with as soon as possible.

The Centerville Light & Traction Company, Centerville, Iowa, is planning extensive improvements which will include the rebuilding of the central heating plant and the installation of a new 300-hp. boiler.

The Woods Brothers Thresher Company, Des Moines, Iowa, has been incorporated to take over the business of the Wood Brothers Steel Self-Feeder Company. The capital stock has been increased to \$600,000 preparatory to enlarging the factory and greatly increasing the output.

The Excelsior Steel Furnace Company, Chicago, will establish a branch factory in Des Moines, Iowa, at Second street and the Des Moines Union tracks. R. A. Walker of Chicago will have charge of the Des Moines branch.

The Lenox Furnace Company, Marshalltown, Iowa, is securing options on land on which it will build early in the spring a stove factory. The company has been making steel ranges for a year and the business done warrants enlarging the plant. The stove business will be incorporated separately from the furnace business.

The plant of the Alfalfa Meal Company at Council Bluffs, Iowa, valued at \$50,000, was burned January 11.

The Decker Mfg. Company, Keokuk, Iowa, will erect a three-story garage and manufactory at Third and Blondeau streets. The company will install two boilers and two electric elevators.

The Taylor Mill & Elevator, Dannebrog, Neb., was burned January 10, causing a loss of about \$10,000. The plant will be rebuilt at once.

North Pacific Coast

PORTLAND, ORE., January 13, 1911.

A fair index of the present flourishing, stable condition of the metal working industries on the north coast, inclusive of machinery building and repairing, is to be found in the activity of the Willamette Iron & Steel Works of this city. It is now busy in every department, particularly the boiler, tank and hydraulic pipe shops. Marine work continues fair and logging engines have recently been in good demand for the season. To provide for the further increase in business which it is believed from present inquiries will develop in the spring, additional equipment is being installed and the layout of the shops improved, so as to secure the highest possible efficiency in all branches of production.

The Meese & Gottfried Company of San Francisco and Seattle, whose specialty is the manufacture and installation of power transmission, elevating and conveying machinery,

THE MACHINERY MARKETS

has opened a branch at 67-69 Front street, Portland, Ore., with H. F. Gearson in charge. Business in the new location started with the first of the year.

In order to encourage the location there of manufacturing industries, by providing better shipping facilities, the Port of Coos Bay, Ore., has voted \$500,000 in bonds to cover the cost of harbor improvements.

The city of Gresham, Ore., has retained Louis C. Kelsey, Dooley Building, Salt Lake City, Utah, who has also opened an office on the coast, to plan the construction of water works.

A match factory is to be built in Springfield, Ore., by Paul Bettelheim. Further details are lacking.

The Coquille Mill & Mercantile Company, Coquille, Ore., whose buildings were wrecked by a boiler explosion, is preparing to rebuild. The electric power plant connected with the saw mill, which is operated as the Coquille River Electric Company, has already been replaced.

A power station is to be built at Magoon Lake by the Eastern Oregon Light & Power Company, Baker City, Ore., which has in operation at the latter place a combined steam and hydroelectric plant of 3200-kw. capacity. The company is planning to furnish power extensively for motor-driven machinery used in irrigation works. The equipment now in service includes Cahill boilers, a Nordberg engine, Pelton water wheels and General Electric and Westinghouse dynamos.

Improvements are being made in the plant of the Western Oregon Lumber Company, Portland, Ore., and additional apparatus, including the new pneumatic system of trimmer operation, installed. The machinery will be furnished by the Summer Iron Works, Everett, Wash.

The project for a municipal pumping plant at Ashland, Ore., will be delayed indefinitely, as a bond issue of \$170,000 was defeated in the recent election.

Additions are to be made to the equipment of the Pioneer Planing Company's plant at Ashland, Ore., and changes effected that will materially increase its output.

The Nisqually Iron Works, Tacoma, Wash., which acquired the shops formerly operated by the Tacoma Eastern Railway, has kept very busy on repair work and in manufacturing equipment for logging purposes, including a number of very salable specialties. It is starting in on the new year under most favorable auspices.

The Ketichan Power Company, Ketichan, Alaska, which is a center of canning operations, will extend its facilities, including the enlargement of the saw mill which provides lumber for boxes. The output of the box factory is also to be increased correspondingly.

A saw mill, which will probably be electrically operated, is to be erected in Camas, Wash., by Peterson Bros.

A new power station was recently completed by the Whatcom County Railway & Light Company, Bellingham, Wash., giving it upward of 5000-kw. capacity, and further improvements are to be effected during the year.

A thoroughly modern box factory is to be constructed in the near future at Clarkston, Wash., by the Valley Lumber Company, including the installation of motor-driven machinery. The equipment of its timber cutting plant is also to be enlarged.

Bids are being taken by the city of Spokane, Wash., on

two horizontal 14-in., two-stage centrifugal pumps, a 900-hp. three-phase, 60-cycle, 2200-volt induction motor, and a separate motor-driven centrifugal unit of 3,000,000 gals. daily capacity, together with switchboard and control apparatus, &c., for high pressure water service.

The plant of the Page Lumber Company, Buckley, Wash., which recently burned, will be rebuilt.

Government Purchases

WASHINGTON, D. C. January 16, 1911.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids February 4 for one 60-ton electric traveling crane for building No. 23, Norfolk Navy Yard.

The Paymaster General, Navy Department, Washington, will open bids January 31, under schedule 3255, class 22, for furnishing one exhaust fan motor and dust collecting system.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids January 10 as follows:

Class 1.—One overhead traveling electric crane—Bidder 12, Alfred Box & Co., Philadelphia, Pa., \$1675; 77, Hoisting Machinery Company, New York, \$1518; 103, Modern Steel Structural Company, Waukesha, Wis., \$1820; 120, Niles-Bement-Pond Company, New York, \$2100; 156, Toledo Bridge & Crane Company, Toledo, Ohio, \$1700; 167, Whiting Foundry & Equipment Company, Harvey, Ill., \$2315; 179, Northern Engineering Works, Detroit, Mich., \$1850; 184, Butte Engineering & Electric Company, San Francisco, Cal., \$2280.

Class 11.—One screw-cutting engine lathe—Bidder 26, Caldwell Brothers Company, Seattle, Wash., \$1210; 64, Garvin Machine Company, New York, \$1311 and \$1213; 75, Hallide Machinery Company, Seattle, Wash., \$1265; 107, Manning, Maxwell & Moore, New York, \$1463; 128, Perrine Machinery Company, Seattle, Wash., \$1104; 143, Springfield Machine Tool Company, Springfield, Ohio, \$1325.

Class 13.—One 2-kw. constant speed motor generator and one 2-kva. open core wireless telegraph transformer—Bidder, Diehl Mfg. Company, Elizabethport, N. J., \$1975; 95, Fritz Lowenstein, New York, \$1600; 122, National Electrical Signaling Company, Pittsburgh, Pa., \$1065; 157, Telefunken Wireless Telegraph Company, New York, \$1150.

Class 51.—One set of speed gears, one set of motors, with controlling appliances, and one set of four distant control apparatus for above gears—Bidder 30, Cutler-Hammer Mfg. Company, Milwaukee, Wis., \$8160; 42, Diehl Mfg. Company, Elizabethport, N. J., \$3744, part; 59, General Electric Company, Schenectady, N. Y., \$3449.

Class 53.—One bolt heading, upsetting and forging machine—Bidder 58, Frevert Machinery Company, New York, \$2724; 107, Manning, Maxwell & Moore, New York, \$2750.

Class 54.—One steam winch—Bidder 70, Hyde Windlass Company, Bath, Me., \$460 and \$550; 92, Lidgerwood Mfg. Company, New York, \$1076; 173, Williamson Brothers Company, Philadelphia, Pa., \$750.

The Bureau of Yards and Docks, Washington, opened bids January 7 for furnishing and installing one electric motor driven capstan at Portsmouth, N. H., Navy Yard as follows: Hyde Windlass Company, Bath, Maine, \$2200; Williamson Brothers Company, Philadelphia, Pa., \$2295.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids January 3, as follows:

Class 1.—Two Bement vertical drilling machines—Bidder 29, Fairbanks Company, Washington, \$569 and \$687; 37, Garvin Machine Company, New York, \$415 and \$445; 48, J. P. Kemp, Baltimore, Md., \$427, \$442 and \$568; 64, Niles-Bement-Pond Company, New York, \$570; 80, Vermilye & Power, New York, \$444.90.

Class 56.—Four portable ventilating sets—Bidder 26, Diehl Mfg. Company, Elizabethport, N. J., \$76; 73, B. F. Sturtevant Company, Hyde Park, Mass., \$75.

doctrine. There has never been a platform of a national convention since the organization of the Democratic party that has advocated free trade theories. They have always maintained that the true position of the party was in favor of a tariff for revenue. There has never been a tariff bill enacted into law by the Democratic party that has not favored the doctrine of a tariff for revenue as opposed to a tariff levied along free trade lines, such as the revenue laws of Great Britain."

"What do you think of the plan to revise the tariff schedule by schedule?"

"I am heartily in accord with it. I believe it can be done intelligently that way. It cannot be when a committee has to take up all the schedules at once. It is the only sensible way to revise the tariff. It eliminates trading, which has been the main cause of trouble in the past and has destroyed most of the great tariff bills. That is what has been chiefly responsible for 'jokers' and their other bad features."

"If you were asked especially to tell the business men of the country what you will stand for in the way of a tariff bill, what would you say?"

"I would simply say that I believe in a tariff for revenue only, but with that principle carefully and conservatively worked out. I would also tell them that they are not going to get from my committee a high protective tariff bill to protect their profits."

Congressman Underwood's Tariff Views

A reporter of the New York *Herald* has interviewed Representative Oscar W. Underwood of Birmingham, Ala., who is expected to be Chairman of the Ways and Means Committee of the House of Representatives of the Sixty-second Congress, and will, therefore, take an important part in the revision of the tariff. Some extracts from the interview as printed in the *Herald* of January 15 are given below:

"Would you mind stating your tariff theory in more detail?"

"I would be glad to, because I often find myself in the anomalous attitude of having some of my constituents who are protectionists declare that I am a free trader, and I often find that when I am in Washington some of my colleagues, because I represent a great manufacturing district, assert that I am a protectionist. In the preparation of a tariff bill the differences that exist between the two great parties are not the issue of protection against free trade, but the true issue is that one desires to write a tariff bill that leans toward prohibition of imports and the other a revenue tariff that favors fair competition. Although we occasionally find a free trader within the ranks of the Democratic party the great rank and file do not favor the free trade

Obituary

JOHN W. SEAVER

John W. Seaver, consulting and contracting engineer, Cleveland, Ohio, died suddenly January 14, from apoplexy, as he was about to start from his home for his office. He was 55 years of age, having been born in Madison, Wis., in 1855. His early life was spent in Buffalo. He entered the field of mechanical and civil engineering when a young man and made a world-wide reputation. He was a pioneer in designing coke oven machinery.

At the age of 13 Mr. Seaver went to work for the Shepard Iron Company, Buffalo, as a machinist. Two years later he was promoted to the drafting room. Later he was made superintendent of the plant. While acting



JOHN W. SEAVER.

as superintendent he designed the engines of many lake boats, among them the engines for the Great Western, a noted vessel in its day. When he was 23 he went to Pittsburgh, where he became connected with the Schultz Bridge Works. While with that company he designed and built a large number of bridges. Later he engaged with the Riter-Conley Mfg. Company.

Mr. Seaver removed to Cleveland 15 years ago from Pittsburgh, and in that city joined his interests with those of others in the Wellman-Seaver-Morgan Company, of which he was vice-president. About four years ago he withdrew from that company, and, with J. E. A. Moore as a partner, opened an office as consulting and contracting engineer, the business being conducted under the name of Mr. Seaver. He was the first designer and builder of Gantry cranes and other important material handling and steel manufacturing machinery. He was a noted book lover, and had an extensive library and a collection of autographs of famous engineers. He was a member of the Rowfant, Union and Euclid clubs in Cleveland, and of the Cleveland Engineering Society, the American Society of Civil Engineers and American Society of Mechanical Engineers. He leaves a widow and four children.

JAMES BARNETT, president of the George Worthington Company, Cleveland, Ohio, wholesale and retail hardware dealer, who had for a long time been called Cleveland's first citizen, died January 15, aged 89 years. He was

born in Cherry Valley, N. Y., his parents removing to Cleveland when he was two years of age. After finishing his education in the Cleveland public schools he entered the hardware store of Potter & Clark, and three years later became an employee of George Worthington. Later he became a partner in the concern under the name of George Worthington & Co., and was the senior partner from the time of Mr. Worthington's death in 1874 until the present George Worthington Company was incorporated in 1887. From the time of its incorporation until his death he was president of the company. He took an active interest in the iron industry in Cleveland in its early days as one of the owners and vice-president of the Cleveland Iron Company that operated a blast furnace for a number of years. He was also prominent in banking circles, serving as president of the First National Bank from 1876 to 1905, and being on the directorates and holding other official positions with other Cleveland banks at various times. He took a deep interest in political matters and was a leader in civic affairs and charities, devoting much time to philanthropic and civic work as the head of various organizations and in other prominent capacities. He served his country through the Civil War during which he won great distinction. He entered the service as a colonel and rose to the rank of brevet brigadier general for gallant and meritorious services. He leaves three daughters, one of whom is the wife of Alexander Brown, vice-president of the Brown Hoisting Machinery Company.

JOSEPH C. POULTERER, who some seven years ago retired from the iron and steel business, which had been conducted under the name of Poulterer & Co., Philadelphia, Pa., died at his home in that city January 13, aged 50 years. He leaves a widow and two sons.

ROBERT J. GARDNER, superintendent of the S. Jarvis Adams Company, Midland, Pa., is dead, aged 35 years. For several years he was superintendent of the wire department of the Schoenberger Works of the American Steel & Wire Company, Pittsburgh.

DAVID BOVAIRD, senior member of the firm of Bovaird & Co., Bradford, Pa., died January 4, aged 78 years.

Personal

W. S. Chase, sales manager, and P. E. Ryan, advertising manager, of the National Acme Mfg. Company, Cleveland, Ohio, sailed from New York for Europe January 14. They will spend several weeks in England and on the Continent looking after the interests of their company.

W. P. Pressinger, having sold his interest in the Keller Mfg. Company of Philadelphia, has resigned as vice-president to again become manager of the compressor department of the Chicago Pneumatic Tool Company, with headquarters in New York.

The firm of D. C. & Wm. B. Jackson, Boston, Mass., has been retained by the British Government to advise the Postmaster-General in regard to the value of the plant of the National Telephone Company, which will be taken over by the government this year and made a part of the post-office system. Prof. D. C. Jackson sailed for England January 18 to spend a week in London conferring in regard to the execution of the valuation, expecting to return by a steamship due to arrive in New York February 7.

J. O. Entrekin, for a number of years secretary of Sloan, Howell & Co., dealers in iron, steel and contractors' supplies, Philadelphia, Pa., has resigned to become associated as sales manager with the Lebanon Valley Iron & Steel Company, Lebanon, Pa., now manufacturing a complete line of bolts, nuts, rivets, track bolts, bar iron and bar steel.

J. F. Doolittle, president of the Cleveland Steel Tool Company, Cleveland, Ohio, has started on an extended vacation trip of four months. As his time will be spent entirely in recreation, he will tour by easy stages through

the Isthmian Canal district, Old Mexico, Southern California and Yellowstone National Park, returning to business about May 1.

H. H. Barbour has been appointed district sales agent of the Lackawanna Steel Company for the metropolitan district, with offices at 2 Rector street, New York, this appointment becoming effective January 19, on the removal of the general sales office of the company to its works at Lackawanna, Erie County, N. Y.

E. T. Weir, president of the Phillips Sheet & Tin Plate Company, Weirton, W. Va., has sailed for Europe.

F. A. Botts has been transferred from the Birmingham, Ala., to the New York pig iron selling force of Hickman, Williams & Co.

R. H. Watson, for several years second assistant to A. R. Hunt, superintendent of the Homestead Steel Works of the Carnegie Steel Company at Homestead, Pa., has been appointed superintendent of the open hearth department, to succeed Reese James, who died recently.

D. B. McClelland, vice-president and treasurer of Spang, Chalfant & Co., Inc., Pittsburgh, has gone on a Western business trip and will be absent about six weeks.

C. B. Walter has been appointed district manager of the Pittsburgh office of the Russell Machine Company of Massillon, Ohio, succeeding F. G. Borden. Mr. Walter has been connected with the Pittsburgh office for several years.

Geo. G. Crawford, president of the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., will sail in February for a European trip of two or three months.

The Engineer as a Salesman

BY STERLING H. BUNNELL.

The increasing complication of manufacturing processes and the specialization of manufactures into peculiar lines have brought into the field of consulting engineering numerous specialists, each expert in a narrow field, which may so absorb his efforts that he will have little time to acquire a broad knowledge of other lines. In the construction of steam power plants, the development of water power, the design of electric central stations and the construction of street railroads, engineers of a high degree of specialization can be found adequately equipped to solve the most intricate problems, and to produce designs and superintend construction which will give a successful and satisfactory working plant. On the other hand, it becomes increasingly difficult to find engineers of broader general knowledge, though less specialized in particular lines, who can undertake problems involving a number of different fields, such as are met with in new lines of manufacture.

To the prospective owner or manager of a plant for manufacturing some new product, a problem is presented involving location, design of power plant and transmission, design of buildings, organization of operating force, and selection of machinery among standard lines obtainable in the market, special construction which can be adapted for the particular purpose, and newly designed machinery which must be made up largely without precedent. In factories of usual size there is not enough work in any one line to indicate the selection of a consulting engineer to take charge of all. Further, the most expert engineer in each line has carried his studies in refinements and economies to a point far beyond what is justifiable in connection with a small installation of his special apparatus. The noted power plant engineer, for instance, regards a factory power plant of 100 or 200 hp. as a mere nothing, in comparison with the 20,000-hp. plant, which he considers of only ordinary size. The man charged with the design of a new plant is, therefore, likely to be taxed with selecting the best among many consulting engineers, and in deciding for himself the questions of difference which arise between them.

The easy way out of these difficulties lies in accepting the services of the engineering salesman who combines the functions of advisory engineer with the salesman's knowledge of mechanical construction and cost. In machinery lines to-day the technical man is rapidly taking his place as a prominent member of the sales department. At the same time, the business trained salesman, forced by competition with the technical man to study the theory of his product, has learned enough of the technicalities to hold his own successfully against the other, so that there is little to choose between the engineer trained in selling and the salesman trained in engineering.

A machinery house handling a wide variety of material and equipment, and employing a force of salesmen with general mechanical knowledge, is well equipped to assist in the construction of a factory in an advisory capacity. An engineering salesman is alive to the question of costs, first and foremost. While he has a general knowledge of competing lines he has also a wide knowledge of noncompeting lines, through his general acquaintance with other machinery salesmen and with the purchasing public. A competent engineering salesman who is in a position to devote his undivided attention to a manufacturing proposition can give advice and assistance from the commencement of design to the completion of the last payment, which is of the greatest value to the owner and constructor. The services of such a man cost the purchaser nothing; they are paid for by reason of the increased total selling commission realized by the machinery house, which is thus enabled to furnish the entire equipment, instead of being limited to one or two parts only. In fact, since an engineering salesman can figure closer on a large equipment than on a few scattered items, the total cost of the entire contract may be less than the sum of the costs of the various items if purchased separately, and the services of the engineering salesman, being paid for from the saving in expense, are without cost to the purchaser.

The Griscom-Spencer Company, New York, with which the writer is connected, is a typical concern which is furnishing engineering advice and machinery equipment, working in co-operation with the purchaser's engineers. This company, under the name of the James Reilly Repair & Supply Company, operated a general machinery and supply business for many years. In the course of time it purchased or developed a number of steam specialties. The experience gained in original design, in reducing successful design to a manufacturing basis, and in purchasing for the supply business, called for the employment of one technical man after another, until the engineering and selling force of the company grew to a score of men, the majority technical graduates, the rest trained in practical salesmanship. Among such a force special experience and practical knowledge of many diversified lines of manufacture are found ready at hand for the advice and guidance of a prospective purchaser, who thus becomes the client of an engineering firm of wide experience in construction and purchase, as well as in design. The engineer or manager charged with the construction of a factory of new design or peculiar construction can find in such a force the best of practical advice and assistance on every point, from the first line of drawing to the last detail of equipment. The engineering fee is paid solely from the elimination of wasteful competition, the saving in time spent in unnecessary correspondence and visits, and in the investigation which will be necessary in obtaining the information which is already in possession of the force of engineering salesmen.

To supply the increased demand for the old-fashioned iron sheets the Empire Iron & Steel Company, Niles, Ohio, is installing four additional puddling furnaces. The company states that it has always done considerable business in this line and that the trade that it has established has taken practically all of its output. With the view of taking care of a larger trade in pure iron sheets the installation of equipment to produce a greater tonnage was decided upon.

Large Basic Open Hearth Furnaces

Features of Practice with Heats Averaging Over 87 Tons

BY THEO. D. STRAUB.

Recently in one of our technical schools, during a talk on the metallurgy of steel made in the basic open hearth furnace, the speaker mentioned to the class the fact that the limit in size for economical production with a cold charge had been approximately 65 tons. Thereupon a student contributed to the informal conversation by saying, "I was told the other day that there are furnaces in operation with a capacity of 80 to 100 tons," and he gave his authority.

It might be of some interest, therefore, to give a brief outline of the practice carried on in an open hearth furnace of this size at the new plant of the West Penn Steel Company, Brackenridge, Pa. At the outset it may be stated that the operation of producing mild steel in large quantities at a cast has proved so successful as to warrant the company in building a second furnace of the same type and size; the gas was turned on July 1, 1910, in this second furnace, which has been in use steadily ever since.

The first furnace built at Brackenridge, using natural gas as fuel, was put in operation October 15, 1909, and was operated with only minor repairs until the latter part of May, 1910, when slight repairs to the breast and slides were made. During this run 298 heats, averaging over 87 tons, were tapped from this furnace. It is rated at 80 tons, but the average was almost 10 tons more to the heat. A few heats have run up to 100 tons and one to 107, which was the largest—144 ingots. Moreover, after this run the furnace was only partly repaired. At the time of writing this—the latter part of December, 1910—the record of the furnace stands at 520 heats with original roof.

Construction, Charging and Melting

The principles of construction are essentially the same as those of the prevailing type of fixed or stationary furnaces—rectangular melting chamber, regenerators, checkers, pan of heavy riveted plate steel carried on beams supported on especially heavy foundation, walls, &c. The construction throughout is exceedingly heavy and solid because of the size of the charge, which runs up to 250,000 lb. The angle of the ports is about the same as on a smaller furnace. The use of natural gas as fuel is, of course, an advantage. The hearth platform is large and very convenient and ample room is afforded for the charging machine and general operations.

The charge of limestone, pig and scrap iron is brought up on an incline to the hearth platform in trains of boxes, which are unloaded in the furnace by an improved charging machine. The operation of charging requires an average of about four and one-half hours. Melting and manipulation of the fusion require about 10 to 12 hours more, so that under usual conditions a heat is expected every 13½ or 14 hours, though the time necessary to get proper results has been a trifle more or less.

After the steel has been refined to the right stage it is tapped from the furnace into a large, suitably lined ladle, which, motor driven, runs on a track over the pit. The whole melt is allowed to run out from the furnace, the slag running out of the ladle on the side opposite the molds into slag boxes so arranged that they take care of all the slag. The steel is immediately poured from the bottom of the ladle into the fountain of a group which fills eight molds at a time from the bottom, the eight molds of a group being suitably connected with runner brick on the floor of the oblong pit.

The ingots measure 10 in. square on the small end, 13 in. square on the large end, and are from 45 to 55 in. in height. They weigh in the neighborhood of 1750 lb. each, depending upon the size required. Immediately after tapping the furnace bottom and tap hole are cleaned

out by means of compressed air and charging operations are begun.

In stripping the pit the caps are first removed and then the electric crane overhead lifts four molds at a time until all are out. Then by throwing the chains over the farthest two ingots at each end a group of eight ingots is lifted by the crane from the pit to the scales, whence they are carried to the soaking pits as required. By means of old runners with their cores of steel, placed in each corner of the slag boxes, the crane also lifts the slag out when cool in one mass. It is then removed to its place for disposal in cars awaiting it.

Uniform Conditions Secured

The mild and semimild steel made in these furnaces is for various purposes, including high grade bars and sheets. Phosphorus has been eliminated to 0.01 and sulphur to 0.022. The arrangement is such that all operations are under excellent control of the skilled melter and his assistants, who claim it is not any harder to manipulate a large furnace than it is a smaller one, as conditions are more uniform. These furnaces were constructed by the S. R. Smythe Engineering Company of Harbison & Walker brick, and have been in continuous operation ever since started. There is no trouble in keeping the melt hot long enough during the operation of casting. The steel is of highly satisfactory quality and the cost per ton for labor, fuel, &c., compares most favorably with that of steel produced similarly in a smaller furnace, for the equipment of the West Penn Steel Company's plant is of the highest efficiency developed by modern practice.

Isolated Plant Protective Association.—The first steps toward the formation of an Isolated Plant Protective Association were taken at a meeting held in the Engineering Societies Building, 29 West Thirty-ninth street, New York City, on Monday evening, January 16. The aims of this association are to further the interest of isolated plant owners and to increase the number of such plants throughout the country. Organization was effected by electing Charles G. Armstrong temporary chairman, and Ernest Fieux temporary secretary. A committee was appointed to draw up a constitution and set of by-laws for the association, and will present its report at a meeting to be held on the evening of January 30, when the permanent officers will be chosen.

The American Wire Fabrics Company, Clinton, Iowa, has filed articles of incorporation, with an authorized capital stock of \$1,500,000. The new corporation will be successor to the American Wire Cloth Company and will manufacture all kinds of wire cloth, wire nettings, cables, nails, fencing and other wire products. The company has plans prepared for an extension to its plant which will practically double its capacity, and on which work will be commenced as soon as weather permits. The officers of the new company are as follows: H. W. Seaman, president; C. L. Hoff and A. F. Norrish, vice-presidents; C. K. Anderson, secretary and treasurer.

The Vierling Steel Works, Chicago, has been incorporated to carry on the business formerly conducted under the style of Vierling, McDowell & Co. The capital stock of the new company is \$250,000, an increase of \$150,000. This increase in capital was made necessary to cover expensive improvements that have been completed the past year in the company's plant at Chicago. The power equipment has been changed from steam to electric motors and a large increase has been made in the fabricating equipment, giving the company one of the largest plants in the West for the fabricating of structural material.

The Pittsburgh office of the Erie City Iron Works, Erie, Pa., has received an order from the American Sheet & Tin Plate Company for 400-hp. vertical water tube boilers to be installed in the Pittsburgh Works, at New Kensington, Pa.

Canada's Economic Upbuilding

TORONTO, January 14.—American and other onlookers of Canadian developments must be impressed with the rate at which construction is going on all over this country. The spirit of enterprise, active though it has been for the greater part of the decade that has just closed, never before entered so largely into what may be called town building and city improvement as it did in 1910. "Town building" and "city improvement" are not used simply in reference to public undertakings, but comprehend everything done, whether by municipal or private enterprise, that conduces to the production of wealth.

Railroad Building

For some years the conspicuous feature of the country's development was the building of railroads—the construction of the National Transcontinental, the rushing of the Canadian Northern from its interior system toward the Pacific and the Atlantic, and the double tracking and branch building of the Canadian Pacific Railway. There is still great activity in the carrying out of these railroad programmes. The Canadian Northern is now working on the long section across the Rockies. The Grand Trunk Pacific is also getting its mountain section farther advanced, and the Transcontinental Railway Commission is getting the gaps between its completed sections fewer and narrower. In a short time the Government will begin in earnest upon the construction of the Hudson Bay Railway, the route for which is already surveyed.

Railroad building in Canada is still very active, and will be throughout the whole of 1911, in which year it is expected there will be as much capital applied on this account as there was in 1910. There is at least \$100,000,000 of capital in hand for extensions and improvements of existing lines in 1911, to say nothing about capital that may be raised in the same account in that year.

New Transportation Projects

Three other huge transportation projects are promised by the Dominion Government. These, however, are for waterways. They are the improvement of the Welland Canal, the construction of the Ottawa and Georgian Bay Canal and the canalization of the Saskatchewan River. The first two will, it is estimated, cost \$200,000,000. The third will also be extremely costly.

To the last-named undertaking, the premier, Sir Wilfrid Laurier, strongly pledged his Government in several of the speeches he made in the course of his summer tour of the West. That and the Hudson Bay Railway he promised to set about very soon, and he assured the grain growers of his government's purpose to proceed with the Ottawa and Georgian Bay Canal in the near future. A few weeks ago he was waited on by two very large deputations of delegates from Boards of Trade, the one urging action in regard to the reconstruction of the Welland Canal, and the other with regard to the Ottawa and Georgian Bay Canal. He gave rather positive answers favorable to the enterprises.

There is no doubt that it is the Government's intention to go on with these works with the least possible delay; Sir Wilfrid Laurier expressing the hope that the reconstruction of the Welland Canal would be begun within the present fiscal year. That improvement means no less than the construction of a new Welland Canal large enough to accommodate vessels requiring upward of 20 ft. draft. The depth will be not less than 25 ft. The locks will be correspondingly large.

The Spirit of Construction Abroad in the Land

But though railroad building has continued on a very large scale, and though great new transportation undertakings are to follow the large ones now in a forward state, it is no longer solely upon works of this kind that capital is being fixed on an enormous scale. There is now a very large amount of new capital being widely diffused and applied in a diversified way. Hundreds of millions of dollars are every year being turned into land, mines, timber limits, factories, office buildings, dwellings, bridges,

roads, pavements, power developments, electrical plants, water works, machinery and equipment of all kinds.

This new capital, which is being transformed into productive instrumentalities, is not by any means altogether the accumulation of Canadian thrift and Canadian profits. On the contrary, it is for the most part the money of British investors. Backing the spirit of enterprise in Canadian and American promoters of industry here, British investors are furnishing the money for the great construction and reconstruction in progress in every Canadian city, every live Canadian town, and at places which a short time ago were no more than railroad town sites. There is some reason to fear, indeed, that the ease with which some of the municipalities and other borrowers are getting money is making them careless as to their use of it, and this may some day cause a reaction and a tightening of British purse strings. Though Lloyd George gets probably more condemnation than commendation from Canadian newspapers, it cannot be denied that, if he is scaring capital out of the United Kingdom, much of it is seeking asylum in Canadian investments that are proving very fruitful elements in the development of the country's resources.

The United States Contributing

For its present era of development Canada is also much indebted to men of enterprise in the United States, who in many cases take the initiative in opening up this or that center of natural resources, and in giving utility to this or that potential wealth. An enormous amount of American money has in this way and in the form of branch factories been transferred to the Canadian side of the border.

The great fact to be noted by all who take a commercial interest in Canada is that there is now going on here a vast amount of foundation work financed, for the most part, by British capital which never before was so unstintedly supplied for Canadian use as it has been in recent years. This foundation work will be the basis of permanent activities that will maintain large business operations. It will count tremendously in the making of the country. If this year the country is favored with good crops the forward movement in Canada will receive new impulses from British capital, from well to do immigrants and from new trade relations.

C. A. C. J.

The Massachusetts Institute of Technology Desires More Liberal State Aid.—Richard C. MacLaurin, president of the Massachusetts Institute of Technology, has drawn up a strong argument, making a pamphlet of 12 pages, urging a large increase in State aid to the institute. He gives the history of its establishment and says it was "the first school to equip a mining and metallurgical laboratory for the instruction of students by actual treatment of ores in large quantities; the first to establish a laboratory for teaching the nature and use of steam, and a laboratory for testing the strength of the materials of construction in commercial sizes; and the first in America to establish a department of architecture. It was also the first in this country to set up distinct and separate courses of study in electrical engineering, in sanitary engineering, in chemical engineering and in naval architecture." The needs of the institute are clearly set forth.

New Railroad Equipment.—The St. Louis Southwestern has placed its order for 1500 box cars and 500 furniture cars with the American Car & Foundry Company. The Baltimore & Ohio is reported to have divided an order for 1000 cars equally between the American Car & Foundry Company and the Haskell & Barker Car Company. The Vandalia is inquiring for 150 freight cars. The Great Northern, in addition to its recent order for 500 cars, has placed 400 hopper cars with the Haskell & Barker Car Company. Recent locomotive orders include 10 from the Seaboard Air Line for the Baldwin Locomotive Works. The Pittsburgh & Lake Erie is reported in the market for 24 locomotives.

The New England Foundrymen's Association

The annual meeting of the New England Foundrymen's Association, at the Exchange Club, Boston, January 11, was made a memorable occasion by the presence of a large delegation of fellow foundrymen from Philadelphia and other Pennsylvania cities, Baltimore, Newark, N. J., and Wilmington, Del. The meeting was the largest in the local association's history, some 200 members and guests enjoying the dinner and the excellent after-dinner speaking. At the business meeting these officers were elected: President, Herbert E. Wetherbee, James Hunter Machine Company, North Adams, Mass.; vice-president, Charles L. Newcomb, Deane Steam Pump Company, Holyoke, Mass.; treasurer, George H. Lincoln, G. H. Lincoln & Co., Boston; secretary, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge, Mass. Executive Committee: Robert C. Bird, Broadway Iron Foundry, Cambridge; C. A. Reed, Hickman, Williams & Co., Boston; J. C. Hosford, Magee Furnace Company, Boston; Charles L. Nutter, Old Colony Foundry Company, East Bridgewater, Mass., and F. W. Stickle, Capitol Foundry Company, Hartford, Conn. M. A. Hanna & Co., Cleveland, and the Carborundum Company, Boston, were admitted to membership.

Henry A. Carpenter, Providence, R. I., was the toastmaster, and the speakers included Mayor John F. Fitzgerald of Boston, Thomas Devlin, president of the Philadelphia Association, and Howard Evans, its secretary; Dr. E. E. Brown, Philadelphia; Dr. Wilmer Krusen, Lebanon, Pa.; Col. H. Anthony Dyer, Providence; Hon. Geo. W. Gardner, Collector of the Port of Providence, and Carlisle Mason, Philadelphia. A male quartette and an orchestra furnished music during the dinner.

The visitors included the following from Philadelphia: Thomas Devlin, Thomas Devlin Mfg. Company; E. E. Brown and C. R. Brown, E. E. Brown & Co.; Josiah Thompson, J. Thompson Company; J. H. Sheeler, Sheeler-Hemsher Company; Carlisle Mason, Nelson Valve Company; J. I. Fasey, Philadelphia Chaplet Company; Frank Krug, Joseph Dixon Crucible Company; George C. Davies, Pilling & Crane; John Alexander, Harrison Safety Boiler Works; Howard Evans and A. W. Warren, J. W. Paxson Company; H. M. Plitt, Plitt & Co.; C. E. Bertie, Rogers, Brown & Co.; N. Ayers; W. W. Parry, American Pattern Company; L. U. Parke, Naylor & Co.; Oliver Gee, Matthew Addy & Co.; Wilfred Lewis, Tabor Mfg. Company, and W. B. Robinson and A. A. Miller, *The Iron Age*. Others of the party were: R. S. Buch, A. Buch's Sons Company, Elizabethtown, Pa.; R. A. Talmie, Lobdell Car Wheel Company, Wilmington, Del.; J. S. Stirling, Hilles & Jones Company, Wilmington; Mr. Barlow, Newark, N. J.; D. T. Jones, Wilbraham-Green Blower Company, Pottstown, Pa.; Dr. Wilmer Krusen, Buchanan Foundry Company, Lebanon, Pa.; W. H. Ridgway, Craig Ridgway & Sons Company, Coatesville, Pa.; H. D. Harvey, Monarch Engineering & Mfg. Company, Baltimore.

Our Foreign Trade Makes a New Record

The record of foreign trade of the United States in the year ended December 31, 1910, as reported by the Bureau of Statistics, Department of Commerce and Labor, shows larger imports than in any preceding year, larger exports than in any year except 1907, and a larger total of imports and exports combined than ever before.

The total value of imports for the year was \$1,562,807,622, against \$1,475,520,724 in 1909. The exports were \$1,864,411,270 in 1910, against \$1,728,198,645 in 1909, and \$1,923,426,205 in 1907. Imports and exports combined amounted to \$3,427,218,892, which exceeded by about \$80,000,000 the former high record year, 1907. The excess of exports over imports was \$301,603,648, against \$252,677,921 in 1909.

Over \$200,000,000 worth of iron and steel manufactures were exported from the United States during the calendar year 1910, a larger total in value than in any earlier year. The largest exportation prior to 1910 was

\$197,000,000 worth in the calendar year 1907, while in 1902 the total was \$98,000,000, and in 1903 \$99,000,000, thus indicating that the exports of 1910 will be more than those of 1902 and 1903 combined. The total value of all manufactures, including those of iron and steel, exported during the calendar year 1910 aggregated about \$830,000,000. Iron and steel manufactures form in value nearly one-fourth of the exportation of manufactures of all kinds. In addition to this large exportation to foreign countries the shipments of iron and steel to Porto Rico, the Hawaiian Islands and Alaska aggregated about \$12,000,000.

December exports were valued at \$227,155,049, being larger by \$20,000,000 than in any other month in the history of the export trade. The December imports were slightly greater than those of November, but slightly less than those of December, 1909.

Molders' and Stove Founders' Conference

A full report of the annual conference between representatives of the Stove Founders' National Defense Association and the International Molders' Union of North America, held at Chicago in December, is given in the *International Molders' Journal* for January. The meeting brought out some very sharp differences and it seemed at times that no agreement could be reached. However, an advance of 5 per cent. on present molding prices was agreed upon, making 30 per cent. on board prices instead of 25 as heretofore. It was agreed that sections where a different percentage has been paid will pay an equivalent advance. The advance applies to all stove and furnace molders, including day workers, and any new device upon which a molder is employed. The question of hours caused a long discussion. The agreement reached was that on and after April 1, 1911, the last ladle of iron will be given to the molder within one and three-quarter hours after the seven hours of molding.

For several years the question of dirty iron has been agitated by the representatives of the Molders' Union, who claimed that the molders were not responsible for work lost from this cause. On the other hand, the stove founders have contended that the fault was with the molders and that the bad work was due to careless pouring. The discussion on the subject at Chicago brought out the usual differences of view, but it was finally decided that where there is an abnormal loss of work in particular cases, the secretary of the Stove Founders' Association and an officer of the Molders' Union must promptly take the matter up, and where investigation shows that the work is lost through no fault of the molder he shall be paid in full.

The issue raised over molding machines was considered at length. The stove founders claimed that their members had never been able to operate a machine with a molder because of the construction put upon the agreement on this subject by officers of the Molders' Union. The latter insisted that the expert who was to make a pace for machine molding prices must come into the shop a perfect stranger and that the first day's work should be used to determine the price. The stove founders' understanding was that an expert could be employed for any length of time, so as to become familiar with the work, and when ready to make a demonstration would then put up a day's work, using that as the basis for a price fixing. Assurances were given from both sides that a more liberal construction would be put on the clause relating to molding machines, and it was agreed that an immediate effort be made both by the firms and the molders to price all work now made on molding machines. It was agreed that the normal output of the machine must be taken into consideration and a demonstration made whenever this is necessary. When the firm and the Price Committee disagree the question must be submitted to the officers of the two organizations for adjustment.

The Empire Shipbuilding Company, Buffalo, N. Y., has been awarded contract for the construction of a twin screw steel passenger steamer, 210 ft. in length, for the Buffalo & Fort Erie Ferry & Railway Company.

Standards of Efficiency in Shop Operations*

How the Compensation of the Employee Should Be Determined—The Element of Justice in Scientific Management

BY HARRINGTON EMERSON.

Unforeseeable fluctuations in cost, uncertainty as to cost may ruin a manufacturer. Piece rates have, therefore, in many instances, been insisted on, not from any desire to underpay the worker, but to substitute certainty for uncertainty. Nevertheless, whatever the original motive, the result generally is that a manager having freed himself from worry about the way the worker is putting in his time, has himself more time to worry about the amount the piece rater is earning. The manager starts out by saying that the worker is not giving him enough for the \$3 paid a day, only five pieces, so he puts him on piece rate, based on what the manager thinks is a fair cost, say, \$0.30 a piece for 10 pieces a day. The worker hustles, standardizes conditions and operations, gets out 15 pieces a day, and the manager is horrified to find he is earning \$4.50 a day and forthwith tries to cut the piece rate to \$0.20. The worker resents this, but in the long run he is helpless. He may stand pat on his production and refuse to do even what is reasonable. This would work if he were alone, but there are others who will not stand pat. He may even fight against a manifestly just reduction in rate, as when high speed steel was introduced. In the end, in old established industries, men and women are speeded up beyond health and justice. I have known men in one of the largest concerns in the country, a well managed concern, to come to work at 4 a.m. because otherwise at the prevailing piece rates they could not make adequate wages. I have seen girls produce 60,000 pieces a day, month after month and year after year, until vitality was sapped.

In both these establishments for many years that abominable, iniquitous plan had been pursued of setting a mental limit to earning power, of holding out the bait of piece rates, of keeping tab on maximum performance, of dividing maximum output into preconceived wage rate and utilizing every opportunity to cut the price. In one great plant when I was checking over piece rates, I said: "Your piece rates are evidently very unscientific, since the same man earns one week \$25 and another week \$40." "Not at all," said the manager, "you do not understand the scheme. The normal wages for these men is \$30 a week, but by the occasional bribe of \$40 we run them along at \$25. They only average in pay \$28. Their pay is really \$2 a week below what they are entitled to and would receive were it not for our plan."

There may be honest and fair piece rates, but I have never encountered them, and the influences are all against them when an interested party sets both time and price.

Not 50 years ago we abolished human slavery, only five years ago I heard the general superintendent of a great concern boast that he took boys, whose parents supposed they were to learn the trade, placed them in front of a machine, stationed for a few days a teacher behind them who held their wrists and manipulated their hands until the boy could do automatically the repeated job as fast as the machine could work. The superintendent boasted that he got as much out of a \$0.10 an hour boy as out of a \$0.30 machinist.

Only a few days ago it was reported that the Carnegie Company in Pittsburgh was trying to break up the practice of certain bosses and foremen who regularly levied blackmail on those under them, each applicant for work paying a cash bonus to be put on a job and paying a commission each week on his wages.

Compensation on a Just Basis

All this shows that two elements enter into compensation: First and all important is the moral element; secondly, and less important, the method.

Made wary by all the abominations of the past, I mistrust self-interest whether in employer or employee. I desire to see both adopt a method of compensation that will reduce the opportunity for injustice to a minimum, yet benefit them both.

I, therefore, do not submit any method or device for paying wages, but certain principles in the hope that they may be discussed in the spirit in which they are proposed. They are intended to substitute justice for selfishness, co-operation for antagonism, certainty for uncertainty, economy for wastefulness—moral aims every one of them. If I were permitted to apply these principles to a large shop it would not be necessary to discharge a single man, nor to decrease his hours or lessen his wages. I would compel no man to work any harder than his inclination and I would discourage excessive effort. Every man would receive higher and higher wages year after year, simply because he stayed, each man at the end of service would receive service pension, the average earnings per hour per man would be much higher than elsewhere, the labor costs per unit far lower, the output be increased probably threefold, giving employment to a greater number of workers, the total unit cost greatly reduced, all operating costs would be accurately and reliably predetermined not only before work was begun, but long in advance, say, 12 months. Not having to fight and cheat each other, workers not having to worry about their positions, nor managers having to worry about cost uncertainty, both could put in more gray matter eliminating unnecessary and, therefore, wicked waste. The happiness and morale of the whole shop would be very high.

Principles of Efficiency

To begin with the last assertion, the morale and happiness of the shop. Before even considering the subject of the worker and his pay, I would be prepared to apply through a competent form of organization the 12 principles of efficiency, which are:

1. Definite plans and ideals.
2. Supernal common-sense.
3. Competent guidance.
4. Discipline.
5. The fair deal.
6. The dispatching of work.
7. Reliable, immediate and adequate records.
8. Determination of standards.
9. Standard practice instructions.
10. Standardized conditions.
11. Standardized operations.
12. Efficiency rewards.

Every proposition, every plan, every method and device that runs counter to any one of these principles is to be rejected without further waste of time. Accepting the principles I would plan as to

The Worker and His Pay

The first essential for success and happiness in a working life is that the worker shall like his work and be competent to do it. It is as great a disaster for a boy to start in a trade for which he will never have liking, in which he will never be able to excel, as it is for a girl in early womanhood to make an unsuitable marriage. In either case it generally means a shipwreck of life. There should be a protected shop, a shop closed against any not anxious and fitted to work in it, a shop into which

* Extracts from an address on "Justice, Common Sense and the Pay Roll," delivered at the New York meeting of the National Civic Federation, January 12, 1911.

it would be a coveted privilege to enter, a shop it would be a catastrophe to leave.

The basic rate of wages should be for each trade the current rate of the district and time. The basic scale may from time to time have to be modified. Scarcity of labor may force it up, lower wages elsewhere may force it down; it is the most delicate of all wage questions, and it will be years before it can always be peacefully settled.

Standard Cost of Work

Whatever his real costs may be, a manufacturer is entitled to know what his standard costs are. He must know the quantity and quality of his materials, the quantity and quality of his supplies, the quantity and quality of labor required, the quantity and quality of equipment required. He must know the cost per pound of his materials and supplies and the amount that he must use, he must know the standard wage rate per hour for the operation and the hours required to do it, he must know the cost of equipment charges per hour and the hour's equipment is busy. The wise shop manager must therefore determine time equivalents for all operations. This necessity, this obligation to determine standard and actual costs has no direct connection with any method of paying or varying wages. Having determined time standards he will exert himself to the utmost to make them easy of attainment. He will see that the shop is hygienic, safe, comfortable, well lighted, that machines and tools are maintained in first-class condition, that work is abundant and always ready for the man, that castings are not too hard, that crane and other helper service is prompt. The wise manager will in addition have both ears open for every suggestion coming to him from those closer to the work than he is. The blue prints and other instructions and directions will be plain; there will be shop standards of high and decent excellence.

In such a shop it would not be possible for the following to happen—a record of actual experience. A piece of steel about the size of a visiting card was on a shaper. Although $1\frac{1}{4}$ in. would have been sufficient, the stroke was actually over 4 in. The speed of the stroke was exceedingly slow, not more than one-third of what it ought to have been. The tool had a diamond point, and was taking off 1-32 in. each stroke when a round-nosed tool could easily have taken one-eighth. The operator took in succession four cuts, each a mere film, when one rough cut and a scraping finishing cut would have answered. The total efficiency of the operation was 1.25 per cent. This operation was taking 80 times as long as it should. It is to call the attention of all concerned, from worker up to manager, to losses of this kind that standards and instructions are required. The worker was not vicious, he had simply not been told, he had no incentive to think. A standard cost statement will show where every inefficiency occurs. There are 12 different inefficiencies, and only one of them is due to the worker; the other 11 are due to the managers.

In determining a rational standard of speed or endeavor for the worker the scientific expert knows that there is a speed which is a pleasure and a joy, a right speed, also a slow speed that is killing by its dullness and a fast speed that is killing by its strain. When thousands of workmen rode on their bicycles to their work, was there not an average speed voluntarily adopted as more pleasant? It was not 5 miles an hour, it was not 20 miles an hour, but somewhere between 10 and 15 miles, according to the wind, path, grade and personal feeling.

Costs should be standardized by those who are qualified. The manager cannot arbitrarily set standards, his work is cut out for him in eliminating the 11 inefficiencies for which he and not the workers are responsible, and when it comes to doubt as to standard time set for cost determination, if I were a manager, I would be willing to refer the question to an arbiter qualified by long experience with the conditions, machines and work to pass on the reasonableness of the time set. It has been my experience with committees of the shop men that they were usually not lenient enough, that they did not sufficiently consider all the causes that might lengthen the time that they insisted on times too short, therefore I prefer a competent, disinterested arbiter.

Promotion and Efficiency Reward

I have spoken of a basic wage for each trade. The same basic rate for every hour of a whole lifetime is a hopeless kind of outlook. Everybody else can improve his condition. A permanent fixed rate is a relic of status, one of the slimy traces of slavery. In my shop there would be variations above and below the basic rate, an apprentice rate below base the man who had served his time would receive the basic rate, but after three or five years with added years of service would come an addition to the hourly rate. The amount of the increase I cannot state. Possibly the basic rate might double in 40 years. It is for a principle, not for a specific amount I am contending. A man who has worked long and well in a plant has acquired a special value which can economically be recognized. Promotion is, however, not to be limited to a small advance in pay with increasing years. For a competent, steady man there ought always to be promotion into a higher rank with corresponding higher pay. Scientific management requires fewer elementary workers, more high class workers, so the side chances of promotion are increased.

There is yet a third form of promotion, one of efficiency reward, the most important of all. Some bicycle riders prefer a 15-mile gait, others a 10-mile gait, as a matter of personal pleasure. There are men whose pride it is to work fast and accurately; there are other men who hate insufficient effort. If there are standards scientifically set, reasonable, attainable standards, if a man will act as his own foreman, it is proper that the continuous attainment of standard should be individually rewarded. If a man does less than standard he is neither blamed nor discharged; if he does more than standard, all the time he saves should be paid for at full rate, and in a plan I have often recommended, between 10 miles an hour and 15 miles an hour, to use this as an example, he is given an increasing individual reward.

Fifteen miles is reasonable but not compulsory. At 10 miles he receives full wages per hour, let us, say, \$0.30, but at 15 miles he receives \$0.36, and if he chooses to ride 18 miles he receives for his hour 0.42.

In a well-organized shop under this system, with over 800 workers, no new man was admitted who was not at least capable of riding 10 miles an hour, and while most of the workers showed efficiencies between 80 and 120 per cent., there were some as low as 30 per cent. There was one who attained 200 per cent. It was his choice, his pleasure never to make a false move, to work with both hands at once, and it never entered the manager's head to raise the standard because this man was a marvel of his class.

Another job had been standardized at 0.9 hours or 54 minutes. A master machinist did it regularly in 51 minutes, and was ultimately promoted to a foremanship. An apprentice in his last month replaced him, and did 1296 pieces in 24 minutes each. He was a wonder to watch. His phenomenal time, high earnings and consequent low cost prompted an investigation. The work was most carefully time studied, and it was the unanimous verdict that the standard time of 54 minutes should stand, as there was probably not another man in the world who could do the work in 24 minutes. In this shop and under this system no one was paid by the piece or given a bonus for any individual job. He was given a bonus proportionate to his average monthly efficiency if it exceeded two-thirds of the time standard.

The last volume of the *Proceedings of the Master Mechanics* describes a fireman who shoveled in 1 hour 2088 lb. of coal. The locomotive smoked, the pop valve hissed, water and fuel, money and effort were being needlessly wasted. The next hour the locomotive did more work, but there was no smoke, no escaping steam, the fireman shoveled only 720 lb. of coal. He had performed only one-third as much manual work, but he had backed up his muscle with thought and intelligence. He deserved higher pay.

Results of Efficiency Management

Efficiency management, therefore,

1. Selects men who will find pleasure and delight in their work.

2. It guarantees them a basic hourly rate.
3. It gives them higher pay from year to year.
4. It pensions them at the end of service.
5. It gives them many opportunities for promotion.
6. It establishes scientifically the 12 elements of standard cost and puts it up to the manager to eliminate the losses due to 11 of these elements.
7. It gives graduated efficiency reward to every worker from apprentice boy up to president.

This system puts responsibility where it belongs, sets no definite tasks, encourages no special stunts, does not reward specifically special stunts.

It is evident that if there are 12 different items of cost and that 11 of them can be lessened by scientific management, it must be for the purpose either individually or collectively of increasing human welfare, of paying more to the workers per hour. There is no possible escape from this conclusion. The public may receive all the benefit of waste elimination temporarily, financial backers may appropriate more than a fair return, but the men of all others who deserve immediate recognition are those who direct and do the work, who aid in waste elimination. Therefore, under the efficiency system the public may profit by lower prices, sellers may profit because of greater output and lower overhead charges, but first and foremost the man who has substituted brain activity for muscle activity ought to receive increased pay.

The Standard Oil Company's Tin Plate Purchase

The recent buying of American tin plates by the Standard Oil Company, as noted in *The Iron Age* of January 12, and the great strength in the British tin plate market, are commented upon in London trade journals. The total of the Standard Oil Company's late purchases from domestic producers is 260,000 boxes, 200,000 boxes for the trade in which drawback plates have been used and 60,000 boxes for direct export. The London *Ironmonger* of January 7 says of the British tin plate situation:

"The tin plate market continues to show unabated strength, and very high prices are being paid where buyers require prompt deliveries. The demand is of an all round character, and the trade seems to be on so firmly established a foundation that makers become more and more independent from week to week. As much as 16 shillings has been paid for quarters for prompt delivery, but it is hard to get supplies even at that figure. Some of the shortage in prompt deliveries seems to arise from the fact that certain works have sold the output of their new mills and, being unable to get anything like a proper return from them, have been unable to deliver, and buyers have had to purchase against them. The bulk of the business passing, however, is for July-December, Liverpool interests, it is reported, being particularly active buyers. Some very extreme figures are asked by the most independent works even for far forward deliveries. For instance, while 28 shillings 6 pence to 29 shillings, f.o.b. Wales, is very generally asked for 20 x 28 plates for delivery up to December next, we hear of actual business at 28 shillings 1½ pence, July-August-September, f.o.b. Swansea. There is an excellent demand for light wasters for Japan. Makers continue to experience the utmost difficulty in securing adequate labor. The Standard Oil Company is reported to have booked 200,000 boxes with the United States Steel Corporation for January-February-March. It is rather fortunate for the buyer that it was able to place the business in the United States, for it certainly could not have secured anything like this quantity for early delivery from Welsh makers."

The United States Radiator Corporation has decided to move the general offices of the company from Dunkirk, N. Y., to Detroit, Mich. The company has an office force of 150. The legal headquarters of the company for the election of directors and the meetings of the stockholders of the corporation will continue to be in Dunkirk. F. W. Herendeen has been elected a director to fill the vacancy caused by the death of his brother, E. G. Herendeen.

Iron and Steel Production for Twenty-Five Years

The accompanying chart shows in a graphic way the expansion of iron and steel production in the United States in the past 25 years. It was prepared particularly to indicate, much more vividly than is possible by the use of figures merely, the quantitative relation of the important forms of product—pig iron and steel ingots; then the relation of open hearth to Bessemer steel, and finally, the percentage of steel ingots which enters into rails. The approximation of the steel ingot output to that of pig iron is the most marked feature of the diagram. In the first six years covered by the exhibit the pig iron production averaged more than twice that of steel. Then for six years it averaged about 50 per cent. more. The course of the two lines after 1897 was due not simply to the fact that steel became increasingly prominent, but to the fact that basic open hearth steel made a phenomenal advance, and hence the steel tonnage received a strong reinforcement from the use of old material. It will be seen that in the past five years the production of steel has averaged only about 2,000,000 tons a year less than that of pig iron.

Another feature of the plotted lines will attract attention—the close parallelism, through about half the period, of the line for total steel ingots and that for Bessemer ingots. As the open hearth steel line grew steeper the interval between total ingots and Bessemer ingots widened. Then came the long predicted crossing of the open hearth line to the upper side of the Bessemer line, followed in 1908 by the descent of the latter at a more acute angle than that of the open hearth, and in 1909 by a much sharper ascent of the open hearth than the Bessemer line.

The steel rail production is plotted chiefly to show how relatively unimportant is its percentage of the total output of steel, and how much greater this percentage was in the first half than in the second half of the chart period.

The position of the pig iron line for 1910 is already quite closely determined, and it is, therefore, plotted on the chart. The line for total steel ingot production as it crosses the last space on the chart will probably parallel closely that for pig iron, indicating for 1910 an output slightly above 25,000,000 tons. The open hearth and Bessemer lines will probably have a slight slant upward, while that for rails will be nearly horizontal, though terminating at a point slightly above the 3,000,000-ton mark. The production statistics for the period covered by the chart are as given in the following table:

Production of Pig Iron, Steel Ingots and Rails for the Past 25 Years.—Gross Tons, 1 = 1000.

	Pig iron.	Total steel ingots.	Bessemer ingots.	Open hearth ingots.	Steel rails.
	Thousand tons.	Thousand tons.	Thousand tons.	Thousand tons.	Thousand tons.
1886.....	5,683	2,562	2,269	218	1,579
1887.....	6,417	3,339	2,936	322	2,119
1888.....	6,489	2,899	2,511	314	1,390
1889.....	7,603	3,385	2,930	374	1,513
1890.....	9,202	4,277	3,688	513	1,871
1891.....	8,279	3,904	3,247	579	1,298
1892.....	9,157	4,927	4,168	669	1,541
1893.....	7,124	4,019	3,215	737	1,130
1894.....	6,657	4,412	3,571	784	1,017
1895.....	9,446	6,114	4,909	1,137	1,300
1896.....	8,623	5,291	3,919	1,298	1,117
1897.....	9,652	7,156	5,475	1,608	1,645
1898.....	11,773	8,932	6,609	2,230	1,977
1899.....	13,820	10,639	7,586	2,947	2,271
1900.....	13,789	10,188	6,684	3,398	2,384
1901.....	15,878	13,473	8,713	4,656	2,872
1902.....	17,821	14,947	9,138	5,687	2,941
1903.....	18,009	14,534	8,592	5,829	2,991
1904.....	16,497	13,859	7,859	5,908	2,283
1905.....	22,992	20,023	10,941	8,791	3,375
1906.....	25,307	23,398	12,275	10,080	3,977
1907.....	25,781	23,362	11,667	11,549	3,632
1908.....	15,931	14,023	6,116	7,836	1,920
1909.....	25,795	23,955	9,330	14,493	3,023
1910.....	27,275*	.....	.....	.....	.....

* Estimated.

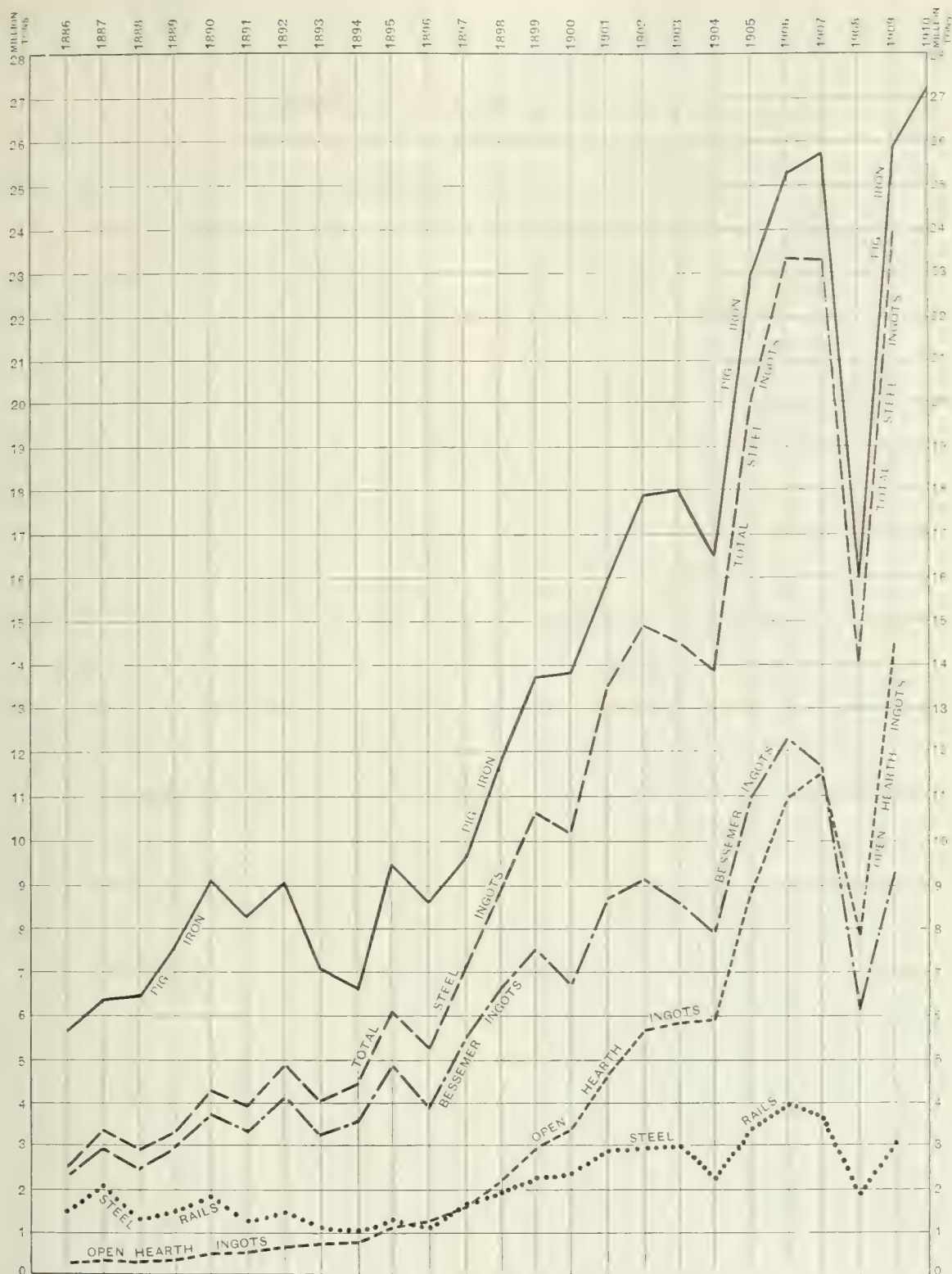


Chart of Production of Iron and Steel in the 25 Years 1886-1910.

The Tariff Commission Convention

The Tariff Commission Convention held at Washington, D. C., January 11 and 12 was an enthusiastic gathering of men prominent in varied branches of commercial and industrial activity. Numerous addresses were delivered in favor of a permanent Tariff Commission. Among the speakers at the banquet on the evening of the 12th was President Taft, who openly indorsed the Longworth bill, making a strong argument in its favor. Henry R. Towne, president of the Yale & Towne Mfg. Company, delivered an able address on this occasion, in which he demonstrated the great necessity of departing from the time honored but unsystematic method of tariff revision. He said in part:

As in engineering and modern industrial development facts have replaced empirical beliefs and rule of thumb practice, so in the tariff, which vitally affects all industries directly, and all other interests indirectly, we need and should have a basis

of solid facts on which to build. It will be the function of the Tariff Commission to ascertain the essential and underlying facts, for the information, use and guidance of Congress. In this regard the issue has been misunderstood and befogged. Under the Constitution only Congress can legislate. It cannot and should not delegate this power and responsibility. The functions of the Tariff Commission will be closely analogous to those of a commissioner, appointed by a court to take evidence and to make findings of fact based thereon. On these findings, so reported, the court, or in this case the Congress, bases its decision and decree.

The convention unanimously adopted a resolution demanding of Congress the passage at the present session of legislation creating a permanent Tariff Commission "having functions and compensation analogous to the Interstate Commerce Commission." A resolution indorsing "the proposal of President Taft that hereafter the work of tariff revision, whenever required, shall be accomplished schedule by schedule, or, preferably, subject by subject," was also passed unanimously.

Steel Manufacturers Confer on Trade Conditions

Sentiment Against Reductions in Prices of Steel Products at This Time

The dinner given by Chairman E. H. Gary of the United States Steel Corporation at the Waldorf-Astoria, New York, Wednesday evening, January 11, was attended by representatives of nearly all the steel companies of the country and of firms prominent in other departments of the iron industry. It was a notable gathering, not only because so representative, but also because of the interest taken in it by buyers of iron and steel. While the sentiment of the leading manufacturers on the policy of maintaining prices under present conditions was quite generally known before they came together in New York, there was just the amount of uncertainty that might be expected in the absence of any formal declaration, as well as in the absence of an actual canvass of opinions.

There were 90 participants in the dinner, and more than one-third of those present were called upon to speak in the latter part of the evening. One of these was John G. A. Leishman, Ambassador to Rome, who was seated at Judge Gary's right. Next to Mr. Leishman was James A. Farrell, president-elect of the United States Steel Corporation, who was called out early in the speaking. Strong expressions of regard for Mr. Farrell were made by many of the speakers, and of warm approval of his selection. In the same connection President Corey came in for commendation from various manufacturers who referred to their business relations with him.

An interesting feature of the dinner was the introduction by Judge Gary of Hon. James T. McCleary, who has just been elected secretary of the American Iron and Steel Institute. This office has been filled since the organization of the Institute by W. J. Filbert, comptroller of the United States Steel Corporation, pending the choice of a permanent secretary giving all his time to the work.

Expressions Concerning Prices

The after-dinner speaking was quite informal. Some of those who made remarks were called upon by Judge Gary, others were called out by various members of the company. The expressions of the manufacturers on the advisability of maintaining present prices for steel products were uniformly favorable. In some cases figures were presented, showing that prices now ruling are low in comparison with those of other recent periods. The level of 1907, it was stated by one speaker, was about \$7 a ton above that of to-day on important rolled products, apart from rails, and wages to-day are higher than in 1907.

Among those called upon to speak were: L. E. Block, W. L. Brown, J. G. Butler, Jr., J. A. Campbell, H. S. Chamberlain, E. A. S. Clarke, A. C. Dinkey, H. Du Puy, B. F. Fackenthal, Jr., J. A. Farrell, E. C. Felton, A. I. Findley, T. W. Guthrie, E. G. Grace, A. F. Huston, O. N. Hutchinson, J. H. Hoyt, I. A. Kelly, Willis L. King, Samuel Mather, Geo. W. Perkins, Veryl Preston, Chas. S. Price, H. F. Perkins, David Reeves, W. A. Rogers, James R. Roe, I. M. Scott, W. P. Snyder, Powell Stackhouse, C. J. Stark, John A. Topping, Geo. M. Verity, F. S. Witherbee, F. W. Wood, and W. P. Worth. A cablegram sent from London by Charles M. Schwab was read. It said: "Hope each will see advisability of maintaining present situation, as I believe active demand at hand and change will delay."

Following the dinner Judge Gary gave out the statement below:

"The dinner of the evening, given to the leading steel manufacturers of the country, was largely a social event. Many different topics were referred to by the various speakers. However, the subject of prices was more or less referred to, and without exception the opinions were opposed to any reduction. Figures were given tending to show that the present prices of all steel commodities are not only reasonable, but very low. I do not think any

reductions are contemplated. As to business prospects, the consensus of opinion as expressed was very favorable."

Judge Gary's Remarks

In introducing the subject which most of those who followed him touched upon, Judge Gary spoke as follows:

GENTLEMEN AND FRIENDS: It is a very great pleasure and happiness to be here this evening in your company. In my short experience in life there have been no occasions which to me have been more enjoyable in the truest sense than the enjoyment of these meetings. I am not prepared to make a set speech, although I ought to be; but before I take my seat I am going to make some remarks which I think are pertinent to our interests, and after that I am going to call on a few others to speak. I do not know whom I will call upon. I have made no selection. Every one of you is subject to draft, but comparatively few of you, in view of the limited time, will actually be called upon. It is not expected that we will have any formal addresses. No one will be blamed if he does not make a speech that is entirely satisfactory to himself.

A 95 PER CENT. REPRESENTATION.

I have many letters from members of our profession throughout the United States who are unable to be here this evening. Some of my friends here estimate that at least 90 per cent. of the iron and steel industry of this country is represented in this room. If those absent who have written to me expressing their confidence in us and their desire to co-operate with us and their hope that no changes in the course which we have been pursuing shall be made, were present here, there would be represented of the iron and steel trade in the United States more than 95 per cent. of the total. That, I think, gentlemen, is most remarkable. I believe that in no line of business in the world at any time has there been such a large percentage of those engaged in a business as the percentage in this country who are going along day by day, hand in hand, pursuing the same course, anxious to promote the welfare of all the others.

THE WAY TO DEMORALIZATION.

At this particular time there is not in this country a demand for more than 50 per cent. of the total producing capacity in our lines. It is obvious from this statement of fact that there is not enough business to go around, and that there is no possible way of protecting one another and thereby protecting oneself except to submit ourselves to the conditions as they exist, and to take and be satisfied with our fair proportion of the business which is offered. It is not necessary, in this presence, to say that if one individual or company engaged in this business tries to secure or actually secures for a day or a week more than a fair proportion it simply means that in the long run that man or that company gets no more than his share; he has accomplished nothing whatever except to bring about demoralization, reduction of prices and heavy losses to all concerned, including himself. This is a logical proposition. No man is smart enough to long continue a practice which gives to him more than his fair share of business. He may succeed in one trade, he may get away from his friend or competitor his customer for a single transaction or two transactions; but it is just as certain that the competitor whose business has been taken away will the next day or the next week enter within the domain of the one who has first trespassed, taking away his business and adjusting, equalizing, bringing about at the end of the year or at some definite period simply the natural division of business and at greatly reduced prices. And there is no exception to this unless it be the basis of the strong man or the strong company having the advantage over his

neighbors, and he gets the business only by means which result in forcing his competitor out of business, and in that way antagonizing the public interest and earning the condemnation, not only of the public, but of the very government itself. Therefore, it is impracticable.

HOW LEGALLY TO CO-OPERATE.

Now, in view of the fact that we have no right legally to enter into any arrangement by direct or indirect means which enables us to maintain prices, to divide territory, to restrict output, or in any way to interfere with the laws of trade or to stifle competition, and in view of the fact that we cannot legally directly or indirectly do anything which may be construed to be in restraint of trade, and, therefore, are relegated to the one position of treating each other on the basis of fair, just and equitable treatment, it behooves us to use the greatest care in the exercise of our rights and in the transaction of our business, so as to make it absolutely certain that day by day, and with reference to every transaction, we are certain to recognize the rights of our competitors, our friends, and the obligations which we are under toward them.

I say in this presence to men who know by long experience—men who know to a demonstration that what I speak is true and logical—that we have something better to guide and control us in our business methods than a contract which depends upon written or verbal promises with a penalty attached. We as men, as gentlemen, as friends, as neighbors, having been in close communication and contact during the last few years, have reached a point where we entertain for one another respect and affectionate regard. We have reached a position so high in our lines of activity that we are bound to protect one another; and when a man reaches a position where his honor is at stake, where even more than life itself is concerned, where he cannot act or fail to act except with a distinct and clear understanding that his honor is involved, then he has reached a position that is more binding on him than any written or verbal contract.

SUSPICION HAS GIVEN WAY TO CONFIDENCE.

In years gone by—and not many years since—many of us at least entertained toward others a feeling of suspicion, or, if not as bad as that, we certainly lacked entire confidence in one another. I know at the magnificent reception which you gave to one of your number a year ago last fall some of you were frank enough to say that even three years ago, when we met in this building under circumstances that were very uncertain concerning the future, you had feelings of doubt, if not of distrust, in regard to the real motive of the one who was bold enough to invite you to come together to discuss our mutual interests. And no doubt what was said at that time was true of many others who participated in the considerations of that eventful year, and that all of us to some extent had a feeling of distrust, or, at least, of doubt.

But I venture the assertion that there has been a change in this respect, and those in this room, particularly those who for the last three years have been coming into close contact with others, meeting them day by day, and having opportunity to know what was in the mind and what was the intention of his neighbor, have been forced to reach the conclusion that their competitors and neighbors were honest and fair minded.

Is it any wonder that such as I, coming a few years ago from another profession, having spent my time in other lines of activity, coming into this business without knowledge of it or acquaintance with those connected with it, groping along, in more or less uncertain paths, but eventually reaching the position which we have reached in our travels, so that we can have and do have absolute confidence in one another—willing to lay our business down upon the table for the inspection of our neighbors—is it any wonder that I should be elated, that I should be happy, that I should be proud of the fact that I am associated with such as you; that in representing the interests of a large corporation I can do business with so many men of prominence, education, experience, high standing and repute in the community, feeling all

the time that I and the interests I represent are absolutely safe in your hands? It is a proud moment in my life, gentlemen. I cannot understand, I have not the vision to see why it is that you gentlemen have been so kind to me personally. But at the same time I have sufficient mental capacity to appreciate what you have done for and what you are to me and the high position you have put me in by the confidence you show in me when you come around the table at any time, from any distance, at my invitation, ready, willing and anxious to turn over to me and to my friends all that is in your mind and in your heart concerning your own business. And is it to be wondered that I take pride in this, that this is the greatest enjoyment in all my business life? And this is equally true of each of you, for you occupy the same position that I occupy.

THE MORAL OBLIGATION EMPHASIZED.

Why do I mention these things? From the abundance of the heart the mouth speaketh. These thoughts in my mind, in my heart, force expression. I deal in frankness. Why is it? Why are these thoughts in my mind? Why do they crowd into words? Because at this particular time I am anxious that no man around this table, no one connected with this business, shall, for a single moment, forget the high moral obligation he is under toward his neighbor; because if it was the last word I could have the privilege of saying to you, I would say with all my might and with all the emphasis that I could find words to express, I consider it of the highest importance at this particular time that every one of us should have a keen and abiding sense of the personal obligation which he has toward all others and to make no mistake of running the risk of trespassing within the domain of the rights of his neighbor, who has given his confidence and trust, and who is willing at all times to put within the knowledge of others, and therefore more or less under their charge and control, the very direction of his affairs.

I know, gentlemen, what human nature is, and I know also that there is no other line or branch of business kindred to our lines which occupies at present a higher position than ours. We are to some extent the subject of unjust attacks and of campaigns, originated and carried on for the purpose of creating dissensions in our ranks or to separate us one from the other or to make us suspicious, endeavoring to induce us to believe the charges that are made from time to time of the misconduct of our neighbors and to accept them as true and to act accordingly. We must all the time be on the alert. When we read in the newspapers or when we hear a report verbally from any source, even from our own subordinates, that our neighbors are not dealing justly by us, we must scrutinize the reports, we must receive them with caution and we must not adopt them unless we are assured they are reliable. And then before we act we must be certain to go frankly and promptly to the neighbor who is charged with wrongdoing and give him an opportunity to satisfy us in regard to the facts before we do him the injustice of deciding against him.

As I said recently, we have a disposition, an honorable instinct, which is calculated to take care of one another and therefore ourselves. Have we also the intelligence to manage our affairs in such a way as to make it certain that our business is not controlled by those who are inimical to our interests?

THE QUESTION OF MAINTAINING PRICES.

At the present time the question of maintaining or changing the prices of the commodities in which we deal is uppermost in our minds, because we read and hear about this question every day and almost every hour. I have been pained, I admit, from time to time to read in the newspapers that the United States Steel Corporation carried a big stick and was in the habit of inviting the independents, so-called, to come together for the purpose of lecturing them or, worse than that, of threatening them in case they proposed to reduce prices. I call upon you as witnesses to refute these insinuations. If it is just, if by my conduct or by my language I have induced any of you to suppose that I believe our corporation has any advantage or is disposed to take any advantage, or has intended to urge you to fix or to maintain prices

concerning your commodities which were not in accordance with your own views, I do not hesitate to ask your pardon. We make no claim for ourselves, except of the pride that we have in being your associates, and because you have given us your confidence and are willing to work with us. If any of you desire to lower prices at any time, and will make the fact known to me, you will find that I am a follower and not a stubborn opposer. I shall always beg leave to express my opinions in regard to what I think are fair prices, but I will do it not for the purpose of expecting you to adopt my views, nor for any purpose except the same purpose that you have in mind when you express to me your opinions. We deal in the open, we deal fairly and, as I have frequently said, you will always find me an easy mark. If a majority of you shall be of the opinion that I am making a mistake in advocating the maintenance of prices you will have no difficulty in getting me to change my opinion. And very fortunately the Finance Committee of our corporation, which determines the policy of the corporation, and which is made up of the biggest men we can get, are in accord with me concerning these views. They have always been willing to sustain me because they believe the positions taken are right.

Now my opinion is that it would be a mistake to reduce prices at this time; that it would do more harm than good; that instead of getting more business we would get less business; that the average purchaser, perhaps without exception, is not so much in favor of the reduction of prices as he is in favor of making it absolutely certain his prices are the same prices that another has to pay for the same commodity. And the only reason in the mind of the proposed purchaser now, able and ready, willing and anxious to buy—the only reason for hesitation—is that he gets the impression in one way or another through the newspapers, and, I fear, frequently from our own subordinates, that there is a possibility in the future of a reduction in prices, and he is, therefore, waiting for that time to come.

WAGES INVOLVED.

It is argued in some of the newspapers that we are making a mistake in maintaining prices because we are keeping large numbers of our employees from work. I do not think the claim is logical or reasonable. I doubt if we would get more business if we should reduce prices. One thing is certain: In view of the high cost of production at the present time and the low prices of our products, which are very much lower than they were in 1907, we cannot, with very slight exceptions, reduce prices unless we reduce the prices which we are paying for labor; and that, I think, would be deplored. I think we should all the time have in mind the best interests of our employees, no matter whether they treat us right or wrong, and regardless of what they may have done in the past. We have the advantage of them in education, in experience, in wealth, in many ways, and we must make it absolutely certain under all circumstances that we treat them right.

You know what has been the attitude of the members of the institute on this subject. Many of you remember the most excellent address of Mr. Dickson before the members of the institute, and you know many circumstances tending to show our friendly attitude toward labor. We must not take a backward step in this matter. We may be forced to reduce wages, anyhow, for maybe they are too high at present, but you, gentlemen, will have to satisfy me with facts and figures before you get my consent to any reduction. I would like to maintain them, if we can, but to do that we must have fair and reasonable prices for our product.

We are all interested. We are traveling together, and we are going to stand together, I believe, without any interruption in the future, and if we do stand together there is nothing that can prevent the greatest success; because it has been and shall be in every respect our intention and our decision to transact our business in such a way as to be sure we are fair and reasonable, and also within the requirements of the law and the demands of the public interest.

NO AGREEMENT ON PRICES.

You may read in the newspapers hints that we are actually making agreements to maintain prices or that we are indirectly or by inference making arrangements which are in restraint of trade, and so we must make it certain that the contrary is true. I would not make an agreement under any circumstances to maintain prices or to do or refrain from doing anything which would prevent me from being absolutely independent from all others in every respect concerning every department of our corporation, or in regard to the conduct of our business, and I would not ask for any different conclusion from others. As I said before, the very fact that it is understood we have this right; that we are independent; that we can go out of this room and do exactly as we please without violating any agreement or understanding, and that all must depend upon the belief that as honorable men we are desirous of conducting ourselves and our business in such a way as not to injure our neighbors, must make each of us much more careful in regard to the conduct of our affairs. And there will be no secrecy in what we do. You may say, "Why aren't the newspaper reporters allowed in this room?" Because, in the first place, many of us, unaccustomed to speak in public, would hesitate to talk in the presence of newspaper men, and because more particularly we might fear we would be incorrectly reported. This is why, I suppose, at these meetings you have delegated me to make a brief statement to the newspapers, so that there will be no opportunity on the part of any one to publish what is not a fact and then make excuse that it was based upon information that he received from some one present at our meeting. There has never been any secrecy on my part. I have never failed to disclose the exact facts in regard to our meetings, and in regard to our conclusions, and that shall be my attitude. I think probably it is better for us to be here together as a family, and without the presence of newspaper representatives, outside of the trade journals.

I want you to criticise me as much as you please—as much as I deserve. If you have fault to find with the conduct of any one connected with our company do not hesitate to speak your mind. If there is anything you want us to do, tell us. If you think we can help you in any way, ask us. If we are injuring you in any respect, do not hesitate to find fault. What is true at this meeting is true at all times. Come to our offices, if you please, and we will work with you so far as we can legitimately. We are proud to work with you.

Those Present at the Dinner

Edward Bailey, president, Central Iron & Steel Company, Harrisburg, Pa.; A. F. Banks, president, Elgin, Joliet & Eastern Railway Company, Chicago; George Bartol, general manager, Otis Steel Company, Cleveland; J. G. Battelle, president, Columbus Iron & Steel Company, Columbus, Ohio; L. E. Block, vice-president, Inland Steel Company, Chicago; W. L. Brown, Pickands, Brown & Co., Chicago; E. J. Buffington, president, Illinois Steel Company, Chicago; J. G. Butler, Jr., president, Bessemer Pig Iron Association, Youngstown, Ohio; A. C. Bolling, assistant general solicitor, United States Steel Corporation, New York.

J. A. Campbell, president, Youngstown Sheet & Tube Company, Youngstown, Ohio; H. S. Chamberlain, president, Roane Iron Company, Chattanooga, Tenn.; Daniel Coolidge, president, Lorain Steel Company, Johnstown, Pa.; H. Coulby, president, Pittsburgh Steamship Company, Cleveland; G. G. Crawford, president, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.; E. A. S. Clarke, president, Lackawanna Steel Company, New York; D. M. Clemson, president, Carnegie Natural Gas Company, Pittsburgh; T. I. Crane, president, Northern Iron Company, Philadelphia.

W. B. Dickson, first vice-president, United States Steel Corporation, New York; A. C. Dinkey, president, Carnegie Steel Company, Pittsburgh; H. Du Puy, chairman, Crucible Steel Company of America, Pittsburgh.

B. F. Fackenthal, Jr., president, Thomas Iron Company, Easton, Pa.; J. A. Farrell, president, United States Steel Products Company, New York; E. C. Felton, president, Pennsylvania Steel Company, Philadelphia; W. J. Filbert, comptroller, United States Steel Corporation, New York; A. I. Findley, editor, *The Iron Age*, New York.

Elbert H. Gary, chairman, United States Steel Corporation, New York; T. W. Guthrie, president, Republic Iron & Steel Company, Pittsburgh; E. G. Grace, general manager, Bethlehem Steel Company, South Bethlehem, Pa.

H. L. Haldeman, vice-president, Pulaski Iron Company, Philadelphia; Edward H. Hagar, president, Universal Portland

Cement Company, Chicago; J. A. Hatfield, president, American Bridge Company of New York, New York; F. E. House, president, Duluth & Iron Range Railroad Company, Duluth, Minn.; C. R. Hubbard, president, Wheeling Steel & Iron Company, Wheeling, W. Va.; A. F. Huston, president, Lukens Iron & Steel Company, Coatesville, Pa.; O. N. Hutchinson, general manager, Grand Crossing Tack Company, Grand Crossing, Ill.; J. H. Hoyt, Hoyt, Dustin & Kelly, Cleveland; August Heckscher, vice-president, Eastern Steel Company, New York.

J. R. Jones, secretary, Alan Wood Iron & Steel Company, Philadelphia.

W. V. Kelley, president, American Steel Foundries, Chicago; I. A. Kelly, president, Ashland Steel Company, Ashland, Ky.; D. G. Kerr, second vice-president, United States Steel Corporation, New York; Willis L. King, vice-president, Jones & Laughlin Steel Company, Pittsburgh.

Hon. J. G. A. Leishman; C. C. Linthicum, Linthicum Belt & Fuller, Chicago; James Lord, president, American Iron & Steel Mfg. Company, Lebanon, Pa.; Thomas Lynch, president, H. C. Frick Coke Company, Pittsburgh.

Charles MacVeagh, general solicitor, United States Steel Corporation, New York; W. A. McGonagle, president, Duluth, Missabe & Northern Railway Company, Duluth, Minn.; G. G. McMurtry, chairman, American Sheet & Tin Plate Company, New York; Samuel Mather, Pickands, Mather & Co., Cleveland; W. G. Mather, president, Cleveland-Cliffs Iron Company, Cleveland; Harrison S. Morris, president, Wharton Steel Company, Philadelphia.

Benjamin Nicoll, B. Nicoll & Co., New York.

W. J. Olcott, president, Oliver Iron Mining Company, Duluth, Minn.

W. P. Palmer, president, American Steel & Wire Company, Cleveland; E. W. Pargny, president, American Sheet & Tin Plate Company, Pittsburgh; George W. Perkins; Veryl Preston, president, Eastern Steel Company, New York; Charles S. Price, president, Cambria Steel Company, Johnstown, Pa.; Leonard Peckitt, president, Empire Steel & Iron Company, Catsauqua, Pa.; H. F. Perkins, International Harvester Company, Chicago.

J. V. W. Reynders, vice-president, Pennsylvania Steel Company, Steelton, Pa.; Charles A. Rathbone, Buhl Malleable Company, Detroit, Mich.; J. H. Reed, Pittsburgh; David Reeves, president, Phoenix Iron Company, Philadelphia; F. B. Richards, M. A. Hanna & Co., Cleveland; W. A. Rogers, president, Rogers, Brown Iron Company, Buffalo; Wallace H. Rowe, president, Pittsburgh Steel Company, Pittsburgh; James R. Roe, general superintendent, Glasgow Iron Company, Pottstown, Pa.; John Reis, assistant to president, United States Steel Corporation, New York.

J. H. Sheadle, secretary, Cleveland-Cliffs Iron Company, Cleveland; W. B. Schiller, president, National Tube Company, Pittsburgh; I. M. Scott, president, La Belle Iron Works, Steubenville, Ohio; F. C. Smink, president, Reading Iron Company, Reading, Pa.; W. P. Snyder, president, Shenango Furnace Company, Pittsburgh; Powell Stackhouse, Cambria Steel Company, Philadelphia; C. J. Stark, *Iron Trade Review*, New York; H. H. Stambaugh, treasurer, Brier Hill Iron & Coal Company, Youngstown, Ohio.

Alexis W. Thompson, president, Inland Steel Company, Chicago; John A. Topping, chairman, Republic Iron & Steel Company, New York; Richard Trimble, treasurer, United States Steel Corporation, New York.

George M. Verity, president, American Rolling Mill Company, Middletown, Ohio.

W. R. Walker, assistant to president, United States Steel Corporation, New York; F. S. Witherbee, president, Witherbee, Sherman & Co., New York; F. W. Wood, president, Maryland Steel Company, Sparrows Point, Md.; W. P. Worth, treasurer, Worth Brothers Company, Coatesville, Pa.

August Ziesing, president, American Bridge Company, Chicago.

The Dallas Coal, Iron & Steel Company

An important addition to the industries of Texas is assured by the recent incorporation of the Dallas Coal, Iron & Steel Company of Dallas, with an authorized capital of \$2,500,000. The directory is composed mainly of men who are identified with the leading interests of the city. The new company will take over the property of the Jefferson Iron Company, Jefferson, Texas, which began operations in 1891. Though the furnace was blown in on charcoal, the fuel was changed to coke later on. Brown hematite ore from Marion and Cass counties was used, and the annual output averaged about 36,000 tons of foundry iron. About two years since, the furnace was purchased by interests identified with the De Camp Bros. & Yule Iron, Coal & Coke Company, St. Louis. In May, 1909, the Jefferson Company purchased the iron ore property of the Lone Star Iron Company of Texas.

The new company intends to remodel the blast furnace, but it is not yet decided where the mills will be located. These comprise a billet mill and a merchant mill for rolling cotton ties and merchant bars. W. F.

McClurg, who formerly operated the Jefferson furnace, will have charge of the work. The company owns about 7000 acres of Texas iron ore lands, and controls enough coking coal to produce its requirements in metallurgical coke. The officers of the company are as follows: President, R. D. Yoakum; vice-president, J. W. Wright; secretary, R. P. Wafford; treasurer, F. J. Shoelkopf. Executive Committee—J. W. Wright, chairman; J. B. Wilson, A. L. Clark, R. D. Yoakum and L. Lipsitz. The directors are J. W. Wright, L. Lipsitz, R. D. Yoakum, A. L. Clark, F. J. Shoelkopf, W. F. McClurg, R. P. Wafford, A. P. De Camp and T. L. Camp.

Canadian Manufacturers Oppose Reciprocity

TORONTO, January 16, 1911.—In manufacturing circles satisfaction is expressed with the answer given by Sir Wilfrid Laurier to the deputation that waited on him last Friday. The memorial presented to him was a petition and argument against reciprocity with the United States, especially reciprocity affecting Canadian manufacturing industries. The Prime Minister's reply was in effect an assurance that due consideration would be given to the manufacturing interests of Canada. The point of it is in the concluding sentences, which are as follows:

Last spring we received overtures from the nation which occupies the southern part of this continent, which we did not think it wise for us to refuse. But when we decided to meet our neighbors we were not oblivious to the fact that the Americans have their manufacturing industries developed far in advance of us and that conditions are not entirely parallel and identical in both countries. We approached the question in that light, and Mr. Fielding and Mr. Paterson, who are now in Washington, will not forget, and will have before them in the negotiations, that there is not a parity between the two countries. For myself, I think we could make some trade arrangement between the two countries which would not interfere with the manufacturing community.

Sir Wilfrid also dwelt on the fact that the former efforts of his Government to bring about closer trade relations between Canada and the United States were directed to the particular object of reviving the reciprocity treaty of the period 1854-1866. This is significant, as that treaty comprehended only natural products.

While the manufacturers are quite pleased with his answer to their deputation, the farmers are now saying that his answer to their deputation of December 16 looks emptier and emptier the longer it is thought about. It gives them no reason to suppose that the Government will comply with the part of their petition that calls for the facilitating of the importation of manufactured articles from the United States. Both deputations were unprecedentedly strong, the farmers numerically and the manufacturers in personal weight and in the magnitude of the interests they represented.

To newspaper men and others who are looking on critically, the odds appear to be strongly in favor of the manufacturers. The Government knows the manufacturers are in earnest and that they are thoroughly organized to make a campaign in support of their advocacy of protection. Further, the Government knows that in eastern Canada as a whole—in the Maritime Provinces, Quebec and Ontario—the preponderant public opinion is on the side of protection. There is some reason to believe that the demonstration the farmers made at Ottawa was much less the result of a spontaneous rising against protection than of activity on the part of organizers and resolution framers. Sir Wilfrid Laurier may be of that opinion. At all events, neither his answer to the farmers' deputation nor his answer to the manufacturers' deputation gives ground for any expectation that he is prepared to join in a reciprocity arrangement that would put Canadian manufacturers on a tariff footing much more disadvantageous than the one on which they now stand.

C. A. C. J.

The British Board of Trade returns show that 1910 was a record year for British trade, the figures exceeding even those of 1907, which was a boom year. The imports in 1910 were £678,440,173, an increase of £53,735,216 over 1909. The exports amounted to £534,365,915, an increase of £64,840,749.

Fluctuations in Metal Prices for the Period 1898-1910 in Carloads

(With Supplement.)

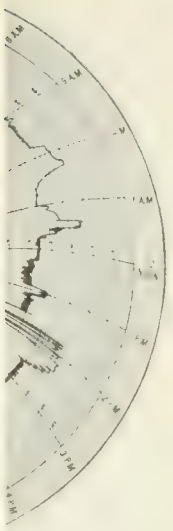
The accompanying supplement shows by plotted lines the fluctuations in prices of the more important metals in the period from 1898 to 1910, inclusive. The prices used for this purpose are the computed monthly averages of the prices of carloads, at New York, given in the metal market reports of *The Iron Age* week by week. The columns of figures alongside the chart give the values. The column to the left gives tin in cents per pound, the middle column, copper in cents per pound, and the first represents lead and spelter in cents per pound and tin plate in dollars per base box. The following tables give the monthly averages, on which the chart is based:

Average Monthly Prices, 1898-1910.

1898	Lake copper. Cents.	Spelter. Cents.	Lead. Cents.	Tin. Cents.	Tin plate. Dollars.
Months.	Cents.	Cents.	Cents.	Cents.	Dollars.
January	11.00	3.75	3.66	13.77	3.05
February	11.19	3.79	3.69	14.04	3.02
March	11.95	4.00	3.71	14.26	2.90
April	12.05	4.00	3.61	14.41	2.90
May	12.04	3.95	3.64	14.54	2.89
June	11.85	4.65	3.86	15.05	2.85
July	11.59	4.51	3.95	15.60	2.84
August	11.85	4.35	3.99	16.14	2.82
September	12.25	4.62	3.99	16.02	2.85
October	12.37	4.61	3.81	17.25	2.75
November	12.69	5.09	3.70	18.07	2.80
December	12.79	5.13	3.62	18.20	2.89
1899					
January	14.02	4.90	4.02	22.12	3.11
February	17.66	5.68	4.53	24.25	3.50
March	17.55	5.99	4.37	23.86	4.03
April	18.56	6.25	4.30	24.82	4.10
May	18.65	6.72	4.42	25.61	4.05
June	18.20	6.02	4.45	25.69	4.05
July	18.37	5.79	4.55	28.72	4.38
August	18.50	5.55	4.56	31.40	4.60
September	18.47	5.40	4.60	32.40	4.82
October	18.03	5.37	4.59	31.35	4.82
November	17.00	4.64	4.58	28.52	4.83
December	16.69	4.68	4.65	25.19	4.84
1900					
January	16.21	4.55	4.70	26.00	4.84
February	16.25	4.69	4.70	29.71	4.84
March	16.41	4.60	4.70	32.42	4.84
April	17.00	4.71	4.70	30.85	4.84
May	16.80	4.52	4.22	29.25	4.84
June	16.31	4.27	3.90	30.00	4.84
July	16.31	4.24	4.03	32.76	4.84
August	16.55	4.17	4.26	31.13	4.84
September	16.75	4.10	4.36	29.63	4.68
October	16.73	4.10	4.37	28.46	4.19
November	16.75	4.20	4.37	28.10	4.19
December	16.87	4.19	4.37	26.84	4.19
1901					
January	16.90	4.08	4.37	26.60	4.19
February	16.97	3.94	4.37	26.55	4.19
March	17.00	3.89	4.37	25.95	4.19
April	17.00	3.94	4.37	25.94	4.19
May	17.00	3.97	4.37	26.82	4.19
June	17.00	3.95	4.37	28.22	4.19
July	16.97	3.90	4.37	27.41	4.19
August	16.50	3.92	4.37	26.90	...
September	16.50	4.02	4.37	25.04	4.19
October	16.71	4.20	4.37	24.62	4.19
November	16.82	4.32	4.37	27.47	4.19
December	14.71	4.35	4.19	24.39	4.19
1902					
January	11.45	4.28	4.02	23.38	4.19
February	12.47	4.18	4.10	24.73	4.19
March	12.12	4.29	4.10	26.16	4.19
April	11.97	4.41	4.10	27.29	4.19
May	12.10	4.50	4.10	29.26	4.19
June	12.23	4.88	4.10	29.29	4.19
July	11.94	5.23	4.10	28.28	4.19
August	11.59	5.46	4.10	28.14	4.19
September	11.60	5.45	4.10	26.55	4.19
October	11.71	5.48	4.10	25.76	4.19
November	11.44	5.29	4.10	25.43	3.79
December	11.61	4.91	4.10	25.33	3.79
1903					
January	12.13	4.82	4.10	27.76	3.79
February	12.80	5.00	4.10	29.14	3.79
March	14.31	5.36	4.44	30.06	3.90
April	14.85	5.65	4.59	29.69	3.99
May	14.75	5.75	4.37	29.36	3.99
June	14.56	6.00	4.25	28.30	3.99
July	13.73	5.95	4.12	27.60	3.99

Months.	Lake copper. Cents.	Spelter. Cents.	Lead. Cents.	Tin. Cents.	Tin plate. Dollars.
August	13.35	5.94	4.12	28.00	3.99
September	13.58	6.00	4.26	27.06	3.99
October	13.41	6.05	4.40	25.83	3.99
November	13.25	5.08	4.25	25.35	3.84
December	12.30	5.15	4.19	27.53	3.79
1904					
January	12.62	4.95	4.39	28.75	3.75
February	12.34	4.95	4.40	27.98	3.64
March	12.60	5.05	4.50	26.19	3.64
April	13.19	5.22	4.50	27.99	3.64
May	13.28	5.14	4.48	27.76	3.64
June	12.74	4.79	4.22	26.14	3.64
July	12.42	4.85	4.17	26.28	3.60
August	12.50	4.85	4.15	26.74	3.49
September	12.67	5.06	4.20	27.27	3.49
October	13.09	5.17	4.20	28.53	3.49
November	14.22	5.49	4.51	29.00	3.56
December	14.87	5.80	4.60	29.27	3.56
1905					
January	15.18	6.17	4.56	29.18	3.74
February	15.25	6.12	4.50	29.49	3.74
March	15.25	6.06	4.45	29.21	3.74
April	15.18	5.97	4.50	30.43	3.74
May	15.00	5.55	4.50	30.04	3.74
June	15.00	5.32	4.51	30.36	3.74
July	15.03	5.38	4.56	31.71	3.74
August	16.07	5.66	4.64	32.85	3.74
September	16.12	5.83	4.85	32.21	3.74
October	16.62	6.05	5.07	32.47	3.55
November	16.90	6.17	5.48	33.46	3.53
December	18.75	6.50	5.96	35.84	3.59
1906					
January	18.78	6.48	5.86	36.36	3.66
February	17.94	6.09	5.56	36.48	3.69
March	18.50	5.96	5.35	36.62	3.69
April	18.62	6.05	5.39	38.86	3.76
May	18.70	5.95	5.90	43.08	3.85
June	18.69	6.14	5.94	38.97	3.94
July	18.47	5.98	5.80	37.18	3.94
August	18.65	6.06	5.78	39.90	3.94
September	19.31	6.19	5.92	40.32	3.94
October	21.81	6.18	5.94	42.90	3.94
November	22.50	6.36	5.97	42.70	4.09
December	23.06	6.62	6.19	42.62	4.09
1907					
January	24.41	6.90	6.30	42.14	4.09
February	25.10	7.00	6.31	42.16	4.09
March	23.88	6.92	6.31	41.29	4.09
April	24.62	6.81	6.16	40.84	4.09
May	24.10	6.51	6.02	43.01	4.09
June	23.94	6.45	5.75	42.65	4.09
July	21.95	6.15	5.24	41.15	4.09
August	18.94	5.71	5.12	37.35	4.09
September	16.41	5.28	4.84	37.22	4.09
October	13.80	5.45	4.64	32.33	4.09
November	13.94	5.10	4.45	30.81	4.09
December	13.48	4.39	3.76	27.92	4.09
1908					
January	13.90	4.54	3.73	27.43	3.95
February	13.13	4.78	3.75	28.74	3.89
March	12.85	4.76	3.88	30.46	3.89
April	13.09	4.68	4.02	31.79	3.89
May	12.88	4.60	4.26	29.84	3.89
June	13.00	4.56	4.45	28.18	3.89
July	13.00	4.46	4.50	28.92	3.89
August	13.71	4.71	4.59	29.99	3.89
September	13.80	4.76	4.54	28.91	3.89
October	13.81	4.81	4.34	29.44	3.89
November	14.44	5.03	4.39	30.43	3.89
December	14.53	5.17	4.24	29.13	3.89
1909					
January	14.56	5.15	4.19	28.19	3.89
February	13.37	4.99	4.07	28.44	3.89
March	12.90	4.81	4.02	28.75	3.74
April	12.94	4.94	4.19	29.35	3.64
May	13.21	5.12	4.32	29.07	3.64
June	13.50	5.39	4.36	29.26	3.64
July	13.34	5.35	4.35	29.05	3.64
August	13.56	5.74	4.36	29.96	3.64
September	13.50	5.85	4.39	30.00	3.66
October	13.19	6.09	4.39	30.41	3.74
November	13.44	6.32	4.40	30.74	3.79
December	13.80	6.35	4.56	32.91	3.82
1910					
January	14.00	6.26	4.70	32.61	3.84
February	13.78	5.89	4.63	32.65	3.84
March	13.75	5.72	4.51	32.51	3.84
April	13.31	5.60	4.40	32.83	3.84
May	13.06	5.20	4.37	33.05	3.84
June	12.88	5.19	4.38	32.79	3.84
July	12.66	5.20	4.40	32.99	3.84
August	12.93	5.26	4.40	33.92	3.84
September	12.81	5.53	4.40	35.17	3.84
October	12.84	5.69	4.40	36.76	3.84
November	12.98	5.95	4.44	37.38	3.84
December	13.00	5.80	4.50	38.21	3.84

SUPPLEMENT TO THE



ater Temperatures
truments.

or this class of
o that only tem-
would affect its

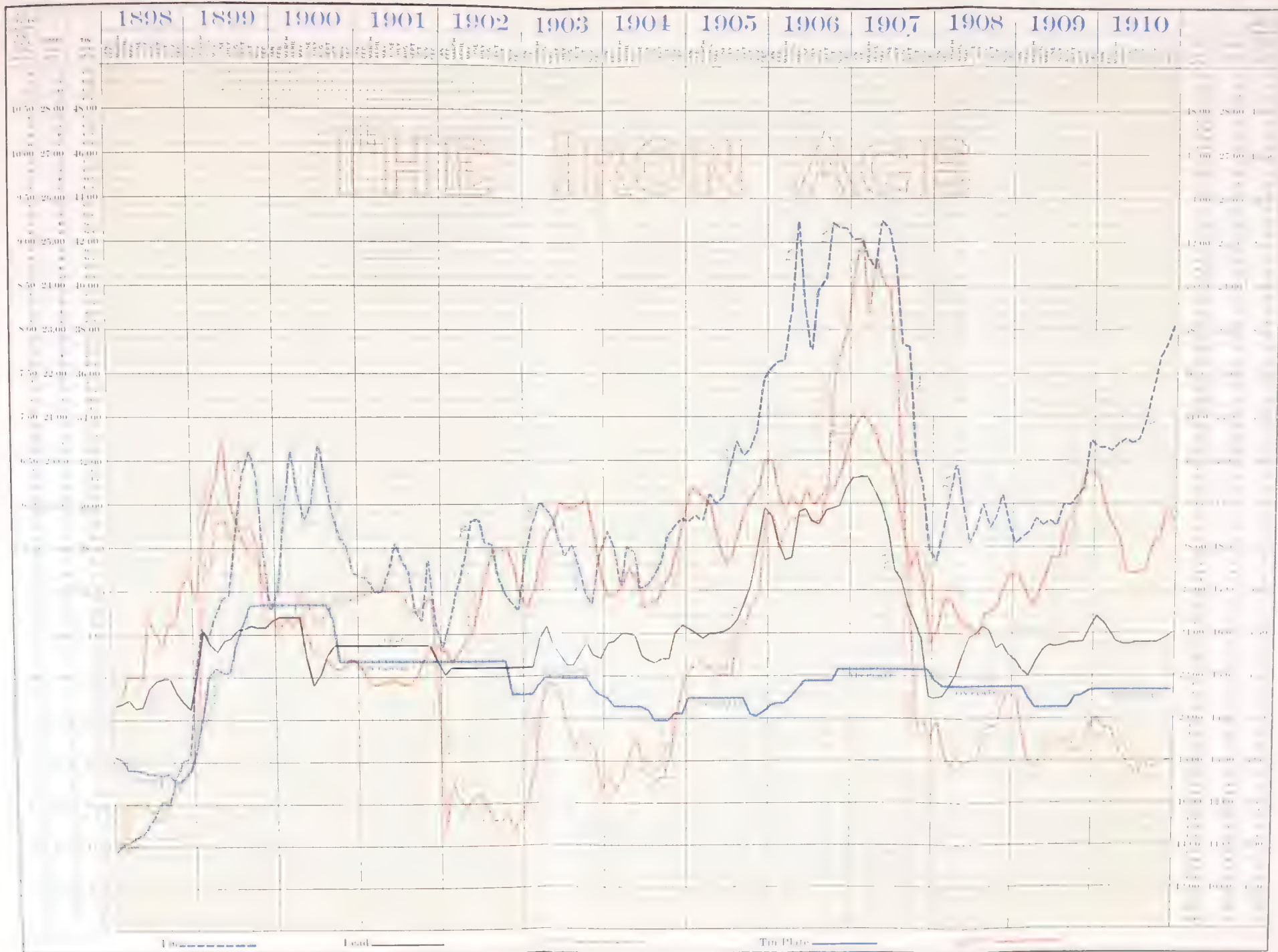
quipped with a
ie lower part of
is cut off at the
e bulb which is
tube being filled
erature changes
ding changes in
ing to the laws
ese changes are
nent. To make
e along the con-
gas contained in
10 in. long and
ortion to that in

ter temperatures
on a chart hav-
F. is reproduced
mination of this
ions is reversed,
f condenser cir-
While the aver-
5 degrees at the
its vacuum, the
int, as was the



Fluid Tin Plate in in Carloads.

ater Temperature.



Fluctuations in the Prices of Copper, Lead, Tin, Spelter and Tin Plate in New York from January 1, 1898, to December 31, 1910 in Carloads.

The Bristol Class III. Recording Thermometer

A Gas Filled Instrument with an Automatic Compensating Device

Recording thermometers depending for their operation upon the expansion of a liquid, the vapor of a liquid or a gas have been made in numerous different forms during the last 15 years by the Bristol Company, Waterbury, Conn. Although instruments of this character have been used very extensively for measuring temperatures ranging up to 800 degrees F., it is only lately that a thermometer depending for its operation upon the expansion of a vapor or a gas and transmitting this volumetric change through the connecting tube between the sensitive bulb and the instrument has been adapted for recording lower

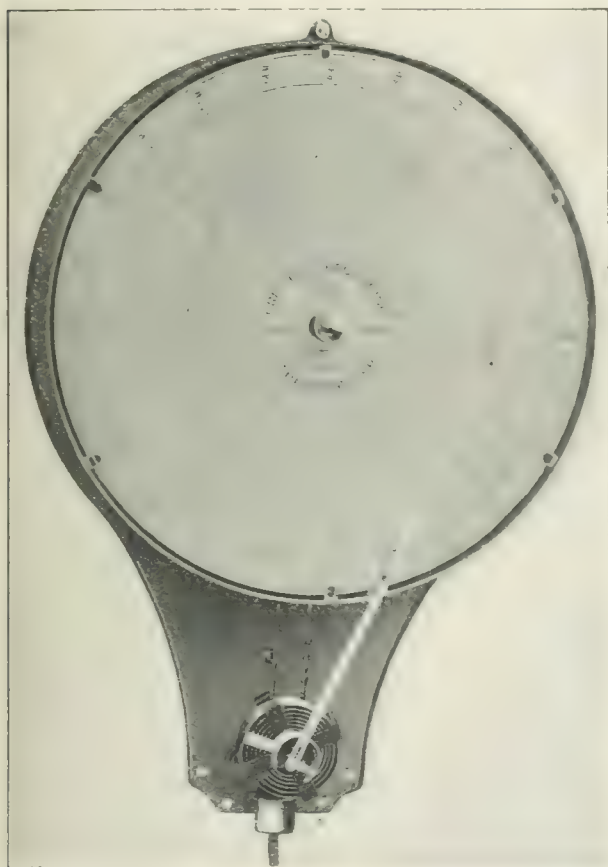


Fig. 1.—The Interior of the New Class III. Compensated Recording Thermometer Manufactured by the Bristol Company, Waterbury, Conn.

ranges of temperature. Fig. 1 shows the interior of a new compensated gas filled recording thermometer known as the class III., while Figs. 2 and 3 show specimen records, one of condenser circulating water temperatures and the other of boiler feed water temperatures. This type of instrument has been developed for recording the lower ranges of temperatures, such as that of the atmosphere, water, brine and refrigerating systems, &c., and is equipped with a compensating device which automatically makes corrections for temperature changes at the recording instrument. This compensating device is a very important feature of this new thermometer, as an instrument so equipped will give an accurate record of the temperature being measured regardless of any changes in temperature at the recording instrument itself. The necessity for such a compensating attachment can be best illustrated by the application of a recording thermometer to measuring temperature of brine in a refrigerating system. Although the temperature of the brine at the point where the sensitive bulb was installed might remain constant, that of the atmosphere at the point where the recording instrument was placed might

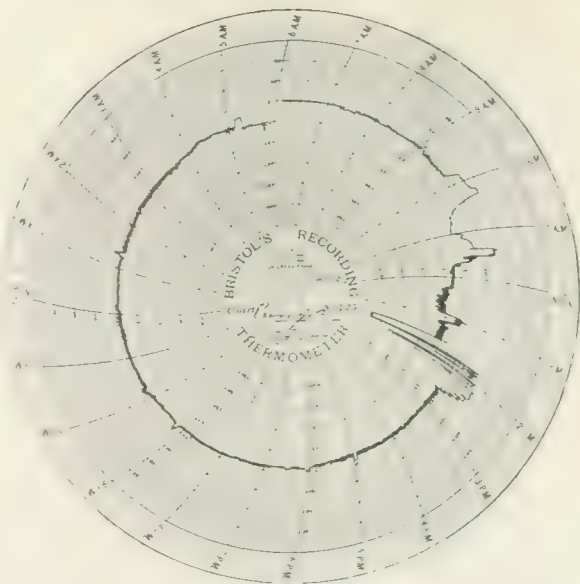


Fig. 2.—A Record of Condenser Circulating Water Temperatures Obtained with One of These New Instruments.

change, and a recording thermometer for this class of work should, of course, be constructed so that only temperature changes at the sensitive bulb would affect its records.

The class III. thermometers are equipped with a special spiral pressure tube, shown in the lower part of Fig. 1, a capillary connecting tube which is cut off at the bottom of the engraving and a sensitive bulb which is not shown, the bulb and the connecting tube being filled with an inert gas under pressure. Temperature changes at the sensitive bulb produce corresponding changes in the pressure of the confined gas according to the laws governing the volumes of gases, and these changes are measured and recorded by the instrument. To make the error due to changes in temperature along the connecting tube negligible the volume of gas contained in the sensitive bulb, which is generally 10 in. long and $\frac{1}{4}$ in. in diameter, is very large in proportion to that in the capillary connecting tube.

A record of condenser circulating water temperatures as traced by one of these thermometers on a chart having a range of from 40 to 220 degrees F. is reproduced in Fig. 2. It will be noticed from an examination of this chart that the scale of uniform graduations is reversed, which for measuring the temperature of condenser circulating water is a desirable feature. While the average temperatures are generally below 145 degrees at the same time when the condenser loses its vacuum, the temperature may reach the boiling point, as was the



Fig. 3.—A Specimen Chart of Boiler Feed Water Temperature.

case between 1.39 and 1.45 p.m. on this particular chart.

Fig. 3 shows a record of boiler feed water temperature traced by one of these instruments on a chart ranging from 10 to 225 degrees F. The graduations on this chart are uniform throughout the entire range, which makes it possible to use the Bristol-Durand radii averaging instrument, which was illustrated in *The Iron Age*, June, 30, 1910, for computing the 24-hour average feed water temperature.

Accidents in Industrial Plants

Statistics of Risks, Based Upon Careful Investigation, in Their Relation to Employers' Liability and Workmen's Compensation

In investigating the subject of workmen's compensation, commissions and individuals as well as insurance companies have experienced great difficulty in getting adequate data upon which to base the relative cost to the manufacturer of the system as compared with employers' liability. Frank F. Dresser, Worcester, Mass., has given this important matter very careful attention, and some of the results of his investigations formed part of an address made by him before the Boston Branch, National Metal Trades Association, at Boston, January 4. His statement is as follows:

Total Data of Accidents in Five Mills

I have examined 674 accidents occurring in five mills, for the most part my information about them comes from the accident reports, though in a large proportion of them I have seen the results of an independent investigation. These accidents were as follows:

	Number of accidents	Total number of employees
All that occurred in 1½ years in a textile mill.	156	2,040
All that occurred in 2 years and 10 months in a foundry.	13	125
All that occurred in 2 years and 10 months in a machine shop.	8	150
All that occurred in 2 years in a leather supplies factory.	135	1,500
All that occurred in 1 year in a carpenter and machine shop.	79	3,025
Totals	391	6,850

Reduced to a yearly basis, there were 257 accidents out of 6,850 men employed.

The proportion of accidents to employees in the different departments of these factories is as follows:

One accident to	Per cent.
19½ men.	5.1
27 men.	3.6
53 men.	1.8
22 men.	4.5
87 men.	1.1
19.6 men.	5.1
43.8 men.	2.28

Or, taking the totals, one accident to 26.6 men employed, or 3.7 per cent.

My guess is that while the nature of the business has a very great effect on the number of accidents, yet the character of the employees has even more. The experienced and skillful workman, one who goes about his business in a workmanlike way, is not apt to get hurt, and the mills that employ men of that character have the better record.

I have also examined 284 accidents occurring at the American Steel & Wire Company in Worcester, where 5854 men are employed.

The data of this total of 675 accidents are as follows:

	Per cent.
2 fatalities	0.3
84 permanent injuries, not quite	12.5
588 temporary injuries	87.2
234 disabled for more than one week.	34.
On the two weeks' exemption I should judge that not more than 20 per cent. would come within the scope of payment.	20.
Men employed less than one year.	52.
Men employed one to five years.	23.
Men employed five years or more.	25.

	Per cent.
82 accidents due to defective plant.	12.
2 accidents due to negligence of a superintendent	0.3
46 accidents due to failure to instruct	0.9
46 accidents due to negligence of fellow servants	6.8
538 accidents were due to contributory negligence or an incidental risk of the business.	80.

Under the law as it stands at present I doubt if there would be liability in more than 11 per cent. of these cases. The surprisingly few cases of negligence of a superintendent shows that a repeal of the employers' liability act would have very slight effect on these industries, though it would, of course, have a greater effect upon the railroads. It is likely that an investigation going beyond the accident report might show more instances of negligent superintendents.

In four plants, covering 595 accidents, 49 claims, or 8 per cent., were made; lawyers represented plaintiff in 11 claims, and but four writs were brought. These data as to claims are from my files, and I think undoubtedly that more claims were made and paid.

All of these plants with the exception of the American Steel & Wire Company carry insurance. They are careful to obey the safety device statutes and report all accidents. In looking at the nature of the injuries, I find many cases of strain caused by lifting too heavy weights, slipping or stumbling on floors, green men blistering their hands, and the like. A great many of the injuries are due to blood poisoning. While I have not looked at that carefully, I judge that in one mill 10 per cent. of the cases were blood poisoning, and one fatality was said to have been caused by it. In the American Steel & Wire Company accidents about 20 per cent. seem to be blood poisoning. This is in spite of the fact that each of these mills employs a doctor and mill nurse, and that efforts are made to attend to such cases immediately.

The Textile Mill

The textile mill employs 2040 employees. All the accidents occurring there for a year and a half have been examined. They number 156, or one accident to 19.6 employees on a yearly basis. The details are as follows:

	Accidents.	Per cent.
Employed one year or less.	75	48.1
Employed one year to five years.	36	23.1
Employed over five years.	45	28.8
Fatality	1	0.6
Permanent injury.	18	11.6
Temporary injury.	137	87.8
More than one week disability.	59	37.7
Injury caused by:		
1. Defect in plant.	25	16.
(a. Fellow servant.	5	2.5
2. Carelessness { b. Superintendent or delegate.	2	1.5
(c. Failure to instruct.	0	0.
3. Carelessness or assumed risk.	124	80.

Number of claims made.	4
Number of claims paid.	4
Intervention of plaintiff's lawyer.	4
Writs brought.	1

This mill employs a mill nurse, whose business it is to give temporary aid alone or in conjunction with the doctor, and to attend to the care of the patients when they are not in a city hospital. The necessary medical attention is paid for by the mill. An injured person is kept on the payroll at full wages for two weeks. After that time he is kept on the payroll, when authority is obtained from the treasurer, for a reasonable time. This reasonable time is generally until he is able to come back to work or until he makes claim for other compensation. The four claims paid approximately only the lost wages; the highest amount paid was \$350.

Of the 16 per cent. of defect in plant causes a large number of the accidents could probably be avoided by the installation of a more perfect system in one particular; but, although they might be avoided in that way, in only a small proportion would there be liability because the plaintiff would have assumed the risk of the obvious danger upon entry into the employment where such conditions existed. There would seem to be probable liability in about 11 per cent. of all accidents.

Under a compensation act where no payment was made for disability of a week or under, 97 employees, or

62 per cent. of all injured, would receive no compensation whatever. A compensation plan whereby all suits were avoided would cost this particular mill very little, if any, more than it at present pays for its liability insurance and the full time wages to all disabled employees. It would not tend to improve the relations between employer and employed, which have always been good.

The American Steel & Wire Company

Two hundred and eighty-four accidents at the four Worcester plants of the American Steel & Wire Company have been examined. These employed at the time of these accidents 5854 employees. These 284 accidents are those denominated "serious" accidents, meaning a week's disability or a permanent injury. Slighter accidents are not reported in such detail, though the number is known. The details are as follows:

	Accidents	Per cent.
Employed one year or less	152	53.8
Employed one year to five years	57	20
Employed over five years	75	26.2
Fatality	1	0.4
Permanent injuries	24	8.4
Temporary injuries	259	91.6
Disabled less than one week	194	68.3
Disabled one week to one month	66	23.3
Disabled more than one month	24	8.4
Injuries caused by:		
1. Defect in plant	25	8.8
a. Fellow servants	18	6.4
b. Superintendent or delegate	0	0
c. Failure to instruct	6	2.2
2. Carelessness or assumed risk	235	82.7
Number of claims paid	34	12
(or 37 per cent. of disability for more than one week.)		

Intervention of plaintiff's lawyer	4
Writs brought	0

That of these accidents only 8.8 per cent. could be fairly ascribed to defect in plant and that there were none chargeable to a careless superintendent or delegate speaks remarkably well. I had supposed that the percentage would be much greater. There would be about 13 per cent. cases of liability under the law as it stands at present.

Under a compensation act 194 of these so-called injuries, or 68 per cent., would receive no compensation, and this number receive no compensation now. Of the injuries not reported in detail the percentage would be very much higher.

The Foundry and Machine Shop

From January 1, 1908, to November 1, 1910, there were 21 accidents in all, one report missing. The foundry had 13 accidents for 125 employees, or, on a yearly basis, 1 to 35 men employed. The shop had 8 accidents to 150 employees, or, on a yearly basis, 1 to 81 men employed. Very few green men are employed, practically none in the machine shop, and they are of a high grade. The details are as follows:

	Accidents	Per cent.
Employed less than one year	8	40
Employed one year to five years	7	35
Employed over five years	5	25
Fatalities	0	0
Permanent injury	5	25
Temporary injury	15	75
Disability less than one week	3	15
Injury caused by:		
1. Defect in plant	2	10
2. Careless		
a. Fellow servants	7	35
b. Superintendent or delegate	0	0
c. Failure to instruct	0	0
3. Carelessness of plaintiff or assumed risk	11	55
Settlements	7	35

Intervention of plaintiff's lawyer	1
Writs brought	1
Amounts paid in settlement, not including medical expenses	\$522.50

In the third class the very great majority of these cases were due to the carelessness of the plaintiff rather than to incidental risks of the business.

In 15 per cent. of these cases there would be no compensation paid under a compensation act. There is about 10 per cent. liability under the law as it now stands. A compensation act on the English model would largely increase the cost to this company.

The Leather Working Factory

All the accidents in the years 1908 and 1909 are covered in the data here presented. There are 1500 men employed and there were 135 accidents, or, on a yearly basis, one accident to 22 men. The details are as follows:

	Accidents	Per cent.
Employed one year or less	54	40
Employed one year to five years	42	31.2
Employed five years or more	39	28.8
Fatalities	0	0
Permanent injuries	21	17
Temporary injuries	112	83
Disability one week or less	95	70
Injuries caused by:		
1. Defect in plant	14	10.4
2. Careless		
a. Fellow servants	12	8.9
b. Superintendent or delegate	0	0
c. Failure to instruct	0	0
3. Carelessness of plaintiff or assumed risk	109	80.7

Claims made	4
Intervention of plaintiff's lawyer	0
Writs brought	2

These cases show about 7 per cent. liability with the law as it stands now. Of the third class of cases 64.4 per cent. were due to the contributory negligence of the plaintiff and 16.3 per cent. to the incidental and inevitable risks of the business. During five years there have been but three writs brought, all of which have been settled without trial.

Under the compensation act 70 per cent. of the injured would receive nothing. The cost to this mill of a compensation act would be greater than it at present pays.

Carpenter, Foundry and Machine Shop

The accidents occurred during the year 1909. The employees numbered 3035; number of accidents, 79; or, on a yearly basis, one accident in 38.4. The details are as follows:

	Accidents	Per cent.
Employed one year or less	54	68.4
Employed one year to five years	16	20.2
Employed over five years	9	11.4
Fatalities	0	0
Permanent injuries	14	17.8
Temporary injuries	65	82.2
Disabled over one week	27	34
Injury caused by:		
1. Defect in plant	16	20.1
2. Careless		
a. Fellow servants	4	5
b. Superintendent or delegate	0	0
c. Failure to instruct	0	0
3. Incidental risk	41	52
b. Contributory negligence	18	23

Stephens-Adamson Offices.—The Stephens-Adamson Mfg. Company, Aurora, Ill., has recently strengthened its organization by securing the services of G. H. Stephens, who has been a prominent factor in the conveying industry for over 20 years, and has obtained a substantial interest in the company, and will assume at once the management of its entire Eastern business. The Eastern office is located at 50 Church street, New York City. The engineering department of the New York office is under the charge of J. G. Marcum, formerly associated with Mr. Stephens in business. Earl D. Stearns, who has represented the company in the East for the past two years, will henceforth take charge of the Chicago office in the First National Bank Building. The Stephens-Adamson Mfg. Company manufactures a complete line of conveying, elevating, screening and power transmitting machinery. The main office and shops are located at Aurora, Ill., on the main line of the Burlington Railroad. These shops are thoroughly modern in every respect.

Recent developments in modern industrial construction are particularly apparent in some of the newer railroad shops finished and in process throughout the country. The handsome new shops of the New York Central at West Albany and the large new shops of the Chicago & Northwestern at Chicago allow an immense expanse of windows of the Fenestra type, made in solid metal bars of rolled steel. In practice this more substantial filling of window openings is shown to be successful and economical.

Machine and Boiler Shops of Improved Construction

Features of Recent Additions to the Plant of the York Mfg. Company

The York Mfg. Company, York, Pa., has been making improvements from time to time to meet the demand not only for increased capacity for the production of refrigerating machinery, but also for greater efficiency and economy in manufacture. Modern equipment has been

installed and advanced methods adopted in many departments. The purpose of this article is to describe and illustrate two of the most recent additions this company has made, which have largely increased its productive capacity—its new machine and boiler shops. These em-

body the most recent ideas as to construction, heating, lighting and ventilation, together with an arrangement of tools and machinery and methods for handling material which are best adapted for its class of work. The details of construction, as well as those of arrangement, are the work of the company's own engineers. The construction of the buildings is along the lines of almost perfect proof against fire; abundant daylight and ventilation are provided, and the welfare of the employees duly regarded.

The Machine Shops

The locations of the No. 1 machine shop and the smaller No. 2 machine shop which adjoins it are shown in Fig. 1. They are of structural steel frame with brick walls. The work of erecting the structural steel was done by the York Bridge Company; all else was done by the York Mfg. Company, itself or under the supervision of its engineers. The general ground plan of the No. 1 machine shop shows it to be 100 ft. wide by 230 ft. long and three stories high, with a floor surface of about 52,000 sq. ft. Adjoining it is the No. 2 machine shop, 47 x 130 ft., two stories. The No. 1 or main shop is 50 ft. in height at the center line; in the center it is open for a width of 38 ft., which provides for a crane runway and heavy erecting floor, while the whole width of the shop is devoted to machine work. The second and third story bays on each side of the building are 29 ft. 11½ in. wide, the height of the ceiling on the first floor being 16 ft.; the second floor, 14 ft., and the third floor, 16 ft. These bays are carried by the structural steel frame of the building, and supported inside the building on 15-in. Bethlehem H shapes, spaced 16 ft. 2 in. apart and resting on 4-ft. square concrete foundation, all piers and footings for foundation walls going down to solid rock. In this construction it will be noted that the girders carrying the floors of the bays are let into the H columns, and that the crane runway at the top of the inner row of H columns is let into and carried on the tops of the columns, the strain therefore being directly on the columns.

FLOOR CONSTRUCTION.

The construction of the various floors is particularly interesting. It was the object in the case of the main floor to avoid all possibility of moisture rising from the bottom; it was therefore built up of 3 in. of concrete, on which was laid two coats of hot tar and two layers of heavy tar roofing paper alternating, starting with the hot tar. On this was an 8-in. layer of concrete, and this finished with a top dressing 1 in. in thickness. The floors

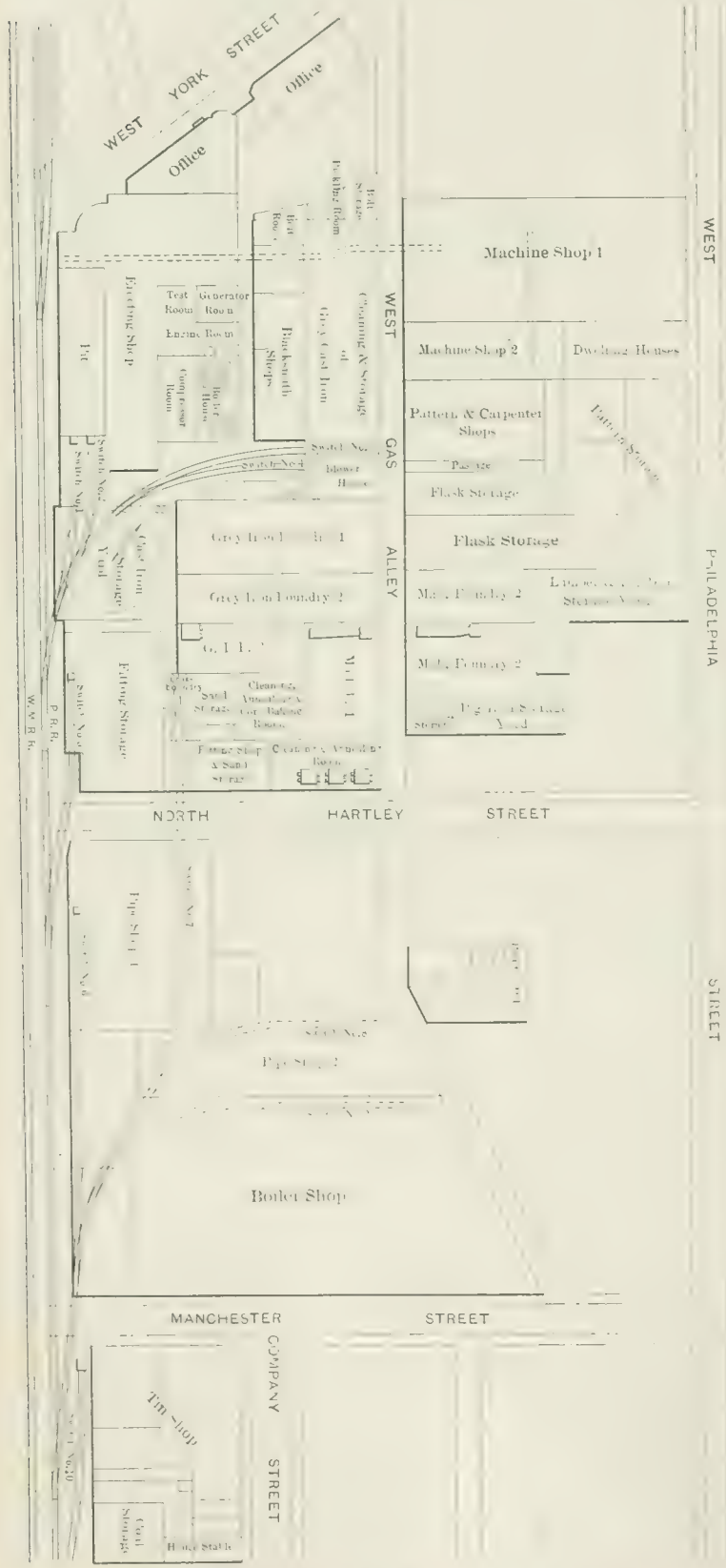


Fig. 1.—Plan of the York Mfg. Company's Works, York, Pa.

Fig. 2.—Arrangement of Heavy Machine Tools on Main Floor
of Machine Shop No. 1.



FIG. 3. View in New No. 1 Machine Shop, Looking Toward Main Entrance, Showing in Part Machine Tools in Galleries.

are located machine tools for work on heavy crank shafts, steam cylinders, air cylinders, flywheels and engine bases. Under the bays are located the tools handling the less bulky character of machine work, with testing tanks for cylinders, which are tested up to 300 lb. per inch internal pressure. The tools located on the main floor under the galleries are served by eight electric trolley cranes, five of which are of 5 tons capacity each, one of 3 tons and two of 1 ton. Some of these operate the full length of the shop, while others of the swing type serve individual tools. All of the tools on the first floor of the shop are of individual electric drive.

TOOL AND SUPPLY DEPARTMENT.

At the rear of the main floor of the shop, extending 10 ft. under the sidewalk, is located a storage department for templets for drilling machines. These are separately racked and classified, and are furnished mechanics for the class of work to be performed by a system of checking, similar to that employed in tool rooms. In this same section of the shop is the tool making and blacksmithing department, in which are located forges, steam hammers and heating and tempering furnaces for the manufacture of shop tools. An independent system of ventilation is provided for this department. A series



FIG. 4. Main Floor of No. 1 Machine Shop—40-Ton Electric Storage Battery Truck in Foreground.

of tool rooms are also located at the rear of the shop. These have 16 x 18 ft. floor space each, 10-ft. ceilings and are located one above the other, so that three tool rooms serve both the main floors and the galleries, although separate tool rooms for small equipment are also located in the different galleries.

THE NO. 2 SHOP MAIN FLOOR.

The main floor of the No. 2 machine shop, having an area of over 6000 sq. ft., which adjoins the No. 1 shop, is

GALLERY EQUIPMENT.

The second floor gallery of the No. 1 machine shop on the east side is used largely for turret lathe work, there being 13 turret machines, while the west gallery is used for small lathe, drill press and miscellaneous work. The tools are driven in two groups with countershaft motor drive. Two 3-ton overhead Shepard Electric Crane & Hoist Company cranes command the east gallery, and there are three 3-ton cranes in the west gallery. The

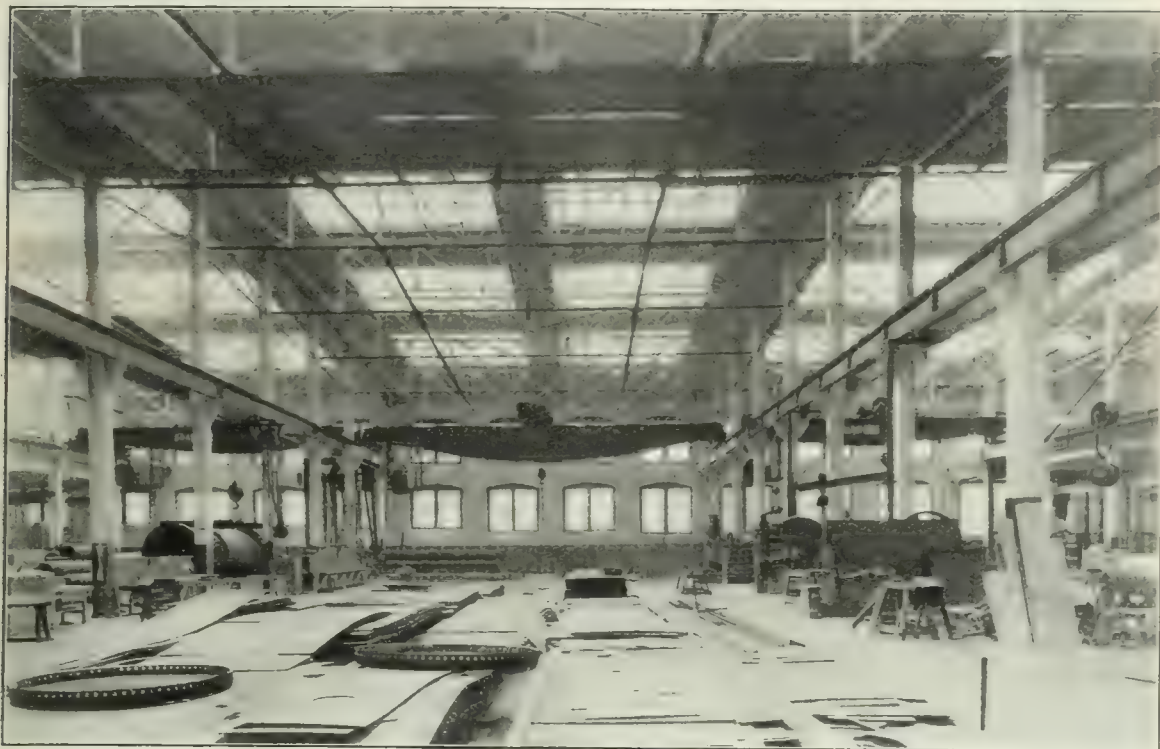


Fig. 5. Central Bent in New Boiler Shop.

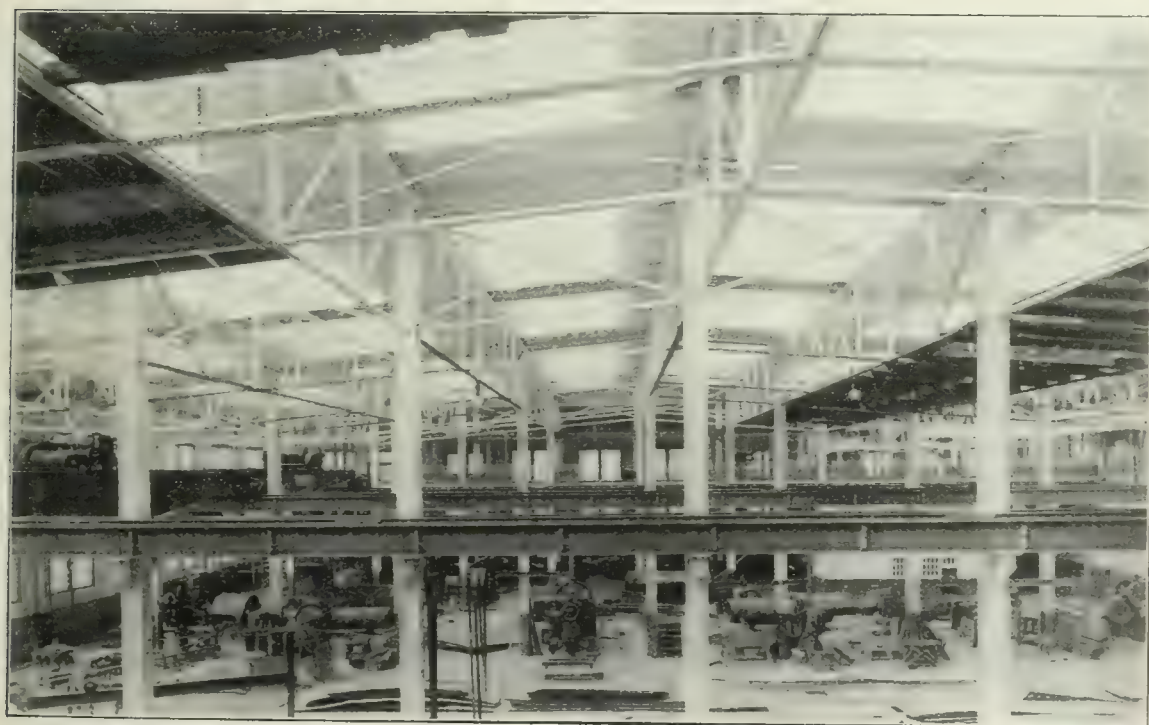


Fig. 6. View Across Boiler Shop at Right Angles to That in Fig. 5.

used partly for grinding and buffing crank shafts, each tool being equipped with an individual exhaust system to carry off the dust. The rod finishing department is also located on this floor, as is also the cylinder lagging department, which is supplied with the necessary shears, punches, bending rolls, &c. One 3-ton and two 5-ton electric overhead traveling cranes serve this department. The tools which comprise drills, punches, slotters, crank shaft machines, &c., are electrically driven in two groups.

second floor of the No. 2 machine shop, which adjoins that of the No. 1 shop, is used for planer, milling machine and shaper work of various kinds. This department is served by a 5-ton overhead electric crane.

The third floor galleries comprise bench and vise work, including that on crossheads, piston rings and governors. There are also brass working departments on the west side and a tool making department on the east side. In this gallery is located the grinding department, in



Fig. 7.—Skylights of No. 1 Machine Shop.

which the internal and surface grinding is done. The tool making department covers a floor space 28×72 ft., and is fully equipped with the usual tools required for this work. An overhead bridge connects these two galleries.

Figs. 3 and 4 are interior views in the new machine shop.

Boiler Shop

The new boiler shop, Figs. 5 and 6, is of irregular shape, measuring in the main portion 333 ft. in its greatest length and 164 ft. in its greatest width, east and west. It is of structural steel and brick construction, the same details being followed in general as in the machine shop. The roof trusses as well as the second floors of the shop are carried on 12-in. H columns, set on 4×4 ft. concrete piers, extending down to rock foundations; while for the columns carrying the runways for the overhead cranes 14-in. sections are used. The north wing, extending over the adjoining pipe shop, occupies a ground space of 50×110 ft. In the construction of the roof, main concrete floors, stairways and gallery floors, the same methods were followed as in the machine shop. Toilet facilities are also provided on the same liberal basis. A description of this shop can best be given by starting with the center bent, which has a width of 58 ft. 8 in. between columns. A bent on the north and one on the south of the middle bent have a width of 45 ft. 5 in. Each of these three bents is 163 ft. in length, and the height is 45 ft. along the center line of the building. Generally speaking, the width of the building is the working length of each of these bents. To the north of the right center bent the floor area of the shop, which is irregular in shape, measures 133 ft. $7\frac{1}{8}$ in. by 164 ft. by 48 ft. 5 in. by 203 ft. 2 in., and over this is a gallery of the same dimensions. At the south end of the building the floor space is also of irregular size, 50×163 ft., with a wing 52 ft. 1 in. by 112 ft. $9\frac{1}{4}$ in., extending partly over the yard and the adjoining pipe shop. Over this is a gallery of the

same dimensions, the floors being carried on H columns, except that portion extending over the yard, which is supported by an inverted truss; so as to provide for the transportation of freight by means of a spur from the railroad siding entering the building at the southeast corner and running along the entire east side of the shop.

CRANES, LIGHTING AND HEATING.

Each of the three main bents of the shop is spanned by an overhead electric traveling crane, the center one being of 20-ton Morgan crane, and the other two 20-ton Shaw cranes. These handle material directly from or to cars on the track along the side of the shop. For the galleries at the ends are 5-ton Otis' electric elevators, inclosed and fully protected in the same manner as those in the machine shop. The same scheme of heating and ventilating is followed, though the various heating ducts are larger. In addition to windows in the side walls, Drouvé Anti-Pluvius skylights of the standard type are located in the roof. Over the center bent are eight 16×20 ft. and four 12×20 ft. skylights; over the right and left center bents, four 16×36 ft. and two 12×36 ft. skylights, while over the north and south galleries the same number and of the same size. Eight additional lights of various sizes are located in the roofs of the irregular wings at each end of the main shop. For overhead ventilation are 19 30-in. Pullman ventilators along the ridge of the roof. The skylights of the new shops are shown in Figs. 7 and 8.

ARRANGEMENT OF TOOLS.

The main floor of the middle bent is devoted to heavy plate work. On each side between the columns are the punches, shears and other tools for bending, drilling and planing. In addition to the general traveling crane service, many of the tools are served by individual 3 to 5 ton jib cranes, hung from the columns and supported at the base in some cases by the frames of the tools them-



Fig. 8.—Arrangement of Drouvé Skylights on Boiler Shop Roof.

selves. In the right center bent are facing machines and testing machines, with pumps for testing purposes; in the left center bent are lighter tools, including hydraulic riveters, operated by electrically driven pumps, rivet heating furnaces and pneumatic tools of various types. Under the south gallery is the department for welding, the oxy-acetylene system being extensively used. Each bent is equipped with a 3-ton electric crane. Under the north gallery are located the smaller shop tools for general machine drilling, cold sawing and other operations. The main floor tools have individual motor drives. Fuel oil is used for the rivet heating furnaces.

The south gallery is given up largely to storage, particularly for ice cans, it being necessary to carry large stocks of various sizes. The north gallery is used for machining and fitting up in connection with the pipe department, and is provided with lathes, planers, drilling machines and pipe cutting tools. The tools are electrically driven in groups. In this department there are four 3-ton electric cranes. There are tool rooms, wash rooms and lavatories at each end of the building.

While this shop is called the boiler shop, it is in real-

racks along the west side of the shop under the gallery. The finished work is placed directly upon the cars without going back into the main bent.

Every effort has been made to reduce the labor of handling and finishing, by introducing labor saving devices and by routing the work so as to reduce handling. Thus the capacity of this department of the works has not only been increased 300 or 400 per cent., but the cost of manufacture has been materially reduced.

Improvements in Other Departments

Besides building the two new shops, the York Mfg. Company has made improvements throughout its plant. What was formerly a combination machinery and erecting department is now used for erecting only. An erecting pit, Fig. 9, 40 ft. wide and 150 ft. long, has been constructed in the No. 1 shop. This is served by two cranes, one of 25 tons and the other of 35 tons capacity. No. 2 shop has two 5-ton, one 10-ton and three 8-ton; No. 3 has two 5-ton and two 3-ton cranes. All these cranes are electrically driven.

The erecting department is equipped with all needed

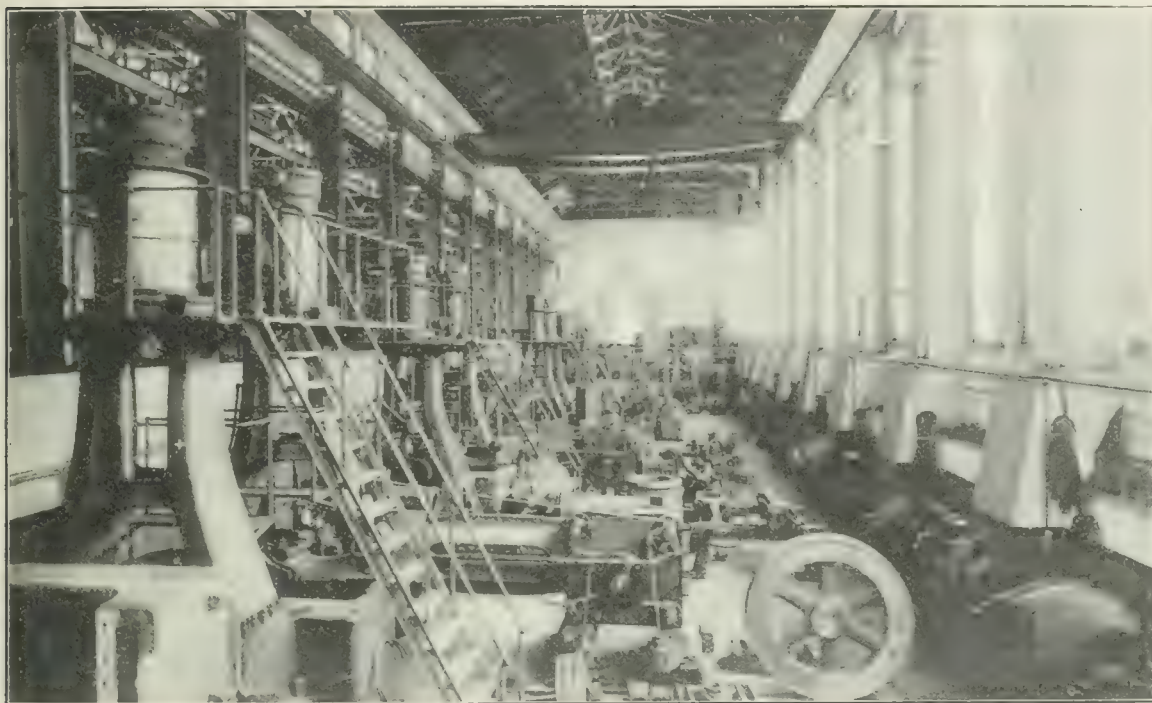


Fig. 9.—Rearrangement of Pit in Erecting Shop.

ity a group of shops working on product which calls for a certain amount of sheet iron or boiler work.

HANDLING IN AND OUT.

A track runs through the length of the east side of the shop so that cars can be loaded and unloaded with any one of the cranes. The sheet material is received in the center bent where it is laid out, sheared, punched, planed and formed. Material which is to be welded up or used in the welding department goes to the south bent, where all the tools and apparatus needed to form, weld, face off and test this class of work are located. Here it is finished up, tested and placed on the cars and shipped.

The material which is to be riveted up goes from the center bent to the north bent. Here it is riveted up, caulked and finished, tested and placed on the cars and shipped. Thus there is no interference or crossing of the work in course of manufacture.

In the south bent there is a 3-ton electric crane between each line of posts. These cranes run under the gallery and can receive and deliver material to be welded from and to the south bent, and thus are feeders to this main bent.

Under the north gallery the cranes run the same way as those in the main bents. This is for the reason that the work done here is principally that of building cranes used in ice plants, the beams for which are placed in

stationary and portable tools to finish up machines after they have been set up and marked, thus avoiding the necessity of returning any part of the work to the machine shop.

The shop formerly used as the boiler shop is situated between the erecting and machinery departments. It abuts the foundry and has been turned into a casting cleaning and casting storing department by running a track into the foundries through an opening made in the dividing wall. Thus the foundry department has gained as molding space that formerly used for cleaning, and the routing of the castings has been changed so as to reduce the handling.

The cleaning and storing shop has a 40-ton Shaw crane, which delivers the castings to the electric track mentioned above. The latter conveys them either to the machinery or the erecting department. The crane operator and the truck operator thus do the work formerly requiring a gang of laborers. The advantage is marked in the winter season, as now the castings are under roof, whereas they were formerly out in the weather. The difference in cost of handling under these conditions can be appreciated.

The improvements referred to in this article were begun in January, 1909. The machinery department was ready to receive its tools in September, 1909, when the work of moving the machine tools was begun. The boiler

shop was ready to receive its equipment June 1, 1910, when the moving of the tools was begun. Each tool was put in perfect working order before being started up in its new position.

Economies Secured

This radical and costly reconstruction was compelled by congestion, due to a phenomenal growth of the business. The point was reached where increased business meant increased cost, hence it was necessary to either reduce the volume of business or resort to the heroic measure of greatly increasing the plant. That the plan followed was effective is shown by this fact: The actual overhead expense in the year ending September 30, 1910, showed such a reduction that the allowance made for overhead expense, based on that of 1908, has more than absorbed the total cost of moving, cleaning and repairing the tools, putting in new foundations where needed, setting and connecting up the tools ready for operation, repairing the floors and other parts of the shops from which the tools were taken; in fact, everything which was not actually an addition to the plant.

The volume of work done in this plant was practically the same for each year of the last three, hence the reduction in overhead cost can only be attributed to the betterment of the equipment brought about by the additions and improvements. The plant as it now stands is considered one of the most modern and up-to-date for its class of work in the country.

Before the changes described the company employed about 1250 men. It is now estimated that the output can be doubled with an addition of 750 men; that is, with 2000 men the company can turn out twice as much product as it formerly did with 1250 men. This would mean the saving of 500 men.

The Ingersoll-Rand and Cameron Pump Alliance

A most interesting circular has been issued regarding the purchase by the Ingersoll-Rand Company of a controlling interest in the A. S. Cameron Steam Pump Works. Following are some extracts:

One of the strongest connections of kindred industries recently effected is that of the Ingersoll-Rand Company and the A. S. Cameron Steam Pump Works; the former having purchased a controlling interest in the latter, yet the connection between these two companies cannot be looked upon as a merger in any sense of the word. The A. S. Cameron Steam Pump Works will continue under the management of Geo. W. Fuller as in the past, and there will be no change in the policy of the company but a greater expansion is contemplated.

Quite a romance might be woven about this alliance, since each company had its origin at nearly the same time and in the same building nearly half a century ago, and for some years, in their early history, carried on their respective manufacture under the same roof, Second Avenue and East Twenty-second street, New York City. The acquaintance thus began ripened into a close and enduring friendship, and a community of activities and interests; the Ingersoll-Rand Company acting as the representatives for the sale of Cameron pumps in some of the leading cities at home and abroad, chiefly in Texas and Mexico, and along the border, and in South Africa, where their success was phenomenal; while the Cameron Works for many years made the castings for Ingersoll compressors and until the latter company removed from the city and built its own foundry.

A history of each company is given. In connection with that of the Cameron Works, the announcement is made that the plant in New York City, though ample at first, is now inadequate for its rapidly growing business. This disadvantage will, however, soon be overcome, as it is the intention to move out of town and to far more commodious quarters, where every facility will be afforded to continue the manufacture under better auspices and ample provisions for further growth and development.

E. N. Breitung & Co., Rockefeller Building, Cleveland, Ohio, have issued a booklet giving cargo analyses of 1910 shipments of their ores with guarantees for 1911. Three Bessemer ores are listed—Foley and Foley No. 2 from the Marquette range and Algoma ore from the Michipicoten range in Ontario. There are 11 Marquette non-Bessemer ores and four Marquette and one Menominee siliceous ores.

The Triple and Trinity Gaskets

The Cincinnati Gasket & Packing Company, 1536 Plum street, Cincinnati, Ohio, is manufacturing two new types of gaskets. The object in making these two gaskets is to produce one which will not stick to the joint when the latter is broken for repairs, and also one that can be used over and over again. Fig. 1 is a view of the Triple gasket and Fig. 2 is a view of the Trinity gasket.

The Triple gasket is so called because there are three layers of material in it, two of which are metal placed on either side of a layer of asbestos or other packing material. In the types of gaskets now on the market for packing seams and joints in steam, hot water and other fittings, one of the surfaces presented to the ends of the joints is asbestos, rubber or some other packing material which in use adheres to the joint, so that when it is broken for repairs or other purposes the gasket is destroyed. With a view to overcoming this difficulty two metal sheets forming a sheath are used, and in this space is placed a layer of asbestos or other packing material. One of these metal sheets is provided with metal flanges, which entirely surround the other sheet.

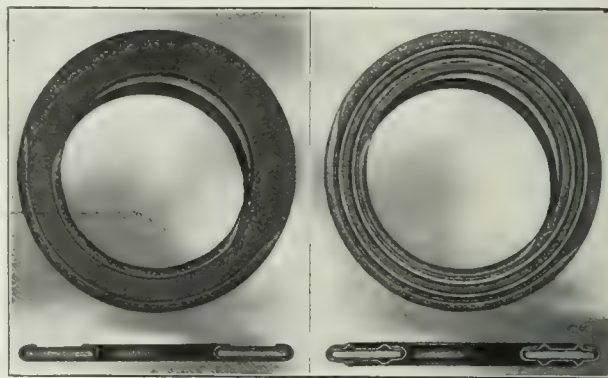


Fig. 1.—The Triple Gasket. Fig. 2.—The Trinity Gasket.

Two New Gaskets Made by the Cincinnati Gasket & Packing Company, Cincinnati, Ohio.

This feature is clearly shown in the section in the lower part of the engraving.

The Trinity gasket shown in Fig. 2 is designed as an improvement on the Triple gasket as it provides a gasket possessing more resiliency and elasticity than the ordinary types, and consequently one that is more efficient where great variations of temperature are met with or the parts are subjected to vibration. This gasket consists of two annular sheets of pliable metal, such as steel or copper, one of the sheets being slightly narrower than the other. Both the sheets are corrugated concentrically with their edges, the corrugations being convex, with a broad, flat surface intervening. A layer of asbestos or other packing material is placed between the two sheets and in assembling the edges of the wider metal sheet are turned over to overlap the narrower one and the layer of packing, which is thus entirely surrounded by metal. When assembled the gaskets, therefore, present as the bearing surface for the joint two pliable metal sides, each of which has corrugations separated by a broad, flat surface, a construction which gives great elasticity as well as the requisite contact area.

Robert W. Hunt & Co., engineers, Chicago, recently issued pamphlets entitled "The Inspection of Rails for Street and Interurban Railways," and now find an annoying typographical error to which they call attention. The pamphlets contain the recommended specifications as adopted by the Committee on Way Matters of the American Street and Interurban Railway Engineering Association at Atlantic City, October 11, 1910. The error occurs on page 6, section 4. This paragraph relates to the chemical composition, and the proper limits for the carbon content should be 0.60 to 0.75 and not the limits as shown in the pamphlet.

The Weaver Roller Jaw Chuck

High speed steel is being used more than ever before, and one result of this increasing use has been to augment the strain to which drills and reamers are subjected in operation. This increase in the stress has led users to secure the strongest possible construction for the shanks of these tools as well as for the holders for them. There are a number of chucks now on the market, but one recently brought out by the Weaver Mfg. Company, Springfield, Ill., is said to possess a combination of advantages such as none other has. Among its special features are its adaptation to straight shank tools exclusively, thus eliminating the taper shank drill having tangs to twist off; polished steel roller jaws which grip the shank powerfully and yet at the same time do not mar it; its entire freedom from delicate or complicated mechanism, and a wide range of capacity. The chuck possesses three principal parts—a body, a cage and the three roll jaws which are shown respectively in Figs. 1, 2 and 3, while Fig. 4 is a diagram illustrating the manner in which the jaws engage the drill shank and increase their grip as the resistance of the drill increases.

resistance of the drill increases due to the tendency of the latter to force the rolls farther up the faces of the cams.

Another special advantage of this chuck is that broken tang drills can be used up by simply turning down their taper shanks. In this way it is possible to use up taper shank drills which are frequently discarded as soon as the tangs twist off because of the cost of adjusting a lathe and turning a new taper shank. In adapting these drills for use in the Weaver chuck all that is necessary is to have the lathe take a cut parallel to the cutting edge of the drill as no particular size or finish is required.

The chuck can be used with either a stationary or a portable drill, and is made in three sizes. The smallest will take drills from $\frac{1}{8}$ to $\frac{3}{8}$ in. in diameter and meets the demand in most shops for the smaller sizes of work. The medium size accommodates drills ranging from $\frac{3}{8}$ to $\frac{1}{2}$ in. in diameter as well broken tang drills having either Nos. 1 or 2 taper shanks. The largest size of chuck takes straight shank drills ranging in diameter from $\frac{1}{2}$ to 1 in. as well as those having Nos. 2, 3 or 4 taper shanks.

The Merchant Marine Congress.—The Merchant Marine Committee of One Hundred, acting under the auspices of the National Association of Manufacturers, has called a National Merchant Marine Congress to meet at the New Willard Hotel, Washington, D. C., January

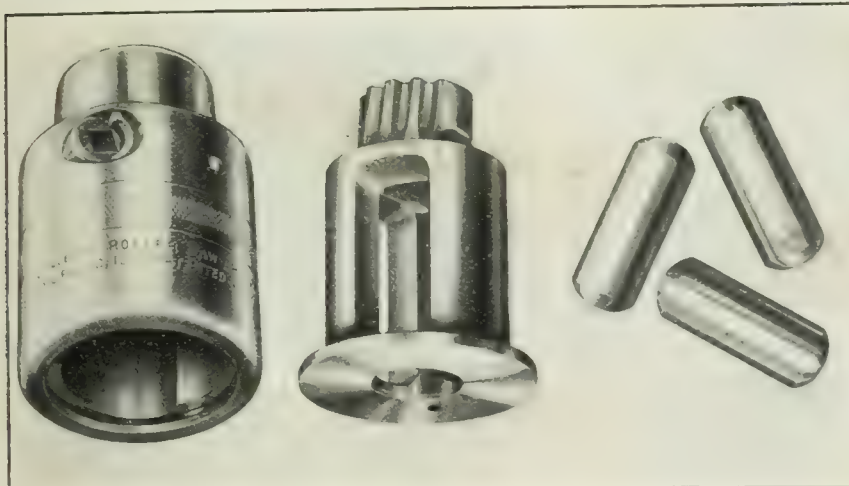


Fig. 1. The Body.

Fig. 2. The Cage.

Fig. 3.—The Roll Jaws

The Three Parts of the Roller Jaw Chuck Made by the Weaver Mfg. Company Springfield, Ill.

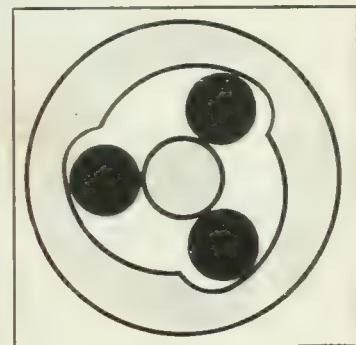


Fig. 4. Diagram Showing Principle Upon Which the Weaver Roller Jaw Chuck Operates.

The chuck body, shown in Fig. 1, is made from a solid piece of hardened, ground and polished steel. The thickness of the walls and the construction of the interior cams against which the roll jaws bear are clearly shown in the engraving. The body is said to be free from any tendency to damage through either use or abuse, and the highly finished exterior surface will not become marred by careless handling.

Like the body, the cage, Fig. 2, is also made of a single piece of hardened steel. As will be noticed from the engraving, the construction is very simple. This cage contains and controls the rolls, and together with them can be instantly removed for cleaning by simply extracting the locking pin. This pin is the only means employed to secure the entire mechanism of the chuck in position.

The three roller jaws which are of hardened tool steel ground and polished are shown in Fig. 3. They transmit all the strain of driving to the heavy one-piece body by bearing against the internal cams. The smooth finished surface will not mar or deface the drills no matter how great the pressure to which they are subjected, and there are no sharp jaws to cut and scar the drill shank which would be apt to ruin the tool and cause it to run out of true.

In Fig. 4 the principle upon which this chuck operates is shown. The outer rim is the body of the chuck, and the three cam faces which comprise its interior wall and upon which the rolls operate is clearly shown. The center circle is the drill shank, and the three surrounding ones represent the roller jaws. When these are brought into very light contact with the shank of the drill, the grip of the jaws automatically tightens as the

23 and 24. Attention will be focused upon a single object, namely, the passage of an ocean mail measure by the present Congress; consequently, all collateral questions, such as construction subsidies, free ships, discriminatory duties and the like, will be excluded from discussion. It will urge Congress to pass without further delay an ocean mail bill, which will authorize the Post-Office Department to apply the revenues received on account of foreign postage toward securing ocean mail service in American built ships flying the American flag and available in time of need for naval use with those regions where ocean mail facilities are now most inadequate, namely, South America, South Africa, Australasia and the Orient. D. A. Tompkins, president of the committee, is a large manufacturer of Charlotte, N. C. A number of the leading Chambers of Commerce will send delegates, and so will important national associations of manufacturers.

The Newark Technical School, Newark, N. J., is having a new laboratory building erected in which the faculty expects to open a course in tool making and tool designing. In addition to instruction in the designing and making of small tools, mechanical drawing will be taught and a course in metallurgy in iron and steel will be offered the pupils. The students in the latter course and in the tool making course will be required to attend seven hours a day for five days in the week and four hours on Saturday. Four hours of each day's instruction will be devoted to practical work in the mechanical laboratory and the remainder of the time will be given over to drawing and academic work.

The Morris 20-In. Cone Head Lathe

A New Tool with a Special Type of Drive

A new 20-in. cone head lathe with an 8-ft. bed has been brought out by the John B. Morris Machine Tool Company, Cincinnati, Ohio. One of the principal features of this new tool is a peculiar method of driving through a three-step cone pulley and a double back gear. In this drive the double back gear keyed to the cone pulley

gears render three changes of feed available for every change of gears. These feeds range from 0.005 to 0.5 in. per revolution of the spindle and are secured by moving a lever. The compound rest has a very long traverse.

Because of the special manner of driving employed it is impossible to lock the cone pulley to the spindle as is ordinarily done, and a plate, *a*, having a number of holes drilled into it is keyed into the spindle to accomplish this. The plunger *b*, which has a spring seat, extends through the cone, and the knurled knob *c*, pinned

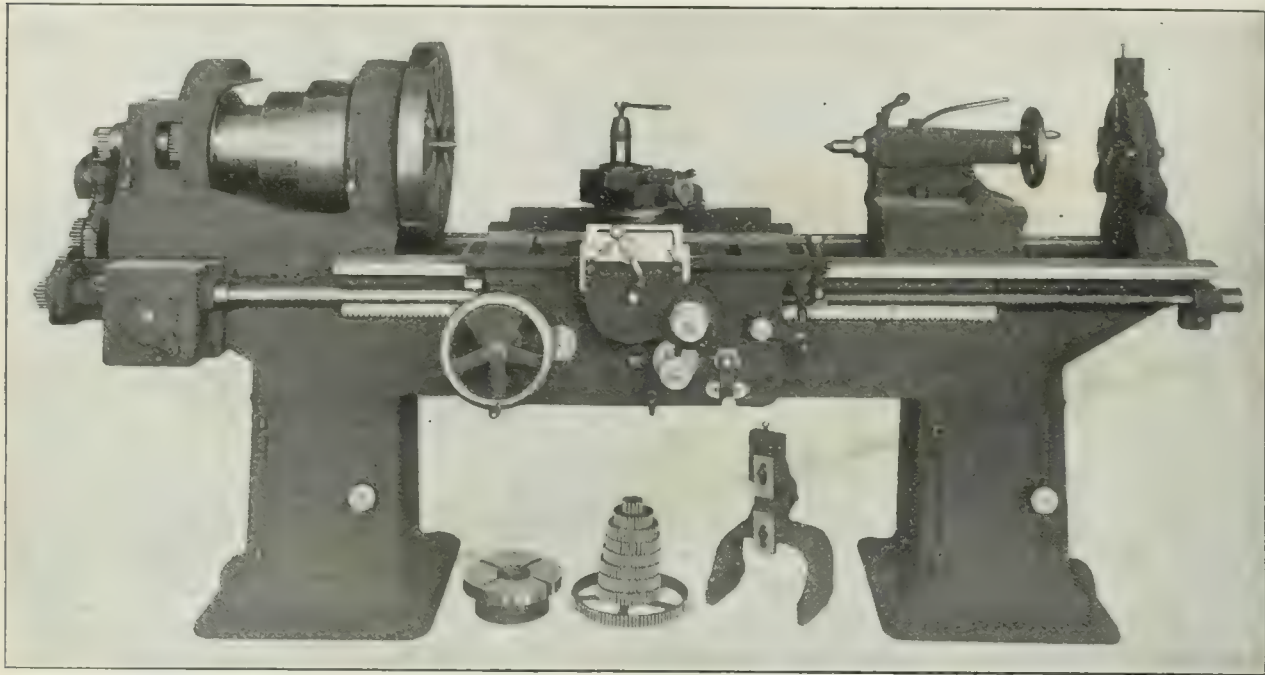


Fig. 1.—The 20-In. Cone Head Lathe Built by the John B. Morris Machine Tool Company, Cincinnati, Ohio.

meshes with the sliding gears on the back gear quill, and the pinion on the back gear quill meshes with the face gear keyed to a flange on the spindle on the outside of the front bearing. Fig. 1 is a general view of the tool, while Fig. 2 is a sectional plan of the headstock, showing the arrangement of the gearing.

The headstock is long and massive and entirely encloses the face gear. The reverse plate is located on the outside of the headstock, thus avoiding the necessity for coring out the web to make room for this part. The tailstock is also of massive construction and can either be bolted solidly to the bed by two heavy bolts or extended over the end when long pieces of work are being handled.

Like all the other modern tools of this type, the apron has double walls, and double support is provided for all shafts subjected to severe strains. The lever below the apron, Fig. 1, gives a positive feed for rough chasing all threads with the ordinary rack feed, thus preserving the lead screw threads for finishing. The rack and screw feeds are both kept out of engagement at the same time, and provision is also made for reversing the cross and the longitudinal feeds in the apron. There is a chasing dial for catching all the threads, which range from 2 to 72 per inch, including an 11½ pipe thread, without stopping the lathe or reversing the lead screw. The semiquick change

to the left end of the plunger with the retaining pin *d*, keeps the plunger out of engagement with the holes in the plate *a* when the back gears are in use. This knurled knob is operated by hand through an opening in the gear cover.

Both the front and rear headstock bearings are tapered and provided with ring oilers, and the boxes for the spindle and the headstock are of the same type as

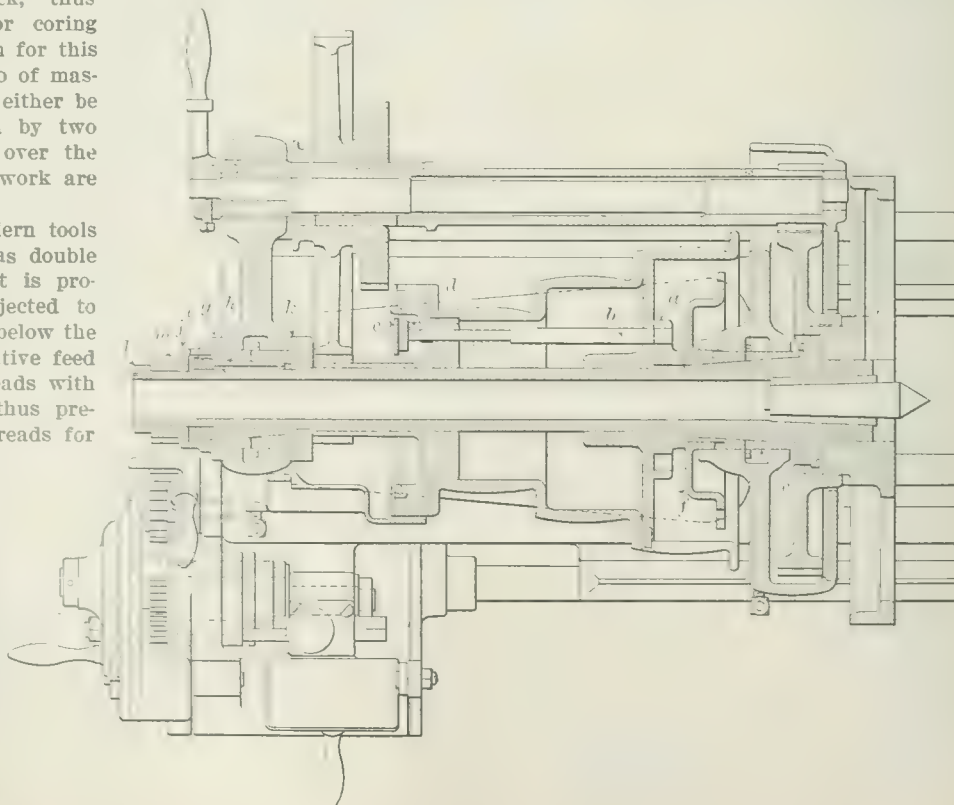


Fig. 2.—Sectional Plan of the Headstock, Showing the Arrangement of Gearing.

that used on the 16-in. geared head lathe, an illustrated description of which appeared in *The Iron Age* January 12, 1911. The means for making adjustments for wear are the same in both types of lathes and the spindles of both are interchangeable. The headstock boxes are not capped, but are solid bearings bored to the same size. The bronze sleeve *e*, the bore of which corresponds to the spindle taper is fitted into the front bearing with a light driving fit and keyed to keep it from turning in the headstock. A left-hand thread is cut on its inner end to receive the adjusting nut *f*, which has a right-hand thread on the hub to fit into the headstock. This nut has a large flange which is drilled to receive the pins of the face spanner wrench used in making adjustments. This adjustment is made by removing the small cover shown on the enlarged portion of the headstock next to the cone pulley. The back portion of the headstock has a bushing, *g*, driven into it, which is taper bored to receive a sleeve, *h*, keyed to slide upon the spindle. This sleeve can be moved longitudinally on the spindle by the adjusting nut *i*, which is operated by a spanner through holes in the thrust cup casting *j*. The hardened tool steel washer *k* opposes the natural thrust exerted by the spindle in operation, and the spindle is prevented from moving longitudinally by the nut *l* on its outer end and the feed gears *m*, bearing against the cup *j*. This cup has its bearing against the rear headstock box. In making adjustments of the spindle, the end play is first adjusted and then the front or the rear box can be adjusted independently.

The high grade crucible steel spindle has a bore of 1½ in. and its nose is 3½ in. in diameter. The spindle nose serves as a pilot for the face plate or chuck plates which screw directly into the face gear. The largest diameter of the front spindle bearing is 3¾ in. and it is 5½ in. long. The three steps of the cone pulley are arranged for a 4-in. belt, and the double back gear gives ratios of 4.4 to 1 and 18 to 1. The speeds are arranged in geometrical progression.

The following table gives the principal dimensions and specifications of the lathe:

Swing over ways, inches.....	20¾
Swing over carriage, inches.....	12½
Length of bed, feet.....	8
Regular distance between centers, inches.....	53
Maximum distance between centers, inches.....	58
Bore of spindle, inches.....	1½
Diameter of spindle nose, inches.....	3½
Maximum diameter of front spindle bearing, inches.....	3¾
Length of front spindle bearing, inches.....	5½
Width of driving belt, inches.....	4
Ratio of back gears.....	4 to 1 and 18 to 1
Range of threads, per inch.....	2 to 72
Size of tool post opening, inches.....	¾ x 2
Diameter countershaft friction pulleys, inches.....	14
Face width of countershaft friction pulleys, inches.....	4
Net weight of tool, pounds.....	3,700

The equipment furnished with this tool includes face plate, change gears, wrenches and all the other customary accessories, as well as a countershaft with double friction pulleys which enables both belts to be run forward, as no reversing belt is required.

The Girod Electric Furnace

Concerning recent progress with the Girod electric furnace, the following statement is made by its representatives:

At one plant in Ugine, France, six Girod furnaces are now in operation. Two of these are refining up to 16 tons each of cold charges of ordinary scrap material, and recently in the presence of the controller of the French Navy one of the furnaces made a heat of 18 tons of steel for castings. Cold charges are used exclusively, but with molten metal these two furnaces could take charges of 20 tons. The power supplied is 1200 to 1500 kw. and each furnace is provided with four electrodes. Two other furnaces at this plant, with a capacity of 3 tons of cold or 4 tons of molten charges, are each operated with a single electrode. The power capacity is 325 to 350 kw.

Two furnaces each having a capacity of 2 tons are also in operation at this works. The output is high speed or tool steels, projectile steel and steel for castings, auto-

mobiles, &c. A new 8000-kw. power furnace is now being installed at Ugine. The Girod Company has 40 other furnaces operating exclusively on ferroalloys.

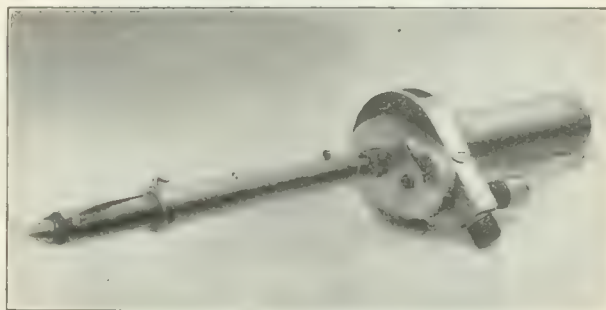
The Cockerill Company in Seraing, Belgium, has been operating a Girod furnace of 4 to 5 tons for the past two years in refining molten Thomas steel for rails, locomotive tires, cannons and automobiles, and at the Krupp works a 12½-ton Girod furnace, operated with three-phase current, will be used for the production of tool steel, castings, cannons, automobiles and other Krupp product.

The Girod furnace installed by the Simonds Mfg. Company at Chicago last year is being transferred to this company's new plant at Lockport, N. Y., to be used for refining the high grade of steel required for saws, machine knives and files.

The Stirling Packing Machine

Hand packing, which is the commonly accepted manner of packing the stuffing boxes of condensers, possesses the objections of slowness and expensiveness, and is not altogether satisfactory. With a view to overcoming these objections Robert R. Stirling, 847 Avenue C, Bayonne, N. J., has invented an automatic machine for inserting and packing the lacings or strings in the stuffing boxes for the tube ends of surface condensers.

The machine consists of a rotatable hammer tube with a helical slot and guide hook. Power for rotating



A New Type of Machine for Packing the Stuffing Boxes for the Tube Ends of Surface Condensers Invented by Robert R. Stirling, Bayonne, N. J.

this hammer tube is transmitted to it by the compressed air motor at the right, the quantity of air consumed being very small. In fact, when the machine is used with connection with other pneumatic tools supplied from the same reservoir the amount is said to be negligible.

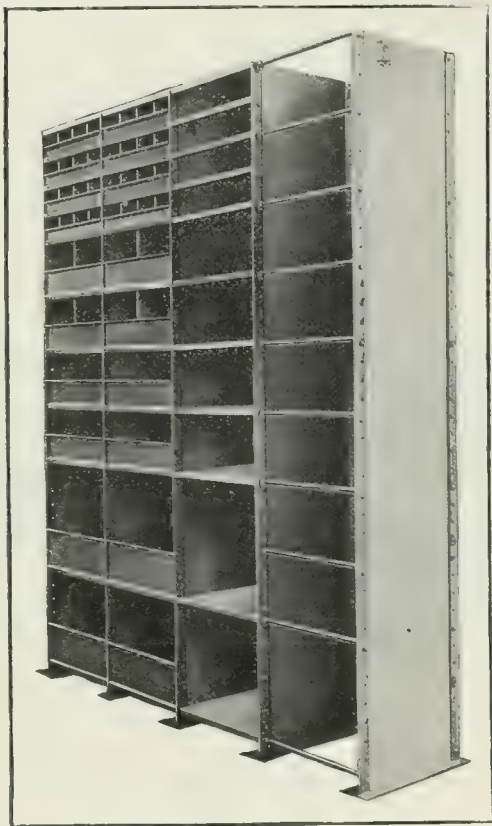
In operation the machine places and starts the end of the lace in the bottom of the stuffing box and then automatically winds the lacing about the tube and hammers in each coil. Each of these coils is perfectly flattened and wound tightly against the tube, thus keeping it out of the threads for the ferrule. The operation of the machine is entirely automatic, and a lace is inserted and packed in from 2 to 3 seconds. The condition of the tubes and stuffing boxes, the position of the work and the ability of the operator all affect the number of boxes that can be packed in a given time. The average in ordinary work is from 6 to 9 boxes per minute throughout the day, which gives a total output of from 2500 to 3000 boxes per day, these results having been obtained under actual working conditions that included breathing and resting spells and time for erecting scaffolding. The machine is regularly equipped with a hammer tube to fit either ⅝ or ¾ in. stuffing boxes, but as these tubes are interchangeable it is possible to pack all sizes of boxes with one machine.

The Treadwell Construction Company, Midland, Pa., recently received a large contract for sugar mill equipment for shipment to Cuba. During 1910 this company built 80 ladles for open hearth and blast furnace use, having capacities of 60 to 80 tons. It is now operating its plant to about full capacity on a variety of heavy plate work.

The Twentieth Century Steel Stock Rack

The increasing use of fireproof construction for manufacturing and storage buildings has created a demand for some material other than wood for shelving and bins and racks. In addition to the employment of a different material these racks must possess other features tending toward economy, especially in the storage of machine parts and miscellaneous stores. The Twentieth Century steel stock rack, made by the Manufacturing Equipment & Engineering Company, Boston, Mass., is said to possess a number of advantages, such as ease in varying the distances between shelves and the sizes of bins, interchangeability, large carrying capacity, stability, resistance to fire, ease in changing from one location to another and ease and comparative low cost of construction.

The uprights or main partitions are made of a light



The Twentieth Century Steel Stock Rack Made by the Manufacturing Equipment & Engineering Company, Boston, Mass.

gauge metal sheet bound at either end by one of heavier gauge that is formed into a triple V and forced on the central sheet. This binding is punched throughout its entire length with holes spaced 3 in. on centers for the truss bars, as shown at the right of the engraving. The burr produced when these holes are punched is carried through the central sheet, thus making the latter and the stiffening edges on either side integral. The load is supported by the truss bars, which are bolted into the punched holes in the reinforced edge and transmit the stresses to it. In addition, these edges also carry the backs and fronts of the bins. Any width of partition can be made, but the customary ones are 18, 24, 30 and 36 in. The spacing between the partitions depends on the length of the truss bars.

Tubing is used for the construction of the truss bars, which carry braces or knees riveted on either end. Holes are drilled through the free flanges of the knees to receive bolts. These bolts pass through the knees on truss bars, and the uprights of the frame thus tightening and bracing up the whole rack, the knees acting as a reinforcement to the main joint. The bolts employed are of the ordinary type and can be tightened with a spanner wrench, a feature which enables the shelves to be changed with ease. These bars are regularly furnished in lengths of 24, 30 and 36 in. for supporting va-

rious loads of material of different characters. A set of these bars in position is shown in the right section of the rack illustrated.

Supported on the truss bars are the shelves, shown in the second section from the right end, which are made in any of the customary gauges to carry the load. All four sides are flanged, and in addition, the front and rear edges are trussed, thus allowing a light sheet to support a heavy load. In moving these shelves and the front and rear supporting bars from one set of holes to another it is not generally necessary to remove any other shelf. Holes are pierced in the shelves for taking a card holder on the front and dividing partitions, which fit either transversely or longitudinally in punchings on the shelves. These partitions are hemmed on the front and back edges to remove the sharp edges and also to stiffen them. The tops and bottoms are flanged for bolts which pass through and secure the partitions to the shelves.

The bin fronts are formed to hook under the shelves and can be swung into place readily. They are flanged on each end and are kept in place by bolts passing through these flanges and the uprights. To enable these fronts to be used as a ladder the upper edge is trussed and left very broad. These fronts can be supplied for any of the customary heights of bins, and they can be readily taken on or off. Although not regularly furnished backs can be supplied for the shelves when ordered. Like all the other parts they are flanged on either edge and pierced to receive the bolts holding them fast to the shelves. The left half of the rack is a typical arrangement of shelves, bin fronts and card holders.

United States Petroleum Production in 1910

The year 1910 has been sufficiently eventful in the development of new oil supplies in the United States to more than keep up the country's phenomenal production of the last three years. In fact, the production increased to over 200,000,000 barrels, which is two-thirds of the world's production and several million barrels more than the whole world produced seven years ago.

The most surprising developments of the year were in the Sunset-Midway district of California. The developments in the Caddo field of Louisiana also entirely changed the position of that field. Connected with the developments in both these fields were important changes in the conditions of marketing the oil.

The production of oil in the United States in 1910, as reported by Dr. David T. Day of the United States Geological Survey, was between 200,000,000 and 208,000,000 barrels, approximately, as follows:

	Barrels.
Illinois	32,000,000
Appalachian and Lima-Indiana fields.....	32,000,000
Gulf and Caddo fields.....	14,000,000
Mid-Continent and Rocky Mountain fields.....	53,000,000
California	73,000,000
Total.....	204,000,000

Stocks increased over 50 per cent. on the Pacific Coast. Prices of crude oil declined except in the Mid-continent field, where they increased to 44 cents a barrel.

Dearborn Feed Water Treatment Abroad.—The Dearborn Drug & Chemical Works, McCormick Building, Chicago, which has distributed its feed water treatment and lubricants through an agency in the Philippines for the past two years, has decided to open its own branch office and warehouse in Manila. F. O. Smolt, who has been connected with mining propositions since his graduation in chemistry from the University of Illinois in 1891, has become connected with the Dearborn Company, and sailed January 7 for Manila to take charge of this work, under the supervision of E. C. Brown, manager of the foreign department of the company. Mr. Brown has spent most of the past two years in Japan, China and the Philippines, investigating steam plant and railroad conditions in the interests of Dearborn products, and is still there, having made selling connections at Tokyo, Tientsin, Hongkong and Shanghai.

An Interesting Labor Inquiry

Recent Immigrants in the Iron and Steel Industry

BY W. J. LAUCK.

A valuable report upon labor conditions in the iron and steel industry is now being published as the result of the extensive investigation made by the United States Immigration Commission. This investigation covered iron and steel manufacturing in all its aspects in the territory east of the Mississippi River. Detailed information was secured for 86,000 employees of the industry, and an intensive study was made of 2500 families the heads of which were employed in iron and steel manufacturing establishments. In the tabulation and presentation of these data the results are first shown for the industry as a whole, followed by general surveys of conditions in the East, Middle West and South. The section of the report dealing with conditions in the East also includes an exhaustive study of the Pittsburgh and Youngstown districts, and in the section on the South separate and detailed treatment is given to the Birmingham district. These divisions of the report render possible a comparison of wages and conditions of employment which prevail in different parts of the country.

Employees Mainly of Foreign Birth

In the industry as a whole it was found that almost three-fifths, or 57.7 per cent., of the total number of employees are of foreign birth, while 13.4 per cent. are of the second generation of immigrants or of native birth but of foreign father. Only slightly more than one-fourth, or 28.8 per cent., of the iron and steel workers are native Americans. Native Americans and immigrants from Great Britain, Germany and northern Europe were exclusively employed until the early part of the decade 1880-1890. During the past 25 years the greater part of the labor forces for the industry has been recruited from recent immigrant races from southern and eastern Europe. Of these races, the Slovaks, Poles and Croatians are employed in the largest proportions at the present time, although all races of recent immigration have a representation in the operating forces of the blast furnaces and steel mills. The old immigration from Great Britain and northern Europe is represented chiefly by the English, Irish and Germans, although considerable numbers of Swedes are employed in the sheet and tin plate establishments and of Bohemians in foundry and machine shops.

The southern and eastern Europeans, unlike the races of older immigration, have had little experience or training in their native countries for the work in the iron and steel manufacturing establishments. Of the total number of employees of foreign birth less than one-tenth, or only 8.6 per cent., had been employed in the steel industry before coming to the United States. On the other hand, more than three-fifths, or 64.4 per cent., had been farmers or farm laborers in their native lands. At the present time the native Americans, English, Irish, Welsh and Germans in the iron and steel plants occupy the skilled and executive positions, while the recent immigrants from the south and east of Europe do the rough and unskilled labor. The industrial progress and efficiency of the southern and eastern Europeans has been slow on account of their illiteracy and their inability to speak English. For this reason and the additional fact that the sons of Americans and older immigrants are entering the industry in constantly decreasing numbers, many employers express grave doubts as to the efficiency of the operating forces in the future. The loss in this respect, however, seems to be more than counterbalanced by improved mechanical devices and processes.

Earnings and Standard of Living

The average weekly earnings of all classes of iron and steel workers were \$14.35. The average annual earnings of all employees, 18 years of age or over, were \$346, and the average earnings each year of male heads of

families were \$409. The average annual income of families of all classes of employees was \$548. Slightly more than four-fifths of all the families depended entirely upon the male head for support, while one-third, composed principally of southern and eastern Europeans, secured their income from such earnings and from the payments of boarders and lodgers. The families whose heads were native Americans depended more largely upon contributions of children than those the heads of which were born abroad.

As a matter of fact, the standard of living of the recent immigrant households was found to be very low. Most of the southern and eastern European steel workers were single or, if married, had left their wives abroad. Consequently they were able to adopt the group method of living, popularly known as the "boarding-hoss" system, whereby each member paid a fixed sum, usually \$3 per month, and the cost of food was shared equally.

Of the foreign born families, 41.5 per cent. supplemented the earnings of the heads by keeping boarders or lodgers, as contrasted with only 8.3 per cent. of the families the heads of which were native born. This practice has led to a high degree of congestion within the households the heads of which were foreign born, which can be seen from the fact that the average monthly rent per capita in households the heads of which were foreign born was only \$1.14, while that in native American households was \$1.71. The average number of persons per room in households the heads of which were of foreign birth was 1.76, as compared with 0.93 among the families the heads of which were of native birth; and the average number of persons per sleeping room in foreign born households was 2.89, as contrasted with 1.96 in the native born households. Of the total number of foreign born households 14.7 per cent. used all rooms for sleeping purposes, as against only 3.8 per cent. of the households the heads of which were native born.

Of the native born employees 20 years of age or over, 64.6 per cent. were married, and of the total foreign born 67.2 per cent. Of the foreign born employees 84.2 per cent. were able to read and 82.3 per cent. could both read and write. Of the employees of foreign birth who were of non-English speaking races only 51.8 per cent. were able to speak English.

The southern and eastern European iron and steel workers manifested very little evidence of general progress and assimilation. The tendency toward acquiring citizenship among the wage earners of foreign birth was very small, only 32 per cent. being naturalized and 11.4 per cent. having taken out first papers. Of the families the heads of which were foreign born 20.6 per cent. owned their own homes, as compared with 15.1 per cent. of those the heads of which were native born. Only 1.5 per cent. of foreign born and 3.6 per cent. of native born employees were members of labor organizations.

Eastern Blast Furnace Wage Reductions

In explanation of the 10 per cent. reduction in wages made last week at the blast furnaces of the Thomas Iron Company and the Empire Steel & Iron Company in the Lehigh Valley and the Wharton Steel Company in New Jersey, it is stated that this brings the basis back to that paid prior to October 1, 1909. It is added that wages paid by the above three companies are still higher than those paid by merchant furnaces in the Schuylkill and Lebaon valleys. The Thomas Iron Company is now reported to be operating at 53 per cent. of capacity, the Empire Steel & Iron Company at 50 per cent. and the Wharton Steel Company at 36 per cent. The rate of common labor and of all employees receiving less than \$1.50 a day is not reduced. On behalf of the furnace companies it is stated that the price of pig iron has fallen fully \$4 per ton since the beginning of 1910, and the cost of manufacturing to-day is fully \$5 higher than in 1898, due to the gradual advance in wages since then, the higher cost for railroad freights, ores, fuel, supplies and all other material entering into the cost. The advance in material is also due largely to the advance in wages.

Trade Publications

Woodworking Machinery.—The Bental & Margedant Company, Hamilton, Ohio. Catalogue L. This is the company's 1911 catalogue, describing and illustrating a complete line of woodworking machinery for various purposes. All the different tools are shown and brief specifications are given on facing pages.

Gas Exhauster.—Wilbraham-Green Blower Company, Pottstown, Pa. Bulletin No. 5. Illustrates the Wilbraham-Green rotary positive pressure gas exhauster, which can be driven by a belt, steam engine or electric motor. The illustrations show both the exterior and interior of the blower, and a brief specification table is also included.

Canning Machinery.—Ayars Machine Company, Salem, N. J. Catalogue No. 12. Size, 6 x 9 in.; pages, 64. Illustrates and describes a line of machinery for canneries, which includes not only the necessary apparatus for preparing the filling for the cans, but also shafting for driving the various machines and can making machinery and tools.

Air Compressors.—Clayton Air Compressor Works, 115 Broadway, New York City. Bulletin C-205. Treats of a line of vertical and horizontal air compressors that are particularly designed for automobile garage work for inflating tires, cleaning cushions and inaccessible parts of engines and for supplying air blast for brazing or soldering operations. The various types of compressors are illustrated and brief tables of dimensions are included.

Power Presses.—Joseph T. Ryerson & Son, Sixteenth and Rockwell streets, Chicago, Ill. Catalogue. Relates to a line of upright, inclinable, double crank and toggle power presses. The general features of the presses are first described and this is followed by a more detailed description of the various types. The text is supplemented by illustrations and brief tables of dimensions are included.

Upright Drill Presses.—The Aurora Tool Works Company, Aurora, Ind. Pamphlet. Devoted to a line of upright drill presses ranging from a 14-in. sliding head bench drill to a 44-in. back geared tool having a positive gear feed. The various drills are illustrated and brief specifications are given on facing pages.

Automobiles.—The Winton Motor Car Company, Cleveland, Ohio. Brochure. Devoted to the 1911 model of the Winton Six car. The various features of the model are illustrated and described and statements are given as to the maintenance required by previous models in actual use.

Power Transmission Appliances and Grates.—Valley Iron Works, Williamsport, Pa. Several pamphlets. Call attention to adjustable ball and socket hangers for shafting, a compression clutch coupling, friction clutch pulleys, pillow blocks, post hangers and floor stands, while others show four different types of grates. In all the pamphlets the various appliances are illustrated and brief dimension tables are included.

Traction Engines.—Hart-Parr Company, Charles City, Iowa. Catalogue No. 10. Gives general description and specifications for a line of traction engines using gasoline, kerosene and alcohol as fuel. The general features of the construction of these engines are first given, followed by brief descriptions of the three sizes of engine built—namely, 30, 45 and 80 hp. In addition to views of these engines there are a number of engravings showing them in use.

Steam Hammers and Hydraulic Machinery.—The Chambersburg Engineering Company, Chambersburg, Pa. Catalogue No. 33. Illustrates and describes a few of the hydraulic machines and steam hammers most recently built by this company. These include riveters, cranes, pressure pumps, presses and forging machines, all of which are operated by hydraulic pressure, and single and double frame steam forging hammers. Brief tables of dimensions are included for the various tools. In addition to the ones shown in the catalogue, the company is prepared to design and build other tools to suit any particular work its customers require.

Screw Machine Products.—Grant & Wood Mfg. Company, Detroit, Mich. Catalogue. Calls attention to a line of screw machine products of both standard and special types. The former includes set, cap and collar screws, coupling bolts, milled studs and hexagon and castle nuts. A number of the special parts are illustrated and several tables of useful information complete the catalogue.

Ignition Goods.—The American Coil Company, Foxboro, Mass. Catalogue. Calls attention to a line of ignition goods which includes induction coils, spark plugs, switches, timers, &c. All of these are illustrated and the engravings are supplemented by brief descriptions.

Drilling Machines.—The Rockford Drilling Machine Company, Rockford, Ill. Catalogue. Gives general description and specifications for a line of single spindle and gang drills, one page being devoted to each tool. An illustration of the drill is given on the upper part of the page, while a brief description occupies the remainder. Among the drills shown is the 14-in.

drill with geared attachment for tapping six holes simultaneously, which was illustrated in *The Iron Age* February 3, 1910.

Drill and Tap Holder.—The Beaman & Smith Company, Providence, R. I. Pamphlet. Devoted to a safety drill and tap holder, the special advantages of which are simplicity, sturdiness and compactness. The holder proper consists of only four parts, the shank and body, the cap, the socket and the check or spanner nut. Five sizes in all of holder are made for handling drills and taps having a maximum diameter of from 1/4 to 2 1/2 in. The construction of the holder is shown and this is followed by a description of the various parts.

Motor Cars.—The Lozier Motor Company, Detroit, Mich. Pamphlet. Is a text-book on the construction of a modern high power automobile rather than a catalogue. The various special features entering into the four and six cylinder 1911 models are described and illustrated and space is given to the records made by this car in 1910.

Shapers.—The Smith & Mills Company, Cincinnati, Ohio. Catalogue. Illustrates and describes a line of crank and geared pillar shapers. Among the tools covered is the variable all geared drive shaper which was illustrated in *The Iron Age* May 5, 1910. Space is devoted to a number of attachments that can be supplied with the shapers and a complete telegraph code completes the catalogue.

Hoisting Engines.—The Chase Machine Company, Cleveland, Ohio. Pamphlet, consisting of loose leaf circulars. Lists the various types of reversing, hoisting, deck and docking engines which this company manufactures.

Machinery and Supplies.—Cutter & Wood Supply Company, 68 Pearl street, Boston, Mass. Catalogue No. 10. Size 6 x 9-in.; pages 667. Calls attention to a large and varied line of machinery and supplies which includes tools and supplies for machinists, engineers and foundries; factory, mill and manufacturers' supplies; transmission machinery and supplies, emery grinding and polishing machinery and polishers' and electroplaters' outfits and supplies. The various accessories are illustrated, and while the descriptions are of necessity brief they are planned to bring out the salient features. An extensive alphabetical index occupying 26 pages renders the finding of any desired article a comparatively simple matter.

Water Softeners.—The Kennicott Company, 50 Church street, New York City. Circular. Concerned with the Kennicott water softeners and their accessories, such as tanks, boilers and water weighers. All of these appliances are illustrated and briefly described.

Steam Boilers.—The Babcock & Wilcox Company, 85 Liberty street, New York City. Pamphlet. Contains a report of a test made on a Babcock & Wilcox boiler for the United States battleships Wyoming and Arkansas, which was presented before the American Society of Naval Engineers and is reprinted from the November number of the society's *Journal*.

Recording Liquid Weigher.—Henry R. Worthington, 115 Broadway, New York City. Pamphlet No. W-182. Gives general description and specifications for the Worthington recording liquid weigher, which is designed for measuring liquids by weight where there is little or no pressure and the liquid flows into the tank by gravity. Two sizes of weigher are illustrated and space is given to some special applications of the apparatus.

Spiral Riveted Pipe.—American Spiral Pipe Works, Chicago, Ill. Pamphlet, entitled "Water Powers of the Third Magnitude." Refers to the use of spiral riveted pipe in the water power line of the North Creek Electric Company and shows by numerous illustrations the conditions which had to be contended with in its construction.

Punching and Shearing Machinery.—Bertsch & Co., Cambridge City, Ind. Catalogue No. 3. Size 6 x 9 in.; pages 152. Illustrations and descriptive matter explain the operation of a line of tools for punching, shearing and bending sheet metal and iron and steel bars. These machines are adapted for belt, engine or motor drive, and included among them is the multiple punch and shear with automatic feeding mechanism which was illustrated in *The Iron Age* October 7, 1909.

Acetylene Lighting.—The Commercial Acetylene Company, 80 Broadway, New York City. Several loose leaf circulars. Deal with various appliances for lighting railroad cars, signals, locomotive headlights and houses by acetylene. The various fixtures and accessories used in each different line are described in the circular pertaining thereto.

Gear Tester.—The Adams Company, Dubuque, Iowa. Circular No. 821. Illustrates the Farwell gear tester for measuring the accuracy of the pitch circle and the tooth curves. An illustrated description of the tester appeared in *The Iron Age* September 29, 1910.

Ventilation.—Warren Webster & Co., Camden, N. J. Pamphlet entitled "Ventilation in Its Relation to Health." This is a reprint of a paper read by William G. Snow of Cornell University, which points out the necessity for properly ventilating rooms and public buildings.

Electric Fans and Water Motors.—Hunter Fan & Motor Company, Fulton, N. Y. Catalogue and pamphlet. The

former pertains to the Tuerk and H E fan motors, which are designed to meet all conditions, frequencies and voltages of alternating and direct current, and are applied to electric fans of all types. The latter describes and illustrates a line of ventilating fans for belt operation from a water motor and also shows the motor itself.

Power Transmission Chains.—Diamond Chain & Mfg. Company, Indianapolis, Ind. Catalogue B. Pertains to the Diamond chains for automobiles, bicycles and general power transmission. The various types of chains are illustrated, and this is followed by a list and description of the various parts.

Electrical Machinery and Appliances.—The General Electric Company, Schenectady, N. Y. Three bulletins. No. 4462-A describes the Thomson watt hour meters for switchboard service. No. 4790, superseding No. 4468-A, illustrates and describes in considerable detail two and three motor mine locomotives of various capacities arranged to operate either singly or in tandem. The company's gathering locomotive, which consists of any one of its standard locomotives equipped with a motor operated reel to which flexible cable is attached, is also described, as well as the various devices such as controllers, fuse blocks, head lights, &c., with which the locomotives are equipped. No. 4794 describes the 1200-volt lines of the Milwaukee Electric Railway & Light Company, and is a reprint of an article which appeared in the *Electric-Railway Journal* on the same subject.

Paper Making Machinery.—E. D. Jones Sons & Co., Pittsfield, Mass. Several loose leaf circulars. These show some of the various pieces of machinery built by this company, which include iron and wood tub beating engines, rotary fire pumps and motor and belt driven Jordan engines.

Power Presses and Roller Bearings.—Standard Machinery Company, 7 Beverly street, Providence, R. I. Catalogue and loose leaf circulars. The first is concerned with the roller bearings which this company manufactures under the Mossberg patents. The circulars cover a line of power presses which includes among others the 6-J power press illustrated in *The Iron Age* October 6, 1910.

Well Drilling and Prospecting Machinery.—Sparta Iron Works Company, Sparta, Wis. Catalogue. Size $7\frac{1}{2} \times 10\frac{1}{2}$ in.; pages 60. Refers to a line of portable well drilling and prospecting machinery. The machines are illustrated and complete specifications are also given.

Pneumatic Tools.—Ingersoll-Rand Company, 11 Broadway, New York City. Form No. 9007. Concerned with a complete line of pneumatic tools, which includes rock drills, stone channeling machines, mining tools and pneumatic drills and hammers. Space is also given to air compressors, air hoists and motors and accessories used in connection therewith, such as hose and hose couplings, aftercoolers and air receivers and reheaters. The various tools and machines are all illustrated and are briefly described.

Traction Engines.—Fairbanks, Morse & Co., Wabash avenue and Eldredge place, Chicago, Ill. Catalogue No. 1426. Shows the company's 25-hp. engine, which is of its standard water-cooled four-cycle single cylinder type. It is said that when running at full load the engine consumes only from $\frac{1}{4}$ to 1-10 gal. of fuel, which can be either gasoline, benzine, naphtha or distillate, per horsepower-hour. One of the special features of the engine is its easy starting, which is due to the use of a hand starter pump that forces a mixture of gasoline and air into the cylinder, where it is exploded with a match striker or an electric igniter.

Jewelers' Machinery.—The W. W. Oliver Mfg. Company, 1483 Niagara street, Buffalo, N. Y. Catalogue No. 17. Covers a complete line of jewelers' machinery, which includes rolling mills of the single, double and triple geared types; plating dynamos, bench shear and rod cutter, ring stretchers and benders, mandrels, bench lathes and bench drills and power drop presses. All of the various tools are illustrated and the engravings are supplemented by text.

Belted Vertical Milling Machines.—Becker Milling Machine Company, Hyde Park, Mass. Pamphlet No. 56. Size 6 x 9 in.; pages 24. Descriptive of the two smallest models of a new line of vertical spindle milling machines. The general construction of the line is described at length, and this is followed by a brief description of the special features of each of the two models.

Rotary Shear and Universal Bender.—Bethlehem Foundry & Machine Company, South Bethlehem, Pa. Two pamphlets. The first calls attention to the Bethlehem rotary shear, designed for shearing sheets and plates of metal, but also adaptable for cutting fiber board, sheet rubber, sole leather, &c. The two sizes of shear are illustrated and brief specifications are given. The other illustrates and describes a universal bending machine for structural shapes and pipe, which by using special rolls will bend the latter in spirals or coils. The special feature of this machine is that the shapes to be bent are passed forward and backward between the rolls, which are gradually raised at each pass.

Multiple Lathe Stops.—The Lodge & Shipley Machine Tool Company, Cincinnati, Ohio. Catalogue No. 22. Points out the advantages of using adjustable multiple stops for the

cross and longitudinal feeds in lathe work for the rapid production of duplicate parts. The construction and use of both types of stops are described at length, and there are a number of engravings showing the different sizes of lathes to which this mechanism has been applied. Among the tools included is the 16-in. lathe, an illustrated description of which appeared in *The Iron Age*, November 18, 1909.

Automatic Gear Hobbing Machines.—Schuchardt & Schütte, West Street Building, New York City. Catalogue. Gives general descriptions and specifications for a line of automatic gear hobbing machines, which includes one that cuts noiseless gears; hob grinders, thread millers, tooth rounding machines, profile milling and grinding machines and cam milling machines. All of these machines are illustrated, and tables of dimensions are included. Among this number is an automatic thread milling machine, an illustrated description of which appeared in *The Iron Age*, December 1, 1910.

Machine Tools.—The Hamilton Machine Tool Company, Hamilton, Ohio. Loose leaf catalogue. Describes and illustrates a line of machine tools which includes lathes having swings ranging from 14 to 48 in., planers which are 24 to 60 in. wide between the housings, and upright drills, the swings of which range from 12 to 42 in. Each of the tools shown is described in considerable detail and brief specifications are included.

Lamp Sockets.—Harvey Hubbell, Inc., Bridgeport, Conn. Mailing card. Illustrates the new Hubbell double break pull socket No. 3618, which is said to be capable of carrying any lamp from the smallest up to the biggest Tungsten made. It has a current capacity which is claimed to exceed by at least 500 watts the demands of the largest lamp.

Ventilating Apparatus.—The Bentz System Company, 16 Lawrence street, Newark, N. J. Pamphlet. Describes the Bentz humidifier and air washer and gives photographs of several buildings where they have been installed.

Elevating, Conveying and Handling Machinery.—The Exeter Machine Works, Pittston, Pa. Bulletin No. 10. Contains a number of illustrations of machinery for elevating, conveying and handling coal and ashes. Space is also given to engravings of unloaders for handling bulky material, cranes, steam and electric hoists and cars for industrial railways.

Pneumatic Track Sanders.—American Locomotive Sander Company, Thirteenth and Hamilton streets, Philadelphia, Pa. Pamphlet. Describes with numerous illustrations the construction, installation and operation of the Leach sanders for locomotives.

Centrifugal Pumps.—The American Well Works, Aurora, Ill. Catalogue No. 117. Size $7\frac{1}{4} \times 10\frac{1}{4}$ in.; pages 127. Shows a complete line of centrifugal pumps made in both the volute and the turbine styles. In addition to illustrating and describing these various pumps a number of test reports are included, and instructions as to the best way of installing and operating the pumps are given. A number of tables of useful information for pump users completes the catalogue.

Gas and Gasoline Engines.—The Backus Water Motor Company, 172 Pennsylvania avenue, Newark, N. J. Catalogue. Concerned with the Backus gas and gasoline engines for driving all kinds of machinery and a suction gas producer, which is built in sizes up to 250 hp. The Backus engines are built in 20 sizes, ranging from 1 to 75 hp., and with the exception of the smallest and the four largest can be furnished mounted on trucks or as traction engines. In addition to these horizontal engines vertical engines ranging from 100 to 250 hp. can be built to fill special orders.

Bolt and Tire Machines, Portable Forges, Drills and Shapers.—Boynton & Plummer Company, Inc., Worcester, Mass. Five pamphlets. The first refers to bolt cutting and heading and tire bending and shrinking machines. The second lists a number of different styles of portable forges, while the third and fourth give general description and specifications for an extensive line of drills and shapers. The fifth is devoted to detail parts for these machines and contains an illustrated list of repair parts and prices.

Furnaces.—C. U. Scott, Davenport, Iowa. Pamphlet. Covers a line of furnaces for annealing and hardening steel. The various types of furnaces and their accessories are illustrated and described and brief specifications are included.

Calendar.—The Grant Locomotive & Car Works, Houston, Texas, has sent out a calendar hanger measuring 21 x 23 inches. The calendar pad, which measures $3\frac{1}{2} \times 7\frac{1}{4}$ in., has white figures on a contrasting background, thus making them easily read at a distance.

Calendar.—The Flat Fuel Company, Bluefield, W. Va., shippers of Pocahontas coal and coke, has issued a calendar measuring 17 x 29 in. A specially noteworthy feature of the calendar is the size of the figures used to mark the dates. These are 1 in. high and are printed in white on a red background.

Gasoline Engines.—Brunner Foundry & Machinery Company, Peru, Ill. Pamphlet. Lists a line of horizontal gas and gasoline engines, air compressors, pumping jacks, pumps, wagon and platform scales, &c.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—		Genuine Iron Sheets— Galvanized.		METALS— Tin—	
Refined Iron:		Nos. 22 and 24		Straits Pig.....	
1 to 1 1/4 in. round and square.....		No. 26		Copper—	
1 1/2 to 4 in. x 3/4 to 1 in.....		No. 28		Lake Ingot.....	
Rods—9 and 11-16 round and square.....		Corrugated Roofing—		Electrolytic.....	
Angles:		2 1/2 in. corrugated.....		Casting.....	
3 in. x 3/4 in. and larger.....		No. 24.....		Spelter—	
3 in. x 3/4 in. and 1/2 in.....		No. 26.....		Western.....	
1 1/2 to 2 1/2 in. x 3/4 in.....		No. 28.....		Zinc.	
1 1/2 to 2 1/2 in. x 3/4 in. and thicker.....		Tin Plates—		No. 9, base, casks....	
1 to 1 1/4 in. x 3/4 in.....		American Charcoal Plates (per box.)		Lead.	
3/4 x 1/2 in.....		"A A A." Charcoal:		American Pig.....	
3/4 x 1/2 in.....		1C, 14 x 20.....		Bar.....	
3/4 x 1/2 in.....		1X, 14 x 20.....		Solder.	
3/4 x 1/2 in.....		A. Charcoal:		1 1/2 & 1 1/4, guaranteed.....	
3/4 x 1/2 in.....		1C, 14 x 20.....		No. 1.....	
3/4 x 1/2 in.....		1X, 14 x 20.....		Refined.....	
3/4 x 1/2 in.....		American Coke Plates—Bessemer—		Prices of Solder indicated by private brand vary ac-	
3/4 x 1/2 in.....		1C, 14 x 20.....		cording to composition.	
3/4 x 1/2 in.....		1X, 14 x 20.....		Antimony—	
3/4 x 1/2 in.....		American Terne Plates—		Cookson.....	
3/4 x 1/2 in.....		1C, 20 x 28 with an 8 lb coating.....		Halletts.....	
3/4 x 1/2 in.....		1X, 20 x 28 with an 8 lb coating.....		Other Brands.....	
3/4 x 1/2 in.....		Seamless Brass Tubes—		Bismuth—	
3/4 x 1/2 in.....		List November 14, 1908.....		Aluminum—	
3/4 x 1/2 in.....		Brass Tubes, Iron Pipe Sizes—		Per lb.....	
3/4 x 1/2 in.....		List November 13, 1908.....		No. 1 Aluminum (guaranteed over 99% pure), in ingot	
3/4 x 1/2 in.....		Copper Tubes—		for remelting.....	
3/4 x 1/2 in.....		List November 13, 1908.....		Rods & Wire.....	
3/4 x 1/2 in.....		Braze Brass Tubes—		Sheets.....	
3/4 x 1/2 in.....		List August 1, 1908.....		Old Metals.	
3/4 x 1/2 in.....		High Brass Rods—		Dealers' Purchasing Prices Paid in New York	
3/4 x 1/2 in.....		List August 1, 1908.....		Copper, Heavy cut and crucible.....	
3/4 x 1/2 in.....		Roll and Sheet Brass—		Copper, Heavy and Wire.....	
3/4 x 1/2 in.....		List August 1, 1908.....		Copper, Light and Bottoms.....	
3/4 x 1/2 in.....		Brass Wire—		Brass, Heavy.....	
3/4 x 1/2 in.....		List August 1, 1908.....		Brass, Light.....	
3/4 x 1/2 in.....		Copper Wire—		Heavy Machine Composition.....	
3/4 x 1/2 in.....		Base Price.....		Clean Brass Turnings.....	
3/4 x 1/2 in.....		Carload lots mill 14 1/2		Composition Turnings.....	
3/4 x 1/2 in.....		Copper Sheets—		Lead, Heavy.....	
3/4 x 1/2 in.....		Sheet Copper Hot Rolled, 16 oz quantity lots.....		Lead, Tea.....	
3/4 x 1/2 in.....		Sheet Copper Cold Rolled, 16 oz advance over Hot		Zinc Scrap.....	
3/4 x 1/2 in.....		Rolled.....			
3/4 x 1/2 in.....		Sheet Copper Polished 20 in wide and under, 16			
3/4 x 1/2 in.....		square foot.....			
3/4 x 1/2 in.....		Sheet Copper Polished over 20 in. wide, 20			
3/4 x 1/2 in.....		square foot.....			
3/4 x 1/2 in.....		Polished Copper, 16			
3/4 x 1/2 in.....		square foot more than Polished			



NICHOLSON

Granted that just ONE mechanic in your shop can save from ten to twenty minutes time per day through the use of NICHOLSON FILES—how great will be the saving when from fifty to one hundred or more men “get busy” with the fast cutting

NICHOLSON?



Nicholson File Company

Providence, R. I.



THE IRON AGE

Established
1855

New York, January 26, 1911

VOL. 87: NO. 4

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.	

CONTENTS.

Editorial:	PAGE.
Continuous Betterment.....	231
Heavy Section High Carbon Rails.....	232
A Noteworthy Anti-Roycott Decision.....	232
Increasing Machinery Exports.....	233
The Steel Corporation's Exports in 1910.....	233
Private Industrial Museums.....	233
Official Lists of Machine Tool Builders.....	234
Correspondence, Illustrated.....	234
British Interests Acquire Brazilian Iron Mines.....	234
New Publications.....	235
The Iron and Metal Market Reports.....	236 to 245
Notes on Prices.....	245
Iron and Industrial Stocks.....	245
African Copper.....	245
Obituary	246
More Water Power Development Needed.....	246
Republic Iron & Steel Company.....	247
Works Administration as a Constructive Science.....	248
The Durham Coal & Iron Company.....	249
Personal	250
The Machinery Market Reports.....	251 to 260
American Electrochemical Society.....	261
The Canadian Duty on Rolled Rails.....	261
The 15-Ton Heroult Furnace at South Chicago. Illustrated.....	262
The Reliability of Electric Furnaces.....	266
Copper Consumption.....	267
Electrolytic Iron.....	268
The All-Geared Multi-Spindle Drill. Illustrated.....	268
The Cincinnati Boring Mill. Illustrated.....	270
Water Filtration for Industrial Purposes.....	271
Some Adaptations of the Pratt & Whitney Thread Miller. Illustrated	272
European Steel Syndicates.....	273
McWane's Handbook for Cast Iron Pipe Users.....	273
Electricity in the Machine Shop. Illustrated.....	274
Rogers, Brown & Co.'s Thirtieth Anniversary.....	277
An Electrically Driven Brass Mill. Illustrated.....	278
New Railroad Equipment.....	279
The Grant Multiple Spindle Rivet Spinner. Illustrated.....	279
The Reed Heavy Duty Engine Lathes. Illustrated.....	280
The Barnes Motor Driven Gap Lathe. Illustrated.....	281
Forging with a High Speed Hydraulic Press. Illustrated.....	282
Super-Vitrite High Speed Steel.....	282
The Acme Combination Turret Lathe. Illustrated.....	283
New Marquette Ore Dock.....	284
The Production of Iron Ore in 1909 and 1910.....	284
The Flanders Mfg. Company.....	284
New Work at Lake Shipyards.....	285
Trade Publications.....	285
Current Metal Prices.....	286

Continued Betterment

An Advance of \$1 a Ton in Wire

Rails, Structural Material, Tin Plates and Wire More Active—Pig Iron Weaker

The week has shown further betterment in the steel trade—largely sentimental thus far in some lines; in others, as rails, structural material, wire and tin plates, shown by an actual increase in orders. It will take a little time to find out how far this is simply the natural rebound from the very low state of the trade in December and early January and how far it represents the beginning of a genuine movement that will broaden as spring advances.

The advance of \$1 a ton in wire products has done what was intended in bringing on the books a good volume of jobbers' specifications on old orders in anticipation of the spring trade. The expedient has been useful before at such a juncture. It is evident, however, that some buyers were taken unawares. Wire is now only \$3 a ton above the low price reached in May, 1909, which was advanced \$2 after two weeks of furious buying. Present prices are \$6 a ton below the high point of 1907.

The rail order of the New York Central Lines now definitely placed, amounts to 176,750 tons, of which Steel Corporation mills will furnish 87,500 tons, the Lackawanna Steel Company 81,250 tons, and the Bethlehem Steel Company 8000 tons. These will be open hearth rails for the most part, though a considerable tonnage of ferrotitanium rails will be rolled at Buffalo. The Southern Railway has ordered 22,400 tons of rails from the Tennessee Company and 3000 tons from the Maryland Steel Company. The Western Maryland has taken 9875 tons, the Nashville, Chattanooga & St. Louis 2000 tons, and a Central Western coal road 4000 tons. The Delaware & Hudson has bought 3200 tons of light rails.

Structural orders, a good many of them long pending, are coming to the fabricating companies at a most encouraging rate. The Insurance Exchange, Chicago, 14,000 tons, was awarded to the Brown-Ketcham Iron Works. Bethlehem shapes will be used for this as well as for the McAlpin Hotel, New York, 12,000 tons, also placed last week. The Lake Superior & Ishpeming ore dock at Marquette, 5900 tons, goes to the Wisconsin Bridge Company. The American Bridge Company has the contract for the Kentucky & Indiana Railroad bridge over the Ohio at Louisville, Ky., 15,000 tons. The Chicago & Northwestern bridge order, 5000 tons, was divided. Railroads are giving out bridge work more freely, and a good tonnage is about ready for estimates, including 9000 tons for the Norfolk & Western and 3000 tons for the Burlington.

The tin plate mills are running fuller than for sev-

eral months and nearly 80 per cent. of capacity is now operating.

A more satisfactory condition is reported in sheets than for several months. The American Sheet & Tin Plate Company is operating about 56 per cent. of capacity.

At Pittsburgh good specifications are coming to the plate mills on car works contracts, the largest of these being 35,000 tons of plates and shapes for the Canadian Car & Foundry Company. Eastern plate mills are running at slightly over 50 per cent.

Pig iron inquiries have fallen off in Eastern markets, after the fairly large buying that came from those of early January. Prices have suffered in all markets. A good many foundries would buy at this level for second and third quarters, but furnaces will not make these concessions for far forward delivery. At Buffalo inquiry has been heavy and considerable business has been done at the low prices of the past two weeks.

There is accumulating evidence of lessening business and sharper competition in the foundry trade—a condition that promises no early betterment for foundry pig iron.

Inquiries for steel making pig iron include 10,000 tons of basic in eastern Pennsylvania and 5000 tons of basic at Pittsburgh for a steel foundry.

Pig tin has advanced steadily in the past week under excited and at times almost panicky buying. Transactions in New York exceeded 700 tons, the price rising to 43.25 cents. The low prices for copper have brought a number of buyers into the market, sales of the week exceeding 40,000,000 lb.

Heavy Section High Carbon Rails

Steel rail manufacturers will be interested in the radical departure some railroad engineers have made experimentally in the size of rail sections and in the results secured from these unusually heavy rails. Data were recently given in these columns of service results with 135-lb. rails on some of the curves on the Central Railroad of New Jersey. These rails were 6½ in. high and 6 in. wide on the base, and the web was ¾ in. thick. The carbon was 0.95 to 1 per cent., and in some drillings was found to be as high as 1.12 per cent. The phosphorus was less than 0.02, the open hearth process being used. The elevation of the curves is in some instances as much as 8 in. and the freight traffic is very heavy, while a good many fast trains are run. After four months it was found that the rails had satisfactorily resisted wear and there were no breakages across, though some longitudinal fractures of the rail head occurred. It is noteworthy that in every case these fractures were found where the carbon content ran above the specified maximum. It was noticed also that all these fractures were on the outside of the inner rail of the curve and were due, the engineers of the road concluded, to the excessive pressure on that side of the head underneath the false flange of worn locomotive tires. The shoulder in the false flange cut a slight groove in the top of the rail and the fracture started in the groove.

In these tests, involving 1000 tons of rails, the high curve elevation has had much to do with the results. The significant fact in the experiments is that with such high carbon steel there have been no cross breaks under the severe service imposed on the rails. The

resistance to wear, moreover, is much greater than has been found with average open hearth rails.

We may expect to hear more of heavier section rails of high carbon and low phosphorus steel. The enormous increases in train loads and the commonness of high train speeds will compel abandonment of some of the comparatively slender sections from which railroads are now exacting so much on tangents as well as on curves. The rail mills are asked each year to produce better rails, but 70 and 75-lb. sections are required to stand a service for which they were never designed. High carbon requirements must be accompanied by much heavier sections, and it will not be many years before 125-lb. rails will be as common as 100-lb. rails are to-day. The rail mills must be prepared to take larger ingots and that will mean that early passes will be in heavier blooming mills, standing behind the present-day blooming mills—a procedure already anticipated at the Gary mill.

It is easily conceivable that heavier section rails will figure largely in the maintenance demands of the next decade. The rail mills will not lack for tonnage, whatever comes of the predictions that new track building is to be a diminishing or at best a stationary factor.

A Noteworthy Anti-Boycott Decision

An important addition has been made to the judicial decisions affecting the labor laws of the State of New York by Judge Blackmar of the New York Supreme Court, in the case of the Albion J. Newton Company against the Carpenters' and Joiners' Union. The company operates an open shop in the manufacture of woodwork for buildings. The union has for a long time attempted to prevent the use of woodwork made in open shop factories by calling strikes on buildings in which it is installed. It is stated that it has hounded the open shop, in some cases, to literal extermination. When an attack was started on the Albion J. Newton Company a stubborn fight was made in which that company applied for an injunction to restrain the union from its action and in its fight had the support of the American Anti-Boycott Association and of other manufacturers of woodwork. The injunction was issued after a careful hearing before Judge Blackmar, who handed down a clear and forcible decision, from which the following extracts are taken:

The plaintiff has a right to carry on business as absolute as the right of workmen to control their own time and labor. This right is a property right. The relations of a dealer to his customers and to the trade generally is called good-will and is property which the law is bound to protect. There is no branch of the law better settled than the jurisdiction of equity to protect the good-will of a business against trespass and invasion by its writ of injunction. This property is of a peculiar intangible nature; but it is the subject of bargain and sale; it may be capitalized as the basis of a corporate stock issue; and it is often the most important asset possessed by a manufacturer or merchant. To bring an "obstinate" manufacturer to terms, an attack on his good-will would be fully as effective as to tear down his factory or to smash his machinery.

Certain methods and weapons the law permits. Others it prohibits. It permits the strike on the one side and the lockout on the other. But each combatant must respect the rights of the other guaranteed by our constitution. Among these are life, liberty and property. Violence against persons and tangible property will not be permitted. Neither will attacks on intangible property rights, like business, good-will or trade, be permitted. One cardinal principle must be borne in mind, that any element of illegality essential to a scheme or combination makes the whole illegal. This principle the defendants have overlooked. They have found a lawful means, viz., strikes, and an ultimate lawful end, viz., the improvement of labor; but they have forgotten that

the very turning point in their scheme, and which alone makes it effective, is the coercion of plaintiff by injuring property rights. This is exactly what the defendants intended, it is what they have done, and it is unlawful.

The exposition of individual and property rights here made is clearly applicable to conditions throughout the country. It is an encouragement to all employers and manufacturers whose interests are attacked in this vicious manner. The boycott is a method of enforcing the exactions of unions which should be strenuously resisted wherever attempted. It is highly creditable to our courts that when the question has been brought before them for adjudication their decisions have been so strongly against the practice.

Increasing Machinery Exports

The growing exports of American metal working machinery, especially machine tools, can be attributed in a large measure to the increasing care taken by machinery manufacturers to meet the requirements of foreign buyers. The familiar complaint of American consular representatives that American manufacturers do not pack their export shipments properly, and other superficial criticisms, ceased to satisfy machinery makers long since as a reason for their small share of export trade, and a large number of them have gone deeper into the export problem by personal investigation with excellent results. Many of them found that a very important reason was that their goods were not properly represented, or rather, through the ignorance of their foreign selling agents, were entirely misrepresented. Machine tool manufacturers ascertained that their products were being handled in many foreign countries by people who could hardly distinguish a milling machine from a textile loom. They discovered that literature published by their foreign representatives, and often paid for by the manufacturer, entirely misrepresented the equipment advertised and described the working parts in a manner that aroused the mirth of mechanical engineers understanding the language in which it was printed. Frequently, it was learned, sales of a machine had been made at exorbitant prices and with undue profit to the selling agent. These abuses were the direct result of granting agencies to men whose credit was found to be fairly good, without investigation into their knowledge of mechanics or their ability to sell machinery.

Of late many machine tool builders have been paying more attention to their foreign trade literature. They have increased their sales abroad by publishing carefully prepared catalogues in other languages than English, principally in Spanish, French and German. The export department of the National Association of Manufacturers has been used by many of them in their translation work, and its assistance has been utilized in establishing foreign connections to such an extent that the work of the department has grown wonderfully. Many machine tool men have investigated the foreign field by personal visits and have installed agencies in charge of competent engineers. Others are following their example after learning of the successful results obtained. It is because of these things that the exports of metal working machinery have recently grown. It will be well when all manufacturers, in this line at least, cease to depend for their foreign trade information on agents—consular and otherwise—who know nothing of the mechanical requirements of the countries upon which they make reports.

The Steel Corporation's Exports in 1910

The United States Steel Corporation's exports of the products of its subsidiary companies last year reached the record total of 1,489,819 tons, or nearly 40 per cent. in excess of the largest previous year's total, which was 1,079,319 tons in 1906. Attention has been called from time to time to the strong reinforcement the Steel Corporation's diminishing business at home has had in the past year from markets abroad. Rails have been a large item in this increase, about 50,000 tons more having been exported last year than the 299,000 tons of 1909. Sheets and plates show an increase of more than 100,000 tons and structural steel of about 50,000 tons.

Production and Exports of Finished Products by the United States Steel Corporation.—Net Tons.

	Exports.	Production shipped.	Per cent. exported.
1905.....	353,858	9,226,386	10.3
1906.....	1,079,319	10,578,433	10.2
1907.....	1,014,082	10,376,742	9.8
1908.....	799,406	6,206,932	12.9
1909.....	1,009,746	9,859,660	10.2
1910.....	1,489,819	.....	...

The statement has been made, though not confirmed as yet by the publication of the official figures, that the exports of the Steel Corporation in 1910 were 13.5 per cent. of its entire shipments. This would indicate total shipments somewhat in excess of 11,000,000 tons, or 450,000 tons more than the previous high record, made in 1906.

The Bureau of Statistics estimates that the total value of iron and steel exports from the United States last year was above \$200,000,000, as against \$157,674,394 in 1909, \$151,113,114 in 1908 and \$197,066,781, the high record, in 1907. The exports of such iron and steel products as are reported in tons were probably about 1,540,000 gross tons last year, against 1,302,000 tons in 1907, indicating that prices last year were below those of 1907. It should be noted that the Steel Corporation's exports as tabulated above are in net tons. Those for 1910 are equivalent to 1,330,000 gross tons, which is about 86 per cent. of the total exports of the rolled and other products which are reported by weight.

Private Industrial Museums

Each year valuable knowledge of the manufacturing arts is destroyed as machinery and processes and products are replaced or improved. If preserved in some form, by sample or photographs or models, or by the machinery or apparatus itself, important records are established. Inventors know the value of being able to look over what has been done by others along the lines upon which they are working. Consequently the industrial museum is coming to be recognized as having educational value of no insignificant degree. In various manufacturing centers the effort is being made to create a territorial institution which would preserve the products of local works and the methods of their manufacture, going back as far as possible and maintaining the succeeding steps of future development without a break in chronological sequence for the benefit of those who will come after in the various fields. In a few cases individual enterprises have taken up this work in a systematic manner and their collections are of great interest. Many inventors have come to grief because they have unknowingly repeated the errors in elements of design of their predecessors, constituting failures which would have been avoided

New Publications

Outlines of Iron and Steel Metallurgy (Grundzüge des Eisenhüttenwesens). By Dr. T. Geilenkirchen. Pages, 249; illustrations, 66; plates, 5. Price, cloth, bound, 8 marks. Published by Julius Springer, Berlin, Germany.

This first volume of three is divided into three parts which are, respectively, "Iron and Its Properties," "The Occurrence of Iron in Nature and the Methods of Its Production from the Ore," and "Heat and Its Production in the Iron Industry." The first part covers 55 pages and deals in a very brief way with a large number of subjects, such as the uses of steel and iron, properties of pure iron, iron and carbon system of alloys, classification, the influence of the various elements on iron, heat treatment and the various methods of testing iron and steel. Under microstructure a curious mistake is noticed on Plate 1. The second photograph on this plate is a beautiful one of gray iron, showing very plainly the plates of graphite and the phosphide eutectic. It is, however, referred to as if it were white iron, both underneath the photograph and on page 14. The feeling one has after reading this first part is that it is altogether too concise. The second part gives the properties and analyses of the various ores used in Germany, and by means of a map the distribution of the ores and the location of the blast furnaces are clearly shown. Then comes a short discussion of oxidation and reduction and of the various slags of the iron and steel producing processes. The third part takes up the remainder of the book from page 91. It deals in considerable detail with fuels and refractory materials. There is an excellent section of 30 pages on "Coke and Its Production," taking up, with diagrams, the typical German coke ovens. This is followed by another good section on "Gaseous Fuel," in which the various gas producers are considered. There is also a discussion of the various furnaces in which the fuel is burnt. Finally after two short sections on minor methods of heat production there comes a discussion of refractory materials.

The book gives promise of being of great assistance to students and beginners in iron and steel metallurgy. It is to be followed quickly by Volumes 2 and 3, which will deal with the metallurgy and mechanical treatment of iron and steel.

G. B. W.

The Analysis of Paints and Painting Materials.—By Henry A. Gardner and John A. Schaeffer. Size, 6 x 9 in.; pages, 100. Bound in cloth. Price, \$1.50 net. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York City.

A series of selected methods for the analysis of materials used in paint manufacture are presented by the authors in this book. These methods include new ones worked out by the authors as well as some of the older standard ones. No attempt has been made to give any detailed explanation of the operations used in ordinary quantitative chemical analysis, as the authors assume that the readers are fairly well versed therein.

The book is logically divided into three chapters and two appendices. The first of these is devoted to the analysis of dry pigments, and contains methods for analyzing lead and zinc followed by those for the various other colored pigments. The analysis of mixed pigments and paints occupies the second chapter and general methods for the analysis of a mixed white paint are given. No special method is given for analyzing mixed colored paints as the composition of the color present can be determined by a qualitative examination and the constituents of the particular coloring matter determined according to the methods outlined in Chapter I. The final chapter is given over to an analysis of paint vehicles and varnishes and the methods for determining the amounts of water, linseed oil and turpentine, as well as the constituents of varnish and japan and shellac. On account of the increasing use of paint containing bituminous matter, methods for the analysis of paints of this character are given in appendix A. The portions of the paint specification of the Army and Navy departments referring to the chemical requirements are given in ap-

pendix B, so that a chemist engaged in the examination of such materials may become better acquainted with the requirements.

A Pocketbook of Mechanical Engineering.—By Charles M. Sames. Fourth edition. Bound in flexible leather. Size, 4 x 6½ in.; pages, 220; 42 illustrations. Price, \$2. Published by the author, 542 Bramhall avenue, Jersey City, N. J.

This book contains a collection of tables, data, formulas and examples, comprising the greater part of the reference information usually required by mechanical engineers and students, condensed into a volume, the dimensions of which are small enough to be conveniently carried in the pocket. In preparing this last edition, new matter has been incorporated to bring the work thoroughly up to date. Among these added subjects are new alloys and alloy steels, critical speed of shafts, new steam tables, formulas dealing with saturated and superheated steam, steam turbines, electric drive and the power required for machine tools and cooling towers. Besides these subjects new data have been added at a number of points in the text.

The Scientific American Cyclopedia of Formulas.—Edited by Albert A. Hopkins. Bound in cloth. Size, 6½ x 8¾ in.; pages, 1077; 200 illustrations. Price, \$5 net. Published by Munn & Co., Inc., 361 Broadway, New York City.

This is practically a new book and contains over 15,000 of the most useful formulas and processes which represent almost every branch of the useful arts. The formulas are classified and arranged in 27 chapters, and an appendix of three parts, each of which contains related subjects, while a complete index makes it easy to find any desired formula. A chapter on chemical, pharmaceutical and technical manipulation which is an entirely new departure in a book of this character, has been prepared by the aid of well-known chemists and contains a considerable amount of practical information. A price-list of odd technical products and many useful tables are also included.

Practically all ordinary subjects upon which information might be desired are covered in the book. There are chapters on accidents and emergencies, alloys and amalgams, adhesives of all kinds, the coloring of metals, electrometallurgy, the heat treatment of metals, lubricants, paints, photography, waterproofing and fireproofing. The appendix is divided into three parts, the first of which deals with miscellaneous formulas which do not lend themselves to classification in the main chapters readily, the chapter on chemical manipulation which has been previously referred to and a table of the principal weights and measures.

A new publication called *Data* has been recently started by the Technical Data & Appliance Company, 92 La Salle street, Chicago, Ill. This magazine, which is published monthly, is devoted exclusively to engineering data and is intended to supplement the regular engineers' pocketbook by providing information on various subjects which can be readily filed either in a card index file or a small loose leaf pocket note book. With this object in view, the engineering data presented is in tabloid form, being printed on leaves measuring 3 x 5 in., which can be readily detached from the binder for filing.

The William Tod Company, Youngstown, Ohio, has received a contract from the American Sheet & Tin Plate Company, covering runout tables, complete, for the new jobbing and plate mills now under erection by the American Sheet & Tin Plate Company, at Gary, Ind. This contract is in addition to the order for the jobbing and plate mills awarded to the same company some months ago.

The Buckeye Steel Castings Company, Columbus, Ohio, and Pittsburgh, Pa., has just closed the purchase of a tract of 85 acres at Indiana Harbor, Ind., at a cost of \$150,000. A large steel foundry will be erected to supply the Western demand for railroad equipment and other steel foundry products.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

Jan. 25, Jan. 18, Dec. 28, Jan. 26,
1911. 1911. 1910. 1910.

PIG IRON, Per Gross Ton:

Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$19.00
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	17.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	14.00
Foundry No. 2, local, Chicago	15.50	15.50	16.00	19.00
Basic, delivered, eastern Pa.	14.25	14.25	14.75	18.75
Basic, Valley furnace	13.25	13.25	13.25	16.50
Bessemer, Pittsburgh	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh	14.15	14.15	13.90	17.40
Lake Superior charcoal, Chicago	17.50	18.00	18.00	19.50

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	28.00	28.00	31.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	28.00	28.00	28.00	33.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.50	14.50	15.50	20.00
Iron rails, Philadelphia	17.00	17.00	17.00	20.50
Car wheels, Chicago	13.00	13.00	13.50	18.00
Car wheels, Philadelphia	13.00	13.00	13.00	17.50
Heavy steel scrap, Pittsburgh	13.50	13.50	13.50	17.50
Heavy steel scrap, Chicago	11.50	11.50	12.00	16.00
Heavy steel scrap, Philadelphia	12.50	12.50	12.50	17.00

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.32½	1.32½	1.32½	1.60
Common iron bars, Chicago	1.30	1.30	1.35	1.60
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.71
Beams, Pittsburgh	1.40	1.40	1.40	1.55
Angles, tidewater, New York	1.56	1.56	1.56	1.71
Angles, Pittsburgh	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.25	1.50
Skelp, sheared steel, Pittsburgh	1.30	1.30	1.30	1.60

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	1.75	1.70	1.70	1.85
Cut nails, Pittsburgh	1.60	1.60	1.60	1.85
Barb wire, galv., Pittsburgh*	2.05	2.00	2.00	2.15

METALS, Per Pound:

Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.75	12.75	13.00
Electrolytic copper, New York	12.87½	12.50	12.75
Spelter, New York	5.55	5.55	5.60
Spelter, St. Louis	5.40	5.40	5.50
Lead, New York	4.50	4.50	4.50
Lead, St. Louis	4.35	4.35	4.35
Tin, New York	43.25	41.75	38.45
Antimony, Hallett, New York	7.25	7.87½	7.75
Tin plate, 100-lb. box, New York	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full

extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8 .....	.15
Gauges under No. 8 to and including No. 9 .....	.25
Gauges under No. 9 to and including No. 10 .....	.30
Gauges under No. 10 to and including No. 12 .....	.40
Sketches (including all straight taper plates), 3 ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over .....	.20
Boiler and flange steel .....	.10
"A. B. M. A." and ordinary firebox steel .....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive .....	.05
Widths over 110 in. up to 115 in., inclusive .....	.10
Widths over 115 in. up to 120 in., inclusive .....	.15
Widths over 120 in. up to 125 in., inclusive .....	.25
Widths over 125 in. up to 130 in., inclusive .....	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel.		Iron.	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1, 1½, 3½ in.	72	58	68	54		
¼ in.	75	63	71	59		
¾ to 1½ in.	79	69	75	65		
2 to 3 in.	80	70	76	66		
Lap Weld.						
2 in.	76	66	72	62		
2½ to 4 in.	78	68	74	64		
4½ to 6 in.	77	67	73	63		
7 to 12 in.	75	59	71	55		
13 to 15 in.	51½					
Butt Weld, extra strong, plain ends, card weights.						
1½, ¾, ¾ in.	69	59	65	55		
1½ in.	74	68	70	64		
¾ to 1½ in.	78	72	74	68		
2 to 3 in.	79	73	75	69		
Lap Weld, extra strong, plain ends, card weight.						
2 in.	75	69	71	65		
2½ to 4 in.	77	71	73	67		
4½ to 6 in.	76	70	72	66		
7 to 8 in.	69	59	65	55		
9 to 12 in.	64	54	60	50		
Butt Weld, double extra strong, plain ends, card weight.						
1½ in.	64	58	60	54		
¾ to 1½ in.	67	61	63	57		
2 to 3 in.	69	63	65	59		
Lap Weld, double extra strong, plain ends, card weight.						
2 in.	65	59	61	55		
2½ to 4 in.	67	61	63	57		
4½ to 6 in.	66	60	62	56		
7 to 8 in.	59	49	55	45		

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld

2, 2½ to 4 in. Lap Weld

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2¼ in.	61	43
2½ in.	63	48
3 to 5 in.	69	55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, \$28; open hearth and chain rods, \$28.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, January 25, 1911.—(By Telegraph.)

Pig Iron.—Sentiment in the pig iron trade has slightly improved, and several furnaces that make foundry iron are asking higher prices. As yet the Standard Sanitary Mfg. Company has not closed for the 6000 to 8000 tons of Northern and Southern foundry for which it has been negotiating for over a week. The American Steel Foundries is reported in the market for 5000 tons of basic for its works at Alliance, Ohio. There is very little demand for Bessemer iron, for which furnaces are still quoting \$15, but several lots of Bessemer are being offered by dealers as low as \$14.50 and \$14.75, Valley furnace. A sale is reported of about 2000 tons of gray forge for delivery February to June at about \$13.25, Valley furnace. We quote Bessemer iron nominally at \$15; basic, \$13.25 to \$13.50; No. 2 foundry, \$13.75, and gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Several steel makers report that specifications against contracts for billets and sheet and tin bars are heavier than for some time. Shipments to the sheet and tin plate mills are showing a decided increase. The new demand for billets and bars is not heavy, being mostly for small lots. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

Structural Material.—The American Bridge Company has received a contract from the Kentucky & Indiana Railroad for the erection of a steel bridge across the Ohio River at Louisville, Ky., which will require 15,000 tons.

(By Mail.)

The better feeling in the iron trade noted in last week's report is intensified this week. It is not entirely sentimental, but is shown in an actual increase in orders and in specifications against contracts. The advance in wire products of \$1 a ton came as a complete surprise to the trade, not having even been foreshadowed. The building outlook is referred to as being very satisfactory, and it is believed that 1911 is going to make a record in this line. New orders and inquiries for billets and sheet bars are better, and in finished lines there has been distinct improvement in sheets, tin plate, structural material and plates. The whole situation, in fact, is decidedly more encouraging than it has been at any time in some months. The weak spot is pig iron, and it would seem that further reduction in output must be made before any better prices can be expected.

Ferromanganese.—A sale of 200 tons of foreign 80 per cent. for delivery up to July is reported on the basis of about \$38, Baltimore. We quote 80 per cent. for reasonably prompt shipment at \$38 and for delivery over this year at \$38.25 to \$38.50. The freight rate to Pittsburgh is \$1.95 a ton.

Ferrosilicon.—There is practically no new inquiry, and prices continue weak. We quote 50 per cent. for prompt shipment at \$54 and for delivery over the year at about \$55. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent. \$24 and 12 per cent. \$25, f.o.b. cars, Jisco and Ashland furnaces.

Skelp.—Prices are firmer and most sellers are now refusing to quote under 1.30c. for grooved steel skelp. One mill reports a sale of 1000 tons for delivery over the next two months at this price. We quote grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Muck Bar.—With no new demand, and in the absence of sales, we quote best grades of muck bar, made from all pig iron, at, nominally, \$29.

Steel Rails.—The Carnegie Steel Company has sold 5700 tons of standard sections for export. The coal mining concerns continue to place liberal orders for light rails, but very little business is being received from the lumber interests. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per lb.

Plates.—The Carnegie Steel Company is now receiving specifications on the contract for about 35,000 tons of plates and shapes from the Canadian Car & Foundry Company; from the Pressed Steel Car Company, specifications for about 10,000 tons of plates and shapes for the 730 cars to be built for the Pennsylvania Lines East and West, and for 4000 tons of structural material for McClintic-Marshall Construction Company, on contracts placed some time ago. The general demand for plates is considerably better, and the mills are running to fuller capacity than for some time. Prices are firm and we quote ¼-in. and heavier plates, in wide and narrow sizes, at 1.40c., Pittsburgh.

Structural Material.—The Jones & Laughlin Steel Company has taken a contract for 600 tons for the steel viaduct for the Pittsburgh & Lake Erie Railroad at Aliquippa, Pa., and the American Bridge Company has taken 175 tons for a draw span for the Louisville & Nashville Railroad and 1000 tons for three new buildings for the Crucible Steel Company of America at Newark, N. J. One of the steel barges built by the American Bridge Company for the American Steel & Wire Company has been on exhibition on the Monongahela River at the foot of Wood Street in this city and attracted considerable attention. It is the first of the 10 barges ordered, each having about 300 tons of plain material in it. Prices are firm, and we quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Sheets.—While no especially large contracts are being placed, the general demand is better and actual orders going to the mills are more numerous. Prices are being well maintained except at one or two consuming points. Taken as a whole, the sheet trade is in more satisfactory condition than for several months. The American Sheet & Tin Plate Company is operating about 56 per cent. of capacity, and the independent mills are running better than for some time. The demand for corrugated and roofing sheets is picking up in view of the near approach of spring weather, when outside building operations will be resumed. The present schedule of prices on the different grades of sheets is given in full on a previous page.

Tin Plate.—The new demand is fair, an encouraging feature being the fact that specifications against the heavy contracts placed in November and early December are coming in very freely. The American Sheet & Tin Plate Company is operating to about 76 per cent. of capacity in tin plate, showing an increase of about 25 per cent. over operations a month ago. The larger independent mills are also running to nearly full capacity. With the high price of pig tin there is little trouble in maintaining regular quotations on tin plate. We quote 100-lb. cokes at \$3.60 per base box, f.o.b. Pittsburgh.

Bars.—The new demand for steel bars is fair, and specifications against contracts from the implement trade and wagon builders have been coming in more freely in the past two weeks than for some time. Shipments of steel bars by the mills this month have been heavier than in the corresponding period in December. The railroads are specifying quite freely against their contracts for iron bars, and a fair amount of new business is being placed. The demand for hard steel bars for concrete purposes is not as heavy now as it was a month or two ago, due to the cessation in building operations on account of the weather. The market is firmer. We quote steel bars at 1.40c. and common iron bars at 1.35c., f.o.b. Pittsburgh.

Hoops and Bands.—Specifications against the large contracts for hoops and bands placed in December have started to come in quite freely, and the new demand is also regarded as being better. We quote hoops at 1.50c. and bands at 1.40c., in carload and larger lots, the latter carrying extras as given in the steel bar card of September 1,

THE IRON AND METAL MARKETS

1909. On some very desirable contracts for hoops placed recently it is understood that the regular price was slightly shaded.

Spikes.—More orders are being placed for railroad spikes than for some time. The Great Northern Railroad recently contracted for 1000 kegs and the Erie Railroad for 3000 kegs with a local mill. Other orders are pending. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c. for local trade. We quote small railroad and boat spikes at 1.60c. to 1.65c., base, in carload and larger lots.

Spelter.—A sale of 50 tons of prime Western was made last Saturday on the basis of 5.40c., East St. Louis, or 5.52½c., Pittsburgh.

Merchant Steel.—Specifications have been better this month than in December, and orders are more numerous, but are still confined to small lots to cover actual needs. We quote, f.o.b. Pittsburgh: Iron finished tire, 1½ x ½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Shafting.—The automobile trade is specifying more heavily against contracts than for some time, and the new demand from the implement trade is also looking up. The makers of shafting state that present conditions in this trade are better now than they have recently been, and that prices in the main are being firmly held. Discounts on cold rolled steel shafting are 57 per cent. off in carload and larger lots and 52 per cent. in small lots, delivered in base territory.

Rivets.—The new demand is a little better, but is still confined mostly to small lots to cover actual needs. Specifications against orders so far this month are better than in December. Prices are being fairly well maintained.

Wire Products.—Effective January 20, the leading wire interests announced an advance of \$1 a ton. It is stated that some large contracts were placed by important jobbers prior to the advance for delivery within 60 days from date of contract. The new demand for wire and wire nails is only fair, running mostly to small lots, while specifications against contracts are being received in moderate volume. We quote galvanized barb wire at \$2.05, painted \$1.75, annealed fence wire \$1.55, galvanized \$1.85, wire nails \$1.75 and cut nails \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—No large inquiries for line pipe for gas or oil lines are in the market. The general demand for merchant pipe from jobbers and consumers is fair, but is expected to be heavier next month. Some very large projects for gas and oil lines are being considered, and the demand this year for the larger sizes of pipe therefore promises to be heavy. Pipe mills are operating at present from 50 to 65 per cent. of capacity. It is stated that discounts on iron and steel pipe are being fairly well maintained.

are pending, and theetaoin shrdlu cmfwyp xziffiffi cmfwy
Boiler Tubes.—Several large contracts for locomotives are pending, and the demand for locomotive tubes promises to be more active in the near future. The new demand for merchant tubes is light, and prices are still being considerably shaded.

Coke.—A local coke operator reports having made several fairly large sales of standard grade furnace coke for delivery in the East on the basis of \$1.55 per net ton, at oven. This price is a little higher than is being secured for some grades of furnace coke, which are being sold at \$1.40 to \$1.45, at oven, for spot shipments. Best makes of 72-hour foundry coke are being held at \$2.10 to dealers and from \$2.25 up to \$2.50, at oven, to consumers. Several leading coke operators, including the Jamison Coal & Coke Company and Bessemer Coke Company, are understood to be holding foundry coke firm at \$2.50, at oven. No large inquiries for furnace or foundry coke are in the market, but several blast furnaces now idle expect to start up in the near future, and will probably be in the market soon. We quote standard makes of furnace coke for spot shipment at \$1.45 to \$1.55 per net ton, at oven, while on contracts for delivery over the year from \$1.70 to \$1.75 is being quoted by some coke operators, while others, that are pretty well filled up, are holding their furnace coke firm at \$1.90 to \$2, at oven. The output of coke in the Upper and Lower Connelleville regions last week was 280,320 tons, a slight advance over the previous week.

Iron and Steel Scrap.—There is a firmer tone in prices. Most dealers are now trying to cover short sales and are finding it difficult to pick up the different grades of scrap at present prices. Several state that they could sell large quantities of scrap for delivery ahead at present prices, but are not inclined to do so, fully believing that prices on all grades of scrap will be better in the near future. There has been a fairly heavy movement in bundled sheet scrap lately,

and this material is now held very firmly at about \$10 at loading point. This price is equal to \$10.75 to \$11 delivered in the Pittsburgh district. Several sales of heavy melting scrap have been made in the past week at \$13.75 delivered. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh or elsewhere, as noted:

Heavy scrap, lump, Scotch, locally, f.o.b. Lansbee, Sharon, Monessen and Pittsburgh delivery	\$13.50 to \$13.75
No. 1 country cast	13.00 to 13.25
No. 2 country cast	12.00 to 12.25
Bundled sheet scrap, at point of shipment	10.00 to 10.25
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	14.75 to 15.00
No. 1 railroad malleable stock	12.75 to 13.00
Grate bars	10.75 to 11.00
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.00 to 24.50
Steel car axles	20.25 to 20.50
Locomotive axles	24.00 to 24.50
No. 1 busheling scrap	12.25 to 12.50
No. 2 busheling scrap	8.75 to 9.00
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.75 to 16.00
Cast iron borings	8.00 to 8.10
Machine shop turnings	8.60 to 8.75
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50

Chicago

FISHER BUILDING, January 25, 1911.—(By Telegraph.)

The deadlock which has held back contracts for structural material was broken last week, and the fabricating interests are greatly encouraged. The contracts reported in the West foot up 31,000 tons, with a large amount of similar business pending and on the point of being closed. The liberal purchases by railroads are considered significant. In addition to the railroad items reported as closed, the Chicago, Burlington & Quincy is in the market for 3000 tons of bridge work. Manufacturers of railroad material are becoming optimistic regarding the future. There is moderate improvement in finished products of general consumption. There was no new bar business last week, but this week's specifications are coming on old contracts at a very encouraging rate, and there is more new buying. Sheet orders are also picking up, and the wire manufacturers anticipate no difficulty in maintaining their advance of \$1 a ton. Buying from store is more active in all lines. Buyers are apparently becoming reconciled to the maintenance of prices and will gain more confidence when the extent of recent orders from railroads and other large interests becomes known.

Pig Iron.—The market is very quiet on both Northern and Southern grades. Chicago houses report no inquiries of moment, and business the past week has been confined to small lots for prompt shipment. The Southern furnace interests are discouraging forward purchases. Furnaces which are willing to sell for prompt shipment at a shade less than \$11 are unwilling to quote this price for first half or for second quarter. A number of small lots of Southern iron have sold recently below \$11, Birmingham, in this market, but in practically every case there are special conditions. Usually the iron is a little off the regular grade, but it is satisfactory to the purchaser. Transactions in off grades have formed a large part of the business done here for a long time, as the furnaces have followed the policy of piling only the regular foundry grades. It is understood that there is a shortage in the South of pipe iron, although stocks of higher foundry grades and basic are very large. The Northern furnace interests are pursuing a waiting policy and do not encourage inquiries for forward shipment. Lake Superior charcoal is quoted lower, owing to the accumulation of stocks and lack of demand. Jackson County silvery irons are also lower. Foundries at an average have enough iron bought to carry them three or four months at the present rate of consumption. Their forward buying in the past year and a half has resulted in losses to the buyer, and there is a general disposition now to wait until increased consumption makes it necessary to make forward purchases. The following quotations are for January, February and March shipment. Chicago delivery:

Lake Superior charcoal	\$17.50 to \$18.00
Northern coke foundry, No. 1	16.00 to 16.50
Northern coke foundry, No. 2	15.50 to 16.00
Northern coke foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.50 to 16.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

THE IRON AND METAL MARKETS

(By Mail.)

Billets.—The leading interest continues to maintain \$31, base, Chicago, on open hearth forging billets, but independent mills have not been able to obtain better than \$28, Chicago.

Rails and Track Supplies.—Rail orders booked in Chicago last week for standard sections amounted to 15,000 tons. Railroad orders for track supplies for prompt shipment are increasing, but have not yet reached the capacity of the mills. The leading interest is quoting current prices on track supplies only for prompt shipment or very short delivery periods. Higher prices are asked for deliveries extending over several months. Important developments are expected in the way of railroad buying this week. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Structural Material.—The steel contract for the Insurance Exchange Building in Chicago, 14,000 tons, was let to the Brown-Ketcham Iron Works, Indianapolis, Bethlehem shapes specified. The McNeil Building in Chicago, 900 tons, was let to the South Halsted Street Iron Works. The Lake Superior & Ishpeming Railway has given the Wisconsin Bridge Company the contract for an ore dock amounting to 5900 tons. The Chicago & Northwestern Railway has let 5000 tons of bridge work, of which the Pennsylvania Steel Company gets 2000 tons, the McClintic-Marshall Construction Company 2000 tons and the American Bridge Company 1000 tons. The St. Louis & San Francisco Railroad has let to the American Bridge Company a draw span bridge, 1000 tons, at Pocahontas, Ark. The American Bridge Company has also taken two large bridge contracts over the Sacramento River, one a highway bridge requiring 1600 tons of steel and one a street railway bridge, at Sacramento, 1300 tons. A 150-ton bridge contract of the Great Western Railroad was let to the American Bridge Company. The Missouri Valley Bridge Company was awarded 280 tons of highway bridge work in Ada County, Iowa. A building for the American Radiator Company at Denver, 350 tons, was let to the Loweth Brothers Iron Works Company. There has been a good run of small contracts recently for highway bridges and light structural work, and the fabricating interests are greatly encouraged by the prospects. One construction company in Chicago has been holding up 11,000 tons of work on which it has the general contracts, and there has never been so large a tonnage of structural business pending. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Specifications have been coming in better and will probably show still more improvement the coming week, as all the fabricating shops are in the market, and there are also more car orders in prospect. Miscellaneous plate business outside the structural field is satisfactory. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—The sheet mills are lagging behind other finishing departments in the volume of new business, but prices are holding firm, and there is some improvement in the amount of new orders. The sheet mills expected a dull month in January and will not be disappointed if the improvement is slow, as long as it is steady. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar business is the duller spot in the market. A year ago there was almost a famine in bars, and buyers were clamoring for shipments as well as for the opportunity to book orders for near deliveries. Now there is very little new business in steel bars. The bar mills, however, held up better during the fall than other finishing departments, and generally ran full until November 1. The bar iron mills are doing better but are still considerably short of a normal volume of business. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.40c. to 1.45c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The leading interests have made a general advance of \$1 per ton on all common wire products, including plain wire, wire nails, barb wire, &c. It is understood that the manufacturers of chain, bolts, rivets and other products in which wire is the raw material are considering a corresponding advance. Specifications for wire have increased 20 per cent. in the past two weeks, and a firm market with a heavy demand is anticipated for some time in the future, with the possibility of a further advance in prices. Jobbers' carload prices, which are quoted to manufacturing

buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Merchant Steel.—Specifications are very satisfactory and the mills furnishing agricultural steel are running at full capacity.

Cast Iron Pipe.—It is estimated that the lettings thus far this year are just about equal to the total that had been taken a year ago up to this time. Municipalities have been a little slow in advertising their requirements, but the tonnage they specify is satisfactory. A fair amount of gas business is being booked. Water pipe lettings last week were small, but several large lettings are expected next week. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25; 6 to 12 in., \$24; 16-in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—The market is stagnant, with no inquiries from consumers. Rerolling rails have sold as low as \$13.25 for small lots in transit. Both cast and malleable scrap are weaker. The restricted operation of malleable foundries has also depressed short steel rails. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	12.25 to 13.75
Old steel rails, less than 3 ft.....	12.50 to 13.00
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	11.25 to 11.75
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	11.75 to 12.25
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	10.75 to 11.25
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00

Philadelphia

PHILADELPHIA, PA., January 24, 1911.

While a better feeling prevails in both the crude and finished material markets, it has not yet been substantiated by any pronounced buying. The volume of business done during the second half of January, however, has been materially larger than that of the first half. The movement in pig iron during the week was probably less than that of the previous one, and producers in this territory promise a sharp reduction in the output in February. A trifle more business is reported in billets for prompt shipment. In finished materials a larger number of miscellaneous orders have come out. The movement in coke and old material has been comparatively light.

Iron Ore.—Importations at this port during the week ending January 21 aggregated 38,658 tons. Sellers report an absence of any negotiations which would lead to early purchases.

Pig Iron.—The movement during the week has been less pronounced. In steel making grades, which were quite active last week, but one sale, covering several thousand tons of basic for early shipment, at \$14.25, delivered, was reported. A recent purchaser is in the market for 10,000 tons of basic for April-May delivery, but is holding out for a price concession. Small lots of low phosphorus iron have been sold at prices within the range of recent quotations. In the higher foundry grades business continues to drag. One large block of No. 2 plain and No. 3 foundry, which was before the trade last week, has been closed, but transactions in standard brands of No. 2 X have been confined closely to moderate lots, few exceeding 100 tons, and mostly for early delivery. Sales of Northern low grade iron to the cast iron pipe works continue to be made, one of 1000 and another of 2000 tons being reported. These interests are still in the market for further moderate quantities. In Virginia foundry irons local orders have ranged from carloads up to 100 tons

THE IRON AND METAL MARKETS

for early delivery. Heavier sales both of the higher as well as off grade irons have been made, however, to consumers in the Virginia district. While the leading Virginia producers still maintain firmly the recent quotation of \$13, furnace, for No. 2 X and No. 2 plain grades, less desirable brands can, it is reported, be had for early delivery at a concession of 25c. a ton. Several small sales of Southern No. 2 foundry to consumers in this vicinity, February and March delivery, are reported at \$11, Birmingham. While there has been some demand for forge iron, buyers appear to be holding out for lower prices and no sales are reported. Plans are under way for the blowing out of at least four merchant stacks during the next 30 days. The Eastern Pig Iron Association, which met in this city last week, reported practically unchanged conditions. There was no appreciable change in the statistical position, although stocks are understood to have crept up a trifle, while unfilled orders were slightly less. The feeling that prices are at rock bottom is generally expressed by producers, who state that, rather than continue in operation at the present basis, a more general cessation of production will be made. Little interest is shown by producers in inquiries on which the delivery is extended. Sellers in a number of instances confine their quotations largely to deliveries during the next 60 and 90 days. Prices are unchanged, the following range being named for standard brands, delivered in buyers' yards, eastern Pennsylvania and nearby points, during the first quarter or, in instances, the first half of the year:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.00 to 15.25
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.25 to 14.50
Basic.....	14.25 to 14.50
Standard low phosphorus.....	21.50 to 22.00

Ferromanganese.—While there has been no fresh inquiry or buying reported in this territory, 80 per cent. ferro is being offered for prompt delivery at \$38, Baltimore, and for extended delivery \$38.50 is named.

Billets.—Eastern makers report a better volume of business, although sales are seldom in excess of 100 tons. There is still some inquiry for larger lots for extended delivery, although buyers are not inclined to place such business at ruling prices, which are on open hearth rolling billets \$25.40 and on ordinary forging billets \$30.40, delivered in this vicinity.

Plates.—A better run of miscellaneous orders is reported by mills in this vicinity, and operations have been on a better basis the past week. It is believed that with the increased volume of orders received during the second half of January the deficiency during the first half of the month will be overcome. No particularly large inquiries are reported, but the makers express more hopeful views regarding future business, and it is believed that the present demand will gradually expand. Prices for ordinary plates, delivered in this vicinity, are being firmly maintained at 1.55c. minimum.

Structural Material.—Bids for the superstructure of the Vine street pier for the city, requiring about 3000 tons of structural material, were opened last week, and it is reported that the McClintick-Marshall Company is the low bidder, but the contract has not yet been awarded. The bulk of the work in sight in this immediate district is individually small; several propositions requiring upward of 200 tons have recently come out, but the greater portion of the current orders has been for small lots. The mills, however, are taking on a larger aggregate volume of business. Quotations for plain shapes are being firmly maintained at 1.55c. minimum for delivery in this vicinity.

Sheets.—Sufficient business is now coming to local mills to enable the majority of them to operate at full capacity and to insure several weeks' work ahead at that basis. The demand shows considerable improvement, although consumers are still confining their orders to immediate or very near future requirements. Prices are firm and unchanged, Eastern mills naming the following range for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Consumers have been placing orders for somewhat better quantities and for a little more extended deliveries, in some cases requirements for the first quarter and half of the year being covered. This is more particularly the case in connection with refined iron bars, which are being pretty firmly held at 1.25c., Eastern mill, equal to 1.32½c., minimum, delivered here. Not all makers, however, will meet that price, a full tenth above that figure in some instances being quoted. Steel bars are firm, at 1.55c., minimum, delivered, with business fair.

Coke.—Negotiations for moderate lots of furnace coke are still pending, consumers not being in a hurry to place contracts under existing conditions in the pig iron market. In foundry grades the demand is closely confined to small

lots. Prices are unchanged, at \$1.50 to \$1.65, at ovens, for furnace, and \$2 to \$2.25, at ovens, for foundry coke. For delivery in this vicinity the following range of prices per net ton is named:

Connellsville furnace coke.....	\$3.75 to \$3.90
Foundry coke.....	4.25 to 4.50
Mountain furnace coke.....	3.35 to 3.50
Foundry coke.....	3.85 to 4.10

Old Material.—Transactions continue of the small lot order, with both buyers and sellers awaiting developments. Sales in but few instances exceed 200 tons, as sellers refuse, as a rule, to let go of any larger tonnage at the prevailing prices. Heavy melting steel has been sold in small lots at \$12.50 and \$13, depending on the grade, and it is stated that strictly first-class material is scarce, even at the top of the market. Railroad wrought and other grades of rolling mill scrap have been rather quiet, and there is little business moving in special grades. Prices, in the absence of sufficient business to establish a market, are nominally quoted in the majority of the leading grades. The following range, however, about represents sellers' ideas of the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	15.00 to 15.50
Low phosphorus.....	17.50 to 18.00
Old steel axles.....	19.50 to 20.00*
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	17.00 to 17.50
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.50 to 16.00
Wrought iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	11.00 to 11.50
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	8.25 to 8.75
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	12.25 to 12.75
Grate bars.....	11.00 to 11.50
Stove plate.....	10.00 to 10.50

* Nominal.

Cleveland

CLEVELAND, OHIO, January 24, 1911.

Iron Ore.—A few additional reservations are reported, but no sales, the inquiries for small lots noted last week not as yet having resulted in any business. Ore firms are getting some requests from consumers for information regarding 1911 prices, but sellers are giving the matter no consideration and will delay action until there are prospects of a fair buying movement. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.74; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Sellers report a better volume of inquiry for foundry iron from the East and the Pittsburgh district. Little business is coming out, however, in the northern Ohio territory, the few sales reported being for small lots for spot shipment. Many of the foundries not already under contract for the first half either have not taken all the iron on their last quarter contracts or have liberal stocks in their yards, and efforts to interest them in new contracts are unsuccessful. The only sale of any size reported by a local interest is 1000 tons of No. 2 foundry in the Pittsburgh territory. The furnace of the Upson Nut Company, Cleveland, which was blown in recently on foundry iron will go on basic about March 1 and consequently will not be much of a factor in the local foundry iron market. The local market is firm at \$14.25 for No. 2 foundry, delivered, Cleveland, for either spot shipment or contract. In the Valley prices show no improvement, No. 2 foundry being quoted at \$13.50 to \$13.75. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	14.00
Southern foundry, No. 2.....	\$15.10 to 15.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—There is some inquiry for furnace coke, but mostly for small lots for spot shipment. Outside of carload orders, there is practically no demand for foundry grades. There is no change in prices. We quote standard Connells-ville furnace coke at \$1.40 to \$1.50, per net ton, at oven, for spot shipment, and \$1.70 to \$1.80 for the first half. Connells-ville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—The better demand for nearly all finished lines noted last week has not only kept up, but has further improved, and the feeling is becoming more general that the improved conditions will be permanent. Mill agencies not only are getting a larger volume of orders but these average larger tonnages than for some time, making

THE IRON AND METAL MARKETS

in the aggregate quite a satisfactory volume of business. The bulk of it is in current orders, although some good steel bar specifications are coming out. Some new contracts for steel bars and structural material for the first half have been placed. Prices are firm at 1.40c., Pittsburgh, for steel bars, plates and structural material. Some good orders have come from jobbers to replenish stocks. The structural outlook is improving. The contract for the entire new plant to be built by the Ford Plate Glass Company, Toledo, Ohio, which includes several buildings, has been taken by the McClintic-Marshall Construction Company. It is estimated that it will take about 4000 tons of steel. There is an inquiry for 200 tons for a church in Canton, Ohio. The demand for sheets has improved somewhat and prices are being fairly well maintained. The local demand for wire and tin plate is quite active. Good specifications for shafting are coming out. A local frog and crossing builder has placed a contract for 2000 tons of steel rails, and an Ohio traction company has given shipping instructions for 600 tons of standard sections contracted for some time ago. The demand for iron bars is only moderate, but local mills are running at from 65 to 70 per cent. of their average capacity. Prices on iron bars are stationary at 1.30c. to 1.35c., at mill.

Old Material.—The market shows no improvement. Mills are taking some material on contracts and appear a little more willing to buy small lots. They are unwilling, however, to pay current prices. Dealers, on the other hand, have taken a somewhat firmer stand and are buying scrap at about the prices offered by the consumers. This material they plan to hold for an advance in price. There is nothing to indicate an early advance, but dealers look for a better demand and firmer prices about March 1. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.75 to \$14.25
Old iron rails.....	15.00 to 15.50
Steel car axles.....	18.50 to 19.00
Heavy melting steel.....	12.50 to 13.00
Old car wheels.....	12.50 to 13.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.75 to 12.00
Railroad malleable.....	12.75 to 13.00
Light bundled sheet scrap.....	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.50
Iron and steel turnings and drillings...	6.50 to 7.00
Steel axle turnings.....	8.75 to 9.00
No. 1 busheling.....	10.50 to 11.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 cast.....	11.75 to 12.25
Stove plate.....	10.00 to 10.50
Bundled tin scrap.....	11.00 to 11.50

Buffalo

BUFFALO, N. Y., January 24, 1911.

Pig Iron.—The volume of inquiry continues large and appears to be steadily increasing. The proportion of buying to inquiry, however, has been comparatively small so far this week, a large tonnage being still under negotiation. Several prospective buyers have asked for extended deliveries and quotations made for current shipment and many consumers are desirous of covering at present prices for longer deliveries than furnaces are willing to concede, sellers asking considerably higher prices for last half than for current half delivery. New business booked was chiefly for small lots although it comprised a few orders of 1000, 2000 and one of 3000 tons of foundry grades, the largest coming from cast iron pipe interests. There is a perceptible growth in consumption, judging from the fuller specifications on contracts. Pipe foundries especially seem to be preparing for larger business and taking on increased stocks of raw material. There are also increased specifications and inquiry from machinery manufacturers at New England points, the new inquiry aggregating several thousand tons. Prices continue to exhibit signs of weakness, notwithstanding the efforts of some furnaces to maintain the maximum of current schedules, and a good share of the business taken has to be at some concession. It is quite possible that deals might be put through by certain furnaces at 25 to 50 cents per ton under the appended schedule, but in a general way it represents the market as closely as possible. For prompt and first half delivery, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.50 to \$15.00
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	14.00 to 14.25
No. 3 foundry.....	13.75 to 14.00
Gray forge.....	13.75 to 14.00
Malleable.....	14.25 to 14.75
Basic.....	14.25 to 15.00
Charcoal.....	17.25 to 17.75

Finished Iron and Steel.—The outlook is brighter with indications of a steady improvement. Specifications for immediate shipment are continuing to come out quite freely, the most noticeable betterment being in steel bars and cold

rolled steel. There has been a growing feeling among consumers of steel products that the action of the makers in not reducing prices was wise, although it has not yet resulted in any buying movement for the future. Buyers realize that the mills are in a position to make prompt shipments, and there is consequently no incentive to anticipate requirements beyond immediate needs. The advance of \$1 per ton on wire and wire products is producing a stimulating effect on the placing of specifications on existing contracts. The price status for other lines remains unchanged. The Canadian demand keeps up uninterruptedly, with good tonnages being inquired for and placed right along. In fabricated structural steel a good run of business is coming out, with a favorable outlook for increasing activity as spring approaches. R. T. Ford & Co., Rochester, the successful bidders for the State power plant to be built at Albany, are calling for figures covering the structural steel, which will amount to about 1100 tons. Figures are also being received for the steel for the addition to the Hammersmith paper mill to be erected at Erie, Pa., 400 tons, and for the Iroquois Hotel addition in this city, about 150 tons.

Old Material.—Shipments on contracts are now going forward to mills without restriction, and new business in most lines has improved in volume in comparison with the preceding two or three weeks. Dealers are figuring on moving scrap now, to provide yard room and funds for spring trade, and in consequence material is being offered freely for prompt shipment. The week has brought out a number of inquiries for old car wheels; also some inquiry for cast scrap for delivery over the next 60 days. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.25 to \$12.50
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	14.25 to 15.25
No. 1 railroad and machinery cast scrap..	14.00 to 14.50
Old steel axles.....	18.50 to 19.00
Old iron axles.....	23.00 to 23.50
Old car wheels.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.25
Boiler plate.....	10.25 to 10.50
Locomotive grate bars.....	10.50 to 11.00
Pipe.....	9.75 to 10.00
Wrought iron and soft steel turnings..	7.00 to 7.25
Clean cast borings.....	6.25 to 6.50

Birmingham

BIRMINGHAM, ALA., January 23, 1911.

Pig Iron.—The schedule of quotations on any delivery has not been changed, but this market is generally considered stronger than at the time of last report. Of the inquiries received the past week, only a small proportion resulted in sales, and the aggregate business booked is probably less than that of the week previous. However, the selling interests have without exception manifested an indifferent attitude and to all appearances are content to await developments. The sales reported consist of 1000 tons of analysis iron for shipment over the next 90 days, at \$12, Birmingham; 1000 tons of Nos. 2, 3 and 4 foundry for shipment within 90 days at \$11 for No. 2, with a differential of 50c. per ton for the lower grades; 500 tons of analysis iron for first quarter delivery at \$12, and an aggregate of some 900 tons in lots of 100 to 300 tons at \$11, for delivery over the remainder of the first half. The most significant inquiry was for 6500 tons of Nos. 2, 3 and 4 foundry for shipment over the first half. This business has so far not been placed, as buyer and sellers are apart on prices. A lot of 2000 tons for first half delivery is also still pending, owing to the refusal of the producing interest to guarantee a certain analysis. The fact that the tonnage recently placed has gone largely to the smaller producers, owing to the reluctance with which the larger interests have submitted prices, is given considerable consideration. It is noted that two of the leading interests have been practically out of the market for some weeks and that another large concern now offers second quarter deliveries only. As far as can be ascertained, no figures have been submitted on third quarter shipments, notwithstanding the business that has been offered.

Cast Iron Pipe.—The aggregate of small orders placed within the week is quite satisfactory. It is believed that prices have been established on a firmer basis and that the outlook is such that a further advance at an early date is not unwarranted. The requirements for the piping of gas from the gas field at Fayette, Ala., to Birmingham, Ala., and Columbus, Miss., are soon to be up for consideration, but the tonnage required has not been given out. This contract has been held in abeyance for some months pending further tests in the gas field. No change in operations has been made at local producing plants, and stocks of both water and gas pipe have been materially reduced since January 1. We quote prices unchanged, as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$20 to \$20.50; 8 to 12 in.,

THE IRON AND METAL MARKETS

\$19.50 to \$20, over 12 in., average \$18, with \$1 per ton extra for 2-s. pipe.

Old Material. The sales for this market in the past week are considerably heavier than for some previous weeks, but without changing current quotations. Indications for a much larger consumption are general and dealers are adding to their stocks whenever practicable. The most recent movements from local yards have consisted in the main of light cast, and the total accumulation of that particular grade now in evidence is comparatively small. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	11.00 to 11.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.00 to 9.50
No. 1 foundry.....	7.50 to 8.00
No. 2 foundry.....	7.00 to 7.50
No. 1 gray iron.....	9.50 to 10.00
No. 1 steel.....	10.00 to 10.50
Turned car wheels.....	9.00 to 9.50
Standard car wheels.....	10.00 to 10.50
Light cast and stove plate.....	8.00 to 8.50

St. Louis

ST. LOUIS, January 23, 1911.

Business men of St. Louis are gratified to note an increase of around 10 per cent. in the bank clearings the past week over 1910, for this city, Kansas City and St. Joseph. The open winter is admitting of more than the usual activity in building operations. Money is plentiful and obtainable at low rates for approved loans. Pig iron is quiet, but there is an increasing demand for metals, and the inquiry for finished iron and steel is better. Coke is quiet.

Pig Iron.—Most of the leading sellers complain of a dull market, both as to inquiries and sales. The representative of a leading Birmingham interest reports an improvement in his office over the previous week, mentioning sales aggregating 1750 tons. A large car builder is reported to be out with an inquiry for 2000 tons of malleable Bessemer. The purchase of 1000 tons each of Southern warrant iron by a couple of Belleville foundries is reported. The week's inquiries, however, were mainly for small lots, indicating a want of confidence in existing prices. It is stated that standard Southern No. 2 foundry can be bought for shipment over 60 days for \$10.50, but for first half delivery \$11 is asked, and for second quarter only, \$11.25, f.o.b. Birmingham.

Coke.—A little better inquiry for coke is reported, but the week's sales were light; a merchant seller mentions a contract for 250 tons of Connellsville 72-hour foundry, which was the largest single transaction handled. It is reported that a by-product coke company has taken a contract for furnace coke, understood to be on the basis of \$1.30 per net ton, Connellsville, establishing a new low record. The tone of the market is weaker, owing to larger offerings. We quote best selected 72-hour foundry at \$2 to \$2.25 per net ton, f.o.b. oven, Connellsville. Special brands are held higher.

Old Material.—It is a featureless market in scrap iron and steel. Relaying rails continue to be in good request, but for the list in general it is a dealers' market. There were no railroad offerings posted during the past week. Prices are nominally unchanged. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$12.00 to \$12.50
Old steel rails, rerolling.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, 80 lb.....	24.00 to 24.50
Relaying rails, 100 lb.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Cast iron axles.....	18.00 to 18.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 locomotive tires.....	9.00 to 9.50
Mixed scrap.....	4.50 to 5.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings.....	8.50 to 9.00
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.50 to 9.00
Railroad sheet and tank scrap.....	8.50 to 9.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

Finished Iron and Steel.—The leading interest reports more inquiry from railroads, and mentions the sale of 500

tons of standard rails to a local railroad company, with an inquiry for 3300 tons. The demand for light rails continues fair. There is a good inquiry for bars, coming mainly from manufacturers. For structural material the inquiry is only for special lots. Specifications for track material are coming in more freely.

Cincinnati

CINCINNATI, OHIO, January 23, 1911.—(By Telegraph.)

Pig Iron.—The comparative scarcity of low grade iron, especially in the South, is attracting attention. The pipe works and other users of this class of iron have been quiet but steady consumers and have made great inroads into furnace stocks. Producers who were reported to be making concessions in prices for prompt shipment on iron that was not quite up to standard No. 2 foundry are now said to have been cleaned out, and from all reports the price situation appears somewhat firmer. A northern Ohio melter has contracted for a good sized tonnage of Northern foundry for first half delivery. A southern Ohio consumer bought 3000 tons of basic for early shipment, and there are numerous scattered orders for smaller amounts of Southern iron, principally for prompt and first quarter delivery. Sales generally are said to show an improvement. An order for 2000 tons of malleable from a St. Louis firm is expected to be closed soon, and there is also another inquiry from a nearby concern for 200 tons of malleable. A southern Illinois firm is reported to be asking for prices in this market on a round tonnage of foundry iron for first half delivery. There are a few small lots of charcoal iron wanted and it is quoted around \$24, Birmingham basis. No. 2 foundry for first quarter shipment is quotable at \$11, Birmingham, and \$14, Ironton, with deliveries extended through the first half at the same figure if desired. These prices are maintained for spot shipment, although there may be a few cases where commissions are divided to move some small special lots. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75 to \$15.25
Southern coke, No. 2 foundry.....	14.25 to 14.75
Southern coke, No. 3 foundry.....	13.75 to 14.25
Southern coke, No. 4 foundry.....	13.50 to 14.00
Southern coke, No. 1 soft.....	14.75 to 15.25
Southern coke, No. 2 soft.....	14.25 to 14.75
Southern gray forge.....	13.00 to 13.50
Ohio silvery, 8 per cent. silicon.....	18.20 to 18.70
Lake Superior coke, No. 1.....	15.70 to 16.20
Lake Superior coke, No. 2.....	15.20 to 15.70
Lake Superior coke, No. 3.....	14.70 to 15.20
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	19.50 to 20.50

Coke.—There is an inquiry out for 5000 tons of furnace coke for February-March shipment, and another for approximately 1000 tons for prompt delivery, the latter from a Southern furnace operator. None of the prospective contracts recently mentioned has been closed. Some small quantities of furnace coke are being sold for domestic use. The Pocahontas and Wise County operators are maintaining prices on a firm basis for furnace coke, and for spot shipment \$1.65 to \$1.75 per net ton at oven is quoted, but in the Connellsville field furnace coke is said to be obtainable around \$1.50 per net ton. Foundry coke is only being bought in small quantities and \$2 is the average prompt shipment price, with contract figures between \$2.15 and \$2.25 for standard brands in all three fields.

Finished Material.—There is a better inquiry for structural material, and some business is being booked. The agricultural implement manufacturers are also holding up the demand for bars. Practically all manufacturers' agents and warehouse dealers expect a good spring trade. Reports of price cutting on the part of several independent mills do not seem to have affected this market, and mill orders are being taken on a basis of 1.40c., Pittsburgh. Warehouse quotations are unchanged at 1.75c. to 1.90c.

Old Material.—No new railroad offerings or sales are reported. Consumers appear to be taking a little more interest in the scrap market, and purchases are made to cover longer time requirements, both on the part of the rolling mills and foundries, though the latter are not now very heavy users. Prices for delivery in dealers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast scrap, net ton.....	4.75 to 5.25
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Bushel sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton.....	11.25 to 11.75

THE IRON AND METAL MARKETS

The German Iron Market

BERLIN, January 13, 1911

The situation in the iron market is still characterized by considerable uncertainty. The chief interest of the trade has centered in the opening of bids for bars by the Reich Administration at Hanover last week, which called out tenders at considerably lower prices than had been agreed upon by the convention for this specialty. The bids ranged as low as 107 marks, whereas the convention price is 112 to 114 marks. The iron trade and also the stock markets were not a little excited over this price cutting, and the news was made the basis for pretty heavy selling of iron shares for several days. It has been explained, however, that the low offers did not come from the mills, but from several dealers. Then the suspicion was that one of the big manufacturing companies was behind the offers, but all these have now given their word of honor that they have not taken any contracts below the convention price; and there the case rests for the present. The matter has been much discussed and has created the impression that matters are on a very uncertain basis in the bar trade, with the probabilities that the convention will not be prolonged at the meeting to be held next week for that purpose. Others, however, believe that it will be continued, inasmuch as the break down of the arrangement would cause the withdrawal of the export bounty of 5 marks a ton on bars for the foreign trade, at present paid by the Steel Works Union.

This week the stock market had a good day or two for iron shares upon the strength of an Essen dispatch which mentioned a strong foreign demand for German pig iron, especially from England, and that orders for 50,000 tons had just been placed. Considerable doubt, however, has been cast upon this dispatch, and many persons even regard it as spurious. At any rate, the regular market reviews contain nothing corresponding to its contents, though they do mention that the chief business in pig is at the moment for foreign account, and that some of this is for remoter dates. The December figures for the production of pig iron are now available, showing that it was a record breaking month, as 1910 was a record breaking year. The output in December amounted to 1,307,084 metric tons, exceeding the previous month by 35,750 tons and December, 1909, by 143,460 tons. The year's make reached 14,793,325 tons, which compares with 12,917,653 in 1909, 11,813,511 in 1908 and 13,045,760 in 1907. The prospects are that production will continue at its present level or even be increased.

The market for foreign ores remains firm, and in the Siegen district the demand is still expanding. Of course the general trade is supplied for the first half of the year, but considerable supplementary orders are coming in at the selling agency of the mines. Stocks have been so reduced that they are only about two weeks ahead of consumption. Prices are now so high for Swedish, Spanish and Mediterranean ores that many consumers are holding back and few sales are reported. High grade manganese ores are also firm, but few transactions occur owing to the high level of prices.

The market for scrap iron is somewhat weaker under heavier offers. It is reported that in some cases goods that had been sold have been left on the hands of sellers and have again come upon the market.

The shipments of the Steel Works Union in December amounted to 442,661 tons, being about 22,300 tons more than for November and 32,800 tons more than in December, 1909. The most striking thing in the December figures was the heavy gain in rails and ties. The shipments of these reached 193,324 tons, or more than for any other month since March, 1908.

Business in steel material continues at a normal level, and it is believed that it will grow still larger. It is expected that prices for the second quarter, which will be fixed at a meeting of the union next week, will be left unchanged. Considerable quantities of beams are going abroad, and the foreign market continues to buy pretty well, some of the transactions being for distant dates. In heavy plates there is still much more work on hand, but the tendency for new business is quieter. Home buyers of wire rods are rather backward in placing orders, but the foreign demand has improved and some of the buying is for long terms. There is considerable difficulty in getting satisfactory prices.

The manufacturers of galvanized sheets have just formed an organization for promoting and regulating their foreign trade. The works in question are chiefly in the Siegen region. Tin plate mills are busy and have work ahead for some time, but prices are low in view of the high level of tin prices. There is a movement on foot to increase the number of tin plate manufacturing shops by one or two. This is about the most backward department of the German iron trade, the greater part of the German consumption still being supplied by England.

The news from the Belgian iron market this week is again less satisfactory. Prices are again weakening. Foundry iron has dropped slightly. The export price for bars on board ship is about 94 shillings.

New York

NEW YORK, January 25, 1911.

Pig Iron.—Most of the buyers who came into the market soon after the opening of the year have taken some iron and the volume of inquiries before the trade has diminished. At the prices reached in the late buying melters would like to contract farther ahead than furnaces are willing to book. Considerable business was done by Buffalo furnaces for shipment into New York State and New England. Virginia iron has again been offered at \$12.75, at furnace, for No. 2 X, though some furnaces hold for \$13. Business in basic iron could be done if buyers' offers of \$14. delivered in eastern Pennsylvania, were accepted. A sale is reported at \$14.15. A New Jersey foundry has taken a second lot of 1000 tons, and is still inquiring for 500 tons. The Government is in the market for 800 tons of pig iron, including 250 tons of charcoal iron, for the Portsmouth, N. H., and Washington navy yards. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Steel Rails.—The order of the New York Central Lines for 1911 and its distribution are announced this week. The total is 176,750 tons, of which the Steel Corporation mills will roll 87,500 tons., the Lackawanna Steel Company 81,250 tons and the Bethlehem Steel Company 8000 tons. Open hearth rails make up the greater portion of the order, though a large tonnage of ferrotitanium rails will be rolled at Buffalo. The lines east of Buffalo will use 82,750 tons of the total. The division among the various roads is as follows: New York Central, 55,000 tons; Boston & Albany, 15,000; Rutland, 2750; Michigan Central, 15,000; Lake Shore, 22,500; Big Four, 12,000; Peoria & Eastern, 3500; Cincinnati Northern, 3500; Chicago, Indiana & Southern, 6000; Indiana Harbor Belt, 2500; Lake Erie & Western, 5500; Toledo & Ohio Central, 6000; Pittsburgh & Lake Erie, 17,500. Other rail orders of the week are 25,400 tons for the Southern Railway, 22,400 tons to the Tennessee Company and 3000 tons to the Maryland Steel Company; 2000 tons for the Nashville, Chattanooga & St. Louis; 2800 tons for the Buffalo, Rochester & Pittsburgh, and 9875 tons for the Western Maryland, taken by the Carnegie Steel Company. A Central Western coal road has bought 4000 tons. The Delaware & Hudson has bought 3200 tons of light rails from the Pennsylvania Steel Company.

Finished Iron and Steel.—A definite improvement in conditions is reported by all lines except bar iron, which so far has not felt it. Structural material and steel bars especially are in better demand, and even plates, never very active in this territory, are taking a very fair total tonnage in small lots. Improvement has been steady since the holiday and temporary season was over, and the past week has been the best in many months. Whether the improvement is temporary or permanent business is better now than for a long time, and it is significant that mills are shying at contracts for extended delivery at present prices. Among the more important structural contracts recently closed are the following: For the McAlpin Hotel, New York, 12,000 tons, taken by the Bethlehem Steel Company; for catenary bridges for the New York, New Haven & Hartford, electrification, 2500 tons, taken by the American Bridge Company; for a bridge in Baltimore for the New York Central, 1500 tons, taken by the Pennsylvania Steel Company; for the Boston elevated railroad power house, 1360 tons, taken by the New England Structural Company; for the Brunswick Steamship Line's pier 14, New York, 1325 tons, taken by Levering & Garrigues; for the Edward Ford Plate Glass Company, Toledo, Ohio, 1200 tons, taken by the McClintic-Marshall Construction Company; for the McNeil Building, Chicago, 900 tons, taken by the South Halsted Street Iron Works; for a building for the Consolidated Gas Company, Irving place and East Fifteenth street, New York, 800 tons, taken by Levering & Garrigues; for a loft on West Thirty-third street, New York, 600 tons, taken by the Uris Iron Works; for a repair shop for the Boston Fire Department, 500 tons, taken by the Eastern Steel Company; for a New York Central bridge at Niagara Falls, 500 tons, taken by the American Bridge Company. Orders reported of less than 500 tons each, making up a total of about 2500 tons. New bids pending in New York are for two loft buildings, one of 2000 tons on Thirty-sixth street and one of 1500 tons on Broadway. Also in the market are about 9000 tons for the Kanawha Bridge for the Norfolk & Western over the Ohio River, which is awaiting Government permission to build; about 1000 tons for the Harlem prison; a 400-ton bridge

THE IRON AND METAL MARKETS

for the Boston & Maine and six small spans for the Lehigh Valley, in addition to others previously noted on which awards have not yet been made. Prices remain unchanged, as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.35c. to 1.40c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Ferroalloys.—Sales of some good round lots of ferromanganese have been made in this market. An inquiry for 300 tons was filled at about \$38.15 for delivery over the first half and a number of other lots were sold at very close to that price. The demand for ferrosilicon is fairly good and New York dealers are quoting \$55.50, Pittsburgh, for delivery over the first half.

Cast Iron Pipe.—A number of good sized orders have been placed by private water and gas companies in the past week, for spring delivery, aggregating considerably over 10,000 tons. More business of this character has been secured by pipe manufacturers this month than in any other month for a long time. No public lettings of importance are announced. Carload lots of 6 in. continue to be quoted at \$22 per net ton, tidewater.

Old Material.—More inquiries are being received than for several weeks and sentimentally the market is in better condition. Transactions have not been numerous nor have the quantities involved been large. Some sales have been made of heavy melting steel scrap for delivery in eastern Pennsylvania. The rolling mills are doing but little purchasing at present outside of wrought scrap. Cast scrap and old car wheels seem to be in most demand. The old car wheel situation is somewhat peculiar, as sales of small lots have been made to dealers as low as \$11.10 in this vicinity, but the dealers are asking somewhat higher prices for what they have in stock, as they consider this class of old material a good investment at current prices, believing that they will find a considerably better market at a reasonable time in the future. Some inquiry for car wheels export has developed. Quotations per gross ton, New York and vicinity, are as follows:

Old under and Frals for melting	\$10.50 to	\$10.75
Heavy melting steel scrap	10.50 to	10.75
Relaying rails	20.50 to	21.50
Standard hammered iron car axles	2.00 to	2.10
Old steel car axles	16.00 to	16.70
No. 1 railroad wrought	13.50 to	14.00
Wrought iron truck scrap	12.00 to	12.50
No. 1 yard wrought, long	11.00 to	11.50
No. 1 yard wrought, short	10.50 to	10.75
Light iron	5.00 to	5.50
Cast borings	6.00 to	6.50
Wrought turnings	6.00 to	6.50
Wrought pipe	10.50 to	11.00
Old car wheels	12.00 to	12.50
No. 1 heavy cast, broken up	12.00 to	12.50
Stove plate	9.50 to	10.00
Locomotive grate bars	8.50 to	9.00
Malleable cast	12.00 to	12.50

Metal Market

NEW YORK, January 25, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.						
Copper, New York.		Lead		Spelter		
Jan.	Lake.	Electro- lytic.	New York.	St. Louis.	New York.	St. Louis.
19....	12.75	12.50	{ 41.40 41.50	4.50	4.35	5.55
20....	12.75	12.37½	41.45	4.50	4.35	5.55
21....	12.75	12.37½	41.45	4.50	4.35	5.55
22....	12.75	12.37½	41.70	4.50	4.35	5.55
23....	12.75	12.37½	{ 42.25 42.70	4.50	4.35	5.55
24....	12.27	12.37½	42.25	4.50	4.35	5.55
25....	12.75	12.37½	43.25	4.50	4.35	5.55

Heavy sales of copper have been made during the last three days, but at a lower price than prevailed last week. Consumers of pig tin came into the market yesterday and bought heavily at higher prices than have been paid since 1907. Lead is slightly firmer, but is not active. Buyers continue to neglect spelter.

Copper.—Following an announcement made by the United Metals Selling Company last Friday to the effect that it would accept orders for electrolytic copper delivered in the Naugatuck Valley, 30 days, at 12.50c., which made the spot price in New York 12.37½c., other sellers who had been holding out for a higher price made similar reductions, with the result that consumers came into the market and bought heavily. It is hard to estimate how much copper has been sold within the last five days, but it is generally conceded that fully 30,000,000 lb. was disposed of, and it is highly probable that the sales reached 50,000,000 lb. The liberal orders placed by consumers indicate that many of them were short of stocks, and when it is remembered that no sales of any consequence were made during October, November and December this does not seem strange. It is also apparent that consumers were determined to hold out for reduced prices, and the manner in which they conducted

their buying transactions indicated that most of them were familiar enough with the statistics to warrant their belief that holders would have to make reductions to induce business. It will be remembered that there was some good trading January 16 and 17, when prices were declining, but when, on the 18th, the market stiffened to 12.50c. for electrolytic the buyers withdrew. It is the opinion that the leading sellers will continue to hold electrolytic copper at 12.37½c. until they have disposed of their surplus metal. Lake copper is firm at 12.75c. The trading during the last few days has been largely in electrolytic. The exports of copper so far this month amount to 24,012 tons. In London to-day spot copper sold at £55 7s. 6d. and futures £56 3s. 9d. The sales amounted to 300 tons of spot and 300 tons of futures. The market closed quiet.

Pig Tin.—After watching pig tin quotations advance nearly 1c. a lb. during the week, consumers in this market indulged in a buying panic yesterday which was repeated in a measure this morning. A number of them began to feel the market on Friday, but they withdrew without buying, only to find on Monday morning that quotations had advanced 25 points. They tried again yesterday and discovered that the market was soaring still further. A few orders were placed for small lots and the sales were reported, and then the consumers became frightened and a buying panic ensued that has not been equaled in this market in a number of years. Orders for fully 700 tons of tin were placed and some estimates add 300 tons more to the total sale. Buyers who took 25 or 30 tons in the morning came back and doubled their purchases in the afternoon at 15 to 25 points higher and in many cases the same purchasers were asking for more tin this morning. The London market continued to advance all the week, and it is apparent that the syndicate has full control of the situation. There are no indications of the operators showing any disposition to let go their hold, but the situation is a dangerous one for speculators. Available stocks in this country are very small as the result of the purchases of yesterday and to-day, and they are closely concentrated. There was more excited buying in New York this afternoon, when news came from London that that market had closed £2 higher than yesterday. Both spot and futures were sold at £195. The London market was described as being greatly excited, and the day's sales were large, amounting to 570 tons of spot and 1540 tons of futures. It is a significant fact that futures are bringing the same price as spot, when they are as a rule nearly £1 lower. Sales in New York were made this afternoon at 43.25c., and the market is likely to go higher.

Tin Plates.—There are better inquiries for tin plates and manufacturing consumers are taking small lots for early use. The price remains unchanged at \$3.84 for 100 lb. coke plates. Quotations on foreign tin plates continue the same as last week, the price at Swansea, Wales, being 14s. 10½d.

Lead.—Very little lead is being called for, but the market seems slightly firmer than it was last week. Dealers in the West who were offering concessions have stiffened their quotation slightly. The price in New York is 4.50c., and it is selling in St. Louis at 4.35c.

Spelter.—Spelter is weaker and there are reports of concessions made for shipments from St. Louis. There is very little spelter here for spot delivery, and many sellers here are holding the metal subject to their order in East St. Louis. Consequently, while the price is 5.55c. in New York, it might be bought for a shade less than 5.40c. in St. Louis, although that market is usually 15 points lower than New York.

Antimony.—Nothing has developed from the talk of a possible trade combination among producers of antimony in Europe and the market generally has weakened, although Cookson's is still held firm at 8.25c. Hallett's can be had at 7.25c., and Chinese brands and Hungarian grades are offered at 7.25c. to 7.50c.

Old Metals.—The market is weak. Dealers' selling prices are as follows:

	Cents.
Copper, heavy cut and crucible	12.00 to 12.50
Copper, heavy and wire	11.50 to 12.00
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.25 to 8.50
Brass, light	7.00 to 7.25
Heavy machine composition	11.00 to 11.25
Clean brass turnings	8.00 to 8.25
Composition turnings	9.00 to 9.50
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.25 to 4.30

Metals, Chicago, January 24.—On recent concessions a considerable amount of copper has been placed for February and March shipment in this territory. As a result of this weakness, however, copper is quoted this week one eighth

THE IRON AND METAL MARKETS

cent lower for both casting and lake. Tin persists in its upward course and still higher prices are asked for February shipment. Spelter is weaker, but the nominal quotations of the St. Louis market are not confirmed here. A recent inquiry for a round lot brought no offers from smelters below 4.45c., Chicago. We quote Chicago prices as follows: Casting copper 12½c.; lake, 12½c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 42¼c.; small lots, 44c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.45c. to 4.50c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter No. 1, 29c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, January 23.—Lead is very quiet and quoted at 4.35c.; spelter is dull and held at 5.30 to 5.35c., both at East St. Louis. Zinc ore is quoted at \$38 to \$41 per ton. Joplin base. Average conditions show open offerings below metal basis price. Tin is higher and held at 41.90c. per lb.; antimony (Cookson's) unchanged at 8.60c.; lake copper unchanged at 13.10c.; electrolytic, 12.98c., all at St. Louis. The demand for finished metals has shown a gain each week since the new year opened.

The annual statistical report of the New York Metal Exchange for January, 1911, compiled by C. Mayer, secretary, has been issued. The volume is uniform in appearance with previous reports issued by the exchange, and contains, in addition to production figures on iron and nonferrous metals, monthly fluctuations in prices and other interesting data going back to 1905.

Notes on Prices

Rope.—Business continues to be moderate and possibly not quite up to the output of a year ago. Contractors, railroads and other large consumers are using comparatively small quantities at this time, while the demand from vessels is also light. This shrinkage in requirements, combined with less demand from merchants, accounts for the present quietness. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8¾c. to 9¼c. per pound; second grade Manila, 7¾c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¾c. per pound; second grade, 6¼c. per pound; jute rope, ¼-in. and up, No. 1, 6c. to 6¾c. per pound; No. 2, 5½c. to 6c. per pound.

Linseed Oil.—The market in New York is strong. The country is now largely dependent for its supply of seed upon the Argentine and India crops. Another factor entering into the situation is the decrease in the consumption of linseed oil abroad, which opens the question how much of foreign seed and oil will be available for import to this country. The following quotations represent New York prices in five-barrel lots or more:

African Copper.—From the January circular of James Lewis & Son, Liverpool, the following statement is taken: "At the annual meeting of Tanganyiki Concessions, Ltd., held December 16, it was stated that the first blast furnace at the Star of the Congo mine, producing 1000 tons of copper monthly, would be in operation in April next, and that the reduction plant, to produce another 1500 tons monthly, is now being shipped and will be started as soon as possible after the first blast furnace is in full working order, increasing the output to 2500 tons per month or 30,000 tons per annum—to be increased to 40,000 tons by the end of this year when the railroad is extended to the Kambove mine. It was further stated by the managing director that there are practically unlimited supplies of ore in the Katanga copper belt, that the amount of copper that can be produced is only limited by the time it takes for the railroads to connect with the mines, and that when the Benguella Railway is completed there will probably be an increase up to 100,000 tons from the Star or eastern end of the copper belt and of a similar quantity from the Kolwezi or western end, the cost of production delivered in Europe not exceeding £32 per ton of copper when smelting with European coke, as at present, and £23 to £27 per ton when the shorter railroad

	Cents.
State raw	94
City raw	94
Refined, 50 lbs. 50 gal. 1 cent advance per gallon	
Refined, 100 lbs. 100 gal. 1 cent advance per gallon	

Spirits Turpentine.—Prices continue at a high level, owing to the strength of the Savannah market, where large interests have the situation well in hand. New York quotations in five-barrel lots are as follows:

	Cents.
Inset barrels	86
Inset machine barrels	86½
Loss time 50 gal. lots, 1 cent advance per gallon	

Iron and Industrial Stocks

NEW YORK, January 25, 1911.

Although a period of comparative dullness in transactions, the stock market maintained its strength fairly well the past week. Fluctuations were narrow, except in Colorado Fuel, which advanced sharply. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	7½	Railway Spr. com.....	34½
Allis-Chalm., pref.....	29	Railway Spr., pref. 95¼	96
Beth. Steel, com.....	29¾	Republic, com.....	32½
Beth. Steel, pref.....	60½	Republic, pref.....	94½
Can. com.....	9	Sloss, com.....	50½
Can. pref.....	78½	Pipe, com.....	16
Car & Pdry., com.....	52¼	Pipe, pref.....	50
Steel Foundries... 45¼	46½	U. S. Steel, com...	76½
Colorado Fuel... 32½	36	U. S. Steel, pref...	118¼
General Electric... 151	153	Westinghouse Elec. 67	68
Gr. N. ore cert....	58½	Va. I. C. & C.....	54½
Int. Harv., com....	113	Am. Ship, com.....	111¼
Int. Harv., pref....	123¼	Chi. Pneu. Tool....	41¼
Int. Pump, com....	40	Cambria Steel....	44½
Int. Pump, pref....	85½	Lake Sup. Corp....	28
Locomotive, com....	40	Pa. Steel, pref....	106¼
Locomotive, pref..	110	Warwick.....	10
Nat. En. & St., com....	18	Crucible St., com..	12¼
Nat. En. & St., pref.	84¼	Crucible St., pref..	75¼
Pressed St., com....	32	Harb.-W. Ref., com....	34
Pressed St., pref..	94½		95½

The Connecticut industrial stocks, as quoted on 'Change in Hartford, demonstrate most encouraging conditions. American Hardware Corporation, New Britain, has recently advanced from 125 to 128; Landers, Frary & Clark, New Britain (par value \$25), from 78 to 82; Billings & Spencer Company, Hartford (par value \$25), from 40 to 41; Colt's Patent Fire Arms Mfg. Company, Hartford, from 118 to 120; International Silver Company, Meriden, from 109 to 110½; Torrington Company, Torrington, preferred (par \$25), from 27½ to 28½. In a few cases a drop of but \$1 per share is recorded, but the average values are high. Recent sales of local industrials at Providence, R. I., showed an equally strong condition.

Dividends.—The Cambria Steel Company has declared the regular quarterly dividend of 1¼ per cent., payable February 15.

The Torrington Company has declared a semiannual dividend of 4 per cent. on the common stock, payable February 1. An extra stock dividend of 10 per cent. was also declared on the common stock, payable to holders of record January 20.

The Plymouth Cordage Company has declared the regular quarterly dividend of 2 per cent., payable January 20.

routes to the coast are available. The stock of copper at the Kansanshi mine—2000 tons—is now being shipped to England."

The Gilbert Iron & Steel Company, New York City, is involved in bankruptcy proceedings before the local United States Commission in Bankruptcy, its affairs having been complicated with several other concerns in financial difficulty.

The National Enameling & Stamping Company is to make Granite City, Ill., the home of its general offices, which have heretofore been in St. Louis. The change is made because the company's largest manufacturing plant is located at Granite City.

The Calumet Engineering Works, Harvey, Ill., will continue in operation under receivers appointed last week. All contracts and orders will be completed, pending a settlement or reorganization of the business.

The Nittany Iron Company will blow out its furnace at Bellefonte, Pa., this week, to make needed repairs.

Obituary

EDWARD B. MANNING, a founder of Manning, Bowden & Co., Meriden, Conn., died January 22, on his seventy-seventh birthday anniversary.

WALTER GRATTAM MILLER, for about 20 years connected with the Jones & Laughlin Steel Company, Pittsburgh, and for some years assistant to Roland Gerry in the cold rolled sales department, died suddenly of heart disease in Pasadena, Cal., January 16. He had been ailing for more than a year and went to California last November in the hope of recovering his health. He leaves a widow.

The Rutland Railroad Company, Rutland, Vt., of which B. A. Aikens is purchasing agent, is considering the purchase of the following machine tools: One 42-in. boring mill, similar to Pond No. 1190, and one heavy duty planer, from 8 to 10 ft. bed, standard width, both to be driven by individual motors of suitable capacity, alternating current, 400 volts, two-phase, 7200 alternations; also one heavy duty double head axle lathe, with all attachments complete, motor driven, 400 volts, three-phase, 25-cycle and one 26-in. all steel four-jaw independent chuck (for 26-in. lathe), outside step to be 1 in. high. Bids are being asked for through the purchasing department.

From statistics and estimates received by the United States Geological Survey from about 20 per cent. of the companies manufacturing Portland cement, representing nearly half of the entire output of the country, it is estimated by E. F. Burchard of the Survey that the quantity of Portland cement manufactured in the United States in 1910 was between 73,500,000 and 75,000,000 barrels, as compared with 63,508,471 barrels produced in 1909—an increase of 10,000,000 to 12,500,000 barrels, or 15 to 20 per cent.

Wickwire Brothers, Cortland, N. Y., manufacturers of woven wire products, have placed a contract with the Mesta Machine Company, Pittsburgh, Pa., for two 500-hp. producer gas engines, of the horizontal single tandem double acting four-cycle type, with cylinders 24 in. in diameter and 32-in. stroke, operating at 150 rev. per min. They will each be direct connected to a 350-kw. generator and generate the power for driving the motors throughout the plant.

Five new motor boats are under construction by the Russian Government for revenue service on the Amur River. Power equipment is to be Fairbanks-Morse three-cylinder heavy duty marine engines developing 30 hp. on kerosene. The order for these engines resulted from the sale of a 15-hp. marine engine to the Russian Government some time ago, which gave such satisfactory service that the new boats were ordered to be equipped with the same make of engine.

The Republic Rubber Company of Pittsburgh, an identified interest of the Republic Rubber Company of Youngstown, Ohio, has been granted a charter with a capital of \$20,000. The new company will occupy the quarters in the Conestoga Building, at Wood and Water streets, Pittsburgh, formerly occupied by the Revere Rubber Company. Elmer E. Gallup is president; Lawrence H. Irwin, treasurer, and Millard Fisher, secretary.

The report that the Wilkoff Brothers Company, Youngstown, Ohio, dealer in iron and steel scrap, had purchased the mill of the Shenango Iron & Steel Company, at Wheatland, Pa., and would change it into a steel plant, is pronounced absolutely untrue by the former company, which states that it has no intention of taking over the property.

The furnace of the Bellefonte Furnace Company, Bellefonte, Pa., is undergoing repairs. It was blown out December 21.

More Water Power Development Needed

The Executive Committee of the National Electric Light Association, at a meeting held in New York, January 12, adopted resolutions urging that a joint commission of Congress be appointed at this session to investigate fully the situation pertaining to the public lands of the United States in connection with the development of water powers. The association represents about \$2,000,000,000 invested in central stations for electric light and power and the apparatus they employ, with 100,000 employees, and includes within its ranks 90 per cent. of the investment and capacity for public service thus represented. It therefore speaks as an authority. Secretary T. C. Martin of the association says:

"There are already nearly 1000 central stations in this country using water powers but, under the present conditions that have tied up such development, very few new water power plants can be undertaken, and the result is that for lack of such utilization of such water power the consumption of coal and other fuel goes on at a rapidly increasing rate. It is to relieve this deadlock that Congress is invited to investigate fully at once all the aspects of the matter with the idea that a great many communities, particularly in the West, which are seeking to enjoy electric light, power and traction, through the development of unused water power sites, may be enabled to gratify their natural wishes in this respect. The amount of coal, oil, gas, &c., now being consumed which would be conserved by hydroelectric development on the largest scale possible literally transcends belief and is almost incalculable."

The City Council's Water Committee and the Commissioner of Public Works, Buffalo, N. Y., have approved the purchase by the city of three steam-turbo-electric generators for the equipment of the new water works from the Westinghouse Machine Company, the lowest bidder, at \$248,180. In addition to providing power for pumping service, the new generators will supply current for lighting the streets and public buildings, for which Niagara power is now used.

The Drop Forging Company of New York, manufacturer of Spartan chain pipe wrenches and other special drop forgings, has purchased from the Bergen Foundry its site and buildings located at the corner of West Side avenue and Fisk street, Jersey City, N. J. The plant has a frontage on West Side avenue of 308 ft. and on Fisk street of 210 ft. and has been in operation for over two years in the same locality.

At a meeting held at the Carnegie Technical Schools in Pittsburgh, January 13, the foundry foremen of Pittsburgh and vicinity organized and elected temporary officers for the benefit and entertainment of foundry foremen visiting Pittsburgh during the convention of the National Foundrymen's Association, to be held in that city in May, 1911.

Stockholders of the Monongahela River Consolidated Coal & Coke Company held their eleventh annual meeting in Pittsburgh last week at which J. A. Donaldson, president, presented his annual report, showing the business of the company in 1910 to have been the largest in its history. The surplus, after payment of a dividend of \$1 a share, was \$31,232.64.

The Parkersburg Iron & Steel Company, Parkersburg, W. Va., manufacturer of iron and steel sheets and the genuine Parkersburg blue sheets, is building an addition, 100 x 200 ft., to its main mill building, in which will be installed a modern galvanizing plant for the galvanizing of its products.

The Murphy Iron Works, Detroit, Mich., has extended its selling organization in the South by opening a district office in the Empire Building, Atlanta, Ga., with Roland B. Hall in charge.

Republic Iron & Steel Company

The Executive Committee of the Republic Iron & Steel Company has issued its report for the six months ending December 31, 1910. Chairman Topping says:

"The volume of business during the six months has been disappointing. The stagnant condition of business referred to in the report for the year ending June 30, 1910, was followed by a general liquidation of iron and steel supplies in consumers' hands, and by steady declines in price, and which checked sales and restricted specifications against contracts to the buyers' necessities. General iron and steel prices are now below the 1908 panic level, many products being below the level of 1904; labor costs, however, are at the maximum, and the margin of profits unsatisfactory.

"The results of operations for the six months, on the whole, compare favorably with the same period in 1909, notwithstanding the reduction in volume of business, as increased efficiency, economy and earnings from tubular products partly offset adverse operating conditions. The open hearth steel works construction expenditures, however, have substantially increased the fixed charges, but have not added to earnings, as the new steel works will not be ready for operation prior to April 1, 1911. Full allowance for depreciation, maintenance and all other charges having been made, the net profits applicable to dividends are \$1,207,850 and the amount of net assets \$11,090,852."

The income account and statement of surplus for the six months, compared with 1909, is as follows:

	SIX months 1910.	SIX months 1909.
Gross profits.....	\$2,632,085	\$2,499,775
Maintenance and repairs of plant.....	680,000	598,376
Balance.....	\$1,951,457	\$1,901,399
Interest and dividends received, less interest paid.....	40,956	72,212
Total profit.....	\$1,992,411	\$1,973,611
Deduct—		
Depreciation and renewal of plants.....	300,168	312,178
Provision for exhaustion of minerals..	133,511	127,684
Interest on bonds.....	290,882	199,357
Net profits.....	\$1,267,850	\$1,334,392
Dividend on preferred stock.....	875,000	794,796
Balance surplus.....	\$392,850	\$539,596

Adding surplus at July 1, 1910, which was \$4,954,660, the total surplus carried to balance sheet December 31, 1910, is \$5,347,510, as against \$5,081,990 one year previous.

The balance sheet December 31, 1910, is as follows, with comparison with December 31, 1909:

ASSETS.		December 31, 1910.	December 31, 1909.
Plant, &c.....		\$58,212,415	\$54,558,375
New construction.....		2,688,496	776,648
Investments in other companies.....		942,385	1,092,384
Prepaid royalties and expenditures....		894,524	983,366
Miscellaneous.....		8,472	3,795
Inventories.....		6,954,570	5,976,982
Ore contract payments.....		599,582	527,279
Advances to associated companies.....		—	317,700
Accounts and bills receivable.....		3,699,124	3,954,437
Cash.....		2,172,556	5,135,792
Totals.....		\$76,174,124	\$73,326,758
LIABILITIES.		December 31, 1910.	December 31, 1909.
Common stock.....		\$27,191,000	\$27,191,000
Preferred stock.....		25,000,000	25,000,000
First mortgage bonds.....		1,647,000	7,773,000
10-30 year sinking fund 5s.....		8,196,000	—
Haselton property mortgage notes....		1,475,000	—
Potter Ore bonds.....		325,500	334,000
Martin Coke Works bonds and notes..		373,382	—
Accrued interest.....		139,421	97,163
Ore contracts.....		188,474	186,131
Accounts payable.....		1,475,252	2,180,550
Haselton Steel Tube Company.....		—	1,230,086
Reserve funds.....		*3,343,461	2,546,848
Accrued taxes.....		93,587	76,694
Dividend warrants.....		938,290	1,189,050
Dividends accrued.....		440,246	440,246
Profit and loss.....		5,347,510	5,081,990
Totals.....		\$76,174,124	\$73,326,758

* Includes fund for exhaustion of minerals, \$1,365,452; for depreciation and renewals, \$1,224,130; for relining furnaces, \$208,091; for fire and accident insurance, &c., \$403,079; for contingencies, \$142,709.

The statement of unfilled orders for finished and semifinished products and pig iron is as follows, with comparisons:

	Finished and semi-finished products. Tons.	Pig Iron. Tons.
December 31, 1910.....	293,734	76,378
June 30, 1910.....	341,887	82,906
December 31, 1909.....	457,785	39,995
June 30, 1909.....	392,420	94,247
December 31, 1908.....	391,040	89,934
June 30, 1908.....	283,743	59,196
June 30, 1907.....	448,627	74,500

The Chamber of Commerce, Butler, Pa., has issued a handsomely illustrated brochure setting forth the advantages of that city for the location of manufacturing industries. It is 30 miles from Pittsburgh, has four steam railroads and two interurban electric lines, is in a rich oil and natural gas region, and is further in a section enjoying many other natural resources needed by manufacturing interests. The largest industry the city possesses at present is the Standard Steel Car Company's works, which employs from 4000 to 6000 men. The Pittsburgh-Hickson Company, also located there, is a large manufacturer of metal bedsteads. The city has a population of 22,000 and is the center of a district having at least 30,000. It is located in the Pittsburgh freight district, and the merchants and manufacturers have the same rates as those located immediately in Pittsburgh.

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., has received a contract for piping and fittings to be used in the 5-mile gas line being laid from Montgomery to Charleston, W. Va., for the Montgomery Gas Company. It has recently received contracts for high pressure piping installations as follows: Wheeling Traction Company, Ohio State Penitentiary, Columbus Railroad Company, Girard Iron Company, Crystal Coal & Coke Company, Turkey Gap Coal & Coke Company, Pittsburgh post-office, Firth-Sterling Steel Company, McAlpine Coal Company, McKeesport Tin Plate Company, American Steel & Wire Company, Pittsburgh Brewing Company, Pittsburgh Clay Pot Company and Monongahela River Consolidated Coal & Coke Company.

The new plant of the Union Rolling Mill Company, Cleveland, was placed in operation January 16, improvements that have been in progress several months having been completed. The old 9-in. mill was abandoned, this being replaced by a Belgian mill. The new equipment includes a 14-in. roughing mill and a 9-in. finishing mill. These occupy a new building, 70 x 320 ft., with a lean-to, 40 x 140 ft. The capacity of the new mill will be about 25 per cent. greater than the one that was replaced.

Oglebay, Norton & Co., Cleveland, Ohio, have added the Old Riverton mine to their holdings in the Iron River district of the Menominee range, near Republic, Mich. The property, consisting of two 40-acre tracts, adjoins the firm's Chatham mine. The new property was formerly operated by the United States Steel Corporation, which abandoned it a few years ago. It will be gradually developed by the new owners.

The United States District Court, New York, has granted the application of A. Gordon Murray, receiver and trustee in bankruptcy of the J. B. & J. M. Cornell Company, structural iron and steel, at Eleventh avenue and Twenty-sixth street, New York City, and at Cold Spring, N. Y., to sell the entire property of the company, as the plan for a reorganization could not be accomplished.

S. H. Head, sales manager for the Samson Iron Works, Stockton, Cal., is reopening the company's San Francisco office at 501 Market street. This company is a large manufacturer of gas engines and irrigating pumps, and operates one of the largest crucible steel casting plants in the State, furnishing castings for several other machinery manufacturers.

Works Administration as a Constructive Science

Operative Methods Well Developed, but Directive Methods Still Lack Much—The Use of Standards and Records

BY H. F. STIMPSON.*

The object of civilization, physically speaking, is to provide the individual with a sufficient quantity of such of its products as he may desire. Let us see why this is not done.

We have an abundance of raw material or of productive soil; our mines are not exhausted nor is our soil cultivated to the ultimate degree of possibility. We have an abundance of equipment; the trade journals tell us that the tool manufacturers are not as busy as they might be.

We have an abundance of labor or the material from which it can be developed. There are always many persons who desire to work, yet who find no opportunity for doing so. There are many others who are physically capable of working, but who do not desire to work. Many of these are supported by the worker in some form of restrictive institution. These same workers, curiously, seem to prefer to support these people at the cost of added effort on their own part rather than to allow those so supported to earn their own living.

We have no lack of skilled methods for the operation of equipment upon the material. These have been supplied to us in abundance as the result of study and experiment, both by direct workers and, later, after being formulated, by our technical schools.

Trained Administrators Lacking

Where then is the lack? I assert that it is in the supply of trained administrators in sufficient quantity to combine all of the material, equipment and labor which are necessary for the production of the amount of the things which we need.

The reasons for this shortage are: 1. In contradiction to the plain teachings of our experience in every other line, we hold to the absurd doctrine that a manager is born, but cannot be trained; hence, 2, our system of education provides for instruction in the management of things and not of men.

Management or administration is an exact and constructive science which can be as well formulated and taught, without reference to the business to which it is to be applied, as can the science of mechanics. We are beginning to see that scientific management will pay when applied directly to the worker at the bench. It is even more profitable when applied to every individual through whom the efforts of the worker at the bench are directed. This science is being formulated to-day by men who have been studying it for years. They are the only source from which immediate relief can be secured; but the professional educator should bestir himself in the remodeling of the present antiquated methods, so as to meet the new demand and in order that coming generations may receive the instruction which their forefathers were unable to procure.

Standardizing as Large Corporations Were Formed

The business organization known as a corporation is as necessary and logical a resultant of the development of our civilization as are the uses of electricity. With the increase in the volume of ascertained fact it has been found impossible for any one man to acquire a sufficient knowledge of all the phases of a subject, by personal contact therewith, to draw entirely comprehensive conclusions regarding it. For this reason the collaboration of many individuals becomes necessary in the conduct of any business, and the ability to co-ordinate and direct the efforts of these individuals is as

much a science as is the work of any one of them, and it is entirely distinct therefrom. The effort of this article will be to show that it is constructive in its character.

About 1899, when the loose federations of business firms known as trusts began to crystallize into giant corporations, having complete ownership and operating from central points, it became apparent that while the ultimate power was being focused in fewer hands the resulting change in the organization, which became necessary in order to properly connect the executive with the worker, was one of kind rather than of quantity. Each of the unit businesses before these combinations took place had its individual methods and peculiarities, and so long as these affected itself only no inconvenience resulted. Subsequently it became essential that all the units should adopt one single method of performing any common act. This involved a decision as to the merits of the different methods, and some sort of a standard became a necessary prerequisite to such a decision. Mere whim or personal opinion had to stand the fire of conflicting opinion, and there was a search for a basis of sound logic upon which to erect these standards.

Possibilities, Not Records, the Standard of Effort

The determination of these standards, furthermore, necessitated a radical departure from previous habits of thought. This departure as yet has been completely made in only a few cases. The decisions necessary to the conduct of business up to that time had generally been based upon a reflective consideration of the historical records of accomplishments rather than upon a constructive consideration of future possibilities. Effort, while energetic, was then and is now largely directed toward the surpassing of previous achievements rather than toward the attainment of a definite result. It was not realized, apparently, that many data which already existed as to the possibilities within our power were but very slightly utilized. Take the case of labor: The amount of "a fair day's work" has been the subject of endless discussion, when it is really a matter of comparatively simple, though rather voluminous, calculation. Frantic guesses were and are made both by employer and employee as to its amount, and many bitter battles have been fought in consequence. Yet a day's work for a normal man can be determined with mathematical exactness, and the variations due to individual characteristics can be equitably covered by a logical application of the piece work or the task and bonus systems.

Productive and Directive Methods

In any body of men commonly engaged in organized effort the number and type of those directing the work has a direct relation to the volume and type of effort. A director needs to know, not all that the one directed already knows, but rather that which he does not know. Duplication of knowledge is highly uneconomical and is one of our material failings. This arises from the day of small things, when the master stood at the workman's elbow ready and able to take the tools and give him a direct and practical illustration of proper methods if it became necessary. This function is now performed by a demonstrator who is not even a foreman, but is purely an adviser. The higher processes of the directive function, whereby equipment and material are combined in the execution of received orders, are not now exercised directly as of old, but through the medium of a number of individuals which is, as has been said, in direct proportion to the volume and kind of the desired perform-

* Chief engineer, Universal Audit Company, Singer Building, New York.

ance. The large employer of to-day has often allowed his direct knowledge of productive methods to diminish without correspondingly increasing his knowledge of directive methods and thereby has directly lowered the efficiency of his whole organization.

No one man in the space of life allotted to him for preparatory work can assimilate complete knowledge of all the functions of a business. Some one man in the organization must, however, carry all of the responsibility. From this combination of conditions arises the necessity for individuals termed "staff assistants," who advise the executor or administrator along their especial lines in the performance of his duties. The allocation of these men and the definition of their duties and responsibilities has also been a subject of much discussion. Yet here again it is possible to determine with almost absolute accuracy the number and character of these men and their relation to the other members of the organization.

The Place of Cost Accounting

Having secured and used competent assistance in the determination of reliable standards as a guide in the issuance of his directions, the administrator next needs accurate records of the resulting performances, from which by comparison with the predetermined standards, he can ascertain the efficiency or inefficiency of his practice. This is the true function of cost accounting and much apprehension commonly exists in relation thereto. A record in itself is of but comparatively little value and cannot become so without the corresponding standard. The initial records of operations must be, so far as possible, in prime or indivisible terms. Combinations can be made later. The methods used should be such as will completely convey the necessary information to every member of the organization from the top to the bottom, and in such shape that it shall correspond to the predetermined standards. The civil engineer traces the stresses set up in each member of a bridge or other framed structure by each pound of dead or live load on its way to the ground underlying the foundations. In like manner the trained accountant traces every bit of data in its course to the successive and ultimate persons interested thereto.

The Science of Administration Applied

The reason which obtains in the conduct of any business for the collaboration of individuals of varying experience, as given at the opening of this article, applies with equal force to the conduct of the enterprise of advising business men in the application of the science of administration. The grasp of the problem must be complete in order to insure success. Piecemeal methods are exceedingly dangerous. It is, perhaps, a necessary phase of evolution in this line that many persons, actuated by the highest motives, should have endeavored and are now endeavoring to remedy the various defects in our business methods whose existence is becoming more and more apparent every day. They have attacked defects in sales methods, cost accounting and shop engineering, and have produced results which were good so far as they went, but these efforts have failed to be as completely or as permanently useful as might have been the case had they been properly correlated and adjusted to each other. This result, as in any other line of work and for the same reasons, can only be brought about by a properly designed organization embracing the necessary individual experience, operating under competent direction and, therefore, able to undertake the analysis of all details of administration from the charter of the corporation, or its equivalent, to the shipping platform and from one side of the business to the other. Such facilities are at the disposal of business men who are willing to put personal prejudice and policies aside and get down to logical deductions based on ascertained facts. When this becomes the common practice and it is realized that administration is a science which can be as well formulated and taught, without regard to the business in which it is to be employed, as can the science of mechanics, our educational methods will be improved accordingly, the era of cut and dry methods will end and the ensuing extravagant use of our resources will gradually pass into history.

The Durham Coal & Iron Company

The Durham Coal & Iron Company, James Building, Chattanooga, Tenn., has purchased and is now operating the properties of the following companies: Durham Coal & Coke Company, Sale Creek Coal & Coke Company, New Soddy Coal Company, Hamilton Coal Company, Chattanooga Company, Ltd., and Fox Coal Company. The stockholders of the new company are mainly New York capitalists, with some representation from Baltimore, Md., and London, England. C. E. James, D. P. Montague and H. S. Chamberlain of Chattanooga are also largely interested in it. C. H. Smith, vice-president and general manager, will have active management of the properties. He has for the past four years been located in Baltimore, where he has been manager of the Davis Coal & Coke Company, Western Coal & Mining Company, and Consolidated Coal Company of St. Louis.

The production of the company, which is large now, will be not less than 2,000,000 tons of coal per year, beginning January, 1912, and eventually will be increased to 3,000,000 tons. The company is the sole producer of Durham coals and foundry and furnace coke, having a high reputation. The Durham 72-hour foundry coke is sold under a guarantee to carry a greater burden than any other coke produced in the United States, to carry less than one-half of one per cent. of sulphur and not to exceed 5 per cent. ash.

The battleship *Arkansas*, the largest warship ever constructed in this country, was launched January 14 from the yards of the New York Shipbuilding Company, Camden, N. J. Its length over all is 562 ft.; beam over armor, 93 ft. 2½ in.; draft, 28 ft. 6 in.; displacement, 26,000 tons. The contract calls for a speed of 20½ knots an hour. The *Arkansas* will have the greatest gun power in broadside fire of any ship afloat. The main armament will consist of 12 12-in. breech loading guns mounted in six turrets. The armor belts will have an average thickness of 10 in. The vessel will be turbine driven and will have 28,000 hp. The keel was laid last January, and at present the ship is about 60 per cent. completed.

The Chicago Foundry Foremen's Association held its January meeting at the Great Northern Hotel on the evening of January 14. Prof. Fred A. Rogers of the Lewis Institute gave a demonstration lecture on wireless telegraphy, using two sets of apparatus for demonstrating the subject. At the last meeting of the Executive Committee it was decided to hold a general foundrymen's banquet at the new Sherman Hotel, on the evening of February 11. An invitation is extended to every foundryman in the Chicago district, and the association desires assistance in getting a personal mailing list of foundrymen who are not affiliated with the association.

The West Penn Steel Company, Brackenridge, Pa., has completed an addition to its sheet mill building and is installing some squaring shears and stretcher levelers. The company states that its business in full pickled, full cold-rolled, stretcher leveled and resquaring sheets has been developed to such an extent that it is unable to keep up with the demand. Its plant has been in continuous operation since it was completed in October, 1909. Having large contracts booked, the company expects to run to full capacity for some time.

The American Supply & Packing Company, Marinette, Wis., has taken over the business of the Mechanical Supply & Machinery Company of the same city under a reorganization in which more capital and fresh energy have been added. The company is engaged in jobbing mine, mill and factory supplies, steam specialties and machinery.

The Youngstown Bronze & Iron Foundry Company, Youngstown, Ohio, manufacturer of gray iron castings, pipe balls and bell dies, has recently made an addition to its foundry of 5000 sq. ft. of molding floor space, but no new equipment will be needed.

Personal

Ehrich Benjamin, who has succeeded Paul Koning as New York representative of Brandeis-Goldschmidt & Co., London, England, has been elected a member of the New York Metal Exchange.

H. H. Peck, who was recently connected with the Gary Works of the Illinois Steel Company, has been made New York representative of the New Jersey Steel Casting Company, Rahway, N. J.

Paul R. Goldey, formerly superintendent of the Camden & Trenton Railway Company, recently resigned, is now connected with the sales department of the Walker Electric Company, in its branch office, 1402 Park Building, Pittsburgh, Pa.

Charles J. Graham, secretary of the Graham Nut Company, Pittsburgh, has returned to that city from a long stay in Florida.

Carlisle Mason, vice-president and general manager of the Nelson Valve Company, Wyndmoor, Pa., sailed January 21 on a business trip, in the course of which he will visit Manchester, London, Paris, Vienna and Berlin, returning by way of Rio Janeiro, Buenos Aires, Valparaiso and other South American cities. He will be absent three months.

James V. Davidson has been appointed agent for Indiana of the National Malleable Castings Company, at the Indianapolis plant, succeeding Charles E. Brooks, who had held the position for over 20 years.

The formal presentation of the Perkin medal to Charles Martin Hall was made at the Chemists' Club, 108 West Fifty-fifth street, New York, on the evening of January 20. The presentation speech was made by Prof. Charles F. Chandler and some phases of the aluminum industry were touched upon in an address by Dr. Paul Heroult.

E. E. Kiger has been made steam engineer of the Lackawanna Steel Company, Buffalo, N. Y., succeeding the late E. P. Coleman. Mr. Kiger was formerly identified with the Cambria Steel Company, Johnstown, Pa., and was principal assistant to Mr. Coleman. He is a graduate of Sibley College, Cornell University.

Fred W. Koehler has been appointed purchasing agent of the Sharon Steel Hoop Company, Sharon, Pa., succeeding O. A. Blackburn, resigned.

M. Jackson Crispin, general manager of the United States Metal & Mfg. Company, entertained the following prominent iron and steel manufacturers and others at the Pennsylvania Society dinner given to President Taft on the evening of January 21 at the Hotel Astor, New York: James Lord, president American Iron & Steel Mfg. Company; George S. Shimer, president Milton Mfg. Company; P. S. Dyer, president American Horseshoe Company; H. H. Light, president Lebanon Valley Iron & Steel Company; E. L. Herndon, vice-president Eastern Steel Company; H. B. Spackman, purchasing agent Lukens Iron & Steel Company; L. F. Nagle, purchasing agent Worth Brothers Company; W. W. Lukens, purchasing agent Alan Wood Iron & Steel Company; W. M. Hager, secretary American Car & Foundry Company; M. B. Parker, secretary Railway Steel Spring Company; H. P. Wingert, purchasing agent American Brake Shoe & Foundry Company; L. Weimer Murray, department manager United States Metal & Mfg. Company; J. Alexander Brown, vice-president and manager Pocket List of Railway Officials.

George E. Molleson, president of George E. Molleson & Co., 50 Church street, New York, who has been seriously ill for the last five weeks, has recovered sufficiently to attend to business.

Felton Bent succeeds J. O. Entrekin as secretary of Burroughs, Sloan & Co., iron, steel and contractors' supplies, Philadelphia, Pa. Mr. Entrekin resigned to become general sales manager of the Lebanon Valley Iron & Steel Company, Lebanon, Pa.

James A. Huston, for nine years contracting manager of the Pittsburgh office of the American Bridge Company, will retire February 1 to devote his time to private in-

terests. He has been engaged in the structural steel trade for 27 years, connecting himself in 1884 with the Smith Bridge Company, Toledo, Ohio. From 1892 to 1902 he was president and general manager of the Toledo Bridge Company, which succeeded the Smith Bridge Company. In 1902 he removed to Pittsburgh to accept the position he now leaves.

Edward Worcester, vice-president and general manager of sales of the National Tube Company, Frick Building, Pittsburgh, who has been on the Pacific Coast for a month, will be home this week.

C. C. McGrath, one of the oldest employees of the Connellsville Machine & Car Company, Connellsville, Pa., and who until recently had charge of its machine shop, is now general manager of the company. He succeeds I. C. Kelly, who recently resigned to return to his former position of master mechanic with the H. C. Frick Coke Company, Scottsdale, Pa.

The Michigan Electric Welding Company is the new name of the Agnew Electric Welding Company, Detroit, Mich. Its present location is at the corner of Third and Congress streets. The new quarters consist of a one-story brick building, 35 x 60 ft., having in the rear a two-story building approximately 25 x 65 ft. In addition to this, there is a large storeroom. The company has added additional machinery, and is now in excellent shape to handle job welding and manufacturing for the trade in its territory. A specialty is being made of automobile work. Rod and yoke end assemblies are furnished complete, and other parts, such as the welding of tubular reach, torsion and radius rods, torque tubes, drag links, fore and aft connections can be furnished. The welding of propeller shafts and any other sort of forgings and parts that can be welded to rods, shafts or tubes or other job welding will be undertaken. Operators of long experience in electric welding are employed, which will insure the reliable work which is not only desired but is of such great importance in electric welding.

The Chester B. Albree Iron Works Company, Pittsburgh, has completed the manufacture of six power riveting machines to be shipped to Seattle, Wash. The riveters are of assorted sizes, and each is equipped with a universal bail, which permits operating the machine at any angle desired. The company has also completed the manufacture of an automatic toggle joint riveting machine for the William B. Scaife & Sons Company, Pittsburgh. The machine is regulated automatically to rivet the thickness desired, eliminating entirely hand adjustment. The structural steel department of the plant is engaged on the manufacture of about 2 miles of railing for bridge work at Kansas City, railings for the Ohio River bridge at Sewickley, and the ornamental iron and stair work for the Haugh & Keenan nine-story warehouse in course of construction on Center avenue, Pittsburgh.

The Elmer P. Morris Company, Elizabeth, N. J., and the Frederick Iron Works, Frederick, Md., were consolidated January 21 under the name of the Morris Iron Company, which is capitalized at \$175,000. Operations will hereafter be carried on at the Frederick foundry and work will be commenced at once on an addition there comprising 61,000 ft. of floor space. John Mitchell, Jr., is president; E. P. Morris, vice-president and general manager; C. C. Biser, treasurer, and W. T. S. Diven, superintendent.

W. E. Corey will sail for Europe about March 1 for a stay of four months. On returning in July he will have offices in the Hudson Terminal Building, 30 Church street, and will remove to the Bankers' Trust Building on its completion next year.

The Ryder Brass Foundry Company, Bucyrus, Ohio, has been incorporated under the laws of that State. The company manufactures brass, bronze and aluminum castings, manganese and phosphor bronzes and special alloys.

The Machinery Markets

Machinery buying is gradually increasing throughout the country. The railroads are asking for small lots of machine tools in the New York market, and the Boston & Maine Railroad is out with a good sized list of machinery on which the New England trade is bidding. Automobile manufacturers are also placing considerable business in New England, and there is some good buying in sight there from other sources. Scattered inquiries from the railroads, together with a fair-sized list from the Pennsylvania Railroad, contribute to the slightly better feeling among Philadelphia machinery interests and an increasing volume of business is noted in Pittsburgh. Some improvement is noted in Cleveland, where announcement is made that the American Steel & Wire Company has placed an order for \$50,000 worth of tools for its plant at Corey, Ala. Inquiries are increasing in Cincinnati and Detroit. In the Farther Central West makers of automobiles and gasoline engines are exceptionally busy. There is a revival of trade in the Southwest, where orders from smaller manufacturing plants predominate. The opening of new industrial railroads and extensions to the present systems is bringing good trade to Southern machinery dealers. Second-hand machinery is in especially good demand in that territory.

New York

NEW YORK, January 25, 1911.

The machinery trade continues to improve in New York and railroads are coming into the market for small lots of machine tools in a manner to indicate that a moderate buying movement from that direction is on. The Erie Railroad is asking for bids on gear cutters for its shops at Meadville, Pa., and the Delaware & Hudson Railroad is out with a small list. The Pennsylvania Railroad also has a small list in the hands of dealers. There are inquiries from the mechanical departments of a number of Southern railroads that promise to result in some buying. A Pennsylvania electrical equipment manufacturing company is investigating the machine tool situation with a view to making extensive purchases, and there are increased inquiries from the general manufacturing field. Some good business has come into two markets of late from the silk mills in and around Paterson, N. J., chiefly in the way of power equipment and mill supplies. The call for second-hand machinery and especially for certain types of used machine tools is so good that regular dealers in that line of equipment are searching about to buy machines for resale and for stock. Export business continues to give excellent support to the market and some good buying has been done for machines to be delivered in Great Britain, Germany and Italy. German manufacturers of railroad equipment have been generous purchasers of machine tools and hot metal working machinery.

The Delaware & Hudson Railroad has a small list of machine tools out which may be the forerunner of a larger list. For the last two years the company has been planning in a general way to erect large additions to its car repair plant at Green Island, N. Y., as well as the improvements at Watervleit outlined in these columns last week. It is understood that the plans include a structure 800 ft. long, which will be used as a general machine shop. From all accounts plans for the building have been practically concluded, but the equipment on which bids are now being asked for may be wanted for the present plant at Green Island. The list includes one 5-in. semiuniversal radial drill, one 16 ft. by 10 in. bed toolmakers' lathe, one 20-in. slide back geared pillar shaper, one 20-in. double spindle bolt threading machine and one No. 4 high power milling machine.

The Lauter Piano Company, Morris and Essex Railroad avenue, Newark, N. J., has disposed of its plant to the Westinghouse Company and will build a much larger factory on Sussex avenue, Newark. Plans for the new building are now being prepared. The Westinghouse Company will use the Lauter factory to increase its manufacturing facilities.

The Grasselli Chemical Company, 60 Wall street, New York, has acquired a plot of land of about 54,000 sq. ft. in Newark, N. J. The property is on Passaic avenue along the line of the Central Railroad of New Jersey. It is understood that the company will build a plant there, but no announcement of the size of the buildings has been made as yet.

The Rubber & Celluloid Harness Trimming Company, 54-56 Ferry street, Newark, N. J., has awarded a contract to Frederick Phelps of Newark, as engineer, for the erection of a five-story fireproof building, 40 x 70 ft., as an addition to its plant. The building will be of brick and reinforced concrete construction.

The Water Power Vacuum Cleaning Company, 730 Main street, Buffalo, N. Y., has been incorporated, with a capital stock of \$50,000, to manufacture vacuum cleaning apparatus. Arrangements are being completed for a manufacturing plant. C. C. Trow is president; H. C. Redfern, treasurer, and J. P. Clifton, secretary.

The Bison City Table Company, Buffalo, N. Y., which recently sold its three-story factory at 1490-1496 Jefferson street to the Buffalo Receptacle Company, is arranging to build and equip a new plant at Scoville avenue and the Pennsylvania Railroad. Arthur J. Kreinheder is president, 10 Scoville avenue.

The Nye Company, Buffalo, N. Y., has been incorporated, with a capital stock of \$10,000, to take over the business of Geo. B. Nye, 44 Henry street, and continue the manufacture of safety devices for saws, shapers and other wood-working machinery and also for stamping machinery. The officers of the company are Geo. B. Nye, president and treasurer; Walter Devereaux, secretary.

The Central Star Laundry Company, Buffalo, N. Y., will build and equip a 90 x 100 ft. addition to its plant at Masten street and Northland avenue.

The Empire State General Vehicle Company, Rochester, N. Y., will erect a building on Circle street, 48 x 212 ft., two stories, to be used as a distributing plant.

The Loritz Tenschler Company, Utica, N. Y., will soon receive bids for a one-story steel frame factory building, 160 x 160 ft., which it will erect on Lincoln avenue, the estimated cost being \$60,000.

The Rome Wire Company, Rome, N. Y., has plans completed for a one-story mill, 100 x 134 ft., steel frame construction, which it will add to its plant early in the spring.

The Alberger Gas Engine Company has been incorporated at Buffalo, N. Y., with a capital stock of \$221,000, for the manufacture of gas engines. It will take over the business of the A. H. Alberger Company and will establish its plant and main office at Buffalo. Among the directors are Charles H. Taylor, Louis E. R. French and I. G. Holender. Offices, 695 Ellicott Square Building, Buffalo.

The Linde Air Products Company, Buffalo, N. Y., of which Cecil Lightfoot is general manager, will build a branch plant at Trafford, Pa., in addition to branch factory at South Elizabeth, N. J., for which bids are now being received. Steel and brick construction will be used for both of the new plants the estimated cost of each being \$40,000.

The Automatic Transportation Company, Buffalo, N. Y., will establish its Canadian branch plant at Welland, Ont. A site has been secured adjoining the works of the Canadian Iron & Steel Company and plans completed for a brick and concrete factory building to be erected there.

Catalogues Wanted

Silver Brothers Iron Works Company, Salt Lake City, Utah, is arranging a catalogue library and desires trade literature relating to the metal industry.

The Southern Tool & Machine Company, 5 East Main street, Chattanooga, Tenn., formerly known as the J. W. Gore Company, desires latest catalogues from manufacturers of machine tools, planing mill and pattern shop machinery and machinists' supplies. While the name of the company has been changed, the ownership continues the same.

Chicago

CHICAGO, ILL., January 24, 1911.

The Chicago machinery trade is making fair progress and a moderate amount of business is being closed, although conditions have not yet reached a basis satisfactory to the majority of the dealers. Two small shop lists were closed last week in the West, the business being taken by Chicago houses, and there is a good run of scattering inquiries and sales. Apparently the machine tool business has been keeping pace in the past six months with the general iron and steel business. The conditions which have caused hesitation among industrial buyers in placing forward contracts for iron and steel have had a corresponding effect in check-

THE MACHINERY MARKETS

ing plans for additions or improvements in old shops as well as the organization of new companies. The indications of a favorable turn in the steel industry are expected to bring a corresponding improvement in the demand for iron and steel working tools. The recent decline in interest rates and easing up in the money market will encourage plant investments. This is also favorable for the railroads, as it will enable them to sell bonds and make financial arrangements for new construction.

The Orton & Steinbrunner Company, Chicago, has recently closed the purchase of about \$15,000 worth of machine shop tools for a new plant at Huntington, Ind.

The Joliet Wheel Mfg. Company, Joliet, Ill., advises that it will in all probability rebuild its plant which was destroyed by fire on January 13. The company will be in the market for boilers, wood working machinery, tools and other necessary equipment for the manufacture of wooden wheels.

The Swanson Mfg. Company is now located in its new plant at Marseilles, Ill., where it has greatly increased manufacturing facilities. All correspondence should be sent to the new address in the future.

The Quincy Gas, Electric & Heating Company, Quincy, Ill., is considering plans for improvement of its electric power house. About \$50,000 will be expended.

The City Council of Naperville, Ill., is preparing to improve its electric light plant.

The C. Ehman Company, Decatur, Ill., whose plant was destroyed by fire on the night of January 7, entailing a loss of approximately \$200,000, including \$75,000 worth of new machinery, advises that its plans for the future are still unsettled excepting that it is arranging to resume operations at the earliest possible time.

J. Burroughs, of Yale, Iowa, and M. E. Beckstrom, of Moline, Ill., have purchased the rights from the National Rubberette Company, Davenport, Iowa, to install a rubberette plant at Springfield, Ill., and will erect a \$10,000 plant there.

The Commercial Club of Belleville, Ill., has closed a deal with the Joan d'Arc Mfg. Company, St. Louis, for the location in Commercial Place of one of its plants for the manufacture of steam valves, school globes and ice manufacturing plants for residences. A bonus of 10 acres of ground has been given the new concern. A building, 80 x 585 ft., is to be erected.

The T. J. Derwent Company, Rockford, Ill., has been incorporated with a capital stock of \$10,000. The incorporators are T. J. Derwent, Luther Derwent and Alaline Derwent. The company will operate a planing mill.

Philadelphia

PHILADELPHIA, PA., January 24, 1911.

In some instances a shade more business has been recently done, but the majority of machine tool merchants report the demand as being light and confined principally to small and single tool propositions. There has been some scattered inquiry from the railroads, particularly the Pennsylvania, which has been asking for bids on a few tools for one of its shops, but there is as yet no general demand from this class of buyers. There is a more confident feeling in the trade generally, and, while no pronounced betterment in the demand was anticipated during January, it is expected that business will show an increased volume in the near future. Several fair propositions, which have temporarily been held in abeyance, are expected to develop into business; in fact, some preliminary buying is to be noted on the part of one interest which had quite a good list under consideration something less than a year ago.

Some manufacturers report a trifle larger volume of new business, particularly in equipment of a special nature, but orders are not large individually and few are from buyers in this immediate vicinity. Little demand for tools for export is reported.

Second-hand machinery and tool merchants find the demand irregular and the class of equipment inquired for varied. Heavy engine builders still report a slow development of pending negotiations, although a fair volume of business is under contract. The demand for second-hand power equipment shows little betterment.

The A. P. Whitman Company has completed the building of additions to its forging plant at Chester, Pa. A large quantity of machinery has been acquired and about 50 per cent, is now installed. The new addition is expected to be in full operation by March 1.

The Pennsylvania Railroad has been taking bids for a 60-in. and a 24-in. lathe, a 1½-in. double staybolt machine, a hydraulic press, a pipe cutting machine and an electric crane. The bulk of this equipment is understood to be for its Trenton shops.

The Hamburg Broom Works, Hamburg, Pa., will erect an addition to its plant the coming spring. The new building will be 60 x 300 ft. No additional power equipment will be required, as electricity supplied either from its present plant or from the Hamburg Electric Company will be used.

Plans are being considered in connection with the rebuilding of the plant of the Catawissa Car Company, Bloomsburg, Pa. Several weeks will elapse, it is stated, before any decision in the matter will be reached.

The Turner-Forman Company is understood to have a contract to erect a 10-story reinforced concrete manufacturing building, 71 x 193 ft., on Twelfth street between Wood and Pearl streets, for John H. Smaltz, to be occupied on completion by the Smaltz-Goodwin Company, manufacturer of shoes.

The Bergner & Engel Brewing Company will erect a one-story boiler house and coal and ash bunker, of steel and reinforced concrete, about 42 x 74 ft. The contract for the building has been awarded to Matthew Schmid.

The Parker Boiler Company, Pennsylvania Building, is looking for a plant suitable for the manufacture of boilers and plate metal work, which it will buy or lease. The plant must be a going concern with at least \$200,000 annual business and a good manufacturing organization. The purchase is to be made at a fair appraised valuation.

The Chadwick Engineering Company, automobile manufacturer, Pottstown, Pa., expects to occupy its new plant within the next three months. The buildings have been practically completed. Plans for an electric power plant are now being considered, and this equipment will be later installed; in the meantime current will be supplied by local power producers. While nothing has been definitely decided upon in the way of new equipment for its enlarged plant, we are informed, additional tools will no doubt be required. This company reports that the demand for 1911 Chadwick automobiles is opening very satisfactory, and a growing export demand is noted.

The Pennsylvania Shafting Company, Spring City, Pa., whose round drawing department was destroyed by fire late in December, 1910, has completed the erection of a temporary structure and will start operations again during the present week. The damage to its power house has been fully repaired. A new brick and steel building for its round drawing department, 75 x 185 ft., on the site of the destroyed building, will be erected at an early date; plans are now being considered. For the equipment of the new building cranes and possibly other equipment will be required.

The plant of the Oliphant Steel & Iron Company, Trenton, N. J., has been sold to the National Radiator Company, Johnstown, Pa. It is the intention of the purchaser to equip the Trenton plant for the manufacture of its line of radiation. This, the latter company informs us, will necessitate an addition to the buildings and alterations to the present plant. It is hoped to get at least part of the new plant in operation by May. The main office of the National Radiator Company will be continued at Johnstown, Pa.

The limited partnership between Louis J. Bergdoll and George F. Pawling, under the name of Bergdoll & Pawling, engineers and contractors in iron and steel, has been dissolved and will be succeeded by a corporation to be known as George F. Pawling & Co., for which a charter under the Pennsylvania laws, with a capital stock of \$25,000, will be applied for February 14. The incorporators are Louis J. Bergdoll, George F. Pawling, Walter D. Stewart, George M. Beatty and Philip S. Tyre.

Cincinnati

CINCINNATI, OHIO, January 24, 1911.

The machine tool trade continues to feel encouraged over the inquiries coming in, but the aggregate of orders booked does not meet expectations. The railroads in this section have been buying sparingly and reports to the effect that several large purchases of machine tools were quietly made recently do not appear to be well founded. Not only railroad officials, but the manufacturing interests generally are openly impatient over the delay in settling the freight rate question. A decision in this matter will undoubtedly stimulate business all over the country, as under present conditions railroad officials do not know where they stand, and with some roads, the operating departments have become wearied of putting in requisitions for tools and equipment that are not passed on.

One very encouraging matter is the large number of new incorporations in the central West for manufacturing companies, as well as the additions to capital stock of several firms to take care of contemplated increases in the capacity of their plants.

THE MACHINERY MARKETS

The Ohio Corrugated Culvert Company, Middletown, Ohio, announces the increase of its capital stock from \$65,000 to \$100,000. The capacity of its plant will be greatly increased, and one of the new proposed buildings will be used for manufacturing portable houses made from American ingot iron, rolled by the American Rolling Mill Company of Middletown.

The annual meeting of the American Tool Works Company, Cincinnati, was held January 17, and all the old officers and directors were re-elected. Franklin Alter is president; J. B. Doan, vice-president and general manager; Harry Luers, treasurer, and Robert S. Alter, secretary and advertising manager. Business received during the year 1910 was reported as showing a very satisfactory total.

To manufacture buggies, the M. F. Carroll & Sons Company has been incorporated at Hillsboro, Ohio, with \$25,000 capital stock. The incorporators are M. F. Carroll, J. E. Carroll, E. P. Carroll, C. L. Carroll and J. W. Carroll.

The Queen & Crescent Railroad Company, A. Telford, purchasing agent, Cincinnati, has out a requisition for one combination punch and shear, with 48 in. depth of throat; one bolt heading machine, and one self-feed rip saw.

The Massillon Foundry & Machine Company, Massillon, Ohio, has purchased an increase in its capital stock from \$50,000 to \$100,000.

The Victor Lamp Company, Cincinnati, completion of whose plant was recently announced, has been incorporated with \$100,000 capital stock, by William J. Cocoran, John L. Cocoran, Edward B. Cocoran, John Galvin and H. R. Kerans.

The Barnard Carburetor Company, Dayton, Ohio, has been incorporated with \$100,000 capital stock, to manufacture hydrocarbon engines. The incorporators are Davis Barnard, R. L. Stauter, I. M. Haas, C. J. Smith and C. L. McCrea.

The Toledo Plate & Window Glass Company, Toledo, Ohio, recently increased its capital stock from \$100,000 to \$300,000, and there is an unconfirmed report that some extensions to its plant are contemplated.

The recently mentioned sheet metal plant of Kirk & Blum, Cincinnati, will be located at the corner of Western avenue and York street, where this firm has acquired a site. Construction work will begin as soon as the building plans are completed.

The Triumph Electric & Ice Machine Company, Oakley, Cincinnati, has just closed contract for four of its 40-ton ice machines to be shipped the Canadian Fish Company at Seattle, Wash. The Triumph Company has recently opened a sales office at 728 Poydras street, New Orleans, La., which is the sixteenth outside sales office now being maintained by this company and the third to be opened during the past year. A large stock of motors and generators will be carried at the New Orleans station to fill orders calling for prompt shipment.

The Clark Gear Company, Elkins, W. Va., has been incorporated, with \$20,000 capital stock, to manufacture the Clark patented automatic gear. The incorporators are P. E. Clark, Mary R. Clark and R. Chaffey of Elkins, and L. C. and E. K. Dyer of Hambleton, W. Va.

It is reported that the Petersburg Lumber Company, Petersburg, W. Va., will erect a sawmill in Grant County of that State. The company was recently incorporated, with \$25,000 capital stock, by Luther Stratford, Charles N. Finnell of Keyser, W. Va., and E. E. and Charles Fout of Laurel Dale, W. Va.

Cleveland

CLEVELAND, OHIO, January 24, 1911.

Inquiries in the Cleveland machinery market have improved. While actual orders are still somewhat light, more business was done the past week than the previous one. Dealers generally report an improvement over December. One fairly good sized order was placed with local dealers during the week, but sales were mostly of single tools. The American Steel & Wire Company placed its order for the machine tool equipment for its new plant at Corey, Ala., for which an inquiry was sent out last fall. This business, amounting to about \$50,000, went to a Birmingham dealer.

Reports from manufacturers indicate that inquiries with them show more improvement than those received by dealers. A local manufacturer of forge shop equipment reports inquiries above the normal. Inquiries for drilling machinery have also picked up considerably. The automobile trade is buying a little more freely and if business starts out as expected in this industry in the early spring a fair volume of orders is looked for from this source. Recent purchases have been largely due to different machines being needed in getting out new models. The prospective business is in equipment to reduce the cost of production rather than to in-

crease capacity, and it is expected that it will be more in special machinery than in standard tools.

The General Fire Extinguisher Company will enlarge its plant at Warren, Ohio, by the erection of a brick and steel factory building, 150 x 350 ft., the contract for which has been placed with the Woods Construction Company of Detroit, Mich. A portion of the building will be used for pipe storage purposes and the remainder for a machine shop. An electric crane will be installed as well as other machinery.

The Avery Company, Cleveland, has been incorporated with a capital stock of \$150,000. It is stated that the company was formed to manufacture dies and machinery, but names of the men interested and announcement of the plans are withheld until the project assumes more definite shape.

The Carroll Foundry & Machine Works, Bucyrus, Ohio, will enlarge its plant with an addition to its machine shop. The new building will be 82 x 212 ft., of steel construction. A 20-ton crane, to run the length of the building, and other new machinery will be installed. Later an extension to the foundry is planned.

The Mebane Mfg. Company, Cleveland, has been incorporated, with a capital stock of \$10,000, by C. P. Mebane and others, to make foundry facings and other products. The company will have an office at 6110 Euclid avenue and will have a plant in the rear of that number.

The Ceramic Improvement Company, Alliance, Ohio, has been incorporated, with a capital stock of \$10,000, to manufacture devices used in the ceramic industry. The incorporators are J. F. Kryder, T. F. Bailey, C. W. Casselman, A. B. Love and M. R. Broadhurst.

The Economy Automatic Mine Door Company, Canton, Ohio, has been incorporated, with a capital stock of \$5,000, to make automatic mine doors. The incorporators are John Wack, J. C. Skelton, H. E. Vankirk, J. J. McCall and S. F. Bowman.

The Peterson-Brown Company, Mansfield, Ohio, with a capital stock of \$10,000, has been organized to make locks, &c., by John F. Peterson, Edward N. Brown and others.

The Morton Tractor Company, Fremont, Ohio, expects to build a new plant. A number of propositions to locate in other northern Ohio cities have been made to the company and a site has not yet been decided upon.

The Fremont Stove Company, Fremont, Ohio, which recently acquired the June foundry plant in that city, has completed the necessary alterations and the plant is now being placed in operation.

The Southern Naval Stores Company, Toledo, Ohio, has been incorporated, with a capital stock of \$25,000, by Sigmond Sanger, K. A. Kaley and others. It is stated that the company will build two plants, one in Florida and the other in Georgia, to extract resin and turpentine from pine stumps.

The Firestone Tire & Rubber Company, Akron, Ohio, has gone into the manufacture of automobile and carriage rims, in addition to making tires. The company has placed in operation a complete rim plant adjoining its present tire plant.

The American Farm Machinery Company, in which William N. Whitely and others are interested, is equipping a large plant in Lancaster, Ohio, for the manufacture of farm implements. Considerable machinery has been moved to the new plant from the old Co-operative plant in Springfield.

The Ralston Steel Car Company, Columbus, Ohio, has increased its capital stock from \$1,000,000 to \$2,500,000.

The Iceless Icebox Company, Cleveland, has been organized by A. B. Smythe and others, with a capital stock of \$20,000, to make sheet metal boxes to be placed outside of windows, taking the place of a refrigerator during cool weather.

The Kelly Gypsum Company has been formed at Sandusky, Ohio, and, it is announced, will build a \$75,000 gypsum plant near that city. The incorporators are S. C. Kelly, W. L. Allendorf, J. B. Swift, Paul H. Sprow and George C. Beis.

The Hoffman Heater Company, Lorain, Ohio, is erecting an addition to its plant, 32 x 75 ft., to be used as a store-room.

Detroit

DETROIT, MICH., January 23, 1911.

Not only machinery dealers but business men in many diverse lines state that the outlook for the coming year is very encouraging. Construction, beginning with the first open weather, cannot fail to be uncommonly heavy, as the number of plans now in the hands of architects and builders shows.

The Swedish Crucible Steel Company, Detroit, has entrusted the preparation of plans for its new foundry to R. E. Raseman, Penobscot Building.

Interests identified with the Colton Company, Detroit, are planning the erection of a new plant in which to manufacture special machinery, the nature of which is not stated.

THE MACHINERY MARKETS

The Riverside Machinery Depot, Detroit, has had a fair run of inquiries this month for second-hand machinery for both metal and woodworking plants, as well as boilers, engines, pumps, electric motors, power transmission apparatus and other equipment for a wide range of industrial service.

The municipal authorities at Muskegon, Mich., have engaged an engineer, here to prepare plans and the complete specifications for an electric plant of about 1000 kw. capacity.

The American Stamping Company will build a plant in Battle Creek, Mich., for the manufacture of grease and oil cups used in automobile and similar service. The stock of the company is held principally in Mendon and White Pigeon.

Interests identified with the Cartier Lumber Company, Ludington, Mich., acquired the water power property at Hamlin Lake and will build a new plant, including concrete dam, to supply electric current for industrial power and lighting in Hart, Hamlin and Pentwater, Mich.

The Alpena Motor Car Company, Alpena, Mich., is taking measures to increase its output, particularly in the body making department.

The Eastern Michigan Edison Company has had plans drawn by its division engineer at Rochester, Mich., H. W. Hall, for a steel and concrete power station, 230 x 208 ft., at Amy, Mich. The details of equipment have not yet been fully determined upon.

The Battle Creek Industrial Association, Battle Creek, Mich., is endeavoring to secure the construction there of a plant for the manufacture of hot water furnaces by the Finlayson Heater Company, Detroit. It is reported that a definite proposition is now being considered.

Plans for the new pumping station in Holland, Mich., are in course of preparation.

Steps are being taken to rebuild the plant of the Holly Electric Light & Power Company, Holly, Mich., whose destruction by fire was recently reported.

The Christie Kline Forge Company, Detroit, has been incorporated.

The lumber mill of W. A. Hosmer, Bellaire, Mich., which burned about two weeks ago, will be rebuilt and equipped with modern power and sawing machinery.

The Paige-Detroit Motor Car Company has increased its capital stock from \$100,000 to \$250,000, in order to provide for the extension of the business, as necessitated by recent orders. The company's manufacturing facilities in Detroit and elsewhere will be enlarged.

An additional pumping engine, to be installed in the water works station as a reserve unit, will be purchased by the city of Grand Rapids, Mich.

A new corporation at Muskegon, Mich., is the Wright Cooler & Hood Mfg. Company, organized for the production of the automobile accessories named.

The factory of the Hunt Show Case Company, Detroit, was damaged by fire last week, but not sufficiently to require any new machinery.

The Manistee Iron Works, Manistee, Mich., is considering plans for an extension of its plant, which will provide for an increase in its working force of at least 200 men. It is proposed by the city authorities and local Board of Trade to furnish a bonus in furtherance of the project.

A new timber cutting plant is to be erected by A. F. Anderson, South Boardman, Mich., in place of the mill which burned a fortnight since, but it will probably be located nearer to his present forest holdings.

Construction contracts are now being let for the new three-story plant, 145 x 180 ft., of the Fisher Body Company, Detroit.

Deep well pumps are to be provided for the new water works station at Holland, Mich., instead of having connections made with Lake Michigan and a heavy duty pumping unit installed, as originally planned.

The Kalamazoo Aeroplane Company, Kalamazoo, Mich., has established a new industry there which is expected to attain large proportions. The first machine is now being completed and orders for others have been taken.

Preparations are under way for building a plant here in which to manufacture aeroplanes and dirigible air craft. Charles J. Strobel, Toledo, Ohio, was in Detroit recently looking for a site, and it is stated that his plant there will be combined with the new factory.

Temporary measures are being taken at Richmond, Mich., to resume operations at the municipal electric plant, where the machinery was recently damaged by an accident; but the latter will probably lead to its remodeling and enlargement to meet the growing needs of the service.

The Michigan Hearse & Carriage Company, Grand Rapids, Mich., is contemplating the erection of an addition to its plant during the coming spring.

The Clarke-Carter Automobile Company, Jackson, Mich., is erecting an addition to its plant, three stories and basement, 50 x 160 ft. The basement will be used as a blacksmith shop, and testing and repair room. The first and second

floors will be used for assembling and shipping rooms and the third floor for painting and trimming.

The Northern Engineering Works, Detroit, Mich., reports a large increase in sales of Northern cranes, among which are one 8-ton, 60 ft., to Gregg Company, Newburgh, N. Y.; Anderson Forge Company, two 10-ton; Pierce-Prosser Company, one 25-ton, 70 ft.; Detroit River Tunnel Company, one 25 ton; Pennsylvania Terminal, one 25-ton; Dodge Brothers, one 10-ton and one 15-ton.

Pittsburgh

PITTSBURGH, PA., January 24, 1911.

Inquiries for machinery of all kinds are gaining in volume, but bookings continue moderate.

A new, and what is regarded by many as an important, development in the industrial growth of this district is the formation of the Pittsburgh Wood Preserving Company, Pittsburgh, which has taken measures for the erection of a timber-treating plant between this city and Connellsville on a site recently secured for the purpose. The president and general manager is Grant B. Shipley, who designed the largest tie, pile and pole preserving plants in the country, including those of the Pennsylvania and the Atchison, Topeka & Santa Fe railroads. Contracts insuring the success of the enterprise have been made with railroad companies in this district, but the plant will be operated as a general commercial proposition on orders from steam or electric railroads, telegraph and telephone companies, mining companies, municipal boards or companies controlling docks, harbor improvements, &c. With the rapidly increasing use of treated timber, to preserve it from decay, there will be room in the United States for many such plants, and their equipment of machinery is very considerable. It includes enormous steel pressure cylinders, pressure pumps, vacuum pumps, general service pumps, air compressors, boilers, feed pumps, heaters, engine or other prime mover, electric generator, motors, storage tanks, hoists, yard locomotives, special cars, equalizing reservoirs, underground discharge reservoirs, piping, steam receivers, traps, separators and a mass of auxiliary apparatus such as is commonly used with the above.

The Four States Coal & Coke Company, a new organization which has taken over several large mines in West Virginia and will market its product through the Pittsburgh-Buffalo Coal Company of this city, is reported to have decided upon plans for extensive development work which will involve the purchase, within the next few months, of considerable power and mining machinery.

It is stated at Connellsville, Pa., that additions will be made shortly to the power house and repair shops of the West Pennsylvania Railways Company, which are located there, in consequence of the company's decision to extend its lines and service.

The Beaver County Light Company, New Brighton, Pa., is reported to be considering plans for tripling the capacity of its main generating station and erecting another plant in or near Woodlawn, Pa.

Manufacturers of power machinery in this district will figure in the near future on the equipment of a large electric plant to be erected at Streator, Ill., by the Illinois Valley Gas & Light Company.

The Mataoka Electric Power Company was recently organized at Mataoka, W. Va., by James C. Stras and others, to build an electric power and pumping plant, with boiler capacity sufficient for public heating service.

The Echo Oil & Gas Company, Williamson, W. Va., has acquired the property of the Twelve Pole Coal & Iron Company and will install machinery for its development on an extensive scale.

It is reported from Erie, Pa., that the Standard Pattern Works will be opened there, about February 15, by George J. Behringer, formerly secretary-treasurer of the Modern Pattern Works. The location of the plant is 614-616 West Twelfth street.

The Martinsburg Power Company, Martinsburg, W. Va., whose plans for enlargement were recently mentioned, has ordered a duplicate of the 1000-hp. boiler at present in service, which was built by the Edge Moor Iron Company, Edge Moor, Del., and will contract shortly for a steam turbine and generator of 750 kw. capacity.

The Red Jacket Consolidated Coal & Coke Company, Thacker, W. Va., is taking measures to increase its output and will be in the market for equipment at intervals between now and spring.

Pump builders in this district expect to figure on a new unit of 6,000,000 gal. daily capacity for the city of Logansport, Ind., the purchase of which will probably be authorized about February 15 or a little later.

McCoy & Brandt, House Building, Pittsburgh, dealers in

THE MACHINERY MARKETS

new and second-hand machinery, and making a specialty of crane equipment, electrical controllers and starting boxes, have purchased from the Crystal Glass Company, Wheeling, W. Va., all of the machinery in its machine shops, which includes 10, 25 and 50 hp. gas engines, six modern lathes, three shapers, one radial and one stationary drill press, tool grinders, hack saws, &c. The equipment is in good condition.

New England

BOSTON, MASS., January 24, 1911.

A stronger tone pervades the machinery market, based upon a fair amount of business actually booked, a large volume of orders known to be pending, and more cheerful reports from the machine tool builders. Not all of them are fattening up their order books more rapidly than last fall, but reports from agents and customers are more encouraging than for several months, and expectations of a revival of trade are more confident. Some works are very dull, others are fairly active, while a more fortunate class, which is increasing in numerical strength, is compelled to run overtime. The same wide variation of conditions applies to practically every line of industry. Some of the deferred local business is being placed. Additional requirements are coming to notice. The trade is watching carefully the intentions of buyers who have been asking prices, but who have not yet given promise of when the business will be placed. The General Electric Company is among the prospective customers, with a sizable number of machines for the works at Lynn, Mass. The Boston & Maine has out a list of machinery for Lyndonville, Vt., and other requirements will probably be made public by this company soon, for other old shops, which it is planned to rejuvenate. Taking the New England industrial situation as a whole, the year's expansion of works and new plants should total above the average.

Orders have been received from automobile manufacturers since the beginning of the year in amounts far exceeding the business from this source for months past. A number of builders whose machines are used in large numbers by this trade report an excess of buying which was quite unexpected. Grinding machinery seems in exceptional demand. When the slump in the automobile industry came vast totals of orders were canceled or held up. Some of this equipment has since been absorbed by the original buyers. Requests for deferred shipments have been withdrawn, and other orders have been reinstated. One large house states that at least 25 per cent. of the business canceled last summer has since been delivered, and the expectation is that a large proportion of the remainder will be placed within the next six months. The belief exists that the automobile industry is readjusting itself to the new conditions, and that the time when it will become a steady, reliable customer, like the longer established lines, is not far distant. Unfavorable reports from the New York automobile show, that orders placed for cars were less numerous than last year, are not considered convincing of a poor season, because this season no probable buyer has the fear of finding the market emptied of desirable makes of machines, while last year the rush was early and insistent. The renewed buying of machinery does not affect the standard lines of machine tools, but rather those of a semi-special nature.

The R. & T. Cement Railroad, of which Edward B. MacAllister, Rockland, Maine, is the head, will construct a line to connect the quarries of the New England Portland Cement Company, Thomaston, Maine, with the water front at Rockland. The line will be from three to five miles in length and will undoubtedly be operated electrically. New York capital has become interested in the enterprise and the general plant will be developed the coming season.

The H. B. Smith Company, Westfield, Mass., manufacturer of heating boilers and steam specialties, will erect a large building for a cleaning room, in connection with the foundry and machine shop which have already been mentioned in this column.

The factory of the Draper & Maynard Company, Plymouth, N. H., manufacturer of sporting goods, was destroyed by fire January 16, with a loss of \$125,000. The company states that the power plant was saved, together with the storehouse. Temporary quarters are already secured, and manufacturing will be resumed in a few weeks. Plans are under way for a modern factory which will probably be completed before the summer is over.

The Ideal Switch Company, Plainville, Conn., manufacturer of electrical specialties, will erect a new factory. Very little machine equipment will be required in the beginning of the occupancy, but the company will need shafting and hangers, and may be in the market for a steam engine and boiler.

The contract has been awarded for the new repair shops for the Boston Fire Department, to cost about \$95,000. They will be larger than the burned building, the site of which will be occupied, and will be fireproof throughout. No list of the machinery requirements will be ready for some time, it is understood.

The new roundhouse which the New York, New Haven & Hartford Railroad will construct at a cost of \$200,000 will be located in North Haven, at what is known as Montowese, Conn.

The New England Brick Company, 252 Asylum street, Hartford, Conn., has begun the construction of a large plant at Farmington, Conn. It will be of steel, 40 x 200 ft., with boiler and engine house 40 x 60 ft. The boiler and engine have been purchased. The Collins-Plass Company, Fall River, Mass., will erect a cloth bag factory, 60 x 120 ft., three stories.

The Boston & Maine Railroad has just issued a list of machinery requirements for its repair shops at Lyndonville, Vt., as follows:

20 x 20 x 24 in. crank pump.
30-in. by 10-ft. planer type milling machine.
Two 24-in. x 10-ft. lathes.
One 24-in. by 6-ft. lathe.
Four 20-in. by 6-ft. lathes.
Brass turret lathe.
1½-in. double bolt cutter.
Tool grinder.
30-in. turret boring mill.
Twist drill grinder.
15-in. slotter.
60-in. plain radial drill.
Flue welder.
40-in. drill press.
72-in. plate bending rolls.
Centering machine.
Steam driven air compressor, 1000 ft. per minute.
Flue furnace.
Three oil rivet furnaces.
Two 5½-ton portable hoists.
Two 2500 lb. anvils.
No. 9 pressure blower.
20-in. by 7-ft. buzz planer.
Band saw filer and setter.
Iron frame rip saw table.
Cut-off saw and gainer.
24 in. x 10 ft. double surfacer.

The Boston & Maine Railroad has adopted the policy of bringing several of its old shops up to date in connection with large new works. The Concord, N. H., shops are included, as well as those at Lyndonville, but not in this list of machinery.

Indianapolis

INDIANAPOLIS, IND., January 24, 1911.

The Seaton Spring Wheel Company, Indianapolis, has been incorporated, with \$10,000 capital stock, to manufacture wheels, tires and automobile parts. The directors are B. C. Seaton, W. B. Cooley and W. H. Nusbaum.

R. A. Brown has leased a building at Gaston, Ind., in which he proposes to install machinery for an electric light and power plant.

The Welch Electric Company's plant at Anderson, Ind., has been sold at receiver's sale to the Hoyt Electric Company of Westfield, Ind. The company manufactured magnetos.

The Wabash Pearl Button Company has been organized at Delhi, Ind., with a capital stock of \$20,000, to manufacture pearl buttons.

At the annual meeting of the Jenney Electric Company, Anderson, Ind., C. D. Jenney was re-elected president, V. J. Fagin was elected secretary-treasurer and P. J. Winters assistant secretary. Other directors are S. J. Murray, W. J. Murray of Cincinnati, Ohio, and L. D. Keach of Indianapolis. It was decided to leave the capital stock at \$600,000.

The Bucyrus Vulcan Steam Shovel Company, Evansville, Ind., has elected the following officers: President, H. P. Eels, Cleveland, Ohio; vice-president, G. F. Steedman, St. Louis, Mo.; secretary-treasurer, C. L. Schweigart, Milwaukee, Wis.

The Muncie Regulator Company, Muncie, Ind., has been incorporated, with \$25,000 capital stock, to manufacture temperature regulator devices. The directors are W. O. Haymond, J. O. Potter and W. T. Haymond.

Fire which started in the engine room destroyed the coal docks of the Big Four Railroad at Greensburg, Ind., together with the interlocking switch tower. The loss was \$40,000, covered by insurance.

B. A. Myers, Goshen, Ind., is erecting a factory at Middlebury, Ind., for the manufacture of a voting machine. Later on it is the intention of Mr. Myers to establish a factory in either Michigan or Wisconsin. Additional equipment will be purchased later.

The City Council of Muncie, Ind., is considering improvements to its electric lighting system.

The Dill & McGuire Lawn Mower Company, Richmond, Ind., will erect a new factory at a cost of \$100,000.

THE MACHINERY MARKETS

Milwaukee

MILWAUKEE, WIS., January 23, 1911.

Manufacturers of machine tools and other equipment for shops and foundries are, in practically every instance, starting the new year with a well established trade which insures comparative steadiness of production, and the opening weeks have brought a very satisfactory run of inquiries, not only from the industrial centers of this country but also from abroad, where the business of Wisconsin firms was largely extended during the past year. Locally the demand continues slow in nearly all lines, fall and early winter buying having been sufficient for most of the present needs.

As a consequence of the demands made upon the facilities of the road by the Pacific Coast extension, which is breaking all records in the way of business handled by new trunk lines, the shops of the Chicago Milwaukee & St. Paul Railway at West Milwaukee will be crowded to their fullest possible capacity for an indefinite period; and, although the issue is evaded just now by the responsible officials, it is certain that there will be almost continuous purchasing of shop tools and supplies, motors, controllers and other apparatus, one or a few at a time, all through the year. Every order is placed through the general purchasing department at Chicago, but the recommendations of the local officials are given due consideration. The efficiency of the shops here has been radically improved by changes in equipment made within the past three or four years, and many individual economies in operation have been brought about by good management. Before the end of February contracts will be let for the construction of the new manufacturing plant to be built in Clintonville, Wis., by the Four Wheel Drive Auto Company, the plans of which are being prepared by W. W. DeLong, Appleton, Wis. The principal building of the group will be 60 x 120 ft., with a separate power house about 35 x 50 ft., with steel stack. The buildings will be of brick and steel. The manager of the company, H. B. Annable, is supervising all of the details of building and equipment.

The Hartman, Nelson & Zapfe Company, Green Bay, Wis. is proceeding with plans for new shop construction and will conclude the purchase shortly of a crane, blowers, motors, steam or power hammer and auxiliary apparatus for forging. Other details are to be taken up later.

The City Council of Menasha, Wis., has practically committed itself to the purchase of another Diesel oil engine for the municipal power and pumping plant, together with a generator, the type of which appears to have been as yet undetermined.

The C. Reiss Coal Company, Sheboygan, Wis., is about to conclude arrangements for the construction and equipment of its new dock and power house at Manitowoc, Wis., both of which will be thoroughly modern in type.

Measures are being taken by the city authorities to provide funds for the erection of an electrically operated bascule bridge in Milwaukee between Oneida and Wells streets.

Construction of a municipal power and pumping station, with water distribution and electric lighting systems, has been decided upon at New Lisbon, Wis., where funds for the purpose will be available by spring.

The wood-working plant of the Lakeside Craft Shops, Sheboygan, Wis., of which E. J. Barrett is manager, is nearing completion, and a modern line of machinery, which will be increased later as the needs of the business develop, will be installed.

Plans for a manufacturing plant at Manitowoc, Wis., are now being made by the Manitowoc Aluminum Novelty Company, but the work of building will not begin until spring has fairly opened.

Machinery, including electric motors, will be installed shortly in the addition to the plant of the Harley-Davidson Motor Company, Milwaukee, giving it considerably greater capacity than it now has.

Power and wood-working machinery will be required for the new factory of the Western Parlor Frame Company, Plymouth, Wis., which is to be completed by early spring. Good second-hand equipment may be considered.

A Corliss engine has been purchased by the Hardwood Products Company, and bids on electrical machinery for driving wood-working tools in its new plant at Neenah, Wis., are now being taken. The installation of a blower system will next be considered.

The Milwaukee Grinder & Specialties Company, Milwaukee, has been incorporated for \$25,000 by Max Paul and others. It is already manufacturing small grinders.

The Milwaukee Malleable & Grey Iron Works, Layton Park, Milwaukee, is arranging for the installation of a line of induction motors for alternating current.

Measures are expected to be taken shortly at Green Bay, Wis., for the purchase of the plant of the Green Bay

Water Company by the city and enlargement of its capacity.

Plans are reported to be in progress for a further extensive addition to the works of the Power & Mining Machinery Company, Cudahy, Wis., which is now operated as a branch of the International Steam Pump Company.

Preparations will be made at once to erect a new manufacturing plant for the Minn Billiard Company, Milwaukee, to replace the factory that burned last week. This was two stories, 120 x 180 ft.

Manufacturers here will figure on various details of equipment for enlarging the municipal electric plant at Norwich, Conn., including a 750-kw. steam turbine unit.

Power transmission apparatus and some new machinery will be needed for the shingle mill which the Republic Lumber Company, Marinette, Wis., will build to replace the plant that recently burned.

O. C. Uehling, of this city, is now completing plans for the new manufacturing plant of the Hummel & Downing Company, Milwaukee, the main structure of which will be 100 x 400 ft.

Preparations for an enlarged output will need to be made during the year by the Best Register Company, Milwaukee, as the result of increasing trade.

C. R. Thomson, Richland Center, Wis., who has been investigating the feasibility of a hydroelectric development on the Kickapoo River to furnish current for power and lighting service in Viola, Wis., recently arrived at a decision favorable to the project. The Viola Light & Power Company has been incorporated by C. R., A. A. and C. S. Thomson, with headquarters at Viola. Construction of the necessary dam will begin shortly.

The Logemann Brothers Company, Milwaukee, manufacturer of hydraulic and motor-driven presses, metal scrap balers, pipe-straighteners, force pumps and a varied line of special machinery, will install a line of electric motors for machine tool drive.

The La Crosse Rubber Company, La Crosse, Wis., is planning extensive improvements to its plant.

San Francisco

SAN FRANCISCO, CAL., January 18, 1911.

Business in new machine tools remains rather quiet, purchases being limited almost entirely to single tools of small size; though considerable second-hand equipment is changing hands. There are few new inquiries of an important nature, though most shops around San Francisco are starting the year with a fair amount of work on hand. The market for general machinery shows many indications of improvement, though prospective purchasers are a little slow in placing definite orders. A heavy rainfall last week has relieved all fears of a dry year, assuring plenty of water power in the mining districts. Many mines in California and Nevada are figuring on new equipment, principally in the line of electric or gasoline hoisting and pumping machinery, with some inquiry for stamp mills, power drills, &c. Pumps of various sizes for waterworks and irrigation are in good demand, and renewed activity in oil pumps and oil-well rigs is expected within the next three or four months. Some business is coming from logging and lumbering interests, and a general movement in this line is expected during the spring. Recent orders from cement and brick manufacturers have been moderate, being principally in the nature of renewals, though a few plants are being materially increased. Figures are being taken, however, on some large quarry and crushing outfits, and several transactions of this nature will probably be closed early in February.

Considerable marine work is being done in Pacific Coast shops at present. The Union Iron Works has several contracts of this class on hand, having just taken an order for a \$326,000 steamer for the Interisland Navigation Company of Honolulu. It will have four Scotch boilers and a 2400-hp. triple-expansion engine. It is reported that the Southern Pacific is planning a number of steel ferry boats.

It is announced that the Craig shipbuilding plant at Long Beach, Cal., will be greatly enlarged during the year.

A number of inquiries are coming up for small locomotives, orders for which may be placed at any time within the next few weeks. A 35-ton locomotive and 12 flat cars have just been shipped to the Hilo Railroad in the Hawaiian Islands.

The California Boiler Works is now located in its new building on Howard near First street.

The Western Pipe & Steel Company has removed its offices from 9 Fremont street to 444 Market street.

The San Francisco Iron Works has been incorporated, with a capital stock of \$25,000, by Fred Muck, F. and W. P. Stoesser.

The Studebaker Bros. Company of California is pre-

THE MACHINERY MARKETS

paring to install a lot of woodworking machinery for the manufacture of automobile bodies at its San Francisco quarters.

R. H. Brotherton has been named as receiver for the Pacific Jupiter Steel Company.

A petition in bankruptcy has been filed against R. W. Hammer, a machinery dealer of Oakland, Cal.

H. G. Peake, formerly with the Bucyrus Company and recently with the Yuba Construction Company, Marysville, Cal., has entered into partnership with W. W. Johnson, formerly of the Northern Dredge Building & Construction Company, to engage in the designing and building of placer mining dredges. The partnership will be known as the Union Construction Company, with offices at 604 Mission street, San Francisco.

The Equitable Light & Power Company has just completed the installation of a number of large Westinghouse-Parsons turbine generators and Sterling water-tube boilers at its stations in San Francisco and Oakland. The company is preparing to install three additional boilers in its station in the Phelan Building.

It is reported that work will be started shortly on a large hydroelectric installation for the Hammon interests on the Truckee River.

The Pelton Water Wheel Company is shipping machinery for the Grangeville Electric Light & Power Company's plant at Grangeville, Idaho. It will include a 550 hp. Pelton-Francis turbine direct connected to a Westinghouse generator.

Charles C. Moore & Co., San Francisco, have taken a contract for a 300-kw. plant, including steam turbine generators and Wheeler condensers for the Vancouver Portland Cement Company, Vancouver, B. C. This company will also install a 3000-kw. power plant for the Mt. Hood Railway, Portland, Ore.

Honolulu manufacturers are shipping a complete sugar mill outfit to Mindanao island, in the Philippines.

It is reported that an automobile factory is to be added to the large implement plant of the Benicia Iron Works, Benicia, Cal.

A large electric traveling crane will be installed on the new Barnesson-Hibberd wharf at China Basin, San Francisco. The Harbor Commissioners are preparing plans for Pier 32, which will be one of the finest on the coast, with heavy traveling cranes and a complete outfit of freight-handling machinery.

The Alameda Sugar Company is installing a 150-hp. electric pumping plant, with transformer, on its land near Woodland, Cal.

The Durate Mutual Irrigation Company, Monrovia, Cal., will shortly install a high power pumping plant.

The Beeson Gold Dredging Company, Redwood City, Cal., is preparing plans for a gold dredge to operate in the Merced River bed.

The town of Mountain View, Cal., is considering the installation of a steam turbine at the municipal waterworks.

The city of Los Angeles will receive bids January 20 for a two-drum electric cableway hoist and carriage.

The Southern California Edison Company has secured permits to erect three new sections of its power plant at Long Beach, Cal.

The Southwestern Sugar Company, Los Angeles, is planning to erect a beet sugar mill near Perris, Cal.

St. Louis

ST. LOUIS, January 23, 1911.

Business is beginning to pick up; buyers are now coming out of their retirement and placing orders.

The Standard Oil Company proposes to spend an additional \$2,000,000 on its large refinery at Woodriver, Ill., near St. Louis, making a total of \$5,000,000 appropriated for this plant to date.

Fayette R. Plumb, Inc., has issued invitations to the inauguration of its new St. Louis plant in the St. Louis suburb of Wellston, for Saturday, January 28. This plant is for the manufacture of hatchets and other tools on a large scale, to supply Western hardware jobbers. All buildings and appliances are according to the most modern ideas.

Arthur W. Johnston and Gustav Grossmann, of Nome, Alaska, were in the city this week to purchase dredging machinery.

Albert B. Bowman, machinery dealer, reports the sale of some King boring mills and one or two other heavy tools.

The Steiner Engraving & Badge Company, whose plant for the manufacture of medals, badges, &c., is at Twentieth and Mullamphy streets, reports business very satisfactory for this season and looks for a further improvement.

The St. Louis Iron & Machine Works, whose specialty

is Corliss engines and heavy machinery, is very busy and has several months' work ahead for its large plant at Main and Chouteau streets. This company has been installing some heavy tools, including a large vertical boring mill.

The St. Louis Cordage Company, maker of hemp rope, finds business very good at this time.

The Missouri Lamp & Mfg. Company, maker of wall fire extinguishers, &c., is very busy on its specialties.

The Medart Patent Pulley Company is keeping its large force of machinists and foundrymen well employed.

The Davis Expansion Boring Tool Company has been reorganized and the name will now be the Mathews-Davis Tool Company. It makes a specialty of a patented line of boring bars.

A fire at the plants of the Pennsylvania Oil Refining Company and the Tamm Brothers Glue Company, at Vandeventer avenue and Wabash Railroad tracks, caused damage to the extent of \$50,000 to both companies.

Postmaster-General Hitchcock has asked for an appropriation of \$100,000 for the installation of labor-saving devices in the new St. Louis post-office building. He advises the adoption of mechanical handling devices, belt conveyors, spiral chutes and bucket lifts for handling the mail.

The West End Packing Company, St. Louis, has been incorporated with a capital stock of \$30,000. The incorporators are Mathew Courtney, Mathew-Courtney, Jr., and Edward Courtney.

The Model Stove & Mfg. Company, Carthage, Mo., has been incorporated. The capital stock is \$15,000. The incorporators are W. L. Murphy, William Kitching and Victor Clinton.

The DeKalb County Electric Light Company, Maysville, Mo., has been incorporated with a capital stock of \$15,000. The incorporators are E. A. Bunton, George F. Brown and Thomas D. Williams.

The Weg Cornice Works, Moberly, Mo., and the wholesale house of O'Keefe Brothers, were damaged by fire January 17 to the extent of \$83,000.

The Pioneer Iron & Steel Company, Kansas City, Mo., has been incorporated with \$10,000 capital stock. The incorporators are D. S. Rettig, L. C. Rettig and M. Andrews.

The Lawrence County Water Company, Marionville, Mo., has received a franchise to establish light and water works systems.

Toronto

TORONTO, January 21, 1911.

There is a considerable volume of important new business ready to be placed, and much more in sight, but reports indicate that competition for it is unusually keen. Some of the conditions impelling to this greater activity in pursuit of business are favorable. One is that the capacity of Canadian works engaged in the manufacture of machinery, plant equipment, &c., is much greater than it was a year ago. Another is that American interest in this market is keener. It is to be added that the selling agents of German makers of machinery are doing all they can to push trade here, and that British firms are waking up to a realization of the importance of this market and to a perception of the necessity for energetic action on their part if they are to hold their own. Talk of reciprocity between Canada and the United States has had its influence upon British competitors here. To British firms has fallen some good business for mining plant and for pulp and paper making machinery. To Canada the satisfactory feature of the situation is that the demand for machinery of all kinds continues to grow.

William Whyte, vice-president and general manager of the Canadian Pacific Railway system's lines west of Winnipeg, was in Toronto on Thursday. This year, he says, his company will at least keep pace with all other roads in the West in the matter of track laying. Double tracks are to be laid between Fort William and Port Arthur. Double tracks will be laid the whole 123 miles between Winnipeg and Brandon. Branch lines east and west of Moosejaw will be double-tracked. Altogether 400 or 500 miles of new track will be laid by the system in the West this year. Eighty-pound rails are to be used. Large terminal improvements are to be made at Regina, Moosejaw, and Medicine Hat. East of the Lakes there are to be liberal expenditures on the company's lines. Double-tracking between Toronto and Montreal is on the programme for this year. Several new steel bridges are to be built in the West, and a number of others strengthened to provide for the increasing weight of engines and loads.

The City Engineer of Toronto recommends that improvements involving an outlay of \$626,544 be made in the City waterworks. Of this sum \$465,000 would be laid out on a 6-ft. steel conduit.

THE MACHINERY MARKETS

The works which the Canadian Automatic Transportation Company proposes to build in Welland are to be close to the Ontario Iron & Steel Company's plant and to the Page-Hersey Iron Tube & Lead Company's buildings.

The Provincial Steel Company is installing its machinery in the re-rolling mill it has just erected at Cobourg, Ont. A. L. Reading is general manager of the company.

The Central Canada Iron & Steel Corporation, with a capital stock of \$500,000, has been incorporated by Dominion authority. Its head office is to be in Montreal. Some other new Dominion corporations are the Quebec Pulp & Paper Company, capital stock \$15,000,000, head office Montreal; Canadian Quarries & Construction Company, capital stock \$2,000,000, head office Ottawa; Brockville Construction Company, capital stock \$100,000, head office Brockville, Ont.; Western Mfg. Company, lumber and contracting, capital \$250,000, head office Winnipeg; Matthew Guy Carriage & Automobile Company, capital \$250,000, principal place of business Oshawa, Ont.

Supplementary letters patent have been issued by the Canadian Government authorizing an increase of \$3,000,000 in the capital stock of the Massey-Harris Company, manufacturer of agricultural implements, Toronto and Brantford, Ont. This brings the capital stock of the company up to \$15,000,000.

A permit has been granted for additions to the foundry of the Fairbanks-Morse Company, Toronto.

It is stated that work will be begun in the spring on a plant for the electric smelting of iron at Chats Falls, 20 miles west of Ottawa, Ont.

The 10-in. mill of the Hamilton Steel & Iron Company, Hamilton, Ont., was destroyed by fire last week.

The Nova Scotia Hydraulic Company proposes to expend a large sum on the development of the water power of the Mersey River at a point near Liverpool, N. S.

The Kam Power Company, Port Arthur, Ont., is enlarging its power house and will install new machinery when the building is ready to receive it.

The Canadian Pacific Railway Company's new Port Arthur shop for repair work was opened for operations last week.

The six transformers ordered from Sheffield, England, for the municipal power plant at Winnipeg have been received, and will shortly be placed in position at Point du Bois. They are of 3000-kw. capacity which will step up to 6600 for transmission. Five alternating generators are also being shipped from Sheffield to Winnipeg for the municipal power works there. They are of 4000 hp. The machinery was all thoroughly tested at Sheffield, and proved to surpass the standard called for, and consequently was approved by the English expert engineers representing Winnipeg in the matter.

The ratepayers of Vancouver, B. C., have approved by-laws providing for the following capital outlays: \$967,000 on schools; \$425,000 on street improvements; \$400,000 on waterworks; \$286,500 on hospitals; \$115,000 on exhibition buildings; and \$115,000 on a steel bridge.

The National Bridge Company, a new concern of strong financial membership, is building works at Longue Point, Montreal. It is to do a general business in steel construction.

The Canadian Top Company, Tilbury, Ont., recently incorporated, is erecting a plant to be devoted to the manufacture of automobile tops. The company is in the market for bow shapers and transmission appliances.

Texas

AUSTIN, TEXAS, January 21, 1911.

Business prospects and conditions generally have been further brightened the past week by another general rain in the northern and western regions of the state. While there is still a considerable shortage of water supply in some localities, the ground is in fine condition for spring planting. Projects, involving the installation of considerable machinery, which were being held in abeyance pending an improvement in the coming season's crop prospects, are now being made ready for consummation. The wonderful agricultural and manufacturing development in the Gulf Coast region and the lower Rio Grande valley still continues without any signs of decrease. Many hundreds of new settlers are pouring into those sections from the northern and middle Western States, and the former unbroken ranch region is being rapidly transformed into a garden of industry.

Harp & Wilkins will establish a plant for the manufacture of tile for sub-irrigation at Plainview, Texas. The initial factory will have a daily capacity of 6000 ft. per day, to be increased during the year to about 40,000 ft.

The Cuero Cotton Factory will install an additional

2000 spindles, with accompanying carding, picking and weaving machinery, in its factory at Cuero, Texas. A modern humidifying apparatus and steam heating plant will also be installed. J. C. Saunders is manager.

J. M. Powell & Son, Avalon, Texas, will erect a new cotton gin at that place to cost about \$15,000, to replace the plant recently destroyed by fire.

The Texas Fiber Machine Company will erect a factory at El Paso for the manufacture of machines for converting certain species of the cactus plant into fiber.

The El Paso & Electric Company will install a new gas tank of 500,000 cu. ft. storage capacity at El Paso. It will also make large extensions of its gas mains during the present year.

H. E. Powell, Springfield, Ill., and associates will install a gas plant at Plainview, Texas. He has made application to the City Council for a franchise for the proposed distributing system.

A. L. Stanford, Lyford, Texas, and associates have taken the preliminary steps toward constructing a system of irrigation in the lower Rio Grande valley which will be the means of reclaiming about 60,000 acres of land. The proposed system will cost about \$1,200,000. While the primary purpose of the canal will be to irrigate 60,000 acres, it will be constructed on a scale to later on furnish water for 150,000 acres.

Receiver James F. Weed of the Beaumont Traction Company, Beaumont, Texas, will issue \$125,000 in receiver's certificates for the purpose of making extensive improvements and changes in the company's electric street railway system. It is stated that the entire physical property will be overhauled.

The Gulf, Colorado & Santa Fe Railroad will install new machinery and make other improvements in its shops at Cleburne, Texas. It will also install an electric light and power plant there. W. F. Buck, superintendent of motive power, with headquarters at Galveston, has charge of the proposed work.

The Donna Sugar Mill Company is erecting a sugar mill at Donna, Texas, at a cost of about \$250,000. It will be finished in time to handle the sugar cane crop of that section of the lower Rio Grande valley next season.

The City Council of Bryan, Texas, recently began the work of extending the water mains of the municipal system. More than 3000 ft. of 6-in. mains will be laid.

The Colorado River Power Company recently received 12 car loads of cotton mill machinery which it is installing in its new factory at Marble Falls, Texas.

Otto Foster will erect a broom manufacturing plant at Goliad, Texas. Many farmers of that section are planting large acreages of broom corn in order to supply the proposed factory with brush.

The War Department will install an electric lighting system at Fort Bliss, Texas. It will cost about \$20,000.

The City Council of Brownsville, Texas, contemplates ordering an election to vote on the proposition of issuing \$40,000 bonds for the improvement of the water works plant and electric lighting system.

Glasgow, Davis & Co., New York, will erect a provision packing plant at Sweetwater, Texas, to cost \$250,000.

The Northern Texas Traction Company, Fort Worth, recently increased its capital stock from \$3,500,000 to \$4,500,000 for the purpose of providing funds for improvements. The company is a Stone-Webster concern, which owns the interurban electric line that runs between Dallas and Fort Worth.

The McAllen Gin Company, recently organized with a capital stock of \$10,000, will erect a cotton gin at McAllen, Texas. The incorporators are Scott Cawthon, W. O. Bryan and W. E. Stewart.

The Gulf, Colorado & Santa Fe Railroad, in addition to the \$42,000 which was appropriated for the purchase of additional machinery for its shops at Temple, Texas, will install a steam heating plant to cost \$18,000, and also contemplates installing an electric light and power plant.

The people of Deming, N. M., have voted \$35,000 bonds for the construction of a complete sewer system for that town.

The plans of the American Beet Sugar Company to erect a large beet sugar factory at Portales, N. M., are making good headway. The company is also arranging to install a large electric power plant and to construct an electric railway between Portales and Taiban, N. M., traversing the center of the proposed sugar beet district. This road will do both a freight and passenger business.

The Torreon Mercantile Company, Torreon, Mexico, will install an ice plant at Velardena, state of Durango, Mexico.

The City Council of Gainesville, Texas, will purchase the water works system now operated by private company and will make extensive improvements.

The Southwestern Cement Brick & Tile Company, Victoria, Texas, has been organized with a capital stock of

THE MACHINERY MARKETS

\$5000. The incorporators are James F. Welder, Theodore Buhler and John Stoffels.

The Houston Structural Steel Company, Houston, Texas, will soon make extensive improvements at its plant at Yale and Center streets. The yard will be wired for arc lights, so that a night shift can be worked. The capacity is to be increased to 100,000 tons per month. A. F. Elrod, the former manager of the company, has resigned and has accepted a position with the Union Iron Works of Houston. E. W. Jennings, formerly of Little Rock, Ark., is now in charge of the plant.

Charles J. Stanzel, of Brownwood, Texas, will establish at Aransas Pass, Texas, a foundry, machine shops and boiler works.

The creosoting plant of the International Creosoting Construction Company at Beaumont, Texas, was burned January 12. The loss is estimated at \$80,000. The insurance is reported to be ample. The head office of the company is at Galveston.

The Houston Brick & Tile Company, Houston, Texas, has been organized with a capital stock of \$25,000. C. A. Barbour, C. R. Miner and Captain Tellaferro are the incorporators.

The Wichita Falls Motor Car Company, Wichita Falls, Texas, has been incorporated, with \$160,000 capital stock, and will erect a plant of about 50,000 sq. ft. of floor space, which will be equipped to manufacture motors, transmissions, axles, bodies and a single lever control for shifting gears, handling clutch, throttle and spark patented by C. A. McKiernan. Charles Adams, who was factory manager of the E-M-F Company, Detroit, Mich., will be manager of the new company. The incorporators are J. A. Kemp, F. N. Kell, J. G. Culbertson, C. A. McKiernan and R. G. Schefferly, formerly designer and assistant engineer of the E-M-F Company.

The South

NASHVILLE, TENN., January 23, 1911.

The attention of the trade is largely directed at present to equipment needs necessitated by the building of new industrial roads or extensions, as well as other steam and electric lines, by terminal, river and harbor improvements, by hydroelectric power plants, and by development work in connection with ore and coal mining, quarrying and the recovery of phosphate rock and minerals. Second-hand outfits in good condition are quite freely offered and taken, particularly heavy machinery that has been rebuilt.

The Roanoke Gas & Water Company, Roanoke, Va., has decided upon the enlargement of its gas generating and holding plant, which, with the distribution system, will hereafter be conducted by a separate corporation from that in charge of the water works.

Unconfirmed advices from King, N. C., are to the effect that a machine shop will be established there by the V. T. Grabs Company, recently incorporated by Geo. E. Babcock and others.

A large increase in its manufacturing facilities, including an addition to the factory, is being provided for by John B. Ransom & Co., Nashville, Tenn. Boxes are the principal product.

The Gregory-Conder Motor Company is reported to have been organized at Columbia, S. C., to establish an automobile selling agency and repair plant. A. J. Gregory, W. T. Gregory and J. W. Conder are named as incorporators.

E. M. Wallace, manager of the Capitol Lumber Company at Frankfort, Ky., has been granted a franchise by the city to build an electric power plant for public service and will proceed with the work at once. Transmission lines will be run to nearby communities and transformer substations provided.

Plans for extensive additions to its plant, including the installation in due course of some new machinery, are being considered by the Bristol Door & Lumber Company, Bristol, Tenn.

An electric plant is to be constructed at Warrenton, N. C., to furnish industrial power and lighting service, by the Warrenton Electric Light Company, recently organized by J. W. White and others.

The Richmond Electric & Power Company, Richmond, Ky., has provided funds for the further development of its system, which includes a modern generating plant, engine driven, with a capacity of 150-200 kw.

The mill of the Bryant Lumber Company, Wilson, N. C., which recently burned, will probably be rebuilt this spring.

A large new manufacturing plant equipped with electric motor drive will be established in Thomasville, N. C., by the Cramer Furniture Company.

A. P. White & Co., Cadiz, Ky., are planning to build a

concrete dam in the spring and construct a hydroelectric power plant, with mill, elevator, &c.

The Rome Soil Pipe Mfg. Company, Rome, Ga., will make some improvements in its plant, including the installation of a blower unit.

A bond issue to cover the cost of constructing an electric power plant is proposed at Fairburn, Ga.

Additional pumping machinery is needed at Laurel, Miss., and will probably be provided for this year.

It is stated that a new boiler and other equipment will need to be provided by the Standard Lumber & Box Company, Nashville, as the result of an explosion which occurred lately damaging its plant.

The city of Patterson, La., has engaged Fred A. Jones, Houston, Texas, as engineer in charge of construction of water works for which the sum of \$30,000 was recently voted. A 1000-gal. pump will be installed.

The Sanford-Day Iron Works, Knoxville, Tenn., is preparing to erect a new foundry at an estimated cost of \$200,000.

The plant of the Marias Central Sugar Refinery at Lorientville, La., was burned January 13. The loss is estimated at \$200,000. The plant was insured for \$120,000.

The Railway Brake Shoe Company, Moundsville, W. Va., has completed plans for the erection of a plant which will comprise a two-story mixing and press room, 50 x 120 ft.; annealing room, two stories, 60 x 100 ft., and foundry, one story, 80 x 100 ft. The total floor space of the buildings will be 25,000 sq. ft. J. L. Cohagan is president of the company.

The Aluminum Company of America, Pittsburgh, Pa., states that the article in the Knoxville (Tenn.) papers to the effect that it has under way a \$5,000,000 power development project on the Little Tennessee River is entirely erroneous. The company is simply investigating some small water power rights and may undertake to develop them in a year or two if the surveys are favorable.

The Southwest

KANSAS CITY, MO., January 23, 1911.

From all parts of the Southwest, and particularly the more recently developed sections, come reports of renewed activity. Orders for the smaller plants predominate, but quite a number of large projects are also under way.

Rollins & Westover, Kansas City, will furnish the city of Patsburg, Mo., shortly with preliminary plans and estimates for the construction of an electric plant for illuminating and commercial service.

C. H. Cole, president of the United Iron Works, Springfield, Mo., is reported to be interested in a plan for the construction of a hydroelectric power plant of large capacity on the White River, not far from that city.

The project for municipal water works and sewage improvements, together with an electric power and lighting plant, which has been pending at Glasgow, Mo., for some time past, is being brought to a head, as the result of a favorable court decision on a bond issue the legality of which was disputed. An engineering firm in Kansas City was recently engaged to prepare plans and specifications, so that bids covering equipment will probably be invited within a month or two.

The capacity of the municipal lighting plant at Oregon, Mo., which is at present equipped with an engine-driven generating set of 60 kw., will be enlarged by the installation of a 100-kw. unit, with additional boiler of 150 hp. and auxiliary equipment, none of which has been purchased.

W. C. Pearce, Marked Tree, Ark., will install modern shingle making machinery in an idle saw mill there and operate it.

It is reported from Sylvia, Kan., that an electric power plant will be built there to replace the one which burned.

The plant of the Jones Mfg. Company, McAlester, Okla., containing power and planing mill machinery, was recently burned and will be rebuilt.

The Bisbee-Naco Water Company, Bisbee, Ariz., expects to construct a steel water tank of 500,000 gal. capacity.

Plans for municipal power plant at Durant, Okla., were recently approved by the City Council and the project will be pushed to completion.

The lighting plant at Conway, Ark., which was taken over by the city from the Conway Electric & Mfg. Company, has been damaged by an explosion and some new equipment is likely to be needed.

It is probable that the enlargement of its shops at Coffeyville, Kan., together with other improvements, will be entered upon shortly by the Missouri Pacific Railroad.

The purchase of machinery for municipal water works will be taken up in the near future at White City, Kan.

In addition to the power plant extensions recently noted, the Oklahoma Railway Company, Oklahoma City, Okla., has decided upon building a modern forge, machine and wood-working shop for repair work, at a site secured on Second street, to replace the small plant now operated at Twelfth and Santa Fe streets, which is no longer adequate to the demands of the service.

A municipal water works system is to be constructed at Englewood, Kan. The purchase of machinery and other equipment will be determined upon between now and spring.

Work is about to be commenced on the construction of the Uncompahgre & Gunnison Valley Railway, 29 miles, the headquarters of which are in Montrose, Colo. M. L. Paret, Kansas City, is reported to be the engineer in charge. The details of power equipment have not yet been considered.

The J. S. Worley Company, Reliance Building, Kansas City, has been engaged by the municipal authorities at Mound City, Kan., to prepare plans and specifications for a pumping plant and water distribution system.

The Pike County Water Company, Murfreesboro, Ark., has engaged an engineer to prepare plans for its proposed hydroelectric plant, which will be of about 10,000 kw. capacity.

Improvements, including the purchase of some new equipment, are to be made in the system of the Webb City & Carterville Waterworks Company, Webb City, Mo.

The Lumberman's Cement & Brick Company, R. A. Long Building, Kansas City, Mo., has been incorporated with \$1,250,000 capital stock to manufacture and deal in Portland cement, lime, plaster, terra cotta, &c.

Burns & McDonnell, Kansas City, Mo., are preparing plans for an electric light and water plant for the city of Upton, Wyo.

The H. J. Brunner Metal & Machinists Supply Company, Kansas City, Mo., whose stock was recently destroyed by fire, advises that it would be pleased to receive manufacturers' catalogues and price lists. The company expects to be in business again within the next 10 days.

Edward Snyder, Kansas City, will erect at Broken Bow, Neb., a packing plant at a cost of \$100,000.

Spring Hill, Kan., has voted bonds in the sum of \$6000 for the construction of an electric light plant.

The Pearce Lumber Company, Pine Bluff, Ark., has been organized with a capital stock of \$60,000. T. Pearce is president, J. F. Rutherford vice-president and James H. Allen, late of Memphis, Tenn., secretary and treasurer. The company has leased the plant of the Bluff City Lumber Company at Kearney.

The Hot Springs Gas Company, Hot Springs, Ark., has been incorporated. The capital stock is \$100,000. The incorporators are W. C. Fordyce, W. A. Butrell and Henry J. Lehman.

The furniture factory operated by the Gurath-Lombard Company, Independence, Kan., was destroyed by fire January 10.

Loag & Bell of Lyons, Kan., have purchased the old Plumb elevator as a site for their ice plant and will erect a new building, 40 x 75 ft., and have it ready by the time the machinery arrives.

Judge L. F. Parker, Vinito, Okla., is preparing the plans for the formation of a company to erect a cotton gin plant to be run by electric power.

The plant of the Rogers Ice & Cold Storage Company, Rogers, Ark., is now being erected. It is to cost \$20,000 and will have an ice storage capacity of 1500 tons.

Farther Central West

OMAHA, NEB., January 23, 1911.

Manufacturers of agricultural machinery and vehicles, mill and elevator outfits, steam and gasoline engines, &c., are crowding their output at present and effecting gradual improvements in shop or warehouse facilities which will enable both production and distribution to be accelerated. From these sources dealers are receiving numerous inquiries, some of which concern new plants or shop buildings to be erected before next fall, and there are indications that many deliveries of tools will be contracted for a long time ahead. In the general industrial field prospects are also excellent, but with the demand now extremely variable. The Western mining districts show up strong. Reports from Denver, Salt Lake City and other cities of Colorado, Wyoming and Utah have recently been almost uniformly favorable.

The boiler capacity of the Centerville Light, Power & Traction Company, Centerville, Iowa, whose present battery consists of Atlas and Murray units aggregating 300 hp., is to be doubled, if the present plans for an extension of its central heating system are consummated. Other improvements, including the addition of new electrical apparatus, may also be entered upon.

The franchise for an electric power and lighting plant at Carbondale, Colo., has been granted to W. M. Dinkel.

A vote is to be taken in the spring at Gunnison, Colo., on the question of building an electric plant for municipal service, to replace the present small station, 125-kw. capacity, which was taken over from the Gunnison Gas & Water Company and is now inadequate to the requirements of the community. Hydroelectric power is proposed, with the existing station as a reserve.

The Telluride Power Company, Provo, Utah, which has constructed a number of large hydroelectric plants under the direction of L. L. Nunn, is preparing to build another on the Malad River, near its junction with the Snake, where there is a fall from which upward of 10,000 hp. can be developed.

An air compressor operated by electric power will be purchased by the Sugar Loaf Consolidated Mining Company at Sugar Loaf, near Leadville, Colo., together with additional drilling machinery.

The construction of a water works plant is under consideration by the municipal authorities at Mayfield, Utah. No definite plans in relation to equipment have as yet been arrived at.

The Qualm Vacuum Cleaner Company, Waterloo, Iowa, has closed a deal at Charles City, Iowa, by which it comes into possession of a large tract of land and will move its factory in the near future.

The Des Moines Sawmill Company will erect a new gunstock mill in Des Moines, Iowa.

The Rockwell City Bottling Works, Rockwell City, Iowa, has been sold to a Carroll, Iowa, firm. The new proprietors have made a deal for a garage building which they will use in connection with the bottling establishment. It is their intention to fit up the plant with new machinery, using electricity as motive power.

The roundhouse of the Iowa Central Railroad at Marshalltown, Iowa, was burned January 16.

The grain elevator of Payne & Sargisson at Luton, Iowa, was burned January 14. The loss is estimated at \$13,000.

Government Purchases

WASHINGTON, D. C., January 23, 1911.

The Panama Railroad Company's circular No. P-3003 calls for bids to be opened February 1 for furnishing eight 4-ton electric cargo handling cranes.

The Department of the Interior of the United States Reclamation Service, Washington, will open bids February 15 for furnishing centrifugal pumps, motors, transformers and switchboards for Salt River project, Ariz.

H. C. Newcomer, Lieutenant-Colonel of Engineers, United States Army, Pittsburgh, Pa., opened bids January 11 for a water power air compressor plant at lock No. 1, Monongahela River, as follows: Trump Mfg. Company, Springfield, Ohio, \$3750; American Compressor & Pump Company, Baltimore, Md., \$3569; Blaisdell Machinery Company, Bradford, Pa., \$3710; Hall Steam Pump Company, Pittsburgh, Pa., \$3159, \$3268, \$3343, \$3532.75 and \$3650.

The Constructing Quartermaster, Fort Howard, Md., opened bids January 10 for constructing pump house and installing machinery at Fort Smallwood, Md. Various alternate bids were received. Bids for the completed work are as follows: Peters & Harding Constructing & Building Company, Baltimore, Md., \$4000; H. C. Clark, Delaware City, Del., \$2460; L. B. Jacobs, Newark, Del., \$1973; McKay Engineering Company, Baltimore, Md., \$2939.50; James L. Robinson, Baltimore, Md., \$2881; M. W. Hill Company, Baltimore, Md., \$3933; F. J. Boas, Philadelphia, Pa., \$2780.50.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids January 17, as follows:

Class 1.—One hand painter and jointer—Bidder 33, J. A. Fay & Egan Company, Cincinnati, Ohio, \$408.10 and \$358.60; 36, Fox Machine Company, Grand Rapids, Mich., \$218; 49, Hallidie Machinery Company, Seattle, Wash., \$255; 63, J. P. Kemp, Baltimore, Md., \$274; 81, Oliver Machinery Company, Seattle, Wash., \$565; 83, Perrine Machinery Company, Seattle, Wash., \$296; 93, H. B. Smith Machine Company, Smithville, N. J., \$323; 118, Arthur F. Homer, Boston, Mass., \$180.

Class 2.—One special motor headstock lathe—Bidder 3, American Woodworking Machinery Company, Rochester, N. Y., \$284.50 and \$332.50; 33, J. A. Fay & Egan Company, Cincinnati, Ohio, \$207; 49, Hallidie Machinery Company, Seattle, Wash., \$343.75 and \$316.25; 63, J. P. Kemp, Baltimore, Md., \$227.50.

Class 41.—One high pressure air compressor—Bidder 53, Ingersoll-Rand Company, New York, \$7690, \$7735, \$7455; 77, Norwalk Iron Works Company, South Norwalk, Conn., \$4600.

Bids were opened December 21 by the inspector of the Second Lighthouse District, Boston, Mass., for furnishing one oil engine and air compressor for light vessel No. 41, as follows:

Ingersoll-Sargent Drill Company, Boston, Mass., \$4398 and \$4591; American Air Compressor Works, New York, \$4547 and \$4859; De La Vergne Machine Company, New York, \$4960, \$4900, \$5195 and \$5135; August Mietz Iron Foundry & Machine Works, Boston, Mass., \$4936, \$4540, \$5900, \$5285, \$4842 and \$6285.

American Electrochemical Society

Chicago Members Discuss the Electric Furnace

A Chicago section of the American Electrochemical Society was organized recently, with Prof. H. N. McCoy of the University of Chicago as chairman, and Arba B. Marvin, 115 Adams street, Chicago, as secretary. The first general meeting of the section was held at Chicago Friday evening, January 20, at the rooms of the Western Society of Engineers. The papers related to the electric furnaces in the manufacture and refining of steel, and the meeting was very successful. About 200 were in attendance, including engineers, chemists and metallurgists of the leading iron and steel and foundry interests of Chicago and vicinity. The following formal papers were presented and discussed:

"Electric Furnaces for the Manufacture of Iron and Steel," by James Lyman, district engineer for the General Electric Company, Chicago.

"Reliability of Electric Furnaces for Commercial Work," by F. T. Snyder of the Metallurgic Engineering Company, Chicago.

"Electrolytic Refining as a Step in the Production of Steel," by C. F. Burgess, professor of chemical engineering at the University of Wisconsin, Madison, Wis.

"The Electric Steel Furnace of the Illinois Steel Company at South Chicago," by Chas. G. Osborne, superintendent of special steels of that company.

The meeting was preceded by a dinner and a business meeting of the Chicago section of the American Chemical Society, at the Grand Pacific Hotel, at which the Chicago members of the Electrochemical Society were guests of the older organization.

Mr. Lyman was introduced as the first speaker at the evening meeting. He reviewed the progress of the electric furnace in the manufacture of steel, both in Europe and America, showing stereopticon views of leading types and installations. He explained in detail the equipment and operation of all the successful types and gave data showing the amount of electrical current used in reducing iron ore, in melting and refining cold pig or scrap, and in refining hot metal. His paper, with illustrations, will be presented in a later issue of *The Iron Age*. The papers of Mr. Osborne, Mr. Snyder and Professor Burgess are given on other pages.

Discussion

Answering the question whether there are electric furnaces designed for brass melting: Mr. Snyder said: "They have been used for the melting of copper quite extensively in commercial work and the melting of brass has been carried on in a way, but I don't know of any furnace that is running regularly melting brass commercially."

Question: In melting copper is there much oxidation?

Mr. Snyder: Not in copper. They use the oxidizer just as they do in steel. Consequently they get a copper which is very much freer from oxidation than the ordinary copper refining furnace manufactures.

Professor Burgess was asked whether he ever used molten iron for electrolytical work. He said: "Only to a very slight extent. We got no encouraging results."

Mr. Jones: One point I consider very important is the cost of the current. Using it during the off months or at the off times of the day, the rate of the ordinary charge for the refinery will be almost one-half of the ordinary price, and that will make it very low indeed and ought to help out a great deal in this business.

Mr. Brady, chemist at the Illinois Steel Company's works, was called out. He said: "As Mr. Osborne stated in his paper we are apt to get anything in our analysis of slag. I must say we have had our troubles trying to analyze it, and in trying to say which belongs here and which belongs there we have got a pretty difficult problem, and I think possibly we have solved it as well as we can; maybe not quite as satisfactory as it might be. We are still working on it."

Mr. Baker: I would like to ask Professor Burgess if he ever tried electrolyzing iron from chloride solutions?

Professor Burgess: You cannot get deposits of iron

from chloride solutions as satisfactorily as from sulphate solutions. However, it is simply a question of adjusting your electrolyte so you can build up a big deposit and which will be cheaper. Other experimenters have reported satisfactory results from chloride solutions, but we have not been so successful.

Mr. Bentley: May I ask Professor Burgess if he has the electrodes in motion in depositing the iron; whether they are moving while the iron is being deposited or whether they are stationary in solution.

Professor Burgess: Everything is perfectly quiet in the tank. We have tried the effect of rapid circulation and slow, and find little, if any, change in it; in fact, the tanks are left for several months without cleaning out—that is, cleaning out at the bottom. But once a week the solution is circulated through a series of tanks, just circulating two or three times.

Mr. Bentley: I believe in certain plating work, by rotating the electrodes quite rapidly, a deposit which is more uniform and which is smoother and freer from crystalline structure is obtained, and I was wondering whether it might not have the same effect with the iron.

Professor Burgess: Of course, what we tried to do was to work out a process for doing this as economically as possible. If you figure the cathode investment in moving the electrode throughout your entire plant, it would be a very expensive proposition. We have tried to deposit iron tubes by rotating the cathode, but never got any higher deposits from it than by having them quiet.

The Canadian Duty on Rerolled Rails

The Provincial Steel Company is now installing its equipment for rerolling steel rails at Cobourg, Ontario, Canada. It is apparently for the benefit of this company that the Canadian Government has issued an order terminating the rate of duty heretofore existing of 25 per cent. of the cost of rerolling rails "which have been in use in the tracks of railroads in Canada, and which have been exported from Canada and returned thereto after having been rerolled and weighing not less than 56 lb. per lineal yard when rerolled, and which are to be used by the railroad company importing them on its own tracks." This order was issued under a provision in the Canadian tariff that "whenever the Governor-in-Council is satisfied that a mill adapted and equipped for rerolling such rails in substantial quantities has been established in Canada" the duty thus specified could be abolished, and that "thereupon all such rails when imported shall be subject to such duty as otherwise provided" in the Canadian tariff. A duty of \$7 per ton is now imposed on such rerolled rails.

It is alleged that the arrangement was sometimes taken advantage of to send new rails in to Canada under the misrepresentation that they were old Canadian rails rerolled, but this does not seem to have been a consideration in deciding the Canadian Government to put an end to it. The change will be welcomed by the Canadian steel interests, but it will not be relished by the railroad people. Of course, the effect will be to put a complete stop to the sending of Canadian old rails to American mills to be rerolled and returned, for the duty of \$7 a ton now required would prohibit reimportation.

A new journal in the technical field is *Mill Supplies*, the initial issue of which has just appeared. It is published by the Crawford Publishing Company, 209-213 North Jefferson street, Chicago, and will be issued monthly at a subscription price of \$2 per year. It is specially devoted to the interests of jobbers and manufacturers of mill, steam, mine and machinery supplies. Elmer Crawford is editor-in-chief; Clay C. Cooper, managing editor, and the associate editors comprise a corps of six. Elmer Crawford is president; S. P. Browning, Maysville, Ky., secretary Ohio Valley Pulley Works, and president American Supply & Machinery Manufacturers' Association, is vice-president; C. W. Miller is secretary; John K. Allen is treasurer. An advisory board comprises men of prominence in the manufacture or jobbing of machinery and mill supplies.

The 15-Ton Heroult Furnace at South Chicago*

Details of the Manufacture of Electric Steel—A Typical Charge Sheet and a Chart Showing Fluctuations in Impurities

BY CHARLES G. OSBORNE

The 15-ton Heroult arc furnace at South Chicago has now been in more or less continuous operation since May 7, 1908, a period of over a year and a half, and therefore a few experiences of those who have been connected with these operations will, perhaps, be of interest.

Description of Furnace

Upon a solid foundation about 5 ft. above the ground level a stationary rack 8 ft. 9 in. long is fastened. Upon

when tipping. This is taken care of by having a movable cylinder pivoted at both the top and bottom, which allows the cylinder to follow the motion of the furnace.

Construction of the Furnace

The furnace shell is of plate steel, 1 in. in thickness, riveted together. The outside horizontal cross section plan is approximately that of a complete circle of 13½ ft. in diameter, with two flattened portions situated at the front and back respectively. The outside vertical cross section can be readily seen by referring to Fig. 2. On the bottom of the furnace, within the 1-in. plate, and next to it, one row of magnesite brick laid the 4½-in. way is placed across the flat portion. The side walls of the furnace are vertical and consist of two rows of magnesite brick laid the 9-in. way, giving a thickness of 18 in. of magnesite brick. These solid magnesite brick walls extend up to the furnace roof. The bottom proper of the furnace consists of dead burned Spaeter magnesite to a depth of 12 in. at its thinnest point, which is, of course, at the extreme center. From this thinnest point the bottom slopes gradually upward so as to form a portion of a sphere 7 ft. 2 in. in radius.

To diverge a moment from the construction of the furnace, this bottom was put in in the following manner: Dead burned and carefully ground Spaeter magnesite was mixed with basic open hearth slag in the proportion of four of magnesite to one of open hearth slag. To this mixture sufficient tar was added to make the mass sufficiently plastic to enable it to be tamped into the furnace in the usual manner. The entire depth of the bottom was tamped in this way. Next the furnace was filled with wood dried out for about 48 hours and then filled with coke and the electrodes lowered and the current turned on. In this way the bottom was fluxed into place.

The roof of the furnace is of silica brick 12 in. in thickness. The roof is made up on a movable ring. This rig is fitted with a top and bottom angle iron to take a skewback brick, and then from this the arch is spanned across the 10-ft.

interior of the furnace with an 8-in. rise. The bricks are set in circles parallel to the steel ring, the usual wooden wedges being placed here and there to take care of the subsequent expansion of the brick. Holes for the electrodes are left in the roof by means of templates placed in position. The bricks are held in position around these holes by their lateral pressure.

There are five doors, two on each side of the furnace, and one in front over the pouring spout. These doors are of cast iron lined with clay brick laid the 4½-in. way. They work in the usual groove arrangement and are operated by steam pressure of about 150 lb. The front door over the pouring spout is an exception to this, being operated by hand with a counterbalance.

The Electrodes and Their Handling Device

The three electrodes are let down through the roof in the form of an equilateral triangle, each side of which is 5 ft. 2 in. in length. The apex of this triangle points

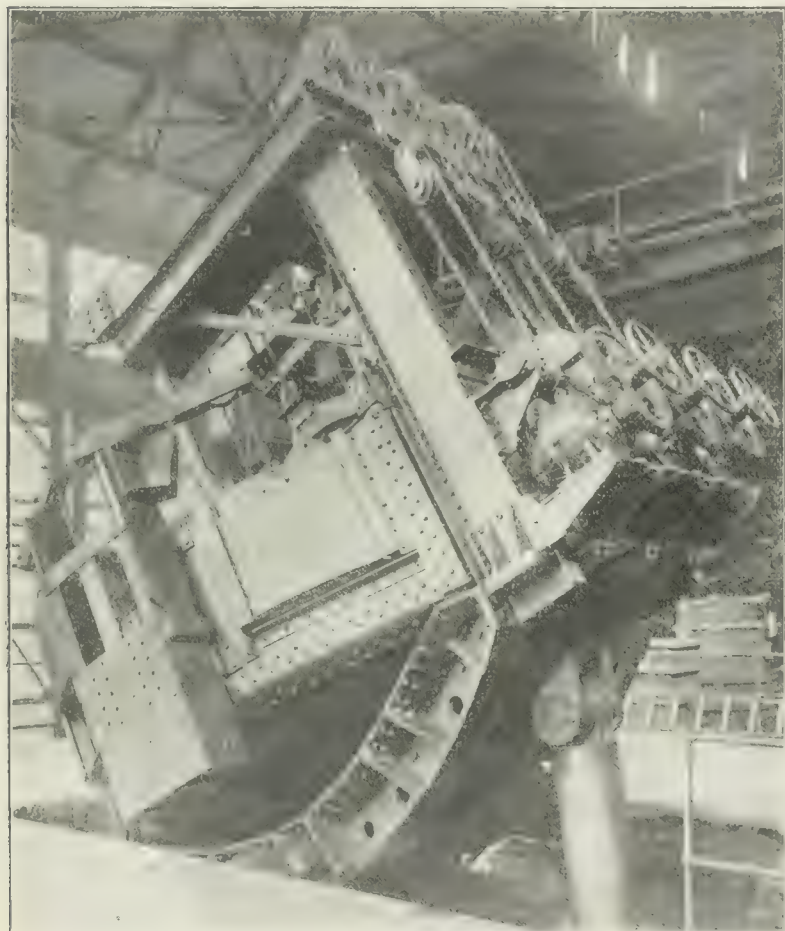


Fig. 1. 15-Ton Heroult Electric Furnace at South Chicago Works of Illinois Steel Company.—Furnace Tilted by 18-in. Plunger.

this rack the furnace proper rests on a floating pinion fastened to its shell by rivets. The arc of this floating pinion has a radius of 10 ft. and aims to give the furnace an angle of approximately 29 degrees when tilted over to its full extent. The position of the furnace when tilted is shown in Fig. 1. Attached to the extreme back of the furnace is an 18-in. plunger with a 4-ft. stroke working in a cylinder attached to a hydraulic line of 500 lb. pressure to the square inch. This gives a lifting power of approximately 45 tons. The balance of the furnace is so arranged that the equilibrium is never upset, and therefore to return to a horizontal position merely requires the releasing of the pressure and the furnace returns of its own weight. It will be readily seen that the floating pinion and rack work requires some provision for the forward motion of the furnace

* From a paper read before the Chicago Section of the American Electrochemical Society, January 29, 1911.
Superintendent of South Chicago Works, Illinois Steel Company

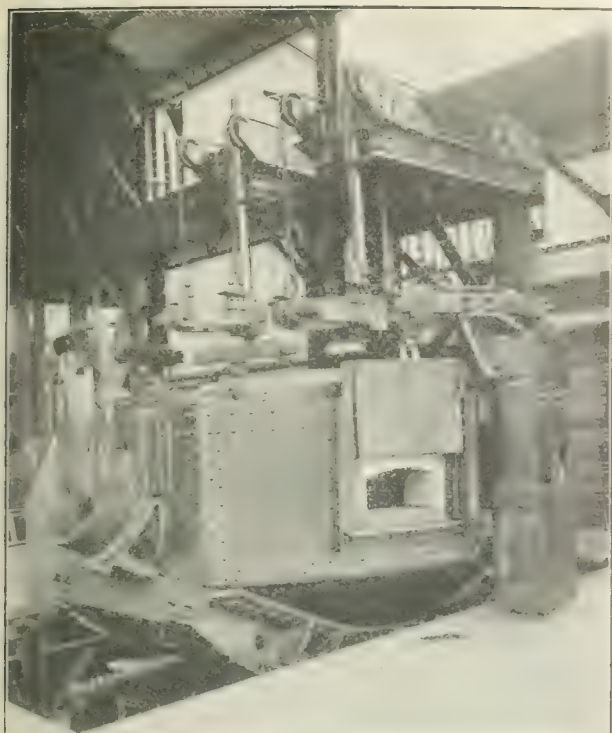


Fig. 2.—Side View Showing One of Five Doors, Also Method of Supporting Electrodes.

directly east—that is, toward the back of the furnace. The center of this triangle coincides with the center of the furnace roof. The overhead structure which supports these electrodes may be seen in Fig. 2. There are, of course, three separate holders, one for each electrode. Each holder is constructed of a solid copper casting bolted directly to the bus bar. In front these holders are split and joined with a right and left screw, which enables the holder to be opened or closed at will. The

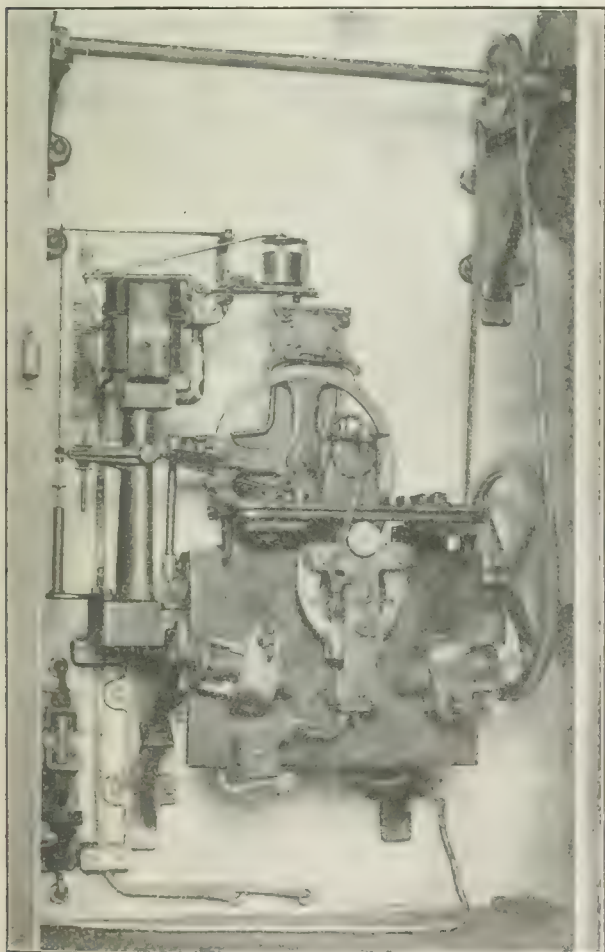


Fig. 3.—Mechanism for Automatic Regulation of Electrodes.

holders are designed to carry a 24-in. electrode, but by means of contact blocks to fill, any smaller sized electrode can be employed. The weight of the electrode is supported by the chains. These run back over pulleys to the drums at the back of the furnace. The electrodes are kept in alignment by vertical guides. They are regulated by individual motors placed at the back of the furnace. These motors are attached by gears to the drums. The regulation is by hand, by controllers or by an automatic device.

Each electrode is, of course, regulated separately, and (referring to Fig. 3) its regulation is as follows: A stationary magnet coil, the current through which can be adjusted at will, is opposed by a floating magnet coil, whose position is determined by a spring and the amount of current passing through it. The current in this floating magnet is obtained from a current transformer attached to the bus bars. When the current in the bus bars and the proportional current, therefore, of the

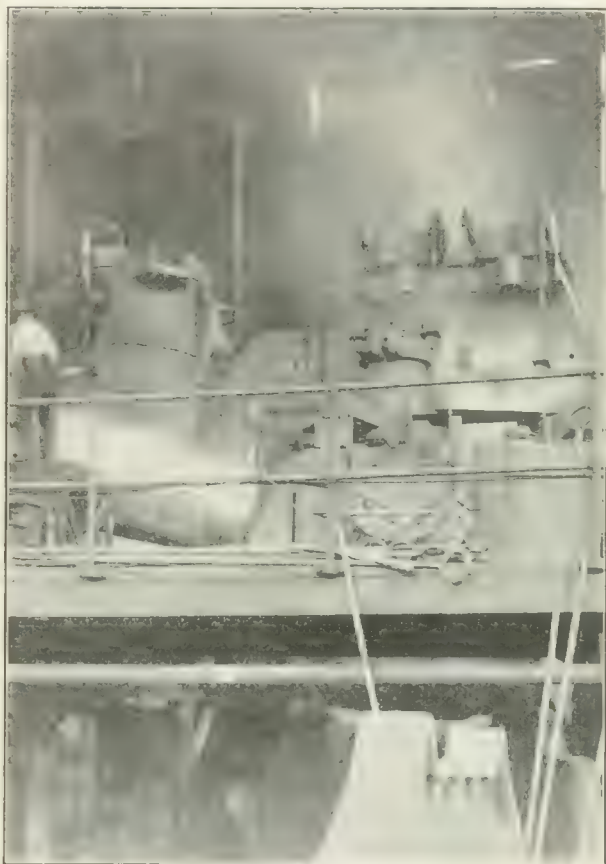


Fig. 4.—Charging Converter Metal Into Electric Furnace.

floating magnet, is that for which the regulator of the stationary magnet is set, the magnetic opposition of the two magnet coils is exactly counterbalanced by the strength of the spring, and the apparatus is at rest. When, on the other hand, the strength of the current in the bus bars, and consequently the proportional current in the floating magnet, is either greater or less than that at which the stationary magnet is set, then the magnetic opposition of the two magnet coils either overcomes or is overcome by the strength of the spring, and the two magnet coils either retreat from or approach toward one another. This motion of the floating coil is transmitted by a lever which in turn causes a dog to drop into a slot in a constantly moving rocker wheel, and in this way a right or left contact is made, and the direct current motors controlling the electrodes are started, either clockwise or anticlockwise, and the electrodes in turn are either raised or lowered. This is repeated with each oscillation of the locker until equilibrium is restored. It might be of interest to state here that each contact made as spoken of above serves to raise or lower an electrode about $\frac{1}{8}$ in. It has already been stated that the regulation can be by hand controllers. These three hand regulators are situated at the back of the furnace

helpers shovel iron oxide and lime into the furnace through the working doors. In this way a basic oxidizing slag is produced, which serves to remove the phosphorus. In about 30 minutes this slag has served its purpose and the furnace is tilted slightly forward and the slag removed in from 5 to 10 minutes by hand rabling.

The recarburizer is added at this point. On the bare surface of the oxidized metal lime is quickly added with sufficient fluorspar to keep the mass fluid. In about 15 minutes this lime is melted, and finally divided coke dust is now thrown on the top of the slag beneath each of the three electrodes.

Under the influence of the arc calcium carbide is produced in gradually increasing quantities. As soon as this state of affairs is reached a neutral, if not actually reducing atmosphere, has been obtained. From here to the finish there is practically a dead melt in a reducing atmosphere. The slag at this stage of the process is fluid and highly basic. If a sample should be taken and water added to it the resultant acetylene gas, from the well-known calcium carbide water reaction, is of sufficient quantity to light and burn for half a minute.

Tests are now taken to show the condition of the steel. A small cylindrical test piece is poured and forged to a round pancake shaped object under a steam hammer, located at the furnace. If this forged sample shows by its appearance a satisfactory condition of the metal the bath is tapped. If not, further refining is necessary.

To tap the furnace the electrodes are raised from the bath and the ladle swung by a crane under the pouring spout and the tilting lever pulled forward. The pouring is done through a 1½-in. nozzle to molds of varying sizes.

Table 1.—Electric Furnace Charge Sheet.

Material:	Pounds.
Bessemer blown metal	30,000
Scale	700
Ferromanganese, 80 per cent	200
Ferrosilicon, 10 per cent	60
Ferrosilicon, 50 per cent	80
Recarburizer	130
Fluorspar	400
Coke dust	200
Lime—first slag	600
Lime—second slag	600
Dolomite	400
Magnesite	25
Tapped previous heat	7.00 a.m.
Metal ordered for	7.15 a.m.
Metal received	7.15 a.m.
Began fettling	7.17 a.m.
Current on	7.27 a.m.
Slag off—began	8.00 a.m.
Slag off—finished	8.11 a.m.
Tapped	8.48 a.m.
Time of heat	1 hr. 21 min.

A typical furnace charge sheet, as in Table 1, may interest you. It will be seen from this that it takes us an hour and a half or two hours to heat, according to the grade of steel produced.

What is actually done in the electric furnace at the South Works is to take oxidized blown metal of an approximate analysis of

C	S	P	Mn.	Si.
0.05-0.10	0.035-0.070	0.095	0.05-0.10	0.005-0.015

and produce deoxidized steel low in sulphur and phosphorus and within reasonable limits of practically any analysis required by the consumer.

Fig. 5 shows the elimination of the impurities in the electric furnace during the process of making an alloy heat. Fig. 6 shows the fluctuation in the slag analysis.

The Variety of Product

The electric furnace at South Chicago has operated on a greater variety of product than any furnace in the world, and with bewildering intermingling of high grade alloy steels, high grade carbon steels and ordinary carbon steel. We have made of ordinary carbon steel rails of a dozen different sections, billets of all sizes and grades, plates of all sizes and grades, structural shapes, castings, small and large, high carbon and low, and forgings of all sizes. Of alloy steels we have made nickel, nickel-chrome, chrome, manganese and silicon steels.

Perhaps many of you will wonder at the adaptability of this furnace for handling cold materials. We have made a number of heats from cold materials. In several of these we took the worst scrap we could pick up, which appears to us to be stove plate scrap. With this stock axle heat was made which showed excellent physical tests. If I remember correctly, 77 blows from a 1640-lb. hammer falling 43 ft. broke the first axle and 68 similar blows the second.

The Quality of the Steel

The main chemical or physical differences in electric steel seem to be these:

1. A comparative freedom from oxidation.
2. A comparative freedom from segregation.
3. A higher tensile strength and slightly higher ductility for the same chemical analysis up to about 0.40 carbon, where the difference becomes less apparent. See Table 2.
4. A steel of greater density than our other commercial steels, with the possible exception of crucible.

In conclusion let me say that the three electric furnaces of the Steel Corporation are the largest in the world that have as yet been put in operation. They have presented many interesting and complex problems and the manufacturer has encountered occasional troubles. Although we feel that we are as yet but on the threshold of this method of manufacture, we feel that electric steel is a success and its future assured.

The Pope Mfg. Company, Hartford, Conn., now turning out automobiles as well as bicycles, is stated to be doing an unusually heavy business in the latter. In the fiscal year ending July 31, 1910, it shipped 57,000 bicycles. The current fiscal year the shipments will exceed 65,000, and will break any previous year's showing of the company, even in the old days when it was exclusively a bicycle concern, and when that industry was enjoying its boom 16 or 18 years ago.

Table 2.—Statement of Averages of Ultimate Strength and Per Cent. Elongation (in 2 In. of Plates and Open Hearth Plate Steels Arranged According to Carbon Analysis.

Electric Plate Steel.				Basic Open Hearth Plate Steel.			
Carbon.	No. of heats.	No. of tests.	Average ultimate strength.	Carbon.	No. of heats.	No. of tests.	Average ultimate strength.
0.08	3	5	59,194	0.08	3	5	51,690
0.09	2	5	59,502	0.09	2	5	52,570
0.10	3	5	57,662	0.10	3	5	54,666
0.11	3	5	59,585	0.11	3	5	54,854
0.12	2	5	64,080	0.12	2	5	56,510
0.13	3	18	65,880	0.13	3	18	56,595
0.14	3	12	62,030	0.14	3	12	55,322
0.15	3	15	61,203	0.15	3	15	58,683
0.16	5	27	69,220	0.16	5	27	52,901
0.17	5	22	66,638	0.17	5	22	55,780
0.18	5	21	65,350	0.18	5	21	58,469
0.19	3	15	70,336	0.19	3	15	59,504
0.20	2	7	72,853	0.20	2	7	58,294
0.21	2	9	68,640	0.21	2	9	63,050
0.22	1	2	70,820	0.22	1	2	54,500
0.23	2	7	73,370	0.23	2	7	61,148
0.24	1	2	69,540	0.24	1	2	63,560
0.16	28	107	65,640	0.16	28	107	56,947
Average of averages.							

The above table shows 15.5 per cent. increased ultimate strength for the electric steel and 11.3 per cent. decreased elongation as compared with open hearth plate steel of approximately the same chemical analysis.

The Reliability of Electric Furnaces*

Factors in Their Development Under American Conditions

BY F. T. SNYDER.†

A few days ago a man who had been in the East attending the meetings of an association of engineers, representing an industry that uses a large amount of high grade steel in various forms, was asked about the electric furnace paper on the programme. He characterized it as "the usual optimistic hopes by the agent of an electric furnace inventor." But without the furnace inventors and without the optimistic hopes that held them for 10 years to the expenditure of time and energy and money that was all outgo and results deferred, there would be no commercial electric furnace work to-day to consider. Moreover, it now seems as though the time had come to point out to those who are less closely in touch than ourselves that the electric furnace has grown beyond a question of this or that inventor; has grown beyond a question of hopes to one of commercial use, and is now a matter of engineering and finance; that to-day the electric furnace has achieved reliability.

The Siemens Electric Furnace

But before the time goes by when particular arrangements of electric furnaces are named after their inventors, as such time has gone by for the open hearth furnace and for the crucible furnace, it would seem proper that we should call by the name of its inventor that simplest of all electric steel furnaces, in which a single electrode above leads the current through an arc to the steel and a metallic contact with the steel bath below leads the current back to the dynamo. Back in 1880, so far back that the paper describing it was read before the Society of Telegraph Engineers, then the only organization representing electrical engineering, William Siemens built and operated his furnace in which the heat of the electric arc was used to melt steel. This little furnace was a practical furnace. It made good steel. A duplicate of it, copied from the old drawings, will work to-day without difficulty, making its little batch of steel. It is especially fitting that to this same William Siemens the steel industry also owes its open hearth furnace, only second in importance to the blast furnace itself.

As the Siemens electric steel furnace was the first practical electric steel furnace, so now it bids fair to be also the furnace to be used in the greatest numbers. It is characteristic of the electric furnace that it is reliable in small units, and it is in this direction that the industry is tending—the making of some steel castings by many of the gray iron foundries; the making of their own steel castings by many of the larger users. In these small installations the simplicity and reliability of the Siemens electric steel furnace will be important. With proper engineering this single electrode type of steel furnace can be built reliably up to 500 kw., producing 250 tons of steel per month with continuous operation. Many more than a majority of commercial installations will be below this tonnage. A worthy use of this opportunity will be to emphasize the good to electrochemistry that has lived beyond the life of this man by calling this type of electric furnace the Siemens furnace.

Commercial Results

Broadly, reliability is commercial, the ability to make a profitable return on an investment. That the electric steel furnace is reliable in this way is emphasized by the growth of those plants in Europe that are making electric steel exclusively. And beyond steel making, the electric furnace has been commercially reliable so long in the aluminum industry that the general patents have run out. The commercial reliability of the electric fur-

nace in the manufacture of carbide has for years been in evidence with each user of acetylene light. Less widely known but commercially profitable has been the electric furnace manufacture of carbon bisulphide, of phosphorus, of graphite, of abrasives, of magnesium for flash lights, of ferroalloys for steel refining, and in the last few years we have seen the reliability of electric furnace operations pledged in the investments of the millions of dollars that are going into the construction of huge electric furnace plants for the production of fertilizers. And it is the commercial reliability of these older electric furnace applications that is back of the reliability of the newer application of the electric furnace to steel. In them was developed the demand that justified the building of electrode factories whose products is now available for steel furnaces. In them was developed the special engineering ability to handle the large electric currents of furnace work. They had their part in the demand for electric current at lower and lower cost. It is these things that have given the Siemens electric steel furnaces of 30 years ago, a technical curiosity then, its standing to-day as a reliable industrial tool.

Technically, reliability is a matter of apparatus and men and supplies. These react on each other. Experienced and skilled men can force poor supplies and indifferent apparatus to a commercial output. Apparatus that is inherently self-regulating will permit the use of such men as can be had at a permissible cost. Supplies that have a factor of safety in their constitution will carry the equipment through an overload. Involved in the question of commercial reliability is the element of time. Results must be prompt.

An American Electric Steel Industry

To make electric steel in the United States means furnaces that are reliable, with American men and American supplies. In the rush of industry reliability cannot afford the time hazard of importation. Europe developed the electric steel furnace industry first, just as it developed the dynamo first, the steam turbine, the large gas engine and steel making itself. There the pressure of competition for opportunity, the abundance of trained technical men and the low cost of capital force enterprise. Safely we may look in America for the same swift overtaking of achievement with the electric steel furnace that has characterized other technical developments. For this reliable American electric furnace supplies are now available and tested. American electrodes can be had in sizes as large as furnace requirements call for. Refractories made in this country have been developed with an ability to stand up well under the higher temperature of the electric steel furnace. Campaigns with roofs of American brick have run into months as against weeks for European practice.

Skilled electric furnacemen are scarce. The rapid installation of furnaces more than absorbs the few who have had an opportunity to become experienced with electric furnaces working in commercial operation. Trials with electric furnacemen imported have not been wholly satisfactory. The drive of the American steel plant does not seem to fit with the methodical nature of the foreign technician. This shortage of skilled furnacemen at permissible costs has thrown more of the burden on the apparatus, has directed American electric steel furnace design toward inherent self-regulation, as we say electrically; toward reliability, as the investor looks at it; toward making it "fool proof," as the man on the job phrases it. Furnace detail that works very well in Europe, with the skilled help available there, has to be designed here to work with the help that can be had. This inherent reliability can now be carried to an

* A paper read before the Chicago Section of the American Electrochemical Society.

† Metallurgical Engineering Company, Chicago.

extent that permits taking a steel melter from a crucible or open hearth furnace and putting him on an electric steel furnace, with the assurance that within a week he can be making salable steel regularly. This does not mean making an electrician of him. Actually he knows no more of electricity than he knew of the kinetic theory of gases in his open hearth work, but he does know that when the wattmeter needle is in a certain position he has a supply of heat in his furnace, and hot heat at that, and heat that, hot as it may be, will not burn his steel.

Better Steel

But a reliable furnace and reliable supplies and reliable melters are not all of the commercial reliability of electric steel. The steel produced is different from crucible steel. It is different from open hearth steel. If it were not different the electric furnace would not be used. It is true that under favorable conditions steel can be made cheaper with an electric furnace than in other ways; but the fundamental reason that is speeding electric furnace construction is that the steel is better. Being better means differing chemically, differing physically from the steels of the other furnaces, and this difference chemically and physically must be reckoned with in the subsequent processes the steel goes through. In the foundry the molding must be done for this new material. It is freer from gases. It usually is hotter. The tendency is to lower the carbon for the same tensile strength, and this makes it set at a higher temperature. The improved elimination of phosphorus and sulphur tends in the same direction. In the forge and rolls electric steel shows its additional strength and toughness.

It must be handled from the point of view of its characteristics. It is a mistake simply to consider the electric steel furnace as a substitute for some other kind of a melting furnace. Its introduction can be counted on to mean changes of method, as far as the steel is followed in manufacturing processes, and unless this is clearly recognized there will be disappointment and the reputation of the electric furnace for reliability will suffer.

Electric Furnace Construction No Experiment

From a still narrower technical point of view, reliability means freedom from actual breakdown, from the enforced necessity of change in construction and the consequent loss of time and productive capacity. As to this, electric furnace design is now on an engineering basis. Dependence on experiment is now a matter of volition on the part of the investor. It is no longer a necessity. As a piece of engineering apparatus an electric furnace can now be more closely designed to meet narrow specified operating conditions than can an open hearth furnace.

In a recent instance an electric furnace and a small open hearth were installed side by side in a new steel casting shop. The open hearth gave trouble and has been replaced by a better design. The electric furnace, although not of most modern design, has operated without need of alteration. Those details in which an electric furnace differs from established open hearth practice—the electrode holders, the electrical regulation, the contacts with the bath of steel—are now rugged and simple. Electrode holders are in evidence that operate with less than one hour's lost time in a hundred heats.

The Record of a Western Plant

Recently I have had occasion to examine carefully in detail the condition of a plant using electric furnaces exclusively, that started operation on a commercial scale in the summer of 1907, and that is quite aged as electric furnace design goes. It is proposed to double the size of the unit and increase the size of this plant fivefold; and this examination was made to determine from the condition of the plant and the operating history what changes in the original design could be made to advantage in the extensions. Incidentally, the examination disclosed a condition of continuing reliability that is worth recording. Substantially all of the original equipment was still in use. The plant, which is in the West, has been operated since its installation by Chinese labor under a white superintendent, and neither the superin-

tendent nor the Chinamen knew more of electricity than is involved in the opening and closing of circuit breakers and the reading of ammeters and voltmeters. One of the power transformers had been replaced, but it was learned after its removal that the trouble was an abraded spot on a terminal that could have been readily repaired on a Sunday at the plant. This particular plant, while not a steel plant, is of interest in showing on many of its operating records a heat development efficiency of over 90 per cent.—that is, of the heat equivalent of the energy delivered to the plant by the high potential electric wires, over 90 per cent. is transferred to the material under treatment.

Cheap Electricity a Prime Factor

It is to be expected that the success of this new and flexible tool of industry will lead to over enthusiasm and to its application in wrong ways and in wrong places, and that its failure as a panacea for troubles it has properly nothing to do with will bring setbacks. But back of its present success is the cause of that success, the steadily lowering cost of electric current. Thirty years ago the furnace of Siemens worked as an apparatus. It was not until the cost of current dropped below the figure at which the electric furnace was commercially reliable in this country that its industrial application began and its engineering side developed. This dropping of the cost of electricity is still going on, and as it goes on it brings a greater and greater motive force to bear on the installation of electric furnaces. At the same time, unfortunately for industry in general, but fortunately for the electric furnace, the cost of fuel for direct and gaseous heat is slowly but steadily rising.

Summed up more briefly, the facts that an investigator of electric furnace results may expect to find are:

1. That the electric furnace itself has passed from the field of experiment to that of engineering, but that the fields of manufacture using the electric furnace products are still experimental.
2. That the electric furnace is technically reliable and will operate continuously with the men and supplies that are available in this country. That the details are simple and rugged, and that the inherent regulating powers can be made such as to bring it well within the ability of usual plant labor.
3. That the electric furnace is commercially reliable. That when installed with the same business care and adaptation to conditions that should be used with other furnaces, it will earn a profit on the investment, and a profit that is larger than the normal manufacturing profit in proportion as the field is more open.

Copper Consumption.—President Daniel Guggenheim of the American Smelting & Refining Company has given the press his views on the development of the copper industry and the outlook for it. He says that the demand in Europe was greater last year than in any previous year. Business in Europe prospered throughout the entire year, and industries which consume copper were more active and aggressive than ever. While the buying of copper was more spasmodic in this country than in Europe last year, the consumption had increased in this country about 10 per cent. over 1909. He makes the interesting statement that 50 per cent. of the copper consumed is used in electrical industries, 35 per cent. in the manufacture of brass sheets and tubes, 7 per cent. in copper sheets and other finished products and 8 per cent. in brass castings.

At the annual meeting of stockholders of the Harbison-Walker Refractories Company, held in Pittsburgh last week, the following directors were elected: H. W. Croft, Hamilton Stewart, O. M. Rief, L. C. Turley, J. J. Brooks, Jr., George W. Reese, H. F. Bigler, J. E. Lewis, T. H. Given, R. W. Harbison, T. L. Chadbourne, Jr., Hay Walker, Jr., Hay Walker, William Walker and N. McQuillen. The board organized by re-electing these officers: President, H. W. Croft; vice-presidents, Hay Walker and O. M. Rief; secretary, Hamilton Stewart; treasurer, William Walker.

Electrolytic Iron*

Can It Be Made an Industrial Product?

BY CHARLES L. BURGESS.

During the past five years investigations have been carried on in the chemical engineering laboratories of the University of Wisconsin, dealing with electrolytic refining of iron and its use in the production of alloys. About 3 tons of iron have been refined and over 1000 alloys produced and tested. While this experimental work has been on the "test tube" or laboratory scale, it is believed that some of the results indicate the feasibility of enlargement to commercial state, and a short discussion is submitted here bearing on the question, "Can electrolytic iron be made an industrial product?"

Many old textbooks on electro-chemistry give descriptions of methods of depositing iron electrolytically, implying, therefore, that electrolytic iron is not a new product. The only use suggested, however, is for facing engraved plates used for printing. By following any of these earlier processes it is seen that only very thin layers of iron can be deposited, the coating tending to become dark, rough and powdery. It is to overcome this limitation that the work at the University of Wisconsin was undertaken, and that this has been successful, in a measure, is indicated by an iron cathode nearly 2 in. in thickness.

The Field for Electrolytic Iron

The manner in which electrolytic refining has revolutionized the copper industry is now an old story, and electrolysis has likewise become an industrial agent in the metallurgy of silver, gold and lead. Now, that it has been found that iron can be refined electrolytically almost as easily as copper, it is pertinent to inquire whether there is a field of usefulness for such iron. This depends upon whether electrolytic iron has superior qualities due to purity or physical condition, and whether it can be procured at low cost.

From the standpoint of purity it must compete with some notable metallurgical developments which have resulted in product such as being made by the American Rolling Mill Company in a basic open hearth process. For this material a purity of 99.94 per cent. is claimed, and justifiably so, as some of our analyses show. The electric furnace is another factor which is contributing largely to the control of the composition and purity of iron alloys, and the striking possibilities which are offered in this developing field cannot be overlooked in advocating the development of an electrolytic iron process.

The chief source of commercially pure iron has been and, perhaps, now is, the high grade Swedish and Norway iron, used largely as a base material for high grade crucible steel. The analyses of this material usually indicate a high purity, though frequently and erroneously calculated by difference, after determining carbon, sulphur, silicon, phosphorus and manganese. It is not uncommon to find oxides and slag to the extent of 2 per cent. in this material, and this impurity undoubtedly may have an influence on the resulting alloys made from it.

Electrolytic Iron 99.97 Per Cent. Pure

We have found that electrolytic iron can be produced with a purity as high as 99.97 per cent., and, perhaps, even better, using extraordinary precautions. This record has been made by using the best commercial grades of pure iron as anodes. A few hundredths of 1 per cent. of purity must be sacrificed in using anodes of mild steel or other less pure materials. Electrolytic refining offers a means of reducing or screening out most of the impurities commonly found in iron and of producing a material not only of high purity, but of great uniformity. Even though it may be shown eventually that electrolytic iron may not have a higher purity than that attainable

by other methods, the uniformity of its composition should make it a valuable material as a means of eliminating many of the variables with which the crucible steel maker has to contend.

Using an electrolyte containing 40 g. of iron per liter in the form of ferrous sulphate, together with 40 g. of ammonium chloride, it has been found possible to conduct a continuous refining operation for many months at a current density of 6 to 10 amperes per square foot of cathode surface, and at a potential difference of about 1 volt. The current efficiency is very close to 100 per cent., as it is in copper refining.

A Calculation of Cost

This leads to the calculation that 1 kw.-h. will refine 2 pounds of iron; or a cost for power of $\frac{1}{2}$ cent per pound is attainable. The costs for labor, solution maintenance and fixed charges are estimated to be not greater than the power costs, making a cost of refining of about \$20 per ton. Assuming the anode material to be a mild steel costing \$35 per ton, the cost of electrolytic iron would be in the neighborhood of \$55. These approximate calculations indicate that this material might well compete in price with high grade Swedish iron.

Among the properties of electrolytic iron which may give it some added usefulness is its content of hydrogen and the brittleness which results from this occluded gas. This hydrogen may be of some service in reducing oxides in a melt. The brittleness of the electrolytic iron before the hydrogen is driven off makes it easy to break it up into pieces suitable for introduction into the steel crucibles.

The All-Geared Multi-Spindle Drill

Especially Designed for High Speed Drilling

Adjustable multiple spindle drilling machines occupy an important place among manufacturing tools, for they allow all of the holes in one piece to be drilled in the time required for one with an ordinary drill press. The All-Geared multi-spindle drill illustrated in Fig. 1, a new design offered by the Walter H. Foster Company, 50 Church street, New York City, is designed especially for the use of high speed steel drills to their maximum capacity without undue strain or wear on the adjustable and moving parts. The substitution of gears for uni-

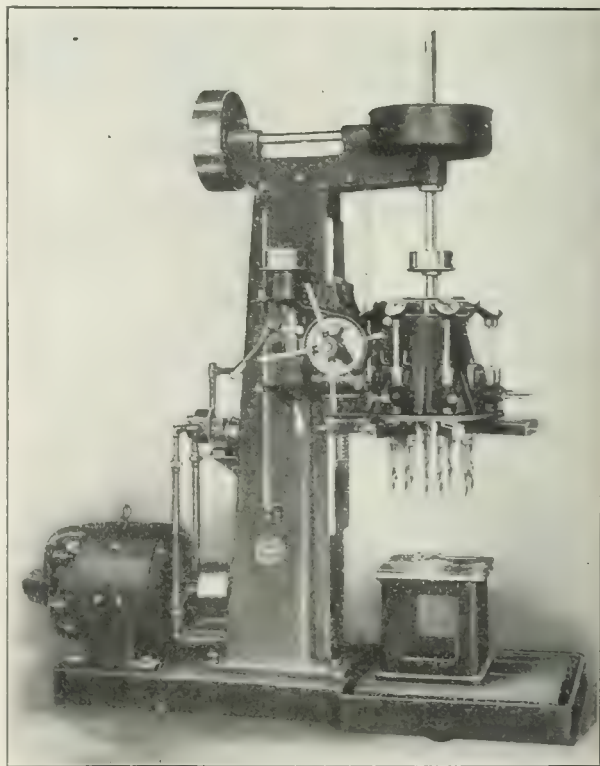


Fig. 1 The All-Geared Multi-Spindle Drill Sold by the Walter H. Foster Company, New York.

*A paper read before the Chicago Section of the American Electrochemical Society, Jan. 20, 1911.

† Professor of chemical engineering University of Wisconsin.

versal joints, the introduction of steel where cast iron was formerly used, and the improved method of adjusting the spindles to any desired position, either horizontally or vertically, are the more important features.

The base has a working surface of 28 x 30 in. with an oil groove around it, connecting with an oil receptacle cast integral with the base. An extension at the rear of column supports a motor or countershaft, as the case may be. The column is of heavy box section mounted on the base, and contains a counterbalance for the drill head.

As illustrated the power is transmitted from a two-to-one 5-hp. variable speed motor through a 4-in. double belt to a 16-in. pulley. An oil pump located on the rear of the column is belted direct from the motor or countershaft. The spindle head is of conical box pattern, with ample bracing to insure rigidity, and has a bearing surface on the column of 9 x 20 in., and has adjustable gibs to compensate for wear.

Referring to Fig. 2, the feed drive is taken from the pulley *a* to the pulley *b* and through the gears *c* to the gears *d*. The latter running continuously, but loose on their shaft, may be selectively engaged to the vertical shaft *e* by a diving key controlled by the lever *f*. Through two bevel gears on the lower end of the shaft *e* and a positive jaw clutch controlled by the handle *g* the feed transmission continues to the horizontal shaft *h*. This carries a hardened steel worm, which drives a large bronze worm wheel which is integral with its shaft and

Particular attention is called to the method of attaching the spindle carrying arms to the drill head. The arm itself (*l*, Fig. 2) is a steel casting, and the intervening saddle *m* is machinery steel, with a projection or pintle which serves to maintain the vertical position of the spindle, while the nut is loosened for adjustment to position. The arm is carried in the saddle by a dovetail, and the head of the binder screw is a nut in which the horizontal adjusting screw is operated.

The vertical adjustment of the drill socket in the spindle, shown at *p*, in Fig. 2, is new in multi-spindle drills, and of special value, enabling the operator to start with all drills cutting at the same time, and providing for a considerable range of stepped drilling; this adjustment is 1½ in. in each spindle, and is accomplished by turning a knurled nut.

For drill lubrication a central oil reservoir is provided in the spindle head, and oil is conveyed to each drill through spiral flexible hose; a valve controls the supply to each spindle. All spindles and driving shafts run in bronze bushings, and the bearings have ample and accessible lubricating facilities. The drill spindles have Hess-Bright radial and thrust ball bearings and the feed worm a thrust ball bearing.

The capacity of the machine illustrated is ¼ to ½ in.

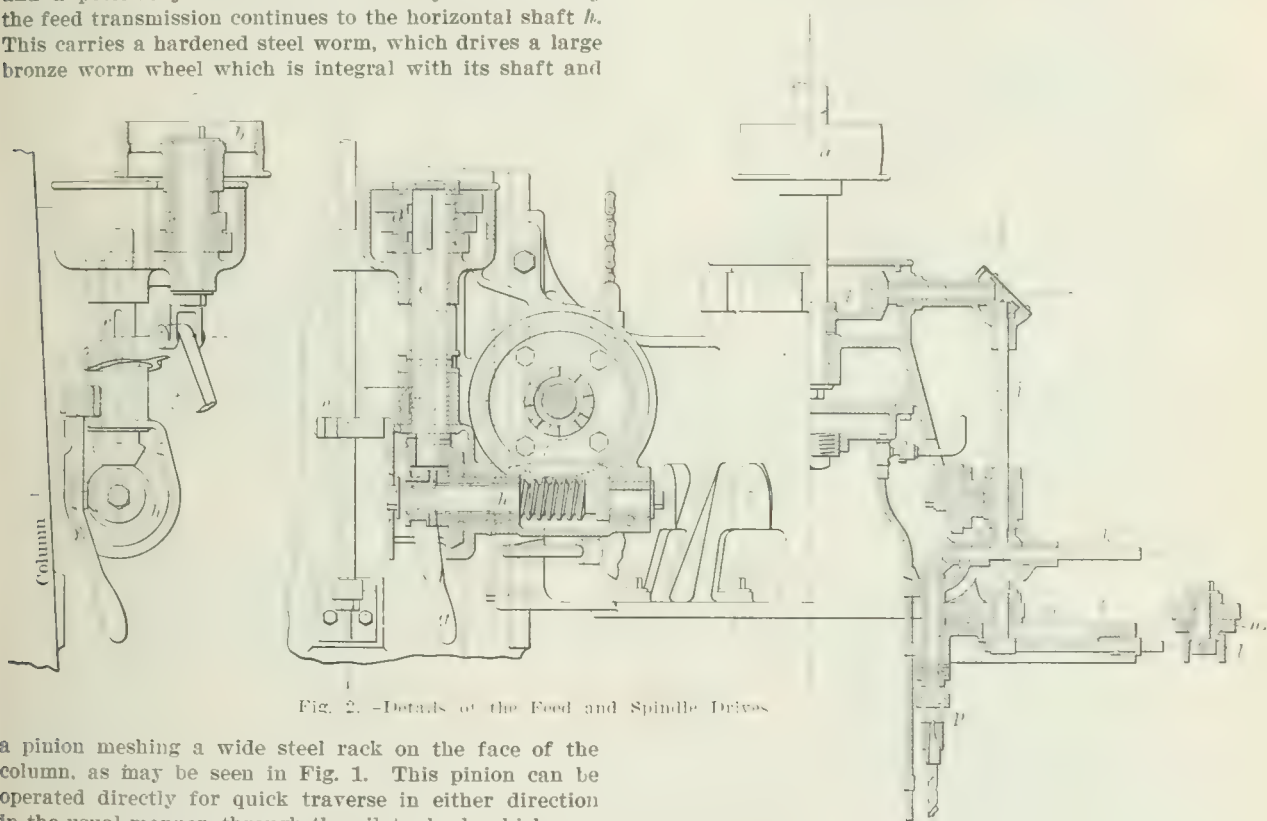


Fig. 2. -Details of the Feed and Spindle Drives

a pinion meshing a wide steel rack on the face of the column, as may be seen in Fig. 1. This pinion can be operated directly for quick traverse in either direction in the usual manner, through the pilot wheel, which may be seen in Fig. 1, engagement being made by a tooth clutch. The power feed can be set to be tripped at any point by setting the adjustable dog *n* to contact with an arm on the lever *g*.

Fig. 2 also shows the details and transmission of the spindle drive. The shaft carrying the pulley *a* also carries the large bevel gear *i*, which is in constant mesh with eight bevel pinions on horizontally radiating shafts equal distances apart. Through miter gears the drive is transmitted to eight vertical shafts, *j*, then to eight horizontal shafts, *k*, and finally to the individual spindles. The horizontal shafts *k* have longitudinal adjustment in their supports to allow the drill spindles to be located at various distances from the center, and they also have angular adjustment in a horizontal plane, so that the drill spindles may be placed at various distances from one another. Between these two adjustments it is possible to set the spindles in any regular relation, circular, square, rectangular, or in a straight line, or any irregular arrangement within the limits of the maximum adjustments. The small bevel gears are of chrome nickel steel, hardened and incased, thus permitting them to run in lubricant.

high speed drills within a 12-in. and outside a 4½-in. circle; the least center distance between spindles, 1¾ in. Other standard sizes are furnished with 4, 6, 10 and 12 spindles, suitable for drilling 1-in. holes, the largest inside of a 24-in. circle, and outside of a 9-in. circle, and also a standard head for 12 and 16 ½-in. holes in a rectangular surface 16 x 20 in. The box table is 16 in. square by 16 in. high.

In the machine illustrated the maximum distance from the spindle to the bed is 42 in. and the minimum 16 in. From the face of the column to the center of the head is 14 in. The drill spindles have No. 1 Morse taper sockets. The three drill speeds are 300, 450 and 600 rev. per min., and the three feeds 0.005, 0.008 and 0.011 in. per revolution of the spindle. The overall height of the machine with the head in its highest position is 8 ft. 10¾ in.; the floor space is 3 x 7½ ft., and the net weight 3600 lb.

The Girard Iron Company has blown in its furnace at Girard, Ohio, which has been out some months for repairs and improvements.

The Cincinnati Boring Mill

An Extension to the Lines of the Cincinnati Planer Company

The manufacture of boring mills has been commenced by the Cincinnati Planer Company, Oakley, Ohio, and

As will be noticed from Fig. 1, the bed is of the box type, 21 in. in depth and all parts are thoroughly ribbed and braced, an I-beam construction of liberal thickness being used instead of the customary channel sections, which are more apt to spring. The table is 10 ft. in diameter and 10 in. deep at the edge. It is supported on a broad, flat bearing 9 ft. 5 in. in diameter, and the large center spindle revolves in a bushed bearing which is

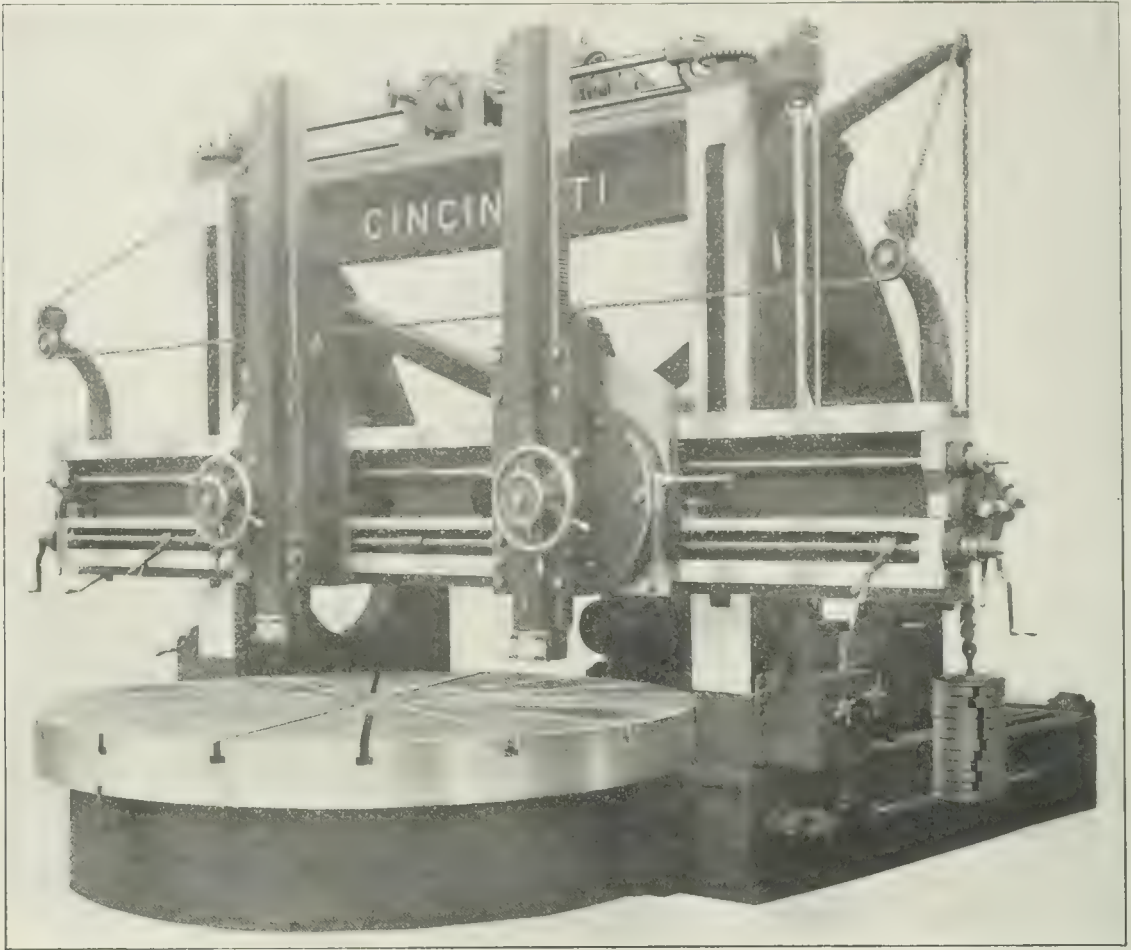


Fig. 1.—Front View of a New Boring Mill Built by the Cincinnati Planer Company, Oakley, Ohio.

several sizes have been brought out. Among these is a 10-ft. mill, a front view of which is given in Fig. 1. Fig. 2 shows the driving gear, Fig. 3 illustrates the adjusting mechanism provided for the head, while Fig.

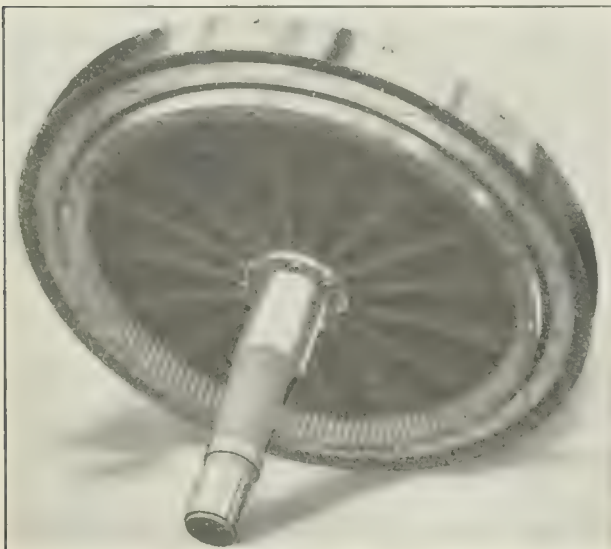


Fig. 2.—The Driving Gear of the Mill.

4 is a rear view of the tool giving some idea of the massive construction of the housings, and showing the arrangement of the controlling levers.

adjustable for wear. A step bearing is provided at the bottom for adjusting the load on the stump of the spindle, which is not changed after setting.

A special feature is the manner of lubricating the track on which the table travels. Three pockets are cored in the bed to receive the automatic oiling devices. These pockets are filled from the outside, and are so arranged that the operator can see the amount of oil they contain, and he can thus be sure that the track is receiving the necessary lubrication at all times. This arrangement does away with the periodic flooding of the track with an oil can, and also obviates the necessity of raising the table from the track to clean off the gummed oil. The pockets can be drained and thoroughly cleaned at any time by simply inverting the inlet pipe.

The driving gear is inside, and as Fig. 2 shows, this arrangement avoids the lifting tendency developed in machines where the table is driven by a bevel gear. All pinions have a large number of teeth, thus insuring a smooth motion to the table.

The cross rail is 30 in. deep, is of box form and has an arch on the back to take care of the weight of the heads or strains from heavy cuts. It is clamped to the housings, both on the outside and inside edges. The rail is thus rigidly secured at its weakest point.

The tool heads have a 34-in. bearing on the cross rail. The guiding surfaces for each head are on the lower part of the cross rail, which is readily understood to be especially advantageous when the tool bars are extended some distance below the rail. The tool bars are of cast steel and have a travel of 48 in. Each bar is separately counterweighted. Both the heads have rapid

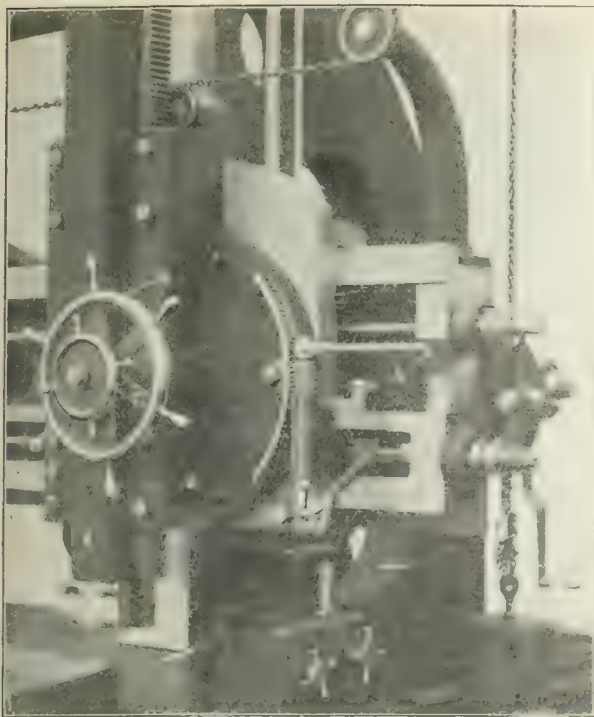


Fig. 3. - The Adjusting Mechanism for the Head.

traverse along the rail, and each is easily adjusted to any angle by a worm gear and gear segment, operated by the ratchet hand lever A, Fig. 3. The tool bar is quickly elevated or lowered by the capstan hand wheel B, and the power thrown on or off by the smaller hand wheel C.

As will be seen from Fig. 4, the housings are of massive box form. They have a 12 in. face and a wide and

depth of from 10 to 16 ft., that has all the general features of the 10-ft. mill just described. The housings are moved back and forth by power, giving a capacity of 16 ft. 3 in. when they are extended to the limit, and will take work 5 ft. 6 in. high. The extension arm is of very heavy construction, and is provided with an auxiliary swiveling head and a tool bar 6 in. in diameter, having a stroke of 48 in. with vertical head and power feed. It is counterbalanced independently, and the extension arm is arranged so it can be conveniently removed at any time.

A 25-hp. motor is required for driving both of these mills, and nine different speeds are obtained through a gear box with a ratio of 1 to 18. If a two to one adjustable speed motor is used, 40 speeds are available with a ratio of 1 to 36. An additional 6-hp. motor is required for raising and lowering the cross rail. The main driving motor is mounted on the rear of the bed, as shown in Fig. 4, while the motor for adjusting the cross rail is mounted on the top brace, as shown in Fig. 1.

Water Filtration for Industrial Purposes

The meeting of the Franklin Institute on the evening of January 18 was devoted to the discussion of "Water Filtration for Industrial Purposes," and a paper on that subject was read by Churchill Hungerford, filtration engineer of Philadelphia. The paper dealt with some of the extraordinary forms of pollution which cause trouble in certain manufacturing processes, but in the main it discussed problems of purification of such waters as the average textile manufacturer is compelled to use. A number of interesting instances were cited showing the manner in which impurities are so completely taken out of water contaminated by manufacturing operations that it is made even more satisfactory than the municipal supplies of the towns in which the factories are

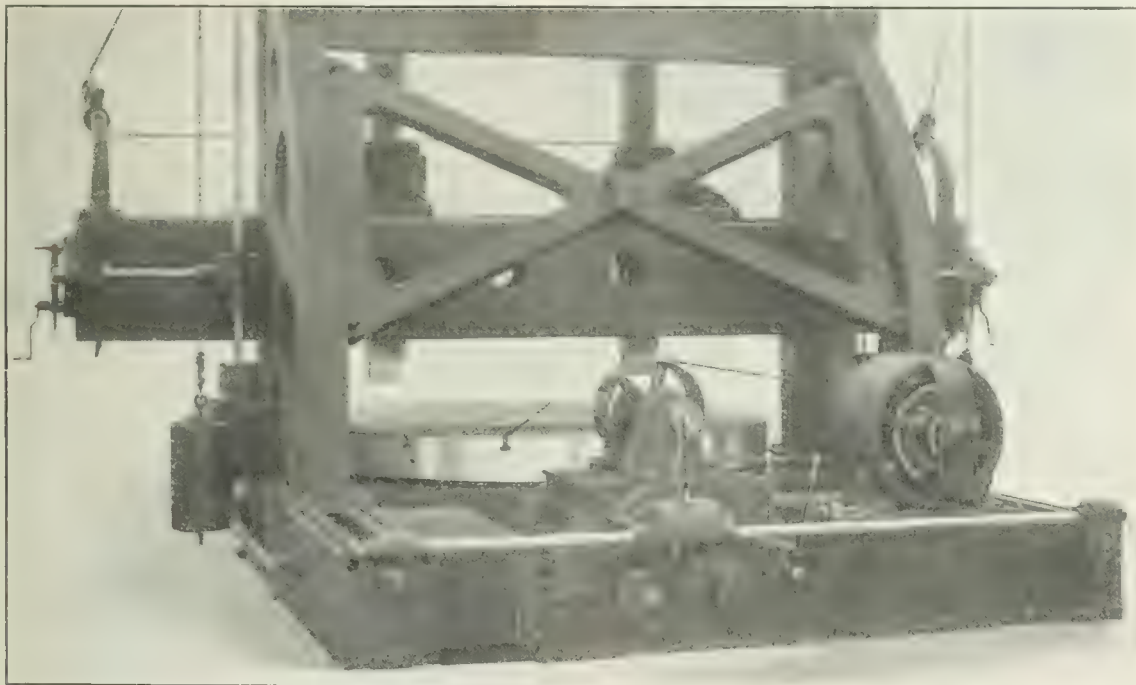


Fig. 4. - Rear View of the Mill, Showing the Massive Construction of the Housings.

deep base, thus insuring rigidity under the most severe duty. In addition to the usual top brace, the manufacturer has provided an unusually heavy cross brace at the back of the housings, which is designed to take care of all side strains, due to heavy cuts made when the cross rail is raised some distance from the table. An original feature of the design is mounting the feed boxes on the housings instead of on the housing base. This does away with the necessity of the operator being compelled to creep under the work to operate the feed levers. Eight changes of feed are provided, ranging from 1-32 to 1 in. in any direction.

The company also builds an extension mill having

located. Interesting data were given relating to the amounts of water required by different industries. A pound of muslin or similar cotton fabric requires in the bleaching about 27 gal. of water. A pound of paper requires about 50 gal. of water and a pound of silk not less than 1000 gal. of water. The use of chemicals, such as alum, lime, sulphate of iron, calcium hypochlorite and sulphate of copper, as an aid to the purification process was discussed, and a detailed account given of the manner in which these chemicals are completely removed from the water after they have done their duty. A description was given of a filter plant capable of handling highly polluted waters.

Some Adaptations of the Pratt & Whitney Thread Miller

Milling Internal Threads and the Cutting of Spiral Gears Are Now Possible on This Machine

The Pratt & Whitney Company, Hartford, Conn., has recently developed an attachment by which it is possible to mill internal threads on any of its standard thread milling machines. Great flexibility characterizes the attachment, and by its use it is possible to increase the value of the machine for doing this class of work. Fig. 1 shows one of the maker's standard thread millers equipped with this attachment, and Fig. 2 gives some idea of the character of work which a machine so equipped is capable of turning out. Fig. 3 shows the standard 6 x 14 in. Pratt and Whitney thread miller arranged to cut spiral gears.

The construction of the cutter head, which is made as a separate and complete unit, is very rigid throughout. The head is designed to be readily accommodated to the

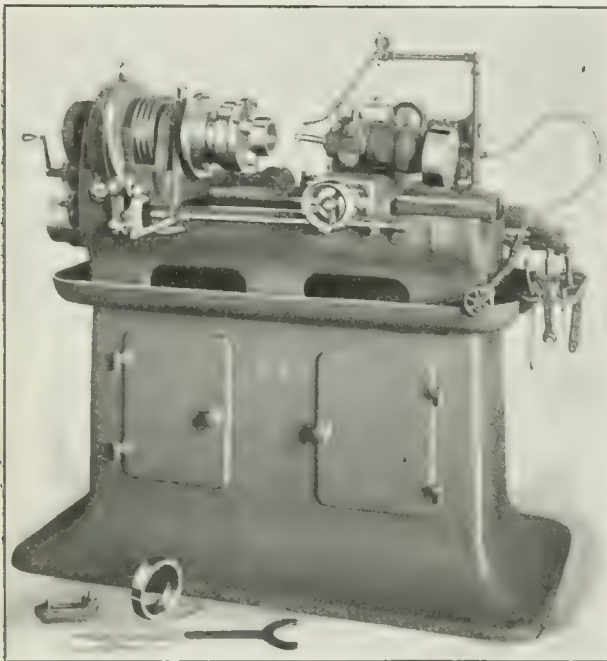


Fig. 1. A Thread Miller Equipped with the Internal Thread Milling Attachment Developed by the Pratt & Whitney Company, Hartford, Conn.

regular carriage, and the proper relation between the two is maintained by long dovetail bearings and a taper gib capable of easy adjustment to compensate for wear. The mounting of the cutter head proper enables the necessary swiveling action for proper cutter clearance to be obtained without disturbing the central relation of the cutter and the work and accurate graduations are provided. Once the cutter head has been set to the required angle, as indicated by these graduations, it is securely clamped in its seat by powerful holding bolts, thus giving the equivalent of a solid member.

Very accurate and positive control of the cutter head is secured by a micrometer dial and a positive adjustable stop. The construction of the latter is novel and yet at the same time simple. Its use enables the cutter to be withdrawn from the work and accurately returned to the exact previous depth, a feature that has proved especially valuable on internal thread work. The automatic control of the longitudinal movement of the carriage, as well as a quick return has also been embodied in the construction of the head. Three cutter speeds are secured by a three-step cone pulley, and for each of these speeds 18 carriage feeds are instantly available through a gear box.

The tool steel spindle is hardened, ground and lapped and special care was taken in its manufacture to insure

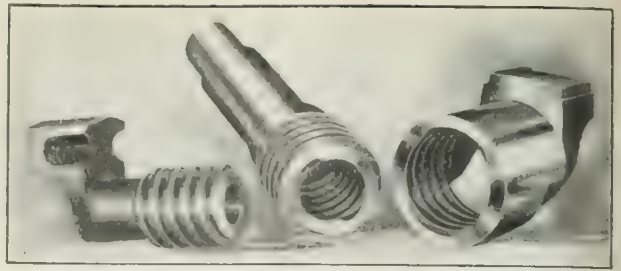


Fig. 2. Some Specimens of Work Done by the Attachment.

accuracy and durability. A taper hole extends through the spindle to receive the cutter arbors, which are held in place by a drawback bolt. The spindle runs in a bronze sleeve or box and is so mounted in the head as to enable the spindle to be adjusted longitudinally when resetting the cutter to a thread that has been previously cut. The main driving shaft transmits its power directly to the cutter spindle through gearing, a way which has proved very satisfactory. A flywheel which is mounted in bearings independent of the spindle is employed to eliminate backlash in the driving gears and to prevent vibration and chattering of the cutter.

Either single or multiple threads can be cut on this machine. When the latter are being cut, as is the case in Fig. 1, the work holding appliance is carried on the inner spindle. For cutting any desired multiple thread the outer spindle has an index ring which is very large in proportion to the diameter of the work operated upon. Although the design of the spindle is such as to readily lend itself to the accommodation of the various holding appliances required by the different classes of work, the step chuck and closer shown in place on the machine has proved very efficient for work within its range. As will be noticed, this step chuck has adjustable jaws that are independent of the closing mechanism, and once these are set to the desired diameter or contour, the work will be held rigidly and true. A drawback rod from the back of the spindle furnishes a rapid and convenient means for operating the chuck.

As regularly made, the attachment is suitable for threading holes ranging from $1\frac{1}{2}$ to 6 in. in diameter, with single or multiple threads of either the right or the left hand types. Fig. 2 contains a striking example of some pieces out of the ordinary run of work which were threaded by this new attachment at a fraction of the cost of doing the work previously.

Fig. 3 shows the Pratt & Whitney 6 x 14 in. thread miller arranged for cutting spiral gears. This machine is said to be very convenient and efficient in operation,

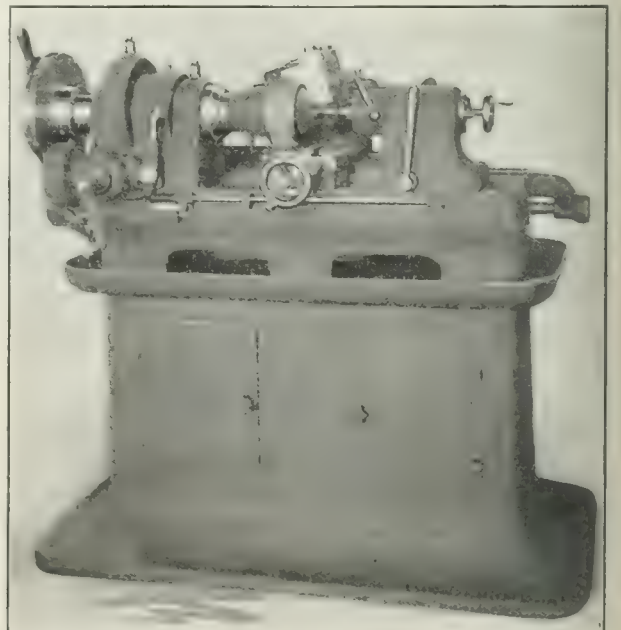


Fig. 3.—The 6 x 14 In. Pratt & Whitney Thread Miller Arranged to Cut Spiral Gears.

as the change gears and other operating mechanism are very simple in their construction and so convenient in their location and operation that one workman can take care of several machines. Another special feature of the machine is its exceptional rigidity, which is secured by a rigid manner of supporting the work coupled with a stiff cutter head, a combination that has resulted in practically eliminating vibration of the work and chattering of the cutter.

The indexing is accomplished by varying the relation between the inner and the outer spindles and is controlled by an index plate and pawl, which is said to be better than indexing by gears. The index plates used have a very large diameter as compared with that of the gears to be cut, an arrangement which reduces errors to a minimum.

The quick return device is actuated by a crank at the front of the machine and is very rapid in its operation. Precision lead and cross feed screws are furnished and a micrometer dial and positive adjustable stops provide accurate control for the cutter head. The cutter has three different speeds and 18 carriage feeds, for each of the three cutter speeds are rendered instantly available by a geared feed box, thus giving a total of 54 feeds. In this machine it is possible to use a very fast feed without sacrificing the quality of the work, as the cutter is so located as to prevent the chips from interfering with its operation.

European Steel Syndicates

In discussing the proposed Italian steel syndicate, whose organization is now well under way, the *London Iron and Coal Trades Review* has the following concerning the syndicates in other European countries. The reference to the United States Steel Corporation in this connection is, of course, pertinent in so far as it represents a large output of steel products under the control of one organization:

The latest iron and steel producing country to organize its industry into a syndicate is Italy. It is announced that negotiations are already well advanced and it is hoped will be completed in the early months of this year, for the formation of an Italian steel syndicate on the model of the German Stahlwerks-Verband. The principal groups of works interested in the project are the Terni-Elba-Savona, the Piombino and the Ferriere Italiane. These various works together have a productive capacity of more than 50 per cent. of the demands of the country. The syndicate would embrace in its scope structural shapes, rails, merchant bars and plates. In addition, there will be organized opposition to foreign competition, and suggestions are being placed before the government for an increase of the import duties. Finally, the large works—Piombino and Savona—will associate in the production of descriptions of iron and steel which still continue to be imported from Germany in considerable quantities, such as steel castings, boiler plates, railroad material, tubes, forgings, &c.

Italy is thus practically the last of the important producers of iron and steel to adopt the syndicate system. In all others, except our own, the system already obtains. The United States Steel Corporation and the German Stahlwerks-Verband are too well known to need any comment in these columns. The Belgian steel syndicate or the Comptoir des Aciéries Belges, has now been established for some years. Its provisions are drafted on the German model, the main feature being that it acts as a sales bureau for undertaking business on the common account of the constituents, and also regulates production. It embraces the Angleur, Boel, Cockerill, Couillet, Ougrée-Marhay, Providence, Sambre et Moselle, and Thy-le-Chateau Works. French industry is well organized, although on rather different lines. For the export trade one of the most important organizations is the Comptoir d'Exportation des Produits Métallurgiques, which has its headquarters in Paris. This organization looks after the sales of rails, joists and channels. The Comptoir des Tubes en Fer et en Acier, which embraces the four large makers, deals with the tube

trade. There are also organized the Comptoir des Essieux (axles), which embraces 15 manufacturers, and the Comptoir des Poutrelles (joists), which embraces 19 manufacturers, and which also deals with channels.

All these syndicates have their head offices in Paris. The Comptoir des Métallurgique Longwy embraces all the firms in the Meurthe-et-Moselle district. These may be said to be the principal syndicates, but the French ironmasters have the Comité des Forges de France, a very important association, which, while not dealing with the selling side of the trade, is available for any concerted action. This also has close relations with subsidiary committees. In like manner Sweden has the Jernkontoret. The main district in Russia is the South, where the nine principal works—the Russo-Belge, Taganrog, Providence Russe, Hughes, Makeefka, Donetz-Jourieska, Briansk and Oural-Volga—have formed into a syndicate. The Austrian trade is controlled by a syndicate, which is comprehensive, the bulk of the output being in the hands of about half a dozen firms. The Spanish steel trade is also regulated by an association, which embraces the Altos Hornos de Vizcaya, Duro Felguera, Mieres, San Francisco del Desierto, Moreda y Gijon, and several smaller works, making 10 in all. The Altos Hornos holds a commanding position in the syndicate.

If the proposed syndicate is formed and is successful in maintaining the home market for home consumers, it is bound to seriously affect the import trade of Italy. In recent years we have sent to Italy an average of over 200,000 tons of iron and steel, whereas Germany has sent an average of just under 300,000 tons, and Belgium an average of between 40,000 and 50,000 tons. Our exports to Italy are principally pig iron and scrap, and we are, therefore, much less likely to be affected than Germany, whose trade takes the form of more finished products. We send to Italy, however, consignments of ship and boiler plates from time to time, and, of course, also a considerable tonnage of tin plate, but since Italy commenced the manufacture of tin plate herself the quantity of British tin plate has not shown a tendency to increase. No doubt in time the Italians will aim to make all their supplies of pig iron, but at present they are likely to have to continue to import considerable quantities from this country as the raw material for their steel industry.

McWane's Handbook for Cast Iron Pipe Users.

The McWane Pipe Works, Lynchburg, Va., has issued a book which classifies and tabulates in convenient form its full line of standard cast iron pipe and special fittings. The contents also include the standard specifications for cast iron water pipe; dimensions and other data of standard bell and spigot pipe, standard cast iron water pipe, crosses, tees, &c.; dimensions of cast iron flanged pipe and flanged specials; details entering into the cost of pipe laying as determined by actual practice under varying conditions. A number of tables are presented covering data of use to engineers, although it is stated that no attempt has been made to furnish information regarding water and gas works construction. Illustrations are given of special products of the company. The McWane Pipe Works is a department of the Lynchburg Foundry Company, having foundries at Lynchburg and Radford, Va. The company maintains branch offices in New York City and Chicago. The book is a publication of 64 pages, is of convenient size for pocket use and bound in flexible leather covers. The company has also issued a large wall calendar, on which is reproduced in colors the painting by Mosler of "Washington in Time of Peace," which shows our first President in a family group.

The H. K. Porter Company, Pittsburgh, is building five 10 x 14 in. cylinder mogul locomotives for the United Fruit Company, to be used on its railroad running from its large fruit plantations to the seacoast in Central America.

Electricity in the Machine Shop*

Its Applications and Savings Effected by Its Use

BY C. W. JOHNSON, PITTSBURGH, PA.

Outlining a paper on this subject which will be of value to the shop man I have found difficult. The trade journals and engineering societies have published much on the subject, and I have considered it advisable to refer to the most satisfactory of these published papers, which were read before a joint meeting of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, April 12, 1910, making this paper an attempt to supply additional information rather than a complete treatise on the subject.

The Fundamental Principles

To appreciate thoroughly the problems connected with an electrical installation some knowledge of the fundamental laws of electricity and a general acquaintance with the characteristics of various types of motors are necessary. Electrical power is measured by the product of volts, or pressure, and amperes, or current, expressed in watts; 1000 watts equals 1 kw. and 1 hp. equals 746 watts or approximately $\frac{3}{4}$ kw.

In every electric current conductor there is a loss causing a drop in voltage and heating the conductor. This drop is equal to the product of current and the resistance of the circuit. The heating is proportional to the power lost or to the product of the current flowing and the voltage drop, or the square of the current multiplied by the resistance. Large line drop means unsatisfactory operation, due to the voltage fluctuating with the load. With large amounts of power, small line drop and consequently satisfactory operation requires either large conductors or a very small current, which

that both factors must always be taken into consideration.

Electric current is of two kinds, direct and alternating. Direct current generated at a certain voltage is

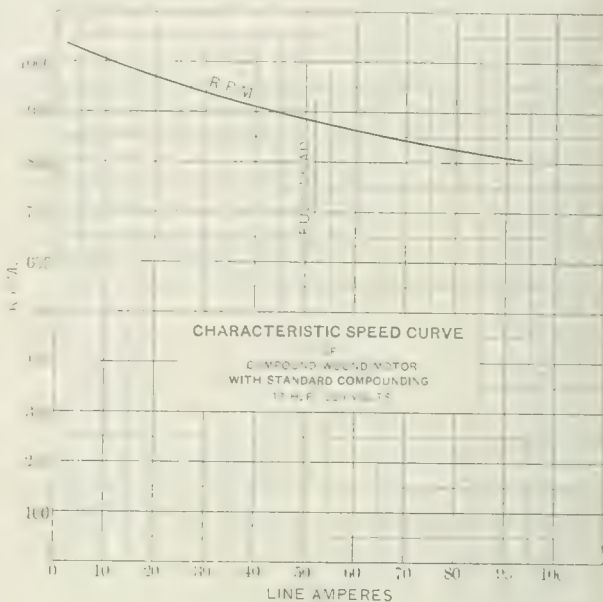


Fig. 2.

transmitted and used at that voltage. The voltage can be raised only by a motor generator set or by connecting two or more generators in series. Direct current voltages higher than 600 or 650, the standard for street railway work, are seldom used, although recent improvements in electrical machines have made it possible to use pressures as high as 1200 volts on railroad lines.

Alternating current, on the other hand, can be passed through transformers and the voltage either raised or lowered. Voltages as high as 750,000 are used for insulation testing. As transformers are comparatively inexpensive and highly efficient, alternating current is especially adapted to long distance transmission of power with low line losses.

The Various Classes of Electric Motors

The following briefly outlines the most striking characteristics of the various types of industrial motors: Direct current motors are classified with reference to the field coil windings, which determine the strength of the magnetic field on which the speed of the motor is dependent, as shunt, compound and series machines. The speed characteristics of motors having these windings are shown in Figs. 1, 2 and 3. Shunt wound motors are best where the load is readily started and there are no sudden overloads or extreme fluctuations in load. They have nearly a constant speed with change in load; compound wound motors are best for heavy starting duty, or where there are large overloads and sudden and great changes in load. Series wound motors are such as the standard crane and street railroad motors. The speed varies inversely as the load and the motors will stand great overloads without sparking at the commutators. By referring to Fig. 3 it will be noticed that the no-load speed is very high and the motors are likely to run away when the load is thrown off suddenly.

During the past two or three years the characteristics of direct current motors have been very materially changed by adding extra pole pieces and field windings. These are commonly known as auxiliary poles, and

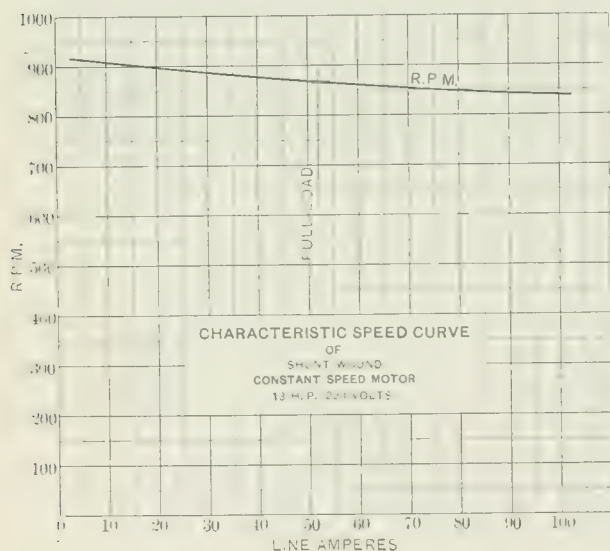


Fig. 1.

with a given amount of power requires a high voltage. This is more clearly shown by an illustration. To transmit 200 kw. to a point 1000 ft. distant, at 100 volts, with 5 per cent. line drop, requires 2000 amperes and 25,000 lb. of copper, while to transmit the same power the same distance at 500 volts, with the same per cent. drop in voltage, requires only 400 amperes and 1000 lb. of copper, the size of the conductor being limited solely by the drop in voltage. These proportions will not always hold true, as with a shorter line and larger current the limiting feature would be the heating of the conductor, so

* Read before the Metal Trades Superintendents' and Foremen's Club, Cleveland, Ohio, January 21, 1911.

† Assistant Manager of Works, Westinghouse Electric & Mfg. Company.

greatly improve commutation and enable a motor to carry large momentary overloads without sparking. More important, however, for machine shop service is that auxiliary pole motors will permit changes in speed by field control to a much greater extent than was possible previously. Without this additional winding, a motor's capacity is greatly reduced when it is speeded up by weakening its field. This is due to poor commuta-

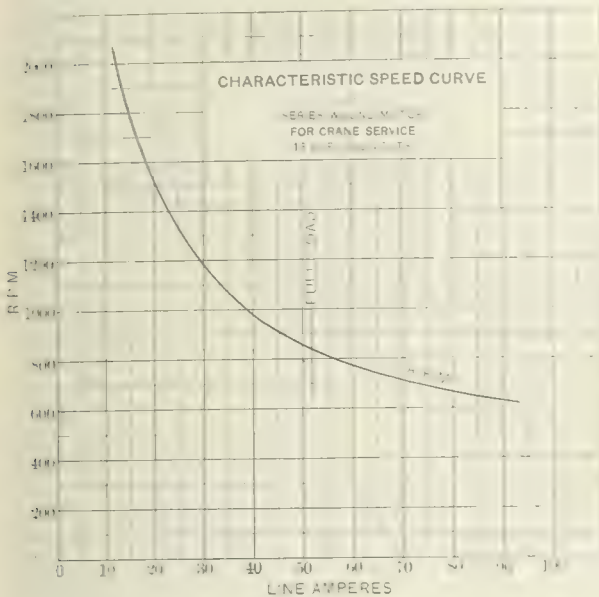


Fig. 3.

tion, resulting from the weakened field, and it was not usual to operate motors having a speed range greater than two to one by field control. Under the improved conditions a speed range of three or four to one is readily obtained, which makes such a motor ideal for machine shop use, where considerable speed variation is required.

Alternating current motors in ordinary service are divided into single phase and polyphase motors, the latter being subdivided into squirrel cage and wound rotor types. Single phase motors are particularly suitable where single phase lighting current is available and only a small amount of power at a constant speed is desired.

Squirrel cage motors correspond in characteristics to shunt wound direct current motors. They run at practically constant speed, the speed falling off very slightly with increasing load. They are not suitable for extremely heavy starting duty, but are the most perfect motors ever devised for light starting duty and where approximately constant speed is required because of their extreme mechanical simplicity and the absence of troublesome parts, such as commutators and brush holders.

Wound rotor induction motors are adapted for heavy starting duty, and can be run at any speed below normal with reduced efficiency by the introduction of resistance in the rotor winding. When this resistance is inserted the speed varies inversely as the load, and if a motor is running below speed, due to resistance in the rotor winding, the speed will come up to maximum as soon as the load is thrown off.

Polyphase alternating current is ordinarily two or three phase. To obtain the power in a two-phase circuit multiply the volts between the two wires of one phase by the current flowing, which gives the power in one phase, the total power being the sum of that in two phases. To obtain the power in a three-phase circuit, assuming all phases to be balanced, multiply the current in any wire by the voltage between any two wires and multiply this product by the square root of three.

Lighting, either arc or incandescent, is equally satisfactory with direct or alternating current. One hundred and ten volts is standard for incandescent lamps, but with direct current they can be run from higher voltage generators by means of comparatively cheap balancing sets, and on the three-wire system, which results in a great reduction in the amount of copper required. Al-

though it is not so desirable, incandescent lamps can be connected in series so as to accommodate them to the voltage. With alternating current the voltage at the generator is of little consequence, as transformers are readily provided.

In installing electrical equipment it is important that the work be thoroughly first class, using the best material, and also to have the size, arrangement and division of circuits carefully worked out by a competent engineer. Poor wiring is a constant source of danger and expense, and poor arrangement or proportion of circuits makes an electrical installation unsatisfactory in operation. If lamps are operated on the same circuits with elevators and crane motors they will flicker, due to sudden throwing on and off of the loads.

For direct current motors for general shop use 110 or 120 volts is not generally used on account of the large current, requiring expensive wiring and controllers, and 500 volts cannot be handled comfortably and is objectionable as employees often get shocks. The commutators of 500-volt motors also require a little more attention than those of lower voltage, and are more apt to give trouble from sparking under overloads. Therefore, 220 to 240 volts become standard for general shop use and seems to answer all requirements very satisfactorily.

The choice of the kind of current and type of motors for any installation or application is important, as each installation has certain characteristics which make a certain kind of current or type of motor better than others.

The Use of Adjustable Speeds

In almost any machine shop it will be found profitable to drive many of the tools at varying speeds. It is not always convenient or possible to obtain the desired speed range by mechanical devices and retain the necessary quick operating features, so the adjustable speed motor has been developed. In its present form this motor is the outcome of many years of development and is a shunt wound, auxiliary pole motor. The speed adjustment is accomplished by introducing resistance in series with the shunt field by a controller, which also closes the armature circuit. This controller is arranged to reverse the motor and thus give speeds in either direction. Controllers can be designed to give any number of speeds forward or reverse, but it is customary to provide 16 forward speeds and fewer reverse. On a four to one motor 16 speeds give an increase of speed of

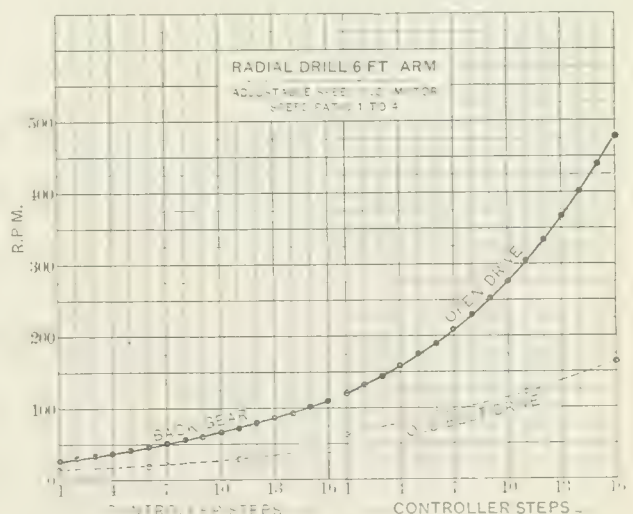


Fig. 4

very nearly 10 per cent. for each notch on the controller.

In the earlier days motor speed could only be increased slightly by field adjustments without causing sparking at the commutator. Armature resistance was used to reduce the motor speed below normal. This was inefficient on account of the power lost in the resistance and also because the speed of a motor so controlled decreased with the load, which conditions are not allowable with varying or intermittent motor loads. The next and logical step was the introduction of the multiple voltage

system for supplying a number of voltages to the motor armature, the gaps between voltage being filled by field adjustment speeds, and a very wide range could be covered with an unlimited number of controller notches. In two machine shops with which I am familiar, a four-wire multiple voltage system is in use, where a speed range of about nine to one is obtained on the motors with 42 controller notches. This gives an increase of approximately 3 per cent. for each speed over the previous one. Such a speed range results in an excessively large motor and an unnecessary refinement in speed adjustment, as well as an expensive controller. For some years the multiple voltage system filled a long felt want, but it was not ideal. The balance sets and the complications and extra cost of shop wiring were objectionable, and the present adjustable speed motor is a natural result of necessity.

In any system of speed adjustment the ideal is attained when the speed can be increased by constant percentage increments. This is known as geometric progression as distinguished from arithmetic progression in which each increment is equal to the preceding one. It is generally conceded that 10 per cent. increments are satisfactory, and when these are increased to 15 or 20 per cent. production is restricted, and time and money wasted because tools cannot be operated at the most efficient speeds. Any discussion of correct and efficient operating speeds presupposes an organization and system

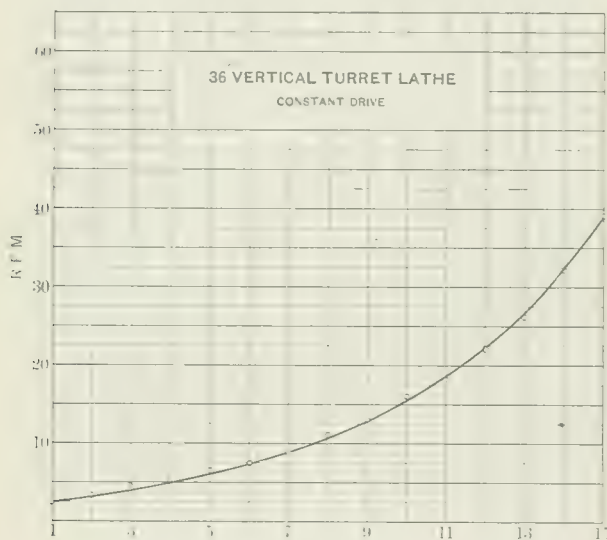


Fig. 5.

which will obtain the maximum output from operators. One of the greatest obstacles has been removed now that an operator can reach without changing his position a simple lever by which he can control the cutting speed of his machine throughout a considerable range by increments of 10 per cent.

Motor-Driven Tools

Fig. 4 shows a graphic speed chart of a standard belt driven radial drill and of the same tool equipped with an adjustable speed motor and one change in gearing. It will be noticed that only eight speeds are obtainable with the old belt drive, having one change of gears and a four-step cone pulley. This drill is one of probably 25 or 30 in one shop, all used on a varied class of work, consisting of drilling, counterboring and tapping various sized holes. Several of these drills have been converted to motor drive with a marked increase in output. The increased output depends upon the class of work, as there would be no increase if the same sized holes were being drilled at all times, provided the proper speed could be obtained for that hole. In this case the work was constantly changing, and workmen rarely shifted the belt on the cone pulley and only changed the back gears. Nevertheless the shop was considered progressive and used a modern system of wage payment which was supposed to secure maximum output from the men. Little time would probably be saved by shifting the belt

to change the speed, as this is a slow process and the workmen avoid it whenever possible.

With the motor drive and the back gears arranged to be changed quickly the operator can readily be in-

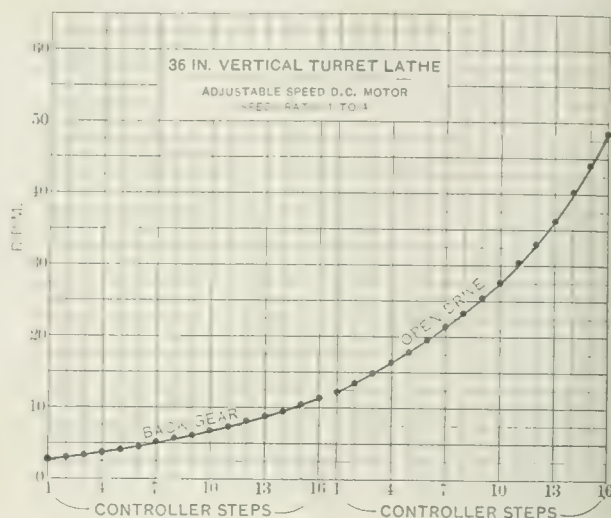


Fig. 6.

duced to work at the most advantageous speed. The men are enthusiastic about the change in drive and willingly accept a cut of three hours on a 10-hour job, which a careful study of conditions shows to be a very moderate estimate of the saving. If we assume earnings of 30 cents per hour and an overhead of 100 per cent., a man will do work in one day on the altered tool for \$3, or a factory cost of \$6, which formerly cost 40 per cent. more, thus making a saving of \$2.40 per day. This saving will pay for the tool in a short time, and does not have one wondering just what percentage of the investment must be saved per year to justify the expense. It is needless to point out how important it usually is to increase the output of a given equipment without requiring additional floor space and mechanics.

I have dwelt on this drill press case for several reasons. The tool is universally used, and, in my opinion, is not given the attention it deserves in many shops. Also the statements made regarding the advantages of applying motor drive to it apply to almost every tool where a variety of work is turned out. I have frequently heard the statement made that it does not pay to apply motor drives to old tools. I believe that the example given fully proves the contrary, especially when you consider that the motor and controller can readily

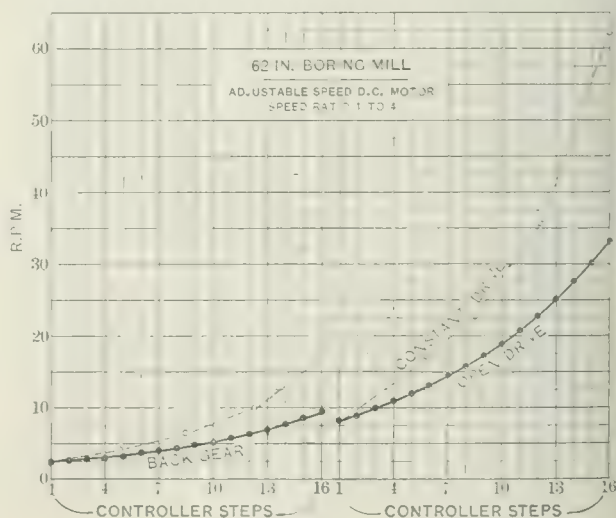


Fig. 7.

be applied elsewhere when the old tool goes to the scrap heap.

Records of lathes, drill presses and boring mills, notes upon charts of the correct running speeds for all classes of work regularly done on each tool and a consideration

of the time and manual labor required to make the changes in speed would be a revelation to many, and emphasize the desirability of adjustable speed motors. I would strongly recommend that such records be compiled and charted for all existing machine tools in the shop unless they are specialized and it is known that correct speeds are readily obtainable. It is equally advisable to secure the same information on tools about to be purchased, for it is often surprising to note the poor assortment of speeds which some tool manufacturers offer.

Fig. 5 shows speed curves of one of the most modern tools, a 36-in. vertical turret lathe, with mechanical speed changes. Fifteen speeds are obtainable in almost exact geometric progression with 20 per cent. increments. Such results are exceptional, and the manufacturers deserve great credit, yet 20 per cent. increments are rather large where the highest efficiency is desired. Also the friction in the gearing is of considerable importance, and greater speed range, more speeds and smaller speed increments can be secured by leaving off the extra gearing and installing an adjustable speed motor. This will mean but a very small addition to the first cost of the tool.

Fig. 6 shows a chart of a 62-in. vertical boring mill. This mill has not been changed to motor drive, but the chart shows how desirable that would be. When belt driven the speeds overlap, so that in reality only eight speeds are obtainable, and of them at least one is higher than can be used. It is needless to point out what a saving a motor would be on this tool. The point I wish to impress, however, is that such tools are not the exceptions but the rule in the average shop.

Fig. 7 shows the chart of a modern heavy duty radial drill press. It is interesting in several respects. The motor is rated at 12½ hp. at 400 to 1600 rev. per min. Spindle speeds from 30 to 120 rev. per min. are obtained with back gears in and 125 to 500 rev. per min. with gears out—32 speeds altogether. A competitive drill test was recently conducted on this machine, grading the drills in three ways, according to the inches of both steel and iron they would drill without distress, the same when run to destruction, and the horsepower required to drive each drill under all conditions determined by a recording meter. Naturally the drills which required the least power gave the longest life. There was a very appreciable difference in this power and the readings with different drills of the same manufacturer were consistent.

In these tests the 12½-hp. motor was frequently run up to 35 hp., or nearly 200 per cent. overload. While it is not recommended that motors be run for long at such overloads, yet with the extremely intermittent work on such a tool there is little danger of injuring the motor with overloads. In general when motors have been put on machine tools they have been too liberal in size. Properly proportioning the motor to the work will greatly reduce the cost, and much work is now being done toward determining the proper size of motor for various classes of work.

In considering small group or individual motor drives in a machine shop it is usual to lay great stress upon the power to be saved as compared with long lengths of line shafting. While power, and frequently a large amount of it, is thus saved, the feature of prime importance is the effect on production, and any scheme which will increase the output of a given equipment and floor space even a few per cent. will justify a considerable investment. The papers which I have referred to show that electric motors in the machine shop will make a saving which leaves no doubt as to the advisability of making the investment.

H. W. Hendrickson, Park Building, Pittsburgh, manufacturers' sales representative, has arranged with the Wetzel Mechanical Stoker Company, Trenton, N. J., to represent it in certain sections of Ohio, Pennsylvania and West Virginia. Mr. Hendrickson also represents the Riblet Heater Company, Erie, Pa., manufacturer of the transverse current feed water heaters. Recent Pittsburgh

contracts include the following: People's Natural Gas Company, 400 hp.; Joseph Horne Company, 600 hp.; Allegheny General Hospital, 1000 hp.; Lewis Building, 600 hp., and the Jenkins Arcade, two 500 hp.

Rogers, Brown & Co.'s Thirtieth Anniversary

On January 17 to 19 Rogers, Brown & Co., the widely known pig iron firm, held in Cincinnati a meeting of its members, resident managers and other representatives to commemorate the thirtieth anniversary of the founding of the house. It was the fourth meeting of this character that the company has held, and was by far the largest, most representative and most enthusiastic. Marking the closing of 30 years of successful business, it was in many ways an event of unusual interest.

On the first day the partners held their annual meeting. On the second day the resident managers and salesmen from the branch offices arrived, and at noon the company, numbering 43, dined at the Queen City Club. The afternoon was spent in general business discussion and the delivering of addresses as follows: "Welcome," W. A. Rogers; "Northern Iron," Harwood Wilson; "Southern and Virginia Iron," F. W. Miller; "Eastern Iron," N. H. Swayne, 2d; "Lake Superior Iron," F. I. Foote; "Information," C. A. Stillman; "Settlement of Complaints," J. C. Mears. In the evening D. B. Meacham entertained the company at his home in Avondale, for the mutual interchange of ideas. It was an informal and delightful gathering. A number of the younger men of the organization, calling themselves the "Pig Iron Pushers," gave a dramatic performance for the balance of the assembly, which was much enjoyed.

On the third day the visitors were entertained at luncheon at the St. Nicholas Hotel, where there was a further informal discussion of plans for the following year. The addresses that afternoon were as follows: "Our Raw Material," W. A. Rogers; "Coke," W. P. Cheney; "Alloys and Foreign Trade," J. C. Claussen; "Fluorspar," W. A. Moore; "Credits," J. R. Houston; "Buyers," H. W. Fernald; "Transportation," F. C. Wright. On both afternoons the addresses in general were of high caliber, but the address of Mr. Rogers on "Our Raw Material," in which he explained to all present the far-reaching extent of the ore properties which are controlled by the furnaces represented by Rogers, Brown & Co. gave a splendid inspiration to all the salesmen and demonstrated that no effort is being overlooked to make stronger the first position occupied by this company in the iron world. Another talk which was of much importance was that on fluorspar. This company has recently become the largest dealer in fluorspar in that material in this country, representing the large deposits in southern Illinois, which in a short time will be equipped with the most complete plant ever known for the handling of this material, which is so largely used in the metal trade.

Those present during the three days were as follows: Wm. A. Rogers and W. T. Shepard, Buffalo, N. Y.; M. C. Armour and E. L. Billingslea, Chicago; D. B. Meacham and J. K. Pollock, Cincinnati; A. A. Fowler, New York; N. H. Swayne, 2d, Philadelphia; H. W. Fernald, Boston; S. W. Hubbard, Cleveland; Harwood Wilson, Cleveland; J. C. Mears, St. Louis; J. R. Darragh, Pittsburgh; W. P. Cheney, Pittsburgh; C. A. Stillman, Chicago; C. P. Mercer, Birmingham; F. I. Foote, Chicago; F. C. Wright, Cincinnati; J. R. Houston, Cincinnati; F. W. Miller, Cincinnati; W. A. Moore, Rosiclare; R. T. Melville, Buffalo; H. B. B. Yergason, Cincinnati; J. C. Claussen, New York; William Sampson, Cincinnati; G. R. Sullivan, Philadelphia; H. E. Turner, Cincinnati; L. G. Calkins, Chicago; Douglas Bissell, Buffalo; R. W. Clark, New York; F. W. Bauer, Cincinnati; C. A. Wyatt, Boston; W. H. Knight, Cincinnati; F. E. Fitts, Jr., Boston; Wm. S. Rogers, Buffalo; A. O. Sonne, Chicago; F. J. Waldo, Buffalo; A. J. Wentworth, Cincinnati; H. W. Frister, New York; R. D. Meacham, Cincinnati; C. E. Bertie, Philadelphia; A. O. Galloway, Cincinnati; G. M. Butler, Chicago.

An Electrically Driven Brass Mill

Details of the Installation at the Plume & Atwood Mfg. Company's Plant

In 1900 the Plume & Atwood Mfg. Company, Thomaston, Conn., manufacturer of brass wire, rods and sheets, equipped a portion of its plant with the electric motor drive. At that time, a 200-kw. two-phase generator was installed to supply power to various tools in the machine shop and replaced the engine drive previously employed, the immediate cause of the change being the distance to which the engine had to transmit power through belting and line shafts. The greatest advantage of the electric drive in machine shops, namely, the use of adjustable speed direct current motors on individual tools, was not obtained, as only a few large constant speed alternating current motors were installed to drive the line shafts. The service, nevertheless, was satisfactory, and the drive

The service record of the turbine is especially interesting. It was put in commission in October, 1907, and the case was not opened until a year later. An inspection was then made of the blades, but no repairs of any sort were made, and at present the turbine is running 10 hours per day and six days a week. Prior to the opening of the turbine case in 1908, no trouble was experienced and the only reason for making the inspection was a desire to see whether any wear had taken place, but no appreciable signs of wear could be found.

One of the immediate results of electrifying the plant was a material increase in its capacity, owing to the speeding up of the rolls. At the time the change was made the speeds of the rolls were increased from 15 to 100 per cent., the average being 40 per cent. Considerable overtime work which had previously been found unavoidable was eliminated by the change, and in addition considerable floor space was rendered available in the shop due to the removal of the main engine, while rearrangements and additions have made further economies possible. In changing over from the engine to the motor

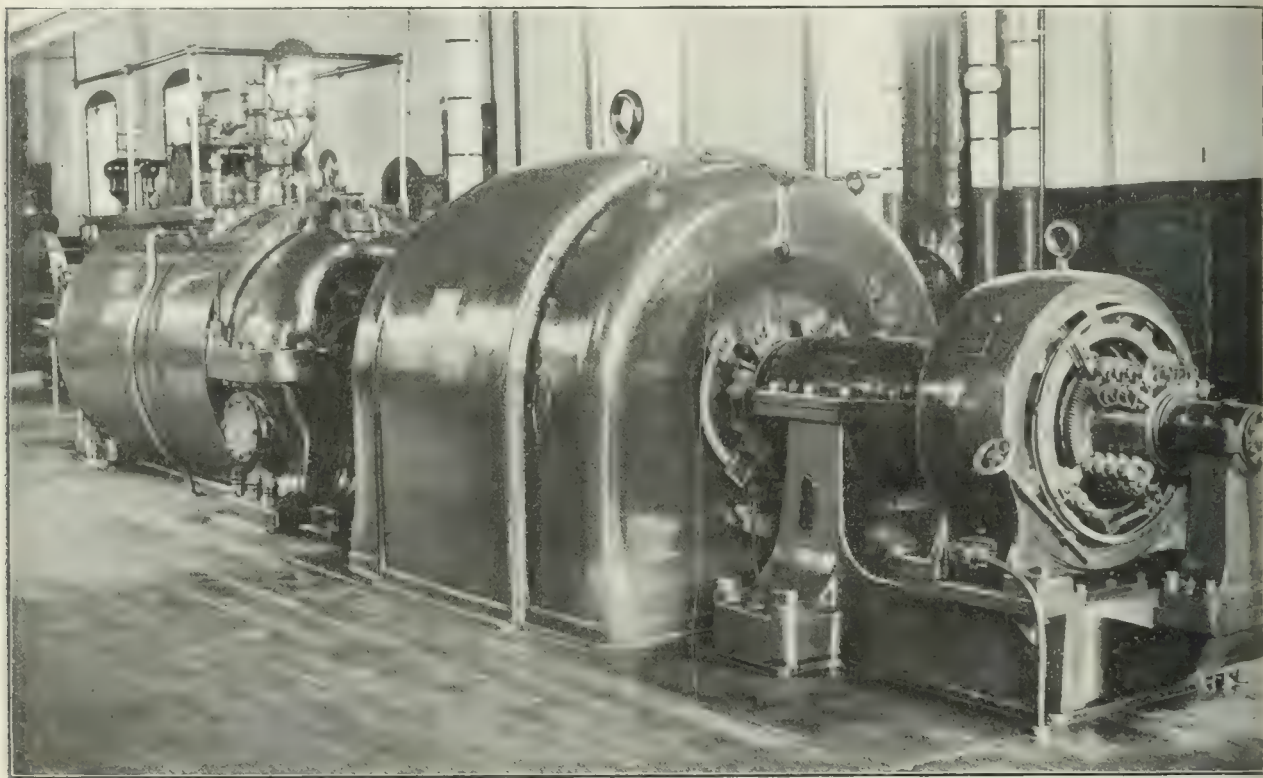


Fig. 1.—The Westinghouse 750-Kw Steam Turbo-Generator Set Installed in the Brass Mill of the Plume & Atwood Mfg. Company, Thomaston, Conn.

was gradually extended by adding motors here and there in the various rooms, although the power for the main rolls was still supplied by a large steam engine in the floor of the main shop, the steam supply being piped from the boiler plant, which was located in a separate building. In 1907 it was decided to use electric power throughout the plant and the engine set drive was entirely discarded. Since that date the application of the principles of the electric motor drive has been extended until at present the plant is believed to be the most complete electrically driven brass mill in the United States.

When the change was made a 750-kw. Westinghouse steam turbo-generating set was installed in the main power house, together with the original 200-kw. generator. A view of this new set, together with the necessary auxiliary apparatus, is given in Fig. 1. Various sizes of motors made by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., who also furnished all the other electrical equipment, were installed in the shop to drive the different rolls, some being placed in pits below the floor and others on the floor. The motors were geared to the countershaft driving the rolls in some cases and in others silent running chains were employed to transmit the power. These additional motors brought the total capacity of the installation up to 1300 hp., the individual capacities of the 22 motors ranging from 5 to 150 hp.

drive, no interruption of any sort was caused to the rolling service, and the men were able to work through the changes, with the result that the production of the mill was not even temporarily decreased.

As a general thing a single motor drives two rolls, but the three through which the first passes are made are driven by a single countershaft which derives its power from two motors, one of 100 hp. and the other of 150 hp. Both of these are the standard Westinghouse type CCL squirrel cage induction motors and are connected to the countershaft by silent running chains, thus operating in parallel not only electrically, but also mechanically. The 150-hp. motor is shown in Fig. 2, with its chain connection to the pinion countershaft, and the chain connecting the other motor can also be seen, although the motor itself is hidden. This engraving illustrates very clearly the flexibility of the electric motor drive, as although 250 hp. was required, a motor of this size could not be installed in the pit without tearing out a portion of the foundation. It was found more satisfactory to use two motors having as their total the required horsepower and located on opposite sides of the pinion countershaft, an arrangement which materially reduced the strain on the countershaft bearings. In another location at the plant where 175 hp. was required for driving another set of rolls, two motors were connected by chains to the same pinion coun-

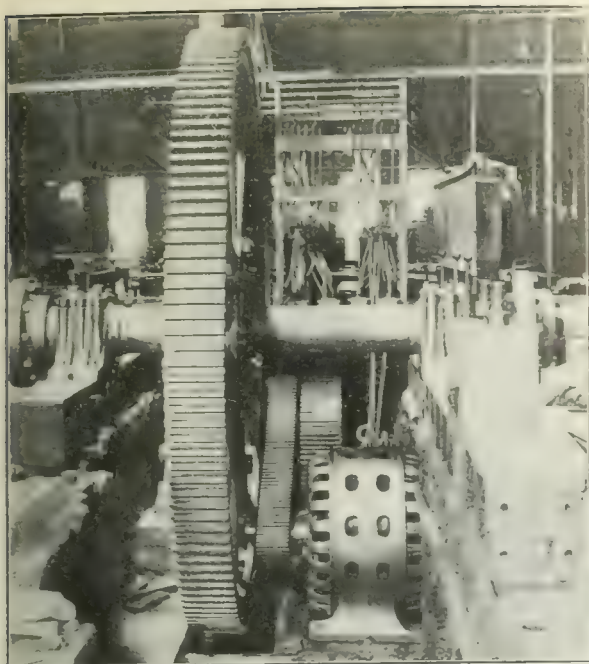


Fig. 2 The Countershaft Driving the Three Rolls Through Which the First Pass Is Made and One of the Motors Furnishing Power to It.

tershaft. In both these cases a flywheel was used to smooth out the sudden demand for power due to material entering the rolls. Without a flywheel the sudden application of the load would take the slack out of the chain with a snap sufficiently violent as to run the risk of breaking the chain or at least throwing it off the sprocket. The flywheel acts as a cushion and the load is taken very easily and quietly with only a few slight undulations of the chain.

The installation of the motor drive on the rolls has brought about economies not only in money but also in time. Formerly when the work jammed in the rolls the latter broke and had to be replaced, which cost money and also required time. With the electric motor drive the fuse blows out and cuts off the current from the motor, thus stopping the rolls. During the three years that the rolls have been motor driven, there has been no expense for renewing broken rolls and the total maintenance charge on this particular portion of the roll and motor equipment is said to have been less than \$25. The speeding up of the rolls as a result of the use of motor drive increased their capacity above that of the overhauling machines and necessitated overtime work at different times. These machines were driven by a 20-hp. motor and to obviate the necessity of running the large turbo-generator to supply it with power, a direct current motor was installed nearby so that the belt from the alternating current motor could be readily shifted to it. Direct current for this motor is supplied from a small steam engine driven generator that was previously used as the exciter for the original 200-kw. generator.

New Railroad Equipment.—The Central Railroad of New Jersey is reported to be in the market for 250 refrigerator cars and the Central of Georgia for 300 freight cars. The Great Northern ordered 100 additional freight cars and the Illinois Central will build 100 all wood logging cars at its shops. The Norfolk & Western has awarded the building of 700 steel underframe cars to the Virginia Bridge Company, and will build 700 in its own shops. The Philadelphia & Reading will build 23 passenger locomotives at its Reading, Pa., shop. The Grand Trunk Pacific is reported to have ordered 12 locomotives, and the Illinois Central is preparing specifications for 45. The Boston & Albany has closed with the American Locomotive Company for 10 passenger engines.

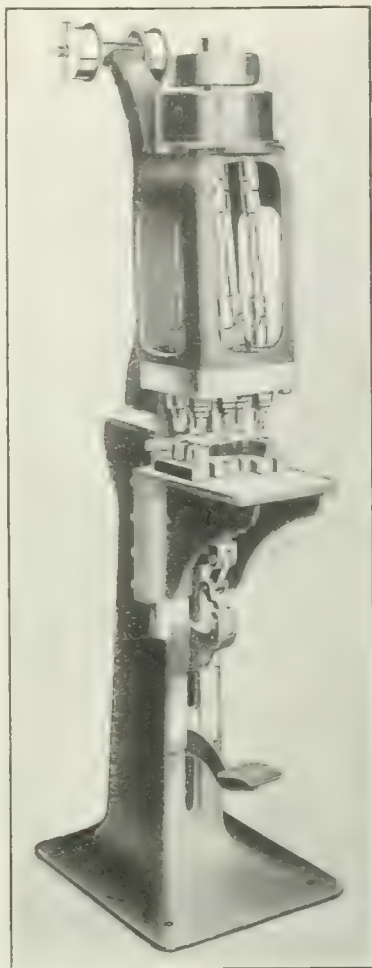
Mattie Furnace of the Girard Iron Company, Girard, Ohio, was blown in last week after being relined and extensively repaired.

The Grant Multiple Spindle Rivet Spinner

The Grant Mfg. & Machine Company, Bridgeport, Conn., has recently brought out a special five-spindle, noiseless rotating roll rivet spinning machine. It was particularly designed for riveting five posts into clock frames or plates, but is readily adapted to a great variety of work where the holes are not too close to permit

spindles of sufficient size and strength to be used. This new machine differs very materially from the company's regular line of single spindle rivet spinners, one of which was illustrated in *The Iron Age* September 16, 1909.

Among the points of difference to be noticed are that the table moves up and down, thus bringing the work in contact with the spinning rolls by an arrangement of toggles. The spindles have individual vertical adjustment for accommodating various heights of work, and are revolved from one common pulley in practically the same way as the drill spindles in a multiple spindle drill press. The spiral gears driving the spindles are enclosed in a cast iron case and are partly immersed in oil. While these gears are in motion a pumping action



A Multiple Spindle Rivet Spinner with Rotating Rolls Made by the Grant Mfg. & Machine Company, Bridgeport, Conn.

takes place which draws oil from the bottom of the gear case up and around the sleeve gear bearing. Centrifugal force throws the oil out at the top of the gears and gravity returns it to the bottom of the gear case, an arrangement which lubricates the upper working parts thoroughly.

The roll holders and the lower part of the spindles are mounted in a solid casting attached to the main frame of the machine. The location of the spindles in this casting matches exactly the location of the posts to be riveted, as it is intended to use a number of these spindle rotating plates or castings to accommodate work of different shapes and varying center distances. All of these plates are interchangeable with the frame, and can be quickly removed and replaced by others, as the lower part of the universal joint connecting the upper and the lower parts of the spindle has a square hole in it that matches the short spindle attached to the plate casting. This arrangement permits the casting to be removed and another plate and set of spindles inserted that will exactly match the work for which it is intended without adjustment in a very few minutes.

J. C. Maloney, manufacturers' agent, Swissvale, Pittsburgh, Pa., has secured the agency for the Blume & Blume diamond mesh woven wire fence machines and is now prepared to furnish the trade.

The Reed Heavy Duty Engine Lathes

A New Line of Tools Particularly Intended for Railroad Work

Several new heavy duty engine lathes are being put on the market by the F. E. Reed Company, Worcester.

worm gear and the cross and longitudinal feeds by double frictions. All of the tools are equipped with a quick change mechanism, giving 60 changes for both the lead screw and the feed rod, and the arrangement is such that both the rod and the screw cannot run at the same time. All the gears in the front case are of steel, with a coarse pitch. A thread cutting index is furnished for the lead screw. For transmitting power to these tools a two-speed

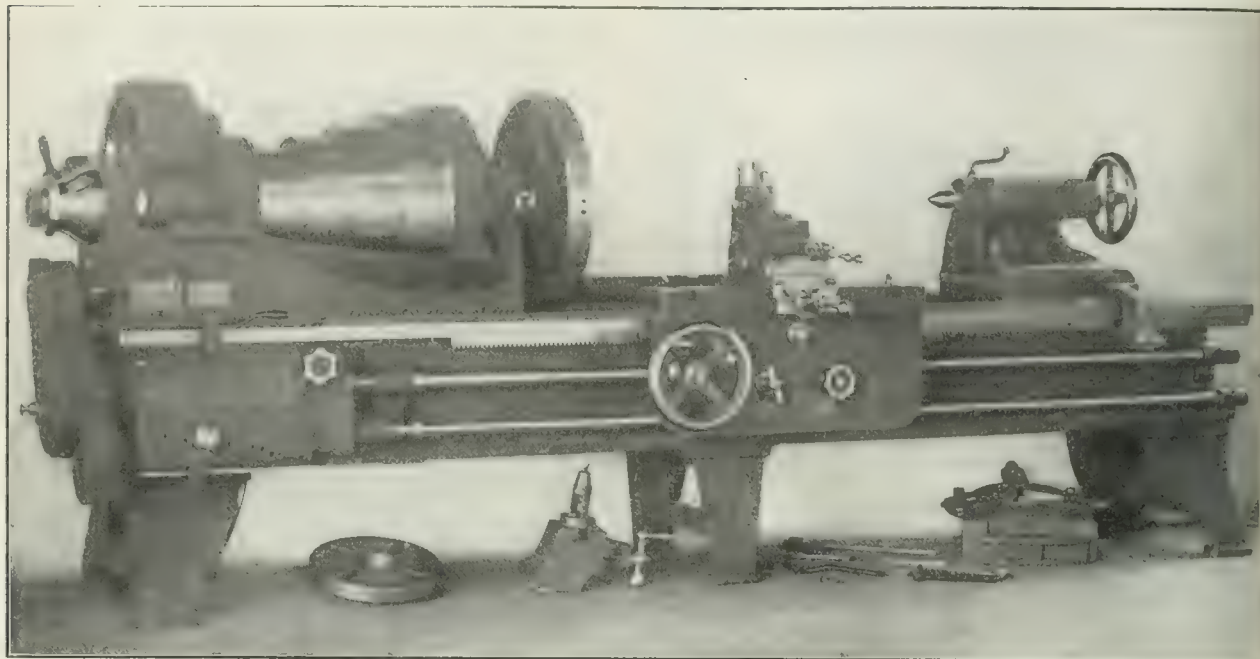


Fig. 1.—The 24-In. Lathe.

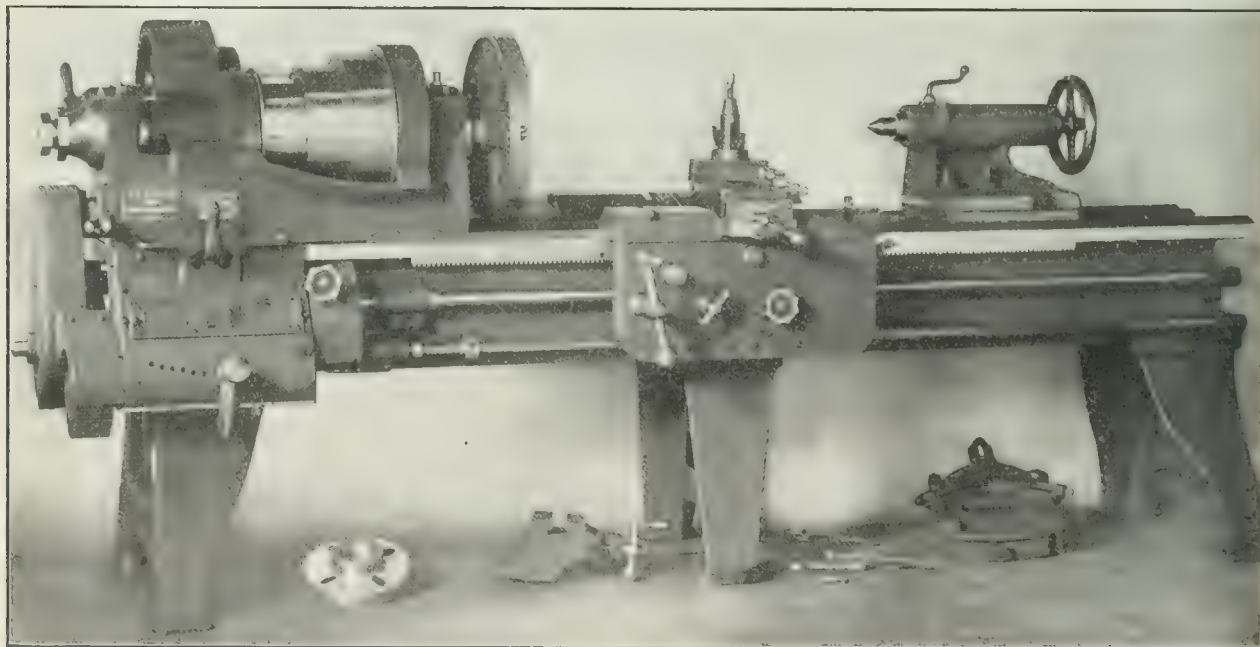


Fig. 2. The 18-In. Lathe.

Two of the New Double Back Geared Lathes with Quick Change Gear Box Built by the F. E. Reed Company, Worcester, Mass.

Mass. These tools are specially designed for use in railroad shops and for handling other classes of heavy work. At the present time the lathes are built with swings of 18, 20, 22 and 24 in., and the company is making preparations to add a 27-in. and a 30-in. size. Fig. 1 shows the 24-in. lathe and Fig. 2 the tool having an 18-in. swing.

The headstocks are of massive proportions. All the sizes have double back gears and the three smaller ones are equipped with a three-step cone pulley, while the 24-in. and the two proposed additional sizes have one more step. All of the tools are made proportionately heavy throughout to correspond with the increased swing. The apron feed mechanism is driven by a worm and

friction countershaft with large pulleys and self-oiling bearings is used.

The Scott Madden Iron Works Company, St. Louis, Mo., has purchased a large manufacturing plant at Marion, Ind., which it will remodel for its special purpose. Completion is expected June 1, at which time the company will combine its entire manufacturing force at Keokuk, Iowa, and Rushville, Ind., also the St. Louis office. It has taken over the manufacture of the Kersey power excavator, formerly manufactured by Francis E. Kersey, Lebanon, Ind.

The Barnes Motor Driven Gap Lathe

A Small and Convenient Tool with All Parts Self-Contained

A self-contained motor drive has been applied by the Barnes Drill Company, 814 Chestnut street, Rockford, Ill., to its 12-22-in. sliding extension gap lathe. This tool was originally designed to meet the demand for a small extension gap lathe, and the addition of the motor drive makes it a very convenient machine for garages and other isolated places where, although there is no line shaft, electric current is available.

The bed is exceptionally broad and deep and thoroughly braced. Both the top and the main beds are fitted closely together by dovetail construction, thus permitting the upper one to be held firmly at any point by clamp bolts extending transversely through the main bed. When it is desired to increase the gap the screw and crank at the rear end draw the top bed back. The rack and pinion controlling the movement of this bed are cut from steel and the former is in one piece.

The headstock is of heavy and strong construction and the spindle is of high grade machinery steel. It runs in amply proportioned bronze bearings that are carefully scraped and fitted. Eight changes of spindle speed are available by a four-step, wide face cone pulley and set of back gears. The cone pulley can be instantly locked to the spindle by a push pin. An off-set type of tailstock is employed which permits the compound rest to be set parallel with the bed. A setover adjustment for use when turning tapers is also furnished.

The carriage is extended in front and has sufficient strength to support the turning tool firmly when doing work in the gap. It is fed by a splined screw, and has a long V bearing on the front way of the bed and a flat one at the rear. There are a number of gibs for taking up wear, and if desired the carriage can be clamped to the bed for cross feed work. T slots for clamping work on the carriage are also provided. The compound rest has a graduated base and sufficient travel to take care of the maximum capacity of the lathe.

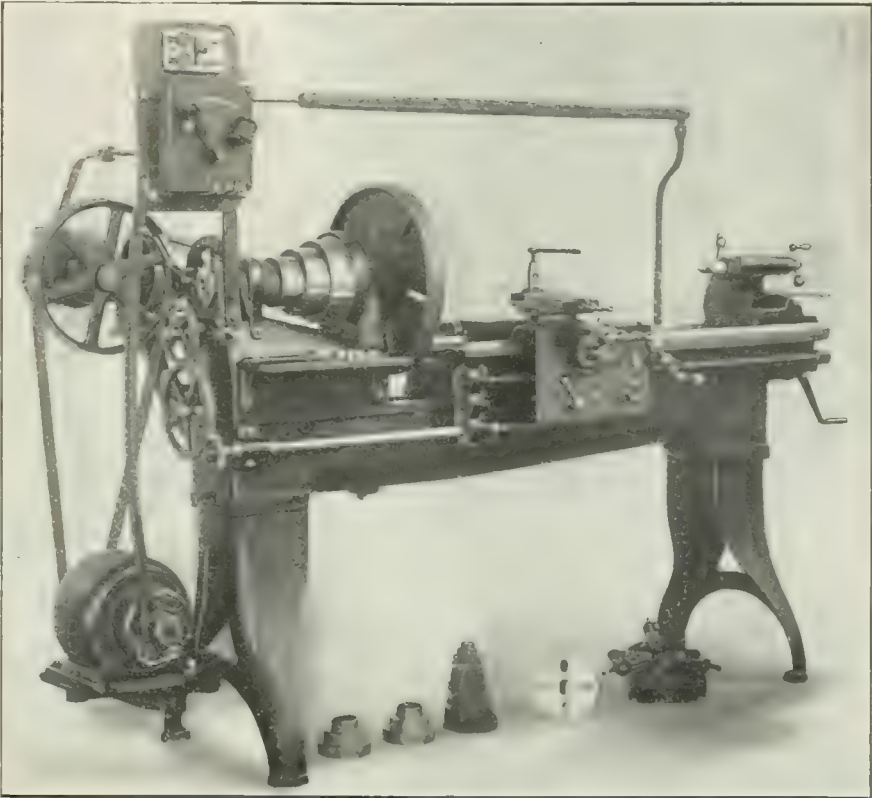
Both the cross and the longitudinal feeds are of the power type, and the necessary change gears for cutting either right or left hand threads for all numbers from 2 to 18, including an 11½ pipe thread; every even thread from 18 to 36, and every fourth thread from 36 to 48, are furnished.

Any standard alternating or direct current constant speed motor can be used for driving the lathe, and when so equipped eight changes of spindle speed are available. The motor is belted to the driving shaft pulley, and the friction clutches for changing the direction of rotation are mounted on this shaft. These clutches are of the same type as the ones used in the maker's all-g geared tapping machine, which was illustrated in *The Iron Age* June 30, 1910. From the driving cone pulley mounted on this shaft a 2-in. belt transmits the power to the spindle cone pulley. The horizontal shifting bar above the lathe within convenient reach of the operator controls the starting, stopping and reversing of the spindle. Moving the bar to the left gives the forward motion, to the

right the reverse and in the central position the motor is stopped. The ratio between the forward and the reverse speeds is 1¾ to 1.

The following table gives the principal dimensions and specifications of the lathe:

Swing over bed, inches.....	13
Swing over carriage, inches.....	8½
Swing in gap, inches.....	22½
Diameter of largest cone pulley step, inches.....	7½
Diameter of smallest cone pulley step, inches.....	3¼
Width of cone pulley steps, inches.....	2½
Diameter of hole through spindle, inches.....	1½/32
Diameter of spindle nose, inches.....	1¾
Diameter of front headstock spindle bearing, inches....	2¼/16
Length of front headstock spindle bearing, inches.....	37/16
Diameter of rear headstock spindle bearing, inches....	1½
Length of rear headstock spindle bearing, inches.....	2¾
Diameter of tailstock spindle, inches.....	1¾
Morse taper of tailstock spindle.....	No. 3



The 12-22-In. Gap Lathe with Motor Drive Built by the Barnes Drill Company, Rockford, Ill.

Morse taper of headstock spindle.....	No. 4
Ratio of back gearing.....	8 to 1
Diameter of feed screw, inch.....	1
Size of tool post slot, inches.....	½ x 1
Angular travel of compound rest, inches.....	3

The lengths of bed are regularly furnished—namely, 5½ and 7½ ft. The shorter lathe has a minimum distance between centers of 36 in. and a gap of 18 in., while the maximum distance between centers on the other type is 96 in. and the gap is 36 in.

The equipment furnished with this lathe includes change gears and the other accessories ordinarily supplied. The starting rheostat, which is also included, is conveniently mounted on a bracket, and the tool is supplied with belts, completely wired and ready to run as soon as the feed wires are connected.

The Bollinger-Andrews Construction Company, Pittsburgh, has completed an extension, 140 x 150 ft., to the foundry department of its plant at Verona, Pa., giving the foundry a total length of 610 ft. The plant is being operated on gray iron castings, chiefly ingot molds and furnace castings.

The Pacific Coast Steel Company has completed the installation of machinery at its new plant in South San Francisco, including an 8-in. and a 10-in. rolling mill. Two 20-ton open hearth furnaces are to be completed in time for the plant to start in April.

Forging with a High Speed Hydraulic Press

It has been possible for some time both in this country and abroad to make large forgings with a hydraulic press, but it is only lately that it has been possible to

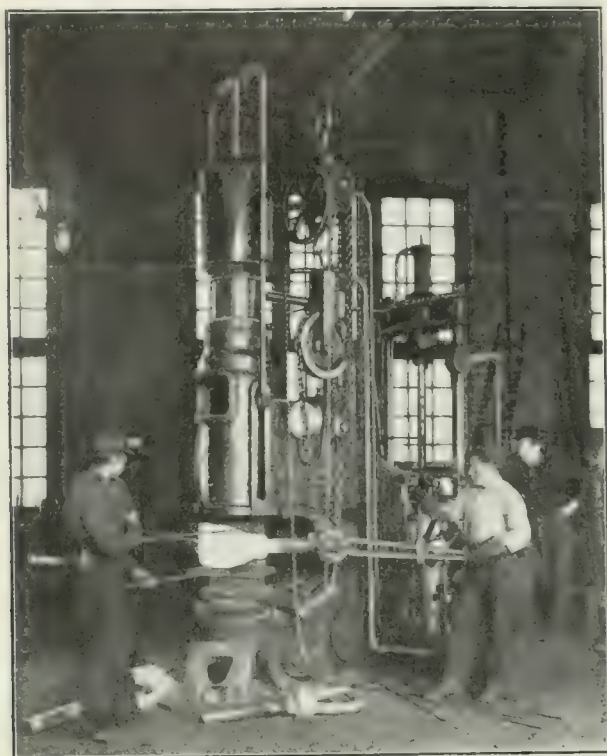


Fig. 1.—The 150-Ton High Speed Hydraulic Forging Press Made by the United Engineering & Foundry Company, Pittsburgh, Pa.

utilize a press of this type for smaller forgings. The larger type of hydraulic presses equipped with the Davy single lever control and manufactured in this country by the United Engineering & Foundry Company, Farmers'

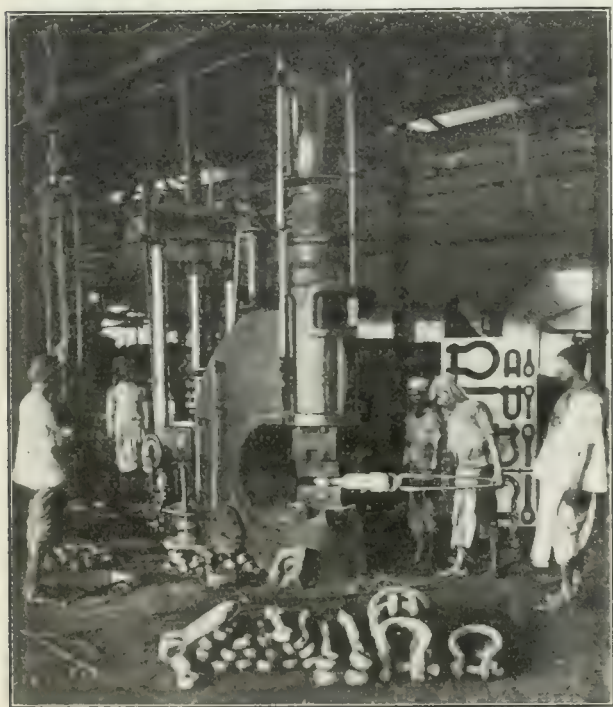


Fig. 2.—Forging Shackles with Unskilled Labor in India on a Hydraulic Press.

Bank Building, Pittsburgh, Pa., were illustrated in *The Iron Age* June 30, 1910. Figs. 1 and 2 show two 150-ton presses of this company in operation under widely differ-

ing conditions, and Fig. 3 illustrates a typical forging made with one of these presses.

Fig. 1 shows the machine in operation in America and illustrates how simple tools can be used under the press to help on certain jobs. One of these is the tapered wedges used to form the sides of the eyebolt being forged. These wedges are said to work very satisfactorily without placing the crew in danger.

An installation of one of these presses in India is shown in Fig. 2, and the ease with which forgings can be made and the absence of flying scale or sparks are clearly illustrated. This is one point in favor of the forging press as compared with a hammer, as it would be impossible for people dressed as the Indian natives do to work at a hammer. The practice employed in making shackles differs from that generally employed in this

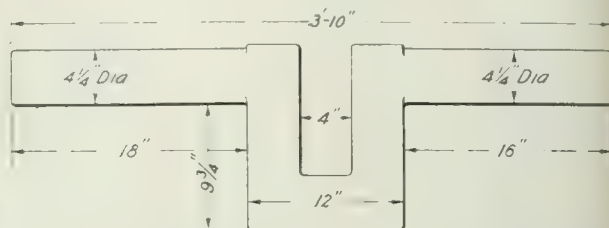


Fig. 3.—A Crank Shaft Forged by One of These Presses from a Solid Piece.

country. In forging shackles on the press illustrated, a billet of sufficient size to form the head without upsetting is used. In this way a superior forging is said to be obtained because of the amount of working the steel receives, while at the same time the work is turned out quickly, as the press is able to make a large reduction in the size of the billet at each stroke.

The use of the single lever control on these presses is said to make it possible to do a great variety of work that cannot be handled by a hammer. The crank shaft shown in Fig. 3 was made from a billet measuring 14 x 4 1/2 x 21 in. in a 150-ton press without the use of any special tools, in 19 min. with one heat. This time included the slotting out between the cheeks and the saving due to not having any slotting or drilling to do afterward is apparent. This time was made on the first of a lot by a crew that had not had any previous experience on this particular class of work.

Super-Vitrite High Speed Steel.—Howell & Co., Ltd., Wincobank, Sheffield, England, is calling attention to a fine performance of its Super-Vitrite high speed steel in turning a shaft in its own shops. A rolling mill shaft had been broken, and it was essential that it should be repaired at the earliest possible moment. A rough forged steel shaft of 0.40 carbon, weighing 4928 lb., was obtained and turned down to the necessary dimensions. It was at first attempted to turn the shaft at 68 ft. per minute, but so much sand had been forged into the skin of the material that this was found to be impossible, the cut sparking like a dry emery wheel. The speed was then reduced to 50 ft. per minute, and kept until the turning was finished. The finished weight of the shaft was 3248 lb., so that 1680 lb. was turned off. The time taken was 29 hours, of which 13 was roughing and 16 finishing. During the roughing the material removed amounted to nearly 112 lb. per hour. The roughing cut was eight cuts to the inch, and the depth varied from 1/4 to 1/2 in. The performance would have been greatly improved if it had not been for the sand in the skin of the material. The tool was only ground twice in the progress of the work.

The J. W. Gore Company has changed its name to Southern Tool & Supply Company, and removed from 3 Boyce street to 5 East Main street, Chattanooga, Tenn. The company now has much more commodious quarters, has increased its capital and is prepared to handle a very much larger business than heretofore in machine tools, planing mill and pattern shop machinery and machinists' supplies.

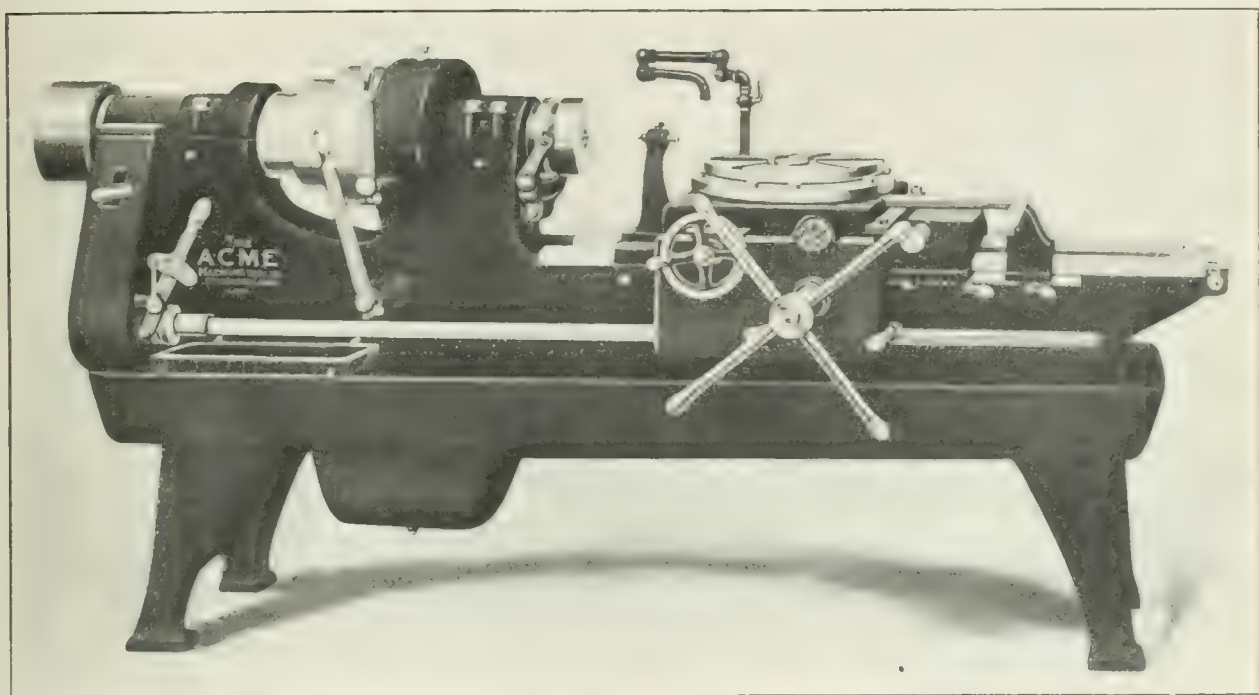
The Acme Combination Turret Lathe

A new type of turret lathe capable of handling a wide range of bar stock work and also forgings and castings has recently been designed by the Acme Machine Tool Company, Cincinnati, Ohio. With the bar outfit of tools, which are very simple, pieces having a maximum diameter of 2½ in. and not over 26 in. long can be handled, while with the chucking outfit forgings and castings as large as 14 in. can be accommodated.

In the design of this tool great rigidity is assured by casting the head solid with the bed. Friction back gears and a three-step cone pulley with the individual steps large enough to accommodate a 3½-in. belt are also provided. The spindle which is of high carbon hammered crucible steel has ring oiling, babbitt lined bearings, all of which are ground and then scraped by hand. A special design of chuck which grips the work both accurately and powerfully is used. The features of this

lathe for taking up wear. Hand and power cross feeds are provided in both directions with a large micrometer dial to indicate the amount. The power feed which is also applicable to the longitudinal movement of the turret is of the geared type and consists of four changes, any one of which is instantly available by moving the lever at the front of the head. Both the cross and the longitudinal feeds can be reversed by throwing the lever at the front of the feed box. Each tool on the turret has an independent adjustable stop, which is conveniently located for the operator and can be used in any desired combination. The automatic feed can also be tripped by these stops, and a very rigid one is used to locate the turret in its central position, as all movement of the cross slide is from the center out.

The bearing of the carriage is of the V type with large proportions, and extends the entire length of the carriage, which is securely held in position by gibs at the front and the back. In addition to the automatic adjustable stops for each turret hole, which were men-



The 2½ x 26 In. Combination Turret Lathe Built by the Acme Machine Tool Company, Cincinnati, Ohio.

chuck are the elimination of end motion of the work when the chuck is closed, thus making it possible to do second operation work where an exact length of shoulder is required, and also the doing away with the overhang of the jaws which permits short work to be gripped without tilting the jaws. These jaws are inserted and removed readily without dismantling the chuck. A long lever at the front of the chuck opens and closes it while the machine is running, and also operates the roller feed, as the centering jaws and the rolls are automatically operated in unison. When making adjustments to feed any desired size of stock the jaws are turned by a spanner wrench until the stock is gripped. The jaws are then loosened slightly which places the rolls under the proper tension to feed the stock, which can be hexagonal, round or square.

The turret is mounted on an amply proportioned cross slide, and consists of a circular plate with radial slots for locating the tools and with holes for the bolts clamping them to the turret top. The locking bolt is placed at the front end of the slide directly under the cutting tool and works in hardened and ground taper bushings let into the solid turret. The downward pressure on the tool while taking a cut is transmitted to the turret. This construction gives what is said to be a very rigid support to the tool. In addition to the regular oil pipe each tool space has an oil hole for use with oil tube drills and tools of that character. The swinging stock stop is supported by the front of the saddle. The cross slide travels in a narrow dovetail guide provided with a

tioned in the preceding paragraph, there are four auxiliary stops which may be used in any special combination. These auxiliary stops will trip the automatic feed also, and are controlled by the knob at the right end of the carriage. The working parts are all carefully protected from dirt and chips to insure an accurate output.

The chip pan is made very deep to hold a large quantity of chips, and the oil tank is cast solid with it. This tank has a perforated cover which serves as a strainer and allows the oil to flow back into the tank. The oil pump which operates when the machine is running in either direction is of sufficient size to deliver an ample supply of lubricant. The regular equipment of the machine includes an improved stock supporting stand and a triple friction countershaft with ring oiling bearings, although if desired motor drive can be substituted for the latter when specially ordered.

The Pittsburgh Motor Car Company has purchased the buildings formerly occupied by the Pennsylvania Steel Pulley Company on the North Side, Pittsburgh, Pa., which it ceased to use when it disposed of its business to the Oneida Pulley Company, Oneida, N. Y. The main building is 100 x 380 ft., and is a brick structure. The Pittsburgh Motor Car Company has outgrown the plant it has been operating at New Kensington, Pa., and will at once remodel the Pittsburgh plant with the expectation of getting it in operation by February 15. The company expects to add two stories to the building a little later and increase the capacity of the plant accordingly.

New Marquette Ore Dock

A Suit to Test the 80-Cent Ore Rate in Minnesota

MARQUETTE, January 21.—At an estimated cost of \$1,200,000 the Lake Superior & Ishpeming Railway Company is to build at this port the highest and one of the greatest ore docks in the world. The pier will be of reinforced concrete. It will be 1200 ft. long, 54 ft. wide and 75 ft. high, 2 ft. higher than any ore dock yet built, and will have 200 pockets of an aggregate storage capacity of 47,000 tons. The spouts will be 35 ft. long; they will be operated in groups of six by electric motors. The steel contract has been let to the Wisconsin Bridge & Iron Company. The estimates call for 5000 tons of steel, 250,000 ft. of maple, 800,000 cu. ft. of earth filling, 8000 piles, 80,000 ft. of fir lumber and 33,200 cu. yd. of concrete. Work will begin soon, and the dock will be ready by the season of 1912.

Two Minnesota Suits

A suit which is attracting much attention is that filed with the Interstate Commerce Commission by Leon F. Lum of Duluth against the Great Northern Railway. The complainant seeks a reduction in the 80-cent railroad rate on iron ore shipments from the Mesaba range. Mr. Lum, who is the holder of a mineral tract near Grand Rapids, at the extreme western end of the Mesaba, asserts that 80 cents is an excessive charge, and that "any rate in excess of 40 cents per ton is unreasonable and unjust." He declares that because of this excessive rate, his ore is greatly depreciated in value and he is prevented from leasing or selling the same. His suit is based on the alleged refusal of the Great Northern to publish a rate on ore from Grand Rapids to the docks at Superior, Wis. Arguments were advanced that the ore owned by Mr. Lum was not merchantable, and it was suggested that "conservation of natural resources cannot be effected by encouraging the reckless mining and shipping of ore." Mr. Lum alleges that the ore is of merchantable quality.

Another interesting suit, that of the State of Minnesota *vs.* Eliza Korner, now pending in the Minnesota courts has to do with the ownership of mineral bodies underlying meandered and navigable lakes, whether such ownership is vested in the State or in the owners of property on the shore of the lakes. The final arguments in the district court will be made February 28. The case directly concerns a body of ore lying partly under Long-year Lake, near Chisholm, on the Mesaba range, and which is being mined by the Euclid Mining Company. There are many meandered lakes in the iron region of Minnesota, and the State some time ago laid claim to the mineral which might be found under them.

A new mining district, the development of which is now being started, is the country in the vicinity of Grand Rapids, at the western extremity of the Mesaba range. The Hanna interests of Cleveland are preparing to open a mine on the property of J. W. Poole, close to the shore of Pokegama Lake. A shaft will be put down and the ore deposit will be opened. The property has been named the Poole. A number of other tracts in the vicinity have been leased, and it is indicated that the new field will become one of no small importance.

On the Old Ranges

The Kloman Mining Company, controlled by John T. Jones of Iron Mountain and associates, will soon commence sinking a shaft at the Kloman mine in the Republic district. Machinery will be used taken from the old Saginaw. A recent shipment of 1000 tons received and tested at the Jones Furnace at Iron Mountain showed that the Kloman ore is of most desirable grade.

The New York Steel Company is making excellent progress with the development of the Goodman and Gleason properties, near Iron River, Mich. Some ore will be shipped the coming season. At one of the twin properties a 12 x 12 shaft is being sunk. The ore lies at considerable depth at this point, and the drifting that will

open the deposits will not be started for a number of months.

Oglebay, Norton & Co. of Cleveland, already important operators in that locality, have added the old River-ton mine to their holdings in the Iron River district of the Menominee range. The property was recently abandoned by the United States Steel Corporation. It is the plan to explore and open that portion of the property as yet undeveloped. This can be done advantageously from Oglebay, Norton & Co.'s Chatham mine, which adjoins the River-ton.

The Cleveland Cliffs Company has reduced the working force at its Cleveland Lake mine at Ishpeming by 175 men, on account of lack of stockpile room.

The St. Clair Company has surrendered its contracts for drilling various properties in the district adjacent to Ishpeming, Marquette range, and has withdrawn from the field. The exploratory work for the Jones & Laughlin company will be continued by the Duluth Diamond Drill Company. This is in progress near Iron Mountain Lake and at the Winthrop location, in both of which localities there are good prospects. The Jones & Laughlin company's Lake Angeline mine, at Ishpeming, is being operated in a quiet way, although if desired the output could be materially increased.

The Production of Iron Ore in 1909 and 1910

In response to telegraphic requests by the Director of the United States Geological Survey at the close of 1910, reports and estimates of iron ore production for 1909 and 1910 were promptly sent by 18 of the largest iron mining companies, whose combined output represents about 75 per cent. of the total production of the United States. From these returns it is estimated by E. F. Burchard of the Survey that the iron ore produced in 1909, not including stocks left at the mines, was between 51,000,000 and 52,500,000 gross tons. Of this quantity 45,500,000 to 46,500,000 tons was red hematite, the remainder consisting of brown hematite, magnetite and carbonate ores in the order named. The returns for 1910 indicate that between 52,500,000 and 54,000,000 gross tons of iron ore was produced, of which between 47,000,000 and 48,000,000 tons was red hematite.

The following tables afford a comparison of the quantities of iron ore produced in the years 1907 and 1908, with the estimates of production in 1909 and 1910; and also a comparison between the quantities of iron ore produced and the pig iron manufactured. The data on the pig iron are taken from the annual reports of the American Iron and Steel Association, with the exception of those for 1910, which are estimated:

Years.—	Gross tons	Iron ore	Pig iron.
1907.....		51,720,619	15,781,361
1908.....		35,983,336	15,936,018
1909.....		*51,750,000	25,795,471
1910.....		*53,250,000	*27,099,422

* Estimated.

The Flanders Mfg. Company.—This company, incorporated with \$2,250,000 capital stock, has taken over the business of five companies with plants at Pontiac and Chelsea, Mich., engaged in the manufacture of motor cycles and automobile parts. The merged companies are the Grant & Wood Mfg. Company, with a plant at Chelsea and offices in Detroit, engaged in the manufacture of automatic screw machines and screw machine products; and four companies at Pontiac, the Pontiac Motor Cycle Company, Pontiac Drop Forge Company, Pontiac Foundry Company and the Vulcan Gear Works. Walter E. Flanders and others identified with him in the manufacture of automobiles and automobile parts control the new company, but it is announced that Mr. Flanders will remain at the head of the E M F Company. The officers of the Flanders Mfg. Company are: President, Robert M. Brownson, formerly secretary and treasurer of the E M F Company; vice-president, A. O. Smith; secretary, James B. Book, Jr.; treasurer, Harry L. Stanton. The new company will engage extensively in the manufacture of a motor cycle which has been given the name of Bi-Mobile.

New Work at Lake Shipyards

The indications now are that the shipyards on the Great Lakes will have work to carry them into the spring. The *Marine Review* gives the following particulars of contracts now on hand and the prospects:

The shipyards of the Great Lakes have 18 vessels under construction for 1911 delivery, including five bulk freighters, one car ferry, two passenger steamers, one excursion steamer, two oil tenders, one fuel lighter, one car float, two light-house tenders, two light vessels, and one quarantine steamer. Of this programme the American Ship Building Company is building eight, the Great Lakes Engineering Works one, the Manitowoc Dry Dock Company one, the Racine Boat Mfg. Company three, the Collingwood Ship Building Company four, and the Kingston Ship Building Company one.

Excluding Canadian tonnage the four bulk freighters included in this programme will have a carrying capacity of 43,000 gross tons of ore in a single trip, or 460,000 gross tons in an average season of 20 trips. Twenty bulk freighters were launched in 1910, having a carrying capacity of 194,500 gross tons in a single trip, or 3,890,000 gross tons in an average season of 20 trips. In the past nine years bulk freighters having a carrying capacity of 41,088,000 gross tons of ore have been added to the lake fleet. The 1911 programme as so far announced will increase this to 41,548,000 tons. This is practically equivalent to the yearly movement of ores during 1909 and 1910. Moreover it is generally known that additional contracts are pending. For instance, the Pittsburgh Steamship Company has been authorized by the United States Steel Corporation to build two 600-footers, and it is likely that Mr. Coulby, president and general manager of the company, will let the contracts in the near future. [It now seems likely that these orders will be withheld for some time.—*Editor IRON AGE.*] W. P. Snyder of Pittsburgh has also had plans drawn for an addition to his fleet in the shape of two 615-footers, though probably not more than one of them will be built for 1911 delivery. It is an interesting commentary that not a single bulk freighter is building for independent interests. They are all for interests identified with iron and steel making. Apparently the independent owner desires that the business shall absorb the present tonnage before he adds to it. The surplus of ships was quite acute during 1910.

Altogether 51 vessels were launched on the Great Lakes during 1910, exclusive of Canadian tonnage. The last included 20 bulk freighters, three package freighters, two passengers, one steamer, three car ferries, one river ferry, one lumber steamer, 12 tugs, three lighters, one light-house tender, one sand sucker, two dump scows and two gold dredges.

The shipyards have on hand a number of vessels undergoing repairs, some of them of an extensive character, especially those that are being altered to the arch system of construction, so that the shipyards at least are assured of a profitable winter.

Trade Publications

Automobiles.—Stevens-Duryea Company, Chicopee Falls, Mass. Pamphlet. Contains a brief description of the building of the bodies of these cars and shows them at successive stages of the manufacture as well as in completed form.

Boilermakers' Tools.—J. Faessler Mfg. Company, Moberly, Mo. Catalogue No. 27. Calls attention to an extensive line of tools for boilermakers, which includes flue expanders of the rolling type, sectional heading expanders, flue cutters, patch bolt countersinking tools, &c. All the various tools are illustrated and for the most part a description with brief specifications is given on the pages facing the engravings.

Corliss Engines.—Allis-Chalmers Company, Milwaukee, Wis. Bulletin No. 1501. Illustrates and describes the Reliance pattern of belted Corliss engines. Considerable space is devoted to describing the various parts, and the text is supplemented by engravings.

Power Plant Supervision.—Richard D. Kimball Company, 437 Fifth Avenue, New York City. Pamphlet. Outlines a method of obtaining the most economical and efficient operation of power plants which this company is prepared to furnish

the U. S. department of testing and inspection to heating, lighting and power plant owners, managers and superintendents. The present methods of operating power plants are briefly discussed, with a complete statement of what can be done to increase efficiency and eliminate waste. Following this is a description of how this company proposes to bring these economies about.

Baling Presses.—P. K. Dederick's Sons, Albany, N. Y. Catalogue. Treats of a line for handling all kinds of material. The various types of presses are illustrated and described at length.

Steam Engines.—The Fitchburg Steam Engine Company, Fitchburg, Mass. Catalogue. Relates to the Fitchburg four-valve, horizontal, vertical and high speed engines. After a general description of the engines space is given to their separate parts, the text being supplemented by illustrations. This is followed by illustrations of the different types and reproductions of indicator cards taken from them. Tables giving dimensions of the various sizes and styles of engines complete the catalogue.

Universal Milling Machine.—The Garvin Machine Company, Spring and Varick streets, New York City. Circular No. 135. Calls attention to the special features of the Garvin No. 2A universal miller which was illustrated in *The Iron Age* December 15, 1910. Four views of the machine, as well as one of the positive feed gear change box, which renders 10 feeds available, are given.

Calendar.—McClintic-Marshall Construction Company, Pittsburgh, Pa., contractor for the erection of steel bridges and buildings, has issued an annual calendar. The leaves for the various months in addition to having figures for the current month, have those for the preceding and succeeding months, and the card hanger has a calendar running from January, 1911, to May, 1912. Each leaf has an illustration of some contract executed by the company or some of its plants or specialties. Among the last is the Alken roof which was illustrated in *The Iron Age* October 6, 1910.

Calendar.—Henry Vogt Machine Company, Tenth and Ormsby streets, Louisville, Ky., manufacturer of ice and refrigerating machines and water tube boilers, has issued a calendar measuring 21 x 16½ in. The upper part of the calendar contains a bird's-eye view of the company's plant and the calendar pad in the lower portion not only gives the day of the month in red figures but also by small numerals indicates how many days have elapsed.

Motor Cars.—H. H. Franklin Mfg. Company, Syracuse, N. Y. Pamphlet. Size 6¾ x 12¼ in. Devoted to the company's 1911 motor cars, which includes four models, two six-cylinder and two four-cylinder, with 11 styles of open and closed bodies. The special distinctive features of these models are described and this is followed by a general description of the features common to all, such as the motor, transmission gear, running gear and equipment.

Metal Sawing Machines.—Cochrane-Bly Company, Rochester, N. Y. Loose leaf circulars. Concerned with a line of metal sawing machines, saw sharpeners of the automatic type and bench and floor filing machines. The make-up of the various circulars is practically uniform, an illustration of the particular machine described therein being given on the first page, with a description on the two inside pages and specifications in brief form on the last page.

Band Resaws.—W. B. Mereshon & Co., Saginaw, Mich. Catalogue. This is the company's 1911 catalogue, describing and illustrating a line of band resaws. The arrangement of the catalogue is somewhat novel, the methods of constructing the resaws being taken up first and followed by a description of the various types and their special features. The last portion of the book is devoted to useful tables and information pertaining to band saws, as well as a practical and complete treatise on the use and care of band saw blades.

Wire Rope Tramways.—The Hallidie-Palnter Tramway Company, 320 Market street, San Francisco, Cal. Concerned with aerial wire rope tramways of both the single and double rope types. The various styles of tramways and buckets are illustrated.

Steam Pumps.—C. H. Evans & Co., 183 Fremont street, San Francisco, Cal. Catalogue. Refers to a line of crank and flywheel steam pumps and pumping machinery for every purpose. The various types of pumps are illustrated and brief tabular specifications are given on the facing pages. A number of tables of useful information completes the catalogue.

Electric Motors and Lighting Plants.—Fairbanks, Morse & Co., Chicago, Ill. Three bulletins. Nos. 21 and 207 give general descriptions and specifications for direct current dynamos and motors and alternating current induction motors, respectively. The various parts entering into the construction of these motors are shown and described at length. No. 34 points out the advantages of the Fairbanks-Morse complete residence lighting plants capable of supplying current for 50 30-volt lamps. The illustrations show the dynamo, the gasoline engine, the storage battery, the switchboard and some of the fixtures.

The following quotations are for small lots New York. Wholesale prices, at which quantities only can be bought, are given elsewhere in our weekly market report.

[illegible]

THE IRON AGE

Established
1855

New York, February 2, 1911

VOL. 87: No. 5

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.	

CONTENTS.

Editorial:	PAGE.
New Orders Increasing.....	287
The Reciprocity Agreement with Canada.....	288
An Anti-Accident Inspection Service.....	288
The Leaders in Pig Iron Production.....	289
Limits of Large Marine Oil Engine Units.....	289
A Government Hydraulic Testing Plant.....	289
Correspondence.....	290
Electric Iron and Steel in Norway.....	291
Steel Corporation Earnings in 1910.....	292
Eight-Hour Day for New York Machinists.....	292
New Railroad Equipment.....	292
The Detroit Foundry Supply Company.....	292
The Detroit Steel Products Company.....	292
New York Central Ferrofitanium Rails.....	292
The Crucible Steel Company Buys Midland.....	293
Steel Corporation Changes.....	293
E. P. Thomas President of the United States Steel Products Company.....	293
The Iron and Metal Market Reports.....	294 to 303
Notes on Prices.....	303
Iron and Industrial Stocks.....	303
The Frick Coke Company Will Not Reduce Wages.....	303
Pittsburgh's Position in Steel.....	304
The Carnegie Steel Company Relief Fund.....	305
Bylesby Convention in Chicago.....	305
The Depreciation of Unprotected Steel Work.....	306
The Pig Iron Record of 1910.....	306
Sidewalk Lights for Interior Use.....	306
Total Production of Pig Iron in the United States in 1909 and 1910.....	307
Results with Dry Air Blast. Illustrated.....	308
The Webster Mfg. Company's Improvements.....	309
Canadian Steel Interests and Reciprocity.....	310
The Canadian Railway Club Meeting.....	310
A Blooming Mill with Novel Features.....	310
The Demand for Broad Foundry Training.....	311
Rifle Shots Open a Chilled Cinder Notch.....	311
The California Metal Trades Association's Annual Meeting.....	311
Personal.....	312
Obituary.....	312
The Reciprocity Agreement with Canada.....	313
The American Society for Testing Materials.....	313
The Quebec Bridge.....	313
The Expansion of Fayette R. Plumb, Inc. Illustrated.....	314
The Chandler & Farquhar Company's Expansion.....	317
Cammell Laird & Co. of New York.....	317
The Ajax Hot Saw and Burring Machine. Illustrated.....	318
The Quaker City Foundry Supply Exhibit.....	318
Coke Oven Gas in Open Hearth Furnaces.....	318
The Newark Gear Pattern Cutter. Illustrated.....	319
The Richardson Mechanical Lubricator. Illustrated.....	320
The Robbins Patternmakers' Lathe. Illustrated.....	321
Power Requirements of Electric Furnaces.....	322
Iron Ore Receipts at Lake Michigan Ports.....	323
Large Sizes of Lap Welded Pipe. Illustrated.....	324
New Gould & Eberhardt Gear Cutter. Illustrated.....	325
Labor Conditions in Iron Mining.....	326
The Northern Tumbling Barrel. Illustrated.....	327
A Labor Conviction Under the Sherman Anti-Trust Law.....	327
New Standard Samples of Steel and Ore.....	327
Electricity on a Plantation.....	328
The Acme Blueprint Machine. Illustrated.....	329
The Calumet Crane Type Tumbler. Illustrated.....	330
Carnegie Technical School Lectures.....	330
The Triumph Type L Transformer. Illustrated.....	330
The Buffalo Steel Plate Pressure Blower. Illustrated.....	331
The Benjamin Tungsten Mill Cluster. Illustrated.....	331
New Tools and Appliances.....	332
The Machinery Market Reports.....	332 to 342
Judicial Decisions of Interest to Manufacturers.....	343
Trade Publications.....	344
Current Metal Prices.....	346

New Orders Increasing

Export Demand Still a Marked Feature—A Possible Tin Plate Advance

The improvement in steel trade conditions has been more marked in the past week. In some lines, as wire and tin plate, it is more pronounced than in the heavier products; but throughout the trade there is a definite impulse toward greater activity. One result has been the publication of extravagant statements, particularly grotesque being those referring to efforts to prevent price advances.

The Steel Corporation's statement gives a good gauge of what has taken place, in showing new orders averaging 30,000 tons a day in January up to the 27th, as against 22,000 tons a day in December and November, when it was plain that wear and tear were not being replaced by new buying. The New York Central and Pennsylvania tonnages, it is noted, are not included in the January figures.

Another index is the Steel Corporation's list of active blast furnaces, which in the first half of January showed about 47 per cent. of capacity in blast. To-day the percentage is 51, and will be advanced to 56, when five furnaces now being made ready are blown in.

The news of the double tracking programme of the Union Pacific, well timed with the Steel Corporation's report, has strongly reinforced the more cheerful sentiment of the week. Of the \$75,000,000 outlay the steel mills will get a substantial share. Probably 250,000 tons of rails, or 50,000 tons a year, will be needed, besides many thousands of tons of steel for bridges.

Exports have figured in a large way on the Steel Corporation's order books in the past fortnight. Canada's steel works have not been equal to the pressure on their finishing capacity, and 15,000 tons of billets will be shipped from Gary to a Canadian plant, which is in the market for a further round lot. The National Railways of Mexico have just placed in this country 20,000 tons of rails in addition to 5000 tons early in January.

At Ottawa, the commissioners of the Transcontinental Railway opened bids this week on 61,200 tons of 80-lb. rails. Canadian mills, it is likely, will be able to roll only a part of it. American mills may take some portion of the order for delivery at the Pacific end, but British mills have the benefit of the preferential tariff.

Considerable rail business is pending. The principal order of the week was given out by the Burlington. It was for 30,000 tons, equal lots going to the Illinois Steel, Colorado and Lackawanna companies. The Boston & Maine and New Haven orders, amounting together to 61,000 tons of open hearth rails, are about closed. The Rock Island has bought 10,000 tons and the Western Maryland has taken 12,000 tons, besides 9875 tons already reported.

Late structural contracts include 18,000 tons for the

Kenova, W. Va., bridge of the Norfolk & Western, taken by the American Bridge Company; 2500 tons for the New Haven catenary bridges, and 2200 tons for the Hayworth Building at Chicago. The Cruikshank Building, New York, will take 5000 tons. In the East reports persist of very low prices on fabricating contracts, which presumably are backed by concessions from some sellers of plain material. In the Chicago district, however, fabricating prices are stiffening and mill prices on shapes are reported firm.

While wire mills now have very satisfactory orders ahead for the spring trade, talk of a further advance in wire products is quite premature.

In the tin plate trade demand continues strong, in view of which and the added cost of 25 cents a box for tin in the past year, a 10 cent or 15 cent advance on tin plate would not be surprising.

In steel making pig iron there is a slightly better movement, but the foundry iron market both in price and in volume is quite out of step with finished lines. Western malleable foundries are in the market for iron for the second half, in view of contracts they are about making with railroads; but in general the foundry industry is in a discouraging state, which is closely reflected in foundry pig iron.

Sales of 100,000 tons of Newfoundland ore have been made at Philadelphia at 7 $\frac{3}{8}$ c. a unit, or $\frac{3}{8}$ c. more than the last sale made for 1910 delivery. Foreign demand for these ores and the export duty of 7 $\frac{1}{2}$ c. a ton account for this advance, but the delivered price is still well below the Lake ore parity. Shipments of Newfoundland ores into Pennsylvania this year are expected to be about 285,000 tons.

The Reciprocity Agreement with Canada

Negotiations for more favorable trade relations have been proceeding for some months between representatives of the United States and Canada. Announcements have been made from time to time that they were getting closer together in deciding upon the special articles on which duties could be mutually reduced. The task was a most difficult one, as the representatives of each country were necessarily anxious that the result of their labor would be such as would commend itself to the great mass of their people. It was desirable that they should avoid doing anything that would be seriously injurious to producers or manufacturers in their own countries, and yet it was essential that if trade relations were to be promoted, some concessions of a material character should be made. The agreement at which they have arrived is now before the people of the two countries, and undoubtedly much depends upon the expression of public sentiment thereon in securing ratification by the respective legislative bodies.

President Taft has transmitted a message to Congress in which he takes strong ground in favor of the adoption of the agreement precisely as it comes from the joint commissioners. In private and public utterances he has since emphasized the position thus taken, indicating that he thoroughly believes that the time is at hand for securing more liberal trade relations with our neighbors. Opposition of a strenuous character has developed in both the Senate and the House of Representatives, and the agreement is likely to have rather rough treatment in the discussions which will

take place on the floor of Congress. It may be that some of the provisions of the agreement may appear to those affected to bear heavily on certain of our producing and manufacturing interests. Nevertheless, if we are ever to improve our trade relations with Canada, this is the time to take favorable action. The representatives of the two countries have at last been able to agree upon schedules relating to quite a number of articles, and the agreement should be adopted unless the people of this country have made up their minds that they do not desire to establish better relations than those which have been latterly existing. The people of Canada have made great strides in the development of their country in recent years and take pardonable pride in that development. They feel that every year makes them more independent of other countries, and from time to time their duties have been advanced so as to make it more difficult for American products to reach Canadian markets. It may be assumed that this disposition will continue, and be even intensified if this agreement should be rejected by the United States.

An Anti-Accident Inspection Service

Our correspondent "Manager," writing of workmen's compensation for accidents, makes a suggestion that should work out practically to the advantage both of the accident indemnity companies and of many manufacturers who contract for such insurance. It is that insurance against damage payments on account of industrial accidents should have connected with it a system of shop inspections comparable in safeguarding value with those of boiler and fire insurance companies. It is true that the industrial casualty insurance companies make preliminary inspections, with a view to deciding in which of their classes of hazards to place an industrial establishment for which they are writing a policy. The fact is, too, that as the result of such inspections it is sometimes pointed out that a certain expenditure of money by the manufacturing company will lessen the risk, and thus give it the benefit of a lower premium rate. But, as our correspondent points out, there is no such organization for the inspection of industrial plants as will give manufacturers the benefit of specialized and expert information in their respective lines of production and result in a definite reduction in the risk taken by the workman.

State factory inspection laws exist, as is well known; and it is equally well known that their execution is in too many instances so much a matter of politics and of graft as to make this branch of the public service a byword. Too often the evident purpose of State inspections is to harass and antagonize employers and appease a labor union demand for the punishment of noncompliant manufacturers. A service organized in the interest of safety—the conservation of human life and of the resources that are now wasted in preventable accidents—would eliminate these most objectionable features of State inspections, and its suggestions would be met with a respect and co-operation that could never be secured under political auspices.

What is of most importance, such an inspection would actually save human life and prevent an untold amount of suffering; and that, more than accident

compensation or legislation regulating payments for injury or death, is the great end of all the agitation that has been looming up as the most important industrial development of recent years.

The Leaders in Pig Iron Production

In 1910 the United States, Germany and Great Britain for the first time brought their combined production of pig iron above 50,000,000 gross tons. This was due to the remarkable increases made by this country and Germany, the latter exceeding all performances of recent years by producing 1,876,000 tons more than in the previous year, while the United States added over 1,500,000 tons to its total for 1909. Great Britain, while official figures are lacking for the year, produced 4,993,000 tons in the first half, and probably fell somewhat below that in the second half. With the expansion in the world's trade in iron and steel last year indicated by the exports of the principal producing nations, it is fair to assume that France, Belgium, Austria, Russia, Canada, Italy, Spain and all the lesser iron making countries added to their outputs of 1909. The probabilities are, therefore, that the world's pig iron output in 1910 was not far short of 65,000,000 tons. The comparison of the three leading countries with the three years preceding 1910 is as follows in gross tons (figures for Germany in metric tons):

Pig Iron Production in United States, Germany and Great Britain, 1907-1910.—Tons.

	1910.	1909.	1908.	1907.
United States...	27,298,545	25,795,471	15,936,018	25,781,361
Germany.....	14,793,325	12,917,653	11,813,511	13,045,760
Great Britain...	9,800,000*	9,664,287	9,056,851	10,114,281
Totals.....	51,891,870	48,377,411	36,806,380	48,941,402

* Estimated.

It is probable that stocks of pig iron in producers' hands in the three countries increased last year by more than the excess of production over 50,000,000 tons, or by more than 1,900,000 tons. In the United States the increase is estimated at fully 1,000,000 tons. For Germany the statement is made that with the increase of 1,876,000 tons in output over 1909, "heavy stocks accumulated," so many furnaces being kept going because their gases were needed for power. In Great Britain the Stocks in Connal's stores increased from 390,000 to 530,000 tons, or by 140,000 tons, against 253,000 tons increase in 1909, while stocks in producers' hands made a considerable gain. Both Germany and Great Britain, like the United States, are adding to their blast furnaces, so that it may fairly be said that the world is carrying a pig iron capacity representing a wide margin beyond any need that will be encountered in the immediate future.

Limits of Large Marine Oil Engine Units

Illuminating deductions as to the future of the marine internal combustion engine are made by an editorial writer in *The Engineer*, London, based upon an analysis of the motive power of the new Dutch freighter *Vulcanus*, which is propelled by oil engines of the Diesel type. Making flat denial of the reports that the British Admiralty has adopted this class of motors for its ships, the article goes on to enumerate some of the difficulties which are yet to be overcome before the internal combustion engine can hope to replace steam, even in comparatively small ocean-going vessels. To quote a few paragraphs from the paper:

There are many boats propelled by internal combustion engines, but they are, with perhaps a couple of exceptions, either pleasure craft, purely experimental vessels, or small boats not venturing far from their base. The *Vulcanus* is a tramp steamer propelled by oil engines, and when she makes the first voyage from Holland to Borneo and back she will be the pioneer of a new navigation. Whither the system leads we dare not venture an opinion. That the internal combustion engine will be used regularly for ocean voyages it is impossible to doubt, but whether the biggest ships will be propelled by it is as yet too soon to say. Between the 70,000 hp. of the *Mauretania* and the 500 hp. of the *Vulcanus* is more than arithmetical difference.

At the moment, the difficulties of building internal combustion engines of very high power have proved themselves insuperable, and we are forced to admit that we must not look for more than 1000 hp. per cylinder for some time to come. It is needless to add that no marine superintendent is likely to contemplate with favor the placing of 70 odd cylinders in a single vessel. Six large cylinders per shaft would, we imagine, be as great a number as could be looked upon as a practical proposition; with them we might expect a combined shaft power of, say, 20,000 to 24,000 on four shafts, and with that we could engine some such ship as the *Caronia* or *Carmania*, vessels about 650 ft. long, with a speed of 19 knots. Within the next 10 years we may see ships of that size plying across the Atlantic, but before then much water must flow under the bridges and much work be done on smaller powers. Messrs. Schneider are now building a marine oil engine of 1000 hp. per cylinder, but so far no power approaching that has been tried at sea; the *Vulcanus* develops only half that amount, in six cylinders.

A question that is likely to stand in the way of rapid development for some time to come is the much greater cost of fitting a ship with internal combustion than with steam engines. It is safe to say that for the same horse power the cost for the former will be 25 to 35 per cent. more than for the latter. The shipowner has to see many advantages before he will be prepared to pay the difference. That material advantages do exist—take alone a reduction of 50 per cent. or so in the cost of fuel—cannot be denied; but, nevertheless, where shipbuilders have offered, as in one or two cases they have already done, alternate designs and estimates for oil engines and steam turbines, the purchaser has thought only of the great cost of the former.

A Government Hydraulic Testing Plant

A movement is in progress to interest the National Government in the establishment of a hydraulic testing plant. The purpose is to create a standard practice in water power development and permit of the testing of water wheels and other hydraulic apparatus under any and all conditions which might arise in connection with a power station. The theory is that the work of such an institution would constitute a very important step toward the conservation of one of the greatest of the country's resources. Experts assert that comparatively few, even of the most recent, installations in North America reach the standard of efficiency which might reasonably be expected, and many of them fall far behind this standard. Engineering tests are revealing such cases constantly.

Hydraulic engineering has developed greatly of late years, and practice is gradually improving, but standards of design have not been evolved, it is claimed, and the errors of engineers have proved costly in too many cases. Should the Government establish a plant on some important water power, such as Niagara Falls, with an ample supply of water at all seasons, exact data would become available, based upon long test and experiment, and the owner of a water power would have at his disposal information upon which his engineers would base the design of his installation. With the known conditions, such as head and volume of water, and the topography, the Governmental practice would furnish the remaining engineering data. To cite one of many problems, where a pair of wheels are employed, the distance between them in the pit would become an exact factor.

To-day the variation in this essential element is a wide one. Hydraulic units designed to develop 2500 hp. and upward have been found to yield little more than 2000 hp., because of faulty calculations and theory. The annual financial loss is easily realized. It is truthfully argued that every horsepower of water saved is an item of conservation of the fuel supply.

To the manufacturer who makes use of water power, the cost of his product depends upon the efficiency of his installation. If he invests a certain amount of money to secure a given power, and gets 10 or 15 or even 25 per cent. less than the estimates of his engineers called for, his investment charge is altogether too high. The waste is expensive. Apart from the matter of investment, these losses of power often result in a large increase in the cost of operating auxiliary steam plants. In drawing upon water storage during dry seasons, it makes a vast difference if an unnecessary quantity has to be used in creating a given horsepower. The supply does not last so long, of course, and dependence upon steam alone comes sooner. Time after time manufacturing plants have been obliged to start their engine to make up for a deficiency in power, less than would have been secured if the water power was producing to its designed capacity.

A conservative estimate puts it that at least 15 per cent., and probably more, of the water power now developed under modern conditions as to equipment is being thrown away. The hydraulic plant once created is there to stay. Great masses of masonry and concrete have been erected. Alterations mean large expenditures of money and long idleness. The time to discover faulty design is on the drafting table. Experimentation on a large scale seems necessary. A Government plant would not be a very costly institution. To an extent it would be self-supporting, through the fees of clients. The Government, it is pointed out, is spending large sums of money each year in experimental work on the various fuels, with the intention of conserving the supply to as great an extent as possible. Work on the hydraulic question would be along similar lines, for water power is the equivalent of fuel.

Correspondence

An Inspection System to Prevent Industrial Accidents

To the Editor: The present agitation on the subject of employers' liability has brought up certain considerations which I have not seen published and which seem to me to deserve careful thought. In the first place the expression "employers' liability" as a subject is an unfortunate one. What we should really turn our minds to is the subject of "accidents to workmen" during their regular employment.

Every one who has had experience as a manager knows that many accidents are caused by carelessness or very frequently willful disobedience on the part of employees, especially where the strength of the labor unions is such as to prevent the maintenance by the employer of strict discipline. But every one who has considered this subject knows also that the subject is not ended when this is stated. There are two other classes of accidents—casualties, pure and simple, and preventable accidents.

ACCIDENTS THAT CANNOT BE AVOIDED.

The former result from a fortuitous conjunction of circumstances which could by no possibility be foreseen or prevented. It seems likely that this class of accidents will always endure in those occupations in which man applies the great forces of nature to the accomplishment of his tasks on an industrial scale. The forces occasionally must escape from control and do harm to person and property. This is the law of probability and cannot be altered.

But as our knowledge increases the kinds of accidents which are classed in this group will occur less and less frequently, and the accidents themselves will also become less numerous because, as we find out more, we shall be enabled to see that some happenings now considered fortuitous would have been capable of prediction by a greater intelligence or a wider knowledge, and such accidents will be removed from this classification and put into the preventable class.

ACCIDENTS WHICH COULD HAVE BEEN PREVENTED.

Preventable accidents are those whose causes could be foreseen by a reasonable use of existing knowledge and so removed in time. Every man of wide industrial experience knows that plants under different management have very different personal equations in regard to the number of accidents which take place within their boundaries. At one plant, great care and forethought will be given to the prevention of accidents; the manager will be not only careful but conscientious, and will consider it a matter of personal responsibility and regret when an accident takes place. At a similar plant, only across the river, perhaps, a different class of management will care nothing for the number of men maimed or hurt, provided only that the ambulance-chasing lawyers can be silenced for a less sum per year than it would cost to operate on a more careful basis.

I personally know of a coal mine disaster whereby some 80 lives were lost, where the general manager (who was one of the principal owners) was described to have wept over the loss of the many friends whom he numbered among his employees, but who, it was proved by indisputable records, operated the mine in absolute disregard and neglect of every precaution urged upon him by the State mine inspector in his official report a week or two before the disaster. Everything he had been told to do had been left undone; everything he had been warned not to do had been done. One would think he would have felt personal responsibility, as if he had caused the death of the men who perished in the disaster, but there was no indication in his demeanor of anything of the sort. Such accidents as this are not casualties in any proper sense of that word, and the time will surely come when those responsible in such cases will be held for manslaughter on a gigantic scale.

INSPECTION OF INDUSTRIAL PLANTS.

The point sought to be emphasized is that of the accidents that now occur many are preventable by good management, and it is, therefore, our duty to discover a way in which the management may be assisted to prevent them. The large corporations now have their departments of safety with their inspectors, elaborately organized for this very purpose; but many of the smaller manufacturers, unable to afford this means of meeting the need, and not sufficiently organized to know how to apply it if they had the means, are contented to let the manager do the best he can and to cover up his shortcomings in this direction by employers' liability insurance. These insurance concerns divide all industries into broad classes, each one of which takes a certain rate, generally speaking, irrespective of local conditions, including management. Why should this be so?

Every intelligent manufacturer knows that boiler insurance is worth to him what it costs, for the independent inspection of his boilers, for the certainty that they are properly cared for and operated and that needed repairs are made in time to prevent disasters. In a general way, also, the operating practice is improved and money saved thereby. Why? Because the boiler insurance companies employ trained and competent men who are kept continually going from plant to plant, in-

specting boilers and all their appliances, operating conditions, safety devices, gauges, &c., thoroughly and effectually several times a year. They recommend what improvements shall be made, and if these are not made the insurance on that boiler is withdrawn.

With fire insurance the same plan is even more highly organized by the Board of Underwriters, with whose requirements the manufacturer must comply or his insurance is withdrawn with the stroke of a pen. No one acquainted with the facts can doubt that the insurance companies have benefited the community enormously by bettering the conditions for the prevention and extinguishment of fires. They also have different rates for different plants. If one man chooses to have a fire trap, where his neighbor across the street is carrying on the same business in a slow burning or a fireproof building, he must pay out 1 or 2 per cent. per year more on his investment than his neighbor to equalize the risk.

Why should we not have the same thing in regard to employers' liability insurance? Why should not the employers' liability companies develop a body of trained inspectors, precisely analogous to boiler inspectors, who would go from point to point making themselves familiar with operating conditions, recommend an improvement here, a new safety appliance there, warn the manager as to dangerous practices he is permitting, and, above all, make a lower rate for insurance of a plant well managed in this respect than for a similar one poorly managed?

The State inspectors in such States as have competent factory inspectors can do much, but the State is seldom able to carry on any function so well as private enterprise, once private enterprise sees where it can save money by efficiency. The Board of Underwriters have not, so far as known, dropped their inspectors in those States which have State fire wardens, nor is there any likelihood they will do so. Similarly there is no reason why the official work of the State factory inspector should not be assisted and supplemented by the work of the safety inspector of the employers' liability company. Such a plan would accomplish three objects:

First, and by far the most important, it would tend to diminish the most lamentable of all forms of suffering and death, those from industrial accidents.

Second, it would increase the stability and eventually the earning power of the employers' liability company itself.

Third, it would give to the safely and conscientiously managed plant and to its manager a well deserved advantage over their present position, as compared with the unscrupulous and the careless.

MANAGER.

Automatic Reversing Trippers

To the Editor.—Our attention has just been called to an article on page 1437 of your December 22 number, which describes and illustrates an automatic reversing tripper which, according to the article, is made by the Stephens-Adamson Mfg. Company, Aurora, Ill.

This machine is described as a "new" automatic reversing tripper. Your article contains such a full and detailed description of the mechanism, that we are able to say with certainty that the device infringes every one of the 12 claims of our patent No. 673539 of May 7, 1901, covering a tripper invented by the late James B. Humphreys, who was for several years the chief engineer and description of the tripper referred to in your paper of this company. We ask you to examine the picture and satisfy yourself that there is not a single mechanical detail which is not fully shown and described in our patent of 10 years ago, which we enclose.

Our company has built hundreds of trippers under this patent, every one of which is plainly marked with the patent number. We have also had full sized machines of this type operating at all of the large world's fairs since the Paris Exposition of 1900, where we received the only Grand Prix which was awarded for conveying machinery. Furthermore, this same tripper is illustrated and described fully in our earlier catalogues. Therefore, we are compelled to attribute to audacity rather than to ignorance the claims made by

the Stephens-Adamson Company in your pages that it is offering a "new" automatic reversing tripper and that "there has been a great need in certain classes of work for a tripper of this sort."

Several years ago this company discontinued to some extent the use of the friction drive for moving the tripper and substituted, wherever it was possible, a mechanical equivalent which is absolutely dustproof, thereby saving our customers the expense of renewing the friction wheels; but the fact that we do not commonly employ a mechanical detail which was tried and found wanting offers no excuse for any one to use your pages in order to foist upon the public, as original and new, a device which has been patented for 10 years in every civilized country on the globe, and which has been advertised and sold in large numbers by the most prominent concern in its line of business.

The matter of infringement of our rights is one which we can look after with the help of our attorneys, but the damage, and particularly the annoyance, which we shall suffer from the article in your journal are serious matters. We are sure you will agree that such an article breeds other infringements and attracts trade away from those to whom it rightfully belongs. We, therefore, trust that you will give this letter as much prominence as was accorded in your columns to the article to which we have made objection.

ROBINS CONVEYING BELT COMPANY.

THOMAS ROBIN, President.

NEW YORK, JANUARY 23, 1911.

To the Editor: We are in receipt of yours of January 26th, inclosing copy of letter you have received from the Robins Conveying Belt Company, saying that the automatic reversing tripper manufactured by us and illustrated in your issue of December 22, is an infringement on the Humphreys patent of 1901, which that company claims to own. We wish to say that our machine is not an infringement of the Humphreys patent or any other patent; further, that our machine is a decided success, and we are prepared to demonstrate its superiority over any automatic tripper on the market. We certainly would not put a machine on the market unless we were prepared to demonstrate its efficiency, and our position in the conveying machinery line is sufficient to justify the statement.

Regarding the general tone of Mr. Robins's letter, we have no remarks to make whatever, and we trust you will publish his letter, together with our reply, because we are perfectly willing to let the public judge as to the record and present standing of the Stephens-Adamson Mfg. Company and the Robins Conveying Belt Company. We fully believe that the publicity of these letters will in no way harm us, and we trust it will do no harm to our competitors.

STEPHENS-ADAMSON MFG. COMPANY,

W. W. STEPHENS, President.

AURORA, ILL., JANUARY 28, 1911.

Electric Iron and Steel in Norway.—The Arendals Power Company, which owns the large Bøllefossen water falls in Norway, has increased its capital to \$1,000,000 and will engage in electric smelting of iron. These water falls will produce 30,000 hp. at average flow, and hydrolic development will give 12,000 hp. additional. The company also owns practically the whole mining district about the city of Arendal. Recently it acquired the right to use the patents owned by the Swedish Electrometal Company for producing iron and steel by means of electricity. The methods involved in these patents have been thoroughly tested at Trollhättan in Sweden and at Hardanger in Norway. The new works will be ready for operation in January, 1913.

The six blast furnaces and the Bessemer and open hearth steel plants of the Carnegie Steel Company's Ohio Works, Youngstown, Ohio, are now in full operation for the first time in some weeks. The upper and lower mills of the same company at Youngstown are running about four days a week.

Steel Corporation Earnings in 1910

Total for 1910 Was \$141,144,002, Against \$131,491,414 in 1909

The statement of its earnings for the last quarter of 1910, just issued by the United States Steel Corporation, enables approximate figures for its total earnings of the year to be made up. Adding the results of the last quarter to those given for the previous quarter, the total is \$141,144,002, showing an increase of \$9,652,588 on the earnings of 1909. The figures for 1910 may be changed slightly upon completion of the audit of accounts for the year. The quarterly statement of earnings given below compares the last quarter of 1910 with the last quarter of 1909:

	1910.	1909.
October, earnings.....	\$10,512,130	\$14,048,205
November, earnings.....	8,228,857	13,711,765
December, earnings.....	7,249,991	13,211,339
Total after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants, employees' bonus funds, and interest on bonds and fixed charges of the subsidiary companies....	\$25,990,978	\$40,971,309
Less charges and appropriations for the following:		
Sinking funds on bonds of subsidiary companies.....	\$410,430	\$438,914
Depreciation and reserve funds (regular provisions).....	5,118,088	6,181,963
	\$5,528,518	\$6,570,877
Net earnings.....	\$20,462,460	\$34,400,432
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding	\$5,816,640	\$5,880,324
Sinking funds for the quarter on U. S. Steel Corporation bonds—viz.:		
Installments	1,012,500	1,012,500
Interest on bonds in sinking funds	482,822	419,139
	\$7,311,962	\$7,311,963
Balance	\$13,150,498	\$27,088,469
Net adjustments in sundry accounts	83,766	562,874
	\$13,066,732	\$27,651,343
Dividend for the quarter on preferred stock, 1½ per cent.....	\$6,304,919	\$6,304,919
Dividend for the quarter on common stock, 1¼ per cent., 1910, and 1 per cent. and ¾ per cent. extra, 1909	6,353,781	8,895,294
	\$12,658,700	\$15,200,213
Surplus for the quarter.....	\$408,032	\$12,451,130

The balance of the surplus carried forward from previous quarters in 1910 was \$16,520,687, which, added to \$408,032, makes a total of \$16,928,719. From this appropriations were made of \$5,000,000 for new plants, construction, &c., and \$1,000,000 for the reserve fund to cover advanced mining royalties, leaving \$10,928,719 for the balance of surplus for the year carried forward. The total appropriation for the year for new plants, construction, &c., was \$25,000,000.

Eight-Hour Day for New York Machinists.—National and local officers of the International Association of Machinists met in New Jersey January 29 with the general executive board, shop delegates and district chairman of District No. 15, to consider making a general demand for an eight-hour day in the district which takes in New York City and Hudson County, N. J. In November, 1910, the 15 lodges in District 15 and the affiliated Junior Order of Machinists decided by a referendum vote in favor of an eight-hour day demand. It is expected that it will be formally presented in March. At the meeting of January 29 a resolution was passed declaring for the eight-hour work day in automobile garages, general job-

bing, repair and machine shops and indorsing a general demand for a 50-hour working week in manufacturing shops, unless the straight eight-hour day as voted for in November is reaffirmed at a general mass meeting of employees of manufacturing shops.

New Railroad Equipment.—Recent railroad car inquiries include 500 hopper cars and 300 box cars for the Lehigh & New England, 400 freight cars for the Chicago, Indianapolis & Louisville, 1000 refrigerator cars for the American Refrigerator Transit Company, 500 steel under-frame cars for the Chicago, Burlington & Quincy and 50 to 75 tank cars for the Barrett Mfg. Company, Chicago. The Chicago Railway Company will build 215 passenger cars at its own shops. The Chesapeake & Ohio has ordered 25 coaches from the Pullman Company. The Argentine Government has placed 21 sleeping cars and 8 baggage cars in this country. The Chesapeake & Ohio has ordered 10 passenger locomotives from the American Locomotive Company, and the Grand Trunk has placed 12 locomotives and the Long Island 4 with the same company. The Algoma Central & Hudson Bay has ordered 10 locomotives from the Montreal Locomotive Works. The Missouri Pacific is reported to be about to close for 75 engines.

The Detroit Foundry Supply Company.—Important changes were made at the recent annual meeting of the Detroit Foundry Supply Company, Detroit, Mich. W. J. Woodison, whose long connection with the company as president and manager has made him well known to the trade throughout the Central West, retired and was succeeded as president and manager by W. Bruce Howard, a controlling stockholder. M. Z. Fox, formerly with the Hill & Griffith Company, Cincinnati, was elected vice-president, and R. S. Ray, secretary. The company has secured the services of J. H. Lyle as salesman to cover Illinois, Wisconsin and Iowa, and H. E. Moyer to cover Indiana, parts of Ohio and Canada. Mr. Woodison is considering a proposition to become sales manager of the Advance Machinery Company, Toledo, Ohio, maker of glue heaters, &c.

The Detroit Steel Products Company.—At the annual meeting of the Detroit Steel Products Company, Detroit, Mich., January 24, reports showed a large increase in the year's business in all departments. Directors were re-elected as follows: Henry N. Campbell, J. H. Avery, C. H. Heckler, John G. Rumney, Walter S. Russel, Henry Russel and Henry W. Dakin. Officers were elected as follows: Walter S. Russel, president; John G. Rumney, vice-president; Henry W. Dakin, treasurer, and H. E. Hade, secretary. The usual quarterly division of 1¼ per cent. was declared, and also an extra cash dividend of 3 per cent., making a total dividend for the year of 10 per cent.

New York Central Ferrotitanium Rails.—The rail orders of the New York Central Lines for 1911 as reported in these columns last week, amounting to 176,750 tons, include 41,500 tons of ferrotitanium Bessemer rails. The specifications for these call for the use of 1 per cent. of a 10 per cent. titanium alloy (or equivalent titanium), thus requiring for the order more than 400 tons of the 10 per cent. alloy. The strength of the titanium content in the alloy may be increased to 15 per cent., thus requiring a proportionately smaller quantity of alloy; but in any case the order is the largest ever placed for alloy steel rails.

The American Shipbuilding Company has received orders during the past week for three lake boats. One order is from the Wisconsin Steel Company for a 545-ft. freighter, to be used in the ore trade. It will be built in time for delivery early in the summer. It has not been decided where this boat will be built. The other two boats have been ordered by the Standard Oil Company. One will be an oil tank steamer and the other a barge. The length of each will be 260 ft. The steamer will be built at Detroit and the barge at Superior.

The Crucible Steel Company Buys Midland

One of the largest deals in manufacturing plants that has occurred for some time was closed in Pittsburgh last week, being the purchase by the Crucible Steel Company of America of the entire property of the Midland Steel Company, located at Midland, Beaver County, Pa. The negotiations were handled by J. H. Hillman & Son, Oliver Building, Pittsburgh, dealers in pig iron, coke, ore and coal lands. Herbert Du Puy, chairman of the Crucible Steel Company of America, has issued an official statement regarding the purchase, which is as follows:

The Crucible Steel Company of America has entered into a contract with the owners of the Midland Steel Company for the purchase of the plant of that company at Midland, Beaver County, Pa. The property consists of 423 acres of level land adjoining the Ohio River, and above the highest high water stage, and is admirably suited for manufacturing purposes and of sufficient size to permit of almost indefinite expansion.

The owners of the property have erected upon it one blast furnace of the most modern type, with a capacity of 480 tons of pig iron per day; foundations and underground connections and equipment for a second furnace of the same size; 250 beehive coke ovens; a large modern ore bridge with a capacity sufficient to take care of the supply for two furnaces; a river coal hoist, piers and landing; water works of sufficient capacity to take care not only of the present plant, but of one of double its capacity; machine shops, electric plant, pig casting machine, and all other necessary buildings and workshops required about a modern blast furnace plant. All of these improvements are practically new and of the most approved design and, including the value of the land, could not be reproduced for a sum less than \$3,500,000.

In addition to this, the company has purchased from the owners of the Midland Steel Company all the capital stock of the Midland Limestone Company, which owns a tract of 418 acres of surface and 130 acres of limestone, located at Walford Station, in Lawrence County, Pa., upon which is erected a crusher having a capacity of 1000 tons per day. As a further addition to this plant, there is included some 2000 acres of coal lands located directly opposite on the south side of the Ohio River, and so close to the point of operations that it is proposed to carry the coal by buckets directly from the mouth of the mine across the river to the plant.

This property is served by the Pennsylvania Lines and has slack water navigation.

We propose to erect upon this property a modern open hearth plant for the production of high grade open hearth steels, such as are now being made at the other plants of the company. This plant will consist of eight 60-ton standard and one tilting open hearth furnaces and also an electric furnace forming part of the plant; a modern blooming mill with the latest mechanism for its operation, and a billet mill sufficient to take care of the capacity of the open hearth department, all of which will be operated with the latest improvements of labor saving mechanisms. The development of this plant has been necessary owing to the inability of the company to produce a sufficient capacity of high grade steel at its present works to take care of its rapidly growing trade. It is also proposed to erect a modern mill for the production of agricultural shapes sufficient to take care of the requirements of the country. These improvements, when completed, will cost \$5,000,000.

We have incorporated the Pittsburgh Crucible Steel Company, which will take title to all these properties with all the improvements mentioned, all of which capital stock is owned by the Crucible Steel Company of America. The Pittsburgh Crucible Steel Company has authorized an issue of bonds aggregating \$7,500,000 par value, dated March 1, 1911, bearing interest at the rate of 5 per cent. per annum, free of tax, and maturing in 30 annual installments of \$250,000 each, the first of which shall become due March 1, 1916, and annually thereafter.

These bonds are secured by a first mortgage on all the property and franchises of the Pittsburgh Crucible Steel Company now owned or that may hereafter be acquired, and are guaranteed absolutely as to principal and interest by the Crucible Steel Company of America. In this guarantee the Crucible Steel Company of America covenants that, until \$3,750,000 par value of the bonds so guaranteed shall have been paid, its quick current assets shall at all times be one and one-half times its liabilities, including all guarantees and other indirect liabilities of every nature, but not including guarantees heretofore made by it of the bonds of the St. Clair Steel Company, the St. Clair Furnace Company and the Clairton Steel Company, properties now owned by the United States Steel Corporation, and whose bonds are now guaranteed by it, a large proportion of which bonds have already matured and been paid; also not including the guarantee of \$45,000 per annum interest upon bonds of the Norwalk Steel Company, a company owned by the Crucible Steel Company of America.

After \$3,750,000 of the bonds of the Pittsburgh Crucible Steel Company have been retired, and until the remainder have matured and been paid, the quick current assets of the Crucible Steel Company shall equal the liabilities of the company.

The Crucible Steel Company of America also covenants, as part of its guarantee, that until the bonds of the Pittsburgh Crucible Steel Company so guaranteed by it shall have been paid and retired, it will neither create, nor suffer to be created, any mortgage, lien or other incumbrance upon any of its properties, nor issue any scrip in lieu of dividends.

The mortgage of the Pittsburgh Crucible Steel Company and the guarantee of the Crucible Steel Company of America provide that the entire proceeds of this issue of bonds shall be expended only upon the property covered by the lien of the mortgage and its betterment and improvement.

It is the intention of the Crucible Steel Company to eventually move the open hearth plant now at its Park Works to Midland. It is also probable that in time the Park and Crescent works of the Crucible Steel Company, now located in Pittsburgh, will be moved to Midland, but no plans for this have yet been made. The purchase is regarded on all sides as a splendid one for the Crucible Steel Company and will make its position much stronger than it has ever been. Eventually the company will manufacture its entire supply of pig iron and billets at Midland, freeing it from the necessity of purchasing in the open market.

Steel Corporation Changes

At the meeting of the Board of Directors of the United States Steel Corporation, held January 31, Thomas Morrison, Pittsburgh, tendered his resignation as a member of the board. James A. Farrell was elected to fill the vacancy thus created. The resignation of W. E. Corey as president was accepted and James A. Farrell was elected to succeed him. Mr. Farrell entered upon the duties of the office February 1. He becomes ex-officio a member of the Finance Committee, of which the other members are Chairman Gary, George F. Baker, George W. Perkins, H. C. Frick, Norman B. Ream, J. Pierpont Morgan, Jr., and P. A. B. Widener. Mr. Corey continues as a director of the corporation.

After the meeting of January 31 Chairman Gary made the following statement concerning business conditions: "The reports of the general managers of sales, which we get weekly, are all very favorable, more so than at any time during the last six months. Our last daily report of bookings is of January 27, and including that day the bookings per day for the month of January are over 30,000 tons, exclusive of the large orders for rails which we have been receiving during the last few days and which are not yet reported. This compares with 22,000 tons per day in December and a similar amount for November. The tin plate, wire and export business are very active. In all lines there is a marked improvement."

E. P. Thomas President of the United States Steel Products Company

At a meeting of the board of directors of the United States Steel Products Company on January 27 Eugene P. Thomas was elected president, to succeed James A. Farrell, who became president of the United States Steel Corporation on February 1.

Mr. Thomas was born in Atlanta, Ga., and started in the steel business there in 1892 with the Johnson Company, now the Lorain Steel Company, one of the subsidiary companies of the United States Steel Corporation. In 1899 he went abroad for that company, representing it in London for four years, the company maintaining London offices jointly with the American Steel & Wire Company and the Illinois Steel Company. In 1903, on the formation of the United States Steel Products Export Company, headed by James A. Farrell, Mr. Thomas returned to New York to take charge of one of the departments, and for several years has been chief assistant to Mr. Farrell.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

PIG IRON, Per Gross Ton: Feb. 1, Jan. 25, Jan. 4, Feb. 2,
1911. 1911. 1911. 1910.

Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$18.75
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	17.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	14.00
Foundry No. 2, local, Chicago	15.50	15.50	15.50	19.00
Basic, delivered, eastern Pa.	14.25	14.25	14.75	18.50
Basic, Valley furnace	13.25	13.25	13.25	16.50
Bessemer, Pittsburgh	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh	14.15	14.15	13.90	17.15
Lake Superior charcoal, Chicago	17.50	17.50	18.00	19.50

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	28.00	28.00	31.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	28.00	28.00	28.00	33.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.50	14.50	15.50	20.00
Iron rails, Philadelphia	17.00	17.00	17.00	20.50
Car wheels, Chicago	13.00	13.00	13.00	18.00
Car wheels, Philadelphia	13.00	13.00	13.00	17.00
Heavy steel scrap, Pittsburgh	13.50	13.50	13.50	17.50
Heavy steel scrap, Chicago	11.50	11.50	11.50	16.00
Heavy steel scrap, Philadelphia	12.50	12.50	12.50	17.00

FINISHED IRON AND STEEL.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.30	1.32½	1.32½	1.65
Common iron bars, Chicago	1.30	1.30	1.30	1.60
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.71
Beams, Pittsburgh	1.40	1.40	1.40	1.55
Angles, tidewater, New York	1.56	1.56	1.56	1.71
Angles, Pittsburgh	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh	1.30	1.25	1.25	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.30	1.30	1.60

SHEETS, NAILS AND WIRE.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	1.75	1.75	1.70	1.85
Cut nails, Pittsburgh	1.60	1.60	1.60	1.80
Barb wire, galv., Pittsburgh*	2.05	2.05	2.00	2.15

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.75	12.75	13.00	13.87½
Electrolytic copper, New York	12.37½	12.37½	12.75	13.62½
Spelter, New York	5.55	5.55	5.55	6.12½
Spelter, St. Louis	5.40	5.40	5.40	5.90
Lead, New York	4.50	4.50	4.50	4.70
Lead, St. Louis	4.32	4.35	4.35	4.60
Tin, New York	42.75	43.25	39.55	32.60
Antimony, Hallett, New York	7.75	7.25	7.55	8.25
Tin plate, 100-lb. box, New York	\$3.84	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates.

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold roll sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck

	Steel.	Black.	Galv.	Iron.	Black.	Galv.
1½, ¼, 3, 4 in.	72	58	68	54		
1½ in.	75	63	71	59		
¾ to 1½ in.	79	69	75	65		
2 to 3 in.	80	70	76	66		
Lap Weld.						
2 in.	76	66	72	62		
2½ to 4 in.	78	68	74	64		
4½ to 6 in.	77	67	73	63		
7 to 12 in.	75	59	71	55		
13 to 15 in.	51½					
Butt Weld, extra strong, plain ends, card weights.						
1½, ¼, 3, 4 in.	69	59	65	55		
1½ in.	74	68	70	64		
¾ to 1½ in.	78	72	74	68		
2 to 3 in.	79	73	75	69		
Lap Weld, extra strong, plain ends, card weight.						
2 in.	75	69	71	65		
2½ to 4 in.	77	71	73	67		
4½ to 6 in.	76	70	72	66		
7 to 8 in.	69	59	65	55		
9 to 12 in.	64	54	60	50		
Butt Weld, double extra strong, plain ends, card weight.						
1½ in.	64	58	60	54		
¾ to 1½ in.	67	61	63	57		
2 to 3 in.	69	63	65	59		
Lap Weld, double extra strong, plain ends, card weight.						
2 in.	65	59	61	55		
2½ to 4 in.	67	61	63	57		
4½ to 6 in.	66	60	62	56		
7 to 8 in.	59	49	55	45		

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld Will be sold at two or three points lower basing higher prices than merchant or card weight pipe, Butt or Lap Weld as specified.

2, 2½ to 4 in. Lap Weld

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing higher prices than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	40	40
1½ to 2½ in.	61	43
2½ in.	65	48
2½ to 3 in.	69	55
3 in. and smaller, over 18 ft. 10 per cent. net extra.		
2½ in. and larger, over 22 ft. 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, \$28; open hearth and chain rods, \$28.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c.; base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ¼ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, February 1, 1911.—(By Telegraph.)

Pig Iron.—The Standard Sanitary Mfg. Company has bought upward of 5000 tons of Northern No. 2 foundry for its New Brighton and Pittsburgh works and is in the market for 3000 to 4000 tons of Southern for its Louisville plant. Prices paid for the Northern No. 2 foundry are understood to have ranged from \$13.50 to \$13.75 and possibly \$14, Valley furnace, for a small part of the iron. Most furnaces are now quoting Northern No. 2 foundry firm at \$13.75 and some are asking \$14, at furnace. Valley furnaces continue to quote Bessemer at \$15, but a local dealer has 4000 to 5000 tons which he secured in exchange for basic, and which he will sell at \$14.75, Valley furnace, or lower. Malleable Bessemer is a little firmer, and sales have been made as high as \$13.75, Valley furnace. A local interest is credited with having bought recently 4000 to 5000 tons of forge iron at about \$13, Valley furnace, for delivery over the next six months, but the furnaces are now quoting \$13.25. We quote Bessemer iron nominally at \$15; malleable Bessemer, \$13.75; basic, \$13.25 to \$13.50; No. 2 foundry, \$13.75, and gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Mills report that specifications against contracts for billets and sheet and tin bars were heavier in January than in December, especially for tin bars. The new demand is only for small lots as nearly all regular consumers of steel are covered by special contracts. The market is firm. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

The general feeling in the trade is much better, and it is backed up by actual orders. Specifications sent to the mills in January were heavier than in December, and the outlook for the near future is regarded as very encouraging. A number of plants that heretofore have been working three or four days a week are this week on full time. Quite a good deal of tonnage of pig iron is being quietly sold, and furnaces and dealers are more encouraged than for some time. While there is little actual demand for Bessemer pig, it is firm, at \$15, at furnace. There has been some movement in malleable Bessemer, and while one seller has been quoting as low as \$13.50, at Valley furnace, sales are reported as high as \$13.75. A local interest has bought in the past week upward of 4000 tons of No. 2 foundry iron at prices ranging from \$13.75 to \$14, at Valley furnace. This consumer bought some foundry iron early in January at \$13.50, at furnace, and later tried to cover his requirements for the last half of the year at the same price, but could not do so, having to pay as high as \$14 for certain brands of No. 2. There is not much inquiry for forge iron, but Valley furnaces are quoting \$13.25, at furnace. Nearly all consumers of billets, sheet and tin bars are covered on sliding scale contracts, against which they are specifying quite freely, but very little new business is being placed. In finished material there has been noticeable improvement in new orders for structural steel, plates and steel bars. A

great deal of business is pending in structural material and some good sized contracts have been closed. Further business from the railroads in steel cars and other equipment is expected in the near future, and it is believed the railroads will be heavier buyers of material this year than they were in 1910.

Ferromanganese.—The market is weak and sales of limited tonnage that had to be moved are reported as low as \$37.75, Baltimore. We quote 80 per cent. foreign at \$38, Baltimore, for prompt shipment, and note sales of 75 to 100 tons to consumers for prompt delivery at that price. The freight rate to Pittsburgh from Baltimore is \$1.95 a ton.

Ferrosilicon.—Prices are a little firmer, and a sale of about 25 tons is noted to a consumer on the basis of close to \$56, Pittsburgh. Quotations on 50 per cent. ferrosilicon for prompt shipment are \$53.50 to \$56, Pittsburgh. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent. \$24 and 12 per cent. \$25, f.o.b. cars, Jisco and Ashland furnaces.

Skeps.—The market is firmer and sales of grooved steel skep at 1.25c. are hard to find, nearly all makers quoting 1.30c. We quote grooved steel skep at 1.30c., sheared steel skep, 1.35c.; grooved iron skep, 1.60c. to 1.65c., and sheared iron skep, 1.70c. to 1.75c., all for delivery at consumers mills in the Pittsburgh district, usual terms.

Muck Bar.—Practically no muck bar is being made in the Pittsburgh district for the open market, all the mills making muck bar here using their entire output. We quote best grades of muck bar made from all pig iron at nominally \$29, Pittsburgh.

Sheets.—Another meeting of sheet steel makers was held in the Fort Pitt Hotel, this city, on Wednesday, January 25, at which J. A. Campbell, president of the Youngstown Sheet & Tube Company, presided. Reports made to the meeting were to the effect that the demand is slightly better and prices are being more firmly held than for some time. Specifications against contracts are reported as fair, with the outlook that they will be heavier in February or March. The American Sheet & Tin Plate Company has started up three of its 23 hot sheet mills in the Aetna-Standard Works at Bridgeport, Ohio. The full schedule of prices now in effect on the various grades of sheets is printed on a previous page.

Tin Plate.—The American Sheet & Tin Plate Company is now operating close to 80 per cent. of its tin plate capacity, having recently started up 16 of the 23 hot tin mills in its Laughlin Works at Wheeling, W. Va. The high rivers this week necessitated closing down its Demmler, McKeesport and Monongahela works, but this will only be temporary. Specifications against contracts are reported as coming in quite freely, but new demand is somewhat quiet. We quote 100-lb. cokes at \$3.60 per base box, f.o.b. Pittsburgh.

Steel Rails.—The Carnegie Steel Company has taken a contract for 9800 tons of standard rails from the Western Maryland Railroad. The Edgar Thomson mills at Bessemer are now better supplied with orders for standard sections and also for light rails than for some time. Fair sized orders for light rails continue to be placed, most of the business coming from coal mining interests. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per lb.

Plates.—No large orders for plates have come out in the past week nor have any important orders for cars been placed. The Standard Steel Car Company has received contracts for 300 all steel underframe cars from one of the Western roads. Prices on plates continue firm and we quote ¼ in. and heavier at 1.40c., Pittsburgh.

Structural Material.—More inquiry is reported than for some months and some large contracts have been placed. The McClintic-Marshall Construction Company has received a contract for about 3000 tons of structural steel for new buildings for the immense plant of the Ford Plate Glass Company, at Rossford, near Toledo, Ohio. The main building will be 195 x 980 ft., and there will be 15 smaller buildings. Some other large jobs are in sight that will likely be placed in the very near future. Prices are firm and we continue to quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Bars.—Steel bar mills report that specifications from the implement makers and wagon builders and for concrete purposes are coming in quite freely. The new demand is light. Railroads are buying more freely of iron bars and are specifying more liberally against contracts. The market is firm and we continue to quote steel bars at 1.40c. and iron bars at 1.35c., f.o.b. Pittsburgh.

Hoops and Bands.—Some good sized contracts for

THE IRON AND METAL MARKETS

bands have recently been placed and it is stated that on very desirable specifications, 1.35c., Pittsburgh, has recently been done. The demand for hoops is fair and specifications against large contracts placed in November and December are coming in quite freely. We quote hoops at 1.50c. and bands at 1.40c., in carload and larger lots, the latter carrying extras as given in the steel bar card of September 1, 1909.

Spikes.—Effective February 1, the spike makers adopted a new schedule of prices and now charge the same for the smaller sized railroad spikes as for the larger size, wiping out a former differential of 10c. per keg in favor of the smaller size. The new prices, effective from February 1, are as follows:

Railroad Spikes.

4 1/2 in. square, 12 to 24 in. long.....	Extra	1.15
3 1/2 in. square, 8 to 16 in. long.....	Extra	.19
2 1/2 in. square, 6 to 12 in. long.....	Extra	.20
2 in. square, 4 to 8 in. long.....	Extra	.30
1 1/2 in. square, 3 to 6 in. long.....	Extra	.40
1 in. square, 2 to 4 in. long.....	Extra	.60
3/4 in. square, 1 1/2 to 3 in. long.....	Extra	.80

Boat Spikes.

3/4 in. square, 12 to 24 in. long.....	Extra	.15
3/8 in. square, 8 to 16 in. long.....	Extra	.15
1/2 in. square, 6 to 12 in. long.....	Extra	.15
3/8 in. square, 4 to 8 in. long.....	Extra	.20
1/4 in. square, 3 to 6 in. long.....	Extra	.30
1/8 in. square, 2 to 4 in. long.....	Extra	.45
1/16 in. square, 1 1/2 to 3 in. long.....	Extra	.75
3/32 in. square, 1 to 2 in. long.....	Extra	1.00
3/64 in. square, 1/2 to 1 in. long.....	Extra	1.00

Spelter.—The market has quieted down and prices have gone off. We now quote prime grades of Western at 5.25c. and 5.27 1/2c., East St. Louis, equal to 5.37 1/2c. and 5.40c., Pittsburgh.

Merchant Steel.—The demand continues light and specifications against contracts are only fair, but shipments by the mills in January showed a slight increase over December. It is stated that shafting discounts are being fairly well maintained and on cold rolled steel shafting are 57 per cent. off in carload and larger lots, and 52 per cent. in small lots, delivered in base territory.

Rivets.—Trade continues quiet and the demand is still for small lots only. Consumers are not specifying very freely against contracts, but prices are fairly well maintained.

Wire Products.—Only small orders for wire and wire nails have been placed since the advance in prices, which went into effect January 20, the large trade having covered its requirements before the advance was made. The demand for cut nails is fair, but prices are a shade firmer. We quote galvanized barb wire at \$2.05, painted \$1.75, annealed fence wire \$1.55, galvanized \$1.85, wire nails \$1.75 and cut nails \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—Several very large projects for gas and oil lines are being talked about, but are not yet far enough along to be mentioned. The demand for merchant pipe is about as heavy as usual at this season. Discounts on iron and steel pipe are being quite well maintained.

Iron and Steel Scrap.—There is a decidedly better feeling in the scrap trade, new inquiry being heavier, and dealers are firmer in their ideas as to prices. Consumers are willing to contract ahead for the next four or six months at present prices, but dealers are not disposed to sell at this level, except for prompt delivery, believing that the market will be higher in the very near future. There has been a heavy movement recently in bundled sheet scrap and prices are decidedly firmer. We note a sale of about 1500 tons of heavy steel scrap at about \$13.75, Monessen, Pa. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Folsom, Sharon, Monessen and Pittsburgh delivery.....	\$13.50 to \$13.75
No. 1 foundry cast.....	13.00 to 13.25
No. 2 foundry cast.....	12.00 to 12.25
Bundled sheet scrap, at point of shipment.....	10.00 to 10.25
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.75 to 15.00
No. 1 railroad malleable stock.....	12.75 to 13.00
Grate bars.....	10.75 to 11.00
Low phosphorus melting stock.....	17.00 to 17.25
Iron car axles.....	24.00 to 24.50
Steel car axles.....	20.25 to 20.50
Locomotive axles.....	24.00 to 24.50
No. 1 busheling scrap.....	12.25 to 12.50
No. 2 busheling scrap.....	8.75 to 9.00
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.75 to 16.00
Cast iron borings.....	8.00 to 8.10
Machine shop turnings.....	8.60 to 8.75
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.50 to 14.75
Heavy steel axle turnings.....	10.25 to 10.50

Boiler Tubes.—Several large inquiries for boiler tubes are in the market and will likely be closed in the very near

future. The demand for merchant tubes continues light, and prices are still more or less shaded.

Coke.—There are no new large inquiries for either furnace or foundry coke. The market is still suffering from overproduction, and not much betterment in either prices or demand can be expected until the output is materially cut down. The production in the Upper and Lower Connelville regions last week was 287,475 net tons, an increase over the previous week of a little over 7000 tons. We quote standard makes of furnace coke for spot shipment at \$1.45 to \$1.55 per net ton, at oven, while on contracts for delivery over the year from \$1.70 to \$1.75 is being quoted by some coke operators, while others, that are pretty well filled up, are holding their furnace coke firm at \$1.90 to \$2. at oven. Best makes of 72-hour foundry coke are being held at \$2.10 to dealers and from \$2.25 up to \$2.50, at oven, to consumers.

Chicago

FISHER BUILDING, February 1, 1911.—(By Telegraph.)

Western railroads have adopted a more liberal buying policy within the last week. The Chicago, Burlington & Quincy has bought 30,000 tons of rails, 10,000 tons each from the Illinois, Lackawanna and Colorado companies, and several other roads have placed 10,000-ton orders for early requirements. Malleable foundries which do railroad work are figuring on contracts for deliveries covering a year from July 1, although the railroads have not yet specified the full tonnage bought last year. Structural business is improving steadily and the fabricators are getting better prices than a week ago. Mill prices on structural material are very firm and conditions may soon justify an advance similar to the recent advance in wire products. The wire interests obtained immediate results by this policy. Their trade was lagging on account of hesitation among both jobbers and manufacturers, but specifications for wire are now running in excess of mill capacity and hardware jobbers look for another advance within a few weeks. Outside of railroad buying, structural work and wire products, improvement is slow but encouraging. There are no reports of the leading mills increasing their operations, but if the improvement of the past week continues another week more furnace and mill capacity will be brought in. The scrap market reflects improvement in conditions.

Pig Iron.—The malleable foundries are inquiring for round lots of malleable Bessemer iron for delivery during the last half, as they are figuring on railroad contracts for the next fiscal year in this trade. The market for malleable Bessemer has been badly congested, owing to the fact that the railroads and railroad equipment industries have not given specifications for castings purchased for the current trade year. This leaves the foundries with large stocks of high priced iron, which they bought a year ago, many of the foundries having enough iron on hand or due them to cover their requirements for the first half of this year. Aside from these malleable inquiries, the market is quiet. The foundries are not buying except in small lots to even up their stocks, and local furnaces are reluctant to sell for further than prompt shipment. This condition also applies to Southern iron. The high phosphorus grades of Southern iron are selling below \$11, and \$10.50. Birmingham, could be done on any round lot for prompt shipment, but no transactions of any magnitude are reported on this basis. Alabama brands are held nominally at \$11 with no inquiries of moment to test the market. The leading Southern interests are holding back on sales for forward delivery, expressing confidence in an early improvement in the demand. The following quotations are for February and March shipment, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—The Illinois Steel Company has made a sale of 15,000 tons of open hearth rolling billets to a Canadian steel manufacturing interest. On an inquiry last week for 500 tons of forging billets Eastern mills quoted below \$29, Chicago, but the leading interest continues to quote \$31, base, Chicago, on open hearth forging billets.

THE IRON AND METAL MARKETS

Rails and Track Supplies.—Including its allotment of the New York Central rail order, the Illinois Steel Company booked about 100,000 tons of standard rails last week. This includes 10,000 tons from the Chicago, Burlington & Quincy, which also ordered 10,000 tons from the Lacksawanna Steel Company and 10,000 tons from the Colorado Fuel & Iron Company. Good orders were taken for light rails, including several sales for export to South American countries. The railroads are not placing large yearly contracts for track supplies, but their current orders and specifications are improving. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb. 1.25c. to 1.29½c., Chicago.

Structural Material.—The American Bridge Company has received specifications for 13,000 tons of steel construction for the Minnesota Steel Company, and it is understood that work on this plant is to be rushed. The Heyworth building, Chicago, a theatre and office building, 2250 tons, standard shapes, was let to the Brown-Ketcham Iron Works, Indianapolis. The City Club, Chicago, 200 tons, went to the Vierling Steel Works. Buildings for the Pabst Brewing Company, Milwaukee, 2000 tons, were let to the Worden-Allen Company. The Chicago & Northwestern Railroad has awarded 1500 tons of bridge work to the King Bridge Company, in addition to the contracts given other fabricating interests by this railroad which were reported last week. A highway bridge at Peoria, Ill., 1000 tons, was let to the Milwaukee Bridge Company. Swinging bridges at Dallas, Texas, 230 tons, were let to the Virginia Bridge Company. A high school building at Portland, Ore., 200 tons, was taken by Milliken Brothers, Inc. These contracts, with those reported last week, make a total of about 50,000 tons of structural and bridge business in the West in two weeks. The Illinois Steel Company has booked two or three orders for structural material and plates which amount to 25,000 tons, besides a large number of small orders, and other mills selling in this territory report a great improvement in current business. Plain material is very firm and prices on fabricated work are stiffening. The smaller fabricating shops are filling up with work on highway bridges and small buildings. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—The Pennsylvania Lines, West, have given the American Car & Foundry Company an order for 500 50-ton steel coal cars. Smaller lots of flat cars and special cars were awarded to other car companies. The report that Missouri Pacific had ordered 2000 steel cars is not confirmed. The St. Louis Southwestern has ordered 2000 wooden cars from the American Car & Foundry Company. Specifications for car material are getting around to the mills and make quite an increase in the tonnage of plates booked. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Sheet business is not growing at the rate that appears in heavier products, but there is more new business and conditions are improving as rapidly as the sheet interests expected. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The market for all grades of bars is quiet. The agricultural implement manufacturers have been giving the mills good specifications on contracts for soft steel bars, but there is not much new business. The hard steel bar mills find the trade very dull. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.40c. to 1.45c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The advance in wire prices was made without giving buyers any opportunity to cover, and there is a general expectation in the hardware trade of another advance within a few weeks. This is bringing in a rush of specifications and business is running considerably in excess of the 6000 tons daily average of the wire mills. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Merchant Steel.—The mills are generally behind in deliveries on their specifications from the agricultural implement trade.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company booked orders last week amounting to about 5000 tons of gas pipe, and also secured 2000 tons of water pipe at Kansas City, Mo. St. Paul, Minn., let 950 tons of water pipe to the American Cast Iron Pipe & Foundry

Company. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25; 6 to 12 in., \$24; 16-in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—A favorable indication in the scrap trade is that dealers are beginning to bid higher prices on railroad lists than current quotations for spot material. Railroad scrap purchased from a list usually does not arrive on the dealer's hands for disposition for 30 to 60 days. The bids received by the Chicago, Burlington & Quincy on a list which closed last week were generally 25c. to 50c. better, allowing for switching charges, than the figures at which dealers have been delivering scrap to local buyers. In the market for spot material there is practically no change, except that high grade wrought scrap, like arch bars and transoms, is a little stronger. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered Chicago:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, remodeling.....	11.25 to 13.75
Old iron rails, less than 11 ft.....	12.50 to 14.00
Refractory rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	14.50 to 15.00
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel car wheels and components.....	11.25 to 11.75
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle bushings.....	7.75 to 8.25
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	11.75 to 12.25
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	10.75 to 11.25
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00

M. M. Broad withdrew from partnership with the American Iron & Supply Company, taking effect February 1, and has taken active charge of the Chicago Scrap Iron Company, First National Bank Building, as president and treasurer, and will carry on a regular brokerage business in scrap iron and steel, with an increase in the capital stock of that company from \$5000 to \$20,000.

Philadelphia

PHILADELPHIA, PA., January 31, 1911.

The market appears to gain strength sentimentally, backed to some extent by slightly better buying. The volume of general business for the month shows an improvement over that for December. There is a greater disposition shown by consumers of pig iron to buy ahead, but sellers are not disposed to accept that class of business at current prices, some preferring to blow out their furnaces. The only stack of the Wharton Steel Company now active will be blown out this week, and the Warwick Iron & Steel Company has definitely decided to blow out its No. 2 furnace about the middle of February. Several eastern Pennsylvania producers are also considering a reduction in output. The Delaware River Steel Company will blow in its furnace on basic iron about February 15, and later in the month the Princess Furnace Company expects to blow in its stack at Glen Wilton, Va. Sellers of finished material report more activity. Plates, shapes and billets have been purchased in somewhat better quantities and prices are well maintained. Refined iron bars are easier, sales being reported at 1.30c., delivered here. The feature of the old material market has been sales of old car wheels for export.

Iron Ore.—Sales of 100,000 tons of Wabana ore, for this year's delivery, have been made to consumers in this district at 7½c. per unit. This is ¾c. above the last sales made for 1910 delivery, the higher price being due to the export duty of 7½c. a ton, effective this year, and the heavy demand for shipments abroad. Negotiations are pending for further sales, and it is expected that another 100,000 tons will be distributed among consumers in this territory. A little more interest is being shown in other brands of ore, but no sales are reported. Importations at this port for the week ending January 28 show a total of 5515 tons, valued at \$10,644.

Pig Iron.—While there has been no pronounced buying, sellers feel encouraged with the increased inquiry for for-

THE IRON AND METAL MARKETS

ward deliveries. In some instances melters of foundry iron would place orders for second and third quarter delivery and even for the remainder of the year, but sellers show little interest in such business at current prices and are inclined to contract only for deliveries running over the next three or four months. In low grade iron, one sale of 5000 tons and another of 1000 tons, the latter at \$14.75, delivered, to cast iron pipe makers in this district have been reported, with further business still under negotiation. Of local iron fair sales of No. 2 X and No. 2 plain foundry grades are being made, few exceeding 300 tons. More activity is reported in Virginia foundry; sales running up to lots of 500 tons, delivery during the next three and four months, have been made to customers in this territory, with somewhat larger blocks for Western shipment. Leading Virginia producers maintain the \$13, furnace, basis, for either No. 2 X or No. 2 plain grades, although it is said that a concession of 25c. is still to be had, in one or two instances, for less desirable makes. No transactions in Southern iron are reported in this district. Forge iron shows a little movement, small sales being reported at \$14.25, delivered here. Buyers are still in the market and are endeavoring to shade this price. No further movement in steel making grades is reported. The recent purchase of 3000 tons of low phosphorus iron by a mill in this city was about equally divided between two makers. Prices for this grade have been gradually declining recently and the market for standard analysis low phosphorus iron now ranges from \$21.50 to \$21.75, delivered in this vicinity. One consumer of basic would take a block of that grade for delivery during the next 60 days at \$14.25, but, while business was recently done at that level, sellers are holding out for \$14.50 for prompt deliveries, and are disinclined to quote on extended shipments. The general range of prices is being well maintained, and sellers contend that no further concessions will be available for the usual standard brands of iron, quotations for which, delivered in buyers' yards in this territory during the next three or four months range about as follows:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.00 to 15.25
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.25
Basic.....	14.25 to 14.50
Standard low phosphorus.....	21.50 to 21.75

Ferromanganese.—Arrivals of moderate quantities of unsoft ferro continue to exert a weakening influence on prices and \$38, Baltimore, is by no means strong for moderate lots for prompt shipment. For delivery over the second quarter \$38.25 and for the second half \$38.50, Baltimore, about represents the market for 80 per cent. Business in this territory, however, is practically at a standstill.

Billets.—Makers feel more encouraged with the outlook. Specifications against contracts, both in rolling and forging billets, have been more substantial and a moderate amount of new business comes out; individual orders, however, continue small in size, but have been more numerous, and the aggregate business is somewhat better. While consumers still endeavor to get price concessions, Eastern makers are maintaining firmly the present basis of prices, open hearth rolling billets being quoted at \$25.40, and ordinary forging billets \$30.40, delivered in this vicinity.

Plates.—A moderate amount of new business has come out, while specifications against contracts have been more liberal, as a result of which the makers view the situation more hopefully. Inquiries have also been more plentiful; one for about 1000 tons of boat steel is before the trade, while a very fair number of moderate specifications for boiler, tank and bridge plates are being figured on. Some car business is also under negotiation. Mills close the month with a better volume of business on hand, and while some few moderate contracts for deliveries over varying portions of the first half of the year have been taken, mills are not very anxious for that class of business. Prices are being firmly maintained, 1.55c., delivered in this territory, representing the minimum for ordinary heavy plates.

Structural Material.—The contract for the Vine street pier, on which bids were opened January 20, is still unplaced, as are also several smaller propositions on which the quantities required are around 200 to 300 tons. A better run of small orders for work of a miscellaneous character is reported, and the trade looks forward to more active buying during the current month, although the major portion of the work in sight is either small or of moderate size. Prices are well maintained at 1.55c. minimum for plain shapes, delivered in this territory.

Sheets.—Most makers in this district continue to operate their mills close to full capacity, but in few instances have sufficient orders ahead to insure over a week's run. A fair amount of business comes in from day to day, however, and the outlook is considered somewhat more favorable, although little disposition is shown by consumers to contract for ex-

tended requirements: Prices are firm and unchanged, Eastern mills naming the following range for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—A fair volume of business has been done in refined iron bars, but at the expense of prices. There is considerable competition for desirable specifications. Refined iron bars are to be had at 1.30c. to 1.40c., delivered in this vicinity, although some producers will not meet the lower quotations. A moderate business in steel bars has been done at unchanged prices, 1.55c., delivered here.

Coke.—Business is rather quiet. Small sales of foundry coke continue to be made at unchanged prices. Negotiations for furnace coke for forward delivery are less pronounced, consumers generally confining their purchases to prompt lots. The range of quotations shows little change, the following being named, per net ton, for delivery in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$3.75 to \$3.90
Mountain furnace coke.....	4.25 to 4.50
Foundry coke.....	3.35 to 3.50
	3.85 to 4.10

Old Material.—The feature of the market has been the export movement in old car wheels. Individual sales have been mostly in lots of a few hundred tons, at prices ranging from \$13.25 to \$13.50 on dock, seaboard. In the aggregate about 2000 tons have been recently moved, shipments being made to Italy, Germany, England and Canada. Rumors are occasionally heard of possible exports of heavy steel scrap, but we can learn of no actual transactions. The domestic demand shows no appreciable change, although the market is sentimentally stronger, and any marked buying would, no doubt, be productive of higher prices. At the present level few holders of the principal grades of old material are willing to sell any quantity, preferring to maintain present accumulations. A small movement in bargain lots of heavy melting steel is reported at prices ranging from \$12.50 to \$13, delivered in this territory. The top price, however, would hardly be productive of any heavy movement of strictly No. 1 steel. There has been little demand for the rolling mill grades of scrap, and prices show practically no change. The following range about represents sellers' ideas of the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	15.00 to 15.50
Low phosphorus.....	17.50 to 18.00
Old steel axles.....	19.50 to 20.00*
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	17.00 to 17.50
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.50 to 16.00
Wrought iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	11.00 to 11.50
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	8.25 to 8.75
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	12.25 to 12.75
Grate bars.....	11.00 to 11.50
Stove plate.....	10.00 to 10.50

* Nominal.

J. C. Moyer & Co., iron, steel, coal and coke merchants, have removed their offices from the Pennsylvania Building to 610 Real Estate Trust Building, Philadelphia.

Cleveland

CLEVELAND, OHIO, January 31, 1911.

Iron Ore.—The lowering of the duty on Canadian ore under the proposed reciprocity agreement with Canada is not causing much concern among the lake ore firms, as the imports of Canadian ore from the Lake Superior region are light, and it is not expected that even the entire removal of the present duty of 15 cents a ton would tend to increase these imports to any great extent. No new developments have appeared in the matter of fixing 1911 prices. We quote prices as follows: Old range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—The local market continues quiet. The only sale of any size reported is a fairly good tonnage of basic by a Cleveland furnace. Some inquiry for small quantities of foundry iron is coming out, and a few sales of lots of 300 tons and under are reported. The majority of buyers, however, are taking no interest in the market. Some will need iron within the next few weeks, but express their intention not to make purchases until their present supply is about exhausted, as they do not look for any advance in prices. Local prices are firm at \$14.25, delivered, Cleveland, for No. 2. There is a little firmer feeling in the Valley. While \$13.75, Valley furnace, can still probably be shaded one or two Valley interests have advanced their price to \$14 for

THE IRON AND METAL MARKETS

No. 2 foundry and the sale of a few small lots is reported at that price. Business has picked up somewhat with the small foundries, but some of the large foundries report a light volume of orders. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer	\$15.00
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Northern foundry, No. 3	14.00
Gray forge	14.00
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	19.00

Coke.—The only sales reported are small lots of foundry coke for spot shipment. Prices remain stationary. We quote standard Connellsville furnace coke at \$1.40 to \$1.55 per net ton, at oven, for spot shipment and \$1.70 to \$1.80 for the first half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—The better demand noted during the past two or three weeks shows further improvement in all lines and the feeling is now very general that the improvement will be permanent. Specifications are coming out quite freely and there is a good volume of current orders. While the latter are mostly for small lots, they aggregate a good tonnage. A number of contracts for steel bars, plates and structural material have also been placed for the first quarter and first half. Stocks of fabricators have become very low and orders have been placed to replenish these stocks. The demand for plates, which has been slower than other lines to pick up, now shows a fair improvement, some new orders being placed by tank shops. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for sheets shows considerable improvement and prices appear to be firmly maintained. The American Shipbuilding Company has placed an order with the Carnegie Steel Company for 3000 to 3500 tons of plates and shapes for two new lake boats, and a boat to be built for the Wisconsin Steel Company will require about the same tonnage. A local mill agency will receive specifications in a few days from an Ohio bridge builder for 2000 tons of plates and shapes for a Western bridge. Among new structural inquiries is one from the Lake Shore Railroad for 1500 tons for grade crossing elimination work in Chicago. Fabricators still complain that work is being taken at very low prices. There is a good demand for forging billets in carload lots to replenish stocks, which have been allowed to run low. A Michigan automobile manufacturer is in the market for 1000 tons of forging bars. The demand for iron bars continues moderate, with prices stationary at 1.30c. to 1.35c., at mill. Jobbers report quite an improvement in warehouse orders. The demand for iron pipe and shafting is quite active.

Old Material.—The market shows considerable improvement in small lot orders and prices are firmer. Little of any kind of scrap is being offered at recent prices. Dealers feel that, with the improvement in the steel industry, scrap prices will be established at a higher level and they are holding out for 50c. to \$1 a ton higher than recent quotations on most grades. No inquiries for round lots for future delivery are coming out. The railroad lists this week include usual monthly tonnages from the Wheeling & Lake Erie, to be closed February 1, and from the Pennsylvania Lines West and Erie Railroad, to be closed February 2. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	\$14.00 to \$14.50
Old iron rails	15.50 to 16.00
Steel car axles	19.00 to 19.50
Heavy melting steel	12.75 to 13.25
Old car wheels	12.50 to 13.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	11.50 to 11.75
Railroad malleable	12.75 to 13.00
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.50 to 7.00
Iron and steel turnings and drillings	6.50 to 7.00
Steel axle turnings	8.75 to 9.00
No. 1 bushelin	11.00 to 11.50
No. 1 railroad wrought	12.00 to 12.50
No. 1 cast	12.00 to 12.50
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, February 1, 1911. (Cin. Telegraph.)

Pig Iron.—A better market sentiment may be reported, but inquiries are still principally for small lots, and actual business booked will hardly aggregate that of the previous seven days. The situation may be tersely summed up in the statement of a local firm, that we are just one week nearer a change, which present conditions indicate will be for the better. Consumption is now estimated to be about equal with production, and there seems to be no tangible reason

why a gradual stiffening in prices should not commence at an early date. Numerous intimations have been received from prospective customers that if concessions were made in price they would place their orders immediately, but generally speaking furnace interests do not appear willing to meet buyers' views, and any shading in quotations in this market would doubtless cover only a few special lots of iron not up to standard and for spot shipments. A local melter is inquiring for 1500 to 2000 tons of analysis iron, and is expected to close this week. The specifications would indicate that this order will be about equally divided between Southern and Northern iron, with the possibility that a Virginia furnace may take part of the business. For No. 2 foundry our quotations remain at \$11, Birmingham, for Southern, and \$14, Iron-ton, for Northern for first half shipment. Malleable is not in demand, and is quoted at \$14, Iron-ton, for either prompt or first quarter shipment. A couple of small inquiries are out for gray forge, but no business has so far resulted. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	\$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	18.20
Lake Superior coke, No. 1	15.70
Lake superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

(By Mail.)

Coke.—Inquiries are scarce, and those that have been pending for furnace coke remain unclosed. With the exception of two or three special contracts, practically no large business in furnace coke is looked for before June or July. Foundry coke is moving only in carload quantities, though prices are said to be a trifle firmer. Connellsville furnace coke is still obtainable around \$1.50 per net ton at oven for prompt shipment, but Pocahontas and Wise County coke is held at \$1.65 to \$1.75, with contract figures ranging a few cents higher. Foundry coke, for spot shipment, is bringing an average of \$2 per net ton at oven in all three fields, and between \$2.15 to \$2.25 for first half delivery, although there are a few special brands that are being sold as high as \$2.50 per net ton at oven.

Finished Material.—The past week showed up well in the finished material line, and, while this week opens up with a good inquiry for structural material and steel bars, actual business is rather light. This is said to be due to press reports of another steel meeting in New York, and many consumers are holding back awaiting the results of this conference. No cut in prices is anticipated by local mill agencies, but the announcement of the alleged meeting appears to have had a disturbing influence. The mill price on structural material and steel bars is 1.40c., Pittsburgh, and the warehouse quotations range between 1.75c. and 2c.

Old Material.—Although prices remain the same, the market generally is quieter. The foundries continue buying only carload lots. One dealer reports a fairly good business in cotton tie clippings, bought in the South and shipped to Western copper mines. Prices for delivery in dealers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	\$12.00 to \$12.50
Cast borings, net ton	4.75 to 5.25
Steel turnings, net ton	6.00 to 6.50
No. 1 cast scrap, net ton	11.00 to 11.50
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Bushel sheet scrap, gross ton	8.50 to 9.00
Old iron rails, gross ton	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton	21.50 to 22.50
Old car wheels, gross ton	12.00 to 12.50
Heavy melting steel scrap, gross ton	11.25 to 11.75

Birmingham

BIRMINGHAM, ALA., January 30, 1911.

Pig Iron.—Practically all the producers in this district are holding more firmly and accepting orders more nearly only on a prompt shipment basis than was the case January 1. It is a fact that firm offers at \$11 for shipment over the next six months have been refused. It is also known that a firm offer of \$10.75 at furnace for 2000 tons for shipment over the next 60 days was declined. While there have been no very large sales, the continued inquiry for lots of 100 to 5000 tons has tended to confirm pig iron people here in the belief that certainly prices will not go lower, and that they have everything to gain and nothing to lose by making \$11 the minimum and by quoting only for nearby delivery. There is a pronounced shortage of No. 4 foundry and gray forge, as well as a scarcity of the silveries. Several inquiries for high silicon or silvery grades have been before

THE IRON AND METAL MARKETS

The price the past week. Gray forge is bringing \$10 and No. 4 foundry \$10.25. There is apparently more No. 3 foundry on Alabama furnace yards than anything else. Careful estimate leads to the conclusion that shipments will approximately offset the make for January. All efforts to locate a break in the \$11 price have proved futile, and it is not believed that any open price below \$11 has been made by any interest for any delivery. All interests are refusing to quote for shipment beyond July.

Cast Iron Pipe.—Manufacturers continue to report fair tonnages being placed, but insist that prices are such as to yield absolutely no margin of profit. The city of St. Paul is inquiring for 1500 tons of water pipe, while Atlanta is reported as having just bought 1200 tons from a nearby manufacturer. It is understood that Kansas City has recently let contract for 2000 tons, which will be shipped from this district. The plant of the American Cast Iron Pipe Company is in operation; Dimmick and Sheffield are closed down. Prices remain nominally, per net ton, on board cars here, as follows: 4 to 6 in., \$20; 8 to 12 in., \$19.50; over 12 in., average, \$18, with the usual differential of \$1 per ton higher for gas pipe.

Old Material.—Scrap dealers report a larger volume of business, but prices no better. In fact, until there is a very much larger buying movement, dealers can hardly expect any improvement in prices. We continue to quote asking prices, per gross ton, f.o.b. cars here, as follows:

Old iron rails.....	\$14.00 to \$14.50
Old iron rails.....	12.00 to 12.50
Old steel axes.....	14.00 to 14.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.00 to 9.50
No. 1 country.....	7.50 to 8.00
No. 2 country.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.00
No. 1 steel.....	10.00 to 10.50
Light car wheels.....	9.00 to 9.50
Standard car wheels.....	10.00 to 10.50
Light cast axle pipe.....	8.00 to 8.50

Buffalo

BUFFALO, N. Y., January 31, 1911.

Pig Iron.—There has been considerable increase in the tonnage placed as compared with the previous week, some of the business taken having been secured at the expense of the previous week's price schedules, owing to strong competition. An order for 3000 tons of pipe iron was placed by the leading cast iron pipe interest at the minimum of the present schedule. A good total of varied foundry grades and a fair tonnage of both malleable and basic were also bought. Inquiry has shown a broadening interest from a wider field of consumption, covering pipe, agricultural implement, stove, electric and general machinery and general foundry work, indicating that stocks are becoming lower, not from an increased rate of consumption, but owing to the fact that old stocks have been used up during the recent period of slackened replenishment, and consumers are obliged to place orders for current and near-by requirements. Prices appear to have settled, temporarily, at least, into the following approximate schedule for current and first half deliveries, f.o.b. Buffalo, with some furnaces passing all inquiries for last half delivery and declining to quote at present:

No. 1 N.....	\$14.25 to \$14.75
No. 2 N.....	13.75 to 14.25
No. 2 plain.....	13.50 to 14.00
No. 3 foundry.....	13.50 to 13.75
Gray forge.....	13.50 to 13.75
Malleable.....	14.00 to 14.50
Basic.....	14.50 to 15.00
Charcoal.....	17.25 to 17.75

Finished Iron and Steel.—The tendency toward increased strength and activity noted last week is being maintained and the feeling of confidence in the development in an improved situation is growing. Inquiry in all lines is good and orders and specifications on contracts are coming in in satisfactory volume. Special activity is shown in tin plate, users feeling that if the present high prices for pig tin continue, with the betterment in the steel market, sheet bars will probably be advanced, causing an advance in the price of tin plate. At any rate, they are apparently convinced there will be no lowering of prices and are coming into the market for their first half requirements. Some improvement is also noted in specifications for cold rolled steel. In the Canadian export trade a considerable tonnage of steel billets has been closed during the week by the Buffalo agency of the leading interest and negotiations are pending on a further quantity, while there is continued good demand in all lines of finished products. Buffalo iron and steel interests that make a specialty of Canadian export business are of the opinion that the reciprocity compact with Canada would be of benefit and at least indirectly increase the export trade in many lines of finished products. In structural material the indications are that a large amount of construction work will be undertaken in this locality the coming

spring and summer. No local work has come out for figures during the week, but a number of inquiries for railroad bridge work in the State are in the market, also some bridge work on the western division of the Lake Shore Railroad. Plans are soon to be out for a 16-story office building for the Canadian Pacific at Toronto, requiring a large tonnage of steel.

Old Material.—The free movement of scrap material on contracts is continued, the open weather conditions prevailing in this district giving dealers a favorable opportunity to clean up their yards for the anticipated early spring trade. Some small lot new business has been taken, attributable to these conditions. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.25 to \$12.50
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	14.75 to 15.25
No. 1 railroad and machinery cast scrap..	14.00 to 14.50
Old steel axes.....	18.50 to 19.00
Old iron axes.....	23.00 to 23.50
Old car wheels.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.25
Boiler plate.....	10.25 to 10.50
Locomotive grate bars.....	10.50 to 11.00
Pipe.....	9.75 to 10.00
Wrought iron and soft steel turnings..	7.00 to 7.25
Clean cast borings.....	6.25 to 6.50

St. Louis

ST. LOUIS, January 30, 1911.

An increase in the volume of general business for the past week over the corresponding week of 1910 is again shown in the bank clearings of this city and Kansas City. New manufacturing plants for St. Louis have been secured each week for some time past, and more are in prospect in the near future. Railroads are increasing their buying of rails and supplies. The demand for pig iron continues moderate and coke is dull.

Pig Iron.—The leading pig iron sales agencies, while in receipt of numerous inquiries during the week, state that actual business was of very moderate proportions. In some instances sellers reported that an encouraging feature was noted in several requests to anticipate contract shipment and in other cases to hurry delivery. The inquiry for 2000 tons of malleable Bessemer reported as pending is likely to be closed this week. The representative of a leading Birmingham interest executed contracts for 850 tons to various consumers. An inquiry is out for 1200 tons of Southern analysis iron for shipment over the second and third quarters. While the undertone is somewhat improved, there is no change in the market for Southern foundry, No. 2 being offered at \$11, f.o.b. Birmingham, for shipment over the first half, with from 25 to 50 cents premium asked for second quarter only. No prices are out for third quarter delivery. Northern iron is quoted at \$14 to \$14.50, f.o.b. Ironton, for shipment over the first half.

Old Material.—Leading dealers state that buyers and sellers are apart on prices, consumers demanding concessions that dealers do not feel warranted in making, as they look for a better market, or at least a better demand, in the near future. There were no railroad offerings the past week. Prices are nominally unchanged. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, subject to inspection.....	24.00 to 24.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart..	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axes.....	18.50 to 19.00
Steel car axes.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings..	8.00 to 8.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	8.00 to 8.50
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

Coke.—The market for coke is quiet and no large inquiries are pending. A merchant seller reports inquiries for around 20 carloads from various consumers, and other merchant sellers mention booking some carload business. Prices are steady on the basis of \$2 to \$2.25 per net ton, at oven, for standard 72-hr. Connellsville foundry, with

THE IRON AND METAL MARKETS

special selected held 25¢ per ton higher for shipment through the year.

Finished Iron and Steel.—The leading interest reports a better inquiry for standard rails. A contract with the Terminal Railroad for 3000 tons has been closed and one with an outside railroad company for 500 tons. The inquiry for light rails is fairly good. For structural material the inquiry is still confined to special lots from fabricators. An improved demand for bars is noted mainly from implement and wagon manufacturers. There is a fair demand for track material.

The St. Louis Blast Furnace Company's furnace was put in blast on Saturday.

The Laclede Gas Light Company has begun the construction of one of the largest gas-holders in the country, to cost about \$400,000. The contract was awarded to the Ritter-Conley Mfg. Company, Pittsburgh. The new holder will be nearly 200 ft. high and 214 ft. in diameter.

The Pioneer Coal & Coke Company, St. Louis, has been incorporated. The capital stock is \$10,000. The incorporators are Alexander Yule, Frederick E. Coe and N. P. Withington.

San Francisco

SAN FRANCISCO, January 25, 1911.

No general buying movement has materialized, but the volume of business is gradually increasing, and important transactions are pending in several lines. Purchases for stock are for the most part small, though the larger consumers appear to be taking more interest. Manufacturers of implements and some lines of machinery are preparing for an extremely active year. Water and gas companies are likely to be large purchasers, and considerable business is expected in rails and rolling stock.

Bars.—The bar market is unsettled, owing to local competitive conditions. Jobbing prices have been reduced, and the customary differential of 0.20c. between steel and iron abolished, with little probability of its being restored. Some of the larger merchants are handling iron bars on a smaller scale than formerly, though some of the coast mills rolling this material are working at about the usual rate. One mill in southern California has resumed operations after being closed for several weeks. The distributive trade in soft steel is rather quiet, as usual at this season, and merchants are buying in a limited way, though manufacturing interests are beginning to make provision for future requirements. Some foreign material is still arriving on old contracts. Reinforcing bars are fairly active. The city of Los Angeles will require a considerable tonnage for aqueduct work, which is scheduled for completion within 18 months. Merchants are quoting bars from store, San Francisco, at 2c. for both iron and steel, though some interests quote as low as 1.90c. for iron. The Western Steel Corporation now has a considerable tonnage of steel in store, and is quoting 1.90c., f.o.b. San Francisco or Seattle, in 500-ton lots. Importers quote foreign steel, in cargo lots, to arrive, at about 1.70c. in the harbor.

Structural Material.—While representatives of the leading Eastern fabricators take a hopeful view of the outlook, the situation at the moment is not entirely satisfactory. Few of the local shops are busy, and there is a tendency to make exceptionally low figures on work in prospect. The McClintic-Marshall Construction Company has taken a contract for 840 tons for a foundry at the government drydock, Bremerton, Wash., but aside from this nothing of any importance has been let.

Rails.—Bookings of standard sections in this territory have been very satisfactory for January, though individual purchases have usually been of only moderate importance. A general movement is expected in the next few months, as inquiries are coming in from all parts of the Coast.

Merchant Pipe.—A slight improvement is noted in the distributive movement, the general plumbing supply trade being active through the country, but quiet in San Francisco. Merchants feel somewhat encouraged regarding the outlook, but are not disposed to carry large stocks, as they have no difficulty in getting quick delivery on current orders.

Cast Iron Pipe.—Consumers of cast iron pipe all over the Coast are taking advantage of the present easiness of the market to buy for requirements of the near future, and scattered orders have been received aggregating a larger tonnage than usual for this season. Aside from large orders recently placed for the city of Portland and the Portland Gas Company, most current purchases run under 1000 tons. New inquiries are sufficiently numerous to assure an active movement through the spring. The Bay Cities Water Company has placed an emergency order for 600 tons for the Alameda system, and the Pacific Gas & Electric has ordered

1000 tons for various points in the interior; this business, as well as an order for 800 tons of 6 and 8 in. pipe from the town of Vallejo, Cal., being taken by the United States Pipe Company. The Southern California Consolidated Gas Company is in the market for a large tonnage of both large and small pipe, and there are smaller inquiries from Santa Barbara and Monrovia, Cal. The Redondo Water Company plans to lay 2½ miles of large pipe this spring. Bids have just been received on a complete water system for the town of Ontario, Cal. Lewis Lukes, of the Monterey Railway, Light & Power Company, Monterey, N. L., Mexico, has called for bids, to be received March 1, for installing a gas plant and distributing system at that place.

Pig Iron.—The market remains very dull, as local melters are operating on a rather small scale, and are buying little for either spot or future delivery. A cargo of 1000 tons of English iron arrived January 21. Prices show no quotable change, \$22 being the figure generally asked by importers for ordinary grades of English and Continental foundry iron. Southern foundry iron is nominally quoted at \$21.50, but the amount used here is negligible.

Old Material.—All descriptions are quiet at the moment, though some business of a fairly large nature is pending in rerolling rails and steel melting scrap. Melters are taking little interest in cast scrap, but offerings are not large. Wrought scrap is in fair demand, but no large lots are offered. All lines are firm, values showing very little change. Quotations are as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12 to \$15; rerolling rails, per net ton, \$15.

New York

NEW YORK, February 1, 1911.

Pig Iron.—Transactions and inquiries in New England have been of more interest in the past week than business in the immediate vicinity of New York. One inquiry for 4000 tons of foundry iron for delivery in Massachusetts, after being before the trade for several weeks, has been withdrawn and purchases of several small lots have been made instead. Two other machinery foundries in New England have been in the market, but no large buying has resulted. In a number of cases orders have been received from foundries to hold up pig iron shipments, in view of the slackening in the demand for castings. This feature of the situation has given sellers some concern. Production of pig iron in New Jersey and Eastern Pennsylvania will be somewhat curtailed in February. One New Jersey and one Lehigh Valley furnace, both of good size, are expected to go out this month and another New Jersey furnace is temporarily out of commission, while further curtailment in the Lehigh Valley is under consideration. Some tentative offers on basic iron are reported in Eastern Pennsylvania, and business will result if the furnaces are willing to meet \$14.25 or a shade lower. A sale of 4000 tons of basic iron has been made for New England delivery. We quote for tidewater delivery as follows: Northern No. 1 foundry \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Finished Iron and Steel.—Evidences of improved conditions are increasing, extending now to bar iron also. While this line has felt an encouraging sentiment, in the past week it has had more tangible encouragement in better orders. The plate trade also shows greater activity, and in common with all other lines will close a better month in January than it has experienced in half a year. While there are not so many definite items to report in structural lines as in the previous week, it is no indication of a falling off, and the prospect of the near future release of many of the long deferred railroad orders will doubtless have a stimulating effect on business generally and tend to bring out more inquiries for building requirements. The latest structural awards include the Kenova, W. Va., bridge for the Norfolk & Western, 12,000 tons, taken by the American Bridge Company; the catenary bridges for the New Haven electrification, 2500 tons, which went to S. W. Bowles instead of the American Bridge Company as reported last week; the Browning loft building on West Thirty-sixth street, New York, 1700 tons, taken by the Hay Foundry & Iron Works; the Lincoln High School, Portland, Ore., 1000 tons, taken by Milliken Brothers, Inc. Bids were received January 30 on the Cruikshank building at Greenwich and Morton streets, this city, which will be eight stories and require 5000 tons. Other work bid upon includes the Gunter building, Chicago, 2000 tons; a cotton mill in Greenville, S. C., and 500 tons for the Lake Shore. The Delaware & Hudson is reported to be in the market for 2000 to 3000 tons for shops at Watervliet, N. Y. The steel for the Woolworth building in this city is withdrawn from im-

THE IRON AND METAL MARKETS

mediate consideration by the decision to increase its width and height; it will have a front of an entire block on Broadway and is to be about 750 ft. high, or about 50 ft. higher than the Metropolitan building. The remainder of the site cannot be cleared until May 1 and the plans are to be redrawn so that the steel is not likely to come into the market for several months. Prices are firm as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.35c. to 1.40c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Steel Rails.—The United States Steel Products Company has just booked 20,000 tons from the National Railways of Mexico, which is in addition to 5000 tons placed in this country by the same road a few weeks ago. The Boston & Maine and the New Haven orders, amounting together to 61,000 tons, have been held up for some time on account of new points in the specifications, but are now about closed. They call for open hearth rails entirely, and these will be supplied by the Pennsylvania Steel, Lackawanna and Bethlehem companies. The Burlington has placed 30,000 tons, and the Rock Island 10,000 tons. The Western Maryland has taken 12,000 tons, besides 9875 tons already reported.

Ferroalloys.—Some fair sales of ferromanganese have been made at about \$38.25, Baltimore, for delivery over the first half. Ferrosilicon is in good demand, with dealers here quoting \$55.50, Pittsburgh, for delivery over the first half.

Cast Iron Pipe.—A few small public lettings are coming out in New England, but municipalities generally are slow in making their purchases for this year's requirements. Private gas and water companies, however, are buying quite freely and some of them are taking good sized quantities. Alexander Potter, consulting engineer, 116 Liberty street, is building water works for Oklahoma City, Okla., which will require 3000 tons of pipe. Some manufacturers are feeling firmer in their views as the result of booking considerable business, but others are still taking low priced contracts. Revere, Mass., bought 300 tons of water pipe at \$21.45, delivered. Prices are now \$21.50 to \$22 per net ton, tidewater, for carload lots of 6-in.

Old Material.—Buying by consumers is confined to small quantities, seldom exceeding 100 tons. No indication is visible of a disposition to anticipate requirements for any length of time. The belief apparently prevails that no advance is to be feared in the market on old material. The supply is large, and such railroad lists as are now coming out are quite heavy. Cast scrap is strong, notwithstanding the low prices prevailing on pig iron. The volume of business is well distributed through the list. Quotations per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting.....	\$10.25 to \$10.75
Heavy melting steel scrap.....	10.25 to 10.75
Relaying rails.....	20.50 to 21.50
Standard hammered iron car axles.....	22.00 to 23.00
Old steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	12.50 to 13.00
Wrought iron track scrap.....	11.50 to 12.00
No. 1 yard wrought, long.....	11.00 to 11.50
No. 1 yard wrought, short.....	10.50 to 10.75
Light iron.....	5.00 to 5.50
Cast borings.....	6.00 to 6.50
Wrought turnings.....	6.00 to 6.50
Wrought pipe.....	10.50 to 11.00
Old car wheels.....	12.00 to 12.50
No. 1 heavy cast, broken up.....	12.00 to 12.50
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	12.00 to 12.50

Metal Market

NEW YORK, February 1, 1911.

THE WEEK'S PRICES

		Cents Per Pound for Early Delivery.		Lead.		Spelter.	
		Electro.	Tin.	New	St.	New	St.
		Lake.	lytic.	York.	York.	York.	Louis.
Jan.	12.75	12.37½	42.75	4.50	4.32	5.55	5.40
26.....	12.75	12.37½	42.75	4.50	4.32	5.55	5.40
27.....	12.75	12.37½	42.75	4.50	4.32	5.55	5.40
28.....	12.75	12.37½	42.75	4.50	4.32	5.55	5.40
30.....	12.75	12.37½	44.35	4.50	4.32	5.55	5.40
31.....	12.75	12.37½	43.25	4.50	4.32	5.55	5.40
Feb. 1.	12.75	12.37½	42.75	4.50	4.32	5.55	5.40

After advancing to 44.35c. on Monday, pig tin has receded sharply. The buying movement in copper has eased for the present and the market is rather weak. Lead is weaker in St. Louis. Spelter is listless.

Copper.—Copper is weak. It is apparent that consumers have filled their present wants, as they are taking no interest in quotations. Although the buying of two weeks ago was very heavy sellers were unable to dispose of enough to make an appreciable reduction in their holdings. It has been the custom during the last two years for some of the large selling companies to induce a buying movement by making a sharp reduction, as was done two weeks ago, and then advance the price again after about 10 days' selling. There are no signs, however, of such

action being taken at present, and some of the smaller interests have gone so far as to offer concessions with a view to inducing buyers to place large orders. Consumers, however, show no inclination to accept the offers. As is their usual custom around the first of each month, they are awaiting the appearance of the Copper Producers' statistics. Electrolytic copper is offered in New York at 12.37½c. Lake can be had at 12.75c. and perhaps a shade less. The exports of copper during January were good, amounting to 20,257 tons. At the close of trading in London to-day spot copper was sold for £55 3s. 9d., and futures for £55 18s. 9d. The sales amounted to 450 tons of spot and 700 tons of futures. The market closed firm.

Pig Tin.—Statistics favorable to the consumer, showing the January deliveries in this country, coupled with the fact that the Banca sale of 2500 tons in Holland on December 26 increased the visible supply of stocks, tended to weaken the hold of the London syndicate. That market declined nearly £7 yesterday and to-day. It is too early, however, to tell whether the operators have decided to let go. The leading consumer of pig tin in this country is reported to have made purchases in New York and in London, but its buying in any event was not heavy. Little trading was done here during the week, although prices steadily advanced until Monday, when they declined in sympathy with the London movement. The low prices made yesterday and to-day did not influence consumers to enter the market. The statistics compiled by C. Mayer, secretary of the New York Metal Exchange, showed deliveries into consumption during January amounting to 3200 tons, as against 3500 tons for the same period of last year. The total visible supply December 31 was 17,194 tons, while yesterday it was 18,616 tons. The average price of pig tin during January was 41.20c. The London market closed with spot tin selling at £194 10s., and futures at £194. The sales amounted to 200 tons of spot and 670 tons of futures. The market closed weak. Pig iron was sold in New York this afternoon for 42.75c.

Tin Plates.—Foreign tin plates have advanced again, being quoted this morning at 15s. 1½d., Swansea, Wales. Trade here is picking up, can manufacturers making inquiries for material for delivery over the second half. The price remains unchanged at \$3.84 for 100-lb. coke plates.

Lead.—Lead is weaker in St. Louis and sales have been made there at 4.32c. The leading interest continues to quote 4.50c. in New York and other sellers are acting accordingly.

Spelter.—Spelter is listless and slightly weaker. Consumers show no interest, but the feeling is that, if they actually wanted to buy, some holders would be willing to make concessions on the usually quoted price, which is 5.55c. New York and 5.40c. St. Louis. The St. Louis market is a great deal more uncertain than the New York trade.

Antimony.—Nothing has developed from the attempt made in Europe to form a selling combination among leading producers of antimony, but the talk in that direction resulted in strengthening the market. Resale offerings of Hallett's, which were made at a low price last week, have been taken up and that brand is now quoted at 7.75c. The recent advance in Cookson's to 8.25c. is being firmly maintained, and Chinese brands and Hungarian grades are selling at from 7.25c. to 7.50c.

Old Metals.—The market is dull. Dealers' selling prices are nominally as follows:

	Cents.
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.75 to 11.00
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	9.00 to 9.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, January 31.—There has been heavy buying of copper by consumers in this territory, generally for February and March shipment, as a result of the lower prices which became available last week. Spelter and lead are dull. Tin is the despair of the buyer at present. We quote Chicago prices as follows: Casting copper 12¼c.; lake, 12½c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 45c.; small lots, 47c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.40c. to 4.45c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 43c.; zinc, 4¼c.; pewter No. 1, 29c.; tin foil, 34c.; block tin pipe, 37c.

THE IRON AND METAL MARKETS

Metals, St. Louis, January 30.—Lead is quiet at 4.32½c. to 4.35c.; spelter is dull at 5.30c., both at East St. Louis. Zinc ore is held at \$41 per ton, Joplin base. Tin is stronger and quoted at 44.10c. per pound; antimony (Cookson's) unchanged at 8.60c.; lake copper easier at 13.05c.; electrolytic, 12.85c. all at St. Louis. The demand for finished metals was active for the first half and quiet for the last half of the past week.

Notes on Prices

Rope.—Jute fiber is about the only line for which there is a fair inquiry, and it is advancing in price. Sisal fiber is somewhat weak, owing to lack of demand, while on other than the highest grades of Manila hemp lower prices are expected by cordage manufacturers. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8¾c. to 9¼c. per pound; second grade Manila, 7¾c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¾c. per pound; second grade, 6¼c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—The strong position that has characterized the linseed oil market is not so pronounced, business having fallen off, but without change in quotations. The high prices bid for flax seed at Northwestern points last week brought considerable seed to market. Shipments of seed and oil arrived from Argentine last week in considerable volume, largely for paint manufacturers. The local demand for oil is comparatively light. The following quotations represent New York prices in five-barrel lots or more:

State, raw.....	Cents. 94
City, raw.....	94
Linseed, in lots less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon.	

Naval Stores.—Turpentine holds a high level in prices, and while buying continues in Savannah the demand is light in the New York market. High prices have resulted in the use of large quantities of turpentine substitutes and paint manufacturers are using other products which they would not have thought of a year or so ago. This is affecting the demand for turpentine to a considerable extent. New York quotations in five-barrel lots are as follows:

In oil barrels.....	Cents. 86
In machine barrels.....	86½
Less than 5 bbl. lots, ½ cent advance per gallon.	

Rosin prices are firm in sympathy with the Savannah market and buying is of a hand-to-mouth character. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$6.75 and grade D at \$7.05 in the New York market.

The Frick Coke Company Will Not Reduce Wages.

—Reports have been current for some time that the Frick Coke Company and other operators in the Connellsville region were contemplating an early reduction in coke workers' wages on account of the very low prices of blast furnace and foundry coke. These reports were brought to the attention of Thomas Lynch, president of the H. C. Frick Coke Company, who denied their truth in a statement as follows: "The scale of wages put into effect by our coke companies January, 1910, is still being strictly adhered to. There has been no reduction in any item at any of our plants, and no reduction is contemplated. On the contrary, we hope and believe that if any change is made in wages during 1911 it will be an advance and not a reduction."

The plant of the Star Expansion Bolt Company at Bayonne, N. J., was almost entirely destroyed by fire January 20. The loss on buildings and machinery was almost complete. The stock of manufactured merchandise, however, was but slightly damaged, and the company was enabled to continue deliveries without interruption. The general and executive offices of the company are at 147-149 Cedar street, New York, with branch offices and warehouses in Chicago, San Francisco, New Orleans, Montreal, Toronto and Winnipeg. The company carries heavy stocks at all of its branch warehouses.

Rubber Goods.—Owing to the further decline in raw rubber there has been some lowering of prices in belting, hose, rubber specialties and other mechanical rubber goods, approximating 5 to 10 per cent. This decline applies to the higher grades of goods only, as in the cheaper lines there is naturally much less rubber, the prices of which are not materially changed.

Vitrified Sewer Pipe.—The general quotation on first-class vitrified standard sewer pipe and fittings, 3 to 24 in., in carload lots, f.o.b. factory, is 88 per cent. discount. The demand is comparatively light and the market is not very strong, owing to competition and a desire to move stocks.

Iron and Industrial Stocks

NEW YORK, February 1, 1911.

Another period of advancing prices has occurred. Nearly all the steel and equipment stocks made important gains. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com... 29½-33½	Railway Spr., pref. 96-98½
Allis-Chalm., pref. 29½-33½	Republic, com... 32½-34½
Beth. Steel, com... 29½-33½	Republic, pref. 94-98½
Beth. Steel, pref. 59½-62½	Sloss, com... 50-51
Can. com... 90-100	Pipe, pref. 51-56
Can. pref. 79½-82½	U. S. Steel, com... 77½-80
Car & Fdry, com... 53½-55½	U. S. Steel, pref. 118½-120
Car & Fdry, pref. 116-117	Westinghouse Elec. 66½-68
Steel Foundries... 45½-46½	Va. I. C. & C... 58-59½
Colorado Fuel... 34½-35½	Am. Ship, com... 75
General Electric... 151-154	Am. Ship, pref. 111½-112
Gr. N. ore cert... 59-60½	Chf. Pacif. Tool... 41-46½
Int. Harv., com... 113½-116½	Cambria Steel... 44½-45½
Int. Harv., pref. 123-124	Lake Sup. Corp... 28-29
Int. Pump, com... 39½-40½	Pa. Steel, pref. 106
Int. Pump, pref. 84½-85½	Warwick... 10-10½
Locomotive, com... 40-41½	Crucible St., com... 12½-12½
Locomotive, pref. 110-110½	Crucible St., pref. 75½-79½
Pressed St., com... 32½-34½	Harb.-W. Ref., com... 35
Pressed St., pref. 96-97	Harb.-W. Ref., pref. 95
Railway Spr., com... 34	

A special meeting of stockholders of the Pittsburgh Valve, Foundry & Construction Company will be held February 23, to vote on a proposed issue of preferred stock to be exchanged for common stock share for share, not exceeding 5750 shares.

At the annual meeting of stockholders of the Keystone Driller Company, Beaver Falls, Pa., held last week, an annual dividend of 6 per cent. was declared.

Dividends.—The Pressed Steel Car Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred, payable February 23.

The United States Steel Corporation has declared the regular quarterly dividends of 1¼ per cent. on the preferred stock, payable February 27, and 1¼ per cent. on the common stock, payable March 30.

The Pittsburgh Steel Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable March 1.

from which points it can make immediate deliveries in case of emergency or when customers require quick shipment.

The Lawrence Iron & Steel Foundry Company, Thirty-second street and Allegheny Valley Railway, Pittsburgh, of which William Yagle is general manager, is operating its plant to fair capacity on contracts for acid open hearth steel castings for mills and various other uses. The company makes a specialty of building the Blake improved ore and rock crusher, and has lately commenced to make all its principal parts of steel castings, which, being lighter and stronger than iron, make the weight of the assembled machine considerably less and, therefore, enable it to be more easily handled.

The Seneca Chain Company, Kent, Ohio, announces the opening of its Eastern sales office at 30 Church street, New York, in charge of W. A. Hengstenberg, vice-president. The company has two large plants at Kent and Mansfield, Ohio, completely fitted with the most modern equipment for the manufacture and testing of all types and patterns of both hand-made and machine-made welded chains and forgings.

The Cambria Steel Company, Johnstown, Pa., will start its new wire rod mill about February 15, and its wire drawing mills about April 1.

Pittsburgh's Position in Steel

Some Considerations Bearing on Its Future

In an interesting address before a meeting of the Pittsburgh Realty Club at Pittsburgh, January 25, Henry P. Bope, vice-president and general manager of sales of the Carnegie Steel Company, discussed the position of Pittsburgh in the manufacture and distribution of steel products, as affected by developments in other districts. Mr. Bope said in part:

Other Districts Supply Their Own Demand

We have the supply here, never better than to-day; the genius of our workmen, and their skill and their ability to produce a most satisfactory quality in the most satisfactory way were never greater than to-day; but by the location of large plants in other centers, by the fact that a great demand has arisen in localities where it did not exist before—localities which can be served better by plants located near to the source of demand—our demand has fallen off. I can make that a little plainer by stating, using Chicago as an illustration, that the plants in Chicago, in the neutral freight zone, of course, can do as well as ourselves; but our neutral freight zone only goes to the western Ohio lines. Everything west of that is in the domain of Chicago and Birmingham. Therefore, it becomes necessary for us to look in other directions: first, to find new fields; second, to find new uses for steel. The first is possible; also the second, but not to the same extent, because in the various new uses found for steel other manufacturing concerns can join as well as ourselves. . . .

No one will deny that we have been absolutely extravagant to the point of gross extravagance in the use of natural gas, and what we wasted in the early days of the discovery of that great adjunct to the prosperity of this community would have run it a quarter of a century. We have been equally extravagant in the use of our coal supply. Many times we have not obtained even a new dollar for an old one for our coal, and every ton taken out of the ground under those conditions is absolutely wasted, because it is one of the great laws of nature that she never restores absolute waste. Therefore, it becomes necessary that every bushel of coal, every stick of timber, every ton of ore that is used to-day must carry with its full value; otherwise we are losing the benefit of these resources and conservation is an idle word.

Looking to the Future

But we are more interested in knowing what is going to happen to Pittsburgh. I do not know that I am a prophet, but I think the pessimism which is pervading Pittsburgh to-day with regard to its future is unwarranted. We must not be satisfied with the victories of the past. The great problems of the future are twofold. They are undoubtedly operating to obtain the greatest economy in manufacture and selling, because it does no good to produce cheaply if we cannot market the products which are produced. I think we can produce in Pittsburgh as cheaply as we ever could, as cheaply as can be done in any locality in the United States. The commercial problems, however, are a little more serious, for the reason, as I have said, that the territory in which Pittsburgh can operate is becoming more and more restricted, and that some territory contains, in the steel business at least, a larger measure of competition than is found anywhere else in this country. In the district between the western Ohio line and the Atlantic Ocean there is every large plant but one, for I am not considering Birmingham as a very large factor at the present time. It is coming on, but the South with its great resources, with the wealth which is pouring into it from the products of its soil, will become largely a self-contained section of the country, and much larger than any plants there at present or projected south of Mason and Dixon's line can take care of. But here in Pittsburgh we have the competition of every large plant outside of Chicago, and that competition is becoming serious, be-

cause the handwriting is on the wall for the plants located east of the Allegheny Mountains. With Chicago made a basing point as to freight it will be absolutely impossible for any plant east of the Alleghenies to place its product in the Chicago district or west, and it is going to be difficult for Pittsburgh, handicapped as it will be, unless there is some concession from the freight rate of \$3.60 per ton.

Pittsburgh's Importance in the Steel Corporation

There are two ways, it seems to me, in which we are going to be able to overcome some of our disadvantages. The first is the canalization of the Ohio River; the second, the opening of the Panama Canal. I would like to preface that statement by saying that I have heard the statement made by business men of Pittsburgh that the formation of the United States Steel Corporation was a detriment to Pittsburgh; but I do not think that is true. The great plants of that organization located in Pittsburgh are not plants that the Corporation by any means despises. When you consider that one of them in this district has a larger total ingot production than all the rest of the Corporation put together, and that its finished product amounts to something more than one-third of the total production of the Corporation, it is not likely that the men who dictate the affairs of that organization are going to take any drastic steps to interfere with the management, the organization or the results to be obtained in this district by their plants located here. I think it is only fair to say also, with due respect to the men who have preceded him, that the new president of the Steel Corporation is a man of wide intelligence, of broad knowledge in commercial matters especially, and a man who is deeply interested in the welfare and prosperity of Pittsburgh, and who is just as anxious to see that prosperity retained and promoted as any of us who are here laboring for the welfare of this great community.

River Transportation

Now the question of cheaper transportation rates down the Ohio River is not detrimental to the interests of the railroads. If we follow it up in another way, the products which go down the river will naturally be the heavier products of steel, coal and products of a similar nature. The majority of these products are not in themselves large revenue producers to the railroads in respect to their classification. The railroads would much prefer to see a wider diversity of interests here in Pittsburgh by which a higher character of manufacture would give them a higher class of transportation, and enable them to obtain a larger revenue by reason of that classification. And with the increase of the higher class industries here I am satisfied that the railroads will not only not oppose but will welcome a larger measure of water transportation to the community here. We have recognized this in the building of a fleet of steel barges, the first of which can be seen to-day at the foot of Market street, and which is the beginning of a large fleet of handsome and effective steel barges which will carry our products down the river to the Gulf, and eventually, whether by barge or transshipment, through the Panama Canal to points on the Pacific Coast and westward. Now if we can diversify our interests so as to increase the prosperity of this community, increase the tonnage which is produced here, and give the railroads a larger share of higher rate producing products, naturally they will be only too glad to see a larger portion of the heavier and less valuable freight go away from them. This is one of the means we are going to maintain the supremacy and prosperity of Pittsburgh.

Loss of Pacific Coast Steel Trade

Another means will be a larger extension of our foreign trade and regaining that portion of our trade on the Pacific Coast which has been lost to us by reason of the Payne-Aldrich tariff bill. I know the tariff bill is rather a live wire in a Pittsburgh audience, and it ought to be, because when we consider that on the Pacific Coast during the year 1910 there was imported a larger tonnage of steel products than in the four previous years put together, the operation of the Payne-Aldrich tariff bill so

far as it relates to this field has been detrimental, and I do not understand how any man could advocate a reduction in duty, which not only does not reduce the cost of living, but which, by taking work away from the Pittsburgh workman, prevents him from obtaining that which might be cheaper. If that argument be true, then it does not stand to reason that this community is benefited by a tariff bill of that character.

But we have been thinking out the proposition how to get back some of that trade by cheaper transportation from the Atlantic Coast to the Pacific. Whether that is done by contract with existing steamship lines, or whether the large corporations will build their own steamers, whereby they can manipulate their own freight rates from one coast to the other, or whether the trans-continental lines will see the handwriting on the wall and lower their rates is immaterial at this time. So long as one or the other is done, and we can obtain rates of freight that will enable us to deliver our products on the Pacific Coast, it does not make a great deal of difference which it is. This will take up some of the slack we lose elsewhere and it will be another means by which Pittsburgh can retain its supremacy.

Heavier Rails and New Uses for Steel

Then we come to the new uses of steel, in which this community will share; but it will not be altogether benefited by this because that is something of which other communities will also get their portion. But it is only fair to assume that with the increased demands upon the railroads for heavier cars, larger loads, larger trains and increased speed, the present system of tracks will not be sufficient for the purpose. Therefore, we can expect a heavier rail, perhaps as much as 33 1-3 per cent. heavier than the largest rail used to-day, which is, and only in the main tracks, 100 lb per yard. That would mean an increase of one-third in the rail tonnage. This would of necessity compel the railroads to look for a better system of track maintenance, and points to the steel tie, which, when it comes, means a very large increase in the demand for steel. There are other things which are being cultivated by the steel manufacturers in this district, so that so far as we are losing tonnage in one direction it is being made up by the several things of which I have spoken.

It seems to me, therefore, that it is not a time for pessimism. It is a time for every one of us to realize that while Pittsburgh has been great in the past and is great to-day, that greatness cannot be retained by being satisfied to rest upon past laurels, but that every one must stand for Pittsburgh in the future as he never stood for her in the past. It means that in lines of operation and commercialism, from the shovel load of the laborer to the inventive genius of the superintendent or the wide commercial knowledge of the commercial man, nothing that efficiency can do in manufacture, in operation can be lost sight of, and we must use every means within our power, legitimate and honest, to promote the interests of this great community.

The American Blower Company.—The way in which the American Blower Company, Detroit, Mich., regards the business outlook for 1911 is shown in a personal letter written during the past few days by President Inglis of that company to one of its customers, an extract from which is as follows: "Never in the history of the business of this company at this time of the year have the conditions been more favorable. This statement is based on a survey of current shipments, unfilled orders, prospective business and collections." This company is now working on a large installation for the heating and ventilating plant for the jobbing mill warehouse, sheet mill warehouse and galvanizing departments of the new plant of the American Sheet & Tin Plate Company at Garry, Ind. The contract includes one 240-in. fan and two 220-in. fans, three-quarter housed, 30 sections of heater and a complete system of galvanized iron distributing ducts.

The Follansbee Brothers Company, Pittsburgh, has completed two new sheet mills at Follansbee, W. Va., making a total of four sheet and six tin mills in that plant.

Byllesby Convention in Chicago

The following interesting article relative to a large engineering company controlling numerous public utility corporations is taken from the *Electrical World*.

The second annual convention of the employees of H. M. Byllesby & Co., and affiliated public service companies, was held in the Congress Hotel, Chicago, January 12-20. The registered attendance was 286, 128 of this number being from the home office in Chicago and 158 from the various affiliated companies scattered throughout the country, these latter operating electric service, street railway, gas power transmission and telephone utilities.

The meeting was opened by an address by H. M. Byllesby, president of the parent company, who in the course of his speech gave some interesting statistics showing the magnitude and extent of the work carried on under the direction of the company of which he is the head. A year ago the company was operating in 40 different municipalities, while at present its activities embrace 82 different municipalities in this country, which are spread broadly from the Canadian border on the north to the Gulf of Mexico on the south and from Illinois to the Pacific Ocean on the west. The employees directly on the pay rolls of H. M. Byllesby & Co. are 138, and those permanently and directly in the field in the various local companies aggregate 2400, making a total of 2538 regular employees. In addition, during the last 12 months an average of 2000 men have been at work in the field on construction, making a grand total of 4538 individuals employed and corresponding to about 23,000 individuals whose livelihood depended upon the interests represented at the meeting.

Mr. Byllesby called attention to the action of a prominent Public Service Commission in one of the States in which the company operates largely, which has prepared a bill to submit to its State legislature whereby public service corporations are authorized, after having capitalized at market value in stocks and bonds for the actual cash cost of their properties, to add thereto 100 per cent. of "profit sharing stack," thus recognizing the value of encouraging industry and enterprise. Mr. Byllesby considers that this is one of the most remarkable steps in advance that have taken place in the public service business in the 30 years during which he has been connected with it. F. H. Tidnan, manager of the Oklahoma Gas & Electric Company and chairman of the convention, responded in appropriate terms to Mr. Byllesby's address.

On Wednesday afternoon, January 18, Samuel Insull, president of the Commonwealth Edison Company, gave an address on modern methods of conducting central station business, and later in the same day Mr. Byllesby gave some interesting reminiscences of the days of electric lighting in the early eighties, when the speaker was a member of the staff of T. A. Edison.

On the recommendation of a committee, of which Harold Almert of Chicago is chairman, it was decided to start a monthly technical and commercial paper to serve as a medium of communication between the various companies and interests affiliated with H. M. Byllesby & Co. It was also decided to collect information on industrial power for a data book to be furnished to all representatives of the companies interested in the various States, which will show the characteristics of various industrial plants using electric drive supplied with electrical energy by the various affiliated companies. The book will contain information about load factors, connected load, power required to drive various types of machinery, &c.

On Tuesday afternoon, Mr. and Mrs. Byllesby gave a reception at the Drexel Boulevard home to the delegates of the convention. Opportunity was also offered to visit the Chicago Electrical Show. Thursday evening there was a theater party. There were also excursions to the Fisk street power house and Division street gas works. On Friday evening a banquet was given at the Congress Hotel.

The officers of H. M. Byllesby & Co. are as follows:

President, H. M. Byllesby; vice-president, in charge of operation, A. S. Huey; vice-president and chief engineer, O. E. Osthoff; vice-presidents, J. S. Cummins of Chicago and C. E. Groesbeck of Portland, Ore., in charge of Pacific Coast interests; treasurer, in charge of auditing, J. J. O'Brien; secretary, R. J. Graf; assistant treasurer, R. E. Wilsey.

The Depreciation of Unprotected Steel Work

An examination of the steel work of a foundry building was recently made by Lockwood, Greene & Co., Boston, and portions of their report contain matter of much general interest regarding the depreciation of structural steel work.

The structure inspected is of conventional steel mill building design, 500 ft. long and 120 ft. wide, three bays. The south bay contains two 5-ton cranes of 30-ft. span. In the 60-ft. central bay there are four cranes—two 10-ton, one 20-ton and one 30-ton. The 30-ft. north bay is equipped with one 5-ton crane for a portion of its length. The furnaces are located at the west end of the building in the south side bay, which is widened to 40 ft. for a length of about 80 ft. to accommodate them. The following extracts from the report indicate the condition of the steel work 10 years after the erection of the building, the reader being left to draw his own conclusions:

"In inspecting the steel work a most rigid examination was made wherever the eye or hammer showed cause for suspicion; the scale, if any, being chipped off and the remaining metal scraped. No evidence could be found of any damage from gases. The steel columns on the south side are badly rusted near the base, due to constant contact with the earth, 25 per cent. of the total area being lost. This corrosion does not extend more than 1 ft. above the bottom of the column, above which point the metal is in very good condition. In many of these columns the outstanding legs of column angles have been badly bent, in some cases being folded inward about 45 degrees.

"The columns on the north side have suffered somewhat from rust near their bases and from the same cause as on the south side. In addition, their upper portions are rusted sufficiently to reduce the area 10 per cent. None of these columns has angles bent as is the case on the south side. The lower portions of the main columns are in very good condition, as far as rust is concerned. Two places were noted where sufficient rusting has taken place to reduce the area 5 per cent. within 1 ft. of base. Above this point and in the lower portions of all the other main columns the metal is sound and clean. The upper portions of all the main columns opposite the monitor windows are slightly rusted, but not sufficiently so to cause any appreciable reduction in area.

"In the trusses the outstanding leg of the top chord angles has lost about 10 per cent. of its area through rust due to a leaking roof. With this exception the trusses are in first-class condition. One knee brace over charging platform has been cracked. When the large cranes pass the columns there is a perceptible jar. This is doubtless due to the loosening of bolts in the end connections of crane track girders. Examination revealed many loose bolts at these points.

"We were unable to observe any lateral swaying of the building as a whole, more than would be expected in a building of this type. Our representative made a number of trips on the cranes and also stood on various parts of the structure while the regular work of the cranes was being done, and even had the crane operators run their carriages back and forth, starting and stopping as quickly as possible, but no unusual amount of swaying could be observed, and certainly not enough to cause any apprehension. There was no wind blowing at the time our observations were made. Longitudinally the building was exceptionally rigid. We also were unable to note at the time of our visits any appreciable vibration of the whole plant, which has been suggested as sometimes taking place when the engines are running."

The Pig Iron Record of 1910

The official pig iron figures for 1910, as reproduced on the following page from the *Bulletin* of the American Iron and Steel Association, show a total of 27,298,545 gross tons. Every blast furnace but one reported directly. The increase over 1909 was thus 1,503,074 tons, or 5.8 per cent. The following table gives the half-yearly production in the past four years in gross tons:

	1907.	1908.	1909.	1910.
First half.....	13,478,044	6,918,004	11,022,346	14,978,738
Second half.....	12,303,317	9,018,014	14,773,125	12,319,807
Totals.....	25,781,361	15,936,018	25,795,471	27,298,545

It will be seen that in the year ending June 30, 1910, our pig iron production reached the enormous total of 29,751,863 tons, or more than 2,450,000 tons in excess of the total for the calendar year 1910. The production in the second half of 1910 was 2,658,931 tons, or 21.5 per cent. less than in the first half.

Steel-Making Iron

The production of Bessemer and low phosphorus pig iron in 1910 was 11,244,612 tons, against 10,557,370 tons in 1909, an increase of 687,242 tons, or over 6.5 per cent. In the second half of 1910 the production was 4,920,729 tons, as compared with 6,323,883 tons in the first half, a decrease of 1,403,154 tons. The production of low phosphorus pig iron alone in 1910 amounted to 259,077 tons, against 212,615 tons in 1909. The production of Bessemer and low phosphorus pig iron in 1910 was 2,595,906 tons less than in the banner year 1906, when it amounted to 13,840,518 tons.

The production of basic pig iron in 1910, not including charcoal of basic quality, was 9,084,520 tons, against 8,250,225 tons in 1909, an increase of 834,295 tons, or over 10.1 per cent. In the second half of 1910 the production amounted to 4,140,578 tons, against 4,943,942 tons in the first half, a decrease of 803,364 tons. The total in 1910 was the largest in our history, the former record year being 1909.

The production of spiegeleisen and ferromanganese in 1910 was 224,431 tons, against 225,040 tons in 1909, a decrease of 609 tons. The production of ferromanganese alone in 1910 was 71,376 tons, against 82,209 tons in 1909. Of spiegeleisen alone the production was 153,055 tons, against 142,831 tons in 1909. In addition several thousand tons of ferrophosphorus was produced in 1909 and 1910.

Production by Fuels

The production of bituminous coal and coke pig iron in 1910 amounted to 26,255,086 tons, as compared with 24,721,037 tons in 1909, an increase of 1,534,049 tons. In the first half of 1910 the production was 14,382,346 tons and in the second half, 11,872,740 tons. A small quantity of iron made experimentally with manufactured gas is included for 1909 but not for 1910. The production of mixed anthracite and coke pig iron in 1910 amounted to 649,082 tons, as compared with 698,431 tons in 1909, a decrease of 49,349 tons. In the first half of 1910 the production was 376,739 tons and in the second half, 272,343 tons.

The production of pig iron with anthracite coal alone in 1910, included above, amounted to 20,503 tons, against 16,048 tons in 1909.

The production of charcoal pig iron in 1910 was 394,377 tons, against 376,003 tons in 1909, an increase of 18,374 tons. A small quantity of pig iron made with charcoal and electricity is included in the figures for 1909 and 1910. In the first half of 1910 the production amounted to 219,653 tons and in the second half to 174,724 tons. No pig iron was made in 1909 or 1910 with mixed charcoal and coke.

Sidewalk Lights for Interior Use.—That sidewalk lights are practical indoors as well as out is demonstrated by the construction of the new Court House of Shelby County, in Memphis, Tenn., where the Raydiant

TOTAL PRODUCTION OF PIG IRON IN THE UNITED STATES IN 1909 AND 1910.

Statistics collected from the Manufacturers' Reports for 1909 and 1910. Gross Tons of Pig Iron.

Production in 1910, 27,298,545 Gross Tons; in 1909, 25,795,471 Tons; in 1908, 15,936,018 Tons; and in 1907, 25,781,361 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES					Production—Gross tons.		
States	Blast Furnaces				In 1910 (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.)		
	In blast June 1910	In blast 1909	In blast 1908	In blast 1907	First blast 1910	Second blast 1910	Total for 1910
Massachusetts	1	1	0	2	7,505	9,077	16,582
Connecticut	2	3	0	3			
New York	18	15	14	29	1,017,951	920,456	1,938,407
New Jersey	3	2	7	9	155,087	109,694	264,781
Pennsylvania	116	74	90	164	6,065,688	5,206,432	11,272,120
Maryland	4	2	3	5	170,708	155,506	326,214
Virginia	11	9	17	26	244,275	200,701	444,976
Georgia	0	1	3	4			
Texas	0	0	4	4	6,725	4,000	10,725
Alabama	24	20	30	50	1,012,545	926,602	1,939,147
West Virginia	1	1	3	4	137,439	37,222	174,661
Kentucky	3	2	6	8	46,520	53,989	100,509
Tennessee	12	10	10	20	235,969	161,600	397,569
Ohio	50	35	41	76	3,210,562	2,540,505	5,751,067
Illinois	20	11	15	26	1,552,160	1,123,486	2,675,646
Indiana	6	3	6	9			
Michigan	11	9	7	16	716,832	533,271	1,250,103
Wisconsin	4	4	3	7			
Minnesota	1	1	0	1	170,814	136,612	307,426
Missouri	2	1	1	2			
Colorado	4	2	4	6			
Oregon	0	0	1	1	227,958	200,654	428,612
Washington	0	0	1	1			
California	0	0	0	0			
Total	293	206	267	473	14,978,738	12,319,807	27,298,545

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	15	15	7	22	1,017,901	920,456	1,938,357
New Jersey	3	2	5	7	152,975	109,694	262,669
Pennsylvania	95	61	62	123	5,688,738	4,932,270	10,621,008
Maryland	4	2	2	4	170,108	155,506	325,614
Virginia	11	8	14	22			
Georgia	0	1	1	2	247,731	202,611	450,342
Texas	0	0	3	3			
Alabama	23	17	28	45	997,206	906,237	1,903,443
West Virginia	1	1	3	4	137,439	37,222	174,661
Kentucky	2	2	5	7	45,963	52,988	98,951
Tennessee	11	9	9	18	234,393	159,685	394,078
Ohio	49	35	36	71	3,210,542	2,539,465	5,750,007
Illinois	20	11	15	26	1,552,160	1,123,486	2,675,646
Indiana	6	3	6	9			
Michigan	2	1	3	4	673,580	520,442	1,194,022
Wisconsin	3	3	3	6			
Minnesota	1	1	0	1			
Missouri	1	0	1	1	253,610	212,678	466,288
Colorado	4	2	4	6			
Washington	0	0	1	1			
Total	257	174	208	382	14,382,346	11,872,740	26,255,086

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	5	5			
New Jersey	0	0	2	2	376,739	272,343	649,082
Pennsylvania	14	10	25	35			
Total	14	10	32	42	376,739	272,343	649,082

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	1	1	2			
Connecticut	2	3	0	3	*7,555	9,077	*16,632
New York	0	0	2	2			
Pennsylvania	4	3	3	6	2,323	1,819	4,142
Maryland	0	0	1	1	965	590	1,555
Virginia	0	1	3	4			
Alabama	1	3	2	5	15,339	20,365	35,704
Georgia	0	0	2	2			
Texas	0	0	1	1			
Kentucky	1	0	1	1	5,037	4,416	9,453
Tennessee	1	1	1	2			
Ohio	1	0	5	5	20	1,040	1,060
Michigan	9	8	4	12	155,740	105,065	260,805
Wisconsin	1	1	0	1			
Minnesota	1	1	0	1			
Missouri	0	0	1	1	*32,674	*32,352	*65,026
Oregon	0	0	1	1			
California	0	0	0	0			
Total	22	22	27	49	*219,653	*174,724	*394,377

* Includes a small quantity of pig iron made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	257	174	208	382	14,382,346	11,872,740	26,255,086
Anth. & anth. & coke	14	10	32	42	376,739	272,343	649,082
Charcoal	22	22	27	49	219,653	174,724	394,377
Total	293	206	267	473	14,978,738	12,319,807	27,298,545

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO					Production—Gross tons.		
States	Blast Furnaces				In 1910 (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.)		
	In blast June 1910	In blast 1909	In blast 1908	In blast 1907	First blast 1910	Second blast 1910	Total for 1910
Pennsylvania	16	12	14	26	369,529	389,721	759,250
Schuylkill	10	8	9	17	404,583	398,779	803,362
L. Susq. "	10	8	9	17	358,511	284,759	643,270
Juniata	3	3	6	9	93,557	97,997	191,554
Allegheny Co.	38	23	24	47	2,895,729	2,435,169	5,330,898
Shenando Valley	20	9	14	23	1,041,381	883,138	1,924,519
Miscel. bitum.	15	8	11	19	900,075	715,050	1,615,125
Charcoal	4	3	3	6	2,323	1,819	4,142
Mahoning Val.	20	14	9	23	1,345,926	1,189,043	2,534,969
Hocking "	0	0	1	1			
Lake Counties	10	6	10	16	866,805	607,660	1,474,465
Miscel. bitum.	10	8	8	16	722,360	562,370	1,284,730
H. R. bitum.	9	7	8	15	275,451	180,392	455,843
H. R. charcoal	1	0	5	5	20	1,040	1,060

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	464,263	370,369	834,632
Pennsylvania	2,466,797	1,927,110	4,393,907
Maryland	170,108	155,506	325,614
Virginia, West Va., Kentucky, and Tenn.	184,281	84,296	268,577
Ohio	1,942,374	1,517,330	3,459,704
Illinois	1,035,681	790,726	1,826,407
Michigan Wisconsin, Mo. and Cal.	60,379	75,392	135,771
Total	6,323,883	4,920,729	11,244,612

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania	Lehigh Valley	88,370	76,606	164,976
	Schuylkill Valley			
	Lower Susquehanna Valley	59,374	67,089	126,463
	Allegheny County	1,322,242	1,029,099	2,351,341
	Shenando Valley			
	Miscellaneous bituminous	996,511	753,506	1,750,017
Ohio	Mahoning Valley	873,483	865,424	1,738,907
	Lake Counties	505,261	325,673	830,934
	Hanging Rock bituminous			
	Miscellaneous bituminous	563,630	326,233	889,863

PRODUCTION OF BASIC PIG IRON, NOT INCLUDING CHARCOAL IRON.

New York and New Jersey	274,032	140,196	414,228
Pennsylvania—Allegheny County	1,480,013	1,327,452	2,807,465
Other counties	1,228,391	1,211,134	2,439,525
Virginia and Alabama	392,559	304,818	697,377
Ohio	612,331	543,090	1,155,421
Indiana, Illinois, Missouri, and Colorado	956,616	613,888	1,570,504
Total	4,943,942	4,140,578	9,084,520

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	91,381	65,218	156,599
Illinois	39,566	28,266	67,832
Total	130,947	93,484	224,431

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1906 TO 1910.

States—Gross tons	Production—(Includes spiegeleisen, ferro-manganese, etc.)				
	1906	1907	1908	1909	1910
Massachusetts	20,239	19,119	13,794	18,388	16,582
Connecticut					
New York	1,552,659	1,659,752	1,019,495	1,733,675	1,938,407
New Jersey	379,390	373,189	225,372	294,474	264,781
Pennsylvania	11,247,869	11,348,549	6,987,191	10,918,824	11,272,120
Maryland	386,709	411,833	183,502	286,856	326,214
Virginia	483,525	478,771	320,458	391,134	444,976
Georgia					
Texas	92,599	55,825	24,345	26,072	10,725
Alabama	1,674,848	1,686,674	1,397,014	1,763,617	1,939,147
West Virginia	304,534	291,066	65,551	228,282	174,661
Kentucky	98,127	127,946	45,096	86,371	100,509
Tennessee	426,874	393,106	290,826	333,845	397,569
Ohio	5,327,133	5,250,687	2,861,325	5,551,545	5,751,067
Illinois	2,156,866	2,457,768	1,691,944	2,467,156	2,675,646
Indiana					
Michigan	369,456	436,507	348,096	964,289	1,250,103
Wisconsin					
Minnesota	373,323	322,083	148,938	348,177	307,426
Missouri					
Colorado					
Washington	413,040	468,486	313,071	382,766	428,612
California					
Total	25,307,191	25,781,361	15,936,018	25,795,471	27,298,545

sidewalk lights manufactured by the Berger Mfg. Company, Canton, Ohio, are in use. The lights were installed largely in the courts of the huge building, which is one of the handsomest in the South. The cost of the building was \$1,500,000. The architects for the Court House were Hale & Rogers, New York. Perfect light is an essential in a county hall of justice, and it was only after a thorough test and demonstration of the light giving qualities of the Raydiant system that the lights were contracted for.

Work will be started shortly on the large extensions and improvements at the Pittsburgh Steel Company's plant at Monessen, Pa., comprising, it is understood, four 400-ton blast furnaces and two or more open hearth furnaces. Two blast furnaces will probably be completed first and two more will quickly follow. The company will then be independent of the pig iron market. It has for some time been buying all its requirements of basic pig iron from the Shenango Furnace Company, Sharpsville, Pa., and M. A. Hanna & Co., Cleveland, Ohio.

Results with Dry Air Blast

Great Uniformity in Moisture and Temperature— Fuel Saving with Increased Output

Some recent data of dry air blast operations, furnished by James Gayley, are given below. Mr. Gayley states that they are from a Western furnace plant, for the months of June, July and August, 1910. These months represent the period of greatest humidity and demonstrate the efficiency of the Gayley process under careful management for producing a dry air blast that is uniform to a remarkable degree, both in contents of moisture and in temperature. While the atmosphere varies widely in both temperature and moisture, the variations in the dry air are within narrow limits, and approach as close to uniformity as seems possible to obtain in a mechanical device that is treating 40,000 cu. ft. of air per minute.

The amount of work done by a dry air plant in mid-summer in removing moisture is ordinarily not fully comprehended by simply expressing the moisture content in grains per cubic foot of air. In a furnace consuming 40,000 cu. ft. of air per minute the presence of 1 grain represents the delivery of 41.2 grains of water per hour to the furnace. Taking, for example, a very humid day, July 6, when the moisture as shown in Table 2, averaged 7.90 grains for the day and night, there would have entered the furnace under natural air conditions 7797 gal. of water in the 24 hours. This would be the equivalent of 185.6 barrels. The dry air on the same day contained only 0.86 grain, and the quantity of water entering the furnace was accordingly reduced to 849 gal., thereby eliminating 6948 gal., and saving the fuel necessary to dissipate it. Taking again the day with the lowest humidity, July 19, when the moisture for day and night averaged 3.45 grains, the furnace would have received 3410 gal. of water, but the dry air carried in only 809 gal., representing an abstraction of 2601 gal. Thus, even on days of relatively low humidity, the quantity of water extracted is very large.

Table 1.—Record of Operations of Dry Blast Process at a Western Furnace.

Grains of moisture per cubic foot air.						Temperature (Degrees F.)			
1910. Atmosphere.		Dry blast.		Atmosphere.		Dry blast.			
June.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.		
1.....	2.88 2.97	0.84 0.80	47 50	15 16					
2.....	3.03 3.01	0.82 0.83	53 50	15 15					
3.....	3.10 3.16	0.85 0.84	55 51	15 16					
4.....	3.06 3.87	0.82 0.84	56 55	16 16					
5.....	4.56 3.85	0.84 0.80	59 53	16.3 16					
6.....	4.27 3.70	0.83 0.80	60 53	16.3 15					
7.....	3.42 3.44	0.85 0.82	62 59	16.1 16					
8.....	3.78 3.91	0.85 0.83	66 59	17 17					
9.....	3.08 3.77	0.87 0.84	70 61	17.3 18					
10.....	4.33 4.32	0.85 0.82	62 61	17.7 19.6					
11.....	4.60 4.12	0.84 0.84	60 55	17.5 18.8					
12.....	3.84 4.07	0.86 0.85	68 60*	18.7 18.1					
13.....	3.97 3.80	0.86 0.86	76 67	19.1 17.5					
14.....	4.17 4.53	0.87 0.87	77 73	18.9 18.1					
15.....	4.62 4.60	0.87 0.83	81 72	18.8 17.6					
16.....	4.79 4.36	0.85 0.85	82 71	19.7 18.2					
17.....	4.39 4.99	0.85 0.85	85 76	19.7 18.2					
18.....	5.75 5.92	0.86 0.85	87 74	19.6 19					
19.....	5.99 6.33	0.83 0.84	83 71	19 18.4					
20.....	6.52 6.61	0.86 0.84	83 74	20 19.3					
21.....	6.54 5.76	0.83 0.83	83 73	19 18.9					
22.....	4.68 5.38	0.81 0.84	83 74	19.5 19					
23.....	5.82 6.36	0.86 0.86	89 84	20 19					
24.....	5.79 4.93	0.93 0.82	76 68	19.6 17.8					
25.....	4.39 5.07	0.80 0.79	78 69	18.5 17.6					
26.....	5.45 5.58	0.81 0.83	80 74	18.3 19					
27.....	5.97 6.20	0.85 0.82	72 65	21.8 19					
28.....	4.19 5.07	0.82 0.82	80 74	16.7 18					
29.....	5.50 5.84	0.85 0.84	79 73	18 19					
30.....	5.91 6.08	0.87 0.89	87 80	19 20					

Table 2.—Record of Operations of Dry Blast Process at a Western Furnace.

Grains of moisture per cubic foot air.						Temperature (Degrees F.)			
1910. Atmosphere.		Dry blast.		Atmosphere.		Dry blast.			
July.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.		
1.....	5.37 5.46	0.85 0.84	91 79	18.5 19					
2.....	5.09 6.10	0.86 0.86	89 79	18 19.5					
3.....	6.06 4.96	0.85 0.83	82 71	19 18.5					
4.....	4.43 4.56	0.84 0.81	72 68	16 16					

Grains of moisture per cubic
foot air.

1910. Atmosphere.		Dry blast.		Temperature (Degrees F.)		Atmosphere.		Dry blast.	
July.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.
5.....	5.14 5.99	0.82 0.85	77 71	17.8 19					
6.....	7.96 7.84	0.86 0.86	77 70	21 21					
7.....	6.24 6.56	0.86 0.85	82 70	19.5 20					
8.....	5.31 6.59	0.79 0.83	86 76	18 20					
9.....	6.47 6.97	0.86 0.82	86 74	20 19					
10.....	6.76 5.37	0.84 0.82	81 69	20 18					
11.....	4.25 4.89	0.82 0.77	82 73	19 18					
12.....	7.03 5.54	0.84 0.79	79 71	20.5 19					
13.....	3.91 4.20	0.78 0.80	74 65	16 15.3					
14.....	4.40 5.15	0.79 0.80	78 70	18 17.6					
15.....	5.57 6.24	0.81 0.83	83 75	19 19					
16.....	5.68 5.51	0.85 0.81	84 70	18 18					
17.....	4.03 4.31	0.79 0.85	74 66	17 17.7					
18.....	3.73 3.54	0.81 0.83	75 65	17 14.7					
19.....	3.54 3.37	0.80 0.84	75 66	16 15					
20.....	3.48 4.35	0.81 0.85	79 73	17 18					
21.....	6.07 6.33	0.82 0.82	78 71	19 17.5					
22.....	4.52 4.96	0.83 0.82	84 75	18.5 18					
23.....	6.04 5.87	0.83 0.82	85 77	18 17					
24.....	6.21 6.61	0.84 0.85	85 77	18.5 19					
25.....	5.28 5.16	0.83 0.83	83 72	16 17					
26.....	7.23 5.79	0.85 0.83	82 71	19.2 18					
27.....	5.58 6.10	0.80 0.84	80 71	17 18					
28.....	5.31 5.74	0.82 0.82	81 71	18.3 18.7					
29.....	6.47 7.06	0.82 0.84	82 75	19.2 20					
30.....	4.43 4.74	0.83 0.79	81 70	18 18.5					
31.....	4.40 4.29	0.81 0.78	75 66	18.5 17.5					

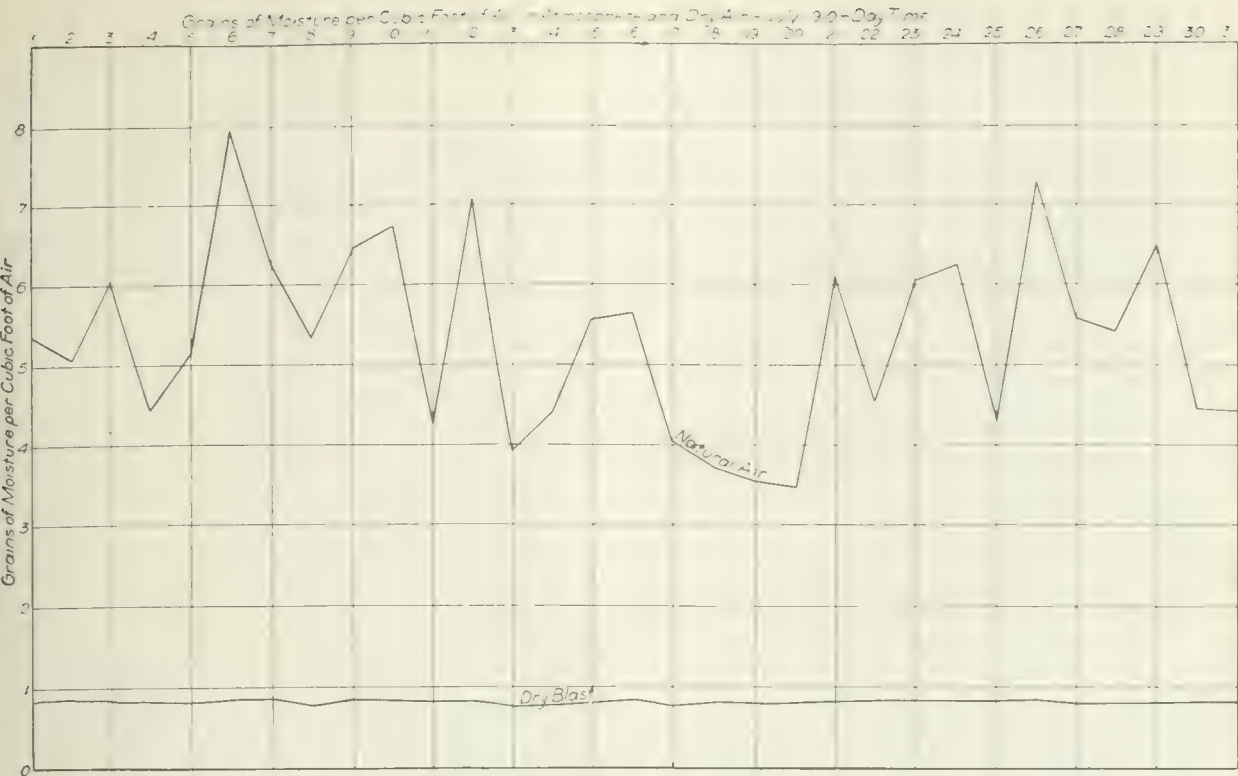
Table 3.—Record of Operations of Dry Blast Process at a Western Furnace.

Grains of moisture per cubic foot air.						Temperature (Degrees F.)			
1910. Atmosphere.		Dry blast.		Atmosphere.		Dry blast.			
August.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.	Day. Night.		
1.....	3.96 5.86	0.87 0.82	79 71	17 18.5					
2.....	6.98 7.14	0.83 0.83	78 72	18 18.6					
3.....	6.04 5.67	0.84 0.83	84 77	17.1 18.4					
4.....	4.41 3.70	0.83 0.77	76 63	16 16.4					
5.....	3.34 3.30	0.80 0.77	73 75	15.5 15					
6.....	3.41 4.57	0.82 0.81	79 73	17 18					
7.....	5.02 4.92	0.84 0.81	74 68	16.7 16.3					
8.....	4.58 4.85	0.82 0.84	80 70	17.4 16.4					
9.....	5.21 5.64	0.85 0.84	76 69	18 18					
10.....	4.82 5.13	0.81 0.82	78 69	17 16.9					
11.....	4.95 5.15	0.82 0.84	77 68	18 17					
12.....	3.88 5.19	0.81 0.83	78 66	18 18.4					
13.....	4.63 4.55	0.85 0.83	82 72	18.4 17.8					
14.....	4.39 5.34	0.82 0.83	86 76	19 18					
15.....	5.11 7.13	0.83 0.83	87 78	19 19.7					
16.....	7.09 6.19	0.85 0.85	83 76	20 18					
17.....	6.55 6.64	0.87 0.86	89 79	18.5 18.5					
18.....	6.40 5.15	0.85 0.84	76 68	19.5 17					
19.....	4.05 4.01	0.84 0.84	76 66	18 16					
20.....	4.20 4.72	0.81 0.86	74 66	17 16					
21.....	4.68 5.37	0.85 0.84	81 71	18 18					
22.....	6.12 5.94	0.85 0.85	79 75	17 18.5					
23.....	5.96 6.11	0.85 0.85	75 74	17 18					
24.....	5.43 5.63	0.83 0.84	87 79	17.5 18.5					
25.....	6.94 4.12	0.86 0.79	80 60	19.5 18					
26.....	3.47 3.77	0.85 0.79	66 59	17 18					
27.....	3.15 3.96	0.84 0.80	71 62	16.7 18					
28.....	4.56 5.32	0.85 0.85	73 68	18 19					
29.....	5.60 6.39	0.86 0.85	74 71	18.5 19.4					
30.....	5.90 6.06	0.86 0.84	84 78	20 19.5					
31.....	5.54 4.26	0.84 0.80	73 67	17 17.5					

The amount of water extracted through the dry air process expressed in gallons as seen in Table No. 4 is very impressive, and will be particularly appreciated by practical blast furnace managers who are familiar with the cooling effect produced in the furnace hearth from a small leak from a tuyere or bosh plate. The diagram shows graphically the grains of moisture in the atmosphere and the resulting dry air. The uniformity of the dry air speaks for itself, as to its value in a process so delicate in adjustment and so variable as a blast furnace.

When the results of dry air were first made public in 1904 it was thought by some that the economical results obtained were not due so much to low moisture in the dry blast, as they were to creating conditions of uniformity in the moisture—that is, if the moisture was maintained uniformly at 2 to 2.50 grains or 3 grains, the results would be practically as good as if it was reduced to 1.5 grains. This, however, does not appear to be borne out in actual practice, as the best results are obtained when the moisture is reduced below 1 grain per cubic foot of air, and is markedly greater at 0.75 grain than at 1.50 grains. The reasons for this do not seem at present to be clearly understood, although it has been demonstrated in practice.

The conclusion reached from the experience of the past



Results with the Gayley Dry Blast. Graphic Chart of the Performance of a Western Dry Blast Plant for the 31 Days of July, 1910, Showing High and Varying Moisture in the Atmosphere and Low and Uniform Moisture in the Resulting Dry Air.

six years is that dry air blast conservatively considered will effect a saving of 10 per cent. in fuel, with an increase in output of 12 per cent., and the product can be increased beyond this at the expense of fuel saving, and vice versa. The tendency in some cases is to increase the output at the expense of fuel saving. At one works the saving in coke was 7.5 per cent. on dry air, but concurrently the output was increased by 23 per cent. Thus the dry air blast not only reduces the cost of pig iron, but it also creates uniformity in the furnace operations, and any cheapening of the pig iron cost is reflected to a greater extent in the finished steel product.

Table 4—Gallons of Water Delivered to Furnace in 24 Hours

With natural air. blast.		With dry natural air. blast.	
July, 1910	Gallons.	July, 1910.	Gallons.
1.....	5,349	17.....	4,116
2.....	5,517	18.....	3,588
3.....	5,438	19.....	3,410
4.....	4,432	20.....	3,915
5.....	5,488	21.....	6,119
6.....	7,797	22.....	4,678
7.....	5,428	23.....	5,876
8.....	5,873	24.....	6,327
9.....	6,633	25.....	5,152
10.....	5,981	26.....	6,450
11.....	4,511	27.....	5,764
12.....	6,203	28.....	5,453
13.....	4,002	29.....	6,184
14.....	4,713	30.....	4,525
15.....	5,828	31.....	4,258
16.....	5,522		
Total, July.....			164,560
Equivalent in barrels of 42 gal. each.....			3,918

The Webster Mfg. Company's Improvements.—The Webster Mfg. Company, Chicago, is making extensive additions to its plant at Tiffin, Ohio. The plans cover a malleable iron foundry and sheet iron works, occupying two buildings, 120 x 330 ft. each.; a machine shop, 120 x 300 ft.; storage and shipping building, 90 x 270 ft.; office building, 100 x 250 ft.; foundry, 120 x 300 ft.; pattern vault, 100 x 120 ft. The buildings are to be of one story, of brick and steel truss construction, and will be fitted with electric cranes and the most modern methods for lighting, heating, &c. There will also be a large air equipment for handling various tools with air compressors. The plan of the shop is to work everything to the center, the shipping and storage rooms being in

the center, the cranes delivering everything to the tracks located in this building. The entire plant when completed will cover an area of about 4 acres. The company conducts a business as engineer, founder and machinist.

The Sherman Machine & Iron Company, now located at 18 to 36 East Main street, Oklahoma City, Okla., has secured a tract of five acres on East Fourth street, near the Missouri, Kansas & Texas Railroad, on which it will erect a new plant on which building operations will be commenced shortly. The buildings will comprise a foundry, machine shop, storage warehouse, boiler shop, wood-working shop and various other structures, including an office. On the old site thus vacated the N. S. Sherman Warehouse Company will erect a fireproof warehouse, 140 x 240 ft., six stories; the incorporators of this company are N. S. Sherman, Sr., N. S. Sherman, Jr., W. S. Sherman, N. V. Hope and R. V. Moran.

The Winnipeg Development and Industrial Bureau, Winnipeg, Canada, has issued an illustrated brochure entitled "The Corner Posts of a Great City." The illustrations show imposing structures which have been erected at the corners of prominent streets in that city. They are most impressive in indicating the importance of the business interests of this enterprising city of the far North which in 1870 had a population of only 215 and at present has a population, including suburbs, of 185,000. Reports on the manufacturing possibilities of the city and vicinity are furnished free of charge by Charles F. Roland, Commissioner, Union Bank Building, Winnipeg.

The Chase Foundry & Mfg. Company, Columbus, Ohio, manufacturer of roller bearing trucks, industrial cars and industrial railroad equipment generally, held its annual stockholders' meeting January 14, at which time the old Board of Directors was re-elected. P. A. Myers of the firm of F. E. Myers & Bro., Ashland, Ohio, was elected president; Guy C. Myers, Ashland, Ohio, vice-president; S. M. Chase, Columbus, Ohio, secretary and general manager. The business for 1910 was found to be most satisfactory, and there is an exceptionally good outlook for the coming year.

Canadian Steel Interests and Reciprocity

TORONTO, January 30, 1911.—The reciprocity arrangement that is now before the Parliament of Canada and the United States Congress does not very materially affect the iron and steel industries of this country. In most cases the reduction in the Canadian duties goes no lower than the level of the intermediate tariff. Wire rods were and long have been on Canada's free list, but wire rods entering the United States are subject to duty. As under the agreement Canadian wire rods would be free to enter the United States, that item is in Canada's favor.

The Canadian bounty on wire rods will cease at the end of next June, unless in the meantime Parliament provides for its continuance. In some quarters it is thought that Parliament may do so, though before the terms of this agreement were made public there seemed ground for the expectation that the Government would compensate the manufacturers for the withdrawal of the bounty by transferring rods from the free to the dutiable list. The agreement negatives such a mode of indemnifying the rod manufacturers for the loss of the bounty, and it is thought doubtful that entrance to the United States market will prove an equivalent. Hence there is a revival of the notion that the bounty may be renewed.

The numerous articles included under the name of agricultural machinery would undoubtedly be more freely imported from the United States were the agreement to be adopted. Lloyd Harris, M. P., of the Massey-Harris Company, with whose Brantford works he is most closely associated, is quoted as saying that the reductions would not hurt the farm machinery industry. It is to be remembered that pig iron, rolled iron and rolled steel are already entitled to a drawback of 99 per cent. of the Canadian duty when they are used in the manufacture in Canada of mowing machines, reapers, harvesters, binders and attachments. This is worth more to the agricultural implement makers than some additional percentage ad valorem in the way of tariff protection on their products. Type casting and type setting machines, which are dutiable at 20 per cent. under Canada's general tariff, would come free from the United States under the reciprocity agreement. At the same time they would remain dutiable at 12½ per cent. coming from Great Britain, that rate being the one specified in Canada's preferential tariff. American brass in bars and rods, not less than 6 ft. in length, or brass in strips, sheets or plates, not polished, planished or coated, would be free under the agreement, whereas, coming from Great Britain it would remain dutiable at its present rate of 5 per cent. ad valorem.

C. A. C. J.

The Canadian Railway Club Meeting

A number of machinery and railroad supply men from the United States attended the meeting of the Canadian Railway Club, January 27, at Windsor Hall, Montreal, being particularly interested because of the flourishing condition of Canadian railroad business. A. A. Maver, master mechanic of the Grand Trunk Railroad, is president of the association. The speaker of the evening was G. J. Phillips, superintendent of the Lackawanna Railroad, who, in response to the toast, "The Railways," called attention to the fact that the Canadian railroads are on a sound financial basis and said: "We in the United States have to spend many millions of money yet in making our railroad facilities meet the demands of the time and are now asking that we be helped to earn the money to meet these demands. We have made many mistakes, I admit, but the biggest mistake is, I think, that we have not built big enough." H. H. Vaughn, assistant to the vice-president of the Canadian Pacific Railroad, in responding to the toast, "Our Guests," spoke of the cordial feeling existing between Canadian railroad men and American machinery and supply manufacturers. G. H. Pearsall, secretary of Joseph T. Ryer-

son & Son, Chicago, answered the toast to the supply men.

A Blooming Mill with Novel Features

The United Engineering & Foundry Company, Farmers' Bank Building, Pittsburgh, has completed and is shipping this week to the Republic Iron & Steel Company at East Youngstown, Ohio, a 40-in. two-high blooming mill, in which have been incorporated some novel features. The mill is practically a duplicate of the blooming mill built last summer by the same company for the American Rolling Mill Company and installed at its East Works near Middletown, Ohio. Its special features are briefly as follows:

In designing the housing, the ordinary practice of a parallel window was not used, but the housing was given more or less the shape of an A-frame, with the object of having a wide window at the bottom and maintaining a narrow opening at the top where the bending stress of the housing is very severe; as the wide bottom of the window would similarly cause heavy bending stress, this part of the housing was formed in the shape of a link, being filled in by a very rigid cast steel block which carries the bottom roll bearing. This arrangement causes the housing to take the form of a huge stirrup, which is subject almost entirely to tensile stress rather than bending.

As the window of the housing has considerable width at its lower part, it has been found possible, by a special arrangement of the table, to have the first roller of the mill tables pass through the window and receive its support from the table girders, so that it is unnecessary to have any rollers passing through the housing posts. This feature is considered highly valuable, as table rollers passing through the housing posts invariably cause difficulties in operation. If such a roller is bent in the journals, it is very difficult to remove, and usually causes delays of the mill, whereas with the arrangement just described it is only necessary to raise the top roll and remove the bent roller through the housing window.

The arrangement of counterbalance is also somewhat novel, consisting of a hydraulic cylinder placed between the housings which operates through links to a pair of beams, which in turn carry the top roll. In this construction no bolts or other threaded members are used, these having been replaced by links with forged heads between the balance beams and the cylinders and by heavy hook liners between the beams and the roll carrier.

In changing rolls, the top roll is lowered against the bottom roll and the balance pressure from the cylinder relieved, after which the top roll carriers may be withdrawn from the housings without loosening any bolts or other fastenings. After this is done, pressure is again applied to the balance cylinder and the screws run up, carrying the balance beams and top roll rider with them. This leaves the top roll entirely free to be removed from the window of the housing. The bottom roll may be removed by simply taking off the scale guards and lifting it out through the window.

The screw-down mechanism is operated from a 100-hp. motor through worm gearing and has a lift of 36 in., so that the mill can be used for edging slabs up to this width. The construction of the screw-down is such that, by removing eight bolts and two keys, the entire superstructure may be removed from the mill when repairs to any of its parts are required.

The pinion housings are of specially heavy design, being entirely inclosed so as to be oil tight, and the pinion bearings are of the solid type, having no means of adjustment. The pinion bearings are of such large dimensions that practically no wear will occur, each neck being 22 in. in diameter by 36 in. long in the bearing. The spindles between roll and pinion housings are 20 ft. long, the top spindle being carried by a very substantial arrangement, so constructed that both the carrier and spindle may be quickly removed. The roll housings are of cast steel and weigh 96,000 lb. each. The bed plate weighs 3020 lb. per running foot on each side of the mill. The pinion housings are also of cast steel and weigh 60,000 lb. each, excluding the caps.

The Demand for Broad Foundry Training

Thomas D. West, Cleveland, Ohio, lectured Thursday evening, January 26, at the School of Applied Industries, Carnegie Technical School, Pittsburgh, on "American Foundry Practice and Its Demands." This was the first of eight lectures which are announced by this school to be given in the next four months. Mr. West presented 38 illustrations in the form of lantern slides, indicating the great variety of work compassed in modern foundry operations. A list of specialties in iron and steel castings, which accompanied the lecture, contained 50 classes of work, ranging from locks, hinges and toys to the heaviest engines, mining machinery and electric generators. Mr. West emphasized what he has been advocating for several years—namely, the training of young men for the career of master founders. He feared that the prominence of specialties nowadays and the deplorable unwillingness of young men to devote the time that must be spent in the foundry in order really to learn the trade, would result in all-around mastery of foundry practice becoming a lost art. As long as specializing in foundry lines continues to be the rule it was pointed out that the man who systematically sets about acquiring a broad acquaintance with the trade would have a great advantage. The speaker cited his own experience in being called on to extricate specialty founders from difficulties with which, owing to the one-sided character of their training, they could not cope. The speaker deprecated the impression so widespread, and frequently leading to financial disaster, that only ordinary qualifications are required for success in foundry management. He recommended a thorough apprenticeship and a variety of experience in engine or other machinery plants, as well as those doing a general jobbing business, and considered that no city offered better advantages for such broad training than Pittsburgh.

The address took up some of the important classes of foundry work, as cast iron pipe, radiators, electric generators, locomotive castings, malleable castings, car wheels and steel castings, and gave a practical foundryman's description of these various lines of operation. The use of the molding machine in the foundry and the modern advances represented by welding the use of lifting magnets, casting in permanent molds and the use of dies in connection with casting under pressure, were illustrated and described.

Rifle Shots Open a Chilled Cinder Notch

The blast furnace of the Northern Iron Company at Standish, N. Y., which produces Chateaugay low phosphorus pig iron, recently made a slip, which resulted in the chilling of the cinder notch. The usual method of opening it with coal oil blast lamps was applied, but the material was of such a nature that it did not respond to the heat produced by the blast lamps. Some 8 or 10 barrels of oil were burned, with but little progress more than apparently to soften the chilled material. The furnace at the time was full of iron and slag, and after a number of attempts had been made to drive steel bars through the notch a high power rifle with steel jacketed bullets was effectively tried. Thirty or 40 shots were used to open the notch. This method was also used advantageously on several chilled tuyeres.

The annual meeting of the stockholders of the Standard Underground Cable Company was held in Pittsburgh January 24 and the retiring Board of Directors was re-elected as follows: L. W. Dalzell, John Moorehead, Jr., J. N. Davidson, B. F. Jones, Jr., A. H. Childs, J. W. Marsh, W. A. Conner, F. A. Rinehart and Joseph Wood. The annual report has not yet been given out, but it is understood that the business of the company the past year was most satisfactory.

A creditors' petition in bankruptcy has been filed against the United Bearings Company, Bradford, Pa., by three alleged creditors, whose claims aggregate \$7629.77.

The California Metal Trades Association's Annual Meeting

The California Metal Trades Association held its fourth annual meeting January 25 in San Francisco, Cal. The retiring president, J. M. Robinson, made his report for the year and in it said:

"The report was made by this association to you for its members an agreement along the lines under which you are operating your shops to-day, and its efforts have been successful in having had brought into being an agreement calculated to accomplish for you what we now know was intended by the framers of the former agreement, namely, no discrimination against San Francisco in the matter of hours constituting a work day for employees of shops embraced within the membership of the California Metal Trades Association."

Officers for the ensuing year were elected as follows: President, Sam J. Eva, United Engineering Works; first vice-president, Constant Meese, Meese & Gottfried Company; second vice-president, George J. Henry, Jr., Pelton Water Wheel Company. Executive Committee: C. H. Evans, C. H. Evans & Co.; O. H. Fischer, Union Gas Engine Company; Andrew L. Kerr, Steiger & Kerr Stove & Foundry Company; John A. McGregor, Union Iron Works Company; R. H. Postlewaite, Risdon Iron & Locomotive Works; P. H. Reardon, Compressed Air Machinery Company; Otto Schrader, Schrader Iron Works, Inc.; John T. Scott, Moore & Scott Iron Works.

At an Executive Committee meeting held in New York City last week the dates of the joint conventions of the Southern Hardware Jobbers' Association and the American Hardware Manufacturers' Association were fixed for April 26, 27 and 28. The conventions will be held at San Antonio, Texas, and plans are being made for a special train for the accommodation of members and other visitors, which will start several days in advance of the convention, so as to provide for brief visits en route to some of the principal Southern and Southwestern cities. A special transportation committee is being formed by the American Hardware Manufacturers' Association to make all arrangements for this special train. The personnel of this committee will be announced at an early date.

Stockholders of the Ironton Iron Company, Ironton, Ohio, elected these directors recently: H. A. Marting, W. A. Murdock, F. L. McCauley, D. C. Davies, Dr. C. A. Lowry, E. O. Marting, W. W. Marting and Fred J. Horschell. The directors organized by electing the following officers: H. A. Marting, president and general manager; E. O. Marting, first vice-president; W. A. Murdock, second vice-president, and W. W. Marting, secretary and treasurer.

At the Brown-Bonnell Works of the Republic Iron & Steel Company at Youngstown, Ohio, the Bessemer steel plant, 20-in. and 10-in. skelp mills, the 7-in. and 8-in. continuous mills, the No. 3 bar mill and the spike and washer factories are running this week, while at the Mahoning Valley Works the two bar mills, 7-in. mill, blooming mill and shafting departments are in operation.

Sixteen of the 23 hot tin mills in the Laughlin plant of the American Sheet & Tin Plate Company at Wheeling, W. Va., were put in operation last week for the first time since the plant closed down October 29 last year.

The Delaware Steel Company, Chester, Pa., which recently sold a considerable tonnage of pig iron, is preparing to blow in its furnace. It will probably be ready to go in about February 15.

The Massillon Foundry & Machine Company, Massillon, Ohio, has increased its capital stock from \$50,000 to \$100,000.

The Warwick Iron & Steel Company, Pottstown, Pa., will blow out its No. 2 Furnace about the middle of February.

Personal

H. A. Dorsey, an instructor in the engineering department, University of Cincinnati, Cincinnati, Ohio, has resigned to take charge of the mechanical department of the Oliver-Schlemmer Company, Cincinnati. A most annoying error was made in referring to Mr. Dorsey last week, his name having then been printed as Foster.

E. J. Codd, formerly president of the E. J. Codd Company, Baltimore, Md., is the head of a new concern, the Codd Tank & Specialty Company, 406 West Camden street.

Edward Blake, Jr., manager of sales for the Wells Brothers Company, Greenfield, Mass., for the past four years, and a director of the corporation, severed his connection with the company February 1. He has obtained the controlling interest in the Canadian Tap & Die Company, Ltd., Galt, Ontario, Canada, of which he has been treasurer since its organization in 1905. He leaves within a few weeks to take the active management of the company's affairs and will devote his entire time to promoting its business. Mr. Blake came from the West nine years ago to enter the employ of the Wells Brothers Company as a stock clerk and acquired a thorough knowledge of the entire line of Little Giant screw thread cutting tools and machinery, which was of great value in his later work. He was promoted to the order department, and from there went through the various departments of the offices to the desk of sales manager and manager of the offices. His work in this capacity was eminently successful and in 1909 he was elected a director.

E. T. Hendee, assistant to the president of Joseph T. Ryerson & Son, Chicago, sailed for Europe February 1, on the Mauretania. He will give special attention to the extension of the foreign business of his company, which has been growing rapidly in recent years.

E. W. Puckett, for the past 10 years president and manager of the Fort Wayne Oil & Supply Company, Fort Wayne, Ind., has accepted the position of vice-president and sales manager of the Republic Belting Company, Cleveland, Ohio, manufacturer of leather belting.

Ernest H. Rowe has been elected secretary of the Coke Producers' Association of the Connellsville Region, First National Bank Building, Uniontown, Pa., succeeding George B. Irwin, who resigned on account of ill health. The office of the association has been combined with the office of the Uniontown Chamber of Commerce, of which Mr. Rowe is also secretary. Although the two organizations as such have not been merged, a common headquarters and secretary are convenient because of the substantial identity of the interests of the two bodies.

V. A. Longaker, Detroit, Mich., who has for the past six years successfully managed the affairs of the American Motor Car Company, has become general manager of the American Motors Company, the new company recently organized to take over and enlarge the properties of the old company.

Jay I. Andrews, general manager of sales of the American Sheet & Tin Plate Company, Pittsburgh, is now on the Pacific Coast on business. He expects to return about February 15.

W. W. Broughton, St. Paul, Minn., has been elected vice-president of the Pittsburgh Coal Company, succeeding C. E. Wales, resigned. Mr. Broughton recently resigned the position of general traffic manager of the Great Northern Railroad.

E. W. Mudge of E. W. Mudge & Co., iron and steel factors, Frick Building, Pittsburgh, and district representatives for the La Belle Iron Works, Steubenville, Ohio, and Lackawanna Steel Company, Buffalo, N. Y., has sailed for Europe.

W. P. Murray of Pickands, Mather & Co., Cleveland, has gone to Cuba to spend several weeks.

Wilmer Wickersham, for some years sales agent of the Pope Tin Plate Company, Pittsburgh, mills at Steubenville, Ohio, has resigned, effective February 1. He has had a long and successful experience in the tin plate trade

from the selling standpoint, and while he has not definitely made plans for the future he expects to continue in this line of business.

Jay Pickands of Pickands, Mather & Co., Cleveland, is spending several weeks in Bermuda.

Price McKinney of Corrigan, McKinney & Co., Cleveland, has gone to Mexico, where he will remain several weeks.

President James A. Farrell of the United States Steel Corporation will deliver an address before the Pan-American Commercial Conference, held under the auspices of the Pan-American Union, at Washington, Monday, February 13. Addresses will also be made by President Taft, Secretary Knox, Senator Root, Champ Clark and Latin-American diplomatic representatives.

Exile Burkitt has resigned as general manager of the Southern Engine & Boiler Works, Jackson, Tenn., to become manager of the Southern Motor Works at Nashville, Tenn.

Obituary

GEORGE W. FIFIELD, Lowell, Mass., prominent as a machine tool builder for many years, died January 30.

CALVIN B. ORCUTT, president of the Newport News Shipbuilding & Dry Dock Company and of the Baltimore & Ohio Coal Company, died January 30 at Johns Hopkins Hospital, Baltimore, where he had gone for an operation. Mr. Orcutt had lived in Elizabeth, N. J., all his life. He was president for many years of the local Y. M. C. A. and an elder in the Second Presbyterian Church. He was an expert in shipbuilding.

JEREMIAH J. KEENAN, one of the oldest and best known boiler makers in northern Ohio, owner of the Lake Erie Boiler Works, Cleveland, which he established 25 years ago, died at his home in Cleveland, January 27, aged 72 years.

JAMES MILLS NASH, superintendent of the wire department of the plant of the Pittsburgh Steel Company at Monessen, Pa., and a brother of George Nash, general superintendent, died January 30, aged 47 years. He was born in Pembrokeshire, Wales, and in 1887 came to this country, settling in St. Louis, Mo., where he worked in the wire mills. Three years later he went to Rankin, where he was placed in charge of the wire department of the American Steel & Wire Company. During President McKinley's administration he served as postmaster of Rankin, and was a Councilman there for two years. He leaves a widow.

BENJAMIN K. LIVERIGHT, of the firm of Liveright Brothers, file manufacturers, Philadelphia, Pa., died suddenly from paralysis of the heart at his home in that city January 28, aged 32 years.

The plants of the Dover Forge & Iron Company and the Reeves Mfg. Company, Canal Dover, Ohio, will be merged, according to reports from that city, and three new tin mills will be added to the plant of the first named company.

The first West Siberian Exposition of the product of agriculture, forestry and industry is to be held at Omsk, Siberia, this year, opening June 28 and closing August 14. It will be conducted under the auspices of the Moscow Agricultural Society. The main purpose of this exposition is to acquaint visitors with the vast natural richness of the territory of West Siberia; also to provide opportunities for the display of improved agricultural and other implements, machinery, &c. Further information can be secured from the Russian-American Messenger, 102-104 West Thirty-eighth street, New York.

The McKeesport Tin Plate Company, McKeesport, Pa., has completed two new tin mills and now has 22 hot mills in one plant, making it the largest single independent tin plate plant in the country. The company expects to have the entire number of mills in operation shortly.

The Reciprocity Agreement with Canada

The provisions of the proposed reciprocity agreement with Canada have been made public by the transmission of the document by President Taft to Congress, with an accompanying message urging its adoption. The agreement covers a long list of food products which are either made free or subjected to considerably decreased rates of duty. It also includes a number of manufactured articles. We have taken from the schedules, as shown by the accompanying tables, the articles affected by the agreement which are of special interest to our readers:

Mineral or Metal Products to Be Free of Duty.

	Present United States duty.	Present Canadian duty.
Gypsum, crude.....	30c. ton.	30c. ton.
Mica, unmanufactured.....	5c. lb. — 20	17½ %
Feldspar, crude.....	Free	Free
Feldspar, ground.....	35 %	35 %
Asbestos, not further manufactured than ground.....	Free	.....
Fluorspar, crude, not ground.....	\$3 ton	Free
Glycerine, crude, not purified.....	1c. lb.	17½ %
Talc, ground or bolted, not for toilet.....	35 %	Free
Sulphurate of soda or salt cake.....	\$1 ton	\$1 ton
Soda ash.....	¼c. lb.	¼c. lb.
Carbon electrodes.....	30 %	30 %
Brass in bars and rods, in coil, &c.....	45 %	10 % or free
Cream separators and parts of.....	45 %	Free
Tin plates, &c.....	1.2c. lb. or va- rious	5 %
Crucible cast steel wire.....	35 %	35 %
Galvanized iron or steel wire.....	1.2c. lb. or not less than	.....
Typecasting and typesetting ma- chines.....	35 %	Free
Barbed fencing wire.....	30 %	20 %
Coke.....	¾c. lb.	Free
.....	20 %	20 %
Roller round wire rods, iron or steel, valued at 4c. or less per pound.....	3-10c. per lb.	3-10c. per lb.
Valued at over 4c. per pound.....	6-10c. per lb.	6-10c. per lb.

Mineral or Metal Products at Reduced Duties.

Articles, the growth, product or manufacture of the United States, to be admitted in Canada at the undermentioned rates of duty when imported from the United States, and reciprocally the same articles the growth, product or manufacture of Canada, to be admitted into the United States at identical rates of duty when imported from Canada:

	United States rates.	Can- adian rates.	Recip- rocal rates.
Clocks, watches, time recorders, clock and watch keys, clock cases and clock movements.....	40 %	Average 30 %	27½ %
Plateglass, not beveled, in sheets.....	22½c. sq. ft.	27½ %	17½ %
Autos and motor vehicles, except for railroads or tramways.....	45 %	35 %	30 %
Automobiles and motor vehicle parts of (excluding tires).....	Do.	Do.	Do.
Digesters for pulp mills.....	Do.	30 %	27½ %
Portable engines and traction engines.....	30 %	20 %	20 %
Parts of, for repair.....	45 %	17½ %	15 %
Horse powers for farm use.....	30 %	30 %	20 %
Hay loaders.....	45 %	25 %	20 %
Potato diggers.....	45 %	25 %	20 %
Fodder or feed cutters.....	45 %	25 %	20 %
Grain crushers.....	45 %	25 %	20 %
Fanning mills.....	45 %	25 %	20 %
Hay tenders.....	45 %	25 %	20 %
Farm or field rollers (and road rollers).....	45 %	25 %	20 %
Manure spreaders.....	45 %	20 %	20 %
Windmills.....	45 %	20 %	20 %
Parts for repair.....	45 %	20 %	20 %
Grindstones, not mounted, 30 in. or more in diameter.....	\$1.75 ton	15 %	5c. cwt.
Flagstone, granite, rough sandstone and all building stone not ham- mered, sawn or chiseled.....	.....	.....	.....
Roofing slates.....	10c. cu. ft.	10c. cu. ft.	12½ %
Vitrified paving blocks.....	20 %	{ 75c. 55c. 100sq. ft. 100sq. ft.	.....
Paving block or stone.....	35 %	22½ %	17½ %
Oxide of iron.....	10c. cu. ft.	20 %	20 %
Asbestos, woven fabrics of.....	30 %	22½ %	22½ %
Asbestos, other manufactures of.....	40 %	25 %	25 %
Pocket knives and penknives worth not over 40c. dozen.....	40 %	30 %	27½ %
Worth over 40c. but not over 50c. doz.	{ 1c. ea. + 40 %	1c. ea. + 40 %	.....
Worth over 50c. but not over \$1.25 dozen.....	{ 5c. ea. + 40 %	5c. ea. + 40 %	.....

A small list of articles is given special rates by each

country. Canada reduces the rate on coal to 45 cents per ton and cement to 11 cents per 100 lb. The United States reduces iron ore to 10 cents per ton and lowers the rate on aluminum products.

It is understood that, because of the time and labor expended in maturing the agreement and the benefit expected to result to the people on both sides of the border, it would remain in operation for a considerable period, but neither the United States nor Canada is to be prevented from making any changes in its tariff policy that might be desirable in the future. The utmost care is to be taken by both governments to see that only such customs regulations are adopted as are reasonably necessary to prevent fraud, and that none should be made unreasonably to hamper the more liberal exchange of commodities. Any further legislation necessary to accomplish this is to be sought by both sides.

It is stipulated that the legislation on either side may contain a proviso that the agreement shall not become effective as to rates until actual action on the subject in that direction is assured.

The American Society for Testing Materials

Announcement is made concerning the letter ballot on the manner of the organization of technical committees of the American Society for Testing Materials. The proposal that the chairman of such committees should be selected from representatives of consuming interests and unattached experts was carried by a vote of 189 to 67. The minority favored no restriction on this matter, so that producers as well as consumers and unattached experts might be eligible to committee chairmanships.

There has been some sentiment in favor of holding the annual meeting of the society at a farther western point, but it was decided not to change this year, and the annual meeting will therefore be held at Atlantic City in the last week of June, 1911. As far as possible papers and committee reports will be printed in advance of the meeting. One of the features of the programme already scheduled is a symposium on hardness tests.

Preparations will soon be started for the Sixth Congress of the International Association for Testing Materials which will be held in New York in 1912. A nucleus for the Committee on Organization has been constituted in the Executive Committee of the American Society and the officers of its standing committees. They will hold their first meeting in New York in February. The American membership in the International Association is now 450, out of a total membership in the American Society of 1325. It is expected that the American representation will be very considerably increased before next year.

The Quebec Bridge

Disagreement between the members of the Quebec Bridge Board having arisen over the design of the bridge, George P. Graham, Canadian Minister of Railways, has appointed H. W. Hodge of New York and M. J. Butler, general manager of the Dominion Steel Company, to adjust the differences. The Quebec Bridge Board consists of H. E. Vautelet of Montreal, chairman; Ralph Modjeski of Chicago, and Charles MacDonald, formerly of New York, but a Canadian by birth. Tenders were submitted by several companies, including the British Empire Bridge Company of England, which bid upon the Government's design for the bridge. Mr. Vautelet is understood to approve this bid and to recommend its acceptance. The St. Lawrence Bridge Company, a merger of several big Canadian companies, has exercised its privilege of submitting a design of its own. It is understood that Mr. Modjeski and Mr. MacDonald favor this bid. Under the order in council governing the bridge policy, experts are to be retained to pass on such differences.

The total cost of the wrecked bridge was disclosed in Parliament, January 30, by Minister Graham, in response to questions. The cost of the wreck to date is \$7,154,987.49, but the Minister estimates that the value of unused steel on hand is \$300,000.

The Expansion of Fayette R. Plumb, Inc.

A New Plant Completed at St. Louis

The business of Fayette R. Plumb, Inc., manufacturer of small tools, at Philadelphia, Pa., is to be greatly enlarged by the new plant just completed at St. Louis, Mo. The causes which led up to the construction of much larger works in the West than the factory at Philadelphia are well told by the company as follows:

"Every dealer who specializes in tools has seen the growth of the demand for 'something better.' Recogni-

of many thousands of dollars. This has been done at our Philadelphia plant.

"The result has been apparent in our line. The improvement has brought the demand we expected. We are giving our customers a line of tools on which they can talk and prove quality. Their business has increased so much that, in spite of our not soliciting new accounts and the general refusal of new business, our business has ex-

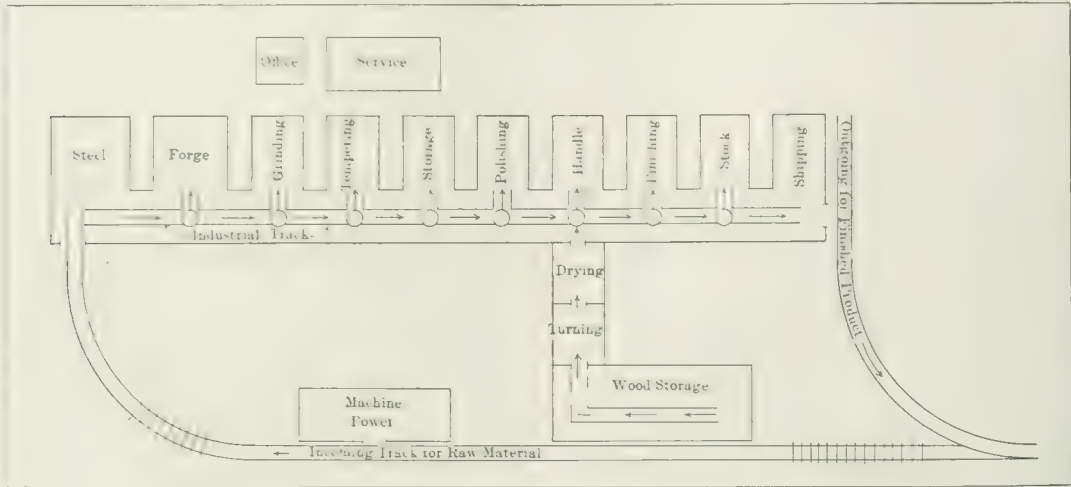


Fig. 1.—Ground Plan of the St. Louis Works of Fayette R. Plumb, Inc.

nizing this insistent demand, we adopted some years ago the motto, 'They're worth more,' and bent all our energies toward making the motto true.

"The first step was a revolution in our Philadelphia plant. We realized that to get tools uniformly good more scientific methods must be employed. The old rules of thumb and haphazard methods must be done away with. In the old way we could make good tools, but we weren't sure. Too much was dependent on the skill of the individual workmen. When the tools were not good, many

panded beyond our power to take care of it at our Philadelphia plant. On account of this fact, the greatest fault our customers have found has been our failure to ship orders with reasonable promptness. We realized the importance of prompt shipments, and consequently decided to build an additional plant.

Why St. Louis Was Selected for the Location of a New Plant

"The first thought, of course, would be to build an extension to our Philadelphia plant. We realized, however, our opportunity. Prompt shipment was only half the battle. Quick delivery was necessary. The great hardware jobbing centers of the United States are in the Central West. From our Philadelphia plant we can ship to advantage for export trade to New England and to all points that can be reached from either the Atlantic or the Pacific coasts. By building our new plant in the Central West we have the advantage of quick deliveries and low freight rates in this important territory. Thus from St. Louis we can make quick deliveries to the heart of the country, while at Philadelphia we sit at the doorway into the Southeast and New England and command the water ports for our export trade or the Pacific Coast.

"Next in consideration to advantages in delivery is ease or saving in the purchase of raw materials. The raw material which is the most difficult for us to secure is high-grade hickory for our handles, and here St. Louis has a great advantage over any more northern point. Hickory has to be bought under widely differing conditions in numerous small lots. The man on the ground is able to save thousands of dollars every year on a volume of purchases

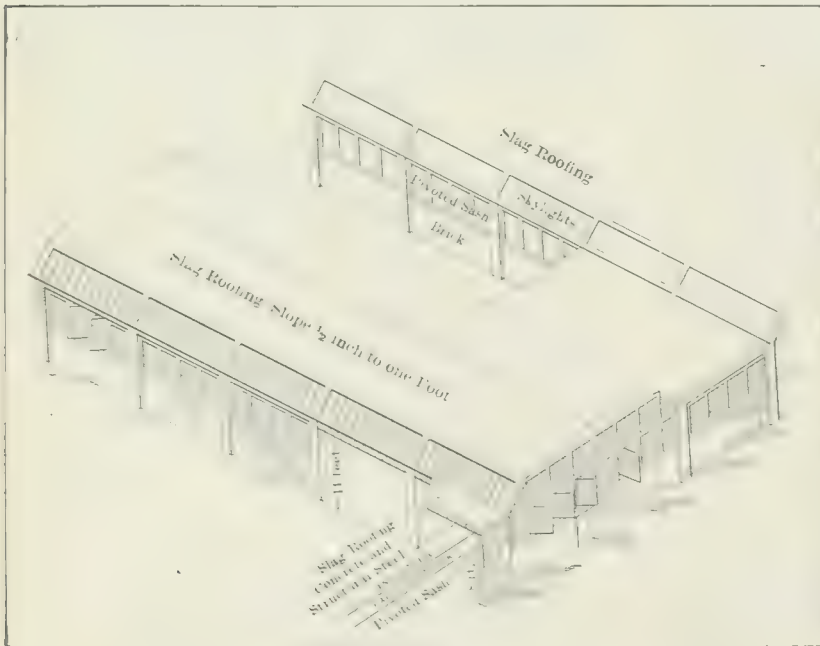


Fig. 2. Design of Buildings for the Separate Departments.

were bound to get through, and there was the constant temptation to let them go rather than swallow the loss. The development of new methods and the adoption of new machinery meant the work of years and the spending

were bound to get through, and there was the constant temptation to let them go rather than swallow the loss. The development of new methods and the adoption of new machinery meant the work of years and the spending

such as ours and get a higher grade of material. Steel, of course, is our chief raw material, but the freight rate is the only advantage location can give in the purchase of that. We found also, as regards other supplies, such as coal and fuel oil, St. Louis was advantageously located. Our investigations showed us, therefore, that for our industry St. Louis was well located to secure raw material.

"More important, however, than any question of raw material is that of the labor condition. At the St. Louis suburb of Wellston we found the ideal combination of a small community with the facilities of a large city. The five car lines converging within a short distance of our plant enable us to draw either from the adjacent rural communities or the city. The plant itself is in an open space free to light and cooling breezes and surrounded by moderate priced ground where our employees can build and own their own homes. We want men of good character, health and ability, whom we can train in our own methods. We therefore get a permanent force who will settle around us and take a personal interest in us as we

For the Comfort of the Employees

All main departments are not only heated in winter with fresh air, but in summer are supplied with cool air from a central 210-in. steel plate exhauster. The fresh air in winter is forced over four row miter type heaters, and through underground ducts to each department where it distributes itself from large radiators 8 ft. above the floor level. The pressure of the air is such that when windows are opened the air will be rushing out doors rather than in doors. As the temperature of the air can be controlled to whatever degree of heat is desired, it keeps a constant temperature in all departments. Unpleasant drafts are also kept from the workmen, on account of the windows being above their heads and the tendency of fresh air to go out through them, carrying with it smoke or impure air. Each department is equipped with necessary toilet facilities and a drinking fountain.

The service building is the center of population. It is so placed as to be the shortest distance for the greatest number of employees from their respective departments.



Fig. 3.—View in the Interior of the Long Connecting Building, with Stations for Inspectors at the End of Each Department Building.

in them. This it is almost impossible to secure in the congested centers of a city with its floating population."

Description of the St. Louis Works.

The accompanying illustrations show some features of the new plant. In Fig. 1 the layout of the buildings is presented. Instead of erecting a very large single building, housing the entire force of operatives, the scheme was adopted of dividing the work into a number of departments, each of which is placed in a building by itself. The design of the department buildings is shown in Fig. 2. An open space of 30 ft. is provided between each department building and the one nearest to it, for the purpose of securing an abundance of light and air. A building running the entire length of the plant connects all department buildings at one end, and enables close inspection to be made of the entire output. A view down the interior of this connecting building is given in Fig. 4.

The windows are placed 8 ft. above the floor levels and run to the roofs in order to obtain full advantage of the natural light. They are placed in tiers and are pivoted vertically so that they can be opened in both summer and winter to allow smoke and air to blow out without subjecting workmen to drafts. Above the windows skylights are placed. The shape of the buildings also adds materially to the lighting. The interior of all buildings except the office is lined with white tile. The ceilings are white washed and the floors are of granitoid concrete. In addition to this, all piping, shafting, &c., are below the floor level so that there is nothing to throw shadows within the rooms. The result is practically perfect natural light.

It is for the exclusive use of employees, and is provided with steel lockers, benches, and all necessary toilet facilities, so that workmen can change their clothes and prepare for work before going into their various departments. This building prevents space being wasted in the manufacturing departments for the use of lockers and washbasins. It saves the company considerable time, as every employee changes his clothes in this building, and from there goes to the department in which he is employed. He rings "in" on a time clock after entering the department ready for work. At noon each workman rings "Out," and returns to the service building for dinner, where arrangements have been made to serve hot luncheon to all employees at a moderate cost. The departments are closed during the dinner hour, and reopened only a few minutes before starting for the afternoon, when the programme of the morning is repeated. This gives the men complete recreation from their work in the middle of the day.

Efficiency in Management

Next in importance to attracting the proper class of employees is the adoption of methods of management by which the most efficient work can be secured from them. The very design of the buildings in this plant goes far to solve this problem. Every employee is under the eye of either the foreman in his department or of the chief inspector in the long inspecting department. There is an inspector for each operation, who is obliged to examine every tool immediately after it leaves the department for which he is responsible. Any tool which is not perfect is at once rejected and returned.

From the polishing room onward a modification of the Taylor system of shop management is used. All tools, after being polished, are placed on movable tables, tagged with cards upon which is clearly printed all information concerning the finish, packing, labeling, &c., which they are to receive before shipment. This insures every tool against errors occurring in following departments.

Improved Manufacturing Methods

After everything possible has been done to secure the best class of employees and to make it a natural thing for them to put forth their best efforts, it is still necessary to furnish them with machinery worthy of their skill. The company states that the manufacturing methods have been developed to meet these requirements. In the forging operation, for example, the foreman does not rely upon the taste or skill of the individual employee, but holds him to standards which the machinery makes it natural for him to follow. The design of each particular tool is laid out by the engineering department in consultation with not only the sales department, but wherever possible, after study of the "points" looked for by the individual mechanics. From this design a model is prepared, and from this model sets of expensive dies are made; these are what the workman uses in his forging machine, and by the method that he follows every detail must absolutely conform to these dies and consequently be like the original model. These practices differ widely from the method formerly used where the workman simply followed certain dimensions and the lines depended more or less upon his individual skill and taste.

The same principle of substituting the accuracy of standards for individual skill has been followed in the tempering operation, conducted in the department shown in Fig. 4. The effect of both the hardening and drawing operation in tempering is secured by quenching the steel suddenly at known temperatures. In the old method these temperatures were left to be judged by the eye of the workman who frequently attained a surprising skill. The scientific method, however, and the one pursued by this company, is with the use of pyrometers and thermometers, by which the temperatures can be determined exactly.

Wood billets from which handles are made are stored in a special building designed for them. This building is so arranged that the billets are constantly free to natural outdoor air drying without being exposed to the weather, as shown in Fig. 5. After being turned into handles, they are stored in another room which dries them further—not by hot air, but by warm changing air. Through this method is obtained the result of air drying, which does not injure the original strength of the wood, instead of forcing the drying kiln at a high temperature.

How Economy in Manufacturing Is Secured

Efficiency in a plant, however, includes not only the ability to turn out the product just as it is wanted, but has a second very important factor—namely, economy in manufacturing. It has already been shown how the arrangement of the plant makes supervision of labor easy and the saving in time effected by having all the employees ring up in the departments after they are ready for work. A further saving is effected by the arrangement of the buildings through which the cost of handling the product is reduced to a minimum.

To illustrate this, observe that the plant is composed of 16 buildings. Thirteen of them are devoted directly to manufacturing purposes. The other three are an office and chemical laboratory building, a service building, and a power house and machine shop. The buildings devoted directly to manufacturing purposes represent the various departments through which the material passes during the process of manufacture. The raw material is brought in by rail and unloaded by cranes in the steel storage building. Thence it goes successively to the forging department, the grinding room, the tempering room and to the intermediate storage. The tools are then polished and go to the handle department. Joined to the handle department is a wing composed of three buildings, each separated by a fire wall, where wood is stored and made up into handles. At this point in the manufacturing process the steel product meets the wood product and the two are assembled. A fire wall separates the polishing department from the handle department and the finishing department from the stock department.

After the steel tools are fitted with handles they go to the finishing department, where they are labeled, wrapped and boxed, then to the storeroom, and from it to the shipping department, where they are loaded on cars. Each one of these departments is the building adjoining the preceding operation and connected to it by the long inspection department. The product, therefore, passes in a steady stream without winding or check straight in its way from the raw material to the shipping car.

The power used for all machinery in the plant is electric. Wasted power is prevented by the use of individual motors for the machinery in the forging department and the machine shop, where it is often desirable to run only one heavy machine at a time without using power for the whole department. In the other departments, such as grinding, polishing, &c., the machinery is run by groups, so that but one line of machinery can be run at a time if desired. Where the machinery is run by groups all shafting is supported by roller bearings. This reduces shafting friction to a minimum and affords a considerable saving of power.



Fig. 4.—Heat Treatment or Tempering Department.



Fig. 5. Wood Storage Building, Where Hickory Is Seasoned Before Being Made Into Handles.

Other Special Features

All shafting is laid in concrete pits underground. This not only permits better natural light on account of the absence of the heavy shadows resulting from overhead shafting, but enables the shafting to be easy of access in case of needed repairs. Being covered over with all pulleys and belting practically out of reach, it also considerably reduces any danger of accidents. The only visible equipment in all departments consists of the actual machines themselves, as the piping and wiring are also laid beneath the floor. Besides the fact that such belting as is used is protected from dirt and grit, the quantity needed is reduced to a minimum, there being less than \$400 worth of belting used in the entire plant.

The prevention of fire has been carefully borne in mind. The buildings vary somewhat in design, each being particularly adapted to that branch of the industry for which it is used. The walls of all buildings are of brick. The roofs are of steel with roof trusses covered with either concrete or slow burning material. Departments in which wood is used are separated by fire walls and are protected by a sprinkler system, so as to reduce fire damage to a minimum. The design of all the buildings is such that one of the leading manufacturers' mutual insurance companies quoted a net rate of only 5 cents per \$100.

What the Plant Will Make

While the St. Louis factory will make a line of high-grade hammers, hatchets, &c., such as are made in the Philadelphia plant, a line of chopping axes has been added. In doing this, the company states, that it fully realizes the conditions governing the axe business and that the capacity of the present plants is well able to take care of the volume required. On this point it says: "We believe, however, there is a demand for an axe that is 'worth more.' Our plant will enter the field equipped only with the latest and most improved machinery and designed in every part to use effectively the improved scientific, accurately correct methods learned from our experiences in remodeling our Philadelphia plant. We do not intend simply to add to the present volume of axes made, but to make something different. Our aim shall be to supply the demand for 'something better.'"

The Chandler & Farquhar Company's Expansion.—

The Chandler & Farquhar Company, machine tools and machinists' supplies, 34-38 Federal street, Boston, Mass., states that the increase in the volume of its business has necessitated larger stock room. A commodious and well arranged machine tool store has therefore been opened at 419-425 Atlantic avenue, where a display is made of new feature machine tools in actual operation. The supply department at 34-38 Federal street has been renovated and rearranged with the addition of new sections of compact and up-to-date equipment. W. A. Dow and Martin D. Farnum, for many years identified with

the sales department, have been admitted to membership in the corporation. The company has again booked for an extensive showing of machine tool equipment in operation at the National Motor Boat Show, Boston Automobile Show and Boston Chamber of Commerce Exposition. The supply department has also engaged a desirable corner space at the New England Hardware Dealers' Exposition.

Cammell Laird & Co. of New York

Cammell Laird & Co., Ltd., ranking among the three greatest steel workers and shipbuilders in Great Britain, have formed an American company to handle their products in this country. This new American corporation is known as Cammell Laird & Co. of New York, and its main office and warehouse are in the four-story building just completed at 34 Cliff street, New York City. It will occupy the entire building, and will carry a larger stock than ever of English tool and high speed steel. It will be one of the most modern and best equipped steel warehouses in the United States.

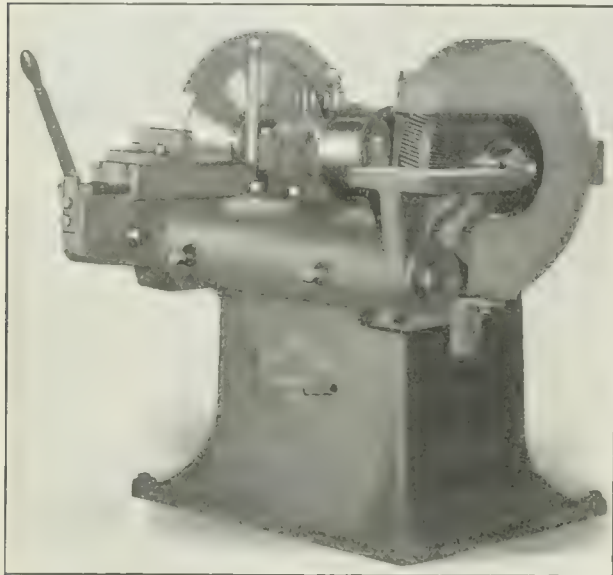
Cammell Laird & Co. were among the first experimenters in and developers of high speed tool steel, and special attention to this class of the business will be given by their American company. Among their other great specialties are nickel and chrome nickel steel for automobile parts and heavy forgings for ships, rolling mills, sugar mills, &c.

One of the managers of Cammell Laird & Co. of New York is Lionel Samuel, who has been the general agent of the English company and established its offices here some years ago. Under his energetic direction the business has so outgrown its old quarters at 25 Cliff street that the organization of a new company and the quadrupling of warehouse and office facilities became necessary. Mr. Samuel is not only well known in New York, but also in Mexico and in Central and South American countries, with many of whose governments he has had large business relations. He is the secretary, manager and a director in the new company. The president is Leonard Munn of Sheffield, England. The treasurer is Alexander Muir, who was the Canadian manager of the English company. The new corporation will represent not only Cammell Laird & Co., Ltd., of Sheffield, but all its allied interests, such as the Cyclops Steel & Iron Works, Yorkshire Steel & Iron Works, Grimesthorpe Ordnance, Steel Tyre & Spring Works and Shipbuilding Works at Birkenhead.

The third semiannual meeting of the American Institute of Chemical Engineers will be held in Chicago, June 21 to 24. Arrangements will be made to visit a number of the large plants in the vicinity. The committees on Chemical Engineering Education and Standardization of Boiler Tests will have important reports to present. The programme of papers will be announced later.

The Ajax Hot Saw and Burring Machine

A desire to bring about further economy in the production of machine made forgings has prompted the Ajax Mfg. Company, Cleveland, Ohio, to develop and place on the market an addition to its line of forge shop equipment. This new machine is a hot saw and burring machine that has been primarily designed for use in connection with an upsetting forging machine for all sizes of forgings that can be easily handled without using a crane. The material is heated, placed in a forging machine and formed, after which the headed forging is cut from the bar by the hot saw, thus leaving a clean square end. The burrs or fins that are formed



A New Hot Saw and Burring Machine Built by the Ajax Mfg. Company, Cleveland, Ohio.

after a set of dies have been used can be readily removed without reheating.

In general design the machine is similar to a double ended grinding or emery wheel stand. The shaft is journaled in two bearings with the belt pulley located between them, and outside of these bearings at either end are the saw and the burring head. The latter which is at the right end is fitted with a milled band and a milled disk face, which are made of a special grade of steel. The burring table is adjustable and can be tilted to any angle by loosening the clamping bolts that hold it to the stationary shaft secured in the front housings. The saw table at the opposite end is fitted on the under side with a rack meshing with a pinion which is operated by the hand lever shown at the left of the engraving. There is a rigid shield over both the saw and the burring head to protect the operator from flying pieces of steel.

The machine is built with a heavy base and large bearings to withstand the high speed at which it is operated. The main bearings have ring oilers. Three sizes of machine are built with saws and burring heads 14, 20 and 30 in. in diameter. The floor space occupied by all sizes is the same, 3 x 4 ft.

The Quaker City Foundry Supply Exhibit

Annually between Christmas and New Year's Day the J. W. Paxson Company, Philadelphia, Pa., gives an exhibition of foundry equipment and supplies, presenting the new articles that have been introduced during the year. Expert molders and craftsmen are employed who show each machine at work. These men are able to demonstrate in detail the "how and wherefore."

At the recent exhibition about 300 foundrymen (iron, steel and brass) availed themselves of this opportunity to keep in line with such new labor-saving machinery as the new Whitehead flask bar tucker, to tuck the sand under and on both sides of the bars at the same time.

This is done while in a standing position and saves the molder from bending over and injuring the ends of his fingers. Another simple device was demonstrated to stop the run outs in foundry flasks. It enables the operator to force a bunch of wet sand where it is wanted to stop the escaping metal. A complete Paxson-Warren sand blast outfit with the latest improved sand blast tumbling barrel and air compressor, also tramrail, hoists, and small capacity overhead cranes, &c., were in evidence. The new Buch hand and foot power jar ramming molding machine makes the cope and drag, turns them over and draws the pattern in a jiffy. This is for bench work and small castings. The new Barker rock-over molding machine for air, with vibrator attachment, also came out the past year. This machine turns over the flask, rams it and draws the pattern automatically. The Paxson-Colliau cupola, under construction, with the new side inlets to take the blast pipe more readily, and the new idea of ironing foundry ladles were also noticed.

The new ocean towing barge, Lottie, that carries 900 tons of molding sand, is an addition to the fleet of Paxson's line of 19 tugs, boats and steam barges. New machinery and improved methods were seen in the facing mills, pattern shop, blacksmith and machine shops; also in the wire and bristle brush and bellows factory. The Paxson Company believes in an early start, and now extends an invitation to visit its 1911 exhibition at headquarters.

Coke Oven Gas in Open Hearth Furnaces

A recent issue of *Stahl und Eisen* has a short article on the subject given above. The experience at Hubertushuette with the use of coke oven gas in open hearth furnaces has already been reported by Dr. Petersen; and the results of further experiments at the same plant were given at the International Congress at Düsseldorf by Chief Engineer Terpitz, as reported in *The Iron Age* of July 14, 1910, page 103.

At the Cockerill plant in Belgium work has been done on a small 4-ton furnace, in opposition to the large furnaces at Hubertushuette. After some change in the ports this small furnace has been run since last July entirely on coke oven gas. The air alone is heated in regenerators. The best run of the furnace has been 300 heats. The gas consumption, with a daily production of 16 tons, amounts to 15,360 cu. ft. per ton of steel. The gas is furnished by a battery of 108 Solvay by-product ovens, the output of which is 450 to 500 tons of coke per 24 hours. The average analysis of the producer and coke oven gases is as follows:

	Producer gas. Per cent.	Coke oven gas. Per cent.
CO ₂	7.5	1.5
CO	19.3	6.0
CH ₄	1.3	22.5
H	12.3	57.0
N	59.6	13.0

The additions made to the steel and the composition of the finished steel remained the same with coke oven gas as before. A careful comparison was made to determine whether it is more scientific to use coke oven gas to heat open hearth furnaces or to use it in gas engines. The advantage was with the former method by 20 per cent.

The highest value now obtainable in the gas engine under Belgian conditions is 29.3 cents per cubic meter, while in the case of the open hearth furnace the amount is 36.7 cents.

The Cockerill plant is also experimenting with coke oven gas in heating furnaces, and hopes to be able soon to do away with the use of coal. Blast furnace gas has not been found to have enough fuel value for open hearth furnace use; but this may be rectified by an admixture of either heavy hydrocarbons or coke oven gas.

G. B. W.

The Baird Machinery Company, Pittsburgh, Pa., dealer in machine tools and machinists' supplies, has opened a branch office in Masonic Temple Building, Erie, Pa., in charge of F. J. McCoy.

The Newark Gear Pattern Cutter

A Universal Machine Operating at Constant Speed for Cutting the Teeth of Wood Gears

Spiral and helical gears are now cast solid from patterns made in wood. These wooden patterns are exact models of the finished gears, and to produce them rapidly and economically the Newark Gear Cutting Machine Company, Newark, N. J., has brought out a new gear cutting machine. Fig. 1 is a view of the operating side of the cutter, while Fig. 2 shows the driving side. It will be noticed from these engravings that the general construction of the machine resembles that of a regular gear cutter operating upon metal blanks. There are, however, several points of difference between the two due to the nature of material to be cut in both cases, the principal ones being the feed and the indexing mechanisms.

helical gears. A very large range of pitches can be cut on this machine, and when fly cutters are used all pitches ranging from 1 to 7 in. circular can be cut, while it is also possible to cut heavier pitches easily. Where teeth of fine pitches have to be cut this can be done by employing regular rotary gear cutters. The types of cutters for heavy pitches are clearly illustrated in the engravings. In Fig. 1 a formed fly cutter is shown mounted upon the spindle for cutting spur gear patterns. An end mill type of fly cutter mounted on an end mill attachment is used for cutting helical gears or worms, as shown in Fig. 2. In this case the cutter is operating at a speed of 4200 rev. per min., while for spur gears the speed is 1000 rev. per min. less.

The wooden pattern blank is mounted upon the work arbor or directly upon the face plate, which is solid with the dividing worm wheel. This wheel is made in two sections, and the worm is generated after the wheel has been put in place to secure accuracy. It is possible to take the dividing worm out of mesh with the wheel, thus

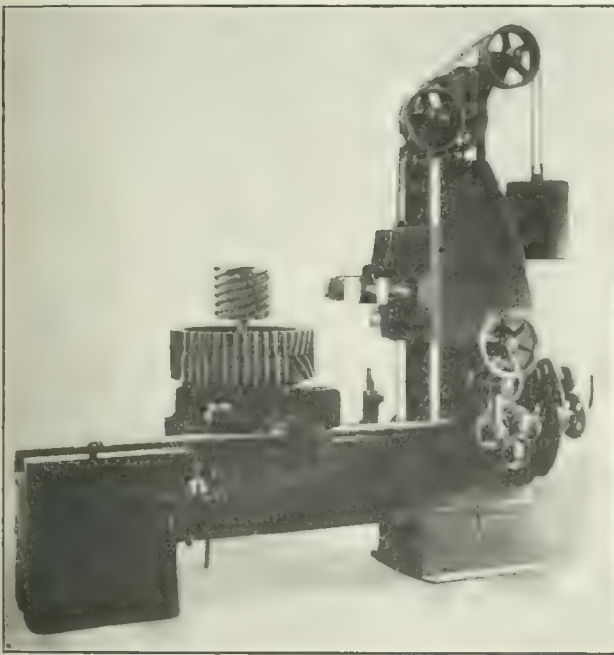


Fig. 1 - The Operating Side.

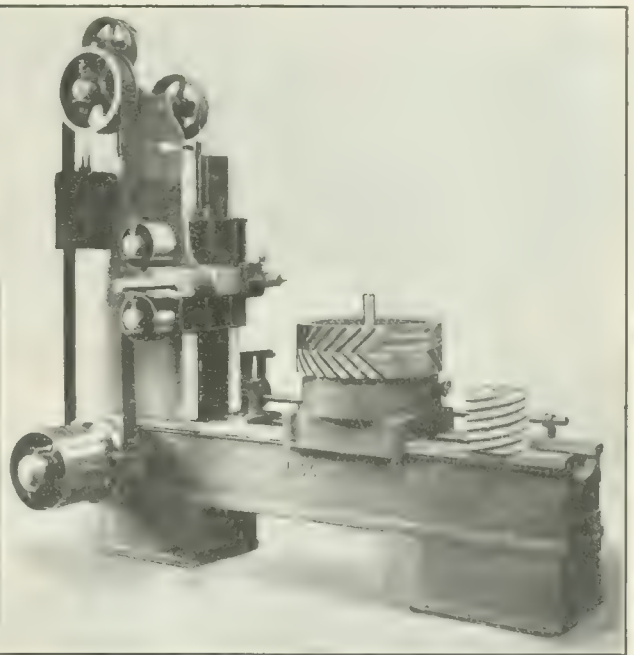


Fig. 2 - The Driving Side.

Two Views of a Cutter for Making Wooden Gear Patterns Built by the Newark Gear Cutting Machine Company, Newark, N. J.

A hand wheel operating a screw with ball thrust collars actuates the feed mechanism. Hand feed is used in preference to the automatic power feed of the standard gear cutter, so that the rate can be varied as desired. During full cut it is possible to feed very fast, but at other times, such as when the grain of the wood changes or the cutter strikes a knot or when they come through at the end of the cut, it is desirable to feed more slowly. The cutter carriage which has a counterbalance to equalize its weight is returned to start a new cut as each tooth is finished and the blank is indexed by a hand crank. The indexing is accomplished by change gears, which avoids the use of dials and the possibility of spoiling work through mistakes in their use, and the operator makes one or more even turns of the crank according to the index furnished. Like the automatic gear cutter of this company which was illustrated in *The Iron Age* December 29, 1910, all numbers of teeth up to 100 can be cut, and all except prime numbers from 100 to 450. The machine is so arranged that if any unusual number is required to be cut it can be done by employing an extra change gear, although this is seldom necessary, as a wide range of higher numbers can also be cut. The capacity of the machine for spur gear patterns is 8 ft. in diameter and 24 in. face width, while for helical or spiral gear patterns the diameter is 1 ft. less, while the face width remains the same. It is possible to cut a worm having any lead or any desired number of threads, as well as any desired lead for

allowing the blank to be rotated by hand, and the worm also has an attachment for use in resetting blanks or in taking side cuts. Protection from dirt and dust are afforded to both the worm and the worm wheel by a guard completely surrounding them. For taking the thrust of the cut when working on large gear patterns a rim support is provided. A screw with a dial graduated to read in thousandths of an inch furnishes the necessary adjustment for the work head on the bed. In addition to cutter patterns for gear blanks, blocks of wood for use in gear teeth molding machines can also be cut.

While this machine is designed for cutting wood the metal is distributed as though it were intended for use with metal blanks. The bed is deep and of the box type, a feature which eliminates the tendency to vibration generally found in machines of this character. It is also very rapid in operation, a 40-tooth spur gear pattern of 8-in. face width and a circular pitch of 3 in. being cut in 30 minutes actual cutting time.

Another noticeable feature of this gear cutter is the simple drive with an endless belt, that is clearly shown in Fig. 2. An arrangement of tight and loose pulleys running on a rigid sleeve and not on the shaft drives the machine itself. This relieves the shaft of all strain due to belt pull and at the same time the possibility of accidental starting. As the machine runs at a constant speed, motor drive can readily be applied without the use of a countershaft.

The Richardson Mechanical Lubricator

A New Device for Lubricating Engine Cylinders

Friction between the piston rings and the internal walls of the cylinder of an engine is responsible for the greater part of the power lost in a steam engine. As can be shown by the use of indicator cards, this loss amounts to anywhere from 3 to 20 per cent. While some of this loss occurs in the bearings the bulk of it is due to the cylinder friction. Although bearing lubrication is amply provided for in the majority of engines the question of cylinder lubrication is not generally so well taken care of. In fact, one of the most difficult problems that a power

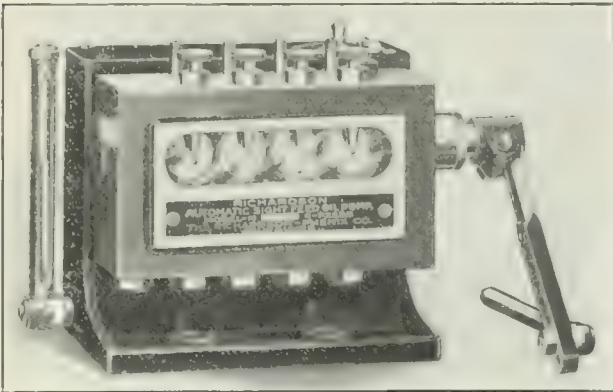


Fig. 1.—The Richardson Model M Lubricator Made by the Richardson-Phenix Company, Milwaukee, Wis.

plant engineer has to solve is the proper lubrication of steam cylinders.

In an effort to solve this problem the Richardson lubricator was designed, and the latest type of this device, which is manufactured by the Richardson-Phenix Company, Milwaukee, Wis., is shown in Fig. 1. Fig. 2 shows one of the lubricators applied to a Corliss engine, while Fig. 3 is a section of the lubricator showing the details of its construction, and Fig. 4 illustrates the application of one of these lubricators to a tandem Corliss engine. Although this lubricator has been on the market in its original form for some time, in its most improved form it has a number of new features, such as the circulating channel over the top of the device and a special excess feed valve that allows an extra supply of oil to be fed into the various lines without deranging the adjust-

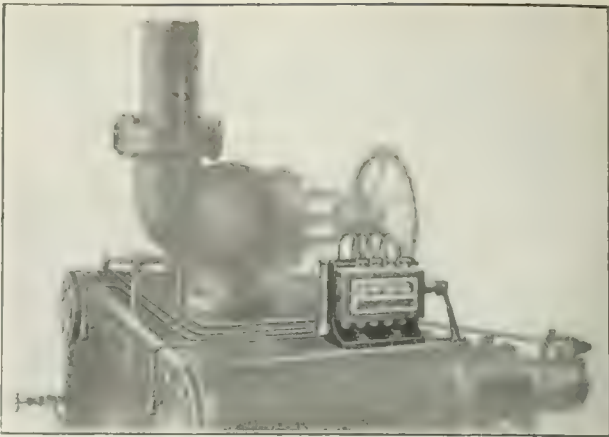


Fig. 2.—A Four-Feed Richardson Lubricator Applied to a Corliss Engine.

In the ordinary methods of cylinder lubrication the oil is fed by a hydrostatic lubricator or else by one of the force feed type, both of which mix the oil at stated intervals with the entering steam. These lubricators are said to be faulty in one respect, however, as they do not provide economical lubrication for every stroke of the engine. If, for example, four drops of oil are to be fed per minute to the steam entering the cylinder and the speed of the engine is 200 rev. per min., each large drop of oil will be broken up and atomized with the steam, but at the same time a large portion of it will pass out with the exhaust without having effected any lubrication. During the following 100 unlubricated strokes the entering steam will remove whatever portion of this large drop was deposited on the cylinder walls, and when the next drop is fed they are so dry that it is difficult for the oil to emulsify and cling to them.

In the Richardson lubricator some oil is fed at every stroke of the engine, and an oil cup plunger is used for each feed line. This plunger moves up and down in unison with the strokes of the engine and cuts off a small particle of oil and forces it into the cylinder at each revolution regardless of the rate at which the oil is being fed through the sight feed nozzle.

The design and operation of this lubricator will be un-

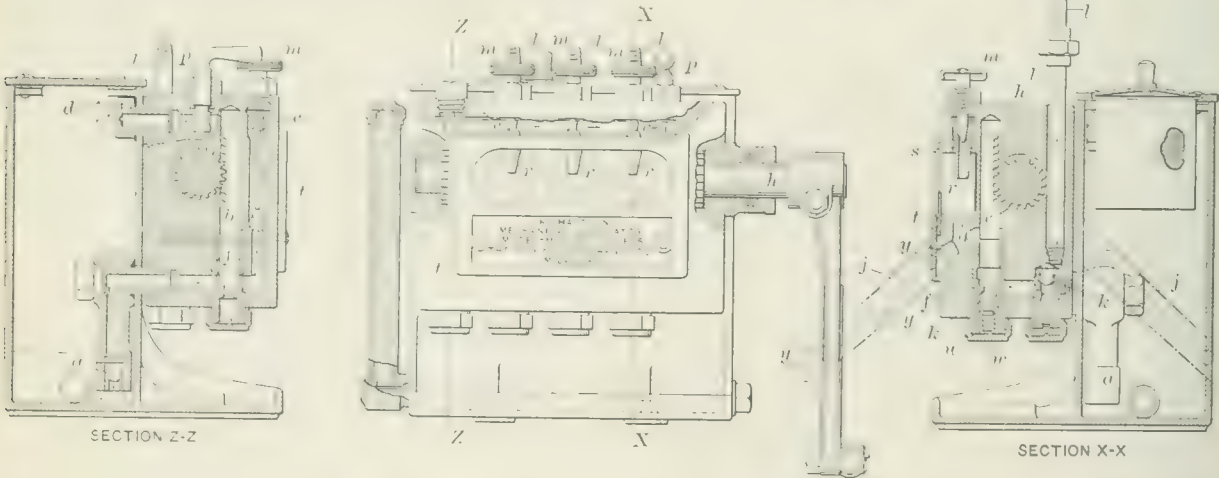


Fig. 3.—Constructional Details of a Three-Feed Lubricator.

ment of the individual drips. The use of this circulating channel makes it possible to place a quantity of flaked or powdered graphite in the oil reservoir, and the continuous circulation of the oil through the body of the lubricator keeps the graphite churned up so that it remains in suspension and is carried by the oil to the various parts to be lubricated.

derstood by referring to Fig. 3, in which the travel of the oil from the main reservoir to the outlet feeds is indicated by arrows. The lubricant is withdrawn from the reservoir through the foot valve *a* by the plunger *b* and delivered to the circulating channel *c*. The needle valves *m*, which regulate the flow of oil through the drip nozzles *r*, are connected to this channel. The surplus lubricant

which does not flow through the feed valves is returned to the reservoir through the overflow ball check valve *d*. There is a slight constant gravity head on each drip nozzle which causes the oil to flow drop by drop at any desired rate into the chamber *g*. A common gear shaft, *h*, which derives its motion from the driving lever actuates the individual feed line plungers *e*, which move up and down with every revolution of the engine. At each downward stroke a small particle of oil lying in the chamber *g* is cut off and forced out through the check valves *k* into the feed line *l*. These feed lines are always full of oil as far as the check valve *n*, which is located at the point of delivery. In this way every time the pump plungers come down they force a small particle

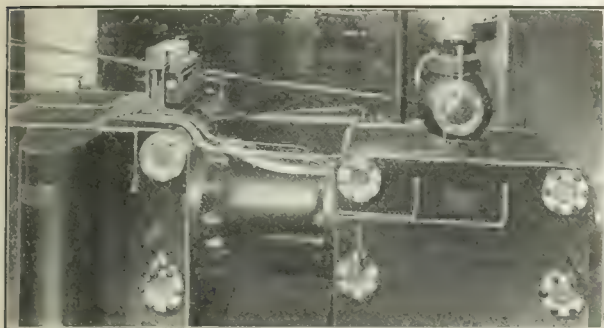


Fig. 4—A Tandem Corliss Engine Equipped with an Eight-Feed Lubricator.

of oil into the feed line, and a corresponding amount is liberated at the terminal check valve. Using these two check valves, which are of a special steel ball type held in place on a bronze seat by a coiled spring bearing against the plate *u*, under the hexagonal nut *w*, prevents the steam from backing up into the lubricator.

A special feature of the lubricator is the increased feed valve *p*, located in the oil circulating channel *c*. Normally this valve is open, but if it becomes necessary to increase the amount of lubricant fed temporarily it is closed. This shuts off the overflow return to the reservoir and causes all the oil delivered by the plungers to flow through the feed nozzles, thus temporarily forcing the flow of all the feeds. After the demand for increased lubrication has been met, the valve *p* is opened. In this way it is possible to meet a temporary demand for additional oil without changing the adjustment of the needle valves *m*. The driving lever *j* can be moved into any position on the shaft, and the travel required for it adjusted by placing the driving rod in any one of the eight wrist pin holes *y*, which permits any straight travel between 3 7-16 and 8½ in. to be secured. The feed nozzles *r* are protected by the glass *s*, kept in place by a spring retained frame of brass, which can be easily tipped forward for cleaning.

Several sizes of lubricator are made, and the device can be had with any number of feeds, and if so desired with a subdivided tank for handling two or three different kinds of oil. Two types of these multi-feed lubricators are shown in Figs. 2 and 4, a four-feed type in the first engraving and an eight-feed in the latter. In the first of these the extra feeds are used for injecting oil under valve seats or metallic piston rod packing. In one special type of lubricator having 22 feeds three kinds of oil are fed. This ability to handle several kinds of oil is an advantage where the lubricator is to be used to supply oil to the cylinders of steam engines, air compressors, refrigerating machines, &c.

An interesting test of the efficiency of the Richardson lubricator was recently made at the Lardner's Point pumping station, Philadelphia, Pa. At the time this test was made 12 engines were in operation. Six of these, the first to be installed, had the ordinary type of force feed lubricator, while the others added later were lubricated by the Richardson device. To determine the relative merits of both types of lubricators, one of the original units was tested for oil consumption for two months. During the first month its regular equipment was used and for the latter half of the test a Richardson lubricator was employed. The results of these two tests showed

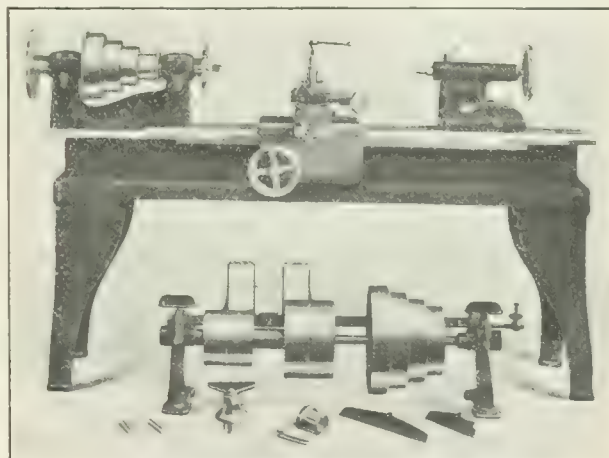
that the substitution of the Richardson lubricator reduced the oil consumption about one-third, and at the same time the efficiency of the engine was increased. Five tandem compound engines aggregating 3000 hp. and operating 24 hours a day were installed at the plant of the Alpha Portland Cement Company. With the old type of lubricator about 600 gal. of medium grade cylinder oil was used per month, but when the Richardson lubricator was substituted the amount of oil was reduced approximately 40 per cent.

The Robbins Patternmakers' Lathe

Recently the Robbins Machine Company, Worcester, Mass., has redesigned its 16-in. patternmakers' lathe. The changes made have resulted in the production of a tool embodying all practical points of convenience in its construction, and that is powerful and rigid throughout.

Crucible steel is used for the headstock spindle, which extends through to the outer end of the headstock. The spindle runs in dustproof, ring oiling phosphor bronze bearings having large reservoirs for lubricant, and a large face plate for turning work having a greater diameter than the swing over the ways is mounted on the outer end of the spindle. The headstock is also swiveled at the base and has graduated plates for turning tapers on face plate work. The tailstock is of the ordinary cutaway and setover design, and the crucible steel spindle has a long travel.

The carriage is rigidly constructed and gibbed to the bed with hand lateral feed for the entire length of the lathe. If desired, power lateral feed can be furnished at a slight additional cost. The compound tool rest has a graduated swivel which can be adjusted on the cross slide of the carriage by a screw having a coarse pitch. Adjusting screws with long travel, and the usual tool posts are furnished, and the compound rest can be quick-



A New 16 In. Patternmakers' Lathe Built by the Robbins Machine Company, Worcester, Mass.

ly detached and replaced with swivel holders supporting tool rests for hand turning.

The countershaft hanger boxes are self-oiling, and the two pairs of tight and loose pulleys of different diameters enable two speeds to be secured, this change being controlled by the maker's special belt shifter, which requires only one handle to operate both belts. The equipment furnished with the lathe includes tripod rests, three hand tool rests, one pair each of wood and pointed centers, two face plates, a screw plate and the necessary wrenches.

A bill introduced recently in the Michigan Legislature provides a specific tax of ½ cent per pound on copper and 15 cents per ton on iron ore produced in the State of Michigan, in addition to regular taxes already levied. The bill is backed by the State Grange, powerful in southern Michigan politics. The fight for the governorship last fall centered largely around this question, and in his canvass for votes Governor Osborne stated plainly that he was opposed to such a measure.

Power Requirements of Electric Furnaces

Results with the Frick Type in Reducing Iron Ore and in Refining Steel—Heroult Furnace Pig Iron

At the meeting of the Chicago Section of the American Electrochemical Society at Chicago, January 20, a paper was read by James Lyman, Chicago district engineer of the General Electric Company, on "The Electric Furnace for the Manufacture of Iron and Steel." It covered comprehensively the various types of electric furnaces which have become commercially successful and gave data on results of operations with each type. Much of this ground has been covered in articles heretofore published in *The Iron Age*, therefore the lantern slide views which accompanied the reading of the paper are omitted. Extracts are made below, however, from the portion of the paper dealing generally with the subject and that describing the Frick electric furnace, concerning which less has been published than of other types. Some data are also included of the performance of the Heroult furnace in the reduction of iron ore:

Advantages of the Electric Furnace

Highly skilled chemists, mechanical and electrical engineers have wonderfully improved and increased the output of our iron and steel mills in recent years. They have probably developed the present processes to very nearly their limit of perfection. They are, however, certain inherent characteristics of these processes that prevent obtaining the very highest qualities of iron and steel. For instance, these processes depend upon various fuels as the source of heat, and during the treatment for the elimination of harmful ingredients, certain foreign impurities, such as nitrogen and oxidation products, enter the bath injuring in a measure the desired qualities of the metal. Further, there is not always a perfect homogeneity and soundness of metal throughout the entire charge, and either the chemical analysis of different charges or the physical properties of these charges, or both, may differ perceptibly.

Many metals, including iron and steel, are refined by melting them in contact with a slag composed of ingredients which will absorb their impurities. For the most effective action the slag must be fluid only at the highest temperatures. The electric furnace is capable of creating the highest known temperatures, much higher than any temperatures of combustion, and therefore producing the greatest fluidity of flux and metal, and this without introducing air or fuel; but, on the contrary, maintaining a perfectly neutral atmosphere above the metal and slag. While the high fluidity of metal and slag conduce to the most rapid, uniform and chemically perfect action on the part of the absorbing flux, no oxidizing products, nitrogen or other impurities of combustion can enter the metal, and the whole operation can be continued as long as the operator desires introducing or removing any ingredients and in exact percentages.

Furthermore, irons and steels of specifications which have been obtained with difficulty or never have been obtained in any of the standard processes are readily obtained in the electric furnace. For instance, nickel steel, which Mr. Schwab is quoted as stating will be the steel for rails in the future, can be made directly without difficulty in the electric furnace. The superior control of the electric furnace over all furnaces depending in their action on heat of combustion especially commends its use in the refining of high grade irons and steels.

Heat Costs Compared

The extent to which the electric furnace will be generally introduced depends on the cost of operating the electric furnaces and the superiority of the product, as compared with that of the combustion furnaces. The cost of electric heat obviously depends upon the cost of power from water or other sources, as compared to the cost of fuel at the locality under discussion. Further,

electric energy may be supplied from water power or from blast furnace gas at a cost, when the efficiency of the electric furnace is considered, which compares very favorably with the cost of high grade fuels, as charcoal and producer gas.

Professor Richards pointed out in his excellent paper on "Electric Furnace Reduction of Iron Ore," presented at Niagara Falls in 1909, that the amount of fuel used in a blast furnace is determined by the amount which must be burned at the tuyeres to produce the necessary smelting temperature, and not by the amount necessary to perform the reduction of the metallic oxides. The amount necessary for performing the reduction taking place in the furnace is only one-third to one-half of the amount necessary to burn to provide smelting heat, and he is confident that any practical method of introducing electrical heat into the crucible of a blast furnace will result in large economies in furnace working. Only one-quarter of the heating power of the fuel is developed around the blast tuyeres, and yet if half of this could be replaced by electrically generated heat, an economy of 50 per cent. could in all probability be reached upon the fuel bill. It takes 1.2 tons of coke to make a ton of pig iron in the blast furnace and about $\frac{3}{4}$ ton is burnt by the blast producing the melting zone, about 25 per cent. of the calorific power of the coke. If one-half this smelting heat, or 12½ per cent. of the actual heat of combustion, could be supplied by electric energy, the coke required could be reduced one-half, or 0.6 ton, per ton of pig iron. The quality of the pig iron would also undoubtedly be greatly improved and it is probable the output would be increased.

The Frick Arc Furnace

Arc furnaces are so called because the heat is developed in an arc established between two large carbon or graphite electrodes, or between these electrodes through the slag and metal bath. The induction furnace is so called because the melted metal forms a single turn closed circuited secondary of a large transformer. The arc furnace is adapted to both the reduction of iron ore to pig iron, and also to the refining of pig iron and steel. The induction furnace is only adapted to the refining of metals, and cannot be used for the reduction of ore.

The Frick electric reduction arc furnace for smelting iron ore has shown a capacity approximately 25 tons of pig iron per 24 hours; the current taken is 2000 kw., or approximately 1 kw.-hour per pound of pig iron produced. Where the iron ore used is of not less than 57 per cent. F., the theoretical power required for the reduction of the iron in the presence of carbon and unslacked lime is from 1200 to 1350 kw.-hours per ton, exclusive of the heat absorbed by the slag. This heat is from 100 to 300 kw.-hours per ton of the pig iron, making a total of from 1300 to 1650 kw.-hours per ton, provided burnt limestone is used. The radiation losses occur partly through the walls, partly through the electrodes. In the case from which data have been obtained the radiation losses are said to be from 320 to 370 kw.-hours. The electrical efficiency of this furnace is therefore approximately 80 per cent. Smaller furnaces have larger radiation losses and lower efficiency.

The Frick Induction Furnace

The Frick induction type furnace for refining iron and steel has the following construction: A ring shaped crucible of uniform cross section holds the melted metal, forming the secondary winding of the transformer. A magnetic core built of laminated iron forms a closed magnetic circuit around the coils. Two primary coils of insulated copper ribbon are mounted, one above and one below the crucible, on the magnetic core. These coils may be wound for any desired voltage up to, say,

6000 volts. A furnace built by Mr. Frick for Fried. Krupp, A. G., in Essen, Germany, in January, 1910, has been in successful operation since, refining approximately 20 tons of steel per day from cold scrap in three charges of about 6½ tons each, with six and one-half hours' duration of charge. The power required is approximately 1 kw.-hour for 3 lb. of steel refined, or 665 kw.-hour per ton. To obtain a reasonably high power factor a special low frequency alternating current of from 5 to 15 cycles is used. An engine driven generator designed to furnish this low frequency single phase current is employed. The electrical power supplied is controlled by regulating the generator voltage. The electric efficiency of this furnace is said to be about 65 per cent.

The power consumed in melting the material (cold iron and slag) to, say, 1500 degrees C., in a 10-ton furnace, is approximately 600 kw.-hours per ton, or 0.3 kw.-hour per pound. The power consumed for refining the steel after melting is from 1800 to 2000 kw.-hours for a 10-ton charge, or approximately 0.1 kw.-hour per pound. Therefore, only where cheap power is available can the electric furnace be commercially used to melt cold material. The melting down can be effected more economically in the open hearth or other combustion furnace.

Thermal Efficiency

It is estimated that in a well designed 15-ton 2000-kw. induction furnace the total thermal efficiency from coal or gas would be approximately as follows:

	Per cent.
Gas engines, say.....	20
Electric generator, say.....	94
Electric furnace, say.....	80
Total efficiency.....	15

If steam turbine generators are used at, say, one-half the cost for fixed charges over the gas engine installation, and, say, 15 per cent. efficiency from the coal or blast furnace gas, the total thermal efficiency of the electric furnace would be about 11 per cent.

The efficiency of an open hearth furnace is said to be from 20 to 25 per cent. In this case the fixed charges and maintenance of the gas producers partly offset the turbines or gas engines. It is therefore apparent that the cost of refining melted pig iron or steel in the electric furnace, while considerably greater than by the open hearth, is not excessive.

The Heroult Furnace for Pig Iron

The most notable installation of the Heroult arc furnace for the reduction of iron ore to pig iron is that of the Noble Electric Steel Company, at Heroult, Cal. In 1907 the first large furnace was built, taking 1500 kw. of power, but not proving entirely successful, this furnace was replaced with a smaller experimental furnace of 100-kw. capacity. From the experience obtained with this furnace a second large furnace was built early in 1909, which has been in almost continuous service, making 25 tons of pig iron per day of a quality comparable with the best Swedish kind. Four more furnaces of the same size are now being built, which will make this the largest plant of the kind in the world.

A very pure magnetite ore of 70 per cent. F. and a high grade limestone are quarried near by. The company makes its own charcoal and purchases hydroelectric power from the Northern California Power Company. Three 750-kw. oil insulated, water cooled, 60-cycle transformers are wound for 2200 volt primary and a secondary range of 35 to 75 volts. The secondary current varies from 10,000 to 21,400 amperes. The range in voltage is controlled by a dial switch in the primary circuit of each transformer, giving steps of about three volts in the secondary. The generation of energy in the furnace is, therefore, controlled externally without movement of the electrodes, whose position is changed only to accommodate their wear in the crucible of the furnace. There are six electrodes, two for each transformer. While the primaries of the transformer are connected to the three-phase power line, the secondaries are not interconnected.

High Grade Steel Products

The demand for strictly high grade steel absolutely homogeneous and with fine grain is to-day coming from the railroads for steel rails and structural bridge steel.

from the Government for armament, from the automobile industry, from every manufacturer of tools and machinery, engines, steam turbines, electrical manufacturers, and, indeed, every manufacturer using iron or steel. The treatment of Bessemer and open hearth steel in the electric furnaces at an increased cost entirely within the limits of the purchaser will make this steel comparable in its fineness with crucible steel, and have the physical characteristics best adapted to the particular application desired. Since the railroads have investigated the causes of rail breakage it has been proved that many of them were due to the presence of foreign injurious bodies, such as slag and manganese sulphide. The possible presence of these impurities as well as the products of oxidation and nitrogen is inherent in the Bessemer and open hearth furnaces, but can be almost entirely eliminated by a treatment of an hour or two in the electric furnace.

Rails from electric furnace steel are now being tried out on curves, railroad crossings and points where the service is most severe by a number of the large railroad systems. These rails combine unusual tensile strength, toughness and hardness. Their life alone, aside from their increased reliability, will probably justify the increased cost.

To bring the enormous output of steel rails, structural, merchant and plate steel up to the high grade of crucible will mean a new era for the steel business, and rapid advances in all lines of manufacture employing iron and steel.

Electric Steel Castings and Forgings

The manufacture of modern and light weight steel castings has always been a difficult and unsatisfactory problem. There is a large wastage particularly in castings of odd shapes. This is principally due to impurities and sluggishness of the flow of metal in castings. With less than one-third the electric power necessary for purification, the liquid metal can be held indefinitely in an electric furnace without any loss in its composition or danger of burning, and a highly liquid metal can be cast uniformly free from impurities and gases. Such steel castings can in a large measure replace steel forges at present used at a much reduced price. While the large steel companies will, no doubt, introduce electric furnaces as a refining process for their principal output, the electric furnace can probably be used to advantage by manufacturers of all kinds of iron and steel products in making special high grade steels from their waste scrap iron and steel, including borings and turnings, as it accumulates in process of manufacture. These furnaces will either be entirely electric or the metal may be brought to melting point by gas or coke fuel and then treated by electric heat.

Iron Ore Receipts at Lake Michigan Ports.—The receipts of iron ore at Lake Michigan ports in 1911, as reported by the *Marine Review*, are as follows:

South Chicago, Ill.....	5,080,679
Gary, Ind.....	1,775,886
Indiana Harbor, Ind.....	287,172
Milwaukee, Wis.....	121,446
Elk Rapids, Mich.....	69,857
East Jordan, Mich.....	37,919
Eminence, Mich.....	37,785
Bayne City, Mich.....	59,555
Total.....	7,452,984

The developments on the south and southeast shores of Lake Michigan, as represented particularly at Gary and South Chicago, have brought up the total materially so that 1910 has made a new record.

A joint convention of the Southern Supply and Machinery Dealers' Association, the National Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association will be held at Louisville, Ky., April 3, 4 and 5. The convention headquarters will be at the Hotel Seelbach. As it is very unlikely, however, that the Seelbach will be able to accommodate all the members of the three associations, arrangements have been made with the Galt House and the Louisville Hotel to take care of any who can not secure rooms at headquarters.

Large Sizes of Lap Welded Pipe

A Recent Extension to the Line of the American Spiral Pipe Works

Until recently the largest size of lap welded which it was possible to obtain was 30 in. in diameter. At the present time the American Spiral Pipe Works, Chicago, Ill., is manufacturing lap welded pipe ranging in diameter from 12 to 72 in. from open hearth flange steel having a tensile strength of 55,000 to 65,000 lb. This pipe is used for high pressure hydraulic lines, condenser piping and compressed air work as well as other places where severe duty is required. Fig. 1 shows some sections of the 30-in. pipe, 32 ft. long, which have a perfectly smooth interior wall. Figs. 2 and 3 illustrate two lengths of pipe, one 24 in. and the other 20 in. internal diameter, after undergoing tests to rupture the welded joint. Fig. 4 is a view of an 11-ft. lap welded steel drum

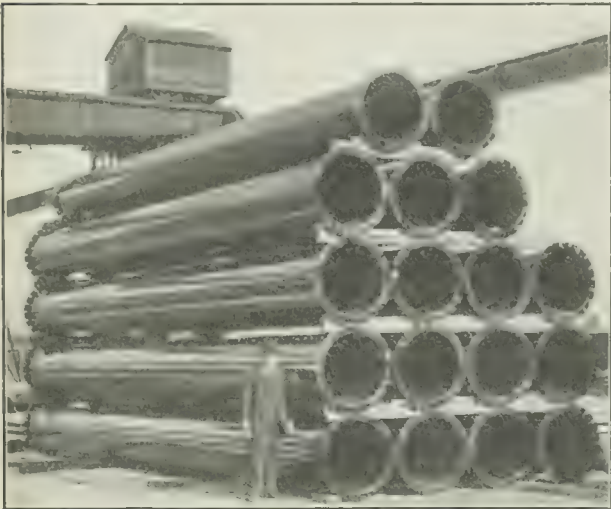


Fig. 1.—Some 30-In. Lap Welded Dredging Pipe, 32 Ft. Long. Made by the American Spiral Pipe Works, Chicago, Ill.

and serves to give some idea of the capacity of the maker's plant.

After the pipe has been welded, it is heated for a second time in a large annealing furnace and thoroughly annealed to remove any strains which may have been produced during the welding process. Test bars cut from the welded seam show the remarkable strength possessed by the weld, and in many tests the joint developed a tensile strength in excess of 60,000 lb. per sq. in. The results of a series of physical tests made by Robert W. Hunt & Co., on some of the welded joints are given in the following table:

Specimen number.....	1	2	3	4	5
Remarks	Welded	Welded	Welded	Welded	Unwelded
Original length, in....	1.49	1.497	1.504	1.51	1.503
Original width, in....	0.255	0.245	0.252	0.242	0.249
Length after fracture, in.	1.15	1.38	1.152	1.18	1.13
Width after fracture, in.	0.145	0.182	0.145	0.145	0.152
Original area, sq. in.	0.38	0.3668	0.379	0.3654	0.3742
Fractured area, sq. in.	0.1667	0.2512	0.167	0.1711	0.1718
Actual elastic limit, lb.	17,610	17,000	20,110	15,530	16,810
Actual maximum load, lb.	23,760	22,400	24,150	20,500	22,590
Elongation in 8 in., in.	1.03	0.44	0.88	0.92	1.18
Elastic limit per sq. in., lb.....	46,340	46,350	53,060	42,500	44,920
Tensile strength per sq. in., lb.....	62,520	61,070	63,720	56,100	60,370
Elongation in 8 in., per cent.....	12.88	5.50	11.00	11.5	14.75
Reduction of area, per cent.	56.13	27.66	55.93	53.18	54.09

The four welded specimens all broke outside of the weld except the second, which broke across the joint. Specimens 1 and 5 were both taken from the same pipe, No. 1 being at the weld and No. 5 some distance away.



Fig. 2.—A 24-In. Pipe After Undergoing a Fatigue Test.

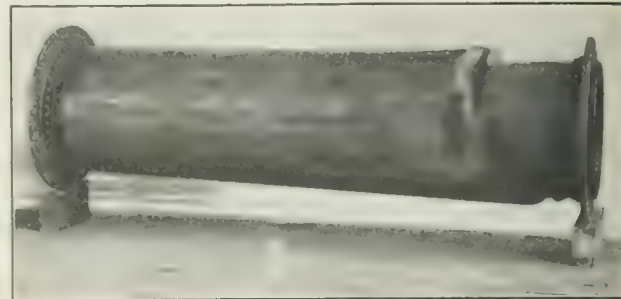


Fig. 3.—A 20-In. Pipe After Being Subjected to 565,000 Lb. Pressure in an Unsuccessful Effort to Open the Seam.

It is not claimed by the maker that the seam is stronger than the material from which the pipe is made, but at the same time the character of the weld is said to be such that it will average close to the maximum strength of the plate.

Fig. 2 shows a length of 24-in. internal diameter pipe with a wall $\frac{1}{4}$ in. thick, which was tested for fatigue to see if the weld would weaken under repeated strains. In making this test the pressure was raised to between 900 and 1100 lb. nine different times without the pipe showing any signs of fracture, although the diameter increased $1\frac{1}{4}$ in. and the metal stretched approximately 4 in. as is clearly shown in the engraving. On the tenth test a small fracture occurred near the weld. As the internal diameter of the pipe was then

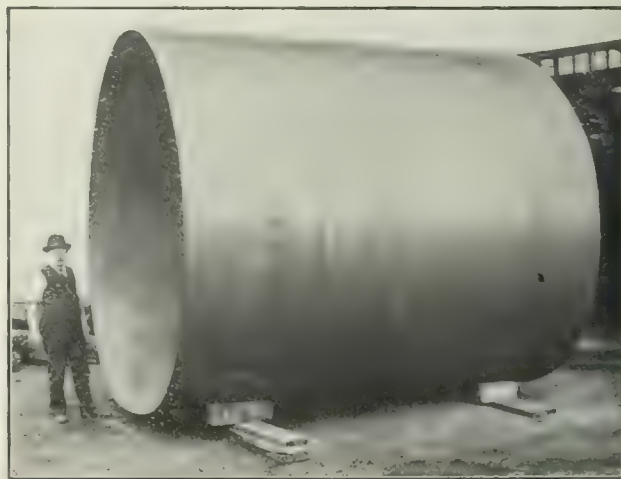


Fig. 4.—An 11 Ft. Lap Welded Steel Drum.

23 $\frac{1}{4}$ in., the strain to which it was subjected was in excess of 55,000 lb. per sq. in.

In Fig. 3 a length of 20-in. internal diameter pipe with walls $\frac{1}{4}$ in. in thickness is shown after being subjected to a total end pressure of 565,000 lb. in a hydraulic press in an effort to rupture the welded seam. Although as the engraving shows the seam was badly folded, when tested under water pressure no sign of fracture was apparent.

The Russel Wheel & Foundry Company, Detroit, Mich., reports a very active demand for logging cars, a particularly heavy volume of business coming from the South. This company has recently added to its power plant, having installed a 250-hp. boiler and a 175-kw. generating unit. An addition has also been made to its blacksmith shop.

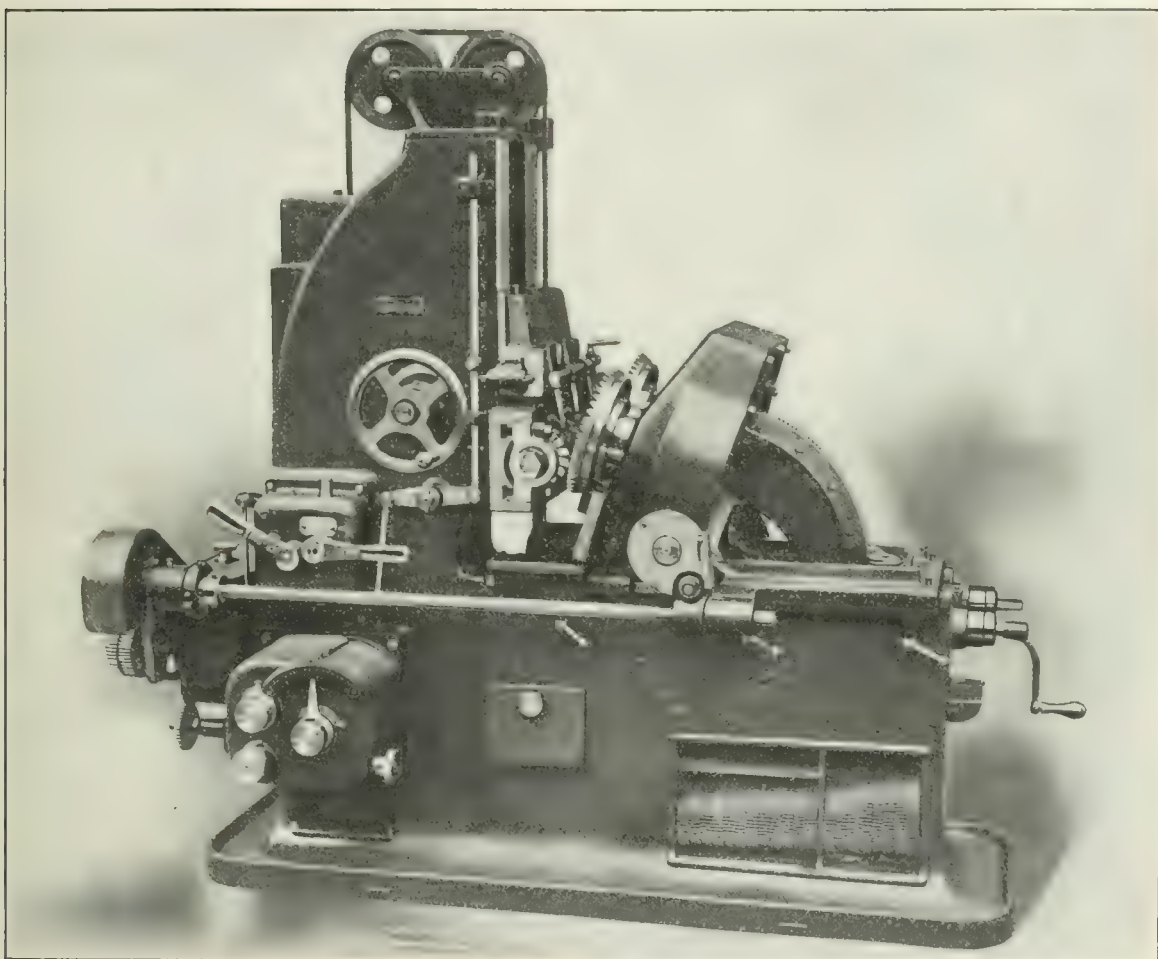
New Gould & Eberhardt Gear Cutter

A Multiple Spindle Automatic Vertical Machine Is the Latest Product

For roughing out bevel gears preparatory to finishing them on a bevel gear planer, Gould & Eberhardt, Newark, N. J., have designed and are manufacturing a new gear cutter. This machine which represents one of the latest developments in the art of gear cutting machinery is of the multiple spindle automatic vertical type, and is a manufacturing tool capable of cutting from one to three bevel or spur gears or worm wheels or clutches simultaneously, a feature which materially reduces the time per piece. The machine has sufficient capacity to handle

jected to excessive stress. The feeding and indexing mechanism of the cutter are driven very directly, ball bearings being used where necessary to take care of the thrust. At the present time patents are pending on the arrangement controlling the feed, return and indexing of the cutter slide. This mechanism is operated by two levers and enables the operator to return the cutter slide by power without unlocking the indexing mechanism. This feature is very useful in sizing a gear blank. A safety device that keeps the cutter slide from feeding until the indexing of the work is completed also forms a part of this mechanism.

The work slide has three spindles. All of the spindles are controlled by a positive mechanism which indexes them in unison by helical gears directly under the blanks being cut. Blanks of various diameters can be cut by



A New Multiple Spindle Automatic Gear Cutter Built by Gould & Eberhardt, Newark, N. J.

blanks 24 in. in diameter and 8 in. wide, and in the engraving is shown roughing out two steel driving gears having 49 teeth of 5 pitch and a face 1 5-16 in. wide.

With the exception of the special cutter and work slides this machine is substantially the same as the automatic vertical gear cutter which was illustrated in *The Iron Age* December 29, 1910. The cutter slide is arranged for one, two or three cutters and the bearing for the spindles is of such a type that each cutter has an individual support located close to it on either side. The extra number of cutters used and a corresponding increase in the amount of torsional stress to which the cutter arbor is subjected, as well as the extra duty required of it, led to the use of a bearing of this nature. The slide actuating mechanism operates on the draw-cut principle. Instead of anchoring the feed screw at the upper part of the stanchion and subjecting it to compression, it is anchored in the base of the stanchion, thus producing a tensile strain. This arrangement results in all the strains and impulses of the cutter being directly transmitted to the base of the machine and overcoming the vibration that is present when the feed screw is sub-

changing the number of spindles used. When all three spindles are employed the maximum diameter of blanks which can be accommodated is 5½ in. Using the two outer spindles doubles the diameter of the blank, and if only the center one is used the capacity of the machine is a 24-in. blank. The regular segmental table support controlled by a worm and a worm wheel sector located in a central position under the table and securely held in place by an extra clamping device is used, and in addition there is a special adjustable brace supporting the periphery of each blank being cut. This brace supports the blank directly in back of the face of the bevel gears, and also acts as a chip chute to direct the used lubricant into the proper pocket in the base of the machine, where it is strained and the chips separated from it before it reaches the oil pump again. This combination of supports to the work table and the blank makes a rigid and solid construction that is essential in cutting a gear rapidly.

The weight of this machine is approximately 3500 lb., and it is equipped with guards that cover every running gear entirely.

Labor Conditions in Iron Mining

Contrasts Between Native and Foreign Born Workers of Lake Superior and the South

Conditions of living and employment in the iron mining districts of the country are set forth in an interesting and striking report of the Federal Immigration Commission, which will shortly be available for distribution. The operating forces in iron mining were studied by the commission on the Mesaba and Vermillion ranges of Minnesota and the Marquette, Menominee and Gogebic ranges of Michigan, as well as in the Birmingham district of Alabama.

Detailed information was secured for 8281 employees; and 255 households, the heads of which were employed in iron mines, were intensively studied. Of the total number of employees 52.6 per cent. were foreign born, while 4.3 per cent. were native born of foreign father, and 43.1 per cent. were native Americans, or native born of native father. The North Italians, Poles and Slavonians were the principal races of southern and eastern Europe engaged in the industry, while the Flemish, English and Swedes, of the races of Great Britain and Northern Europe, were represented in largest numbers.

Of the total number of foreign born employees only 8.5 per cent. had had any experience in iron mining before coming to this country, while 62.3 per cent. had been farmers or farm laborers while abroad. The average weekly wage of employees engaged in the industry was \$12.72; the average annual earnings of male heads of families, \$706, and of all males 18 years of age or over, \$682. The average annual income of families, the heads of which were employed in the industry, was \$990. Over one-half, or 55 per cent., of the total number of families studied derived their entire incomes from the earnings of husbands, while 31.6 per cent. were supported by the earnings of husbands and the payments of boarders or lodgers, and 4.8 per cent. by the earnings of husbands and the contributions of children. Only 18.2 per cent. of the households the heads of which were native born, as contrasted with 36.9 per cent. of those the heads of which were foreign born, kept boarders or lodgers.

The average number of persons per room in households the heads of which were native born was 0.97, and per sleeping room, 2.41, as against 1.71 persons per room and 3.47 persons per sleeping room in households the heads of which were immigrants. None of the native born households, as contrasted with 5.6 per cent. of the foreign born, used all their rooms for sleeping purposes. The greater degree of congestion in the latter class of households is shown in the average monthly rent payments per capita, that of the households whose heads were foreign born being \$1.09, and of the households whose heads were native born, \$1.38.

Of the total number of foreign born employees 91 per cent. were able to read and 89.8 per cent. were able both to read and write. Of the immigrant employees of non-English speaking races only 62.1 per cent. were able to speak the English language. Of the total number of employees 20 years of age or over 62.5 per cent. of the native born and 53 per cent. of the foreign born were married. Of the heads of families studied 19 per cent. of those native born owned their homes, as against 63.4 per cent. of those foreign born. Of the total number of foreign born employees 37.9 per cent. were fully naturalized and 22 per cent. had first papers. Only 1.2 per cent. of the foreign born males and 6.9 per cent. of the native born were affiliated with labor organizations.

The Mesaba and Vermillion Ranges

On the Minnesota ranges 218 households were studied and detailed information was obtained for about 2000 iron ore workers. The open pit methods of mining on the Mesaba range not requiring any skill or experience afforded ready employment to southern and eastern Europeans, and it was found that more than nine-tenths of

the operating forces were immigrants. The principal races employed in the Minnesota operations were, in the order of their numerical importance, Finns, Slovenians, Croatians, North and South Italians, Poles, Slovaks, Montenegrins, English, Americans and Swedes. Up to 1890 the necessary labor to develop the iron mining districts was drawn from the Michigan ranges and other sections of the United States. Since the early nineties a large proportion of the mine workers have come from abroad and Southern and Eastern Europeans have become the chief source of supply. The Vermillion range has well developed towns and is peopled with a permanent population. Representatives from all races employed own their own homes. On the other hand, the Mesaba district, although it has several cities of considerable size, is made up as a rule of more or less temporary mining communities, chiefly composed of Southern and Eastern European immigrants who have very little permanent interest in the country or the industry. The number of families is small as compared with the Vermillion district and the proportion of single men or married immigrants unaccompanied by their families is large. The prevailing living arrangement is that commonly known as the "boarding boss system," which usually consists of a boarding group occupying shacks and sharing equally the cost of living.

Of the immigrant iron ore workers on the Minnesota ranges only 7 per cent. had had any experience in mining before coming to the United States, while 75 per cent. had been farmers or farm laborers and unskilled laborers in their native countries. The average weekly earnings of native Americans were \$16.20 and of immigrants, \$14.12. About four-fifths of both nativity groups earned more than \$12.50 each week. The average annual earnings of native Americans who were heads of families were \$1024, and of foreign born heads of families, \$659. The average annual income of American families was \$1058, and of immigrant families, \$995. More than one-half of both classes of families were entirely supported by the earnings of the husbands. About one-fifth of the American families, however, depended also upon the earnings of children and two-fifths of the immigrant families supplemented the earnings of the head by keeping boarders and lodgers. The number of boarders in immigrant households averaged about eight persons, and in the cases of the households of some races was even higher. More than four-fifths of the Croatian households had boarders or lodgers. This practice, which was characteristic of Southern and Eastern Europeans, resulted in a high degree of congestion and in low standards of living. Medical service and accident and life insurance benefits are provided by the companies for the mine workers. About 10 per cent. of all the employees were illiterate and 50 per cent. were unmarried. Of the immigrant wage earners who were married more than two-fifths had left their wives and children abroad.

Of the native American families investigated only 19 per cent. as contrasted with 63 per cent. of the immigrant families owned their own homes. Excellent school facilities were provided in all communities, and because of the Minnesota compulsory school laws members of all immigrant races were found in the classes of the public schools. The greatest tendency toward naturalization was found among the Swedes and Finns. Members of these races take an active interest in politics, and come to the mining districts with the intention of establishing permanent homes. Of the total number of mine workers studied only 27 per cent. were fully naturalized and 17 per cent. had secured first papers. About seven-tenths of the total number of employees of non-English speaking races were able to speak English, although the proportion was much lower in the case of certain races, such as the North and South Italians and Montenegrins.

The Michigan Iron Ranges

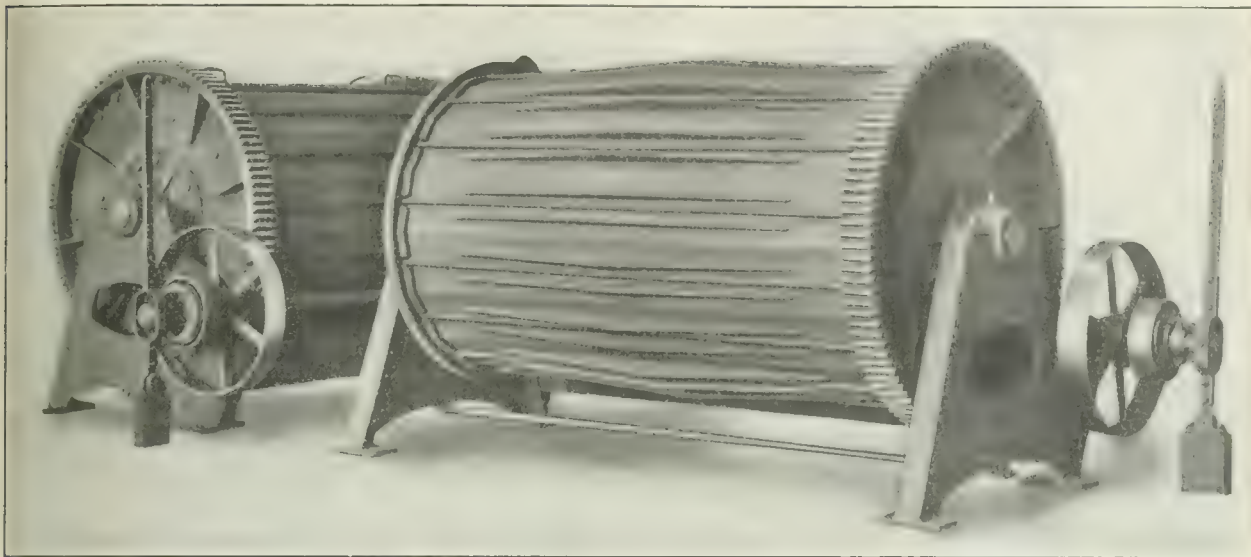
The investigation on the Marquette, Menominee and Gogebic ranges in Michigan covered about 3000 iron ore workers. The principal races employed were, in the order mentioned, Finns, North Italians, Poles, Swedes, Croatians, English, Slovaks and Slovenians. Altogether

immigrants of 26 races were represented in the operating forces, and, as in Minnesota, about 90 per cent. of the operatives were of foreign birth. All the miners in the early days on the Michigan ranges were Americans, English and Irish. The French Canadians were first employed in the early seventies, and the Finns in the beginning of the decade 1880-1890. The immigrant employees from Southern and Eastern Europe have entered the mines during the past 25 years in response to the demand for labor growing out of the expansion of mining operations.

The greater part of the immigrant mine workers had been farmers or farm laborers abroad, and only about 10 per cent. had had any experience in mining before

The Northern Tumbling Barrel

Two particularly noteworthy tumbling barrels were recently built by the Northern Engineering Works, Detroit, Mich. The special features of these barrels were their unusual size and the use of a friction clutch pulley. These barrels are of the maker's standard class B type in which a friction clutch pulley is employed for transmitting power from the overhead countershaft to the tumbling barrel shaft. The use of this clutch makes it possible to run these barrels singly or in batteries from one overhead shaft and still secure the positive drive from spur gearing, which is very desirable on such ma-



Two Northern Class B Tumbling Barrels with Friction Clutch Drive Made by the Northern Engineering Works, Detroit, Mich.

coming to the United States. The average weekly earnings of immigrant employees were \$14.24, and of native Americans, \$13.78. The favorable showing of the foreign as compared with the native born wage earners was largely due to the high range of earnings of the experienced English and Swedish miners.

The immigrant employees also showed a somewhat higher degree of literacy and a larger proportion married, as contrasted with those of the Minnesota iron ore mining districts. A greater tendency toward a normal family life was also evidenced by the fact that only about 30 per cent. of the male employees who were married reported their wives and families to be abroad. Only about one-half of the Polish and Slovenian miners, however, and less than one-half of the Croatians and North and South Italians were able to speak English. Forty-five per cent. of the foreign born mine workers were fully naturalized and 24 per cent. had signified their intention of becoming citizens.

The Birmingham District

The study in the South was based on detailed information secured for 3500 employees in the Birmingham district of Alabama. The significant feature of the situation in the South was that only about 5 per cent. of the Southern employees, composed chiefly of North and South Italians, were of foreign birth, and that 67 per cent. of the operating forces were negroes. Slightly more than one-fourth were native white Americans. The earnings in the South were also considerably lower than in the other iron mining districts. The weekly earnings of the native white Americans were \$11.09; of the negroes, \$10.60, and of the immigrants, \$8.81. Illiteracy was much more marked in the South also, as compared with Minnesota and Michigan. Although 91 per cent. of the native white Americans could read and write, 42 per cent. of the negroes and 40 per cent. of the wage earners of foreign birth were illiterate. Two-fifths of the immigrant employees in the South could not speak English.

chines. In action they are said to be positive and stop and start without shock or sudden strain.

In the construction of these barrels hard cast angle staves secured by through bolts were used. These staves supported each other at the edges, thus giving a very strong construction. The bearings had a dust protecting casing and improved oiling attachments and were lined with babbitt metal. Renewable steel liners which can be replaced when worn out, thus saving the expense of a new barrel head, were used on the barrels. All the wearing parts were made exceptionally heavy on account of the extreme size of the barrels.

A Labor Conviction Under the Sherman Anti-Trust Law.—Organized labor felt the restraining force of the Sherman anti-trust law when a jury in the United States Circuit Court, at New Orleans, on January 25, returned a verdict of guilty against members of the New Orleans Dock and Cotton Council, charged with conspiracy to interfere with foreign commerce. The convicted men are James Byrnes, former president of the council and at present State Labor Commissioner of Louisiana; Philip Pearsaw, former president of the local Coal Wheelers' Union, and U. S. Swan, former president of the Longshoremen's Union. Swan and Pearsaw are negroes. The strike, which was begun two years ago, grew out of the refusal of the Coal Wheelers' Union to coal a steamer because nonunion longshoremen had been employed to load the vessel.

New Standard Samples of Steel and Ore.—The Bureau of Standards, Washington, D. C., is ready to supply the following new analyzed samples: No. 29, titaniferous magnetite ore, from New Jersey; No. 11a, basic open hearth steel with 0.2 per cent carbon; No. 12a, basic open hearth steel with 0.4 per cent. carbon. The steels replace the original samples which are exhausted. Renewal samples of Bessemer steels with 0.1 and 0.2 per cent. carbon are in process of analysis, also a nickel and a chrome vanadium steel.

Electricity on a Plantation

On the eastern slope of the Allegheny Mountains in Virginia is located a tract of rolling upland consisting of about 11,000 acres owned by Thomas F. Ryan, the well-known American financier. The property is at Oak Ridge, Nelson County, on the Southern Railroad between Charlottesville and Lynchburg. Recently this large plantation was equipped with a complete electrical system for lighting all buildings on the place and to supply electric energy to drive the farm machinery, to operate the dairy, the flour and grist mill and to manufacture ice and do the other endless chores pertaining to farm work. Without this modern power system it would require a considerable number of men and horses to do the work about this large plantation. Now the working energy of 80 horses—of 500 men—is confined in one power room, where it can be instantly dispatched in any amount desired to do the hard work about the farm and the many farm buildings.

The Power House

The main power house, located near the barn buildings, is of stone construction, with concrete floors, and is amply large enough to house the power generating machinery and the refrigerating apparatus and leave space enough for the milkrooms and the milk handling machinery. In the power room is a 60-kw., three-phase, 2300-volt General Electric generator, direct connected to a 100-hp., three cylinder Nash gas engine. The Nash engine operates on gas produced in the building from a gas producer plant utilizing anthracite pea coal. This gas driven generator supplies ample current for all the electricity used to light the many buildings on the plantation, gives energy to the many motors driving the farm machinery and provides for the operating of special heating devices, fan motors, &c. Compressed air is used for starting the gas engine, a 1-hp. motor operating the air compressor. Fastened to the ceiling in the power room is a small exciter, belted to the main shaft. To the left of the engine and generator are located the necessary switchboard panels. Three 10-kw. transformers are placed in the loft of the power house for stepping the voltage down to 220 volts for the motor circuits, with a 110-volt tap for lighting circuits. Standard marine wiring is used throughout and all wires are laid in conduit.

A portion of the power house building is devoted to refrigeration and the manufacture of artificial ice. A ton of ice is made every day, and in addition to this the plant maintains low temperatures in four cold storage rooms—one for meats, one for the perishable fruit products of the estate, another for milk and still another for milk products, such as cream and butter. A 15-hp. General Electric motor drives the ammonia gas compressor in this refrigerating plant, while a smaller motor, of 1½ hp. operates the brine circulating pump.

Another interesting installation in the power house is a 25-hp. low pressure boiler, which generates the steam used for heating the power house, supplies pressure to the small steam turbines which operate the cream separator and the bottle washer and gives a surplus supply of live steam for sterilizing the cans and bottles and the dairy machinery.

The Dairy Arrangements

The dairy barn, which houses 60 imported Guernsey cows, is a model of its kind, with every convenience for caring for the stock and every sanitary arrangement necessary to preserve the health of the cattle and to assure a large supply of sanitary milk.

The milking is still being done by hand, although a vacuum milking system, driven by an electric motor, is being talked of. The milk is carried on an elevated cableway across the intervening space between the dairy barn and the power house building and deposited in the milk receiving vat located in the loft. The milk handling room is finished in white plaster with a concrete floor. A 3-hp. motor drives a countershaft from which are belted the pasteurizers, pump, &c. As the milk descends from the receiving loft by gravity it is strained and cooled. Part is then sterilized or pasteurized for ship-

ment and the remainder is put through a De Laval separator, driven by a tiny steam turbine, the cream being carried away to the ripening room, where it is cured and soured by a special process. In this apartment a 3-hp. motor drives the churn and other machinery.

In connection with the milkroom is a washroom where a 2-hp. motor drives a countershaft from which is belted a machine for washing cans. This machine washes the can inside and out in one process. A bottle washer is driven by a small steam turbine. Every can, bottle and pail, as well as the parts of the separator and other machinery, are thoroughly sterilized with live steam as soon as the washing is done. Live steam is also used to sterilize the floors and walls of the milkrooms after the rooms have been thoroughly washed and flushed. The dairy attendants are provided with a washroom, which is also equipped with suitable lockers and shower bath.

A novel feature of the dairy work is an up-to-date laundry where the white uniforms and other clothing of the dairymen are laundered. A 2-hp. motor drives the washing machine. Another motor, rated at ½ hp., whirls the centrifugal dryer and the mangle is operated by a ½ hp. motor. The drum of this mangle is heated by electricity. Electric flatirons are also used.

Besides the blooded cattle on the plantation there are nearly 200 thoroughbred horses. To supply all these animals with ground feed, a small flour mill is maintained with a capacity of 50 barrels of flour a day, where a large portion of the grain produced in that section is made into flour and the waste utilized for cattle feed. This flour mill is driven by a large electric motor.

The Homestead

Electricity plays no insignificant part in adding to the comfort of those who enjoy the hospitality of the Ryan homestead. The energy for lamps for the main residence is furnished by a storage battery located in the basement which is charged from the main power plant. Every room in the large mansion is provided with an abundance of electric light and electricity is also extensively used about the building for heating and other purposes. There are electric dish warmers in the kitchen, electric heaters in the chambers and electric cooking devices for special service.

In order that the electric service need not cease even if the main power plant should meet with some unlooked-for accident, an auxiliary plant is located about 300 yd. from the main power station, which has been arranged for parallel operation with the main plant. In this auxiliary power house, which was the initial electrical equipment on the estate, is located a 50-hp. gas producer plant similar in operation to the one in the main power house. A 45-hp. three-cylinder Nash engine is belted to a 37½ kw. alternating current General Electric generator. This plant, though somewhat smaller, is operated nearly the same as the main plant and is held in readiness to be instantly started up in case of an emergency.

A mile away is still another gas producer plant where a 37-hp. gas engine is direct connected to a powerful pump which forces water into a large reservoir with a capacity of 365,000 gal. This reservoir is located on a hill, so that the water system for the entire place is operated by gravity, giving an abundant supply of water as well as ample fire protection.

This electrical plant has been in successful operation for nearly a year, and the foreman of Mr. Ryan's plantation speaks in the warmest terms of its conveniences, flexibility and safety. The apparatus was installed by Westerberg & Williams of New York City, and the electrical equipment is almost entirely General Electric apparatus. Already plans are under way for extensive improvements of the electrical apparatus and ultimately electricity will be employed wherever power is required about the plantation.—*Electrical World*, January 26.

A bill has been introduced in the Indiana Legislature providing for putting the Technical Institute at Indianapolis in charge of Indianapolis school authorities and authorizing a city tax to maintain the institution, which is to be collected in the same manner as taxes for other school purposes.

The Acme Blueprint Machine

A New Mechanism for Sensitizing Blueprint Paper and Making and Drying the Prints

A new type of blueprint machine, known as the Acme, has been designed and placed on the market by the M. & L. Engineering & Machine Works, 210 Canal street, New York City. The special feature of this machine is that it will coat or sensitize the paper for making the prints, produce the prints at the same time without extra labor and dry them after they have been washed without any additional expense. Fig. 1 shows a finished print issuing from the machine, while Fig. 2 is a view of the opposite end showing the drive.

The construction of the machine is very rigid, as cast iron and steel are employed throughout. It is built in three distinct parts. The first is the main frames, which

of the machine and the paper passes from the coating chamber at the bottom to a roller at the top and then down to the bottom and up again to a point about half the distance between the top and bottom of the section where it passes out. Electric heaters dry the paper so that it is in the proper condition for printing when it is led out of this chamber. The coated and dried paper is then led around the elliptical printing chamber and then passes out as a print ready for washing.

The coating rollers and the pans in which they rotate are enameled to protect them against the action of the chemicals used. The scrapers are raised or lowered by a hand lever within easy reach of the operator to regulate the amount of scraping. This lever can also be adjusted to stop the coating process without interfering with the use of the machine for producing blueprints.

The paper is pulled by pure rubber belts during the process of printing. These belts surround and travel around the elliptical glass printing chamber, and pro-

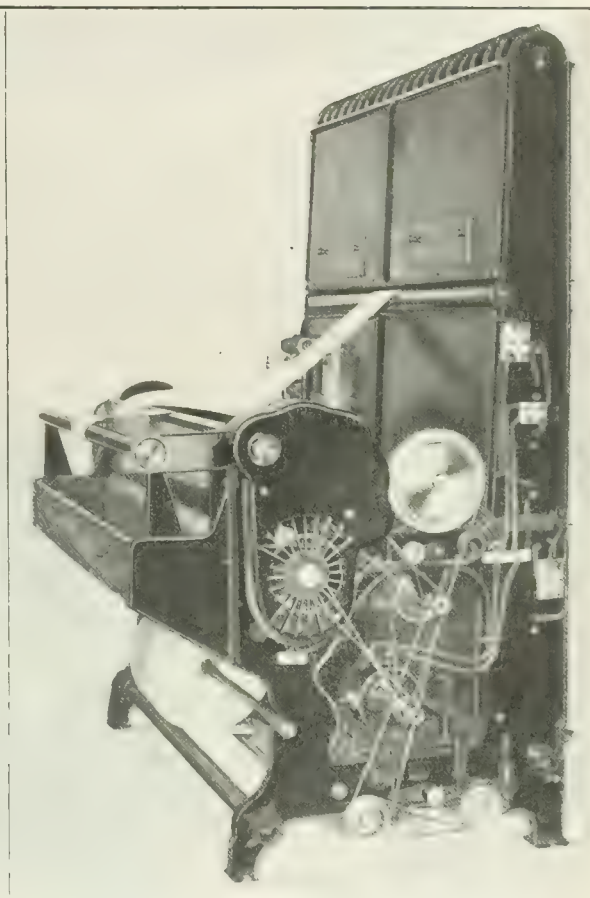
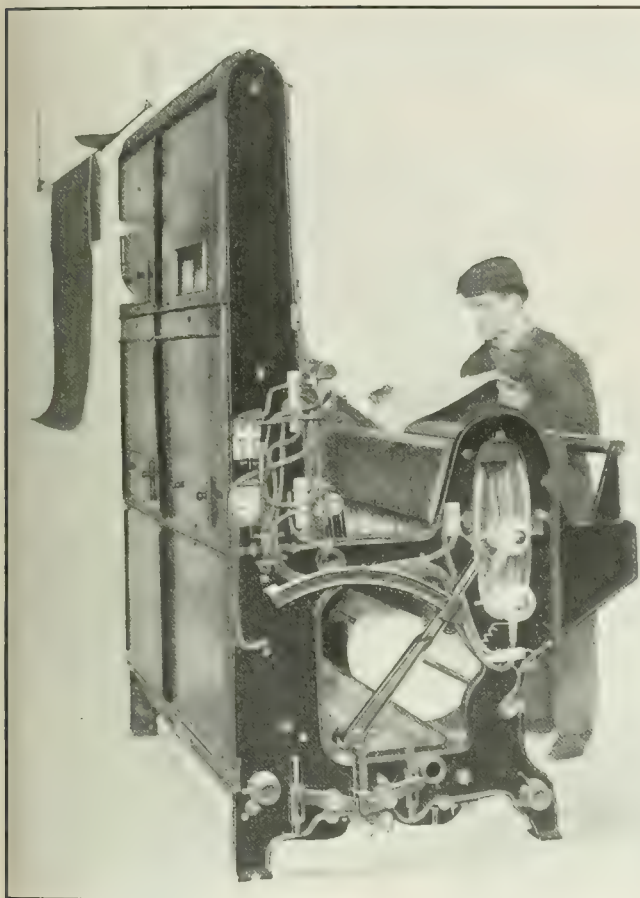


Fig. 1- View Showing Finished Print Coming Out.

Fig. 2. View of Opposite End Showing Drive

Two Views of the Acme Coating and Blueprint Machine Made by the M. & L. Engineering & Machine Works, New York City.

are made of cast iron and connected with steel tubing and angle iron, while the drying chamber that is the upper portion of the vertical member is made in a separate section so as to be readily removable. The receiving box, which is located in the front of the machine and into which the prints drop as they are finished, forms the third section. All of the rolls used in the machine are of seamless steel tubing highly machined and journaled in ball bearings, which are also used on all the moving parts. The drive is of the variable speed type, and is composed of a two-step cone pulley, on which the belt is shifted by a hand wheel. The main drive is from this pulley through steel chain and sprockets. All the gearing is covered, which eliminates noise and also the danger of the operator becoming caught in the gears.

A roll of ordinary white paper is put in place in the lower front part of the machine and one end of this roll carried over to the first coating roller and held in position against it by an idler. After leaving this roller it passes over a glass scraper to the second coating roller. It is again scraped to insure a smooth coat and then enters the drying chamber. This occupies the entire rear

vision is made for securing the proper tension at all times regardless of the stretch. The printing frame is made in two sections, so that it can be swung back to clean the lamps or the glass walls themselves. As the prints issue from the machine in the form of an endless strip of paper they are wound up on a roll. After the prints have been washed, if desired they can be dried by hanging them on lines back of the machine, as the heat radiated by the coils in the driving chamber is sufficient for this purpose, especially if the doors in the cover of this chamber are opened.

Two sizes of machines are built; one will handle paper 54 in. wide, while the other, which is the one illustrated, is limited to paper 20 in. in width. An extensive use of the latter machine is the making of blueprint records for insurance companies and factories having a large amount of this work to do each day. The machines are regularly equipped with Cooper-Hewitt lamps 42 in. long. However, if desired the machines can be specially equipped with a row of arc lamps or a row of tungsten lamps. It is claimed that the machine will operate at the cost of 19 cents per hour.

The Calumet Crane Type Tumbler

Patents on a new type of tumbling barrel have been recently applied for by the Calumet Engineering Works, Harvey, Ill. When it is necessary to pick up the barrel from the standards with a crane and carry the load of



A New Crane Type Tumbler Made by the Calumet Engineering Works, Harvey, Ill.

castings to any desired part of the cleaning room, this tumbler is intended to be used instead of the old roller type as well as for carrying the barrel itself into the foundry for loading and unloading.

In addition to being able to lift the barrel from the standards for loading and unloading the castings, this new tumbler also possesses a positive drive which was not possible with the older style. This drive is of the customary type, a gear being mounted on the circumference of the barrel at one end and meshing with a pinion on the driving shaft. When it is desired to lift the barrel from the standard, the pinion is first slid out of mesh with the gear after which the barrel is lifted by placing the crane hooks under the cast steel lifting strap. This strap is fastened to a solid heavy bearing that is clamped to the trunnion by a retaining ring.

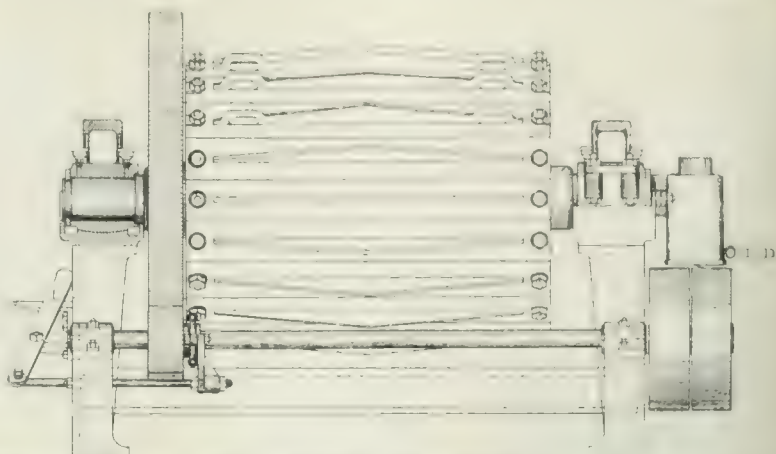
Carnegie Technical School Lectures.

—A series of lectures is to be given in the School of Applied Industries in the Carnegie Technical Schools, Pittsburgh, for the benefit of the students. A complete list of these lectures, together with names of the lecturers, is as follows: January 26, "Modern Foundry Practice and Its Demands," by Thomas D. West, foundry expert and manager, Cleveland, Ohio; February 6, "Spur and Bevel Gearing," by George W. Klages, superintendent of the John A. Brash-eer Astronomical Works, Pittsburgh; February 23, "Spiral and Worm Gearing," by George W. Klages; March 9, "Cupola Practice," by John C. Knoeppel, Knoeppel Company, Buffalo, N. Y.; March 23, "Glass," by J. I. Arbogast, glass specialist, Pittsburgh; April 6, "Industrial Education," by Samuel Hamilton, superintendent Allegheny County Public Schools; April 20, "Modern Developments in Electric Power Stations," by Charles Sanderson, Westinghouse Electric Mfg. Company, Pittsburgh; May 4, "Large Engines of Duquesne Works," by H. L. Schreck, Mackintosh-Hemphill Company, Pittsburgh.

The Clark Car Company, manufacturer of balance door dump cars, has removed its offices from the Frick Annex to the Henry W. Oliver Building, Pittsburgh.

The Triumph Type L Transformer

The Triumph Electric Company, Cincinnati, Ohio, has recently placed on the market a new line of light and power transformers for use on overhead single phase circuits. Fig. 1 is an exterior view of the transformer,



showing the manner in which the leads are brought out, while Fig. 2 shows the coils.

These transformers are built for 1100 and 2200 volts on the primary and 110 and 220 on the secondary. The normal frequency is 60 cycles, but transformers can also be furnished for operating between 50 and 140 cycles. The shell type of construction is employed. In



Fig. 1.—The Shell.

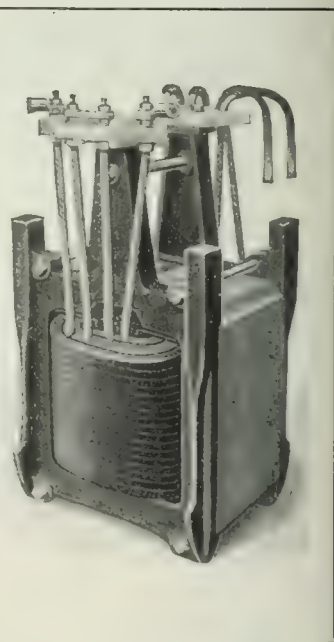


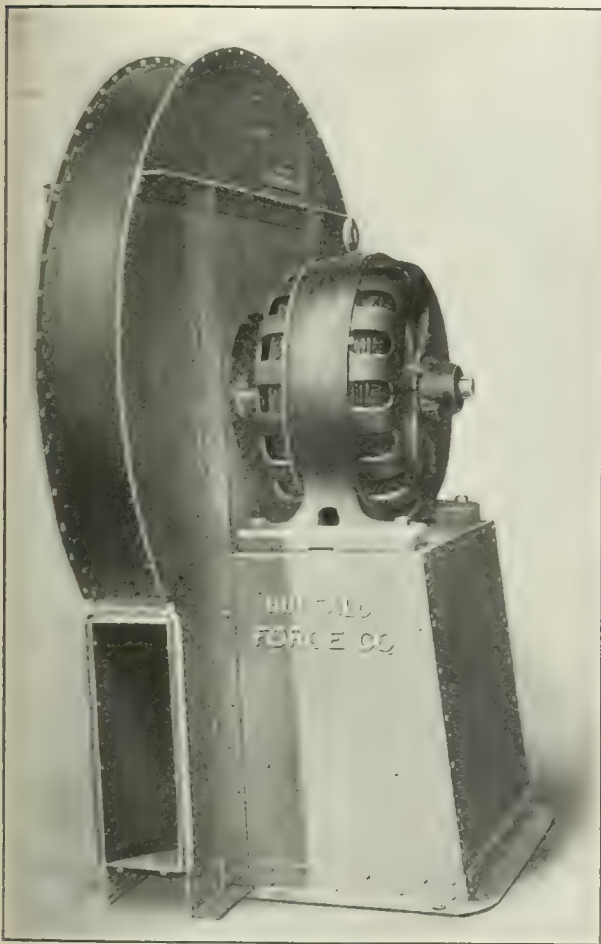
Fig. 2.—The Coils

Fig. 1 and Fig. 2 are views of a New Lighting and Power Transformer Made by the Triumph Electric Company, Cincinnati, Ohio.

selecting any particular kind of transformer, the losses occurring in operation are, next to the mechanical construction and durability, the most important consideration. A low core loss, while highly desirable, is frequently obtained at the expense of other important characteristics, such as an excessive copper loss and poor regulation. Too much insulation will also produce high reactance, poor regulation and cause over-heating with a correspondingly low efficiency. Although core losses should be eliminated as far as possible, as they are continuous, good regulation is even more important. In these new transformers, which are known as the Triumph type L, the regulation is good and the copper and core losses are low. The transformers are dried in a vacuum, and the coils are impregnated with a special insulating compound which is said to possess a very high melting point and be absolutely insoluble in oil.

The Buffalo Steel Plate Pressure Blower

Blowers, on account of their location in the foundry, generally require some independent unit to drive them. The first prime mover connected to high pressure centrifugal blowers for cupolas, forges and furnaces was a small steam engine. These were very uneconomical and with the advent of the electric motor they were abandoned. Since that time blowers have taken a large percentage of the output of the various electric motor manufacturers. In driving centrifugal fans, the power required varies approximately as the cube of the speed, provided the other conditions remain the same, and as speed variation is generally very desirable, the employment of resistance in the armature circuit, which is the cheapest method of securing it, is not objectionable. A direct connected electric motor is undoubtedly the most desirable arrange-



A Direct Motor Driven Centrifugal Blower Having a Capacity of 10,000 Cu. Ft. of Air Per Minute at a Pressure of 10 Oz. Per Sq. In.—Built by the Buffalo Forge Company, Buffalo, N. Y.

ment, although the great difference between the speeds of the blower and the motor has prevented the wider application of motor drive to centrifugal fans. Besides this there is also another difficulty encountered in the use of alternating current motors for this work, as in many cases the speed range of these motors is not great enough to accommodate the desired blower speeds.

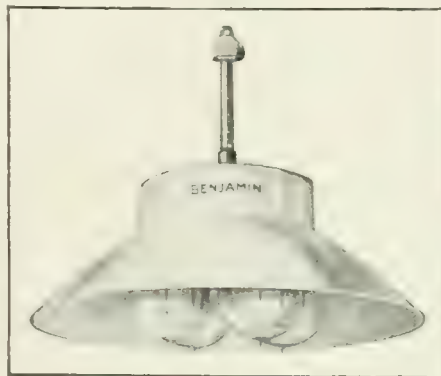
On account of these two difficulties the engineers of the Buffalo Forge Company, 490 Broadway, Buffalo, N. Y., have designed a special line of steel plate pressure blowers that are especially adapted for motor drive. The diameter of the blast wheels is large, which permits a great peripheral speed and high pressure to be secured at a comparatively low rotative speed, thus enabling standard types of motors to be used. In constructing these blowers great care was taken to secure a very accurate running balance and with that end in view the hubs and spiders are heavier than the usual construction and the fan housings are heavily braced. These blowers are built for pressures as high as 18 and 20 oz. per sq. in.

It is not always possible to build a large diameter

fan of such proportions as to be capable of operation at the speed of an electric motor. For use in cases of this kind, another line of blowers known as the two-stage type has been designed. In general the design follows that of the steel pressure blower, but a cast iron shell is employed, and the blower has a double casing with two blast wheels on the same shaft. In a blower of this type the air enters the second wheel at the pressure that has been imparted to it by the first. The wheels may or may not be the same diameter which enables a differential pressure to suit any desired set of conditions to be obtained. With a view to obtaining the highest possible efficiency the width of the wheel, the air passages between the two wheels and the inlet and outlet have been carefully designed. These blowers are built for pressures of between 2 and 3 lb. per sq. in.

The Benjamin Tungsten Mill Cluster

Up to the present time the use of the arc lamp for industrial lighting has been quite general. While this form of illumination has been fairly satisfactory, it is, however, expensive, requires a considerable amount of time and labor for trimming the lamps and the light furnished is not of the best quality. On this account the tungsten lamp, which is used so extensively for store and public building lighting by reason of its exceptionally good quality of light and a reduction of approximately one-third in the amount of current consumed, is now invading the in-



A New Type of Tungsten Mill Cluster with Steel Reflector Made by the Benjamin Electric Mfg. Company, Chicago, Ill.

dustrial field. The Benjamin Electric Mfg. Company, 120 South Sangamon street, Chicago, Ill., is marketing a new type of mill cluster. The principal advantages claimed for this new lighting device are a superior quality of light, 1500 cp. of reflected light as compared with 1300 cp. of the flaring arc and a saving in operating expenses including current, lamp renewals and depreciation of from 25 to 30 per cent.

Two forms of cluster are furnished, both having reflectors 24 in. in diameter. The first which is style illustrated has an enameled steel concentrating reflector, and is intended to be used where the lighting units have to be suspended at some height to clear traveling cranes, &c. The other type of cluster has an enameled steel flat cone reflector for an installation requiring the units to be suspended at a height of from 25 to 30 ft. above the floor. Each fixture has a patent shock absorber to protect the lamps which are of the 250-watt large base series type. These lamps can be burned either in series on a 220-volt circuit or in series multiple on a 110-volt circuit.

Arthur D. Little, Inc., Laboratory of Engineering Chemistry, 93 Broad street, Boston, Mass., has been appointed official chemist of the American Brass Founders' Association. In accepting this appointment, the company states that it has done so with full realization of the responsibilities it carries and will endeavor to make its laboratory an effective clearing house of scientific information relating to all nonferrous alloys. A special charge will be made to members of the association for analyses of alloys of \$1 per determination.

New Tools and Appliances

This is essentially a news department for which information is invited.

Double Housing, Heavy Duty Forge Planer.—The Detrick & Harvey Machine Company, Baltimore, Md., has recently developed an extra heavy duty double housing forge planer, with a new type of induction drive. The machine which is nominally rated as a 48-in. tool will plane work 50 in. wide and 48 in. high. The table is 43 in. wide and 12 in. deep over the ways, one of which is flat and the other a V. The bed has a depth of 22 in. and three vertical metal ribs extend throughout its entire length. The housing cheeks are 32 in. deep and 55 in. long, while the housings are of rectangular box cross section with faces $16\frac{1}{4}$ in. wide. These housings are secured at the top by a tie extending from the front to the rear, which tends toward great rigidity. The cross rail, which is 19 in. high and 20 in. deep, is raised and lowered by an independent electric motor. The heads, of which there are two, are of heavy construction with steel aprons and holders. All the gearing except the driving worm is of steel cut from the solid. The worm is of phosphor bronze, and has six teeth in engagement with the table rack. This rack is 9 in. wide and is cut from solid forged steel bars. The total weight of the tool is 53,000 lb. exclusive of the motor and the drive; the table weighs 9100 lb.; the bed, 14,500 lb., and the cross rails, 3100 lb. The new type of induction drive furnishes variable cutting speeds of from 35 to 50 ft., and return speeds of from 65 to 100 ft., either of which can be changed quickly and independently of the other. If desired, the machine can also be furnished for belt drive from a line shaft or an electric motor.

Molders' Ramming Stand.—The New Britain Machine Company, New Britain, Conn., has placed on the market a ramming stand for use in connection with work in a jobbing foundry that must be hand molded. The design of the stand is such that the struck sand falls to each side of the column where it can be easily shoveled up and used again. The base and the top of the stand are machine finished, while the supporting column which is hollow gives the required rigidity. The top is arranged for holding mold boards with cleats having a center distance of about 10 in. and measuring 21 in. from front to back. The height of the stand is 30 in., and its shipping weight 200 lb.

A Universal Oil Stone Slip.—The Norton Grinding Company, Worcester, Mass., has recently added to its line of India oilstones a universal slip, which by reason of the great variety of sharpening faces can be used for all styles of cutting edges. It is stated that the cutting edges of any shape of tool can be sharpened easily and accurately. It balances perfectly to the angle of the cutting edge of the tool, and its shape is such that no matter which face is being used, the slip can be held comfortably in the hand.

Machine Recorders.—The General Electric Company, Schenectady, N. Y., has recently put on the market a new line of curve drawing instruments which are easily adaptable for obtaining information on motor driven machines. The internal parts consist of a clock mechanism for driving the chart, the measuring element and a damping device. To produce an instrument which can be operated on both alternating and direct current circuits, the electrical element is of solenoid type with gravity control. With one of these instruments it is possible to obtain information regarding the time of operation of a machine, both light and loaded, and the time required to change work.

Combination Boring, Drilling, Milling and Tapping Head.—A new type of boring head which is known as the type C head is being built by the J. Morton Poole Company, Wilmington, Del. It is designed to use milling cutters, the diameter of which does not exceed 12 in., for cutting in either a horizontal or a vertical direction. The spindle diameter is 6-3-16 in. and the stroke is 16 in. The bearing of the saddle on the cross rail is $28\frac{3}{4}$ in. It is driven either by a 5-hp. adjustable speed reversing motor or by a two-speed countershaft and a three-step cone pulley together with two mechanical speed changes.

Twelve spindle speeds, ranging in approximately geometrical progression from 8 to 96 rev. per min., are available. For boring there are four feeds, ranging from 1-64 to $\frac{1}{8}$ in. per rev. of the spindle, and the same number of milling feeds, the range being from 1-80 to 1-10 in. For vertical cutting there are 14 feeds, ranging from 4-9 to 1-720 in., and eight horizontal cutting feeds, the limits being 1-10 and 1 in. The number of feeds for facing and turning is the same as that of the maker's standard head.

Ferracute External Notching Press.—For cutting the notches in the circumferences of armature disks, the Ferracute Machine Company, Bridgeton, N. J., is building an external notching press so constructed as to be capable of turning out accurate work at very high speeds. A pawl acting directly upon a ratchet performs the indexing and provision has been made in the construction of this mechanism to avoid all looseness, while the notches can be accurately located with reference to any holes in the disks by an adjustable jaw on the lock which controls the stopping position. After each revolution of the disk, the slotting ram stops automatically at the highest point of its stroke, and the pawl is thrown out of mesh with the ratchet simultaneously. The operator does not have to take any thought as to when he presses the treadle as a timing device working upon the hub of the flywheel prevents the press from starting at the wrong time. The shaft is run continuously, and the ram is connected to it through a pitman and a ram clutch, thus eliminating the clutch troubles incident to operating presses at high speeds. This tool will notch disks from 2 to 24 in. in diameter and medium sized work having about 20 or more notches can be turned out at the rate of 400 strokes per min. Where notches are to be cut in large disks and especially if gang dies are used, cutting two or more at once, the speed may fall as low as 200 strokes per minute.

A 22-1-2-In. High Speed Drill.—The Superior Machine Tool Company, Kokomo, Ind., has recently added a 22 $\frac{1}{2}$ -in. size that is fully automatic in its operation to its line of upright drills. This new machine is designed to handle high speed steel drills and machine or pipe taps up to $1\frac{1}{2}$ in. It will drill to any depth not exceeding 8 in., and the spindles can be automatically tripped at any predetermined point by adjustable dogs. After the spindle has been tripped, it backs out and goes forward again in about 1-10 sec. By adjusting the set screw in the trip lever the spindle can be made to feed downward, automatically trip itself, run back to its upper position and stop. When at the upper limit of its motion it can be started downward by throwing a lever operated from the front of the machine. Positive geared feeds with all the gears heat treated and ground are provided. The spindles have ball thrust bearings, and the sleeves are graduated. The construction of the table, which is rigid and heavy, is of the knee type. The working surface of the table is 17 x 40 in. and raising and lowering the table is effected by a telescoping screw. Both spindles can be started or stopped by a shifter lever, or each can be controlled independently by foot pedals on the foot of the base. The operating levers are all located so that the workman can reach them easily without changing his position.

Heavy Duty Radial Drill.—The Detrick & Harvey Machine Company, Baltimore, Md., has brought out a powerful radial drill that can be attached to the cross head of a gantry crane or to a heavy building column. A special feature of the drill is the direct drive of the spindle by a vertical adjustable speed motor mounted on the drilling head and driving the spindle directly through spur gearing having a ratio of 1 to 4, the speed of the spindle ranging from 100 to 400 rev. per min. The drill spindle is $3\frac{1}{2}$ in. in diameter, and it has a vertical movement of 18 in. by either hand or power. Power feed is provided, the four changes ranging from 0.0076 to 0.0625 in. per rev. of the spindle. The vertical face of the radial arm, which is of box section, is $24\frac{3}{4}$ in. wide. The arm is heavily braced to a cylindrical vertical portion resting upon a ball bearing seat in a pivot bracket. The maximum and minimum radial drilling capacities of this tool are 6 ft. 6 in. and 2 ft. 6 in. respectively.

The Machinery Markets

Quiet buying on the part of the railroads has improved the general tone of the machinery trade. Inquiries have increased materially in the New York market, and a decidedly better call for metal working machinery has developed. The South has become an excellent market for second-hand equipment. The railroads there are large buyers of used tools, and their purchases of late have resulted in materially advancing the value of that class of machinery. There are increased inquiries in Chicago. In Cincinnati a railroad buying movement promises to increase trade, and inquiries from the general manufacturing field are coming in more freely. The second-hand machinery market is especially good in Philadelphia, and inquiries are encouraging. Railroad supply companies promise to be good purchasers in the New England market, and the trade there is bidding on a \$100,000 list of machine tools for a large metal working machinery manufacturing company. The railroads are occupying the attention of the trade in St. Louis, where the outlook for future trade is reported to be good. The New York, Ontario & Western Railroad has a good-sized list out in New York, consisting of machine tools and blacksmith shop equipment.

New York

NEW YORK, February 1, 1911.

A decidedly better business is being done in New York than at any time within the last two months. A good indication of the trend of trade is shown in the inquiries that reached one New York machinery house during the three days of this week, when they averaged 30 per cent. larger than on the corresponding days of a month ago. Business done in January in the way of actual orders was not as large as during December, but inquiries were better than in any month since September. A great deal of the business that came forward in January from all indications will be closed out during the present month, and the outlook in the trade, all things considered, is more encouraging than it has been at any time since the spring of 1910. During the last week the Simms Magneto Company, whose enterprise has been mentioned before in these columns, closed out for its tool room equipment, which amounted to an expenditure of about \$5000, and a supplementary list of general machine shop equipment will be out in the near future. A large sewing machine manufacturing company is making inquiries with a view to adding to its machine shop equipment, and the mechanical departments of a number of Southern railroads have come forward with requests for catalogues and estimates for machine tool equipment for early delivery. No new railroad inquiries of any consequence have come into this market. Second-hand machinery is becoming rather scarce, and good prices are being taken for used equipment. Many people who have asked for prices on second-hand material have of late changed their requests for bids by asking for figures on new machinery, and as about every kind of machine tool, with the exception of automatic machinery, can be had on a few days' notice, it is thought that the present scarcity of used machinery will result in an increasing call for first-hand machinery. The export business continues surprisingly good. Two leading export houses have been placing large orders for delivery in Continental Europe direct with manufacturers. The United States Lighting & Heating Company, with New York offices at 30 Church street, is buying machine tools in this market for delivery to its new plant at Niagara Falls, N. Y. The company has been equipping a large plant for the manufacture of storage batteries and commercial trucks and lighting and heating systems for railroad trains. Another large buyer in this market at present is the Lewistown Foundry & Machine Company, Lewistown, Pa., which is placing orders for a general line of machine tool equipment amounting to nearly \$1000.

The International Steam Pump Company, 115 Broadway, New York, has completed negotiations for the sale of a block of its 20-year 5 per cent. bonds, which is part of the balance of \$3,500,000 remaining from its \$12,000,000 bond issue of 1909. These bonds are being sold to defray the cost of improvements on the company's various plants and to make final payments on the F. M. Prescott Steam Pump Company of West Allis, Wis., Jeanesville Iron Works Company, Hazelton, Pa., and the Denver Rock Drill & Machinery Company, Denver, Colo. The company is planning to add to the manufacturing equipment of most of its plants. It will be remembered that a little more than two years ago the International Steam Pump Company issued a very extensive list, a large part of which was afterward withdrawn because of the business depression. It is very probable that this list will be put forward again to provide for machinery for the proposed extensions.

Alexander Potter, consulting engineer, 116 Liberty street, New York, has charge of the construction of a large water works at Oklahoma City, Okla., which will cost about \$1,500,000. The enterprise includes the construction

of a concrete dam 1000 ft. long, pumping station capable of pumping 20,000,000 gal. of water a day and a water purification system to handle 10,000,000 gal. of water a day. Mr. Potter is also consulting engineer on the construction of a garbage disposal plant for the city of Muskogee, Okla., which will necessitate the expenditure of \$35,000. The power for operating the plant will be furnished by burning combustible waste material and most of the equipment for this enterprise will be special machinery.

Inquiries out in the New York market indicate that the General Electric Company, Schenectady, N. Y., will shortly proceed with its plans to add to its plant at Erie, Pa. Mention of the company's enterprise has been made in these columns from time to time, and it may be remembered that a large foundry was recently built there. It is understood that inquiries now out indicate that a machine shop will be added to the Erie plant and perhaps the more ambitious plans of the company toward making Erie a large manufacturing unit in its system will be carried out.

Frederick A. Waldron, industrial engineer, 37 Wall street, New York, has been awarded a general contract for the construction of a large factory building at Glenmore and Snediker avenues, Brooklyn, N. Y., for Shapiro & Aronson, 24 Morton street, Brooklyn. The plant will be used for the manufacture of chandeliers. The plans call for a building 100 x 100 ft., five stories and basement, and will be equipped with metal working machinery.

The Lord & Burnham Company, Irvington, N. Y., builder of greenhouses, is planning to make extensive additions to its works at Des Plaines, Ill. The company has 16 acres of land there and has completed the first unit, 150 x 400 ft., saw-tooth roof construction, of what will be the largest plant of its kind in America. The completed building is to be used as a power plant and wood working shop. Most of the machinery has been purchased.

The Rome Mfg. Company, Rome, N. Y., which recently arranged for the erection of a building 60 x 300 ft., two stories, will use its added manufacturing capacity as a department for the making of its rubber goods. Most of the equipment to be installed will be special rubber working machinery.

The Morrin Climax Boiler Company, which recently purchased the plant of the West Pulverizing Machine Company at Mallory and Pollock avenues, Jersey City, N. J., has been incorporated, with an authorized capital of \$100,000, to manufacture boilers, steam generators, pipe fittings, &c. T. F. Morrin, E. T. Morrin and T. J. O'Day are the incorporators.

George Fuller, consulting engineer, 111 Broadway, New York, is preparing plans for the construction of a sewerage system and disposal plant for the municipality of North Plainfield, N. J. The plant will cost about \$100,000.

The city of Aurora, N. Y., is preparing plans for a system of sewers and a disposal plant to cost about \$100,000. Frederick K. Wing is the engineer in charge.

The Ithaca-Auburn Power Company, recently organized with a capital stock of \$50,000, has purchased the Remington Power plant at Ithaca and will enlarge and re-equip it to provide operating power for the Auburn-Ithaca Inter-Urban Trolley Company in addition to power for the Ithaca Electric Railway Company and the lighting of the streets of Ithaca.

The Alberger Gas Engine Company, recently incorporated in Buffalo with a capital stock of \$221,000, has in addition to taking over the gas engine business heretofore conducted by the A. H. Alberger Company, acquired substantially all of the capital stock of the Howard Iron Works, Buffalo, which concern has been controlled since 1905 by the Otis Elevator Company. The Absorbing Company will, besides the manufacture of gas engines from 15 to 500 hp. at the Howard Iron Works plant, continue to carry on at this plant the business of general founders and machinists and manufacturers of transmission machinery

THE MACHINERY MARKETS

and the Burdick bolt and nut machines, the same as was done by the former management of the Howard Iron Works. The officers of the new company are: president, Alvin H. Alberger; vice-president, Edward B. Holmes, president, E. & B. Holmes Machinery Company; secretary and treasurer, Harvey L. Brown.

The Wayne County Gas & Electric Company will install a number of electric motors of various sizes in its power plant at Lyons, N. Y., to replace old motors. The cost of the improvements to be defrayed one-half by the company and one-half by the consumers of electricity at Lyons.

The Lockport Textile Company, Lockport, N. Y., has completed plans for the erection and equipment of an additional mill, which will double its present capacity.

Construction work is soon to be commenced on the enlargement of the plant of the Remington Typewriter Company, Illion, N. Y., for which plans have been completed.

The Laundry Plant of the Mohr & Hunter Company, Cherry and Michigan streets, Buffalo, N. Y., is to be largely increased and new machinery equipment installed.

The City Dairy Company, Rochester, will erect a two-story addition to its creamery at Hudson avenue and Woodbury street, and install new machinery.

The Rochester Gas Engine Company, Rochester, N. Y., has completed plans for its new plant and construction work will begin early in the spring.

The Troy Wire Goods Company, Troy, N. Y., has been incorporated with a capital stock of \$10,000 to manufacture wire specialties. The incorporators are Howard B. Bone-steel, Horace A. Olmstead and Clifford Her.

Chicago

CHICAGO, ILL., January 31, 1911.

The general demand for machine tools in this territory continues to improve, although it has not yet reached a normal volume of business. There are more inquiries from manufacturing users of tools and there is also better progress in closing sales on scattering inquiries. If all the inquiries that are coming in were being closed promptly the market would be quite satisfactory, but a large proportion of the buyers who are figuring in this market are chiefly interested in getting prices and data on which to place business later on, when the improvement they hope for in their business actually appears. The jobbing foundries and machine shops have been running light this winter, and their experience in buying iron the past year encourages them to wait until improvement actually appears in the form of contracts and orders. The machine tool men are looking with interest on the reports of better conditions in the steel industry, especially in railroad buying, as this will have a good effect on the railroad equipment and supply industries. The manufacturers who sell to the agricultural trade have been steady buyers of tools and shop equipment all winter.

The Skillin & Richards Mfg. Company, Chicago, engineer, founder and machinist, will remove its plant from its present location at Fulton and Union streets to Courtland street and Forty-sixth avenue, where a new factory building 118 x 410 ft. is being erected. The building will be equipped with a traveling crane and will cover a floor space considerably in excess of an acre. The company expects to occupy the building by May 1.

The Leader Iron Works, Decatur, Ill., has increased its capital stock from \$100,000 to \$200,000. It is the intention of the company to do considerable building during the year and install new equipment. The company will also extend its selling organization.

The Burgess-Norton Mfg. Company, Geneva, Ill., is contemplating the erection of an addition to its plant, for which plans have not been prepared.

Peter Brothers, Algonquin, Ill., are erecting a new machine shop building, 55 x 120 ft., two stories. A new lathe and drill press will be purchased. Electricity will be used for operating power.

G. E. Hixon, Harrisburg, Ill., is interested in a company which is considering the feasibility of the erection of a power plant at the Grand Rapids dam, near Mount Carmel, Ill., where a site was recently purchased. It is the intention of the company to put in a plant with 8000 to 10,000 hp., with a steam auxiliary plant.

The City Council of Sidney, Ill., is preparing to establish a municipal lighting system.

The Orinda Stove & Mfg. Company, Quincy, Ill., has been incorporated with a capital stock of \$50,000. The incorporators are C. H. Wurst, Henry Lange and A. H. Stork.

The plant of the Commonwealth Steel Company at Granite City, Ill., was damaged by fire January 22, to the extent of about \$15,000. The loss is covered by insurance.

New England

BOSTON, MASS., January 31, 1911.

Machinery builders and their representatives who have been visiting other sections of the country are returning home with confidence greatly increased. They report a stronger sentiment practically everywhere. While the average manufacturing plant is not doing more than a fair business, expectations are a good deal better, in many cases based upon tangible knowledge of future orders. It is especially significant that the large manufacturers of railroad supplies and equipment in various parts of the country are preparing to do a very large business, and are especially interested in heavy semi-special machinery, which will improve their product and at the same time reduce costs. The viewpoint of the average manufacturer and dealer in this territory in regard to the situation is changed in a marked degree. Practically no one appears to doubt that the improvement, already felt to some extent, will become more strongly accentuated as the spring approaches nearer.

And important development of the week is the entrance of Beaudry & Co., Inc., 141 Milk street, Boston, into the market for \$10,000 worth of machine tools, for which quotations are being asked. The company manufactures the Beaudry Champion power hammer and duplex forging presses, combining press, shears and punch.

The American Warp Drawing Machine Company, Boston, is finishing its new shop building at Harrison Square, and will occupy it in a short time. Not much new machinery has been installed, but the company is planning to duplicate the structure in the comparatively near future, which would mean extensive purchases of tools. Ample land is available on the new site. The building is 60 x 103 ft., two stories. The demand for the company's machinery is very heavy, necessitating running overtime, and the indications are that the new shop will not be adequate for very long. The present works are at 289 A street, South Boston.

The Sturtevant Mill Company, Boston, Mass., manufacturers of crushing and other mining machinery, suffered a loss of about \$20,000 in the recent fire in the shops at Harrison square, the damage being confined mostly to the buildings, lighting, belting, shafting, engine and some other machinery. The company states that it is too early to say what will be required in the way of new equipment. It is possible that a change will be made to electric drive.

The New England Coke & Coal Company, Boston, has out specifications for two colliers, to cost not in excess of \$1,000,000. If the bids prove too high, orders may be postponed.

The new foundry of the Vanadium Metals Company, East Braintree, Mass., will be located on land adjacent to the plant of the New London Ship & Engine Company, at Groton, Conn.

The outlook for New England is for large industrial expansion this year. The list of concerns which have either begun the erection of new works or additions, or which plan to increase equipment in a large way in existing works, is a long one, and it is known that other important improvements will be announced soon. Some of the companies already mentioned are the Trumbull Electric Mfg. Company, Plainville, Conn.; Stanley Machine Company, Salem, Mass.; United Shoe Machinery Company, Beverly, Mass.; General Electric Company, Lynn and Pittsfield, Mass.; Central Oil & Gas Stove Company, Gardner, Mass.; Waterbury-Farrel Foundry & Machine Company, Waterbury, Conn.; H. B. Smith Company, Westfield, Mass.; Marcus Mason & Co., and the Ames Plow Company, Worcester, and the Gurney Heater Company, Boston, new works at South Framingham, Mass.; H. D. Smith Company, Southington, Conn.; Lake Torpedo Boat Company, Bridgeport, Conn.; C. O. Churchill & L. Holst, valve and foundry plant, Westfield, Mass.; Baird Machine Company, Oakville, Conn., works at Bridgeport; New London Ship & Engine Company and Vanadium Metals Company, works at Groton, Conn.; C. H. Metz, Waltham, Mass.; Oven Equipment & Mfg. Company, Stamford, Conn.; at New Haven; S. A. Woods Machine Company, Boston; Ideal Switch Company, Plainville, Conn.; Steele & Johnson Mfg. Company, Waterbury; National Perforating Machine Company, Athol, Mass.; Bradley Car Works, Worcester; F. E. Wells & Son Company, Greenfield, Mass.; National Spring Bed Company, New Britain, Conn.; Potter & Johnston Company, Pawtucket, R. I.; Malleable Iron Works, New Britain; Screw Machine Products Company, Providence, R. I.; and A. H. Wells & Co., Inc., Waterbury.

The Boston & Maine will be the large buyer among the New England railroads, but the New York, New Haven & Hartford is not an unlikely factor in the machinery market. Nothing has been done by this road toward erecting large

THE MACHINERY MARKETS

repair shops at the western end of its system, and they are needed there. While no definite knowledge is obtainable at this time, nor are reports current, still those who have been watching the situation at New Haven expect to hear something of the plans in the near future. The general intention is to build works at least as large as those at Readville, for both locomotive and car repairs.

Philadelphia

PHILADELPHIA, PA., January 30, 1911.

Merchants and manufacturers report a continued quiet demand, with sales confined largely to single tool propositions. While prospective buyers are taking estimates on probable purchases, the actual placing of orders is in many cases deferred until the last possible moment and then urgent delivery required. This is particularly the case with recent inquiries coming from railroads, which seem disinclined to make any purchases that can possibly be avoided. Representatives of merchants and manufacturers in this city who have recently made trips over the territory usually known as the Philadelphia district report conditions as being unfavorable for any pronounced buying in the near future, except in the way of small lots, and even this class of buying is not very extensive. One prospective buyer in this territory, who had a large list out about a year ago for the equipment of a proposed new plant which was subsequently built, is now asking for proposals for practically the same equipment in second-hand tools. Manufacturers of tools and machinery note an irregular demand, better in the aggregate, however, than that during the closing month of 1910. The last half of January was also more productive in orders than was the first half, due no doubt to business having been held in abeyance pending the completion of inventory matters.

The demand for boilers and engines has not been very active; some fair inquiries are before the trade, but orders develop slowly.

The second-hand machine tool trade has been a shade more active, particularly in the way of inquiries. The rather extensive list of the M. E. Treadwell Company for its new plant, as advertised in a recent issue of *The Iron Age*, is being extensively figured on.

The Hess Steel Casting Company, Bridgeton, N. J., has about completed the erection of its buildings and has contracted for such equipment as is needed at this time. This company will manufacture steel castings of special design by a German process which Henry Hess, its president and also president of the Hess-Bright Company, Philadelphia, has acquired for North America.

The Metropolitan Electric Company, Reading, Pa., is taking bids for several lathes, drill presses and a grinder, all electrically driven, to be installed in its machine shop. R. Carpenter, New York is the consulting engineer.

Estimates are being taken by Walter Smedley, architect, for a seven-story reinforced concrete building, 47 x 122 ft., for light manufacturing purposes, to be erected at 633-35-37 Arch street, for Charles E. Morris.

The Phoenix Portland Cement Company, Nazareth, Pa., has under consideration, it is stated, extensive improvements to its plant. New buildings are proposed, as well as power equipment. The roasting, grinding and crushing departments of the plant will be materially increased if the plans under advisement are carried out.

Bergdoll & Pawling, engineers, will erect an eight-story concrete and steel manufacturing building, 35 x 84 ft., at the southeast corner of Broad and Carlton streets. Estimates for the subcontracts will be asked at an early date.

The Department of Public Safety, Bureau of highways, room 232, City Hall, opens bids to-day for the reconstruction of a bridge on the line of Forty-seventh street, over the West Chester & Philadelphia Railroad.

The Philadelphia Toilet & Laundry Company is having plans prepared by the William Steele & Sons Company for a brick and concrete factory building, 72 x 125 ft., partly for laundry purposes, to be erected at 1427-1433 Race street. Plans will be ready for estimate, it is stated, in the near future.

The Philadelphia & Easton Electric Railway is planning an extension from Doylestown to Lansdale, Pa., a distance of 10 miles. At the latter point a connection would be made with the Montgomery Traction Company, which line runs to Norristown and thence via Chestnut Hill to this city.

The Sanitary Can Company, Bridgeton, N. J., will increase the capacity of its plant. A one-story factory building, 115 x 208 ft., for the manufacture of cans, will be erected, on the completion of which the present factory building will be used for warehouse purposes.

Bids will be taken until February 7 by the Department

of Wharves, Docks and Ferries, city of Philadelphia, for furnishing one deck and derrick scow. Specifications may be obtained by applying to Joseph F. Hasskari, acting director, 555 Bourse Building, this city.

Cincinnati

CINCINNATI, OHIO, January 31, 1911.

If any change at all is to be noted in the local manufacturing situation, it is for the better. Inquiries for machine tools continue coming in freely, and with several firms there has been a slight increase in the amount of business booked. There is a rumor that two Western railroads, recently mentioned, will come into the market soon for small sized lists of tools, and it is known that the Queen & Crescent System will make purchase of equipment for its Somerset, Ky., shops at no distant date. Business from automobile manufacturers continues quiet, but machine tool salesmen report indications of a revival in this particular line, as practically all automobile makers are commencing to build commercial vehicles in connection with the pleasure cars now turned out.

One local firm reports a surprising number of inquiries for boilers, both for large and small units, which indicates that many new manufacturing industries are planned for the present year. Electrical machinery is in better demand, especially so are the smaller sizes of generators and motors.

The Potts-Rine Supply Company, Columbus, Ohio, has been incorporated, with \$25,000 capital stock, to manufacture and deal in engineering specialties and supplies. The incorporators are B. D. Potts, H. L. Potts, F. M. Rine, L. G. Williams and Frank Christ.

The Warner Mfg. Company, Toledo, Ohio, was incorporated, with \$500,000 capital stock, to manufacture automobiles. The principal incorporator is Thomas W. Warner of Toledo.

The John Dietz Mfg. Company, Cincinnati, manufacturer of the Dietz rubberboard washing machine, has moved into its new quarters at Eighth and Elm streets. It needs further woodworking machinery to complete its equipment, and is in the market for a jointer, surface planer, rip saw, band saw and boring machine.

The Carr Milling Company's plant at Hamilton, Ohio, was destroyed by fire January 28, and the reported loss is about \$120,000, partly covered by insurance. It is stated that the mill will be rebuilt, for which considerable power equipment and flour milling machinery will be required.

To manufacture furniture the Frank-Clapps Company has been incorporated at Toledo, Ohio, with \$30,000 capital stock, by E. C. Frank, George J. Budd, A. C. Budd, H. W. Clark, C. K. Southard and W. Clapp.

The annual meeting of Smith & Mills, machine tool manufacturers, Cincinnati, was held January 26. No change was made in the personnel of the officers. Albert S. Smith is president and treasurer; James Mills, vice-president and general manager; James E. Mills, secretary, and Ernest Mills, superintendent.

The Laidlaw-Dunn-Gordon Company, Elmwood place, Cincinnati, is shipping an air compressor of 4000 cu. ft. capacity to the Vesta Coal Company, which is a subsidiary company of the Jones & Laughlin Steel Company, Pittsburgh, Pa. This is the third of a series of seven machines for which the Laidlaw-Dunn-Gordon Company has an order from the company mentioned. Compressors for the government are also being built, with capacities running from 3500 to 4500 cu. ft., and for shipment respectively to the navy yards at Washington, Philadelphia, Brooklyn and Mare Island.

The Cincinnati Abattoir Company, Cincinnati, has had plans prepared for an addition to its refrigerating plant.

Plans have been drawn up by J. L. Epperson, architect, Canton, Ohio, for a manufacturing plant to be put up for the Lawrence Clay Products Company, at North Lawrence, Ohio. There will be four buildings in all, of brick and steel construction.

The Pressing & Orr Canning Company, New Holland, Ohio, is preparing to erect a canning factory.

The Hicks Ash Coal Company, Peytona, W. Va., will probably require some power plant equipment at an early date.

The recently mentioned project for a new paper mill has materialized and the Franklin Coated Paper Mill Company, Franklin, Ohio, has been incorporated with \$300,000 capital stock, and work on the proposed plant will begin at an early date. The incorporators are John J. Maloney, John Fischer, W. Symmes, B. Bickley and W. C. Hodges, all of Hamilton, Ohio.

The city of Mansfield, Ohio, is considering the building of a municipal electric lighting plant.

THE MACHINERY MARKETS

Schenck & Williams, architects, Dayton, Ohio, have completed plans for the Beaver power landing to be erected in that city. The structure will be 180 x 184 ft., three stories and of reinforced concrete construction.

Recent sales of the Triumph Electric Company include three 50-kva, alternating current generators for the Otis Elevator Company, one 150-hp. induction motor for H. T. Lloyd, mining engineer, Spokane, Wash.; 36 induction motors, ranging from 1 to 10 hp. for the Bishop Babcock Company, pump manufacturer, Indianapolis, Ind., and several other orders, among which are two generators for use in the new shops of the Missouri Pacific Railway Company. The Triumph Company's new brass foundry is now in full operation.

A party of Eastern capitalists are said to be interested in taking over the plant of the defunct Steel Foundry Company, Winton place, Cincinnati. W. B. Melish, Cincinnati, is receiver for the old company.

Sechler & Co., Cincinnati, carriage manufacturers, are remodeling the old Harkness & Cowing building, adjoining their plant at Fifth and Culvert streets. Two stories will be added to the building and the Grinnell sprinkler system installed throughout. The Queen City Paper Company will occupy part of the structure when the repairs are completed.

The William Powell Company, Cincinnati, reports an excellent business during 1910. It is making regular shipments on its contract with the Isthmian Canal Commission for globe and angle valves, up to and including the 4-in. size. This is the regular Powell Model Star valve that is furnished the trade, and which was selected by the Board of Engineers in competition with various other manufacturers.

The City Council of Canton, Ohio, has been petitioned for \$69,000 to be expended for improvements to its water works system. The improvements include stand-pipe, engine, generator, &c.

St. Louis

ST. LOUIS, Mo., January 30, 1911.

Machinery merchants report business continuing fairly good this week.

The W. B. Knight Machinery Company, maker of vertical reuiling machines, finds business picking up and is well satisfied with the outlook.

The Kansas City Terminal Railroad has been buying a few tools for its new shop at Kansas City, Mo.

The Ward Mfg. Company, St. Louis, has been incorporated, with a capital stock of \$10,000. The incorporators are Willis E. Ward, John D. Moore and Jackson Guthrie. The company will engage in the manufacture of mechanical appliances.

The National Gas Machine Company, St. Louis, recently incorporated, has purchased for \$40,000 a three-story and basement factory on Wilson avenue, near the St. Louis & San Francisco Railroad, for the purpose of entering upon the manufacture of its gas machine. The president of the company is B. F. Fenn; H. G. Wernimont is the secretary and general manager.

The plant of the Ferguson Waterproof Company, manufacturer of oil cloth goods, at 2136 South Second street, was destroyed by fire January 25. The loss is estimated at \$55,000. Forrest Ferguson is the president of the company; Albert F. Baggett is its secretary and treasurer.

The Carroll Muzzle Company, whose plant is now at Carroll, Iowa, will remove to St. Louis in the near future and locate at 821-823 South Tenth street. The company, which has a capital stock of \$100,000, has been engaged in the manufacture of wire muzzles, but will hereafter make all kinds of wire novelties. A. W. Swender, the vice-president, has been in St. Louis making the necessary arrangements.

The International Electric Fixture & Contracting Company, St. Louis, has been incorporated. The capital stock is \$10,000. The incorporators are Oliver T. Hiras, Paul Brown, Jr., and Robert Holmes.

The General Novelty Mfg. Company, St. Louis, has been incorporated, with a capital stock of \$15,000. The incorporators are Frank Bishop, Donald H. C. O'Neil and H. C. Barker. The company will manufacture auto parts.

The Donnell Sanitary Milk Can Company, St. Louis, has been incorporated, with a capital stock, fully paid, of \$50,000. The incorporators are W. F. Donnell of Hematite, Mo.; John F. Meier of Pevely, Mo., and L. W. Meier of St. Louis.

The largest brewery machinery manufacturing plant in the world will soon be established in this city. This is assured by the incorporation of the Busch-Sulzer-Borschers-Diesel Engine Company at St. Louis, with a paid up capital stock of \$2,100,000. The company will erect a large factory at South St. Louis, on land already purchased. The officers

will be chosen at the first meeting of the new corporation, February 2.

The Acme Tool Company, Jennings, Mo., has been incorporated, with a capital stock of \$150,000. The incorporators are William Klasing, Louis Klasing and F. J. Steiner.

The Faeth Iron Company, Kansas City, Mo., has increased its capital stock from \$225,000 to \$350,000.

The Aurora Electric Light & Water Company, Marionville, Mo., has settled upon a site for its plant. Work on the plant and the laying of water mains will begin at once. The cost is estimated at \$25,000.

The Manchester Milling Company, Manchester, Mo., suffered the loss of its flouring mill by fire January 21. The loss is estimated at \$100,000.

A. F. Sievert was in St. Louis last week assisting Mr. Boettger of Warrenton, Mo., in the selection of machinery for his new ice plant.

Water Commissioner Atkins of St. Louis, Mo., has petitioned the Council for an appropriation of \$750,000 for improving the city water system. Of this amount \$100,000 will be used for the erection of a new boiler house at Bissell's Point and new equipment, including turbine engines; revetment of the river bank at Chain of Rocks, \$150,000, and a new distribution department to cost \$250,000.

Cleveland

CLEVELAND, OHIO, January 31, 1911.

The outlook in general machinery lines is improving and many manufacturers report a satisfactory volume of orders. The machine tool market continues somewhat quiet. Local dealers are getting a little better volume of orders, but they are mostly for single tools. The buying is largely scattered and inquiries of any size are lacking. Practically no business is coming from the railroads. Business with crane builders has improved considerably, but orders are mostly for small equipment for small industrial plants. The demand for foundry supplies shows an improvement. In the foundry trade orders for aluminum and malleable castings have improved, some business now being placed by the automobile trade, and makers of gray iron castings are looking for an increase in orders from this source shortly. With the improvement in general conditions more new concerns are being formed in metal working lines than for some time past and some inquiries are developing from this source for small lots of machine tools. As good deliveries can be secured, the placing of these orders in many cases are being deferred until the equipment is needed.

The Stuyvesant Motor Car Company has taken over the plant formerly owned by the Gaeth Automobile Company on West Twenty-fifth street, Cleveland. The new company will manufacture both touring cars and commercial trucks. The plant will be enlarged by the erection of a building on an adjoining site. Additional floor space to the amount of 30,000 sq. ft. will be provided. Plans have been prepared and the work will be started very shortly. Considerable new machinery will be purchased, according to present plans. Frank E. Stuyvesant is president of the company.

The Mora Power Wagon Company, Cleveland, has been incorporated, with a capital stock of \$750,000, to manufacture commercial power driven vehicles. S. H. Mora and others are interested in the company.

The Foundries Company, Orrville, Ohio, has been incorporated, with a capital stock of \$10,000, by H. D. Shannon, D. Ed. Seas, George Wendling, H. A. Smitzer, Benj. Wheeler, R. A. Kinney and B. G. Cope.

The National Metal Specialty Company, London, Ohio, has been incorporated, with a capital stock of \$50,000, by Clyde C. Thomas, M. B. Armstrong, Harry C. Haines, R. W. Boyd and Eb. Converse.

The Toledo Pipe Threading Machine Company, Toledo, Ohio, has recently completed additions to its plant, largely increasing its capacity. A new building has been erected, 40 x 200 ft. and two stories. A new power plant and a new pattern shop have also been provided. The new power equipment includes two boilers and a 150-hp. engine. The company will hereafter make its own screw parts, having installed automatic machines for that purpose. All the machinery is now motor driven under the group system. The company reports an increase of 30 per cent. in its business during 1910, as compared with the previous year, and a still larger gain in orders during the present month as compared with January, 1910.

The Toledo Bridge & Crane Company, Toledo, Ohio, is extending its business to the ore handling field and will make bridges and other handling equipment. The company reports a very satisfactory volume of business during the past year, the sales of its crane department having reached \$200,000. This company has just completed the installation of a Gantry

THE MACHINERY MARKETS

crane and bucket for handling coal at the power plant of the Toledo Railways & Light Company.

The Toledo Machine & Tool Company, Toledo, Ohio, has under construction two huge presses, each of which is the largest of its type ever made. One is a triple crank 14-ft. press and the other a single crank 5-ft. press. Each weighs 275,000 lbs. This company reports that its business during 1910 was double that of the previous year and that the outlook for the present year is quite encouraging.

The National Supply Company, Toledo, Ohio, is planning large extensions to its plant during the present year. Three buildings will probably be erected in which to manufacture oil well supplies. The company will install new forge shop machinery and probably other equipment.

The Aluminum Products Company, Canton, Ohio, has been incorporated, with a capital stock of \$250,000, to manufacture aluminum sheets and various aluminum products. Outside capital is largely represented in the project.

The Favorite Stove & Range Company, Piqua, Ohio, will enlarge its plant by the erection of an additional building for the molding department. The building will be 110 x 300 ft. Other departments will also be enlarged.

The Defiance Chamber of Commerce, Defiance, Ohio, has been organized to promote the business interests of the city, and especially to bring new industries there. The officers are T. T. Ansberry, president; S. A. Craven, vice-president; I. M. Adams, secretary, and Albert Diehl, treasurer.

The new foundry of the Davis-Price Company, New Cumberland, Ohio, has been placed in operation. The machine shop will be completed within a few weeks.

The Matthews Boat Company, Port Clinton, Ohio, will enlarge its plant by the erection of a concrete and steel building.

The Upper Sandusky Electric Light & Power Company, Upper Sandusky, Ohio, has been purchased by the American Gas & Electric Company, Providence, R. I. It is understood that the plant will be overhauled and new equipment installed.

Indianapolis

INDIANAPOLIS, IND., January 31, 1911.

The Enterprise Foundry & Fence Company, Indianapolis, has increased its capital stock from \$50,000 to \$75,000.

The Bedford Stone Product Company has been incorporated at Bloomington, Ind., with \$50,000 capital stock, to quarry stone. The directors are James Wampler, C. L. Beck and George W. Bollenbachner.

The Ford Meter Box Company has been organized at Wabash, Ind., with \$25,000 capital stock, to manufacture water meters. The directors are E. H. Ford, T. W. and W. A. McNamee.

The Isbell-Strickland Company, Elkhart, Ind., has been incorporated with \$10,000 capital stock, to manufacture building materials. The directors are E. E. Isbell, C. B. Isbell and H. J. Isbell.

The Brook Novelty Company, Brook, Ind., has been incorporated, with \$30,000 capital stock, to manufacture novelty goods. The directors are L. E. Lyons, L. C. Lyons, Edward Hess, J. B. Lyons, Sr., and W. A. Bringham.

The Fortune Post Company, Richmond, Ind., has been incorporated, with \$10,000 capital stock, to manufacture fence posts. The directors are Mather B. Kelsey, J. E. Peltz and H. B. Williams.

The Siler-Petit Mfg. Company, Fort Wayne, Ind., has been incorporated, with \$250,000 capital stock, to manufacture pumps, liquid storage and distributing systems. The directors are E. E. Siler, B. F. Petit, G. S. Hanford, M. J. Martene and E. M. Hulse.

The Bahr Brothers Mfg. Company has been incorporated at Marion, Ind., with \$25,000 capital stock, to manufacture machinery. The directors are Amel F., Otto B. and William F. Bahr.

The Electro-Lighting Company, Indianapolis, recently incorporated, with \$100,000 capital stock, will manufacture a device for furnishing electric searchlights for automobiles, by means of dynamos, connected direct to the engine and running at engine speed. A storage battery for use when the engine is not running, and which is automatically charged, will be used with the new device. The device provides ignition as well as lighting, and, in location, as well as use, takes the place of the present magneto. It is said to overcome the difficulties of governing the dynamo current under the variable speed of the engine, also to overcome the overcharging of the battery, the current being automatically cut off when the battery is fully charged. Until a permanent location for a factory is found the dynamos and coils

will be made under contract. The officers of the company are: President, S. C. Renick; vice-president, Charles C. Wedding; secretary-treasurer, Joseph E. Bell; assistant secretary, W. H. Harbison. The officers are in the Board of Trade Building.

The Vincennes Electric Company has been incorporated at Vincennes, Ind., with \$20,000 capital stock, to furnish heat, light and power. The directors are W. T. Barnes, A. J. Heitz and C. W. Sherman.

The Miller Shoe Mfg. Company, Cincinnati, will build a branch factory at Greensburg, Ind., to manufacture uppers exclusively. The company may equip a building already there. The company's capital stock will be increased in order to provide for the extension.

Frank E. Towns, Gary, Ind., proprietor of the Hoosier Machine Shop, is erecting a machine shop, 30 x 60 ft., which he expects to have ready for occupancy about February 15. The shop will be equipped for general repair work, including two lathes, drill press, gas forge, brazing forge, shears and punch, bicycle repair outfit and overhauling tools for automobile work, universal milling machine, shaper and large drill press, one rail traveling hoist and oxy-acetylene welding plant.

The Goshen Churn & Ladder Company, Goshen, Ind., is contemplating the erection in the spring of a two-story brick factory and office building, 64 x 156 ft., and a power plant and dry kiln. Details of equipment to be installed have not been decided upon.

The American Motors Company, Indianapolis, Ind., has purchased the assets of the American Motor Car Company of that city, taking over all of its contracts and assuming all of its liabilities. The capital stock of the company will be materially increased and its manufacturing facilities extended. The officers of the company are as follows: V. A. Longaker, chairman of Executive Board and general manager; J. I. Handley, president; D. S. Menasco, vice-president; J. D. Bright, treasurer; J. E. Kepperly, secretary.

The Dille & McGuire Mfg. Company, Richmond, Ind., is contemplating extensive improvements to its plant during the spring, plans for which are now being prepared. The new buildings will be erected on ground adjoining the present plant and when completed will cover a city block. The buildings will be of fireproof construction and electricity will be used for operating power.

Detroit

DETROIT, MICH., January 31, 1911.

The interest among the manufacturers of this city this week is mainly centered upon the proposed reciprocity agreement with Canada. Directly across the river from this city is the city of Windsor, Ontario, a manufacturing center of importance, which possesses several branch factories of Detroit concerns, particularly automobile. Naturally the latter and also the manufacturers of farm implements, both products of which are included in the proposed agreement, are somewhat interested, but in neither case are they of the opinion that there will be any immediate change in prices. Thus far January gives promise for a great year, especially in the automobile industry. More stability seems prevalent than at any time last year.

The American Auto Trimming Company of this city will occupy as its main factory the manufacturing plant recently vacated by the Hudson Motor Car Company. It is a two-story building of mill construction, occupying a ground space of 54 x 400 ft.

The Snell Creamery Company, Detroit, incorporated a short time ago, has commenced construction on the buildings of the plant, located at Highland Park. The main building will be 40 x 120 ft., and the barn 50 x 200 ft.

The Diamond Match Company of this city has generously advised the Patent Office that its patent on the sesqui-sulphide match-making process is now open to use by independent match manufacturers, and the dangerous use of the white phosphorus, the cause of bone necrosis to workers, will no longer be necessary.

The administration building of the Lozier Works, in the course of being transferred from New York, is nearing completion, and the employees of the general offices are preparing to occupy their new quarters in this city.

Morris Grabowsky, vice-president of the Alden Sampson Mfg. Company, has confirmed the report that the \$350,000 plant of the Sampson organization will be transferred from its present location at Pittsfield, Mass., to this city. The factory in the former city will be closed on January 31, and

THE MACHINERY MARKETS

the machinery immediately moved by motor truck to two special trains, and thence shipped here.

The annual meeting of the Detroit Pressed Steel Company resulted in the election of the same directors and officers as last year. The capacity of the plant has been enlarged, and the line of products extended. The capital stock is increased from \$60,000 to \$200,000.

The Fenn Mfg. Company, Charlotte, Mich., filed articles of incorporation. This is a change from the co-partnership to facilitate business. The company possesses the patent on a machine devised to automatically bend scythe snaths.

The Marquette Motor Works, Saginaw, Mich., will move into its immense new machine shop about February 1. The force of men employed will be increased by about 150 when improvements are completed.

Articles of association of the American Stamping Company, Battle Creek, Mich., have been filed. The purpose of the corporation will be the manufacture of oil cups, grease cups and metal goods used principally by manufacturers of automobiles, engines, hardware and plumbing goods. The stock is held by E. L. Estes of Mendon, J. M. Benjamin of White Pigeon and L. H. Sabin of Battle Creek.

A reorganization of the office force of the General Motors Company at Pontiac, Mich., is in full swing. George A. Horner and W. A. Voss, general manager and assistant, respectively, of the Rapid Motor Vehicle Company, have both resigned. Other changes will follow.

The Alpena Portland Cement Company, Alpena, Mich., has asked for the appointment of a receiver. The plant has not been in operation since 1909.

Baltimore

BALTIMORE, MD., January 31, 1911.

Business in the iron, steel and machinery trades in this territory has been somewhat irregular during the past month. Transactions in the first half of January were restricted, but an increased demand in the last half has brought the aggregate volume in some lines up to, and in a few instances in excess of, the average. In the machine tool trades business continues light, buying being of the small lot order, with few inquiries of any size under consideration. Railroad buying has also been very light. Contractors' supplies and equipment have been dull, as is usually the case at this season. In general machine shop supplies, dealers report a fair volume of business, resulting largely from the placing of orders held up prior to the first of the year. Builders of special tools note an increasing demand and in a number of instances plants engaged in that character of work are quite actively engaged. Considerable irregularity is still to be noted in the foundry trade. While January is usually a dull month in the building trades, quite a few contracts for buildings for manufacturing purposes have been placed and negotiations are under way for a fair amount of new work, both locally and in the Southern territory. Fabricators of iron and steel report a fair month's business and estimating departments are actively engaged on specifications for further work. Complaint is heard that, notwithstanding the fact that prices for finished materials have been maintained, those for fabricating and erecting work are being shaded and quotations are in some instances reported as being below actual cost. Municipal contracts have not been very heavy; while considerable work of this character is in prospect, little has been recently contracted for. The trade generally looks forward to a larger volume of business in the near future, and it is believed that the increased volume closed during the latter part of the month is but a forerunner of a gradual betterment which will ultimately extend to all branches of the trade. There has been a better demand for boilers and engines, and engineers are making further bids on a fair run of new business.

Announcement has been made that preliminary plans for a large power house to be erected at Boston and Patuxent streets, for the American Tobacco Company, are being prepared by Architect T. W. Pietsch. The structure is to be fireproof and the engineering features will be looked after by Painter & Posey, engineers.

The Atlantic Fertilizer Company is planning to make extensive improvements to its Curtis Bay plant the coming spring. A manufacturing building, 170 x 420 ft., of steel and concrete, and other additions are being considered.

Fabricators are estimating on the structural work, 250 tons, for additions to the buildings of the Home for the Feeble Minded, at Owings Mills, Md.

Bids were opened January 25 for the heating, ventilating and power plant for the addition to the Hochschild-Kohn Company department store, but awards have not yet been announced.

The Davidson Chemical Company has plans under consideration for an enlargement of its plant and bids have been taken for some of the building work. The improvements, it is stated, consist of three buildings of steel construction—one an acid chamber building, another a burner building and the third for general storage purposes.

The Maryland Casualty Company has had plans prepared for extensive additions to its present buildings. Adjoining property has been acquired for this purpose. Otto G. Simonson is the architect and Henry Adams engineer in connection with the work, which will not be started, however, for several months.

The W. & J. Knox Net & Wire Company is about ready to begin the work of erecting a two-story brick and concrete addition to its plant at Johnson and Barney streets. Machinery for the manufacture of nets and twine for installation in the new plant is stated to have been contracted for.

The Miller Fertilizer Company will make extensive additions to its Canton plant, which will be remodeled in many ways. A system of hoisting machinery, cranes, &c., will be installed. Architect T. Wells Pietsch is taking bids for alterations to the building, while Painter & Posey have charge of the engineering features in connection with the improvements.

Revised plans in course of preparation by architects and engineers for the extensive buildings to be erected for the Baltimore Bargain House will, it is now stated, be ready for estimate about the middle of the month. Recent proposals for the work under the original plans and specifications were rejected.

The McShane Bell Foundry Company has made considerable additions to its brass finishing department for plumbers' goods. About 4000 sq. ft. of floor space has been added, and equipment to increase the capacity of the department about one-third has been installed and will be added to as the business demands.

Dietrich Brothers have recently booked orders for the structural steel work, about 150 tons, for the Kriel Building, and about a like tonnage for a building for the Owners' Realty Company. A fair amount of miscellaneous business has also been taken. The new office building being erected for its own use by this firm is nearing completion, as is also its new ornamental iron shop. Work on its new structural shop is being rapidly pushed forward.

The Canton Box Company has awarded a contract to George A. Blake for a new factory building, 117 x 125 ft., two stories, of brick and concrete construction. The company, which manufactures wooden boxes, states that some machinery will be required for the new building, but the character or quantity has not yet been decided upon.

The John C. Raum & Son Company, carriage and wagon builder, has let a contract for the erection of an addition, 19 x 95 ft., to its plant at 303 South Sharp street. The new building will be used as a blacksmith shop and purchases of steam hammers have already been made, but the company is still in the market for a band saw, emery wheels and stands and drill presses.

John D. Adt has taken orders for elevator plants to be installed in the new plant of Dietrich Brothers, and in additions under way by the Monumental Brewing Company. Large orders for tobacco drying machinery have also been received from the Italian Government. Extensive orders for special machinery have also been taken. The plant is fully engaged, notwithstanding the fact that its working capacity has recently been increased over one-third.

Ernest and William Knabe, who sold their interest in the William J. Knabe Piano Company to the American Piano Company, contemplate again entering the business of piano making. Plans regarding the proposed plant or its location have not fully developed, and it is stated by Ernest Knabe that nothing definite will be done for several months.

The Baltimore Bridge Company reports a seasonable business during the past month. Current orders were not particularly large, but its estimating department is busy on a considerable amount of miscellaneous work. Recent orders include a 150-ft. span, known as the Destierrro span, for the Northern Railway of Costa Rica, wireless telegraphy towers for shipment to Cuba, and one for 150 tons of sheet piling for export to Costa Rica. Domestic orders during January were mostly small and of a miscellaneous character.

The Chamber of Commerce, Washington, D. C., has been instrumental in providing a site at Hollywood, a suburb of that city, for a plant to be erected for the manufacture of a line of wagons by the National Wagon Company, with offices in the Fleming Building in that city. The latter company states that as soon as financial matters are completed, which will require several months, work on the new plant will be started. A. D. Phillips is secretary of the company.

The Maryland Steel Piano Company launched successfully on January 21 the collier *Neptune*, building for the United States Government. This is the first collier for the govern-

THE MACHINERY MARKETS

ment in which turbine engines will be used. The vessel will have a carrying capacity of 12,500 tons of coal. The company is also building, among others, two boats for the Chesapeake Steamship Company, which will be used in the Chesapeake Bay service.

The Chesapeake Iron Works has taken orders for the structural steel work for the addition to the plant of the Morris Iron Company, Frederick, Md., also the structural and ornamental iron work for a hotel building in Grafton, W. Va., and is estimating on a very fair amount of new work. Business the past month has been close to the average for the first month of the year, and but 10 per cent. below that for January, 1910. The outlook for future business is looked upon as more favorable by this concern.

The Crook-Kries Company, heating and ventilating engineer, has recently taken an order for the boiler equipment for the Southern Building, Washington, D. C. The installation will include two 125-hp. water tube boilers, the order for which has been placed. Inquiries are reported good, and the estimating department is busy on a number of plans, the major portion of which is for propositions of the smaller size. The company recently completed the installation of a central power plant for ex-Governor Edwin F. Warfield. The plant is located in a garage building, and, in addition to heating that building, also furnishes the heat for two residences, 1217 and 1219 Linden avenue.

The T. C. Bashor Company reports an exceptionally good demand for boilers and engines the past month, it being in fact one of the best first months of the year that it has ever had. Boilers will be installed by it for the Davidson Chemical Company and the Maryland Bleach & Dye Works. Boilers and engines will be supplied for the new plant of Becker Brothers & Sons, while an additional boiler is to be furnished the Weisner Brewery. Contracts for the heating and ventilating system for the addition to the Highlandtown plant of the Crown Cork & Seal Company have also been taken and the estimating department is busy figuring on additional work of that character. The company's plant is busy on a large amount of boiler, tank and special work.

The Morris Iron Company, to which reference was made in *The Iron Age* last week, proposes to treble the capacity of its plant at Frederick, Md. Contracts have already been let for additions to the buildings. Additional equipment will be required both in the foundry and machine shop, including overhead traveling cranes. Electric power will be extensively used and a plant for its own supply of current will probably be installed.

The Baltimore Gas Appliance & Mfg. Company, H. W. Hunter, president, which was recently organized, with an authorized capital of \$300,000, has leased a plant at Bayard and Wicomico streets, containing 2000 sq. ft. of floor space, for the manufacture of gas ranges, gas heaters, &c. The company will shortly ask for bids on machinery and other equipment for the manufacture of 30,000 gas ranges and 15,000 gas heaters a year. Martin W. Longfellow of the Estate Stove Company, Hamilton, Ohio, is to be general superintendent of the plant.

Toronto

TORONTO, January 28, 1911.

While reciprocity negotiations were in progress at Washington, Canadian machinery manufacturers as a class were on the anxious seat. Makers of mining machinery, for example, had no more or less reason to expect to have their tariff protection left unimpaired than had makers of factory plant. That there would probably be reductions of the duty on agricultural machinery imported from the United States was the opinion of most people, but it would have caused no surprise had the machinery duties generally been lowered slightly in favor of that country. To the majority of Canadian machinery manufacturers, therefore, Mr. Fielding's presentation of the agreement in the House of Commons on Thursday afternoon brought genuine relief. It showed that reductions are conceded, but that they are not large, and that the list of them is not long. But these considerations do not make the arrangement acceptable to Canadian manufacturers. They are hopeful that Congress will fail to put the seal of legislation on the concessions made on the United States side and thus bring the agreement to naught.

The general offices of the Dominion Steel Corporation, at Sydney, N. S., were burnt on Wednesday evening. Among the things destroyed was a complete record of the company's affairs for the decade that has just closed. The building was valued at about \$50,000.

The Campbell Lumber Company's pulp mills at Weymouth, N. S., was built on Monday night, January 23, entailing a loss of \$50,000. The company had recently installed \$15,000 worth of new machinery.

The Canadian Locomotive Company, Kingston, Ont., has just completed one of the four largest engines ever made in its works. It is to be used on the Provincial Government's Temiskaning & Northern Ontario Railway line. The weight of engine and tender exceeds 118 tons.

The International Harvester Company of Canada has let a contract for a new office at its plant in Hamilton, Ont. It is to cost \$40,000. This is the last one in the series of buildings begun by the company last year, the total cost of which is put at nearly \$500,000.

The demand for gasoline engines suitable for fishing boats is reported to be large on both coasts of Canada, as well as on the lakes.

The rate payers of Calgary, Alberta, have voted in favor of certain modifications of the agreement under which the Calgary Natural Gas Company holds its franchise. It is stated that as a consequence of the larger license thus given to it the company will enter into an arrangement to pipe the gas to Calgary from wells at Bow Island, 150 miles distant. On this work \$3,500,000 would be spent.

Improvements that would cost \$140,656 have been recommended by the city electrician of Saskatoon, Saskatchewan, in the city's power plant and pumping plant.

Diamond drills are in demand for testing operations in the Porcupine gold field, in the Sudbury nickel region and in the Rainy River iron ranges. There are large plans for building in Porcupine.

Of the tenders submitted for the construction of a bridge across the St. Charles River at Quebec, L. A. Vorlee, the engineer consulted, selected five, which he narrowed down to two, and reported upon the latter as the most advantageous. One was the tender of J. H. Gignac, Ltd., for \$169,000, and the other was the tender of the Phoenix Bridge Company of Montreal for \$169,500. The latter, he said, conforms most closely to the Government plans. Both tenders are for a swing bridge. It was decided by the Road Committee of the Quebec City Council to defer action on the matter until tenders should be received for a bridge of the bascule type. Tenders for this will at once be called for.

The secretary of the Board of Trade at Calgary, Alberta, is receiving numerous inquiries as to the advantages obtainable in that city for new manufacturing enterprises there. On Tuesday he was applied to by a large company in Illinois for particulars as to the terms on which natural gas could be supplied there. The company stated that it desires to establish a plant that would require labor enough to earn \$125,000 in wages the first year.

The City Commissioners of Calgary, Alberta, advise the expenditure of \$75,000 on fire station and equipment account.

The Ontario Government is offering two large pulp wood concessions for long term lease, with right to renew cutting rights at the end of the period. One is the Abitibi section of the Temiskaming district and covers 1569 sq. miles. The successful tenderer for the privilege must expend \$500,000 on buildings and equipment for mill purposes and employ steadily 250 men. The other is a Rainy River section. There the mill is to cost \$350,000 and 200 hands are to be employed.

The Joliette Steel & Iron Foundry Company, incorporated with a capital stock of \$250,000, has opened offices at 371 St. James street, Montreal. The company will manufacture various classes of iron and steel castings.

The Exshaw Cement Company's plant at Calgary was sold at auction on January 18 to the Canada Cement Company, the price being \$1,000,866.

Vice-President Whyte of the Canadian Pacific Railway Company says that the company's shops at Winnipeg will be made one-third larger.

Another \$300,000 is required for the completion of the municipal power station in Calgary, Alberta. A by-law is being prepared for submission to the ratepayers to authorize the raising of that sum on this account. Much of the money is required for the purchase of equipment.

The Board of Control of Ottawa has decided that another fire engine must be purchased, the fire chief recommending one of 750 gal. per minute.

A 600-ft. dry dock, capable of accommodating the largest Canadian vessels on the Great Lakes, is projected for Amherstburg, Ont. There is to be a large machine shop as well, and it is expected that a shipbuilding plant will be added. A. H. Clark, M.P. for Essex, is one of the principal parties connected with the undertaking.

The factories of the Massey-Harris Company in Toronto are now working day and night and 2000 men are employed.

THE MACHINERY MARKETS

The South

CHATTANOOGA, TENN., January 30, 1911.

Johnson City, Tenn., is considering the plans for the new \$500,000 water system which is to furnish water for the city and the Soldier's Home. The distance from the city to the Big Blue Springs, from which the water is to be obtained, is 12 miles.

J. H. Hice, of the Ivey & Hice Company, Hickory, N. C., has sold his interest in the corporation and will establish at Johnson City, Tenn., a similar plant for the manufacture of textile novelties. The new company will have a capital stock of \$25,000.

The Mandeville Creamery & Mfg. Company of Mandeville, La., has let the contract for the creation of its plant. The machinery has already been ordered.

The Feriday Hoop Company, Feriday, La., will soon be ready to start up. The plant was removed from Spencer, Ohio. J. E. Ormsby is the general manager. Fifty men will be employed in the manufacture of hoops.

The J. L. Pease Company, Berwick, La., has recently ordered three carloads of improved appliances which will be installed in its plant. The company is engaged in the manufacture of patented built-up porch columns. After the new machinery is installed, the working force will be increased to 300 men.

The Many Ice, Water & Light Company, Many, La., has been organized. The president is Prof. W. C. Roaten; vice-president, J. H. Boone; secretary, R. Frazer; treasurer, W. H. Vandegear; and W. Robinson, general manager. The building will cost \$12,000.

The Madisonville Chair Company, Madisonville, Tenn., has taken over the business of Kile Brothers of that city and has purchased property with a view to extending the capacity of the latter company's chair manufacturing plant. The company will arrange to manufacture 1000 chairs a day.

The United States Engineer's office, Nashville, Tenn., is asking for bids to be opened February 20 for furnishing machinery, fittings, &c., for the derrick boat Tishomingo.

E. P. Epps, city engineer, Gainesville, Ga., is preparing plans for a water works and sewer system for that place to cost approximately \$100,000.

The H. S. Jaudon Engineering Company, Savannah, Ga., is preparing plans for a water works system of 2,000,000-gal. capacity, to cost about \$30,000, for the city of Dalton, Ga. Bids will be opened about March 1.

The Thomas Grate Bar Company, Birmingham, Ala., has acquired the plant of T. F. Johnson, Forty-second street and Tenth avenue, East Birmingham, and will equip it for the manufacture of the Thomas elliptical grate bar. Edward L. Thomas is president and W. D. Webster secretary of the company.

The Carolina, Clinchfield & Ohio Railway is reported to have made application to the Charleston, S. C., Harbor Commission for a permit to erect coal piers on its property at Cooper River.

The Weeks Iron Works & Supply Company, Monroe, La., is in the market for a 1000-lb. steam hammer. Inquiries should be addressed to George G. Weeks, president of the company.

The Southwest

KANSAS CITY, MO., January 30, 1911.

The Imperial Heater Company, Kansas City, Mo., advises that it has not definitely decided whether it will remove its factory to Lawrence, Kan., but that it expects to reach a decision within the near future.

The Oklahoma Light Mfg. Company, Guthrie, Okla., has decided to remove its plant and offices to Oklahoma City. A site has been secured in the Delmar Heights addition from the Packington Development Company, upon which will be immediately begun the erection of a brick building, 25 x 100 ft., two stories. Other buildings will be erected as they are needed. The company manufactures acetylene and other gas lights and fixtures, and its capital stock is \$25,000.

The Acme Spring Bed & Mattress Company, Fort Smith, Ark., is contemplating improvements to its plant during the coming summer to take care of its increasing business.

The Pine Bluff Bottling Company, Pine Bluff, Ark., has been reorganized, to include a number of new stockholders, with a capital stock of \$25,000. Lawrence Dixon is the president.

H. W. Lowe has leased the canning factory at Florence, Neb., and will enlarge its output.

The Titusville Iron Company of Pennsylvania will locate its Western office at Tulsa, Okla., about February 1. Thomas

McKinney, a director of the company, will locate there and manage the business.

Milwaukee and the Northwest

MILWAUKEE, WIS., January 30, 1911.

The Reliance Iron & Engine Company, Racine, Wis., has signed a contract with the Industrial Association of La Crosse, Wis., for the removal of its plant to the latter city. Articles of incorporation have been filed with \$200,000 capital stock, and the name of the company changed to the Sta-Rite Engine Company. A site for the plant has not been definitely decided upon, but temporary quarters will be secured at once. The company will manufacture gasoline engines.

The La Crosse Plow Company, La Crosse, Wis., is contemplating the erection of a new foundry, for which plans have not yet been prepared.

The Columbia County Light & Power Company, Wycena, Wis., has purchased the water power and electric plant formerly owned by the Duck Creek Light & Power Company, and will install new machinery and construct a transmission line to Rio, Wis.

Colfax, Wis., is having plans prepared by Oscar Clausen, St. Paul, Minn., for the construction of a water works system.

The interest of dealers and sales agencies in the Twin Cities has been given principally of late to the announcement of the plans for a new steam turbine power station in Minneapolis, as mentioned below; but the most important news of the week from the standpoint of future business is contained in the report that the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has made a contract with the Dakota Power Company, Rapid City, S. D., to supply electric current, from its new hydraulic power plant at Pactola, for operating the machinery at the four mica mines, operated by the former near Custer, S. D., in one of which additional equipment is now being installed. The significance of this deal lies in the fact that it means the running of transmission lines into an important mining region, with the substitution of electric motors for other forms of machinery drive, which inevitably occurs when the power is made available to mines or ore reduction plants. The Dakota Power Company has arranged to take over the generating station of the Rapid City Electric & Gas Light Company, combining it with its hydroelectric plant, so as to make one system of 5500 to 6000 kw., and will make further provision for supplying power to the mining districts as fast as the new system can be introduced. The Rapid City plant is to be remodeled and improved.

The Minneapolis General Electric Company, through its managers and engineers, Stone & Webster, Boston, Mass., is planning the construction of a new auxiliary plant for city service, at a cost between \$750,000 and \$1,000,000, to replace the combined engine and turbine driven station which was recently destroyed by an explosion. For the present dependence will be made for power upon the hydroelectric units at Taylor Falls, the number of which has just been increased. The company is also in possession of additional water power sites on the St. Croix and Mississippi rivers, which will be developed as the needs of the service increase.

It is reported from West Duluth, Minn., without direct confirmation, that a new plant will be built there this spring by the Osborn Pump Works, now located at Virginia, Minn.

The city of Fergus Falls, Minn., which has been purchasing power from the Otter Tail Power Company, is considering the erection of its own electric plant, to be equipped either with steam turbines or gas producer engine units.

The purchase of an auxiliary pumping unit is under consideration, with other improvements in the water supply system, at Eveleth, Minn.

The construction of a mechanical filtration plant has been decided upon by the authorities at Fargo, N. D., and bids on equipment will be taken before long.

It is reported from Mandan, N. D., that work on a wood-working plant, to be operated principally as a sash and door factory, will be begun there shortly by Rober Bros.

Measures for the installation of an electric power plant, to be operated either by the community or under a franchise, are being taken at Minto, N. D.

As negotiations for the purchase of the local water works recently failed, the city of Helena, Mont., has voted bonds for \$650,000 to cover the cost of constructing a municipal pumping plant and distribution system. Machinery will be bought some time this year.

The Northern Minnesota Railway Company has been organized at Virginia, Minn., by interests reported to be identified with the Virginia & Rainy Lakes Company, including Edward Hines of Chicago, Ill., to build an electric traction line.

THE MACHINERY MARKETS

Farther Central West

OMAHA, NEB., January 30, 1911.

The construction of a municipal power and pumping station, for which a fund of \$30,000 will shortly be available, has been decided upon at Adair, Iowa. Purchases of machinery will be made before spring.

An addition to its power plant will be constructed by the Griswold Milling & Light Company, Griswold, Iowa, and machinery for ice making installed to be operated as a day load.

Important extensions, including additional power machinery, are to be made in the system of the Charles City & Western Railway, Charles City, Iowa, during the present year.

A contract has just been made with the city by the Shenandoah Ice, Heat & Power Company, Shenandoah, Iowa, by which it guarantees to take over the municipal plant and install high pressure pumping machinery with a daily capacity of 250,000 gal.

Planing mill machinery will be installed in an addition which the Martin-Culbertson Company, Des Moines, is planning to make to its plant.

Construction of the new line of the Iowa City, Ottumwa & Southwest Electric Railway, Ottumwa, which will be one of the longest in the State, is to be started in the spring.

The Sundance Oil Company, Sundance, Wyo., will install power and drilling machinery for opening up its property in that vicinity.

The plant of the Clinton Milling Company, Clinton, Iowa, owned by C. J. Claussen, was destroyed by fire January 23. The loss is estimated at \$20,000.

The proprietors of the Cedar Falls, Union Mill Company, Cedar Falls, Iowa, which was recently burned, causing a loss of \$50,000, announces that the flouring mill will be rebuilt. H. I. Brown is the manager.

Webster City, Iowa, has purchased a new site and a municipal light and power plant will be installed at a cost of \$50,000.

Fred Dutton and Thomas Thompson, Brighton, Iowa, will erect a plant for the manufacture of condensed milk, to cost upward of \$200,000.

The town of Rippey, Iowa, is advertising for proposals for the construction of a water works plant, until February 8.

The City Council of Marshalltown, Iowa, has authorized the Mayor to advertise for bids for machinery necessary to install a water power plant at the city pumping station, with a view to utilizing the power of Iowa River as far as possible.

T. F. Stroud & Co., Omaha, Neb., grading machinery, are erecting an addition to their plant and are in the market for an oil or gas engine of 75 hp., direct connected.

The Quick Action Range Company, Marshalltown, Iowa, has been incorporated with an authorized capital stock of \$225,000. The company will commence in the early spring the erection of factory buildings and foundries to manufacture the Quick Action range with its special patented adjustable grate.

The Vincent Clay Products Company, Fort Dodge, Iowa, a co-partnership, has been organized to manufacture drain tile and building blocks. A site has been secured and buildings will be erected as soon as possible. None of the equipment has been purchased.

W. J. Woods, Spencer, Neb., proposes to install an electric light plant, comprising two 35-hp. gas engines and two 3000-cp. dynamos.

Dodge City, Iowa, will install a municipal lighting plant to be operated in connection with its water works system.

The City Council of Utica, Neb., is considering the establishment of a water works system at a cost of \$15,000.

An appropriation of \$12,000 has been recommended for improvements to the water works system of Norfolk, Neb.

Auburn, Iowa, has estimates prepared for the construction of a \$10,000 water works system.

Texas

AUSTIN, TEXAS, January 28, 1911.

The rapid development of sugar cane culture in the lower Rio Grande Valley of Texas is causing the establishment of a number of large sugar mills in that region. The demand for additional mills to care for the increased acreage of cane will be met by the erection of several plants during the next two or three years. In addition to the new mill to be built at Harlingen by Lon C. Hill and associates at a cost of \$400,000, plans for which have already been drawn; the new mill that is under construction at Donna by the Donna Land & Water Company, to cost \$250,000; the mill

which S. A. Robertson of San Benito and associates are preparing to erect at that place, to cost about \$400,000; the La Feria Sugar Company, which has its headquarters at Minneapolis, Minn., has had plans prepared for a \$500,000 sugar mill to be erected at La Feria, a new town in the lower Rio Grande Valley. J. C. Fifield of Minneapolis, president of the latter company, recently selected the site for the proposed mill, and has let the contract for its construction.

J. T. Lawler of New Orleans has taken preliminary steps toward erecting a flour mill of 250 bbls. daily capacity at Bryan, Texas. He contemplates installing an electric power and lighting plant in connection with the mill. He has made a proposition to the City Council of Bryan to sell the city his surplus power.

Joseph Sauter will install a broom factory at Devine, Texas. He is also enlarging his mattress factory at that place.

C. C. Murray & Sons have been granted a franchise by the Board of County Commissioners of Madison County, Texas, for an electric light and power plant at Madisonville. They will organize the Madisonville Light & Power Company to carry out the project. The company also contemplates installing an ice plant at Madisonville.

Another election has been ordered for February 14 by the City Council of Rusk, Texas, to vote on the proposition of issuing bonds for the construction of a water works system.

E. F. Glaze is constructing an ice factory and poultry packing plant at Goliad, Texas.

The water works system of El Paso is being extended and improved at a cost of \$300,000. The City Council recently purchased the site for the proposed garbage disposal plant which will be erected at a cost of \$100,000.

The Houston Brick & Tile Company which was recently organized will construct a modern brick and tile plant on the south side of the Houston ship channel in Houston. It will manufacture a concrete cement brick and tile, the latter to be used for drainage purposes. The plant will have a daily capacity of 55,000 brick and a large quantity of tile. The incorporators of the company are C. A. Barbour, C. R. Miner and Sinclair Taliaferro, all of Houston.

W. H. Randolph and Fred Smith of Huntsville, Texas, are installing a brick-making plant at that place. A concrete block manufacturing plant will be installed by the same parties.

J. Sandford Smith and associates are preparing to construct an interurban electric railway between Waco and Mexia, Texas. At a mass meeting of citizens which was recently held at Waco a committee was appointed to aid in the carrying out of the projected road. J. Desenberg of Mexia is also interested in the project.

The Texas Candelilla Wax Company, which was recently organized with a capital stock of \$25,000, will establish a factory at Marfa, Texas, for the manufacture of a high grade of wax from the candelilla shrub, a desert plant that grows profusely in that part of the state. This wax is being extensively manufactured from the plant in Mexico. It is marketed chiefly in Europe, where it is used for manufacturing phonograph records and other articles. The incorporators of the new company are F. S. Breeding, S. W. Wooley and W. P. Murphy.

The Victoria Safe & Lock Company will erect two buildings and install machinery for the manufacture of safes at Victoria, Texas. The plant will have a capacity of about 2000 safes a year. H. H. Stephenson is manager.

George M. Dickson, Henry M. Dickson, Charles M. Rein and R. G. Duff, all of Houston, are interested in the erection at that place of a plant to cost \$200,000 for the manufacture of metallic hose, which is an invention of W. M. Schulze of Houston.

Armour & Co., Chicago, will erect a three-story office building and refrigerating plant at Houston. An ice plant will also be installed. The proposed improvements will cost about \$125,000.

The Houston Structural Steel Company will increase the capacity of its plant at Houston to 100,000 tons per month. The company will also make improvements to its electric lighting system.

A granite crushing plant is to be installed at the granite quarries near Llano, Texas, by C. C. Baker and associates.

The Board of Water Commissioners of Temple, Texas, has adopted plans for a new filtration system to cost \$30,000. It will have a daily capacity of about 2,000,000 gal.

The contract for the construction of the new system of water works at Douglas, Ariz., has been let to M. C. Dicus of that place for \$85,000. The Chicago Bridge & Iron Works of Chicago, Ill., was given the contract to erect the water tower at a cost of \$11,950. The pumping equipment

THE MACHINERY MARKETS

will be installed by the Rock Drill & Mfg. Company of Denver, Colo., at a cost of \$20,000 and the De La Vergne Machinery Company will install other machinery at a cost of \$20,000.

M. D. Loomis is preparing to install four irrigation pumping plants on his farm near Roswell, N. M. The water will be pumped from wells, each lift being about 35 ft.

Carter Smith contemplates enlarging his broom factory at Tucumcari, N. M.

The Guanajuato Power & Electric Company is installing a third hydroelectric plant on the Angulo River, in the State of Michoacan, Mexico. This plant will give the company a total capacity of 20,000 hp. It recently finished the construction of an electric power transmission line from its hydroelectric plants to San Luis Potosi, 87 miles.

The legislature of the State of Coahuila, Mexico, has granted Herculano Cerda and Vicente Garcia Fuentes an extension of 10 years to finish the construction of their cotton-seed oil mill and electric light and power plant at Torreon, Mexico, which are to cost about \$1,000,000.

The Zinc Smelter Company, Saltillo, Mexico, will soon begin the erection of a large zinc smelter at that place.

W. H. Ellis of New York and associates have been granted a concession by the Mexican Government for the construction of a number of factories in different parts of that country for the manufacture of crude rubber from the palo amarillo tree.

A syndicate of Chicago men is negotiating for the purchase of the water works system and electric light plant of the Tucumcari Water & Light Company at Tucumcari, N. M. If the deal is consummated the purchasers will make extensive improvements, it is stated.

The town of Sanderson, Texas, is considering the matter of purchasing the local water works system with the view of making improvements and extensions.

The National Railways of Mexico has begun preliminary work toward the erection of new shop buildings and the installation of a large amount of machinery at San Luis Potosi, Mexico. The terminals at that place will also be enlarged and otherwise improved, and a new union passenger and freight station constructed for the use of the several lines comprising the government merger system. C. M. Tripp of Atlanta, Ga., is in charge of the work.

The Texas Welding & Gas Compressing Company, Houston, Tex., recently incorporated with \$5000 capital stock, is planning to immediately double its capacity and to erect a factory at an expenditure of about \$25,000. The company uses its own welding process, designed by M. A. Mueller, secretary and general manager of the company. The process has been in operation in Germany for about 10 years, having been introduced in this country by Mr. Mueller.

Charles J. Stanzel, Brownwood, Texas, is constructing at Aransas Pass, Texas, a foundry, machine shop and boiler shop, each of which will occupy separate buildings. The foundry will be of five tons capacity and will do general foundry work and brass casting.

The Yost Brick, Tile & Stone Company, Cynthiana, Texas, has been incorporated, with a capital stock of \$25,000. The incorporators are C. T. Yost, S. T. Rowles and C. B. Hall.

Pacific Coast

SEATTLE, WASH., January 27, 1911.

In plants all through the North Pacific States machinery that was ordered last fall is now being installed. For a considerable percentage of these it has since been found that additions will be necessary, owing to the fact that the requirements were too conservatively estimated, and there will be irregular buying for some time by companies whose needs have been reported filled. Inquiries in relation to machinery for new enterprises or improvements decided upon at the annual meetings held this month are also coming out in gratifying volume. Shipments for Alaska will be rushed forward as early as possible next spring, as there is imperative need of equipment for extensive operations which were decided upon too late to get the machinery out before the close of navigation. Buying will, therefore, be correspondingly early.

To meet the growing demand for their products from the industries on both sides of the border, the Stetson-Ross Machine Works, Seattle, will extend the shops now operated here and probably erect a branch plant at Vancouver, B. C.

Word has just reached Seattle of the remarkable record

made near Fairbanks, Alaska, by one of the Marion Steam Shovel Company's build, which was in continuous operation for a season of 233 days, until stopped by heavy ice. This is the largest machine of the kind in the world and includes in its equipment electric motors of 1000 hp.

From Vancouver, Wash., it is reported that the Cascades Light & Power Company has been incorporated by W. W. Arnold, W. P. Connaway and others to build a hydroelectric plant on the north fork of the Lewis River.

The Seattle Electric Company, Seattle, is making preparations for building its new power plant.

The Cottage Grove Electric Company, Cottage Grove, Ore., whose plant is equipped with a Westinghouse alternating current generator of 200 kw., driven from an engine supplied by the Russell Engine Works, Massillon, Ohio, will install an additional boiler and electric unit if granted a 20-year extension of its franchise.

The North Star Mining Company, Orient, Wash., is installing an air compressor and 50 hp. motor for its operation. Other improvements are also to be made.

The Acme Mfg. Company, Tacoma, Wash., is about to start construction on its new woodworking plant, to replace the one that burned. Some of the machinery formerly in service can be utilized.

M. M. Valerius, Sutherlin, Ore., is organizing a company for building a power plant and an electric traction line.

The Washington Water Power Company, Spokane, Wash., is planning the erection of a new power plant in Opportunity and the remodeling of its transmission system for that section.

A campaign to secure new industries has been started by the Douglas Commercial Club, Douglas, Wash.

The Bellevue Electric Company, Bellevue, Wash., recently incorporated, will construct an electric plant to serve the large dairying district lying between lakes Washington and Sammamish and the coal mining and timber district adjacent, together with 20 miles of railroad. Construction work will commence in the spring, at which time the company will be in the market for power machinery and track equipment.

The United States Cashier Company, Portland, Ore., is erecting a factory for the manufacture of automatic coin playing machines.

Louis P. Larson, Coville, Wash., has been granted a franchise to construct and operate a water works and electric light system at Meteline Falls, Wash.

The Yuba Construction Company, Marysville, Cal., has acquired the business and equipment of the Western Engineering & Construction Company of that place. This is one of the oldest firms engaged in gold dredge construction in America.

Government Purchases

WASHINGTON, D. C., January 30, 1911.

The Paymaster General, Navy Department, Washington, will open bids February 21, under schedule 3276, for one plain gap grinder.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids for supplies for the department on dates as follows: February 14, schedule 3296, one water tube boiler; February 21, schedule 3312, two ventilating sets and schedule 3313, four 20-hp. gasoline engines; February 28, schedule 3297, one chisel mortising machine and one boring machine.

R. V. Ladow, Superintendent of Prisons, Washington, will open bids February 14 for furnishing and delivering at the United States Penitentiary, Atlanta, Ga., electric light and power installation for the hospital building.

The Department of Justice, Washington, will open bids February 16 for furnishing and delivering at the United States penitentiary, Leavenworth, Kan., electric light and installation for hospital buildings.

Bids were opened January 14 for furnishing laundry machinery for the Columbus barracks, U. S. Army, Columbus, Ohio, as follows:

Item 1.—Steam collar and cuff ironer—Troy Laundry Machinery Company, Ltd., Chicago, Ill., \$568.70; Columbia Mfg. Company, Columbia, Pa., \$650; American Laundry Machinery Mfg. Company, Cincinnati, Ohio, \$650.

Item 2.—Collar and cuff starcher—Troy Laundry Machinery Company, Ltd., Chicago, Ill., \$228.60; items 1 and 2, alternate bid, \$762.30; Columbia Mfg. Company, Columbia, Pa., \$300; American Laundry Machinery Mfg. Company, Cincinnati, Ohio, \$172.50 and \$215.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Patentability of Old Machine for New Use.—Application of an old machine or combination to a new use is patentable only when the new use is so remote from that to which the old machine has been applied, or which it was evidently conceived, that its application to the new use would not readily occur to the trained mind of the ordinary skilled mechanic, seeking to devise means to accomplish the desired function.—United States Circuit Court of Appeals, Eighth Circuit, Warren Webster & Co. vs. C. A. Dunham Company, 181 Federal Reporter 836.

Employers' Liability for Negligence Concurring with That of Fellow Employees.—An employer is liable for injury to a workman caused by failing to provide and maintain a safe place for the latter's work, notwithstanding concurrent negligence of fellow employees contributes to the injury.—United States Circuit Court of Appeals, Sixth Circuit, Bryson vs. Gallo, 180 Federal Reporter 71.

Persons for Whose Negligence Employer Is Liable.—An employee in charge of a particular piece of work as a subforeman or pusher is engaged in "superintendence" within the meaning of the New York employers' liability act (laws 1902, chapter 600), which makes an employer liable for injuries to workmen caused by the negligence of a superintendent or a person exercising superintendence.—United States Circuit Court of Appeals, Second Circuit, Pennsylvania Steel Company vs. Lakkonen, 181 Federal Reporter 325.

Relationship Between Foreman and Workman as Affecting Employer's Liability.—A foreman sent with workmen to install steel arches in a building, he having control of the work and being the employer's sole representative at the installation, was not a fellow employee of the workmen in such sense as to relieve the employer from liability for injury to the workmen caused by the foreman negligently ordering them to work upon an unsafe scaffold.—Minnesota Supreme Court, Johnson vs. St. Paul Foundry Company, 128 Northwestern Reporter 293.

Employer's Duty to Warn Inexperienced Workmen.—A workman in charge of a cinder pot in an iron and steel manufacturing plant, who is ignorant that liquid slag flowing into the pot may explode on contact with water, even after so far cooling as to become hardened on the surface, does not assume the risk of injury through an explosion so caused. An employer in assigning an inexperienced employee to work must notify him of extraordinary dangers likely to arise in the work, which the workman cannot see nor understand without such information.—Indiana Appellate Court, Republic Iron & Steel Company vs. Lulu, 92 Northwestern Reporter 993.

Assumption of Risks by Workmen.—A workman assumes such risks in his employment as are known to him or would be known to him by the exercise of ordinary observation and forethought. The danger to be apprehended from the breaking off and flying about of bits of steel from the point of a small steel cold chisel held against an iron surface and struck hard with a seven-pound hammer is so obvious that an employee of mature years and of experience in the use of steel drills must be held to have appreciated the danger, even against his testimony that he did not.—Maine Supreme Judicial Court, L'Houx vs. Union Construction Company, 77 Atlantic Reporter 636.

Employers' Duty to Workmen Respecting Places Controlled by Third Parties.—An employer is not ordinarily responsible for injuries sustained by an employee caused solely by an unsafe place of work which is owned and controlled by third persons. Circumstances may, however, impose upon the employer the duty of inspecting the premises of another, or of refraining from giving a workman orders to use those premises, or of giving the workman warning of danger in connection with their use.—Minnesota Supreme Court, Lingren vs. Williams Brothers Boiler Mfg. Company, 127 Northwestern Reporter 626.

Liability for Injury to Contractor's Workman as Affected by Negligence of a Third Party.—A steel company that contracted to erect the superstructure of a bridge on concrete piers built by another, and that directed the placing of the superstructure on the piers before the time required for the piers to harden had expired, cannot avoid responsibility for injury to a workman caused by collapse of a pier, on the ground that the company relied on the engineer employed to supervise construction of the bridge to warn the workmen of the danger, and to see that the place in which they were required to work was reasonably safe, since that was a duty which the company owed to its employees, and which cannot be delegated to a third person in such way as to exempt the company's responsibility.—Maryland Court of Appeals, Pennsylvania Steel Company vs. Nace, 77 Atlantic Reporter 1121.

Implied Warranty of Machinery Sold by Manufacturer.—

A manufacturer and seller of machinery cannot escape responsibility for latent defects in machinery, of which he is presumed to know, by providing in the contract of sale that there are no warranties.—Louisiana Supreme Court, American Hoist & Derrick Company vs. Frey, 53 Southern Reporter 486.

Rights of Buyer of Scrap Iron Respecting Deficient Material.—The fact that, through urgent needs, the buyer of scrap iron accepted a shipment containing 40 per cent. of foreign material and used it did not preclude him from claiming a deduction from the agreed price, where the agreement permitted only a small percentage of foreign material. Notice of such claim was seasonably given where it was mailed November 2, though the shipment was received October 31, in view of the fact that a letter that day complained of the quality of the shipment.—Wisconsin Supreme Court, Nicoll vs. Modern Steel Structural Company, 128 Northwestern Reporter 72.

Personal Liability of President of Corporation on Guarantee.—An iron works company, having received an order from a plumbing company for goods, requested that the president personally guarantee payment. To this request the president wrote, "I will see that you are protected in any dealings you may have with this corporation." Held that he became personally liable.—South Carolina Supreme Court, J. L. Mott Iron Works vs. Clark, 69 Southeastern Reporter 227.

Implied Warranty of Heating Plant Available to Owner of Building.—In selling a heating plant to a contractor for installation by him in a building, the manufacturer impliedly warrants that it is reasonably fit for the purpose, and if the owner is damaged by defects in the plant he can set the amount of the damage off against a mechanics' lien claim by the manufacturer.—Kentucky Court of Appeals, American Radiator Company vs. McKee, 130 Southwestern Reporter 977.

What Constitutes Warranty.—Any distinct assertion or affirmation of quality made by a seller to effect a sale is a warranty whether the word "warranty" is used or not.—South Carolina Supreme Court, Iler vs. Jennings, 68 Southeastern Reporter 1041.

Implied License to Manufacture Patented Articles.—Persons who bought from a patentee parts used in making a patented article had an implied license to manufacture as many articles as were required to utilize such parts.—United States Circuit Court, Southern District, New York, Auto Spring Repairer Company vs. Grinberg, 175 Federal 799.

Right to Assign Trademark.—A trademark can be assigned only in connection with a transfer of the business and good-will with which it is associated.—United States Circuit Court, Southern District, New York, Spiegel vs. Zuckerman, 175 Federal Reporter 978.

Infringement of Patents—Equivalent Mechanism.—As a means of propelling a vehicle, a sprocket chain drive is the equivalent of a bolt drive, as affecting the question whether one patent infringes another. The Hovey patent, No. 876,058, for a railroad motor velocipede propellable by hand, foot or motor, is valid, but is not infringed by Jenkins patent, No. 914,845.—United States Circuit Court, Northern District of Illinois, Sheffield Car Company vs. Buda Foundry & Mfg. Company, 177 Federal Reporter 713.

Presumption of Joint Invention Not Overcome.—The presumption of joint invention arising from the granting of a patent to two persons is not overcome by the fact that one of them first perceived the crude form of the elements of the device and the possibility of their adaption and composition to accomplish a useful result.—United States Circuit Court of Appeals, Sixth Circuit, Vrooman vs. Penhollow, 179 Federal Reporter 296.

Infringement Not Excused by Manufacturer's Inability to Supply Demand.—One cannot excuse infringement of a patent on the ground that the manufacturing patentee is unable to supply the demand for the patented device with promptness, and that users are subject to delay on that account.—United States Circuit Court, Eastern District of Wisconsin, Commercial Acetylene Company vs. Autolux Company, 181 Federal Reporter 387.

What Constitutes Unfair Competition.—Loss of the exclusive right of manufacture when a patent expires does not deprive the patentee of his right to protection against unfair competition resulting from efforts on the part of another to lead the public to believe that they are buying the patentee's product.—New York Court of Appeals, Westcott Chuck Company vs. Oneida National Chuck Company, 92 Northeastern Reporter 639.

Infringement of Trademark.—To constitute infringement of a trademark, duplication or exact imitation is not essential, it being sufficient that the marks are so similar that confusion or deception is apt to result. Infringement may occur though the infringer does not know that another has acquired the right to the exclusive use of the mark. The owner of a registered trademark need not await actual injury through infringement before suing to stop it.—United States Circuit Court, District of New Jersey, Eagle White Lead Company vs. Pfug, 160 Federal Reporter 579.

Trade Publications

Boiler Feed Pumps.—Dean Brothers Steam Pump Works, Indianapolis, Ind. Catalogue No. 83. Refers to a line of special boiler feed or pressure pumps, which includes pumps with compound and noncompound steam ends, outside center packed high pressure pumps and single and duplex double acting piston types of pumps. All of these are illustrated and described and brief tables of dimensions are included.

Steam Heating.—Warren Webster & Co., Point and Elm streets, Camden, N. J. Deals with the Webster vacuum, modulation and modulation-vacuum systems of steam heating, and gives reasons why it is desirable to use the products of this company. A number of illustrations showing buildings in which these three types of heating systems have been installed are included.

Calendar.—Mussens, Ltd., Montreal, Canada, dealer in machinery and supplies for railroads, mines, contractors, mills, factories, machine shops, &c., has issued a large calendar measuring 21 x 43 in. Each leaf contains a calendar for one month on the lower portion and the space in the upper part is used to display some of the various tools which this firm handles.

Electric Motors.—The Electro-Dynamic Company, Bayonne, N. J. Three circulars. No. 36 illustrates and describes the Inter-pole motor, which was illustrated in *The Iron Age* February 2, 1905. The special features of these motors are discussed, the various sizes and styles are shown and a number of test curves are included. No. 37 covers the subject of motor drive and shows a number of installations of the Inter-pole motors for driving machine tools. No. 38, superseding No. 35, contains data on the ratings and dimensions of the type S motor for various speed ratios of both open and closed adjustable speed motors, and also those operating at a constant speed.

Lubricators.—The Swain Lubricator Company, 250 Lake street, Chicago, Ill. Pamphlet. Describes and illustrates the Swain lubricator, the special advantages of which are economy, cleanliness and convenience. These lubricators are made in the form of cups in two different styles for shafting and for loose pulleys. The lubricant employed is a candle made of oil and petroleum products ordinarily, although special candles of asbestos, graphite and mica can be supplied in various sizes and degrees of hardness.

Hydraulic Engines.—Niagara Hydraulic Engine Company, 140 Nassau street, New York City. Pamphlet. Size 6 x 9 in.; pages 44. Pertains to the Niagara hydraulic engine, which is a new development of the hydraulic ram made in several sizes, ranging from one for supplying dwellings with water to one capable of supplying water for irrigation, operating mine washers and filling railroad water tanks. The construction of the engine is described at length, and this description is supplemented by drawings showing the various parts. A number of installations are shown and space is given to directions for installing the engine.

Twine and Cordage Machinery.—The Hoover & Gamble Company, Miamisburg, Ohio. Catalogue. Describes and illustrates a line of binder twine, rope and cordage machinery for manufacturing sisal and Manila twine and rope. The machines included are fiber breakers and spreaders, drawing frames, spinners, balling machines and tow cards.

Sawmill and Threshing Machinery.—Heilman Machine Works, Pine and First streets, Evansville, Ind. Catalogue No. 61. Describes with numerous illustrations a line of traction engines, threshing machines, portable and stationary engines, boilers, pumps, single and double sawmills, edgers, saws, lumber trimmers, hoisting engines, mine cages and ventilating fans.

Wheels for Mine and Industrial Railroads.—Lobdell Car Wheel Company, Wilmington, Del. Pamphlet. Shows the Lobdell tight and loose wheel equipment for mine and industrial railroads. In this equipment one wheel is fast on the axle, while the other is loose, and both revolve with it until curves are reached. At this point the loose wheel revolves sufficiently to relieve the strain occurring at that time. These wheels can be equipped with the Hyatt roller bearing or the ordinary brass bearing as desired.

Elevators.—Craig Ridgway & Son Company, Coatesville, Pa. Catalogue. Size 6 x 9 in.; pages 74. Covers a line of steam-hydraulic and electric elevators for freight and passenger service. In the former type the motive power is obtained by turning the steam into a closed cylinder partly filled with water, which at once has the same pressure as the steam and can be used for lifting, pushing, pulling and similar operations. All of the various styles of elevators are described at length, and the text is supplemented by illustrations.

Boilers.—Pennsylvania Boiler Works, Erie, Pa. Catalogue Q. Concerned with a line of portable and stationary horizontal and vertical return tubular boilers. The various types of boilers are illustrated and brief tables of specifications are included.

Ditchers.—The Browning Engineering Company, Cleveland, Ohio. Catalogue. Refers to the use of the Browning-railroad

ditcher, which is a revolving steam shovel designed to be used in widening cuts, opening up ditches and light gravel pit work where the material is loaded on top of the flat car upon which the ditcher is carried. The construction of the ditcher is described at length and there are a number of illustrations showing it in actual use.

Engines.—Lake City Engineering Works, Erie, Pa. Catalogue. Consists of a number of loose leaf circulars referring to horizontal and vertical engines of the center crank type and pumping and dredging machinery. All of the different engines and pumps are illustrated and brief tables of specifications are included.

Chucks.—The Skinner Chuck Company, New Britain, Conn. Catalogue and price-list. Lists an extensive line of independent and universal combination lathe chucks, drill and planer chucks, face plate jaws, drill vises and reamer stands. The various types of chucks are all illustrated and briefly described, and a telegraph code for use in ordering completes the price-list.

Governors.—The Ludlow Valve Mfg. Company, Troy, N. Y. Four bulletins. No. 101 points out the factors to be considered in selecting a water wheel governor, which in the order of their importance are the type and then the size. No. 103 gives general description and specifications for the type M governor for turbines having cylinder or sleeve gates operated by a rotating shaft. No. 105 is devoted to the type K governor, which is the company's standard model for small turbine units with wicket gate control, while No. 106 calls attention to the type L, which is the standard for turbines having wicket gates operated by an oscillating shaft.

Bench Lathe and Attachments.—Moseley Lathe Company, Elgin, Ill. Loose leaf circulars. Pertain to a line of bench lathes and attachments for handling a variety of work. All of the attachments are illustrated and brief specifications are included.

Motor Cars.—Cadillac Motor Car Company, Detroit, Mich. Calls attention to the special features of the 1911 car and shows the various styles of bodies and tops that can be furnished.

Gas and Gasoline Engines.—Warren H. Jeffers, 373 Canal street, New York City. Pamphlet. Illustrates and describes the various sizes of Backus gas and gasoline engines and suction gas producers which he handles as a selling agent for the manufacturer.

Seamless Tubing.—Benedict & Burnham Mfg. Company, Waterbury, Conn. Brochure. Treats of the various weights and sizes of Benedict-nickel seamless drawn tubing for exposed plumbing, railings, &c., in residences, offices and public buildings. These tubes are made in two styles, one having white metal all the way through and the other having a steel lining which reinforces the white metal and is cheaper in price. A complete table giving the weight per foot of the various sizes of tubing is included.

Cork Brick.—Armstrong Cork Company, Pittsburgh, Pa. Pamphlet. Relates to the use of cork brick as a substitute for wood and concrete flooring. The special features of these bricks are described at length and directions for their installation are included.

Lathes.—Pringle & Brodie Machinery Company, 512 South Canal street, Chicago, Ill. Catalogue. Describes and illustrates a line of woodworking machinery which includes combination and variety wood turning lathes, an automatic back knife gauge lathe, a machine for turning wood rings and valve handles, a multiple spindle boring machine, a sanding or buffing machine for finishing dowel pins and single and double head dowel machines.

Machinists' Tools.—Athol Machine Company, Athol, Mass. Catalogue No. 31. Illustrates vises, grindstone frames, machinists' tools, &c.

Sand Dryer.—Hyde Brothers & Co., Commonwealth Building, Pittsburgh, Pa. Circular. Deals with the Steel City sand dryer, which is made in two sizes having capacities of approximately 10 and 5 tons per day, respectively. In use the wet sand is shoveled into the top of the dryer and as it dries runs out through holes in the bottom.

Clay Working Machines.—H. Brewer & Co., Tecumseh, Mich. Catalogue No. 50. Illustrations and descriptive matter explain the operation of a line of clay working machines that includes brick machines, drain tile and hollow block machines, automatic brick and tile cutters, clay granulators, pug mills, compound and straight roll crushers, dry pans, disintegrators, elevators and conveyors and hand operated cutters for brick, tile and hollow block.

Air Compressors and Pneumatic Tools.—Ingersoll-Rand Company, 11 Broadway, New York City. Three pamphlets. No. 3007 deals with the class PD air compressor, which is the latest power driven type. Its principal features are inclosed dust-proof construction with automatic flood lubrication for the main bearings, crank pins and cross heads and large valve area and intercooler surface. No. 5003 describes the Radialax air driven coal cutter, which is designed for undercutting in a pitching seam, shearing, mining in the middle of the seam and cutting out bands in the coal. It is essentially a long stroke drill with

a special mounting to adapt it to the class of work it does. No. 9008 relates to a pneumatic tamping machine for relining copper converters.

Calendar.—The Goldschmidt Thermit Company, 90 West street, New York City, has issued a large calendar hanger. A large map of North America occupies the central portion of the hanger and there are three small illustrations of the principal work done by this company—namely, locomotive and marine repairs and rail welding. A list of the various kinds of repairs handled by this company and some of their products are also given.

Presses.—The Hydraulic Press Mfg. Company, Mount Gil-ead, Ohio. Two catalogues. No. 31 pertains to a line of hydraulic presses and pumps for manufacturing emery wheels, pressing fiber board and making lard and veneer and leather belts. No. 30 describes and illustrates hydraulic presses and accumulators and pumps of various types.

Twist Drills, Reamers, &c.—The Cleveland Twist Drill Company, Cleveland, Ohio. Catalogue No. 37. Size 6 x 9 in., and pocket edition, size 4 x 6 in.; pages 214. Describes, illustrates and lists the complete line of the company's regular products, a number of tools not previously listed being shown. In addition to the main divisions of drills, reamers, &c., sections are devoted to tools for turret lathes, Paragon Flatwist high speed drills and sockets, Peerless high speed reamers and Paradox adjustable reamers. An innovation is the listing of high speed and carbon steel tools of the same style in parallel columns, which, it is believed, will prove a great convenience to prospective purchasers.

Marine Engines.—Fairbanks, Morse & Co., Chicago, Ill. Catalogue. Describes the full line of internal combustion engines for marine purposes built by this company.

Spray Nozzles.—Spray Nozzle Company, 201 Devonshire street, Boston, Mass. Bulletin No. 10. Briefly describes the radical improvements which have been made in spray nozzles and spray cooling systems during the past year. It is claimed that this system is more economical in first cost and operation than any other artificial means of cooling water for condensers, water jackets or other industrial purposes.

Calendar.—The Blake & Johnson Company, Waterbury, Conn., has issued a large calendar hanger measuring 31 in. square. The hanger is very attractive and the upper portion contains a large reproduction of the painting, "The Eternal Seas," while a small calendar pad occupies space at the bottom of the hanger.

Milling Cutters.—Barber-Colman Company, Rockford, Ill. Catalogue B. Size 4 $\frac{1}{4}$ x 7 $\frac{1}{4}$ in.; pages 87. Calls attention to an extensive line of carbon and high speed steel milling cutters, which include plain milling cutters with and without nicked teeth, side milling cutters, end mills of various types, metal slitting saws, angular cutters, gear hobs and various formed cutters. Brief specifications are given for all these cutters and a number of tables of useful information complete the catalogue.

Road Making Machinery.—Indiana Road Machine Company, Ft. Wayne, Ind. Four catalogues. Give general descriptions and specifications for a line of road making machinery which includes graders, a ditcher and wagon loader, dump wagons, wheel and drag scrapers, contractors' plows, stone crushers and road rollers and graders. All of these machines are illustrated and in addition space is given to engines of both the stationary and the traction types for use in connection with this line of machinery.

Drop Forgings.—Union Drop Forge Company, Chicago, Ill. Two folders. Call attention to the various kinds of drop forgings made by this company and show some of the different patterns. Among the lines illustrated are valve stems, weldless crank shafts of the single and double throw and the opposed center bearing types, connecting rods with and without T heads, yoke and rod ends, igniter levers and cams. In each case the various sizes in which these forgings are made are given.

Railroad Supplies.—Railway Appliances Company, Old Colony Building, Chicago, Ill. Catalogue No. 108 and two pamphlets. The first is devoted to the Globe ventilators for steam railroad cars and shows the construction of the ventilator and its use on railroad cars and in shops. One of the pamphlets deals with the Priest snow flanger, which is intended to be attached back of the pilot so that it will clear a space of about 1 ft. on each side of the rail, thus enabling the drivers to exert their full tractive power. The second pamphlet relates to the R A skid shoe, which is an emergency tool that enables train crews to clear the main track quickly of cars unable to be moved on their own wheels.

Engines, Boilers and Feed Water Heaters.—The Brownell Company, Dayton, Ohio. Catalogue No. 68. Lists an extensive line of engines, boilers and feed water heaters. The engines include an automatic self-oiling type, a self-oiling tandem compound engine, heavy duty automatic and side crank and heavy duty slide valve engines. The boilers include horizontal tubular, portable locomotive, vertical tubular and Scotch boilers.

In addition to the feed water heaters, space is given to boiler settings, fronts, grates and smoke connections. All the various types of engines and boilers have complete dimension tables given.

Threshing Machinery.—Robinson & Co. Machine Works, Richmond, Ind. Catalogue. Size 7 $\frac{1}{2}$ x 10 in.; pages 40. Deals with an extensive line of threshing machinery, all of which is illustrated and described at length.

Electric Motors.—Roth Brothers & Co., Chicago, Ill. Bulletins No. 156, 161, 182, 193 and 199. Pertain to the line of electric motors manufactured by this company and show their adaptability for driving various kinds of tools.

Air Compressors and Rock Drills.—Ingersoll Rand Company, 11 Broadway, New York City. Four bulletins. No. 3002 illustrates and describes the class A-1 straight line steam driven single stage air compressor and shows a number of installations. No. 4109 treats of Temple-Ingersoll electric air rock drills, which are pneumatic air drills driven by pulsations of compressed air created by a pulsator actuated by a standard electric motor. Nos. 9004, 9005 and 9006 relate to classes F, G and BF of the Calyx diamondless core drills.

Friction Clutch.—A. Plamondon Mfg. Company, 12 North Clinton street, Chicago, Ill. Circular. Relates to a disk type friction clutch possessing few parts and no springs, bolts or other complicated mechanism apt to become deranged in use.

Valve Reseating Machine.—The Leavitt Machine Company, Orange, Mass. Catalogue No. 15. Illustrations and descriptive matter explain the operation of the improved Dexter valve reseating machine for reseating all flat and taper seated valves of $\frac{1}{4}$ to 12 in. diameter without disconnecting the valve. Space is also given to a disk cutter, and a partial list of users completes the catalogue.

Clay Working Machinery.—The C. W. Raymond Company, Dayton, Ohio. Two pamphlets. The first is a compendium illustrating the soft mud machinery and appurtenances made by this company for the manufacture of brick. The other deals with the Youngren producer gas fired continuous kiln and the Raymond periodical direct fired kilns. The operation and construction of these kilns is given and a number of views of installations are shown.

Centrifugal Pumps.—Buffalo Steam Pump Company, Buffalo, N. Y. Catalogue No. 230. Size 6 x 9 in.; pages 96. Deals with a line of horizontal and vertical belt, motor and engine driven single stage centrifugal pumps. The construction of these is described at some length and is followed by illustrations of the various styles. Space is given to float switches and motor starters and a number of tables of useful information complete the catalogue.

Crucible Steel.—Braeburn Steel Company, Braeburn, Pa. Catalogue. Pertains to the line of crucible steel manufactured by this company for various purposes. The various grades of steel are described and the labels attached thereto are reproduced. There are tables giving the weights of various sizes of bars, and a number of illustrations with dimensions of the various special shapes made are included.

Calendar.—The New State Iron & Supply Company, McAlester, Okla., wholesale dealer in hardware, mill and mine supplies, has issued a calendar measuring 15 x 20 in. The pad is of the customary type, and in addition to giving the days of the month also contains information regarding the moon's phases.

Concentrating Table and Drills.—The Denver Rock Drill & Machinery Company, Eighteenth and Blake streets, Denver, Colo. Three bulletins. T-1 describes and illustrates the company's concentrating table, while 3-S1 and 8-D2 show the Waugh hand sinker and the Waugh drifter, respectively. In all three bulletins the various parts of the machines are shown.

Water Motor.—The Chicago Water Motor & Fan Company, 40 Dearborn street, Chicago, Ill. Pamphlet. Describes the construction of the Chicago water motor and calls attention to its special features and shows a number of applications.

Textile Machinery.—Parks & Woolson Machine Company, Springfield, Vt. Pamphlet and circulars. Cover a complete line of machinery which includes polishing and brushing machines, shears, boiling machines, trade marking machines, folders and woolen and cotton napers.

Portable Tools and Machinery.—Stow Flexible Shaft Company, Philadelphia, Pa. Catalogue No. 30. Size 6 x 9 in.; pages 48. Refers to the use of the Stow flexible shaft for driving a number of portable tools from an electric motor or from a countershaft by the interposition of ropes. The various tools capable of being driven in this way are shown, as well as the manner of driving them.

Folding and Cutting Machines.—Dexter Folder Company, 200 Fifth avenue, New York City. Three pamphlets. These point out the advantages of using Dexter folding machines, the Dexter automatic clamp cutter and an automatic continuous feeding system for which this company is the sole selling agent. All the various machines are illustrated and described and brief specifications are included.

CURRENT METAL PRICES.

The following quotations are for small lots in New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL — Bar Iron from store—		Genuine Iron Sheets— Galvanized.		METALS— Tin—	
Rebbed Iron		No. 22 and 24		Sheet Iron	
1 1/2 to 1 in. round and square		No. 26		Lake Ingot	
1 1/2 to 1 in. x 3/4 in. flat		No. 28		Electrolytic	
1 1/2 to 1 in. x 1/2 in. flat				Castings	
Rods 3/4 and 1 1/2 round and square					
Angles		Corrugated Roofing—		Copper—	
3 in x 3 in larger		No. 24		Lake Ingot	
3 in x 3 in smaller		No. 26		Electrolytic	
1 1/2 to 2 in x 1 in		No. 28		Castings	
1 1/2 to 2 1/4 in x 3/4 in and 1/2 in					
1 to 1 1/4 in x 3/4 in		Tin Plates—		Spelter—	
1 to 1 1/4 x 1/2 in		American Charcoal Plates (per box)		Weston	
3/4 x 3/4 in		No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		Zinc.	
3/4 x 3/4 in		No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		No. 9, base, casks	
3/4 x 3/4 in				Lead.	
3/4 x 3/4 in				American Pig	
3/4 x 3/4 in				Baltimore	
3/4 x 3/4 in					
3/4 x 3/4 in				Solder.	
3/4 x 3/4 in				No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	
3/4 x 3/4 in				Antimony—	
3/4 x 3/4 in				Cookson	
3/4 x 3/4 in				Hess	
3/4 x 3/4 in				Other brands	
3/4 x 3/4 in				Bismuth—	
3/4 x 3/4 in				Per lb	
3/4 x 3/4 in				Aluminum—	
3/4 x 3/4 in				No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	
3/4 x 3/4 in				Old Metals.	
3/4 x 3/4 in				Dealers Purchasing Prices Paid in New York	
3/4 x 3/4 in				Copper Heavy cut and crucible	
3/4 x 3/4 in				Copper Heavy and Wire	
3/4 x 3/4 in				Copper Light and Bottoms	
3/4 x 3/4 in				Brass Heavy	
3/4 x 3/4 in				Brass Light	
3/4 x 3/4 in				Heavy Machine Composition	
3/4 x 3/4 in				Clean Brass Turnings	
3/4 x 3/4 in				Composition Turnings	
3/4 x 3/4 in				Lead Heavy	
3/4 x 3/4 in				Lead Tea	
3/4 x 3/4 in				Zinc Scrap	



NICHOLSON



We have had over forty years' experience in making Files and Rasps; we not only know what KIND of steel to use, but HOW to use it.

If NICHOLSON FILES did not hold their CUTTING edge—our order books would not hold so many CUSTOMERS.

We make over 3,000 different styles and sizes. Send for Catalog.

NICHOLSON FILE COMPANY

PROVIDENCE, R. I., U. S. A.

THE IRON AGE

Established
1855

New York, February 9, 1911

VOL. 87: No. 6

Published Every Thursday by the

DAVID WILLIAMS COMPANY

14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada, \$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum. Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Continued Improvement.....	347
The Gary Idea in the International Steel Trade.....	348
The Copenhagen Polytechnic Plan.....	349
British Insurance Against Unemployment.....	349
Specialized Seeking for New Customers.....	349
Correspondence.....	350
Pig Iron Production. Illustrated.....	352
The Iron and Metal Market Reports.....	354 to 363
Notes on Prices.....	363
Iron and Industrial Stocks.....	363
What Union Labor Is Doing for San Francisco.....	363
The Carnegie Steel Company Relief Fund.....	363
Personal.....	364
Experience with Concrete Patterns.....	365
The Otto Gas Engine Works.....	365
Greater Activity at Youngstown, Ohio.....	366
Obituary. Portrait.....	367
The Warwick Iron & Steel Company's Annual Report.....	368
New Railroad Equipment.....	368
The Nelson Hot Blast Stove.....	368
Dry Air Blast.....	368
Jones & Laughlin Ore Operations.....	369
Clyde Mitchell Carr. Portrait.....	369
Electricity and Fence Wire Rust.....	369
New Publications.....	370
Republic Iron & Steel Company Handbook.....	370
Customs Decisions.....	371
The International Harvester Company.....	372
The Gary Screw & Bolt Company.....	373
Alumalloy to Be Made by a New Company.....	373
The Taft Plan to Lease Water Power.....	373
The Linde Air Products Company's Growth.....	373
Iron Ore Briquettes.....	374
The Mechanical Engineers' Monthly Meeting.....	374
Two 617-Ft. Ore Vessels Ordered.....	374
By-Product Coke Ovens and Conservation.....	374
The Stenotype.....	375
Foundry Supply and Machinery Exhibition.....	375
The General Electric Blowing Engine.....	375
Exports and Imports of Iron and Steel in 1910.....	376
Eclipse Concrete Mixers at Chicago Cement Show.....	376
Westinghouse Type E Alternating Current Generator. Illus.....	377
Shop Floors.—I. Illustrated.....	378
The Michigan Stove Company.....	382
Additions to the Laidlaw Dunn Gordon Plant. Illustrated.....	383
The Detroit Stoker. Illustrated.....	384
The North Wales 8-In. Grinder Head. Illustrated.....	386
Swedish Tool Steel Agencies.....	386
New Toledo Pipe Threading Tool. Illustrated.....	386
The Philadelphia Foundrymen's Association.....	386
The Noyes T Square. Illustrated.....	387
Diamond Boiler Repair Bolts. Illustrated.....	388
The M. R. V. Brass Melting Furnace. Illustrated.....	388
The Pels Deep Throated Power Punch. Illustrated.....	389
The Hart Hollow Cap Screw. Illustrated.....	389
The Sullivan Machinery Company Makes Some Changes.....	389
New Tools and Appliances.....	390
Trade Publications.....	390
The Machinery Market Reports.....	392 to 401
The Faeth Iron Company's Enlargement.....	401
Current Metal Prices.....	402

Continued Improvement

The Steel Corporation's January Gain May Exceed 300,000 Tons

Tin Plate Advanced—Better Outlook for the Foundry Trade

Our pig iron statistics for January show an output of 1,759,000 tons, or 18,000 tons less than in December, indicating the extent of the slump in operations at the opening of the year. Yet the report of capacity active February 1 reflects plainly the improvement in finished material, the 206 furnaces then in blast producing at the rate of 59,568 tons a day, against 53,347 tons a day for 189 furnaces January 1.

Of the net gain of 17 furnaces in the past month the steel works furnaces contributed 14 and the merchant furnaces 3. So many furnaces were banked at the opening of the year that production fell off to 19,700,000 tons a year. On February 1 it was 22,000,000 tons a year.

Some measure of the increased activity in steel lines is found in the business of the leading Pittsburgh interest. In rails and billets its new orders and specifications in January were 50,000 tons more than in December.

What has been given out of the bookings of the Steel Corporation in January, including the Pennsylvania and New York Central rail business, indicates that the unfilled orders January 31 were fully 300,000 tons more than on December 31.

In the new demand nearly all finished lines are represented, but apart from rails the heavier products still lag behind tin plate and wire.

The expected advance in tin plate was made February 3 and is 10 cents a box on coke plates, while charcoal bright plates are advanced 30 cents, with a further increase for the more heavily coated plates. Some producers favored 25 cents advance on coke plates. Nearly all mills are booked six months ahead. As in the case of wire, heavy tin plate buying preceded the advance.

Prices on sheets are firmer than in several months. Most of the leading mills are operating from 60 to 70 per cent. of capacity, which is a distinct improvement.

New lake vessel work announced in the past two weeks calls for 17,000 tons of plates and shapes for six boats. Plate mills are getting more work, but still have an uncomfortable amount of slack capacity.

Structural contracts include 4000 tons for the Vine street pier at Philadelphia and 3000 tons for a Louisville & Nashville viaduct at Louisville, Ky.

Bars have not shared in the movement of the past three weeks. Shipments on old orders are well taken, but there is no important new contracting.

Rail orders include over 61,000 tons for the New Haven, including the Boston & Maine and Maine Cen-

tral. The Lackawanna has placed 23,000 tons and the St. Paul is about closing for 60,000 tons.

In the pig iron market a sale of 25,000 tons by a Southern interest, at less than \$11, for No. 2, is the largest transaction. Recent purchases of the leading pipe interest are put at 40,000 tons. The foundry outlook is more promising in some districts, and efforts have been made by a number of melters to buy for the second half of the year. This is particularly the case with Western malleable foundries. Radiator and other interests have bought considerable Buffalo iron at low prices.

Better reports from the machinery markets, in which increased railroad buying is mentioned, should help the drooping foundry industry and show its effect on the market for foundry pig iron.

Recent buying of basic iron in eastern Pennsylvania amounts to 20,000 tons and further business is pending. The last sales were at \$14.50 and some furnaces have advanced their price to \$15. Central Western furnaces which recently accepted low prices for basic are taking a firmer stand this week and some are quoting \$14, at furnace. A meeting next week will take up again the proposed selling agency for basic iron.

The copper statistics for February 1 show an increase of 20,000,000 pounds, or about 16 per cent. in domestic stocks. While larger than looked for, the increase has had no effect thus far on the price, electrolytic selling for 12.37½. The decline in pig tin, which met some buying in its early stages, has now frightened consumers from the market.

The Gary Idea in the International Steel Trade

Engrossed as the steel manufacturers of the United States have been for several months in the problems growing out of the situation at home, it was not to be expected that international relations would be given prominence. However, there are indications that the work begun at the New York meeting of the American Iron and Steel Institute in October, 1910, looking to a more friendly footing of competitors in the world's steel markets has not been allowed to lag. It is now expected that another international conference will be held at Brussels, Belgium, in June of this year, with the purpose of making definite progress toward the end sought when the foreign manufacturers were invited to New York.

The *Proceedings* of the American Iron and Steel Institute, covering the New York meeting, have been distributed in the past week. They contain, in addition to a full report of the Waldorf-Astoria sessions for the reading of papers (already given in these columns) an interesting report of the luncheon meeting at the Railroad Club, New York, on October 24, the day before the foreign visitors sailed for home. Opinions may differ as to the economic soundness of the proposals of Chairman Gary and his friends, the home and foreign manufacturers of steel, but it is to be said that there is no secrecy in their avowals. The publication and circulation both in the United States and Europe of the remarks made at the Railroad Club luncheon is evidence that publicity is not least among the innovations represented by the Gary idea.

As the spokesman on that occasion, Chairman Gary explained in somewhat the line of thought followed in his address at the dinner he gave last month, how

price maintenance could be made effective without a formal agreement. He said that steel manufacturers in the United States had some advantage over those from abroad in that about 95 per cent. of them "are in substantial accord, working in harmony, trying to help one another." This condition he attributed to the fact that in the past few years

the iron and steel industry has been in the control of a class of men who have the intelligence, the education, the experience and also the disposition to work together on two grounds—first, that it is pleasant and agreeable to have such a friendly feeling toward each other, and secondly, because as a matter of intelligent reasoning we know the pecuniary results are sure to be better.

Going further into the matter, Judge Gary explained to his foreign guests the procedure which had been deemed permissible in the United States. Particularly noteworthy in the following extract is the distinction between actual competition and potential competition, or leaving oneself free to compete:

On account of the laws of this country we have to work with the greatest care. We have to be very particular what we say and what we do. We cannot enter into contracts with each other which tend to restrict trade; we cannot lawfully enter into a contract to maintain prices, to divide territory, to restrict output, or in any way to restrain general trade; but, as I said at the meeting of the American Iron and Steel Institute, quoting the Attorney General, it is just as well settled in this country that under the law we are not compelled to compete, if we only leave ourselves free to compete. If we enter into no arrangement which restricts us from entering into competition, if we so desire, we are within the law, and, therefore, if by coming together and divulging our business, by making statements of exactly what we are doing and what our prices are, saying one for himself only what he proposes to do, in other words, disclosing our methods and our conditions and our prices, so that every one is thoroughly acquainted with the business of others, and, therefore, as a matter of fair and friendly competition, maintains his prices and keeps within his proper domain and treats his neighbor as his neighbor ought to be treated, we are not violating any principle of law.

Since 1907, following the great panic, we have in a large measure at least worked together; we have secured as a rule the maintenance of fair prices; we have kept within our own particular bailiwicks; we have avoided injuring our neighbors who are in competition with us; we have helped one another almost daily and have secured and maintained conditions that are very much better than they were during the times many years ago when, regardless of public sentiment, contracts were actually made, though not kept, to establish and maintain prices. We have a committee which we call the Committee on Improvement in Methods; that is more or less general and very comprehensive; but it is an advisory committee. It is a committee to whom any one may apply at any time for information and advice; a committee without any power except a moral power; a committee which may advise and which advice the one who receives it may follow or reject as he sees fit. The result is that any one at any time believing his neighbor is not conducting his business as it ought to be conducted in any respect, may go before that committee and ask for information and advice concerning that particular business. The committee may take up the subject matter with the one whose methods are complained of, and, after obtaining all the facts, advise that individual what ought to be done. The individual may follow the advice or not; he is under no obligation to follow it, but frequently, if not generally, the result is that he is disposed to adopt the recommendation of the committee.

Illustrating the practical working of the American plan, the speaker gave this incident:

A gentleman to-day appealed to the fairness of the president of our corporation in regard to the methods of doing business in a certain locality, stating the facts and giving his reasons for believing that it was not quite neighborly. Our president said that he was unacquainted with the facts, but he would ascertain them immediately, and, if a correct statement had been made, his disposition would be to advise a change in that particular locality, and I have not a shadow of doubt the error committed there will be corrected immediately. There is no obligation to do it, except a moral obligation; a disposition to carry into practical effect what I have said in this friendly co-operation which means when one company benefits another company it benefits itself. It means that one company cannot succeed permanently to the disadvantage of another.

Judged by the expressions of the visitors from Great Britain, Germany, France, Belgium and Austria, in re-

sponse to Chairman Gary's proposal of an international iron and steel association on the lines of the American Iron and Steel Institute, such an organization is in a fair way to be realized. Naturally the 25 guests of last October came with no authority to act for others. They came to hear and promised to go home and report. At the Railroad Club meeting, as the *Proceedings* just published reports it, no discordant note was sounded and each of the foreign representatives promised to commend international co-operation to the steel manufacturers of his own country. The movement, indeed, took even more definite shape than this, the following resolution being passed:

With a view to forming an international association to extend existing friendly relations between steel producers throughout the world, and to provide for conferences in relation to matters in which they are all interested, it is recommended by the gentlemen here assembled that a committee be formed by the producers of the different countries to consider the subject and report to a meeting to be held in Europe in 1911. The committee shall be made up of representatives of the different countries to be appointed from nominations made by them respectively. The objects to be attained are not intended to conflict with the province of existing iron and steel institutes or technical societies already organized.

The committees thus provided for have been appointed in the respective countries, it is understood, and are now co-operating, with a view to the more definite action which it is expected will be taken at Brussels in June. On the practical outcome of the movement, time will be needed to give light. Some of the international arrangements already in existence in the steel trade—particularly that relating to rails—are matters of common knowledge. The international trade in structural steel has been conducted with some measure of co-operation, and so far as its European side is concerned is chiefly in the hands of two associations. As efforts are made to regulate conditions in certain other lines where the concerns are of smaller caliber and more numerous, difficulties will naturally increase. In pipe and wire there is a measure of co-operation now, but comparatively little in plates, sheets and bars.

Naturally international co-operation involves many difficulties growing out of international rivalries, that are often stronger than the inducement of larger pecuniary returns. But there is no question of the growing unwillingness of steel manufacturers in all countries to make sacrifice sales in outer markets for the sake of setting a hot pace for their foreign competitors. Moreover, the anomaly of the lowest prices for steel being constantly made in countries which do not produce it will hardly be tolerated indefinitely.

The Copenhagen Polytechnic Plan

The Polyteknisk Løereauhalt, the great engineering school of Copenhagen, has established a practice in its course—which should have strong advocates among American educators—of compelling a protracted period of actual industrial training in connection with the regular curriculum. The course is four and one-half years. At the expiration of the first two years, the student must pass an examination and thesis test and then serve at least two years in some practical work which is in keeping with the department of which he is a student. At the end of the period he returns to the school and takes the final two and one-half years.

Complaint has always been made that the average graduate of an engineering school requires several

years of training in his employer's service until he becomes of real value. It may be argued that a young man would do as well by taking two years of practical work after graduation as two years in the middle of the course, but this is not accepted as correct. A scientific course must be largely theoretical and a great handicap to the majority of students is that they do not realize what they really need to get out of the school. The young man taking the course has probably never rubbed up against the practical application of engineering except in a superficial way. A certain time in an industrial atmosphere, before the course begins, or under the Copenhagen system, gives the student an entirely different viewpoint during his theoretical work. An objective, more or less pronounced, has been created for him.

British Insurance Against Unemployment

Radical labor legislation abroad must always be regarded with something like apprehension in America, because established customs of other countries contrive to find their way here, often being intensified and made more obnoxious to employers by our legislative bodies. The British Parliament appears to be on the eve of passing a bill providing compulsory insurance against unemployment, which shall be paid for by the employer, the employee and the state, in some proportion not yet determined. The proposed insurance will be by trades, and the experimental bill, following a British custom, will confine its operation to a limited number of employments, including works of construction, engineering, machine and tool making, and ship and boat building, comprising a total employment of upward of 2,500,000 adult males.

The law will not act to help the habitually idle workman. It is not intended for him, but for those who are industrious. To review the measure briefly, before a man can receive insurance benefits he must have contributed a few cents a week for about eight months. When out of employment he will receive nothing for the first week; if employment is not secured, his benefit will be \$1.92 a week for 15 weeks, or longer if the weekly benefit is smaller, but in no case for more than 20 weeks. With each succeeding application for insurance benefits he must have contributed to the fund for a longer period. If work is secured for him (and this will be looked after with system) he must accept it or furnish a good reason for a declination, and with work his insurance ceases.

The experiment, if carried out, will be watched with keen interest in all industrial countries. It savors less of paternalism than many such measures. But there will be skeptics until comprehensive public benefits will have established the real value of this new scheme of insurance.

Specialized Seeking for New Customers

A factor in the selling system of industrial works which is coming to be recognized as yielding large returns is the systematic and constant search for possible new customers. A few very large companies employ special men for this purpose—free lances who have nothing to sell and nothing to buy, but who must constantly be keenly alert for new outlets for the company's products. The reports of such a man go to the sales department and are acted upon quickly and ener-

getically. The results achieved are said to be well worth the cost of the department.

Salesmen are supposed to do just this work, but of course much of their time is occupied in taking care of known buyers. The salesmen's efficiency in the search for the unknown varies greatly. Most of them need stimulation in this respect. Occasionally, however, a good salesman is developed from the encouragement given by an employer to some young man on his force who is seen to have the requisite qualities for taking the initiative in hunting up new customers. An instance of this kind is recalled in which a young man who had been schooled in the details of the business was turned loose with instructions to work up new trade and to avoid calling upon those who were regular customers. Of course, his familiarity with the products handled by his employers enabled him to select consumers in possible need of just such merchandise. His work was done with such enthusiasm, feeling the responsibility imposed upon him of establishing a reputation for himself, that it was not long until he had developed much more trade than had been thought possible. It was found that quite important consumers within easy reach of the establishment had never been cultivated with a view to securing their trade. It is needless to say that the young man speedily developed into one of the most important members of the selling force.

It must be admitted that the supplementary investigations in pursuit of new business are much more thoroughly done if made a specialized task. Smaller houses could not afford to maintain men for the one purpose alone, but there are few selling forces that would fail to improve in efficiency if the search for new customers and new purposes for the product and possibilities for new products was carried on with more system. During dull times the work should be pursued relentlessly. In known cases almost unbelievable results have followed organized effort in this direction.

Correspondence

Legislation and a Lower Cost of Living

To the Editor: The people have been educated to the point of believing that all the ills, misfortunes and sorrows of life and the failure to get what they want are caused by the party in power, and that conditions would be reversed if they put in power the party that was out. A great hue and cry went up in the last campaign concerning the failure of the party in power to revise the tariff downward. It was charged also that the trusts were robbing us of our liberty and the pursuit of happiness; that the high cost of living was due to the above alleged causes. In the dust and turmoil of political battle it was overlooked that we now have the best tariff we ever had, and the lowest on a general average, and it was forgotten that trusts rob us no more than every one and anybody will, when an opportunity offers.

However untrue and unjust the charges against the tariff and the trusts, there is no denying that the cost of living is high. The serious question is, What makes it so, and what is the remedy? We have had a lower cost of living under a higher tariff, and robbers under one guise or another we always have had with us—and always will. But wages were never so high as they are now, and with coal miners, bricklayers, carpenters, plumbers, railroad employees and all other classes of labor getting the highest wages and the best conditions ever known in this country, or any other, the cost of living cannot be low. High wages and low cost of living do not go hand in

hand. They are incompatible. This is so plain a proposition as to require no elucidation. It is self-evident.

The fact is that the high cost of living is due to high wages, shorter hours, less efficiency, reduced production per man and per dollar, and other causes rather than that high wages are due to the high cost of living. The people and the politicians are responsible for existing conditions. Public sentiment as expressed is with scarcely an exception in favor of demands for an increase of wages (higher costs), and helps enforce the demands, forgetting for the moment who ultimately has to pay the bills. The politicians advocate anything that will secure votes, however pernicious, unsafe and unsound, contrary to the economic principles of existence, dangerous to the perpetuity of the republic and in conflict with the fundamental laws of the Creator.

Besides, we have too many nonproducers, too many middlemen, who extract high toll from both employer and employee, and whose support comes from the earnings of labor and capital. They produce nothing, contribute nothing to the general welfare, and are heavy burdens on society. In every city, village and community there are 10 tradesmen, where one would be sufficient; there are 10 men living by hook and crook, when one would be superfluous. On account of the small volume of business and large proportionate expenses, the innumerable retail merchants have got to get excessive profits in order to exist. But this is aside the main question, although it adds materially to the cost of living.

For "the high cost of living" there is a remedy as simple as the cause. With free trade will come a reduction of wages corresponding to those of other countries, which will turn the tide of labor back to the land and relieve the congested centers. This condition will cause a larger and cheaper production of the necessities of life. There will be more abundant and cheaper labor for the farmer, and consequently more plentiful and less costly food supplies. The fewer railroad and industrial employees will have less money to buy with. Thus, step by step, will the high cost of living be cured.

Putting grains, meats, animals, vegetables, fruits, wool, woolen and cotton goods on the free list will be extremely helpful in securing lower prices for these articles, as they are highly protected now; and the agriculturist will be glad to contribute his share to the general welfare, for he is fair and honest and believes in doing to himself what he would have done to others.

But after all has been said about ways and means of getting prices down, the question remains: Are we really to have a lower cost of living? Can we afford to pay the price of the remedy for "the high cost of living?" When the end comes, it will be found that a protective tariff is first of all for the protection of the American workman.

AN OHIO MANUFACTURER.

Sand Blast Pressures

To the Editor: The following, we believe, gives the correct comparison between the high and low pressure type of sand blast machine. It is entirely a question of economy. Economy of work comes under two heads. First, the actual economy of the sand blast machine itself, the cost of the compressed air used and sand worn out by the machine. And second, the amount of sand blast power that can be conveniently put into the hands of one man so as to reduce the wage cost of the operation.

One pressure of air is not the most economical for all uses. The grain of sand must deliver a blow of a force properly proportioned to the work that it is expected to do. A given horsepower of compressed air will impart a certain velocity to a given weight of sand per minute and no more. If this velocity is sufficient, then doubling the velocity of the sand will reduce the factor of economy of the machine to 25 per cent. of its former efficiency for these reasons. At double the velocity each grain of the flying sand will contain four times the energy of the same grain at the lower velocity, and, therefore, the total quantity of sand to which it can impart this veloc-

ity will be only one-quarter that to which it can impart the lower velocity. As at the lower velocity the sand has sufficient energy to do the work required of it, with greater energy it can do no more, and the extra energy imparted to it is only wasted.

OTHER SOURCES OF WASTE.

There is more slip, so to speak, between the sand and the impelling air at high than at low velocities. And at lower velocities the comparatively lower pressure air imparts more nearly its own velocity to the sand than the higher pressure air moving at a greater velocity. This can readily be seen when the machine, running without sand, at the lower pressures, say, at about 10 to 16 lb., has the sand turned on and the pressure rises some 25 to 30 per cent., or to 14 to 20 lb. Whereas, when the machine is running at about 80 lb. the rise of pressure is scarcely perceptible, not over 2 or 3 per cent., when the sand is turned on. No other kind of a machine that consumed 97 per cent. of its power load when running idle would be considered economical. These conclusions caused the low or moderate pressure machine to be developed. A long course of comparative experiments fully verified them before the machines were put on the market.

These conclusions are true of any type of sand blast machine, but with the flexible hose type are emphasized. The long flexible hose is always a source of loss of power for every time a grain of sand strikes the soft elastic lining of the hose it loses considerable of its velocity, which must be again imparted to it or it will finally come to rest and clog up the tube. For this reason the larger the diameter of the hose and the less the velocity of the mixed stream of sand and air passing through it, the less is this loss because the greater the ratio of cross section to wall area, and therefore the fewer the impacts of the sand grains with the walls, and also, owing to the low velocity, the less is the loss at each such impact.

As an illustration: Our No. 6 machine has a hose $2\frac{1}{2}$ in. internal diameter. Through this hose 180 cu. ft. of free air compressed to 14 lb. passes per minute. When the sand is turned on this air carries with it about 35 lb. of sand per minute, and the pressure rises in discharging the same amount to about 20 lb. This mixed stream is discharged through a $\frac{3}{8}$ -in. nozzle. In comparison with this we quote from the catalogue of a high-pressure machine. A hose $\frac{3}{4}$ in. in diameter carries an unspecified amount of air at 80 lb., and discharges it through a nozzle of 3-16 in. in diameter. The increase of pressure when carrying sand would be practically imperceptible, and the amount carried could not possibly be more than 6 or 8 lb. per minute, probably much less. This is forced through a tube of only 0.09 the area of our hose with, it is easy to see, what a loss of velocity and wear on the tube from the fact that the machine will not work at all if the pressure is reduced very much below the specified 80 lb. When discharged the sand has not to exceed an efficiency, weight for weight, of more than one and one-fourth to at most one and one-half that of an equal weight of sand discharged from our machine, or a net cleaning power of at most one-third that of our machine at the same cost of air and a greatly increased cost for sand and hose, which the higher pressure wears out much more rapidly, and at a wage cost, if in each case one man handles one hose, of three times that called for by our machine. Including wages, air, sand and hose, this type of machine will cost nearly or quite six times as much per square foot of cleaning ordinary castings, forgings, &c., as our machine.

ENERGY WASTED MOVING AIR.

The economy of the high pressure and medium pressure machines may be compared in another way, which illustrates the inherent waste of the former class. The air discharged at a considerable velocity from the nozzles of either class of machine is itself of considerable weight—i. e., about 1-13 lb. for each cubic foot of free air. Taking the machine discharging 180 cu. ft. of free air per minute, this air will weigh about 14 lb., and is discharged at practically the same velocity as the sand with which it is mixed. The force necessary to give velocity to the air is in itself without effect in sand

blasting. Only the force which is imparted to the sand is useful. Evidently, therefore, a machine which discharges a mixture of 14 lb. of air and 30 lb. of sand per minute utilizes somewhat over 70 per cent. of the total force put into it in giving useful velocity to the sand it discharges, and wastes only somewhat less than 30 per cent. in incidentally imparting velocity to the air that is discharged along with it. Whereas, a machine that discharges the same weight of free air per minute at the higher pressure mixed with only 6 to 8 lb. of sand at a maximum, utilizes only 30 to 35 per cent. of the force in usefully throwing sand, and wastes some 65 to 70 per cent. of its force in uselessly throwing air at the same velocity. This is to say nothing of the fact mentioned above that at the higher pressures the sand does not so nearly attain the same velocity as the air in which it is mixed as it does at a lower pressure.

Another wasteful point about some of the high-pressure machines is the fact that they use a very, short nozzle. The higher the pressure and the greater the velocity sought to be imparted to the sand, the longer should be the nozzle through which the mixture passes, so that the air will have a longer time to act on the sand. The reason that this is not done is that at the higher velocities the wear of the flying sand is so destructive to the nozzles as to be more expensive, and, therefore, recourse is had to a short nozzle, thereby deliberately sacrificing economy and efficiency of action to secure a longer life to this part of the machine.

THE MINIMUM DESIRABLE PRESSURE.

One other point in regard to the proportioning of the velocity to the work to be done. One might readily imagine from the above reasoning that a still lower pressure would be still more economical. In general this is so, and for work like the depolishing of glass, where the removal of any of the substance is not desired, but only the roughening of the surface, where the effect will be produced at a very low velocity, it is most economical to use air pressures as low as about 1 lb. The reason being that at that pressure each grain of sand completes the work by striking the surface, and the same surface does not require another blow from another grain of sand. The same with cleaning of castings and forgings. At 10 to 20 lb. pressure, depending upon the nature of the sand or scale to be removed, each grain of sand cuts down to the clean metal, and the same spot does not require another blow to complete the work. If the blow were weaker, too weak to finish the work at each impact, so that a second and third blow were required to complete it, then the process would be less economical than when it is finished at one blow. Even this would not be so wasteful as making each blow several times as hard as is necessary to clean down to the metal each time it is struck. If this is done a great proportion of the force of the blows would be wasted on the clean metal beneath the sand and scale which you want to get rid of, instead of being practically all expended in removing the sand or scale which it is desired to remove. To put the comparison in a word, the use of the high pressure machines for this purpose is much like a proposition to use a heavy long-stroke pneumatic riveting hammer in place of a light, quick short-stroke hammer for work suitable for the latter.

TILGHMAN-BROOKSBANK SAND BLAST COMPANY.

PHILADELPHIA, PA., January 25, 1911.

The Detroit & Cleveland Navigation Company has accepted the bid of the Detroit Shipbuilding Company for the construction of a new steel passenger steamer to be called the City of Detroit, which will be the largest passenger steamer on the Great Lakes. The length over all will be 470 ft.; molded breadth, 55 ft.; breadth over guards, 93 ft.; molded depth, 22 ft.; steel construction throughout; approximate cost, \$1,500,000. Elevator service will be provided. The new boat will be ready early in 1912, and will be placed on the Buffalo run.

The Public Service Commission has ordered the elimination of three grade crossings of the Erie Railroad Company in Jamestown, N. Y., requiring three steel bridges.

Pig Iron Production

A Slight Falling Off in January

More Furnaces Active February 1 and Output Increasing

The January pig iron statistics show that the total production of coke and anthracite iron last month was 1,759,326 gross tons, as against 1,777,817 tons in December. A good many furnaces which were banked on January 1 were started up soon after, and these together with furnaces which resumed last month after repairs made a total of 206 active on February 1, an increase of 17 in the month. The daily capacity active February 1 was 59,568 tons, or 2800 tons more than the daily average production in January. Production to-day is, therefore, at the rate of about 22,000,000 tons a year, including charcoal iron, while under the general banking of furnaces in the holiday time it fell to 19,700,000 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with January, 1910, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.

	Steel works.	Merchant.	Total.
January, 1910.....	57,200	26,948	84,148
February.....	57,876	27,740	85,616
March.....	56,113	28,346	84,459
April.....	55,663	27,129	82,792
May.....	52,235	24,867	77,102
June.....	51,637	23,879	75,516
July.....	47,183	22,122	69,305
August.....	46,534	21,429	67,963
September.....	47,007	21,536	68,542
October.....	45,794	21,726	67,520
November.....	41,427	22,232	63,659
December.....	35,909	21,110	57,019
January, 1911.....	36,401	20,351	56,752

January Output by Districts

The table below gives the production of all coke and anthracite furnaces in January and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.

	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)
New York....	148,999	147,894	142,610	142,674	136,519
New Jersey...	18,773	19,115	18,284	15,437	12,627
Lehigh Valley.	63,919	69,327	62,161	68,341	68,324
Schuylkill Val.	60,689	61,673	54,642	51,466	60,592
Lower Susquehanna and Lebanon Val.	53,750	54,072	50,370	51,888	43,942
Pittsburgh dis.	505,342	507,508	445,083	397,379	409,698
Shenango Val.	108,114	112,026	82,904	82,706	82,922
West. Penn....	115,622	126,098	87,568	81,957	94,118
Md. Val. and Kentucky...	68,398	67,926	58,772	59,945	56,424
Wheeling dis.	74,143	76,581	84,390	74,225	77,715
Mahoning Val.	201,986	202,667	180,717	162,349	174,318
Central and North. Ohio..	111,958	117,902	108,599	112,662	127,579
Hocking Valley, Hanging Rock and S.W. Ohio.	27,657	24,029	25,008	29,959	33,253
Mich., Minn., Mo., Wis., Col., Wash.	63,935	72,825	78,927	68,313	60,941
Chicago dis....	259,672	246,504	239,469	197,340	165,826
Alabama.....	148,755	160,077	165,512	154,025	128,188
Tenn., Georgia and Texas....	24,563	26,897	24,764	26,961	26,340
Totals.....	2,056,275	2,093,121	1,909,780	1,777,817	1,759,326

The list of furnaces blown in between January 1 and February 1 (a good many of them after banking through the holiday) includes one Swede in the Schuylkill Valley, three Carrie, one Duquesne, one Lucy and two Edgar Thomson in the Pittsburgh district, one New Castle in the Shenango Valley, one Cambria (net—two in and one out) and Rebecca in western Pennsylvania, two Mingo and one Bellaire in the Wheeling district, two Ohio and Mattie in the Mahoning Valley, one Lorain and Upson in northern Ohio, Belfont in the Hanging Rock district, Madeline in the Chicago district, one Colorado at Pueblo, Missouri at St. Louis, the rebuilt Dayton in Tennessee (the other Dayton furnace blowing out).

Among furnaces blown out last month were one

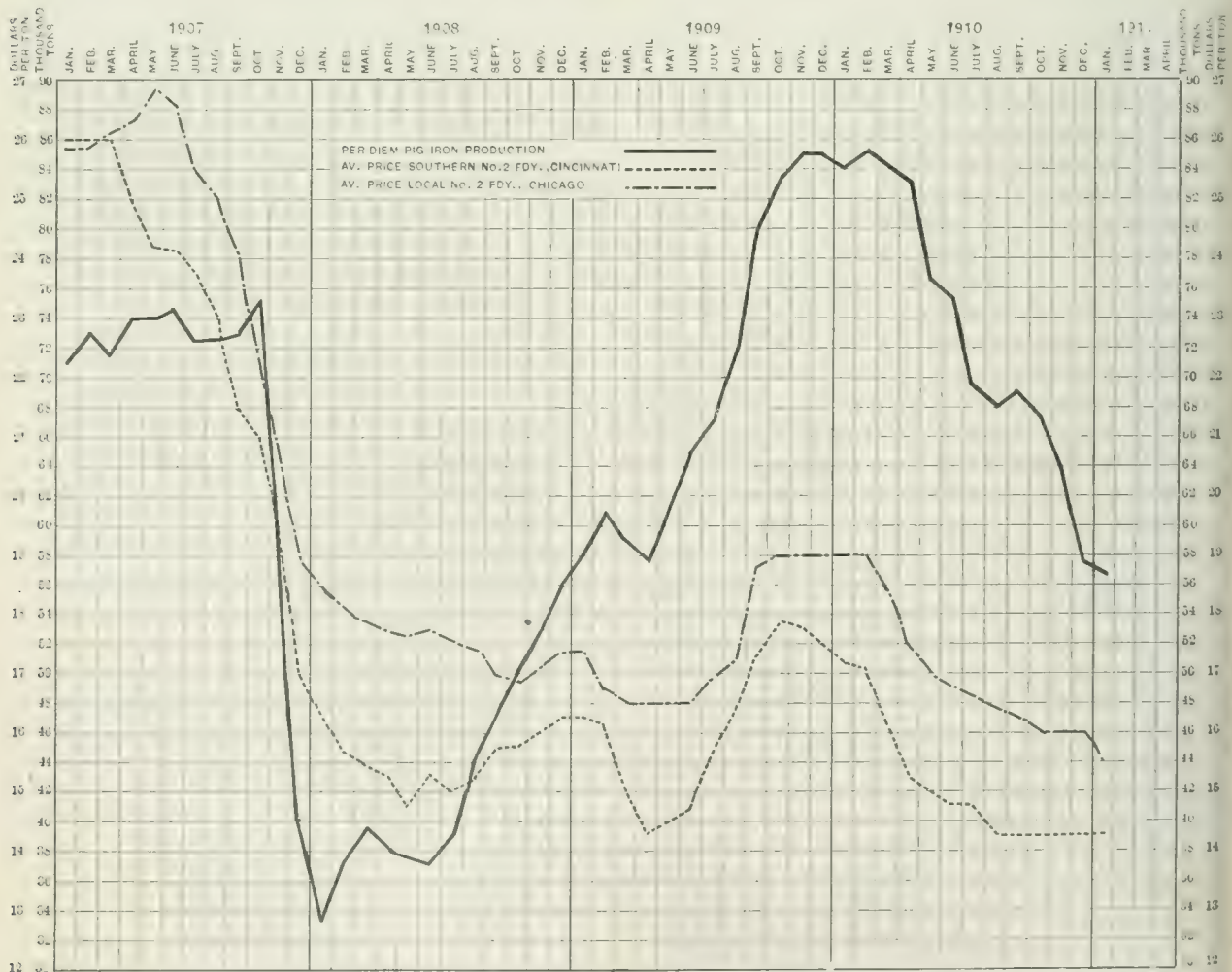


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to February 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron Delivered at Chicago.

Aliquippa in the Pittsburgh district, Dunbar and Nittany in western Pennsylvania, one Calumet and one South Chicago in the Chicago district and Cumberland in Tennessee.

Capacity in Blast February 1 and January 1

The following table shows the daily capacity of furnaces in blast February 1 and January 1. These figures are based largely on the performance of the furnaces in the past two months:

Coke and Anthracite Furnaces in Blast and Capacity.—Gross Tons.

Location of furnaces.	Total number of stacks.	February 1.		January 1.	
		Number in blast.	Capacity per day.	Number in blast.	Capacity per day.
New York:					
Buffalo.....17	12	3,931	12	4,034	
Other New York.....7	3	558	3	568	
New Jersey.....1	2	410	2	502	
Spiegel.....2	..	..	..	..	..
Pennsylvania:					
Lehigh Valley.....23	11	2,110	11	2,062	
Spiegel.....3	1	95	1	84	
Schuylkill Valley.....16	7	1,965	6	1,660	
Low, Susquehanna.....7	4	705	4	690	
Lebanon Valley.....10	5	712	5	710	
Pittsburgh district.....50	35	14,215	29	11,890	
Spiegel.....3	1	130	1	134	
Shenango Valley.....20	9	2,997	8	2,541	
Western Penna.....27	11	2,990	11	2,763	
Maryland.....4	2	575	2	530	
Wheeling district.....14	8	2,850	5	1,725	
Ohio:					
Mahoning Valley.....23	18	6,240	15	5,286	
Central and North.....22	12	4,244	10	3,455	
Hocking Val., Hanging Rock and S. W. Ohio.....15	8	1,120	7	910	
Illinois and Indiana.....32	13	5,208	13	5,605	
Spiegel.....2	..	..	1	175	
Michigan, Wisconsin and Minnesota.....10	5	1,058	5	1,104	
Colorado, Missouri and Washington.....7	4	1,185	2	708	
The South:					
Virginia.....23	8	906	8	893	
Kentucky.....5	2	340	2	320	
Alabama.....46	17	4,134	17	4,094	
Tenn. and Georgia.....20	8	890	9	904	
Total.....415	206	59,568	189	53,347	

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies.—Gross Tons.

	—Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1909	1910.	1911.	1910.	1911.
January	1,117,823	1,773,201	1,128,448	19,538	8,360
February	1,073,363	1,620,539		21,396	
March	1,140,553	1,739,212		25,591	
April	1,092,092	1,669,898		22,304	
May	1,256,148	1,619,283		26,529	
June	1,365,527	1,549,112		27,680	
July	1,508,762	1,462,689		22,924	
August	1,591,991	1,442,572		25,756	
September	1,660,839	1,410,227		15,151	
October	1,769,094	1,419,624		8,500	
November	1,689,994	1,242,804		9,032	
December	1,768,799	1,113,174		12,178	

Graphic Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907	1908	1909	1910	1911
January.....	71,149	33,748	57,975	84,148	56,752
February.....	73,038	37,163	60,976	85,616	..
March.....	71,821	39,619	59,232	84,459	..
April.....	73,885	38,289	57,962	82,792	..
May.....	74,048	37,603	60,753	77,102	..
June.....	74,486	36,444	64,656	75,516	..
July.....	72,763	39,287	67,793	69,305	..
August.....	72,594	43,851	72,546	67,963	..
September.....	72,782	47,300	79,507	68,476	..
October.....	75,386	50,554	83,856	67,520	..
November.....	60,937	52,595	84,917	63,659	..
December.....	39,815	56,158	85,022	57,349	..

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou. No. 2	Loc. No. 2	Sou. No. 2	Loc. No. 2	Sou. No. 2	Loc. No. 2	Sou. No. 2	Loc. No. 2
Jan.	26.00	25.85	16.15	18.45	16.25	17.35	17.25	19.00
Feb.	26.00	25.85	15.75	18.16	16.13	16.75	17.06	19.00
March	26.00	26.10	15.50	17.85	15.05	16.50	16.30	18.30
April	25.06	26.35	15.20	17.73	14.25	16.50	15.37	17.50
May	24.25	26.85	14.75	17.63	14.50	16.50	15.00	17.06
June	24.10	26.60	15.25	17.73	14.70	16.50	14.85	16.75
July	23.85	25.55	15.00	17.55	15.75	17.00	14.75	16.58
Aug.	23.00	24.85	15.25	17.35	16.38	17.13	14.31	16.50
Sept.	21.50	24.10	15.65	17.05	17.35	18.70	14.25	16.40
Oct.	20.95	22.45	15.75	16.85	17.88	19.00	14.25	16.06
Nov.	19.50	20.66	16.00	17.10	17.75	19.00	14.25	16.00
Dec.	17.00	18.80	16.25	17.35	17.45	19.00	14.25	16.00
Jan., 1911.	14.25	15.50	..	..	..	..	..	..

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.
January.....	2,205,607	1,045,250	1,797,560	2,608,605
February.....	2,045,068	1,077,740	1,707,340	2,397,254
March.....	2,226,457	1,228,204	1,832,194	2,617,949
April.....	2,216,558	1,149,602	1,738,877	2,483,763
May.....	2,295,505	1,165,688	1,883,330	2,390,180
June.....	2,234,575	1,092,131	1,930,866	2,265,478
July.....	2,255,660	1,218,129	2,103,431	2,148,442
August.....	2,250,410	1,359,831	2,248,930	2,106,847
September.....	2,183,487	1,418,998	2,385,206	2,056,275
October.....	2,336,972	1,567,198	2,599,541	2,093,121
November.....	1,828,125	1,577,834	2,547,508	1,909,780
December.....	1,234,279	1,740,912	2,635,680	1,777,817
January, 1911.	1,759,326	..	..	..

The Westinghouse Electric & Mfg. Company, Pittsburgh, has closed a contract with the Universal Portland Cement Company for motors to operate its No. 6 plant at Buffington, Ind. The motors will be of the MS mill type, having characteristics specially suitable for cement mill work, and will operate on a 3-phase, 25-cycle, 440-volt circuit. The sizes range from 5 hp. to 200 hp., and the aggregate capacity is 11,500 hp. This will be the largest cement plant in the United States, having a daily capacity of approximately 12,000 barrels, and will be electrically operated throughout, the various drives being of the latest development for cement mill work.

Plans have been formulated and contracts signed for a complete reorganization of the E. R. Thomas Motor Company, Buffalo, N. Y., in the interest of the creditors. A new corporation will be formed, capitalized at \$2,000,000, which will take over the plant and business. The creditors will receive 20 per cent. of their claims in cash, and the remainder in notes bearing interest and maturing not later than August 1, 1912. Mr. Thomas is to receive a satisfactory settlement for his interests and will remain in the reorganized company.

The Electrical Alloy Company, Morristown, N. J., is putting on the market a new alloy which the company calls its Grade C. It is a pure nickel and copper alloy, of noncorrosive material, having a resistance of 164 ohms per mil. ft., which does not become brittle with repeated heating and cooling. The new alloy is designed to replace 18 per cent. German silver. The company is also placing on the market its new high grade phosphor bronze armature bending wire, manufactured from an imported alloy.

The American Institute of Mining Engineers will hold its one-hundredth meeting June 6, 1911, at Glen Summit Springs, near Wilkes-Barre, Pa. The Institute was organized at Wilkes-Barre in May, 1871; thus the one-hundredth meeting comes in its fortieth year. The annual business meeting of the Institute will be held at its office, 29 West Thirty-ninth street, New York, Tuesday, February 21, at 11 a.m.

All the six furnaces of the Ohio group of the Carnegie Steel Company, at Youngstown, Ohio, were in blast February 1, one having been blown in January 9, and another January 26.

Three of the five furnaces of the National Tube Company, Lorain, Ohio, were in blast February 1, one having been blown in January 8.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Feb. 8, Feb. 1, Jan. 11, Feb. 9,
1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton :				
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$18.75
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.15	17.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	14.00
Foundry No. 2, local, Chicago	15.50	15.50	15.50	19.00
Basic, delivered, eastern Pa.	14.50	14.25	14.75	18.50
Basic, Valley furnace	13.75	13.25	13.25	16.50
Bessemer, Pittsburgh	15.90	15.90	15.90	19.65
Gray forge, Pittsburgh	14.15	14.15	14.15	17.15
Lake Superior charcoal, Chicago	17.50	17.50	18.00	19.50

BILLETS, &c., Per Gross Ton :				
Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	20.00	18.00	28.00	33.00

OLD MATERIAL, Per Gross Ton :				
Iron rails, Chicago	14.50	14.50	14.50	19.00
Iron rails, Philadelphia	17.00	17.00	17.00	20.00
Car wheels, Chicago	13.00	13.00	13.00	18.00
Car wheels, Philadelphia	13.00	13.00	13.00	16.75
Heavy steel scrap, Pittsburgh	13.75	13.50	13.50	17.50
Heavy steel scrap, Chicago	11.50	11.50	11.50	15.50
Heavy steel scrap, Philadelphia	13.00	12.50	12.50	16.50

FINISHED IRON AND STEEL,				
Per Pound :	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	<i>1.29</i>	1.30	1.32½	1.60
Common iron bars, Chicago	1.30	1.30	1.30	1.60
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.25	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.30	1.60

SHEETS, NAILS AND WIRE,				
Per Pound :	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	1.75	1.75	1.70	1.85
Cut nails, Pittsburgh	1.60	1.60	1.60	1.80
Barb wire, galv., Pittsburgh*	2.05	2.05	2.00	2.15

METALS, Per Pound :				
Lake copper, New York	12.75	12.75	12.75	13.75
Electrolytic copper, New York	12.37½	12.37½	12.50	13.50
Spelter, New York	5.50	5.55	5.55	6.12½
Spelter, St. Louis	5.30	5.40	5.40	5.87½
Lead, New York	4.45	4.50	4.50	4.70
Lead, St. Louis	4.30	4.32	4.35	4.55
Tin, New York	40.19½	42.75	40.25	32.60
Antimony, Hallett, New York	7.75	7.75	8.00	8.25
Tin plate, 100-lb. box, New York	\$3.94	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full

extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8 .....	.15
Gauges under No. 8 to and including No. 9 .....	.25
Gauges under No. 9 to and including No. 10 .....	.30
Gauges under No. 10 to and including No. 12 .....	.40
Sketches (including all straight taper plates), 3 ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over .....	.20
Boiler and flange steel .....	.10
"A. B. M. A." and ordinary firebox steel .....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive .....	.05
Widths over 110 in. up to 115 in., inclusive .....	.10
Widths over 115 in. up to 120 in., inclusive .....	.15
Widths over 120 in. up to 125 in., inclusive .....	.25
Widths over 125 in. up to 130 in., inclusive .....	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold roll sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
¼, ½, ¾ in.	72	58	68	54
¾, 1 in.	75	63	71	59
1, 1½ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	68	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½			
Butt Weld, extra strong, plain ends, card weights.				
¼, ½, ¾ in.	69	59	65	55
¾ in.	74	68	70	64
1 to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
¼ in.	64	53	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1 1/2 in. Butt Weld Will be sold at two (2) points lower basing higher prices than merchant or card weight pipe, Butt
2, 2 1/2 to 4 in. Lap Weld or Lap Weld as specified.
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1 1/2 in.	49	43
1 3/4 to 2 1/4 in.	61	43
2 1/2 in.	63	48
2 3/4 to 5 in.	69	55
2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.		
2 3/4 in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$29.

Steel Rivets.—Structural rivets, 3/4 in. and larger, 1.90c., base; cone head boiler rivets, 3/4 in. and larger, 2c., base; 3/8 in. and 1 1/16 in. take an advance of 15c., and 1/2 in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, February 8, 1911.—(By Telegraph.)

Pig Iron.—The elimination of a heretofore aggressive seller of basic pig iron, together with the generally improved conditions of business, has brought about a much stronger situation in that grade of pig iron, and the market to-day is higher by at least 50c. a ton than the prices of a week ago. One furnace interest claims that it was offered \$14, at furnace, for 10,000 tons of basic for forward delivery and turned the business down. A Canton steel maker is in the market for 3000 tons of basic, and will have to pay higher prices than a week ago. A meeting of Valley furnacemen is to be held, probably next week, for the purpose of discussing the question of establishing a single selling agency for basic iron in the Pittsburgh district and nearby consuming points. The matter was fully discussed a month or more ago, but no action was taken at that time. Bessemer and foundry iron are quiet, but the whole pig iron market is decidedly firmer. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75; No. 2 foundry, \$13.75, and gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—For the first time in some months the Bessemer steel plants of the Carnegie Steel Company at Bellaire, Mingo Junction and Youngstown are in full operation this week. Consumers are specifying freely against their contracts for billets and sheet and tin bars. The steel market is now very firm, with more steel moving from the mills to consumers than had been the case in some months. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1 1/2-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

Structural Material.—Reports that the Westinghouse Electric & Mfg. Company has placed contracts with the American Bridge Company for foundries Nos. 1 and 2 at Trafford City, Pa., involving about 3000 tons of steel, are denied by both concerns.

(By Mail.)

The improvement in the iron trade is not based on sentiment alone, as in January the rail and billet sales department of the Carnegie Steel Company received orders and specifications against contracts for 50,000 tons more than in December, and February promises to show an increase over last month. Other interests report similar conditions in their trade. The trade is decidedly more optimistic, the only weak spots being pig iron and coke, in which there has been an overproduction for some months.

Wire Rods.—Prices of rods are firmer, and we now quote Bessemer and open hearth rods at \$29, Pittsburgh, which is an advance of about \$1 a ton over previous prices. The capacity for making rods has, however, materially increased recently, by reason of the starting up of the new mill of the Jones & Laughlin Steel Company, to be followed this month by the new mill of the Cambria Steel Company, with an aggregate output of close to 700 tons of rods per day.

Ferromanganese.—Further weakness is shown, some

very low prices having been made in this district in the past week or two by a New York importer. Sales of 80 per cent. foreign have been made as low as \$37.50, Baltimore, in small lots for prompt shipment. The freight rate to Pittsburgh is \$1.95 a ton. We note sales of two cars, or about 50 tons, for prompt delivery, at \$37.50, Baltimore.

Ferrosilicon.—The market is fairly strong, and we note a sale of 50 tons of 50 per cent. for forward delivery on the basis of about \$54.50, Pittsburgh. We quote 50 per cent. at \$54.50 to \$55, Pittsburgh, for delivery within the next three or four months. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent. \$24 and 12 per cent. \$25, f.o.b. cars, Jisco and Ashland furnaces.

Skelp.—Prices are decidedly firmer, and the few mills in this district that roll skelp are pretty well filled up for some time ahead. One local pipe mill has bought recently several round lots of grooved steel skelp as low as 1.25c., but makers report that the minimum price at which it can now be bought is 1.30c. A sale is reported of 1000 tons of narrow grooved steel skelp at 1.30c., for forward delivery. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Muck Bar.—In the absence of sales, we quote muck bar nominally at \$29, but a leading maker in this district states that he has been offered \$30 for upward of 1000 tons for forward delivery.

Sheets.—A decided improvement is observed in the demand, while prices are being better maintained than for several months past. The increase in orders is not confined to one locality, but comes from all over the country. Most of the leading mills are operating from 60 to 70 per cent. of capacity, which is better than they were doing up to very recently. The full schedule of prices will be found on a previous page.

Tin Plate.—Effective February 3, the manufacturers announced an advance of 10c. per base box on 100 lb. cokes, and greater advances were made on some grades of terne plate and higher grades of tin plate. This advance was not unexpected, as the high price of pig tin has added materially to the cost of making tin plate. A further advance in the near future is not improbable. No advance was made on black plate for tinning. The new demand for tin plate is fairly heavy, while specifications on contracts are coming in very freely. The American Sheet & Tin Plate Company is operating this week to about 82 per cent. of capacity. The leading independent mills also report an increase in operations, and it is believed that the production will shortly be up to 90 per cent. or more of capacity. We now quote 100 lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Steel Rails.—No important contracts for standard sections have been placed in the past week, but the Carnegie Steel Company reports orders for several small lots for early shipment. New orders and specifications for light rails received by this company are running at the rate of about 2000 tons per week, most of this business coming from the coal mining interests, but it is expected that about April 1 the lumber concerns will be in the market. The company's three rail mills at Bessemer, Pa., are now operating to larger capacity than for some time. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Structural Material.—Inquiries are decidedly better and considerable business has been placed in the past week. The Cambria Steel Company has taken 1000 tons of steel for a power house at Albany, N. Y.; 3000 tons for a viaduct for the Louisville & Nashville Railroad, at Louisville, Ky., and 500 tons of bridge work for the New York, New Haven & Hartford Railroad. The American Bridge Company has received a contract for a number of bridges for the National Railroad in Mexico—10,000 tons. The McClintic-Marshall Construction Company has a contract for some viaduct work for the Norfolk & Western Railroad, 2000 tons, and some areaways for the New York Central, 600 tons. Prices are firm and we continue to quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Plates.—The demand is much better. The Cambria Steel Company will furnish the plates and shapes for two new ore boats to be built by the Shenango Steamship Company, controlled by the Shenango Furnace Company of this city. The Jones & Laughlin Steel Company has taken about 3500 tons of shapes and plates for a new ore boat to be built by the American Shipbuilding Company, for the Wisconsin Steel Company, an identified interest of the International Harvester Company. New orders for cars have been light, but the local courts have finally granted per-

THE IRON AND METAL MARKETS

mission to the Wabash-Pittsburgh Terminal Railway Company to build 1000 steel cars, and the Pennsylvania Railroad will build 1000 open gondola cars at its shops at Altoona, Pa. Prices on $\frac{1}{4}$ in. and heavier plates are firm at 1.40c., Pittsburgh.

Bars.—Specifications against contracts from the implement makers and the wagon builders are coming in at a fairly satisfactory rate, but the new demand for both iron and steel bars is quiet. Hard steel bars for reinforced concrete work are in lighter demand than for some time. We quote steel bars at 1.40c. and iron bars at 1.35c. to 1.40c., in carload and larger lots, f.o.b. Pittsburgh.

Hoops and Bands.—Some quite heavy contracts for steel bands have recently been placed, and one local mill has made a price of 1.35c. on some especially attractive business, plus the usual extras. The new demand for both hoops and bands is mostly in small lots to cover actual needs. Specifications against contracts for hoops are said to be coming in quite freely. We quote hoops at 1.50c. and bands at 1.40c., in carload and larger lots, the latter carrying extras as given in the steel bar card of September 1, 1909.

Spikes.—While the new demand for railroad spikes is light, several inquiries are in the market for round bolts. The new prices on spikes, effective from February 1, are as follows:

Railroad Spikes.

4 1/2, 5 and 5 1/2 x 9	Extra	1.55
3 1/2, 4, 4 1/2 and 5 x 9	Extra	.10
3 1/2, 4 and 4 1/2 x 7 1/2	Extra	.20
3 1/2, 4 and 4 1/2 x 9	Extra	.30
2 1/2 x 9	Extra	.40
2 1/2, 3 and 3 1/2 x 7 1/2	Extra	.60
2 x 9	Extra	.80

Boat Spikes.

3/4 in. square, 12 to 24 in. long	Extra	.15
3/4 in. square, 8 to 16 in. long	Extra	.15
3/4 in. square, 6 to 16 in. long	Extra	.15
3/4 in. square, 6 to 12 in. long	Extra	.20
3/4 in. square, 4 to 12 in. long	Extra	.30
3/4 in. square, 4 to 8 in. long	Extra	.45
3/4 in. square, 4 to 8 in. long	Extra	.75
3/4 in. square, 3 to 3 1/2 in. long	Extra	1.00
3/4 and 5/16 shorter than 4 in., 1 cent extra.		

Spelter.—The market is firmer, with more inquiry. We quote prime grades of Western spelter at 5.25c., East St. Louis, equal to 5.37 1/2c., Pittsburgh.

Merchant Steel.—New orders and specifications against contracts in January showed a slight increase over December, and this month, so far, has been quite good.

Rivets.—The demand is mostly for small lots to cover actual needs and specifications against contracts are only fair. Regular prices are sometimes shaded for desirable orders.

Wire Products.—Buying of wire and wire nails is fair, but is still mostly in small lots. New orders and specifications for cut nails are reported as a little better. Prices are said to be firmly maintained. We quote galvanized barb wire at \$2.05, painted \$1.75, annealed fence wire \$1.55, galvanized \$1.85, wire nails \$1.75 and cut nails \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—This is always the dull season in the pipe trade, new business being confined to small lots. Stocks throughout the country are said to be lighter than in a long time, which promises that when spring trade opens up the demand will be quite heavy. Some large projects for gas and oil lines are under way. Discounts are said to be quite well maintained.

Boiler Tubes.—Some fairly large inquiries are in the market for locomotive boiler tubes, but actual business being placed is only fair. The demand for iron tubes is reported as heavier than for some time, and the Tyler Pipe & Tube Company is operating its plant at Washington, Pa., on iron tubes to nearly full capacity. The demand for merchant tubes is dull and prices are more or less shaded.

Coke.—Owing to the starting up of additional blast furnaces of the United States Steel Corporation, the H. C. Frick Coke Company has recently fired 3000 additional ovens and is now operating to about 65 per cent. of its capacity. Prices are possibly a shade firmer, but low figures continue to be named on both furnace and foundry coke loaded on cars which must be moved. The output in the Upper and Lower Connellsville regions last week was 291,705 tons, an increase over the previous week of more than 4000 tons. We quote standard makes of furnace coke for spot shipment at \$1.45 to \$1.55 per net ton, at oven, while on contracts for delivery over the year from \$1.70 to \$1.75 is being quoted by some coke operators, while others, that are pretty well filled up, are holding their furnace coke firm at \$1.90 to \$2. at oven. Best makes of 72-hour foundry coke are being held at \$2.10 to dealers and from \$2.25 up to \$2.50, at oven, to consumers.

Iron and Steel Scrap.—There is more disposition by consumers to take in scrap than for some time, but dealers believe that prices are soon going to be higher and are not

willing to take contracts and trust to their ability to cover them. There is a better movement in steel scrap, and prices are about 25c. a ton higher. The mills are operating to slightly larger capacity and the consumption is heavier than for some time. Dealers now quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as stated:

Heavy steel scrap, Steubenville, Folsom, Sharon, Monessen and Pittsburgh delivery	\$13.75 to \$14.00
No. 1 foundry cast	13.00 to 13.15
No. 2 foundry cast	12.00 to 12.25
Bundled sheet scrap, at point of shipment	10.00 to 10.25
Revolving rails, Newark and Cambridge, Ohio, and Cumberland, Md.	14.75 to 15.00
No. 1 railroad malleable stock	12.75 to 13.00
Grate bars	10.75 to 11.00
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.00 to 24.50
Steel car axles	20.25 to 20.50
Locomotive axles	24.00 to 24.50
No. 1 busheling scrap	12.25 to 12.50
No. 2 busheling scrap	8.75 to 9.00
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.75 to 16.00
Cast iron borings	8.00 to 8.10
Machine shop turnings	8.60 to 8.75
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50
Stove plate	10.75 to 11.00

Chicago

FISHER BUILDING, February 8, 1911.—(By Telegraph.)

The best news of the week is that the Illinois Steel Company is preparing to blow in three furnaces this week, two at the South Works and one at Joliet, and will bring in another at Gary next week. The Bessemer rail mill at South Chicago will be in operation again February 20. Current business shows improvement in all lines. Wire products have taken the lead and specifications are running in excess of mill capacity, with the prospect that delays in shipment may prove embarrassing in the hardware trade, as storms this week have demoralized railroad traffic. Enough rail business has been booked to operate the mills until other orders are received. The St. Paul road is on the point of closing for 60,000 tons of standard rails, and other good orders are in immediate prospect. Contracts for structural material are being let at a satisfactory rate, especially on the large tonnage of building work pending in Chicago. Current orders from the fabricating shops for mill material are reaching a good volume, both in structural shapes and plates. Specifications for steel bars are coming in better and the sheet business is slowly improving. Contracts have been let this week for extensive additions to the largest plant in the West for building steel freight cars.

Pig Iron.—All the large malleable foundries in the West have been asking for prices on malleable Bessemer iron for the last half of the year and in some cases they have offered to begin taking deliveries in April. A meeting of the malleable foundries is being held to-day to consider prices of castings and general trade conditions, as the largest customers of the foundries are in the market to make contracts for castings for the fiscal year beginning July 1. The furnace interests in this and Milwaukee territory are unwilling to sell the last half, excepting at a substantial advance over current quotations. An encouraging feature in the trade is that the malleable foundries are giving better shipping orders on old contracts, on which the iron has been held at the furnaces. The current demand from the gray iron foundries for small lots is improving and in the last few days has been equal to the daily production of the local furnaces. Several round lots of foundry have also been sold for forward delivery, on which details are not yet available. There are also better inquiries for Southern iron for prompt or near deliveries, and practically all of the high phosphorus iron that has been selling at concessions has disappeared from the market. The low grades are scarce in the South, as the pipe foundries have been quietly picking up a considerable tonnage on the basis of \$10, Birmingham, for No. 4. A Northern pipe interest is in the market for analysis iron for delivery in Ohio. This interest bought 30,000 tons a year ago at this time, principally from Valley and southern Ohio furnaces. The following quotations are for February and March shipments:

Lake Superior charcoal	\$17.50 to \$18.00
Northern coke foundry, No. 1	16.00 to 16.50
Northern coke foundry, No. 2	15.50 to 16.00
Northern coke foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.50 to 16.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.80 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.80 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.80 to 20.40

THE IRON AND METAL MARKETS

(By Mail.)

Billets.—A Milwaukee consumer is inquiring for 1000 tons of forging billets, and there is another inquiry pending for 500 tons. The leading interest continues to quote \$31, base, Chicago, but independent mills are shading this price.

Rails and Track Supplies.—The Illinois Steel Company booked orders last week for about 40,000 tons of standard rails, including this company's allotment of the Pennsylvania rail business. Orders for track supplies are improving. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Structural Material.—New structural contracts are coming out steadily. The Northwestern Terra Cotta Company, Chicago, has let to the American Bridge Company about 1000 tons for plant construction. The Monroe Building, Chicago, 2714 tons, was let to the South Halsted Street Iron Works. The Western Steel Car & Foundry Company has let contracts requiring 1460 tons of steel for additions at shops at Hegewisch, Ill. The Chicago, Burlington & Quincy Railroad has let 2500 tons of bridge work, but the name of the successful bidder, supposed to be the Pennsylvania Steel Company, has not been announced. The Bon Marche Building, Seattle, Wash., 1443 tons, was let to the Vulcan Iron Works. Smelter construction at El Paso, Texas, 227 tons, was let to the Darbyshire-Harvie Foundry Company. The American Radiator Company's new building at Denver, Colo., a warehouse, has been changed to mill construction. A Chicago contractor is inquiring for 1200 tons of steel piling for a dam in Wisconsin, and there are other good current inquiries for structural material. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Specifications from the general trade are improving, but the railroads are slow in placing car orders which the plate mills need for full operation. The only important car business reported pending is for refrigerator cars. The Chicago, Burlington & Quincy is in the market for 500 of these cars with steel underframes, and a refrigerator line is figuring on 1500. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Business continues to improve and there is a better tone in the market, but current specifications only equal about half the capacity of the mills. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar business has been dragging behind other finished lines, but the season is opening for concrete business and there are several good inquiries pending, including one for 800 tons. Specifications from the agricultural trade are better. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The rush of business since the advance in prices last month is evenly distributed over all the important lines of wire. The railroads are closing good yearly fence contracts and their storekeepers are placing liberal orders for nails and other material. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Merchant Steel.—The agricultural implement manufacturers appear to be doing more business this year than in their record breaking trade season a year ago. They began specifying early last summer for special grades of steel, but their requirements in harrow disks, rake teeth and other important lines have been even larger than was anticipated.

Cast Iron Pipe.—The city of Chicago has awarded 3500 tons of 36-in. and 48-in. water pipe to the United States Cast Iron Pipe & Foundry Company. The same interest was awarded 5000 tons of water pipe at Cincinnati last week. January bookings were better than for the same month a year ago and better than the average for January. Good lettings are also expected in February. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25; 6 to 12 in., \$24; 16-in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—The scrap market has developed a little strength in the past week for the first time in a long period. Cast scrap and locomotive tires are the only lines actually quoted higher than a week ago, but dealers are more confident on other grades and are not making concessions. Storms will prevent the movement of spot material this week, and this may improve quotations of scrap in transit.

The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered Chicago:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.25 to 13.75
Old steel rails, less than 3 ft.....	12.50 to 13.00
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	14.50 to 15.00
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	11.25 to 11.75
Locomotive tires, smooth.....	17.50 to 18.00
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	10.75 to 11.25
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00

Philadelphia

PHILADELPHIA, PA., February 7, 1911.

The market is decidedly stronger, the sentimental feeling that better conditions were near at hand having been backed by increased buying and heavier specifications for finished materials. Consumers of crude materials have also entered the market more freely and would take further quantities for forward shipment if they could get them at present prices or in some instances at a slight advance. This is particularly noticeable in steel making brands of pig iron, for which makers in this territory have definitely marked up prices. Several producers have also withdrawn from the foundry iron market at the present price level. Generally speaking, the trade is of the opinion that we have made the turn and are now on the upward grade, and that the demand as well as prices of pig iron will show a gradual betterment. Finished material prices remain firm, and mills are booking better aggregate tonnages in plates, shapes, billets and steel bars. Refined iron bars, however, are not particularly strong. The old material market is stronger and shows a sharp stiffening in the prices of some grades. Holders of material are not inclined to sell at to-day's quotations. Coke remains quiet.

Iron Ore.—Further sales of Wabana ore to consumers in this district are reported, aggregating 50,000 tons, at 79¢. per unit, delivery during the current year. Negotiations for about a like tonnage are pending. It is reported that Spanish ore for 1911 shipment will be held at a higher figure, owing to the heavy demand abroad. No sales, however, are reported in this market. Importations at this port in the week ending February 4 aggregated 10,100 tons, valued at \$27,775.

Pig Iron.—Consumers are showing decidedly more interest in the market and would place orders for moderate quantities for forward delivery if sellers would accept the business. This, however, the latter are unwilling to do and a number have withdrawn from the market at the present price level. The most important business in this territory has been in basic iron, an aggregate of 20,000 tons being sold at an advance over the recent low price. These transactions are all reported at \$14.50, delivered, shipment to be made in the next 30 and 60 days. Negotiations for a further block of 5000 tons are pending, and it is stated that consumers have made offers for fair sized lots for delivery over the remainder of the first half at prices above those at which recent sales were made, but most producers have fixed on \$15, delivered, as their price, either for prompt or near future delivery. In foundry irons a fair business has been done, but sellers are not disposed to load up order books at the present level, and one maker has advanced his price 50¢. a ton, which virtually means that he has withdrawn from the market. Sales have been mostly in moderate lots, upward of a few hundred tons, for near future shipment. The movement in low grade iron has not been so heavy; one sale of 1000 tons of Northern iron at \$14.25, delivered, to a Delaware River pipe works, is reported, with further business pending. Virginia foundry irons have been more active; in fact, the Virginia situation looks somewhat better. Stocks in January showed a decrease of about 3 per cent.

THE IRON AND METAL MARKETS

as compared with December, being the first time a decline has been reported for many months. While the leading producers maintain prices firmly, one or two still offer iron, not considered as standard grade, at a concession of 25c. One sale of about 1000 tons of Virginia low grade iron to a Virginia cast iron pipe maker for early delivery is reported. This was made at a low price, owing to its high sulphur content. Practically no movement in Southern iron is reported. The demand for forge iron is not active. One inquiry for 5000 tons of low phosphorus iron for extended delivery is reported; current sales of this grade, for delivery in this vicinity, however, have been light. While prices are firmer, and in some grades show an advancing tendency, the following range is named for standard brands for early shipment, delivered in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain	15.00 to 15.25
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.25
Basic	14.50 to 15.00
Standard low phosphorus	21.50 to 21.75

Ferromanganese.—The situation is unchanged. Little business is done and prices range from \$37.75, Baltimore, for prompt, to \$38.25 for second quarter and \$38.50 for second half, but are not considered particularly strong at those levels.

Billets.—Orders have been coming out somewhat more freely. While a little forward business has been taken, the bulk of the orders are for small lots for prompt delivery. The aggregate, however, shows a little improvement. Prices are well maintained, \$25.40 being quoted for open hearth rolling billets, delivered in this vicinity, while ordinary forging billets are quoted at \$30.40, delivered.

Plates.—Eastern plate makers are more optimistic in their views regarding the situation. Specifications recently have been considerably heavier and there has been a very fair run of new business. Although the quantities required have not been individually large, they indicate increasing activity on the part of consumers. Some business in tank plates, which has been pending for a long time, has been placed, and a very satisfactory volume of business is coming from railroads, boiler-makers, bridge and locomotive builders. Efforts to place contracts for future needs are again more pronounced, but Eastern mills are not particularly anxious for that class of business. Prices are firm, the minimum for ordinary plates, delivered in this territory, being maintained at 1.55c.

Structural Material.—Current orders continue small, although several fair quantities of shapes for building and bridge work are pending. The aggregate business coming to the mills in this district is somewhat larger, although orders continue, for the greater part, small individually. Prices continue firm at 1.55c. for plain shapes, delivered in this vicinity.

Sheets.—Business continues fairly active and, while the bulk of the orders received are for small lots for prompt shipment, some few larger orders for more extended delivery are reported. Mills continue actively engaged, although there is still but little business ahead on the majority of makers' order books. Prices are unchanged: Eastern mills naming the following range for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—While a fair amount of moderate lot business comes out, both in steel and refined iron bars, the market for the latter is not particularly strong. Steel bars remain firm, at 1.55c., delivered here, but refined iron bars have been sold at 1.29c., delivered in this vicinity, although not all producers are willing to make that price and in instances hold at 1.39c., delivered; but the bulk of the business is done around the inside quotation.

Coke.—The movement is light, being confined closely to sales for prompt delivery. While some business in forward furnace coke has been under negotiation, sellers are not willing to accept orders covering any quantity for forward delivery at present prices; meanwhile consumers pick up odd lots for prompt and near future delivery at a low price, 1.45c. to 1.55c., at oven, being frequently done for such business. Foundry coke is quiet, small lots moving at unchanged prices. The following range of quotations about represents the market, per net ton, for near future delivery, in buyers' yards in this vicinity:

Connellsville furnace coke	\$3.75 to \$3.90
Foundry coke	4.25 to 4.50
Mountain furnace coke	3.35 to 3.50
Foundry coke	3.85 to 4.10

Old Material.—While there has been no urgent demand in this district, more buying is noted in some grades, usually at slightly higher prices. Sellers will not dispose of their accumulations, they state, even at prices somewhat above those quoted, particularly when they are able to move current offerings to points outside this district, where better

prices are obtainable. Some consumers show more interest in the market, and higher prices than those recently quoted have been obtained for small lots of No. 1 heavy melting steel, \$13.25, delivered, having been paid for a moderate quantity for early delivery. Old car wheels continue active, and the local locomotive builder is reported to have picked up in small lots an aggregate of 1500 to 2000 tons at a price ranging from \$13.25 to \$13.50, delivered. Rolling mill grades have been a little more active and slightly better prices for wrought pipe, turnings and borings are reported. Machinery cast scrap also shows a slight betterment. The following range about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap	\$13.00 to \$13.50
Old steel rails, rerolling	15.00 to 15.50
Low phosphorus	17.50 to 18.00
Old steel axles	19.50 to 20.00*
Old iron axles	26.00 to 27.00*
Old iron rails	17.00 to 17.50
Old car wheels	13.25 to 13.75
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	13.00 to 13.50
No. 1 large iron	11.50 to 12.00
No. 2 light iron	7.00 to 7.50*
Wrought turnings	9.00 to 9.50
Cast borings	8.50 to 9.00
Machinery cast	14.50 to 15.00
Railroad machine	12.00 to 12.50
Grate bars	11.00 to 11.50
Stove plate	10.00 to 10.50

* Nominal.

Cincinnati

CINCINNATI, OHIO, February 8, 1911.—(By Telegraph.)

Pig Iron.—As far as this market is concerned, there is more confidence displayed both by the seller and consumer. However, sales continue to be confined principally to small tonnages for early shipment. An Indiana melter is said to have purchased 2000 tons of Northern No. 2 foundry, with some high silvery mixed in. The St. Louis territory contributed an order for 500 tons each of Northern foundry and malleable, and there have been numerous sales of Southern foundry in lots of 100 to 300 tons. An Ohio company bought 5000 tons of basic from a Valley furnace and for foundry iron the pipe makers have been excellent customers for Southern furnaces. The local order for 2000 tons of analysis iron has not yet been closed, but it is expected to be booked shortly. Nearby inquiries, in addition to small lots asked for, include 1000 tons of Southern No. 2 foundry. Consumers appear to be willing to cover for the third quarter and last half at prevailing prices, but the furnace interests will not now quote anything except prohibitive figures for that delivery. For the first half \$11, Birmingham, for Southern and \$14, Iron-ton, for Northern No. 2 foundry, rule, and there is a lessening possibility of getting these figures shaved for even spot shipment on iron not quite up to grade. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	\$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	18.20
Lake Superior coke, No. 1	15.70
Lake Superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

(By Mail.)

Coke.—There has been a little activity in foundry coke. During the past week a few contracts, calling for 1000 to 2000 tons each, were closed, deliveries to run through the remainder of this year, at prices ranging from \$2.15 to \$2.25 per net ton at oven. Practically all of this business went to the Wise County field. Foundry coke is obtainable in all three fields, for spot shipment, around \$2 per net ton. Furnace coke remains stationary. In the Connells-ville district it is obtainable at \$1.50 for prompt delivery, with a premium of about 15c. per net ton for future shipment. Pocahontas and Wise County interests are holding out for \$1.65 to \$1.75 per net ton oven for either prompt or deferred shipment.

Finished Material.—Both structural material and steel bars are in better demand. There is also a good call for railroad track supplies. Prices are firm, and 1.40c., Pittsburgh, is the quotable mill figure on beams, channels and bars. Warehouse prices are from 1.75c. to 2c. The trade generally has about realized that the mills have no intention of cutting prices, and there is a steady increase in the amount of business placed.

THE IRON AND METAL MARKETS

Old Material.—The market is dull and unenterprising, but prices are firm. No new railroad offerings have come out, and the two lots recently mentioned are understood to have been absorbed by different dealers. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	\$12.00 to \$12.50
Cast borings, net ton	4.75 to 5.25
Steel turnings, net ton	6.00 to 6.50
No. 1 cast scrap, net ton	11.00 to 11.50
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Busheled sheet scrap, gross ton	8.50 to 9.00
Old iron rails, gross ton	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton	21.50 to 22.50
Old car wheels, gross ton	12.00 to 12.50
Heavy melting steel scrap, gross ton	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., February 6, 1911.

Pig Iron.—Quotations on shipments to cover the remainder of the first half have generally been made with reluctance, and for the reason that the \$11, Birmingham, price could not be made to apply, the aggregate of tonnage sold during the past week is not as large as it could have been. It is now definitely known that two of the leading interests will not accept shipments over the remainder of the first half at \$11, while two of the smaller concerns have practically withdrawn from the market. As far as can be ascertained, no prices have been named on shipments after July 1, notwithstanding the volume of inquiry recently received for such deliveries. The heavy demand for cast iron water pipe has been reflected in the negotiations of such manufacturers and the shortage of low grades which they require is more pronounced. The demand for silvery iron is such that premium prices are being asked, the tonnage available being offered subject to prior sale. A definite statement as to the aggregate of stocks in this district on February 1 is not available, owing to the delay in receiving reports from the several producers, but it is generally believed that a material reduction was made during January. The output of foundry grades was reduced the past week by the blowing out of an additional furnace, and no preparations are yet under way for resumption by stacks that have been idle for some months. The fact that one of the producing interests prefers remaining out of the market rather than to increase its output to take care of additional orders is essential. As a whole the situation is considered more encouraging than for some months, and it is generally believed that the indifference of producers as to additional commitments at the present status of prices is not unwarranted.

Cast Iron Pipe.—The tonnage placed with Southern producers within the past fortnight is well up into round figures, and the prospects for additional lettings are considered very good. Recent transactions consisted of several municipal contracts and an attractive aggregate of small orders for maintenance and extensions. This last mentioned is very encouraging to the producers as the average of prices received was considerably increased. The most important letting now in sight is 3000 tons of water pipe for the city of Minneapolis, Minn., upon which bids will be opened soon after February 15. The city of Los Angeles, Cal., is to place a contract for approximately 1500 tons of water pipe, but the date of the letting has not been announced. Several lots of 1000 to 2000 tons each are being held in abeyance to await the sale of municipal bonds, and as the demand for such bonds has recently improved materially the early placing of an attractive tonnage is expected. An advance in water pipe quotations is believed warranted and we quote revised prices as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$21; 8 to 12 in., \$20; over 12 in., average \$19, with \$1 per ton extra for gas pipe. These quotations are probably subject to shading on large municipal contracts.

Old Material.—The demand continues to improve, and by reason of the recent heavy movement from local yards prices have been revised. It cannot be said that an advance in prices has actually taken effect, but the market is generally considered in a more satisfactory condition than for some months. We quote dealers' revised asking prices as follows, per gross ton, f.o.b. cars here:

Old iron axles	\$14.00 to \$14.50
Old iron rails	12.50 to 13.00
Old steel axles	12.50 to 13.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.50 to 8.00
No. 1 machinery	10.00 to 10.50
No. 1 steel	9.50 to 10.00
Tram car wheels	9.00 to 9.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.50

The furnace of the Silver Creek Furnace Company at

Rome, Ga., has been blown out, owing to a temporary financial embarrassment of that company.

The plant of the Southern Foundry & Machine Company, Birmingham, which concern was recently adjudged a bankrupt, has been closed for an indefinite period.

Cleveland

CLEVELAND, OHIO, February 7, 1911.

Iron Ore.—No further reservations are reported and from present indications it will be some time before a buying movement sets in. The uncertainty regarding prices continues, that subject not yet having been taken up by the ore firms. It is practically certain that nothing will be done on the price question until consumers are ready to buy. A few weeks ago one furnace interest urged that the ore firms make the market more stable by fixing prices for five years or some other stated period, claiming that this would help conditions in the iron and steel industry. This proposal has caused some discussion, but it is not meeting the approval of the ore interests, being regarded by them as impractical. Ore shipments from the docks continue light. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—The United Steel Company, Canton, Ohio, is in the market for 3000 tons of basic—1000 tons for March and 2000 tons for April. In foundry grades the market in this territory continues dull. While a number of sales are reported, they are all for small lots. Local agencies are getting a little better volume of inquiries and orders from other districts. An Ohio pipe plant which sent out a large inquiry for the entire year several weeks ago is still in the market. Conditions continue generally quiet in the foundry trade and many consumers will defer making purchases until their orders improve. Prices are stationary. While some concessions have been made the local market is fairly firm at \$14.25 for No. 2 foundry for Cleveland delivery for the first half. For outside shipment \$13.75, at furnace, is the usual quotation, this price meeting that of the Valley furnaces. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Northern foundry, No. 3	14.00
Gray forge	14.00
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	19.00

Coke.—The only activity is in foundry coke, for which there is some demand for small lots. There is no inquiry for furnace grades. Prices are unchanged. We quote standard Connellsville furnace coke at \$1.40 to \$1.55 per net ton at oven for spot shipment, \$1.60 to \$1.65 for the first half and \$1.75 to \$1.80 for the entire year. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—All mill agencies report a fair volume of small orders and specifications on contract. Not only is the improvement previously noted holding up, but the outlook is growing brighter. In the lake shipbuilding industry contracts have been placed in the past two weeks for six boats that will require about 17,000 tons of plates and structural material. The latest boat for which bids were received was a 470-ft. passenger boat, to be built for the Detroit & Cleveland Navigation Company by the Detroit Shipbuilding Company. The steel, about 1800 tons, will be furnished by the Carnegie Steel Company. New work in building lines is developing slowly and no good inquiries have come out, but a fair volume of specifications is coming from the fabricating shops and bridge companies. The Detroit Bridge & Steel Company has taken the contract for the Pingree building, Detroit, requiring 325 tons. The demand for plates shows some improvement, and prices are being maintained. Sheet prices are firm, with a fair demand. There is a better demand for forging billets than for some time, orders being mostly for 25 and 50 ton lots. The demand for shafting continues active. Wire orders are fairly plentiful. Some rail inquiries are pending for tonnages as yet undecided upon, and some of this business will probably be placed shortly. The demand for iron bars shows a slight improvement; we quote 1.30c. to 1.35c., Cleveland.

Old Material.—The feeling in the scrap trade shows considerable improvement. While business has picked up somewhat, the better sentiment is largely due to the expectation of an improved demand in the early future. Mills are taking some scrap on contract, but most consumers appear to have considerable stock on hand, and are holding back somewhat on shipments. Dealers are holding prices at the advance in quotations made last week, and do not appear anxious to sell. The New York Central Lines received bids February

THE IRON AND METAL MARKETS

1 on about their usual damage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	15.50 to 16.00
Steel car axles.....	19.00 to 19.50
Heavy melting steel.....	12.75 to 13.25
Old car wheels.....	12.50 to 13.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.50 to 11.75
Railroad malleable.....	12.75 to 13.00
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b., Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 6.75
Iron and steel turnings and drillings.....	7.00 to 7.25
Steel axle turnings.....	8.75 to 9.00
No. 1 bushing.....	11.00 to 11.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 cast.....	12.00 to 12.50
Stove plate.....	10.00 to 10.50
Bundled tin scrap.....	11.00 to 11.50

A. L. and M. I. Goldstein of Joseph Nagusky & Co., Cleveland, Ohio, dealers in iron and steel scrap, have purchased the interests, including yards and equipment, of Joseph Nagusky and Max Kyman, and have succeeded to the business of that company, which will be conducted hereafter under the name of A. L. & M. I. Goldstein. The business is located at 855 East Sixty-seventh street.

St. Louis

St. Louis, February 6, 1911.

The most encouraging feature of the situation is the gradual brightening of the prospect for a much larger volume of railroad buying. Railroads of the Middle West are out with inquiries for upward of 4000 cars. The new St. Louis & El Paso Railroad is in the market for most of its rail requirements. The leading steel interests state that not for many months have railroad specifications been coming in so freely. Inquiries are out for 12,000 to 15,000 tons of re-inforcing rods, and there is considerable inquiry for structural material for highway bridges. Manufacturing concerns are beginning to consider it not so much a question of price as of ability to contract for delivery to meet their requirements.

Pig Iron.—Most of the leading sellers report a better feeling in pig iron, with some increase in inquiry and, in case of some of the offices, a fair tonnage in sales. Merchant sellers, whose trade is widely scattered, state that their business for the month of January was the best since last October, mostly secured through their traveling salesmen. The principal transaction mentioned last week was the purchase by a local carbuilder of 3000 tons of malleable Bessemer, for shipment from February to June. Among the inquiries received by one of the leading houses were the following: 3000 tons of Southern No. 2 foundry, for the third quarter; 1000 tons of Northern and Southern No. 2 foundry, for the second quarter; 500 tons of Southern No. 2 foundry, for the second and third quarters; 600 tons of Southern No. 2 foundry, and 600 tons of malleable Bessemer, for the first half; 500 tons of Southern analysis iron, for the first half. The same house reports a sale of 500 tons of Southern No. 2 foundry, for the first half. Another leading broker closed a contract for 1000 tons, but gave no particulars. Other offices reported a fair demand for small lots only, but are in receipt of some urgent requests for shipment no contract. No change in the market is noted except possibly a slightly firmer undertone. We quote Southern No. 2 foundry, for shipment over the remainder of the first half, at \$11, Birmingham. A premium of 25c. to 50c. is asked for second quarter only, delivery, and for prompt shipment \$11 is shaded by some furnaces.

Coke.—There was more doing in coke. A leading broker reports a sale of 2000 tons of foundry coke, and an inquiry from another consumer for 1000 tons. Another leading seller mentions a sale of 30 cars of Connellsville foundry, for shipment over the remainder of the year. There is no improvement in the tone of the market, and prices are ruling the same as last quoted, \$2 to \$2.25 for standard 72-hr. Connellsville foundry per net ton, f.o.b. oven, with some special brands held higher.

Finished Iron and Steel.—The leading sellers report a decided improvement in the inquiry for structural material, both from local and outside sources. There is also a better demand from jobbers for bars, while the inquiry from wagon and agricultural implement manufacturers continues good. Railroad buying of bars, shapes, spikes, nuts and bolts is better, and the receipt of specifications on contracts is freer than for some time.

Old Material.—Dealers are talking more cheerfully respecting an increase in the demand from consumers in the near future, and in some items in the list—old iron rails and

old steel rails—higher prices are asked both on account of present and prospective demand. Relaying rails are easier, owing to a let-up in the inquiry. The following railroad lists were closed out last week: Wabash Railroad, 500 tons; Missouri-Pacific, 2000 tons; St. Louis & San Francisco, 500 tons. The Vandalia Line will put 400 tons on the market next week. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, rerolling.....	12.50 to 13.00
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushing.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light tin scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	8.00 to 8.50
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

The Kewanee Boiler Company, Kewanee, Ill., has installed in the showrooms of its St. Louis branch, on Olive street, one of its new type of smokeless furnace boilers. It is 12 ft. long, 5 ft. high and weighs 5000 lb.

The money for the St. Louis & Kansas City Electric Railway has been subscribed, covering the construction of the line through to Columbia, 150 miles.

The city of St. Louis is advertising for bids for about 100,000 ft. of sewer pipe of different sizes, ranging from 6 to 27 in. in diameter. Sealed proposals will be received at the office of the Board of Public Improvements until 12 m. February 17.

The Arkansas Natural Gas Company proposes to build a pipe line from Caddo Parish, La., to Little Rock, Ark., and thence to Memphis, Tenn.

The German Iron Market

BERLIN, January 26, 1911.

Considerable uncertainty prevails as to the general outlook, owing chiefly to the clouded situation in the bar trade. A meeting of the bar interests was held last week for the purpose of taking steps toward the renewal of the price agreement, but no action was taken beyond adjourning over to a date in February. It is reported that all the leading companies are anxious to have the arrangement renewed, and there are pretty strong hopes that this result will be accomplished.

The Steel Works Union held its monthly meeting yesterday, the chief business on hand being to deal with certain petitions for increasing allotments and to fix prices for the June quarter. All petitions for larger allotments were summarily rejected. Business in semi-manufactured steel products for the next quarter was declared open at unchanged prices, but action in regard to structural goods was deferred to the February meeting. This latter decision was apparently dictated by the hope that within a month a considerable improvement in the building trade will take place and justify higher prices for structural shapes.

The usual monthly report given out by the Union yesterday says that the export business in semi-manufactured steel has been somewhat better since the beginning of the year, especially for the English market. Home requirements in this class of goods for the current quarter have already been about fully arranged for and specifications on orders are coming in at the normal rate. In heavy steel rails no change has occurred in home conditions, but the foreign market continues to send in good orders. Trade in grooved rails is quieter, as is usual at this season, but inquiries in hand indicate that business will be better than usual in the spring. Considerable export business in grooved rails has been taken recently, but concessions had to be made owing to sharp outside competition. Foreign business in light rails for mines is rather quieter, and it is also feeling the effects of sharp competition from foreign makers. Trade in structural shapes is more sluggish, this being the quiet season for beams, but the outlook for the spring is considered encouraging. The foreign sales of structural shapes by the Union in the nine months ended with December 31 showed an increase of 60,000 tons over the previous year.

THE IRON AND METAL MARKETS

It is reported that both dealers and consumers are offering manufacturers of bars a consideration to be liberated from contracts previously made; they evidently hope to get better terms later on. This fact has made a bad impression in the general market. Another thing that throws a damper over the market is the continued weakness of iron and steel prices in Belgium. Reports from Charleroi of two days ago give a rather pessimistic view of conditions there. Pig iron prices are still falling. The cause is attributed to the increased quantities of iron sent into Belgium from Luxembourg; besides, several new furnaces have been blown in this month in Belgium. Belgium steel manufacturers continue to cut export prices, saying that they are compelled to do this on account of the sharp German competition, but plates are firm. Belgium's production of pig iron last year was 1,803,500 metric tons, a gain of 171,150 tons.

Germany's foreign trade in iron and steel in December scored record figures in exports, which reached 474,240 metric tons, and the excess of exports over imports, which was 424,000 tons, was also a record breaking figure. The export trade for the year 1910 reached a larger volume than ever before, amounting to 4,868,385 tons, as against 4,037,300 tons in 1909. Imports amounted to 560,622 tons, as compared with 458,541 tons in 1909. The iron and steel exports for the past two years are compared in the following table:

	1909.	1910.
Pig iron.....	471,046	786,854
Scrap and old iron.....	173,892	146,602
Steel billets.....	474,853	494,400
Beams and angles.....	362,743	442,712
Bars, shaped.....	93,347	93,690
Bars, not shaped.....	332,038	403,637
Hoops and bands.....	118,654	110,887
Plates, thicker than 5 mm.....	224,678	253,446
Plates, thinner numbers.....	101,725	92,471
Wire, unpolished.....	212,287	233,200
Wire, polished.....	136,782	165,367
Wire nails.....	67,648	65,134
Piping.....	97,969	126,954
Steel rails.....	364,662	515,722
Ties and fish plates.....	121,742	162,990
Rolling material.....	66,300	70,493

A remarkable change has come over Germany's foreign trade in pig iron in 10 years. In 1900 imports amounted to 726,700 tons and exports to 129,400 tons, but by 1910 these figures were almost exactly reversed, exports rising to 786,800 tons, while imports dropped to 136,300 tons.

German locomotive shops are quite dissatisfied with the amount of new orders received recently. They had expected orders for 66 locomotives from Japan, but what they actually received was for only 24, a similar number having gone to American and a smaller order to English shops. French orders, which had been a regular feature of the trade for several years, have not materialized this year, France having arranged for all its requirements with English and Belgian works. Home orders are also disappointing.

Buffalo

BUFFALO, N. Y., February 7, 1911.

Pig Iron.—The tone of the market appears to be slightly better, with a fairly good tonnage of orders coming in. About 15,000 tons have been sold out of this district in the past week, principally foundry grades. This includes between 6000 and 7000 tons of No. 2 foundry for a radiator manufacturer, which is said to have been taken at a concession by one of the leading makers. One interest reports a number of good orders for foundry irons from New England points, with a considerable tonnage still under negotiation from the same section. Another reports a run of small lot inquiry, but that large tonnage inquiry has slackened. The demand for malleable and basic is rather light. Selling competition has been strong and at present each furnace is "a law unto itself" in the matter of prices. One or two interests state that they have withdrawn from meeting the low prices on current delivery, which have been in evidence recently, and will hold off for firmer prices, and all furnaces in the district are refraining from quoting for last half. For current and first half deliveries the following schedule represents the market as nearly as possible, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	13.75 to 14.25
No. 2 plain.....	13.50 to 14.25
No. 3 foundry.....	13.50 to 14.00
Gray forge.....	13.50 to 13.75
Malleable.....	14.00 to 14.50
Basic.....	14.50 to 15.00
Charcoal.....	17.25 to 17.75

Finished Iron and Steel.—The situation continues to improve and the feeling is pretty general that the bottom of the market has been reached. Orders for tin plate are being placed at the advanced price, buyers realizing that the improvement in the steel market, with pig tin remaining where it is or going higher, will cause a further advance. There is a little more pronounced activity in steel bars and most other lines are gaining. Canadian export business con-

tinues good, with brisk inquiry. Some inquiry is also noted in foreign trade lines aside from that from Canada, one interest reporting an inquiry for 2000 tons of plates for export from the Eastern coast. In fabricated structural material, present inquiry is slow, although work involving large tonnages for a number of local structures is now on architects' boards. Revised plans are being prepared for the Buffalo General Electric Company's office building, increasing the height of a portion of the building to 20 stories instead of 14 stories. Revised plan bids are now being received on the Jerome Hotel at Erie, and bids are soon to be received on revised plans for the New York Central Station at Rochester, it having been definitely determined to proceed with construction.

Old Material.—A general betterment is observable in the situation as regards most lines of scrap, a little more active inquiry having developed during the week. Mills continue to take scrap on contracts without restriction, which in a measure has combined to cause some stiffening in prices. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.75 to \$13.00
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	15.00 to 15.25
No. 1 railroad and machinery cast scrap.....	14.00 to 14.50
Old steel axles.....	19.00 to 20.00
Old iron axles.....	23.00 to 23.50
Old car wheels.....	14.50 to 14.75
Railroad malleable.....	13.25 to 13.75
Boiler plate.....	11.00 to 11.50
Locomotive grate bars.....	11.00 to 11.50
Pipe.....	10.25 to 10.75
Wrought iron and soft steel turnings.....	7.25 to 7.50
Clean cast borings.....	6.50 to 6.75

New York

NEW YORK, February 8, 1911.

Pig Iron.—The business of the past week in foundry iron was done chiefly in New England, but was not much even there. Sales have been made for delivery in the New York district in 200 and 300 ton lots, but there has been very little forward contracting. In New England, Buffalo furnaces have taken most of the business, their quotations still approximating \$13.25 at furnace for No. 2 iron. Virginia furnaces are reported to be a little firmer in their ideas and for the first time in many months Virginia furnace stocks of pig iron showed a decrease in January. It amounted to about 3 per cent. One Wharton furnace has blown out in New Jersey, while Oxford furnace, which had been doing little for about two weeks owing to tuesday difficulties, is now making a normal output. Some local interest is shown in the sales of basic iron in eastern Pennsylvania and there is more figuring by steel makers in that section. We quote for tidewater delivery as follows: Northern No. 1 foundry \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Finished Iron and Steel.—Now that the improved conditions, which began about the middle of last month, show evidences of continuing, the mills are gradually reducing their per cent. of idle capacity. All lines generally are giving better reports. The steel bar trade reports better specifications, more new business and more inquiry in the last week than for the corresponding period of January, which is not remarkable considering that the first week of January was naturally quiet, but even the better returns that came in in the last two weeks of the previous month have been more than equaled in the past week. Inquiries now are for larger tonnages. Bar iron orders have been received in fair volume, but the improvement in this line is less evident. Plates and structural materials are also in good demand, although there are few specific large items. The Pennsylvania Steel Company will furnish the steel for the Vine street pier in Philadelphia, about 4000 tons. The award is expected within two or three days on the Cruikshank Building at Greenwich and Morton streets, New York City, for which about 3000 tons of steel will be required. As about 900 tons of this will be 15-in. beams, it is an exceedingly attractive proposition from the mill point of view, and there has been considerable competition for the order. No new inquiries of moment have come up this week in this territory. Prices are firm as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.35c. to 1.40c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Steel Rails.—The New Haven rail order, which has been reported to be 61,000 tons, may exceed that amount, reckoning the Maine Central tonnage in addition to that of the Boston & Maine. The Pennsylvania Steel Company gets about half the total, the remainder being divided between the Bethlehem Steel Company and the Lackawanna Steel Company. The Delaware, Lackawanna & Western is reported to have placed 23,000 tons, the bulk of it going to the Lackawanna Steel Company, while 2000 to 3000 tons is given to the Pennsylvania Steel Company. The Bangor & Aroostook

THE IRON AND METAL MARKETS

is in the market. In the past week the Illinois Steel Company has put on its books, including the New York Central order, 40,000 tons of Bessemer and 80,000 tons of open hearth rails. The Tennessee Company booked only 1500 tons, but negotiations are pending for sales to Southern roads.

Ferroalloys.—Dealers in New York have been bidding on 5000 tons of 50 per cent. ferrosilicon for delivery to the United States Steel Corporation, which asked for bids through the Carnegie Steel Company. It is understood that quotations were made at under \$55, Pittsburgh. The market in ferromanganese is quiet, with quotations from \$37.50 to \$38, Baltimore.

Cast Iron Pipe.—The city of Worcester, Mass., opened bids on Tuesday on 2100 tons of water pipe. Danvers, Mass., also opened bids on 500 tons. The Fall River Water Works, Fall River, Mass., will open bids on 470 tons today. A number of smaller lettings are announced. Considerable private buying is still going on, and some of the Eastern foundries are now feeling quite comfortable, having much work booked for the spring months. Quotations are continued at \$21.50 to \$22 per net ton, tidewater, for carload lots of 6-in.

Old Material.—Dealers are taking a little more hopeful view of the situation and are demonstrating this by purchasing more freely for stock. Heavy steel scrap has only moved in small lots during the week. Rolling mill material has been in but slight demand. Business in old car wheels is fair. Cast scrap has been in quite good demand with further inquiries under consideration. Quotations per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting.....	\$10.25 to \$10.75
Heavy melting steel scrap.....	10.25 to 10.75
Relaying rails.....	20.50 to 21.50
Standard hammered iron car axles.....	22.00 to 23.00
Old steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	12.75 to 13.75
Wrought iron track scrap.....	11.50 to 12.00
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.50 to 10.75
Light iron.....	5.00 to 5.50
Cast borings.....	6.00 to 6.50
Wrought turnings.....	6.00 to 6.50
Wrought pipe.....	10.25 to 10.75
Old car wheels.....	12.00 to 12.50
No. 1 heavy cast, broken up.....	12.00 to 12.50
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	9.00 to 9.50
Malleable cast.....	12.25 to 12.75

Metal Market

NEW YORK, February 8, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

Copper, New York.		Lead.		Spelter.	
Feb.	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.
2.....	12.75	12.37½	42.35	4.50	4.32
3.....	12.75	12.37½	41.30	4.50	4.32
4.....	12.75	12.37½	{41.40 41.65}	4.50	4.32
6.....	12.75	12.37½	41.35	4.45	4.30
7.....	12.75	12.37½	40.85	4.45	4.30
8.....	12.75	12.37½	40.12½	4.45	4.30

It is generally believed that the tin syndicate abroad is liquidating its holdings, as the market is declining as sharply as it recently advanced. Copper is firmer than last week and has been selling fairly well. Lead is weaker. Spelter has a better tone.

Copper.—Notwithstanding the general expectation that the report of the Copper Producers' Association would show an increase in stocks, a fair amount of buying has been done. From all appearances, consumers consider the prevailing price a fair one. While there have been reports of some shading of the quotation on lake copper, it is certain that a number of prominent sellers have refused offers of business at less than 12.75c. The quotation on electrolytic copper was steady all week at 12.37½c. The report of the Copper Producers' Association, showing an increase in stocks of 20,409,295 lb., was made known in the trade too late to affect to-day's market, as the members of the association did not meet to pass on the report until 12 o'clock, and both dealers and consumers show a disposition to digest the figures before making any attempt to do business. The London market opened weak this morning, in anticipation of an unfavorable American report and in sympathy with the declining tin market. At the close of trading in London to-day spot copper was sold for £54 10s. and futures for £55 5s. The sales amounted to 400 tons of spot and 1000 tons of futures. The market closed steady.

Copper Averages.—The Waterbury average for January was 12.87 1-3c. The average price of electrolytic copper in New York for the month of January was 12.53½c. and the average price of lake was 12.81½c.

Pig Tin.—In the face of a succession of sharp breaks in the London market, followed by a rapid decline here, consumers have been feverishly placing orders for tin for early delivery. Most of this trading was done February 2, 3 and

4, and those who placed orders were under the impression that the London syndicate was operating a decline with the view to buying in futures. When the market continued to slide off on Monday, the disgusted buyers quit placing orders and retired to await developments. It is now believed that the operators abroad have decided to let go and accordingly it is anybody's market. For the first time in many weeks there was good trading on a Saturday, when on February 4 some large orders were placed. It is estimated that fully 800 tons of spot and February tin were sold during those four days' trading, and now the immediate supply is so scarce that a purchase of 100 tons for early delivery would move the market up regardless of what might be done in London. As a matter of fact this market is not following the London movements so closely except when prices are made on tin for delivery in April and May. Since January 30 prices in London have declined £20 10s. and the market was decidedly weak this morning, when it opened £3 under yesterday's figures. The arrivals of tin in this country so far this month have been 1330 tons, while there are 1420 tons afloat, much of which is not due to arrive until late in the month. The London market closed to-day with spot tin selling at £181 15s. and futures at £181 10s. The sales amounted to 200 tons of spot and 1400 tons of futures. The market closed steady. Pig tin sold in New York to-day for 40.12½c.

Tin Plates.—Following the example of the leading interest, independent sellers of tin plate have withdrawn all concessions and advanced their quotations 10c. a box. While the advantage is due in a measure to the recent high price of pig tin, the fact that there is such a good demand that the mills are working nearer to normal capacity has a great deal to do with the higher price. The new price for 100-lb. coke plates is \$3.94, New York. The foreign market has declined 1½d. in sympathy with the pig tin movement, and the quotation for tin plates at Swansea, Wales, is now 15s. per box.

Lead.—Lead is very easy, both here and in St. Louis, and outside sellers are freely offering it in New York at 4.45c. The change in price came on Saturday when the report from St. Louis told of offerings there at 4.30c., a reduction of 2 points. This market was under the control of the leading seller for several weeks and until last Monday, when the outside sellers began to make offerings at 4.45c.

Spelter.—After weakening last Friday and Saturday, spelter became somewhat firmer on Monday, but only in tone, as but few sales had been made. It is hard to explain the present condition of the market. There are so little stocks available for spot delivery in New York that the price here, which is usually 15 points higher than in St. Louis, is now 20 points higher for early delivery, and purchasers desiring carload lots find it to their advantage to place their business in St. Louis. Quotations in St. Louis to-day are 5.30c., while New York dealers are asking 5.50c.

Antimony.—Antimony is quiet and prices are unchanged from last week. It is firmly believed that the proposed deal to form a selling combination in Europe has fallen through. Hallett's is selling at 7.75c., Cookson's at 8.25c., and other brands at from 7.25c. to 7.50c.

Old Metals.—The demand from consumers continues light. Dealers' selling prices are nominally as follows:

	Cents.
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.75 to 11.00
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	9.00 to 9.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, February 7.—There have been good purchases of copper by Western consumers the past week, and both casting copper and lake are a little firmer. The break in the London price of tin makes this market very uncertain. Spelter is dull, but Chicago buyers are not able to transact actual business at a price as low as St. Louis quotations. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12½c. to 12¾c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 42c.; small lots, 44c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.40c. to 4.45c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter No. 1, 29c.; tin foil, 34c.; block tin pipe, 37c.

Metals, St. Louis, February 6.—Lead is dull at 4.30c. to 4.35c.; spelter is quiet and held at 5.30c., both at East

St. Louis. Zinc ore is quoted at \$38 to \$41 per ton, Joplin base. Tin is quoted at 42.90c. per pound; antimony (Cookson's) unchanged at 8.60c.; lake copper steady at 13.05c.; electrolytic unchanged at 12.85c., all at St. Louis. The demand for finished metals was slower than was the case the previous week.

Notes on Prices

Rope.—The demand is not more than fair and comparatively few orders are for future delivery. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8¼c. to 9¼c. per pound; second grade Manila, 7¼c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¼c. per pound; second grade, 6¼c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6 to 6½c. per pound.

Linseed Oil.—The market continues strong at 94c. for Western raw in carload lots, and 95c. for either city or Western raw in five-barrel lots. Business is dull, as manufacturing consumers are holding off placing orders, awaiting market developments. The following quotations represent New York prices in five-barrel lots or more:

State, raw.....	Cents. 95
City, raw.....	95
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—Buying is light, owing to high prices of turpentine, reflecting the Savannah market. The crop movement is about over, although some turpentine is being received, and it will probably be three months until the new crop comes in. New York turpentine quotations in five-barrel lots are as follows:

In oil barrels.....	Cents. 89½
In machine barrels.....	90
Less than 5 bbl. lots, ½ cent advance per gallon.	

Rosins are also firm on the basis of the Southern market and a fair demand in jobbing lots is reported at this point. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$6.75 and grade D at \$7.35 in the New York market.

Iron and Industrial Stocks

NEW YORK, February 8, 1911.

The upward movement in stocks continued until Monday of this week, when its culmination appears to have occurred. A reaction then set in, carrying prices down to some extent. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.. 8 - 8½	Railway Spr., com. 35 - 38
Allis-Chalm., pref.. 32 - 34	Railway Spr., pref. 98 - 99½
Beth. Steel, com... 32½ - 33¾	Republic, com.... 34½ - 35½
Beth. Steel, pref... 62½ - 63½	Republic, pref.... 98 - 99½
Can, com..... 9½ - 10	Sloss, com..... 52½ - 56½
Can, pref..... 81 - 82½	Pipe, com..... 17 - 18
Car & Fdry, com... 55 - 57½	Pipe, pref..... 54 - 56½
Car & Fdry, pref.. 118 - 118½	U. S. Steel, com... 80 - 82½
Steel Foundries... 46 - 48½	U. S. Steel, pref.. 119½ - 121½
Colorado Fuel.... 35 - 36½	Westinghouse Elec. 68 - 70
General Electric.. 154 - 155½	Va. I. C. & C.... 59½ - 59½
Gr. N. ore cert... 62½ - 63¾	Am. Ship, com.... 75 - 79
Int. Harv., com... 114½ - 116½	Am. Ship, pref.... 112
Int. Harv., pref.. 123½ - 124½	Chi. Pneu. Tool... 46½ - 49
Int. Pump, com... 40½ - 42½	Cambria Steel.... 44½ - 45½
Int. Pump, pref.. 85 - 85½	Lake Sup. Corp.... 29½ - 32
Locomotive, com... 41½ - 42½	Pa. Steel, pref.... 106½
Locomotive, pref.. 110 - 110½	Warwick..... 10½
Nat. En. & St., com. 17½ - 17½	Crucible St., com. 13½ - 13½
Pittsburgh Steel, pref.. 101	Crucible St., pref.. 79½ - 81½
Pressed St., com... 34 - 36½	Harb.-W. Ref., com.... 36
Pressed St., pref.. 97½ - 98½	Harb.-W. Ref., pref.... 95

The Pressed Steel Car Company has paid the last installment of its \$500,000 first mortgage 5 per cent. gold notes. These notes have been paid off in installments of \$500,000 annually, beginning February 1, 1902.

Dividends.—The Inland Steel Company has declared a regular quarterly dividend of 1¼ per cent., payable March 1, and an extra dividend of 3 per cent., payable May 1 to stock of record February 10.

The Interstate Commerce Commission has issued its first annual report on the statistics of express companies. This covers the year ending June 30, 1909. The gross receipts from operation of all the companies covered by this report for one year were \$132,599,190. From this revenue the companies paid for "express privileges" \$64,032,126, this representing chiefly the payments by express companies to railroads. The remainder, \$68,567,064, is reported as the operating revenues of the companies; operating expenses were \$56,273,055, leaving a net operating revenue of \$12,294,009. The investment of the companies, in property and equipment, June 30, 1909, was \$22,313,575.

The Carnegie Steel Company Relief Fund.—The ninth annual report, showing operations for 1910 of the Carnegie Relief Fund of the Carnegie Steel Company and its affiliated concerns has been made public by F. A. Wilmont, manager of the fund. It shows that during the year the amount dispensed was \$216,869.60. Of this amount \$17,777 was for accident benefits, \$92,496.25 death benefits, and \$106,596.35 pension allowances. The pension allowances were greater during 1910 than ever before. The death benefits were smaller than for six years, except 1909. Money paid out to the employees or their families of the Carnegie Steel Company totaled \$114,935.35, twice as much as for any of the affiliated companies, the largest of which is the H. C. Frick Coke Company. The report shows that since the establishment of the fund, the beneficiaries have been as follows: Accidents, 7598; deaths, 1263; pensions, 885; total, 9746.

George B. Limbert & Co., Chicago, have let contracts for a new foundry at East Chicago, Ind., as an addition to the manufacturing plant of the company. The foundry building will be 60 x 240 ft., of brick, with steel truss roof. The plans provide for two cupolas of 25 tons daily capacity each, but only one cupola will be completed at present. The foundry will be equipped with molding machines and all modern improvements for foundry work. The product will be chiefly steamfitters' supplies. A pattern shop and storeroom will also be erected this spring, and other important extensions of the plant are contemplated. It is estimated that the buildings and equipment now under way will cost about \$40,000.

The explosion of a carload of 25 tons of dynamite, which was being transferred from cars on a pier of the Jersey Central Railroad to a lighter in the Hudson River at Jersey City, on February 1, resulted in the probable death of 30 and injuring of at least 200. The killed and injured were mostly workmen on the lighter and on the pier. Hundreds were cut by falling glass in the Jersey Central Station and on the streets in lower New York City, and the damage to property in Jersey City and New York City, mainly broken plate glass windows, is estimated at over \$500,000. The explosion was heard more than 20 miles away. The dynamite was owned by the Du Pont de Nemours Powder Company.

The plant of the Vulcan Foundry & Machine Company, at New Castle, Pa., is to be offered for sale by the sheriff in the near future to satisfy bondholders. It has been idle for about five years. The Lawrence Savings & Trust Company, New Castle, Pa., trustee for the bondholders, has filed papers to collect \$30,000 due on a mortgage dated November 30, 1901. The total appraised value of the plant is \$60,000, including the machinery, which is valued at \$54,098, while the liabilities are \$133,067. It is stated that New Castle parties may buy the plant and operate it.

The Garwood Electric Company, 149 Broadway, New York, whose works are at Garwood, N. J., has appointed Henry Widmer, 731 Union street, New Orleans, La., agent for the sale of its dynamos, motors, &c., in the State of Louisiana, southern half of Mississippi and the city of Mobile, Ala., and all territory within a radius of 50 miles of that city. It has also appointed Milton S. Nettleton, 29 College street, New Haven, Conn., its agent for the city of New Haven and surrounding territory.

The number of immigrants coming to the United States in 1910 was 1,071,885, which compares with 957,105 in 1909 and 410,319 in 1908. The number of non-immigrant aliens arriving on return from visits abroad was 151,588, making a total of 1,223,473 arrivals. The alien departures in the year amounted to 406,041, so that the net gain in population was 817,432. This compares with 802,672 in 1909 and 971,468 in 1907. In 1908 the arrivals were 557,585 and the departures 598,783, making a net loss for that year of 41,198.

Personal

Charles A. Schieren, Jr., of the Charles A. Schieren Company, manufacturer of leather belting, New York, sailed February 1 for Europe, where he will visit the company's agencies on the Continent.

George H. Wadsworth, for the past 15 years superintendent of the Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, has resigned that position, and will on and after March 1 devote his entire time to the Wadsworth Core Machine & Equipment Company, Akron, Ohio. He has purchased all machinery, patterns, tools and interest from the Falls Clutch & Machinery Company, successor to the Falls Rivet & Machine Company for the manufacture of the Wadsworth core machine and equipment as manufactured by that company during the last seven years for him.

C. W. Whitney has resigned his position as contract manager of the Ransome Concrete Company, San Francisco, Cal., to take the position of general purchasing agent for what are known as the "Hammon properties," consisting principally of the Yuba Construction Company, Natomas Consolidated of California, Boston Machine Shop Company and Hammon Engineering Company, who have their main offices in the Alaska Commercial Building, San Francisco.

The Cleveland Drop Forging Company, Cleveland, Ohio, has secured the services of James H. Herron, who will take charge of the sales engineering and metallurgy department. He was formerly connected with the Detroit Steel Products Company in a similar capacity.

Frank P. Bassett, for several years superintendent of the blast furnace department of the Maryland Steel Company, at Sparrows Point, Md., has resigned, and will sever his connection with the company February 15. At a farewell banquet given by his friends and associates, he was presented with a handsome gold watch.

Lewis H. Morgan, who for many years was with the Pond Machine Tool Company, Plainfield, N. J., and afterward was superintendent and general manager of the Ridgway Machine Company, Ridgway, Pa., and is now retired, living at Whitewell, Nantwich, England, has been elected a member of the Institution of Mechanical Engineers, London. Mr. Morgan is a member of the American Society of Mechanical Engineers.

William B. Ogram, who for the past 10 years has been Buffalo manager for the American Bridge Company, has been appointed to the Philadelphia office of the same company as contracting manager for eastern Pennsylvania, with offices in the Pennsylvania Building. He assumed his new duties February 1, succeeding R. W. Bailey, transferred to the Pittsburgh office as division contracting manager. F. D. Rideout is the new contracting manager for Buffalo, western New York and northwestern Pennsylvania, with offices at 658 to 662 Ellicott Square Building, having been transferred from the home office at Pittsburgh with which he has been connected for a number of years.

Francis C. Holmes has been elected by the directors of the Plymouth Cordage Company, Plymouth, Mass., treasurer and general manager, to succeed his father, Gideon F. Holmes, deceased. The office of vice-president has been created, and B. Preston Clark has been elected to the position. Mr. Holmes assumes the management at practically the same age as did his father, who served the company for over 50 years. Mr. Clark is a director, and is a practical cordage man.

S. A. Carson, formerly connected with the sales department of J. K. Dimmick & Co., has become associated with Matlack & Bates, iron, steel, coal and coke merchants, Pennsylvania Building, Philadelphia, Pa.

John Birkinbine will deliver an address on "Early History of Ironmaking" at the regular monthly meeting of the Associated Foundry Foremen of Philadelphia and Vicinity, to be held at the Manufacturers' Club, Philadelphia, Pa., on the evening of February 14.

At the annual meeting of the Brown Hoisting Machinery Company, Cleveland, Ohio, February 1, Alexander C. Brown was elected a director to take the place of

R. W. Hickox, who died during the year. No other changes were made.

William R. Timken, vice-president and treasurer of the Timken Roller Bearing Company, Canton, Ohio, has been elected president of the First National Bank in that city.

With the coming of President Farrell into the Finance Committee of the United States Steel Corporation, succeeding W. E. Corey, that committee is now composed of the following: E. H. Gary, George F. Baker, George W. Perkins, H. C. Frick, Henry Phipps, Norman B. Ream, J. Pierpont Morgan, Jr., James A. Farrell and P. A. B. Widener.

E. B. Blandy has been appointed pig iron sales manager for Pilling & Crane, Philadelphia, in the New York district, with offices at 71 Broadway. Mr. Blandy has had a long experience in the pig iron trade, representing Matthew Addy & Co. in New York for a number of years and later being Eastern sales representative of the Tennessee Coal, Iron & Railroad Company. Up to February 1 he was the Pittsburgh sales manager of the United Steel Company, Canton, Ohio.

R. K. Le Blond, president of the R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, leaves this week for a vacation trip to Cuba, and will visit different points of interest on the island during his stay there.

Chairman E. H. Gary of the United States Steel Corporation has gone to Florida for a stay of two or three weeks.

Frank G. Bolles, for some time with the Allis-Chalmers Company, Milwaukee, has become connected with the Reliance Engineering & Equipment Company of that city.

W. H. McFadden has resigned as vice-president and general manager of Mackintosh, Hemphill & Co., Pittsburgh, to take effect March 1. The resignation has been accepted with regret by the directors. Mr. McFadden has been closely identified with the rolling mill industry for the past 25 years, having taken an active part in the construction and installation of many of the most important steel mills in the country. He will spend a few months in looking after his gas and oil interests and in traveling for his health.

Cecil A. Grenfell, M. P., of London, England, who came to this country representing British stockholders of the Southern Iron & Steel Company, has been made chairman of the Board of Directors, and will take charge of the company's affairs. Mr. Grenfell will remain here several months.

Wade A. Taylor, president of the Deforest Sheet & Tin Plate Company, Niles, Ohio, has been elected president of the Dollar Savings Bank of that city.

Kenneth Lean has been appointed superintendent of the shipping department of the Homestead Steel Works of the Carnegie Steel Company, Homestead, Pa., to succeed Charles Orchard, who was recently made transportation agent.

J. A. Henry, formerly purchasing agent of the Portsmouth Steel Company, Portsmouth, Ohio, has been placed in charge of the company's new office at Cincinnati. He has been succeeded as purchasing agent by Charles Simms, formerly paymaster.

John E. Patton, who has been active for the last two years in organizing and directing the affairs of the Continental Coal Corporation, as its vice-president and general manager, has severed his connection with that company, having been elected president of the Sewanee Fuel & Iron Company at a recent meeting of the Board of Directors of the latter company at its office in Chattanooga, Tenn. He has already assumed active charge of the business of the Sewanee Company.

A. L. Davis, assistant to the president of the American Bridge Company, has been appointed contracting manager of the Eastern Division, relieving C. W. Bryan of that work. The latter continues as chief engineer and will retain headquarters in New York.

The furnace of the Napier Iron Works, Napier, Tenn., will be blown in February 14.

Experience with Concrete Patterns

Joseph Leon Gobeille, general manager of the Gobeille Pattern Company, Niagara Falls, N. Y., addressed the Foundry Foremen's Association of Buffalo, January 31, on "The Molder of To-Day and the Pattern-Maker of the Future." He referred to the improved status of the iron molder in the past 15 years, attributing much of the molder's personal advancement to the trade journals and the spread of foundry literature, and not a little of it to the molding machine. He thought that the unions, instead of showing coldness and antagonism to the machine, should give it a warm welcome, and suggested also the organization of a junior or allied union of machine men and molders' helpers.

Passing to pattern-making, the speaker said that "the pattern-maker of the near future must be a master molder, carrying a molder's card," and that "he will make his forms in a liquid or at least a plastic material." Referring to his own experience in the use of material other than wood, Mr. Gobeille said:

"Something else besides wood must be adopted for patterns and I believe that it will be simple concrete, with some reinforcement, framing and bracing of steel and wood. I have been ridiculed so much in trade journals and elsewhere on account of this belief that I speak to you to-night with hesitancy, but nevertheless with supreme faith and confidence. I have tried it out in a small way only, because there has been no opportunity to do things on a larger scale. You foundry foremen will not accept patterns made thus, no matter what their merits or accuracy, because you are not used to seeing them about, and your molders put up a kick on them, but I am 'arriving.' Some of the greatest difficulties are being overcome, some in a most interesting manner.

"I give you one instance out of many: The new pattern composed of concrete (no two cubic inches of which will be of identical weight), steel, wood and some plaster and litharge, since it has no known or constant decimal of specific gravity, its weight when cast in metal is exceedingly difficult to predict. In the case of the ordinary wooden pattern of pine, the foundryman drops it on a scale, figures mentally the old Dr. Bryan formula of 16 to 1, and knows pretty nearly how much iron he will have to give up, and waste, to fill the contract. The new era pattern is a question of measurement; even so its metallic weight can be closely approximated. But it involves plane and solid geometry, triangulation and sometimes right smart of mathematics and accuracy with the pencil stub. So the concrete-mix pattern was taboo.

"We took a tip from Archimedes and weighed the patterns ourselves without any scales. We made a square tank (also concrete) of known superficial area and filled it half full of water; then we rigged a float with a vertical bar and an easy toggle, to a dial, which was marked in pounds of iron. We knew the decimal for the specific gravity of cast iron per cubic inch. So we submerged the composite concrete in the tank, while the float rising actuated the pointer on the dial. The displacement of water in cubic inches was translated into pounds on this dial—no figuring, no mistakes, no brains, fool-proof.

"The prediction of weight in iron, no matter what the pattern was made of, is simply foolish in its dumb accuracy; so that one foundryman complained loudly because one of our guesses had varied 4 lb. from the actual casting in a lump weighing 128 lb., not realizing that we knew as well as he that any molder could change weights that much either way by over or under ramming any pattern of its size.

"So this is my preachment, my final word: Help along the concrete pattern, thereby improving the status of your craft and aiding at the same time in the conservation of our forests, so that we may do our part to leave a few trees for our posterity."

The Crane Company, Chicago, has increased its capital stock from \$13,000,000 to \$17,000,000, to provide for its rapidly increasing business.

The Warner Iron Company has blown out its furnace at Cumberland Furnace P. O., Tenn.

The Otto Gas Engine Works

At a recent meeting of the stockholders of the Otto Gas Engine Works, Philadelphia, Pa., the management was changed. The personnel of the new board of officers, consisting of Frank Salomon, president and general manager; Erich Krell, vice-president and treasurer, and E. A. Fisher, secretary, bids fair to carry out the programme of enlarging this enterprise, which represents the pioneer efforts in this country of building the best known internal combustion engine in a highly successful manner. Mr. Salomon is very widely known and ranks among men foremost in the handling of machinery, particularly in the direction of gas, gasoline and crude oil engines. L. V. Goebels has been retained as engineer in charge of the technical department.

The company contemplates the building of engines operating on crude oil and similar fuels on a large scale. The original builder of the Otto engine abroad, the Gasmotoren-Fabrik Deutz, Cologne, Germany, of which the Philadelphia company is the United States branch, has been for many years most successful in producing economical and reliable crude oil engines, and its experience in this line would appear to guarantee the placing on the American market of a first-class oil engine. In addition to its Philadelphia plant, the Otto Gas Engine Works owns a tract of 90 acres near Wilmington, Del., which it acquired with the object of erecting a modern plant for the manufacture of large gas and crude oil engines.

Records kept by the Pennsylvania Railroad Company of the time consumed in changing from electric to steam motive power, and vice versa, at Manhattan Transfer station, near Harrison, N. J., show that 98 per cent. of the trains now go through the transfer in the time allotted for the change of power, which is 4 min. for uncoupling, switching and coupling. From 106 to 109 trains pass through the transfer on week days. Nowhere else is a rapid change from steam to electric engines made on so large a volume of traffic. Owing to the difficulty of detaching the steam hose from the engine in cold weather, it has not been thought advisable to make a shorter time allowance during the winter months. Thus far the record for the change is 1 min. 30 sec.

Rathbone, Sard & Co., manufacturers of stoves, at Albany, N. Y., and Aurora, Ill., elected the following officers at the recent annual meeting: President and general manager, Grange Sard, Albany; first vice-president, Edward Bowditch, Albany; second vice-president and Aurora manager, Edmond Rafferty, Aurora; treasurer and assistant general manager, Russell E. Sard, Albany; secretary, A. M. Blanchard, Albany; assistant secretary, A. I. Hennessy, Albany; manager of gas department, John J. Garrison, Albany; assistant manager at Aurora, W. R. Yendall, Jr.; assistant treasurer at Aurora, C. W. Reid.

The Pittsburgh Rivet Company, Pittsburgh, Pa., manufacturer of boiler, ship, tank and structural rivets, machine, bridge and foundation bolts and special forgings, is sending out a hanger on which is given a table showing the estimated weight per 100 of cone and button head rivets in different lengths. The table will be of value to users of bolts and rivets.

Only three of the 19 furnaces of the Illinois Steel Company were in blast February 1, these being one Joliet and two South Chicago. At the Gary plant of the Indiana Steel Company three furnaces were in blast February 1.

The Cambria Steel Company, Johnstown, Pa., blew in one furnace January 11, and another January 12. On January 31 it blew out a furnace, leaving five active out of eight, February 1.

Rebecca Furnace of the Kittanning Iron & Steel Company, Kittanning, Pa., was blown in February 1, having been out since May, 1910, undergoing repairs.

Greater Activity at Youngstown, Ohio

Considerable improvement is noted this week in operations of the mills in the Youngstown district. Machine shops and foundries report more inquiries and a slight increase in orders. All the plant of the Youngstown Sheet & Tube Company is now in operation except six sheet mills, which are being overhauled and the fuel changed from gas to coal. At the Ohio Works of the Carnegie Steel Company six blast furnaces are in operation, the Bessemer department is running nearly full, the open hearth department to nearly 60 per cent., and the Union mills about four days a week. At the Brown-Bonnell Works of the Republic Iron & Steel Company all departments are now in operation except the No. 3 bar mill and the old 10-in. mill. At the Mahoning Valley Works of the same company the old puddle mill, 7-in. mill and shafting works started up on Monday, with prospects of additional mills resuming later in the week.

Geo. J. Hagan, People's Bank, Pittsburgh, sole licensee for the Bailey combination sheet and pair furnace, has received orders for two additional furnaces for the Canton Sheet Steel Company, Canton, Ohio, to be of the single type, stoker fired. The work has just been completed on three more combination sheet and pair furnaces for the Berger Mfg. Company, Canton, Ohio, constituting the sixth order received from this company. The Youngstown Sheet & Tube Company, Youngstown, Ohio, is putting in more furnaces of the Bailey combination sheet and pair type. Mr. Hagan is at present engaged on considerable construction work for the American Rolling Mill Company, Middletown, Ohio.

W. N. Kratzer & Co., structural steel fabricators, Pittsburgh, have considerable work at present, among which are steel lock gates for lock No. 1 in the Monongahela River, and a number of steel bear traps for dam No. 26 on the Ohio River. They are finishing a large contract for structural steel work for the Union Station in Baltimore, Md., secured some time ago; are furnishing the structural steel and erecting a new station for the Pennsylvania Railroad at Greensburg, Pa., and recently completed steel coal tipples, an engine house, boiler house and coal bins for the Pennsylvania Coal & Coke Company at Cresson, Pa. They are running their shops full time.

The contract for the erection of a new office building for the Republic Iron & Steel Company, at Youngstown, Ohio, has been given to the George A. Fuller Construction Company of New York and Chicago. The building will be six stories high and of brick and concrete fire-proof construction. It is expected to be ready for occupancy about August 1, at which time the general offices of the company will be removed there from Pittsburgh. A district sales office for the Pittsburgh territory will be maintained in the Oliver Building.

A new corporation to be known as the Studebaker Corporation, which will be chartered with an authorized capitalization of \$45,000,000, is to take over the wagon works of Studebaker Brothers, at South Bend, Ind., and the automobile manufacturing plants of the Everett-Metzgers-Flanders Company, which the Studebaker firm bought a year ago. The capital of the new company will consist of \$15,000,000 7 per cent. cumulative preferred stock and \$30,000,000 common stock. Control of the new corporation will remain in the hands of the Studebaker people through the ownership of the common stock.

The Champion Rivet Company, Cleveland, Ohio, manufacturer of Victor boiler rivets, announces that it has appointed as its exclusive Pacific Coast agents A. M. Castle & Co. of Chicago, Ill., represented on the coast by R. L. Sanford, 841 Monadnock Building, San Francisco, Cal., and A. H. Castle, 430 Citizens' National Bank Building, Los Angeles, Cal. The company calls attention to

the fact that as it carries over 50,000 kegs of rivets always in stock, it can be depended upon for immediate shipment of any orders.

The Newark Foundrymen's Association, Newark, N. J., held its regular meeting February 1, and after enjoying a dinner discussed the question of extending the scope of the organization. A resolution was passed requesting the Executive Committee to prepare suggestions to be presented at the next meeting, providing for changes in the by-laws, so that the association can take in members from other parts of the State. A short discussion took place over the keeping of cost records.

The Fort Pitt Forge Company, Pittsburgh, Pa., manufacturer of heavy foundation and building bolts, structural and boiler rivets, has been taken over by the Pittsburgh Screw & Bolt Company, the two concerns having been closely identified in the past, and in the future it will be operated as the Fort Pitt Forge Department of the Pittsburgh Screw & Bolt Company. William G. Costin is president and Thomas W. Smith is vice-president and treasurer.

The Union Furnace Company, Ironton, Ohio, held its annual meeting in Cincinnati, January 31. The following directors were elected: D. B. Meacham, J. K. Pollock, H. E. Turner, F. W. Miller and R. D. Meacham. Officers were elected as follows: J. K. Pollock, president; D. B. Meacham, vice-president; H. E. Turner, secretary and treasurer; F. W. Miller, assistant treasurer; S. S. Littlejohn, assistant secretary; W. M. Jefferys, manager. The furnace stack has been rebuilt and is ready for its lining.

The George Whiting Company, manufacturer of punches, shears and special machinery, formerly located at 1417 West North avenue, Chicago, moved its office and works February 1 to its own new and commodious quarters at 1701 to 1719 Elston avenue, northeast corner of Wabansia avenue, Chicago, where greatly increased facilities will be enjoyed.

Bertsch & Co., manufacturers of shears, punches and bending rolls, Cambridge City, Ind., are looking for a new location for their machine shop and factory. They must have a side track and buildings suitable for electric traveling cranes. Any factory sites or buildings that any city or commercial club has to offer will be considered.

The Illinois Steel Company will have four additional blast furnaces in operation by January 20. Three have already been ordered in this week, one at Joliet and two at the South Works, and one will go in at Gary. The Bessemer rail mill, at South Chicago, will resume rolling February 20.

Mackintosh, Hemphill & Co., Pittsburgh, Pa., have about ready for shipment a 44 x 72 in. geared Corliss engine, mill type; two 28-in. sheet jobbing mills and two 30-in. jobbing mills, all for the Portsmouth Steel Company, Portsmouth, Ohio. These mills are expected to be erected and ready for operation about April 1.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has not yet put into effect the six-day schedule at its blast furnaces, but expects to do so February 16, which is the date beginning the next pay period for this month.

The Universal Mfg. Company, Freeport, Pa., has applied for a charter, with a capital of \$100,000, to manufacture washtubs, &c. The incorporators are J. C. Stebick, Scott Hames and William Boyd.

Madeline Furnace of the Inland Steel Company, Indiana Harbor, Ind., was blown in January 10, after having been out for relining since October 6.

Obituary

LOUIS R. ALBERGER

Louis R. Alberger, president of the Alberger Condenser Company and the Alberger Pump Company, with main offices at 90 West street, New York, and plants at Newburgh, N. Y., died January 31 at his home in New York after a brief illness. He was born in Buffalo, N. Y., April 10, 1864, and was one of the best known specialists in the country on pumping machinery and condensing apparatus. After attending Yale University he went in business with his father, J. L. Alberger, at Buffalo, who was engaged in the manufacture of vacuum process specialties used in the salt industry. In 1887 Mr. Alberger became connected with Henry R. Worthington,



LOUIS R. ALBERGER.

whose large pump works at Harrison, N. J., later became a part of the International Steam Pump Company's holdings. He left the Worthington organization in 1901, when he formed the Alberger Condenser Company and acquired an existing plant at Newburgh. Shortly afterward he formed the Alberger Pump Company. The success of these two organizations was largely due to Mr. Alberger's ability as a salesman, as, in addition to having rare ability as an engineering specialist, his talents were particularly adapted to the selling end of the business.

DR. F. A. KJELLIN, the inventor of the induction electric furnace which bears his name, died December 30, 1910, aged 38 years. He was educated at the Royal Technical Institute in Stockholm, graduating in 1893. In 1899 he began his work on the induction furnace at Gysinge. For some years he had been consulting engineer in the electrometallurgical department of the Swedish Gröndal-Kjellin Company.

DANIEL DEMPSEY, general night superintendent of blast furnaces at the Lackawanna Steel Company's plant, Buffalo, N. Y., died suddenly with heart failure in his office last week, aged 52 years. He was at one time with the Maryland Steel Company, at Sparrows Point, Md.; then with the Pennsylvania Steel Company, at Steelton, Pa., and for 15 years with the Lackawanna Steel Company.

GEORGE W. FIFIELD, Lowell, Mass., who died January 30, was identified with the machinery trade all his adult life. In addition to the large shops which he built up at Lowell, he was one of the founders of the Powell Planer Company, now the Woodward & Powell Planer Company, Worcester, Mass. He was born in Belmont, N. H., April

25, 1848, and was educated in the village school and at Gilmanton Academy. He learned the trade of machinist and followed it in the Manchester Locomotive Works, Manchester, N. H., and then passed a number of years at Waltham, Mass. In 1873 he removed to Lowell and started the business which later became the Fifield Tool Company. He made a specialty of engine lathes and was for years one of the most important manufacturers of machine tools in the country. He was a designer as well as a successful business man, and many of his machines were built from his own ideas. A Democrat in politics in a Republican city, he was twice elected Mayor and served as an Alderman. He was at one time president of the Appleton National Bank and had served as president of the Lowell Electric Light Corporation. He was twice married; his second wife died some years ago. He had no children.

JOHN RICHARDSON, for many years connected with the Savage Mountain Fire Brick Company, Frostburg, Md., and Clearfield Fire Brick Company, Clearfield, Pa., died at his home in Sewickley, Pa., February 3, from pneumonia, aged over 80 years. He had well served the trade for the last two generations.

HARRY WOODWARD COLEMAN, of the firm of J. K. Dimmick & Co., died suddenly from apoplexy at his home at Sharon Hill, Pa., a suburb of Philadelphia, January 30, aged 46 years. He was born in Covington, Ky., and entered the employ of the Addyston Pipe & Steel Company, Cincinnati, Ohio, with which J. K. Dimmick was connected, when 16 years of age. He continued with Mr. Dimmick when the latter took charge of the Anniston Pipe & Foundry Company, Anniston, Ala., and in 1889 opened and took charge of the Philadelphia office of that concern. In 1899 he became a partner in the firm of J. K. Dimmick & Co., wholesale merchants in coal, coke, pig iron and iron pipe, Philadelphia. He was a member of the Manufacturers' Club and the Pen & Pencil Club of Philadelphia, and connected with various coal, coke and gas trade organizations. He leaves a widow.

PETER KELLS DEDERICK, Albany, N. Y., died of heart failure, January 17, at Daytona, Fla., aged 73 years. He was born at Claverack, N. Y., was educated at the Hudson River Institute, removed to Albany during the winter of '59-60 and founded the Dederick Agricultural and Machine Works. He invented one of the first practical hay presses when hay baling and shipping was a new industry. In the early days the Dederick concern was the only baling press manufacturer in the world. It was about 20 years before any competitor entered the field. During the half century that he continued in the manufacturing business Mr. Dederick took out more than 300 American and foreign patents. In 1871 he established branch factories at Chicago, Montreal and St. Louis and, in 1876, he became interested in manufacturing in Paris, France, Mannheim, Germany, Moscow, Russia, and Vienna, Austria, under foreign patents. He leaves a widow, a daughter and two sons, Prescott K. Dederick and Archibald M. Dederick, the sons being associated with their father in the firm of P. K. Dederick's Sons, manufacturing baling presses in Albany.

MAHLON C. EDWARDS, assistant local sales agent for the Cambria Steel Company in the Philadelphia district, died suddenly January 19, aged 35 years. He had been connected with the company for 15 years.

The National Foundry Company, organized at Youngstown, Ohio, has leased the foundry formerly operated by the Youngstown Car Mfg. Company, and will make sash weights. It is expected to have the foundry running by February 15. Later on the new company may turn out other products.

In the Pittsburgh district 36 blast furnaces were active February 1 as against 30 January 1. Three Carrie furnaces, one Duquesne, two Edgar Thomson and one Lucy were blown in last week. One Aliquippa of the Jones & Laughlin Steel Company was blown out and the three furnaces in that group are now out of blast.

The Warwick Iron & Steel Company's Annual Report

The business outlook for 1910—one year ago—appeared bright and promising. There was an optimistic feeling throughout the business community. Before the close of the first quarter of the year, indications were that pig iron was being produced in excess of consumption. The falling off in demand and market prices was gradual up to June 1. The last half of the year has been marked by rapidly declining prices, consequent upon increased competition.

Following upon the decreased demand for iron, No. 3 furnace was blown out April 26. It is now idle. It can be put into operation on comparatively short notice, and at a moderate cost, should business conditions improve. No. 1 furnace was blown out, to be relined, May 24, being restarted July 24. At the date of this report, No. 1 furnace is in successful operation. No. 2 furnace ran continually throughout the year. It will be necessary to reline this furnace in 1911. For the year ending December 31 our total product was 254,182 tons of iron. On June 1 \$15,000 of bonds were paid and canceled; outstanding bonds are now \$180,000. Dividends on capital stock were paid as follows: May 15, 3 per cent.; November 15, 4 per cent.

The construction of ore handling machinery became a necessity, in order to handle the additional tonnage of raw material, following upon the increased product of No. 1 and No. 2 furnaces, and also by changed conditions as respects our ore supplies. The cost of this machinery, known as an ore bridge, was \$67,452.90. It has been charged to real estate, plant and equipment account. This account has also been increased by the purchase of certain meadow land, on the east of our furnace plant, and also of a limestone farm adjoining the Bassler limestone quarry, the total cost amounting to \$51,394.

Furnace stack A, now in course of construction, is for use as an alternate stack, whenever No. 1 or No. 2 furnace may be undergoing repairs. Arrangements will be made, so that the A stack can be operated with the equipment of either No. 1 or No. 2 furnace. It was considered an advantageous investment, in view of the fact that the equipment is now so duplicated that it can be kept in continuous operation, while a furnace stack proper must be put out of blast at intervals, in order to make necessary renewals.

The net earnings for 1910, as per balance sheet attached, are \$274,060.92.

The business outlook is not encouraging, whatever may be the cause. Pig iron is urged upon the market in excess of demand. This condition does not pertain to any particular district, but refers to every district making pig iron and steel.

Annexed is a comparative statement for the six years commencing with December 31, 1904, and ending with December 31, 1910, showing the progress made by the company, notwithstanding that, during the period included, business conditions at times have been equally as unfavorable as the outlook for to-day.

COMPARATIVE STATEMENT FOR SIX YEARS			
Assets.			
	Dec. 31, 1904	Dec. 31, 1910.	Increase.
Cash, bills and accounts receivable, &c.....	\$618,797.60	\$1,532,034.14	\$883,236.54
Real estate, plant and equipment	1,735,204.38	2,284,864.97	549,660.59
Totals	\$2,384,001.98	\$3,816,899.11	\$1,432,897.13
Liabilities.			
Bills and accounts payable	\$872,365.49	\$671,674.18	\$299,308.69
Mortgage bonds.....	270,000.00	180,000.00	*90,000.00
Reserves for repairs, depreciation of ores, &c.....		244,300.66	244,300.66
Capital stock.....	1,455,815.00	1,499,715.00	43,900.00
Surplus	285,821.49	1,221,209.27	935,387.78
Totals.....	\$2,384,001.98	\$3,816,899.11	
Increase in plant.....			\$537,854.54
Increase in assets.....			307,533.24
Decrease in bonds.....			90,000.00
Total increase.....			\$935,387.78

BALANCE SHEET DECEMBER 31, 1910.	
Assets.	
Cash	\$101,369.92
Bills and accounts receivable, &c.....	558,336.36
Pig iron, raw materials and supplies.....	872,327.86
	\$1,532,034.14
Real estate, plant and equipment account.....	2,284,864.97
Total.....	\$3,816,899.11
Liabilities.	
Bills and accounts payable	\$671,674.18
Mortgage bonds.....	180,000.00
	\$851,674.18
Reserves:	
For general repairs and renewals	\$181,138.83
For depreciation of ores.	63,161.83
	244,300.66
Capital and surplus	\$1,095,974.84
Capital stock.....	\$1,499,715.00
Surplus — Balance January 1, 1910.....	\$1,078,399.89
Earnings for the year.....	\$301,339.23
Less int. on bonds and borrowed money....	27,278.31
	274,060.92
	\$1,352,460.81
Less dividends ...	\$104,536.40
Doubtful accounts charged off.	26,715.14
	\$131,251.54
Balance Dec. 31, 1910.....	\$1,221,209.27
	2,720,924.27
Total.....	\$3,816,899.11

New Railroad Equipment.—The receivers of the Pittsburgh-Wabash Terminal have made formal inquiry for 1000 steel coal cars and a similar inquiry is probable from the Wheeling & Lake Erie. The Chesapeake & Ohio has ordered 200 flat cars from the American Car & Foundry Company and the Louisville & Nashville has placed an order for 100 Rodger ballast cars. The National Railways of Mexico have ordered 200 flat cars and 100 tank cars from the American Car & Foundry Company. The Spokane, Portland & Seattle will buy 25 passenger cars. The Chilean Government is taking bids on 97 cars. The inquiry of the Hawley lines for 8000 cars, which has been talked of for many months, has been withdrawn. The Missouri Pacific is reported in the market for 75 locomotives, and the Chicago, Indianapolis & Louisville for 10 locomotives.

The Nelson Hot Blast Stove.—In a recent pamphlet issued by Arthur G. McKee, Rockefeller Building, Cleveland, a description is given of the Nelson hot blast stove, patented June 22, 1909. The illustrations show that the stove has large heating surface, with square checkers of uniform size, either 9 x 9 in. or 6½ x 6½ in. All checker walls are 4½ in. thick and the stove was designed to give a larger volume of brick per square foot of heating surface than is the common practice. It is stated that 82 per cent. of the stove lining is composed of standard 9-in. brick, 17 per cent. of standard 9-in. shapes and less than 0.5 per cent. of special shapes. Installations of the Nelson stove have been in operation for about three years and it is in service at eight blast furnace plants.

Dry Air Blast.—A typographical error in the article in *The Iron Age* of February 2, 1911, page 308, on "Results With Dry Air Blast," made an important change in what was originally written. The sentence, "In a furnace consuming 40,000 cu. ft. of air per minute, the presence of 1 grain of moisture [per cubic foot] represents the delivery of 41.2 grains of water per hour to the furnace," should have read, "41.2 gal. of water per hour."

W. M. Carr and other local business men of Wheeling, W. Va., have organized the Carr-Hamilton Engineering Company, to act as consulting engineer in laying out equipment, such as furnaces and auxiliaries for glass plants, incinerating plants, &c., and the installation of gas producer plants.

Jones & Laughlin Ore Operations

Recent Developments on the Menominee Range

MARQUETTE, MICH., February 3, 1911.—M. A. Hanna & Co. of Cleveland have added the so-called Carpenter lands to the tracts they have under option in the Crystal Falls district of the Menominee range. The property is in Section 31, 43-32. It will be thoroughly explored and for that purpose a diamond drill already is in operation. Professor Carpenter of Chicago is the principal owner of the fee, interested in which are a number of persons, among them Benjamin J. Neely of Negaunee. The Hanna interests a few months ago secured an extended lease on the Monongahela and the Revena properties in the same district. The Revena is $1\frac{1}{2}$ miles from the Monongahela, and the Monongahela adjoins the Carpenter on the north. A large deposit of ore already has been proved up at the Revena and shaft sinking is in progress. Production will be started within a few months. The ore at the Revena will run between 55 and 58 per cent. in metallic iron. This is a higher average than most of the ores on the Menominee range, and, inasmuch as an extensive body has been proved up by the drills, the mine will in time be a heavy producer. The Revena adjoins Oglebay, Norton & Co.'s Bristol property.

The Jones & Laughlin Steel Company has surrendered its options on various tracts of Menominee range land and for the time being it is constructing no work in that portion of the Lake Superior region. The properties abandoned are in the Iron River and Crystal Falls districts. Other Menominee range properties will be tested eventually, it is probable. In the meantime, however, exploratory operations will be conducted in the Marquette district and some drilling will be done on the Cuyuna range, in Minnesota. The company controls a number of tracts in this latter field and it has given a portion of the acreage a partial test. The principal ore holdings of the Jones & Laughlin Company are on the Mesaba range, where it owns a group of excellent mines. It also has valuable properties on the Marquette range. Its Lake Angeline mine at Ishpeming has been producing high grade ore for many years and is still in fairly robust condition. The Rolling Mill property at Negaunee is a newly developed mine of much promise. At both the old Mitchell mine and the Iron Mountain Lake property, in the Ishpeming field, the company is operating two diamond drills. Mining operations are being carried on at the Mitchell on a small scale. It is hoped to find extensions to the present known deposits, but so far the drilling has not been productive in the way expected. The drills at the Iron Mountain Lake property have bored five holes to depths ranging from 600 to 1000 ft. There are large deposits of low grade ore at both this tract and the nearby Ogden mine of the Cleveland-Cliffs Iron Company.

Butler Brothers of Minneapolis have been the successful bidders for the work of stripping the Longyear mine in the Hibbing district of the Mesaba range. The contract involves the removal of approximately 3,500,000 cu. yd. of material. The Longyear is controlled by the Interstate Mining Company, which is the Mesaba division of the Jones & Laughlin Steel Company. The property adjoins the Morris on the south and the Webb mine on the east, and it was originally opened as an underground proposition. It has been idle much of the time since 1905. The Longyear contains a large body of ore, as is evident from the large amount of overburden that is to be removed.

Extensive improvements are in progress at the Cleveland-Cliffs Iron Company's Cliffs mine, at Ishpeming, including a fine ore crushing plant, with trestles connecting it with the A and B shafts. All this construction is of steel and concrete. In A shaft 5-ton skips are replacing the cages formerly in use. With the work at the A shaft completed, the B shaft will be given a similar overhauling. It is not expected that ore will be hoisted with the skips at both shafts much before April 1, by which time the new crusher will probably be in operation.

Clyde Mitchell Carr

Clyde Mitchell Carr, recently elected to the presidency of Joseph T. Ryerson & Son, Chicago, was born in Illinois in 1869, and has been prominently identified with the iron, steel and machinery interests for many years. After leaving college he was for two years with W. S. Malory & Co., iron merchants, in Chicago. In 1890 he became associated with the firm of which he is now the head.

Mr. Carr is a director of the Corn Exchange National Bank of Chicago, Chicago Great Western Railroad Company, Gisholt Machine Company, Madison, Wis., and president of the Lennox Machine Company, Marshalltown, Iowa. He is a member of the American Iron and Steel Institute. He has been for a number of years closely connected with various Chicago public institu-



Clyde Mitchell Carr.

tions, and is a trustee of the Art Institute, Chicago Bureau of Public Efficiency, Orchestral Association, Lake Forest University and Chicago City Plan Commission. The social organizations of which he is a member include the Commercial, Onwentsia, Chicago University, Cliff Dwellers, Saddle and Cycle and Princeton University clubs.

Electricity and Fence Wire Rust.—Investigations to discover the causes of rusting in galvanized wire have been undertaken by the agricultural engineering department of the University of Iowa, Ames, Iowa. It has been well known that the lower wires of the fence, down among the moist grasses and weeds, where rusting action would be expected to be most active, invariably last longer than the upper wires in the dry air. M. L. King, experimentalist for the department, says he has found that these lower wires in fences of any length ordinarily carry small currents of electricity, reaching in some cases a value as high as 0.001 ampere, and sometimes showing a difference of potential of as much as 1 volt above ground. Such currents are absent in the upper wires, and it has been suggested, but not proved, that the greater preservative action of the lower strands is due to the suppression of local electric couples by the through currents flowing in the lower wires.

The Thunderer, the seventeenth British dreadnought, and the fourth of the super-dreadnought type, was successfully launched from the yards of the Thames Iron Works Company at Canning Town, London, February 1. The vessel has a displacement of 22,680 tons and will be equipped with turbines with a total of 27,000 hp. She is scheduled to make a speed of 21 knots an hour, is 584 ft. in length and is armed with 10 13.5-in. guns and 24 4-in. guns. She is the largest vessel ever launched in the Thames.

New Publications

Practical Alloying. By J. F. Buchanan. Cloth bound; pages, 265, 6 x 9 in.; illustrations, 41. Published by the Penton Publishing Company, Cleveland, Ohio. Price, \$2.50.

Mr. Buchanan's name is well known in connection with literature on the production of alloys, particularly in the past 15 years, a period in which the advance in this branch of the art has been remarkable. The author, referring to the large number of alloys resulting from the constant invention of new ones, says that "out of the multitudinous mixtures advocated and employed in the practical and constructive arts it is no easy matter to select or even classify the metals of importance." (In alluding to the "battle of the bronzes," he adds that the honors have fallen to phosphor bronze, aluminum bronze and manganese bronze at different periods. The industry is in a constant state of change and new records are being made in alloy practice while new difficulties are presenting themselves as a challenge to investigators.

After a historical introduction, the properties of alloys are considered, chiefly the well-known alloys of the foundry. In addition to the old brass and bronze alloys, three distinct series are recognized as having taken root in foundry engineering practice—namely, the high tension alloys, the anti-friction alloys and the light (chiefly aluminum) alloys of modern invention. The composition of various alloys of tin, antimony, lead, copper and zinc is given with definite instructions for compounding anti-friction alloys. With all such alloys overheating is a fruitful cause of dissatisfaction with the wearing and working qualities. "It was found," the author says, "that babbitt alloy was greatly improved as a self-lubricating metal for fast running light machines when a portion of the tin was replaced by lead. Further experience brought out the truth that properly hardened lead was equal to hardened tin as a metal for anti-friction purposes. 'Twas then the flood arrived."

In the chapter on "Foundry Mixtures" tables are given showing the percentages of the various metals in alloys made from new metals and those from air furnace charges containing scrap. Directions are given for the making of various dips and lacquers. There is a chapter on fluxes for alloys and one on the use of crucibles in the brass foundry. In brief, the author points out in discussing the life of crucibles that moisture is the greatest enemy, while prolonged melting and intermittent heats are responsible for most of the poor averages in ordinary foundry practice. There is a short chapter on the testing of alloys, and the book ends with tables of information concerning metals, their construction, specific gravity, specific heat, electrical and heat conductivity, approximate melting points, and the weights of most of the ordinary metals and alloys. Much of the matter contained in the book originally appeared in the *Foundry* and other journals.

Welding. By Richard N. Hart. Cloth bound; pages, 181, 6 x 9 in.; illustrations, 93. Published by the McGraw-Hill Book Company, New York. Price, \$2.50 net.

It is significant of the development in new welding processes that its literature should now be sufficient to fill a volume. There are four parts to this work: The first dealing with welding metals, the second with electric welding, the third with hot flame welding and the fourth with thermit welding. Iron is naturally first considered under "Metals," and most at length. Some abbreviated data are given concerning platinum, gold, silver, aluminum, copper and nickel. The section on electric welding describes the La Grange-Hoho process, the Zerener electric blowpipe, the Bernardos arc welding process and the Thomson process. After discussing the various forms of apparatus used in connection with oxy-acetylene welding, the author passes to methods of welding by the use of high pressure and low pressure torches. Some details are given of the manufacture of oxygen and acetylene. Brazing and soldering are treated at some length, con-

siderable up-to-date matter being presented. The book is on the whole a very satisfactory presentation of the theory, practice, apparatus and tests of the various welding processes. The reader is given the caution that test and cost data must be taken with a grain of salt. While the iron tests are standard and unquestioned those for special processes have been made in some cases by interested persons. As to the performance of welding machinery, it is suggested that the prospective purchaser must figure the cost of apparatus, plus the cost of labor and the depreciation; but, most important, he must satisfy himself that the apparatus he chooses is the best for his kind of welding.

Testing for Metallurgical Processes. By James A. Barr. Cloth bound; pages, 216; 5¼ x 7¼ in. Published by the Mining and Scientific Press, San Francisco. Price, \$2.

The book is based on original notes and experiments made in the laboratories of the Michigan College of Mines, the nucleus of the material having been published in 1909 in pamphlet form under the titles "Metallurgical Laboratory Experiments," and "Ore Dressing Laboratory Experiments." Descriptions are given of the apparatus and methods employed in making laboratory and small lot tests. Suggestions are given, valuable both to the student and the practicing engineer, as to the selection of the process of treatment for any ore.

Practical Stamp Milling and Amalgamation. By H. W. MacFarren. Cloth bound; pages, 166; 5¼ x 7¼ in. Published by the Mining and Scientific Press, San Francisco. Price, \$2.

The writer gives his own experience and conclusions, together with what he has gathered from other mill men and metallurgists, on the examination of ores and the adjustment of the stamp mill to their requirements. It is a book of details of everyday work. The principal subjects treated are the stamp mill, its location and design; the mortar, die, shoes, tappet and curve; adjustment of height, order of drop, feeder and screens; water supply and power; principles of amalgamation and treatment of plates, retorting and percentage of metal in retorts; loss of gold, mill tests and mill management.

The Backbone of Perspective.—By T. U. Taylor. Bound in cloth. Size, 4½ x 7¼ in.; pages, 56; 40 figures. Price, \$1 net. Published by the Myron C. Clark Publishing Company, 355 Dearborn street, Chicago, Ill.

This book is a reprint of a series of notes which have been given in the form of lectures and drawing board exercises for many years by the author and are placed in this form to enable the volume to be used as a text book, thus saving time in note taking on the part of the student.

The book is divided into four chapters, the first of which deals with the primary methods. The vanishing point method is taken up in the next chapter, while axometric projections are discussed in Chapter III. The last chapter is devoted to the subject of shades and shadows. All of the different principles are clearly illustrated and each chapter contains a number of problems to be worked out by the student on the drawing board.

Republic Iron & Steel Company Handbook.—The Republic Iron & Steel Company has brought out a 1911 handbook of its products. It is leather bound and has 399 pages, 5¼ x 7¼ in. The price is \$2. Preceding the details of the various finished products are a number of pages devoted to Pioneer pig iron and the operations of the company at its Pioneer plant at Thomas, Ala., where it has three blast furnaces. An illustration is given of the old Tannehill furnace at Tannehill, Ala., which was the beginning of the Republic pig iron operations in the South. A full page view is given also of the blast furnaces at Thomas, Ala., and another page is devoted to the Haselton furnaces, Youngstown, Ohio. The bulk of the handbook is devoted to tables of dimensions and weights of various forms of bar mill products, with many pages of illustrations of the shapes and sections manufactured by this company.

Customs Decisions

Machine Repair Parts

The question of the rates of duty to accrue on machine repair parts under the present tariff law came up for adjudication recently before the Board of United States General Appraisers, when a test importation made by the American Mfg. Company called for a decision. The merchandise was invoiced as 200 pairs of solid bottom cams for 1½-in. screws, and are described as repair parts for jute machines. Duty was assessed at the rate of 45 per cent. under the provision in the metal schedule for articles in chief value of metal. According to the importer, the merchandise is dutiable at only 30 per cent. as jute manufacturing machinery. General Appraiser Fischer, who writes the decision for the Board, does not agree with the contention raised by the importer, and accordingly overrules the protest. "Single and unrelated parts," says the decision, "are generally known by their particular names or descriptions, such as gear wheels, connecting rods, cams, &c., while the assembling of two or more of such parts gives to them the general description of machinery." The General Appraiser remarks that in a decision by the Board, known as No. 6967, it was held that parts of lace-making machines were not entitled to the same privilege of exemption that the statute extended to "machines." In construing this provision, Mr. Fischer says:

The term machinery contemplates something more than a mere machine, and embraces as well other appurtenances necessary to its operation. It is used in fact to refer to a working entity, the parts of a machine, other devices and accessories considered collectively. The machinery of a jute manufacturing plant would include all the means necessary to its workings. So a machine with shafting and belting considered collectively would, if imported, be entitled to consideration as machinery. In this respect the term machinery is more comprehensive than that of machine or machines. In its scope it would apply to other parts not strictly regarded as machine parts, but, in our opinion, it would not embrace a single part of a machine, such as a wheel, or a bar, or a cam as we have here before us. The shafting or the belting, if separately imported, could not very well be described as machinery, and it follows to our way of thinking that these metal cams which are described as repair parts for jute machines are not within the meaning of the term. A single wheel or a pair of cams has not that collectiveness essential to the understanding of the term machinery.

Airtight Metal Cans

In overruling a protest filed by H. Kellogg & Sons, New York, the Board of United States General Appraisers has decided that a metal can, the inclosure of which is effected by a friction top or cover and which is thereby made airtight, is not excluded from the provisions of paragraph 195 of the tariff act of 1909. According to the board the clause of exception, "hermetically sealed by soldering or otherwise," applies to such receptacles only as are made secure against leakage or air by fusing, welding, brazing or soldering the metal parts together. The merchandise in dispute consists of tin cans filled with syrup. The tops of the cans are so made that they are closed by forcing a cover or lid into the open space where it is held by friction, such covers or friction tops serving to keep the air out and the syrup in. The cans or coverings are made of metal printed by lithographic process. Duty was assessed on the syrup at 20 per cent., while the cans were returned for duty at the rate of 4 cents a pound and 35 per cent. under the tariff provision for cans not hermetically sealed.

The question before the board was whether a top or cover of a can held by friction constitutes hermetical sealing as called for by the tariff statute. The importers contended that it does, and that the metal coverings are dutiable at the rate applicable to the contents and not at both specific and ad valorem rates as assessed by the collector. General Appraiser Fischer, who writes the decision, does not agree with the importers. He says:

Friction closing is not hermetical sealing. The mere fact that the contents cannot leak out or air enter the can is not sufficient. A bottle closed by a ground glass stopper may be said to be secure against leakage or air, and yet it certainly would not be considered as hermetically sealed. What Congress clearly intended by the term "hermetically sealed by soldering or otherwise" was to exclude from the operation of the paragraph all metal containers made perfectly close by sealing with solder, or welding, fusing or brazing of the metal parts at the opening,

so that the contents could not be removed without cutting open the metal at the top or side of the receptacle.

Iron Drums or Containers

In a decision by Judge Smith, the United States Court of Customs Appeals has reversed a decision of the Board of General Appraisers and affirmed the Government's claim for the assessment of duty on iron drums containing glycerine. The importers in the case are Marx & Rawolle. When the issue was before the board that tribunal found in favor of the importers. It appears that in addition to the duty attached to the glycerine under paragraph 24 of the tariff act of 1909, the collector assessed a duty of 30 per cent. ad valorem on the containers. The importers did not challenge the assessment made upon the glycerine, but protested that the iron drums should be admitted free of duty as the "usual" containers of the merchandise imported. The board sustained the contention of the importers and reversed the collector. The case then came before the Customs Court on review. Judge Smith, who writes the decision for the court, holds that the general board erred, and that the collector was right in returning the drums for duty.

Lead Contents of Type Metal

The American Smelting & Refining Company has been unsuccessful before the Board of United States General Appraisers in an attempt to so construe the tariff law of 1909 as to permit of lower duty on lead contents of type metal. The company imported base bullion or lead bullion, the result of a crude and primary smelting process. The warehouse entry involving the merchandise in controversy specifies 52,800 bars, weighing 5,275,852 lb., chargeable at the rate of 2½ cents per pound, under paragraph 182, of the present tariff act. The duty amounted to \$112,111.

This merchandise was, it appears, regularly placed in a bonded smelting warehouse. General Appraiser Fischer, who writes the decision for the board, states that the tribunal is concerned with a withdrawal for consumption of 1293 bars of alloy metal, the residuum obtained in the ordinary commercial smelting of the lead bullion referred to above, and the by-product remaining after the refined lead and more precious metals had been extracted. The decision states that this alloy metal so withdrawn is shown to consist of lead and antimony, and to be, in fact, an antimonial lead.

Duty was assessed and paid on this alloy metal at the rate of 2½ cents a pound on the weight of the withdrawn quantity. The American Smelting & Refining Company claimed that the only duty that should have been levied by virtue of section 24 of the existing tariff act is that of 1½ cents per pound on the lead content under paragraph 191 as type metal. In this base bullion was subject to duty at the rate of 2½ cents a pound on its actual weight and without deduction for the weight of the nondutiable metals contained in the bullion under paragraph 182. That the issue is a complicated one is acknowledged by General Appraiser Fischer. He does not believe that it was the intention of Congress to permit the product of the smelting and refining to bear a less rate of duty when withdrawn than was applicable to it when imported—that is, it was lead or base bullion when it arrived and subject to duty at 2½ cents per pound. According to the decision, that rate still applies on the portion of the importation warehoused and then withdrawn for consumption. The decision says:

We now note that in these 1293 bars of metal weighing 114,816 lb. there is present 93,282 lb. of lead. No proof is in the record that this lead could not have been recovered in the form of commercial lead, and, even if such proof had been offered, it is not apparent how it would affect the issue. If it was not pure lead it was a form of lead. As a form of lead it was then a part of the "actual amount of lead" produced from the smelting. If there is any doubt as to this issue here tried it must be resolved in favor of the Government.

The provisions by virtue of which it is sought to obtain lower duties are in the nature of a privilege granted to refiners of metal and arise in connection with the permission to smelt, and refine imported lead bullion. The duties chargeable are not collected, but abide the event of the performance of certain requirements. The exemptions that follow as a result of the privilege granted are to be construed most favorably to the Government.

The International Harvester Company

Extensive Construction Work in 1910 and at Present

To keep pace with the vast demand coming from all quarters of the world during the past year, the International Harvester Company has found it necessary to make extensive additions to all of its American and Canadian plants, besides building new factories in Russia and completing factories in Germany and France.

The New Tractor Works

At the Western group of works, consisting of the Deering, McCormick, Plano and Weber works, located at Chicago, the Milwaukee Works at Milwaukee, Wis., and the Keystone Works at Sterling, Ill., many extensive and costly improvements in the building line have been made, and an entirely new plant, constructed at Chicago, is devoted to the manufacture of traction engines, and is known as the Tractor Works. This new works is located south of the Drainage Canal and adjoining the tracks of the Pennsylvania, Baltimore & Ohio and Chicago Junction railroads. The buildings are of a modern type of steel, brick and concrete construction.

The machine shop is 120 x 261 ft., with galleries the entire length, and a second floor across the front of the building for experimental and pattern rooms, the offices being located on the first floor and the balance of the building devoted to machine shop purposes. The exterior of the building is largely of glass, and it is also lighted by saw-tooth lantern construction. All of the sash throughout the building are steel sash, glazed with ribbed glass. The building is provided with heavy duty cranes and elevators. The forge shop is 120 x 241 ft., and is of similar construction to the machine shop, with the exception of being provided with a high-trussed roof, affording ample ventilation. This building is also equipped with heavy electric cranes, and a gantry crane, between the two buildings, permits of handling heavy traction engines from the buildings to the cars. Foundations for additions to both of these buildings are already in place, and the scheme for future development is ample and comprehensive, providing suitably for the future extension of the plants.

The light, heat and power are obtained through an elaborate tunnel from the malleable foundry of the McCormick Works, on the opposite side of the Pennsylvania and Baltimore & Ohio tracks, by means of utilizing the waste heat from the malleable furnaces, generating steam for turbines operating the generators furnishing the current for the direct connected motors, operating all machinery at the Tractor Works, the engineering being done by the Arnold Company, Chicago. The designing and construction of these buildings were in charge of the construction department of the International Harvester Company.

The Milwaukee Works

At the Milwaukee works large and extensive building improvements have been made during the last year to take care of the growing requirements of the gas engine and cream harvester business, which are special lines manufactured at this works. Early in the season was completed a reinforced concrete warehouse, 85 x 353 ft., six stories and basement. This building was erected under what is known as the Turner or mushroom system of reinforced concrete and is a splendid type of reinforced concrete construction. The floors are designed to carry a safe load of 300 lb. to the square foot. A track in the center of the building and tracks and shipping platforms at the side afford ample shipping facilities. The building is provided with two high speed high duty elevators.

At this works there is also being constructed at the present time one of the largest gray iron foundries in the country. This building is 190 x 781 ft. and is provided with two cupola rooms, with ample storage bins for sand and other foundry material, and contains approximately

108,000 sq. ft. of molding floor, and will have an estimated capacity of 250 tons daily. The building is of brick, steel and concrete construction, well lighted, the roof being of saw-tooth lantern type. The sash throughout is steel sash. In addition to the main molding floor a gallery floor is provided, running the entire length of the molding portion of the building. Mezzanine floors are also provided and utilized for toilet rooms, core rooms and cleaning rooms. Adjoining this building is a fireproof pattern storage building, 48 x 168 ft., two stories.

The foundry building proper is thoroughly equipped with electric cranes and trolley systems, so arranged as to handle the work with as little manual labor as possible. A large gantry yard crane permits of the delivering of raw material directly to the cupolas from the yard or from the cars. Particular attention has been given to light, ventilation and sanitary arrangements, making the building modern and up to date in every respect. The engineering work on this building is done by the Arnold Company.

The Keystone, Plano and Weber Works

At the Keystone Works, Sterling, Ill., extensive improvements have been made, including the construction of a new reinforced concrete warehouse, 100 x 201 ft., four stories and basement. This building is constructed under the Turner system of reinforced concrete work and is provided with rapid elevators and inclosed stairways and is substantial and fireproof in all respects.

A fireproof paint storage building has also been completed and an extensive addition made to the power plant, involving the construction of a new wheel house and pit in the mill race adjoining the Rock River, operating the water power for the plant.

The designing and construction of this building were in charge of the construction department of the International Harvester Company.

The Plano Works, located at West Pullman, Ill., is largely devoted to the manufacture of wagons and manure spreaders, and it has been found necessary to add materially to this works to provide for the increased demand for this line of the company's products.

A new wheel shop, 100 x 320 ft., has been completed and six new modern dry kilns of the A. H. Andrews type and two of the Nichols type have been installed, and a reinforced concrete paint grinding building, 49 x 62 ft., two stories, fireproof in every particular, has also been constructed.

The designing and construction of this building were in charge of the construction department of the International Harvester Company.

At the Weber Works, located at Auburn Park, Ill., two modern buildings, commenced in the season of 1909, were put into service, one being a forge shop 80 x 156 ft., of steel construction, with concrete roof, and provided with perfect light and ventilation; the other a manufacturing building, 80 x 150 ft., four stories and basement, this being a mill constructed building, equipped with rapid elevators, sprinkler system, and all modern improvements.

The designing and construction of these two buildings were in charge of the construction department of the International Harvester Company.

The Champion and Osborne Works

Fully as extensive improvements in the building construction lines have been carried on at the larger of the Eastern group of works, consisting of the Champion Works at Springfield, Ohio; Osborne Works at Auburn, N. Y., and Hamilton Works at Hamilton, Ontario.

The improvements at the Champion Works consist of a new foundry building, 150 x 675 ft., with cupola room extension, 42 x 61 ft.; core room, 58 x 142 ft., and core sand storage, 36 x 37 ft. In connection with this new foundry building is provided a new pattern vault 50 x 150 ft.; coke storage, 25 x 200 ft., and sand storage and toilet building, 35 x 195 ft. and 35 x 155 ft. A forge shop building, 140 x 335 ft., is also being erected. The pattern storage vault is a reinforced concrete building, all of the balance of the construction being of steel and brick, with concrete roofs.

The roof construction on the foundry building is of the same type as that adopted by the General Electric Company at its new shops in Erie, Pa., and several other of the larger manufacturing concerns in the country, and is particularly adapted to foundry construction, affording the best of light and ventilation at a minimum cost. The engineering work on this group of buildings has been in charge of the De Vore & McGormley Company, Toledo, Ohio.

At the Osborne Works, located at Auburn, N. Y., extensive building improvements have also been undertaken this year, consisting of a warehouse 128 x 258 ft., four stories, of brick and mill construction, equipped with sprinkler system, rapid elevators and provided with ample shipping facilities.

At this works a large malleable iron foundry is also in the course of construction. This building covers a ground space of 314 x 442 ft., consisting of a molding floor, 122 x 314 ft., and a mill room and annealing room, 120 x 194 ft., and an intermediate room, 60 x 200 ft., and a core and storage room, 60 x 200 ft., together with fire-proof pattern vault, 48 x 122 ft., two stories. This building is of brick, steel and concrete construction and was designed and handled by the construction department of the Osborne Works.

The Hamilton Works

At the Canadian Works of the company located at Hamilton, Ont., it has been found necessary to make extensive additions in the building line to take care of the increased demands of the foreign trade, as well as to supply machines to the vast empire being developed in Western Canada. These improvements add to the capacity of practically every department at this works, and consist of a paint shop building, 72 x 95 ft., four story and basement; of mill construction and an addition to the gray iron foundry building, 82 x 200 ft., of brick and steel construction; a new mill room building, 142 x 150 ft., two stories and basement, of brick and mill construction; an extension to the wood shop building, 81 x 100 ft., and a new manufacturing building, 72 x 305 ft., four stories and basement, of mill construction.

A new warehouse in two sections, respectively, 64 x 119 ft. and 100 x 119 ft., four story and basement, of brick and mill construction, and a new office building, two stories and basement, 60 x 103 ft., have also been constructed. These buildings have been designed and constructed by the Hamilton Works.

To store and handle the goods turned out by this great increase in manufacturing facilities, the International Harvester Company of America has found it necessary, in addition to the vast number of storage buildings located throughout the country, to build during the past season 15 new general agency warehouses, located in all sections from Albany, N. Y., and Baltimore, Md., to Wichita, Kan.; Denver, Col., and Minot, N. D. These buildings have a storage capacity of 100 to 150 carloads of goods each, and range in cost from \$60,000 to \$75,000.

The Gary Screw & Bolt Company

Regarding the plant to be built at Gary, Ind., by the Gary Screw & Bolt Company, an identified interest of the Pittsburgh Screw & Bolt Company, Pittsburgh, W. G. Costin, president of the latter, states that the plans are about finished and bids for the buildings and equipment will be asked for within two or three weeks. It is probable that the new plant will cost \$1,000,000. The product will consist of nuts, bolts and rivets and the capacity of the plant will be upward of 50,000 tons a year.

The plans call for the erection of two main buildings, each to be 450 ft. wide and 650 ft. long. They will be of concrete and steel construction and will have all modern equipment. A very large amount of new machinery will be needed, but bids for this will not be requested for some time.

The officers of the Gary Screw & Bolt Company, recently elected, are as follows: John R. McGinley, Pittsburgh, chairman; W. G. Costin, Pittsburgh, president; W. F. McKenzie, first vice-president and sales manager;

Thomas W. Smith, second vice-president and treasurer; John A. Collins, general superintendent; George A. Lee, assistant general superintendent. W. F. McKenzie, who is first vice-president and sales manager, was formerly connected with the Upson Nut Company, Cleveland, Ohio.

Alumaloyd to Be Made by a New Company

The Alumaloyd Products Company, Canton, Ohio, incorporated with \$250,000 capital stock, has purchased the process, good will and plant of the Alumaloyd sheet department of the Stark Rolling Mill Company of that city. A new plant is under construction in Canton to which the business will be transferred as soon as the buildings are completed. The business will be in charge of R. A. Bartholomew, who has been identified for many years with the Stark Company and other companies in the same line. The Stark Rolling Mill Company has been engaged for several years in the manufacture of alumaloyd sheets, but the business has outgrown the capacity of its facilities in this department, and the organization of a separate company was therefore decided upon.

Alumaloyd is an aluminum coated sheet metal. It has a surface like aluminum, with a smooth velvet-like finish, and can be drawn, pressed, stamped, soldered and double seamed. Its most important application has been in the automobile industry, in which it is used for bodies, fenders, hoods, radiators and other fittings. It is especially adapted to work in which a highly finished painted surface is desired, owing to the fact that it holds paint better than black sheets, and is free from the rust spots which develop on such sheets and cause the paint to peel off. In making automobile bodies and fittings a considerable saving in time is effected, as this metal does not require so many coats of paint to secure the desired finish.

The Taft Plan to Lease Water Power

President Taft has approved a plan for the leasing by the Federal Government of water power sites on public lands prepared by officers of various bureaus of the Agricultural and Interior departments. The principal points of this plan are that legislative authority be sought for issuing term leases for periods not to exceed 50 years; that these leases should contain stipulations to protect the public against the limitation of output of power through delayed or partial development; a yearly rental charge to be based on the amount of power available.

It is proposed that violation of the contract condition or persistence in charging consumers a rate declared excessive by a State Supreme Court shall be ground for the cancellation of the lease. At the expiration of the lease it is proposed to give the lessee a preference right to renewal unless the Government desires to use the property for public purposes. If the lessee fails to secure a renewal he is to receive compensation for the actual value of improvement on the ground or be allowed to remove such equipment.

The Linde Air Products Company's Growth

The Linde Air Products Company, 155 to 183 Chandler street, Buffalo, N. Y., which recently increased its capital from \$500,000 to \$1,000,000, has purchased sites at South Elizabeth, N. J., and North Trafford, Pa., and is proceeding at once with the erection of two large factories. It is anticipated that both these new plants will be completed and in operation by June of this year. The contracts for the buildings have been let as well as for such equipment as the company itself does not construct in its Buffalo shops.

The Linde Air Products Company already has two plants in operation—one in Buffalo and one in East Chicago—but the demand for compressed oxygen and apparatus for oxy-acetylene welding has developed in the past 12 months with such unprecedented rapidity that the additional oxygen plants are required to enable the company to keep pace with the demand.

Iron Ore Briquettes

A Tentative Test Specification

BY ALBERT E. WHITE.

Probably no question relative to the treatment of fine ores and flue dust has received greater consideration than the proper method of sintering, clinkering or briquetting of the ores. It is a question of vital interest to all blast furnace operators, although there is at present considerable disagreement among the different managers of blast furnaces as to the results of the agglomeration of fine ores. I have come in contact with many ways already devised for the sintering of fine ores and have tried to find some means of properly testing the agglomerated product for the purpose of arriving at its real worth. I have found certain portions of methods for carrying out the test, but I have not seen a concise and full statement relative to this matter.

I am therefore taking the liberty of submitting tentative specifications for the testing of sinter, clinker, nodulized or briquetted iron ore or flue dust. I do not say that these are perfect, but it does seem to me that if a product can be shown to stand up under these specifications it will prove to be a very desirable ore. I likewise feel that a presentation of these specifications may possibly call for some discussion with regard to them, with the result that desirable specifications may be brought down to a working basis in a very short time.

TENTATIVE TEST SPECIFICATIONS FOR IRON ORE OR FLUE DUST IN THE FORM OF BRIQUETTES, CLINKERS, NODULES, ETC.

Tests Required.—The products shall be subjected to the following tests: Absorption, abrasion, heat resistance, water resistance, steam resistance and compression.

Selection of Samples.—For the purpose of the tests at least 25 samples representing the ordinary commercial product shall be provided. Each sample or portions of the separate particles making a respective sample shall in all cases weigh at least 5 lb.

Absorption Test.—Five samples shall be selected and thoroughly dried to a constant dry state in an atmosphere of 250 degrees F. and their weight carefully recorded. Samples shall then be immersed in water to a depth of 1 ft. and their weights taken at the following periods from the time of their immersion: $\frac{1}{2}$ hour, $\frac{3}{4}$ hour, 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours, 12 hours, 24 hours, 36 hours and 48 hours. The data thus obtained shall be plotted in a curve showing observation versus time, and the shape of this curve shall be considered in estimating the quality of these briquettes. Should a briquette fail to reach its maximum absorptive power in less than two hours it shall be rejected. Likewise if the briquettes fail to have less than 20 per cent. porosity they should be rejected. **Note.**—Superfluous moisture to be removed by careful wiping with a damp cotton cloth before each weighing.

Drop Test.—Five samples shall be selected and dropped en masse from a height of 10 ft. on a cast iron plate. The entire material shall then be picked up and the operation repeated. This operation shall continue until the briquettes have been dropped 10 times. A sieve test shall then be made on the broken briquettes and it is required that not over 25 per cent. of them shall have been so broken as to pass through 40 mesh.

Heat Resistance.—Five samples shall be selected and subjected to 900 degrees C. of heat for a period of one hour. Two hours shall be the minimum for bringing the briquettes up to the required heat. With such treatment as this the briquettes may begin to sinter, but they must not disintegrate into small pieces. At the conclusion of this test the briquettes shall be subjected to abrasion and compression tests, and failure to stand up under these tests shall be cause for the rejection of the briquettes.

Compression Test.—Five samples shall be subjected to compression. Each briquette shall withstand a pressure of at least 1000 lb. per square inch. **Note.**—Samples having a rough and uneven surface shall be made even by a thin layer of plaster of paris.

Water Resistance.—Five samples shall be selected and immersed in water for a period of 48 hours; at the end of this time no indication of softening shall be manifested. If softening should result the samples shall be subjected, on coming out of the water, to a compression and abrasion test and they should meet these requirements although in a water soaked condition.

Steam Resistance.—Five samples shall be taken and subjected to the influence of steam heat at 150 degrees C. for a period of 12 hours. At the conclusion of this treatment no crumbling shall be manifested. If there is any indication

of crumbling the samples shall then be required to pass a compression and abrasion test.

The Mechanical Engineers' Monthly Meeting

The Committee on Industrial Accidents of the National Civic Federation and the Industrial Safety Association will co-operate with the American Society of Mechanical Engineers at the February meeting of the last organization, which will be held in the Engineering Societies Building on the evening of February 14. The paper to be presented is entitled "The Mechanical Engineer and Prevention of Accidents," and the author is John Calder, manager of the Remington Typewriter Works, Ilion, N. Y.

The paper discusses the nature and incidence of industrial injury, its prevalence and high rate, with particular reference to the United States, and the present general desire for better conditions for securing the safety of machine operators. The chief causes of injury as revealed by a study made by the author of a large number of verified casualties are analyzed and a number of practicable measures calculated to reduce the present numerous fatalities and injuries are recommended. It particularly discusses the important services which the mechanical engineer can render, both as an executive and a contractor, in exercising his ingenuity to avoid industrial accidents. A number of illustrations of safety appliances are included in the paper.

Representatives of the two co-operating bodies will be present, participate in the discussion and contribute additional data from their records.

Two 617-Ft. Ore Vessels Ordered

An important development in the lake shipbuilding industry in the past week was an order for two freight boats 617 ft. in length, or 12 ft. longer than the largest lake boats at present. The negotiations were referred to in these columns a few weeks ago. The contract for the two boats was placed by William P. Snyder, president of the Shenango Steamship Company of Pittsburgh, with the Great Lakes Engineering Works of Detroit. They will have 64 ft. beam, as compared with a 60-ft. width of the 600-ft. boats, and will have a carrying capacity of about 15,000 tons of ore. There are several 600-ft. freighters in the lake trade at present, these having an ore carrying capacity of about 12,000 tons. The new boats will each be equipped with three Scotch boilers, one more than is used in the 600-ft. vessels. The boilers will be 11.5-ft. long and 14 ft. in diameter. They will be operated by marine type quadruple engines, with 23 x 33 x 48 x 69-in. cylinders, and with a piston stroke of 42 in. The boats will be built at the Ecorse Yards of the Great Lakes Engineering Works and will be ready to go in commission July 1, 1912. They will require about 9000 tons of steel. The Cambria Steel Company will furnish the plates and shapes, and this transaction has connected with it a purchase of ore by the Cambria Steel Company from the Snyder Mesaba ore interests.

By-Product Coke Ovens and Conservation

H. Koppers, contractor for by-product coke and gas ovens, Joliet, Ill., has issued an illustrated pamphlet which presents forcible views on conservation, calling attention to the great waste of available gas, ammonium sulphate and tar by the use of the old-fashioned beehive oven in manufacturing coke. The statement is made that in 1907 the beehive coke ovens of this country wasted the enormous sum of \$47,451,197, which literally "went up in smoke." Attention is called to the conservation of available material which is secured by using by-product coke ovens such as the Koppers oven. The yield of surplus gas from the Koppers oven is placed at 50 to 60 per cent. of the total quantity evolved from the coal, being available for power purposes or for distribution to domestic consumers. Some details are given of Koppers plants which have been built or are now in process of construction for iron and steel companies.

The Stenotype

As a substitute for shorthand the Universal Stenotype Company, Dallas, Texas, has developed a machine known as the Stenotype. It is similar in construction to the typewriter and does for the shorthand writer what the typewriter does for longhand work. It is not, however, to be considered as a substitute for the typewriter but rather as a companion to it, although it does replace shorthand in all its fields. Many of the features of its construction resemble the modern standard typewriter, but the most important one is the keyboard, which is so constructed that with 20 keys and a small simple code it is possible to obtain all the initial and final consonants, vowels, diphthongs and figures. The arrangement of the letters on the keyboard is such that any sequence of letters necessary to write the English language at an average of more than word to a stroke is available. The average speed for an experienced stenographer is approximately 80 words per min. and when transcribing the notes at the rate of 50 per min., which is the average speed, the keys of the machine are struck over 300 times per min. The same number of strokes on the Stenotype means more than 300 words per min., and if the operator strikes the keys only half as fast as the average typewriter operator, he is writing approximately double the number of words recorded by an average stenographer.

Aside from this speed there is the advantage that the notes are perfectly legible, as instead of being executed in dots, dashes, big and little circles, long and short characters, curves and straight lines, all of which may be either light or shaded, the Stenotype writes in plain type letters. Another advantage is that under the old system of shorthand it is practically impossible for anyone to transcribe notes except the one who made them. With the Stenotype, however, anybody can learn how to transcribe these notes quickly, and one operator can transcribe the notes of any stenographer.

In operation the various words are printed on a strip of paper by depressing the proper keys, and this roll of paper is rewound as it leaves the machine on a removable spool at the rear. For transcription this rewinder is removed and placed in the copyholder which keeps the notes in plain sight of the operator. As fast as the notes in view on the roll of paper are transcribed, a key at the right is pressed and the paper is fed forward for another predetermined length, the process being repeated as often as desired. The machine is very light, the weight being $8\frac{1}{4}$ lb., thus making it possible to carry it from place to place easily.

Foundry Supply and Machinery Exhibition

Arrangements are being made for the exhibition of foundry machinery and supplies to be held in Pittsburgh, May 22 to 26, 1911, in connection with the annual meeting of the American Foundrymen's Association, the American Brass Founders' Association and the Associated Foundry Foremen. The Executive Committee of the Foundry & Machine Exhibition Company, the corporation which has succeeded the Foundry and Manufacturers' Supply Association, held a meeting in Pittsburgh recently at which it was decided to hold the exhibit in the extensive building of the Western Pennsylvania Exposition Society on Duquesne Way. The location is a convenient one in the business section of the city. The headquarters of the exhibition company will be at the Fort Pitt Hotel. It was decided that a vaudeville entertainment would be given to visiting foundrymen in the auditorium of the Exposition Building, and to this ladies attending the convention will be invited. A charge of \$25 will be made to exhibitors for an exhibition permit and the price of space is 50 cents per square foot, with an additional charge of \$10 for all corners. Space will be assigned on March 20. The total floor space available will be about 35,000 sq. ft., and provision will be made for the furnaces, core ovens and other operating exhibits in a temporary building. Shipments can be unloaded on the grounds from Pennsylvania Railroad sid-

ings. As at Detroit, a charge of \$1 will be made for a ticket giving admission to the exhibits throughout the week.

The General Electric Blowing Engine

A 5000-Hp. Turbine Driven Compressor for the Iroquois Iron Company

The General Electric Company entertained a party of iron and steel engineers and manufacturers at its works, at Lynn, Mass., February 4. The occasion was a demonstration of one of the three turbine driven air compressors for blowing, which are building for the new blast furnaces of the Iroquois Iron Company, at South Chicago, Ill. The demonstration was of unusual interest, for the type marks a radical step in American blast furnace practice, while the latest installation includes important improvements upon the first turbine blowing engine in this country, which has been in successful operation at the Oxford, N. J., furnace of the Empire Steel & Iron Company since March 8, 1910. Richard H. Rice, consulting engineer in charge of the turbine shops at Lynn, directed the party, assisted by a group of engineers and other representatives of the General Electric Company.

A special car took the guests from Boston to the River Works, at Lynn, and the forenoon was passed in viewing the great shops and in looking over the idle blower set and one of its companions in processes of erection beside it, with the interior of the blower exposed, permitting of intelligent observation of the principles of its design. Each unit consists of a 5000-hp. Curtis steam turbine, direct connected with the compressor, which has a capacity of 40,000 cu. ft. of air. Both turbine and compressor automatically adjust themselves to any condition which may arise, assuring a continuous supply of air to the furnace in any predetermined amount. The unit occupies a space but about 25 ft. in length.

After luncheon in the dining room of the company's offices, Mr. Rice read a paper describing the system, lantern slides fully illustrating the operation, mechanism and tests. Then the guests studied the practical operation of the blower for two hours. The demonstration took place under widely varying conditions conforming to those which may be met in the blast furnace. The presence of Julian Kennedy, the engineer in charge of building the blast furnaces of the Iroquois Iron Company, and of Herbert B. Cox of the Empire Steel & Iron Company, proved of much value in supplementing the explanations of Mr. Rice.

The guests were the following: Julian Kennedy, Pittsburgh; S. A. Kennedy, Iroquois Iron Company, Chicago; Julian Kennedy, Jr., assistant to S. A. Kennedy; M. A. Neeland, United States Steel Corporation, New York; Joseph Morgan, Cambria Steel Company, Johnstown, Pa.; Henry Howard, Merriman Chemical Company, Boston; A. F. Backlin, American Steel & Wire Company, Worcester, Mass.; A. R. Maiyer, Power, New York; W. E. Snyder, American Steel & Wire Company, Pittsburgh; Herbert B. Cox, Empire Steel & Iron Company, Catsaqua, Pa.; F. B. Dutton, Pennsylvania Steel Company, Lebanon, Pa.; J. C. Barrett, B. R. Shover and J. A. McDonald, Carnegie Steel Company, Youngstown, Ohio; A. N. Diehl and Robert Carter Reed, Carnegie Steel Company, Duquesne, Pa.; Quincy Bent, assistant to the president, Maryland Steel Company, Sparrows Point, Md.; George W. Vreeland, Carnegie Steel Company, Mingo Junction, Ohio; B. D. Quarrie, American Steel & Wire Company, Nekkburgh, Ohio; H. C. Ryding, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.; John J. Dammon, Buffalo Union Furnace Company, Buffalo, N. Y.; C. J. Bacon, Illinois Steel Company, Chicago; John Nelson, *The Iron Age*.

Two blast furnaces, F and G, at the Lehigh plant of the Bethlehem Steel Company, South Bethlehem, Pa., are nearing completion. Old furnace A has just been dismantled and on February 1 all the four effective furnaces of the company were in blast.

Exports and Imports of Iron and Steel in 1910

Heaviest Exports Ever Made and Largest Imports Since 1887

The appearance of the December report of the Bureau of Statistics of the Department of Commerce and Labor enables the complete statistics of the exports and imports of iron and steel in the calendar year 1910 to be presented. The estimates of the year's pre-eminence in exports, as given out by the Bureau of Statistics some time ago, have been more than verified. The total value of the exports of iron and steel and manufactures thereof, not including ore, was \$201,271,903, being much in excess of any previous year. The figures for 1909 were \$157,674,394, and for 1908 were \$151,113,114.

While the exports thus made an unprecedented showing, the imports also attained important figures, their total value, excluding ore, being \$47,115,112 against \$30,571,542 in 1909 and \$19,957,385 in 1908. In 1887 the imports were \$56,420,607, but in no year since then have they been so large as in 1910.

The value of the December exports, not including ore, was \$18,300,710, against \$18,593,806 in November. The value of similar imports in December was \$3,145,706, against \$3,329,919 in November.

The December exports of commodities for which quantities are given totaled 149,645 gross tons. The figures for each month are presented in the following table:

Months.	Gross tons.	Months.	Gross tons.
January	119,094	July	128,055
February	110,224	August	134,996
March	124,753	September	109,378
April	117,918	October	129,322
May	135,244	November	154,723
June	120,596	December	149,645

Details of the exports of such commodities for December and for the full calendar year are as follows compared with the previous year:

Exports of Iron and Steel.

December,		Twelve mos. ending December,	
1910.	1909.	1910.	1909.
Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	11,419	4,076	127,385
Scrap	4,716	403	25,825
Bar iron.....	1,116	1,249	18,045
Wire rods.....	1,572	2,361	22,869
Steel bars.....	8,236	7,349	107,560
Billets, ingots and blooms.....	10,880	3,625	58,230
Steel rails.....	41,593	53,151	353,180
Iron sheets and plates.	8,365	9,698	102,534
Steel sheets and plates.	14,658	11,316	171,982
Tin and terne plates.	1,056	1,130	12,459
Structural iron and steel.....	13,318	8,515	146,721
Barb wire.....	6,556	5,576	79,461
All other wire.....	7,342	7,406	92,463
Cut nails.....	496	704	8,129
Wire nails.....	4,259	3,075	42,870
All other nails, including tacks.....	765	713	10,202
Pipe and fittings.....	13,298	16,810	155,778
Totals.....	149,645	137,157	1,535,693

A remarkable increase occurred in the exports of pig iron in 1910. The figures show that these exports reached 127,385 gross tons, which more than doubles the previous year. It would be interesting to know from what sections of the country these exports were made and to what countries they were sent, but these details are not yet available. Steel bars showed a heavy gain, the exports increasing from 74,494 tons in 1909 to 107,560 tons in 1910. While billets, ingots and blooms fell off quite sharply, this decrease was more than offset by the heavy gain in the exports of steel rails, from 299,540 tons in 1909 to 353,180 tons in 1910. One of the most remarkable developments in the export trade appeared in the figures accredited to iron sheets and plates and steel sheets and plates. Iron sheets and plates increased from 75,305 tons in 1909 to 102,534 tons in 1910, while steel sheets and plates increased from 104,742 tons in 1909 to 171,982

tons in 1910. It is somewhat difficult to understand the division here made by the bureau. It hardly seems possible that such a heavy movement should occur in iron sheets and plates when the production at this time runs so strongly to steel and but a comparatively small quantity of sheets and plates is being made of iron. Structural iron and steel showed a very heavy gain, running up from 90,830 tons in 1909 to 146,721 tons in 1910. Wire products showed a very healthy gain, while pipe and fittings fell off to some extent, although still making an important item in the export showing.

The imports of commodities for which quantities are given totaled 31,619 gross tons in December. The imports for each month of the year are presented in the following table:

Months.	Gross tons.	Months.	Gross tons.
January	58,308	July	42,326
February	44,519	August	36,878
March	57,150	September	30,960
April	51,438	October	31,454
May	45,021	November	40,584
June	31,010	December	31,619

The details of the imports of such commodities for December and for the full calendar year are as follows, compared with the previous year:

Imports of Iron and Steel.

December,		Twelve mos. ending December,	
1910.	1909.	1910.	1909.
Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	19,911	28,607	237,233
Scrap	2,621	22,080	72,764
Bar iron.....	2,504	2,683	3,823
Billets, bars and steel forms n.e.s.....	1,794	4,887	46,578
Sheets and plates....	185	764	6,152
Tin and terne plates.	3,154	5,195	66,640
Wire rods.....	1,450	590	20,374
Totals.....	31,619	64,806	453,564

Nearly all items showed a considerable gain in imports in 1910 over 1909. The heavy imports of pig iron were probably due to the important purchases of ferromanganese, spiegeleisen and other special blast furnace products which are included in the custom house classification of pig iron. The great increase in billets, bars, &c., was probably due to the reduction in duty which enabled large importations to be made of bars and other forms of steel on the Pacific Coast in competition with the products of domestic mills. It is especially interesting to note that the importation of wire rods almost doubled in 1910.

The imports of iron ore in December were 173,710 gross tons, against 197,833 tons in November. The total quantity of iron ore imported in 1910 was 2,591,031 gross tons, against 1,694,957 tons in 1909, and 776,898 tons in 1909. The imports for 1910 were by far the largest in our history.

Eclipse Concrete Mixers at Chicago Cement Show.

—The Eclipse low charging concrete mixers, manufactured by the Standard Scale & Supply Company, Pittsburgh, will be exhibited at the Chicago Cement Show, February 16 to 23, at the same spaces occupied last year, being Nos. 199-200, and will include both gasoline and steam outfits and the machine in operation. This mixer in operation will likely attract much attention on account of the large opening in the drum, enabling callers at the show to see the actual process of the mixing in the drum and how the material is discharged after it is mixed.

At a joint meeting of the American Society of Mechanical Engineers, the Boston Society of Civil Engineers and the Boston branch of the Institute of Electrical Engineers, held at Hotel Somerset, Boston, February 1, in honor of Prof. Elihu Thomson, it was announced that a plan is afoot to erect a building which would be the headquarters of the engineers of Boston. A committee having the matter in charge has found that a building on Park street could be erected for \$1,500,000, from which between \$30,000 and \$50,000 would be collected in rents. The plan is looked upon with great favor in engineering circles.

Westinghouse Type E Alternating Current Generator

A Low Speed Engine Driven Alternator Possessing a Number of New Features

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has recently developed a new type of alternating current generator. One of the special features of

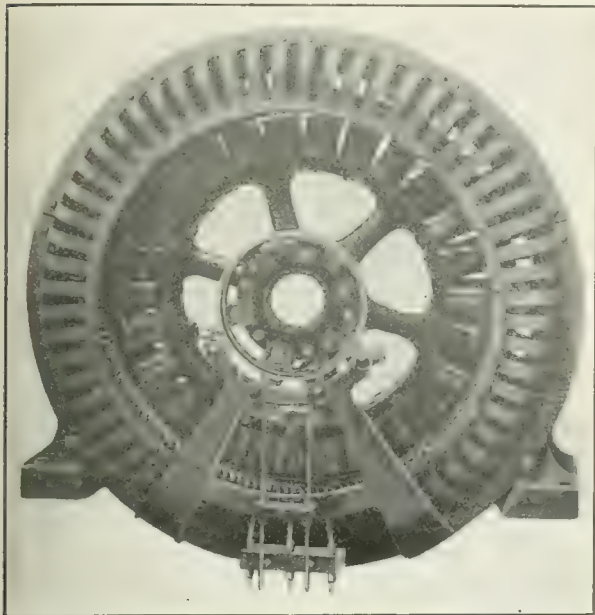


Fig. 1.—One of the New Type E Alternating Current Generators Built by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

these new units is their ability to carry commercial loads having a low power factor successfully. This new line is designed to operate with a direct connected engine furnishing the necessary power, and generates either two or three phase current at a frequency of 60 cycles. The various sizes range from 50 to 1100 kva., and the standard voltages are 240, 480, 600, 1200 and 2400 volts. Fig.

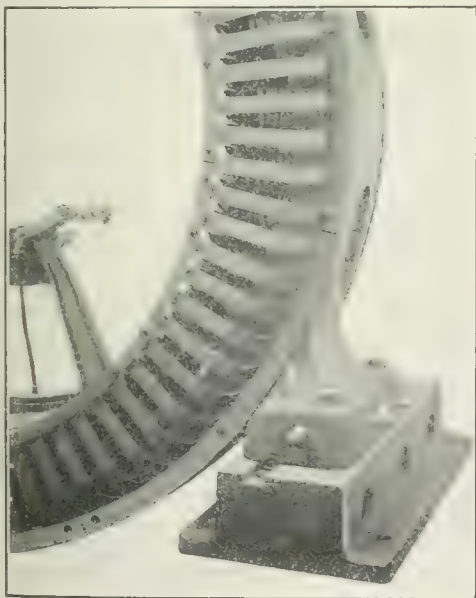


Fig. 2.—The Adjustable Shoe and Slide Rail for Shifting the Frame.

1 shows the general appearance of the new line, which is known as the type E; Fig. 2 is a view of the adjustable shoe and slide rail provided for shifting the frames of the smaller sizes, while Fig. 3 gives details of the brush holder rigging.

These new generators are of the revolving field type and the stator is designed to give great rigidity and plenty of freedom for the end connections of the armature windings. Excellent ventilation is afforded by the construction employed. While care has been taken to produce machines capable of giving satisfactory service under heavy loads and at low power factors and an ample factor of safety is allowed, the materials are used economically. The frame consists of a one-piece casting, except in the larger sizes where the diameter is such that the frame must be split for shipping. In these machines the halves are securely bolted together, which gives practically the equivalent of a solid frame. The smaller sizes of machines have slide rails of the type illustrated in Fig. 2, upon which the frame can be shifted to expose the rotor.

The armature core is built up of japanned steel laminations dovetailed in recesses in the frame. In assembling them pressure is used and they are securely held in place by finger and end plates. Finger plates are also employed to give a firm support to the teeth at each end of the core. A uniformly low core temperature is maintained by employing interior ventilating ducts of ample proportions. The design of the armature winding is such

as to enable repairs to be easily made. Wedges are used to hold the coils in place in the open armature slots, and the coils are not only interchangeable, but are completely formed and insulated before being assembled. The end bells used to protect the armature winding are attached to the end of the frame and consist of a number of segments built into a circular form and fastened together with bolts, so as to be not only light and open, but at the same time rigid and indestructible. Except in the larger sizes the brush holder brackets are bolted to the armature frame, thus making each generator complete in itself. The brush holders in the larger sizes are mounted on a pedestal, such as is shown in Fig. 3, which is fastened to the engine bed plate with bolts. As two brushes are provided for each collector ring, it is possible to adjust any of the brushes without opening the field circuit.



Fig. 3.—The Brush Holder Rigging Employed on These Generators.

The rotor consists of a casting so proportioned as to reduce cooling strains, while the material employed gives a homogeneous magnetic circuit. The laminated pole pieces are bolted fast, and the field coils are wound with strip copper, with the long dimension at right angles to the axis of the coil. Fireproof installation is used between the turns and the heat generated is readily dissipated by radiation, as every turn of the field coil winding is exposed to the air. If desired a cage damper winding, consisting of a series of copper bars embedded in the pole faces with the ends short circuited in the same manner as the squirrel cage winding of an induction motor, can be used. This type of winding is said to be an effective damper to any speed fluctuation and tends to prevent hunting. When a steam engine is used to drive the generator this winding is not essential to satisfactory operation, but its use is recommended where internal combustion engines are employed.

The collectors are of the spider type and consist of two machined cast iron rings mounted on and carefully insulated from a cast iron bushing or hub. This hub is bolted to the rotor spider casting, so that proper alignment is maintained regardless of any shaft adjustment.

Shop Floors—I

The Materials Employed and the Methods of Construction Best Adapted to Various Uses and Conditions

BY H. M. LANE.

This is a subject so broad and so influenced by local and manufacturing conditions that the best floor for any given location is a matter of considerable study. Originally, the floors used in different regions were determined chiefly by the building materials available and the style of construction in vogue. Local soil conditions, moisture and other factors also naturally claimed some attention.

In the early English and Continental factories and engineering works stone and brick were used for walls, the buildings were mostly of one story, and for the floors, it may be said, that the workmen wore them on their feet. In certain Continental countries these were the well-known wooden shoes, while in England they were clogs or pattens, the former being leather shoes with a wooden sole, and the latter a leather slipper with a wooden sole. In any event, the heavy wooden soles or wooden shoes kept the workmen's feet away from the cold damp stone or earth floors. In dye works, paper mills and other places where the floors are wet, and in certain metallurgical operations where the men have to pass over hot metal, heavy wooden-soled shoes are still employed.

The modern workman, however, insists upon wearing a comparatively thin-soled leather shoe, and he wants the floor conditions to be such that he will be comfortable in such shoes. This means that the floor must be of such material and of such a temperature that it will not extract heat rapidly from the body. Of course, there are certain manufacturing conditions where moisture is present where the workman must protect his feet with rubber or otherwise. It has also become the custom to keep factories fairly warm, and this renders superfluous the extremely heavy dress of the workingman of former times; hence influencing his shoes and in turn the floors of the shop.

The workingman is not the only factor affecting the floor problem. The functions of a floor may be stated to be: 1, To support loads, either of work, machines or men; 2, to resist wear or abrasion from the workman's feet, from trucks and other means of transportation, and from the handling of material upon the floor; 3, to protect both workmen and product from dampness. In addition to these three a floor must for certain purposes be practically dustless, and in some cases must be resilient and elastic in a measure.

Foundations

The lower or ground floor of any given plant depends in some degree upon the character of the ground on which the plant is erected. If comparatively heavy material is to be handled upon it, this floor must be firm and strong. If the ground is hard and firm, so that it is capable of bearing or supporting a considerable load per square foot, the floor will not have to be thick. But if the ground is soft and yielding, and particularly if it is wet or swampy, the floor must be in the nature of a floating foundation and the heavier the work the thicker this foundation must be.

Whenever possible transportation of heavy loads upon the floor on trucks or cars should be avoided. It is also well to avoid tracks in the floor, if possible. The objection to tracks is that the trucks are confined to them and are liable to congest certain parts of the plant at times. Then, too, the tracks break up the floor surface. Wherever possible loads should be carried by trolleys or cranes supported from above. Of course this is not always possible. Hence, in many cases the floor

must be so designed as to stand trucking. This brings us to the first great division in floors of all types—namely, the runway or trucking floors.

RUNWAY FLOORS

The consideration of a runway floor directs attention to the runways or traffic ways inside the buildings and also the transportation of supplies in the yard. Where concrete floors are used and trucking is to be done over them the best form of truck should be considered. Square flat treads on wheels should be avoided, as should also rough cast iron wheels. For moderate loads the best trucks for working on concrete are equipped either with rubber tires or with wheels having wooden treads or rims, with the end grain of the wood exposed in the tread. Whatever the material, whether wood, rubber or metal, the face of the tread should be rounded and the corners should be well rounded. When a truck turns a corner the load tends to swing the truck on the outer wheels and to force the outer wheel edges to dig into the floor. A curved face on the truck will materially reduce this tendency. The writer knows of factories having concrete floors throughout all their manufacturing departments over which thousands of tons of product have been trucked in loads up to 2000 lb., and still after several years the floors are in excellent condition. There are two secrets of the success of this particular case.

In the first place, the trucks are constructed with properly faced wheels; and, second, the floors are constructed in the best possible manner and with as few joints as possible. The only place where joints appear in the slabs is over the girders in line with the columns. At these points there has been some slight breaking up of the floor, which has necessitated a few patches 1 in. or less in depth. This case shows that concrete floors can be made to resist a considerable amount of trucking traffic.

Metal Plates

Where heavy traffic exists it is best to surface runways with metal plates. Such plates, however, should be corrugated or roughened sufficiently to afford a foothold for the men. For ground floors cast iron plates are very generally used, laid in concrete. For second floor work steel plates are frequently employed. Where these are laid in concrete most engineers turn the edges of the plate down as flanges and depend upon them to anchor the plates into the concrete. The trouble with this method of fastening is that the constant truck traffic over the surface of a steel plate tends to stretch the upper surface, and if the outer edges are fastened securely the center of the plate will finally rise and be loosened from the concrete. If the plates are fastened at the center the stretching of the upper surface will tend to keep the edges in contact with the floor.

Steel plates with properly rolled surfaces having diamond shaped or other simple forms of projections are very commonly used for the runways in foundries; and in some cases these are not secured to the floor in any way. If traffic over them raises any of the edges the plate is taken up, straightened and returned to its place. A few blows of the hammer will pen such a plate straight.

Concrete Surfaces

Where it is desired to maintain a concrete surface through the entire plant the resistance to wear of the runway can be greatly increased by introducing iron gratings into the top layer of the concrete upon the run-

way. These are composed of steel bars $\frac{1}{4}$ in. thick, and of any suitable width, which are spaced $\frac{1}{4}$ to 1 in. apart by suitable iron washers, and are then placed on the floor while the concrete is being laid, and the spaces between the bars are filled with concrete as the surface is made up.

The concrete is trowled level with the top of the bars and the steel naturally takes the wear of the trucks. This gives the effect of a steel working surface without covering the entire area with steel, and the concrete between the bars prevents the workmen from slipping.

In larger factories and certain types of woodworking plants where the material handled is quite bulky after it is put together, so that it cannot be transported easily on trucks, it is frequently pushed along the aisles on runways. For instance, in chair factories 12 or 15 chairs are grouped together and pushed along the runway by the workman, who follows behind the train, the chairs sliding on their legs. This necessitates the use of a smooth, slippery surface in such runways, but capable at the same time of resisting wear. Smooth steel plates from $\frac{1}{8}$ to $\frac{1}{4}$ in. thick have been found to serve these conditions better than any other material.

Wood and Asphalt

For ground floors where traffic is heavy there are few floor materials that present so many good qualities as a wooden block floor with the end grain presented to the traffic. A number of floors of this type will be described later in this article. For upper floors and moderate traffic an excellent floor can be made from $\frac{7}{8}$ to $1\frac{1}{8}$ in. maple laid with the grain at right angles to the direction of the traffic.

Whenever a wooden floor is to be subjected to traffic the boards should not be tongued and grooved, but should have square edges, which are abutted as closely as possible. In the case of the tongued and grooved floor the rib at the upper side of the groove is sure to be crushed and broken off in a short time, and even in the case of heavy stock without tongues and grooves it is remarkable how soon small truck wheels will sliver the timber. Where possible trucks with wheels of fairly large diameter should be used in all such runways, as it will greatly increase the life of the floor.

For light trucking, asphalt runways are frequently used with good results. The conditions which govern any floor for a runway or traffic way are similar to those which govern a street pavement, and the heavier the traffic the stronger must be the surface presented to resist it. The tractive force used for trucking also plays a part in the selection of the flooring or paving for ordinary traffic ways. In factory yards horses are sometimes used, and when this is the case a pavement or floor material must be used, which will enable the horse to get a good grip with its shoe calks. For runways in the yard wooden block, paving brick or asphalt have each certain advantages corresponding to their advantages in roads.

Far too little attention is paid to the floors which pass outside the factory proper. The runways or traffic ways through the yard are just as important to the manufacturing establishment as are the similar arteries inside the factory walls, and the surface of all such runways should be so constructed as to enable material to be moved with the minimum cost. In some factories the work is carried through all the buildings upon trucks, and is never allowed to touch the floor. In this case the entire floor area of the plant becomes subject to the rules governing trucking runways; but the density of traffic in any given runway in such a plant is likely to be reduced and the work distributed over a larger area. For ground floors where these conditions exist the floor may be of paving brick, asphalt blocks, wooden blocks, regular street asphalt, concrete or plank, each having its special advantages. For upper floors the surfaces are practically confined to hardwood flooring, concrete and concrete with an asphalt surface. In many cases it pays to pave much of the yard area of a plant. This is particularly true when some good cheap paving like treated cedar blocks or other treated wooden blocks can be obtained, and we know of cases where such outside floors or paving is earning good dividends.

MANUFACTURING FLOORS

Turning our attention to floors in general, we may first consider the types of first story floors which have been brought into use. For heavy work a number of types of wooden block flooring have been evolved. One of the first of these followed the lines of a street pavement, which was popular some 30 years ago. This is illustrated in Fig. 1. A foundation was prepared by rolling gravel or cinders into a compact layer, as shown at A, Fig. 1. This was covered with from 1 to 2 in. of sand, as shown at B. Next there came a layer of 2-in. plank, marked C, and upon this wooden blocks about 5 in. high, cut from plank 2 to 3 in. thick, set on end. These are shown at D D. In some cases a wooden strip, E, about $\frac{7}{8}$ in. thick and having the width equal to the length of the blocks D D, was placed between the rows of blocks. This was certainly not good practice, for the strip E was sure to shrink or swell with the different weather conditions, giving an uneven surface; also the strip exposed cross grain, which wore more rapidly than the end grain of the blocks.

There are three objections to this floor. First, the under layer, or plank C, tended to transmit the effect of

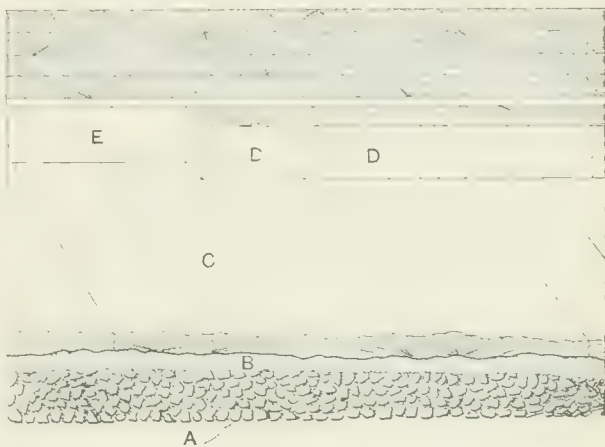


Fig. 1.—Wooden Block Floor of Street Paving Type.

a sudden blow to the surrounding floor, affecting a considerable area, while if the blocks had not been supported by the plank the dropping of a heavy casting upon the floor would simply drive down a few of the blocks, which could subsequently be removed and reset. The second objection is on the score of repairs or changes. If it was desired to cut a hole in the floor it was necessary either to tear up a large section or to cut off the plank C, which was a difficult job, and when repairs were made would result in an irregular floor. Third, the underlying plank C were naturally exposed to conditions which made them liable to decay with considerable rapidity. For street paving the planking usually failed in about five years, and this let the blocks settle.

Modern Block Floors

Wooden block floors are in extensive use both in this country and abroad. Fig. 2 illustrates a general type of floor which has met with considerable favor. In the illustration F represents a layer of from 10 to 12 in. of cinders, which were placed on the ground and rolled hard. Before placing the cinders the underlying soil was also rolled hard. On top of the cinders is a layer of concrete, G, which varies from 4 to 12 in. in thickness, depending upon the burden the floor is to carry, and also upon the underlying soil and the necessity of having a floor capable of distributing loads. In most cases in this country the wooden blocks H are laid directly on the concrete, as shown. In some instances, however, a layer of sand from a small fraction of an inch to 2 in. in thickness is placed on the concrete and the blocks abutted on this—a plan used in a number of European installations. Abroad the floors are commonly made of what is known as red deal, or fir, though the tree from which this is cut is really not a fir but a pine. The blocks are usually from 5 to 6 in. in length, and cut

from 3-in. plank. They are treated with creosote or some other preservative agent before being laid.

In this country the selection of block material has depended upon the local paving customs or upon the local timber market. We know of a number of factories where oak blocks are in use. In one large heavy work machine shop and erecting shop a floor of this kind has been in use for 14 years, and is still in excellent condition. In this case the blocks were set with $\frac{1}{4}$ -in. spaces between them, as shown at J J, Fig. 2, and these spaces were filled with dry, fine sand. The blocks were not treated with any preservative or set in tar or asphalt, and still they are in excellent condition after more than a dozen years. We know of other cases in which the blocks have been dipped in tar before being placed in the concrete, and subsequently the spaces between the blocks poured nearly full of melted tar. The surface was then dusted over with sand, which was swept into

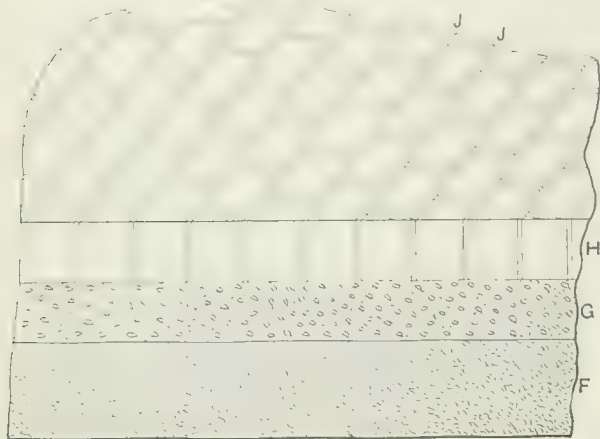


Fig. 2. - Wooden Blocks Laid on Concrete with Underlying Cinders.

the cracks, thus in effect making a block pavement with a tar and sand filler. Repairs and changes could naturally be made more easily on a floor which is not treated with a tar filler.

Where the blocks are not treated, if they are exposed to dampness they have a tendency to swell, so that if not treated they should always be laid with at least $\frac{1}{4}$ -in. cracks between them. Even then the floor will sometimes show a tendency to buckle. Now that several plants have been installed in different parts of the country for impregnating timber with preservative, it is better to use treated blocks, and to lay them without tar filling. Soft wood blocks when treated seem to wear about as well in a shop floor as oak, and if the proper preservative has been used their life should be indefinite. Creosote is the best material for treating wooden blocks.

One interesting feature which has been reported to the writer from a number of plants, and which has also frequently come under his observation, is that when these blocks become dented or deformed on account of the heavy castings falling upon them, the dents so formed seem to be filled again, as the wood fiber slowly comes back to its former position. We know of no other floor material of which this is true to such a marked degree.

Protecting the Floor from Moisture

In laying block floors particular care should be taken to guard against any tendency to dampness in the underlying soil by suitable drains, and if necessary by placing a layer of tar concrete on top of the cinders beneath the floor. Some of the particular advantages of a wooden block floor are that castings or machines do not have a tendency to slip upon it; machines of considerable size can be attached to it without any difficulty; large machines can be safely and easily erected upon it, and blocks or braces can be nailed to it when it is necessary. Owing to the fact that wood conducts heat but slowly, such floors always feel relatively warm under the workman's feet, and the slight elasticity does not produce fatigue as rapidly as a harder surface would.

In some cases a floor of peeled white cedar poles cut

into 5 or 6 in. lengths is substituted for the block pavement shown in Fig. 2. A plan view of such a pavement is shown in Fig. 3. In this case the workman in laying the floor split the blocks up with a hatchet, so that they fitted together as well as possible. Any small cracks are filled with sand, and in some cases tar is used between the blocks, but in a shop floor this is generally deemed unnecessary. Where cedar blocks are used their life indoors is almost indefinite without any preservative. The foundation for the floor should be constructed, as shown in Fig. 2. Decay is the greatest enemy of any wooden floor and moisture favors decay. Hence wooden floors must be kept dry and particularly wooden block floors.

Plank Floors

We now come to the subject of plank floors laid on concrete or other foundations. Fig. 4 illustrates a type which was quite common a few years ago, and still persists in some localities. The soil was first leveled off, and if on filled ground the filling material was rammed and puddled in place as thoroughly as possible. On top of this a layer of 10 to 12 in. of cinders or of coarse broken stone or slag was placed in position and rolled thoroughly. This is shown at K, Fig. 4. Next 6 in. of concrete was laid on top of the broken stone, as shown at L. This concrete was generally put down in two layers, about 4 in. of it being placed first, after which the mud sills M M were placed in position and leveled up, and then the balance of the concrete run in between them. In the old practice the concrete was not brought up under the bottom of the floor, but air spaces were left between the timbers M M and under the planking N. These air spaces were ventilated through openings at the ends or by boring holes in the floor. The planking N, which constituted the subfloor, was generally made of hemlock about 3 in. in thickness, and upon this there was laid a diagonal maple floor marked O, Fig. 4. More recent practice introduces a layer of tar concrete between the layers K and L, and brings the concrete up flush with the tops of the sills M M.

A better form of construction is the tar base, in which L is made a layer of tar concrete in place of cement concrete. On top of the layer of cinders or broken stone K there is generally placed from 3 to 5 in. of coarse gravel or broken stone mixed with coal tar and rolled into position with a heavy roller. On top of this there is placed

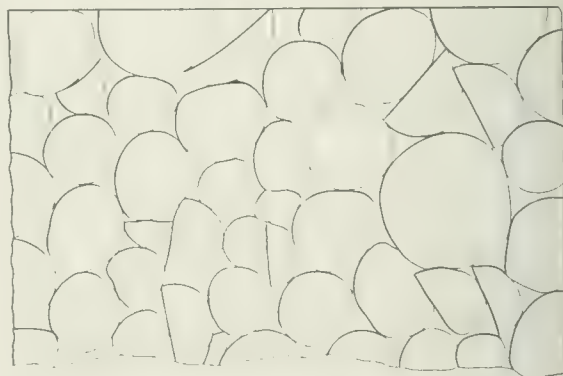


Fig. 3. - A Floor of Cedar Blocks.

$1\frac{1}{2}$ in. of tar concrete, composed of a mixture of coal tar and Trinidad asphalt and fine gravel or fine crushed stone. This is rolled down to about 1 in. in thickness. The timbers M M are then dispensed with and the plank N laid right on the tar asphalt, while the latter is hot and soft. The plank is nailed to the asphalt.

We know of a floor of this kind which was laid in a basement in an Eastern city, where when excavating for the building the soil was found to be full of water. After 10 years of service it was necessary to cut through this floor, when it was found that the subfloor spiked to the asphalt was in perfect condition and showed no signs of dry rot. In this case the subfloor was made of hemlock. We know of other cases in which chestnut lumber has been used for this purpose, and we also have instances where Southern yellow pine or Northern spruce has been

employed. There is no reason why any firm timber which has a fair life cannot be used for this subfloor or planking. The advantage of the tar concrete over the form shown in Fig. 4 is that the sills M M had to be laid in wet cement concrete and hence were predisposed to decay. If the plank is laid on tar concrete and the upper surface of the floor subsequently kept dry, there is no way that moisture can penetrate to it and start decay. The so-called dry rot is the result of a fungus growth which takes place in stagnant air. The plank which is laid directly upon the tar concrete is protected from the attack of such fungus and in addition to this the tar in itself is a preservative.

In the modern shop floors laid on tar concrete or upon any other similar base it has become the practice to lay the top floor at right angles to the sub or base floor in place of diagonally. There never was any really sensible excuse for the diagonal flooring. It is wasteful of material and difficult to repair; hence the practice of laying flooring at right angles has superseded this.

Heavy plank floors without a top wearing surface of hard wood have been used in many cases, particularly on ground floor levels or in one-story shops. In some cases these are put in where the shop is built on filled ground, and are intended simply as a temporary floor to last a few years. In other cases they are used because they are relatively cheap and are easy to attach machines to. Where the ground is fairly dry the general practice is to roll the earth hard and then to place from 12 to 15 in. of cinders on top of this and roll them hard. Heavy mud sills, usually made from 4 by 6 in. or 6 by 6 in. timber, are laid on top of the cinders, being bedded in 1 in. or more. On this is spiked a 3-in. floor, usually

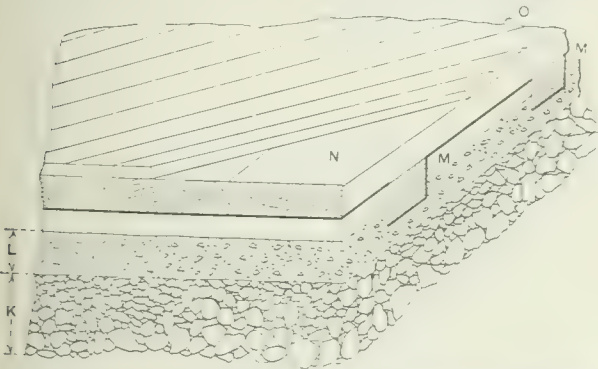


Fig. 4. Plank Floor with Air Spaces. Foundation of Broken Stone and Concrete.

made of oak, though in some cases yellow pine or even hemlock has been used. An oak floor of this kind has given fair service for eight or nine years, after which the sills were so badly rotted out that the floor had to be replaced. In cases where the underlying earth is damp or steam finds its way under the floor decay is much more rapid, and we have known such floors to fail in from four to five years.

Floor Surface of Concrete or Asphalt

In the case of first floors, or ground floors, which are to be exposed to moisture on the upper surface, as, for instance, in paper mills, plating rooms or in any place where water is used freely, a concrete or asphalt floor will be found best.

It may be well at this point to say something concerning the surfacing of any concrete floor. The surfacing should be so done and such material should be used as to give as near a waterproof structure as possible—a floor that is not slippery and that will have the maximum resistance to wear. The materials available will have a marked influence upon the practice of top dressing for concrete floors. Some sand is composed of grains which are exceedingly brittle. This is also true of certain stone used for aggregate. The material itself may be hard enough to resist wear, but such that it will crush or powder under truck wheels, thus leaving holes in the floor and allowing the cement in which it is embedded to be broken down from an exposed edge, so that the entire upper surface is quickly destroyed. Suitable

material for ordinary concrete can be obtained in most localities, but it will frequently pay to bring the material for the top dressing or wearing surface from a distance, so as to secure the best results. Hard blue limestone, trap, granite and various other similar rocks have been found to give excellent satisfaction for this purpose. Sandstone, except when highly metamorphic, and all soft limestone should be avoided. In most cases it is best to consult the practice which has been followed in other shops and find a material which has been satisfactory and then use it. In some cases we have found used what they termed locally "iron mine tailings." These were the hard gangue material separated from magnetic iron ores by concentration from the mines in northern New York State.

In laying a floor surface or top layer the material should be placed in position before the underlying cement has taken its final set, so that it will bond with the lower floor. When this is impossible the lower floor must be thoroughly cleaned by sand blasting or some other suitable method and then scrubbed with a neat cement slush before the floor is dry. When laying a top dressing on concrete which has been in position for some time, after the surface has been cleaned and roughed, it must be thoroughly wet so that it no longer has a tendency to absorb moisture. At the same time care must be taken not to leave too much moisture on the surface of the concrete, as it would thin the floor material when it is laid in place.

GRANOLITHIC FINISH.

The Aberthaw Construction Company, Boston, Mass., calls the top finish for cement floor which it lays a "granolithic" finish, and it advises using one part of Portland cement, one part of stone, from $\frac{1}{2}$ in. down, and one part of sharp sand. The stone should contain no dust and the sand no grains which will pass a 50-mesh sieve, and should preferably have grains of such size that they will range between 20 and 30 mesh. This material is mixed as dry as it is possible to work it, spread on the floor, struck off level by means of screeds or strips, and after the initial set the surface is troweled smooth by an expert workman. Generally the floor is put down in two layers, the first being troweled hard on the underlying cement slab so as to rub it into intimate contact with the slab and eliminate any possibility of voids. The second layer is then struck off level with the screeds, allowed to take its initial set and then troweled to a smooth surface. The troweling lays the grains of stone or sand in the surface flat so that they are in a position to take the wear. Troweling should be continued until a thin film of water appears on the surface, but the mixture should be so dry that it takes considerable troweling to accomplish this.

The tendency of all concrete workers is to hurry through their job, and a floor of this kind should be laid only by an expert who is willing to stay with it until the material has been sufficiently troweled and rubbed to a perfect surface.

This troweling of the floor to a surface after its first set reminds us of a curious experiment tried by a noted contractor in regard to the resetting of cement. He had a batch of cement mixed up in the morning, and made test briquettes from it at intervals of one hour throughout the next 12 hours. As the cement had passed its initial set it was necessary to break it up with a hammer and work it over before it could be gotten into the last briquette molds, but by thorough troweling this was accomplished. This series of briquettes was then put through the regular tests, and to his surprise the material which had been left 12 hours after mixing and then made into briquettes was the strongest. It is probable, however, that the mechanical work which had to be done to get this into the mold and make a good test piece had as much to do with its strength as anything else. The results of these experiments lead us to believe that it is possible that the long troweling has something to do with the making of a wear resisting surface.

When a surface of the kind mentioned is used on upper floors which are composed of concrete slabs and the top dressing put on before the slab has fully set, the entire

floor becomes one piece and the surface takes part of the compression, thus making it possible to use a thinner floor slab than would otherwise be necessary. As will be shown later, a wooden floor on top of a concrete slab is a dead weight and increases the burden which the supporting structure must bear, and hence necessitates heavier columns, girders and floor slabs. For this reason concrete surfaces for upper floors in factories are generally cheaper than wood.

In certain factories there is considerable complaint about dust arising from concrete floors. Under ordinary manufacturing conditions the amount of dust seems to depend inversely upon the quality of the floor. We know of factories which have been running for years with concrete upper floors which show very little wear and report no trouble from dust. On the other hand, in the case of poorly laid floors the dust is excessive.

Waterproofing Concrete Floors

Various compounds have been brought out for surfacing a concrete floor. In some cases we find them painted. This is expensive, however, as only the film of paint is presented to resist the wear, and as soon as it is gone we are back to the bare concrete floor proposition. Paint naturally grinds or wears out much more rapidly on a concrete surface than on a wooden surface. One of the best coverings in this class is pure linseed oil thinned with turpentine or naphtha. This will strike into the surface of the floor and form a more permanent protection than ordinary pigment paints. It will also render the floor waterproof. As a rule in the case of a well surfaced concrete floor the troweling makes it practically waterproof at all points except the joints of the floor slabs.

We know of cases in manufacturing establishments where glass is ground in which concrete floors have been used above the ground floor with a constant flow of water over them from the machines. These floors were made water tight by troweling the upper coat thoroughly. When cracks develop in such a floor they will have to be stopped with pitch.

Concrete Floors in Erecting Shops

Before leaving the subject of concrete floors it may be well to mention the fact that there are apparently great difference of opinion concerning the advisability of a concrete floor for an erecting shop. We believe that the efficiency of the concrete floor surface under these circumstances depends more upon the care taken in using it than upon its inherent virtues. For instance, in a plant erecting agricultural machinery, where castings weighing a few hundred pounds were dragged or bumped around the floor, the concrete was worn out rapidly, while in a very heavy work machine shop erecting water wheel appliances, gas engines and other machinery weighing many tons, the floor surface was in perfect condition. In this shop, however, when a heavy piece was lowered on the floor, they generally threw a couple of planks under it. In like manner, as the pieces were brought in by the traveling crane they were usually placed one upon another and were never dragged or rolled around on the floor. We may say that the reason this floor survived was that the men were not strong enough to bump the pieces around, and the cranes were handled in such a way that the surface of the floor was not dug up.

In like manner in a locomotive erecting shop we found a concrete floor doing excellent service. The locomotive, however, is erected on a pair of steel rails at the sides of the erecting pit, and many of the parts as they are brought in by the cranes never come into contact with the floor. Most of the pieces are so heavy that they are handled with cranes, and the floor had little to do but bear the weight of the men and minor parts or to support an occasional casting which was laid upon it. Where the floor is to receive rough usage, as in the first case mentioned, no surface better than a wooden block floor could be found.

Effect of Concrete on the Health of Employees

Referring to the objection to concrete floors on the ground of their effect on the health of the men, we believe that the underlying principles are generally mis-

understood. Inquiries have been made in many plants working both metal and wood and using concrete floors. In no case does the writer remember having found serious complaint from employees on the second or upper floors of a plant when the room below them was heated. The complaints usually come from the ground floor. We know that concrete is a very fair conductor of heat, and always feels cold to the touch if at a considerably lower temperature than the body. As already stated, the modern workman wears thin soled shoes, and if he stands for some time upon a cold concrete slab it will absorb the heat from his feet and conduct it away until it finally chills or numbs the feet or limbs. This results in an insufficient blood supply in the feet, and standing on the feet in this condition makes them sore. The complaint of its being damp and of the men getting rheumatism is generally due to the above mentioned causes more than to dampness. If the floor is damp, however, it will conduct heat more rapidly, and hence rob the body of heat faster and aggravate the conditions due to slow circulation in the limbs.

In erecting shops and other places where the men are moving about even on damp concrete slabs, very few complaints are heard for the reason that the exercise keeps up the circulation and overcomes the effect of the drain of heat from the extremities. Recognizing these facts the Morse Chain Company, Ithaca, N. Y., placed steam pipes in the concrete floors and heats the rooms from the floors.

The writer remembers only one complaint made on account of the effect of the hard surface of a floor upon the workman, and this was in the case of concrete stairways. The weight of the man in question was considerable, and he had charge of work on several floors, obliging him to go up and down concrete stairways many times a day. He had the habit of running down stairs, and the hard concrete surface jarred him and gave him trouble with his legs and back. He had the treads surfaced with maple plank, after which he had no more trouble.

It is true that concrete is somewhat harder than any other floor surface to which we are accustomed, with the exception of metal plates, and yet it does not seem to have any bad effect due to hardness of the surface, and when the slab is warmed we find but few complaints of any kind. If the slab is much colder than ordinary room temperatures it is advisable to place wooden slat floors, boards, rubber mats, or pieces of linoleum in front of machines where operators have to stand still for many hours, but generally in upper floors this is not necessary.

(To be continued)

The Michigan Stove Company

Reports submitted at the annual meeting of the stockholders of the Michigan Stove Company, held in Detroit, January 31, show a 10 per cent. gain in the business of 1910 over 1909, though operating expenses have been considerably higher. The regular annual dividends of 7 per cent. on preferred and 4 per cent. on common stock were declared, both payable February 1. A total of \$172,000 was thus distributed, \$112,000 to the holders of preferred and \$60,000 to the owners of common. The preferred stock amounts to \$1,600,000 and the common to \$1,500,000.

The officers were re-elected, as follows: President, Jeremiah Dwyer; first vice-president and general manager, George H. Barbour; second vice-president and secretary, Charles A. DuCharme; treasurer, Edwin S. Barbour; corresponding secretary, Harry B. Gillespie; sales manager, Louis B. Young. They will act with the following directors on the Board of Directors: Merrill B. Mills, C. B. DuCharme, Francis Palms, Charles L. Palms and Emmet Dwyer.

George H. Barbour takes a most hopeful view of the coming year, believing that results of the year's business will be equally as good as last year, if not better.

Additions to the Laidlaw-Dunn-Gordon Plant

Interesting Features of Two Recently Completed Structures

Some additions at the plant of the Laidlaw-Dunn-Gordon Company, Elmwood place, Cincinnati, Ohio, have recently been completed. The chief of these are the ex-

further. A 10-ton Toledo crane has been installed to take care of the addition. Another special feature of the plant is the location of the superintendent's office in the center of the building, which gives him a practically unobstructed view of the entire foundry department.

The addition to the erecting shop, shown in Fig. 2, is 120 ft. wide and 298 ft. long, with a gallery on each side for storing small parts and supplies. This building is used as an assembling and shipping department and a loading track extends its entire length. This part of the shop is served by a 20-ton Toledo crane, which in con-



Fig. 1.—The Foundry.



Fig. 2.—The Erecting Shop.

Two Views of the Additions to the Plant of the Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio.

tension of the foundry building, shown in Fig. 1, and an addition to the erecting shop, illustrated in Fig. 2.

The original foundry building covered an area of 120 x 198 ft., and the new structure adds 162 ft. to this. In the addition a platform with a grated floor has been installed covering a sand pit 45 ft. square. This platform is shown directly under the crane in Fig. 1. Two Mumford & George jarring machines are located in the center of this platform, and are claimed to reduce the labor cost as compared with the former process of hand ramming over 50 per cent. It is the intention of the company ultimately to put in a system of conveyors and elevators so that the sand will be automatically carried up into overhead bins and thus lower the labor cost still

nection with the track arrangement has reduced the loading cost of heavy machinery to a comparatively low figure.

As will be noticed from both of the views, the buildings have ample headroom and plenty of light. Geering Bros. & Co., Cincinnati, Ohio, installed the heating system in both of these structures, which in common with the rest of the additions are of brick and steel construction.

The Princess Furnace Company, Glen Wilton, Va., will blow in its furnace, which has been undergoing extensive repairs, in the latter part of February.

The Detroit Stoker

A New Automatic Coal Feeding Device

At the present time the tendency toward the use of boiler units of large capacity instead of installing a number of smaller ones in power plants and the more general use of coal handling machinery is increasing. This has led the Detroit Stoker Company, Detroit, Mich., to bring out a new type of automatic stoker in which reciprocating feed has been substituted for the worm conveyor type that has now been manufactured by this com-

pany during construction. A rear view of the coal magazines is given in Fig. 4. Fig. 5 is a front view of the older type of stoker equipped with worm conveyor feed, and Fig. 6 shows the fire brick arch raised for the insertion of a coking plate.

In selecting a stoker for any particular kind of service it is necessary to take into consideration the kind and the quality of coal available, whether sufficient nat-

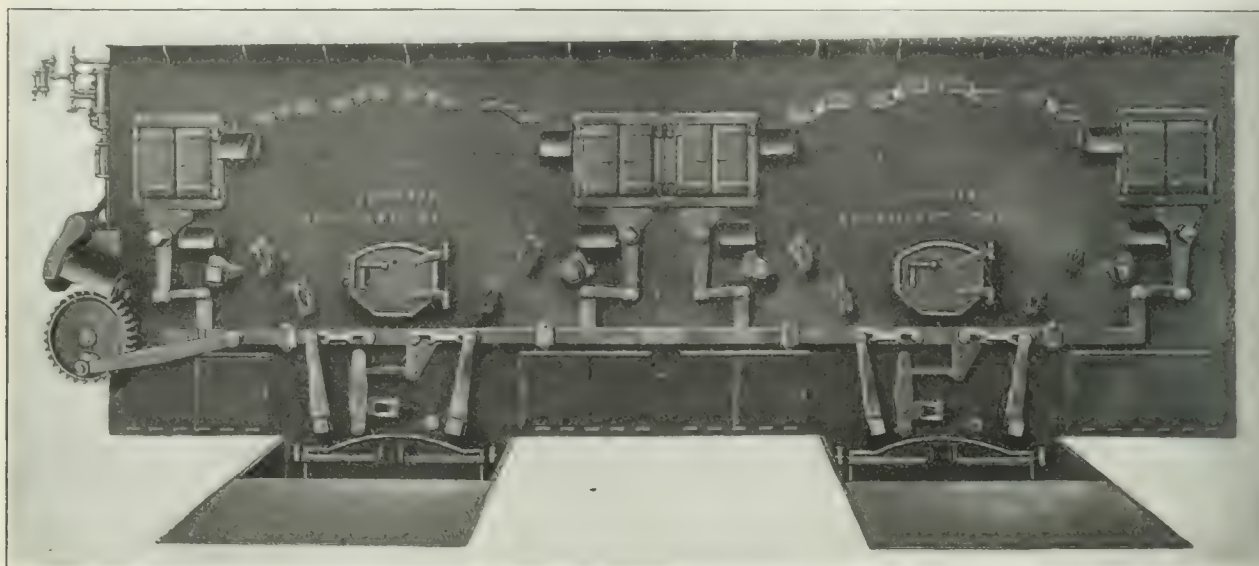


Fig. 1.—Two Stokers with Reciprocating Feed Made by the Detroit Stoker Company, Detroit, Mich.

pany for a number of years. The new stoker operates with natural draft which is claimed to be more economical than the mechanical forced draft system. A large coking surface which is nearly twice the width of the boiler is one of the most important features of this new stoker. The fuel is fed continuously and uniformly into the furnace, and, as the admission of the hot air is under control, it is possible to maintain perfect combustion, even even though low grades of coal are consumed. In this way the problem of smokeless combustion is solved and smoke-free stacks assured. It is stated that when properly installed this stoker will carry a heavy overload

ural draft can be furnished to burn the amount of coal necessary to produce the steam required during the maximum operating period, the load variation and the length of time the plant is operated at its lowest capacity. All of these points are important factors in a successfully and economically operated boiler plant and should be carefully considered. When properly burned bituminous coal will not produce smoke provided the proper equipment is installed in accordance with modern ideas. The gases produced by combustion must be slowly and uniformly distilled and immediately brought in contact with heated air and in proper proportion to the rapidity with which the fuel is burned. The average saving effected by proper firing as contrasted with the ordinary methods of hand firing with unskilled labor varies from 10 to 20 per cent., according to local conditions, cost of

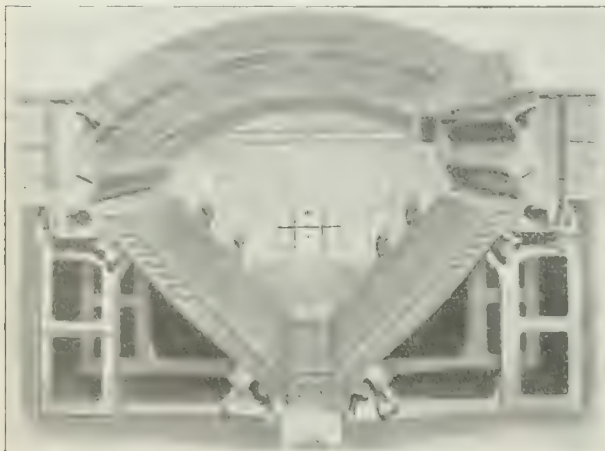


Fig. 2.—The Double Fire Brick Arch of the Stoker.

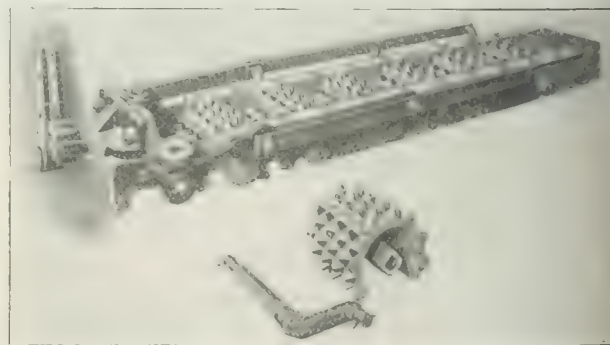


Fig. 3.—The Device for Crushing Clinkers.

without smoking, and, as it is very flexible for varying loads, large momentary or peak overloads can be taken care of. Fig. 1 shows two of the stokers with reciprocating feed connected together to form a single unit. Fig. 2 is a view of the double fire brick arch, while Fig. 3 illustrates the device employed for crushing the clinkers

coal and the amount of steam required. In large installations where overhead coal bunkers and handling devices are installed and operated in connection with the automatic stoker this figure is largely increased.

The Detroit stoker is driven by an automatic engine of approved design and very heavy construction. An

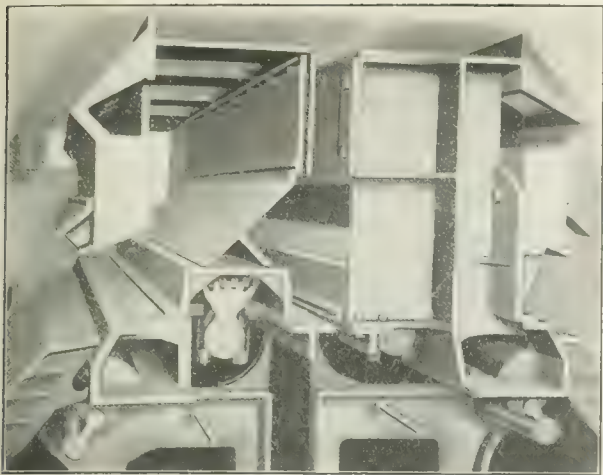


Fig. 4 - A Rear View of the Coal Magazines.

automatic flywheel governor regulates the speed of the engine and stoker to suit conditions. This device is said to be a decided improvement over the old style of throttling governor, which was uncertain in speed control and not economical to operate. For single boilers or batteries of two small units the single cylinder engine is used, while for larger installations the double cylinder engine is used. The engines are noiseless in operation and can be furnished completely hooded. When so desired the stoker can be operated with a variable speed motor. All worms and gears are protected by guards, which render them safe to operate, and at the same time insure clean and constant lubrication. Fig. 1 shows a front view of two stokers with reciprocating feed and the operating bar and connections.

The double arch of special fire brick used in the construction of the stoker is illustrated in Fig. 2. Air is admitted through several openings in the boiler or stoker front and after being preheated between the two arches passes through the sectional arch supports into the furnace. The coal as it passes through the magazine is distributed along the coking plate at the upper sides of

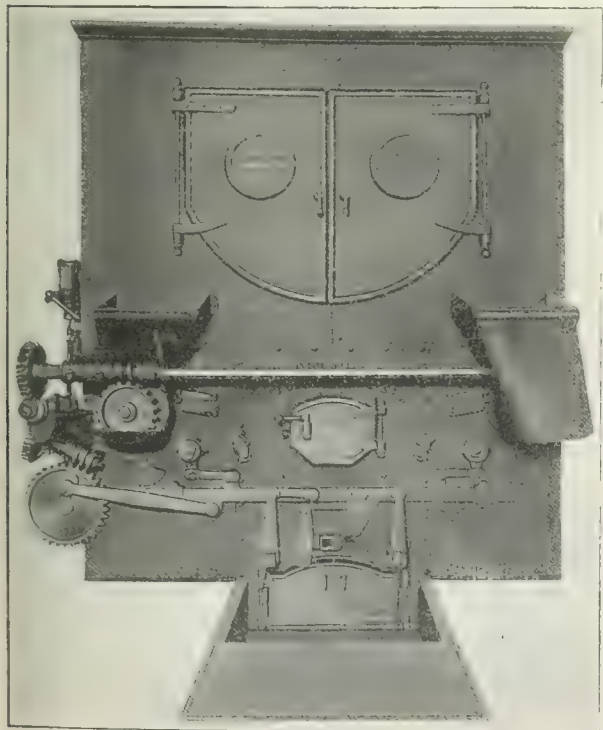


Fig. 5 - A Front View of a Stoker Equipped with Worm Conveyor Feed.

the furnace by the pusher boxes. The gaseous hydrocarbons are released here and mixed with the heated air, which is admitted in proper proportion to produce complete combustion. After the volatile matter passes off the fixed carbon or burning coke is forced slowly down

the inclined grates by the movement of the vibrating grate and is entirely consumed by the time it reaches the clinker crusher, which does away with the clinkers and the ashes as fast as they are formed.

The clinker crusher, which is shown in Fig. 3, is composed of a row of heavy cast iron disks, 10 in. in diameter. These are connected with the front driving bar and rotate alternately toward and from each other, crushing the clinkers and depositing them in the ashpit. The grinding motion of the disks makes them easily operated and the clinkers are readily crushed. The speed of the clinker crusher can be easily regulated during the operation of the stoker, according to the volume of ash and clinker in the fuel. Each crusher disk can be readily replaced, when burned or broken, without disturbing the others. This makes it convenient to handle and reduces the cost of repairs. The exhaust from the engine operating the stoker is discharged between the clinker crushers at regular intervals to cool them and to make the clinkers easy to grind.

The pusher boxes are operated by a shaft extending through the front of the stoker and connected with removable links to the operating bar. A rear view of two coal magazines with reciprocating feed is given in Fig. 4. the left side showing the interior and operation of the pusher boxes with sectional segment gears and coking



Fig. 6 - The Fire Brick Arch Raised for the Insertion of a Coking Plate.

plate. If the coal is shoveled into the magazines by hand through the front the movable slides at the top may be closed. The right side shows the air passage under the coking plate, the rear fire brick wall forming an inclosed air chamber.

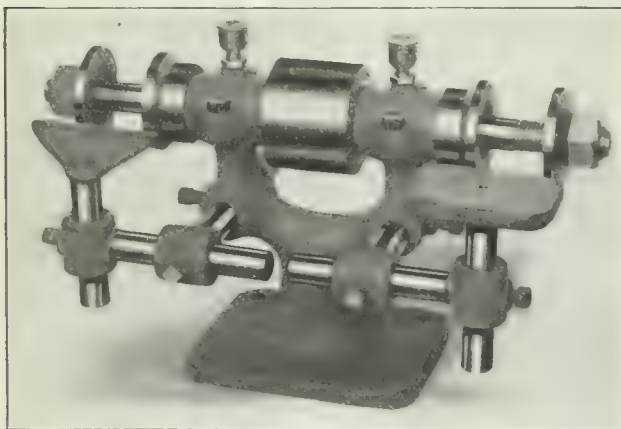
The grate bars are of two kinds, vibrating and stationary. The movement of a vibrating grate bar between the stationary ones eliminates the necessity of poking the fire, which would have a tendency to produce smoke. Each alternate grate bar is operated by the driving bar in front, and may be disconnected when a non-coking or free burning coal is used. The movement of the vibrating grates prevents clinkers from forming on the bars, and at the same time moves the bed of the fire down toward the center of the furnace. An entirely new feature of the Detroit stoker, which it is claimed is not found in any other stoker of its type, is the fact that the two types of grate bars are entirely independent of each other, making it possible to remove and renew any grate bar without disturbing any of the others. The vibrating grates rest on a bar at their upper end, so that they can be vibrated from the top as well as from the bottom. This feature, which, it is said, is not contained in any other stoker, makes it possible to loosen up the fire quickly in response to a demand for more steam, and does away with a large amount of poking. The vibrating bars move slowly, merely loosening up the fuel in the fuel bed for the admission of air. The stationary grate bar is constructed with deep flutings, so designed as to do away with an appreciable amount of sifting of unconsumed fuel, which was an objectionable feature in earlier designed stokers of this type. The large cooling surface on the grates and the admission of

air under the coking plates prolongs the life of the equipment.

The worm conveyor type of Detroit stoker is designed for small plants, especially when the coal is to be shoveled into the hoppers from the floor by hand, and is usually used when the floor space will not permit of the Dutch oven setting. A front view of the stoker with worm conveyor feed is shown in Fig. 5. This type is furnished either with or without the upper half boiler fronts for horizontal tubular boilers, or lower half fronts for water tube boilers. On the sides of the stoker front are the hoppers, which may be filled either by hand or coal handling machinery. From these hoppers, which have a capacity of 400 lb. each, the coal is fed into the magazines continuously by ball bearing worm conveyors. The magazines are in one piece, thus preventing the fine coal from sifting through into the ashpit. The gears operating the worm conveyors are continuously lubricated by running in oil, and are covered with shields, which keep them free from dust and dirt. The coal conveyors have a front end thrust ball bearing, are operated by the upper shaft in front at a slow speed and distribute the coal evenly at the upper end of the inclined grates on a coking plate, as is shown in the rear view under the temporarily raised arch brick in Fig. 6. Either one or both conveyors can be thrown out of commission during operation by disconnecting the clutch gears from the small lever in front of the hoppers, thus regulating or stopping the feed on either one or both sides of the fire, as the conditions may require, while the operation of the grates and the clinker crusher continues. By removing the hopper head the conveyor can quickly be taken out or replaced. The clinker crushers and the grates are designed and operated the same as in the stokers having the reciprocating feed.

The North Wales 8-In. Grinder Head

A new type of grinder head is being manufactured by the North Wales Machine Company, Inc., North Wales, Pa. This tool is intended to mount two grinding wheels, one at either end of the spindle, having a maximum diameter of 8 in., a face 1 in. wide and a center hole $\frac{3}{4}$ in. in diameter. Long dustproof bearings, which are split on one



A Belt Driven Grinder Head Made by the North Wales Machine Company, Inc., North Wales, Pa.

side and capped, are used. The caps have liners and are held in place by hexagon cap screws. The spindle is 14 in. long and $\frac{7}{8}$ in. in diameter in the bearings, which are $\frac{3}{4}$ in. long. The pulley driving the spindle is $2\frac{3}{4}$ in. in diameter and its face is $2\frac{3}{8}$ in. wide. The diameter of the spindle between the grinding wheel flanges is $\frac{3}{4}$ in. and the distance between these flanges is $1\frac{1}{4}$ in. The tool has knuckle jointed rests, with bored, turned and polished knuckles.

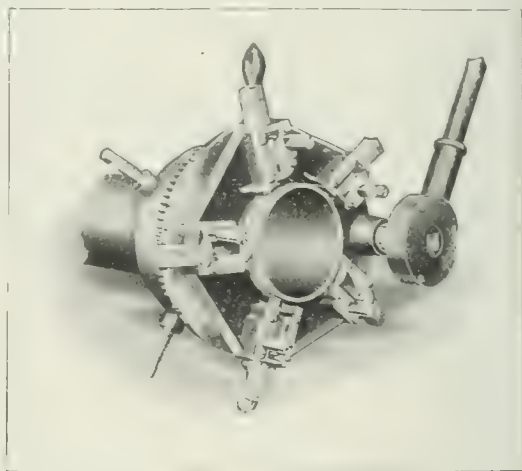
Swedish Tool Steel Agencies.—The Söderfors Bruks Aktiebolag (Söderfors Works, Ltd.) of Falun, Sweden, for which company Horace T. Potts & Co., Philadelphia, Pa., are the general sales agents for the United States, has found such a growing demand for its fine Swedish tool steels, both Rekord high speed and Soderfors Best,

and other carbon steels, Paragon Swedish solid steel anvils, &c., that it has become necessary to arrange for stocks in different parts of the country. C. A. Gridley has been appointed sales agent for New England and is carrying a full line of all grades of tool steels, anvils, &c., at 251 Causeway street, Boston, Mass. For Chicago territory Kent & Simpson, 317 South Clinton street, Chicago, are selling agents for the company's tool steels, and also keep a full stock of all grades.

New Toledo Pipe Threading Tool

A new pipe threading tool has been placed on the market by the Toledo Pipe Threading Machine Company, Toledo, Ohio. This is a new type and size and cuts threads ranging from $2\frac{1}{2}$ to 6 in. with one set of dies. It was brought out to supply the demand for a tool between the No. 2 and the No. 3 threading tools made by this company and is known as the Toledo No. 25.

Simplicity characterizes its construction and is an important feature. The only loose parts are the ratchet handle and the driving cross, which are the two means



The No. 25 Pipe Threading Tool Made by the Toledo Pipe Threading Machine Company, Toledo, Ohio.

furnished for operating the tool. The customary cam plate construction is not employed. Recourse is had to the taper pin principle for making the dies recede. The dies are shifted easily and positively by hand. In changing the position of the dies a spring bolt engages a rack that in turn engages a taper pin providing the receding motion for the dies. This, it is claimed, produces an ideal thread. Two sets of dies are furnished and when one becomes dulled they can be removed from the die holder and reground while the other set is substituted.

The Philadelphia Foundrymen's Association

The regular monthly meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club on the evening of February 1, Vice-President Dr. Elmer E. Brown occupying the chair. The committee on the "Yankee Party," attending the annual dinner of the New England Foundrymen's Association, January 11, made its report through Dr. Brown. All who participated commended highly the hospitality and good cheer extended by the New England Association. The application of the American Pattern Company, Philadelphia, represented by W. W. Parry, for membership in the association was favorably acted upon.

The paper for the evening was on "Arc Lamps, with Special Reference to the Flaming Arc," by K. A. Albrecht, New York City. Mr. Albrecht illustrated by lantern slides various types of arc lamps, showing the development of the flaming arc type and also exhibiting several flaming arc lamps of the types used in foundries, machine shops and other places of large area, difficult to illuminate. The author was given a vote of thanks. After adjournment a luncheon was served in the dining room of the club.

The Noyes T Square

To effect a saving in the amount of time and labor required to make drawings and to enable any desired size of drawing to be made without causing the draftsman to stoop over, the Emmert Mfg. Company, Waynesboro, Pa., has designed the Noyes vertical or horizontal T square. This instrument gives the draftsman in one self-contained unit a combination of the usual T square with scales and triangles, thus reducing the number of moves he must make in laying out a drawing to the smallest possible number, while at the same time an outfit is provided which enables him to make full size drawings of almost any size of machine while either sitting or standing, without bending over the drawing table. Another great advantage of this instrument is that it is possible to make full size drawings of large machines both accurately and conveniently, which is an advantage to the designer, as it assists him in getting the proper proportions, secures accuracy and enables him to locate the operating mechanism so as to have it handy and within easy reach. Fig. 1 shows the T square and Fig. 2 is a view showing its use on a vertical board.

The essential part of this instrument is a vertical T square, combined with a vertically adjustable protractor, which carries interchangeable scales, the whole being guided by a steel track. As will be noticed from Fig. 1, the head of the T square consists of a steel plate having a set of four rollers, which ride upon a straight steel track. This track is fastened at the top of the drawing board either to the board itself or to an independent strip, if interchangeable boards are used. The traveling head cannot become detached from the steel track, but can be easily removed at either end. One pair of rollers is beveled and runs upon ball bearings. These bearings are so arranged that the weight of the head, the T square and the protractor holds the upper rollers against the track, thus making possible a free and sensitive movement.

The weight of the protractor is counterbalanced in either one of two different ways. In the smaller machines a silk line is wound upon a spring balanced drum, the tension of which is easily changed to suit the angle of the board. The spring in the drum operates only under tension, and when the drum reverses it releases automatically to prevent breakage. In the larger machines which are intended for use on vertical or vertically inclined boards a sliding weight operating upon the brace of the T square serves to counterbalance the weight of the protractor and the scales. The line is attached to the former, thus aiding to hold it against the T square and counterbalance its weight.

Two rollers guide the protractor and are aided by two additional ones held against the T square by a ten-

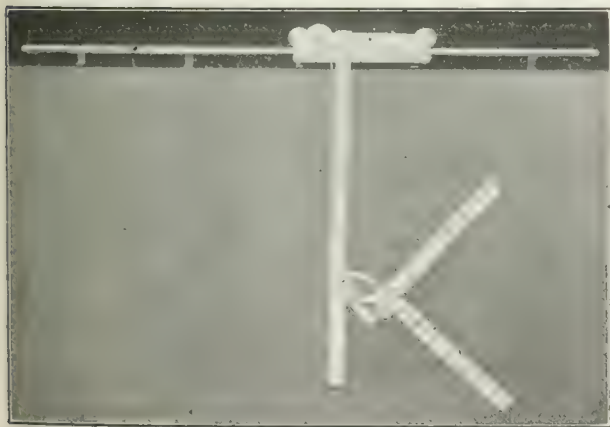


Fig. 1.—The Noyes Horizontal or Vertical T Square Made by the Emmert Mfg. Company, Waynesboro, Pa.

sion spring. In this way the protractor is held firmly against the blade by tension, but can be readily detached for joining points at no special angle. It is also very stiff against any spring from the blade or downward movement. This combination of protractor and T square

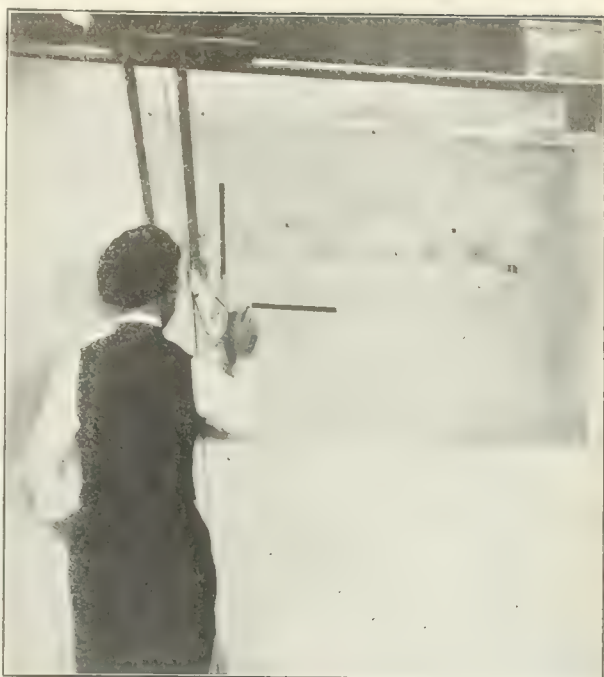


Fig. 2.—View Showing the Use of the Square.

provides for accurate vertical and horizontal motion. A forked arm is pivoted to the sliding protractor and carries the interchangeable scales which are attached to it at right angles to each other. A worm, which is shown in Fig. 1 at the left of the junction of the two scales, is also mounted on this arm. The worm engages notches cut on the periphery of the protractor, which are spaced 3 degrees apart, thus making the instantaneous setting of the protractor to any multiple of 3 degrees possible. An adjustment of this nature is being made in Fig. 2. It is also possible to lift the worm out of mesh with the protractor easily and quickly. The notches on the periphery of the protractor are spaced $\frac{1}{2}$ degrees apart, as this includes all the angles most commonly employed, such as 15, 30, 45, 60, 75 and 90 degrees, while at the same time the 3-degree angle is convenient, as it is not only the common draft given to patterns, but can also be used to represent the conventional angle of screw threads. The neck of the worm is graduated in 12 divisions, each representing 1-12 degree, which gives as fine an adjustment as is ever needed in drawings. Other desired graduations can be obtained by the use of interchangeable scales.

In operation the instrument is held between the thumb and the first or second finger of the left hand, which is the natural position for vertical movement along the blade of the T square or horizontally along the track. When making settings for any desired angle the worm is thrown out of engagement by the right hand, as shown in Fig. 2, and the scales swung until the pointer indicates the proper angle. If no particular angle is required and it is simply desired to join two points, the protractor is swung far enough to the left to disengage it from the blade when it can be moved to any desired position.

The use of the instrument is by no means confined to the vertical position, as it is equally suitable for use on smaller boards in the ordinary horizontal or inclined positions which gives it the name vertical or horizontal. One of the greatest conveniences is the fact that it may be used on vertical board to do away with the inconvenience of holding triangles, scales, &c., as all these instruments are combined in one. In this way the advantages of the vertical board are made available, and, owing to the vertical position of the square, it may be made much shorter than when it is guided from the left side of the board, which insures greater accuracy.

It is stated that the total cost of power, labor, furnace upkeep, general expense and electrodes necessary for the operation of the Girod electric furnace at the Cockerill Works, at Seraing, Belgium, is under \$4 a ton. The output consists of steel for tanks, locomotive tires and car axles.

Diamond Boiler Repair Bolts

In the past it has been impossible to repair boilers where corrosion has occurred in spots, and caused leaks to develop. Soldering would not do any good, as the expansion and contraction of the metal as it was alternately heated and cooled prevented the solder from adhering. To enable permanent and satisfactory

100 lb. of melted metal and in some cases this figure has been reduced to less than 4 cents.

The construction of the furnace is such that it can be easily cleaned after operating. There are no grate bars to get out of order, and it is not necessary for men to start the furnace one or two hours before the regular time in order that it may be in condition for the day's work. It is also stated that the furnace is much cooler than any other device for melting metal. Less than

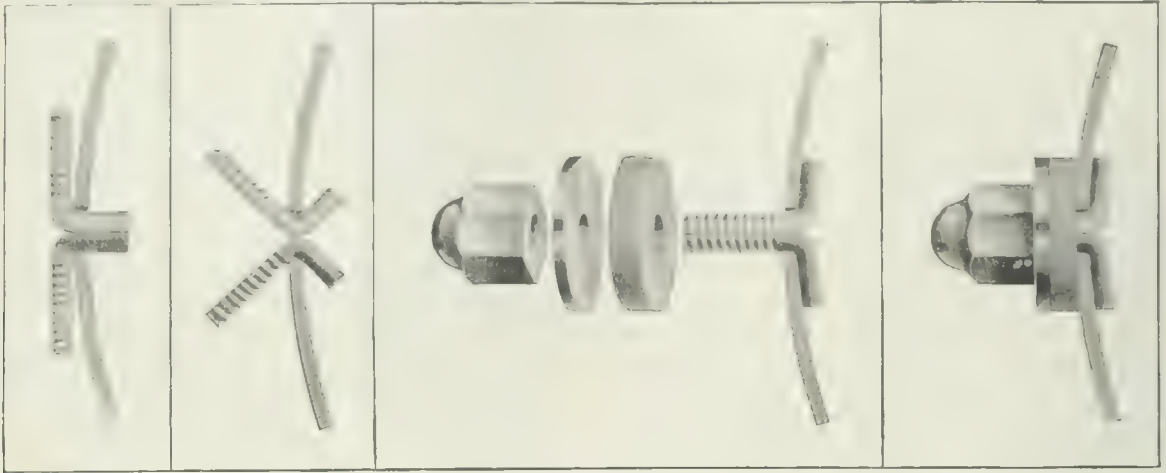


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Successive Stages in Repairing Leaky Boilers with the Diamond Boiler Repair Bolt Made by the Diamond Expansion Bolt Company, New York City.

repairs to be made the Diamond Expansion Bolt Company, 90 West street, New York City, has developed a boiler repair bolt.

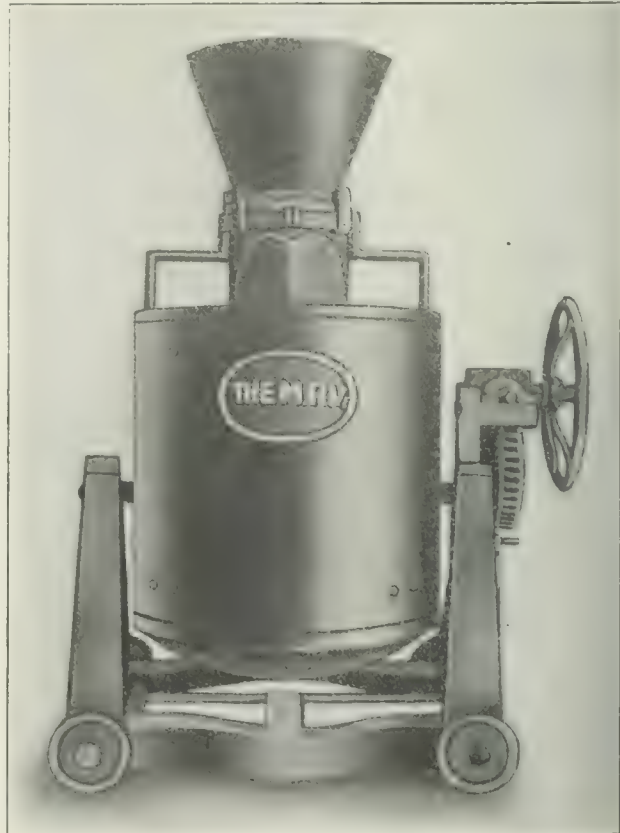
In use the operation of this bolt is very simple. The hole is first reamed out to the proper size, and a Diamond bolt, which is a separable T bolt, is inserted, as shown in Fig. 1. In Fig. 2 the bolt is illustrated, with the two halves separated, as it is being put in the proper position to stop the leak. After the threaded portions of the bolt have been brought together a hard rubber washer is placed over the bolt and against the shell of the boiler. A steel washer comes next, and finally a bonnet or cap nut is screwed down tightly upon them. The various washers and the cap nut are shown in relation to each other in Fig. 3, and Fig. 4 gives an idea of how the completed repair looks.

The M. R. V. Brass Melting Furnace

A new crucible tilting type brass melting furnace is being manufactured by J. B. Wise, Watertown, N. Y. The special advantages claimed for this furnace are rapidity of production, economical operation and a reduction in the amount of metal wasted.

In its construction it is a combination of the old style pit fire put in portable form and using coke as fuel, with a crucible for holding the metal. This is said to result in a new crucible type furnace, having all the advantages of the old style pit fire, with none of its disadvantages. An air blast operating at a pressure of less than 2 oz. per square inch provides for combustion, and the reduction of metal is very rapid, a heat of 440 lb. being easily taken off in one hour after the first heat. After the metal has melted to the proper point the air is shut off. This eliminates one of the disadvantages of the pit fire, which causes the metal to be oxidized by the natural draft of the chimney if for any reason the metal is not poured at once after being brought to the proper heat. The combustion is said to be so complete that the amount of refuse after a day's work will not exceed a small wheelbarrow load, and as the amount of fuel necessary to run six or eight heats a day is less than 500 lb., the objectionable feature of using coke for fuel on account of the space occupied and the time required to charge the furnace is practically eliminated. The manufacturer guarantees that the fuel cost will not exceed 5 cents per

½ hp. is required to supply the air for operating the furnace. If the crucibles are properly treated before being placed in the furnace and ordinary good care is taken of them in operation their life is very long. The average number of heats obtained by users is in excess



The M. R. V. Crucible Tilting Type Brass Melting Furnace Made by J. B. Wise, Watertown, N. Y.

of 70, and at the plant of the Nelson Valve Company, Chestnut Hill, Pa., 135 heats were obtained from one crucible. Tests made on metal melted in this furnace showed a tensile strength of 10,000 lb. per square inch over brass melted in an oil fired furnace.

The Pels Deep-Throated Power Punch

A recent installation of a deep-throated power punch made by Henry Pels & Co., 90 West street, New York city, was in the tender department of the Baldwin Locomotive Works, Philadelphia, Pa. Fig. 1 shows the operating side of the tool, while Fig. 2 is a rear view. Aside from the exceptionally deep throat the tool possesses some unusual features, such as an economical consumption of power, light weight and an exceptionally narrow frame.

As will be noticed from the engravings, the driving, as

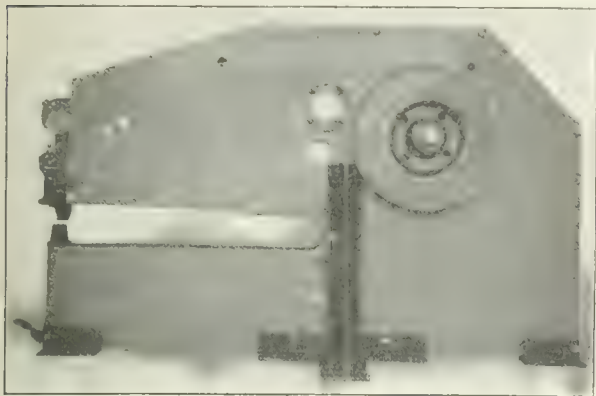


Fig. 1—Operating Side of a Deep-Throated Power Punch Built by Henry Pels & Co., New York City.

well as the operating mechanism, is located parallel with the frame, and the ram is actuated by a powerful lever instead of the customary crank shaft. This feature results in a saving of a considerable amount of power, as a 4-hp. motor is all that is needed to operate the punch when working at its maximum capacity. The ram actuating lever and the connecting links are steel forgings and cast steel is used for the main gears, which, together with its pinion, is protected by gear guards. The long lever at the right of Fig. 2, which enables the operator to raise or lower the ram at will, without starting the machine, and permits him to locate work under the punch, is another feature worthy of special mention. The power may be thrown in by either hand or foot, as shown in Fig. 1, the hand lever being located on the ram housing, where the wire cable terminates.

The entire absence of noise or vibration, coupled with its light weight, 22,000 lb., is a decided advantage. In this particular instance the punch was located on the third floor, which is rather unusual for a tool of this size, the general location being on the ground floor. All

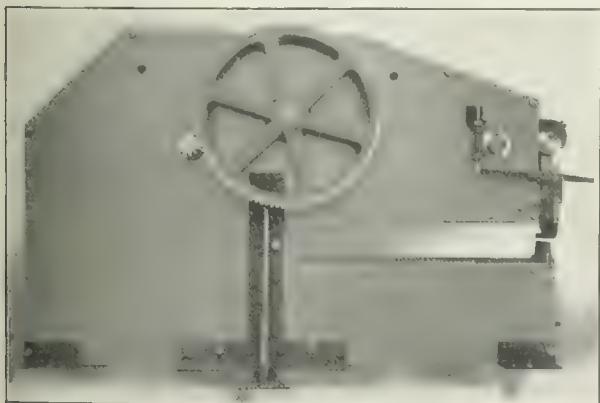


Fig. 2.—Rear View of the Punch.

the movements of this machine take place with great precision and smoothness.

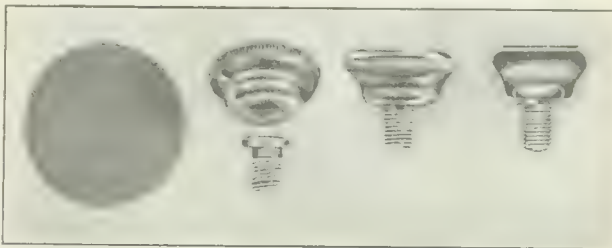
Like the combined punch and shear which was illustrated in *The Iron Age* December 29, 1910, and the other machines manufactured by this company, its frame is constructed of rolled steel plates, and, with the exception of the flywheel and a few insignificant parts, no cast iron is employed. This steel possesses a tensile strength of 90,000 lb. per square inch, and by its use the designer

was enabled to construct an exceptionally narrow and comparatively light frame without sacrificing the usual factor of safety in the least. This very narrow frame combined with the exceptionally deep throat enables any size of sheet to be handled without many changes of positions, and is said to have resulted in some very interesting rapid punching at the Baldwin plant. The punching capacity of the machine is a hole 1 in. in diameter in 1-in. material and its depth of throat is 72 in. The overall length is 12 ft., the maximum height 9 ft. and the extreme width over the brackets on the base 5 ft. This type of punch is manufactured in a variety of sizes and styles, both larger and smaller, and also with varying capacities. In the construction of the punch the manufacturer has taken care to look after practically every detail. The dustproof bearings are of ample proportions, and are lined with carefully fitted bearing metal. Grease cups furnish the necessary means for lubrication, and for handling the machine itself two holes have been located in the upper part of the frame.

The Hart Hollow Cap Screw

The H. C. Hart Mfg. Company, Unionville, Conn., has brought out a type of hollow drawn cap screw which weighs about half as much as the old solid head type. This screw is made in four sizes in both steel and brass for use in the manufacture of small tools, automobile dry batteries and various other articles.

The successive stages in its manufacture are clearly shown in the accompanying engraving. A circular piece of metal is cut as shown at the left, and is cupped into a hollow shell with a square hole punched in the base.



Successive Stages in the Manufacture of a Hollow Cap Screw Made by the H. C. Hart Mfg. Company, Unionville, Conn.

The upper part of the shell is next cupped down and knurled. After this a screw with a square shoulder is inserted in the hole and swaged securely in place. The two parts of the cap screw are shown next to the left end, the third view to the right shows the completed screw, and the one at the extreme right is a section showing how the screw is kept in place in the head.

The Sullivan Machinery Company Makes Some Changes.—The Sullivan Machinery Company, 150 Michigan avenue, Chicago, announces the appointment of Howard T. Walsh as manager of its London office. J. C. West, sales engineer at the company's general offices for the past 10 years, replaces Mr. Walsh as Pacific Coast manager. The San Francisco office of the company is now at rooms 308-309 Sheldon Building, 461 Market street. A branch office has been opened in the Hutton Building, Spokane, Wash., with Austin Y. Hoy in charge, who will represent the company's interests in the Northwest. Stocks of Sullivan machinery will be carried as at present in Seattle, Wash., and Nelson, British Columbia, by the United Iron Works and the Nelson Iron Works, respectively. A large stock of machinery will also be maintained at Spokane. The company further announces that it will hereafter carry a stock of air compressors, rock drills and hammer drills with the Wallace Supply Company at Wallace, Idaho, for the benefit of the mines in the Coeur d'Alene district.

The Engineers' Club of Philadelphia has elected the following officers for the coming year: President, James Christie; vice-president, W. L. Plack; secretary, W. Purves Taylor; treasurer, F. H. Stier. •

New Tools and Appliances

This is essentially a news department for which information is invited.

Metal Scrap Shear.—The Danville Foundry & Machine Company, Danville, Pa., is building a portable shear for cutting scrap material, which is mounted on a four-wheel truck for moving about. Ten-inch knives are used which have four cutting edges, thus making one set really equivalent to four. The capacity of shear is $1\frac{1}{2}$ in. for round iron and soft steel and $1\frac{1}{4}$ in. for square material. Cut gears are used throughout with the exception of one on the crank shaft. A $\frac{1}{2}$ -hp. electric motor, which forms an integral part of the equipment, drives an intermediate shaft through gears, and this shaft in turn transmits power to a crank shaft connected by a pitman to the movable shear.

A 24-In. Planer.—The Putnam Machine Company, Fitchburg, Mass., has developed a motor driven planer for handling work 24 in. square. The construction of the table is heavy with large pockets at each end. Three T-slots are provided as well as the ordinary reamed bolt holes. The trip latch on the shipper dog permits the table to pass without changing the position of the dogs. The traverse of the head is 10 in., and the adjusting screw has a micrometer dial. Work from 5 to 10 ft. in length can be accommodated by the various sizes of tool.

Metal Sawing Machine.—A cold sawing machine for rapid and accurate cutting of all sizes of stock up to 3 in. in diameter has been placed on the market by the Taylor-May Machine Company, Rochester, N. Y. The spindle which is 3 in. in diameter at the large end is driven through bevel gears and a worm and worm wheel from the driving pulley. It is pack hardened and ground, and runs in taper bearings which are adjustable to compensate for wear. The machine is regularly equipped with a semihigh speed steel saw, but saws made of any particular brand can be supplied.

Attachment for Cutting Key Ways.—The Ritter Machine Company, Sedalia, Mo., is making a drill press attachment for cutting key ways, hand milling, &c. In operation the work is secured to the slide which is clamped to the drill press table, while the body of the attachment is fastened to the quill of the machine. The cutter arbor of the attachment is driven through a train of gearing from a bevel gear mounted in the end of the drill press spindle.

Lathe Taper Turning Attachment.—The Willard Machine & Tool Company, Cincinnati, Ohio, is applying a taper attachment to its engine lathes when so desired. This attachment is mounted upon a bracket, which is secured to the back of the carriage, and has a dovetail guide along which the adjustable taper bar can be slid to suit the various pieces of work handled. This bar swivels on the bracket, and the final adjustment in setting is effected by a screw having a knurled knob. The movement of the cross slide is controlled by a shoe which slides along the bar. Graduations at the end of the attachment permit it to be set for tapers either in inches per foot or degrees, the maximum being 3 in. per foot or an angle of 22 degrees.

Double Spindle Grinder or Polisher.—A recent product of the Osborn Mfg. Company, Cleveland, Ohio, is a grinding or polishing machine provided with two independently driven spindles, thus making it practically two machines in one. This construction makes it possible for two operators to use the machine simultaneously without interference, as the independent drive enables one to change the wheel or stop the machine while the man on the other end continues his work. The machine is adapted for polishing and buffing of large work and more especially that of stove manufacturers. The construction is strong throughout and $1\frac{1}{2}$ -in. round steel spindles are used. A special feature of the machine is that the front leg bends inward, providing standing room and increasing the rigidity of the tool.

Multiple Spindle Drilling Machine.—To produce a machine capable of handling a class of medium weight work such as automobile engine bases and similar parts, the Fox Machine Company, Grand Rapids, Mich., has redesigned its No. 3 multiple spindle drilling machine.

The driving pulleys are located in the rear of the base and transmit power to a single pulley at the top of the column that drives the drill spindles through a change gear mechanism. This location of the main driving pulley reduces vibration when drilling to a minimum. The drill speed changes and the feed changes for the drilling table, of which there are four and six respectively, are obtained through a system of sliding gears. An extra tall column has been used with this machine to permit high jigs to be clamped to the table, and the maximum distance from the table surface to the under side of the head is 43 in., the travel of the table being approximately 13 in. less. The main bearings are of a bronze composition and have ample means for lubrication. The principal gears are of chrome-nickel steel with broad faces and those in the head are incased and run in an oil bath. Drill spindles and bearings of special construction are employed which permit holes to be drilled at the same center distances as the diameter of the drill spindles. The dimensions of the drill table are 17 x 22 in. and the drill heads can be furnished in either round or rectangular shapes for drilling from $8\frac{1}{2}$ -in. to 24 3-16-in. holes in either aluminum, cast iron or steel. The floor space of the machine is 30 x 72 in. and its overall height is 92 in.

Trade Publications

Corliss Engines.—The Watts-Campbell Company, Newark, N. J. Catalogue. Devoted to a line of Corliss engines which are built in 26 sizes, ranging from 50 to 700 hp. The special features of these engines are illustrated and described in detail and there are a number of engravings showing the various sizes and styles of engines.

Woodworking Machinery.—The Hermance Machine Company, Williamsport, Pa. Pamphlet. Lists a number of woodworking machines, including planers and matchers, single and double surfacers, molders, stickers, mortisers, tenoners, sash and door clamps, rip and swing saws and combination saws and dado machines. In the make-up of the pamphlet the engravings of the various machines and brief specifications occupy facing pages.

Electric Motors.—The Emerson Electric Mfg. Company, St. Louis, Mo. Two bulletins. No. 3141, replacing No. 3137, points out the advantages of a new line of single phase induction motors, which are built in sizes ranging from 1-10 to 1-5 hp. The special advantage of these motors is a condensed type of frame, which enables them to be installed where the dimension parallel to the shaft is of great importance. No. 3708, replacing Nos. 3704 and 3705, gives general description and specifications for dental laboratory lathes operated by either alternating or direct current motors.

Milling Machines.—The Garvin Machine Company, Spring and Varick streets, New York City. Two circulars. No. 142 contains a description of the Nos. 14 and 15 vertical spindle milling machines for machining castings which require the finishing of surface joints. No. 143 refers to the use of the No. 3 duplex milling machine, one of the special advantages of which is the finishing of two sides of the work perfectly parallel at the same time. An illustrated description of this machine appeared in *The Iron Age* July 21, 1910.

Road Rollers and Contractors' Engines.—The Huber Mfg. Company, Marion, Ohio. Pamphlet. Describes with numerous illustrations a line of road rollers and contractors' engines. The construction of the special features of these rollers and engines is described at length. In addition to the regular road rollers and the engines a special type in which both are combined can be furnished.

Coal Washeriers.—Link-Belt Company, Nicetown, Philadelphia, Pa. Pamphlet. Describes the two washeriers which this company recently completed for the Central Coal & Coke Company, Dunkirk, Kan. The engravings show the machinery installed and the completed plants, as well as a number of progress pictures.

Traction Engine.—The Ohio Tractor Mfg. Company, Marion, Ohio. Circular. Concerned with a gasoline traction engine that is built in four sizes—namely, 20, 30, 45 and 70 hp. Two speeds are regularly furnished and a third one can be added if desired. The special advantages of this engine are that it is under the control of the operator at all times and the fuel consumption is very economical.

Drill Chuck.—R. H. Brown & Co., 287 Ashmun street, New Haven, Conn. Circular. Devoted to the Reid drill chuck, which has a capacity for drills having a maximum shank diameter of $\frac{1}{4}$ in.

Triplex Pumps.—The Sandusky Foundry & Machine Company, Sandusky, Ohio. Catalogue. Shows a line of single and double acting triplex pumps arranged for operation by belt and direct connected electric motors, direct connected gasoline engines and by electric motors through gearing. In nearly

every case two pages are devoted to each of the pumps, an engraving with brief description occupying one side of the leaf while the specifications and dimensions are given on the other side. Some useful information for pump users and an illustrated description of various types of controlling devices for motor driven pumps complete the catalogue.

Grinding Wheels.—The Tanite Company, Stroudsburg, Pa. Catalogue. Size 9 x 12 in.; pages 118. Gives general description and specifications for a line of grinding and polishing wheels which are made in six standard grades, as well as large variety of special ones. Space is also given to emery cloth and paper, suction fans, babbit metal, whet and oil stones, emery grinders, saw gummers and a number of special grinding machines.

Tool Holders.—Armstrong Brothers Tool Company, 339 North Francisco avenue, Chicago, Ill. Catalogue No. 18. Calls attention to the Armstrong tool holders, which are made in a variety of styles to receive inserted steel cutters for turning, planing, boring, slotting, threading, cutting-off and drilling metals. The special advantages claimed for the use of these tool holders and inserted cutters are a reduction in the amount of capital invested in tool steel, an increase in the capacity of the tool, as the cutters can be ground to special shapes with little loss of time or material and the ability of the user to obtain self-hardening steel cutters of stock sizes and shapes and of the brand of steel best suited to his requirements. The various types of holders and cutters are illustrated, as well as grinding machines, lathe dogs, drill holders and drill vises.

Gasoline Storage Outfits.—Tokheim Mfg. Company, Inc., Cedar Rapids, Iowa. One pamphlet. Illustrates and describes a line of self-measuring outfits for handling gasoline and lubricating and paint oils. The special advantage of this system is that all waste due to leakage and spilling is eliminated and by setting a device on the pump it is possible to discharge the desired quantity at one stroke.

Acetylene Lighting.—The Hercules Mfg. Company, Chattanooga, Tenn. Pamphlet. Concerned with street and residence lighting by acetylene. The pamphlet also describes the process of generating acetylene gas by combining calcium carbide with water, and shows the construction and operation of the Hercules generator.

Calendar.—The Wagner Electric Mfg. Company, St. Louis, Mo., has issued a calendar hanger showing the latest type of the company's motor. Unlike the majority of the advertising calendars gotten out, this is comparatively free from any advertising matter, the name of the company appearing in small type at the bottom of each leaf.

High Speed Steam Hydraulic Forging Press.—United Engineering & Foundry Company, Farmers Bank Building, Pittsburgh, Pa. Mailing card. Shows the results obtained by the use of a 500-ton press as compared with those of a 6000-lb. steam hammer. The two illustrations show the two ends of the same ingot which were treated in the different ways.

Metal Sheets.—American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa. Three cards. These give the weights of the various gauges of corrugated roofing sheets per square, the weights per bundle for the various gauges and sizes of black sheets and also for the Apollo galvanized sheets. On the last two cards under each different gauge number are given the weight per square foot in both ounces and pounds, the different sizes of sheets made, the weight of each sheet, the number of sheets in and the weight of a complete bundle.

Threshing Machinery.—The Aultman & Taylor Machinery Company, Mansfield, Ohio. Catalogue. Illustrations and descriptive matter explain the operation of a line of threshing machinery which includes grain separators, threshers, hullers, portable and traction engines and portable sawmills.

Ball and Roller Bearings.—The Bantam Anti-Friction Company, Bantam, Conn. Catalogue. Deals with all the types of ball and roller bearings manufactured by this company. In the illustrations the bearings are printed in colors, thus giving the user an idea of the quality of the material entering into the make-up of the bearings. Many new types and forms of bearings are shown and dimension tables and price-lists of the various kinds are included. Among the various bearings covered is a pillow block which was illustrated in *The Iron Age* October 6, 1910.

Crushing Machinery.—Power & Mining Machinery Company, Milwaukee, Wis. Catalogue No. 4 and bulletin No. 9. The former deals with the McCully gyratory rock crushers, crushing rolls and accessories such as belt conveyors, elevators, screens and quarry cars. All of these various appliances are illustrated and detail dimension sheets are given for the McCully crushers. A number of suggested installation schemes complete the catalogue. The bulletin is devoted to the Evans-Waddell Chilian mill for grinding ore. Its construction and operation are described at length and an illustrated list of repair parts completes the bulletin.

Ice Making and Refrigerating Machinery.—Newburgh Ice Machine & Engine Company, Newburgh, N. Y. Pamphlet. Size 3½ x 6 in.; pages 64. Treats of a line of ice making and refrigerating machinery which includes refrigerating plants

operating on the ammonia or carbon dioxide systems; accessories such as can dumps, ice holsts and cranes, ice elevators and all the fittings and fixtures used in ice factories and refrigerators, and distilling and purifying apparatus for securing pure water. All of these machines are illustrated and described and space is also given to the engines used for driving them.

Cotton Ginning Machinery.—Brown Cotton Gin Company, New London, Conn. Catalogue. Treats of a line of cotton ginning machinery and linters for oil mills. The various types of machines are illustrated and described and complete illustrated lists of repair parts are given.

Rock Drills.—Ingersoll-Rand Company, 11 Broadway, New York City. Pamphlet No. 4202. Treats of the Sargent rock drill, which is a combination of the independent air thrown spool type valve with an improved modification of the tapet action. The various parts of these drills are illustrated and described and there are a number of illustrations showing them in actual use.

Traction Engines and Threshing Machines.—The Huber Mfg. Company, Marion, Ohio. Catalogue. Calls attention to the Huber traction engines and threshing machines. Their special features are described and brief dimension tables are included.

Electric Pyrometers.—The Bristol Company, Waterbury, Conn. Bulletin No. 130. Size 8 x 10½ in.; pages 56. Illustrates and describes both the indicating and the recording types of the William H. Bristol electric pyrometer and calls attention to their special features, among which is an automatic compensator which makes the readings independent of any atmospheric changes at the instrument.

Fans and Blowers.—Garden City Fan Company, Fisher Building, Chicago, Ill. Bulletins Nos. 26, 29, 30, 32, 34, 40 and 41. Deal with shavings exhausters, blowers and ventilating fans of various types.

Elevator and Power Transmission Machinery.—Minneapolis Steel & Machinery Company, Twenty-ninth street and Minnehaha avenue, Minneapolis, Minn. Five catalogues. F is a 111-page book pertaining to the line of elevator and power transmission machinery handled and manufactured by this company. In addition to illustrating the various appliances numerous dimension tables are included. G 105 describes and illustrates the Ohio portable and stationary gas and gasoline engine, while E 103 covers the Twin City line of engines, which are made in a number of different styles and sizes. M 112 describes a complete line of power plant accessories and C 106 is concerned with condensers of both the surface and jet types.

Feed Water Heaters.—Erie Mfg. & Supply Company, Erie, Pa. Pamphlet. Shows the Riblet and Hardwick feed water heaters and explains their construction and operation with considerable detail.

Printing and Matrix Drying Presses.—R. Hoe & Co., 504 Grand street, New York City. Two pamphlets. No. 100 covers a line of rotary electrotypes web perfecting presses for periodical, book, catalogue and pamphlet printing. The various sizes and styles of presses are shown and a partial list of users completes the pamphlet. No. 104 is concerned with a pneumatic matrix drying press heated by steam or electricity. The special advantages claimed for this press are a large saving of time and labor, the production of better matrices and the placing of the pressure cylinder underneath the press, which permits the pressure of the platen upon the matrix to be exerted in a direct line.

Drag Bucket Excavators.—Monighan Machine Company, 2016 Carroll avenue, Chicago, Ill. Catalogue EC. Size 9¼ x 12½ in.; pages 32. Contains a detailed description of the construction of the Monighan scraper bucket excavator, together with condensed specifications and illustrations of the excavators in use.

Wood Sawing Machinery.—McDonough Mfg. Company, Eau Claire, Wis. Pamphlet. Refers to the use of the McDonough band resaws and rip saws for the rapid production of work. The special features of these saws are described, and there are a number of illustrations.

Gas and Gasoline Engines.—The Advance Mfg. Company, Hamilton, Ohio. Pamphlet. Lists the special features of the Hamilton gas and gasoline engines, which are made in sizes ranging from 4 to 35 hp.

Feed Water Heaters and Boilers.—The Bass Foundry & Machine Company, Ft. Wayne, Ind. Two pamphlets. The first points out the advantages of using the Bass open feed water heater and purifier, while the second gives general description and specifications for horizontal and vertical tube boilers.

Concrete Block Machinery.—The Miles Mfg. Company, Inc., Jackson, Mich. Catalogue. Pertains to the Miles line of wet process concrete machinery, which includes mixers, concrete block and cement brick machines and molds for sills, caps, steps and piers. All of these machines are illustrated and for the most part the descriptions occupy the pages facing the engravings. Instructions are given as to the most economical operation of these machines, and space is devoted to a number of illustrations showing buildings constructed from blocks made on these machines.

The Machinery Markets

Railroad and shop requirements to occupy the attention of machinery sellers in the East. An extensive list has been issued to the New York trade by the New York, Ontario & Western Railroad. In New England increased business in 1910 and January proved a better month to machinery houses than November or December. Buying in Philadelphia is on a moderate scale, but there are strong indications of impending railroad buying. The trade in Cleveland is more active than for some time, and some good business has been closed, including one order for \$20,000 worth of machinery. Reports from Cincinnati and St. Louis indicate that there is a decided improvement in the demand. The railroads are coming into the market in Chicago, where a local automobile show is also attracting trade. The general machinery market is better in San Francisco, and favorable action by the National House of Representatives in regard to officially recognizing the Panama-Pacific Exposition there has greatly improved the tone of trade.

New York

NEW YORK, February 8, 1911.

Inquiries for machinery continue to increase in this territory. The feature of the week was the distribution of the New York, Ontario & Western Railroad list of machine tools and blacksmith shop equipment, which is the largest railroad list that has been out in this market for three months. The Simms Magneto Company has added to its requests for bids by inquiring for special toolroom machinery, and a larger list is in preparation in the offices of that company. Work has been begun by the Delaware & Hudson Railroad on its Watervleit shops, but it is said on good authority it will be several months before a machine tool list is prepared. The company has not yet closed out the small list put in the hands of dealers two weeks ago. Its Watervleit requirements will be large, and from all accounts they will excel any list that has been put out in New York for several months. Manufacturers of foundry apparatus are handling an increased business and the foundries in general are decidedly more active. Machinery manufacturers show an increased desire to place long time contracts for castings. Two foundries in this neighborhood recorded orders for machine tool castings in the last week for delivery over the year. While about any kind of standard machinery can still be had from stock, manufacturers of some classes of machine tools declare that if inquiries now before them mature into orders they will be obliged to extend delivery terms. Many Western machine tool manufacturers and a number of New England makers handle their Southern business through their New York representatives, and machinery men from the latter territory have been very busy of late with Southern business. A number of the Southern railroads have been placing single orders for machinery for replacement. All through the South there is an excellent call for used machinery; in many cases manufacturers who have been unable to get second-hand machines have placed their orders for new equipment. The Continental Gin Company, Birmingham, Ala., has been an excellent buyer in the machine tool market. There is also a very good call in the Southern territory for outdoor equipment, such as dredges, steam shovels and contractors' machinery, used in irrigation work.

The New York, Ontario and Western List

The largest railroad list issued in the New York market within the last three months has been sent out by the New York, Ontario & Western Railroad and is in the hands of a number of dealers and manufacturers' representatives here. The list includes a complete line of machine tools and a list of equipment for a good sized blacksmith shop. The machinery required will cost fully \$50,000. The company's requirements were made up by D. P. Fiory, superintendent of motive power, with headquarters at Middletown, N. Y. C. A. Draper is the general purchasing agent, with offices at 56 Beaver street, New York, and he will probably close out for the machinery, a list of which follows:

Machine Shop Tools

- 1—30 x 40 in. x 10 ft. three head planer, motor driven.
- 2—24 in. shapers, motor driven.
- 1—universal lathe 2 ft. swing, 40 ft. long travel, motor driven.
- 1—52 in. lathe, motor driven.
- 1—60 in. lathe, motor driven.
- 1—36 in. radial drill, motor driven.
- 2—30 in. vertical drills, belt driven.
- 2—1/2 in. double spindle speed drills, belt driven.
- 1 nut facing machine, belt driven.
- 1 nut tapping machine, 1 to 4 in., belt driven.
- 1—3 1/2 in. bolt cutter, belt driven.
- 1—12 in. double head shaydon cutter, belt driven.
- 1—27 to 6 in. pipe cutter, belt driven.
- 1—12 in. power hack saw, belt driven.
- 1—24 in. power hack saw, belt driven.
- 1 link grinder, belt driven.
- 1 universal grinder for tools and reamers, motor driven.
- 1 disk grinder, belt driven.
- 1 chaser grinder, belt driven.
- 1 universal grinder for lathe and planer tools, motor driven.
- 2—16 in. double head grinders, motor driven.

- Current, 220 volts, D. C.

Blacksmith Shop Tools

- 1—2 in. bolt heading, upsetting and forging machine, motor driven.
- 1—4 in. bolt heading, upsetting and forging machine, motor driven.
- 1 bulldozer, equivalent to No. 1 7 Ajax, motor driven.
- 1 single punch and shear, to punch 3 in. in diameter through 14-in. steel and shear 2 x 10 in. flat bars, 14-in. plates and 31-in. round bars.
- Current, 220 volts, D. C.

The Mott Wheel Works, Utica, N. Y., which recently increased its capital stock from \$50,000 to \$150,000, has acquired a new building about double the capacity of its present plant, in which machinery is being installed for the manufacture of the company's line of automobile supplies, steel wire wheels, axles, forgings, &c. Frederick Gilbert and Charles B. Rogers, who have become stockholders as a result of the expansion, will be placed in the Board of Directors, which consists at present of Henry R. Williams, Clarence B. Williams and Q. W. Mott.

The Sillocks-Miller Company, manufacturer of artificial leather specialties, celluloid novelties, &c., is having erected at South Orange, N. J., a three-story factory, 50 x 100 ft., with a power house adjoining. A modern ventilating system and a small power plant will be installed, and it is expected to have the plant ready for operation by May 1. W. S. Sillocks is president of the company.

The Electrode Company of America has awarded contracts for the equipment for its plant at Niagara Falls, N. Y., including a crane to be furnished by the Pawling & Harnischfeger Company, Milwaukee, Wis.; elevators and conveyors to be erected by H. W. Caldwell & Son Company, Chicago, and a crusher to be furnished by the Chisholm, Boyd & White Company, Chicago.

The Eclair Film Company, 31 East Twenty-seventh street, New York, has awarded the general contract to Donald Mitchell, 356 West Fifty-third street, New York, for the erection of a factory building, 58 x 115 ft., at Fort Lee, N. J. The plant will be used for the manufacture of moving picture films and apparatus and will cost about \$24,000.

James H. Fuertis, consulting engineer, 140 Nassau street, New York, is preparing preliminary plans for the construction of a system of water works and pumping station for the town of Cranford, N. J.

Steinway & Sons, piano manufacturers, have awarded a general contract to E. E. Paul & Co., 1 Madison avenue, New York, for the erection of additions to their factory at Steinway, L. I. The plans comprise additions to the main building and two wings, 200 x 345 ft. and 200 x 315 ft. respectively.

Point Pleasant, N. J., is considering plans for establishing a municipal water works. The present plant is owned by Martin Maloney, Philadelphia.

Bids are to be received next month by the Board of Public Works, Jamestown, N. Y., for a garbage disposal plant to be erected by the city.

The Ogdensburg Terminal Company, Ogdensburg, N. Y.,

THE MACHINERY MARKETS

will build and equip a 500,000-bu. grain elevator of reinforced concrete to cost approximately \$200,000. Contract for construction awarded to John S. Metcalf Company, Chicago, Ill., and 10 St. John street, Montreal.

Lortz & Teuscher, Syracuse, N. Y., manufacturer of iron bedsteads, is completing plans for a three-story factory.

The Cliff Electrical Distributing Company, Niagara Falls, N. Y., has been authorized by the Public Service Commission to issue general mortgage bonds to the amount of \$250,000, to be sold at not less than 95, to be used for improvements at the company's plant.

The Elmira Water, Light & Railroad Company has been authorized by the Public Service Commission to issue general mortgage bonds to the amount of \$243,995, to be used for extensions of service and improvements to the company's plant at Elmira.

The Hayes Appliance Company, Geneva, N. Y., is planning to build a new factory in western Ohio or eastern Indiana—location and site not definitely determined—the new factory building to be fireproof, about 100 x 130 ft. S. W. Hayes is president of the company.

The Grimm Mfg. Company will add to its plant on Keystone street, a one-story concrete building for testing purposes.

The Spencer Heater Company, manufacturer of the Spencer magazine-feed water-jacketed boilers for steam or hot water heating of dwellings, apartments and office buildings, has opened a sales office in Buffalo, N. Y. Mr. C. P. Wadley has been appointed manager with offices at 920 and 922 White Building.

The Pneumatic Metal Tire Company, Buffalo, N. Y., has been incorporated with a capital stock of \$50,000 by Albert E. Nelson, George O. Graves and Edward L. Kunz, to manufacture automobile metal tires and appliances.

Catalogues Wanted

Gaedt & Nacker (Kratos-Werke), Erlau, Saxony, Germany, are in need of automatic grinding and polishing machines for handling small metal work and desire catalogues of American manufacturers in that line.

Chicago

CHICAGO, ILL., February 7, 1911.

The general improvement in business conditions is creating a better tone in the machinery market, although actual improvement is somewhat slow. Chicago dealers have been busy this week entertaining visitors to the automobile show. A large proportion of the out of town visitors who attend this annual event are men interested in manufacturing or shop work, and they spend a part of their time in the machinery district looking over the display rooms of the dealers. They have not done much buying, but they represent the great unknown quantity of dormant business which has accumulated in the last six months, and which will come out in the form of active orders when general trade conditions have arrived at a satisfactory basis. During the past winter there has been very little building or shop improvement going on in the West, owing to the fact that general foundry and machine shop business has been down to about half an average capacity. The lack of railroad buying has been the chief factor in depressing trade, but the railroads are now coming into the market for equipment and materials, and this long expected railroad buying movement ought to have a very favorable influence.

The American Sheet & Tin Plate Company has recently bought a small list of machine tools for shop work in connection with its new sheet mills at Gary, Ind.

Joseph T. Ryerson & Son, Chicago, have made a sale of important hydraulic riveting equipment to be installed in addition to the plant of the Western Steel Car & Foundry Company at Hegewisch, Ill.

A recent official statement of the International Harvester Company, Chicago, shows appropriations for new factory construction and equipment during the past year, at the various plants of this company, amounting to nearly \$4,000,000.

The Thompson Type Machine Company, 120 Sherman street, Chicago, has increased its capital stock from \$100,000 to \$200,000, and is planning to increase its manufacturing facilities.

The corporate title of the Chicago Fuse & Wire Mfg. Company has been changed to the Chicago Fuse Mfg. Company and the capital stock increased from \$25,000 to \$100,000, all of which has been paid in. The company recently completed the erection of a six-story factory building which it is now occupying.

The business of William Weinstein has changed its name to the William Weinstein Iron Company, and will

occupy offices at 601-602 Manhattan Building, 315 Dearborn street, Chicago.

The Burrell Mfg. Company, Bradley, Ill., founder and machinist, has increased its capital stock from \$50,000 to \$75,000 to provide for its increasing business.

The Macomb Sheet Metal Works, Macomb, Ill., has purchased ground upon which it will build a factory in the early spring. Dimensions of building have not yet been decided upon.

Lawrence Brothers, Sterling, Ill., are having plans prepared for a new factory, work upon which will be started early in the spring.

The Sibley Elevator Company's elevator, at Bloomington, Ill., was destroyed by fire January 29, causing a loss estimated at \$100,000.

The Mackinaw Sand & Gravel Company, Lincoln, Ill., has placed a contract with an Aurora, Ill., engineering firm to place an entirely new screening equipment in the plant.

The Bridgeport Light & Power Company, Bridgeport, Ill., has been incorporated with a capital stock of \$20,000. The incorporators are R. D. Donnelly, W. E. Beyhan and B. H. Lytle.

The Consolidated Concrete Tie Company, Cairo, Ill., has been incorporated with a capital stock of \$100,000. The incorporators include Richard J. D. Cowan, Joseph R. Sneed, Daniel W. Heilig and others. The company will engage in the manufacture of reinforced concrete railroad ties.

The Barry Electric Light & Power Company, Barry, Ill., has been incorporated by F. Frike, W. L. Klein and A. R. Weeks.

Philadelphia

PHILADELPHIA, PA., February 6, 1911.

Buying continues on a very moderate scale and conditions in the market show no appreciable change. Reports from both manufacturers and merchants indicate that business during January was unsatisfactory, as far as volume was concerned. Inquiry so far this month has not improved to any material extent, although the trade looks forward to some betterment in the near future and feels encouraged by more favorable reports regarding railroad work, even though the movement in this immediate district continues restricted. Little buying of importance develops from plant extensions, although some inquiries for tools have come out; in the majority of instances, however, the individual requirements are small. Very little railroad business comes out in this district; in fact, the few inquiries that have recently developed have not materialized in the shape of orders. Activity with machinery builders, foundries and industrial plants is still restricted, and until these industries become more fully engaged, the demand for machine tools is hardly expected to show any marked increase, particularly as existing conditions are hardly conducive to the building of additional industrial establishments, which would be likely to require any extensive machine tool equipment.

Builders of machine tools report a slightly better inquiry, particularly for special tools, and while some scattered orders have been taken, plants continue to operate on a greatly reduced basis. Boiler and engine builders report a little better inquiry, but resultant orders have not been large. Second-hand machine tool merchants note a moderate improvement in the demand, but without any material betterment in actual orders.

The Pennsylvania Railroad has sent out inquiries during the week for a large axle truing machine.

J. J. Crowley of this city and John G. Gray of Wilmington, Del., have been appointed receivers for the Screw Cutting Company of America, Philadelphia. Proceedings were instituted by Edwin W. Crellin, insolvency being alleged.

The Vulcan Brazing & Machine Company, 310 North Sixteenth street, this city, has surrendered its New Jersey charter, and has been incorporated under the laws of the State of Delaware, with a capital stock of \$10,000. The officers of the company are Richard Eckersley, president; C. M. Beddall, secretary and treasurer, and J. R. McCormick, general manager.

The Newton Machine Tool Works, Inc., is in the market for a countershaft level, with vertical and horizontal glass, to be used with a transit or a fixed center. The instrument desired also has an arrangement for suspending it from a line or countershaft.

Savery, Sheets & Savery, architects and engineers, have completed plans for a three-story brick and reinforced concrete garage and delivery station, 80 x 115 ft., to be erected at Sixty-second and Locust streets, for Strawbridge & Clothier.

The Philadelphia & Reading Railroad is proceeding with plans for the erection of a large concrete bridge over the Delaware River at Yardley, to replace its present bridge at

THE MACHINERY MARKETS

that point, which is insufficient for its increased traffic on its Bound Brook Division. Preliminary plans have been completed and are now being considered by the Government.

A considerable portion of the plant of the Barrett Mfg. Company, at Thirty-sixth and Reed streets, manufacturer of roofing materials, was damaged by fire on February 4. At this time it is impossible to learn definitely as to the extent of the damage to its power plant and machine shop, but it is reported that the former was badly damaged.

The contract for the Vine street pier, bids for the erection of which were recently opened by the Department of Wharves, Docks and Ferries, previously referred to in this column, has, it is stated, been awarded to W. S. P. Shields, who was the second lowest bidder, and who also had the contract to build the substructure of the pier, at his bid of \$339,000. The lowest bidder, it is reported, refused to agree to the wages and hours of labor required by ordinance of City Council. The pier will be double decked and specifications will permit of the erection of two more floors if desired.

Franchises are being obtained for the construction of an electric railroad extending from Slatington to Leighton, Pa., a distance of 12 miles, which will complete a continuous extensive electric system in the Lehigh Valley. Bridges over the Lehigh River, the Lehigh Canal and over the tracks of the Central Railroad of New Jersey and Lehigh Valley railroads are proposed. The new line will connect with the Carbon Transit Company at Leighton and the Lehigh Traction Company Lines at Slatington.

The Manheim Mfg. & Belting Company, Manheim, Pa., has been organized with a nominal capital stock. The company will manufacture the Veelos Balata belt, which has formerly been imported by the Charles Bond Company of Philadelphia. The officers of the company include Charles Bond, president; George H. Danner, vice-president; M. M. Pfantz, secretary and H. G. Hess, treasurer. The company is planning the erection of a building.

The Universal Mfg. Company, Freeport, Pa., has been incorporated with \$100,000 capital stock. The company will build and equip a plant with engines, boilers and machinery for the manufacture of enamel ironware. J. C. Stevick is president of the company.

Justice Cox, Jr., & Co., Land Title Building, are in the market for 30 logging cars and 6 flat cars.

Cincinnati

CINCINNATI, OHIO, February 7, 1911.

Business during the past week with a number of machine tool builders has shown a decided improvement. An Eastern manufacturing concern placed a nice sized order in this market for tools, and it is stated that this same company will make further purchases later on. Orders continue to come mainly from the general trade, and the railroads are yet buying sparingly.

The foundries are not very actively engaged, but there are signs of a favorable change, and if the machine tool trade continues to improve they will doubtless be operating with full shifts by the opening of spring.

Second-hand machinery is in better demand, but no large sales have been made lately.

The coming annual meeting of the Cincinnati Branch, National Metal Trades Association, March 2, promises to be one of the largest in its history. Among those who have already signified their intention of attending are F. C. Caldwell of the H. W. Caldwell Mfg. Company, Chicago; H. H. Latham, Latham Mfg. Company, Chicago; J. H. Schwacke, Wm. Sellers Company, Philadelphia; W. A. Layman, Wagner Electric Company, St. Louis; H. H. Rice, the Waverly Company, Indianapolis; D. C. Buell, Union Pacific Railway, and W. H. Vandervort, Root & Vandervort Company, Moline. In the evening a banquet will be served to the local members and visitors at the Business Men's Club.

The Union Thread Company, Cincinnati, has completed plans for moving its factory from its present city location to a site recently acquired at Carthage. It is stated that a three-story concrete building will be erected by the company, work on which will commence at an early date.

The Steel Foundry Company's plant at Winton place, Cincinnati, was sold at auction last week by Receiver W. D. Mellish to a party of capitalists from Chicago for \$44,000. The plant represented an original outlay of about \$175,000 and went into the hands of a receiver some time ago. Isaac Milner, whose address is given as the Palmer House, Chicago, is said to head the new investors, and it is stated that the plant will be put in operation at an early date.

The annual stockholders' meeting of the I. & E. Greenwald Company, Cincinnati, was held February 1. E. E. Greenwald retired from the Board of Directors and was succeeded by Lake Lilley of the Devere Electric Company. Henry Burhold was re-elected president of the company; Alexander Cunningham, vice-president, and W. B. George,

secretary-treasurer and general manager. Edward Estep is shop foreman, succeeding Thomas L. Greenwald, who has been promoted to the sales department.

At the annual meeting of the Niles Tool Works, Hamilton, Ohio, all the old officers were elected. James K. Cullen is president; George T. Reiss, vice-president; Charles Cornell, treasurer; Joseph Blair, secretary, and Lucius Potter, assistant secretary. The year 1910 was reported as being a very prosperous one and the outlook for 1911 is excellent. Some large foundry additions are being made to the Niles plant, which will be completed about April.

Kirk & Blum, Cincinnati, are installing a dust collecting system for the Lunkenheimer Company, Cincinnati; a hot blast heating system for the Republic Iron & Steel Company, Youngstown, Ohio, and a shavings collection system for the Queen & Crescent Railroad at Somerset, Ky.

The Norwood Mfg. Company, Norwood, Ohio, is a new incorporation, with \$10,000 capital stock, to manufacture window ventilators and sanitary household specialties. The incorporators are T. L. Kautz, Nathaniel B. Hadley, John M. Morehouse, Arthur J. Starr and Harry B. Barnes. A factory site has been selected in Norwood and a Cincinnati sales office has been opened at 127 East Ninth street. Heretofore the company has had its ventilators made under contract, but under the new arrangement it will be able to very much increase its output of all its specialties.

Prof. J. K. Renshaw, dean of the Cincinnati Continuation School, addressed a gathering of Toledo, Ohio, citizens, composed of the Board of Education members, prominent manufacturers and workmen, February 2. The subject of the address was the continuation school problem, and from the interest manifested it is quite probable that Toledo will soon start a school modeled after the Cincinnati institution.

The Cincinnati Industrial Bureau and Cincinnati Convention League have been absorbed by the newly organized Cincinnati Commercial Association. The officers of the association are George F. Dieterle, president; E. V. Wilbern, vice-president; Luke W. Smith, treasurer; W. I. Finch, secretary, and Carl Dehoney, assistant secretary. At its annual meeting January 28, S. P. Egan of the J. A. Fay & Egan Company, the retiring president of the Industrial Bureau, was very highly complimented on the work of that organization.

The new plant of the H. P. Deuscher Company, Hamilton, Ohio, to take the place of the structures recently destroyed by fire, will soon be completed, and it is expected that the new shops will be in full operation by April 1.

The Multiple Jet Carburetor Company is a new incorporation at Dayton, Ohio, with \$10,000 capital stock. The incorporators are John W. Raymond, Joseph Friedman, May C. Raymond, B. Semmelman, A. Semmelman and H. A. Kern.

The Synder Mfg. Company, Wapakoneta, Ohio, will rebuild its furniture factory recently destroyed by fire.

F. E. Horton, Ashtabula, Ohio, is reported to be in the market for some power plant equipment.

Vaile & Kirnes, manufacturers of hydraulic, electrical and pneumatic machinery, Dayton, Ohio, have incorporated as the Vaile-Kirnes Company, with \$100,000 capital stock. J. Henry Vailes and Hugh W. Kirnes are named as the principal incorporators.

The Alliance Brass & Bronze Company, Alliance, Ohio, heretofore doing business under a partnership arrangement, has been incorporated, with \$15,000 capital stock, by Charles W. Smith, Anna C. Roth, Laura M. Roth, C. J. Roth and F. B. Crist.

It is stated that the Reed Ice Company, a new incorporation at East Liverpool, Ohio, will erect a small ice plant. J. N. Hanley, William Rager, J. A. Reed, E. L. Reed and Willis Davidson are named as incorporators, and the capital stock of the new company is \$10,000.

The Phelps Iron & Steel Company, Provident Bank Building, Cincinnati, dealer in and manufacturers' agent for iron and steel products, has been incorporated, with \$10,000 capital stock, by Charles Murdock, Florence C. Murdock, Griffith L. Resor, B. Scarlett Phelps and Edward C. Phelps.

Bids will be received until February 21 by the Water Works Department of Coshocton, Ohio, for a pumping engine of 4,000,000 gal. capacity and two centrifugal pumping units of 15,000,000 gal. capacity per day.

Elyria, Ohio, has under consideration extensive improvements to its water works system, including additional water mains and improved pumping machinery.

Cleveland

CLEVELAND, OHIO, February 7, 1911.

The local machine tool market has been more active during the past week than for some time. Considerable business that had been pending since the latter part of last year was placed, these orders being for machinery for one new plant and for extensions to two others. The largest order aggregated about \$20,000. Scattering inquiries for small lots of

THE MACHINERY MARKETS

tools have also improved somewhat, and a fair volume of business in orders for the equipment of new industrial plants is in prospect. Builders of electrical equipment report considerable improvement in the demand for small motors, some nice orders having been received during the past few days and the outlook for future orders is encouraging. In the heavier lines of machinery, including handling equipment, business continues light. There is a fair volume of inquiry pending, but orders are slow in coming out. With the approach of spring, however, manufacturers are looking for a better volume of orders. The foundry trade continues quiet. Some contracts for light gray castings are being placed, but at rather low prices.

The Browning Engineering Company, Cleveland, is erecting a new power plant. All of the equipment has been provided for.

The Thatcher-Rueter Mfg. Company, Cleveland, has been incorporated, with a capital stock of \$20,000, by James C. Thatcher, Henry F. Rueter, R. J. Shilling, W. G. Smith and George F. Rueter. The company will make dies, stampings, hardware specialties and engage in sheet metal work. A plant will be established in one of the Bradley power buildings, having leased 4000 sq. ft. of floor space. Equipment for the plant will be purchased shortly. This will include three lathes, two shapers, four drill presses and some small tools.

The Taylor & Beggis Foundry Company, Cleveland, will build a new plant to replace its No. 2 foundry, that property, located near Euclid avenue and East Fifty-fifth street, having been sold to the Pennsylvania Railroad. A site has not yet been selected. The new plant will include a foundry, machine shop and department for the manufacture of builders' hardware. Plans are now being prepared and work will be started early in the spring.

The Grasselli Chemical Company, Cleveland, is erecting a large plant at Meadowbrook, W. Va., for the manufacture of spelter and allied products. It will be ready for operation during the summer.

George W. Angell, formerly connected with the Erie Wire Nail Company, Erie, Pa., has established a plant at 2617 East Seventy-sixth street, Cleveland, for the manufacture of wire nail machinery and chaplet machinery for making chaplets cold. His present plant will be enlarged considerably and some new machinery will be required.

The Chamber of Commerce, Toledo, Ohio, has taken up the matter of erecting a power building to provide floor space for small industrial plants. A committee, of which Isaac Kinsey is chairman, has been appointed to investigate the matter.

Manufacturers in Toledo, Ohio, are planning an industrial exposition. A committee to form preliminary arrangements has been appointed, consisting of S. O. Richardson, chairman; George Hardy, D. C. Donovan, J. N. Willys, Frank Southard and H. M. Nussbaum.

The McNeil Boiler Company, Akron, Ohio, has purchased a tract of land adjoining its present site to provide room for plant extension.

The general contract for a new filtration plant in Grand Rapids, Mich., has been awarded to the Roberts Filter Company, Darby, Pa.

With a capital stock of \$30,000, the Love-Casselman Company, Alliance, Ohio, has been incorporated to manufacture and deal in sheet metal by A. B. Love, C. W. Casselman and others.

The Indian Motor Car Company, Upper Sandusky, Ohio, has been incorporated, with a capital stock of \$10,000, by S. W. Martin and others to manufacture automobiles.

The Canton Mfg. Company, Canton, Ohio, whose reorganization was recently announced, having been taken over by the interests that control the Multiplex Filing Device Company, has elected the following officers: President, Jacob F. Smith of Buffalo, formerly president of the Multiplex Company; vice-president, C. N. Vicary, who had been president and treasurer of the Canton Mfg. Company; treasurer, C. E. Stuart. The two plants will be merged. The capital stock has been increased from \$100,000 to \$200,000.

The Reliance Mfg. Company, Massillon, Ohio, has been incorporated, with a capital stock of \$10,000, to manufacture hardware specialties. The incorporators are Frank C. McLain, M. R. Bissell, John Igelstrom, F. W. Arnold and John E. McLain.

The M. & M. Rubber Cement Company, Akron, Ohio, will enlarge its plant by the erection of two new buildings of fireproof brick construction, one 50 x 150 ft., one story, and the other 40 x 200 ft., two or three stories. The company will make several additions to its line of products.

The Foundries Company, recently incorporated at Orrville, Ohio, has purchased the Postelwaite planing mill plant in that city and will fit it up at once as a foundry.

B. T. Steiner, for a number of years secretary and general manager of the Gilliam Mfg. Company, Canton, Ohio, has purchased the stock holdings of Stuart S. Kurtz, who has retired as president and treasurer in order to devote his time to other interests, after being connected with the com-

pany for 30 years. Mr. Steiner has succeeded Mr. Kurtz as president and treasurer, and Samuel G. Zimmerman, who has been assistant secretary, becomes secretary. The company will continue the same lines of manufacturing as in the past. Recently the manufacture of wrenches was added to its other products.

New England

Boston, Mass., February 7, 1911.

Nothing has occurred to mar the belief that business is on the mend. On the contrary, various new indications of improvement are observed. January proved a much better month for the dealers than November and December. Good orders have been placed and a very considerable amount of business is in sight, with probability of the early booking of a good sized part of it. The builders of special machinery are quite busy and many inquiries are being received to indicate an increasing interest. However, this branch of the trade is usually more active when business is moderate, customers having more time in which to give attention to improved equipment. The electric companies are making no complaint whatever. With some of them it would take no great amount of improvement to place deliveries in a bad way.

The Arlington Mills, Lawrence, Mass., is making inquiries for a large vertical boring mill, a number of engine lathes and several drills for its shops.

Beadry & Co., Inc., 141 Milk street, Boston, will establish new shops with the purpose of increasing the present output. Inquiries are making for some \$10,000 worth of tools, as was stated last week, but the list is somewhat tentative. It includes two planers, three lathes, several drills, milling machine, shaper, radial drill and miscellaneous machinery, comprising a complete shop equipment. The company will also be in the market for an engine and boiler. The location of the shops is not yet determined.

Alex. D. Morgan has resigned his position with the Becker Milling Machine Company and has resumed his personal business, the sale of machine tools, in which he makes a specialty of second-hand machinery. His address is 22 Bellevue street, West Roxbury District, Boston.

The Boston & Maine has not come to a decision as to the needs of the repair shop at Concord, N. H. No announcement of the location of the big repair shops has been made, but the question will probably be decided within a few days.

The Fisk Rubber Company, Chicopee Falls, Mass., will carry up several three-story buildings an additional story, giving additional space 47 x 138 ft., with ell 16 x 21 ft., 49 x 186 ft. and 36 x 57 ft.

The Springfield Gas Light Company, Springfield, Mass., will expend \$250,000 for new apparatus for its works.

The latest Maine power project is that of Arthur B. Leach, New York, and Linwood C. Tyler, Bangor, Maine, who have applied to the Maine Legislature for the right to incorporate the Maine Power Company, to take over the Bodwell Power Company plant, 13 miles above Bangor, on the Penobscot River. The purpose is to spend \$500,000 in developing the water power.

The Boston School Board has voted to expend \$7000 for a central electric generating plant, to supply a number of school houses. The recommendation carries with it the use of a gas engine.

The Boston Motor Boat and Engine Show, held in Mechanics' Building, Boston, last week, was a very representative affair, a large number of manufacturers of engines, power boats and accessories being represented by exhibits. Very little general equipment, such as machinery and tools, was shown. The attendance was large and the indications point to a busy year for the manufacturers. Motor boating is increasing in popularity in New England, and the condition is reflected in the business of the large number of houses who supply this demand. The engine builders report the outlook very bright.

The industrial show which has been held in Worcester, Mass., for two years will be omitted this winter, the management having decided to join with the Boston Industrial Show, which will be carried out in a large way in Mechanics' Building in the autumn.

The P. H. P. Motor Truck Company, Westfield, Mass., has been organized to manufacture a light automobile truck. The design of E. R. Pendleton in an addition to be built to the building of A. B. Pendleton & Son on Main street. The company states that it is not in the market for machinery at this time.

The C. W. Kelsey Mfg. Company, Hartford, Conn., which will build a three-wheel motor vehicle, has decided to do no manufacturing for itself this season, but will buy the parts from which to assemble an estimated output of 10,000 vehicles.

The new factory of the National Spring Bed Company, New Britain, Conn., will consist of a main building 44 x 116

THE MACHINERY MARKETS

ft., five stories, of heavy mill construction. A new boiler house will be 30 x 40 ft. Contracts for boiler and engine have been let.

The stockholders of the Pratt & Cady Company, Hartford, Conn., at the annual meeting, elected George W. Hayden a director to fill the vacancy caused by the retirement of A. W. Gilbert, the former president of the company, the other directors being James Nichols, Amos Whitney, F. F. Street, L. B. Brainerd, George C. Kimball and John Spencer Camp. Mr. Camp was elected president and treasurer, Mr. Hayden vice-president and general manager, Mr. Kimball secretary and Joseph A. Swift assistant secretary.

In petitioning the Massachusetts Legislature for permission to take over the Boston, Revere Beach & Lynn Railroad, the New York, New Haven & Hartford Company makes the statement that if satisfactory legislation is secured a double track tunnel will be built under Boston Harbor, connecting the eastern branch of the Boston & Maine and the Boston, Revere Beach & Lynn with the South Station, using a lower level of the station as a terminal for station purposes and connecting with the main line tracks at Back Bay. Under the plan at least two tracks of the New Haven line will be electrified from Readville to and through the tunnel, and also two additional tracks from the tunnel to Lynn and the Revere Beach & Lynn road to Lynn. It is also proposed to four-track the main line of the Boston & Maine beyond Lynn to Beverly, to build a four-track tunnel through the city of Salem and to operate by electricity at least as far as Beverly. To carry out these plans would involve the expenditure of many millions of dollars.

Indianapolis

INDIANAPOLIS, IND., February 7, 1911.

The Ridgeville Tile & Brick Company, Ridgeville, Ind., has increased its capital stock from \$10,000 to \$20,000. T. A. Almonrode is president of the company.

The explosion of a gasoline tank partially wrecked the plant of the Union Switch & Signal Company, at Valparaiso, Ind., January 31, causing a loss of \$10,000.

Ezra C. Voris of Crawfordsville, Ind., purchased the United States Cement Company's plant at Bedford, Ind., at receiver's sale for \$181,000. He represented a syndicate of the stockholders. The company had been in receiver's charge two years.

The plant of the Remy Bros. Electric Company, Anderson, Ind., manufacturer of magnetos, has been bought by Indianapolis capitalists, headed by Stoughton A. Fletcher, president of the Fletcher American Bank.

The Jeffersonville Mfg. Company, Jeffersonville, Ind., has secured a contract for 10,000 cots for Government use. Newton H. Myers is president of the company.

The Brooklyn Tool Company, Brooklyn, Ind., has been incorporated, with \$10,000 capital stock, to manufacture tools. The directors are J. S. Spoor, H. T. Blake and I. Spoor.

The Kokomo Railway & Light Company, Kokomo, Ind., has enlarged its articles of incorporation so as to enable it to operate a steam heating plant. George J. Marott, Indianapolis, is president of the company.

The Barker-Brown Shoe Company, Huntington, Ind., has increased its capital stock to \$250,000, and will build an addition to its factory buildings of brick, 50 x 140 ft., and will increase its working force from 250 to 500.

The Grosneckle Grille & Screen Company's plant at North Manchester, Ind., was burned January 30, with \$10,000 loss.

The Altermatt-Wahl Mfg. Company, South Bend, Ind., has been incorporated, with \$25,000 capital stock, to manufacture wood and metal articles. The directors are John F. Altermatt, George F. Wahl and N. G. Altermatt.

The Rider-Lewis Motor Car Works, Anderson, Ind., has been sold to Milwaukee capitalists, represented by Lester C. Matson, an attorney of that city. The price was \$38,500 cash. The plant will be put in operation again with enlarged capital.

The Western Gas Construction Company, Fort Wayne, Ind., is in the market for some new traveling cranes to be used in its foundry; also conveying and elevating machinery for its corerom to carry mixed core products.

The Frank Gruber Boiler Works, Fort Wayne, Ind., will add to its present shop the building, 60 x 95 ft., formerly used by the Bar street foundry.

The Menefee Foundry Company, Fort Wayne, Ind., has just completed an addition, 70 x 80 ft., to its molding department, and is in the market for new machinery to be used in this department. It has also installed a new 72-in. Whiting furnace, 10 to 12 tons per hour capacity.

D. A. Bohlin & Son, Indianapolis, Ind., are receiving bids for the construction of the St. Vincent's Hospital. The work includes electric power and lighting plant.

The Siler-Petit Company, Fort Wayne, Ind., recently

incorporated with \$250,000 capital stock. The company is now having its product manufactured under contract, but advises that it will erect two factories within the next nine months, one in Chicago and the other in New York. The class of machinery to be used will consist of lathes, millers, drill presses and light woodworking machines for pattern-making.

The M. Rumely Company, La Porte, Ind., has increased its capital stock from \$2,000,000 to \$3,000,000 to provide additional working capital.

The Logansport Radiator Equipment Company, Logansport, Ind., is contemplating the erection of an addition to its factory, consisting of a large foundry building, corerom and machine shop. Other improvements contemplated include the installation of an electric light and power plant.

The Jacob A. Teeter Electric Company, Claypool, Ind., has been reorganized and will make extensive improvements.

The Sterling Electric Works, La Fayette, Ind., has been incorporated with \$200,000 authorized capital stock, and has taken over the plant of the Sterling Electric Company of that city, engaged in the manufacture of automobile magnetos and other electrical equipment, including telephone work. The new company has issued \$100,000 of bonds, which have been disposed of to redeem the bonds of the old company. The officers of the company are: Samuel T. Murdock, president, a local capitalist; R. B. Wallace, vice-president; Thomas Duncan, secretary and treasurer.

The city of Bedford, Ind., will install electric pumps at the water works pumping station. W. L. Hurd is chief engineer.

St. Louis

ST. LOUIS, February 6, 1911.

Inquiries continued good the past week with orders comparatively few, although fairly good sales have been closed by some of the dealers.

The Manufacturers' Railway announces that construction will begin forthwith on a large modern freight warehouse in South St. Louis to cost approximately \$1,500,000.

The American Brake Company's extensive improvements are now rapidly nearing completion and the plant makes a formidable appearance on the Broadway frontage.

The Bignall & Keeler Mfg. Company, whose plant is at Edwardsville, Ill., is very busy on its line of high grade pipe machines.

The Corn Products Company, Granite City, Ill., is making some extensive improvements to its plant.

The Curtis & Co. Mfg. Company is busy on fine manganese castings.

The St. Louis Car Company has started up its plant with a large force of employees.

The Aubuchon-Garneau Candy Company, St. Louis, has been incorporated with a capital stock of \$50,000. The officers of the company are: Henry C. Garneau, president and treasurer; William Aubuchon, vice-president, and Paul W. Taylor, secretary. The company is looking for a location on which to build its plant and expects to settle on a site in the next few days.

The Chicago, Burlington & Quincy Railroad Company has purchased property on Second street, for which \$850,000 was paid. It is the present site of the Fulton Iron Works. It is rumored that the latter company will locate on six acres of ground along the Wabash Railroad and erect a foundry at a cost of over \$100,000.

The Howett Mfg. Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are Wilbur E. Howett, Juliet C. Howett and George Barnett. The company will engage in the manufacture of railroad equipment.

The E. R. Hensel Steel & Copper Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are E. R. Hensel, S. M. Hensel and A. Burmeister.

The city of St. Louis will issue \$100,000 in bonds for improvements to its water system outside of the city. Maxine Reber is city engineer.

The factory of the Osage Handle Company, Eldon, Mo., was burned January 21, causing a loss estimated at \$7500. The factory will probably soon be rebuilt.

The plant of the Ferguson Waterproof Company at Second and Trudeau streets, St. Louis, was burned January 26.

Lewis Vogle and A. W. Sweyd of New York City, have purchased 160 acres of land near Weir City, Mo., upon which they will erect a \$25,000 brick plant. W. H. Allen will be the manager of the new plant.

The American Agricultural Corporation is negotiating for the purchase of the Standard Reduction and Chemical Company's plant at Sands, Mo.

The Phoenix American Cob Pipe Company, Washington, Mo., will remove its factory to Boonville, Mo., a bonus of

THE MACHINERY MARKETS

\$25,000 having been raised by the citizens of Boonville. A four-story brick building will be erected. The company furnishes employment for 200 persons.

The Springfield Novelty Mfg. Company, Springfield, Mo., has been organized with a capital stock of \$5000. The company will erect a suitable factory for the manufacture of its specialties, one of which is a window attachment made of wood and metal.

The Sedalia Brick & Tile Company, Sedalia, Mo., has been incorporated with a capital stock of \$50,000. The incorporators are William Wilson of Edina, Jerome Moyer and H. W. Graham, of Sedalia, and others. The company will manufacture bricks, sewer pipe, roofing tile, &c.

The Marston Coopers Company, Marston, Mo., has been incorporated with a capital stock of \$10,000. The incorporators are Seth S. Barnes, O. B. Given, C. M. Barnes and others. The company will engage in the manufacture of cooperage stock.

The City Council of Kirkville, Mo., is considering the establishment of a lighting plant.

Detroit

DETROIT, MICH., February 5, 1911.

The past week, being the last week in January, itself the first month of the new year, has given manufacturers in this city an opportunity to judge, by comparisons, the outlook for 1911. In the matter of sales and orders, a great many state that it could not be better. Factory building bids fair to make history this spring, as every contractor in the city has his hands full. Few, if any, mechanics are idle, evidenced by the size of "help wanted" columns of the daily papers.

The organization of the Concrete Form & Engine Company has been completed. The company is a consolidation of the Collapsible Steel Form Company of Detroit and Carson City, and the New Belle Isle Motor Company of this city. The capital stock of \$150,000 will allow the construction of a large plant.

The report that the Welch-Pontiac Car Company, Pontiac, Mich., will discontinue the manufacture of automobiles is denied by both A. R. Welch and F. S. Welch.

Franchises for an electric railroad from Adrian to Jackson, Mich., are being secured from the intermediate towns. Francis J. Burlask of Toledo, Ohio, is promoting the project.

Construction will soon be begun on a new power dam to cost \$750,000 on the Menominee River, four miles above Iron Mountain. The project is in the hands of O. C. Davidson, of the Oliver Iron Mining Company, who plans to furnish power to the mines in the vicinity of the above city.

The Reed City Veneer Plant, Reed City, Mich., destroyed by fire some time ago, is to be rebuilt. Work on the plant will be commenced next spring.

The Elk Lime & Cement Company, Elk Rapids, Mich., will be reorganized. The plant which was shut down some time ago will soon be in operation if the efforts of Robert Williams and C. A. Whyland of Chicago are successful.

The Consolidated Fuel & Lumber Company, Negaunee, Mich., are arranging for the construction of a third warehouse, which is to be completed by next summer.

The old stove mill at Covington, Mich., the property of the Menasha Wooden Ware Company, has been leased by R. J. Howes and Payton O'Mara, for the construction of a saw mill.

Detroit automobile interests will gain materially by the formation of the new Studebaker Corporation. The E. M. F. plant will be increased in the spring and a big factory for the construction of trucks will be built in connection with the plant on Clark avenue.

The Adrian Novelty Company, Adrian, Mich., has been organized for the manufacture of vending machines. The machines are made to handle articles of all kinds and descriptions, designed, in many cases, to replace the clerk.

The Prison Board of Control of the Jackson State Prison will ask the State for an appropriation of \$21,000 to cover the purchase of a new engine and generator for the prison power plant.

Cadillac, Mich., has authorized its city clerk and engineer to purchase new machinery for the city pumping station. The station will be ready for use by April 1.

The Mackinaw Transportation Company, in the person of Capt. L. R. Boynton, states that the company has decided to purchase another ferryboat, to be of 24-car capacity.

The Board of Commerce of Flint, Mich., is seriously considering a proposition to secure the location of a \$300,000 automobile concern at present established in Chicago.

The city of Manistee, Mich., has approved of a contract with the Manistee Iron Works, whereby it agrees to transfer to the company \$20,000 in park bonds. In return the company agrees to deed to the city a piece of land, and to give employment to 200 men for seven out of the next ten years.

The step will mean the construction of a much larger plant, of considerable importance to the city.

The much heralded water works of the city of Saginaw, Mich., the construction of which was decided upon by a special election held last spring, has been knocked out by a decision of the State Supreme Court. The ruling has to do with a certain technicality affecting an amendment to the city charter, made necessary by the construction of the plant.

Business men of Hancock and Houghton, Mich., have organized a creamery company to be known as the Portage Lake Creamery. A committee has been appointed to attend to the purchasing of the necessary machinery.

Cheboygan capitalists are considering the organization of a company to take over the plant of the Cheboygan Boiler Works, Cheboygan, Mich. The plan is well under way and bids fair to establish a valuable industry for the city.

The Swartz Electric Company, Adrian, Mich., has turned to the manufacture of electric horns, a new product for this company.

The New Haven Coal Company, Owosso, Mich., recently purchased by Detroit capitalists, will begin active operations within the next few weeks. The company intends to greatly enlarge its capacity by the purchasing of new machinery.

The Parrot Heater Company has incorporated with a capital stock of \$20,000. The plant will be located at Jackson, Mich., and will engage in the manufacture of gas and electric heaters.

The Port Huron Salt Company, Port Huron, Mich., will greatly increase its output during the present year. The installing of the double pan system will necessitate a larger addition to the plant, in conjunction with which improvements to the amount of \$40,000 will be made.

The Detroit Pressed Steel Company, Detroit, has completed foundations for a building which will double the capacity of the company.

The John M. Lauer Machine Company of this city is laying plans for a large addition to its present plant. The present quarters are entirely inadequate.

Another chemical plant is to be located at Midland, Mich. The firm of Mercke & Co., with headquarters in Germany, is beginning the erection of a large plant for the manufacture of numerous chemical products.

The National Wire Cloth Company, Niles, Mich., is included in the merger of several wire cloth and wire products concerns, incorporation papers of which were filed at Clinton, Iowa, last week. The company has a capital stock of \$1,500,000.

Charles J. Peterson, Ironwood, Mich., is opening up a granite quarry on his farm near Van Buskirk.

Ball & Son, Coldwater, Mich., will move their plant from Chicago and Clay streets to a site on Fremont street.

The Buhl Malleable Company, Detroit, Mich., is erecting an addition to its plant for the manufacture of open hearth steel castings, which it will begin to turn out about May 1. A building 65 x 300 ft. is being erected of steel and Detroit-Fenestra steel window sash construction. It will be equipped with a seven-ton furnace.

Milwaukee and the Northwest

MILWAUKEE, WIS., February 6, 1911.

The National Brake & Electric Company, Milwaukee, expects to complete in about three months extensive improvements to its plant, consisting of additions to the present foundry and machine shop as well as a new storage warehouse.

The Vilter Mfg. Company, Milwaukee, has installed a 500-kw. generator with cross compound condensing Corliss engine.

The Columbia Electric Light & Power Company, Pardeeville, Wis., will build a lighting plant to be equipped with a 150-hp. boiler, one 125-hp. Corliss engine, one 100-kw. three phase, 60 cycle A. C. generator.

The Hough Shade Corporation, Janesville, Wis., will erect this spring an additional storage warehouse 40 x 80 ft., with brick walls and mill construction.

The A. A. Cutter Company, Eau Claire, Wis., will erect an addition to its plant this spring two stories and basement, with an electric freight elevator.

The Simmons Mfg. Company, Kenosha, Wis., has under construction a new steel and brick foundry, which will not require additional equipment, as it is erected on the site of an old foundry building which is being replaced.

The Menasha Wooden Ware Company, Menasha, Wis., contemplates erecting important extensions to its plant this spring, but definite plans have not yet been decided upon.

The C. A. Lawton Company, DePere, Wis., contemplates erecting a steel and concrete pattern storage room, 60 x 96 ft., on which work will begin as soon as the frost is out of the ground. The building will be of fire proof construction.

THE MACHINERY MARKETS

The MacKinnon Mfg. Company, Grand Rapids, Wis., expects in the near future to operate its plant 12 hours a day; the plant is running 10 hours at present. The increased output will be necessary to complete orders from wagon manufacturers.

The J. S. Rowell Mfg. Company, Beaver Dam, Wis., has plans under consideration for increasing its manufacturing facilities during the coming summer. The company's plant was enlarged about 50 per cent. a year ago, but finds the growth of its business will necessitate further extensions.

The Pacific Power & Light Company, Fruitville, Wis., will enlarge and improve its plant.

E. H. Goodman, city clerk, Townsend, Mont., will open bids February 14 for the construction of a pumping station. Lewiston, Mont., is considering the establishment of a water works system at a cost of \$100,000.

Argyle, Minn., is considering the establishment of a water works system.

Toronto

TORONTO, February 4, 1911.

Operations in many factories have been affected by an epidemic of grippe that appears to be attacking workers at all industrial centers in this province. In some manufacturing establishments the number of hands off work on this account is large, and the effect quite disorganizing. The pressure of orders for spring delivery is great in various lines, especially those having to do with agriculture, with navigation, with road-making, and with mining. Some of the towns that had about closed arrangements for the establishing of branches of manufacturing works in the United States have been notified that negotiations will not be resumed until the reciprocity agreement between the Washington and Ottawa governments has been dealt with by the national legislatures concerned. It is stated that, in the event of the agreement being adopted, several arrangements for the locating of branch works in Canada will be cancelled. The reason is not that the change of tariff in every case would be sufficient to neutralize the advantage of location in Canada, but that it is regarded as probable that other instalments of reciprocity would follow this one. This immediate result of the agreement is being urged as a reason for opposing it at Ottawa, and will be adduced in the arguments that will be brought forward against it in the House of Commons next week. Oddly enough, the rank and file of Canadian manufacturers are not the chief enforcers of this point. As the agreement does not greatly impair their protection against the competition of factories in the United States, and as it operates to deter the opening of American branch factories in Canada, not much fault is to be found with it by the great majority of existing manufacturers in Canada.

The Imperial Oil Company at Sarnia, Ont., is reported to be suspending action on plans for increasing the capacity of its refinery, plans that were in a forward state when the reciprocity agreement was announced. If the plans are carried out the plant will be enlarged sufficiently to make the output one-third greater than it is.

Orders have been issued from South Bend, Ind., for the pushing on of the Oliver Plow Works' building programme at Hamilton, Ont. The erection of the assembly building at a cost of \$200,000 is to be proceeded with at once. Altogether, it is said, there will be expended \$1,500,000 on the company's works. The news that building operations are to be proceeded with gives satisfaction in Hamilton, as it was feared the reciprocity agreement might cause the company to change its plans.

Harry Cockshutt, ex-president of the Canadian Manufacturers' Association, and head of the Cockshutt Plow Company, Brantford, Ont., says that the reduction of the duty on plows and certain other agricultural implements to 15 per cent. ad valorem, will be injurious to the Canadian industry, unless, as in the case of harvesters and mowers, there is a drawback of practically the whole duty on the pig iron and rolled steel used as material.

W. J. Verity, head of the Verity Plow Company, Brantford, Ont., says that he doubts that the John Deere Company will now establish its works at Welland, Ont., as the new tariff arrangement with the United States must tend to make a Canadian branch appear less desirable.

At the annual meeting of the London Street Railway Company, London, Ont., on February 1, it was decided to build an up-to-date steam power plant and abandon the idea of using hydroelectric power from Niagara Falls.

At London, Ont., more than a hundred factory hands have been off work daily for the last 10 days on account of grippe.

The location of Port Mann, the Pacific terminus of the Canadian Northern Railway, has been decided on. It is to be a mile and a half east of New Westminster, and on the south bank of the Fraser River, British Columbia. The

building up of this new terminal city is expected to make much business for manufacturers of structural material, equipment, &c.

A delegation of Pacific Coast men passed through Toronto, bound for Ottawa, on the night of February 2. Their mission is to obtain a charter for the British Columbia Steel Company, whose projected \$10,000,000 plant is to be at or near the Canadian Northern Railway terminal point at Port Mann. They are supposed to have some business with the government on the subject of steel bounties.

In reply to an inquiry of a private member of the House of Commons a few days ago, the government said that the masonry of the Quebec Bridge will be finished by November, and that the tenders for the steel superstructure name dates running from 1914 to 1916 as the time for the completion of that work.

A motion has been passed by the City Council of Hamilton, Ont., calling for the consideration by the Board of Control of a proposal to build and equip a municipal plant for the distribution of hydroelectric power.

The Canadian Steel Foundries, Ltd., has been incorporated with a capital stock of \$5,000,000, and head office at Montreal. This is the concern in which the Montreal Steel Company and the Ontario Iron & Steel Company, Welland, are to be merged.

H. R. Indhope, president of the Indhope Motor Company, Orillia, Ont., says that if the duty on automobiles is reduced 5 per cent. ad valorem, as is proposed in the reciprocity agreement, the duty on all parts and materials entering into automobile construction should be proportionately lowered.

The removal of the duty on type-casting and type-setting machines will reduce the price of these to the Canadian publisher \$800 to \$1000 each.

The Pacific Coast Construction Company, Victoria, B. C., has secured the Dominion Government contract to build a Marine Department depot at Prince Rupert, B. C. The price is \$200,000. A large wharf, set up on patent ferro-concrete piles, is to be built, as well as work shops, power house, buoy shed and residence for the staff.

The Grand Trunk Railway Company will rebuild its shops in Ottawa East the coming summer.

Calgary, Alberta, is to have a municipal paving plant.

There is a surprisingly large movement of machinery over the winter road into the Porcupine mining camp in Northern Ontario.

Motor trucks are coming into use very rapidly in Canadian cities, and manufacturers and selling agents are meeting with a large demand for these wagons.

A generator of 1500 hp. has been transported over the land road from the Toronto & Northern Ontario Railway to Sandy Falls on the Mattajami River in Northern Ontario.

The Dominion Government has put in this year's appropriations \$60,000 to be expended on improvements at Port Stanley, the port of London, Ont. Altogether between \$200,000 and \$250,000 will be expended there.

The Lakefield Canoe Building & Mfg. Company is erecting a new plant at Lakefield, Ont. It is to be fitted with the best machinery.

N. W. Curry, president of the Canadian Car & Foundry Company, is also president of the newly-incorporated Canadian Steel Foundries, Ltd. Other directors of the Car & Foundry Company are also on the board of the new merger. It is understood that the Canadian Steel Foundries, Ltd., will soon issue \$3,000,000 of 6 per cent. bonds, to be guaranteed by the Car Company, and that the money will be expended on extensions.

The Casey Shaw Lumber Company, Sudbury, Ont., has taken over the building supply business there of F. C. Crane-ford. It will establish a modern sawmill at Long Lake. To its Sudbury works it will add a made-to-order house business.

The new power house of the Sherbrooke Railway Company, Sherbrooke, Que., is almost completed.

The Porcupine Imperial Mining Company, whose head office is in New York City, is arranging for the bringing in of plant to operate its property in the Porcupine mining field.

The Hamilton Machinery Company has been incorporated, with head office at Hamilton, Ont., as a machinery-selling company. It has several lines of domestic and foreign manufacture to handle in Canada.

The ratepayers of St. Catharines have authorized a by-law to give municipal advantages to the Steel & Radiation, Ltd., who will erect buildings in the city at a cost of \$50,000.

The Canadian Pacific Railway Company is about to begin the construction of new offices in Toronto, to cost \$1,000,000. The Dominion Bank is to put up a very fine building opposite the Canadian Pacific Railway's new office.

David Spencer & Co. have had plans prepared for a new

THE MACHINERY MARKETS

departmental store building in Victoria, B. C., to cost \$600,000.

A by-law is being prepared for the expenditure of \$300,000 for an electric power plant by the city of Calgary, Alberta. Most of the money will be spent on sub-stations, transformers and machinery.

The Edmonton Heat & Power Company proposes to build a hydroelectric power plant about 60 miles north of the city of Edmonton, Alberta, and develop some hundreds of thousands of horsepower.

Texas

AUSTIN, TEXAS, February 4, 1911.

The demand for machinery for the improvement and enlargement of municipal public service plants and systems, such as electric light and power, water works and sewer disposal, is unusually brisk in the different cities and towns of Texas and the Southwest. The municipal ownership idea seems to be growing, and several bond issues have been voted recently by towns to take over the public utilities in the respective municipalities.

The City Council of Lagrange, Texas, has under consideration the matter of taking over the local water works plant and distributing system at the expiration of the present lease. If this is done improvements and extensions will be made.

The City Commissioners of Waco, Texas, have ordered an election to be held in that city February 14 to vote on the proposition of installing a municipal electric light plant.

The city of Lufkin, Texas, will install a new pumping plant and lay new water mains for its water works system. The question of whether the pumps shall be electric or steam driven is now being considered. A complete filtering plant will be installed in connection with the system.

I. J. Sander of Jacksonville, Texas, will erect a saw mill near Elkhart, Texas.

The Holland-Texas Irrigation Company is installing irrigation pumping machinery on its large farm near Cotulla, Texas. The pump is of large capacity.

The People's Light Company is installing considerable new machinery at its gas plant in Corpus Christi, Texas.

George Gwilt of Vernon, B. C., will install a clay working plant near Houston. Glazed ware and pressed brick will be manufactured.

Charles Malone, Plainview, Texas, will install a four-stand cotton gin at that place. The erection of a cotton seed oil mill is also contemplated.

The Texas Company, the large oil producing and refining company, which has its headquarters at Houston, has begun the development of a prospective gas field near Uvalde, Texas. It is stated that the company will pipe the gas to Eagle Pass and install a distributing system in that town if a sufficient supply of the fuel is developed. A syndicate, headed by J. S. Cartwright of Uvalde, Texas, is also carrying on development work in the same field with the view of piping the fuel to Eagle Pass and other towns.

The city of Amarillo, Texas, is extending its sewer system at a cost of about \$50,000.

Story & Ezzell, San Antonio, Texas, have been awarded the contract by the County Commissioners of Bexar County for the construction of a bridge across the San Antonio River.

A. B. Lorino, Matagorda, Texas, will install an ice plant at that place.

George D. Moore, Detroit, Mich., is negotiating with the City Commissioners of Austin with the view of entering into a contract for the reconstruction of the dam across the Colorado River at this place and the installation of a hydroelectric plant, the proposed cost to be \$1,000,000.

A. G. Hinn, Plainview, Texas, contemplates installing a creamery at that place at a cost of about \$10,000.

The plans for the proposed reinforced concrete viaduct that is to be constructed by the city of Houston, Texas, to connect Main street with Montgomery avenue by bridging Buffalo and White Oak bayous, have been prepared and the construction work will begin about April 15. The proposed structure will cost about \$500,000.

It is announced that the Producers' Oil Company will rebuild its machine shops at Humble, Texas, which were recently destroyed by fire, causing a loss of about \$10,000.

W. E. Gillingham and A. M. Davis, Modesta, Cal., who recently purchased a ranch of 2580 acres of land near Edna, Texas, will convert the tract into a farm, and will install irrigation pumping machinery.

M. B. Goldenberg, Tucumcari, N. M., will build a factory for the manufacture of rope and bagging from bear grass. Machinery for stripping the leaves of the plant and for manufacturing the fiber will be installed.

The New Mexico Realty Company will install irrigation

pumping plants on tracts of land near Tucumcari, N. M. J. W. Campbell, of Tucumcari, is manager.

If legislation which is now pending before Congress is passed, authorizing the Secretary of the Interior to lease water power under reclamation dams for longer than 10-year periods, the Water Users' Association of the upper Rio Grande valley of Texas and New Mexico, whose lands are embraced in the Government's Elephant Butte dam and irrigation project, will organize a subsidiary for the purpose of installing a hydroelectric plant and constructing an electric railroad down the valley for about 100 miles. The Water Users' Association has its headquarters in El Paso. Richard Burges and Felix Martinez, both of El Paso, are actively interested in the subsidiary proposition.

A syndicate composed of L. M. Scribner of San Francisco, Richard E. Abenheim of London, England, W. H. Moore of Mababi, state of Sonora, Mexico, and others will build a large lumber mill at Mababi. It will also erect a canning factory at that place and construct about 60 miles of railway to give its land and other holdings a transportation outlet. Mr. Moore is manager.

The Compania La Tolteca de Cemento Portland, S. A., of Tolteca, state of Hidalgo, Mexico, will double the capacity of its cement plant at that place, bringing the output up to 200 tons per day.

The Monterey Railway, Light & Power Company, Ltd., will receive bids up to March 1, for the installation of a gas plant and distributing system in Monterey, Mexico. The city has a population of 85,000. Lewis Lukes is vice-president and general manager of the company.

The Lockhart Ice Company, Lockhart, Texas, is doubling its capacity for the manufacture of ice.

The Houston Structural Steel Company, Houston, Texas, is proceeding with the improvements which will make it one of the greatest steel plants in the South.

Machinery for the new gas plant at Taylor, Texas, which was purchased in Pittsburgh, Pa., is en route. A. J. Zilker of Austin, Texas, is superintending the work on the water works which he recently purchased, introducing improvements and enlarging the capacity of the plant.

The hull house of the Planters' Oil Mill, Bonham, Texas, was burned January 25, causing a loss of \$7000, fully covered by insurance.

The Greenville Broom Mfg. Company, Greenville, Texas, has increased its capital stock to \$7500.

Vogt & Sons of Philadelphia will establish a packing house and fertilizer plant at Cuero, Texas. Charles Vogt is at Cuero making arrangements for the new industry.

The Texas Auto Specialty Mfg. Company, Dallas, Texas, has been incorporated with a capital stock of \$25,000. The incorporators are L. L. Lane, H. H. Moore and Jennings M. Moore.

Farther Central West

OMAHA, NEB., February 6, 1911.

D. K. Barr, Louisville, Neb., will receive bids March 1 for the construction of a water works system to cost about \$16,000.

Chappell, Neb., has under consideration the construction of a light and water works system.

Battle Creek, Neb., will expend \$10,000 for the construction of a water works system.

The City Council of Lohrville, Iowa, is considering the installation of a water works system.

The Bentley & Olmstead factory, which burned recently at Des Moines, Iowa, will be moved to Ottumwa, Iowa, the latter city having offered the company a free building.

The new factory of the United Woodworkers Company at West Fifth and Taylor streets, Davenport, Iowa, is nearly completed. Plans for the machinery have been placed in the hands of some leading concerns, which are expected to submit bids within the next 10 days. The company is incorporated for \$10,000.

The Davenport Bedding Company, Davenport, Iowa, successor to M. Cromer & Co., has begun the manufacture of mattresses at its new factory at 1027 West Fourth street. M. Cromer, head of the old company, whose factory was burned September 7, is the president of the new concern.

It is reported that the Chicago & Northwestern Railroad Company has appropriated \$400,000 for new railroad shops at Missouri Valley, Iowa. Construction of a new boiler and erecting shop will first be started, to be followed by a new storehouse and an addition to the roundhouse. Work will begin as soon as the spring opens.

The Pitt-Matthews Carriage & Auto Company, Des Moines, Iowa, has been incorporated with a capital stock of \$10,000. The incorporators are Mabel A. Pitt, Edwin Matthews and R. G. Priebe.

The American Enamel Brick Company, Des Moines, Iowa, has been organized with \$200,000 capital stock. The

THE MACHINERY MARKETS

company has closed a contract with the Enamel Concrete Company to purchase one of the new \$50,000 brick making machines. J. C. Mardis, one of the leading contractors of the city, will be the president and general manager of the new company. It is expected that the new plant will be completed by April 1. In the meantime, machines are being built in the local shops.

The city of Mount Vernon, Iowa, will advertise February 21 for bids for the construction of seven miles of sewage and a disposal plant.

The B. F. Swanson Company, Des Moines, Iowa, is erecting a factory at Omaha, Neb., to be devoted to rebuilding typewriting machines, which will give employment to between 50 and 100 men. H. E. Russell will be the manager.

San Francisco

SAN FRANCISCO, February 1, 1911.

The announcement of favorable action by the National House of Representatives on the Panama-Pacific Exposition project has resulted in an immediate improvement in the local market. Most of the metal working shops in San Francisco have been in need of new equipment for some time, but have kept out of the market until the exposition matter was settled. During the few hours since the decision was announced merchants carrying stocks have booked a large number of orders, some of them for large tools, and, while no large lists have come out, it is evident that the period of waiting has passed. Machine tool sales throughout the State have increased slightly during January, but still include very few important transactions, and no individual inquiries of unusual magnitude are coming out.

The general machinery market in San Francisco is also in a better condition, as it is known that many contemplated improvements to manufacturing and other industrial plants have been delayed by uncertainty regarding the exposition. Activity is gradually becoming more general in other parts of the State, though in some lines, such as sawmill and planing mill equipment, little business is expected before the middle of March. Several mining companies have placed substantial orders, and considerable equipment is being purchased by cement interests. Orders are expected shortly for a number of gold and reclamation dredges, steam shovels, &c. Traveling men report activity in all lines through northern California and southern Oregon, while the oil interests of southern California are entering the market on a larger scale than for nearly a year past. Local gas engine manufacturers are figuring on many inquiries for marine engines up to 150 hp., and report steady activity in the Australian and New Zealand trade.

The Pelton Water Wheel Company has moved its San Francisco offices from the Monadnock Building to the works at Nineteenth and Harrison streets.

The Western Laundry Machinery Company and the local branch of the American Woodworking Machinery Company have occupied a new building two doors below their former quarters on Fremont street, near Market.

The Ocean Shore Railway has been sold to the bondholders under foreclosure proceedings, and arrangements are to be made as soon as possible for the completion of the line, which will require the laying of several miles of track. It will be necessary to purchase considerable new rolling stock and motive power before the road can be placed on a regular operating basis.

The Vance Redwood Lumber Company has ordered from the Allis-Chalmers Company a complete steam turbine electric power plant for its mill near Eureka, Cal. The Allis-Chalmers Company has also taken an order for a large gas plant for the Holton Power Company, El Centro, Cal.

Lewis Lukes, vice-president of the Monterey Railway, Light & Power Company, Monterey, Mexico, will receive bids up to March 1 for the erection of a gas plant in that city.

Officers of the Eureka Foundry, Eureka, Cal., have been elected as follows: G. Y. Henderson, president; C. W. Pickett, vice-president; Geo. W. Watson, secretary, and manager. The Eureka Foundry is bidding on a lot of equipment to be used on the Humboldt Bay jetty. The requirements for this work will include a number of cars and locomotives, in addition to a large lot of small tools.

The Harbor Commissioners have placed an order with the Vulcan Iron Works, Wilkes-Barre, Pa., for an \$11,525 locomotive, to be used on the belt railroad in San Francisco. They have taken bids on the erection of a grain elevator, and have granted a permit to the Government revenue service to erect two 30-ton scales at China Basin.

The Joshua Hendy Iron Works has received an order for a 40-stamp mill, amounting to about \$50,000, from a Nevada mining firm.

G. H. Hayes proposes to spend about \$15,000 on machinery to develop a gravel mine near Placerville, Cal.

The Oriental trade is steadily increasing in volume. A demand for American agricultural implements and machinery is being built up in the Manchurian grain country, and a Portland, Ore., firm is preparing a shipment of 500 plows for that country. A flour mill outfit for Forbes & Co., Kobe, Japan, formed the principal cargo of the Chicago Maru, on her last departure from Tacoma, Wash.

The California Pipe & Steel Company has started work on a new factory building at Taft, in the California oil fields.

The Los Angeles Chamber of Commerce is negotiating for the establishment of a zinc products factory. It is said that raw material could be obtained from the Yellow Pine district of southern Nevada.

G. M. Bradrick of the Bradrick Machine Works, Porterville, Cal., states that work will be started shortly on a new shop.

The Lane Mill & Machinery Company has been incorporated at Los Angeles, with a capital stock of \$100,000, by C. C., J. C., G. M. and C. H. Lane and J. M. Hunter.

The Pacific Sashweight Foundry has been incorporated at Los Angeles, with a capital stock of \$25,000, by E. C. Wilson, J. W. Begg and E. A. Buchanan.

The Gas Power Machinery Company has been incorporated at Los Angeles, with a capital stock of \$200,000, by Lyman Stewart, E. C. Sterling, G. R. Harrison, F. C. Nellis and H. A. Grive.

The Warman Steel Casting Company has been incorporated at Los Angeles, with a capital stock of \$50,000, by G. B. Warman, N. W. Warman, N. C. Heron, R. W. Ellis and C. W. Foote.

The Chamber of Commerce of Redondo, Cal., is negotiating for the establishment of a crucible steel plant at that place.

The Riverside Portland Cement Company is proceeding with its new plant in southern California, and has already placed its order for tube mills, &c.

The Pacific Gas & Electric Company is preparing for the installation of a lot of new machinery at its plants in Sacramento, Cal. Plans have already been completed for a new 15,000-hp. steam turbine generator.

Balfour, Guthrie & Co. are rapidly getting their plans in shape for a large cement plant near Bellingham, Wash. A new cement project is being started at San Francisco by the Spreckels interests, though no definite action has been taken aside from the purchase of a site.

The Union Oil Company has purchased a 75-acre tract adjoining its present plant at Martinez, Cal., and it is understood that a lot of new equipment will be added.

The Royal Enameling & Stamping Works, Des Plaines, Ill., is in communication with the Chamber of Commerce of Alameda, Cal., with a view to starting a branch factory in that city.

The California Steel Monolithic Company is preparing to put up a factory near San Rafael, Cal.

The City Council of Long Beach, Cal., is planning to establish a municipal water works system.

The South

CHATTANOOGA, TENN., February 7, 1911.

The Lucas-Wallace Mfg. Company, Paducah, Ky., has been organized to manufacture a new patented carburetor for gasoline and other hydrocarbon engines. The company has equipped a shop and has purchased machinery for its present needs and expects to begin manufacturing operations about February 15.

E. J. Glass, manager of the municipal electric light plant at Nicholasville, Ky., is considering plans for the installation of a 150-hp. boiler and a 75-hp. steam engine.

Bids will be received by the Mayor and Board of Aldermen, Dalton, Ga., until February 23, for furnishing material for the enlargement of the water works and electric system. The plans and specifications adopted call for one 150-hp. boiler, one 300-hp. feed water heater, two turbine pumps with direct connected induction motors, two compound condensing engines with condensers, two 150-kw. A. C. generators with five panel switch board.

The Birmingham Buggy Company, Birmingham, Ala., will erect a wagon plant at Avenue E and Eighteenth street, 70 x 150 ft., four stories, of concrete construction. The plant will include a down draft blacksmith shop with ten fires. The estimated cost is \$75,000.

The Mobile Terminal Company, Mobile, Ala., will erect a power house at Alabama Port to furnish power for the operation of a large electric dredge.

The Veitch-Matthews Engine Company, Birmingham, Ala., recently reorganized with \$250,000 capital stock, is

THE MACHINERY MARKETS

planning the construction of a plant for the manufacture of turbo-rotary engines. Dr. Lovett, fiscal agent, 1203 Empire Building, Birmingham, is asking for bids on equipment for machine shop and foundry. The officers of the new company are I. A. Lewis, president; George Vietch, Sr., vice-president; E. L. Huey, treasurer, and J. M. Lovett, secretary.

Howell Adams, of De Ridder, La., will erect a bottling plant at Many, La.

The Southwest

KANSAS CITY, Mo., February 6, 1911.

The citizens of Spring Hill, Kan., have voted to issue \$6000 in bonds for the establishment of an electric light plant.

H. V. Forest, Kansas City, Mo., has petitioned the City Council of Kearney, Mo., for a franchise to establish an electric light plant.

The Queen Bee Stove Company, Tulsa, Okla., has under construction a two-story factory building, 48 x 112 ft., of concrete and steel, which it expects to have ready for occupancy about April 1. The company will manufacture a full line of gas ranges and heaters. The company will buy a gas engine, electric motors, grinding machinery, pipe cutting and threading machines, drill presses, an elevator and a full line of sheet iron working tools.

The Kansas City Hay Press Company, Kansas City, Mo., whose foundry and equipment were recently destroyed by fire, advises that it will rebuild immediately.

C. W. Parker, engaged in the manufacture of amusement devices, is removing his manufacturing business from Abilene, Kan., to Leavenworth, where a new concrete building is under construction.

The City Council of Muskogee, Okla., has plans prepared for improvements to its water works system.

J. S. Lewis, Ogden, Utah, has petitioned the Council for a franchise for the construction of an electric light plant.

Dodge City, Kan., is planning improvements to its lighting system.

Ira Hickman, Spearville, Kan., is preparing to construct an electric light plant.

Snyder, Okla., is considering the establishment of a water works system.

The Mehle Packing Company, Tulsa, Okla., has increased its capital stock from \$25,000 to \$50,000, and will practically double the capacity of its plant in the near future. U. Holderman is the president of the company.

A. H. Lightner, Milian, Mo., has purchased an artificial ice plant at Claremore, Okla.

The United Mines Company, Joplin, Mo., is erecting a zinc concentrating mill at Davis, Okla. The first carload of machinery has arrived.

The plant of the Winfield Mill & Vibrator Company at Drummond, Kan., was destroyed by fire January 25, causing a loss estimated at \$20,000.

The Cold Storage Company, Siloam Springs, Ark., has let the contracts for the erection of its buildings.

The Adams Lumber Company, De Queen, Ark., has secured a mill site at Ashdown, Ark., and will operate a saw-mill and planing mill at that place. New machinery has been purchased and will be installed as quickly as possible.

E. C. Brice of Mansfield, Ark., is forming a company to erect at Little Rock, Ark., a \$50,000 plant to manufacture cement shingles, fence posts, &c. The cement used by his process is to be mixed with clay and heated with electricity.

The plant of the Fort Smith Ice & Cold Storage Company, Fort Smith, Ark., was recently destroyed by fire causing a loss of \$5000.

The larger of the two Kimball Lacy mills at Arkansas City, Ark., was burned January 27, entailing a loss of \$50,000, which is covered by insurance.

The Board of Directors of the Arkansas Foundry Company, Little Rock, Ark., will issue \$5000 preferred stock. Some improvements in the plant are contemplated.

The Helena Gas & Electric Company, Helena, Ark., has been organized for the purpose of taking over the properties of the Helena Gas Company. The new company intends to install new machinery and apparatus. The incorporators are Claude S. Fitzpatrick, J. B. Miles, Jr., W. J. O'Brien and Judge Lea Mundt.

The saw and planing mill belonging to Francis Shaw, Jasper, Ark., was burned January 30, entailing a loss of about \$5000.

The Texarkana Broom & Mop Company, Texarkana, Ark., has been incorporated with a capital stock of \$10,000. The incorporators are Q. O. Turner, J. B. Wyche and E. E. Bricker.

Government Purchases

WASHINGTON, D. C., February 6, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids February 14, under schedule 3278, class 11, for furnishing one 2-ton side blow converter.

The Paymaster General, Navy Department, Washington, will open bids February 14, schedule 3279, class 21, for one set of gasoline machinery, and schedule 3296, class 22, for one Mosher marine water tube boiler.

The Inspector of the twelfth lighthouse district, Chicago, Ill., opened bids January 4 for furnishing one set of compressed air fog signal machinery for the Peshtige Reef light vessel No. 77, as follows: De LaVergne Machine Company, New York, \$1511; Ingersoll-Rand Company, New York, \$1724; August Mietz, New York, \$1900 and \$2200; American Air Compressor Works, New York, \$2049.

The Inspector of the third lighthouse district, Tompkinsville, N. Y., opened bids January 16 for furnishing one four-drum double cylinder hoisting engine for the tender Iris, as follows: Lidgerwood Mfg. Company, New York, \$2340 and \$1598; Hyde Windlass Company, Bath, Maine, \$1550; Williamson Bros. Company, New York, \$1958.

The Inspector of the third lighthouse district, Tompkinsville, N. Y., opened bids January 23 for furnishing one 35-hp. motor, two 20-hp. motors and one 15-hp. motor, as follows: Crocker-Wheeler Company, Ampere, N. J., \$1482; General Electric Company, Schenectady, N. Y., \$1479; Fort Wayne Motor Works, New York, \$1535.60; Western Electric Company, New York, \$1535.50.

The purchasing agent of the Isthmian Canal Commission, Washington, opened bids January 27, as follows:

Class 1. One 25-ton trolley crane—Bidder 4, Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$6530; 12, Morgan Engineering Company, Alliance, Ohio, \$6495; 14, Niles-Bement-Pond Company, New York, \$6145; 21, Whiting Foundry & Equipment Company, Harvey, Ill., \$5445.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids January 21, as follows:

Class 32. Two 31-hp. motors and one 10-hp. motor—Bidder 66, Diehl Mfg. Company, Elizabethport, N. J., \$775.

Class 111. One 100-hp. induction motor—Bidder 1, Allis-Chalmers Company, Milwaukee, Wis., \$1331; 101, General Electric Company, Schenectady, N. Y., \$1635; 202, Reliance Electric & Engineering Company, Cleveland, Ohio, \$1552; 267, Westinghouse Electric & Mfg. Company, Washington, D. C., \$1642; 268, Wagner Electric Mfg. Company, St. Louis, Mo., \$1574.38.

The Faeth Iron Company's Enlargement.—The Faeth Iron Company, Kansas City, Mo., has increased its capital stock from \$250,000 to \$350,000. It has completed a manufacturing building, 65 x 80 ft., four stories and basement, of standard mill construction, and equipped with automatic sprinklers. A new iron and steel warehouse, 46 x 250 ft., is of steel and concrete construction and has a capacity of 6000 tons. The general office, 46 x 100 ft., is heated and ventilated by the fan system, ventilating in the summer and heating in the winter. The warehouse building is equipped with two electric elevators and with spiral chutes for discharging merchandise from the upper floors to the shipping platform. A railroad siding, with a covered shipping dock, provides ample shipping facilities. The floor space in the new buildings figures 150,000 sq. ft., or almost three and one-half acres. Charles E. Faeth is president; W. J. Dean of Minneapolis, vice-president; C. E. Plank, secretary and treasurer.

The Carnegie Steel Company, Pittsburgh, Pa., is sending out stock list No. 6 of its Waverly Warehouse, Newark, N. J. The list shows the sizes of angles, bars and plates and other materials carried in the warehouse, and the tonnage of each on hand. Edwin A. Amaden is general superintendent and Lewis S. Sitts is sales agent of the Waverly warehouse. A telephone and telegraph code is given, which will facilitate placing of orders. A table is also printed showing the standard classification of extras on steel bars and shapes as adopted September 1, 1909.

The Bowles-Gifford Company, contracting engineer, has removed its offices from 17 West Forty-second street to rooms 1214-1215, 25 East Twenty-sixth street (Madison Square north), New York City.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

Nicholson File Company
Providence, R. I.



THE IRON AGE

Established
1855

New York, February 16, 1911

VOL. 87: No. 7

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	.	.	.	.	} EDITORS
A. I. FINDLEY,	.	.	.	.
H. R. COBLEIGH,	.	.	.	.
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

	PAGE.
Editorial:	
Two Large Sales of Pig Iron.....	403
Steel Corporation Production, 1901-1910.....	404
A Better Outlook for the British Iron Trade.....	404
The Engineer in Steel Foundry Practice.....	405
Railroad Securities as Investments.....	405
The Crucible Steel Company Secures Controlling Interest in Halconb Steel Company.....	406
The Triple Supply Convention.....	406
The Associated Foundry Foremen of Philadelphia.....	406
New Publications.....	407
The George V. Cresson Company in Receiver's Hands.....	407
The Chicago Foundry Foremen's Association.....	407
The Iron and Metal Market Reports.....	408 to 417
Iron and Industrial Stocks.....	417
Notes on Prices.....	417
The New Minnesota Ore Road.....	418
Obituary.....	418
The Henry Souther Engineering Company's Laboratory....	418
The Dodge Quarter Century Club.....	418
Customs Decisions.....	419
The Yuba Construction Company.....	419
The Farrell, Kemp & Gushe Company.....	419
The Electric Smelting of Swedish Iron Ore.....	419
Iron Ore List with Lake Superior Map.....	420
What Union Labor Is Doing for San Francisco.....	420
Personal.....	421
Our Trade with Latin-America.....	422
The American Iron & Steel Mfg. Company's Annual Report.	423
A Bill to Legalize the Boycott.....	423
Canada's Steel Bounties May Be Renewed.....	424
The National Electroplaters' Association.....	424
Machine Tool Awards at the Brussels Exposition.....	424
The Krupp-Midvale Suit Dismissed.....	424
The National Machine Recorder. Illustrated.....	425
Shop Floors.—II. Illustrated.....	426
A Large High Speed Flywheel. Illustrated.....	431
New Railroad Equipment Orders.....	431
Handling Iron Ore with Electromagnets.....	431
The No. 1½ Newton Duplex Miller. Illustrated.....	432
Workmen's Compensation in Ohio.....	433
The Mechanical Engineer and Prevention of Accidents. Illus.	434
Natural Gas in 1909 and 1910.....	437
The Quebec Bridge.....	437
Motors for Driving Main Rolls of Mills. Illustrated....	438
January Copper Production and Stocks.....	442
The Steel Corporation's Unfilled Orders.....	442
The North Wales Geared Power Hack Saw. Illustrated....	443
Some Remarkable Carborundum Company Products. Illus..	443
A Wire Rope of Exceptional Type. Illustrated.....	444
New England Foundrymen.....	445
Pennsylvania Railroad Freight Stations in Philadelphia....	445
The Machinery Market Reports.....	446 to 455
Current Metal Prices.....	456

Two Large Sales of Pig Iron

Mill Operations on a Larger Scale

A Broader Market for Finished Materials in Nearly All Lines

The market in finished lines is broadening. The mills are getting the effect of the January improvement in new orders and in the past week running schedules have been fuller all over the country. At the same time the rate at which new business has been entered upon order books has kept up to that of the second half of January, with rails excepted, and in some lines has exceeded it.

Pig iron has been active in the Chicago district. At the attractive prices named by Southern sellers and met by Northern makers, the leading agricultural machinery interest has bought freely, the total being estimated at 100,000 tons, deliveries extending through and beyond the third quarter. A pipe company has also taken 50,000 tons of Southern and Valley irons, deliveries covering the second and third quarters.

While pig iron buying has been by no means general, the amount of business quietly put through has signified both the lowest prices in months and the belief of important buyers that they marked the turning point. Quoted prices vary more than for many weeks, and in some districts furnaces are definitely holding out for 25c. to 50c. advance.

Following the recent sale of 6000 tons of basic iron at \$13.25, at Valley furnace, one of 3000 tons has been made at \$13.50. Furnaces are now holding for \$13.75 as a minimum. Bessemer iron is inactive, but a sale of 1250 tons is reported at \$15.

In semifinished steel prices appear to be firmly maintained. A sale of 2000 tons of open hearth sheet bars has been made at \$24, Pittsburgh, and one of 2200 tons of high carbon forging billets at \$29, Pittsburgh.

All the steel companies report a larger scale of operations, ranging in some cases from 75 to 90 per cent. of mill capacity. The Steel Corporation now has 60½ per cent. of its blast furnace capacity active, as against 46½ per cent. at the low point at the opening of the year. Its statement of unfilled orders January 31, showing 436,000 tons more than on December 31, the first gain in 13 months, quite exceeded the highest prediction. February promises no duplicates for the New York Central and Pennsylvania rail orders and its export total may not be as great.

New rail business has been light this month. A 15,000-ton contract for girder rails for the Chicago City Railways has been divided between the Steel Corporation and the Pennsylvania Steel Company, the former getting 10,000 tons. Railroad enterprises in various foreign countries are reported promising and the outlook is for an export trade in American rails equal to the excellent total of 1910.

The rail mill of the Illinois Steel Company at South

Chicago, which was shut down when the Gary mill resumed last month, will be started next Monday. Both mills have orders that will occupy them until July 1.

Among the latest structural contracts are 2800 tons for the new plant of the Corn Products Company at Argo, Ill.; 4400 tons for a bridge over the Arkansas River at Ft. Smith, and 3500 tons for the Cruikshank warehouse in New York. The new Delaware & Hudson shops will require 4000 tons. On March 15 the Panama Canal Commission will open bids for 12,000 tons of structural steel for emergency dams. The New York Telephone Company is planning a new building that will take 10,000 to 15,000 tons.

Plate mills are busier, and some of them reached a 75 per cent. basis last week. A Pittsburgh builder of gas holders has bought 5000 tons of plates for Minneapolis and St. Louis contracts.

Pipe mills are running at 50 to 60 per cent of capacity. Some good pipe line contracts are pending. The Tri-State Natural Gas Company is inquiring for 70 miles of 3 to 10 in. pipe, and the Eastern Oil Company has bought 25 miles of 12-in. pipe.

Some wire interests, with their large advance bookings, have favored a higher price, but there is a strong sentiment against any change unless the spring demand expands unexpectedly.

Scrap markets are advancing and speculative buying is a growing factor. Heavy melting steel is particularly strong, advancing 75c. a ton in the Pittsburgh market this week. Railroads are evidently holding their accumulations for higher prices.

Spot tin sold in the New York market February 15 at 45.75c., against an import price of 43.15c., indicating an active cornering operation right at home.

Steel Corporation Production, 1901-1910

On March 31, 1911, the United States Steel Corporation will round out its tenth year, and the anniversary will naturally bring out some interesting comparisons. Reference was made in these columns recently to the United States Steel Corporation's share in the pig iron and the steel ingot production of the country in 1910. Its pig iron output last year was approximately 11,800,000 tons and its steel ingot output about 14,150,000 tons, as officially stated. What is of particular interest in these figures is that the Steel Corporation's percentage of the country's pig iron production last year was exactly, to 1-10 of 1 per cent., what it was 10 years ago in the corporation's first year—namely, 43.2 per cent. This does not answer the question, What percentage of the country's pig iron producing capacity belongs to the Steel Corporation? That would be somewhat difficult to arrive at. Theoretical capacity is one thing, but practically available capacity is quite another. A low price for pig iron would rule a certain percentage of furnaces out of consideration, for many could not be operated except at a loss on a level of prices which to others would yield a fair profit.

Probably, owing to the conditions prevailing in the second half of last year, which led it to reduce steadily the number of its active furnaces—the curtailment being more drastic than in the case of other companies, over which to some extent it apparently held the umbrella—the Steel Corporation's percentage of the 1911 output was less than its capacity percentage. Further, it has

two blast furnaces at Gary, which have never been in commission. At all events it is a significant fact that after 10 years of vigorous blast furnace building the Steel Corporation should produce in the year of high record pig iron output precisely the percentage of its first year of operations.

The pig iron comparison is not quite what it should be, since the Steel Corporation's pig iron, all of which enters into steel, is compared with a total in which foundry iron is an important factor. Taking steel ingots as the basis, we find that the Steel Corporation was less of a factor last year than in 1901. The figures for both pig iron and steel ingots are as follows:

The Steel Corporation's Share of Pig Iron and Steel Ingot Production in 1901 and 1910.

	PIG IRON—GROSS TONS		Per ct.	
	1901.	1910.	1901.	1910.
Steel Corporation	6,855,000	11,800,000	43.2	43.2
Other producers	9,019,000	15,498,000	56.8	56.8
	STEEL INGOTS—GROSS TONS		Per ct.	
	1901.	1910.	1901.	1910.
Steel Corporation	8,949,000	14,150,000	66.2	56
Other producers	4,554,000	11,150,000*	33.8	44

* Estimated.

The estimate of steel ingot production in 1910 by producers other than the Steel Corporation is based on the known fact that the Steel Corporation increased its ingot production of 1909 by 800,000 tons. It is fair to estimate that the other steel interests made at least a corresponding increase, which would give them, say, 600,000 tons more than in 1909, when the country's total was 23,955,021 tons. It appears from the figures that whereas the Steel Corporation produced 66.2 per cent. of all the steel of the country in 1901, its percentages in 1909 and 1910 were but 55.7 and 56, respectively. Such a performance in the two years of the country's high record production indicates plainly that it has not maintained its original position as a steel producer. This has taken place in spite of the prodigious additions to the corporation's steel making plant in the past 10 years, both by new construction and the absorption of three large competitors—the Union Steel Company, the Clairton Steel Company and the Tennessee Coal, Iron & Railroad Company.

A Better Outlook for the British Iron Trade

When the statement of British foreign commerce in 1910 appeared a few weeks ago surprise was expressed that so much complaint should have come from iron and steel manufacturers there last year. Total exports and imports of 1108 million pounds sterling for 1910, against 1071 million pounds in the boom year 1907 seemed to spell prosperity for all industries. Yet in the iron trade the year was a good deal short of a record one, and at no time did British iron market reports indicate that either in price or volume was the business satisfactory. There has been at times a disposition among some British steel manufacturers to lay their trouble on the free access foreign steel products, particularly semifinished steel, have to their market. But they have never been self-contained in ore, and some of their sheet and tin plate and other mills have at times found it to their advantage to accept Germany's attractive offers on semifinished steel. Moreover, it has been the British destiny to draw raw materials from without and ship finished products. But 678 million pounds of imports last year, against 645 millions in 1907 and 430 millions of exports against 426 millions in 1907 accentuates the preponderance of

imports in a way that is well calculated to foster anti-Cobden sentiment.

But leaving out of the account influences that may be slowly at work in the British iron trade, in contrast with the evident expansion in the United States and Germany, the outlook for 1911 is more promising. The *London Iron and Coal Trades Review* cautiously yet hopefully refers to it in the following, after noting that with cheap money and promised freedom from labor troubles the prospect for all industries seems improved:

The Board of Trade returns, whatever their defects, must be regarded as affording some more or less reliable indications of the measure of prosperity the country is enjoying, especially as in this instance they are supported by the records of railroad earnings, bankers' clearings and labor statistics, all of which are of a favorable character, and, even, if the beneficial results of our improved foreign commerce are not yet fully felt, indicate the direction in which we are traveling, and encourage the hope that during 1911 we shall continue to advance along the same road. In the iron and steel trades, very favorable factors in the situation are the prospects of peace in the shipbuilding yards, the large amount of new tonnage on order and the improving freight market, which is likely to lead to further contracts before prices of material rise much higher than they are at present. The iron and steel trades, of course, are not entirely dependent upon the shipbuilding industry, but it is their best customer in this country, and when it is languishing, they cannot be active, while when it is flourishing they must feel the benefit. Then again a host of other important industries are dependent upon shipbuilding and will profit accordingly. . . . So far as can be judged by present indications, there is no apparent reason why the hopes entertained of a steady improvement in trade during 1911 should not be realized and some apparent reason why they should.

The above forecast, based to so large an extent on the British export trade, reflects the continued healthy condition of the world's iron and steel trade that has been indicated by the increasing exports from the United States. With all that is likely to come from the present improvement at home, the export demand in 1911 must be counted on to furnish respectable running schedules to certain mills, particularly in the Pittsburgh district.

The Engineer in Steel Foundry Practice

A great American plant which manufactures and consumes large numbers of open hearth steel castings, many of them small, has demonstrated that a close relationship between the engineering staff and the foundry results in a high proportion of satisfactory castings. At the present time more than 90 per cent. of the pieces delivered to the shop pass the test of machining without revealing blowholes. Formerly in the same works good castings were rather the exception. It was demonstrated that the engineering staff, by furnishing the foundry with the details of each mold, accomplished wonderful improvements in practice. The keynote to success was found to lie in very large risers and plenty of ventilation. Other details were studied out scientifically.

The skill of the experienced foundryman, great though it may be, often savors of guesswork. System in the maintenance of records is often lacking. Empirical judgment cannot always bring results equal to those obtained by the exact calculations and tests and analyses of the engineer. In the works in question, each pattern is studied with the foundry problem in mind. With some pieces the preliminary work is costly, but good castings are obtained. The saving in the waste of machining defective pieces—a waste that includes labor and general costs—more than makes up for the expense of getting down to correct practice in producing any given casting.

Not all of the steel foundries do good work. Some users are fortunate in getting what they are after. Others have abandoned the use of cast steel wherever drop forgings could be substituted. Of course there is a limit to the expense to which a foundry can go, unless the customer is willing to pay for it. The user of castings in which blowholes would be a vital defect should be willing to pay a high price, if by so doing he can get a high percentage of perfect castings. Probably the engineering side of steel foundry practice is seldom developed to the perfection related in the case cited. The more closely such examples are followed, probably the greater the success of the industry.

Railroad Securities as Investments

Events of recent years have cleared up a great deal of uncertainty regarding railroad securities as investments. The efforts of State legislatures and of Congress to enact laws that would meet the popular demand for regulation of the railroads have established the fact that these corporations which have built the highways of the country have rights which cannot be assailed. The railroad is entitled to charge rates which will afford a reasonable return on its capital, and there is no legislative power, either in the States or the National Government, which can encroach seriously upon this right.

This amounts to an indirect guarantee by the Government of railroad bonds as investments, and stocks also share in this safeguard so long as they bear a reasonable relation to the value of the actual property or investment in the railroad. For all practical purposes, railroad bonds have become as safe an investment as the obligations of the Government. Bonds issued by the National Government have no security except the honor of Congress. The Government might repudiate both interest and principal, and there is no tribunal through which the investor could enforce payment. The note issues of the Continental Congress were ultimately redeemed at one cent on the dollar. Other republics on this continent have repeatedly defaulted or repudiated their obligations. Bonds issued by our own Southern States during the reconstruction period, after the Civil War, were repudiated to the extent of several hundreds of millions of dollars, and investors have never discovered any means of collecting interest or principal, because there is no court that has jurisdiction to enforce payment. A county, city or other municipal body may issue bonds, and if it becomes bankrupt, either through extravagance or depreciation of its property, the rights of the investor are limited.

When a railroad defaults in the payment of interest on its bonds or other direct obligations, the courts appoint receivers, whose primary duty is to safeguard the property in the interest of the bondholders. Local railroads, which "begin nowhere and end nowhere" have sometimes been sold out in bankruptcy at a loss to the bondholders, but such cases have been exceedingly rare in the case of large companies or systems. In the receiverships of 15 years ago, even the holders of junior issues received full value for their securities. During the period of rapid construction, from 1870 to 1890, new railroads, especially in the West, had been financed with long time bond issues bearing 6 and 7 per cent. interest, and in many cases securities had been issued recklessly for amounts far in excess of the actual cost of construction and equipment. The large systems which became

bankrupt merely broke down under the burden of paying high rates of interest on excessive capitalization.

The older railroad systems, which have followed from the beginning the practice of issuing no stock except for cash paid in by investors, have never failed to pay attractive dividends. As a rule they have paid 5 to 7 per cent. dividends from the beginning, and have continued regular payments for 50 and 60 years. During the past 10 years practically all the large railroad systems of the United States have adopted this conservative policy of issuing no stock except for cash subscriptions, usually at par. This not only safeguards their underlying bond issues, but has strengthened them financially to such an extent that they were able to earn and pay full dividends in the depression following the panic of 1907.

Many of the Western railroads which became insolvent in the '90s were "one crop" roads. They were built to open new wheat country, and when the world's markets became congested with wheat and the price declined, they were unable to earn operating expenses and their heavy burden of interest. With the growth of a new country crops become diversified, industries are established, and the traffic of the railroad is safeguarded. In all parts of the country the density of traffic increases with the growth of population and industries and thus the earnings of the railroad increase steadily, year after year, and afford a larger and larger margin for the payment of obligations.

In the past the railroads have only been able to sell bonds or securities at long intervals, on any large scale, and their purchases of iron and steel and equipment have been more or less contingent on their ability to sell securities. This has created periods of great activity and corresponding depression in the steel industry. The ebb and flow in manufacturing industries has thus been due to the fact that investors have only been willing to purchase railroad securities, to any large extent, at long intervals when there is no other active demand for money. When the fact becomes recognized that railroad bonds are as safe as those issued by governments, and in many ways more desirable, the railroads should be able to find a more regular market for their securities and thus become more continuous patrons of the industries which supply them with materials and equipment.

The Crucible Steel Company Secures Controlling Interest in Halcomb Steel Company

At Pittsburgh, on February 11, a deal was consummated whereby the Crucible Steel Company of America has secured a controlling interest in the Halcomb Steel Company, Syracuse, N. Y. Press reports have had it for some days that the Halcomb Company had been bought outright by the Crucible Company, but this is not correct. No transfer of interests of the Halcomb Company was made until the date named, and that company has not been absorbed by the Crucible Company, but there has simply been an interchange of stock, and the latter company is now the largest stockholder in the Halcomb Company and controls its operations.

Forest S. Wilkinson, president and general manager of the Halcomb Company, states that the plant will continue to be operated as an independent works, but at the same time the Crucible Company will direct its operations. The plant of the Halcomb Company was built and put in operation in 1906. Its capacity is slightly above 20,000 tons of high-grade steel per year, part of which is finished into the finer grades of wire, such as needle wire, needles, &c. The company has also furnished a large amount of high-grade steel to automobile builders.

The Triple Supply Convention

Marked evidence of the "get together" spirit for the good of all is the announcement made last week that the American Supply & Machinery Manufacturers' Association, the National Supply & Machinery Dealers' Association and the Southern Supply & Machinery Dealers' Association are to meet in triple convention at Louisville, Ky., April 3, 4, 5. This indicates a very happy condition of cordiality between the manufacturer, the jobber and the dealer. It shows harmony and general good will toward each other, an example that might well be followed by a number of organizations existing for the mutual benefit of those so associated.

The American Supply & Machinery Manufacturers' Association is composed of a large number of prominent manufacturers of machinery, power plant accessories and general mill supplies, and has been in existence about seven years. In this time it has accomplished much more in a spirit of uplift, a higher ethical plane and the development of a more comprehensive understanding of good business principles than is common in such organizations. A very unique feature is the conduct of a general promotion or advertising department for the benefit of its members. This involves a general advertising service of a distinct nature, for which no extra charge is made. This service, if obtained through regular channels, would cost considerably more per year than the nominal dues incidental to membership in the organization. The triple conventions, above described, enable manufacturers or dealers to attend three conventions at the price of one.

The Bureau of General Promotion for the American Supply & Machinery Manufacturers' Association is located at 55 Woodbridge street west, Detroit, Mich., and is under the direct supervision of William M. Chamberlin, for many years engaged in general advertising work in the power plant and mill supply field. The general headquarters of the association are located at 309 Broadway, New York City, under the direction of F. D. Mitchell, secretary and treasurer. Inquiries for further information relative to the association will receive prompt attention if directed to either office.

As a result of the special campaign for new members recently started by the American Supply and Machinery Manufacturers' Association, the following firms have been added to the membership roll, all having agreed to the declaration of principles of the organization: Muzzy-Lyon Company, Detroit, manufacturer of babbitt metal and belt dressing; Michigan Lubricator Company, Detroit, manufacturer of lubricators; Detroit Leather Specialty Company, manufacturer of leather packing, &c.; Detroit Twist Drill Company, Detroit, manufacturer of machinists' tools; Wausau Sandpaper Company, Wausau, Wis.; Thomas Grate Bar Company, Birmingham, Ala.; Aurora Tool Works, Aurora, Ill.; Wm. O. Davey & Sons, Jersey City, N. J.; Cumberland Steel Company, Cumberland, Md.; Wolf Company, Chambersburg, Pa.; Elliott Company, Pittsburgh, Pa.; Canton-Hughes Pump Company, Canton, Ohio; Boston Belting Company, Boston, Mass.; Ellis-Watson Mfg. Company, Leicester, Mass.; Longmead Iron Company, Conshohocken, Pa.

The Associated Foundry Foremen of Philadelphia.

—The fact that John Birkinbine, the well-known engineer, was to make an address on "The Early History of Iron Making" brought out one of the most representative gatherings that has ever attended the monthly meetings of the Associated Foundry Foremen of Philadelphia and Vicinity. The meeting was held in the Manufacturers' Club, Philadelphia, on the evening of February 14, president Clarence R. Brown occupying the chair. Mr. Birkinbine, in his address, took up the early manufacture of wrought iron in India, Asia and northern Africa, and carried his hearers by stages up to the present day methods of manufacture. In the early days, he said, there was no use for the foundry foreman, all the work being done in the forge, but we cannot praise too highly the pioneers whose efforts were beset with many difficulties, who blazed the way for the present methods and many uses to which iron and steel are applied.

New Publications

Elementary Practical Mechanics.—By J. M. Jameson. Bound in cloth. Size, 5 x 7½ in.; pages, 321; 212 figures. Price, \$1.00 net. Published by Longmans, Green & Co., Fourth avenue and Thirtieth street, New York City.

The book is an attempt to express practical mechanics as a science of the processes and structures of every day life, rather than a series of more or less abstract mathematical demonstrations. The text has been developed from a series of notes issued by the author for several years to his students. Nothing has been included which has not stood the test of several years' use with students in elementary technical courses, and the book is therefore well adapted for use in elementary, technical or manual training schools, requiring something between the usual text books in elementary mechanics, which are too theoretical or too mathematical, and the text books in general physics, which do not furnish a sufficiently complete and practical course. Where the course is to be followed by more applied ones in mechanism in engineering schools, this book can be used for an introductory course.

The subjects of work, friction and power transmission and tests of power brakes and dynamometers are discussed in considerable detail, and a chapter is devoted to elasticity and stress in materials. These parts of the book are supplemented by laboratory exercises and will furnish enough material for a short course in applied mechanics.

General principles and definitions to form the ground work for laboratory exercises are introduced early in the book, and a complete statement of the theory, together with its applications, is then developed through a combination of laboratory work and lectures. As a rule both the graphical and the analytical solutions are indicated in statics, so that if desired the use of trigonometric functions may be avoided without greatly modifying the ground covered. In those portions of the book which deal with the mechanics of moving bodies a special effort has been made to present the matter in a clear and usable form. The fundamental principle of these bodies is applied to familiar instances, such as the starting and stopping of trains, the tension of hoisting ropes, &c. In approaching the conception of moment of inertia and radius of gyration the familiar ideas of action and reaction and of moment of force are employed, rather than a more abstract mathematical reasoning.

Machine Shop Primer.—By Fred H. Colvin and Frank A. Stanley. Bound in cloth. Size, 6 x 9½ in.; pages, 148; 508 figures. Price, \$1 net. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York City.

This book is an introduction to machine tools and shop appliances, with illustrations, names and definitions, and has been prepared to aid both students and instructors in acquiring a knowledge of the names of the machines, tools and appliances used in practical shop work. The book is divided into three sections. The first contains illustrations of machines, tools and machine shop appliances, so that the learner or apprentice can see what a tool looks like, and if desired this section can also be used as a sketch book. The next section gives the correct name of every part illustrated. As the proper spelling of the names and terms used are an essential part of this work, this division will be found to be a practical spelling book. Section III. is a very complete and convenient alphabetically arranged reference book on mechanical subjects. All the tools illustrated in section I. have a corresponding number to the references in this section.

Metal Statistics. Pages, 208; 3½ x 6 in.; cloth bound. Published by the American Metal Market Company, New York. Price, 50 cents.

The 1911 volume is the fourth issue of this excellent statistical handbook, and this is the third year in which iron and steel statistics have been included. These have

been compiled by B. E. V. Luty, Pittsburgh, while the tables on nonferrous metals are the work of C. S. J. French. The iron ore tables include typical analyses of lake ores, shipments from Lake Superior mines and prices for a period of years. The pig iron statistics give standard analyses of foundry irons with prices of various irons in different markets for six years, while annual averages are given for 20 years. Finished products are covered quite completely with tables of prices and production. A new feature under this head is the "Composite Finished Steel" table. In this the various groups of finished products, apart from rails, are weighted according to their output. Bars, for example, constitute 2½ lb. out of a 10-lb. batch of finished steel, while plates, shapes, wrought pipe and wire are put at 1½ lb. each, sheets at 1 lb. and tin plate at ½ lb. The price of 1 lb. of the composite product is thus put at 1.74 cents as of January 1, 1911. There is also a "Composite Pig Iron" price table. A page is devoted to a graphic presentation of good and bad years in iron and steel, showing at a glance by the varying lengths of lines drawn to the right or to the left of the year whether it was good or bad, and how it compared in volume of production and in price with other years.

The George V. Cresson Company in Receiver's Hands

Webster King Wetherill was appointed receiver of the George V. Cresson Company, Philadelphia, Pa., by decree of the Common Pleas Court, in that city, February 9, and qualified by entering security in the sum of \$500,000. The sole purpose of the receivership is the conservation and protection of the property of the company in the interest of the creditors and stockholders. By decree of the court the receiver is authorized to take charge of the property, assets, fixtures and contracts, and to enter into contracts necessary for the conduct and preservation of the business; with authority, if necessary, from time to time to sell such property as may be required for the payment of the creditors in full.

The difficulties of the company are believed to be but temporary. A large amount of work is on its books, sufficient to keep the plant engaged for some months, and it is understood that the business of the company will be continued by the receiver, and that it will not be long until its temporary difficulties will be fully adjusted.

The Chicago Foundry Foremen's Association.—The annual banquet of the Chicago Foundry Foremen's Association, which was held at the Sherman House on the evening of February 11, proved a highly successful event. Over 150 members and guests were present, including foundry proprietors and officials as well as foremen. Robert M. Thompson of Buffalo, N. Y., president of the American Foundry Foremen's Association, announced the arrangements that have been made for entertaining foundry foremen at the coming Pittsburgh convention. Herman Lange of the Ferguson & Lange Foundry Company, presented an interesting address on observations in the foundry. George Woodruff of Joliet, Ill., who has just returned from a trip of several months to South America, prior to which he made an extensive tour of the Orient, presented in an able manner the possibilities of foreign trade in foundry and machinery products, especially in Latin-American countries. Former United States Senator William E. Mason of Illinois, talked on American citizenship.

The North Range Iron Company is to be organized in March or April by George J. Maas, Negaunee, Mich., with a capital stock of \$500,000, consisting of 100,000 shares of a par value of \$5. Mr. Maas estimates that the mine which this company will operate has a deposit of easily 10,000,000 tons of Bessemer hard ore, averaging about 60 per cent. metallic iron and 0.045 per cent. phosphorus, and about 5,000,000 tons of soft hematite ore, both Bessemer and non-Bessemer, running 60 per cent. iron and 0.036 phosphorus to 55 per cent. iron and 0.237 per cent. phosphorus.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type.
Declines in Italics.

At date of publication, to month and the year previous.

	Feb. 15, 1911.	Feb. 8, 1911.	Jan. 18, 1911.	Feb. 16, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$18.75
Foundry No. 2, standard, local, Phila- delphia.....	14.25	14.25	14.25	17.00
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00	13.75
Foundry No. 2, local, Chicago.....	15.50	15.50	15.50	19.00
Basic, delivered, eastern Pa.....	14.50	14.50	14.25	18.50
Basic, Valley furnace.....	13.75	13.75	13.25	16.25
Bessemer, Pittsburgh.....	15.90	15.90	15.90	18.90
Gray forge, Pittsburgh.....	14.40	14.15	14.15	16.90
Lake Superior charcoal, Chicago.....	17.50	17.50	18.00	19.50

BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh.....	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia.....	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh.....	29.00	29.00	28.00	33.00

OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago.....	15.50	14.50	14.50	19.00
Iron rails, Philadelphia.....	17.50	17.00	17.00	20.00
Car wheels, Chicago.....	13.00	13.00	13.00	17.50
Car wheels, Philadelphia.....	13.50	13.00	13.00	16.75
Heavy steel scrap, Pittsburgh.....	14.50	13.75	13.50	17.25
Heavy steel scrap, Chicago.....	11.75	11.50	11.50	15.25
Heavy steel scrap, Philadelphia.....	14.00	13.00	12.50	16.50

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.....	1.35	1.29	1.32½	1.60
Common iron bars, Chicago.....	1.30	1.30	1.30	1.60
Common iron bars, Pittsburgh.....	1.35	1.35	1.35	1.70
Steel bars, tidewater, New York.....	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York.....	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York.....	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York.....	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.....	1.30	1.30	1.25	1.50
Skelp, sheared steel, Pittsburgh.....	1.35	1.35	1.30	1.60

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*.....	1.75	1.75	1.70	1.85
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.80
Barb wire, galv., Pittsburgh*.....	2.05	2.05	2.00	2.15

METALS, Per Pound:				
Lake copper, New York.....	12.75	12.75	12.75	13.75
Electrolytic copper, New York.....	12.37½	12.37½	12.50	13.50
Spelter, New York.....	5.57½	5.50	5.55	5.60
Spelter, St. Louis.....	5.42½	5.30	5.40	5.45
Lead, New York.....	4.15	4.15	4.50	4.55
Lead, St. Louis.....	4.30	4.30	4.35	4.40
Tin, New York.....	45.75	40.12½	41.75	33.20
Antimony, Hallett, New York.....	7.75	7.75	7.87½	8.25
Tin plate, 100-lb. box, New York.....	\$3.94	\$3.94	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net;

angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base. Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on	
Gauges under 3-16-in. to and including No. 8.....	15
Gauges under No. 8 to and including No. 9.....	25
Gauges under No. 9 to and including No. 10.....	30
Gauges under No. 10 to and including No. 12.....	40
Sketches (including all straight taper plates), 3 ft. and over in length.....	10
Complete circles, 3 ft. in diameter and over.....	20
Boiler and flange steel.....	10
"A. B. M. A." and ordinary firebox steel.....	20
Still bottom steel.....	30
Marine steel.....	40
Locomotive firebox steel.....	50
Widths over 100 in. up to 110 in., inclusive.....	05
Widths over 110 in. up to 115 in., inclusive.....	10
Widths over 115 in. up to 120 in., inclusive.....	15
Widths over 120 in. up to 125 in., inclusive.....	25
Widths over 125 in. up to 130 in., inclusive.....	50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to S. U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for ½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel	Iron
	Black. Galv.	Black. Galv.
1½ in. to 2 in. inclusive.....	72	68
2 in. to 2½ in. inclusive.....	75	71
2½ in. to 3 in. inclusive.....	79	75
3 in. to 3½ in. inclusive.....	80	76
3½ in. to 4 in. inclusive.....	76	72
4 in. to 4½ in. inclusive.....	78	74
4½ in. to 5 in. inclusive.....	77	73
5 in. to 5½ in. inclusive.....	75	71
5½ in. to 6 in. inclusive.....	74	70
6 in. to 6½ in. inclusive.....	78	74
6½ in. to 7 in. inclusive.....	79	75
7 in. to 7½ in. inclusive.....	77	73
7½ in. to 8 in. inclusive.....	75	71
8 in. to 8½ in. inclusive.....	74	70
8½ in. to 9 in. inclusive.....	78	74
9 in. to 9½ in. inclusive.....	79	75
9½ in. to 10 in. inclusive.....	77	73
10 in. to 10½ in. inclusive.....	75	71
10½ in. to 11 in. inclusive.....	74	70
11 in. to 11½ in. inclusive.....	78	74
11½ in. to 12 in. inclusive.....	79	75
12 in. to 12½ in. inclusive.....	77	73
12½ in. to 13 in. inclusive.....	75	71
13 in. to 13½ in. inclusive.....	74	70
13½ in. to 14 in. inclusive.....	78	74
14 in. to 14½ in. inclusive.....	79	75
14½ in. to 15 in. inclusive.....	77	73
15 in. to 15½ in. inclusive.....	75	71
15½ in. to 16 in. inclusive.....	74	70
16 in. to 16½ in. inclusive.....	78	74
16½ in. to 17 in. inclusive.....	79	75
17 in. to 17½ in. inclusive.....	77	73
17½ in. to 18 in. inclusive.....	75	71
18 in. to 18½ in. inclusive.....	74	70
18½ in. to 19 in. inclusive.....	78	74
19 in. to 19½ in. inclusive.....	79	75
19½ in. to 20 in. inclusive.....	77	73
20 in. to 20½ in. inclusive.....	75	71
20½ in. to 21 in. inclusive.....	74	70
21 in. to 21½ in. inclusive.....	78	74
21½ in. to 22 in. inclusive.....	79	75
22 in. to 22½ in. inclusive.....	77	73
22½ in. to 23 in. inclusive.....	75	71
23 in. to 23½ in. inclusive.....	74	70
23½ in. to 24 in. inclusive.....	78	74
24 in. to 24½ in. inclusive.....	79	75
24½ in. to 25 in. inclusive.....	77	73
25 in. to 25½ in. inclusive.....	75	71
25½ in. to 26 in. inclusive.....	74	70
26 in. to 26½ in. inclusive.....	78	74
26½ in. to 27 in. inclusive.....	79	75
27 in. to 27½ in. inclusive.....	77	73
27½ in. to 28 in. inclusive.....	75	71
28 in. to 28½ in. inclusive.....	74	70
28½ in. to 29 in. inclusive.....	78	74
29 in. to 29½ in. inclusive.....	79	75
29½ in. to 30 in. inclusive.....	77	73
30 in. to 30½ in. inclusive.....	75	71
30½ in. to 31 in. inclusive.....	74	70
31 in. to 31½ in. inclusive.....	78	74
31½ in. to 32 in. inclusive.....	79	75
32 in. to 32½ in. inclusive.....	77	73
32½ in. to 33 in. inclusive.....	75	71
33 in. to 33½ in. inclusive.....	74	70
33½ in. to 34 in. inclusive.....	78	74
34 in. to 34½ in. inclusive.....	79	75
34½ in. to 35 in. inclusive.....	77	73
35 in. to 35½ in. inclusive.....	75	71
35½ in. to 36 in. inclusive.....	74	70
36 in. to 36½ in. inclusive.....	78	74
36½ in. to 37 in. inclusive.....	79	75
37 in. to 37½ in. inclusive.....	77	73
37½ in. to 38 in. inclusive.....	75	71
38 in. to 38½ in. inclusive.....	74	70
38½ in. to 39 in. inclusive.....	78	74
39 in. to 39½ in. inclusive.....	79	75
39½ in. to 40 in. inclusive.....	77	73
40 in. to 40½ in. inclusive.....	75	71
40½ in. to 41 in. inclusive.....	74	70
41 in. to 41½ in. inclusive.....	78	74
41½ in. to 42 in. inclusive.....	79	75
42 in. to 42½ in. inclusive.....	77	73
42½ in. to 43 in. inclusive.....	75	71
43 in. to 43½ in. inclusive.....	74	70
43½ in. to 44 in. inclusive.....	78	74
44 in. to 44½ in. inclusive.....	79	75
44½ in. to 45 in. inclusive.....	77	73
45 in. to 45½ in. inclusive.....	75	71
45½ in. to 46 in. inclusive.....	74	70
46 in. to 46½ in. inclusive.....	78	74
46½ in. to 47 in. inclusive.....	79	75
47 in. to 47½ in. inclusive.....	77	73
47½ in. to 48 in. inclusive.....	75	71
48 in. to 48½ in. inclusive.....	74	70
48½ in. to 49 in. inclusive.....	78	74
49 in. to 49½ in. inclusive.....	79	75
49½ in. to 50 in. inclusive.....	77	73
50 in. to 50½ in. inclusive.....	75	71
50½ in. to 51 in. inclusive.....	74	70
51 in. to 51½ in. inclusive.....	78	74
51½ in. to 52 in. inclusive.....	79	75
52 in. to 52½ in. inclusive.....	77	73
52½ in. to 53 in. inclusive.....	75	71
53 in. to 53½ in. inclusive.....	74	70
53½ in. to 54 in. inclusive.....	78	74
54 in. to 54½ in. inclusive.....	79	75
54½ in. to 55 in. inclusive.....	77	73
55 in. to 55½ in. inclusive.....	75	71
55½ in. to 56 in. inclusive.....	74	70
56 in. to 56½ in. inclusive.....	78	74
56½ in. to 57 in. inclusive.....	79	75
57 in. to 57½ in. inclusive.....	77	73
57½ in. to 58 in. inclusive.....	75	71
58 in. to 58½ in. inclusive.....	74	70
58½ in. to 59 in. inclusive.....	78	74
59 in. to 59½ in. inclusive.....	79	75
59½ in. to 60 in. inclusive.....	77	73
60 in. to 60½ in. inclusive.....	75	71
60½ in. to 61 in. inclusive.....	74	70
61 in. to 61½ in. inclusive.....	78	74
61½ in. to 62 in. inclusive.....	79	75
62 in. to 62½ in. inclusive.....	77	73
62½ in. to 63 in. inclusive.....	75	71
63 in. to 63½ in. inclusive.....	74	70
63½ in. to 64 in. inclusive.....	78	74
64 in. to 64½ in. inclusive.....	79	75
64½ in. to 65 in. inclusive.....	77	73
65 in. to 65½ in. inclusive.....	75	71
65½ in. to 66 in. inclusive.....	74	70
66 in. to 66½ in. inclusive.....	78	74
66½ in. to 67 in. inclusive.....	79	75
67 in. to 67½ in. inclusive.....	77	73
67½ in. to 68 in. inclusive.....	75	71
68 in. to 68½ in. inclusive.....	74	70
68½ in. to 69 in. inclusive.....	78	74
69 in. to 69½ in. inclusive.....	79	75
69½ in. to 70 in. inclusive.....	77	73
70 in. to 70½ in. inclusive.....	75	71
70½ in. to 71 in. inclusive.....	74	70
71 in. to 71½ in. inclusive.....	78	74
71½ in. to 72 in. inclusive.....	79	75
72 in. to 72½ in. inclusive.....	77	73
72½ in. to 73 in. inclusive.....	75	71
73 in. to 73½ in. inclusive.....	74	70
73½ in. to 74 in. inclusive.....	78	74
74 in. to 74½ in. inclusive.....	79	75
74½ in. to 75 in. inclusive.....	77	73
75 in. to 75½ in. inclusive.....	75	71
75½ in. to 76 in. inclusive.....	74	70
76 in. to 76½ in. inclusive.....	78	74
76½ in. to 77 in. inclusive.....	79	75
77 in. to 77½ in. inclusive.....	77	73
77½ in. to 78 in. inclusive.....	75	71
78 in. to 78½ in. inclusive.....	74	70
78½ in. to 79 in. inclusive.....	78	74
79 in. to 79½ in. inclusive.....	79	75
79½ in. to 80 in. inclusive.....	77	73
80 in. to 80½ in. inclusive.....	75	71
80½ in. to 81 in. inclusive.....	74	70
81 in. to 81½ in. inclusive.....	78	74
81½ in. to 82 in. inclusive.....	79	

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld { Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in. Lap Weld {
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2 in.	61	43
2 in.	63	48
2½ to 3 in.	69	55
3 in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$29.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, February 15, 1911.—(By Telegraph.)

Pig Iron.—There is more inquiry for pig iron than for some time, the tone of the market is firmer and the advance in prices on basic is being held. The American Steel Foundries has bought upward of 6000 tons of basic for its works at Alliance, Ohio, and while the price on this iron is understood to have been about \$13.25 at Valley furnace, it is explained by the fact that the company got options on the iron before the recent advance took place. The United Steel Company, Canton, Ohio, has bought 1000 tons of basic for March and 2000 for April at \$13.50, Valley furnace. The absolute minimum on basic iron to-day is \$13.75, Valley furnace, and most furnaces are holding for \$14. A sale is reported of 1250 tons of standard Bessemer iron, deliveries 250 tons a month, February to June, at \$15, Valley furnace. Five or six blast furnaces in the Pittsburgh district have blown in since the first of the month. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75; No. 2 foundry, \$13.75, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—This week all of the 54 open hearth furnaces at the Homestead Works of the Carnegie Steel Company are in operation, for the first time in some months. Inquiries for billets and sheet and tin bars are better and prices are firm. The report of a sale of 2000 tons of open hearth sheet bars at \$25, Pittsburgh, the sale being credited to the Cambria Steel Company, is absolutely and officially denied. There is no occasion as yet for consumers to pay premiums for either Bessemer or open hearth steel, as the supply is ample. We note a sale of 2000 tons of open hearth sheet bars, for delivery over the next three months, at \$24, Pittsburgh, and also a sale of 2200 tons of high carbon forging billets at \$31, delivered Cincinnati, or \$29, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

The improved conditions noted in this report for several weeks continue. Actual orders going to the mills for rolling are heavier than for some months. This is shown by the increase in operations among the large steel concerns and the blowing in of a number of additional blast furnaces. The Cambria Steel Company is operating this week its entire open hearth department, comprising 25 furnaces, and running six out of eight blast furnaces, and started on Monday its 134-in. plate mill, which has been closed down for a week or more for lack of orders. The Carnegie Steel Company is increasing operations at nearly all its steel plants and has blown in five or six blast furnaces this month. The new demand for plates, structural steel, tin plate, sheets and wire products is heavier than for some time and promises further increase. Some quite large orders for line pipe have been placed and the pipe mills are getting busier.

Ferromanganese.—The market is weak, with very little new inquiry. Most consumers are pretty well covered

for some time ahead. Sales are reported of two cars, or 60 tons, for spot delivery, on the basis of \$37.50, Baltimore, the freight rate to Pittsburgh being \$1.95 a ton. We quote 80 per cent. foreign ferro at \$37.50 to \$37.75, f.o.b. Baltimore, for prompt shipment.

Ferrosilicon.—The leading local consumer has bought through a New York house 5000 tons of 50 per cent. ferrosilicon, for delivery over this year. This deal has been hanging for some time and was closed on Monday. The price paid is not stated, but is understood to have been relatively low. We quote 50 per cent. at \$54.50, Pittsburgh, for delivery within the next three or four months. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—No new inquiry is in the market, and in the absence of sales we quote best grades of muck bar made from all pig iron at \$30, delivered in Pittsburgh district. Higher prices are being quoted on mill iron, and the few makers of muck bar have advanced prices. The muck bar plant of the Kittanning Iron & Steel Company, Kittanning, Pa., containing 33 furnaces, is expected to start up February 20. It has been shut down for some months.

Skelp.—Prices on the different grades of skelp are firmer than for some time, and the mills have more tonnage on their books. One local maker of grooved and sheared iron bars is reported to have its product sold up for the next three months. A sale is reported of 2000 tons of sheared iron plates at about 1.77½c., Pittsburgh, Pa. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The market on rods is firmer than for some time, and leading makers are now holding Bessemer and open hearth rods firm at \$29, Pittsburgh. The new rod mill of the Jones & Laughlin Steel Company at Aliquippa is making some records for output, while the Cambria Steel Company, Johnstown, Pa., is turning over its new rod mill to-day (Tuesday). This is a Morgan double strand mill and will have a daily capacity of about 350 tons. We quote Bessemer and open hearth and chain rods at \$29, Pittsburgh, and note a sale of 300 tons of Bessemer rods for March and April delivery at that price.

Steel Rails.—The Carnegie Steel Company has taken a contract for 500 tons of standard sections for a prominent line in Ohio, but aside from this has not entered any large orders. There is some buying of light rails, the Carnegie Steel Company having received new orders and specifications in the past week for about 2200 tons. The lumber interests are now making inquiries for light rails for delivery commencing May. Quotations on light rails are, as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Plates.—As orders for steel cars have been light for some time, the plate mills are naturally short of work, but general conditions are showing a slight betterment. The Riter-Conley Mfg. Company has received contracts for gas holders from the Minneapolis Gas Light Company, Minneapolis, Minn., and Laclede Gas Light Company, St. Louis, Mo. These will take about 5000 tons of plates, which will be rolled by the Carnegie Steel Company. No orders for steel cars have been placed in the past week, but it is probable that the contract of the Wabash-Pittsburgh Terminal Railroad for 10000 will be given out this week. The contract for a large riveted pipe water line requiring a heavy tonnage of plates is about ready to be closed. The market on plates is firm and we quote ¼-in. and heavier at 1.40c., Pittsburgh.

Structural Material.—Inquiries are more numerous, but local structural concerns report that very little actual business has been placed in the past week. Bids have gone in for a pier shed at New Orleans, 1500 tons, while the Panama Canal Commission is in the market for 12,000 tons for emergency dams and other work on the canal, bids for which are to be opened about March 15. The McClintic-Marshall Construction Company has taken a contract for the erection of a steel building for the Linde Air Products Company at North Trafford, Pa., about 150 tons, and has a contract from the same company for a similar building at South Elizabeth, N. J. Local work in the market includes 200 tons for the Colfax School and also for the new foundry buildings of the Westinghouse Electric & Mfg. Company at Trafford City, Pa., about 2000 tons. This latter work is likely to be placed in a short time. The market is firm and we quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

THE IRON AND METAL MARKETS

Tin Plate.—Conditions in the tin plate trade are referred to by the manufacturers as being very satisfactory. The American Sheet & Tin Plate Company is operating this week 200 out of 235 hot tin mills, or about 85 per cent. of capacity. The company has recently started up 30 hot tin mills in its Shenango Works and 18 out of 20 hot mills at its New Castle Works. The larger independent tin plate concerns report they are operating to from 80 to 90 per cent. of capacity. Specifications against contracts are coming in very liberally. The recent advance of 10c. a box is being absolutely maintained, and we quote 100-lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Sheets.—Conditions in the sheet trade are steadily showing betterment, the new demand being heavier and specifications against contracts coming in more freely than for some time. The American Sheet & Tin Plate Company is operating to about 65 per cent. of capacity, a considerable increase over its operations of a month ago. It is stated that prices are being firmly maintained. The full schedule of prices in effect on the different grades of sheets is printed on a previous page.

Bars.—The situation in both iron and steel bars is somewhat disappointing, the new demand being light, while specifications against contracts are not coming in at a very satisfactory rate. The capacity for making steel bars has been heavily increased in the past year or two, and it would seem that for the present at least it is somewhat ahead of consumption. None of the makers of steel bars is operating to full capacity, and some report that they are running to only about 50 per cent. We quote steel bars at 1.40c. and iron bars at 1.35c. to 1.40c., in carload and larger lots, f.o.b. Pittsburgh.

Hoops and Bands.—The new demand for both hoops and bands is fair, consumers placing orders only to cover actual needs. Specifications against contracts are being received by the mills in moderate volume. We continue to quote hoops at 1.50c. and bands at 1.40c., in carload and larger lots, the latter carrying extras as per the steel bar card of September 1, 1909. We may note that on some specially desirable contracts placed recently the price of steel hoops was 1.45c. and steel bands 1.35c.

Spikes.—All the makers of spikes are badly in need of more business. It is stated that the new prices adopted February 1 are being firmly held and are as follows:

Railroad Spikes.

4 1/2 x 5 and 5 1/2 x 7 1/2	Extra	\$1.55
3 3/4 x 4, 4 1/2 x 5 and 5 x 7 1/2	Extra	.10
3 1/2 x 4 and 4 1/2 x 7 1/2	Extra	.20
3 3/4 x 4 and 4 1/2 x 7 1/2	Extra	.30
2 1/2 x 3 and 3 1/2 x 7 1/2	Extra	.40
2 x 3 and 3 x 7 1/2	Extra	.60
2 x 3 1/2	Extra	.80

Boat Spikes.

3/4 in. square, 12 to 24 in. long	Extra	.15
1/2 in. square, 8 to 16 in. long	Extra	.15
1/2 in. square, 6 to 16 in. long	Extra	.15
7/16 in. square, 6 to 12 in. long	Extra	.20
3/8 in. square, 4 to 12 in. long	Extra	.30
1/4 in. square, 4 to 8 in. long	Extra	.45
1/4 in. square, 4 to 8 in. long	Extra	.75
1/4 in. square, 3 to 3 1/2 in. long	Extra	1.00
3/8 and 1/2 shorter than 4 in., 1 cent extra.		

Spelter.—The market continues quite firm, and inquiries are reported as considerably better. We quote prime grades of Western at 5.27 1/2c., East St. Louis, equal to 5.40c., Pittsburgh.

Merchant Steel.—New orders are small, but specifications against contracts so far this month have been fully as heavy as in the first half of January. Prices are firm and we quote, f.o.b. Pittsburgh: Iron finished tire, 1 1/2 x 1/2 in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Consumers are placing orders only for small lots and specifications against contracts are not coming in at a very satisfactory rate. Regular prices of 1.90c. on structural rivets and 2c. on boiler rivets are sometimes shaded on desirable orders.

Wire Products.—New buying in wire nails and wire is rather light, but jobbers and consumers are specifying liberally against contracts. Shipments of wire products by the mills in February promise to be considerably heavier than last month. We quote galvanized barb wire at \$2.05, painted \$1.75, annealed fence wire \$1.55, galvanized \$1.85, wire nails \$1.75 and cut nails \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—The Eastern Oil Company has placed a contract with the Mark Mfg. Company for about 25 miles of 12-in. pipe. Some fairly large inquiries for pipe for gas and oil lines are in the market. The Tri-State Natural Gas Company is inquiring for about 70 miles of pipe, from

3 up to 10 in. The general demand for merchant pipe is fairly good, and some of the larger pipe mills are running at a fuller rate of capacity than for some time. The National Tube Company recently started up two more of its blast furnaces and reports a considerable increase in orders. Discounts on iron and steel pipe printed on a previous page are reported as being fairly well maintained.

Boiler Tubes.—The boiler tube trade is still in unsatisfactory condition, the demand for both locomotive and merchant tubes being very dull, with prices more or less shaded, depending on the order.

Coke.—There is a little better feeling in the coke trade, due to the starting up of a large number of ovens of the H. C. Frick Coke Company and other coke concerns who sell a good part of their product to the blast furnace trade. The output of coke last week in the Upper and Lower Connellsville regions was 302,275 net tons, a gain over the previous week of about 11,000 tons. Prices on coke are reported to be slightly firmer. We quote standard makes of furnace coke for spot shipment at \$1.45 to \$1.55 per net ton, at oven; on contracts for delivery over the year from \$1.70 to \$1.75 is being quoted by some coke operators, while others are firm, at \$1.90 to \$2, at oven. Best makes of 72-hour foundry coke are being held at \$2.10 to dealers and from \$2.25 up to \$2.50, at oven, to consumers.

Iron and Steel Scrap.—There has been a radical change in conditions in the scrap trade in the past week or two, the demand being very much heavier, while prices have advanced. It is claimed that there is a decided shortage in the supply, and dealers are afraid to sell ahead. The offerings in the recent list of the Pennsylvania Railroad were largely taken up by consumers, who paid higher prices than for some time. Sales have been made of 3000 to 4000 tons of heavy steel scrap at \$14.25 and up to \$14.50, or higher, delivered at Monessen, Pa., or Steubenville, Ohio. An Eastern steel company has recently bought 12,000 tons of detinned scrap and about 5000 tons of bundled sheet scrap. A sale is also noted of about 1000 tons of bundled sheet scrap at \$11 at loading point. It is stated that sales of heavy steel scrap have been made as high as \$14.50 and \$14.75, delivered, and that offers of \$15 for upward of 20,000 tons for delivery up to July or August have been turned down. Dealers have advanced prices and now quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Folsbee, Sharon, Monessen and Pittsburgh delivery	\$14.50 to \$14.75
No. 1 foundry cast	13.75 to 14.00
No. 2 foundry cast	13.00 to 13.75
Bundled sheet scrap, at point of shipment	10.75 to 11.00
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	14.75 to 15.00
No. 1 railroad malleable stock	13.00 to 13.25
Grate bars	11.00 to 11.25
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.50 to 24.75
Steel car axles	20.25 to 20.50
Locomotive axles	24.00 to 24.50
No. 1 bushing scrap	12.25 to 12.50
No. 2 bushing scrap	8.75 to 9.00
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.75 to 16.00
Cast iron borings	8.25 to 8.35
Machine shop turnings	8.75 to 9.00
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50
Stove plate	11.50 to 11.75

Chicago

FISHER BUILDING, February 15, 1911.—(By Telegraph.)

Railroad buying has not yet assumed any large proportions and other large consumers of steel still show a spirit of hesitation. No additional important rail orders are reported, but a large tonnage of track fastenings has been booked and the manufacturers of car fittings are getting more satisfactory business. In the lighter finished materials wire products are maintaining the lead, with sales running in excess of the normal daily average. On the other hand the improvement in bars and sheets is slow. The mills are getting better specifications for structural shapes and plates from the good contracts that have been let the past month, but there is still a considerable distance to go before normal conditions will be reached. The pipe foundries report that municipal lettings since the first of the year have exceeded the average rate for this period and the business in prospect will make a good showing for February. The general feeling in the trade is optimistic and prices are firm. The scrap market is more active than it has been for more than a year and dealers are bidding higher prices, especially for railroad scrap.

Pig Iron.—The leading harvester interest has been a heavy buyer of both Northern and Southern pig iron the,

THE IRON AND METAL MARKETS

past week. Its purchases are estimated at over 100,000 tons for various deliveries extending through and beyond the third quarter. Large blocks of iron from furnace stocks at both Northern and Southern furnaces are included and it is expected that this will materially relieve the pressure among Southern furnace interests to move their stocks. The Northern pipe foundry interest which was mentioned last week has also been an extensive buyer for second and third quarter for delivery at foundries in central Ohio. Several round lots have been purchased from furnaces in the valleys and southern Ohio and also from a leading Birmingham interest. The total taken by this pipe foundry interest is around 50,000 tons. There has been thus far no general buying movement by foundries or manufacturing interests in the West, although several fair lots of both Northern and Southern iron have been closed. There have been many inquiries for Southern iron for third quarter from buyers who offer to take a fair proportion for prompt shipment at \$11, Birmingham, if they could obtain the same price for third quarter, but the Southern furnaces have been very firm in resisting temptation on these offers. The malleable foundries have not succeeded in purchasing from local furnaces for last half, and it is understood that the closing of contracts with annual buyers of castings will be deferred for some weeks until the furnace interests are willing to make prices on the iron. The following quotations are for February and March shipment, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

Rails and Track Supplies.—The local mills have sold a large tonnage of track fastenings the past week, supplementary to recent orders for rails, but no new orders of moment are reported for standard rails. There are many inquiries from minor Western railroads for small lots of standard sections. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

(By Mail.)

Billets.—Prices of billets have been a subject of discussion among the steel manufacturers for some time, but no improvement is expected as long as independent mills are short of orders on finished materials. Western buyers of forging billets are buying open hearth billets exclusively. Independent Eastern mills are selling for Chicago delivery at prices around \$28, base, Chicago, but the leading interest continues to hold at \$31.

Structural Material.—Additional construction for the Corn Products Company at Argo, near Chicago, amounting to about 2800 tons, was let to the Joliet Bridge & Iron Works. A viaduct at Des Moines, Iowa, 1300 tons, on which bids were taken by the Chicago, Burlington & Quincy Railroad, was let to the Des Moines Bridge & Iron Works. A bridge over the Arkansas River at Fort Smith, 4400 tons, was let to the American Bridge Company. A building for Harned & Von Maur, Davenport, Iowa, 250 tons, was awarded to the Morava Construction Company, Chicago. The mills are getting better specifications for plain material, growing out of the contracts let the past month, and prices are very firm. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Orders from the railroads for repair work on steel cars are becoming an important item in the plate trade. Specifications for tank and boiler plates are also coming in better than in December or January. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Specifications are improving slowly, but are still far short of the capacity of the mills. Prices are reported firm. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar trade is slow in swinging into line.

Iron bars are stronger and the mills are disposed to decline 1000 ton contracts running four or five months ahead, as scrap is advancing, and the present market price is unprofitable. In steel bars new business continues very light, but the concrete bar season will open soon and the mills already have good scattering inquiries. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Specifications from the hardware and agricultural trade are in excess of the capacity of the mills, but it is not expected that the buying movement will result in any serious delay in making shipments. No changes are reported in prices. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Cast Iron Pipe.—The leading pipe foundry interest was awarded 3200 tons of water pipe and 700 tons of pipe for filtration plant at Minneapolis last week. Good lettings are expected this month from Milwaukee, St. Louis and other Western cities. Prices are reported 50 cents a ton higher. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Merchant Steel.—The mills are making normal shipments to the agricultural trade, the season for new specifications in this line being about over.

Old Material.—A strong speculative movement is under way among dealers in old material. Bids on railroad lists are running 25c. to \$1 per ton higher than January prices. A railroad which offered about 25,000 tons on a list which closed last week rejected all bids and will hold its scrap for higher prices. A buyer who inquires for a round tonnage would have to pay considerably higher prices than current quotations, which are based on actual sales to consumers for spot or prompt delivery, usually in odd lots of a few cars. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered Chicago:

Old iron rails.....	\$15.50 to \$16.00
Old steel rails, rerolling.....	13.50 to 14.00
Old steel rails, less than 3 ft. long.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.75 to 12.25
Frogs, switches and guards, cut apart.....	11.75 to 12.25
Shoveling steel.....	11.25 to 11.75

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.50 to \$14.00
Iron arch bars and transoms.....	15.00 to 15.50
Steel angle bars.....	11.25 to 11.75
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.00 to 11.50
Steel knuckles and couplers.....	11.25 to 11.75
Locomotive tires, smooth.....	17.50 to 18.00
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	6.75 to 7.25
Cast and mixed borings.....	5.50 to 6.00
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	7.50 to 8.00
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	10.50 to 11.00
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.75 to 9.25

Philadelphia

PHILADELPHIA, PA., February 14, 1911.

The recent improvement in the demand appears not only to have been fully maintained but has also resulted in increasing inquiry from consumers. Finishing mills in this district are gradually increasing the productive rate and a number are now operating at 75 per cent. of full capacity. Prices of finished materials are all being well maintained and producers are not interested in business of a forward nature. In pig iron a fair amount of buying in foundry grades continues and further quiet sales of basic iron, at \$14.50, have come out, although an advance of 50c. is now pretty generally asked. Statistics regarding the Eastern pig iron situation are more favorable, recent reports of the Eastern Pig Iron Association showing an increase in unfilled orders, with stocks on hand practically stationary. The old material market has stiffened sharply, and prices of the principal grades show an advance over recent quotations.

Iron Ore.—Offerings for this year's supply are being freely made, both in foreign and domestic ore. While sellers are inclined to be in no haste to place business, some very satisfactory amounts of Spanish ore have been sold, although

THE IRON AND METAL MARKETS

sellers withhold particulars at the time. Importations at this port in the week ending February 11 totaled 11,179 tons, valued at \$48,087.

Pig Iron.—While last week's transactions will probably not aggregate as large a tonnage as the previous week, owing to the smaller number of large blocks sold, there has been a very fair general business, and furnacemen feel encouraged with the prospects for the future. Basic transactions have quieted down, although information of two recent sales of 5000 tons each, at \$14.50, delivered, for shipment in the next 60 days, has come out. Consumers are now more fully supplied as to near future requirements and for the time are awaiting developments. Producers in this district have practically all advanced their asking price for this grade, either for early or second quarter shipment, to \$15, delivered, but no business has been done on that basis. Moderate sales of low phosphorus iron, for early shipment, at prices ranging from \$21 to \$21.50, with one large lot for Western shipment, deliveries over the remainder of the year, at a somewhat higher comparative price, are reported. The movement in foundry grades has been fairly active, and consumers are inquiring freely for quantities varying from 100 to 500 tons, for near future delivery, as well as for shipment during the second and, in some instances, the third, quarter. For early delivery prices for standard brands of No. 2 X foundry are very firm, at \$15.50 to \$15.75, with one seller holding at \$16, delivered, but for shipment beyond the second quarter sellers are not prepared to quote. Transactions have for the most part been confined to small lots. Cast iron pipe makers are still negotiating for further supplies of low grade iron, but no important sales have been announced. Somewhat better sales of Virginia foundry iron are noted, and while \$13, furnace, has been the leading producer's price for No. 2 X foundry for delivery over the remainder of the first half, that interest has withdrawn that quotation and now names \$13, furnace, for February-March shipment, and \$13.50 for second quarter. The bulk of the recent orders has been for delivery over three and four months, at \$13, furnace, for either No. 2 X or No. 2 plain grades, equal to \$15.80 to \$16, delivered in this district. Southern iron is being offered at \$11, Birmingham basis, for No. 2, equal to \$15.20 to \$16, delivered, according to destination, in this territory, but practically no business is being done. Forge iron has been in somewhat better demand, several 1000 tons, as well as smaller lots, being inquired for, but buyers and sellers appear to still be somewhat apart in their ideas of prices. The general range of prices shows no change. For delivery in buyers' yards in this vicinity quotations for standard brands are about as follows:

Eastern Pennsylvania, No. 2 X foundry	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain	15.00 to 15.50
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Ohio, low phosphorus	14.25 to 14.50
Basic	14.50 to 15.00
Standard low phosphorus	21.00 to 21.50

Ferromanganese.—The market is quiet, but one small inquiry being reported in this district. For prompt shipments as low as \$37.50, Baltimore, can in instances be done for 80 per cent. ferro, but for extended delivery sellers are holding pretty firmly at \$38, Baltimore.

Billets.—Consumers, while making inquiries for forward requirements, usually place orders for small and moderate lots for prompt and near future delivery. The volume of business is somewhat larger, but mills, while operating on a better basis, are not booked very far ahead. Reports of lower prices for standard open hearth billets are heard, but cannot be confirmed. Leading producers maintain the \$23, Pittsburgh, base, with \$2.40 freight to this district, or \$25.40, delivered, for open hearth rolling billets, and \$30.40, delivered, for ordinary forging billets.

Plates.—The recent gains in the volume of business coming to the mills has been fully maintained. Orders are not particularly large individually, but there is a good number of moderate and small orders, which in the aggregate have enabled mills to attain a productive rate varying from 65 to 75 per cent. of full capacity, and the outlook for continuing at this improved rate is believed to be encouraging. Eastern mills are maintaining prices firmly at 1.55c. minimum for ordinary plates for early delivery in this vicinity.

Structural Material.—The demand does not show the same immediate improvement that is to be noted in some of the other lines. Current orders are mostly small. Several larger building propositions are pending, in instances practically closed, although formal contracts have not been signed. Mills are a trifle more actively engaged, and prices are well maintained at 1.55c. minimum for plain shapes, although for fabricated work, on which there is sharp competition, prices are understood to be weak.

Sheets.—The situation is unchanged; orders are coming out freely, but are usually for small lots for early shipment,

and mills' order books are not in very satisfactory shape as far as the future is concerned, although current orders keep them fully occupied. The following range of prices is named by Eastern mills: For early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The demand is a trifle better, particularly for refined iron bars. Prices of steel bars are very firm, leading producers holding 1.55c., delivered here. A stronger position has developed in refined iron bars, and some of the Eastern mills have withdrawn recent low quotations. While a basis has not been firmly established, a minimum of 1.30c. mill is anticipated. Prompt desirable business has been done at a shade less, although for ordinary specifications 1.35c. to 1.40c., delivered here, about represents the market.

Coke.—Current business is light, consumers confining purchases, as a rule, to prompt lots, which are usually available at lower prices than for moderate forward delivery. Sellers are not disposed to contract for extended delivery at the present range of prices. For reasonably early shipment foundry coke commands from \$2 to \$2.25 per net ton, at oven, according to grade, but for prompt shipment \$1.90 has been done. Furnace coke for spot shipment ranges from \$1.40 to \$1.55, at oven, with \$1.55 to \$1.65 representing about the market for forward deliveries. The following range of prices about represents the market, per net ton, for near future deliveries in this vicinity:

Connellsville furnace coke	\$1.75 to \$1.90
Foundry coke	1.25 to 1.50
Mountain furnace coke	1.35 to 1.50
Foundry coke	1.25 to 1.40

Old Material.—The market, while not particularly active, has developed a decidedly higher range of prices. This has been due in a measure to a higher market in other districts, to which material has been diverted, and also the increasing interest shown by consumers in this territory. Bids for railroad offerings were in instances above the recent high level of quotations, without resulting in business, and it is believed that the railroads are withholding a large part of their recent offerings. While some mills are offering \$13.50 for No. 1 heavy melting steel, no quantity is available at that price, and higher prices have been paid for moderate lots for early delivery. Rolling mill grades are higher, and the market in nearly all classes of material is decidedly stronger. Few sellers are willing to dispose of holdings at current quotations, the disposition being to await still higher prices. The following range about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap	\$14.00 to \$14.50
Old steel rails, rerolling	15.50 to 16.00
Low phosphorus	18.00 to 18.50
Old steel axles	20.50 to 21.00
Old iron axles	26.00 to 27.00*
Old iron rails	17.50 to 18.00
Old car wheels	13.50 to 14.00
No. 1 railroad wrought	16.25 to 16.50
Wrought iron pipe	13.00 to 13.50
No. 1 forge fire	11.75 to 12.25
No. 2 light iron	7.00 to 7.50*
Wrought turnings	9.50 to 10.00
Cast borings	9.00 to 9.50
Machinery cast	14.50 to 15.00
Railroad malleable	12.00 to 12.50
Grate bars	11.00 to 11.50
Stove plate	10.00 to 10.50

* Nominal.

Cincinnati

CINCINNATI, OHIO, February 15, 1911.

Pig Iron.—Apparently the trade is waking up, as inquiries are increasing. The amount of business booked also is very encouraging when compared with nearby weeks. Orders, however, rarely call for more than 500 tons, and for first half shipment. No business is reported for the third quarter or last half as the furnaces are withholding quotations for this delivery. Many consumers have expressed a willingness to cover for the last half at prevailing prices, but thus far have been unable to get the producers to meet their views. High silicon iron appears to be in demand, but the largest actual sale to be recorded is a lot of about 400 tons for an Ohio melter. An Illinois firm wants about 3000 tons of analysis iron, for shipment from March to September. A Michigan concern is also inquiring in this market for about 2500 tons of Southern foundry for last half delivery. A central Ohio company is asking for 6000 tons of basic, and another consumer in the same territory wants 1200 tons of Northern No. 2 foundry for March to June delivery. A nearby agricultural implement manufacturer has out an inquiry calling for a miscellaneous lot of analysis iron, the amount totaling about 2700 tons. It has been reported that a few lots of Southern foundry No. 2 have lately changed hands at a price below \$11 for prompt shipment, but upon

THE IRON AND METAL MARKETS

investigation it is found that these sales either covered iron not quite up to grade or that there were special conditions governing the transaction such as a division of commissions or of the differential in freight rates. We quote Northern No. 2 foundry and malleable at \$14, Ironton, with not much demand for the latter, and Southern No. 2 foundry at \$11, Birmingham. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	18.20
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

Coke.—Local agencies are working on an inquiry for about 7000 tons of furnace coke for shipment in the next two or three months, and 3000 tons is wanted by another consumer for distribution through the remainder of the first half. In the Connellsville district furnace coke is quoted at \$1.50 per net ton at oven for prompt shipment, with a premium of 10c. to 20c. on contracts. In the Wise County and Pocahontas fields both the spot and future shipment price is from 10c. to 15c. higher. Foundry coke is inactive in all three fields, and is quotable at \$2 to \$2.15 per net ton at oven for prompt shipment, and around \$2.25 for future delivery.

Finished Material.—In practically every line there is a steady increase in both inquiries and orders. Steel bars and railroad track material are moving very freely, as compared with last month. The mill price of 1.40c., Pittsburgh, is being strictly maintained in this market. Warehouse figures are around 1.80c. to 1.95c. The demand for structural material also shows some improvement.

Old Material.—There has been a little buying on the part of the rolling mills lately, but the foundries are slow in taking on any stocks. In comparison with pig iron prices, prevailing scrap figures in this market are considered rather stiff, but there does not seem to be any weakening on the part of dealers. Most of them have yards well stocked up. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	5.00 to 5.50
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Bushel sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton.....	11.00 to 11.50

The accounting departments of all outside offices of Hickman, Williams & Co. are being moved to Cincinnati, Ohio, and in the future that city will practically be the head office for this firm.

Cleveland

CLEVELAND, OHIO, February 14, 1911.

Iron Ore.—Indications point to a late opening of the ore shipping season this year. Some of the managers of independent boats are planning not to place their vessels in commission until June or later. Last year so many boats were started out early in the season that there were not cargoes enough to go round, and quite a number of the independent boats were sent to the docks early in the summer. Nothing has been done as yet in regard to fixing ore carrying rates for the season. Ore firms have not yet taken up the question of prices. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Following the advance in the price of basic iron, prices have stiffened up somewhat on foundry grades and some of the Valley furnaces that have been quoting No. 2 foundry at \$13.75 and under are now holding firmly at \$14, but the \$13.75 price has not entirely disappeared. One local interest is now holding basic at \$14, and another has advanced its price to \$14.50. A firm offer of \$13.50 for a round lot of basic was rejected by two Cleveland furnaces during the week. The United Steel Company, Canton, Ohio, is understood to have closed for 3000 tons of basic for which it had inquiries out last week. Among the new inquiries is one for 5000 tons of basic. The foundry iron market is quiet, the only sales reported being a few small lots. A local furnace has sold 500 tons of No. 2 foundry at \$14, at furnace, for northern Ohio delivery, and 500 tons of malleable

at \$13.75. An Erie consumer has bought 300 tons of foundry. A broker is out with an inquiry for 7000 tons of analysis foundry iron. A Mansfield implement concern is in the market for 300 tons of foundry. A development of the week was the appearance of a number of small inquiries for foundry iron for last half delivery. Some buyers would doubtless be glad to contract for the last half at current prices, but sellers do not seem disposed to quote for delivery beyond the second quarter, and especially in view of the fact that it is likely to be some time until they know what their ore is going to cost them this year. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	14.00
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—The only transaction of any size reported during the week was the sale of 7000 tons of furnace coke to a local consumer for March delivery. Prices are slightly firmer, some of the low sellers having advanced quotations 5c. a ton on furnace grades. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton for spot shipment, \$1.60 to \$1.65 for the first half and \$1.75 to \$1.80 for the entire year. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—The demand for nearly all finished lines shows further improvement. A large number of small orders came out during the week and some for fair sized tonnages, and the general report is that the situation is growing better. A number of contracts have been placed in the past few days for steel bars, plates and shapes for first half delivery. While sellers are not disposed to make contracts beyond July 1, one consumer is understood to have succeeded in placing a steel bar contract until October 1. A good volume of steel bar specifications is coming from the implement trade and other users. The demand for plates is picking up, a larger volume of orders coming from the boiler-makers. The demand for tank plates is not active. Structural orders for small lots have improved, but large inquiries are lacking. The demand for steel bars for concrete reinforcing, which has been inactive for some time, has become fairly good with the approach of spring and is expected to be quite heavy within a few weeks. Prices on steel bars, plates and structural material are firm. The demand for sheets has improved and prices are being firmly maintained. Railroad orders are improving, some good business having developed in track fastenings. The demand for shafting continues good. Rivet orders are not plentiful and regular quotations continue to be shaded \$2 a ton except for small lots. The demand for iron bars shows a fair improvement. The minimum quotation of 1.30c. at mill, is being firmly maintained.

Old Material.—The feeling among dealers continues very firm and the recent advances in prices are being generally maintained. Mills still have good sized stocks on hand, so that actual orders are rather light. Some of the consumers desire to contract for April and May delivery, but dealers believe that prices will further advance and are unwilling to make contracts. The Norfolk & Western and the Michigan Central railroads have lists out to close February 16. The list of the latter road includes 2500 tons of iron and steel rails and 1400 tons of short ends of rails. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	15.50 to 16.00
Steel car axles.....	19.00 to 19.50
Heavy melting steel.....	12.50 to 13.00
Old car wheels.....	12.50 to 13.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.50 to 11.75
Railroad malleable.....	12.75 to 13.00
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 6.75
Iron and steel turnings and drillings..	7.00 to 7.50
Steel axle turnings.....	8.75 to 9.00
No. 1 busheling.....	11.00 to 11.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 cast.....	12.00 to 12.50
Stove plate.....	10.00 to 10.50
Bundled tin scrap.....	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., February 13, 1911.

Pig Iron.—Several cross-currents have been encountered in this market the past week, but without having affected quotations. It is widely reported that a leading agricultural implement interest succeeded in obtaining approximately 25,000 tons of foundry iron for delivery over the next five

THE IRON AND METAL MARKETS

months, at a concession from the \$11, Birmingham, schedule, but the details are not given out. A lot of 1500 tons for shipment in 90 days was sold at the \$11 schedule, and an aggregate of some 3500 tons in comparatively small lots is also reported sold at that price. The supply of foundry grades below No. 4 foundry has to all appearances been exhausted, and small lots of 4 to 5 per cent. silicon iron are bringing from \$12 to \$12.50, at furnace. The demand for these last named grades is very good, while the general inquiry from the largest consumers of all grades during the week indicates that a significant tonnage for nearby requirement is yet to be engaged. The strongest feature of the situation at this time is the fact that the production is less than the actual movement. Practically no gain in the accumulation of any grades on furnace yards was made during the month of January, and there is as yet no tangible evidence of any addition to be made to the active producing capacity at an early date. Another large producing interest has recently withdrawn from the market for any deliveries, and those who are soliciting additional orders are still unwilling to commit themselves for anything beyond the first half. It seems reasonably certain that with a stronger market for Northern irons the situation in the South would improve very materially.

Cast Iron Pipe.—No lettings of consequence were made the past week, and the tonnage represented by the small orders was probably less than for the week previous. There has been no change in the rate of production, but the outlook is such that a normal producing capacity at all plants will no doubt soon be warranted. Prices are generally believed to be stronger, and revised quotations are firm as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$21; 8 to 12 in., \$20; over 12 in., average \$19, with \$1 per ton extra for gas pipe. These prices are probably subject to shading for large municipal contracts.

Old Material.—The tonnage handled in this market the past week was comparatively light, but prices were not affected. Considerably more interest has been manifested in steel grades than for some weeks, and a ready market is generally being found for accumulations of light cast and No. 1 machinery scrap. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron axes.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axes.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

St. Louis

ST. LOUIS, February 13, 1911.

The indications of increased interest in the iron market, covering both raw and finished material, are becoming more pronounced. Foundrymen and manufacturers of stoves, implements, wagons and railroad equipment are making inquiries for pig iron, bars, &c., covering in the aggregate a large tonnage. New specifications freely sent in by the railroads constitute a marked feature of the present situation. Bank clearings at St. Louis are 20 per cent. in excess of the same week last year; at Kansas City, 9 per cent. and St. Joseph 12 per cent., which are regarded as encouraging signs of a revival in general business.

Pig Iron.—The improvement noted in the inquiry for pig iron continued the past week in more pronounced form, and some sales of fair volume were booked. Quite a large tonnage, mostly Southern foundry, is still pending, part of which could easily be closed at a concession in the market price, but sellers are firmer in their views, and it is claimed that shading \$11, Birmingham, is becoming less frequent. It is reported that one furnace company has advanced its price 50c. per ton and two others have withdrawn from the market. Inquiry for second and third quarter shipment is increasing, but no business has been done for that delivery. Among the inquiries reported are the following: Quincy, Ill., stove company, 3000 tons of Southern foundry for second and third quarters; a radiator company, 2500 tons of Northern and Southern, for the remainder of the first half. One of the leading brokers reports inquiries for various kinds of iron aggregating 15,000 tons, with sales of 5000 tons to various parties, mostly Southern foundry, principally for the remainder of the first half. Another leading broker mentions inquiries for around 8000 tons in the aggregate. In these reports there are duplications, since buyers apply to more than one office. The sale of 300 tons of gray forge is reported. We continue our quotation of \$11, Birmingham, for Southern No. 2 foundry, for shipment over the remainder of the first half, with a premium of 25c. to 50c.

asked for second quarter delivery. For spot shipment, doubtless a concession of 25c. per ton is still made.

Coke.—Inquiry for coke appears to be more active and the market is firmer. A merchant seller reports the sale of 15 cars of Connellsville foundry coke and an inquiry for 30 cars. A leading sales agency reports the sale of 1000 tons of foundry coke for shipment over the remainder of the year. For standard 72-hour Connellsville foundry, \$2.10 to \$2.40 per net ton is asked, f.o.b. oven. For carload lots and special brands the price is 25c. to 50c. higher.

Finished Iron and Steel.—The leading interest reports some inquiry for standard rails and for light rails there is a moderate call from coal interests. The inquiry for structural material has improved in a marked degree. For bars there is a good inquiry from both jobbers and manufacturers. Track material is in fair demand. An inquiry is out for 2000 kegs of spikes and the sale of 1,000,000 bolts has been made.

Old Material.—The leading dealers report a decided improvement in the outlook, with an increase in the inquiry from consumers. The market is hardening on prices. The inquiry for relaying rails is better. The following railroad lists are on the market: Vandalia Line (additional), 300 tons; Cotton Belt, 250 tons; Southern Railway, 600 tons. While there is no change in prices to report, the entire list is held more firmly at quotations. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, rerolling.....	12.50 to 13.00
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.00
Old car wheels.....	11.50 to 12.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	8.00 to 8.50
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

Matthew Addy & Co. have been appointed the exclusive sales agents of the Clare Coke Company of Greensburg, Pa., maker of high grade Connellsville foundry and furnace coke.

The International & Great Northern Railroad is in the market for a large tonnage of track fastenings.

The Missouri-Pacific Railroad is figuring on specifications for 75 locomotives, mostly for freight traffic.

The plant of the American Steel Foundries at Granite City, Ill., has been shut down. It is reported that the company, having slack business, availed itself of the opportunity to make some repairs. It is believed that operations will be resumed prior to March 1.

The Dallas Hotel Company, Dallas, Texas, has been incorporated. The capital stock is \$600,000. The corporation will erect a 20-story structure, the ultimate cost of which will be about \$1,250,000. On the directorate are the following St. Louis men: Adolphus Busch, E. A. Faust, W. H. Glancy, D. S. Clauss and August A. Busch.

San Francisco

SAN FRANCISCO, February 8, 1911.

A stronger feeling is becoming apparent. Small orders are more numerous, though large transactions are still the exception. There is no lack of important inquiries, some of which are now taking definite shape. The end of the rainy season is expected to bring out some of the business now pending. The local outlook in several departments has been greatly improved by assurance of the Panama-Pacific Exposition, which is bringing out a stronger inquiry for building materials. The general jobbing trade outside of San Francisco is fully normal for this season, with excellent prospects for the next few months. Merchants, however, remain very conservative about placing orders for stock, though the current demand compels them to buy more freely than for some time.

Bars.—The distributive market is still in an unsatisfactory condition, due principally to competition between local iron and foreign or Northern steel. While there is no change in open quotations, the tendency is toward further price cutting. Small inquiries for soft steel have increased considerably, and the actual movement is somewhat larger than

THE IRON AND METAL MARKETS

last month, more interest being manifested by large consumers. Merchants are limiting their purchases as closely as possible, and regard foreign material with less favor than a year ago. The greatest improvement so far has been in reinforcing bars, representatives of Eastern mills having booked a very fair tonnage this month. Several large inquiries have come from outside points, and considerable activity in this city is anticipated. A heavy tonnage will be required later in the year for harbor improvements, both in the San Francisco Bay district and at other coast points. Bars from store, San Francisco, are quoted at 2c., with unconfirmed reports of sales at somewhat lower figures.

Structural Material.—The San Francisco record of building permits for January showed a valuation of \$1,750,-841, compared with \$1,170,000 for the same month of 1910, and an increase of more than \$200,000 over the December valuation. While the record shows an unusually large proportion of fireproof construction, most of the buildings now under way are small, requiring little or no fabricated steel. The Central Iron Works has taken a contract for the St. Ignatius College building on Fulton street, but aside from this nothing of any importance has been let locally. The American Bridge Company will fabricate the steel for the Northern Electric bridge at Sacramento, Cal. Notwithstanding the present dullness, the outlook is considered satisfactory. A number of old projects which may be let at any time will aggregate a considerable tonnage, and orders are likely to be hastened by the increasing firmness of the market. There are also many plans about ready for figuring, which have been withheld pending definite assurance of the Panama-Pacific Exposition. There is some talk of an addition to the Palace Hotel, and it is expected that several old hotel projects will be revived. The Van Nuys office building is the principal structure in prospect at Los Angeles. Bids on the Multnomah county court house at Portland, Ore., will be opened February 25, and bids will be received February 13 for several steel bridges in Oregon. The El Paso Iron & Bridge Company, El Paso, Texas, has taken a contract for a mill for the El Paso-Madera Lumber Company.

Rails.—Recent rail business, though composed of small scattering orders, has been of fair volume for this season. Some inquiries of more than usual importance have come up and conditions are favorable for continued activity through the spring. A new road is to be built in Nevada this year, to connect with the Southern Pacific at Bishop, Cal. There is not much movement in light rails at the moment, but a general demand is expected as soon as the weather becomes settled.

Sheets and Plates.—The distributive movement of black and galvanized sheets is now fairly active, and the consuming demand appears to be growing all over the State. Merchants have for some time been carrying light stocks, and are getting actively into the market for immediate needs. They are buying only in a small way, however, apparently in expectation of lower prices, notwithstanding assurances from producing centers that values will be maintained. The demand for plates is normal, but there is no particular feature in this department at present.

Merchant Pipe.—Local business has been dull for nearly a year, but is beginning to show a little more life, and merchants anticipate a fair activity within the next few months. The demand through the State is steadily increasing. Jobbing stocks are being kept down as closely as possible, but orders for immediate shipment from the mills are becoming more numerous. The situation in oil casing and line pipe is improving, but is not yet entirely satisfactory. Plans are being developed for some important pipe line projects, but little definite inquiry is coming up. The city of Spokane, Wash., is in the market for a lot of 10 and 14 in. kalamein pipe.

Cast Iron Pipe.—The local office of the United States Pipe Company booked orders for about 7000 tons last month. Business continues active, as there is a general impression that prices will be advanced from the present low level. Small orders continue to come in from water and gas companies all over the coast, in addition to considerable municipal business. H. M. Byllesby & Co., Chicago, have been in the market to some extent for improvements to their coast plants, and are expected to buy on quite a large scale during the year. The San Joaquin Light & Power Company is planning to replace the gas system at Merced, Cal. The town of Santa Barbara, Cal., has ordered a lot of pipe from the United States Pipe Company and fire hydrants from the Crane Company. The towns of Tullock and Monrovia, Cal., have just received bids, the latter for 450 tons. The town of Madera, Cal., has called for bids for a complete water system. Contracts will be let shortly for another lot of valves and gates for the San Francisco salt water system.

Pig Iron.—Some foreign iron is being sold to arrive, but the movement is slow, most local melters refusing to take

any interest in the market. A cargo of 3500 tons arrived from China last week. Prices still show considerable range, depending on conditions of sale, but importers are a little firmer in their views, asking about \$23 for spot foundry iron.

Old Material.—So far there has been little stir in the market, cast scrap being generally neglected, though offerings of desirable material are light. Several large transactions in steel melting scrap are pending, and may be closed at any time. Prices on all descriptions are firmly held, being as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12 to \$15; rerolling rails, per net ton, \$15. Beard & Son, Portland, Ore., have chartered a barge to transport 2000 tons of steel scrap from Portland to Irondale, Wash.

Buffalo

BUFFALO, February 14, 1911.

Pig Iron.—Considerable new inquiry has come out the past week, largely for foundry grades, from New England, New Jersey and eastern Pennsylvania, aggregating about 20,000 tons. Orders totaling 10,000 to 12,000 tons, of foundry grades, with a small proportion of malleable, have been booked. In the matter of prices, conditions have reached a point where the local furnaces are not anxious for bookings at the unprofitably low prices which have prevailed recently, and have thought it unwise to continue them; in fact, a majority of Buffalo district furnaces withdrew a week ago from the low range quotations, and as a consequence there has been more or less stiffening in price schedules for the current week. In line with this, and with the information which is procurable, we have advanced our schedule 25c. per ton for practically all grades, as given below, for prompt and first half delivery, f.o.b. Buffalo, no quotations being made for last half:

No. 1 X foundry	\$14.50 to \$15.00
No. 2 X foundry	14.00 to 14.50
No. 2 plain	13.75 to 14.25
No. 3 foundry	13.75 to 14.00
Gray forge	13.50 to 14.00
Malleable	14.25 to 14.75
Basic	14.50 to 15.00
Charcoal	17.25 to 18.00

Finished Iron and Steel.—The outlook is better in most lines, and a number of mills and agencies report more orders coming in than for some weeks for miscellaneous short time requirements while some contracts for forward requirements are being placed. Specifications on existing contracts are also being released in fairly large volume. Underlying conditions are apparently becoming stronger as indicated by present inquiry and placement. In the Canadian export trade conditions are also very good and a large amount of business in general lines is being closed right along. In fabricated structural material plans for projected local construction to be undertaken this spring are not coming out for figures as rapidly as was anticipated a few weeks ago, but will probably be in readiness for bids within the next month. It is expected that bids for steel for the new office building of the Buffalo General Electric Company, involving a considerable tonnage, as it will include a 20-story tower of large dimensions, will be ready for figuring next week. Revised plans for the first building of the group to be erected by the Buffalo Orphan Asylum are being bid upon this week, taking about 100 tons of steel, and bids are also being received for a highway bridge over the Erie Canal, west of Syracuse, about 100 tons. The Cambria Steel Company has been awarded contract for the structural steel, 1000 tons, required for the power house to be built by the State at Albany.

Old Material.—The demand for scrap material in most grades continues to improve and shipments are still moving forward freely on contracts. There has been quite active inquiry for car wheels and for cast scrap as well as for heavy melting steel, and prices have advanced. Malleable scrap has also been affected, in sympathy with the rise in these lines and other commodities, most of which have shown an upward move of 25c. to 50c. per ton. There has also been a little inquiry from outside districts for borings and turnings. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$13.25 to \$13.75
Low phosphorus steel	17.50 to 18.00
No. 1 railroad wrought	15.25 to 15.50
No. 1 railroad and machinery cast scrap	14.25 to 14.50
Old steel axles	20.00 to 21.00
Old iron axles	23.50 to 24.50
Old car wheels	14.50 to 15.00
Railroad malleable	13.75 to 14.00
Boiler plate	11.25 to 11.75
Locomotive grate bars	11.25 to 11.75
Pipe	10.75 to 11.25
Wrought iron and soft steel turnings	7.25 to 7.75
Clean cast borings	6.75 to 7.00

THE IRON AND METAL MARKETS

New York

NEW YORK, February 15, 1911.

Pig Iron. New England has continued to be the center of interest for local sellers of pig iron in the past week. The low prices named in that district by a number of producers, particularly Buffalo furnaces, resulted in a moderate amount of buying that is known, and there are indications that both there and in the New York district a number of transactions have been quietly put through on a low basis. There is a feeling among some sellers that the competition for recent business has been overdone and that enough business has been booked to permit of a stand for a slightly better price. A number of furnaces are now asking 25c. to 50c. advance upon the prices named in the recent scramble. While the level on which sales have been made has been most discouraging to furnace interests, there are indications that both producers and important consumers recognize the probability of the turning point being reached by just such developments as those of the past week or two. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$14.75; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Steel Rails.—The rail manufacturers have closed few contracts this month, though a number of roads are negotiating. The Chicago City Railways have bought 15,000 tons of girder rails, 10,000 tons going to the Steel Corporation, to be rolled at Lorain, Ohio, and 5000 tons to the Pennsylvania Steel Company, to be rolled at Steelton, Pa. Several New England street railroad companies are in the market for girder rails, the total being about 3700 tons.

Ferroalloys.—The Carnegie Steel Company has placed an order with a New York firm for 5000 tons of ferro-silicon. The price in this market is between \$54.50 and \$55, Pittsburgh. There are a few inquiries for small lots of ferromanganese and the usual quotation is from \$37.50 to \$38, Baltimore.

Finished Iron and Steel.—The last two weeks have been a little disappointing, for orders have been slower coming in than was expected from the improvement evident during the last of January, but it is believed that the falling off is only temporary and that recent conditions will be restored before the end of the month. Plates are quiet, but in small lots a fair business is being done. Steel bars are about holding their own; good specifications are being received on old contracts, but new demand is light. Bar iron orders have been considerably better; buyers apparently concede that the price can hardly go lower, consequently orders are coming in more freely, while some of the lowest sellers have withdrawn outstanding quotations, feeling confident of being able to get higher prices. Structural material particularly feels the falling off, but several good prospects are in the New York market and are expected to be closed within a week. These include 400 tons for the New York, Ontario & Western shops, at Middletown, N. Y., bids on which closed February 9; 4000 tons for the Delaware & Hudson shops; 1000 tons for the Fischell Building in this city, and 700 tons for a loft building at 416 to 422 West Thirty-third street, also in this city. Contracts closed include 2500 tons for catenary electric line construction for the New York, New Haven & Hartford, awarded by the general contractor, S. W. Bowles Company, to the Eastern Steel Company, the Cambria Steel Company and the Riverside Iron Works; 3500 tons for the Cruikshank warehouse, New York, taken by the Hinkle Iron Works, which will furnish the cast iron material and have about 2000 tons of structural material to place; 1500 tons for the Kline & Jackson warehouse, at Seventh avenue and Twenty-third street, New York, taken by the Hay Foundry & Iron Works; 600 tons for a warehouse for the Union Bag Company, at Sandy Hill, N. Y., taken by the American Bridge Company; 600 tons for a warehouse for the Graselli Chemical Company, Newark, N. J., and 180 tons in three bridges for the Boston & Maine, taken by the Phoenix Bridge Company. Among the definite prospects still pending are the post-office at the Pennsylvania terminal, the Woolworth Building and the Masonic Temple addition on West Twenty-third street, New York. Plans are now being prepared for a building for the New York Telephone Company, which will probably be 14 stories, with provision for later adding 10 more, and which it is estimated may require between 10,000 and 15,000 tons. Prices are firm, as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.35c. to 1.40c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—The largest transaction reported in this vicinity the past week was the purchase of about 14,000 tons of pipe by the Brooklyn Union Gas Company. The greater part was secured by the Warren Foundry & Machine Company, 8000 tons of 30 to 42 in., and the remainder, comprising sizes running from 4 to 24 in., was divided be-

tween M. J. Drummond & Co. and John Fox, Jr. The water pipe for Worcester, Mass., about 2100 tons, on which bids were opened February 7, was secured by the United States Cast Iron Pipe & Foundry Company. The contract for water pipe for Fall River, Mass., 470 tons, on which bids were opened February 8, went to R. D. Wood & Co. No public lettings of importance are announced for this immediate vicinity. The private water and gas companies are still actively in the market. Competition is keen on the business coming up, it being evident that some pipe foundries are exceedingly anxious to fill their order books. Quotations are continued at \$21.50 to \$22 per net ton, tidewater, for carload lots of 6-in.

Old Material.—A decided increase is perceptible in inquiries, and dealers are expecting a much larger volume of business in the near future. More interest is taken in heavy melting steel scrap; while some demand is coming from consumers, the bulk of the buying so far has been among the dealers, some of whom have contracts which they feel obliged to cover. While thus far the improved feeling here may be regarded as more or less sympathetic with the better conditions reported at Pittsburgh, it must be admitted that the whole situation shows marked betterment. Quotations, per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting.....	\$10.75 to \$11.25
Heavy melting steel scrap.....	10.75 to 11.25
Relaying rails.....	20.50 to 21.50
Standard hammered iron car axles.....	22.50 to 23.50
Old steel car axles.....	16.50 to 17.00
No. 1 railroad wrought.....	13.50 to 14.00
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	12.00 to 12.50
No. 1 yard wrought, short.....	11.00 to 11.50
Light iron.....	5.50 to 6.00
Cast borings.....	6.50 to 7.00
Wrought turnings.....	6.50 to 7.00
Wrought pipe.....	10.50 to 11.00
Old car wheels.....	12.50 to 12.75
No. 1 heavy cast, broken up.....	12.50 to 12.75
Stove plate.....	9.75 to 10.00
Locomotive grate bars.....	9.00 to 9.50
Malleable cast.....	12.50 to 13.00

The Fechheimer Steel & Iron Company, dealer in old material, 231 North Front street, Allentown, Pa., emphatically denies the rumor in circulation that it is in some way connected with another corporation in the same line of business. The company states that it is not only not connected with any other corporation but that no other corporation holds any of its stock.

Metal Market

NEW YORK, February 15, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.									
Copper, New York.		Electrolytic.		Tin.		Lead.		Spelter.	
Feb.	Lake.	lytic.	New York.	New York.	St. Louis.	St. Louis.	Yorks.	Yorks.	St. Louis.
9....	12.75	12.37½	38.20	4.45	4.30	5.50	5.30		
10....	12.75	12.37½	40.00	4.45	4.30	5.57½	5.42½		
11....	12.75	12.37½		4.45	4.30	5.57½	5.42½		
14....	12.75	12.37½	(45.00)	4.45	4.30	5.57½	5.42½		
15....	12.75	12.37½	(45.25)	4.45	4.30	5.57½	5.42½		

Tin is bringing much more in New York than the cost of importation. Copper held steady during the week and a few buyers came into the market. Lead is weak. Spelter is quiet but firm.

Copper.—The Copper Producers' statistics had but little effect on the market. A fair amount of steady buying has been done during the week, and consumers have shown no disposition to ask for reduced prices. A large part of the business done has come from the Waterbury district. The market is fairly firm at 12.75c. for lake and 12.37½c. for electrolytic. At the close of trading in London to-day spot copper was sold for £54 17s. 6d. and futures for £55 11s. 3d. The sales amounted to 200 tons of spot and 300 tons of futures. The market closed strong.

Pig Tin.—Pig tin is bringing more than the cost of importation in this market, which is largely due to the fact that stocks here are very small. The London syndicate, which has controlled the situation for several months, began to liquidate last Thursday, but later bought freely, according to cables sent to metal trading companies in this country from their European connections. The selling on Thursday was caused by internal troubles in the syndicate. The market in London has been picking up since Thursday, and it is believed there that some of the moving spirits in the syndicate are taking hold again. The New York market is moving independently of the English fluctuations, as what little stock there is in this country is closely concentrated. Buyers are taking the metal only as they need it and are purchasing very sparingly, but at that the amount of business done indicates that consumers are very short of stocks. The London market closed to-day with spot tin selling at

£197 and futures at £193. The sales amounted to 200 tons of spot and 800 tons of futures. The market closed steady. In New York this afternoon pig tin sold at 45.75c., while the cost of importation is placed at 43.15c.

Tin Plates.—Consumers of tin plates are buying freely and more business is being done now than at any time within the last three months. Some of the independent mills are charging a little more than the leading interest, and much of the buying done during the last week, it is thought, has been influenced by the belief that prices may advance further. The bottom price for 100-lb. coke plates in New York is \$3.94.

Lead.—Lead is weak. It is freely offered in St. Louis at 4.30c., which makes the price in New York 4.45c. As far as selling is concerned, the leading interest is practically out of the market in this city, as it is maintaining its quotations at 4.50c. The demand is very light and the outside dealers seem anxious to procure business.

Spelter.—Spelter is firm and inquiries indicate that a good buying movement is in sight. Consumers have been holding off so long that it is the general belief that many of them are short of stock. There is very little spot spelter in New York and buyers are placing orders for prompt shipment from East St. Louis.

Antimony.—Stocks of antimony are very plentiful, and the market is weak. Hallett's is offered at 7.75c.; Cookson's at 8.25c., and other brands from 7.25c. to 7.50c.

Old Metals.—The demand from consumers is improving. Dealers' lowest selling prices are as follows:

Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.75 to 11.00
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	9.00 to 9.25
Lead, heavy.....	1.20 to 1.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	1.25 to 1.30

Metals, Chicago, February 14.—Large consumers of copper have been steady buyers recently, with no change in prices for Chicago delivery. Tin has recovered this week from its sensational drop last week and is quoted higher. Spelter is a little stronger, with increased demand. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12¾c. to 127½c., in carloads, for prompt shipment; small lots, 14c. to ¾c. higher; pig tin, carloads, 45c.; small lots, 47c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.45c. to 4.50c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter No. 1, 29c.; tin foil, 34c.; block tin pipe, 37c.

Metals, St. Louis, February 13.—Lead is weak at 4.30c. to 4.32½c.; spelter is stronger at 5.35c., both at East St. Louis. Zinc ore is held at \$40 and \$41 per ton, Joplin base. Tin is easier at 40.35c.; antimony (Cookson's) unchanged at 8.60c.; lake copper is quoted at 13.05c.; electrolytic at 12.70c., all at St. Louis. The demand for finished metals for the past week ruled fair, not brisk.

BERLIN, February 2, 1911.

The leading newspaper of Essen several days ago printed its usual monthly review of the market, which was again characterized by undue pessimism. A few of its first sentences are as follows: "The market persists in an apathetic quiet. Activity in placing orders has been suspended for months, the wholesale trade being uncertain regarding future developments, and therefore avoiding new engagements. Nevertheless, the amount of business in hand with the works has kept up tolerably well. Here and there, indeed, there is a perceptible lack of work, and it will soon be a necessity to secure new orders. Up to now, however, there are no signs that they will be forthcoming, although we have reached the time of year when the spring trade should set in."

This report is regarded as much too dismal. It is a significant fact that the stock market paid no great attention to it. Within a day or two it was dismissed, and now iron shares are again rising in sympathy with the better tendency indicated in this week's *Iron Age* as having shown itself in the American market.

It must be admitted, however, that German export prices have been cut pretty low, and there is as yet no indication of a general improvement in the near future. Competition with Belgian works remains very sharp, and prices in Bel-

gium are again lower. A Brussels dispatch of to-day says that the downward price tendency of pig iron has grown more pronounced. Another dispatch of this week from Brussels states that prices of bars for export are also lower in consequence of German and English competition; that bars of basic steel, f.o.b. at Antwerp, have dropped to 92 to 94.50 shillings, and iron bars to 95 to 96 shillings. On the other hand, a letter in one of the Berlin stock exchange papers this week from its Belgian correspondent says that basic steel bars had fallen as low as 91 shillings, but that they had rapidly recovered to 93 and 94 shillings.

A review of the Silesian market indicates that considerable activity in heavy plates has manifested itself this month. Better business is coming in from home consumers, and the mills are giving correspondingly less attention to the foreign market.

NEW YORK, February 15, 1911.

While transactions have been on only a moderate scale, prices have been well maintained. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Alis-Chalm., pref..	32 - 332	Railway Spr., com.	37 - 376
Beth. Steel, com.	324 - 338	Railway Spr., pref.	376 - 377
Beth. Steel, pref.	62 - 84	South. I. & S., com.	114 - 115
Can., com.	94 - 10	South. I. & S., pref.	114 - 115
Can., pref.	803 - 824	Sloss, pref.	112 - 113
Can. & Fdry., com.	561 - 575	Pipe, com.	18 - 19
Can. & Fdry, pref.	118 - 1185	Pipe, pref.	55 - 568
Steel Foundries....	48 - 521	U. S. Steel, com.	804 - 817
U. S. Steel, com.	119 - 1191	U. S. Steel, pref.	119 - 1191
U. S. Steel, pref.	119 - 1191	Warwick, com.	103 - 104
Int. Harv., com....	1141 - 1193	Va. I. C. & C.....	64 - 65
Int. Harv., pref.	1141 - 1193	Am. Ship, com.	76 - 78
Int. Pump, com....	43 - 44	Chi. Pneu. Tool....	481 - 493
Int. Pump, pref.	863 - 89	Cambria Steel....	451 - 454
Locomotive, com.	418 - 423	Lake Sup. Corp.	301 - 307
Locomotive, pref.	110 - 110	Pa. Steel, pref.	1061 - 1062
Nat. En. & St. com.	173 - 173	Warwick, pref.	103 - 104
Pressed St., com.	351 - 36	Crucible St., com.	13 - 131
Pressed St., pref.	98 - 985	Crucible St., pref.	80 - 804
		Harb.-W. Ref., com.	40 - 41

Dividends.—The Niles-Bement-Pond Company has declared the regular quarterly $1\frac{1}{2}$ per cent. dividend on the preferred stock, payable March 15, and $1\frac{1}{2}$ per cent. on the common, payable March 20.

The Ashton Valve Company has declared the usual quarterly dividend of 1½ per cent., payable February 15.

The General Electric Company has declared the regular quarterly dividend of 2 per cent., payable April 15.

The Republic Iron & Steel Company has declared the regular quarterly dividend of 13¼ per cent. on the preferred stock, payable April 1.

The United States Cast Iron Pipe & Foundry Company has declared the regular quarterly dividend of $1\frac{1}{4}$ per cent. on the preferred stock, payable March 1.

Notes on Prices

Rope.—Manufacturers of cordage feel somewhat encouraged in regard to the future, owing to the business being received by them, the volume of which is rather in advance of that expected at this season. It is stated that the sale of "commercial sisal" rope, which is about equivalent to third grade, is largely in excess of the other grades. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for small sizes: Pure Manila of the highest grade, 8 $\frac{3}{4}$ c. to 9 $\frac{1}{4}$ c. per pound; second grade Manila, 7 $\frac{3}{4}$ c. to 8 $\frac{1}{4}$ c. per pound; hardware grade, 7 $\frac{1}{4}$ c. to 7 $\frac{3}{4}$ c. per pound; pure sisal of the highest grade, 6 $\frac{1}{4}$ c. per pound; second grade, 6 $\frac{1}{4}$ c. per pound; rove jute rope, $\frac{1}{4}$ -in. and up, No. 1, 6 $\frac{1}{4}$ c. to 7c. per pound; No. 2, 6c. to 6 $\frac{1}{4}$ c. per pound.

Linseed Oil.—The Eastern market is very dull, but prices have been advanced 1c. per gallon on account of the latest quotations from London and Liverpool, where prices are equivalent to \$1 per gallon laid down in New York, duty paid. The strong foreign market is due to the fact that enough Argentine oil is being received to fill contract orders. The following quotations represent New York prices in five-barrel lots or more:

Resins have also advanced in sympathy with higher prices at Southern points, with a fair demand. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$7.25 and grade D at \$7.40 in the New York market.

The New Minnesota Ore Road

Large Bonuses on Steel Corporation Stock—Ore for Algoma Works

MARQUETTE, Mich., February 11, 1911. The Canadian Northern Railroad, which is extending its lines to the head of Lake Superior from the Mesaba iron range, and which expects eventually to handle a considerable ore traffic, has started the construction of a merchandise, ore and coal dock at West Duluth. It will have an approach of nearly 1500 ft. and will extend about 2000 ft. into the bay. One-half of the structure will be completed this year, and with the opening of the shipping season in 1912 the entire dock will be in commission. Several warehouses will be built.

The Duluth, Missabe & Northern and the Duluth & Iron Range Railroad, Steel Corporation subsidiaries, which haul the bulk of the ore from the Mesaba and Vermilion ranges, will pay to the State of Minnesota a combined tax of \$829,607 on their gross earnings for the year 1910. The Missabe earned \$12,588,086 and the Iron Range \$8,152,105. The tax on the former is \$503,523 and on the latter \$326,084, which compare with \$495,866 and \$346,231, respectively, the preceding year.

Representatives of the Lake Superior Corporation, which controls the Algoma steel plant and blast furnaces at Sault Ste. Marie, Ont., have been arranging for the purchase of ore for 1911 delivery. The company uses about 1,000,000 tons of ore a year, of which about half is procured in this country and the balance at the company's own properties in the Michipicoten district. A small part of the American ore comes from the Millie Mine, at Iron Mountain, Mich., the lease of which is controlled by the Lake Superior Corporation.

The employees of the Oliver Iron Mining Company who subscribed for the 1906 issue of the preferred stock of the United States Steel Corporation, and who still hold their shares, have received notice of the payment of a special bonus of \$21.35. This is in addition to the regular bonus of \$5 and the dividend of \$7 a year. The total returned to date to subscribers to the 1906 stock in extra bonus, yearly bonus and dividends is \$81.35. It is needless to say that the holders are immensely pleased with their investment. The extra bonus is next to the largest paid by the corporation. The largest was on the issue of 1903, which totaled \$65.04. That issue was sold to employees at the rate of \$82.50 per share. The return on this investment has been, in addition to the \$65.04 extra bonus, \$25 in yearly bonus and \$56 in dividends, a total of \$146.04, which, added to the present market value of the stock, gives an aggregate of nearly \$265. The extra bonus money comes from the accumulation of bonuses and dividends on stock subscribed by employees who have dropped out the past five years.

A statement has been published that the United States Steel Corporation was building a power plant on the Menominee River, 4 miles from Iron Mountain, at a cost of \$750,000, to furnish power to the mines as well as to the city. It is without foundation. The water power referred to is owned by interests other than the Steel Corporation and will be put to commercial use by private capital. The Steel Corporation already owns a hydraulic plant at Quinnesec Falls, on the Menominee River, which is supplying compressed air to the Chapin mine. A water power project is being seriously discussed by the White Iron Lake Iron Company, which proposes the erection of a plant at the falls of White Iron Lake, on the Vermilion range, in Minnesota. The company owns 120 acres of land adjoining the famous section 30 property on the south. The falls are the outlet of White Iron Lake and have a height of 12 ft. It is proposed to construct a dam 12 ft. high. The company would furnish power to the mines at Tower and Ely and vicinity and to other Vermilion range industries. The White Iron Lake Iron Company has holdings on both the Vermilion and Mesaba ranges.

The International Harvester Company is again searching for iron ore in the Crystal Falls district of the Menominee range. It has resumed exploratory opera-

tions at the lot 3 property. Ore of excellent grade was encountered previously, but with high manganese content. The present work is in a portion not heretofore explored. Lot 3 is in the Paint River valley and as far as location goes it bears the earmarks of a promising mine.

The strike recently made at the Aronson property in the Iron River district of the Menominee range is apparently one of importance. The diamond drill is said to have passed through 150 ft. of merchantable ore, with indications that the deposit is large. The property is in the hands of the Geary & Powers Exploring Company of Hibbing, Minn., and will probably be turned over to one of the large operating companies.

Ore from Rogers, Brown & Co.'s Ohio mine at Michigamme, Marquette range, is being shipped to Iron Mountain, Mich., for treatment in the Ardis furnace of John T. Jones.

Obituary

ROBERT PEEBLES, vice-president of the Ashland Iron & Mining Company, Ashland, Ky., died recently at Los Angeles, Cal., aged 65 years. He had been connected with the iron trade for many years.

CHARLES R. RHODES, general manager of the Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, died February 9, aged 44 years. He was a nephew of the late Joshua Rhodes, was born in New Castle, Pa., and was educated in the public schools there. He went to Pittsburgh about 25 years ago and entered the employ of the Shook-Anderson Mfg. Company, which later was absorbed by the Pittsburgh Valve, Foundry & Construction Company. For more than 10 years Mr. Rhodes was manager. He was also director of the National Car Wheel Company and the Pennsylvania Casting & Machine Company. He leaves a widow and four children.

The Henry Souther Engineering Company's Laboratory

The Henry Souther Engineering Company has purchased a plot of land, 100 x 150 ft., at the corner of Laurel and Willow streets, adjoining the Columbia Motor Car Company on the north, in Hartford, Conn. On this plot it has begun the erection of a brick building, 35 x 60 ft., to be arranged for a chemical and metallurgical laboratory. A complete physical testing laboratory will also be installed, including White-Souther alternate stress machines and a most modern tensile testing machine designed by Tinius Olsen & Co., Philadelphia. The Olsen machine has a capacity of 100,000 lb. and can be used for tensile, transverse and compression tests.

The company expects to move from its present quarters at 440 Capitol avenue, Hartford, and locate in its new laboratory building during April. The officers of the company are: Henry Souther, president; C. S. Dunbar, secretary, and F. P. Gilligan, treasurer.

The Dodge Quarter Century Club.—On January 28 the Dodge Mfg. Company, Mishawaka, Ind., organized a Quarter Century Club. Only those officers and employees who have been in the service of the company 25 years or more are eligible for membership. This organization is the outcome of a special feature of the industrial parade in that city on the Fourth of July, 1908, when automobiles containing 24 officers and employees of the company who had been in its service for that period or longer constituted one of the sections. Since that time two of the old employees have died, and three more have become eligible, so that the club starts with 25 charter members. The president, M. W. Mix, president of the company, celebrated the twenty-fifth anniversary of his connection with it on January 26.

Solid steel Detroit-Fenestra windows will be exhibited at the Chicago Cement Show in space 277, February 17 to 23 by the Detroit Steel Products Company, Detroit, Mich.

Customs Decisions

Sewing Machines

The incorporation in the Tariff act of 1909, for the first time, of a special provision for sewing machines has resulted in a test case being brought before the Board of United States General Appraisers for the purpose of construing it. Paragraph 197 enumerates sewing machines with several other kinds of machines, all dutiable at 30 per cent. Under the Dingley Tariff act of 1897, sewing machines were not provided for by name, and were held to fall within the meaning of paragraph 193 of that act as "manufactures wholly or in part of metal, or of which metal is the component material of chief value," dutiable at 45 per cent.

When Congress had the present tariff under consideration, pressure was brought to bear to have the duty on sewing machines reduced from 45 to 30 per cent., and a special provision inserted for such machines. This was done, the general understanding at the time being that the term used referred to the usual domestic apparatus. Now, however, Durburrow & Hearn, importers, make the point before the board that other kinds of sewing machines are entitled to classification under paragraph 197 at the reduced rate of duty.

Specifically the importers in the present test case claim that machines made by the Singer Sewing Machine Company and used for sewing leather, to make what is known as the prix seam, fall properly within the scope of the sewing machine paragraph of the new law. One of the allegations made is that the machines are for sewing straw hats. The Government intends to make a strong fight to have paragraph 197 construed in such a manner as to restrict its scope to the sewing machines used in the home for domestic purposes, its representatives contending that, in reducing the duty from 45 to 30 per cent., the object sought was to benefit housewives. It was not the intent of Congress, the Government hopes to show the board, to admit all kinds of sewing machines at the lower rate, but that machines used for general manufacturing purposes are intended to pay 45 per cent. It is likely that at the hearing to be held February 17 the Government will not lack for witnesses in support of its proposition.

Erasers with Fixed Blades

The Board of United States General Appraisers, in construing the tariff act of 1909, relating to erasers which have fixed metal blades set into handles of wood or other material, upholds a high rate of duty imposed by the customs authorities. The first test case of the kind to come before the board stands in the name of J. D. Irwin & Co., New York. Duty, to which the importers make objection, was levied at the rate of 40 per cent. ad valorem and 10 or 20 cents each, according to value. The protest sets up various claims at lower rates under paragraphs 154 and 199. General Appraiser Fischer says in his decision for the board, that the articles are erasers of the kind denominatively provided for in paragraph 152.

Steel Railroad Ties

The Board of United States General Appraisers has taken unfavorable action on protests filed by Joseph Blank, New York, regarding the classification of steel railroad ties. They were assessed with duty at the rate of 45 per cent. as manufactures of metal, under paragraph 199, tariff act of 1909, and were claimed dutiable at a rate proportioned to the value, under paragraph 131, as "steel not specially provided for." In a case arising under the Dingley act of 1897, the board held that bars of sleeper steel in length about 25 ft. were, in fact, within the class of crude or simpler forms of rolling mill products, and dutiable under the provision for "steel in all forms and shapes, not specially provided for," under paragraph 135. The shorter lengths were held not to be manufactured products and to be likewise dutiable under paragraph 135. Subsequent to this ruling the provision in paragraph 135 in question was construed by the courts to apply only to uncompleted forms and shapes of steel, such as were in the nature of

steel material to be still further manipulated and worked up into finished articles. In denying the contention of the importer for a lower rate on the merchandise General Appraiser Fischer has this to say:

The analogous provision in paragraph 131, tariff act of 1909, reads, "steel not specially provided for," and the change so made in the wording of the provision indicates beyond doubt that Congress had in mind by this catch all clause only unfinished forms of steel as "material." This view would exclude therefrom finished steel railroad ties, ready for special use, and such articles would find classification under paragraph 199, as herein assessed. The line so drawn between the steel as "material" and the article made therefrom requires no extended comment. The collector's assessments are affirmed and the protests overruled.

The Yuba Construction Company

The Yuba Construction Company, Marysville, Cal., the largest gold dredge designer and builder in the West, has entered into an agreement with the Bucyrus Company, South Milwaukee, Wis., by which it takes over the exclusive agency for Bucyrus gold dredge machinery for Alaska and British Columbia. This arrangement enables the Yuba Company to give special attention to the Alaskan dredging business and, as a further facility for handling that business, it has opened an office in Seattle, in the Alaska Building, which will be maintained permanently, in addition to the San Francisco office. P. R. Parker, formerly engineer with the San Francisco office of the Bucyrus Company, is now in charge of the Seattle office of the Yuba Company.

The Yuba Construction Company also recently acquired the business and equipment of the Western Engineering & Construction Company, San Francisco. The latter is one of the oldest firms engaged in gold dredge construction. With these two important acquisitions, the company is in an especially good position for handling gold dredge construction for any requirements. It is now building three 15-cu. ft. dredges in California, a 13½-cu. ft. and a 9-cu. ft. dredge in Idaho, and is installing a complete hydroelectric plant and an 8½-cu. ft. dredge with steel hull in Columbia, South America.

The Farrell, Kemp & Gushe Company.—Farrell, Kemp & Gushe, Joliet, Ill., a copartnership, has been incorporated with \$12,000 capital stock under the title of the Farrell, Kemp & Gushe Company. It is at present located at 516-18 Clinton street and does a general business in sheet metal, slate and tile roofing, furnace heating, &c., but will in the near future move into a new factory, 50 x 150 ft., now under construction. The company's present shop is equipped with a six-ton 50-in. stake riveter and punch, medium punch press, heavy rolls, heavy slitting shear, and an 8-ft. heavy brake, besides the necessary apparatus for light sheet metal work. This equipment will be moved into the new factory when completed, in addition to which there will also be installed a toggle press, heavy rotary shear, spinning lathe, air riveters, &c., making it a strictly modern plant. C. S. Farrell is president; H. C. Gushe, vice-president; W. B. Kemp, secretary and treasurer.

The Electric Smelting of Swedish Iron Ore.—Full operations have been carried on for more than two months at the demonstration plant erected at Trollhättan Waterfalls in Sweden for the electric smelting of iron ore. The process is that of the Electrometal Company, which was employed at the Domnarfvet Works in the experiments of which reports have been published. Up to the latter part of January 670 tons of pig iron had been made, about 5 tons being obtained from each charge. A saving in coal of 67 per cent. from the fuel expenditure involved in ordinary blast furnace practice had been claimed, and this is being practically realized, it is said. In quality the product is up to expectations, particularly in the elimination of sulphur and phosphorus.

Half the product of Ivanhoe Furnace, at Ivanhoe, Va., in January had a phosphorus content under 0.035 per cent.

Iron Ore List with Lake Superior Map.—Oglebay, Norton & Co. have issued an attractive booklet listing the Lake Superior ores they will sell in 1911, with analysis of each. The list shows few changes from that of 1910. A new ore is listed in Bray No. 2 and is said to be better than the Bray ore on the Mesaba range. It is lower in moisture than the Bray ore, a trifle lower in iron and somewhat higher in silica and manganese. Wooley, Yale and Porter ores, all from the Yale mine, do not appear in this year's list, the mine having passed into the hands of a consuming interest. A valuable feature of the booklet is the insertion of a colored map of the Lake Superior district, 15 x 27 in., which gives the locations of important mines. The Atikokan and Michipicoten ranges in Ontario are located and a smaller map on the same sheet shows the Moose Mountain range in the Georgian Bay district. A number of extra copies of this map, unfolded and on heavier paper, have been prepared, and the company will distribute these among its blast furnace friends desiring such copies for framing.

What Union Labor Is Doing for San Francisco.—H. William L. Gerstle's annual address as president of the San Francisco Chamber of Commerce, he says: "Everything is on a competitive basis excepting labor, and this is due to the fact that we have not had the courage in San Francisco to enforce the open shop principle which prevails in our competitive cities. Since our fire in 1906, our manufactures have decreased year by year, and to-day we have but 30 per cent. of what we had four years ago. We have the harbor, the climate, transportation facilities, capital and cheap fuel—in fact, everything requisite for a manufacturing city; but as against this the cost of manufacturing is so high that we cannot compete with neighboring communities. So long as we suffer from this handicap we cannot hope to be a great manufacturing city, and without manufactures we are merely jobbers handling the products manufactured elsewhere on a small commission basis."

The Westinghouse Electric & Mfg. Company has received a contract from the Perine Machinery Company, Seattle, Wash., for four alternating current induction type CCL motors to be used in operating exhaustor fans for removing chips, shavings, sawdust, &c., from the joiner and boat shops at the Puget Sound Navy Yard, Bremerton, Wash. The fan rotors will be overhung on the motor bearings; this direct connection of the units is probably the most interesting feature of the work. The four motors will have capacities of 10, 15, 50 and 75 hp. each. The work in connection with the installation of the motor driven fans will be done under the cognizance of the Bureau of Construction and Repair, Navy Department.

The Sharon Steel Hoop Company held its annual meeting at Sharon, Pa., last week. The following directors were elected: S. P. Ker, F. C. Perkins, Charles Bachman, G. W. Short, W. G. Kranz, J. P. Whitla and J. Reid Evans. The directors organized by electing S. P. Ker president; G. W. Short, vice-president; Charles Bachman, treasurer, and J. Reid Evans, secretary. No improvements to the plant were authorized or discussed. The improvements authorized last year, covering the construction of a 14-in. band mill, are well under way, and it is expected that the new mill will be in operation about June. The company had a fairly satisfactory year during 1910, but is operating to only about 50 per cent. of its steel capacity at present.

The Foundrymen's Club, a new Cincinnati organization, gave a beefsteak dinner at Wiedemann's, in Newport, Ky., the evening of February 9. About 50 members and their friends attended, and among the instructive addresses of the evening was one by Prof. John J. Porter of the Cincinnati University, whose subject was "Cupola Practice." The object of the Foundrymen's Club is to promote closer personal relations between local foundry-

men, and in this it has the hearty support of the Associated Foundries organization.

In regard to the recently reported merger of the Reeves Mfg. Company and the Dover Forge & Iron Company, Canal Dover, Ohio, the former company advises us that it has purchased the plant of the latter and has increased its capital stock to \$500,000. The Reeves Mfg. Company will add two sheet mills and a galvanizing department to its plant and will also make extensive additions and improvements to its roofing department.

The Duquesne Steel Foundry, Kendal Station, Pa., has for several years been using oil fuel in two of its open hearth furnaces, with equipment installed by Tate, Jones & Co., Inc., Pittsburgh. It is now abandoning natural gas and using oil exclusively and has let the contract to Tate, Jones & Co. for the equipment of its last and third furnace with the well-known Kirkwood system.

The Carris Mfg. Company, Washington, Iowa, manufacturer of screw machine products, has been absorbed by the Globe Mfg. Company, Perry, Iowa, and its factory has been moved to the latter place. The Globe Mfg. Company, it is understood, will be prepared to furnish estimates on screw machine products in about four weeks.

The McClintic-Marshall Construction Company, manufacturer and erector of steel buildings and bridges, has opened an office in the Morris Building, Philadelphia, in charge of C. H. Chubbuck, contracting engineer. This company also has contracting offices at New York, Pittsburgh, St. Louis, Chicago, San Francisco and Columbus, Ohio.

The Youngstown Steel Company, operating Tod Furnace at Youngstown, Ohio, held its annual meeting last week. E. L. Ford, Paul Jones, John Stambaugh, Henry H. Stambaugh and David Tod were re-elected directors. E. L. Ford was elected president and general manager; Paul Jones, vice-president, and John Stambaugh, secretary.

The Warren Foundry & Machine Company held its annual meeting at Phillipsburg, N. J., February 13. The old Board of Directors was re-elected and in turn re-elected the present officers, as follows: William Runkle president and treasurer; William H. Hulick, vice-president and assistant treasurer.

The Prentice Bros. Company, Worcester, Mass., builder of lathes and drilling machines, has given to Joseph T. Ryerson & Son, Chicago, the agency for its line in the territory west of Pittsburgh. The Fairbanks Company continues to represent the Prentice Bros. Company in Pittsburgh and the country east of that center.

The Westcott Chuck Company, Oneida, N. Y., manufacturer of lathe and drill chucks, has been notified that it has received the gold medal at the late Brussels Universal Exposition.

The Asbestos Protected Metal Company, Canton, Mass., has opened a branch office at 613 Fisher Building, Chicago, Ill., which is under the management of Wilmet W. Burritt.

The Pittsburgh Nail & Supply Company, Fuller Building, New York City, has opened offices in Room 2130 Oliver Building, Pittsburgh, with H. C. Cramer in charge.

The Lake Superior Iron & Chemical Company has made a reduction of 10 per cent. in wages at its charcoal furnace plant at Ashland, Wis.

The American Sheet & Tin Plate Company's plant, at Elwood, Ind., is operating 24 of the 28 hot mills.

Personal

George Q. Palmer, formerly vice-president, has been made president of the Alberger Condenser Company and the Alberger Pump Company, New York. Mr. Palmer is succeeded as vice-president in the Alberger Condenser Company by D. H. Chester, and in the Alberger Pump Company by W. S. Doran.

At the annual meeting of the Niles-Bement-Pond Company, C. L. Cornell was elected a director, succeeding Alexander Gordon, deceased. Other directors were re-elected.

Philip Frankel has resigned as secretary of the Cleveland Employers' Association, retaining the secretaryship of the Cleveland branch of the National Metal Trades Association. E. J. Hobday has been appointed secretary of the former association. The two associations will hereafter maintain separate offices, the Cleveland Employers' Association having established headquarters at 407 and 608 The Arcade.

William F. Wendt, Buffalo, N. Y., has been created grand commander of the Civil Order of Agricultural Merit by King Alphonso XIII. of Spain. Mr. Wendt is president of the Buffalo Forge Company, George L. Squier Mfg. Company, and Buffalo Steam Pump Company, besides being interested in other large manufacturing enterprises. He is also owner of one of the largest and best equipped fruit and poultry farms in the State of New York which exemplifies his interest in agriculture, and is publisher of the illustrated monthly periodical, *La Hacienda*, which was founded six years ago, is printed entirely in Spanish and Portuguese, and is to-day one of Buffalo's most successful enterprises. The royal decree establishing the Civil Order of Agricultural Merit states that its object is to reward eminent services rendered to agriculture in any of its branches. Membership in it is highly prized and eagerly sought in Spain. Grant to a citizen of the United States is believed to be without precedent.

M. D. Bixby has taken up his duties as direct representative of the Colonial Steel Company in the Denver district, with headquarters in the Jacobson Building, Denver, Col. He was formerly associated with the J. George Leymer Engineering Works Company, Denver.

A. L. Lovejoy has resigned as sales manager of the New York office of the Pratt & Whitney Company, to accept the management of the Chelsea Division of the Flanders Mfg. Company, with headquarters at Chelsea, Mich., to take effect March 1.

The Pittsburgh Coal Company and Colonial Coke Company announce that J. C. Barnhisel has been appointed their district sales agent, with office at Sault Ste. Marie, Mich.

The resignation of T. G. Bennett as president of the Winchester Repeating Arms Company, New Haven, Conn., was announced at the annual meeting February 8, and was accepted by the Board of Directors with much reluctance, and only after Mr. Bennett's insisting that he did not desire to be so active in a business way in the future. A new office, that of consulting director, was created for him. George E. Hodson was elected president and treasurer; Winchester Bennett, first vice-president; Harry S. Leonard, second vice-president; Aro I. Ward, secretary. No change was made in the Board of Directors.

E. F. Lake, Avenue B and Forty-seventh street, Bayonne, N. J., announces that he has severed his connection with the *American Machinist* as steel editor, and will hereafter act in the capacity of a special correspondent and consulting metallurgist. Expert advice will be given on the melting, alloying, casting, welding, heat treating and testing of metals, on the kind of metal best adapted for tools, and the moving or stationary parts on all kinds of machines or machinery and on the shop equipment required to perform this work economically and correctly.

A. Bickel, formerly contract manager of the Freeborn Engineering & Construction Company, has accepted the

position of president of the Commercial Construction Company, whose principal offices are at Kansas City, Mo., and is engaged in a general line of municipal and private construction work.

J. A. Tyrie of the Michigan Twist Drill Company, Detroit, Mich., has been elected secretary and treasurer of the company, and C. E. Price, formerly superintendent of the machine shop of the Ford Motor Car Company, has been made factory manager.

Wm. R. Downey, formerly in the purchasing department of the Detroit Screw Works, Detroit, Mich., was recently elected secretary and treasurer of the Vincent Steel Process Company of the same city, with full charge of the company's business.

H. T. Fisher has taken a position with the Wells Brothers Company, Greenfield, Mass., as sales manager, starting February 1. He succeeds Edward Blake, Jr. Mr. Fisher was formerly connected with the same company, leaving some six years ago to accept the management of the Granite State Mowing Machine Company, Hinsdale, N. H., with which company he has been connected until the present time.

Lewis N. Rancke, formerly manager of the Baltimore Retort & Fire Brick Company, Baltimore, Md., has become associated with the engineering department of the Laclede-Christy Clay Products Company, St. Louis, Mo.

John Fritz, Bethlehem, Pa., had conferred upon him at the Founders' Day exercises of Temple University, Philadelphia, Pa., on February 11, the honorary degree of Doctor of Science, announcement of which was made by Dr. Russell H. Conwell, president of Temple University, at the testimonial dinner given to Mr. Fritz by the Manufacturers' Club in that city on November 17, 1910. The degree, owing to Mr. Fritz's inability to attend the exercises, was conferred in *absentia*.

J. G. Grant of the Grant-Wood Company, Chelsea, Mich., sailed for Europe February 8, to be absent several weeks.

C. A. Ryers, Philadelphia, Pa., has assumed the management of the Baltimore Retort & Fire Brick Company, Baltimore, Md. He was associated some years ago with the Cyrus Borgner Company, Philadelphia, manufacturer of fire brick and clay retorts, and is a practical gas engineer.

Frank M. Eaton, resident partner of Hickman, Williams & Co., Cincinnati, Ohio, will sail from New York next week for a few weeks' vacation on the Isthmus of Panama.

Wm. F. Carroll has been appointed master mechanic for the New York Central Lines, with headquarters at Rochester, N. Y., succeeding F. W. Steel, resigned.

E. W. Mudge of E. E. Mudge & Co., iron and steel factors, Frick Building, Pittsburgh, has returned from Europe.

E. T. Weir, president of the Phillips Sheet & Tin Plate Company, Weirton, W. Va., has returned from Europe.

Jay I. Andrews, sales agent of the American Sheet & Tin Plate Company, Pittsburgh, has returned from an extended visit to the Pacific Coast.

The fortnightly bulletin of the American Railway Association shows that on February 1 the net surplus of idle cars on the lines of the United States and Canada stood at 155,068, compared with 114,820 two weeks before. The increase was 40,248, or 35 per cent. A year ago, at the opening of February, the surplus of equipment was 24,975, but since that time 100,000 new cars have been added, and the weather conditions this month are much more unfavorable than in February, 1910. In February, 1909, the number of idle cars was 301,283.

It is denied that the United States Steel Corporation is planning for the building, through the American Bridge Company, of a large bridge shop in the Birmingham, Ala., district. Another report, equally untrue, is that the Steel Corporation will build a bridge plant near Havre de Grace, Md.

Our Trade with Latin-America*

Much Already Done in Steel and Other Lines—Our Consular Service and Business Methods Commended

BY JAMES A. FARRILL.

The International Union of American Republics, commonly called the Pan-American Union, its distinguished Board of Directors and its competent, zealous and efficient general director, John Barrett, together with the assistant director, Francisco J. Yanes, are to be congratulated upon this great gathering of representative business men, interested in promoting trade and commerce between the countries comprising Latin-America and the United States.

The Need of Outer Markets

As any one who studies the progress of nations can perceive, the producing capacity of the United States has reached a point far exceeding the consumption, and the ratio of excess is assuming greater proportions each year. It is, therefore, imperative for the manufacturers of this country to look beyond its borders for markets wherein they can profitably dispose of their manufactures; and naturally our geographical position points to the vast country lying to the south of us as a market which should enable us to secure a portion of the trade commensurate with our position as one of the foremost producing nations.

The possibilities for the consumption of American products in the markets of our neighboring countries have long been realized by the greatest statesmen, as well as the leaders in the economic and commercial enterprises of our country. To every one engaged in foreign commerce there comes a broader knowledge of human affairs and a better understanding of the relations of men and of nations than comes to those who are solely engaged in domestic or local enterprises.

Our Business Methods in South America

It has been the fashion to criticise American export methods indiscriminately; so, also, it has been the fashion to criticise the commercial methods of South American buyers. There are, doubtless, examples meriting criticism in both cases; but my observation extending over many years in the export business and based on a direct personal acquaintance with the world's markets, enables me to state that, generally speaking, the products of our country and the manner in which they are packed for shipment are equal, if not in many cases superior to, the products and methods of European manufacturing countries.

The improvement which is constantly taking place in the quality and character of American manufacturers is one of the reasons why our trade is constantly increasing. It is a fallacy to believe that quality does not count and that South America wants cheap goods. My experience is that when our friends want railway materials, bridges, building materials and a thousand and one other things, they are as well able to recognize quality and as competent to determine their necessities as we are.

The business methods of our friends to the south of us do not differ materially from ours, excepting that they are rather more conservative. It is more difficult to secure business connections there than in our country, but once secured and mutual confidence established, it is of a permanent character.

Cultivating Closer Relations

The countries comprising what is commonly called Latin-America should be drawn closer to us by ties of friendly relation and brotherhood, cemented by a generous exchange of commodities through the peaceful channels of trade and commerce. As fair dealing is the

only foundation upon which a sound and successful enterprise can be established, none but those of undoubted character and business ability should be sent to represent American industrial enterprises. In our relations with Latin-America, this thought should be uppermost in the minds of those of our merchants who would seek a market in those countries. The patient cultivation of our trade will carry with it rewards of great mutual advantage.

Since the establishment of the Pan-American Union, much has been accomplished to develop trade with those countries. Our neighbors have always found in the United States the greatest and best market for their products, statistics showing that we have given them more in trade than we have received; the reason for this being that, until comparatively recent years, we, as a nation, have been largely interested in the internal development of our natural resources, and have given little thought to the development of foreign trade, except as our requirements of necessities impelled us.

The growth of our country's trade with the Latin-American Republic furnishes a striking example of what can be accomplished by commercial friendship and co-operation. It is beyond the scope of this address to do more than briefly outline the nature and value of the trade between us. The establishing of American banking facilities and American steamship lines are incidental matters which will be evolved in the course of time.

The completion of the Panama Canal will give a wonderful impetus to Pan-American trade. It is impossible at this time to estimate fully the benefits that will accrue to the manufacturing and industrial interests of the United States and Latin-America. We are justified in believing that it will undoubtedly prove one of the most profitable investments ever made by our Government, aside from its being a national necessity.

Trade Balance Against the United States

The United States Government statistics for the calendar year 1910, recently published by the Department of Commerce and Labor, show that our trade with the countries embraced in the Pan-American Union, in round figures, was as follows:

Imports	\$304,000,000
Exports	260,000,000

Balance against United States.....\$134,000,000

This adverse balance is largely accounted for by the figures of our commerce with Brazil, which were in round numbers:

Imports	\$103,000,000
Exports	25,000,000

Balance against United States.....\$78,000,000

While I have not at hand the latest statistics of the total amount of the trade of other countries with those embraced in the Pan-American Union, it will be interesting to note the comparison of the figures for steel products alone, for which reasonably close approximations are obtainable. In 1910 the manufacturers of the United States exported to the Pan-American Union steel products of an aggregate value of \$21,000,000, as against a total of \$35,000,000 exported by European manufacturers to the same countries.

We are a great manufacturing nation, and as such it is only reasonable for us to look to our neighbors for a fair exchange of our commodities in return for those we obtain from them. Up to within recent years a large percentage of our country's exports came to our manufacturers without any particular effort; in late years it has been necessary for our manufacturers to study for-

* An address before the Pan-American Conference, Washington, D. C., February 13, 1911.

oreign markets. To be successful our manufacturers must have a fuller knowledge of their requirements and keep in closer touch with their customers. Such contact places them in a more intelligent position respecting our resources and products, and promotes an intercourse which is mutually beneficial. System, purpose and organization are the only things that count in the long run.

The American Position as to Credits

The delusion exists that the trade of the United States with foreign countries is carried on within narrow limits. Among others, the claim has been made that we do not extend credits, and, in consequence, a large volume of trade goes to Europe which would come here, were we to grant credits of six to nine months. In the great majority of cases, credits such as referred to are granted only against acceptance of drafts, with interest added for the accommodation; but the bulk of the business done with the best buyers, wherever found, is either against bank credit, or cash against shipping documents. Wherever there is a basis for credit, American manufacturers will be found as ready to grant it as Europeans.

It is only within the past few years that we have had direct lines of communication from the United States to many South American ports. The growth and development of trade and commerce between the United States and the countries of Latin America has now been increased to such proportions that there are frequent mailings between ports of the United States on the Atlantic and Gulf coasts direct to the ports of Latin-America, on both the East and West coasts.

In the development of our trade, we should endeavor to obtain our full share of business by fair and honorable means and with due regard to the rights of those with whom we are trading. That "competition is the life of trade" is almost a daily utterance. Were this changed to "Fair competition is the life of trade," it would more correctly represent the basis upon which sound and lasting business relations may be established.

If we investigate the commercial and economic history of the countries that have made the greatest strides in ancient and modern times, we will find that their governments and statesmen have given their best thought, energy and support to foster and protect their interest at home and seek markets abroad.

The Pan-American Union is performing a great work for the advancement of trade, commerce, peace and civilization, and it is to be hoped that the respective governments will continue to support the movement, so that a lasting good will may be established through the peaceful contests fought out in the channels of trade and commerce.

Consular Service Improved

This occasion should not be allowed to pass without a word of congratulation to the commercial world, and more particularly our distinguished President and Secretary of State, on the decisive and effective position held during recent years toward the perfection of our diplomatic and consular organization. The commercial world is watching our consular service and the efforts of the Government to keep this most important branch of our foreign representation on a merit and business basis.

Our consular service has grown and developed in recent years under the present policy of the Government, so as to merit the confidence of our citizens at home and abroad. We should not forget that this service remains the one organized expression of our country in the stupendous economic contests which are now engaging the nations of the earth in competition. The commercial interests of the United States should guard it jealously, and support and fortify in every possible manner the splendid work of Secretary Knox and Director Carr in their efforts to maintain and improve it.

The Department of Commerce and Labor has also in recent years achieved splendid results by sending special agents throughout the world to report on business and economic conditions with a view to the promotion of our country's trade and commerce with foreign countries. This work should be encouraged by the commercial interests of this country in every possible way.

As a business proposition alone, the emoluments of every consulate on the list, where conditions recommend its continuance, should be markedly advanced. Our consular service is highly efficient, and no just criticism can be made of it; but men tire of working for glory alone. The service should be fixed by statute on a permanent basis, and salaries paid commensurate with the importance of the work and the pretensions of our country.

I am one who believes the American Consular Service is the best in the world. I have met many consular officers and I have invariably found them interested in their work and appreciative of the significance of American commerce.

In this connection, the thought is suggested that the consular organization might be used in a direct manner for the dissemination of information concerning American manufactures and exports in a wide and comprehensive way. This could be done by establishing a consular trade bulletin, to be published by the Government in several different editions and in different foreign languages, listing the standard American exports, with specimen prices and other information, as indicated by bills of lading and invoices at the point of shipment. Such a publication, being of a statistical character and bearing the imprint of the United States Government, would be received without prejudice in every market of the world.

The American Iron & Steel Mfg. Company's Annual Report

The balance sheet given in the eleventh annual report of the American Iron & Steel Mfg. Company, Lebanon, Pa., showing the financial condition of the company December 31, 1910, compares as follows with that of the previous year:

	Assets.	1910.	1909.
Cash		\$1,025,061.76	\$596,101.84
Bills receivable.....		11,258.04	11,553.04
Accounts receivable, net.....		576,322.06	673,302.99
Inventory		1,587,642.97	2,143,183.40
Insurance and taxes, unexpired value		6,237.41	7,300.46
Fixed assets:			
Real estate, plants and equipments,			
less allowance in 1910 of \$855,000			
to provide for depreciation.....		4,936,635.62	4,870,166.86
Totals.....		\$8,143,157.86	\$8,301,608.59
	Liabilities.		
Preferred stock.....		\$3,000,000.00	\$3,000,000.00
Common stock.....		2,550,000.00	2,550,000.00
Wages accrued, not due.....		None.	90,998.02
Accounts payable.....		None.	134,728.89
Undivided profits at this date subject to the payment of dividends on preferred and common stock, authorized but payable in January		2,593,157.86	2,525,881.68
Totals.....		\$8,143,157.86	\$8,301,608.59

President James Lord says: "As compared with the previous year the demand for our products was greater, with prices much lower than prevailed during the last half of 1909. Additions were made to plants and equipment amounting to \$116,469."

A Bill to Legalize the Boycott

The line of legislative effort by organized labor at the present session of the New York Assembly is indicated by a bill just introduced at Albany, inserting five new sections in the labor law. It punishes by fine or imprisonment any company or officer compelling persons to refrain from membership in a union as a condition of securing employment. It permits the boycott by providing that agreements or contracts between persons to do or not to do any act in contemplation or furtherance of any trade dispute between employers and employees in the State shall not be deemed criminal and shall not be punished as a conspiracy unless such acts would be criminal if committed by one person. It makes it a misdemeanor to advertise for workmen to take others' places without stating that a lockout exists. Strike breaking is also prohibited by making it a misdemeanor to hire persons to carry arms and to guard property, without the consent of the Governor.

Canada's Steel Bounties May Be Renewed

TORONTO, February 11, 1911.—A statement made by the Canadian Finance Minister on Wednesday strengthens the expectation that the Dominion Government will shortly introduce legislation to provide for a renewal of some of the steel bounties. The statement was made in reply to a large deputation from Morrisburg, Ont., that presented a petition for a bounty of \$5 a ton on sheet steel manufactured in Canada. The request was made in behalf of the Sheet Steel Company's industry in Morrisburg. The Finance Minister said that the Government desires to get rid of the bounties, but he promised to give the petition careful consideration. He added that the Government would not grant a bounty on goods for exportation. Altogether the answer, especially the latter part of it, was encouraging. The Minister, who some months ago intimated rather positively that there would be no more steel bounties, will now go no farther than to negative the idea of bounties on goods for export.

As the bounty law formerly stood, exportation was not a ground for the forfeiting of the bounty, except in the case of certain articles. To draw the bounty on wire rods, manufacturers were required to use them for the making of wire in this country. Steel blooms and steel billets made in Canada could not be exported without return of whatever money had been paid as bounty on the steel ingots from which they were produced. But the rail bounty, which was discontinued some years ago, was payable to manufacturers, whether the rails were sold at home or abroad.

On the day the Finance Minister received this deputation he was asked in the House by a private member whether the Government had changed its intentions as to bounties in future. The reason for making this inquiry was the report that a conference had been held in Montreal between the Finance Minister and the president of the Dominion Steel Corporation, and that the question of bounties had been discussed. The Government was also questioned as to whether many petitions had been received for the abandonment of the bounties. In reply the Finance Minister said that representations had been made to him by the president of the Dominion Steel Corporation with reference to obtaining a bounty on steel rods. Whatever decision the Government should come to would, said the Minister, be announced in the House. On this question, he said, as on all matters relating to the fiscal policy of the Government, there were differences of opinion throughout the country.

Both the Sheet Steel Company and the Dominion Steel Corporation base their case for bounty on changes that are provided for in the reciprocity agreement whose ratification is pending at Ottawa and Washington.

C. A. C. J.

The National Electroplaters' Association

The National Electroplaters' Association of the United States and Canada, an organization composed of electroplaters and electrometallurgists, held its second annual banquet at the Hotel Marlborough, New York, on the evening of February 11. The organization is an educational society formed to pursue the study of electroplating and discuss subjects for the improvement of shop practice. Several hundred members from all parts of this country and Canada attended. Addresses were made by Dr. Joseph W. Richards, professor of electrometallurgy, Lehigh University; Erwin R. Sperry, editor of the *Brass World*, Bridgeport, Conn., and George M. Howard, chief chemist of the Electric Storage Battery Company, Philadelphia, Pa.

The Foster Bolt & Nut Mfg. Company, Cleveland, Ohio, is erecting a two-story brick addition to its shipping department. This company is now manufacturing a full and complete line of stove bolts, stove rods and rivets.

The Republic Iron & Steel Company will blow in the third furnace of its Thomas, Ala., group February 25. It has been out for some weeks for relining.

Machine Tool Awards at the Brussels Exposition

Our Berlin correspondent furnishes the following: "At a dinner recently given here to Privy Councillor Albert, the German commissioner to the World's Fair at Brussels, that gentleman referred to the splendid showing made by the German exhibits there by reason of the scientific thoroughness and exactness that characterized them, and added: 'I will single out only one section of the German division—namely, the machine tool trade. We all know what we have learned in this trade from the Americans, and that we are still engaged in a particularly sharp competition with America. It is, therefore, especially interesting to note how this competition turned out at Brussels, where the Americans limited their exhibits substantially to machine tools. The class jury—that is, the jury composed exclusively of experts—awarded Germany 10 first-class prizes, Belgium 5, Great Britain 4 and the Americans 2. I don't think I could bring forward better proof of how we steadfastly keep our goal in view and work for the intelligent perfecting of a difficult process of production.' The American machine tool manufacturers can see from this what their pupils, the Germans, are now saying after having learned their lesson from the Americans, and having, as they think, outstripped their masters."

Apparently some error has been made with regard to the number of prizes awarded to American machine tool manufacturers at Brussels. Alfred H. Schutte, who represents at Berlin a number of American machine tool manufacturers, cables that Americans received 33 prizes through his exhibits alone.

The Krupp-Midvale Suit Dismissed.—Judge McPherson in the United States Circuit Court at Philadelphia on February 13 handed down an opinion dismissing the bill with costs in the case of Fried Krupp-Aktien Gesellschaft against the Midvale Steel Company. The court's finding was based on the lack of evidence to sustain the charge of infringement averred by the plaintiff company, which alleged that the Midvale Company was infringing on its rights by using a process in the manufacture of armor plates which the former declares is its own invention. The attorney for the Midvale Company argued that the loss alleged by the Krupp concern was purely speculative; that the process in dispute had been in use by the Midvale Company for years prior to the filing of the suit. He also alleged that no injunction could be issued because the patent rights of the process have expired since the proceedings were begun.

The Detroit Bridge & Steel Works, Detroit, Mich., which was organized some months ago, has completed its plant at Delray, a few miles south of Detroit. The plant has a capacity of 12,000 to 18,000 tons of fabricated steel a year. Considerable work is now going through the shop, several local building and bridge contracts having been recently secured, the latest being the steel work for the addition to the Pingree Building, Detroit. The officers of the company are as follows: Max J. L. Fowler, president; W. E. Brinkerhoff, secretary; Richard P. Joy, treasurer; C. A. McLees, assistant treasurer. All the active officials of the company were formerly identified with the old Detroit Bridge & Iron Works.

In the foundry of the Charter Gas Engine Company at Sterling, Ill., February 7, as a large pulley for an 80 hp. heavy duty pumping engine was being poured, the pressure of the molten iron broke an iron clamp and raised the cope. The metal poured over the floor, but fortunately none of the workmen was seriously burned, though faces, hands and arms were scorched. The anchor, sand and cope, together with an 1800-lb. weight upon it, aggregated over 4 tons, all being lifted like a feather after the clamp gave way.

George W. Connors, Atlanta, Ga., formerly secretary and treasurer of the Atlanta Steel Hoop Company, has bought from the Republic Iron & Steel Company the old Birmingham Rolling Mill at Birmingham, Ala., and is having it dismantled.

The National Machine Recorder

A New Device for Recording the Idle and the Running Time of Machines

An improved form of recorder for furnishing an accurate report of the movement of every machine tool in a shop has been brought out by the National Machine Recorder Company, Marquette Building, Chicago, Ill. The special improvements made in the machine are an view of the improved type of machine and Fig. 2 is a

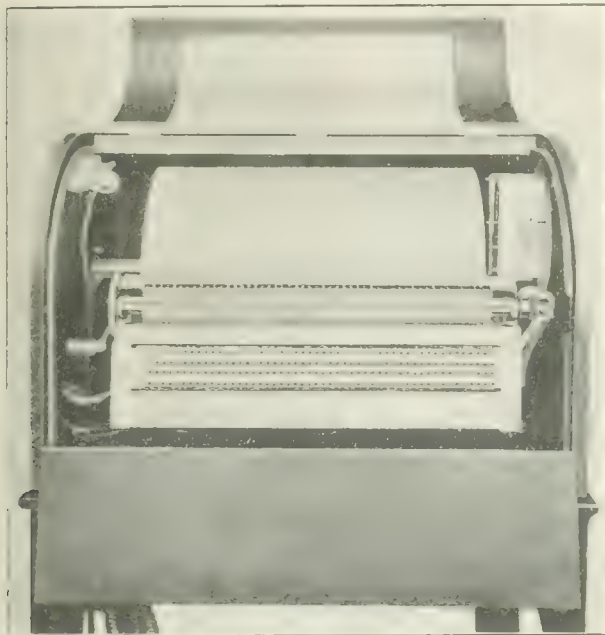


Fig. 1.—A New Type of Recording Instrument Made by the National Machine Recorder Company, Chicago, Ill.

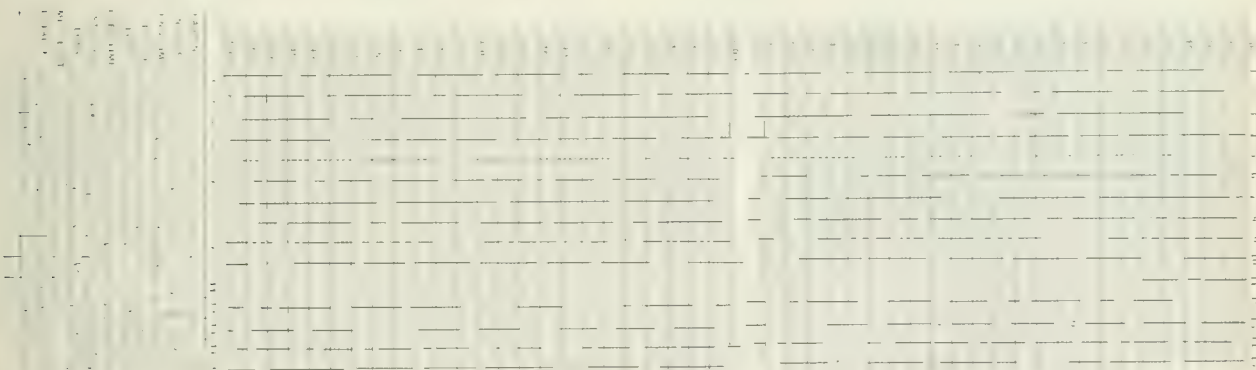


Fig. 2.—Specimen Chart Giving a Record of the Table and the Operating Time of Machine Tools Obtained from the Recorder.

adding attachment and a time setting device. Fig. 1 is a specimen chart giving a record of the idle and the operating time of a number of machine tools obtained from the device.

The adding attachment computes the net running or idle time of each machine in the shop. Each producing unit has a separate counter which shows distinctly in large figures the net amount of time the machine has been turning out work, or, if desired, the idle time that has occurred at any particular interval during the day. At the end of the day this is all totaled automatically by the machine, thus eliminating all clerical work. The time setting device, which is the more important of the improvements, automatically allows a fixed time for performing an operation. It records on the chart and adding wheels only such time as is consumed in excess of the amount for which the device is set. If, for example, a certain operation requires 30 seconds for putting the work in place and removing it from the machine and 50 seconds actual running time of the machine, the time setting device for this particular machine would be set at 1 minute 20 seconds, and would not record any idle

time unless the operator was slow and consumed more than the allotted amount of time. A glance at the recorder serves to indicate just which operators are not coming up to the required efficiency. The idle time shown is that consumed in avoidable delays, as the legitimate time for handling work is not recorded, and the chart shows whether the delays are due to repairs or reasons beyond the operator's control.

Fig. 2 is a reproduction of a chart taken from one of the machines in actual operation, and illustrates results that can be obtained in a shop where the various operations have been standardized. Where the actual running and the actual preparation time for different operations has never been ascertained, it will, of course, be necessary to compile data obtained from the chart until such time as the standard allowances for handling the work and machining it can be determined. Machines 1 and 2 are lathes, both of which are turning out the same piece of work. From the chart it will be noticed that one produces 15 and the other 18 pieces per day. By checking the matter further, it will be found that one lost 60 minutes running time and 105 minutes preparation time, or a total of 2 hours 45 minutes, while the second lost 50 minutes running time and 37 minutes of preparation, the total loss in this case being 1 hour 27 minutes. Machine No. 8, which is a planer, turned out 19 pieces with a total loss of 55 minutes a day, divided into 19 minutes operating loss and a preparation loss of 36 minutes. This was the best showing made by any of the 15 machines connected to the recorder. No. 9 is a traveling crane, and as this is not only a valuable piece of machinery but is also accompanied by a number of laborers, a record as to the proportion of the day that it was actually in use is highly desirable. These records were taken in a shop that has a higher average than the general run, and the losses shown on this chart are said to be very light as compared with those shown by the charts when the machine was first installed. In this case 25 per cent. is a conservative estimate of the time saved.

In use the recorder is located in the superintendent's office and will record the operations of 50 machines

simultaneously. Each machine is connected by a separate wire to its respective marker and these cannot be tampered with by an employee. The charts obtained from the recorder will show just how long it has taken a workman to pick up a part from the truck or floor and insert it in his machine, the length of time required to perform the operation and the amount of time consumed in taking out this part and inserting the next one. Other features of the chart are that it will show whether or not a variable speed motor is being operated to the best advantage, as well as the length of time consumed in taking both roughing and finishing cuts.

The Des Moines Bridge & Iron Works, Des Moines, Iowa, has elected E. W. Crellin, president; G. A. Smith, vice-president, and W. H. Jackson, secretary and treasurer. B. N. Moss, the former secretary and treasurer, has disposed of his interest in the company to Messrs. Crellin and Jackson, with whom he has been associated for 11 years. He will take a vacation, leaving March 1 for a trip to Panama and California.

Shop Floors—II

Materials and Methods of Construction, with Particular Reference to Foundry Floors

BY H. M. LANE.

Soft Floor Surfaces

In certain operations where delicate work is being handled some manufacturers prefer a fairly soft floor, so that if the work is dropped it will not be damaged or broken. If the shop is of concrete construction, the floor slabs can be faced with asphalt or wooden surface floors can be used. The application of these to concrete slabs will be discussed later.

The asphalt top which is laid on floors is practically dustless, is waterproof, and is no heavier than the top dressing of concrete, which is sometimes called "granolithic" dressing. In making this material the asphalt should be melted in kettles and to it should be added an equal bulk of sharp grit or sand. This should be well mixed, heated to about 300 degrees F., spread on the concrete surface with wooden spreaders and struck off to a layer 1 in. thick. When cool the surface should be covered with fine sand or dry Portland cement and rubbed smooth with a wooden rubbing trowel or with a hot metal burnisher like that used in laying the ordinary asphalt pavement. When laying this asphalt on concrete surface it is well to wash the surface of the concrete first with a mixture of molten tar and asphalt. This mixture should contain enough asphalt so that it will be fairly hard when cold, but still slightly plastic so that it will bind with the hot asphalt material.

A floor of this kind for interior shop use has the advantage that the composition can be made such that it will always have the proper resilience at shop temperatures, for as a general rule the temperature of working rooms does not fall much if any below 60 degrees F., while the contractor who attempts to lay an asphalt street pavement has to contend with very extreme ranges of temperature.

In moving machines or material upon an asphalt floor of this kind care must be taken not to allow any heavy weight to rest on rollers in a given position for some time, as the rollers will sink into the asphalt. Such depressions, however, will gradually disappear, the asphalt seeming to flow under the traffic until it fills the hole once more. This surface is dustless, and as small indentations have a tendency to smooth out it has marked advantages over a concrete surface. The asphalt surface is also a much poorer conductor of heat than concrete, and hence feels warmer under the workmen's feet.

In the case of upper floors of factories when an asphalt surface is used over a concrete slab, it cannot be depended upon to take any of the compression in the upper surface, and hence becomes a dead weight on the floor; but this dead weight will scarcely exceed one-third of the dead weight of a wooden top floor. The asphalt surface is much cheaper than wood, and as it is lighter, in a multiple story structure it has the advantage that it tends toward lighter construction in columns, girders and floor slabs. It is undoubtedly true that this surface will become more popular in the future than it has been.

Direct comparisons as to the cost of concrete, asphalt and wooden surface cannot be given, on account of the great differences in cost of these materials in different portions of the United States. Nor can the exact mixtures to be used in asphalt be given, since so many different grades of asphalt are used. Wooden flooring also varies greatly in price in different parts of the country, and on the Pacific Coast, where there are no native hardwoods, fir is generally used as a top flooring. It gives fair results, though it splinters badly when compared with maple.

Wooden Floor Surfaces

In considering the best floor to be used in a factory above the ground floor a number of factors must be taken into consideration. In the early day factories heavy joists stiffly bridged with a thick plant floor on top were very common. This floor contains a large amount of lumber, however, and is a serious firetrap, hence it has gone out of favor. Of the all-wooden floors with some provision against fire risk the first to become popular was that adopted in mill construction. One type of this is shown in Fig. 1. Heavy timbers were used for girders on column lines and either 2 x 4 or 2 x 6 in. pine or hemlock joists laid on edge and spiked together to form a solid wooden floor, as in the illustration. These pieces were dressed to uniform width and after the sub-floor was placed a $\frac{7}{8}$ or $1\frac{1}{8}$ in. maple floor was laid on top of it. The older system always laid this floor diagonally and also used tongue and grooved flooring, as shown.

Modern building methods avoid the tongue and groove, for the reasons already given and also always place the hardwood top floor at right angles to the sub-floor. One advantage of the tongue and groove is that of local repairs, as any given board can be pulled up without disturbing those at the sides of it. Another is the saving in cost. When buying tongue and groove floor the actual face width of the flooring is much less than its nominal width, so that the manufacturer pays for his tongues and grooves twice so far as the floor surface obtained is concerned. For this reason the square edged boards are cheaper.

The floor shown in Fig. 1 has many advantages, as light machines can be bolted to it and work can be handled over it without difficulty. In a factory equipped with sprinklers a floor of this kind is practically fireproof. Of course it has no moisture resisting properties, but a wooden floor should never be used where moisture has to be reckoned with.

As reinforced concrete is becoming more and more the recognized material for floor slabs, methods have been evolved for attaching wooden top floor to this. One of these is illustrated in Fig. 2. The floor slab proper is shown at A. The main reinforcing rods appear in section in the front of the illustration and the smaller cross rods in section at the right. The floor slab proper is poured and struck off to its full thickness. The wooden strips or screeds E should then be placed in position and spaced 18 in. apart, or whatever distance the architect specifies. The space between the screeds should then be filled with concrete, B. This should be applied before the lower slab, A, has hardened, in which case the material between the strips E will be thoroughly bonded to the slab A and will assist in taking some of the compression in the slab. If the cement filling is not placed in position until after the slab has fully hardened, the material between the strips will not take any of the compression and simply becomes a dead weight upon the floor. After the floor has set, the sub-floor of planks, C,

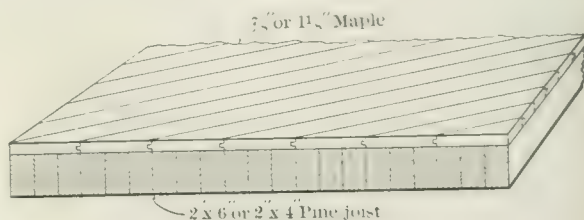


Fig. 1.—A Floor Used in Mill Construction.

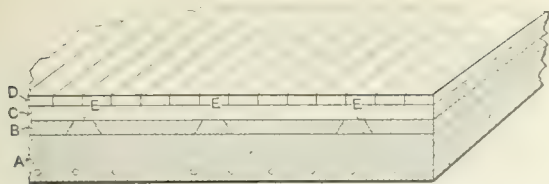


Fig. 2.—Method of Attaching Wooden Top Floor to Concrete Slabs.

is spiked to the strips E and the planks bear on the concrete their entire length.

Some advocate the use of tar or tar paper under the plank floor and on top of the cement B. This is not good practice in most cases, as it is pretty sure to result in dry rot in the planks C and the strips E. It takes several weeks or possibly months for a concrete slab to dry out thoroughly, depending, of course, upon weather conditions, and hence the top floor, D, should not be laid until the slab is thoroughly dry. When it is necessary to get into the factory quickly, we have known cases where the firm has moved in on top of the sub-floor C and worked on it for several months before the top floor D was laid.

THE WORKING SURFACE.

The top floor or working surface should be of $\frac{3}{8}$ or $1\frac{1}{8}$ in. maple, in boards not over 4 in. wide, with square edges; the bottom of each board should be double plowed so that it will have three bearing strips the entire length. The sub-plank C should be nailed to the strips E with nails of sufficient length so that they will pass practically through the strips E; the wearing surface D should be nailed to the underlying plant with 8-penny wire floor nails. These nails should be placed in diagonal rows, so that they will come into different plank in the lower floor, and two nails should be put in each floor board in each row. The rows of nails should be not more than 18 in. apart. A floor laid in this manner after the concrete slab has thoroughly dried will last indefinitely, so far as decay is concerned.

So far very few experiments have been tried in this country in treating the timber for the sub-floor, or the strips E, but we believe that if these were treated with creosote or some other preservative far better results would be obtained in the life of such floors. With maple surface floors there seems to be little object in treating the material, but if maple cannot be obtained some of the softer woods properly treated have better wearing qualities than the wood untreated.

One large manufacturing concern in the East states that its standard wooden floor laid on tar concrete in a manner similar to that described above costs 40 per cent. more than a concrete floor which is used in some departments, and that it is much shorter lived than the concrete.

Gravel concrete or broken stone concrete may weigh as much as 150 lb. per cubic foot. Cinder concrete weighs about 120 lb. per cubic foot. Asphalt surfacing material weighs about 130 lb. per cubic foot in place, hemlock plant approximately 30 lb. per cubic foot and maple 60 lb. per cubic foot. Using these figures, we find that a 1-in. concrete surface will weigh between 12 and 13 lb. per square foot, and, as already shown, when properly laid assists in carrying the compression in the floor slab. A square foot of asphalt surface 1 in. thick weighs 11 lb. and is simply a dead weight on the floor. A square foot of wooden floor composed of a 1-in. maple top, 2-in. hemlock sub-floor and the necessary screeds and cinder concrete filling weighs about 27 to 30 lb. per square foot, and is generally a dead weight on the slab, though, as has been shown, in some cases the concrete filling between the screeds may be made to carry part of the compression in the floor slab.

Asphalt Block Floors

So far our attention has been confined to practically three floor materials and to the main manufacturing buildings. There is one floor material which has given excellent results in a number of large plants for ground

floor work. This is known as asphalt block and is made by the New Castle Asphalt Block Company, Pittsburgh, Pa. These blocks are made from Trinidad Lake asphalt and hard blue limestone. The material is compressed by machinery into blocks about 4 x 4 x 12 in., though the size may be varied for different purposes. The writer has seen a number of these floors in use, some of which have been in continuous service for 12 years, and have given excellent results.

In two large plants in the Pittsburgh district, where very heavy machinery was handled, the blocks were laid on a layer of concrete without any sand between the blocks and the concrete. The underlying soil was largely filled ground, which had had several years to settle. The layer of concrete varied from 4 to 12 in., depending upon the weight to be carried upon the various floors. The individual blocks have something of the elastic property of an ordinary asphalt pavement, are not easily shattered, and to some extent seem to recover their form after dents or injuries have been made upon them. The hard blue limestone presents an excellent wearing surface, so that these have given very good results even in heavy traffic runways. It is unnecessary to say, however, that in a shop of the character of that being described most of the material is handled by traveling cranes or on cars running on tracks, as when the pieces run into tons it is impossible to handle them on ordinary floor trucks.

In some cases the asphalt blocks have a layer of sand an inch or more in thickness placed on top of the concrete before the blocks are laid. This has a tendency to protect the floor from sudden blows at any given point due to the careless handling of heavy weights. The asphalt block floor has very marked advantages over an ordinary asphalt floor, in that it is susceptible of unit repairs as readily as a wooden block floor.

While on the subject of asphalt, we may say that any asphalt floor or asphalt floor surface can be mended or patched as easily as an asphalt street pavement, an advantage which concrete has in less degree. Concrete is the material par excellence for resisting strains and carrying loads. Asphalt in its various forms is useful on account of the fact that it presents a more or less flexible floor surface, and one which will resist moisture better than either concrete or wood. It is not suitable for rolling heavy loads over or for laying heavy castings upon, as they will slowly settle into the asphalt surface. For comfort, silence, easy trucking and protection of work there is undoubtedly no floor equal to a good wooden floor with a maple top, but this is expensive and short lived compared with some of the others.

Forge Shop Floors

Turning our attention to the other departments of the works, we are confronted with the requirements of the forge shop and the foundry. In the forge shop heavy weights must be handled and the floor must not be injured by hot forges. This rules out concrete, wood and asphalt, and leaves only brick as a paving material for the blacksmith shop. For light work in drop forge shops a floor of paving brick is satisfactory. This should be laid on a cushion of sand, which in turn should be underlaid with concrete or rolled cinders. For heavy work, forge shop floors should consist of cinders or clay rolled hard. If the ground is damp provision should be made for draining it, and if necessary a layer of tar concrete introduced 18 in. or 2 ft. below the floor level simply as a dam to prevent moisture rising.

Iron plates are used in some forge shops and are in general use in rolling mills. These undoubtedly form the best surface for handling long pieces of hot iron, but would not be satisfactory for handling heavy hot forgings, as the plates would be warped and bent by the heat and the effect of hot plates upon the men's shoes would not be conducive to comfort.

FOUNDRY FLOORS

When we turn to the foundry we are confronted by a number of problems. We must decide what is the best floor for a malleable foundry, annealing room, for cupola charging platforms, for foundry runways, for pouring

floors, for molding floors and for cleaning rooms. The conditions in all of these cases vary more or less.

Annealing Room Floors

For a malleable annealing room the floor must be capable of resisting heat which comes from the dumping of hot pots or the setting of stacks of hot pots upon it. It must also be capable in most cases of resisting heavy traffic, for usually the annealing pots are charged with a special charging truck which runs on wheels over the floor of the annealing room. These conditions leave but two really satisfactory materials for the annealing room. These are iron plates and hard burnt shale brick. Where iron plates are used they should be slightly roughened to prevent their becoming excessively slippery. The presence of more or less charging material over the floor, however, serves to introduce a gritty medium and to some extent to prevent slipping. The plates are usually of cast iron and are embedded in concrete. A sufficient depth of concrete should be used to form a firm foundation capable of supporting heavy stacks of pots without any deflection of the floor. Where bricks are used they are generally laid on a concrete base, and in some cases are cemented to the base and to each other with a thin wash of cement and sand with which the floor is flushed after the bricks are laid on the concrete base. In other cases they are laid on a thin sand cushion. If the work is well done the writer favors the sand cushion, as it facilitates repairs.

In front of the annealing ovens large plates of wrought iron are usually used for the trucks to travel on, so as to protect the floor slabs of the annealing ovens. When charging the plates are placed far enough into the oven to protect the floor slabs of the oven from the wheels of the trucks. As charging progresses the plates are drawn back.

In many of the modern malleable foundries the stacks of pots are handled about the floor for shaking out and packing by means of a traveling crane, and in this case the travel of the charging truck is limited to the space immediately in front of the ovens. In some cases, however, pneumatic or electric charging machines are used which run all over the room handling stacks of pots from one place to another. These machines move at considerable speed and have rather small wheels, so that the wear on the floor is exceedingly heavy.

Cupola Charging Platforms

For cupola charging floors many materials have been tried and the selection will depend to a considerable extent upon the method of carrying out the work. Where the iron and coke are piled directly on the floor, considerable stock being carried on the platform, the surface should be such as to resist abrasion as much as possible. This practically confines us to plates, either of steel or cast iron. Plates of all kinds have a tendency to wear smooth and hence the upper surface should if possible be corrugated.

We know of one firm which uses channel irons laid with the flat side up and the flanges bolted together. The flanges rest on I-beams spaced about 6-ft. centers. There is enough irregularity in these narrow channels to afford ridges upon which the workmen's feet obtain a grip, while at the same time the differences are not sufficient to interfere seriously with trucking over the surface.

Where the charges are brought up on flat wheeled trucks and stored on the platform there should be a surface provided which is capable of standing heavy traffic. The iron plates are satisfactory for this, except that when they wear smooth they make the shifting of the trucks upon the platform difficult on account of the inability of the men to obtain a suitable footing. In some cases concrete floors have been tried, but these are not satisfactory. A concrete floor carrying a brick pavement presents a better surface than a simple concrete slab.

Where the material is brought up by a trolley system or upon railroad tracks, so that neither the wheels of the trucks nor the metal itself comes in contact with the floor, there is no material that will surpass concrete for a surface, as the slab that carries the tracks can be made to form a strong floor with a good wearing surface.

Foundry Runways

The subject of foundry runways was touched upon when treating the subject of runways in general. The selection of the material for any foundry runway will be governed by the method of carrying the iron or other metal to the pouring floors. Where the metal is carried to the floors by the trolley system and the castings are similarly removed, a concrete floor gives excellent results providing there is not much spilling of iron on it. Concrete, however, chips badly if it comes in contact with hot castings or large masses of molten metal, and for this reason paving bricks make a better runway.

Cast iron plates or steel plates having a rough surface are frequently used with good results. These are particularly advantageous when buggy ladles running on flat wheeled trucks are used.

Where the iron is all carried by hand, either in shank or hand ladles, a clay floor in the runways gives very fair results. These runways or passageways in the foundries are also frequently called the "marsh" or "mash," and no matter what the floor material is the runways should be thoroughly cleaned up each day and some provision made for taking care of the shot iron and other metal which accumulates upon them.

Foundry Pouring Floors

The subject of foundry pouring floors is governed entirely by the class of metal being handled and the size of the castings. In the case of the brass foundry provision should be made to save all shot metal or material spilled on the floor. This necessitates a hard floor surface without large cracks which can easily be cleaned. At the same time the floor surface should be such that hot crucibles can be set upon it without injury to the floor. This last condition eliminates the use of concrete, so that the only satisfactory materials left for a pouring room floor in a brass foundry or for the floor around the furnaces are paving bricks and iron plates. Both are extensively used. Where paving bricks are laid the square cornered type will generally be found better for a pouring room than the round cornered brick commonly used for street paving. The cracks in the brick floor in the pouring room should be filled with molding sand to prevent molten metal from finding its way between the brick, especially in case a crucible should burst.

For pouring floors in iron foundries we meet different conditions. Brass or bronze are usually poured from the same crucible in which they are melted and hence the outside of the crucible is approximately as hot as the metal. In iron foundries the metal is poured from a ladle the outside of which is relatively cool, and for hand pouring operations cement floors are usually fairly satisfactory, particularly when covered with an inch or so of molding sand before the molds are placed upon them. This molding sand also makes it easy to bed the molds in place. A number of large foundries are using this style of floor and report it to be very satisfactory indeed; in some cases castings weighing 2000 or 3000 lb. are poured on such floors. In the case of large castings, however, 3 or 4 in. of molding sand is generally placed around the flask to guard against a runout, and care should also be taken not to set heavy crane ladles directly on the concrete.

The writer in inspecting a concrete floor which had been in use more than five years in such a foundry was surprised to find the excellent condition of the surface. This seems to point to the fact that the life of a floor depends more upon the care with which it is constructed than upon any other feature. Of course the materials entering into the construction play an important part and the floor should have reasonable care taken to protect it afterward.

When shaking out hot castings on a concrete floor they should never be placed directly on the concrete, but several inches of sand should be shoveled onto the floor under them and the castings should be removed to the cleaning room as soon as possible. In one large foundry which was equipped with concrete floors the workmen had been in the habit of piling the castings at the end of each man's floor directly upon the concrete, with the consequence that the surface of the concrete at these points

was entirely destroyed and worn away to the depth of from 1 to 3 in. A little care would have prevented such unnecessary wear. In some cases cast iron plates are used in portions of the foundry, particularly where the castings are to be shaken out.

Clay floors have been used for the pouring department, and if the subsoil is dry and care taken to maintain them at a proper level they will wear very well, though they are not as neat or as easily maintained as concrete or brick floors. Paving brick makes a very good floor for the pouring department of an iron foundry, providing the work is not too heavy, so that large hot castings are liable to be left on the floor. Very heavy work is generally poured in pits or in large iron flasks which are frequently set in shallow pits. The conditions of such a floor necessitate changes in floor level with changes in the work, hence nothing but a clay or molding sand floor can answer these conditions. Large work, of course, is generally poured in the department where it is molded, particularly in green sand work. For this reason a clay floor, with or without permanent pits, is the best for heavy work pouring.

Molding Floors

For the molding floors in a foundry we are again confronted with questions as to the size of the castings, style of molds and other similar features. For machine molding a concrete floor or a floor of paving bricks gives excellent satisfaction. A floor of this kind gives a firm, hard surface to which the molders can shovel and so maintains the floor at constant level. This prevents one man from digging up the floor and another from letting his floor build. The writer has frequently seen as much as a foot of difference in elevation between two adjacent floors operated by piecework molders, one of whom was likely to dig into the floor as he shoveled and the other to let his floor fill up. Of course these men were working on clay or molding sand floors. Had they been working on a hard surface floor they would both have worked over all of the sand and never cut into the floor.

For fairly heavy work such as is done on side floors in ordinary foundries a standard paving brick or concrete floor is excellent, the choice depending largely upon the method of shaking out castings and the care given in handling the floor, also upon the availability of high grade paving brick. The mistake has been made in several parts of this country of trying to make a foundry floor from ordinary red building brick. Such a floor has a very short life and is decidedly disappointing. The paving brick are what are known as shale brick, while building brick are soft clay brick. There is also a difference in the kiln treatment of the two and consequent difference in their ability to resist wear.

For the crane or heavy work bay of a foundry in which much pit work is not required a clay floor is usually satisfactory. If a certain amount of shallow pit work is to be done it is best to dig out that portion of the floor where such work is to be performed and to fill it in with molding sand, for as the pits are dug the molders are pretty sure to mix up the material from the pit with the sand and the hole is sure to be filled with molding sand when the operations are finished, so that in the long run it is generally cheaper to put the molding sand there in the beginning. We know of one foundry where the entire floor is filled to the depth of 10 ft. with molding sand. Of course there are cast iron pipe and car wheel foundries and other special types in which the molding and pouring is done under conditions differing from the ordinary gray iron foundry, and the conditions of such foundries are generally met with special designs. Cast iron plates or steel plates are not advisable for ordinary molding floors, as the concrete or brick floors are cheaper and answer the purpose just as well.

Cleaning Room Floors

When we enter the cleaning room of a foundry we are confronted with a floor proposition which has requirements more severe than any other department. Here rough castings and hot castings will be piled upon the floor, with the damage that might be expected. Concrete will not do. Cast iron plates seem to meet many

demands better than any other floor that can be devised. The plates should be laid in masonry or concrete and should be sufficiently thick to resist wear and any tendency to buckle. A plate 1 in. thick will generally satisfy these requirements, though it should be heavily ribbed on the back. Such plates are generally cast in open sand and are frequently laid with the top or open sand surface up. This surface is not as smooth as the back would be, but the procedure permits the forming of ribs on the bottom of the plate and the rough surface of the top of the casting affords a better grip for the workmen's feet in the cleaning room.

Steel plates, if used at all, should be rolled with a rough or patterned surface and are only suitable for floors over which comparatively light castings are handled. Paving bricks make a fairly good floor for the cleaning room, and the ordinary street paving brick with round corners will do as well here as the square cornered brick, for it is less subject to breakage of the corners. If the castings are not hot when brought to the cleaning room a wooden block floor seems to give very good service in many cases. Plank floors are used in many cleaning rooms, but this is the poorest floor that can be used here and should be avoided wherever it is possible to do so.

In malleable foundries where the castings are brought to the floor practically cold and are mostly cleaned in tumbling barrels or by sand blast, and particularly where most of the castings are handled on trolleys, concrete floors give excellent satisfaction. With the same conditions concrete floors are good in the light gray iron foundry.

Wooden block floors give fair results in a cleaning room providing it is not so wet as to cause the floor to swell and buckle. Generally, however, the conditions are uniform in a cleaning room and whatever the surface is it soon comes to a constant condition of moisture.

For pickling room floors planks are frequently used, on account of the fact that concrete is affected by the acid, and while it is true that the planks are rapidly worn out, they offer a better resistance to the acids. Pickling vats themselves are generally made of wood or of concrete or masonry, and lined with sheet lead. The sheet lead covering should be protected by a rough wooden floor or wooden grating. Asphalt can be used between the pickling tanks to good advantage when the castings are not very heavy.

One method of cleaning large cores out of heavy castings that has been used in only a very few foundries in the country so far will undoubtedly come into more extensive use in the future. This is the hydraulic method, in which the cores are washed out by a jet of water under from 200 to 300 lb. pressure. For this purpose a room should be provided with a concrete floor and concrete tanks for trapping the sand and removing it from the water before the water is allowed to pass to the sewer. The method, however, is so efficient that it will undoubtedly be used more extensively in the future.

Clay floors are used in some heavy work cleaning rooms where very large castings are cleaned and give good satisfaction for this purpose.

Foundry Yard Floors

Before leaving the subject of foundry floors it is well to consider the outside foundry floors, which include the surface of the pig iron storage yard, the flask storage yard and the coke storage.

Coke can be stored either under cover or in the open, but in either case should be placed upon such a surface as to enable the workman to shovel from the edge of the bottom of the pile with ease. In removing a pile of coke it should always be attacked from the bottom and for the floors in coke bins concrete or paving brick make excellent surfaces. Concrete is generally cheaper and gives very good satisfaction.

Altogether too many foundries fail to realize the importance of providing some pavement or surface in a pig iron yard. In foundries in the Central States the writer has seen pig iron dug from 12 to 18 in. below the surface of the rich prairie soil. This had been piled on the hard, dry surface of the soil in the summer, but

when the spring rains came the pile started out of sight. Of course the lower portion of the pile which was in the mud was unavailable during the wet weather, and equally unavailable during the cold weather, for then it was frozen down. A pig iron yard should be so designed as to minimize the handling between the cars and the cupola and still to permit the piling of each grade separately. For ordinary work an excellent floor for a pig iron yard is an ordinary macadam road surface; in other words, a surface of coarse crushed or broken stone rolled hard and finished with a finer surface of the same material. Sometimes a small amount of cement is used in laying this, thus forming a rough cement floor. In countries where limestone, trap rock or similar good macadam material is available this makes an excellent and cheap pig iron yard surface.

In some cases wooden block floors have been installed for this purpose to good advantage, but the blocks should be treated with some preservative solution. In other cases paving brick are used. Where the pig iron is unloaded by the electric magnet and is dropped on to the floor the surface will have to be protected by a layer of rough planking. For this purpose a wooden block floor is fairly good, or a macadam floor over which rough scrap planking has been laid.

Hard rolled cinders or cupola slag and cinders or blast furnace slag makes a very good macadam surface for the pig iron yard. Whatever the surface upon which the pig iron rests, provision should be made between the piles and in the main runways for handling material to the cupola with the least manual labor. If wheelbarrows are employed narrow plank runways are very good. If flat wheeled trucks are used brick pavements give excellent results, but generally narrow gauge railroad tracks are used for this purpose, and in some cases a combination wheel is used on the cars, so that in the yard it runs on a narrow gauge track and on the charging floor on a broad, flat tread on the flange of the wheel.

By carefully laying out the pig iron storage yard it is possible to so simplify the handling of metal to the cupola as to make a saving of several cents per ton in the cost of iron at the spout.

The flask yard rarely receives the attention it should, and the amount of time spent hunting for flasks required or digging them out of the mud or frozen ground totals an amazing sum in some large plants. Where possible all flasks should be stored under cover, and in this case a good cinder floor or macadam floor is generally plenty good enough. For storing light flasks in a yard there should be at least a cinder floor, and it is preferable to have racks of timbers or railroad iron raised above the floor several inches and supported on brick masonry or concrete piers. The flasks and bottom boards are then piled on these racks, which keep them up out of the mud and wet and prevent their being frozen down in the winter or rotted out in the summer.

Large flasks should under all circumstances be placed on some form of foundation. If possible provision should be made for handling the heaviest flasks with a locomotive crane or other handling device, and they should be placed upon cinders, macadam, or, better still, upon raised rails, as described for the light and medium weight flask.

One thing which must be considered is the disposal of the surface water. If a relatively impervious pavement like concrete is employed provision must be made for the run off through suitable gutters of channels, as all of the water will have to pass away in this manner. Gutters must be provided for heavy rains in the summer. Cinders, slag and macadam surfaces have the advantage that they will take a considerable portion of the moisture through the pavement and dispose of it through under drains. When laying such a pavement suitable under drains of tile should be carried along with the work and connected with the sewers.

Molding sand should always be stored under shelter and preferably upon a concrete floor. Experience has proved that in shoveling molding sand the pile should be attacked from the top; hence the surface on which the sand is piled has little to do with the shoveling opera-

tion and comparatively little work comes upon it. A pile of coke or coal should always be attacked from the bottom, as already stated, and hence the pavement or floor must have a true surface upon which to shovel.

MISCELLANEOUS FLOORS

There is one feature of manufacturing floors which must yet be considered, and that is the floors for stairs and landings. With modern fireproof construction concrete steps or treads have often been introduced. Where the men pass up and down over these only once or twice a day for each man, they give excellent results and a fair degree of wear. If a hard, gritty material capable of resisting wear, such as blue limestone or trap rock, is used in making the top surface of the steps, they are not liable to wear slippery and will have a very long life.

Where iron plates are used, if of cast iron the surface should always be corrugated; it is better, however, to make provision for attaching a narrow strip of some of the patent devices for resisting slipping along the front edge of the step. These consist of alternate strips of steel and lead or other similar combinations. For ordinary workshops and factories the surface of the stair should be solid, but for stairs leading to charging platforms in foundries, stairs to the open hearth furnaces, &c., the open grate flooring made of wrought iron bars set on edge will give excellent results, and all of the dirt falls through. Generally there is nothing under these stairs to be injured by this dirt, which is not the case with the stairs in an ordinary manufacturing plant. If the same man has to pass up and down stairs continually a relatively soft surface, such as a maple top, should be used or the stairs should be covered with sheet lead or rubber.

Laboratory and Office Floors

The two departments not thus far treated are the chemical and physical laboratory and the office. The laboratory presents a number of floor problems. The analytical room, where acids are constantly in use, is preferably floored with asphalt. Water is constantly being slopped on such a floor and hence wood is not suitable, though it is frequently employed. For sampling rooms, crusher rooms, furnace rooms and similar departments paving brick makes the best floor. For a surface on which to sample large masses of ore, &c., a hard concrete floor is suitable for most material. If, however, the material being sampled contains valuable constituents, like gold or silver, the sampling should be done on a large steel plate.

In some cases the analytical room or a chemical laboratory is provided with a tile floor. Where this is done a tile should be selected that will not wear smooth and slippery. The office and balance room of a laboratory may be provided with a wooden top floor with asphalt or concrete.

In the office it is frequently the case that for reasons of design in connection with the interior trim, a wooden floor and generally one of maple is preferred. Clerks and office help have to stand a great deal, and for this reason concrete is not a suitable material for office or drawing room floors. Asphalt surfaces have been used with good results. There is one curious office floor in this country, which was designed and put in use 40 odd years ago. This is composed of cast iron plates about 18 x 24 in., mounted in masonry. The plates are so designed with grooves and flat topped projections that only about 30 per cent. of the surface is exposed to carry the weight, and this greatly reduces the area which is capable of conducting heat away from the body. Strange as it may seem, those who have worked on this floor for years state that they have never felt that it was particularly cold to the feet, that it made their feet sore, or gave them any trouble whatever. The floor is so located that it is kept at room temperature, and this seems to indicate that the objection to hard floor surfaces is not so much to the hardness as to the fact that it can abstract heat. When the surface is warm and dry, whether it is of iron or concrete, it will not injure the health. We presume, however, that hard maple floors or hard pine floors will continue to be the favored ones for offices

and drawing rooms for many years to come. Where fire resisting qualities have to be considered and a soft floor is still desired, the asphalt top on a concrete slab will give excellent satisfaction.

(Concluded.)

A Large High Speed Flywheel

Since the introduction of motor driven rolling mills, which in almost every case require high speed flywheels, the Mesta Machine Company, Pittsburgh, Pa., has specialized along this line. The plant is very well equipped for handling this class of work on account of the very large capacity of its air furnaces for producing special mixtures of iron, as well as the open hearth department, in which carbon and alloy steel castings weighing as high as 100,000 lb. can be produced. Recently additional equipment has been added in the machine depart-

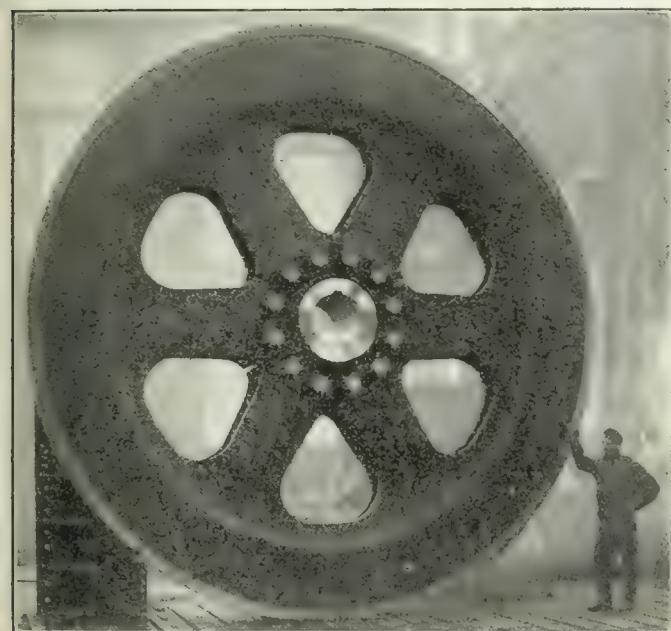


Fig. 1.—End View.

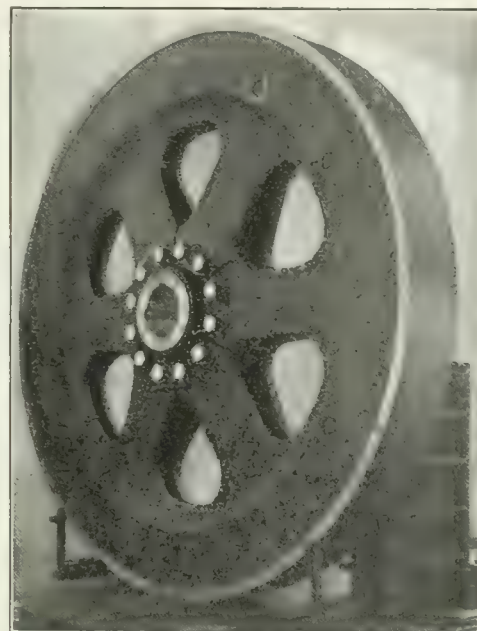


Fig. 2.—Three-Quarter View.

Two Views of a High Speed Flywheel 17 Ft. in Diameter Made by the Mesta Machine Company, Pittsburgh, Pa.

ment which makes the only limit on this class of work the carrying capacity of the railroad handling the finished product. One of the shipments recently made was a 17-ft. wheel to the Cambria Steel Company, Johnstown, Pa., and Figs. 1 and 2 show end and three-quarter views, respectively.

The wheel was especially designed for high speed service and the hub was made of acid open hearth steel. The metal used in the construction of its other parts was a special mixture of air furnace melted iron possessing a very high tensile strength. The wheel arms were each bolted to the hub separately to avoid all strains that might occur if a single casting of this size was used. The face width of the wheel is 24 in. and the bore 18½ in. Its weight is 135,000 lb. The wheel was made in halves and the division was made in the vertical plane. Although this split type of construction was employed the wheel had to be shipped in one finished piece on account of its size, which also made it necessary to secure a special car and have it given a special routing.

New Railroad Equipment Orders.—The Pittsburgh & Shawmut car order amounts to 2115, of which the American Car & Foundry Company will build 1565 and the Pressed Steel Car Company 550. The Central of Georgia is reported to have ordered 250 car frames from the Standard Steel Car Company. The Wabash-Pittsburgh Terminal is expected to place an order for 1000 70-ton steel hopper coal cars. The Pennsylvania will build at Altoona 1000 gondola cars and 66 passenger, dining and postal cars. The Atlanta & West Point has

placed 100 flat cars and the Great Northern 75 tank cars. The Wheeling & Lake Erie is in the market for 500 flat cars. The inquiry of the Buffalo, Rochester & Pittsburgh for 1500 to 2000 freight cars is withdrawn. Among recent locomotive orders are 4 for the Wheeling & Lake Erie, 5 for the Florida East Coast, 10 for the Hocking Valley and 10 for the Kanawha & Michigan.

Handling Iron Ore with Electromagnets

At the Moose Mountain mine in Ontario, Canada, says the *Electrical World*, magnetic iron ore of a high grade is picked from the ground by electromagnets and loaded into cars for the crushers. The ferrous material occurs in the side of a hill, and is loosened and broken up into 500-lb. masses by blasting. It then rolls down to the base of the hill, where an electromagnet, mounted on a crane, is used to pick it up and load it into mine cars, at the same time effecting a rough separation, since

the rock and other nonmagnetic material are left behind. The electromagnet used has a capacity for handling 1200 lb. of pig iron at a load, but such is the magnetic quality of the unrefined ore that 800 lb. can be picked up easily in spite of its unpromising character. This 800-lb. figure was obtained as the average of a number of loads, in some instances the individual lift exceeding this amount by several hundred pounds. A steam shovel was formerly used for loading the ore, but the density and hardness of the magnetite rapidly destroyed the buckets, so that other means had to be resorted to. The installation of the electromagnets also saves handling a quantity of stone which is broken up along with the ore in its native bed, and thus relieves the crushing and magnetic separating plant, to which the material is afterward taken for concentrating before being shipped to its destination.

The David Lupton's Sons Company, Philadelphia, Pa., has opened an office in the People's Gas Building, Chicago, for the sale of Lupton steel sash, Lupton rolled steel skylight, Pond continuous sash and Pond operating device. R. A. Sanborn has resigned his position as division engineer of the Board of Supervising Engineers of Chicago, to take the position of Chicago manager for this company. His education and wide experience in all types of building construction make him well fitted to carry out the company's policy of advising architects, engineers and owners on the construction required to secure the best results with the Lupton products in light and ventilation for their new factory buildings.

The No. 1½ Newton Duplex Miller

A New Design for General Work Employing Large Diameter Face Cutters

A new type of duplex milling machine has been placed on the market by the Newton Machine Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa. The

and Fig. 5 illustrates the elevating mechanism of the head.

The spindles are ground and revolve in bronze bushed capped bearings 120 in. long. Worm wheels 13½ in. in diameter, having bronze rims with teeth of steep lead drive them and the case hardened driving worms are fitted with roller thrust bearings, both being incased for continual lubrication. Bushings mounted on the vertical driving shafts revolve with them and prevent the escape



Fig. 1.—Operating Side.

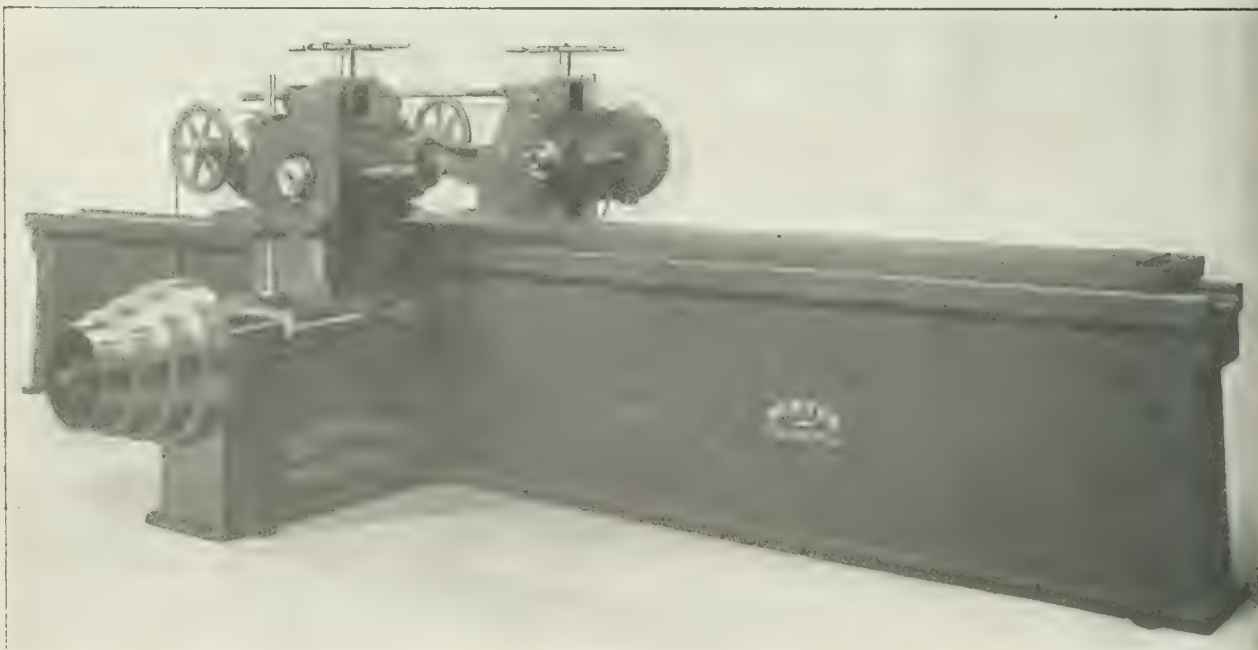


Fig. 2.—Driving Side.

Two Views of the No. 1½ Duplex Miller Built by the Newton Machine Works, Inc., Philadelphia, Pa.

machine is intended for general work, with face cutters having a maximum diameter of 12 in., or as a slabbing machine. The operating and driving sides of the tool which is known as the builder's No. 1½ duplex milling machine are shown in Figs. 1 and 2, respectively, while the three line drawings give some of the details of the various mechanisms. Figs. 3 and 4 are a sectional plan view and a sectional elevation respectively of the head.

of oil from the bearings, thus overcoming a serious objection to designs where the splined shafts revolve in the bearings. The construction of the spindle saddles which are counterweighted and have square locked bearings on the uprights is very heavy. A taper shoe is employed for making adjustments, and the bearing which controls the horizontal alignment of the spindle is on the inside shear of each upright only. In this way the for-

mer objection of distorting the front faces of the upright when the bearing is on the outside of the shear is overcome. The spindle is threaded externally to receive face milling cutters, while in addition it has an internal taper so that the machine can be used for slabbing by placing a mandrel between the spindles. The cutter arbors are driven by a broad face key, and are held in place by through retaining bolts.

Top and bottom bearings enable the elevating screws to be maintained in tension at all times, and the movement is controlled by hand. The adjustment of the up-rights to the wings is secured by taper shoes, and a

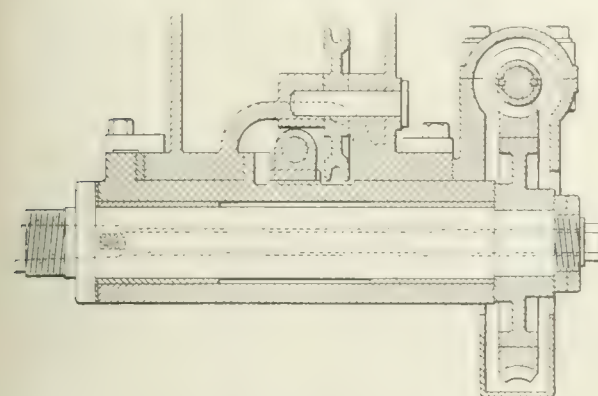


Fig. 3.—Sectional Plan View.

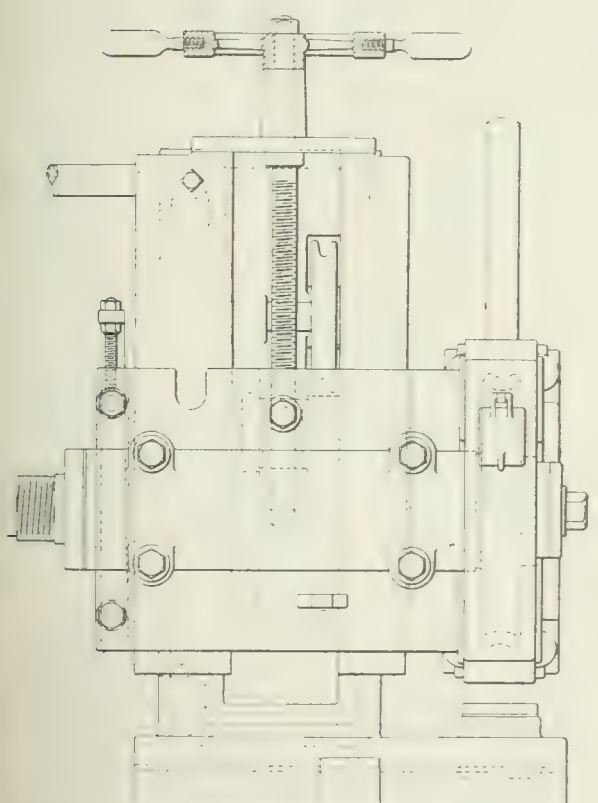


Fig. 4.—Sectional Plan View.
Constructional Details of the Heads.

hand in and out adjustment is provided. The work table has square locked gibbed bearings on the base with T-slots cut from the solid. The drive is by an angular rack and bronze spiral pinion. A variable gear feed and quick power return are provided, the latter being furnished to be reversible or to operate in both directions as desired. The drive illustrated in Fig. 2 employs a four-step cone pulley. Power for vertical bronze shafts is taken through miter gears, and the motion is transmitted to the operating side of the machine for the fast traverse and feed, both of which are engaged by a Johnson friction clutch. It will be noticed from this engraving that only two feed gears are in place at one time. This arrangement is employed, as many manufacturers now specify the feed which is to be used on their work.

Different combinations of gears provide for any desired feed changes. These gears are easily placed in position, as the studs holding them are fitted with slip washers.

The following table gives the principal dimensions of the machine:

Diameter of spindle, inches.....	3
Minimum distance between spindles, inches.....	28
Maximum distance between spindles, inches.....	30
Minimum distance between spindle center and top of work table, inches.....	12
Maximum distance between spindle center and top of work table, inches.....	14
Length of spindle bearings, inches.....	16
Diameter of spindle driving worm wheels, inches.....	12
Maximum diameter of face milling cutters used, inches..	15
Width of work table, inches.....	18
Length of work table, feet.....	12
Length of work table, inches.....	88 1/2
Floor space, inches.....	88 1/2

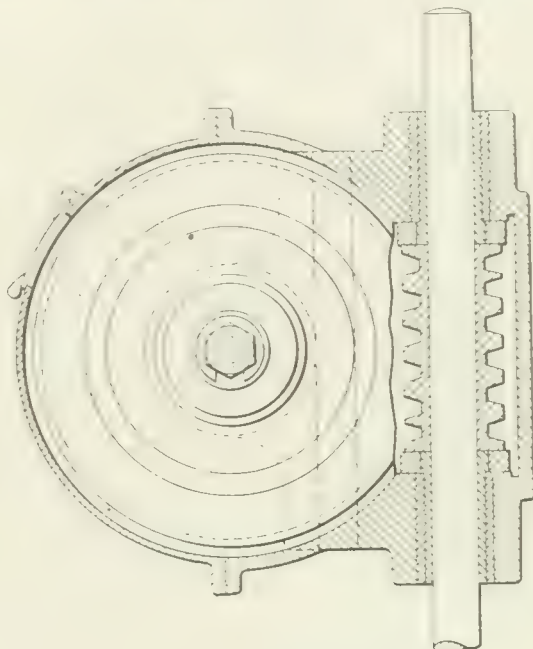


Fig. 5.—Detail of the Elevating Mechanism.

All the bearings are bushed where necessary, and hand adjustment for the work table is provided.

Workingmen's Compensation in Ohio

In the Ohio Legislature at Columbus last week, the Workingmen's Compensation bill, providing for the payment of injured employees from a State insurance fund, to which both employers and employees are to contribute, was sent to the House in the form of a majority report of the special commission which has been at work in the past year. The majority of the commission will present a bill endorsed by the Ohio Federation of Labor, which provides that an employee may sue for damages, if he desires. The judgment, if any, may be recovered by the employer from the insurance fund.

The majority bill takes away from the employee the right to sue, since it provides compensation without regard to negligence. A "State Board of Compensation Awards," with five members, is provided for, with full power to investigate accidents and make awards. A State liability actuary is also provided for. His duties are to classify industries with respect to their hazard and determine the risks of the different classes and fix the rates of premiums accordingly. The rates are to be based on the total payroll and number of employees in each of the classes of employments, and are to be sufficiently large to pay each employer's proportion of the compensations and to create a surplus to guarantee the solvency of the insurance fund.

The Pawling & Harnischfeger Company, Milwaukee, Wis., builder of cranes, hoists, &c., has opened a branch office at 533 Baronne street, New Orleans, La., under the management of T. W. Waddell.

The Mechanical Engineer and Prevention of Accidents*

What He Can Do as a Designer and Executive to Reduce the Number of Injuries

BY JOHN CALDER, ILION, N. Y.

The subject of accident prevention is now coming to the front on that wave of humanitarian consideration which is noticeable everywhere. On its educational and sentimental aspects the public and press of the East have had their interest awakened to some extent by the efforts of the American Museum of Safety Devices, the National Association of Manufacturers, the National Civic Federation and others. On the strictly practical

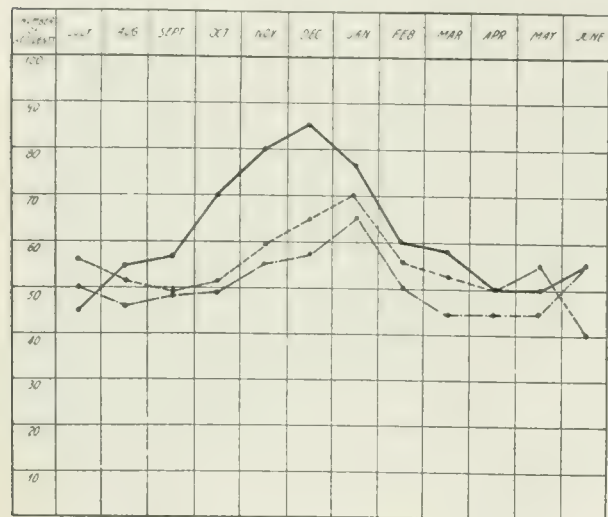


Fig. 1.—Chart Showing the Influence of Daylight Upon the Number of Fatal Accidents.

side the broad based safeguarding work initiated in all its plants at a large outlay by the United States Steel Corporation has received deserved publicity. At the same time the successful operation of thorough preventive measures has been going on unnoticed for years at some relatively few individual works, but these have formed quite a minority among the many plants in-

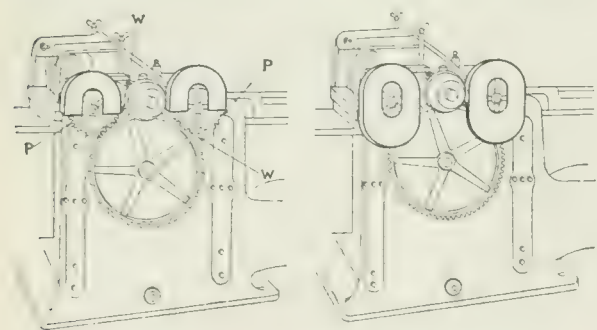


Fig. 2.—Examples of Improper and Proper Gear Guards.

curing accident risks which were imperfectly safeguarded.

The Mechanical Engineer and Accidents

The principles of safeguarding and safeworking in industry should be as much a part of the economic education of the young engineer as those of efficiency and conservation in other directions. The scientific study as a matter of course and the solution by the mechanical

engineer of individual problems of safeguarding, supervision and instruction of employees as they arise in their daily routine will do more than all other existing agencies to bring about satisfactory results.

The author wishes to make it clear, however, that all industrial accidents are not considered preventable, and that, of those that may be avoided, some do not fall strictly within the engineer's province and a large portion is directly within the control of the injured themselves. It is believed that, by proper supervision and precautions in all plants and industrial processes and the cultivation of greater care by operatives, at least one-third of the present annual sacrifice of life and limb can be prevented.

The Causes of Accidents

In illustrating in the present paper what the mechanical engineer may achieve in this department of the conservation movement a definition of "accident" and a review of the chief causes of industrial injuries are in order. The word "accident" in relation to industry is not specifically defined by any statute, but it has the popular significance of any unforeseen and usually sudden occurrence which results in bodily injury to any person while present at the work place or even within the boundaries of the employer's premises. The injury, to be reportable as an accident, need not arise out of or in connection with the employee's assigned duties. It is

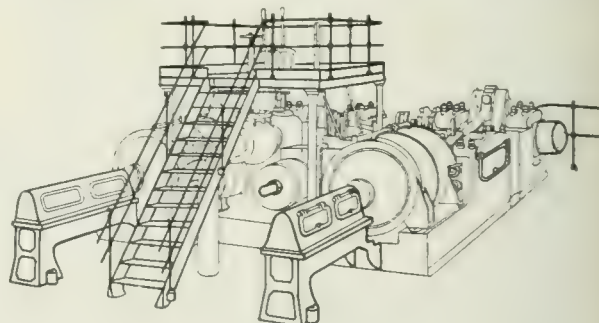


Fig. 3.—Safeguards for a Rolling Mill Engine.

the fact of injury, not the cause, which generally makes an accident reportable under the labor laws to the civil authorities.

In analyzing many thousands of industrial accidents the author has found the following to be the chief causes: Ignorance, carelessness, unsuitable clothing, insufficient lighting, dirty and obstructed workplaces, defects of machinery and structures, and absence of safeguards. In current popular comment on the wastefulness of life and limb in our industrial régime little regard is paid to the facts underlying accident, but well considered action must be based solely on these of which some account follows:

In spite of ample facilities now afforded to all for the acquisition of some knowledge of mechanical principles, the author has found some superintendents, a number of foremen, many operatives and not a few managing owners of smaller plants grossly ignorant of the nature of the forces and mechanical arrangement which it is in their power either to control or to set free with resulting danger to themselves and others.

Sometimes combined with ignorance, sometimes sheer thoughtlessness, folly or horse play, carelessness by operatives stands highest as a cause of industrial accident

* From a paper presented before the American Society of Mechanical Engineers, in New York City, February 14, 1911.
† Manager Remington Typewriter Works.

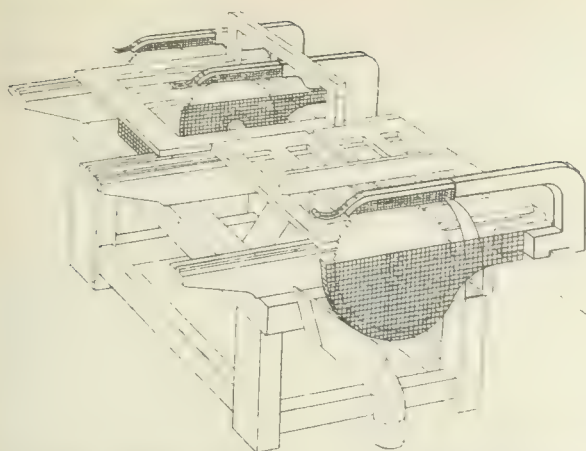


Fig. 4. A Guarded Triple Saw Side Feed Bench with Clear Tables.

from the results of which nothing external can do much to shield the worker and those whom he sometimes involves. It is the experience of the author that the American workman is easily first in taking foolish and wholly unnecessary chances with his life and limbs; chances which in no way add to his efficiency or his earnings. The maintenance of strict discipline in the shops, the adoption of salutary punitive measures and the firm elimination of the dangerous employee is all that can be done, in addition to a campaign of education throughout the plant.

Accident is caused at many machine parts which are necessarily exposed near the operator, and with which he would never come into dangerous contact but for unsuitable or neglected clothing. The ragged sleeve ends, loose ties and open jackets of untidy machinists have again and again been wound upon seemingly trivial parts in motion and through the powerful effect of coil friction have inflicted frightful and often fatal injuries.

Insufficient lighting is a cause of numerous accidents, particularly serious and fatal falls. The author has observed that a maximum of accidents occurs toward the close and beginning of each year, that is during November, December and January, the months of minimum daylight. Fig. 1 shows the seasonal distribution for three successive years of about 700 deaths annually from industrial accidents, which were reported with other injuries from an area embracing 80,000 plants of varying extents. The intensity of artificial lighting at the cutting point of tools, and on very limited machine tool or bench areas is frequently far above actual requirements and a source of much physical discomfort, while all

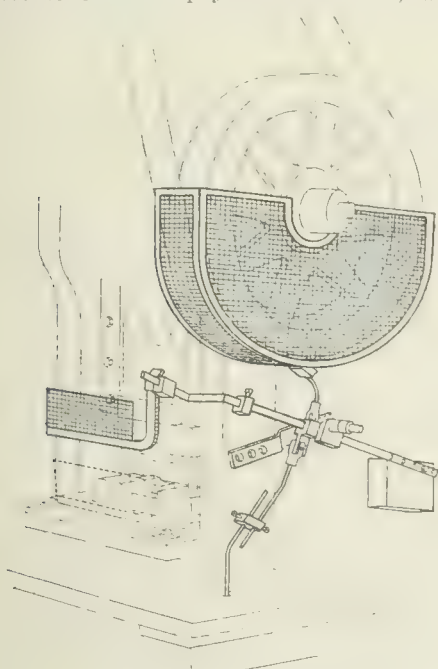


Fig. 5. —An Automatic Screen Guard for Press.

around the operative a semidarkness prevails which has a blinding effect in the sudden transitions of the vision required by his employment. What is wanted is the elimination of this excessive hard light on spots only, which causes eye strain and poor vision of surrounding areas with resulting accident. A more generally diffused light of less unit intensity is now easily obtained by using fewer but larger screened units experimentally located to suit varying shop requirements and reflecting from whitened wall and ceiling surfaces.

Dirty and obstructed workplaces are closely allied to defective illumination as a source of accident. Workplaces often retain unnecessarily dirty and obstructed environments, and every management should see that the cleaning of floors and passages and the removal of wastes is systematically provided for. Almost all our mechanical operations can be conducted under pleasanter and safer conditions than at present, so far at least as light and cleanliness are concerned.

Defects in machinery and structures used contribute to some serious and a number of minor casualties, but to nothing like the extent commonly alleged. It certainly does not pay any employer to keep a defective tool in operation; nor is it in the interest of the employee, particularly if

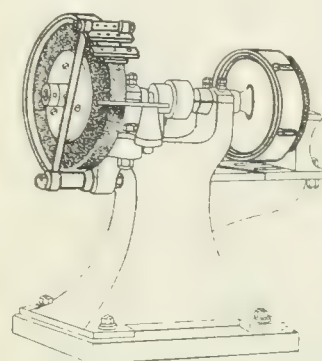


Fig. 6 — Safety Adjustable Hoods for Disk and Face Grinders.

he is paid by the task, to use imperfect apparatus, which reduces his possible earnings. On the other hand, it is by no means infrequent to find workmen showing a striking disregard for their own safety and that of others, especially in framing structures and arrangements of a temporary nature. Workmen persisting in practices of this nature should be eliminated as

unfit and dangerous employees and the ability of any untried operative to construct safe facilities to be used by himself and others should never be taken on trust.

The Possibilities of Safeguarding

The absence of safeguards closely concerns the mechanical engineer, who holds the possibilities largely in his own hands. In many cases of injuries to operatives caused by the absence of a possible safeguard, it will be found that it has been removed, or rendered ineffective by the employee for lack of supervision in such matters or that protection has never been provided. Safeguarding absent at one machine is sometimes actually afforded elsewhere under the same roof and the accident is due to the operation of the principle that what is permitted to be everybody's or anybody's business is in daily life nobody's business. The safety engineering of no plant should be left to the haphazard initiative of a number of individuals.

Consideration of what the mechanical engineer can contribute to this end naturally falls into two divisions: (a) the efficient safeguarding which he may design as an integral part of the machine tools and other apparatus and (b) the safeguarding which he may later devise and supply as the mechanical engineer or executive of plants using power apparatus and other equipment capable of inflicting injury.

The Machine Builder and Safeguards

The machine tool builders have already accomplished a great deal of most useful safeguarding, particularly in protecting the workman from the dangers of toothed gears in metal working and other tools. Now and again a guard is encountered which is simply a snare and which shows conclusively that its designer had appearance rather than utility in mind. The machine at the left of Fig. 2 illustrates this, the pinions P, P, being securely covered on the top, which is the outrunning and safe side, by semicircular flanged hoods, whereas the intaking and dangerous parts of the gears W, W, are

unprotected and have gripped the clothes and limbs of unsuspecting operatives. The covering of the outrunning sides of gears is often desirable to prevent the lodging of chips and waste in them, but they are usually harmless when exposed. The view at the right shows the proper gear protection for the machine illustrated.

In this paper the illustrations are limited to examples of safeguarding from only a few out of the many manufacturing industries concerned, but the principles outlined and the methods shown are applicable with occasional modifications wherever power driven machinery is operated.

Guarding of Equipment Built Into Position

Under this head are embraced all power generators, and a very large class of machines and industrial apparatus whose accident risks at dangerous parts depend upon the environment, the manner of installation and the precise nature of the workmen's duty around them. Protection against accident at such apparatus is not secured by merely guarding the dangerous moving parts. All stationary portions of such structures as may cause injury to attendants and others should be equally included. A double metal railing not less than 3 ft. high and not nearer any moving part than 12 in. should be provided at all dangerous places, and at both edges of all stairs and elevated platforms. The fulfillment of these requirements is shown in Fig. 3 on the starting platform, tail rods and cross heads of a rolling mill engine.

Guarding of Transmission Machinery

The extensive use of motor drives has done away with many transmission belts, shafts, pulleys, collars and couplings in dangerous proximity to employees in all of our more modern plants. The managers and mechanical engineers of many industries have still to reckon daily with the accident risks of the older type of buildings and transmission arrangements, and the latter ought to be closely scrutinized in every detail. Seven feet clear of every moving part is considered the least height from the floor level without guarding and, even then, where a horizontal belt drives across a frequented passage at this minimum elevation it is well to have the lower side screened close to the belt to avoid injuries caused by "whipping" when the belt breaks.

The use of the belt perch prevents the traveling of the belt when unshipped, and accident therefrom; obviates its unnecessary wear and its possible destruction when falling into the narrow gap between a pulley and a bearing. Special care should be taken by the designers to see that all belt shifting and machine starting and stopping gears are positive in their action. Many accidents have occurred at machines through inefficient or defective fast and loose pulley and belt arrangements suddenly starting a tool which was under examination or adjustment.

Especially Dangerous Machines

The most difficult safeguarding problems for the engineer are those relating to numerous machines used in the arts, which are essentially dangerous at the operating point. No machine is effectively protected by any guard which hampers a workman, reduces his speed and earnings and has not been designed for the actual working conditions. Such inadequate apparatus is naturally removed by the workman or wholly or partially put out of action at the first opportunity and the particular safeguarding problem becomes the subject of a fruitless triangular controversy between the employer, the employee and the factory inspector. To educate the employee to use caution and foresight about dangerous machines is difficult enough, and it should not be rendered more so by calling upon him to work with an impracticable safeguard. What is needed in such a case is careful inquiry, by a competent engineer experienced in the study of safeguarding problems, into the conditions under which the employee has to operate and a solution, where such is possible, which will enable him to work with efficiency and safety, or at least to reduce considerably the accident risk of his occupation.

For illustrating the problem of the especially dangerous machine, the author has confined himself to examples of accident experiences with only four out of many

classes of such apparatus. These four, however, are probably the most prolific in accident to the operator when performing his usual duties. They comprise wood-working saws and cutters, punches and presses, rolling machinery of all kinds where hand feeding is necessary, and emery and other grinding wheels.

A close approach by the fingers of workmen to sharp cutting tools running at a very high rate of speed is essential in operating efficiently many woodworking saws and cutters. Consider first the common circular saw. In spite of claims to the contrary a universal saw guard does not exist on the market. On the other hand, except in the case of small diameter checking and grooving saws covered by the work, the author believes it is quite possible to safeguard all saws to varying degrees conditioned by the uses to which they are put.

Fig. 4 shows in some detail the solution of a circular saw protection problem, where the conditions were supposed by workmen and foremen alike to forbid safeguarding, which would permit the machines to be worked at full efficiency. The saw bench illustrated is a combination trimmer and edger, having three saws on one shaft. The overhung saws, a rip and a crosscut, respectively, are fixed in position on the shaft ends, but the middle cross cutting saw must, with any guard, traverse the shaft freely when required for a distance of 18 in. The work handled varies from one to three thicknesses, totaling 2 in., and is fed into the saws on two sliding tables of 29-in. stroke and of fixed and variable gage, respectively. Thus no attachment above the bench for any guard is possible at the front or sides or for about the above distance to the rear of the saw. As finally worked out, the rip saw has a safety parting knife fitted in its rear, and all three saws are efficiently and strongly guarded at every dangerous point. The saw line is always visible through the mesh work and pierced work, yet the operators' hands, which necessarily travel with the work, can never approach the saw teeth too closely, as they are pushed off by the projecting fingers.

The common jointer accounts for a large number of finger and hand amputations every year. In two types of guard, two movements, vertical and horizontal, respectively, are necessary to adapt it to any given piece of work. In a third the guard supported on springs rises automatically when pushed by the work and only the transverse sliding motion is necessary for positioning. After the work has passed the guard the latter returns automatically to a position close to the cutter gap. In the other two types the guards maintain their height above the table until readjusted. All these guards can be readily swung out of the way for cutter adjustments and as easily returned for use.

The vertical spindle molding cutters can also inflict serious injuries. Sometimes a leather knuckle duster revolves with the tool and contact with it warns the workman of too close approach.

Punch and press machinery probably ranks next to woodworking tools in frequency of accident, though usually the operative escapes with less serious injury. The mechanical engineer cannot be too careful in seeing that these tools are in good repair, particularly the actuating gears. Automatic roll feeds, subpresses, magazine, hopper, gravity slides and push slides feeds have done a good deal to eliminate the dangers of feeding such presses by hand, but much work already blanked must still be handled in this way in subsequent punching and pressing operations.

The increasing use of compressed air in mechanical industries permits of light pieces being blown off the die at the end of the operation by a cam operated blast properly directed and timed, while the ordinary spring ejector serves the same purpose for heavier work. Yet there are many punches and presses running to-day without efficient safeguards, and even where they are to be found the principles are not carried out consistently at all necessary places. Fig. 5 shows screen press guard which is timed to descend upon the operators' fingers, if in a position of danger, and secure their withdrawal before an accident occurs.

The third class of special apparatus essentially dangerous at the operating point is hand fed rolling ma-

chinery of every description. At powerful hand fed pressing and calendering rolls the injuries are usually very severe.

In the case of a single pair of large rolls it is possible by having the feed table level with the top of the lower roll and placing a bar, plate or screen across the bottom of the upper roll, to guard effectively the dangerous intake by arresting the operative's hand when accidentally traveling toward it on the work. The chance of accident from hand fed vertical rolls is considerably reduced when a feeding table is used, which keeps the operator at a safe minimum distance from the roll intake and necessitates a conscious effort to reach it. When rolls are operating on plastic materials, easy access for cleaning and scraping the rolls is essential and a suitably placed rod attached to the top roll housing and rising and falling with it takes the place of plate and mesh guards.

In laundry and cloth finishing machinery such forms of protection are not practicable on the rolls, owing to the nature of the work. To meet such cases a light, smooth auxiliary hardwood roll is substituted as a guard. It is pressed constantly against the main rolls by springs and is driven by them, but it fills the dangerous intake and arrests any part of the hand accidentally traveling toward the latter and in danger of being crushed. In compound power fed rolls with continuous webs of work, multiple floating guard rolls, controlled and released by a system of levers whenever a break in the web necessitates restarting by hand feeding, can be used. A counterbalanced bevel edged board is used, which ordinarily swings up and out of the way. With this the operator can with perfect safety push the cloth or other web home till it is gripped by the rolls.

Emery wheels, grindstones and other abrasive tools when overspeeded or when strained or shocked while in motion within the limits prescribed by the makers sometimes burst with great violence and spread death and serious injury in the path of their flight. Various methods for confining the wheel fragments to the machine casing, or at least rendering their velocity harmless, have been worked out. In all of them ample side clearance between the wheel and its casing is a primary requisite. Fig. 6 shows a form of armoring successfully used to retain fractured wheels on disk and face grinders.

Especially Dangerous Processes

In addition to the wide scope afforded the mechanical engineer for assisting in the conservation of life and limb in the operation of industrial machinery, there are not a few matters calling for his attention and for administrative regulation in various dangerous processes used in the arts. Here also our aim as engineers and humane employers of labor should be primarily prevention.

Conclusion

In concluding this review of the field of industrial safeguarding in its more important manufacturing aspects and with special reference to its close relations to the art of the mechanical engineer, some administrative precautions should be briefly noticed.

Safeguards, where at all possible, should be constructed of metal to secure durability. Reinforced steel mesh work is preferred by the author for all but the heaviest machinery. In steel mills, foundries and heavy work plants of various descriptions, where the wear and tear of equipment is very great nothing but strong castings or steel plate work should be used for the majority of the guards. It is the practice of the author to have all safeguards readily distinguished by painting the body of them vermilion and the reinforced edges black. This allows executives to detect at a glance a displaced or defective guard.

Warning and caution notices should be sparingly used and as brief as possible. They give a possible legal protection from certain kinds of accident damage suits, but they are practically worthless in every sense if no attempt is made to enforce them. The supervisory and educational efforts of fully instructed and sympathetic foremen receiving full credit for the safeworking of their respective departments and a few well considered and

enforced regulations prominently displayed in print are, the author believes, far more effective than a long catalogue of work rules which few will read and none will remember.

It has been the practice of the author to give immediate and competent first aid services within the plant to every injured person. The prompt cleaning and dressing of slight accidental wounds gives great relief to the sufferer, and renders any later medical attention more effective. In the majority of cases nothing more is needed, but neglected or delayed treatment of simple injuries may have most serious consequences.

Every works executive and engineer will find it a valuable adjunct to the safety engineering of the plant to maintain in every department, apart from labor law and casualty insurance reports, a full and accurate record of every accident and also of every near accident. Periodical examination of these and the determination of every mechanical engineer to practice safety engineering to the best of his ability, without regard to the legal minimum or compulsion, will help more than anything else to remove speedily a great reproach from our industrial life.

Natural Gas in 1909 and 1910

The production of natural gas in the United States in 1909, as ascertained by a joint canvass made by the United States Geological Survey and the Bureau of the Census, is estimated by B. Hill, in charge of this work, under the supervision of Dr. D. T. Day, to have been of a value of \$55,000,000, an increase of only about \$359,626 over that of 1908. There were no great changes in the industry during the year, the production continuing to decline in Kansas, and an increase being made in Oklahoma and in the Caddo field in Louisiana and in Texas. An interesting feature was the supplying of Fort Worth and Dallas from the gas fields of Clay County, Texas. For the year 1910 the total production is valued at \$57,000,000, an increase of about \$2,000,000 over 1909. During 1910 a feature of great interest was the development of what promises to be a very large supply of natural gas in the Buena Vista Hills, Kern County, Cal., east of the Sunset-McKittrick oil field. Arrangements were made and practically completed during the year for piping this gas to Bakersfield and other towns in San Joaquin Valley.

The Quebec Bridge.—The Quebec Bridge engineers have come to a decision as to the plan of structure to recommend and the tender to report in favor of. They have advised the Minister of Railways and Canals accordingly, but nothing will be given out until he announces the decision in the House of Commons. It is rumored that the St. Lawrence Bridge Company is the successful tenderer. This is a corporation formed by the Canadian Bridge Company, Walkerville, Ont., and the Dominion Bridge Company, Montreal, Que., the two co-operating in this particular enterprise.

The Hubbard Steel Foundry Company, East Chicago, Ind., has completed an extension to its main foundry building, 120 x 190 ft., to provide additional molding space, and also to make room for a second furnace and additional core ovens. The company is at present installing a 15-ton acid open hearth furnace, which is being rushed rapidly to completion. There will be two core ovens in the extension built in a block, each approximately 18 x 25 ft. and 13 ft. high, equipped with doors at each end and with tracks running through the center.

The Queen City Punch & Shear Company has moved from its old plant at 208-212 Lawrence street, Cincinnati, Ohio, to Front and Pike streets, taking the building formerly occupied by the Bickford Tool Company. By this change it doubles its space and capacity and will thus be enabled to handle its orders with more speed. The company manufactures punching and shearing machinery and straightening and bending rolls. It goes into its new quarters with some nice orders looked.

Motors for Driving Main Rolls of Mills

Their Advantages Set Forth, with a Description of Typical Arrangements at Various Plants

BY BRENT WILEY.*

One of the most important matters now receiving the consideration of steel manufacturers is the question of reduction of power costs; for, while the cost of power for rolling steel is only a small percentage of the total cost of its manufacture, the aggregate cost of fuel repre-

ing electric drive to the auxiliary apparatus are sufficient to warrant the extra first cost, even to the extent of abandoning the old engine driven power apparatus.

The advantages of electric drive are constant and regular torque, more reliable drive, less breakage of

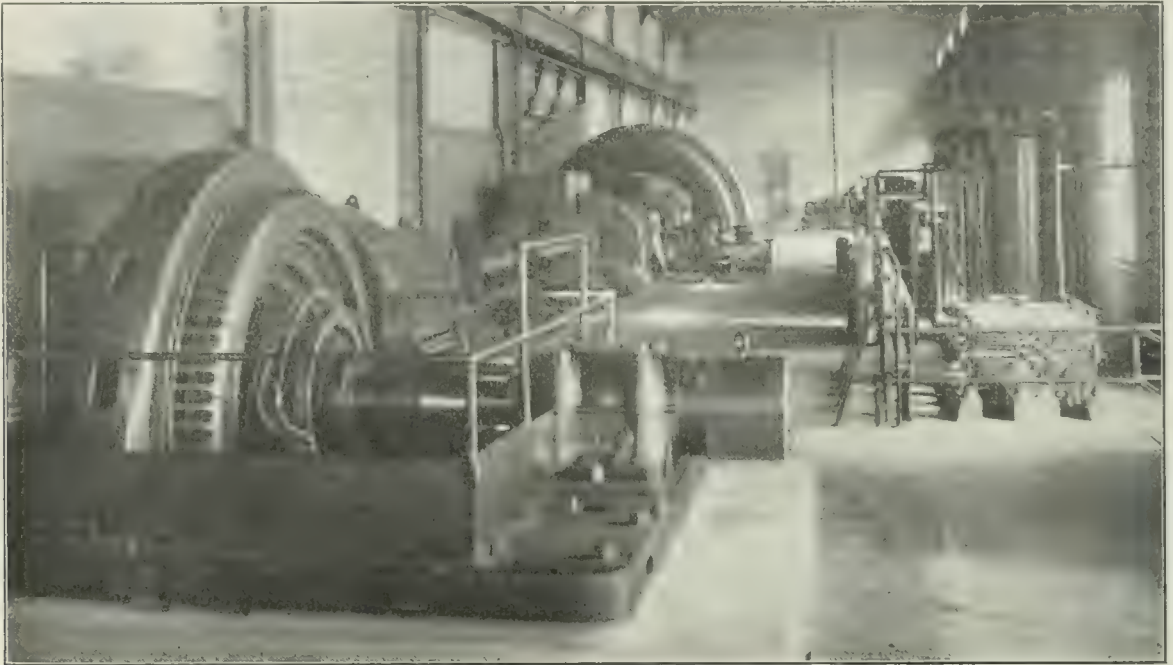


FIG. 1.—3200 Hp. and 650 Hp. Motors Driving Main Rolls of 18 In. Merchant Mill, Shown in Fig. 7.

sents a large amount, due to the exceedingly large tonnage of the mills.

There are two efficient methods of reducing power costs:

1. By the installation of gas engines using blast furnace gas, connected to drive electric generators.
2. By the installation of low pressure steam turbines

couplings, pinions, &c.; less room required, by reason of absence of boilers, pipes, &c.; easy adaptation of motors to mill; easy distribution of power by means of electric cables, instead of steam or gas pipes; easy and simple control of the power; centralized power generation; less labor; lower fuel costs; less oil and others stores, and the use of gas engines of medium size in the power sta-

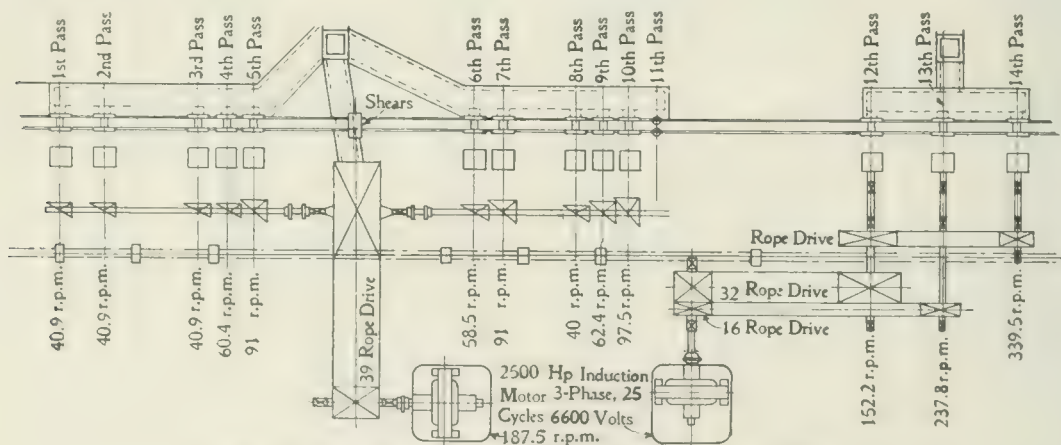


FIG. 2.—Skep Mill of the National Tube Company, Lorain, Ohio.

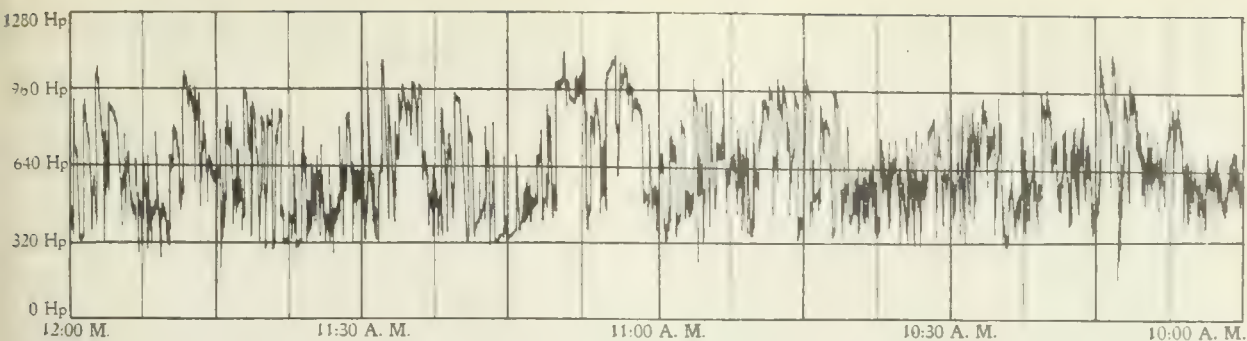
operating an exhaust steam from the mill or other power engines, for driving electric generators.

It is not practical to connect the gas engine or the exhaust turbine direct to the rolling mill, but the best solution is to transmit by means of electricity the cheap power thus obtained. This requires motor drive on the main rolls. In some cases, especially with small plants, the advantages of this form of cheap power for supply-

tion. In addition, the output may be increased at times on account of the economical speed variation that can be obtained with motors, where it is desired to finish the light material at a higher speed than the average product. Alternating current motors can be designed with winding for two speeds, and sometimes two units with cascade connections are used to give the required speed changes.

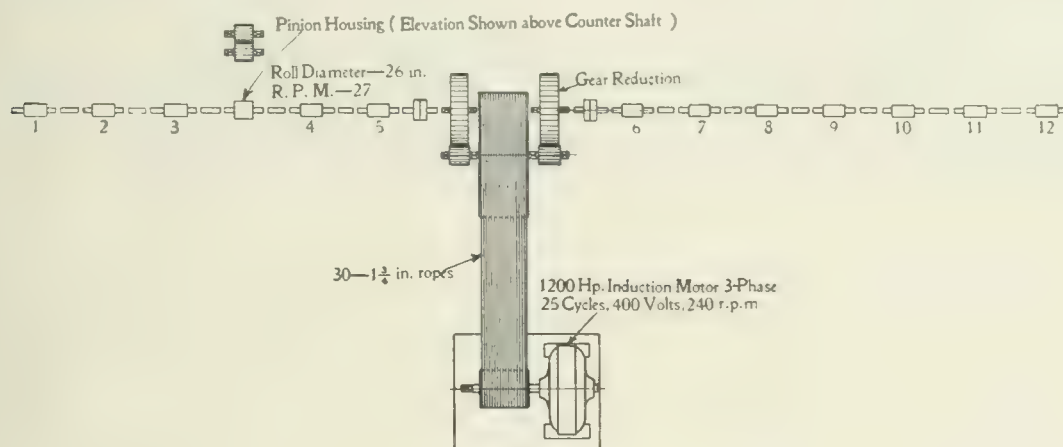
Electric drive for the main rolls of steel mills has also a great many advantages that cannot be capitalized di-

*Commercial Engineer of the Westinghouse Electric & Mfg. Company.



rectly, but which will be very effective in the furthering of this comparatively recent development. One of the principal incidental advantages is the facility afforded for obtaining accurate record of the power required, such as that shown in Fig. 3. The exact operating conditions can be definitely determined at any time by means of indicating and integrating meters. This condition is quite

installed in steel mills, including drives for blooming, billet, rail, structural, universal, plate, wire, merchant, rerolling and sheet mills. Test data from these various mills will do much to advance the art of rolling. The power requirements can be studied in detail and the reduction schedule can be worked out for greatest economy of power and time. Power instruments give indication



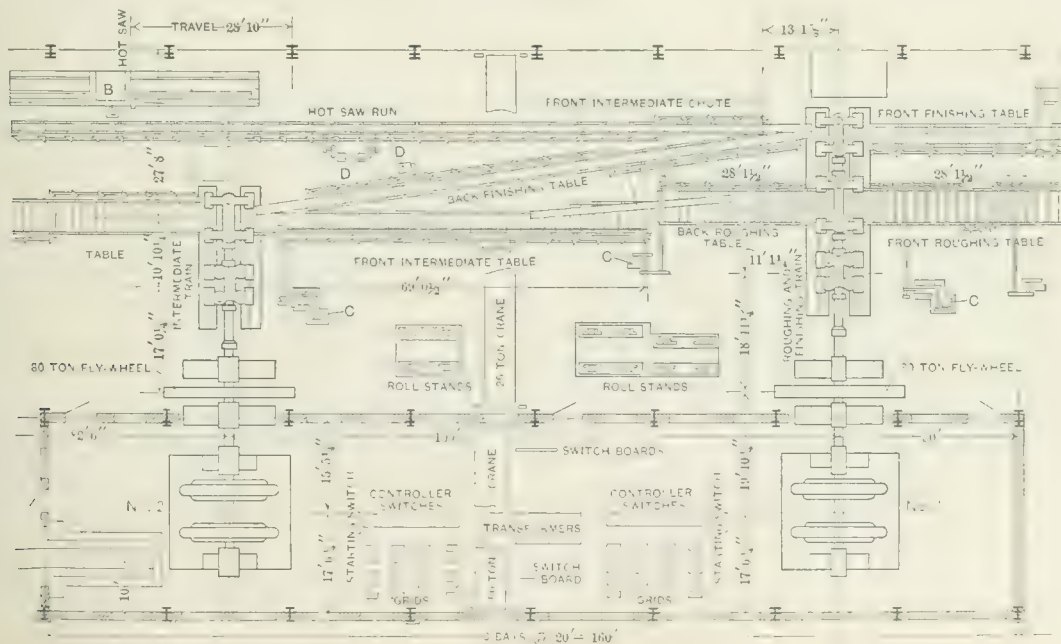
in contrast with the problem of power readings for steam engine drive. The many automatic and protective features of the auxiliary motor drives also permit a better arrangement of the mill and more economical operation by reducing the number of operators required.

150,000 Hp. in Motors for Main Rolls in Four Years

During the past four years approximately 150,000 hp. in large motor units for the operation of rolls have been

of any disorder in the mills proper, thus enabling the mill foreman to prevent excessive friction loads and excessive wear of parts due to poor alignment, excessive thrust and bearing pressure.

The question of commercial efficiency is the principal item to be considered, and it is quite complicated owing to the fact that as conditions vary greatly in different plants a separate analysis must be made of almost every case.



The United States Steel Corporation and many other steel companies are making a careful study of this particular subject in order to improve the economy of their present works. In many plants it is not practicable to consider the gas engine proposition. The number of furnaces may not be sufficient to insure reliable operation or the plant may not include blast furnaces; or, again, the first cost of the installation may be prohibitive, being very much more expensive than a low pressure steam turbine equipment of equal capacity. On the other hand, by the use of the exhaust steam turbine taking steam from noncondensing engines, an increase of 75 per cent. of the power developed by the engine can be obtained without additional fuel consumption.

Various Arrangements and Methods of Drive

The several mill plan views shown give an idea of different mill arrangements and methods of drive. In several merchant mill propositions a motor for each stand of rolls has been considered, but in every case it

advantages in the distribution of power in large plants. The motors are of the induction type with phase wound secondaries.

In estimating a motor for this type of work a load diagram of the torque required during a complete cycle of operations is first drawn up, as shown in Fig. 6. Such a load diagram gives the exact nature of the load conditions, including variation of load and the time element, and this information is essential in calculating the proper capacity of the motor and the necessary flywheel effect to be included in the system. The full line in Fig. 6 shows the calculated load diagram for the motor driving the main rolls of the 18-in. merchant mill of the Indiana Steel Company. This motor, as shown in Fig. 7, drives rolls for eight passes. The rolls of the ninth or finishing pass are driven by a smaller motor which develops approximately 660 hp. for 12 seconds in each 20-second period. The diagram shows a maximum requirement of approximately 4500 hp. and a minimum of less than 1000 hp. during each 20-second period. Owing to

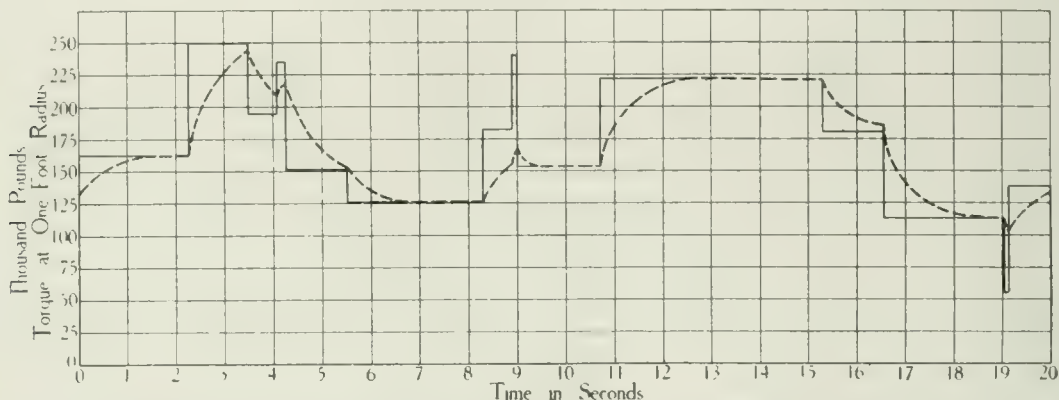


Fig. 6.—Estimated Load Curve for 3200 Hp. Motor.—The diagram represents a cycle of 20 seconds duration and continues by repetition. Full line, load diagram. Dotted line, motor load with flywheel effect of 3,600,000 lb. at 1 ft. radius. Motor speed with 184,000 lb.-ft. torque is 91.5 rev. per min. Slip, 10 per cent.

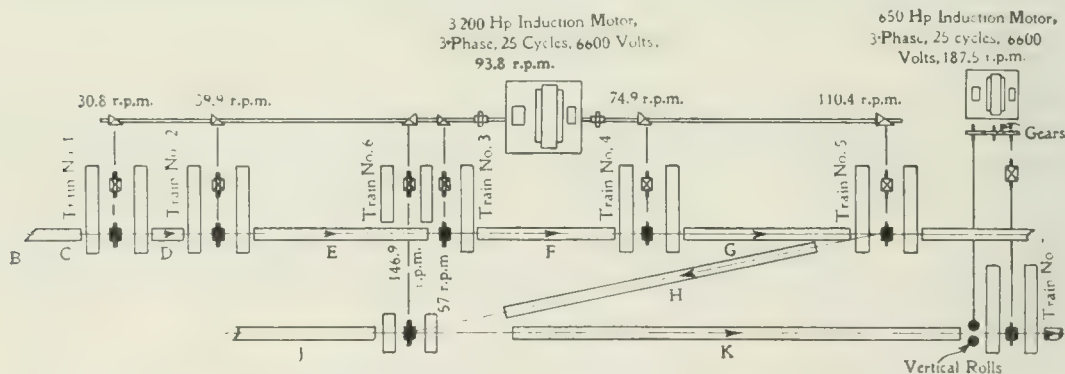


Fig. 7.—18-In. Merchant Mill of the Indiana Steel Company, Gary, Ind.

has been found best to reduce the driving units to two, from a standpoint both of first cost and of mill design. It will be noted that in the Indiana Steel Company's merchant mills the second motor is used to drive the finishing pass only. In existing merchant mills, where all of the roll trains are connected together and consequently all are running at the same speed, it will often be found advantageous to install a motor to drive the last set of rolls or perhaps the last two, thus giving an opportunity to speed up these rolls and thereby get the long material out of the mill more quickly. This is especially true in the smaller mills (8 to 10 in.). The Illinois Steel Company tried out this scheme in its Milwaukee 8-in. merchant mill with splendid success, increasing the output several per cent. due to the more nearly continuous operation of the mill.

Direct current motors have been installed in some cases in order to secure the advantage of speed variation. The present tendency is, however, toward the exclusive use of alternating current at voltages of 2200 to 6000 volts, at 25 cycles, three-phase. The lower frequency allows much cheaper construction of large sized slow speed motors, while the higher voltages afford many

the flywheel effect, the load on the motor is slightly reduced or equalized, as shown by the dotted line. In this particular case the power required is not subject to extreme variations, and, moreover, the cost of power is low. A comparatively low flywheel effect was, therefore, considered advisable. In case the driving power fluctuates between wide limits in very short periods, a larger flywheel effect is preferable, especially where the cost of power is an important item.

The motor is designed to perform the work as shown by the estimated load diagram at a safe temperature rise, or, in other words, is figured on an intermittent load basis, and thus the continuous rating given the motor is really an arbitrary one. The design of the motor is made according to the local conditions. For instance, where rope drive is used, giving flexibility between the motor and mill shaft, it is not necessary to make the motor excessively strong; the speed can be moderate instead of exceptionally slow, as is generally the case when the mill shaft is driven direct, and the rope sheaves give opportunity to place the necessary flywheel effect outside the motor, a good point where exceptional mechanical strength of motor is not actually required.

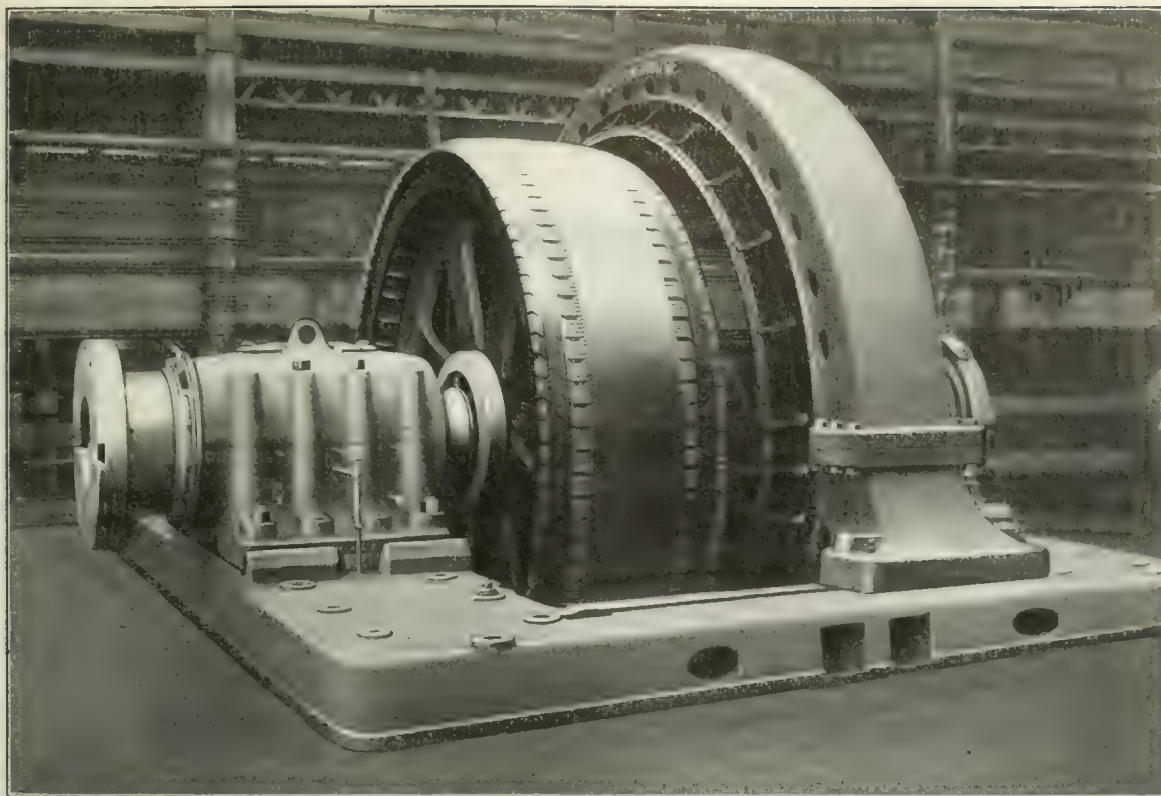


Fig. 8.—3200-Hp. Roll Motor with Stator Moved Aside to Allow Inspection of Rotor.

Features of the Motors

The 3200-hp. induction motor designed to perform the work indicated in Fig. 6 is illustrated in Figs. 1 and 8. This motor weighs approximately 300,000 lb. and has approximately 2,500,000-lb. flywheel effect included in the rotor, which is so designed that additional weight can be added to it should additional flywheel effect be desirable. The illustrations give a good idea of the general mechanical characteristics of the machine.

The primary (or stator) is of the open slot type, wound with form wound coils made of rectangular strap copper, thoroughly insulated and impregnated before winding. The coils are supported rigidly at the outer ends by means of an insulated steel ring fastened to the frame by a number of strong brackets. Means are provided for adjusting the stator vertically and horizontally at right angles to the shaft for adjusting the air gap, and also for moving the stator parallel to the shaft to allow for inspection of repairs.

The slot construction of the secondary, while of the partially inclosed type, thus tending to compensate for the effect of the unusually large air gap provided in such motors, permits the use of a completely insulated form wound coil. The overhanging tooth of the laminations assists materially in retaining the fiber wedge in place. This is of especial importance in the secondary as it is the revolving part. Band wires for retaining the overhanging portions of the coil in place are objectionable, particularly from the standpoint of repairs when all work must be done in the field. A sectional ring is used in place of band wire on this machine, as shown in Fig. 8.

Thrust bearings are provided whose object is to care for ordinary thrusts due to wear of coupling boxes, but not excessive thrusts due to breaking of mill spindle. To provide for these thrusts the rotor is sometimes arranged to have a lateral movement of several inches without damage to any part except the holding bolts of the thrust bearings. Provision is made for shifting the

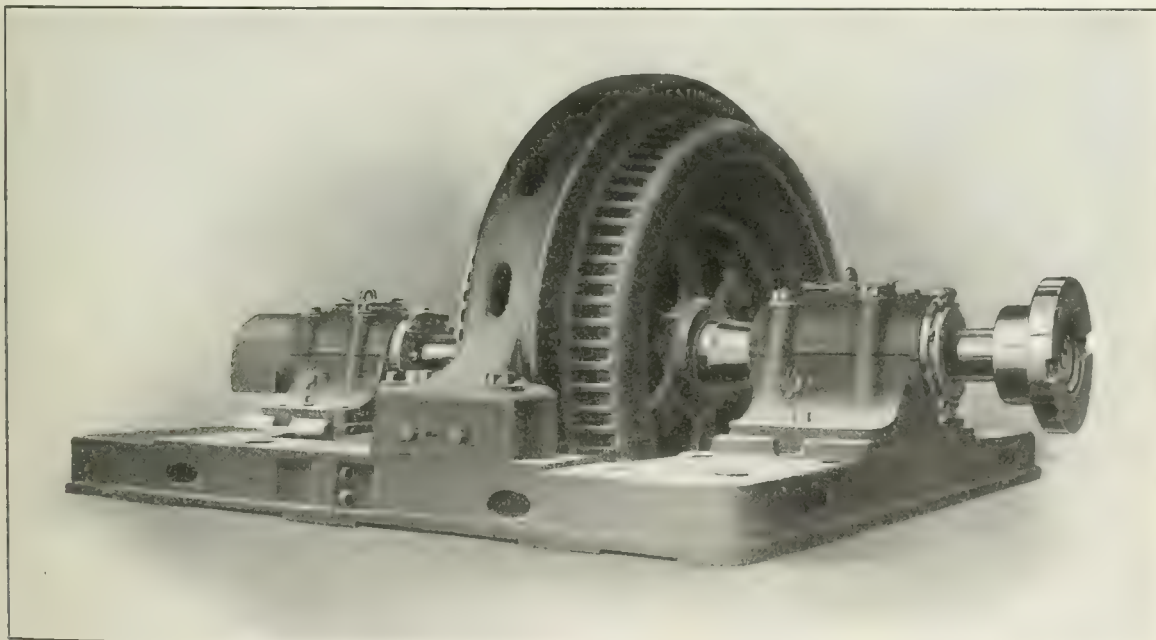


Fig. 9.—650-Hp. Roll Motor, Operating Finishing Rolls. 18-In. Merchant Mill.

entire brush rigging with the rotor so that the brushes will always stay on the collector rings. The thrust bearings are located at the end of the shaft opposite the coupling and are held by two bolts which are turned at one place to provide a breaking point. The bolts which pass through the bearing pedestal, together with the bed

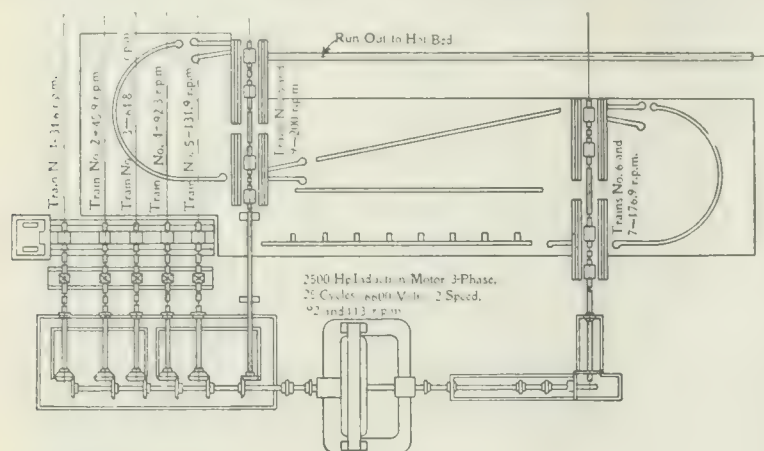
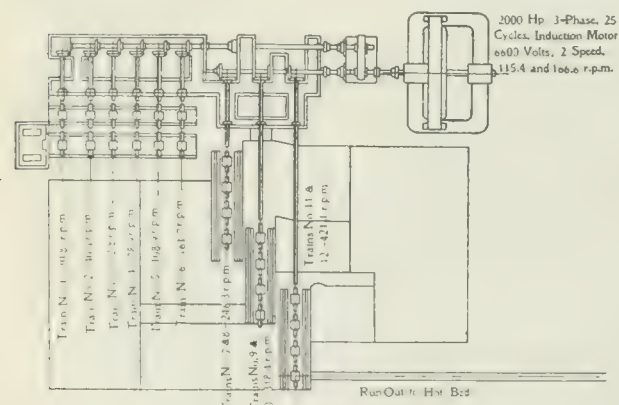


Fig. 10.—10-In. Merchant Mill of the Indiana Steel Company, Gary, Ind.

plates and parts, are designed to withstand the breaking stress of the holding bolts without injury.

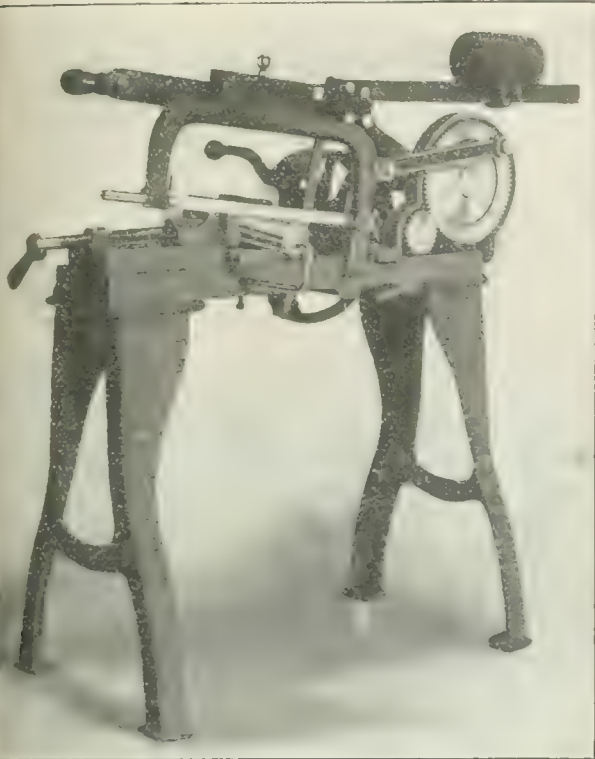
The control outfit for this motor consists of two identical three-pole, single-throw, interlocking primary line switches with oil immersed contacts (one switch for each direction of rotation), a group of magnet switches with the necessary secondary resistance and with current limiting relays, a reversing drum type master switch, and shunt and series transformers for the relays. The line switches are so interlocked that only one can be closed at a time, and neither can be closed while the secondary switches are in other than the off position—that is, unless the secondary resistance is all in circuit. The line switches can be operated from the control pulpit or from the motor house. When the control circuit is open in the motor house the master switch and line switch operating mechanism in the pulpit are inoperative. Should the line switch be opened for any cause, or should the control circuit fail, all switches are immediately opened.

Motors in this service are seldom reversed, these cases arising only where material curls and tends to form a collar or for other reasons forms a cobble in the rolls. They start with resistance in the secondary circuit. As the speed increases this resistance is cut out by means of the magnet switches, each of which is under the control of the master switch, but is so connected as to automatically limit the current to a predetermined value and also limit the current to this same value at any time dur-



The North Wales Geared Power Hack Saw

One of the special features of the new geared power hack saw made by the North Wales Machine Company, Inc., North Wales, Pa., is the use of a direct gear drive. These gears are machine cut and have cast iron covers to protect them. The tool has tight and loose pulleys



A New Type of Geared Power Hack Saw Made by the North Wales Machine Company, Inc., North Wales, Pa.

and a swivel vise, which enables stock having a maximum diameter of 3 3/4 in. to be cut at any angle not exceeding 45 degrees. The maximum capacity for straight cuts is 5 1/2 in. A telescopic connecting rod enables a 12-in. blade to be used when cutting bevels, although

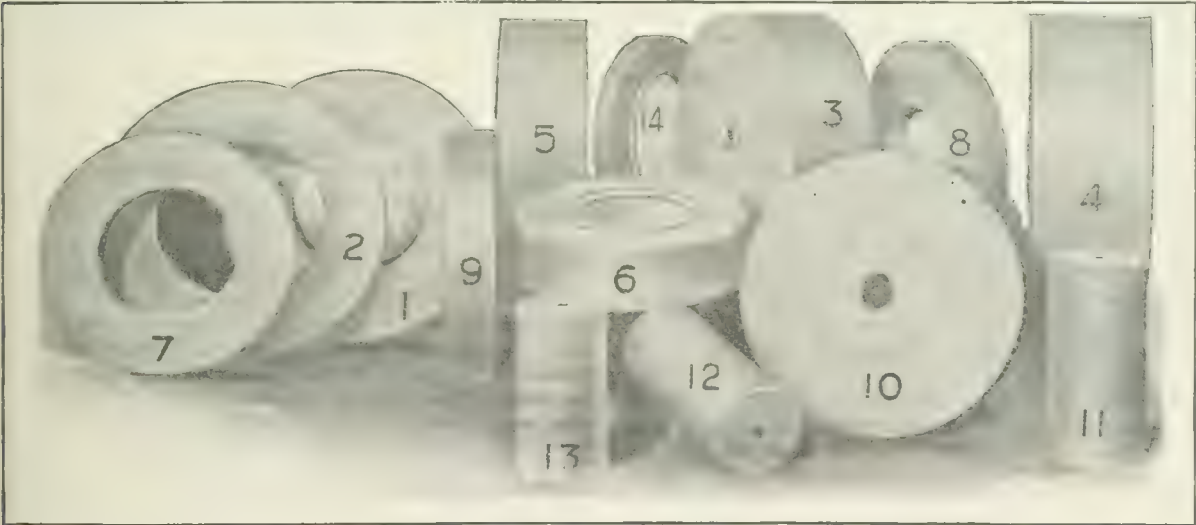
Length of stroke, inches..... 6
Diameter of tight and loose pulleys, inches..... 10
Face width of tight and loose pulleys, inches..... 1 3/4
Total weight, pounds..... 1,575
Shipping weight, pounds..... 225

The main bearing of the machine is 7 in. long and has a brass gib and set screw to take up wear. The mechanism for shutting off the power after the cut has been made is both positive and quick acting and the frame lifting handle is conveniently located for the operator. All parts of the machine are of heavy construction and the vise screw is of the extra heavy type.

Some Remarkable Carborundum Company Products

What is believed to be the largest vitrified grinding wheel ever made is included in the group of rather remarkable wheels herewith illustrated and recently turned out at the works of the Carborundum Company, Niagara Falls, N. Y. The wheel in question is marked No. 2 and is made of Aloxite, the new steel grinding abrasive recently put on the market by this company. The big wheel is 48 in. in diameter and is to be used for tool grinding by one of the carborundum customers in France.

Included in this group of wheels are several other examples of the comprehensive wheel making facilities of the carborundum plant. The net weight of the wheel group is \$850 lb. It includes two massive carborundum drum wheels, Nos. 3 and 4, which are 39 1/4 in. in diameter and 16 1/2 in. thick, which are to be used for hulling grains; No. 6, vitrified Aloxite wheel, 36 in. in diameter, 9 in. thick, to be used in pointing cast steel wire; No. 5, drum wheel, silicate Aloxite, 40 in. in diameter, 14 in. thick, to be used in grinding mower sections; No. 9, silicate Aloxite wheel, 40 in. in diameter, 4 in. thick, to be used for grinding corset steel; No. 14, silicate Aloxite wheel, 36 in. in diameter, 4 in. thick, to be used for tool grinding; No. 1, silicate Aloxite wheel, 48 in. in diameter, 3 in. thick, to be used for grinding cutlery steel; No. 8, vitrified Aloxite wheel, 36 in. in diameter, 4 in. thick, to be used in grinding angle iron; No. 7, silicate Aloxite wheel, 39 in. in diameter, 3 in. thick, to be used in glass grinding; No. 10, carborundum wheel, 40 in. in diameter, 8 in. thick, to be used in grinding structural steel; Nos. 11, 12 and 13, vitrified carborundum



A Group of Remarkable Grinding Wheels Recently Turned Out by the Carborundum Company, Niagara Falls, N. Y.

the one regularly supplied is 2 in. shorter. Gravity feed and an automatic stop to shut off the power after the cut is completed are used.

The following table gives the principal dimensions and specifications of the machine:

Maximum length of blade, inches.....	12
Cutting capacity for straight work, inches.....	5 1/2
Cutting capacity for bevel work, inches.....	3 3/4
Ratio of gearing.....	3 to 1
Maximum swivel of vise, degrees.....	45
Depth of vise jaws, inches.....	2 1/8
Width of vise jaws, inches.....	4 1/2
Opening of vise jaws, inches.....	6

cylinders, 12 in. in diameter and 26 in. long, to be used in grinding vitrified tile.

These wheels cover a widely different assortment of work and serve well to show the grinding possibilities of carborundum and the new abrasive, Aloxite. The facilities at the carborundum plant make it possible to quickly supply wheels for all classes of grinding, not only in all of the regular or standard shapes and sizes, but also in any special shapes and sizes made in accordance with the customer's sketch or blue print.

A Wire Rope of Exceptional Type

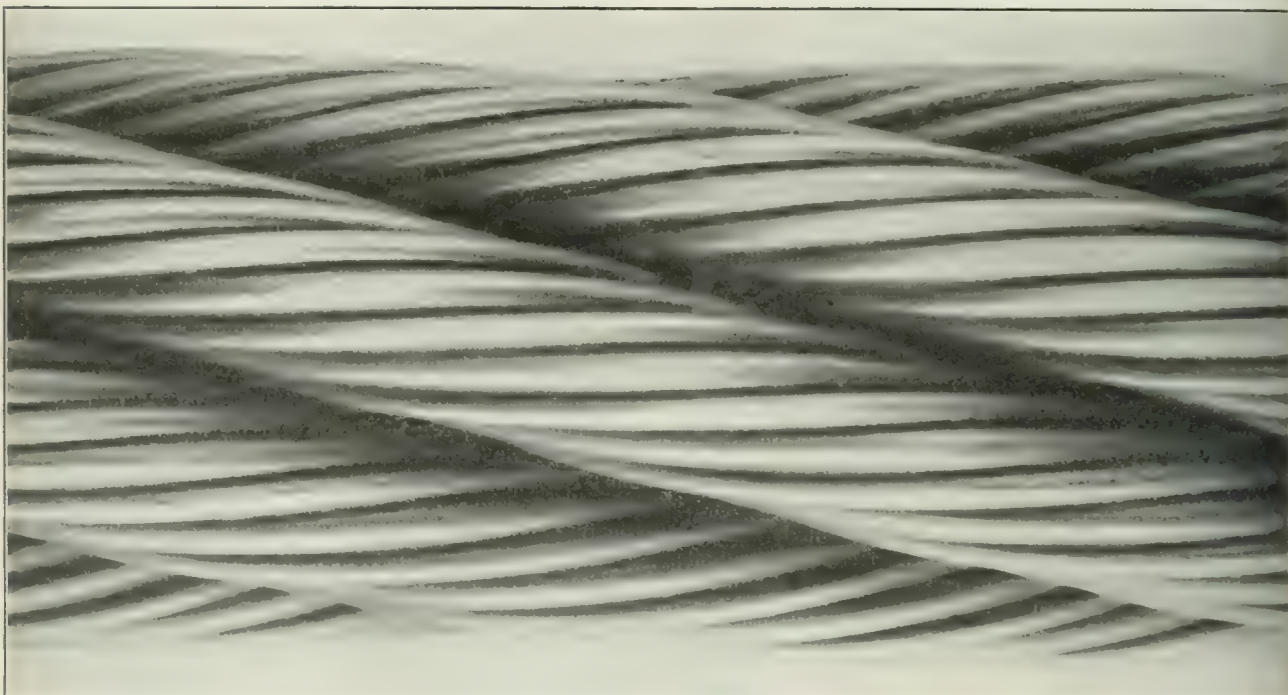
Made by the John A. Roebling's Sons Company,
Trenton, N. J.

Improved methods in the heat treatment of steel have recently led to a material increase in the size of wire that can be used for wire haulage rope. A record has been made in this direction in the manufacture by the John A. Roebling's Sons Company, Trenton, N. J., of a haulage rope, 3 in. in diameter, 7810 ft. long, and weighing over 123,000 lb. This rope has a breaking strength estimated at 377 tons and is remarkable, not alone because of its great size and strength, but also because it contains larger wires than have been heretofore regarded as practicable to manufacture for stranding into rope to be bent around a drum under a heavy load.

As is well known, the designs of wire ropes to be used for hoisting or haulage are influenced largely by the sizes of the drums around which they are to be

important to equip the incline with a rope that would not only take the direct pull with a liberal factor of safety, but that would also have ample power of resistance to the crushing strain which would come upon it when wound on the drum. Calculation showed that a plow steel rope 3 in. in diameter would be strong enough to take the load, and in order to eliminate short bends the operating machinery was designed with drums 20 ft. in diameter.

It was then proposed, instead of twisting six strands with 37 or more wires in each around a center, to follow the usual construction for smaller ropes and place 19 wires in each strand. Instead, however, of using a hemp center, the strands were twisted around a center which in itself was a wire rope $1\frac{1}{2}$ in. thick, composed of six strands of 19 wires each and a hemp core. This construction required for the outer strands wires ranging from 0.175 to 0.225 in. in diameter. It is not uncommon to draw wires as large as these for ordinary commercial uses, but to produce such wires with the strength, toughness and pliability of finer sizes called for the ap-



Wire Rope of Exceptional Type Made by the John A. Roebling's Sons Company, Trenton, N. J. This engraving reproduces its exact size.

wound. A rope to be wound around a drum of comparatively small diameter must naturally be more pliable than one which will not be subjected to short bends. The number of strands in a rope and the number of wires in each strand also bear a relation to the rope's diameter, and when a very large rope is wanted it is usually considered necessary to depart from the construction employed for smaller sizes.

For example, the standard haulage rope up to $1\frac{1}{2}$ in. in diameter is made of six strands of seven wires each twisted around a hemp center. For larger sizes six strands of 19 wires each are used, unless the rope is to be subjected to short bends, or a very large diameter is wanted, when the number of wires in each strand is increased to 37 or more. An advantage is gained by using a small number of wires in a haulage rope, because the wires, being larger, naturally present better resistance to abrasion. In addition to the wear to which it is subjected, if a rope is of very large diameter, a crushing strain develops when it is wound on a reel under a heavy stress. This crushing strain can be much better resisted if the strands are composed of a small number of thick wires instead of a large number of wires of comparatively fine diameter.

When, therefore, the Spanish-American Iron Company, for whom the large rope referred to above was made, proposed to haul a load of more than 330,000 lb. of iron ore up an incline 6716 ft. long, it became very

important to equip the incline with a rope that would not only take the direct pull with a liberal factor of safety and great care in every detail of manufacture.

The manufacture was begun at the furnaces at the Roebling Works with the production of steel that exhaustive tests showed to be possessed of the physical qualities essential for rope wire, and this steel was rolled and drawn into the requisite number of coils to form the strands. Sample pieces taken from each end of each coil were subjected to tests in torsion, bending and direct tension. The results of these tests confirmed the favorable result of the tests of the steel, and the fitness of the wire was further demonstrated when, notwithstanding the thickness of the largest wires, they were readily stranded into rope.

To facilitate handling, the length of the rope was distributed over three reels loaded on two cars, the largest of these reels being 10 ft. high and $9\frac{1}{2}$ ft. wide. These reels were loaded on a vessel in New York for shipment to Cuba, where the mines of the Spanish-American Iron Company are located, and were handled at the place of destination without difficulty.

The Wisconsin Engine Company, Corliss, Wis., is installing in its machine shop an erecting floor of massive concrete construction, with a wood block surface, which will be of material assistance in erecting the heavy machinery which constitutes the greater part of the output of the company.

New England Foundrymen

Data on the Cost of Permanent Molds

At the monthly meeting of the New England Foundrymen's Association, at the Exchange Club, Boston, February 8, Edgar A. Custer, president of the Tacony Iron Company, Philadelphia, read a paper on "The Permanent Mold," illustrated by lantern slides. The Millett Brass Company, Springfield, Mass., and the Union Steel Casting Company, Jamaica Plain, Mass., were elected to membership. The usual dinner was enjoyed. Herbert E. Wetherbee, the new president, was in the chair.

Mr. Custer's paper covered much ground that has been made familiar to readers of *The Iron Age*. The following extract is from the portions dealing with the cost of operations and the life of the iron mold:

"In April, 1910, a statement was made by me that this process was not dependent upon skilled labor, and that ordinary laborers could be employed upon it without previous experience and get economical results. In order to test this out, on Friday, April 21, 1910, we hired 18 men from the street, 16 of whom could not speak English and but one of whom had ever been in a foundry before. On Friday and Saturday we simply pushed these men around and endeavored to teach them not to be afraid of the molten iron. To the 18 men we added three of our more experienced workmen, and on Monday these 21 men were turned over to an outside concern, which then assumed entire charge of this portion of the plant. Account was taken of the number of castings made, the hours of the men and the costs that entered into the production of these castings. There were 37 molds. The average molding cost alone for these castings, when made in sand, was 6 cents each, figured on a piecework basis. The results of this test follow:

	Number hours work.	Number castings made.	Cost per piece.
Monday	7	896	0.023
Tuesday	10	1,419	0.021
Wednesday	10	1,767	0.0169
Thursday	10	1,972	0.0152
Friday	10	2,174	0.0138

"The cost of these castings when made in sand, for molders' labor alone, was \$9.02 per ton. The molding cost the last day of this test was \$2.14 per ton. To the molding cost of the castings, when made in sand, must be added rumbering and cleaning and the cost of sand. So much for the old way as compared with the permanent mold process.

"Each mold is primarily designed to produce 1000 lb. of castings per day, and in our room containing 37 molds there were produced 18 tons of good castings in 10 hours. The floor space required by these molds is 60 ft. long by 26 ft. wide, and to produce the same tonnage of the same castings in sand a floor space of 400 ft. long by 105 ft. wide would be required; also to produce the same tonnage in sand the services of 54 expert molders would have been required, whose pay would average \$3.50 to \$4.50 each per day.

"The question that invariably crops out when we are talking of iron molds is, 'How long do they last?' I have been working them continuously for five years, and can only say: 'I don't know.' The only place where the molds disintegrate is in the runners and gates. The matrix of the mold never, in our experience, shows any signs of wear or crumbling. After we have made from 7000 to 10,000 castings we generally renew the gates by inserting new blocks. The cost of this repair is generally 10 per cent. of the original cost of the mold. We have made 21,000 castings in a single mold, each casting weighing 10 lb., and the matrix to-day shows the original tool marks. The life of the mold does not depend so much upon the number of castings poured into it as upon the number of times it is allowed to become cold. Working a mold continuously day and night will quadruple the number of castings that may be made before repairs are required."

The Cheboygan Bridge & Boiler Works is a new company which has bought the Cheboygan Boiler Works,

Cheboygan, Mich. It will continue the business of making and repairing boilers, but will add the construction of steel bridges under the direct management of R. A. Raymond of Saginaw, Mich., formerly with the Joliet Bridge & Iron Company. Operations in the new line have already begun and conditions warrant a good volume of business.

Pennsylvania Railroad Freight Stations in Philadelphia

The Pennsylvania Railroad Company is to issue a large wall map of Philadelphia, the purpose of which will be to point out to shippers the location of Pennsylvania Railroad receiving and delivering stations in that city. As this is, however, the second map of the kind the company has issued since 1897, it shows in diagram form the remarkable development of railroad facilities in this city within recent years—facilities required by the fact that Philadelphia has become the leading manufacturing center of the world. The map shows the route of Pennsylvania Railroad tracks in that city, of which there are altogether 443 miles. By far the greater part of this is for the direct use of Philadelphia industries, although the map shows the route of the so-called high line, or elevated double track freight railroad, planned by President Cassatt to connect the Main Line and the New York Division with the Delaware Extension and the Philadelphia, Baltimore & Washington Railroad, and intended especially for the coal trains running between Harrisburg and the Delaware River, as well as for large merchandise traffic handled at Dock street terminals in Philadelphia.

Within the 129 square miles in the city of Philadelphia, this map shows the location of 56 separate and distinct shipping and receiving points on the Pennsylvania Railroad, or an average of about 1 to every 2½ square miles. This extraordinary number of stations—which is greater than any other railroad has in any other city—has been brought about by the fact that the manufacturing and shipping interests of the city are so widely distributed that in order that shippers should not be subjected to excessive charges for drayage, there should be established a station and a carload delivery yard in every well defined section of the city.

Attention is also called by the new map to the fact that in the central portions of the city, where the retail and wholesale houses are located, there are to-day spacious buildings at the Dock Street Station, Walnut Street Station and Wharf, Vine Street Station and Washington Avenue Station, furnishing facilities for handling the extraordinarily large miscellaneous freight traffic. The value of these stations to shippers is attested by the large amount of traffic consigned to them.

The map also gives the names of stations at which cranes, track scales and wagon scales have been installed. It shows, for example, that at the Shackamaxon Station an electric crane has been built, which will lift 40 tons. At the Fifty-second Street Station there is a crane with a capacity of 30 tons. Huge cranes and scales have been built at other stations, in order that the handling and weighing of freight might be facilitated to the greatest possible extent. On this map are pointed out the names of the stations at which freight may be loaded to the different directions in which the Pennsylvania Railroad radiates from Philadelphia, thus showing the network of tracks required to enable the shippers of that city to load their freight and have it hurried away within the shortest possible time.

The Armor Steel & Foundry Company, First National Bank Building, Chicago, and Matthews, Ind., is the purchaser of the Steel Foundry Company's old plant at Winton place, Cincinnati. The equipment at its Matthews, Ind., plant will be moved to Cincinnati. The present Winton place building is 134 x 260 ft., and a 215-ft. addition will be made, making the structure 515 ft. long. The new addition will be of steel and concrete construction, conforming with the old building. The company will manufacture steel castings under the Gebhard process and will need some additional equipment for its new plant.

The Machinery Markets

The machinery demand is steadily improving. An encouraging feature is that the buying is conservative and not caused by any fear of advancing prices. The call for equipment is so general and such a wide variety of machinery is asked for that about every branch of the trade is feeling the betterment. The railroads continue to occupy the chief attention of the trade. Some business is being placed in New York, although nothing has been bought as yet against the large list mentioned last week. The railroads are buying in Chicago and a good call exists there for small tools. New England reports a good supply business, and an encouraging indication there is contained in the fact that the New York Central and the Boston & Maine systems increased their freight earnings in January. The Pennsylvania and the Reading railroads have been making inquiries for tools in the Philadelphia market. In Cleveland there is an increased volume of business, mostly for small lots. Similar conditions exist in the South, and in St. Louis there is a decidedly improved demand for all kinds of machinery. The export demand for machine tools and mining machinery continues to give the market good support. A list of mechanical equipment which will perhaps aggregate \$50,000 has been issued by the Everett Mills, Lawrence, Mass., and the buying will be done from there.

New York

NEW YORK, February 15, 1911.

Orders are being placed against the liberal inquiries which appeared in the New York market early in January, and a good general business is being done. It is not often that the machinery houses in this vicinity bid on such a varied assortment of requirements as have come forward recently. Textile machinery, wood working equipment, metal stamping presses, sugar mill machinery, conveying equipment and machine tools are all in good demand, and most of the business that has come forward has been in the way of inquiries for one or two machines. In some lines manufacturers actually have all they can handle. This is especially true with certain makers of special automatic machinery, such as screw machines. The increased activity is reflected in the bookings of the International Steam Pump Company, which show that the volume of orders placed with it in January was 50 per cent. greater than the bookings of the corresponding month of last year. An encouraging feature is that most of the people buying machines are not getting them for replacement, but are adding to their manufacturing facilities, and in consequence there are fewer offerings of second-hand machinery than are usually made when good buying is being done. The demand for second-hand machinery continues especially good and dealers have no trouble in getting good prices for used equipment. Jobbing foundrymen in this market are becoming more active, and those who make a specialty of turning out machinery castings declare that orders are better than they have been at any time within the last five months.

Work has been begun on the second unit of the Argo plant in course of construction at Chicago for the Corn Products Refining Company, 26 Broadway, New York. The company has a large plant already in operation at Chicago, and it has been adding to it for some time, and has been a liberal purchaser in the machinery trade, largely for power equipment, conveying machinery and special machinery. The site on which this plant is being located is 100 acres in extent and at present about 25 acres are covered by buildings. It is the intention to continually extend the plant until all of the property is occupied by manufacturing structures.

The M. H. Treadwell Company, 140 Cedar street, New York, is inquiring for a line of machine tools for installation in a plant at Easton, Pa. The company is asking for a line of slightly used tools, and has also been making inquiries with houses handling only new equipment.

The Rome Mfg. Company, Rome, N. Y., does not manufacture rubber equipment, as was stated in *The Iron Age* of February 2. The company makes sheet metal ware, and the building mentioned was erected last year and is thoroughly equipped and in operation.

The Positive Clutch & Pulley Works, Buffalo, N. Y., has been incorporated under the laws of the State of New York with a capital stock of \$100,000, and will manufacture a complete line of combination jaw and friction clutches for transmission work and a line of steel center wood rim pulleys. The company has arranged for the erection of a large three-story brick factory at 32 and 34 Lansing street, adjacent to the New York Central Railroad Belt Line and will install the requisite equipment of machinery. The officers of the company are C. S. Hook, president; V. P. Beard, vice-president; S. A. Benedict, treasurer and general manager; E. L. Worbois, secretary.

George Laub & Sons, tanners, Buffalo, N. Y., will build and equip a five-story addition, 120 x 120 ft., to their plant at Clinton street and the Erie railroad. The Turner Construction Company has been awarded contract for the building.

The Board of Water Commissioners, Ogdensburg, N. Y., will receive bids until March 7 for the construction of covered sand filters, pipe lines, boilers, water turbines, steam and electrical pumping machinery and other electrical equipment and mechanical appurtenances for new water works plant. Hazen & Whipple, 103 Park avenue, New York, are the consulting engineers in charge.

The New York, Ontario & Western Railroad Company has completed plans for the erection of a machine shop at Middletown, N. Y.

The Buffalo Belt Company, North Tonawanda, N. Y., has completed arrangements for the erection of an extensive addition to its plant at East avenue, Oliver street and the New York Central Railroad and Erie Railroad.

Henry W. Littlefield, successor to Littlefield & Clark, Buffalo, N. Y., has established a manufacturing plant at 21 Illinois street for the manufacture of gasoline motors and portable combination self-powered working machinery for contractors and builders' use. A specialty will be made of the manufacture of the Simplex woodworker, a machine equipped with nine woodworking tools including jointer, saws, boring machine, &c., operated by a gasoline motor built in to the machine.

A three-story and basement shop building, 50 x 169 ft., with three-story wing, 32 x 45 ft., will be erected and equipped by Cornell University at Ithaca, N. Y., in connection with the Rand Hall Memorial Building. Bids will be called for about March 15 by R. H. Treman, chairman, Building Committee.

The Rudolph Wuslitzer Mfg. Company, North Tonawanda, N. Y., manufacturer of musical instruments, is having plans prepared for an extensive addition to its plant at Sawyers Creek and the New York Central Railroad.

Chicago

CHICAGO, ILL., February 14, 1911.

The machinery trade is beginning to feel the quickening impulse and has taken another step the past week in the direction of a normal volume of business. There is still quite a distance to travel, but Chicago dealers are encouraged by the steady growth in the number of inquiries and orders. The out of town trade seems to be in the lead in the matter of improvement. Manufacturers in Wisconsin, Iowa and the Northwest are sending in good orders, especially for small tools, and there are also more inquiries from Chicago industries.

The Motor Truck Show has attracted a great deal of attention among business men. The field for the use of trucks is so large and inviting that it may put the automobile industry on its feet again and result in a further extension of manufacturing facilities in that line, which will mean a market for many millions of dollars' worth of high grade machine tools.

The railroads are doing a little more business in random orders for shop tools, and a settlement of the rate question may enable them to make more extensive purchases.

The Marshall & Huschart Machinery Company, Chicago, recently closed an order for shipment to Berlin, Germany. This was a preliminary order for equipment for the new Berlin plant of the Otis Elevator Company.

The Chicago, Ottawa & Peoria Railway has under con-

THE MACHINERY MARKETS

struction at Ottawa, Ill., a shop building, 62 x 302 ft., which will contain three tracks, two of which will be repair pit tracks and the third will terminate in a paint shop. In addition to this there will be erected a boiler room, heater house and a blacksmith shop and brass foundry. The ultimate size of the shop is expected to be 302 x 302 ft., it being the intention of the road to increase the size as fast as appropriations are available. One corner of the building will contain the offices and drafting room and will be three stories, with a store room on the first floor. The shop will be equipped with a crane of 50 tons capacity, wheel presses, lathes and other machinery, all of which will be motor driven. A sprinkler system will also be installed.

The Brunswick-Balke-Collender Company, Chicago, Ill., has closed a deal with Dubuque, Iowa, for ground upon which it will erect a new factory as soon as the frost is out of the ground. The first buildings will be one story, saw tooth roof, of brick construction, and will contain about 280,000 sq. ft. of floor space.

The Chicago Varnish Company, Chicago, has increased its capital stock from \$200,000 to \$1,500,000.

A project for the establishment of a central heating station at Elgin, Ill., is being promoted by Henry Muntz and others of that city. Plans for the incorporation of a company with \$500,000 capital stock are being arranged, but details have not been worked out.

The City Council of Deland, Ill., is preparing to establish a water works system.

The Central Station Engineering Company, 164 Dearborn street, Chicago, is preparing plans for a central heating plant for the Kokomo, Marion & Western Traction Company, Kokomo, Ind., to be constructed at a cost of \$250,000. The same engineers are also preparing plans and will be ready for bids about February 12 for an extension of the city water works, power system and mains and enlarging the power plant and lighting system for the city of Logansport, Ind. The company also has plans in progress for a central heating plant to be constructed at Anderson, Ind., by a stock company, of which I. E. May, 1009 Main street, Anderson, Ind., is secretary.

The A. E. Staley Mfg. Company, Decatur, Ill., will begin work early in the spring on extensive improvements to its plant. About \$350,000 will be expended by the company.

The Moline Scale Factory, East Moline, Ill., has purchased a tract of ground which adjoins its present property, which it will hold for future growth.

The Economy Light & Power Company, Coal City, Ill., is making preparations for the erection of a new plant. The building will be of fireproof construction.

The Rock Island Sash & Door Works, Rock Island, Ill., has increased its capital stock from \$100,000 to \$500,000, but advises that it is not contemplating any improvements.

Ziegler-Schryer Mfg. Company, Freeport, Ill., gasoline engines, will erect a machine shop, 80 x 200 ft., contracts for which will be let in about 30 days.

Springfield, Ill., will expend \$135,000 for improvements to its water works, including the installation of a new pump.

The Atwood Vacuum Cleaner Company, Rockford, Ill., has been incorporated with a capital stock of \$50,000. The incorporators are James T. Atwood, Howard C. Atwood and Myra C. Atwood. The company will engage in the manufacture of electrical machinery.

The Metropolis Foundry Company, Metropolis, Ill., has been incorporated with a capital stock of \$3500. The incorporators are F. W. Borman, Edgar Jones and Charles C. Leonard. The company will engage in general machinery and foundry work.

The Interstate Cement Products Company, Hoopeston, Ill., has been incorporated with a capital stock of \$10,000. The incorporators are J. H. Hutton, Thomas Woolverton and H. G. Carr. The company will engage in the manufacture of cement, tile, concrete blocks, &c.

The American Heating & Supply Company, Rockford, Ill., has been incorporated with a capital stock of \$40,000. The incorporators are Fred K. Houston, Merritt H. Mott and Charles Franz. The company will engage in the manufacture of heating plants.

The Burlington Tool Committee

The system of purchasing machine tools, which has been adopted by the Chicago, Burlington & Quincy Railroad has invited a great deal of favorable comment among dealers and manufacturers. While it has been the custom of railroads and other large buyers to have committees which consider and recommend specifications or the purchase of machinery, the Burlington committee seems to have more power of initiative and has adopted a more progressive policy.

This committee made its appearance in the trade last fall in connection with purchases for new shops at Havelock, Neb. The committee visited all the Chicago dealers and made an extensive trip among the manufacturers soliciting demonstrations of machines and all the practical infor-

mation that could be obtained from the experts of the manufacturers. The results were evidently satisfactory to the executive management of the Burlington system, as the committee is continuing its work by carrying through on the same plan occasional purchases for other shops of the system.

It seems that for about 20 years the Burlington has had an "Association of Operating Officers," which holds regular meetings, the chief object of the association being to promote efficiency and to secure general discussion by all the operating officers of proposed improvements. The Tool Committee is a regular committee of this association. It has no power to make purchases for the company, but it recommends all purchases of machine tools, and it usually specifies two or more competing machines before actual purchase is authorized or bids invited.

This committee is composed of the most capable men for its work in the employ of the company. One member is the company's "superintendent of piecework," who travels over the system promoting piecework in all the company's shops, and at the same time keeping in touch with the progress of shop efficiency on other railroads and in commercial plants.

The committee has grown into an interesting piece of corporate machinery. It affords the executive management of the company a safe guide in appropriating money or authorizing improvements, and its successful record has given the progressive men who constitute the committee a degree of initiative that is unusual in railroad shop management. The individual shop foreman or superintendent often hesitates to recommend innovations or improvements, because a mistake in judgment would be a set back in his position with his company which would count more than credit for successful work. As a result of this peculiar phase of corporate psychology the foreman or superintendent is usually content to travel along in a rut, and when new machines are required he recommends those which have been used in the shop for 10 to 40 years, without profiting by the progress of the machine tool industry.

The shop payrolls of railroads in the United States amount to about \$250,000,000 annually, while reports show the expenditure of only \$8,000,000 to \$10,000,000 for shop equipment. There has been remarkable progress in the past 10 or 20 years in the efficiency of locomotives and train equipment, as well as in track and bridge construction, but the railroad shop has become a form of backwater in the stream of progress in railroad management.

The system adopted by the Chicago, Burlington & Quincy is apparently throwing light on this problem in railroad management. Recently the committee has disposed of a number of old machines, which have been replaced by new tools. Some that were found to have no commercial value in the market for used tools have been scrapped. These are unusual occurrences in the management of railroad shops. The committee has also shown a willingness to recommend the purchase of new tools that have never been used in railroad shops. When its members are out on an investigating trip and are entertained by a machine tool manufacturer or dealer they show a preference for water, while their strict attention to business has occasioned much comment.

Cincinnati

CINCINNATI, OHIO, February 14, 1911.

Machine tool builders report rather irregular conditions for the past few days. The inquiry is excellent, but not many actual orders are coming in. Lathes are more in demand than any other class of tools. Small dynamos and motors are good sellers and the demand for boilers holds up well. Makers of steam fittings and engineers' specialties are all busy, and, taking everything into consideration, the business situation, so far as manufacturers are concerned, shows a steady improvement. However, in judging conditions in most lines, a period of at least a month should be considered instead of a week. Foundrymen are feeling very much more encouraged. Second-hand machinery dealers are also doing a little better.

A. C. Harrison, W. M. Lockett and J. W. Muster, all of McLean, Ky., have incorporated the Calhoun Planing Mill Company.

The Fisher Auto Top Company, Norwalk, Ohio, has been incorporated, with \$10,000 capital stock, to manufacture automobile tops. The incorporators are William A. Fisher, L. M. Fisher, Lawrence Fisher, M. Fisher and R. E. Thiesen.

The Cahill Shoe Company, Cincinnati, whose factory was recently destroyed by fire, has acquired a building on Denman street, and will fit it up with modern machinery for the manufacture of shoes.

The New Cincinnati Shoe Co. has been organized.

THE MACHINERY MARKETS

special machinery parts and novelties, contemplates enlarging its plant.

For the purpose of manufacturing machinery for handling peat and its products, the Union Peat Company, Toledo, Ohio, has been incorporated with \$25,000 capital stock. The principal incorporators are T. B. Jarvis, O. J. Sigler and C. J. Scott.

The Hisey-Wolf Machine Tool Company, Cincinnati, has completed the installation of the machinery in its new plant. The demand for export trade for its drills and grinders is reported to be rapidly increasing.

The Griess-Pfeffer Tanning Company, Cincinnati, has purchased the property which it now occupies under lease in Chicago from the Grey, Clark & Engle tannery. The company will construct at once a modern tannery, representing an investment of \$200,000 in buildings.

There is an unconfirmed report that the Lockport Stamp Company, Lockport, N. Y., manufacturer of automobile accessories, will build a plant at Findlay, Ohio.

The Vanadium Steel Company has been incorporated at Morgantown, W. Va., with \$50,000 capital stock. The incorporators are Albert Loeb, John M. Gregg, William H. Brand, A. Mornisch, Leopold Sigwart, A. R. Price and John A. Purinton, all of Morgantown.

A creditors' meeting of the Cincinnati Punch & Shear Company has been called for February 17. C. J. McDiarmid, Blymyer Building, Cincinnati, is receiver.

The Producers Supply & Tool Company, Marietta, Ohio, has been incorporated, with \$30,000 capital stock, to deal in second-hand machinery and scrap material. The incorporators are E. W. Le Fever, M. Le Fever, Ike Ruby and David Ruby.

The Swope Garage & Machine Company, Washington Court House, Ohio, has been incorporated, with \$10,000 capital stock, to take over the automobile repair and machine shop of George B. Swope. Some extensions of the business are contemplated. George B. Swope, Elmer Jank and J. E. McLean are named among the incorporators.

The City Council of Canton, Ohio, is planning to purchase a gasoline engine to furnish power for the auxiliary water works and pumping station and for lighting the city auditorium.

The City Council of East Liverpool, Ohio, will expend \$175,000 for extending and improving water works system.

The National Metal Specialty Company, London, Ohio, recently incorporated, has been dissolved and its entire plant has been taken over by the Thomas & Armstrong Company, London, Ohio, an old established company. Extensive improvements are being made to the plant, including the erection of a large building for the manufacture of radiator shields, metal shingles, metal lockers and metal furniture. Machinery is being installed which will enable the company to manufacture everything made of sheet metal. The factory will be in charge of Harry C. Hames, one of the foremost sheet metal manufacturers in the United States.

At the regular foremen's session of the Continuation School, February 9, Fred. Knaft, of the Bradford Machine Tool Company, delivered an interesting address on Master Screw Cutting. Interest in the school is rapidly increasing, and the attendance at the last meeting numbered over 60 foremen and superintendents.

Philadelphia

PHILADELPHIA, PA., February 13, 1911.

Orders coming to merchants and manufacturers do not show any material improvement. Some little business is moving, but it is usually in the nature of the smaller propositions. In certain lines of special work, a more active demand is reported, and here and there a manufacturer is found who is pretty well supplied with work and is running full capacity. Generally speaking, however, builders report the demand as irregular, with plants operating on an unsatisfactory basis. There has been a little more inquiry for equipment coming from both the Pennsylvania and the Reading railroads and the trade feels that it will not be long until more activity from that class of buyers will develop, particularly in view of the fact that some roads have announced their intention in going ahead with extension work planned, but which has been held up for some time. The improved condition of the steel trade is also looked upon as a factor which will result in more active conditions and ultimately have an influence on machine tool buying. In a few instances an improvement in the demand for second-hand machinery is reported, but buying continues irregular and while some fairly good business is being figured on, there has been little actual improvement in sales. A moderate business in boilers and engines is reported, both in new and second-hand equipment; boilers have been the

most active, but there is little important business in engines pending.

The American Can Company, which now occupies a large building for manufacturing purposes at Twenty-first street and Washington avenue, has, it is stated, obtained an option on a portion of the old Neafe & Levy ship-building property at Beach, Palmer and Allen streets, which is to be used as a site for a large manufacturing plant. Details are not available, but it is said that estimates for the erection of two four-story buildings, to occupy a lot 115 x 340 ft., are being taken.

The contract for the new plant for the S. S. Wentzell Machine Company, at the corner of Fifth street and Parkside avenue, 100 x 150 ft. (one story), has been given to the Philip Haibach Construction Company, which will begin work at an early date. No important additions to the machinery equipment of the plant will be required, and we are advised that the power plant for the new shop has already been provided for.

Fire destroyed the blacksmith shop of the Tindel-Morris Company, Eddystone, Pa., on February 8. While the building was destroyed, temporary quarters were provided in one of its other departments, pending the re-building of the burned shop, which will be immediately begun. The fire will in no way interfere with the company's business. An increased demand is experienced for forging work, but for the line of special tools the inquiry still remains rather quiet.

A company has been formed at Lewes, Del., with a capital stock of \$200,000, which will erect a plant for the manufacture of fish oil, &c. The officers of the company are: president, William G. Lofland; vice-presidents, D. W. Burbage and W. H. Bookhammer; treasurer, John R. Baylis, and secretary, James F. Lark. Work on the plant is expected to be started at an early date.

The Philadelphia Roll & Machine Company, reports the receipt of moderate orders for sand and chilled cast charcoal iron rolls from steel iron and rubber mills, but notes that buyers are not yet disposed to make purchases for extended requirements. Recent orders have hardly been sufficient to keep the plant operating full capacity, but from inquiries in hand a better demand in the near future is anticipated.

The city of Chester, Pa., will receive bids until February 20 for the construction of a pier at the foot of Market street, also for the construction of a bulkhead at the foot of Edgemont avenue, that city. Plans, specifications and further information may be obtained at the office of the City Engineer, Chester, Pa.

City permits have been taken out for the erection of a one-story tank house, 42 x 53 ft., with a wing, 32 x 38 ft., a storage building and garage, 46 x 174 ft., and a dryer building, 54 x 62 ft., to be built at Forty-ninth street and the Schuylkill river, for the Penn Reduction Company.

A slight fire damaging one of the departments of the Duplex Metals Company's plant, Chester, Pa., on February 4, is reported. There was no important machinery damage, and the fire will in no way affect the production or deliveries of the company's product.

Dienelt & Eisenhardt, Inc., have recently booked very satisfactory orders for special equipment. One order for a very large machine for oil cloth printing work has been received from New England parties. The demand for dead stroke and special bracket hammers has improved materially as has also that for hydraulic jacks, with orders for both these lines coming out more freely. Sufficient work is now on the order books of this concern to keep its plant fully occupied for some four or five months.

The Dallastown Furniture Company, Dallastown, Pa., has been incorporated with a capital of \$50,000, and will erect a manufacturing plant. A. F. Fix is president; Charles Kohler, vice-president; J. H. Myers, secretary; John C. Heckert, treasurer. A committee consisting of John C. Heckert, Charles Kohler and L. Tarbet, of Dallastown, and Flavel Seitz of Glen Rock, Pa., will have charge of purchasing the equipment, comprising boilers, engines, electric light and power plant, wood working machinery, dry house kilns, general mill fixtures, &c., incident to the manufacture of furniture.

The Temple Malleable Iron & Steel Company has recently been formed and has taken over the plant of the Temple Ornamental & Structural Iron Company, Temple, Pa. Additional buildings have been erected and necessary equipment for the manufacture of malleable iron castings has been installed. The present capacity of the plant will be about 15 tons a day and the new company expects to get in operation on February 27. M. Schwendner is president and Edwin C. Donaghy, secretary-treasurer of the company, which has its Philadelphia office at 421 Arcade Building.

Bids will be received by the Borough Clerk, Coraopolis, Pa., until March 1 for furnishing one 1,500,000-gal. triplex pump; one 150-hp. gas engine; two 225-hp. gas engines,

THE MACHINERY MARKETS

direct connected to 175-k.v.a., 2300-volt, 60-cycle, 3-phase alternating current generator; one 75-hp. gas engine, direct connected to 50 k.v.a.; two 175-k.v.a., 2300-volt, 60-cycle, 3-phase alternating current generator, complete with excitors; one 50-k.v.a. and one 5-panel switchboard.

Toronto

TORONTO, February 11, 1911.

Business appears to be more active than it was a year ago, while the outlook is regarded as very satisfactory, and by some dealers and manufacturers is considered to be exceedingly bright. A noteworthy phase is the establishing of warehouses in the West. This is the sequel to the excursion made through the West last summer by the Canadian Manufacturers' Association. The lesson of that trip was that to get the largest benefit of the expanding demand there and to cope with American competition, it is necessary to have warehouses at each of the important centers for the carrying and speedy distributing of stocks. This building of Western warehouses by Eastern manufacturers is a distinctive and outstanding feature of present day trade adaptation. While it is the general opinion that Canadian Western trade will this year be greater than ever, it is also realized that the struggle for it will be keener. The plans of many eastern Canada manufacturers in respect to the Western trade have been sharply changed since the reciprocity agreement was announced. A more pushing campaign will be carried on for the sale of Canadian articles. There is a feeling that a 50 per cent. preference on British goods will develop a more spirited competition on the part of manufacturers in the United Kingdom. Assuredly the saturating point of the Western demand will be higher up the scale than it was last year.

The Saskatchewan Flour Mills, Ltd., Moose Jaw, Alberta, has decided to increase its flour manufacturing capacity from its present limit of 1600 bbl. per day to one of 2000 bbl., and to build an oatmeal mill to turn out 600 bbl. per day.

Application has been made to the Dominion Government by the City Council of Edmonton, Alberta, for power grants at Grand Rapids, on the Athabasca River. It is intended to build works for the development of possibly 60,000 hp. by the municipality.

J. Larne McGibbon, president of the Consolidated Rubber Company of Canada, has acquired control of Ames-Holden, Ltd., and the James McCready Company, large manufacturers of boots and shoes in Montreal. Four million dollars is named as the sum required to bring the two companies into this merger. J. L. McGibbon says that he will introduce many new methods of manufacture into the shoe business. Two new factories are to be built. The policy followed by the New England makers will be adopted.

Directors of the Western Steel Corporation are reported by British Columbia newspapers as saying that they have taken up their option for the \$500,000 site selected for a steel plant and town site on the southern bank of the Fraser River. It is added that iron ore and coal lands on Graham Island have also been acquired.

The Canadian Pacific Railway Company has let a contract for the construction of a dam on the Bow River at Bassano, Alberta. It is to be used as part of the company's irrigation works. It is stated that 2500 men will be employed on the dam. Janse, Macdonell & Co. have the contract for the excavation work, and Walker, Fyshe & Co. for the concrete work.

The Canadian Pacific Railway Company has plans for the building of a large roundhouse in London, Ont., in the spring. The machinery to be installed will be worked by power obtained from the city's distribution system.

The City Council of Calgary, Alberta, has decided to spend \$38,520 on a new fire station, \$13,000 for an aerial motor truck, \$10,000 for a motor engine and \$13,000 on other fire equipment.

Mining operations are expected to begin on a large scale in the spring in the Fort George district of British Columbia.

Many factories in Hamilton and Brantford, Ont., were temporarily incommoded by trouble at the power house of the Cataract Company's power house at De Cew Falls this week.

A large electrical equipment house in England, which got many of the contracts for motor installations in connection with the hydroelectric system of Ontario, is reported to be seriously considering the establishing of a branch plant in London, Ont.

The Cotton Print Company, a new corporation with a capital stock of \$800,000, is to build a large plant at St. Timothy, Montreal. It is said that the machinery is already ordered.

At the annual meeting of the Northern Navigation Company, Toronto, it was announced that another large passenger vessel will be added to the fleet.

One hundred cars of iron pipe for the carrying of na-

tural gas from Merlin, Ont., to London, Ont., are scattered along the line of railroad between these two points. The work of laying this pipe will be begun as soon as the frost is out of the ground.

Two of the three big dams now being constructed by the Dominion Government for conservation purposes on the Ottawa River will be completed this summer. These are the ones at the Kippewa and Temiskaming lakes. The one at Quinze Lake will be completed next winter. After their regulating influence is established water power and hydro-electric power users on the Ottawa will no longer be troubled by low water.

The Board of Control, Hamilton, Ont., opened the tenders for supplies on February 9 and awarded the contracts, with considerable partiality to local manufacturers. The Gartshore-Thompson Company's tender for cast iron pipe was \$3 a ton higher than that of the lowest tender of an American company, though carrying charges, &c., would reduce this difference to \$1 a ton. The Gartshore-Thompson Company got the contract. The Toronto & Hamilton Sewer Pipe Company has not yet got the contract against an American company that bid lower, but the chances seemed to be in its favor up to the time it was decided to leave the question to be reported on by the City Engineer and one of the Controllers. The Reinforced Concrete Company, Jackson, Mich., got the contract for the 78-in. concrete pipe at \$7.22 per foot. The Hamilton Foundry Company got the contract for castings, at \$1.95 per 100 lb. The Canada Cement Company got the cement contract for \$1.48 per barrel.

The Fire & Light Committee of the City Council of Guelph, Ont., has gone to Lansing, Mich., and other United States points for the purpose of deciding whether motor engines and other suggested fire plant equipment shall be purchased.

The Winnipeg Electric Railway Company has awarded to the Canadian General Electric Company, Petersburg, Ont., the contract for the plant of its new power station. The installation is to be of four units of 3000 kw. each.

Twenty-seven carloads of farm machinery are to be shipped over the Temiskaming & Northern Ontario Railway into the clay belt of Northern Ontario in the spring.

Much is heard these days of alleged statements of owners of American manufacturing plants in Canada to the effect that, had they foreseen the reciprocity agreement, they would not have located on this side of the boundary line.

Canadian Motors, Ltd. Galt, Ont., incorporated with \$250,000 capital stock, advises that it is occupying temporary quarters at present, but that it will erect suitable factory buildings during the coming summer for the manufacture of two lines of cars, including a two passenger roadster and a five passenger tourist.

New England

BOSTON, MASS., February 14, 1911.

General conditions continue to develop signs of improvement and tangible evidences of better business are being felt in many lines. The supply trade is good. One of the dealers found January within a few per cent. of a record. The woolen industry is reviving gradually after a long period of slackness. The railroad earnings of the New York, New Haven & Hartford and the Boston & Maine systems, which serve a very large percentage of the New England territory, indicate a considerable increase in goods hauled. One of the best features of the situation is the practically unanimous opinion that improvement will be felt from now on, most observers basing their judgment or personal experiences in their own lines of trade. The foundries are somewhat more active than they have been.

The S. A. Woods Machine Company, Boston, Mass., manufacturer of wood planing machines, will build a new power plant, from plans by Charles T. Main, Boston. A 200-kw. Rice & Sargent engine has been ordered from the Providence Engineering Works, Providence, R. I. The remaining equipment has not been purchased, including two boilers and a lighting plant. The building will be located on Old Colony avenue, adjacent to the present shops. Plans have been taken in securing a handsome architectural design, with a tower clock as a feature. In fact the power house, according to the general plans, will constitute the original unit of a group of new buildings, corresponding with it in design. The building will be large enough to permit of a duplicate power set when the need of it shall be reached.

The new round house of the New York, New Haven & Hartford Railroad at New Haven, Conn., will contain a large machine shop, for which between \$20,000 and \$30,000 worth of machine tools will be required late in the present year.

The Westfield Foundry & Valve Company, Westfield, Mass., will erect a foundry, 60 x 70 ft., of reinforced concrete, for the manufacture of gray iron and brass castings and valves. The company will act as designer and maker

THE MACHINERY MARKETS

of special values. C. O. Churchill is the president and secretary, L. Holst, vice-president, and R. H. White, treasurer. The capital stock is \$55,000. The equipment has been purchased.

The business of C. L. Barker, Norwalk, Conn., will hereafter be operated in two departments, one for the manufacture of gas engines, the other for the building of the Murray motor truck. Plans are being made for an addition to the plant, consisting of a building 30 x 140 ft. The motor truck is the design of Arthur T. Murray, who for six years has been with the mechanical and drafting departments of the Locomobile and Lozier companies.

The business of the Porcupine Boiler Company, Bridgeport, Conn., has been incorporated in Connecticut with \$23,000 capital stock, the incorporators being John K. Williamson, Arthur M. Marsh and David S. Day, all of Bridgeport. The company manufactures horizontal tubular boilers, Williamson's combination water arch and feed water heater, stacks, tanks and general iron work. The business was formerly conducted as the Hazelton Boiler Company, Rutherford, N. J., and removed in 1903 to Bridgeport.

A. E. Greene, recently with the New Departure Mfg. Company, Bristol, Conn., as superintendent of construction and motor power, has opened an office at 60 Prospect street, Hartford, Conn., as an engineer, with factory building and equipment as his specialty.

The Navy Department has given the Lake Torpedo Boat Company permission to build the \$450,000 submarine cruiser for which the company has the contract, at Bridgeport, Conn., where the facilities of the plant have now been declared satisfactory by a government board. The works have been improved greatly of late, and the expectation is that their development will proceed rapidly under the new conditions.

The New York, New Haven & Hartford Railroad will erect a union station at New Haven, Conn., to cost \$1,500,000. The requirements for various kinds of power and other equipment will be large.

The Auto Safety Crank Company, Holyoke, Mass., has been incorporated, with capital stock of \$10,000, and will manufacture automobile specialties at Holyoke. J. L. Beck is the president and George W. Parker treasurer, the third director being J. L. Perkins. The company has not completed its manufacturing plans.

The Trumbull Electric Mfg. Company, Plainville, Conn., states that the machinery requirements for the large factory additions, contracts for which have been placed, have not been laid out, and that it will be some time before the list is ready. The company manufactures electrical supplies. It has voted to increase its capital stock from \$100,125 to \$500,000. The board of directors has been increased from three to seven, the new members being Andrew J. Sloper and J. E. Cooper, New Britain, and Carl W. Jones and Stanley S. Gwillim, Plainville, the old directors being John H. Trumbull, the president; Frank T. Wheeler, vice-president, and Henry Trumbull, secretary and treasurer.

The United States Motors Company has decided to abandon the Alden Sampson plant at Pittsfield, Mass., and will concentrate both the light and the heavy truck departments at Detroit, Mich., where the machinery of the Pittsfield works is being moved. The announcement had been made that the heavy truck business established by the Sampson Company would be made the nucleus of this department, and would be developed at Pittsfield, but the company found it difficult to secure skilled men in that place, and the site of the shops did not permit of extensive enlargement.

The Housatonic Power Company will triple the producing capacity of its plant at South Norwalk, Conn., by the installation of water gas apparatus and will extend its mains to New Canaan, Conn.

The Boston Machinery Company, Boston, Mass., has been incorporated with a Massachusetts charter, and authorized capital stock of \$100,000. The incorporators are Richard J. Cotter, Judson A. Crane and Edward A. Taft, Jr., 84 State street. The company owns patents covering textile machinery, which will be the product. The locations of the works has not been decided.

The Boston Industrial Development Company, which is closely associated with the Boston Chamber of Commerce, has petitioned the Massachusetts legislature for a charter, the purpose being to assist financially new and promising industries, and those which, already established, are in need of cash assistance in order to develop normally. The Chamber of Commerce believes that a great good can be accomplished in this manner by establishing manufacturing concerns within the limits of the city, especially such concerns as can advantageously conduct their business in so-called loft properties. The idea is to make \$25,000 practically the outside limit of assistance to individual concerns. The subscribers to the movement as members of the corporation will act to guarantee credits up to some \$500,000. Similar organizations have worked with great benefits to other American communities.

The Bridgeport Metal Treating Company, Bridgeport, Conn., has been incorporated under Connecticut laws with \$10,000 capital stock. W. B. Lasher is the president, W. T. Gibson, vice-president, and H. S. Brown, secretary and treasurer. The factory will be at 125 Stratford avenue. The work will consist of case hardening, heat treating and annealing, a specialty being made of high speed and tool steel hardening. The company will also have facilities for light manufacturing.

The Grand Trunk Railroad announces that the building of the extension of its allied line, the Vermont Central, from Palmer, Mass., to Providence, R. I., will begin in the spring, with the intention of having this new and important link in the system in full operation within two years. The last obstacle to the plan has been removed by the authorization by the Vermont legislature of the building of a section of railroad between Brattleboro and Windsor, Vt., a distance which the Vermont Central now traverses on tracks of the Boston & Maine.

The Standard Machinery Company, Providence, R. I., has brought out a combination press installation consisting of three presses mounted on one bed, the outboard machines being adjustable for center distances. The purpose is to handle long work which cannot be taken care of in a gang press.

The Arnold Print Works, North Adams, Mass., is planning a new weave shed containing 43,000 sq. ft. of floor space and an addition to the picker room. The Farr Alpaca Company, Holyoke, Mass., proposes to extend its weave shed, to double its capacity.

The Everett Mills, Lawrence, Mass., has issued a list of 17 machines, orders for which will be placed as soon as possible. James I. Milliken will purchase the equipment. The list follows:

- One 28 in. upright drill with back gears, positive feed and automatic stop, also wheel feed, sliding head and quick return.
- One engine lathe, 26 in. swing, bed long enough to allow 20 ft. between centers, compound rest, taper attachment, power cross feed, traveling rest for shafting turning, hollow spindle, center rests, &c.
- One 30 x 30 in. by 10 ft. open side planer, with cross and side feed, modern in all ways.
- One pipe machine to cut from 1 to 6 in., with all modern attachments, left-hand, dies 1 to 1½ in. Or two machines—one 1 to 2 in., and one 1½ to 6 in.
- One 24-in. engine lathe, 12-ft. bed, hollow spindle, taper attachment, compound tool rest, back rest, face plates, &c.
- One 16-in. sawer, for heavy duty, back geared, furnished with vise, outer support for table opening under ram to admit shafting to 3 in.
- One 20-in. engine lathe, with compound tool rest and back rest, hollow spindle.
- One combination saw table with cutting off and splitting saw, adjustable table (and so that molding tools may be used, if practicable).
- One 36-in. band saw, with tilting table so any angle may be cut.
- One turret bolt cutter, to cut from ⅜ to 1½ in., with adjustable dies.
- One 22-in. upright drill with back gears, positive feed and automatic stop, quick return, sliding head, &c.
- One 28 x 48 or 28 x 57 in. swing gap engine lathe, with 10 ft. bed, large and small face plates, 48-in. independent jaw, chuck, compound tool rest, power cross feed, center rest, hollow spindle.
- One modern traverse drill, or boring machine with power feed and of medium size for general shop work, bed about 12 ft. long.
- Drill, reamers and arbors.
- One modern gear cutter for general shop use.
- One wood boring machine.
- One mortising machine for wood.

Cleveland

CLEVELAND, OHIO, February 14, 1911.

The feature of the local machinery market the past week was a marked improvement in the volume of inquiries. While all of these are for small lots of tools, in the aggregate they amount to considerable prospective business. They have given the market a better tone and dealers are confident that the market will show considerable improvement from now on, although buyers as yet are showing some hesitation about placing orders. While actual orders during the week were not large the market showed some improvement over the previous week. Orders were mostly for single tools and small lots in small and medium sizes. Business with many manufacturers in metal working lines shows some improvement and this is having a stimulating effect on the market, bringing out inquiries from buyers who have been holding off until the business outlook was more favorable. Local machine tool builders also report an improvement in inquiries.

In heavy handling machinery inquiries are more plentiful and some business that has been pending will probably be placed shortly. The demand for water wheels is fairly active. Orders for mining machinery show an improvement. The foundry trade is still somewhat quiet, but the demand for light gray castings shows an improvement.

The Pennsylvania Railroad has received proposals for ore handling machinery to be erected on its new dock in Cleveland, and it is expected that the contract will be placed

THE MACHINERY MARKETS

shortly. A large amount of preliminary work in the way of filling in the west breakwater, where the dock will be located, has already been done, and the work of erecting a concrete dock will be started early in the spring, this contract having been let to the Great Lakes Dredge & Dock Company. It is the intention to start with a capacity of 5,000,000 tons of ore per annum, room being provided for gradually increasing this to 8,000,000 tons. It is planned to have it ready for operation at the opening of navigation in 1912.

The Bingham Mfg. Company, Cleveland, recently incorporated, with a capital stock of \$25,000, has established a plant at 227 Prospect avenue, N. W., for the manufacture of carbureters, spark plugs, gasoline strainers, compensators and other automobile accessories. All of the machinery equipment needed for the present has been installed. H. Bingham is treasurer, secretary and manager.

The Superintendents' & Foremen's Club of Cleveland will hold a midwinter carnival at Trostler's Academy, East Fifty-fifth street, March 1. A vaudeville entertainment, dancing and other amusements and refreshments will be provided.

The annual meeting and banquet of the Cleveland branch of the National Metal Trades Association will be held at the Hollenden Hotel March 2. Speeches will be made by Hon. W. T. Smith of Marion, Ohio, a member of the Ohio Legislature, on "Legislation," and by Dr. W. A. Knowlton of Cleveland and others.

The Wise Furnace Company, Akron, Ohio, has purchased a three-acre building site on which it will erect an up-to-date manufacturing plant, plans for which are under way. The plant will include a factory building, machine shop and warehouse.

The Lewis Electric Welding & Mfg. Company, Toledo, Ohio, has been incorporated with a capital stock of \$10,000 to manufacture mechanical and electrical appliances. The incorporators are G. L. Lewis, Frank W. Otis, Ewald Preus, H. W. Fraser and E. J. Marshall.

With a capital stock of \$50,000 the Bremen Mfg. Company, Bremen, Ohio, has been incorporated to manufacture hot air pumping engines. The incorporators are A. F. Turner, J. F. Purvis, H. M. Shelhamer, P. D. Turner and H. E. Young.

The Burt Mfg. Company, Akron, Ohio, has received an order from the Charlton Mills, Fall River, Mass., for 30-in. double damper ventilators designed especially for weave shed purposes. The ventilators will be made of copper. This company is now figuring on some other large contracts.

The Board of Control, Canton, Ohio, has awarded a contract for a 2,000,000-gal. triplex pump for the new auxiliary pumping station to the Deane Steam Pump Company of Indianapolis at a cost of \$4020.

The Arch City Foundry Company, Columbus, Ohio, has been incorporated with a capital stock of \$10,000 by W. H. Jones, R. W. McCoy, N. F. Ustick, L. V. Colbert and R. E. Pfeiffer.

The Warner Mfg. Company, Toledo, Ohio, recently incorporated with a capital stock of \$500,000, will shortly announce plans for a new plant. The company, which makes gears and other automobile parts, now occupies one of the buildings of the Willys-Overland plant.

The Wadsworth Core Machine & Equipment Company, organized by George H. Wadsworth, recently superintendent of the Falls Clutch & Machinery Company, Cuyahoga Falls, Ohio, has been incorporated with a capital stock of \$15,000. The company will start a plant in Akron, Ohio, about March 1. No new equipment will be required.

Indianapolis

INDIANAPOLIS, IND., February 14, 1911.

The Chandler-Taylor Company of this city, manufacturer of boilers and engines, has received an order for a power plant from Venezuela.

The American Die Castings Company, Indianapolis, has increased its capital stock from \$3000 to \$36,000.

The Royse Electric Company, Indianapolis, has changed its name to the Indianapolis Electric Supply Company and has increased its capital stock from \$60,000 to \$70,000.

The Tiebert Gas Engine Company, Butler, Ind., has increased its capital stock from \$20,000 to \$40,000.

The Crescent Electrical & Mfg. Company, Valparaiso, Ind., has changed its name to the Crescent Company. The company has issued \$20,000 of preferred stock.

The Hoosier Account Register Company, Noblesville, Ind., has been incorporated, with \$40,000 capital stock, to manufacture cash registers and similar articles. The incorporators are John C. Jones, J. C. Craig and A. W. Truitt.

The merchants of Princeton, Ind., have decided to join the Commercial Club of the city in special efforts to induce the location there of small factories, giving them sites, but not bonuses.

The Nye Gas Machine Company, Laporte, Ind., has been incorporated, with \$75,000 capital stock, to manufacture gas machines. The directors are John R. Nye, H. B. Johnston and C. F. Peterson.

The Kells Foundry & Machine Company, East Gary, Ind., has been incorporated, with \$40,000 capital stock, to do a foundry and machine business. The directors are George Earle, William Earle and C. W. Barnes.

The Danziger Furniture Company, Shelbyville, Ind., has been incorporated, with \$30,000 capital stock, to manufacture furniture. The directors are Gustav Danziger, A. E. Spiegel and C. A. Spiegel. The last named is president.

The O'Neill Bottle Machine Company, Terre Haute, Ind., has been incorporated, with \$10,000 capital stock, to manufacture bottle-making machinery. The directors are F. O'Neill, A. L. Pfau and I. W. Richardson.

The S. G. Taylor Chain Company, the principal industry of Maxwell, Ind., is being moved to Hammond, Ind.

The property of the Union Gas Light & Fuel Company at Anderson, Ind., has been sold at receiver's sale to C. W. Hooven, for \$200,000. The name has been changed to the Anderson Gas Company. With \$200,000 capital stock, and with Clement W. Hooven, Joseph H. Millsbaugh and H. L. Millsbaugh as directors.

The Kelly Foundry Company, Elkhart, Ind., has been incorporated, with \$10,000 capital stock, to do a general foundry and machine business. The directors are A. Sorge, Jr., Edward Kelly and John Kelly.

The Braden Mfg. Company, Terre Haute, Ind., has purchased a site on which it will erect a new factory building, 60 x 275 ft., two stories, early in the spring. W. E. Williams, manager of the company, has just been granted a patent for a comb cover design for corrugated roofs. The company is also preparing to manufacture, in addition to the products already provided for, stock tanks, steel ceiling and other material of like nature. The plant will be equipped with new machinery throughout. It is the intention of the company to install a roll corrugating machine and a drop press for steel ceiling work.

St. Louis

ST. LOUIS, February 13, 1911.

There seems to be unmistakable signs of better business. Concerns that have not been buying recently are now coming into the market to some extent. The hope is expressed generally that the improvement may be along conservative lines and anything in the nature of a boom avoided. Most dealers would rather see a more moderate movement, if steady, as better results can be secured per effort expended at such times.

The Aluminum Company of America is making some rather extensive additions to its plant in East St. Louis.

Work is rapidly progressing on the drainage proposition designed to protect East St. Louis against ravages by river overflows. Several big steam ditch diggers are constantly at work.

The Landis Machine Company, maker of harness and shoe sewing machines, has its large plant crowded with work and finds it very difficult to meet its orders with satisfactory deliveries.

The C. Hagar & Gay Hinge Mfg. Company, St. Louis, finds business good and the outlook satisfactory. About six months ago the new addition to its plant, a two-story brick building, was completed, which was rendered necessary by the expansion in its business.

The St. Joseph Terminal Company, St. Joseph, has let the contract for a large ice house to be built at Lake Contrary.

The Fulton Iron Works, St. Louis, Mo., has sold the property on which it is now located to the Chicago, Burlington & Quincy Railroad and will move to a new site of about 8 acres on the outskirts of the city, where it will erect a plant involving an investment of about \$350,000. The new plant will include a machine shop, 400 ft. long with 75 ft. center span and two bays of 45 ft. each; a foundry, 250 ft. long with 75 ft. and a 40-ft. bay; necessary power house, pattern shop, storage, &c. Plans are now being prepared and the company expects to close contracts within the next 30 days. The plant when completed will contain the most modern equipment, all of which will be electrically driven.

The Star Bucket Pump Company, St. Louis, is having plans prepared for a new factory building 64 x 125 ft., three stories and basement.

The Anheuser-Busch Brewing Association, St. Louis, Mo., has plans prepared for a wagon factory, 60 x 163 ft., four stories.

The plant of the Henry Quellmalz Lumber & Mfg. Company, on Second street, St. Louis, was damaged by fire February 9 to the extent of \$10,000. The loss is fully covered by insurance.

The Chemical Floor & Tile Company of Missouri has

THE MACHINERY MARKETS

been incorporated with a capital stock of \$150,000. The incorporators are Daniel F. Rose of Little Rock, Ark.; Edward P. Wehms, Daniel F. Rose, Jr., and others. The company will engage in the manufacture and installation of floors.

The Steinbauer Truck & Motor Car Company, St. Louis, has been incorporated with a capital stock of \$250,000. The incorporators are Peter P. Probst, William Fraeckenschmidt, Alonzo Dryer, John W. Wright and others. The company will engage in the manufacture of vehicles, automobiles, &c.

The Goss-Acrey Calculator Company of St. Louis has been incorporated with a capital stock of \$100,000. The incorporators are W. B. Acrey, B. L. Acrey, George W. Goss and others. The company will engage in the manufacture of calculating machines.

The Automatic Register Company, Dover, Del., which recently purchased all patents, machinery, stock and other assets of the American Fare Register Company of St. Louis, has secured a long term lease upon the first floor of the Metropolitan Building, Fifth and Missouri avenues, East St. Louis, Ill., and has equipped its plant with the latest improved machinery. This company owns several patents on certain automatic passenger recorders which it is manufacturing for the various railroad companies. The company has a capital stock of \$1,000,000. Adolphus D. Branham of Virginia; Judge William P. Launtz, city attorney for East St. Louis, Ill.; Paul W. Abt, vice-president Illinois State Trust Company, East St. Louis, and Ernest Lane, Springfield, Ill., own the controlling interest.

Detroit

DETROIT, MICH., February 14, 1911.

No one city in the United States profits more from the several automobile shows than Detroit. Practically every make of motor cars manufactured in this city is represented at each exhibition, and the thousands of dollars' worth of orders resultant upon each show practically means the life of the concerns. The manufacturers of the commercial cars profited wonderfully from the recent Chicago show. Each concern has booked sufficient orders to practically run the plant for the balance of the season. While the commercial cars were well treated at the New York show, they did not make anywhere near the record they attained at the Chicago show. During the past week, two new automobile companies joined the ranks of this city's long list of motor car manufacturers, which goes to show that no slump is anticipated in the prosperous market conditions.

Details were arranged this week for the organization of a new company with a paid up capital stock of \$12,000, to be known as the Collapsible Shipping Case Company. The company is formed to sell and manufacture a knockdown shipping case, adaptable to a variety of uses, which is the invention of Martin P. Connolly of Wayne.

Bay City, Mich., will vote on a \$600,000 bond issue to defray the expenses of the construction of a modern water works plant. The Charter Revision Committee has recommended that the question be voted upon at the spring election.

A business deal of prime importance to the little city of Union City, Mich., is the consummation of the Union City Mills by the firm of Randall Brothers. The new company will at once expend \$10,000 in improving the water power and buying new machinery for custom and flour manufacturing.

A preliminary organization, with a capital stock of \$100,000, has been effected at Traverse City, Mich., for the manufacture of aeroplane engines. An engine, claimed as absolutely reliable by its inventor, a local man, will be the product of the company.

A new steel ice breaker for the Straits of Mackinac, intended to replace the old Ste. Marie, will shortly be ordered, according to advises from St. Ignace, Mich. The new vessel will be 125 ft. longer than the old boat, and is to be designed after the Baltic service boats of the Russian Government.

In line with many improvements which have been made by the Michigan United Railways Company during the last few months, it is now announced that the company is considering the advisability of installing its own power plants. Engineers are at present making the necessary observations.

The Detroit Wheel Company, with a capital stock of \$1,000,000, was incorporated in Lansing, Mich., this week. The company will manufacture a new spring tire wheel, designed by the inventor, Charles R. Chisholm, to replace the pneumatic tires. The incorporators are planning the construction of a large plant.

The King Motor Car Company, composed of principally Detroit and Cleveland capital, is the name of a new automobile concern of this city. The company has a capital stock of \$500,000 and will manufacture a 30-hp. car that will have only about 450 parts. The average automobile has between 1500 and 1600 parts.

The Great Western Smelting & Refining Company, Detroit, Mich., which suffered severely in the fire that destroyed an eight-story building at Woodbridge and Bates street last week, has opened new office and warehouse quarters at 12 Atwater street.

The Bolton Automobile Company, Saginaw, Mich., has filed articles of incorporation. The company will operate a garage, salesroom and repair shop, installing the most modern machines and garage conveniences.

The B. F. Freeland & Sons tank factory, at Sturgis, Mich., was totally destroyed by fire on February 7. The loss will amount to nearly \$50,000, with about \$11,000 insurance. Another plant will be constructed immediately.

The Muskegon Boiler Works, Muskegon, Mich., is giving indications of great expansion. It recently sent a crew to Pearson, Mex., to erect a plant for the Madeira Company, while another crew has been sent to Big River, Saskatchewan, Canada, to erect a complete boiler equipment for the Big River Lumber Company.

The National Window Weight Company, Detroit, has incorporated with a capital stock of \$30,000.

By the installation of additional machinery the Northern Michigan Brick & Tile Company, Reave, Mich., is preparing to largely increase the capacity of its plant.

The Hastings Motor Shaft Company, Hastings, Mich., has increased its capital stock from \$30,000 to \$50,000. The increase is primarily for the purchase of new machinery, the present plant being inadequate for their rapid growth.

Charles J. Stroebel and Stanley Vaughan, both of Toledo, have picked Detroit as the location of the plant of the International Aviation Company. The concern has a capital stock of \$100,000 and plans to erect the factory near Grosse Pointe, Mich.

The Chief Motor Car Company is the latest automobile concern for Detroit. The company will manufacture an eight-cylinder car, with a detachable body, which can be used for both pleasure and commercial purposes.

The Gray Hawley Mfg. Company, Detroit, has purchased a new factory site on West Jefferson avenue, 55 x 200 ft. Ground has been broken for a two-story factory and office building, to cost in the neighborhood of \$25,000. Its product is brass specialties for motor cars and motor boats.

President Homer Warren of the Warren Motor Car Company, Detroit, announces that work will soon be begun on a second new factory building for the company. The building will duplicate the present one.

Articles of incorporation have been forwarded to Lansing by the Detroit Foundry & Mfg. Company. The company has a capital stock of \$50,000, and will manufacture brass and aluminum castings.

The Auto Parts Mfg. Company, Detroit, Mich., has increased its capital stock from \$100,000 to \$250,000, and has purchased the entire plant formerly occupied by the C. D. Widman Company, which gives it an increase of approximately 64,000 sq. ft. of floor space, and enough land to provide for such buildings as it may desire to erect.

The Battjes Fuel & Building Material Company, Grand Rapids, Mich., is constructing a foundation for the erection of a large gravel washing and screening plant at Lamar, Mich., where it owns extensive gravel property. The gravel will be handled from the pit by a steam shovel and from a hopper will drop upon a 24-in. belt conveyor to be hoisted to the top of a 60-ft. tower. From the belt the gravel will drop to the screens, where it will be washed by a stream of water from a pump, with capacity for 300 gal. per minute. The gravel, after lodging in four compartments, according to grade, will be loaded on cars or wagons by opening chutes in the sides. The stones will be carried by belt conveyor back to the starting place and hoisted to a crusher for grinding, after which they will be graded like the gravel. Plans for the plant are being prepared by J. C. Buckbee & Co., Chicago.

The Michigan Pressed Steel Company, Detroit, Mich., which a few weeks ago moved into its new plant in that city from Ypsilanti, is contemplating further additions and extensions in the spring. The company manufactures sheet metal parts for agricultural machinery and implements. The first new building will be a warehouse; later in the year a shop will be added.

Milwaukee and the Northwest

The American Grinder Mfg. Company, Milwaukee, Wis., has increased its capital stock from \$5000 to \$10,000.

The Nortmann-Duffke Foundry Company, Milwaukee, has completed an addition to its plant and is now doing a general jobbing business in perforated metals in conjunction with its pressed steel and foundry business. The company has all the machinery needed at present, but will be in the market in the near future for additional perforating machines and a 60-in. shear for one-fourth in. metal.

The United States Glue Company, Milwaukee, has under

THE MACHINERY MARKETS

construction a cook house and two or three smaller buildings, of mill construction.

The I. B. Rowell Company, Menominee Falls, Wis., contemplates the erection of additions to its plant in the spring, details of which have not been decided upon.

The American Seating Company, Racine, Wis., advises that the matter of erecting new buildings and improvements for the coming year is held in abeyance pending a report from the executive committee.

A company has been incorporated at Merrill, Wis., with \$75,000 capital stock, for the purpose of establishing a veneer factory, work upon which will be commenced at once. Details of equipment to be purchased have not been decided upon. The officers of the company are: L. G. Leidiger, president; F. W. Olhoff, vice-president; W. A. Runge, secretary and treasurer.

The Gould Mfg. Company, Oshkosh, Wis., has increased its capital stock from \$100,000 to \$200,000.

Bonds have been voted by Stoughton, Wis., to improve the municipal light and power system.

The Schmit Brothers Trunk Company, Oshkosh, Wis., is considering the construction of a dry kiln, 20 x 40 ft., of wood and iron sheeting construction, with concrete foundation.

The Manitowoc Boiler Works Company, Manitowoc, Wis., has under construction an addition to its plant, to be used for housing its lap welding machines.

The S. Freeman & Sons Mfg. Company, Racine, Wis., is contemplating the erection of an addition to its foundry, details of which have not been determined upon.

The Rhinelander Refrigerator Company, Rhinelander, Wis., is completing a fireproof addition, 70 x 150 ft., three stories and basement, and is in the market for fireproof sash frames and a sprinkling system.

The Flambeau Paper Company, Park Falls, Wis., will install a new paper machine and a new battery of boilers. With these changes the company's mill will be operated entirely by steam, thus enabling it to use its water power for grinding pulp.

The Twin Falls Land Company, D. W. Mead, consulting engineer, Madison, Wis., is building a dam on the Menominee River in the vicinity of Iron Mountain, with the intention of installing a hydroelectric power plant.

The Holbrook-Armstrong Iron Company, Racine, Wis., has increased its capital stock from \$150,000 to \$300,000.

The Jewel Gas Company, Aberdeen, S. D., is being organized with \$25,000 capital stock to manufacture the Jewel gas machine. It is the intention of the company to erect a factory which it will equip with modern machinery. A washing machine will also be manufactured. J. H. Regan is president and general manager of the company.

Texas

AUSTIN, TEXAS, February 11, 1911.

Industrial and business conditions generally all over Texas and in a big scope of territory of Northern Mexico have been brightened during the last few days by general rains. In some sections the precipitation was greater than for many months, and the drought is believed to be completely broken. Growing grain was greatly benefited, and the ground was placed in prime condition for planting.

The El Paso Electric Company, a subsidiary of the Stone-Webster syndicate of Boston, Mass., will spend about \$200,000 in making extensions of its electric railway system at El Paso, Texas, and for other improvements.

The Farmers' Union Ginning Company, Taylor, Texas, will erect a cotton gin at a cost of \$25,000. Richard A. Bradford of Taylor is among those who are interested in the project.

The American Sugar Refining & Mfg. Company, which has entered into a contract for the erection of a beet sugar factory at Portales, N. M., to cost more than \$1,000,000, has under consideration the project of erecting a similar factory at Pecos, Texas. It is stated that if the farmers of the lower Pecos River valley will guarantee to raise a sufficient quantity of sugar beets to supply the proposed factory it will be erected.

A factory for the manufacture of leather goods will be established at Taylor, Texas, by Madison & Co., St. Louis, Mo.

Preliminary plans have been adopted for the construction of a system of sewers for Cuero, Texas. The matter is in the hands of the Commercial Club of that place.

The Morris Packing Company has purchased a site for a proposed meat packing plant, which it will erect in San Antonio, Texas. The building will be a three-story brick, with basement.

J. E. Brown and W. D. Kyser have been granted a

franchise by the City Council of Marlin, Texas, for the construction of a water works plant and distributing system.

H. T. Lawler and J. T. Lawler of New Orleans, La., who are arranging to establish a flour mill at Bryan, Texas, with a 200-bbl. daily capacity, have entered into a contract with the City Council of the latter place to furnish electric power and lights for the town.

A site has been selected for the proposed garbage disposal plant, which the City Council of Marlin, Texas, will install.

Dr. W. W. McVea and associates of Yoakum, Texas, are arranging to construct a sewer system at that place.

The Weimer Ice & Cold Storage Company has been formed, with a capital stock of \$12,000, for the purpose of installing an ice and cold storage plant at Weimer, Texas. Charles Fahrenthold is president; Frank Anders, vice-president; George Heider, Jr., treasurer, and Oscar Boettcher, secretary.

Drainage pumps of large capacity will be installed upon a tract of 17,000 acres of land near Orange, Texas, which was recently purchased by J. J. Schult of Madison, Wis., and associates. A system of drainage canals and ditches will also be constructed upon the property.

An election has been ordered for March 25 by the City Council of Brady, Texas, to vote on the proposition of issuing \$40,000 of bonds for extending and improving the water works plant and distributing system. Dams will be constructed across Brady creek to form water storage reservoirs and a new pumping and filtration plant installed.

The Valley Reservoir & Irrigation Company, which is constructing a large system of irrigation in the lower valley of the Rio Grande, in the vicinity of Chapin, is preparing to install a pumping plant at the point on the river where the intake is located.

The Mission Farm Company will install a cotton gin at Mission, Texas. S. J. Smallwood is manager.

The Mission Canning Company is erecting a large canning factory at Mission, Texas. The machinery will soon be installed. A. H. Fisher is manager.

General Luis Terrazas of Chihuahua, Mexico, will construct a large system of irrigation upon his Torreon ranch. The surveys for a dam and proposed storage reservoir have been made by M. C. Liguornik of Chihuahua. It is planned to impound about 6,000,000 cu. meters of water. A large pumping plant will also be installed.

The Farmers' Union Warehouse Company, Taylor, Texas, will build and equip a cotton ginning plant to cost upward of \$25,000 and a 500-ton seed house. J. R. Hargis is the president of the company.

The city of Bryan, Texas, has closed a deal with the present water company for its entire water distributing plant. The contract price was \$12,425.

The new city of Polytechnic, Texas, will vote on a bond issue of \$50,000 for the establishment of a water system.

The city of Brownsville, Texas, will vote on a bond issue aggregating \$140,000, of which \$35,000 is to be applied for the improvement of the water system and \$15,000 for the improvement of the electric light system.

The plant of the Houston Co-operative Mfg. Company, on Naner street, Houston, Texas, was damaged by fire February 4 to the extent of \$25,000. The main building suffered very little damage.

The Model Carriage Company, Houston, Texas, will move into the old Jewish synagogue, which has been purchased by the company for \$22,500.

The Brenham Compress, Oil & Mfg. Company, Brenham, Texas, has let contracts for additional machinery and equipment, which will cost in the vicinity of \$25,000. The contracts were awarded to the Westinghouse Electric & Mfg. Company and the Harrisburg Engine Company.

The property taxpayers of Waco, Texas, decided to issue bonds to the amount of \$250,000 for the election and equipment of a municipal plant.

Farther Central West

The machine shops and equipment of the Highland Park College, Des Moines, Iowa, were totally destroyed by fire on the night of January 30. The shops were equipped with 42 engine lathes, 14 drill presses, 2 shapers, 1 Landis milling machine, 1 Landis grinder, 1 large planer and numerous other tools, none of which can be rebuilt. The college is now planning the erection of new shops, 100 x 180 ft., 50 x 80 ft. of which will be utilized as a forge room, foundry work, traction engine room, wood shop and garage for automobile work. Bids are now being received for construction of the shops and work will be commenced as soon as possible. The building will be one story, of saw tooth roof construction, and it is expected to be completed within three months.

The American Enamel Brick Company, Des Moines, Iowa, is completing arrangements for the establishment of

THE MACHINERY MARKETS

a plant for the manufacture of enameled face concrete brick, which it expects to have in operation about April 1.

The Wood Brothers Thresher Company, Des Moines, Iowa, incorporated with \$600,000 capital stock, to succeed the Wood Brothers Steel Self-Feeder Company, advises that it will not erect any new buildings before next September.

The Northey Mfg. Company, Waterloo, Iowa, maker of ice machines, is contemplating the erection of an addition to its plant this spring, 70 x 145 ft., three stories and basement.

Dexter, Iowa, is considering the installation of a gas lighting system at an estimated cost of \$12,000.

The citizens of Zealring, Iowa, have voted to issue bonds for the establishment of a water works system.

LeRoy Corliss of Omaha, Neb., will erect at Waterloo, Neb., a milk condensing plant, 40 x 150 ft., which will require an investment of \$35,000. The town made a grant of a strip of land 10 ft. wide along the Union Pacific Railroad tracks for the use of the plant.

The South

LOUISVILLE, Ky., February 14, 1911.

An improved demand for machinery is reported in this market, quarrying equipment especially being in good demand. Boilers and refrigerating equipment are also selling well, the manufacturers report.

The Standard Oil Company has purchased a 150-ton ice machine for use in its plant at Whiting, Ind., from the Henry Vogt Machine Company of this city.

The Master Patent Floor Company, Knoxville, Tenn., has been incorporated, with a capital stock of \$60,000, by John F. Master and others. Woodworking machinery will be purchased and a plant equipped.

The Smithfield Milling Company, Smithfield, Ky., will probably purchase equipment for increasing the capacity of its steam power plant.

J. B. Wathen of Louisville has purchased the machinery of the American Piano Player Company of this city, which recently failed. The purchase price was \$4000.

The Elite Laundry will erect a steel addition to its plant and probably will require some additional machinery.

The Fiscal Court has awarded a contract to Booth & Co. of New York for the installation of a water-softening plant in connection with the artesian well at the county jail. The purchase price was \$2080.

The Anderson Resilient Wheel Mfg. Company has been incorporated at Nashville, Tenn. It has a capital stock of \$500,000 and plans to erect a factory for the manufacture of a solid tire automobile wheel. Resilient spring spokes will be used instead. O. H. Anderson of Sparta, Tenn., invented the wheel.

The American Steel & Wire Company will erect a warehouse at Memphis, Tenn., which will be used in the distribution of its products in Southwestern territory. The company has heretofore handled about 50,000 tons through Memphis. Much of the material will be brought down the Ohio and Mississippi rivers in barges.

The annual report of the Geological Survey on Kentucky coal properties indicates that the use of machines for under-cutting coal has undergone a great increase, 50 per cent. of the total output now being machine mined. Punchers and chain breast machines form the bulk of the equipment in use.

Optimistic reports were submitted at the annual convention of the Brick Manufacturers' Association of the United States in this city last week, and the outlook in the trade is good, in spite of the inroads of concrete, to combat which a publicity bureau has been organized. Great advances have been made in clay-working machinery manufacture, and electrical equipment for conveying bricks is now receiving great attention. The machinery manufacturers had numerous exhibits at the convention.

C. D. Norris, formerly with the Studebaker Bros. Mfg. Company, and now superintendent of the American Automobile Mfg. Company of New Albany, Ind., is superintending the installation of machinery in the company's plant, which will be put in operation about April 1.

The Kentucky Electrical Company, Owensboro, Ky., has received a contract for the manufacture of 104 midget flour mills from the Anglo-American Milling Company of that city. About \$100,000 was involved.

The Smith Cooperage Company, Louisville, is establishing an electric light plant and ice factory at Livermore, Ky. The refrigerating equipment has been purchased from the Henry Vogt Machine Company, of Louisville, but the contract for the electrical equipment has not yet been awarded.

The water department of Memphis, Tenn., is planning the issuance of several hundred thousand dollars in bonds to provide for improvements. Additions are to be made to the pumping equipment, and many miles of mains are to be laid. A contract has already been made with the United States Cast Iron Pipe & Foundry Company for 2000 tons of pipe of various sizes. A system of feed water heaters is to be

installed also. A crane is to be built for use in handling pipe and other heavy material.

The Southern Railway is experimenting with a new type of valve gear to supersede the present link motion. The new gears are said to be much more accessible than the old kind.

Machinery is being installed in a new automobile factory at Tullahoma, Tenn. A light road vehicle is to be manufactured.

The Southern Motor Works, Nashville, Tenn., will increase its capacity so as to provide for the manufacture of commercial trucks.

G. W. Setzer, who operates a machine shop at Johnson City, Tenn., is making improvements in his shop a big 12,000 planer having already been installed.

Paul M. Taylor, of Huntington, Ind., purchased at auction the gas works at Washington, Ind. It has been in the hands of a receiver for a year. The purchase price was \$30,000, and the new owner will make improvements.

Oliver Moore and Grant White are planning a \$10,000 flour mill to be established at Whitesburg, Tenn. Most of the equipment has been ordered.

The Appalachian Marble Company, Knoxville, Tenn., is planning the purchase of a diamond saw, polishers, planers and other stone working equipment. It is erecting a mill which will be in operation some time in March.

Woodworking and power equipment will be required by the Harriman Heading Company, which is erecting a heading plant at Harriman, Tenn.

The Lexington Machine Works, Lexington, Ky., has been incorporated, with \$12,000 capital stock, and will manufacture gas engines. It is in the market for power equipment, including engines and boilers.

An ice plant will be established at Clinton, Ky., by the Clinton Water & Light Company.

Improvements are contemplated by the Richmond Electric & Power Company, Richmond, Ky., which recently increased its capital stock and is now issuing \$20,000 of bonds. L. B. Herrington is president of the company.

I. H. Dungan, Humboldt, Tenn., is organizing a company which will manufacture a patented water motor. Definite plans have not yet been made regarding a plant.

A malleable iron plant will be added to the works of the William J. Oliver Mfg. Company at Knoxville, Tenn. It manufactures plows.

Electric light and power equipment will be required by the Nicholson Coal Company, Middlesboro, Ky., which will operate conveying and coal cutting machinery by electricity. J. C. Cardwell of Louisville, is president of the company.

The plants of the Clinton Iron Works and the Maryville Iron Works, at Knoxville, Tenn., have been taken over by the Knox City Iron Works, which recently incorporated. Stoves will be the principal output.

Clarence W. Howes is organizing a company which will establish an electric light plant at Paintsville, Ky.

The capacity of the sawmill of the Haskew Lumber Company at South Pittsburgh, Tenn., will be largely increased by the addition of new machinery, including rip saws and cut-offs. The power equipment will also be added to.

The Cedar City Mills, Lebanon, Tenn., is in the market for equipment for an ice factory and cold storage plant. The factory will have a daily output of 30 tons.

The Freuler Machine Works, Chattanooga, Tenn., is testing a new steam engine which was invented by George Veitsch, of Bessemer, Ala. The engine has been patented, and smaller size and weight in proportion to power than other types are claimed for it.

The Lexington & Interurban Railway Company, Lexington, Ky., will be reorganized and extensive improvements made including the erection of a new power plant at a cost of \$500,000.

The Lexington Machine Works, Lexington, Ky., has been incorporated with \$12,000 capital stock. The company will manufacture gasoline engines and special machinery and deal in and repair machinery of all kinds.

B. J. Robinson, Vicksburg, Miss., has plans prepared for a one-story machine shop to be constructed at a cost of \$4500.

Bids will soon be opened by the city of Dothan, Ala., for the construction of water works and an electric light plant at an estimated cost of \$60,000. B. R. Pilcher is the engineer.

The D. K. Jeffreys Lumber Company, Natchez, Miss., has completed a saw mill and another one will be put in operation in a short time. A third mill will also be erected by the company.

The wagon shops of Otis Smith at Hattiesburg, Miss., were destroyed by fire February 4, causing a loss of \$8000, partially covered by insurance.

The saw mill of J. A. Leindecker, Coushatta, La., was burned February 3. The planing mill was saved and the saw mill will be rebuilt at once.

THE MACHINERY MARKETS

The Rex Smith Aeroplane Company, Washington, D. C., has been organized, with a capital stock of \$500,000, to manufacture aeroplanes and will erect a plant, 40 x 75 ft., at College Park, Md., adjoining the National Aviation Field. For the present only the usual wood working machines for sawing, planing, jointing, shaping and boring will be installed. The officers of the company are Victor J. Evans, president; Rexford M. Smith, vice-president and general manager; Hugh M. Sterling, secretary, and C. A. M. Wells, treasurer.

The American Aim & Finance Company, Fernandina, Fla., has been organized, with \$1,000,000 capital stock, for the manufacture of a patented convertible street car advertising device. The company is planning for the erection of a factory equipped with the most modern machinery, work on which will begin within the next six months. The officers of the company are P. P. I. Fyfe, president; J. W. Brownfield, vice-president; W. H. Allen, secretary, and H. P. Trimble, treasurer.

Citizens of Attalla, Ala., have approved the issuance of \$30,000 in bonds for the construction of a sewerage system.

The Lucas Land & Lumber Company, Paducah, Ky., has acquired the property of the Paducah Veneer Lumber Company. The company plans to make alterations to the plant and additional machinery will be installed later on, details of which have not yet been worked out.

Bonds will be issued by the citizens of Fairburn, Ga., for the construction of an electric light plant.

The city of Manchester, Tenn., is considering the question of building a water works and electric light plant. A bill has been recently introduced in the State Senate allowing the town to vote on the question of issuing bonds to cover the necessary expenses. The citizens favor giving a franchise to a corporation to put in a plant.

The Southwest

The Kansas City Terra Cotta Company, Kansas City, Mo., has plans prepared for a terra cotta plant, warehouse and kilns, 110 x 244 ft., one story.

The Consumers' Electric Light & Power Company, De Soto, Mo., will improve and increase the capacity of its plant.

The Pryor Ice & Light Company, Pryor, Okla., has been incorporated, with \$50,000 capital stock. The company has just completed a new brick building, in which it is installing three new boilers of 100 hp. each, one 80-hp. engine, direct connected with 50-kw. dynamo, and a 160-hp. engine, direct connected with a 100-kw. dynamo. A contract has also been let for the installation of a 10-ton ice plant.

Lamont, Okla., will expend \$20,000 for a water works system.

The Dyer Company, Cleveland, Ohio, engineer and contractor, has secured a contract for the construction in Sevier Valley, Utah, of a sugar plant for the Utah-Idaho Sugar Company. Engines and boilers to be installed have practically been decided upon and specifications for pumps have been issued to various manufacturers. The company will receive bids in about 60 days for structural material to be used in erecting the buildings.

Park City, Utah, has specifications completed for a water works system, bids for the construction of which will be asked at once.

The Degnan-McConnell Coal Company, Wilburton, Utah, has applied to the city of Heavener, Okla., for an electric light and power franchise, it being the intention of the company to erect a plant at that place.

The Arkansas Cold Storage Company, Little Rock, Ark., is having plans prepared for a cold storage plant consisting of cold storage house, 54 x 68 ft., two stories; boiler house, 28 x 45 ft., one story; engine room, 30 x 50 ft., one story; tank house, 21 x 53 ft., one story, and an office building, 16 x 18 ft., one story. Tait & Nordmeyer, Liggett Building, St. Louis, Mo., are the engineers in charge and will soon receive bids on equipment.

The laundry, power and heating plant was destroyed by fire and another will be erected at the State Deaf Mute Institution, Little Rock, Ark.

The large steam cotton gin of J. J. Farrell, Brinkley, Ark., together with all machinery, gin stands, &c., was burned February 7. The property was covered by insurance.

The Grafton Stove & Heading Company, Grafton, Ill., has purchased a tract of 51 acres in Pocahontas, Ark., and will erect a large plant for the manufacture of stoves and headings.

The Helena Veneering Company, Helena, Ark., will break ground at once for the erection of a thoroughly modern plant.

Work has commenced on the new oil refinery at Fort Smith, Ark., which is to cost about \$100,000. The greater part of the building will be of steel and concrete.

The Tulsa Glass Mfg. Company, Tulsa, Okla., will make improvements to cost in the neighborhood of \$250,000. The first change to the plant will be the erection of a new fur-

nace which will be used in the manufacture of white glass globes.

The power house at the planing mill of the 'Frisco Lumber Company at Bokhoma, Okla., was burned February 3.

The National Biscuit Company, Chicago, is expected to begin the erection of a branch factory in Oklahoma City, Oklahoma, some time after March 1. The statement is made that the company has set aside \$360,000 to be used in buildings in that State. It will locate warehouses in several towns.

The Central Foundry Company, which now has a small plant at 304 Northwestern avenue, Oklahoma City, Oklahoma, with offices in the Baum Building, will shortly break ground on a three-acre site along the tracks of the Missouri, Kansas & Texas Railroad in that city for the erection of a brick one-story foundry building, 50 x 150 ft., and a fire-proof pattern building, 35 x 40 ft. The company is at present making gray iron castings, but its new plant will turn out steel castings also. The principals in this company are M. K. Weigel, Garrett A. Walsh and V. L. Bath. The company has a capital stock of \$25,000.

The Ozark Power & Water Company, Forsyth, Mo., has been organized to construct a hydroelectric plant on the White River. The tentative plans of the company call for a dam, 40 ft. high and machinery sufficient to develop 2500 hp. The estimated cost of the plant is \$400,000. Holman & Laird, St. Louis, Mo., are the consulting engineers in charge.

The city of Chaffee, Mo., will expend \$20,000 for the extension of its water works plant. Bids will be received until March 1 by M. S. Murray, Sikeston, Mo., engineer in charge.

The Canadian Power & Light Company, Okemah, Okla., has been incorporated with \$100,000 capital stock to develop a hydroelectric power plant on the Deep Fork of the Canadian River. The plans of the company include the construction of a hollow concrete dam and aqueduct, with turbines developing over 2000 hp. W. H. Dill is president of the company.

The city of Cherokee, Okla., will receive bids through engineers Burns & McDowell, Kansas City, Mo., until February 25, for the installation of a direct connected 75-kw. 2360-volt, 60-cycle generator for the municipal electric light and power plant.

The citizens of Englewood, Kan., have voted for the issuance of bonds for the construction of a system of water works. J. S. Worley & Co., Reliance Building, Kansas City, Mo., are the engineers.

Bids will be received until April 20 for the construction of water works for the city of Helena, Mont., at an estimated cost of \$600,000. W. Heimick is city engineer.

Government Purchases

WASHINGTON, D. C., February 14, 1911.

The Paymaster General, Navy Department, Washington, will open bids February 21 for furnishing supplies as follows:

Schedule 3310, class 81, turret turning gear equipment; class 82, one necessary variable speed power transmission apparatus.

Schedule 3312, class 84, two electric ventilating sets; class 91, four 20-hp. gasoline engines.

The Paymaster General, Navy Department, Washington, will open bids February 28, under schedule 3297, for one hollow chisel mortising machine and one vertical gear-driven gang boring machine for Mare Island, Cal., and schedule 3337, class 52, variable speed power transmission apparatus for Boston, Mass.

The Isthmian Canal Commission, Washington, circular 622, calls for gear and milling cutters and foundry core machines.

The Inspector of the third lighthouse district, Tompkinsville, N. Y., opened bids January 30 for furnishing one power mortising machine as follows: Olney & Warrin, New York, \$255.56; American Wood Working & Machinery Company, New York, \$214.50; Fairbanks Company, New York, \$200 and \$220; J. A. Fay & Egan Company, New York, \$324.

The Inspector of the third lighthouse district, Tompkinsville, N. Y., opened bids January 30 for furnishing two wood boring machines as follows: Cleveland Pneumatic Tool Company, New York, \$125; Chicago Pneumatic Tool Company, New York, \$120; Ingersoll-Rand Company, \$105.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids February 4 for furnishing one 60-ton electric traveling crane for Building No. 23, Navy Yard, Norfolk. Various alternate bids were received. The bids on the completed work are as follows:

Manning, Maxwell & Moore, New York, \$15,085; Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$13,985, alternate for General Electric Company's motors, \$12,450; Whiting Foundry & Equipment Company, Hartford, Conn., \$14,447; Mergat Engineering Company, Alliance, Ohio, \$14,880; Niles-Bement-Pond Company, New York, \$11,965, alternate, \$10,775; Alfred Box & Co., Philadelphia, Pa., \$14,499; Baltimore Bridge Company, Baltimore, Md., \$11,911, alternate, \$10,881.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from store—		Galvanized.		Tin—	
Refined Iron		No. 22 and 24	.....	Straits Pig.....	
1 to 1 1/2 in. round and square		No. 26	.....	Copper—	
1 1/2 to 4 in. x 3/16 to 1 in.		No. 28	.....	Lake Ingot.....	
1 1/2 to 4 in. x 1/2 to 3/4				Electrolytic.....	
Rods 3/8 and 1/2 round and square				Casting.....	
Angles		Corrugated Roofing—		Spelter—	
3 in. x 3/16 in. and larger		2 1/2 in. corrugated.		Zinc.	
3 in. x 1/4 in. and 1 in.		No. 24.....		No. 9, base, casks.	
1 1/2 to 2 1/4 in. x 1/4 in.		No. 26.....		Lead.	
1 1/2 to 2 1/4 in. x 3/16 in. and thicker		No. 28.....		American Pig.....	
1 to 1 1/2 in. x 1/4 in.		Tin Plates—		Bar.....	
3/4 x 3/16 in.		American Charcoal Plates (per box.)		Solder.	
3/4 x 1/2 in.		"A. A. A." Charcoal:		1/2 & 3/4, guaranteed	
3/4 x 3/4 in.		No. 14 x 20.....		No. 1	
3/4 x 1 in.		No. 14 x 24.....		Refined	
3/4 x 1 1/4 in.		No. 14 x 28.....		Prices of solder indicated by private brand vary ac-	
3/4 x 1 1/2 in.		No. 14 x 32.....		cording to composition.	
3/4 x 3/32 in.		Tin Plates—		Antimony—	
Feet:		American Charcoal Plates (per box.)		Cookson.....	
1 in.		"A. A. A." Charcoal:		H. C. S.	
1 1/4 in.		No. 14 x 20.....		Other Brands.....	
1 1/2 in.		No. 14 x 24.....		Bismuth—	
1 3/4 in.		No. 14 x 28.....		Aluminum—	
2 in.		No. 14 x 32.....		No. 1 Aluminum (guaranteed over 99% pure), in ingot	
Channels, 3 in. and larger		American Coke Plates—Bessemer—		for remelting.....	
3 in. x 1/4 in. No. 8		No. 14 x 20.....		Rods & Wire.....	
3 in. x 1/2 in. No. 8		No. 14 x 24.....		Sheet.....	
3 in. x 3/4 in. No. 8		No. 14 x 28.....		Old Metals.	
3 in. x 1 in. No. 8		No. 14 x 32.....		Dealers Purchasing Prices Paid in New York	
3 in. x 1 1/4 in. No. 8		No. 14 x 36.....		Copper, Heavy cut and finished	
3 in. x 1 1/2 in. No. 8		No. 14 x 40.....		Copper, Heavy and Wire	
3 in. x 1 3/4 in. No. 8		No. 14 x 44.....		Copper, Light and Bottoms	
3 in. x 2 in. No. 8		No. 14 x 48.....		Brass, Heavy	
3 in. x 2 1/4 in. No. 8		No. 14 x 52.....		Brass, Light	
3 in. x 2 1/2 in. No. 8		No. 14 x 56.....		Heavy Manganese Composition	
3 in. x 2 3/4 in. No. 8		No. 14 x 60.....		Clean Brass Turnings	
3 in. x 3 in. No. 8		No. 14 x 64.....		Composition Turnings	
3 in. x 3 1/4 in. No. 8		No. 14 x 68.....		Lead, Heavy	
3 in. x 3 1/2 in. No. 8		No. 14 x 72.....		Lead, Thin	
3 in. x 3 3/4 in. No. 8		No. 14 x 76.....		Zinc Scrap	
3 in. x 4 in. No. 8		No. 14 x 80.....			
3 in. x 4 1/4 in. No. 8		No. 14 x 84.....			
3 in. x 4 1/2 in. No. 8		No. 14 x 88.....			
3 in. x 4 3/4 in. No. 8		No. 14 x 92.....			
3 in. x 5 in. No. 8		No. 14 x 96.....			
3 in. x 5 1/4 in. No. 8		No. 14 x 100.....			
3 in. x 5 1/2 in. No. 8		No. 14 x 104.....			
3 in. x 5 3/4 in. No. 8		No. 14 x 108.....			
3 in. x 6 in. No. 8		No. 14 x 112.....			
3 in. x 6 1/4 in. No. 8		No. 14 x 116.....			
3 in. x 6 1/2 in. No. 8		No. 14 x 120.....			
3 in. x 6 3/4 in. No. 8		No. 14 x 124.....			
3 in. x 7 in. No. 8		No. 14 x 128.....			
3 in. x 7 1/4 in. No. 8		No. 14 x 132.....			
3 in. x 7 1/2 in. No. 8		No. 14 x 136.....			
3 in. x 7 3/4 in. No. 8		No. 14 x 140.....			
3 in. x 8 in. No. 8		No. 14 x 144.....			
3 in. x 8 1/4 in. No. 8		No. 14 x 148.....			
3 in. x 8 1/2 in. No. 8		No. 14 x 152.....			
3 in. x 8 3/4 in. No. 8		No. 14 x 156.....			
3 in. x 9 in. No. 8		No. 14 x 160.....			
3 in. x 9 1/4 in. No. 8		No. 14 x 164.....			
3 in. x 9 1/2 in. No. 8		No. 14 x 168.....			
3 in. x 9 3/4 in. No. 8		No. 14 x 172.....			
3 in. x 10 in. No. 8		No. 14 x 176.....			
3 in. x 10 1/4 in. No. 8		No. 14 x 180.....			
3 in. x 10 1/2 in. No. 8		No. 14 x 184.....			
3 in. x 10 3/4 in. No. 8		No. 14 x 188.....			
3 in. x 11 in. No. 8		No. 14 x 192.....			
3 in. x 11 1/4 in. No. 8		No. 14 x 196.....			
3 in. x 11 1/2 in. No. 8		No. 14 x 200.....			
3 in. x 11 3/4 in. No. 8		No. 14 x 204.....			
3 in. x 12 in. No. 8		No. 14 x 208.....			
3 in. x 12 1/4 in. No. 8		No. 14 x 212.....			
3 in. x 12 1/2 in. No. 8		No. 14 x 216.....			
3 in. x 12 3/4 in. No. 8		No. 14 x 220.....			
3 in. x 13 in. No. 8		No. 14 x 224.....			
3 in. x 13 1/4 in. No. 8		No. 14 x 228.....			
3 in. x 13 1/2 in. No. 8		No. 14 x 232.....			
3 in. x 13 3/4 in. No. 8		No. 14 x 236.....			
3 in. x 14 in. No. 8		No. 14 x 240.....			
3 in. x 14 1/4 in. No. 8		No. 14 x 244.....			
3 in. x 14 1/2 in. No. 8		No. 14 x 248.....			
3 in. x 14 3/4 in. No. 8		No. 14 x 252.....			
3 in. x 15 in. No. 8		No. 14 x 256.....			
3 in. x 15 1/4 in. No. 8		No. 14 x 260.....			
3 in. x 15 1/2 in. No. 8		No. 14 x 264.....			
3 in. x 15 3/4 in. No. 8		No. 14 x 268.....			
3 in. x 16 in. No. 8		No. 14 x 272.....			
3 in. x 16 1/4 in. No. 8		No. 14 x 276.....			
3 in. x 16 1/2 in. No. 8		No. 14 x 280.....			
3 in. x 16 3/4 in. No. 8		No. 14 x 284.....			
3 in. x 17 in. No. 8		No. 14 x 288.....			
3 in. x 17 1/4 in. No. 8		No. 14 x 292.....			
3 in. x 17 1/2 in. No. 8		No. 14 x 296.....			
3 in. x 17 3/4 in. No. 8		No. 14 x 300.....			
3 in. x 18 in. No. 8		No. 14 x 304.....			
3 in. x 18 1/4 in. No. 8		No. 14 x 308.....			
3 in. x 18 1/2 in. No. 8		No. 14 x 312.....			
3 in. x 18 3/4 in. No. 8		No. 14 x 316.....			
3 in. x 19 in. No. 8		No. 14 x 320.....			
3 in. x 19 1/4 in. No. 8		No. 14 x 324.....			
3 in. x 19 1/2 in. No. 8		No. 14 x 328.....			
3 in. x 19 3/4 in. No. 8		No. 14 x 332.....			
3 in. x 20 in. No. 8		No. 14 x 336.....			
3 in. x 20 1/4 in. No. 8		No. 14 x 340.....			
3 in. x 20 1/2 in. No. 8		No. 14 x 344.....			
3 in. x 20 3/4 in. No. 8		No. 14 x 348.....			
3 in. x 21 in. No. 8		No. 14 x 352.....			
3 in. x 21 1/4 in. No. 8		No. 14 x 356.....			
3 in. x 21 1/2 in. No. 8		No. 14 x 360.....			
3 in. x 21 3/4 in. No. 8		No. 14 x 364.....			
3 in. x 22 in. No. 8		No. 14 x 368.....			
3 in. x 22 1/4 in. No. 8		No. 14 x 372.....			
3 in. x 22 1/2 in. No. 8		No. 14 x 376.....			
3 in. x 22 3/4 in. No. 8		No. 14 x 380.....			
3 in. x 23 in. No. 8		No. 14 x 384.....			
3 in. x 23 1/4 in. No. 8		No. 14 x 388.....			
3 in. x 23 1/2 in. No. 8		No. 14 x 392.....			
3 in. x 23 3/4 in. No. 8		No. 14 x 396.....			
3 in. x 24 in. No. 8		No. 14 x 400.....			
3 in. x 24 1/4 in. No. 8		No. 14 x 404.....			
3 in. x 24 1/2 in. No. 8		No. 14 x 408.....			

THE IRON AGE

Established
1855

New York, February 23, 1911

VOL. 87: No. 8

Published Every Thursday by the

DAVID WILLIAMS COMPANY

14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada, \$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum. Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Shipments and New Orders Increase.....	457
1910 an Unusual Year in Rails.....	458
The Anti-Trust Cases.....	458
The Electric Furnace and Electrical Engineering.....	459
The Cast Iron Car Wheel and the Grinding Machine..	459
Standard Lengths for Wire Test Pieces.....	459
New Work for the Efficiency Engineer.....	459
The Dual Usefulness of the Mill Nurse.....	460
New Publications.....	460
The Inland Steel Company Will Build Another Blast Furnace	460
Steel Rail Production in 1910.....	461
Customs Decisions.....	461
The Iron and Metal Market Reports.....	462 to 471
Iron and Industrial Stocks.....	471
Notes on Prices.....	471
An International Iron and Steel Conference.....	471
Personal	472
Obituary	472
The Crucible Steel Company Further Strengthens Its Position	473
Ganschow Cut Gear Exhibition.....	473
Storage Batteries.....	474
The Pressed Steel Car Company's Year.....	475
Railroad Efficiency and the Labor Unions.....	476
Our Immigrant Workmen.....	478
The Quebec Bridge.....	479
"Building Up" Impurities in Steel.....	480
The Harrington 16-32-In. Extension Lathe. Illustrated....	481
The Kempsmith Mfg. Company's New Plant. Illustrated....	482
New York's Municipal Building.....	485
New Railroad Equipment Orders.....	485
The Story of a Floor Failure. Illustrated.....	486
Double Track Railroad Mileage Is Small.....	487
The Browning Pile Driver. Illustrated.....	488
The Baird Improved Tumbling Barrel. Illustrated.....	489
The Rellly Friction Clutch. Illustrated.....	490
A Recent Test of O. K. Tools. Illustrated.....	491
Exports Increase Heavily.....	491
An Interesting Curtis Turbine Installation. Illustrated....	492
A Very Complete Foundry Trolley System. Illustrated....	493
An Unusual Standard Press Installation. Illustrated.....	494
Duff Jacks at Buenos Aires.....	494
The Busch Power Sprue Cutter. Illustrated.....	495
Additions to the Steel Corporation's Fleet.....	495
Cylinder Castings Made on a Mumford Molding Machine. Illustrated.....	496
The Murchey Revolving Chuck. Illustrated.....	496
Long Distance Transmission of Steam.....	496
Fuel Handling on the Chelsea Piers. Illustrated.....	497
The New York State Steel Company.....	497
The American Brass Company's Year.....	497
A Model Compensation Code.....	498
Employers' Liability and Compensation Systems.....	498
Workmen's Compensation.....	499
The American Can Company's Annual Report.....	499
Steam and Exhaust Pipe Size Charts. Illustrated.....	500
The Chicago Pneumatic Tool Company's Annual Report.....	501
German Machine Tools.....	501
The Joint Electrical and Mechanical Engineers' Meeting....	501
The New Find on the Cayona Iron Range.....	502
Pig Iron Production in Canada in 1910.....	502
Trade of the United States with Canada.....	502
Cooper Engine Contracts.....	502
Trade Publications.....	503
The Machinery Market Reports.....	504 to 513
The Collin By-Product Coke Oven.....	513
Current Metal Prices.....	514

Shipments and New Orders Increase

More Rail Buying at Home and for Export

A Firmer Billet Market—Pig Iron Stronger in All Districts

The developments of the past week support the view that the buying movement in finished material which started in mid-January is not a mere rebound from the extremely restricted buying of the closing weeks of 1910. The rate at which new orders have been taken this month by the Steel Corporation is considerably greater than that of January. The leading Pittsburgh interest sold 200,000 tons of billets, sheet bars, rails and steel ties this month up to the 18th, against 100,000 tons in the first 18 days of January. At the same time shipments by all steel manufacturers have increased probably 20 per cent., with the larger scale of mill operations in every line.

Railroads are better buyers than is currently credited. The principal rail order of the week is 40,000 tons for the Chicago & Northwestern. Export rail business shows no signs of lessening. The Buenos Aires & Pacific, in Argentina, has just closed for 15,000 tons of 70-lb. rails, and the Manila Railways are in the market for 10,000 tons. It is probable a portion at least of the 65,000 tons the Canadian Pacific is to buy will come to this country, as one Canadian steel mill will be kept busy most of the year on work already booked for the railroads. Buying of track supplies has been excellent. The Lake Shore has closed for 24,000 kegs of spikes and 5000 kegs of track bolts.

The lighter finished lines continue to lead in activity. Wire and tin plate mills are running to 90 per cent. of capacity. The hardship of the sheet industry in December is indicated by a 65 per cent. operation of the sheet mills of the Steel Corporation now against 40 per cent. at low point.

In wrought pipe demand has steadily grown and some good line contracts are expected from present plans for spring work. The Riverside pipe works of the leading interest at Wheeling are to be started up with the connected steel plant and two blast furnaces. The last full operation at this plant was in 1907.

Sharp competition is reported in bar iron in the Chicago district and considerable business was done at 1.25c., though 1.30c. is now the general minimum.

Cast iron pipe, usually a criterion of influences operating broadly in the iron market, has been quite active and a large tonnage is pending for municipalities and corporations. The leading maker took a 5000-ton contract at Chicago of 6 to 12 in. pipe. Milwaukee is in the market for 10,000 tons.

A Canadian steel company which bought 15,000 tons of open hearth billets from the Gary mill in January has taken an additional 10,000 tons. At a Pittsburgh meeting of 20 billet and sheet bar makers February 17 an advance was favored by some companies,

but no action was taken. One large interest is limiting sales at present prices to the first quarter. Sales of 3000 tons of Bessemer and 1000 tons of open hearth sheet bars are reported at \$24, Pittsburgh.

The pig iron market is firmer, particularly in the Central West. Stocks of steel making iron there are large, but are in strong hands, and instead of coming out on realizing sales, as has been the case for a good many months, are now evidently being held for the higher prices which are expected later in the year. Sales of 35,000 to 40,000 tons of basic are reported at Pittsburgh, much of it at \$13.75. Cincinnati reports a sale of 10,000 tons of basic and one of 15,000 tons, deliveries running through the third quarter. Some of this iron may be included in the Pittsburgh transactions.

At a meeting of merchant furnace companies at Cleveland, February 17, the outlook was reported more favorable, particularly in basic iron, for which a number of Valley furnaces are now asking \$14.

More buyers of foundry iron are in the market for their requirements for the second half. For that delivery furnaces are asking 50c. advance. A few sales of Southern No. 2 iron are reported at \$11.50, Birmingham, for the third quarter, and the whole Southern situation has stiffened. Shipments from Alabama this month are reported in excess of output.

The advance in the scrap market, particularly in heavy melting steel, shows signs of too rapid a pace. At Pittsburgh heavy steel scrap has gone to \$14.75, or \$1 to \$1.25 advance in two weeks. Some consumers appear to have over-stayed their market, and there has been active speculative buying by dealers.

Owing to Washington's Birthday falling on Wednesday of this week, this issue of *The Iron Age* is put to press on Tuesday. Hence all our market reports are dated a day earlier than usual.

1910 an Unusual Year in Rails

The statistics of rail production in the United States in 1910 are a surprise. They show that the total was 3,634,029 tons, or next to the highest year, 1906, whereas the general estimate, based on the disappointing business of some of the mills, was that the year's output would be considerably nearer 3,000,000 than 4,000,000 tons. The United States Steel Corporation, it was known, made a new record, at more than 2,000,000 tons, but that was attributed to the first full year of the new Gary mill and to the fact that the Ensley mill, owing to the depressed conditions in 1908 and 1909, had its first fair chance last year to make a good output under Steel Corporation ownership. It was believed that to most of the independent mills 1910 brought a very considerable falling off from their best records. The figures indicate that they fared very well.

A total of 3,634,029 tons of rails last year, against 3,062,582 tons in 1909, 3,633,654 tons in 1907 and 3,977,877 tons in the banner rail year, 1906, suggests that the complaint made all through last year that the railroads were not buying had less foundation than was generally believed. The question will naturally be asked, in view of the official statistics, How far would 1910 have exceeded the record of 1906 had the railroads really been buying last year? We have here another

confirmation of the opinion expressed all through 1910 that it was a year of excellent business in iron and steel, gauged by any standard except that of the new capacity which had been provided in advance of the country's need of it. A further suggestion of a rail product only second to that of 1906 is that if the railroads, with all the effort they made last year to reduce their rail purchases, were compelled to buy more than 3,600,000 tons (less exports of 350,000 tons and 220,000 tons of light rails), the next year of free railroad buying is quite certain to show a total in excess of the nearly 4,000,000 tons of 1906. However, the indications that 1911 will be such a year are not conclusive as yet.

The advance of the open hearth rail from an output of 252,704 tons in 1907 to 1,715,899 tons three years later indicates that some unfavorable experiences with open hearth rails in the beginning of their use did not change the opinion of railroad engineers that it must be increasingly depended upon, in view of the scarcity of low phosphorus ores. Bessemer rail plants will lengthen their lives by the use of ores permitting them to produce rails with 0.07 to 0.08 per cent. phosphorus, but the high carbon, low phosphorus open hearth rail will doubtless pass the Bessemer rail in tonnage this year, and by another year increase the gap materially. Thus far electric steel rails are a negligible quantity, as are also alloy steel rails containing nickel, chrome and manganese. Ferrotitanium rails, which, strictly, are not alloy rails, since little or no titanium is found in the steel, may continue to be a considerable factor, under the new specifications, and we shall expect the insistent demand for quality to result in an increased tonnage of rails containing chrome and nickel. One Eastern steel company, as is well known, makes rail steel from ores containing both these metals, but the content of chrome and nickel may not be such as to put these rails in the alloy class, any more than the rails containing 0.50 to 0.60 per cent. copper, which were made some years ago from Cornwall ores and gave such good results in service.

The Anti-Trust Cases

The interesting opinion is advanced by eminent lawyers that the United States Supreme Court, in deciding the anti-trust cases now before it, will provide an adequate rule of action that may go far toward putting an end to further litigation under the Sherman anti-trust law—that is, the court may be expected to interpret the law so that all engaged in business will know precisely what constitutes a violation of it. They will then be able to tell whether they are approaching the danger line in their methods or whether they may have gone past it.

The fact is pointed out that unless something of this kind is done the Supreme Court is likely to become clogged with litigation, as the Department of Justice is industrious in hunting up cases of alleged violations of the act. That the court is desirous of avoiding such a condition has been shown in its decisions in construing other laws having a wide application, which might have led to the bringing before it of numerous cases, each of which would have had to be specially considered and decided. By laying down a rule of action, such other cases were then headed off. This would seem to be an eminently practical thing to do

in the anti-trust litigation. Not only the courts but the business world would be benefited by a clear statement of what is to be considered restraint of trade under the Sherman law. It is not to be expected that the Sherman law will have its teeth drawn, but the situation will be greatly clarified if those who are conducting large operations are told where the line is definitely drawn between what is lawful and what is unlawful.

The Electric Furnace and Electrical Engineering

The rapid extension of the use of electricity in steel works has made the electrical engineer a much more important factor in the operating organization. But his new prominence grows out of his contribution to the solution of new rolling mill problems, particularly those connected with the use of powerful motors for the driving of rolls. What is happening there is well indicated by the fact that the United States Steel Corporation, which at the beginning of 1907 had 100,000 hp. in gas engines supplied with blast furnace gas, now has 250,000 hp. in gas engines built and building. An important part of this increase is that devoted to the generation of electricity for the driving of rolling mill rolls and tables and the operation of cranes and other rolling mill equipment. It has been common, in commenting on the new place to which the electrical engineer has been raised in consequence of these developments, to link up with them the increasing employment of the electric furnace in the production of steel. It is to be doubted if the further development of the electric furnace will add greatly to the prominence of the electrical engineer as a steel works factor. It is the metallurgical side of electric furnace practice in which engineering skill will find its largest field. Electrode problems, which presented the greatest difficulties of all that were encountered early in American experience with the electric furnace, have now been satisfactorily solved. They were worked out, as were other problems, independent of the electrical engineer.

In the case of one type of furnace a quarter of a million dollars has been spent on experimental work under American steel works auspices. The result has been a degree of uniformity and reliability in furnace detail that makes it possible for an operator familiar with crucible or open hearth practice to become fairly proficient in electric furnace work after a few weeks' experience. The use of electricity for the development of heat is no more reason for the employment of the electrical engineer as a controlling factor in electric steel making than is the use of gas in the open hearth furnace a reason for considering the gas engineer indispensable to an open hearth steel works organization. In fact, it will doubtless come to pass that the greater elimination of variables and the uniform and dependable character of all the factors entering into furnace construction and operation will in time be added to the other advantages claimed for the electric furnace.

The Cast Iron Car Wheel and the Grinding Machine

Manufacturers of cast iron car wheels are availing themselves more and more of the grinding machine, in the belief that its work will greatly assist in maintaining for their product its present prominence in railroad equipment. Formerly the car wheel manufacturer was

compelled to rely upon the accuracy of his foundry work. The chilled wheel does not yield to steel cutting tools. The casting had to be round as it came from the mold. Wonderful accuracy was obtained in the foundry, but naturally only an approximately true cylinder was created. Once a flat spot developed, the wheel ceased to be useful. Its competitor, the steel wheel, can be machined before using, and, also, it can be trued in a lathe at the will of its owner. Since the development of the use of grinding machines for the work, a chilled cast iron wheel can be made round, either on or off the axle. With a cylinder that is true within very narrow limits, the tendency to flat spots is greatly reduced, according to the extended tests of one of the great railroads. The grinding machine builders have solved the various problems most satisfactorily, and apparently have given the chilled cast iron wheel an extension of its career of usefulness.

Standard Lengths for Wire Test Pieces

The suggestion is made that the Bureau of Standards of the Department of Commerce and Labor should take up the question of standard lengths of test pieces of wire, possibly in connection with the task of establishing a standard gauge, which is now in progress. The experience of testing departments is that the longer the test piece the lower the percentage of elongation, so that where very short pieces are used the manufacturer has a certain advantage in competition, his wire showing a greater strength for the same grade. Users of wire are apt to presume that the percentage of elongation must be constant, no matter whether a 2-in. or a 10-in. section be used in the testing machine. Practical experience, however, has demonstrated that in a large proportion of cases the wire develops its one weaker point where much of the recorded elongation takes place. Consequently, under these conditions, the stretch in a long piece bears a lower percentage to the full length than in a short piece. Other elements may enter into the question. Tests from adjacent sections of the same piece of wire demonstrate the truth of the conditions as stated. Therefore, the adoption of a standard length would produce for the buyer a more reliable knowledge of the material.

New Work for the Efficiency Engineer

The rapid development of the efficiency engineer idea is constantly bringing out some new work for that interesting specialist. A large automobile manufacturing company is now using an efficiency man in connection with its purchasing department. He spends much of his time visiting plants of machine tool manufacturers and examining their newest types of machines. He experiments with the equipment in turning out various automobile parts, and when he finds a machine that will reduce the production cost in any automobile manufacturing department he recommends its purchase. Of course, a visitor of this type is warmly welcomed, and is afforded all the help possible in developing new uses for the machine tools. There are many clever machine tool salesmen who make a practice of entering the shops of their customers and showing them how to get added use out of their mechanical equipment, but for a customer to search out

new uses for machine tool equipment and practically assist in development work is a novel idea.

The Dual Usefulness of the Mill Nurse

A great manufacturing plant employing some 1500 people has found the mill nurse a profitable investment, apart from the immediate care of the injured and sick among the employees. A woman, thoroughly trained in her profession, spends her time in the care of the families of employees as well as of the operatives themselves, and keeps in close touch with the life of the people. Her duties resemble those of the district nurse of the cities. In common with many other large manufacturing works of the country, a large percentage of the labor employed in the plant referred to consists of foreigners, many of them with scant knowledge of the English tongue and even less of American customs. Superintendents and foremen find difficulty in getting at intimate facts concerning the personnel of the working force; but the nurse, chosen for her tact as well as skill, eventually becomes more or less a confidante of the women in the homes. Her influence upon them is transmitted to the working members of the families. Their causes of complaint, the reasons for discontent, are learned from the tenements, making it much easier to avoid friction in the works. The influence of the women thus goes toward the prevention of clashes.

New Publications

Popular Handbook for Cement and Concrete Users.

By Myron H. Lewis and Albert H. Chandler. Bound in cloth. Size, 6 x 9 in.; 500 pages; 126 illustrations. Price, \$2.50. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York City.

This book is a concise semipopular treatise of the principles and methods employed in all classes of modern concrete work. It is not intended to compete with the highly technical publications, which are generally too involved and high priced for the nontechnical reader or average user of cement and concrete. The author has, however, brought together in this work all the salient matter of interest to users of concrete and its many diversified products. A lucid explanation of and a clear insight into the fundamental principles employed in concrete design and construction, free from involved mathematics and academic discussions of points not as yet settled in practice, is given.

After a brief introductory chapter, the author describes the kinds of cement and how they are made. This is followed by a discussion of concrete and its properties, and the selection, proportioning and mixing of the materials entering into it. The architectural possibilities of concrete are next taken up, followed by a number of chapters on the use of reinforced concrete for buildings, foundations, retaining walls, bridges and dams. Space is also given to sidewalks and the use of concrete in railroad work and on the farm. The waterproofing of concrete structures is discussed and the duties of a concrete inspector defined. The final chapter is devoted to the cost of concrete work and contains data not only on the cost of the various materials but also on actual contracts. Thirty-five tables scattered throughout the volume give useful information on various branches of concrete work.

Industrial Plants: Their Arrangement and Construction.

By Charles Day. Cloth bound; pages 294. 5 x 7½ in. Illustrations, 48. Published by the *Engineering Magazine*, New York. Price, \$3.

The author, who as a member of a firm of consulting engineers has had much to do with the design and construction of manufacturing plants, prepared a good part of this work for publication originally in the *Engineering Magazine*. The first eight out of twelve chapters are founded on lectures delivered before the Graduates' School of Business Administration, Harvard University,

and the engineering students at Columbia University. They deal broadly with problems connected with the arranging and planning of industrial plants. The selection of the site and definition of building and equipment features are taken up in one chapter. Another is devoted to detailed plans and specifications, and a third to construction work and installation of equipment. Routing as a prime factor in layout is given a chapter. An axle factory is taken as a specific example, and a detail routing diagram is given, with details of machine tool equipment and paths of parts. In chapter VIII the author considers metal working plants from the standpoints of materials, equipment, buildings, labor and administration. Plants of this character are considered under three heads: First, those doing manufacturing work, as sewing machines, cash registers or typewriters; second, those making a definite line of comparatively heavy machine work, as machine tools, steam engines or locomotives; third, those doing general machine work, including miscellaneous, repair and jobbing work. The chapter following deals with machine shops and their specific requirements. Then comes a chapter on "Modern Industrial Plants," in which the features of several typical plants are described with illustrations, and finally there are two chapters dealing with the relationship of client and industrial engineer. One of these emphasizes the value of an outside engineering organization to the building project and the other discusses the question of compensation for engineering service.

The author's broad experience with the methods which modern industrial conditions have brought into play give him abundant material for such a work, and he has put it in a form calculated to be of the best service to his readers.

The Inland Steel Company Will Build Another Blast Furnace

Plans have been completed by the Inland Steel Company, Chicago, for the erection of a second blast furnace at its Indiana Harbor Works, Indiana Harbor, Ind., with a daily capacity of 450 to 500 tons. Contracts for the preliminary work have been let and construction will be pushed with all speed. The Great Lakes Dredge & Dock Company, Chicago, was awarded the contract for the piling, and John Mohr & Son, Chicago, the contract for the plate work and the erection of the stoves. The Allis-Chalmers Company, Milwaukee, secured the contract for the three blowing engines and the generator engine. The contract for the generators went to the General Electric Company. The Babcock & Wilcox Company secured the contract for eight Sterling boilers of 500 hp. capacity each. The completion of this furnace, which, it is expected, will be in the latter part of this year, will give the company a monthly output of 13,000 tons of pig iron.

The Inland Steel Company is also preparing plans for the addition of a department for the manufacture of rivets, track bolts, spikes and nuts in the larger sizes. This department will have a daily output of 100 tons of these products. On March 2 the stockholders of the company will meet to vote on the proposed increase in the capital stock of \$1,500,000, part of which will be used to defray the cost of these improvements.

The Davis-Bournonville Company, West Street Building, New York City, is issuing a house organ, *Autogenous Welding*, the first issue of which has just appeared. Its purpose, as stated editorially, is to spread information requisite to the rapid progress of the oxy-acetylene process of welding and cutting metal. In addition to descriptions and illustrations of interesting apparatus the journal hopes to prove a valuable medium for exchange of ideas between expert operators, dealers and others who are interested.

The lake freight boat that is being built at the Lorain yard of the American Shipbuilding Company for M. A. Hanna & Co., Cleveland, Ohio, will be named Quincy M. Shaw, in honor of the president of the Calumet & Hecla Mining Company.

Steel Rail Production in 1910

Only Exceeded by the Record of 1906

The American Iron and Steel Association's statistics published this week show that the production of all kinds of rails in the United States in 1910 amounted to 3,634,029 gross tons, against 3,023,845 tons in 1909, an increase of 610,184 tons, or over 20.1 per cent. Rails rolled from purchased blooms, crop ends, scrap and "seconds," and rerolled and renewed rails are included. In the following table the production of all kinds of rails in the years beginning with 1900 is given. The maximum was reached in 1906 at 3,977,887 tons:

	Bessemer.	Open hearth.	Iron.	Total.
Pennsylvania	591,502	355,230	.....	986,732
Other States.....	1,326,398	1,320,669	230	2,647,297
Totals for 1910....	1,917,900	1,715,899	230	3,634,029
Totals for 1909.....	1,767,171	1,256,674	.....	3,023,845
Totals for 1908.....	1,349,153	571,791	71	1,921,015
Totals for 1907.....	3,380,025	252,704	925	3,633,654
Totals for 1906.....	3,791,459	186,413	15	3,977,887
Totals for 1905.....	3,192,347	183,264	318	3,375,929
Totals for 1904.....	2,137,957	145,883	871	2,284,711
Totals for 1903.....	2,946,756	45,054	667	2,992,477
Totals for 1902.....	2,935,392	6,029	6,512	2,947,933
Totals for 1901.....	2,870,816	2,093	1,730	2,874,639
Totals for 1900.....	2,383,654	1,333	695	2,385,682

Of the total production of steel rails in 1910, 3,460,943 tons was rolled from ingots made by the makers and 172,856 tons from purchased ingots or blooms, crop ends, "seconds," or renewed or rerolled rails.

Bessemer and Open Hearth Rails

The production of Bessemer steel rails in 1910 amounted to 1,917,900 tons, against 1,767,171 tons in 1909, an increase of 150,729 tons, or over 8.5 per cent. Of the total in 1910 1,829,954 tons was rolled by makers of domestic ingots and 87,946 tons by companies which did not operate Bessemer converters. Included in the total by makers of ingots is 68,497 tons of rerolled rails. The following table gives the total production by States from 1907 to 1910:

	1907.	1908.	1909.	1910
Bessemer rails.....	1,093,932	315,547	553,719	591,502
Other States.....	2,286,093	1,033,606	1,213,452	1,326,398
Totals.....	3,380,025	1,349,153	1,767,171	1,917,900

The production of open hearth steel rails in 1910 was 1,715,899 tons, against 1,256,674 tons in 1909. The increase in 1910 over 1909 was 459,225 tons, or more than 36.5 per cent, while the increase in 1909 over 1908 was 684,883 tons, or over 119 per cent. Almost all the open hearth rails in 1910 were rolled from basic steel, and virtually all were rolled by producers of open hearth ingots. Indiana was the largest maker of open hearth rails in 1910, followed by Pennsylvania, Alabama, Colorado, Ohio, Maryland, New York and California in the order named.

The production of iron rails in 1910 was 230 tons, all rolled in Illinois.

Light Rails and Heavy Sections

The following table gives the production of all kinds of rails in 1910, and 10 preceding years according to the weight of the rails per yard. Street and trolley rails are included:

Kinds of rails.	Under 45 lb.	45 lb. and less than 85.	85 lb. and over.	Total.
Gross tons.	45 lb.			Gross tons.
Bessemer rails.....	190,455	861,591	865,854	1,917,900
Open hearth rails....	31,977	424,381	1,259,541	1,715,899
Iron rails.....	230	.....	.....	230
Totals for 1910....	222,662	1,285,972	2,125,395	3,634,029
Totals for 1909.....	255,726	1,024,856	1,743,263	3,023,845
Totals for 1908.....	183,869	687,632	1,049,514	1,921,015
Totals for 1907.....	295,838	1,569,985	1,767,831	3,633,654
Totals for 1906.....	284,612	1,749,650	1,943,625	3,977,887
Totals for 1905.....	228,252	1,601,624	1,546,053	3,375,929
Totals for 1904.....	291,883	1,320,677	672,151	2,284,711
Totals for 1903.....	221,262	1,603,088	1,168,127	2,992,477
Totals for 1902.....	261,887	2,040,884	645,162	2,947,933
Totals for 1901.....	155,406	2,225,411	493,822	2,874,639
Totals for 1900.....	157,531	1,626,093	602,058	2,385,682

Included in the 3,633,799 tons of steel rails rolled in 1910 are 200,621 tons of so-called alloy steel rails, as follows: Ferrotitanium rails, 195,940 tons; electric rails, 4210 tons; manganese rails, 390 tons, and nickel, chrome and vanadium steel rails, 81 tons. Of the total 174,822 tons was rolled from Bessemer steel and 25,799 tons from open hearth steel. In 1909 the production of alloy steel rails was 50,724 tons. It is a question whether ferrotitanium rails should be included among alloy rails, as under the usual practice the titanium, which is added to the molten steel through a certain charge of ferrotitanium, goes into the slag, and ordinarily there is no intention of producing a titanium alloy steel.

Customs Decisions

Galvanized Steel Wire Rope

In overruling a protest filed by O. G. Hempstead & Son, the Board of United States General Appraisers has fixed the status of galvanized steel wire rope under the tariff act of 1909. Duty was assessed under the provisions of paragraph 135, at 35 per cent. ad valorem (the minimum rate for round iron or steel wire), plus 1 cent a pound for the finished article, plus 0.2 cent per pound additional for the galvanizing. The importers protested against this assessment, claiming that the ad valorem rate should be levied against the value of the wire, and not on the value of the rope, and that the 1 cent per pound additional for the finished article, and the 0.2 cent a pound additional for the galvanizing, should be based only on the weight of the wire used in the manufacture of the rope and not on the weight of the finished merchandise. In denying the contentions of the importers, General Appraiser Fischer says:

The provisions of paragraph 135 of the present act correspond with the provisions in paragraph 137, tariff act of 1897. The change in the wording of the respective paragraphs would not require a different conclusion than that expressed in G. A. 4, 761, wherein the court passed upon a like contention arising under the previous act. Following the rule noted, and for the reasons therein stated, the assessment here in question is affirmed.

File Testing Machines

In overruling a protest filed by Tinius Olsen & Co., Philadelphia, the Board of United States General Appraisers decides that so-called file testing machines are not to be regarded under the terms of the 1909 tariff act as machine tools. The machines in controversy are not used in any of the processes to manufacture complete files, but are used after the files are finished, to test their durability and to determine whether they are up to the commercial standard required. Duty was assessed at the rate of 45 per cent. ad valorem under paragraph 199 of the new law which specifies "manufactures of metal." Assessment is claimed by the importer at only 30 per cent. under the provision in the law for "machine tools." General Appraiser Fischer, in his decision for the tribunal, says: "We do not regard a testing and indicating apparatus as a machine tool, and it certainly is not a tool in the sense required for an article to be so termed. If it were a machine tool, then a thermometer and a scale for weighing articles would have to be likewise so considered. The protest is overruled and the decision of the collector affirmed."

Silico-Spiegel

A protest by Frank Samuel, Philadelphia, involving merchandise described as "10 per cent. silico-spiegel," was decided unfavorably to the protestant, who alleged that duty should be taken at \$2.50 per ton under paragraph 118, at the same rate as that applying to spiegel-eisen. The collector assessed the product under paragraph 183 of the act of 1909, as "metals unwrought." In denying the claim, General Appraiser Fischer says that the merchandise is an unwrought metal, and appears to have been properly classified.

The blast furnace of the Delaware River Steel Company, Chester, Pa., was blown in February 19, and will operate on basic pig iron.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

PIG IRON, Per Gross Ton:	Feb. 21, 1911.	Feb. 15, 1911.	Jan. 25, 1911.	Feb. 23, 1910.
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$18.50
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	16.75
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	13.50
Foundry No. 2, local, Chicago ..	15.50	15.50	15.50	19.00
Basic, delivered, eastern Pa.	14.50	14.50	14.25	18.50
Basic, Valley furnace	13.75	13.75	13.25	16.00
Bessemer, Pittsburgh	15.90	15.90	15.90	18.90
Gray forge, Pittsburgh	14.40	14.40	14.15	16.90
Lake Superior charcoal, Chicago ..	17.50	17.50	17.50	19.50

BILLETS, &c., Per Gross Ton:	Feb. 21, 1911.	Feb. 15, 1911.	Jan. 25, 1911.	Feb. 23, 1910.
Bessemer billets, Pittsburgh ..	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh ..	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia ..	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	29.00	29.00	28.00	33.00

OLD MATERIAL, Per Gross Ton:	Feb. 21, 1911.	Feb. 15, 1911.	Jan. 25, 1911.	Feb. 23, 1910.
Iron rails, Chicago	15.50	15.50	14.50	19.00
Iron rails, Philadelphia	18.00	17.50	17.00	20.00
Car wheels, Chicago	13.00	13.00	13.00	17.50
Car wheels, Philadelphia	14.00	13.50	13.00	16.75
Heavy steel scrap, Pittsburgh ..	14.75	14.50	13.50	16.75
Heavy steel scrap, Chicago ..	12.50	11.75	11.50	15.25
Heavy steel scrap, Philadelphia ..	14.50	14.00	12.50	16.50

FINISHED IRON AND STEEL.	Feb. 21, 1911.	Feb. 15, 1911.	Jan. 25, 1911.	Feb. 23, 1910.
Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia ..	1.37½	1.35	1.32½	1.60
Common iron bars, Chicago ..	1.30	1.30	1.30	1.60
Common iron bars, Pittsburgh ..	1.35	1.35	1.35	1.70
Steel bars, tidewater, New York ..	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York ..	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York ..	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York ..	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh ..	1.30	1.30	1.25	1.50
Skelp, sheared steel, Pittsburgh ..	1.35	1.35	1.30	1.60

SHEETS, NAILS AND WIRE.	Feb. 21, 1911.	Feb. 15, 1911.	Jan. 25, 1911.	Feb. 23, 1910.
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh ..	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh ..	1.75	1.75	1.75	1.85
Cut nails, Pittsburgh ..	1.60	1.60	1.60	1.80
Barb wire, galv., Pittsburgh ..	2.05	2.05	2.05	2.15

METALS, Per Pound:	Feb. 21, 1911.	Feb. 15, 1911.	Jan. 25, 1911.	Feb. 23, 1910.
Lake copper, New York	12.75	12.75	12.75	13.75
Electrolytic copper, New York ..	12.37½	12.37½	12.37½	13.37½
Spelter, New York	5.60	5.57½	5.55	5.70
Spelter, St. Louis	5.45	5.42½	5.40	5.55
Lead, New York	4.42½	4.45	4.50	4.55
Lead, St. Louis	4.27½	4.30	4.35	4.40
Tin, New York	44.75	45.75	43.25	33.20
Antimony, Hallett, New York ..	8.00	7.75	7.25	8.25
Tin plate, 100-lb. box, New York ..	\$3.94	\$3.94	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, 1¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full

extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8 .....	.15
Gauges under No. 8 to and including No. 9 .....	.25
Gauges under No. 9 to and including No. 10 .....	.30
Gauges under No. 10 to and including No. 12 .....	.40
Sketches (including all straight taper plates), 3 ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over .....	.20
Boiler and flange steel .....	.10
"A. B. M. A." and ordinary firebox steel .....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive .....	.05
Widths over 110 in. up to 115 in., inclusive .....	.10
Widths over 115 in. up to 120 in., inclusive .....	.15
Widths over 120 in. up to 125 in., inclusive .....	.20
Widths over 125 in. up to 130 in., inclusive .....	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Iron.	
	Black.	Galv.	Black.	Galv.
2 in.	72	58	68	54
2½ in.	75	63	71	59
3 in.	79	69	75	65
3½ in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ in.	78	68	74	64
3 in.	77	67	73	63
3½ in.	75	59	71	55
4 in.	51½			
Butt Weld, extra strong, plain ends, card weights.				
2 in.	69	59	65	55
2½ in.	74	68	70	64
3 in.	78	72	74	68
3½ in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	61
2½ in.	77	71	73	63
3 in.	76	70	72	62
3½ in.	69	59	65	55
4 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
¾ in.	64	58	60	54
1 in.	67	61	63	57
1½ in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ in.	67	61	63	57
3 in.	66	60	62	56
3½ in.	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1 1/2, 2 to 3 in. Butt Weld Will be sold at two (2) points lower basing higher prices than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2 1/2 to 4 in. Lap Weld
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1 1/2 in.	43	43
1 1/2 to 2 1/2 in.	51	43
2 1/2 to 3 in.	51	48
3 to 5 in.	69	55
2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.		
2 1/2 in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$29.

Steel Rivets.—Structural rivets, 3/4 in. and larger, 1.90c., base; cone head boiler rivets, 3/4 in. and larger, 2c., base; 5/8 in. and 1 1/16 in. take an advance of 15c., and 1/2 in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, February 21, 1911.—(By Telegraph.)

Pig Iron.—There has been quite an active movement in basic iron, and reports are that 35,000 to 40,000 tons have been sold by furnaces and dealers in the past week or 10 days, and at prices fully 50c. a ton higher than prevailed in this market a month ago. A local steel company has bought 10,000 tons for delivery over the next five or six months at a price said to have been \$13.75 or under at Valley furnace. The minimum of the market on basic iron to-day is \$13.75 and most furnaces are quoting \$14, Valley furnace. A meeting of the merchant furnace interests was held at Cleveland, Ohio, February 17, and reports made there showed that the iron trade had improved considerably recently. There is no new demand for Bessemer iron, but furnaces are holding firm at \$15, at furnace. A few small lots of Bessemer have been offered by dealers at about 10c. a ton under this price. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Conditions in the steel trade are more active than for some time and prices are very firm. We note sales of 2000 and 1000 tons of Bessemer sheet bars and 1000 tons of open hearth sheet bars, all at \$24, Pittsburgh, for delivery prior to April 1. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1 1/2-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

A meeting of the Billet and Sheet Bar Division of the American Iron and Steel Institute was held in Pittsburgh February 17, and was attended by about 20 of the large and small steel producers. Reports made by nearly all those present showed that the billet and sheet bar mills are busier now on actual orders than they have been for some months. Some of those present were in favor of making an advance in billets and sheet bars, but it was deemed unadvisable to do so at this time. It was stated, however, that recently, in one or two cases, slight premiums over regular prices had been paid for open hearth billets and sheet bars for spot delivery. None of the mills is disposed to sell steel at present prices for delivery beyond April 1. The Carnegie Steel Company is reported to be sold up on open hearth bars to April 1, and will not take any more orders for early delivery. Last week the steel plants of this company at Duquesne, Bellaire, Mingo Junction, Youngstown and New Castle were operated to full capacity for the first time in several months.

The general situation is undoubtedly better. Up to January 18 the rail and billet sales department of the Carnegie Steel Company received actual orders sent to the mills for slightly over 100,000 tons of billets, sheet bars, rails and steel ties, while up to February 18 the actual orders it entered for these materials exceeded 200,000 tons. The National Tube Company is starting up this week its tube mill at Benwood, W. Va., and two blast furnaces that have been closed down for about a year. The Carnegie Steel Company is starting up this week its No. 3 blast furnace at South Sharon, while the plant of the Allegheny Steel Company at Brackenridge, Pa., is operating now to nearly full time. Prices are firm all along the line. There are reports of another \$1 per ton advance in wire products to be made March 1, but not confirmed. The scrap market is very strong and prices on heavy steel scrap have again advanced. The feeling in coke is better.

Ferromanganese.—Some small inquiry is in the market, but prices are weak. A sale of about 50 tons is reported on the basis of about \$37.50, Baltimore. We quote 80 per cent. foreign at \$37.50 to \$37.75, Baltimore, the freight rate to the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—The leading local consumer that has been in the market for 6000 to 7000 tons of 50 per cent. for delivery over the remainder of this year has not yet closed. Another local consumer is figuring on the purchase of 300 tons of 50 per cent., for delivery up to July, and it will probably be sold on the basis of about \$54, Pittsburgh. Some other small inquiry is in the market, but prices seem weak. We quote 50 per cent. at \$54 to \$54.50, f.o.b. Pittsburgh, for delivery up to July. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—Strictly best grades of muck bar made from all pig iron are held at about \$30, Pittsburgh, but on a firm offer this price might be shaded. No sales have been made here for some time.

Skelp.—The better feeling in steel billets and the firmness in prices are reflected in skelp, which is very strong. The two or three mills in this district that roll iron and steel skelp for the open market have more orders on their books than for some time. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The activity in the wire trade is shown in rods, new inquiry being better than for some time. A sale of 300 tons of open hearth rods for March shipment is reported at \$29, Pittsburgh. The new rod mill of the Cambria Steel Company was started up last week and is working very successfully. It will sell the output in the open market until its wire nail and wire mills are finished, which will be in three or four months. We quote Bessemer, open hearth and chain rods, at \$29, Pittsburgh.

Steel Rails.—No orders for standard sections have been placed in the past week for domestic roads, but the Carnegie Steel Company has booked good orders for export and is having an active demand for its mine section steel ties for use in railroad coal mines, which are giving good satisfaction. New orders for light rails are not as active as they were some time ago, the company having taken in the past week slightly less than 2000 tons. The mills rolling light rails are having strong competition from the rerolling rail mills. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The Pressed Steel Car Company has received an order from the Virginian Railway for 1000 steel hopper cars, and the plates and steel wheels will be furnished by the Carnegie Steel Company. The same car builder has an order from the Pittsburgh, Shawmut & Northern for 550 steel gondola cars, while the American Car & Foundry Company received a like order from the same road. The Lehigh & New England Railroad is reported to have placed an order for 500 steel hopper cars with the American Car & Foundry Company, and a like order with the Standard Steel Car Company. The order for 1000 steel cars for the Wabash-Pittsburgh Terminal Railroad is expected to be given out this week. Prices on plates are firm, and we quote 1/4-in. and heavier plates at 1.40c., Pittsburgh.

Structural Material.—Local structural concerns report they are figuring on a very large amount of business, but that it is very slow to close; in fact, new orders for the past two or three weeks have been disappointing, and there is still much complaint about the low prices being made for erected work. Prices on plain material are reported firm.

THE IRON AND METAL MARKETS

and we quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—This is one of the most satisfactory departments of the whole iron trade, new demand being fairly active, with specifications coming in very freely. The Jones & Laughlin Steel Company has placed a contract with the Standard Engineering Company, Ellwood City, Pa., for the building of 12 more hot mills, which will give it a total of 24 at Aliquippa, Pa. The American Sheet & Tin Plate Company has started up some additional hot mills and is now operating to 87 per cent. of its hot mill capacity. The recent advance in prices is being held, and we quote 100 lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Sheets.—Mills report a slow but steady improvement, the new demand showing a gradual increase, while specifications against contracts are coming in at a fairly satisfactory rate. The full schedule of prices in effect on the different grades of sheets, and which is printed on a previous page, is reported as being maintained.

Bars.—Bar iron prices seem to be firmer, due to the recent advances in scrap, and several local mills are now reported as adhering to the basis of 1.40c., Pittsburgh. The new demand for steel bars is light, but specifications against contracts are coming in quite well. Hard steel bars, used for concrete reinforcement, have been dull for some time, but a larger demand is expected soon, as the building season will open actively in a short time. We quote steel bars at 1.40c., and iron bars at 1.35c. to 1.40c., in carload and larger lots, f.o.b. Pittsburgh.

Hoops and Bands.—A fair amount of new business is being placed, but most large consumers of both hoops and bands made contracts some time ago, against which they are now specifying. The recent weakness in prices is reported to have disappeared, and it is stated that regular prices of 1.50c. on hoops and 1.40c. on bands are now being maintained.

Spikes.—The spike trade continues quiet, no large contracts having been placed with local makers for some time. Prices, as adopted February 1, are reported as being held, and are as follows:

Railroad Spikes.

4 1/4, 5 and 5 1/2 x 9 1/16	Extra	1.55
3, 3 1/2, 4, 4 1/2 and 5 x 7 1/16	Extra	.10
3 1/2, 4 and 4 1/2 x 7 1/16	Extra	.20
3 1/2, 4 and 4 1/2 x 8	Extra	.30
3 1/2 x 8	Extra	.40
2 1/2 x 8	Extra	.60
2 x 8 1/16	Extra	.80

Boat Spikes.

3/4 in. square, 12 to 24 in. long	Extra	.15
3/4 in. square, 8 to 16 in. long	Extra	.15
1/2 in. square, 6 to 16 in. long	Extra	.15
7/16 in. square, 6 to 12 in. long	Extra	.20
3/8 in. square, 4 to 12 in. long	Extra	.30
5/16 in. square, 4 to 8 in. long	Extra	.45
1/4 in. square, 4 to 8 in. long	Extra	.75
1/4 in. square, 3 to 3 1/2 in. long	Extra	1.00
3/8 and 5/16 shorter than 4 in., 1/4 cent extra.		

Spelter.—The market is decidedly firmer, and the demand is reported as much heavier. We quote prime grades of Western at 5.35c., East St. Louis, equal to 5.47 1/2c., Pittsburgh.

Merchant Steel.—New orders are about as heavy as in the corresponding period in January, but shipments by the mills have been larger. Prices are reported as very firm, and we quote as follows, f.o.b. Pittsburgh: Iron finished tire, 1/2 x 1 1/2 in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Orders are mostly in small lots to cover actual needs, but specifications against contracts are reported as coming in more freely. Regular prices, which are 1.90c. on structural rivets and 2c. on boiler rivets, continue to be slightly shaded.

Wire Products.—The new demand for wire and wire nails is quite active and specifications against contracts are reported as coming in well. The two leading wire interests are reported as operating to practically full capacity, with more orders on their books than at any time in some months. We quote galvanized barb wire at \$2.05, painted \$1.75, annealed fence wire \$1.55, galvanized \$1.85, wire nails \$1.75 and cut nails \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—It is reported that the Tri-State Natural Gas Company has placed a contract for 70 to 75 miles of 3 to 10-in. line pipe, but the name of the mill getting the order has not been given out. The National Tube Company is getting ready to start its Riverside tube mill at Benwood, W. Va., which has run only for a few months since 1907. Blast furnace B at this plant was started February 20; furnace A is scheduled to start February 23; the Bessemer steel department and blooming mill, to start

March 6; the skelp mills on the same date, and the pipe mills March 7. This plant turns out pipe up to 6-in. in diameter. The general demand for merchant pipe is showing a gradual increase and the leading mills are working to fuller capacity than for some time. Some very important projects for gas and oil lines, involving a large tonnage of pipe, are under way.

Boiler Tubes.—This trade continues very unsatisfactory, both from the standpoint of prices, which are being materially shaded, and also from demand, which is still dull. It is understood that very low prices are being made on the small amount of business in both locomotive and merchant tubes that is being placed.

Coke.—There is a better feeling in the coke trade. Prices seem to be a trifle firmer. A sale is reported of about 1500 tons of standard grade blast furnace coke for prompt shipment on the basis of about \$1.50, per net ton, at oven. The output in the Upper and Lower Connellsville regions last week is estimated at 323,333 net tons, an increase over the previous week of 21,058 tons. This gain in output was entirely at the blast furnace ovens, due to the starting up of a number of furnaces. We quote standard makes of furnace coke for spot shipment at \$1.45 to \$1.55 per net ton, at oven; on contracts for delivery over the year from \$1.70 to \$1.75 is being quoted by some coke operators, while others are firm, at \$1.90 to \$2, at oven. Best makes of 72-hour foundry coke are being held at \$2.10 to dealers and from \$2.25 up to \$2.50, at oven, to consumers.

Iron and Steel Scrap.—There seems to be something of a runaway market in the scrap trade. Some dealers believe that the advance in prices has been too rapid, and that there will be a reaction. However, it is a fact that there is a scarcity in supply of heavy steel scrap and other grades as well, and dealers are afraid to sell material ahead that they do not have, as they may not be able to get it when needed. Reports are that heavy steel scrap has sold in large quantities in the past week as high as \$15 at nearby consuming points. Consumers had allowed their stock to run down to a minimum, and are now eager buyers at prices they turned down only a few days ago. We have advanced quotations on nearly all grades of scrap. We note a sale of 500 tons of cast iron borings at \$9.75 to a dealer; 5000 to 7000 tons of heavy steel scrap at \$14.50 to \$14.75, with several sales reported as high as \$15; 2000 tons of cast iron borings at \$9.75, delivered to consumers' mills in the Pittsburgh district, and 1500 to 2000 tons of turnings at \$10.50, delivered to consumers' mills. A large steel company in the Youngstown district is reported to have sold a heavy tonnage of steel scrap at \$14.50, f.o.b. cars, at its mill, the freight rate to the nearest consuming point being 45c. per ton. Dealers have advanced prices and now quote as follows per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Folsbee, Sharon, Monessen and Pittsburgh delivery	\$14.75 to \$15.00
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.75 to 14.00
Bundled sheet scrap, at point of shipment	11.00 to 11.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.25 to 13.50
Grate bars	11.25 to 11.50
Low phosphorus melting stock	17.25 to 17.50
Iron car axles	24.75 to 25.00
Steel car axles	20.50 to 20.75
Locomotive axles	24.25 to 24.75
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.75 to 14.00
Sheet bar crop ends	16.00 to 16.25
*Cast iron borings	9.50 to 9.75
*Machine shop turnings	10.25 to 10.50
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50
Stove plate	11.50 to 11.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, February 21, 1911.—(By Telegraph.)

Anticipating favorable Supreme Court decisions in the tobacco and oil cases, Western consumers are inquiring and buying more freely. This tendency is strengthened by recent liberal orders for pig iron from large melting interests and still further encouraged by the precipitation of moisture in dry sections of the Middle West and Northwest, where the need was beginning to cause some anxiety. Numerous inquiries call for pig iron prices as far ahead as the first quarter of 1912, but, stimulated by the same causes of optimism, producing interests are loath to consider business for delivery beyond the first half of this year, except at a sharp advance, and not at all for 1912 shipments. The open winter thus far

THE IRON AND METAL MARKETS

prevailing has been decidedly favorable to outdoor operations and a very healthy demand exists for all kinds of structural and building material. Contracts continued to be placed for large tonnages of cast iron pipe, and specifications running well into six figures have been received by makers since the first of the year. Under the speculative influences at work in this market, scrap has moved upward rapidly in the last two weeks. The resumption of operations on Monday at the rail mills in the South Chicago and Gary plants followed the receipt of attractive shipping instructions for standard sections. The contracts for new construction let last week included a new blast furnace of 450 tons capacity for the Inland Steel Company, to be erected at Indiana Harbor, Ind. The same interest is also planning a further addition of a nut and bolt department to its plant, the contracts for which will be let in the near future.

Pig Iron.—Considerable interest has been manifested in pig metal since the announcement of heavy purchases by pipe and implement interests a week ago. Conspicuous among the inquiries are Western malleable foundries, whose combined requirements run into many thousands of tons. Quit a few of these concerns evince a disposition to contract for their wants to April, 1912, but are receiving no encouragement in this respect from furnaces. Nor are the latter willing to obligate themselves even for last half deliveries, except at sharp advances above present prices. The demand for Southern iron is quite as insistent as that for Northern brands. A great many scattering sales have been made, ranging from 100 tons upward. Furnaces are adhering strictly to the \$11, Birmingham, basis for No. 2 for first half delivery. Some sales for the last half were made last week at this price, but it is not possible to duplicate them. Generally speaking, the schedule for July to December shipment is based on \$11.50 for No. 2, though occasionally the inducement is offered to old customers to cover at \$11.25 for the third quarter, and \$11.50 for the fourth quarter. The market is stiffening daily and at least one large Southern producing interest is declining to quote on any business for the second half. The following quotations are for February and March shipments, Chicago delivery:

Lake Superior charcoal	\$17.50 to \$18.00
Northern coke foundry, No. 1	16.00 to 16.50
Northern coke foundry, No. 2	15.50 to 16.00
Northern coke foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.50 to 16.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

Rails and Track Supplies.—Indicative of improved conditions in these products was the resumption on Monday of work in the rail mills at South Chicago and Gary after an idleness of nearly two weeks. New business in standard sections last week aggregated 5000 tons. A good demand for light rails continues to be felt. Track supplies are moving freely. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Billets and Rods.—Intermediate steel products have stiffened in sympathy with other crude and semi-finished materials and the local mills are holding firm to the minimum of \$30.60, base, Chicago, for open hearth forging billets. Specifications are good and there is some scattering inquiry for new tonnage. Wire rods are firmly held at \$29, Pittsburgh.

Structural Material.—The open weather this month has decidedly aided the structural market. Building operations in the Chicago territory are unusually active for this time of the year. Warehouse stocks have felt this impetus, and there is an active movement from these in small lots. Mill conditions also have improved, due to the heavier specifications from fabricators and railroads, largely attributed to the same cause. Prices of plain material are very firm, but unchanged. The fabricating contracts let this week aggregate 3800 tons, divided as follows: Post-office at Missoula, Mont., 116 tons, let to the St. Paul Foundry Company; foundry building for Puget Sound Navy Yard, Bremerton, Wash., 800 tons, to the McClintic-Marshall Construction Company; First Presbyterian Church, San Francisco, Cal., 140 tons, to Pacific Rolling Mill Company; St. Ignatius Church, for the Jesuit Fathers, San Francisco,

Cal., 800 tons, to Central Iron Works; Y. M. C. A. Building, Chicago, 270 tons, to A. Bolter's Sons, Chicago; wagon factory for the Anheuser Busch Brewing Association, St. Louis, Mo., 570 tons, to Noelke-Richards Iron Company, Indianapolis; coal handling plant for the C. Reiss Coal Company, Manitowoc, Wis., 440 tons, to Heyl & Patterson, Pittsburgh. Figures are being taken for an office building in St. Paul, which will require in the neighborhood of 2000 tons of shapes. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—There is a fair volume of new business coming forward. Specifications continue good and mill order books are in excellent shape. A strong confidence is displayed as to the future trend of the market. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—The most noteworthy feature of the market is the disposition to adhere more strictly to card prices. Galvanized sheets are moving freely as the season for their consumption advances, but black and corrugated sheets are enjoying only a normal demand. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Merchant Steel.—Nothing of importance has developed in the week under review. A fair tonnage of new business has been closed and specifications are up to the average.

Cast Iron Pipe.—There is a very active demand for all sizes. The leading interest has secured contracts this week for 5000 tons of 6-in. to 12-in. pipe from the city of Chicago, and 1500 tons from Boone, Iowa. Milwaukee is in the market for 10,000 tons of 20-in., and possibly a large additional tonnage of smaller sizes. Indianapolis will let a contract February 24 for 1200 tons, and Rockford, Ill., will soon buy 500 tons. There is also pending a very large tonnage, made up of small lots for various municipalities in the States contiguous to this center. Prices are very firm. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Bars.—A very sluggish market prevails in iron and steel bars. Implement interests are slow in making new contracts for their requirement for the fiscal year soon to commence. Specifications against existing contracts also are reported below normal, though the mills appear not to be suffering for tonnage. Bar iron is sentimentally stronger as a result of the sharp advance in scrap, but mills have not been able as yet to advance their prices. The sharp competition among Western producers, in fact, has resulted in concessions on desirable business, and sales have been made in the past week at 1.25c. and 1.27½c. for 30 to 60 day deliveries; however, mills are now holding firm at prices from 50c. to \$1 a ton above these prices. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Specifications from the hardware and implement trades are coming in rapidly, and somewhat earlier than expected. The sales of wire products were better in January than for the same period in the past three years, and February is rounding out considerably above normal. There is some talk of the possibility of an advance to take place in the near future, though prices remain firm as follows: Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Old Material.—Speculators seem to have the local market well in hand. In the face of a light consumptive demand, they have succeeded in raising prices from 25c. to \$1 a ton. Every advantage has been seized to facilitate this upward movement, and the improved conditions in iron and steel of the past two weeks, as well as the possibilities of the near future, have been greatly discounted. Steel scrap has borne the brunt of the advance. Cast and wrought scrap are sluggish, owing to the failure of bar iron makers and pig iron producers to realize higher prices on their products. In the minds of conservative buyers and sellers, it is not believed that the present boom in scrap can long prevail. The Santa Fé Railroad has an accumulation of 20,000 tons of scrap in its yards, which it has been holding for an active market, and the Burlington system is out this week with a list aggregating 2500 tons. The weather throughout the West is very mild, encouraging the accumulation of scrap and a possible early dumping of it on the local market. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this dis-

THE IRON AND METAL MARKETS

trict, owing to high switching charges. Following prices are per gross ton, delivered Chicago:

Old iron rails.....	\$15.50 to \$16.00
Old steel rails, retooling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	12.50 to 13.00
Frogs, switches and guards, cut apart.....	12.50 to 13.00
Shoveling steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$14.00 to \$14.50
Iron arch bars and transoms.....	15.25 to 15.75
Steel angle bars.....	11.50 to 12.00
Iron car axles.....	19.25 to 19.75
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.00 to 11.50
Steel knuckles and couplers.....	11.50 to 12.00
Locomotive tires, smooth.....	17.50 to 18.00
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	7.00 to 7.50
Cast and mixed borings.....	5.75 to 6.25
No. 1 bushing.....	10.25 to 10.75
No. 2 bushing.....	7.75 to 8.25
No. 1 boilers, cut to sheets and rings.....	9.00 to 9.50
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	10.50 to 11.00
Railroad malleable.....	11.50 to 12.00
Agricultural malleable.....	10.50 to 11.00
Pipes and flues.....	9.00 to 9.50

Philadelphia

PHILADELPHIA, PA., February 20, 1911.

The iron and steel markets maintain fully the recent gains reported and some branches show a further improvement. Foundry pig iron is being freely inquired for, but the bulk of the sales are confined to early delivery. Pig iron prices are being well maintained and the lowest sellers have stiffened up considerably. In finished materials a moderate gain in demand, with somewhat better specifications, is generally reported, and some mills are slightly more active. The old material market continues to broaden; prices have again advanced and in many cases it is not possible to get any quantity of the leading grades at present quotations.

Iron Ore.—Sales of quite heavy tonnages of foreign ore are announced. Sota & Aznar have just concluded arrangements for over 250,000 tons of Spanish ores to be brought over this year. Prices for the first half of the year are the same as in their last large sales in July, 1909. Prices for the second half on one grade will be reconsidered if there is any drop in lake ore prices. A large quantity of their Lucainena ore will be taken by the Warwick Iron & Steel Company, which will engage in the manufacture of low phosphorus pig iron. The largest part of the total tonnage sold was Sagmenera ore. Importations at this port during the week comprised one cargo of Cuban ore, 6300 tons, valued at \$17,325.

Pig Iron.—While there has been little large lot business closed recently, a very fair movement has occurred in small and moderate quantities of foundry grades, the aggregate of which is fully equal to the recent average volume. The trade, therefore, feels encouraged with the situation, particularly as inquiries continue to come out quite freely covering consumers' near future as well as more extended requirements. Melters would, in a number of cases, contract for considerable iron for second and third quarter and even for last half delivery, if they could get it at recent quotations or probably even at a slight advance, but sellers refuse to consider anything beyond near future commitments. A good share of this inquiry has been of a quiet nature, prospective buyers preferring not to come before the trade generally. There is a decided firmness observable and it is understood that even in strongly competitive markets, sellers are not showing the same disposition to meet low prices made by producers located outside the district. A better demand is reported for Virginia foundry irons; inquiry has increased and the volume of business taken, while confined principally to small lots, has been a trifle larger. Prices also show increasing firmness and standard brands cannot be had at less than \$13, furnace, for No. 2 X or No. 2 plain, delivery running over three to four months; while some sellers refuse to quote for strictly second quarter shipment, the leading interest will accept orders for such delivery at \$13.50, furnace. In low grade foundry irons there has not been much business, although cast iron pipe makers have moderate inquiries before the trade. Sellers of Southern iron are holding prices firmly, as a result of which there has been little business transacted in this district. Several fresh inquiries for forge iron are reported, but buyers and sellers are still apart on prices. Basic iron is quiet; immediate requirements of consumers in this district are mostly supplied, and, while some melters would probably take on additional moderate quantities at the price prevailing during the recent

movement, sellers are holding firmly at \$15, delivered, and refuse to consider business of a forward character. Several moderate lot sales of low phosphorus iron are reported at the market. The following quotations are named for standard brands, for early delivery in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.00 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.25
Basic.....	14.50 to 15.00
Standard low phosphorus.....	21.00 to 21.50

Ferromanganese.—There has been no fresh demand from consumers in this district and the market generally is reported quiet. For prompt shipment \$37.50, Baltimore, is named, while \$38 about represents the market for forward deliveries.

Billets.—Consumers continue to place orders in small quantities for prompt delivery and the aggregate business is slightly greater. Prices are being firmly maintained at \$25.40, delivered here, for standard open hearth rolling billets, with ordinary forging billets at \$30.40, delivered. The latter class of billets has been proportionately more active than rolling billets. Eastern mills are operating on a slightly better basis, but have not reached the rate of production reported by the majority of finished material mills.

Plates.—A very good business continues to be placed. In few instances are orders large, but there has been a steady demand for tank and boiler plates, as well as a fair share of car work, while specifications against orders for bridge plates have been more active. Reports from the trade are that users of plates generally are more active and the outlook for a continuation of the recently improved business conditions is considered quite favorable. Mills are maintaining their recent productive rate and a few have made further slight gains. Prices are being firmly maintained, 1.55c, delivered, representing the minimum quotation for ordinary plates delivered in this vicinity.

Structural Shapes.—While a slight betterment in the general demand is reported, the increase has not been as large as in other lines, owing to the absence of orders involving anything beyond small quantities. Several moderate building propositions are in sight, including a new Ritz-Carlton Hotel in this city. Current orders are mostly in small lots, for which prices are firmly maintained at 1.55c, minimum for plain shapes, delivered in this vicinity.

Sheets.—A very fair day to day demand is reported, sufficient to keep mills operating at full capacity, but there is still a lack of forward business, and order books are not in good shape for continuous operation. Prices are firm, the following range representing quotations of Eastern mills for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Consumers of iron bars are coming into the market more freely, owing to the recent advance in prices, and efforts to get orders placed at prices prevailing previous to the withdrawal of quotations by makers have been generally unsuccessful. The market to-day is strong at 1.37½c. to 1.42½c. for refined iron bars, delivered in this vicinity, and the tendency appears to be toward a higher level. Steel bars are moderately active at 1.55c., delivered here.

Coke.—The movement is light, both in foundry and furnace grades. Prices for prompt coke are unchanged, but several producers have advanced prices of furnace coke for forward delivery, as high as \$1.85 to \$2 per net ton at oven, being named, although no business is done at that basis. While prices of foundry coke are somewhat firmer, quotations are practically unchanged, the following range being named, per net ton, for deliveries in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$3.75 to \$3.90
Foundry coke.....	4.25 to 4.50
Mountain furnace coke.....	3.35 to 3.50
Foundry coke.....	3.85 to 4.10

Old Material.—The upward movement of prices continues, and at the present range it is almost impossible to get any large quantity of material. Melters have paid \$14.50, delivered, for heavy melting steel and, while that figure is being offered for quantities, it is said that practically no steel comes out. Holders of practically all classes of material are refusing to let go, anticipating a still higher level and what little business is done has been for prompt shipment. The movement in heavy steel has affected other grades and an advance in prices is reported all along the line, although in instances the higher value is based on a comparative rather than actual basis. The rolling mills have been inquiring more freely and sales of choice No. 1 wrought scrap in moderate lots are reported as high as \$17.50, delivered. Turnings and borings have also been sold at higher figures than recently quoted. The following range of prices about represents sellers' views of the market for deliveries

THE IRON AND METAL MARKETS

in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 steel scrap.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	15.75 to 16.25
Low phosphorus.....	18.00 to 18.50
Old steel axles.....	21.00 to 21.50
Old iron axles.....	20.00 to 20.50*
Old iron rails.....	18.00 to 18.50
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	17.00 to 17.50
Wrought iron pipe.....	14.00 to 14.50
No. 1 forge fire.....	12.25 to 12.75
No. 2 light iron.....	8.00 to 8.50*
Wrought turnings.....	10.00 to 10.50
Cast borings.....	9.50 to 10.00
Machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.00 to 12.50*
Grate bars.....	12.00 to 12.50
Stove plate.....	11.00 to 11.50

* Nominal.

The Warwick Iron & Steel Company, Pottstown, Pa., has made an arrangement with the Heckscher Furnace Department of the Alan Wood Iron & Steel Company, by which it will take over the low phosphorus iron contracts, ores and general low phosphorus pig iron business formerly conducted by that concern. The arrangement becomes effective about May 1.

Cleveland

CLEVELAND, OHIO, February 21, 1911.

Iron Ore.—The indications are that the early buying of ore during the coming spring before the opening of navigation will be quite light. A large share of the furnace interests will have enough of last season's ore to last them until the latter part of the summer, if not longer, and these see no reason for buying early. Early purchases will mean early payments on ore that many will not need before fall, and late purchases will enable them to defer starting payments until after contracts are placed. We quote prices as follows: Old range Bessemer, \$5; Mesaba Bessemer, \$4.75; old range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—A meeting of Ohio pig iron manufacturers was held in this city February 17. The general situation was discussed and the consensus of opinion was that the market is much firmer and the outlook more favorable. One or two makers of basic that have been making lower quotations have fallen in line and it is understood that \$14, Valley furnace, is the minimum quotation to-day. Foundry iron is also firmer and it is claimed that none of the Valley furnaces is shading \$14 for No. 2 for future delivery. One northern Ohio producer, however, is not maintaining this price. For Cleveland delivery for prompt shipment, \$13.75 at furnace is being quoted, and about the same price is being named for outside shipment during the first half. The northern Ohio market is quiet. The only sales reported are a few lots of 300 tons and under, and the few inquiries that have come out have not been for larger tonnages. In Michigan and at other Western points the market has become more active and a number of inquiries for foundry and malleable grades in round lots have come out. Some buyers are still feeling the market with last half inquiries. Producers as a rule are unwilling to quote for the last half, but those who will take on tonnage that far ahead want an advance of 50c. a ton over first half prices. A limited tonnage has been sold at that advance. Local sellers have an inquiry for 300 tons of Southern foundry for the last half, but Southern furnaces are not inclined to quote for that delivery. For prompt shipment and the first half, we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.00
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	\$14.00 to 14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.75
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—The market is quiet, the only transactions being small lots of foundry coke for early shipment. Prices are stationary and firm. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton, at oven, for spot shipment, and \$1.60 to \$1.65 for the first half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—The general outlook continues to improve. Both orders and inquiries during the past week were for larger tonnages than during the previous week, and there was a better volume of inquiries for contracts covering the first half. Carload orders are more plentiful than they have been for a number of months. Inquiries for contracts are mostly for steel bars. Large railroad orders and specifications were received during the week

from the Lake Shore & Michigan Southern Railroad for its Western lines, these orders including 24,000 kegs of spikes. The Illinois Steel Company was given an order for 15,000 kegs of spikes, 5000 kegs of track bolts and about 750 tons of angle bars, and an order for 9000 kegs of spikes was divided between two independent interests. The demand for steel bars shows less improvement than some other lines, this being attributed to the fact that some of the bolt and nut manufacturers and other large consumers are substituting iron bars because of the lower prices quoted on the latter. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The structural situation continues quiet, but the outlook is good. T. H. Brooks & Co., Cleveland, have taken the contract for a plant for the Republic Rubber Company, Youngstown, Ohio, requiring 180 tons. The contract for an addition to the Y. M. C. A. Building in Detroit, requiring 200 tons, has been let to Whitehead & Kales of that city. The demand for sheets is more active and prices appear to be firmly maintained. There is an improved demand for light rails in carload lots. The demand for iron bars, which recently improved, is fairly good. Prices are firm at 1.30c., at mill. Warehouse business with jobbers shows an improvement.

Old Material.—There is considerable inquiry for scrap for March and April delivery from both local and outside mills. Not much tonnage has been sold during the week, but dealers are looking for a fairly active buying movement after the present feeling of the market. Further advances have been made on a number of grades. The market is very firm and it is doubtful whether concessions from present quotations can be secured except on small lots of material on the cars. In fact dealers are looking for a further advance and say they do not care to sell much tonnage at present quotations. The Nickel Plate Railroad closed February 21 on its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	16.00 to 16.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	13.25 to 13.50
Old car wheels.....	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 7.00
Iron and steel turnings and drillings.....	7.50 to 8.00
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	11.50 to 12.00
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	12.00 to 12.50
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

St. Louis

ST. LOUIS, February 20, 1911.

All interests identified with the iron trade report an enlargement of inquiry. Manufacturers of cement state that for January their sales were over 20 per cent. in excess of the same month last year, owing in a measure to the open winter. Clearings in St. Louis, Kansas City and St. Joseph, as reported by the banks, were again in excess of the same week last year.

Pig Iron.—Increased interest continues to characterize the pig iron market. A number of inquiries are still pending. In several cases buyers and sellers continue apart in their views, both with regard to the older and some new business which developed within the past few days. Instead of sellers making concessions from current prices, as expected by some intending buyers, they were confronted with firm and in some instances slightly higher prices. There is also a degree of contention over the range of delivery and some transactions could not be worked on account of the premium asked for the third quarter. An inquiry is out by an Illinois stove manufacturer for 1000 tons of Southern No. 2 foundry for shipment over the second and third quarters. One of the leading sales agencies reports the sale of 1600 tons of Northern and Southern iron for shipment over the remainder of the first half. A leading interest reports sales of Southern foundry iron aggregating 10,775 tons in St. Louis territory, for shipment mainly over the remainder of the first half. Well posted parties estimate that upward of 40,000 tons of pig iron have been contracted for in the past four weeks. A feature of the situation is the receipt of requests to anticipate contract delivery. Merchant sellers report a fair activity in buying by small consumers. Prices continue unchanged, but the tone of the market is stronger. We quote Southern No. 2 foundry, for shipment over the remainder of the first half, \$11, f.o.b. Birmingham. For shipment over the third quarter, \$11.50 is asked.

Coke.—With most offices the market on coke ruled quiet, but specifications on contract came in fairly well. A leading

THE IRON AND METAL MARKETS

sales agency reports sale of 2000 tons of foundry coke for forward delivery. Merchant sellers are finding a fairly good inquiry from small consumers. We quote 72-hr. Connellsville foundry for shipment over the remainder of the first half at \$2.10 per net ton, f.o.b. oven, for shipment over the remainder of the year \$2.20. For special brands and carload lots, 25c. to 50c. more per ton is asked.

Finished Iron and Steel.—The leading interests report an increase in inquiry for structural material coming both from structural shops and from car builders. There is a better demand for finished steel than for iron. Manufacturers of implements, wagons, &c., are in the market for material and there is a good inquiry from the railroads for track supplies and equipment.

Old Material.—The improved feeling in pig iron is reflected in the scrap iron and steel market. Leading dealers state that prices are firm and tending upward. There were no railroad offerings the past week. The inquiry from consumers is increasing. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, rerolling.....	12.50 to 13.00
Old steel rails, less than 3 ft.....	12.00 to 12.50
Relaying rails, standard sections, sub-	
ject to disposal.....	22.50 to 23.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart..	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushing.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings..	8.00 to 8.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	8.00 to 8.50
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	8.00 to 8.50
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50

The Cane Creek Iron Ore Company has been incorporated. The capital stock is \$1,000,000. The incorporators are Frank H. Mitchell, Lee F. Mitchell and George L. McBride of St. Louis; D. W. Thompson of Randolph, Ill.; J. J. Love of Bloomington, Ill., and G. W. Witson of Ovalaska, Wis.

The Beck & Corbitt Iron Company will erect an addition to its present building, which will then cover the entire block at the corner of Main and O'Fallen streets. These improvements, when completed, will cost in the neighborhood of \$80,000, and will give the company a seven-story building. The structure will be the most modern, as well as the most complete one devoted exclusively to heavy hardware.

The May Department Stores Company has purchased the William Barr Dry Goods Company and a new building will be constructed, which will cost about \$6,000,000. It will be 21 stories and construction will start in June.

Cincinnati

CINCINNATI, OHIO, February 21, 1911.

Pig Iron.—Northern basic and Southern foundry show considerable activity for second quarter shipment. Of Northern basic 10,000 tons was contracted for last week at a price about 80c. above that of November 1. Another lot of approximately 15,000 tons is reported to have been bought by a southern Ohio manufacturer with deliveries extending through the third quarter. Between 5000 and 6000 tons of basic was also taken by a northern Ohio company from a nearby furnace. Among Southern foundry sales are 6000 tons to a pipemaker, with shipments extending through the third quarter, and a substantial tonnage for spot and second quarter shipment is being taken by consumers who generally buy medium-sized quantities. A few sales of No. 2 foundry for the third quarter have been made at \$11.50, Birmingham, and there was one for second half. Many offers of \$11 for Southern No. 2 foundry are being received for last half shipment, but they are promptly refused and several furnaces are now asking \$11.50 for any shipment after March 1. Low grade Southern iron is scarce. Malleable is in demand and in addition to smaller inquiries two Indiana manufacturers want 1500 and 2000 tons respectively, both for July to December delivery. For prompt shipment malleable is obtainable at \$14 to \$14.50, Ironton, for the first half. Northern No. 2 foundry remains at \$14, Ironton. There is quite a demand for ferrosilicon and ferromanganese. Several small lots of high silicon iron have been sold lately. Based on freight rates of \$3.25 from

Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	18.20
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

Coke.—Furnace coke has shown a little activity, but the transactions closed cover very small quantities. Foundry coke is very dull and sales are for carload lots to fill immediate requirements. Prices remain unchanged. For Connellsville furnace coke we quote \$1.50 per net ton at oven for prompt shipment, with the usual advance of 10c. to 15c. on time contracts. Pocahontas and Wise county furnace coke are quotable around \$1.65 to \$1.75 for spot shipment, with a slight advance for the first half. Foundry coke is obtainable in all three fields at \$2 to \$2.15 for immediate shipment, with \$2.25 per net ton at oven representing the average contract price.

Finished Material.—Steel bars continue to show steady improvement. Hoops and bands have also been bought more freely lately. The inquiry for structural material is good, but actual sales were a trifle slow the past week. The Pittsburgh mill price is 1.40c. and warehouse figures range from 1.80c. to 1.95c.

Old Material.—There is an unconfirmed report that one of the larger railroad systems will offer a large quantity of scrap soon. Prices remain firm, but not much scrap is moving. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	5.00 to 5.50
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Bushel sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton..	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton...	11.00 to 11.50

The German Iron Trade

A Central Selling Agency for Bars

BERLIN, February 9, 1911.

The event of the week in the iron trade was a second meeting of the bar interests three days ago at Dusseldorf to consider continuing the present price convention, or to substitute a more complete form of organization for it. The meeting did not reach a decision, but it appointed a committee to work out a plan for organizing on the basis of a common selling agency, and adjourned to February 22 to take action on this proposal. There is a strong sentiment in favor of this form of combination, while most of the works are quite indifferent to prolonging the present price agreement, which expires at the end of March. However, two important companies were not represented at this week's meeting. One of these, the Gelsenkirchen Company, ranks second to Krupp's in importance among the German iron companies. The other was the Peiner Walzwerke, at Peine, near Hanover, outside of the Rhenish-Westphalian district. The latter concern has already declared that it will not join the new combination, evidently proposing to avail itself of its favorable geographical situation for supplying the territory lying to the east and north. It is believed, however, that the organization will be perfected. The fact that the present drawback on bars would be withdrawn by the Steel Works Union if the bar organization should fail of renewal will serve as a powerful incentive for keeping up some form of combination. Meanwhile the sale of bars has been stopped pending the result of the next meeting. The view is pretty general that the new organization, if it is reached at all, will reduce the existing bar price of 112 to 114 marks per ton.

Pig Iron Output at a New High Rate

The general situation in the iron trade shows few changes. Business remains rather quiet, but goods on order are being generally taken at the normal rate. The production of pig iron continues to mount into new records. The January figures published to-day show a total of 1,320,685 tons, which is 13,600 tons more than for December and 143,100 tons more than for January, 1910. The home demand for pig has not been coming forward since the beginning of the year in a satisfactory volume, but foreign orders continue to arrive in considerable amounts. The prices for export are cut pretty low in competition with foreign producers. The Essen Pig Iron Syndi-

THE IRON AND METAL MARKETS

cate, which went into operation in October for a limited period, is now about to begin negotiations for its prolongation, and efforts will again be made to induce the Siegerland furnaces to join, they having refused to enter the present organization. The iron mines in that region are quite busy. Ores are being called for delivery briskly. The mines are working to 90 per cent. of their possible capacity. The imports of foreign ores in January amounted to only 264,800 tons, or less than half as much as a year ago. Foreign ores, however, are in strong demand and are scarce, especially Swedish ores. German ironmen who acquired ore properties in Normandy, France, a year or two ago are pushing their development work forward rapidly, and ores will soon be coming from there to the lower Rhine furnaces.

Activity in Finished Lines

The foreign market continues to send in good orders for heavy steel rails, but the orders of the home railroad authorities remain very light. The market for structural forms is very quiet. A meeting of the union toward the end of the month will take action on structural prices during the June quarter, but it is understood that they will be left unchanged. Plate mills running on heavy forms have plenty of work ahead for a month or two, but sales for the June quarter have not yet been declared open. Business in wire stock is pretty active, but manufacturers of wire nails complain of light orders, foreign buyers in particular showing a marked tendency to hold back.

The most active section of the iron trade is that of the foundries. Both home and foreign buyers are sending in orders at a brisk rate, and the shops have all the work they can manage. It is expected that the building trade will show a considerable revival in the spring, which would increase the demand for certain forms of castings. The orders for machine castings have been materially increased since the end of December, corresponding with the activity in the machinery trade.

The exports of pig iron in January amounted to 59,532 tons, against 53,752 tons in January, 1910; steel material, 53,369 tons, against 42,692; beams, 18,874 tons, against 21,623; steel rails, 34,986 tons, against 29,093, and ties, 11,600 tons, against 11,649.

The reports from the Belgian market this week are better. An advance of 1 franc a ton in the price for export bars is mentioned in a Brussels dispatch of to-day. Market reviews sent in by mail also speak in a considerably more hopeful tone. Needless to add that the German trade is greatly encouraged by the better reports now arriving from the American market. The summaries of *The Iron Age's* weekly reviews are regularly cabled to the German press, and these are just now attracting unusual attention.

The Krupp Company in a New Line

The Krupp Company has made an agreement, amounting almost to a fusion, with the Westfälische Drahtindustrie of Hamm, in Westphalia, which is the most important wire mill on the Continent. Under this arrangement the capital of the Hamm concern, which is now 10,000,000 marks, will be increased to 16,000,000, and the Krupp Company will take all the new stock. The old stockholders are guaranteed a dividend of 5 per cent., and above that Krupp and the wire concern get the same dividend till 7 per cent. is reached, after which the latter gets an additional half per cent. for every additional one per cent. for Krupp. In other words, the two companies are to be operated practically as under one management. The arrangement is to stand 30 or probably 40 years, after which time the Krupp Company has the right to buy the wire company outright at a price fixed in the agreement. It is understood that the Krupp Company was influenced in making the arrangement by the wish to secure a big and steady customer for its surplus steel. The fusion is another illustration of the tendency with the great iron and coal companies to add new branches of more finished products, partly for the purpose of consuming their raw steel in their own mills, and partly for making themselves strong enough to stand alone if the big Steel Works Union should not be renewed.

Birmingham

BIRMINGHAM, ALA., February 20, 1911.

Pig Iron.—The situation has developed unusual strength here. One interest has withdrawn entirely from the market; another has marked its price up to \$11.50 for deliveries over the second quarter, while still others are confining sales to prompt shipment orders only. It is known that one company turned down orders for several thousand tons last week at \$11 for No. 2, having taken on all the business wanted at that figure. One of the best indications of more strength to the pig iron situation now is that the buying the past two weeks has been from all classes of consumers, whereas heretofore the bulk of the purchases have been by the pipe makers, with some fair tonnage going to

the agricultural implement people. There is, however, quite a lot of pig on furnace banks, and this stock will have a tendency to hold the price down, doubtless, for some weeks, unless an unusually good buying movement should set in, which is not expected now. Furnace companies in this district generally report their movement of iron from yards this month as being in excess of the daily make, and it would not be a surprise to many of them if March 1 should find Alabama furnace stocks materially lower than on February 1, at which time these stocks aggregated in round numbers 300,000 tons. None of the manufacturers here appears to be expecting any increase in production soon. At the same time, there is no particular stack that now appears likely to blow out, for repairs or otherwise, for some months; so it would appear that production should continue at about the same rate as for the last several months.

Cast Iron Pipe.—Producers report a better feeling and an actually better movement, stocks having been reduced materially thus far this year. This would indicate that, with any advance in the price of pig iron, pipe would correspondingly improve. Sales have been of unusually good volume throughout the Central West, where some splendid tonnages have been placed on municipal contracts. It is difficult to say in all cases just how low some sellers have gone in bidding for business. This makes it hard to quote with any degree of accuracy a stable line of prices. The following figures rule to-day, all per net ton, on board cars here: 4 to 6 in., \$21; 8 to 12 in., \$20; over 12-in. average \$19. Gas pipe takes \$1 per ton higher.

Old Material.—The improvement in pig iron is reflected to a degree in scrap. Buyers find it difficult to pick up the bargains that prevailed two weeks ago. There is still quite an accumulation of odds and ends on this market, but it is being held much more firmly. We quote, nominally, dealers' asking prices on board cars here, per gross ton, as follows:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axles.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

New York

NEW YORK, February 22, 1911.

Pig Iron.—It is estimated that 7000 to 8000 tons of foundry iron has been bought in New England in the past week and low prices have prevailed there, prices which a number of sellers say they are not disposed to meet. It is understood that most of the business went to western New York furnaces, a good part of it to Buffalo. Prices asked at Buffalo for Eastern shipment have ranged from \$13.25 to \$14 for No. 2 X foundry, and there are indications that the \$15.50 price, delivered in New England, was carried over from the preceding week, this representing \$13.05 at Buffalo furnace. Irregularity in prices continues, but all sellers seem to be making an effort to get out of the slough into which the market fell two weeks ago, and some assert that the turn has come. Machinery foundries in New Jersey have placed some business, chiefly with eastern Pennsylvania furnaces, and the latter are somewhat firmer in their views. Virginia furnaces are competing less sharply. A sale of 10,000 tons of Virginia pipe iron, No. 3 and gray forge, to one interest in that State has helped in the cleaning up of those grades. We quote, for tidewater delivery, as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$14.75 to \$15; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Finished Iron and Steel.—In this territory trade in all lines, except bars, is very quiet, and notably so in plates and structural material. In bar iron and its products, trade is more active than for many months; good inquiries and orders are being received, especially from the railroads. Otherwise little business is coming from the railroads, contrary to expectations entertained when they appeared to be coming quite actively into the market a few weeks ago. Steel bars also show improvement, one large producer reporting 100 per cent. better specifications so far this month than for the corresponding period of January. February generally has been disappointing as compared with the preceding month, and the lull which was thought to be only temporary still continues. Conditions, while no better, are no worse, however, and some encouragement is taken from the fact that bar iron mills have felt warranted in advancing the price \$1 a ton. Structural awards reported are not large and include 700 tons for the Westervelt cotton mill at Greenville, S. C., taken from the Gallivan Building Company, the general contractor, by the American Bridge Company; 300

THE IRON AND METAL MARKETS

tons for the addition to the Hotel Emerson in Baltimore, also taken by the American Bridge Company; 400 tons for a viaduct for the Richmond & Henrico trolley line, Richmond, Va., taken by the Virginia Bridge Company; 500 tons for the Ontario & Western shops at Middletown, N. Y., and 500 tons for a warehouse for the Standard Oil Company at Newark, N. J., awarded the McClintic-Marshall Construction Company; 200 tons for an ash pit and coaling station for the Philadelphia & Reading at St. Clair, Pa., awarded the Eastern Steel Company; 200 tons for a small bridge for the Boston & Maine, taken by the Phoenix Bridge Company, and 100 tons for a small bridge for the New Haven, taken by Lewis F. Shoemaker & Co. The Boston Elevated Railway has also awarded 500 tons, probably to the Boston Bridge Works. Bids are in, but no award is reported on the 4000 tons for shops for the Delaware & Hudson at Watervliet. Bids closed February 21 on piers at New Orleans, for which 1500 tons will be required, and will be received up to March 1 on a pier for the Central Railroad of New Jersey at Communipaw, requiring 1000 tons. The Boston & Maine has an additional inquiry out for five small bridges aggregating about 200 tons. In connection with the award of the steel for the warehouse for the Union Bag & Paper Company, mentioned last week, it should have been stated that Hamilton & Chambers, New York City, have the general contract. The Virginia Bridge Company was low bidder on two swing span bridges for the Georgia Coast & Piedmont Railroad, requiring 400 tons. With the exception of bar iron, prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Ferroalloys.—There are only a few inquiries for small amounts of ferrosilicon and the quotation is between \$54.50 and \$55. Some fair-sized lots of ferromanganese are being asked for and dealers here are quoting \$37.50 to \$38, Baltimore.

Steel Rails.—The Chicago & Northwestern has just placed a contract for 40,000 tons and further negotiations are under way with Western roads. The export trade keeps up, and in the past week the Buenos Aires & Pacific has closed for 15,000 tons of 70-lb. rails. The Manila Railways will buy 10,000 tons. From the Manchurian Railways, with which American mills have done business for a number of years, an order has come for 1000 tons of frogs and switches. The Metropolitan Street Railway Company, New York, will buy 3000 tons of girder rails and the Transit Development Company of Brooklyn, 2000 to 3000 tons. The Public Service Corporation of New Jersey has bought 2000 tons of girder rails. The Interborough, which recently bought 4000 tons of T rails from the Lackawanna Steel Company, has been in the market for 1000 tons additional.

Cast Iron Pipe.—The most important letting now in sight is by the city of Brockton, Mass., 1200 tons, on which bids will be opened February 24. New York City will purchase a moderate quantity of water pipe March 1. John Fox & Co., 253 Broadway, New York, were among those who received a considerable part of the recent purchase of gas pipe by the Brooklyn Union Gas Company, and not John Fox, Jr., as incorrectly stated in last week's report. The demand from private gas and water companies continues. The statement is made that two companies are now in the market for about 100 miles of pipe. The situation is reported as steadily improving, the foundries gradually increasing their percentage of operation. Quotations are continued at \$21.50 to \$22 per net ton, tidewater, for carload lots of 6 in.

Old Material.—The volume of business has increased materially. A great deal more could be done, as inquiries are numerous, but dealers are conservative in making contracts, fearing that they may find it difficult to cover them at a price which will afford a profit. While some of the current business is being done with consumers, the greater part of the buying is by dealers. The speculative feature of the old material trade is apparent in some of these purchases, although a portion goes to apply on contracts previously made. Prices show increased strength. Quotations per gross ton, New York and vicinity, are as follows:

Heavy melting steel scrap.....	11.00 to	11.50
Light iron.....	5.50 to	6.00
Wrought turnings.....	6.50 to	7.00
Wrought pipe.....	10.50 to	11.00
Old car wheels.....	12.50 to	13.00
No. 1 heavy cast, broken up.....	12.50 to	13.00
Stove plate.....	10.00 to	10.50
Locomotive grate bars.....	9.50 to	10.00
Malleable cast.....	12.50 to	13.00

Metal Market

NEW YORK, February 21, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

Copper, New York.		Electro.		Tin.		Lead.		Spelter.	
Lake.	100 lb.	100 lb.	New York.	New York.	St. Louis.	New York.	St. Louis.	New York.	St. Louis.
Feb. 16.....	12.75	12.37½	44.50	4.42½	4.27½	5.57½	5.42½		
17.....	12.75	12.37½	44.50	4.42½	4.27½	5.57½	5.42½		
18.....	12.75	12.37½	44.50	4.42½	4.27½	5.57½	5.42½		
20.....	12.75	12.37½	45.00	4.42½	4.27½	5.57½	5.42½		
21.....	12.75	12.37½	44.75	4.42½	4.27½	5.57½	5.42½		

Tin continues to sell at higher prices than the cost of importation. Copper is uncertain, but there has been a fair amount of buying. Lead is cheaper. Spelter is slightly higher and firmer. Antimony has again advanced.

Copper.—While there is talk of shading in prices of lake copper, there is little evidence of a disposition on the part of the leading sellers to make any reduction. There may have been a few sales of certain brands during the week at a lower price than the average market quotation, but the regular dealers are asking 12.75c. for lake and they are making a few sales. There is a fairly good demand for electrolytic and a number of sales of several carload lots were made from New York warehouses at 12.37½c. The exports of copper so far this month have not been very heavy, amounting in all to 11,673 tons. In London to-day spot copper was sold for £55 3s. 9d., and futures brought £55 17s. 6d. The sales amounted to 250 tons of spot and 300 tons of futures. The market closed dull.

Pig Tin.—Not in a number of years has the pig tin situation been in such a deplorable condition as it is at present. It is estimated that little more than 100 tons of tin is available for the average consumer. Two leading consumers are holding most of the stocks in New York warehouses, and they need the metal for their own use. No relief is in sight for this month, as the only tin expected to arrive in the near future will come in next Monday, when a steamer will bring 625 tons. This tin has already been contracted for, largely by consumers. The steamer Minnehaha arrived to-day with 775 tons, but most of its cargo was arranged for. Some dealers managed to buy in small lots of this tin yesterday at 44c. The metal will not be laid down in the warehouses until Friday. Stocks on both steamers available for general consumption are included in the estimate above. Dealers are not particularly anxious to do business, as they would be obliged to pay a very high premium, and take their chances on getting rid of what little metal they might be able to contract for. This morning pig tin in New York for early delivery was selling at 45c., as against an import price of 42.60c. This makes the premium on spot tin 2.40c. a pound. Some consumers throughout the country are holding stocks bought within the last two weeks at a record price, and many of them have more than they can use in the next six weeks. Their position is different from that of the two leading consumers, who contracted for their supplies several months ago. If the situation is relieved a month from now and tin becomes cheaper those who bought at high prices for future needs will suffer. The arrivals so far this month have been 3070 tons, and there are 2198 tons afloat, of which very little will get to this country this month. Pig tin was sold in New York this afternoon for 44.75c. The London market closed strong, with spot tin held at £194 15s. and futures selling at £191 5s. The sales of futures were 420 tons. No sales of spot are reported.

Tin Plates.—Orders for tin plates are coming in in good volume, and some of the independent mills continue to charge a little premium over the price charged by the leading interest. The quotation on 100 lb. coke plates in New York is \$3.94. Foreign tin plate mills have all the business they can handle. The price for Swansea plates is 15s.

Lead.—The leading interest is practically out of the market, and a reduction in its quotations is looked for, as outside sellers are shading prices all along the line. The St. Louis market is especially weak and the New York market is sagging. Consumers are holding off in the expectation of a sharp decline. Late last Thursday the outside sellers were offering lead at 4.42½c., a reduction of 2½c. under the price of the day before. Lead can be purchased at that figure in New York to-day, and St. Louis dealers as a rule are quoting 4.27½c., although there are reports of price cutting there.

Spelter.—A slight advance has been made in spelter and some consumers have been forced into the market. It is believed among the dealers that consumers' stocks are low and there is very little spot spelter in New York, although plenty can be had from East St. Louis on short notice. The usual quotation is 5.45c., St. Louis, and 5.60c., New York. There is so little buying to-day that prices are largely nominal.

Antimony.—The antimony market has wakened up

THE IRON AND METAL MARKETS

again as the result of rumors that leading producers abroad were renewing their flirtations of a few weeks ago, looking toward the establishment of a selling agreement. A sale of a 50-ton lot of Chinese antimony was made during the week at 7.25c. and a few sales of Hallett's were noted at 8c., which is an advance of 25 points over the quotation a week ago. Cookson's is firm at 8.25c. The continued policy on the part of sellers of Cookson's to keep the price up has encouraged other holders to take faith in the rumors regarding the European combination.

Old Metals.—A fair demand is reported. Dealers' selling prices are as follows:

	-Cents-
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clear brass turnings.....	7.75 to 8.00
Composition turnings.....	9.00 to 9.25
Lead, heavy.....	4.20 to 4.25
Lead, light.....	3.95 to 4.00
Zinc, sheet.....	12.10 to 12.30

Metals, St. Louis, February 20.—Lead is quiet: quoted at 4.30c.; spelter is stronger and held at 5.45c., both at East St. Louis. Zinc ore influenced by the stronger market for spelter is firm at \$40 to \$41 per ton, Joplin base. Tin is higher at 45.35c.; antimony (Cookson's) unchanged at 8.60c.; lake copper unchanged at 13.10c.; electrolytic ditto at 12.70c., all at St. Louis. The demand for finished metals was quite fair the past week and railroad buying has started up again.

Metals, Chicago, February 20.—Pig tin and spelter are each higher this week, both products enjoying a brisk demand. Copper is dormant, but unchanged in price. Lead is weaker and lower prices are quoted. Chicago prices are as follows: Casting copper, 12½c.; lake, 12¾c. to 12¾c. in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 45½c.; small lots, 48c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c. in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600 lb. casks. There is a fair demand for old metals and prices are stronger, in sympathy with the scrap iron market. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 41c.; powder No. 1, 29c.; tin foil, 34c.; block tin pipe, 37c.

Notes on Prices

Rope.—Comparison of present rope prices with those ruling just previous to the financial disturbance in 1907 would seem to indicate that present prices offered an excellent opportunity for buying. During the last of October, 1907, rope quotations, on the basis of 7-16 in. in diameter and larger, were as follows: Pure Manila, 11½c. to 12c.; B quality Manila, 9c. to 9½c.; pure sisal, 9c.; lower grades sisal, 7¼c. to 7½c. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8¼c. to 9¼c. per pound; second grade Manila, 7¾c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¼c. per pound; second grade, 6¼c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—The advance of 1c. per gallon has not increased the demand, which has been no more than normal. Carload lots of oil are quoted on the basis of 94c. to 95c., with a very firm market. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
State line.....	96
City.....	96
Oil, 100 lbs. in 5 bbl. lots, 1 cent advance per gallon.....	96
Refined oil, 100 lbs. in 5 bbl. lots, 1 cent advance per gallon.....	96

Naval Stores.—High prices of turpentine restrict active buying by large manufacturing concerns, who are purchasing only as they actually need it. The Savannah market, where light stocks are the rule, is firm. New York quotations in five-barrel lots are as follows:

	Cents.
In 60 barrels.....	91
In machine barrels.....	91
Less than 5 bbl. lots, 1 cent advance per gallon.....	91

Resins continue firm on moderate demand at higher prices. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$7.35 and grade D at \$7.70 in the New York market.

Iron and Industrial Stocks

NEW YORK, February 21, 1911.

The stock market maintains its strength, although transactions are not in large volume. Railroad equipment stocks advanced, and there was an especially sharp rise in Cambria Steel. The range of prices on active iron and industrial stocks from Wednesday of last week to Monday of this week was as follows:

Alb. Chalm., com.....	75 1/2 - 81 1/2	Railway Spr., com.....	36 - 37 1/2
Alb. Chalm., pref.....	32 - 32 1/2	Republic, com.....	34 - 35
Beth. Steel, com.....	31 1/2 - 32 1/2	Republic, pref.....	98 1/2 - 99 1/2
Beth. Steel, pref.....	62 - 64	Sloss, com.....	53 1/2 - 55
Cal. com.....	90 1/2 - 91	Sloss, pref.....	112 - 112 1/2
Cal. pref.....	80 - 81 1/2	Pipe, com.....	17 1/2 - 17 3/4
Car & Fdry, com.....	54 1/2 - 56 1/2	Pipe, pref.....	57 - 57 1/2
Steel Foundries.....	49 1/2 - 51	U. S. Steel, com.....	79 - 81 1/2
Colorado Ind., com.....	37 1/2 - 38	U. S. Steel, pref.....	118 1/2 - 119 1/2
General Electric.....	153 1/4 - 154 1/4	Westinghouse Elec.....	69 1/2 - 71
Gr. N. ore cert.....	61 - 63 1/2	Va. L. C. & C.....	64
Int. Harv., com.....	116 1/2 - 121 1/2	Am. Ship, com.....	77 - 78
Int. Harv., pref.....	122 1/2 - 124	Chi. Pneu. Tool.....	49 1/2 - 51 1/2
Int. Pump, com.....	42 - 43 1/2	Cambria Steel.....	45 1/2 - 48 1/2
Int. Pump, pref.....	88 - 88 1/2	Lake Sup. Corp.....	29 1/2 - 30 1/2
Locomotive, com.....	40 1/4 - 43 1/2	Warwick.....	10 1/2 - 11
Nat. En. & St., com.....	18	Crucible St., com.....	13 1/2 - 14 1/2
Nat. En. & St., pref.....	86 1/2 - 90	Crucible St., pref.....	80 1/2 - 81 1/2
Pittsburgh St., pref.....	101 1/4	Harb.-W. Ref., com.....	40 1/2 - 41
Pressed St., com.....	35 - 36	Harb.-W. Ref., pref.....	95
Pressed St., pref.....	119 1/4		

Dividends.—The Harbison-Walker Refractories Company has declared the regular quarterly dividend of one-half of 1 per cent. on the common stock, payable March 4.

The Nova Scotia Steel & Coal Company has increased the dividend rate on the common stock from 5 to 6 per cent., the first quarterly dividend at the rate of 1½ per cent. being payable April 15.

The Railway Steel Spring Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable March 20.

The International Harvester Company has declared a quarterly dividend of 1¼ per cent. on the common stock, payable April 15, an increase of ¼ of 1 per cent. quarterly.

Great Northern Iron Ore Properties has declared a dividend of 50 cents per share, the same as in November, 1910. Previous dividends were 50 cents declared in August and February, 1910, and \$1 in August, 1909, February, 1908, and August, 1907.

An International Iron and Steel Conference

An international meeting of iron and steel manufacturers, similar to that held in New York in October, 1910, will be held in Brussels, Belgium, beginning July 5, 1911. A delegation of steel manufacturers representing the American Iron and Steel Institute will attend. It is expected that the iron and steel interests of Great Britain, Germany, France, Belgium, Austria-Hungary, Italy, Spain and Russia will also be represented. The organization which is now being formed will be known as the International Iron and Steel Institute.

Lowenthal & Co., Buffalo, N. Y., have opened a branch in the Ford Building, Detroit, Mich., in addition to their branches in Buffalo, Cleveland and Cincinnati. Their Elco high-speed steel can also now be obtained in Philadelphia through Barrett & Co., Witherspoon Building, and in Boston through H. W. Hayes & Co., with whom they have agency arrangements.

The Andrews & Hitchcock Iron Company, operating two blast furnaces at Hubbard, Ohio, has re-elected officers as follows: Frank Hitchcock, president; W. J. Hitchcock, vice-president and general manager; H. W. Heedy, secretary and treasurer; directors: M. I. Arms, Mrs. Louis Andrews, John Shaw, Frank and W. J. Hitchcock and H. W. Heedy.

The Union Steel Casting Company, Pittsburgh, has purchased from the Pittsburgh Railways Company 3½ acres of land adjoining its plant. Large additions are contemplated, plans for which have not yet been prepared. The company had an option on 20 acres of ground near Tarentum, Pa., on which it intended to build a new plant, but this plan has been given up.

The Muncie Foundry & Machine Company, Muncie, Ind., having refused to unionize its establishment throughout at the demand of part of the molders, the plant is tied up and about 100 men are idle. The company has conducted an open shop.

Personal

A. H. Tait, formerly with the Abendroth & Root Mfg. Company, has connected himself with George A. Low, 24 State street, New York, who is export manager for the Remington Oil Engine Company, Stamford, Conn.; E. C. Bradford Belting Company, Cincinnati, Ohio; Ohio Valley Pulley Works, Maryville, Ky.; American Steam Pump Company, Battle Creek, Mich., and other manufacturers. Mr. Tait will sail March 4 on a selling trip to the Orient, Australasia, India and Egypt.

Col. Robert C. McKinney, president of the Niles-Bement-Pond Company, New York, sailed February 18 for Egypt, where he will spend a four months' vacation.

At the annual meeting of Manning, Maxwell & Moore, Inc., New York, held February 14, Charles A. Moore, Jr., and J. B. Brady resigned as vice-presidents, and W. O. Jacquette and R. A. Bole were elected to succeed them. C. M. Chester, Jr., was re-elected treasurer, and he will assume the additional office of secretary, formerly held by Charles A. Moore, Jr. With the exception of Mr. Moore, the directors of the company were re-elected.

Sterling H. Bunnell has resigned as works manager of the Griscom-Spencer Company, to open a consulting engineering office at 90 West street, New York, as a specialist in factory system. Mr. Bunnell is the author of "Cost Accounting for Manufacturing Plants," now in press by D. Appleton & Co. as one of their "Business Series." He is a member of the American Society of Mechanical Engineers and of the American Gas Institute. Graduating from the Sheffield Scientific School of Yale University in 1891, he has held positions with corporations manufacturing woodworking machinery, steam and gas engines and refrigerating machinery. As works manager for several plants he has installed cost keeping systems, and in the past four years, with the Griscom-Spencer Company, he has reorganized its shop system and superintended the construction of engineering work. Mr. Bunnell has been retained by Clinton H. Scovill & Co., Boston and Chicago, to take charge of their cost keeping and factory efficiency branches.

B. G. Harrison, London, England, representing Sota & Aznar, Spanish iron ore producers, who has been in the United States for several weeks in connection with the marketing of iron ore, will return home this week.

William S. Pilling of Pilling & Crane, Philadelphia, Pa., and B. F. Fackenthal of the Thomas Iron Company, Easton, Pa., will leave February 25 for a month's trip, visiting New Orleans, southern California and Colorado.

C. E. Beritie, with the sales department of Rogers, Brown & Co. in the Philadelphia district, has resigned and will become associated with the Roanoke Gas & Water Company, Roanoke, Va.

Dr. Edmund A. Engler has resigned the presidency of the Worcester Polytechnic Institute, Worcester, Mass., to take effect at the end of the present academic year. He has been at the head of this well-known engineering school for 10 years.

Fred H. Daniels, general engineer of the American Steel & Wire Company, has been made chairman of the Shop Committee of the Board of Trustees of the Worcester Polytechnic Institute, Worcester, Mass., taking the place occupied for many years by the late Charles H. Morgan.

Charles M. Schwab has returned from a six weeks' trip to Europe.

Chairman John A. Topping of the Republic Iron & Steel Company has gone to Florida for a stay of a few weeks.

Edwin S. Mills, special agent of the Carnegie Steel Company at Chicago, sailed for Europe February 18, accompanied by Mrs. Mills.

Wm. McLauchlan of Pickands, Mather & Co., Cleveland, is spending several weeks in California.

Frank Koester, previously with the Interborough Rapid Transit Construction Company (New York subway), J. G. White & Co., Guggenheim Exploration Company and American Smelting & Refining Company, has

opened an office at 115 Broadway, New York, as consulting engineer. Mr. Koester is the author of "Steam Electric Power Plants" and "Hydroelectric Developments and Engineering."

Frank W. T. Amis, who has been New York representative of Pilling & Crane, Philadelphia, for several years, continues to handle the sale of coal for New Jersey, New York and New England. E. B. Blandy, as already announced in these columns, having charge of pig iron sales.

John Trix, president of the American Injector Company, Detroit, Mich., has gone to Cuba for a stay of several weeks. He will visit the Panama Canal before returning.

L. T. Wilmarth, president of the Wilmarth & Morman Company, Grand Rapids, Mich., left last week for Los Angeles, Cal., to be gone until April 1.

George G. Crawford, president of the Tennessee Coal, Iron & Railroad Company and Mrs. Crawford sailed on the Berlin February 18 for a Mediterranean trip.

J. B. Rider, general manager of the Pressed Steel Car Company, Pittsburgh, has returned from a month's visit to Bermuda.

N. P. Hyndman, sales manager of the Washington Coal & Coke Company, Pittsburgh, has returned from an extended visit to the Pacific Coast.

W. P. Snyder, president of the Shenango Furnace Company, Pittsburgh, is at Palm Beach, Fla.

Obituary

RICHARD C. BRANCH, vice-president of the Branch Saw Works, St. Louis, died February 17, of pneumonia, at the Minor Hospital in Seattle, Wash., after a short illness. He was on a business trip to the Pacific Coast. He was born at Dorchester, England, in 1871, where his parents were visiting, and was the second son of the late Joseph W. Branch, who, before he established the Branch Saw Works, was the first St. Louis representative of Wm. Jessop & Sons. Since his father's death Mr. Branch had been the manager of the business. He is survived by his brother, Joseph P. Branch, president of the company.

MARTIN J. HOGAN, president and treasurer of the Engine & Machinery Company, Canton, Ohio, died February 11, aged 56 years.

LEBOY S. WHITE, Waterbury, Conn., president of the Electrical Appliance Mfg. Company, and well known as an inventor, died suddenly February 17, aged 82 years. A native of Waterbury, his father died when he was four years old and he was bound out to a farmer. At the age of nine he went to work in a cotton mill at Chicopee, rising to the office of room superintendent. He was later employed at die sinking for the Ames Mfg. Company, Chicopee, and in 1855 moved to Hartford, Conn., entering the factory of the Hartford Mfg. Company, where he invented what is said to have been the first successful machine for burnishing silver plated ware. Moving to Waterbury in 1858 he was associated with Rogers & Bros. and later with Brown & Bros. He leaves a widow and three children.

SAMUEL H. MOORE, for a number of years connected with foundry operations in Milwaukee, died at Cleveland February 8, aged 89 years. He was the father of E. Y. and V. M. Moore of the Chisholm & Moore Mfg. Company, Cleveland. In 1873 he founded the firm of S. H. & E. Y. Moore, manufacturers of heavy hardware, in Chicago. In 1888 he removed to Milwaukee, where he and his two sons established the Moore Mfg. & Foundry Company. He removed to Cleveland in 1894, when his sons and others established the Chisholm & Moore Mfg. Company.

WM. KENNEDY FLEMING, who for seven years has been secretary to Chairman E. H. Gary of the United States Steel Corporation, died of pneumonia, at East Orange, N. J., February 17, aged 46 years. He was born at Brantford, Ont., graduated at Harvard University, and spent much of his life in Denver and Washington. He leaves a widow and two sons.

The Crucible Steel Company Further Strengthens Its Position

The present progressive management of the Crucible Steel Company of America, Pittsburgh, which recently took over the plant of the Midland Steel Company, has made another purchase, which will still further strengthen its position in the direction of making its own raw material and controlling its own supply of fuel. On the site which was formerly the property of the Midland Steel Company, at Midland, Pa., the Crucible Steel Company is now planning to build an open hearth plant of sufficient capacity to take care of its increasing demand for open hearth steels of the higher qualities, which demand cannot be met in ordinary times because of the impossibility of the company securing additional lands adjacent to its Park Works in Pittsburgh, where extensions would otherwise be made. The company proposes to add a large Heroult electric steel furnace at Midland to improve still further the quality of its open hearth product.

Directly across the Ohio River from this new acquisition a virgin acreage of steam coal capable of being cheaply transported by aerial means direct to the works has also been secured, thus providing for a constant supply of cheap fuel, guaranteeing protection against interruptions from high water or other causes. In addition to this the company has concluded a purchase of coal lands that will give it an adequate supply of coal for coking purposes to supply its needs for many years. It has bought some 2000 acres of the best low phosphorus and low sulphur extension of the thick vein Connellsville coking coal, lying in one block above Lock No. 6 on the Monongahela River, and close to the dividing line between Washington and Green counties. This vein is of the usual $7\frac{1}{2}$ to 8 ft. thickness, and the purchase is estimated to contain from 25,000,000 to 30,000,000 tons of coal, a supply large enough to produce sufficient fuel for all of the steel plants of the company and for making coke for its blast furnace for more than 25 years. Engineers are already on the ground, planning the developing of the property, locating shafts, tipple, houses, &c., so that, at the earliest possible date, active operations may be commenced, coal mined and the whole property actively worked. It is proposed to ship the coal in lumps for the mills and in crushed coal for the coke ovens by river craft, so that the entire fuel to be consumed by the company will soon be produced from its own property. The deal was made by J. H. Hillman & Son, Oliver Building, Pittsburgh, dealers in pig iron, coke, ore and coal lands.

The Garland Corporation, Pittsburgh, showed the largest net earnings in its history in 1910, reporting \$354,727. This compares with \$297,433 in 1909 and an average of \$216,742 per annum for the five years ending December 31, 1908. After allowing for \$90,000 interest on the \$1,500,000 bonds outstanding, the 1910 balance of \$264,727 is equivalent to 10.85 per cent. on the \$2,439,600 stock outstanding. The corporation materially strengthened its financial and statistical position during the year. The surplus is \$3,461,023, an increase of \$334,730.

Among the orders recently filled by the Reeves Pulley Company, Columbus, Ind., was one for a carload of pulleys to Valparaiso, Chili, and others to Monterey and Vera Cruz, Mexico, and to South Africa. Two large variable speed transmission machines have been shipped to a paper mill in Italy and another to Germany. Fourteen machines have gone to Denmark within the last few days and others to London. The company reports more speed transmissions sold in January than in any one month in five years.

The Macomber & Whyte Rope Company, Chicago, wire rope manufacturer, with plants at Fostoria, Ohio, and Coal City, Ill., is negotiating with several cities with a view to consolidating its two plants at one point. Among the cities under consideration is Waukegan, Ill.

Ganschow Cut Gear Exhibition

An interesting exhibition of the manufacture of raw hide and cut gears was made on the evening of February 18 at the plant of the William Ganschow Company, 1001 Washington boulevard, Chicago. Invitations were extended to all the shops in the Chicago district, members of the National Metal Trades Association, and also to all other concerns that had at any time purchased the Ganschow product. Foremen machinists and shop superintendents were particularly invited, but there were also present many of the executive heads and buyers of the firms with which these men are connected.

The Ganschow Company specializes in the manufacture of cut gears, and its large plant is equipped throughout with modern automatic machines. About 200 visitors availed themselves of the opportunity to see these machines in operation. There were also present, to explain the working of the tools, representatives of the makers, including Henry Boker and associates, of the Brown & Sharpe Mfg. Company; Stanley H. Fox, Gleason Works, Rochester, N. Y.; Alfred Marshall, Marshall & Huschart Machinery Company, Chicago; Gould & Eberhardt, Newark, N. J.; Lodge & Shipley Machine Tool Company, Cincinnati; Warner & Swasey Company, Cleveland, and others.

Red Cut Superior high speed tool steel made by the Vanadium-Alloys Steel Company, Latrobe, Pa., was used on the machines during the demonstration. P. W. Bigger, manager of the Chicago district for McKenna Brothers, Pittsburgh, agents for this company, was also present. S. M. Cantrovitz, Western Raw Hide & Belting Company, Milwaukee, gave a talk on the development and manufacture of the raw hide pinion from the hide to the gear blank, and William Ganschow finished the lecture, detailing the operation from this stage of production to the completed gear. The demonstration was entirely successful from every standpoint, the educational feature of the lecture being the foremost thought in the minds of the hosts. Refreshments were served during the evening.

The William Ganschow Company was founded in 1871 by the father of the present heads of the business, William and Ernest Ganschow. This company enjoys the distinction of probably being the first firm in the West, if not in the United States, to engage exclusively in the manufacture of cut gears. The plant has been greatly enlarged since the founder's death, and is now equipped to cut gears from the smallest up to 14 ft. in diameter.

The Lackawanna Steel Company's New York office has been removed to room 1826, at 2 Rector street, from the former quarters at 1814 in the same building. The New York office is now devoted principally to district sales matters since the removal of the general offices to the company's plant at Lackawanna City, near Buffalo, and is in charge of H. H. Barbour, district sales agent. A number of other departments are, however, still represented at the New York office.

The Mesta Machine Company, Pittsburgh, works at West Homestead, Pa., reports a considerable increase in orders, and it has added more men to its working force. The company has received a contract from the Algoma Steel Company, Sault Ste. Marie, Ontario, Canada, for a vertical blowing engine, 46 x 84 x 60 in., and has also received a contract from the Sharon Steel Hoop Company, Sharon, Pa., for a 57-in. type B Helander barometric condenser, together with a 12 x 20 x 16 in. dry air pump.

The American Rotary Valve Company, recently incorporated with \$500,000 capital stock, will establish its headquarters in the Borden Building, 56 Dearborn street, Chicago. The company will manufacture vacuum cleaners and a rotary valve, and is contemplating the erection of a factory in the vicinity of Chicago. William Waller, Sr., is president; D. Smith, vice-president; Austin H. Heart, secretary; Warren C. Fairbanks, treasurer, and William Waller, Jr., assistant treasurer.

Storage Batteries*

Their Use for Electroplating

BY GEO. M. HOWARD.

The electroplater utilizes a current of electricity to bring about certain chemical or electrochemical reactions, which consist in the dissolving of metal from the anode and the depositing of the same metal upon the cathode. In any battery, primary or secondary, the action is the reverse of this. The chemical reactions taking place between the electrolyte and the two electrodes respectively cause a difference of electrical potential between the poles, so that when these are connected by a metallic circuit outside of the solution a current of electricity will flow.

The Action of the Plating Bath

In a plating bath the anode, or positive pole, is made of the metal to be deposited, and the solution must be so constituted that the anode will dissolve in it only under the action of the current, thus replacing the metal deposited and keeping the bath constant. Practically all primary batteries have this in common with the plating bath, that one of the electrodes goes into solution. An illustration of this is the zinc in an ordinary Leclanche or a gravity cell. A primary cell when exhausted cannot be restored except by the replacing of the exhausted element—either the solution, or one of the electrodes, as the case may be. To restore a secondary or storage cell, however, it is only necessary to pass through it a current from some outside source in the reverse direction to that given by the cell. One of the chief requisites for this characteristic of reversibility is the comparative insolubility of both electrodes in the solution under all conditions of charge and discharge, and it is in this respect particularly that the storage cell differs from both the primary cell and the plating bath.

The Lead Storage Cell

The active elements of a lead storage cell are peroxide of lead for the positive plate and spongy metallic lead for the negative in an electrolyte of dilute sulphuric acid. The "active materials" have to be supported, and the plates are therefore either constructed with grids, which hold the material in place, or else are made with a sufficient core of solid lead to give the necessary strength.

Upon discharge a portion of the lead peroxide and spongy lead unites with sulphuric acid from the electrolyte, forming lead sulphate on both plates. The lead sulphate, being practically insoluble, remains on the plates, and is very readily brought back to peroxide and metallic lead, respectively, upon charging. Thus it is seen that the storing consists merely in bringing about certain chemical reactions by means of an electric current, and that the reverse reactions taking place on discharge produce the secondary current.

The voltage of the lead storage battery on discharging is considerably higher than that of other cells, either primary or secondary, averaging close to two volts at moderate rates. On the other hand, the very low internal resistance makes it possible to draw very large currents if desired.

A Constant Current Necessary in Plating

Coming now to the application to plating, every one who has had experience knows how important it is to maintain a constant current in order to secure uniform deposits. Low voltage dynamos, whether shaft or motor driven, are subject to considerable fluctuation. The steady voltage of the lead battery makes it peculiarly suited to maintaining constant current. When batteries are used, not only will the deposit be more uniform than with machine plating, but it becomes possible to regulate the depth of deposit much more accurately by the ampere

hours used. An instance of the value of the latter feature is found in the experience of a company doing a very large amount of silver plating. When doing the work from generators, there was always an excess of silver deposited owing to the impossibility of accurately controlling the current. The company installed large storage batteries, and the one item of cutting down the overweight saved enough money to pay for the battery in a year and a half.

In figuring on the proper capacity of battery to install it is advisable to allow a considerable margin. This is not only for the purpose of having a reserve, but also on account of the voltage characteristic. When a fully charged cell is put into discharge, the voltage starts considerably above 2 volts and falls almost immediately to about 2 volts where it holds nearly constant until toward the end of the discharge, when it begins to fall more rapidly. Thus it is seen that there is a flat portion of the discharge curve where the voltage is quite constant, and in order to get the full benefit of this in steady output without regulation, it is necessary to use batteries of such capacity that they will never be fully discharged.

How to Use Storage Batteries to Advantage

There are two systems by which storage batteries can be used to advantage. The first is to use them as a regulator for the dynamos and an auxiliary, so as to permit of 24-hour working without running the machine constantly. In this system during the day the battery is connected across the line from the generator to the plating circuits, taking current until it is charged, and then merely "floating," as it is called. While floating, the battery is alternately charging and discharging for short periods, as the voltage of the generator varies, and takes the fluctuations which would otherwise affect the working circuits. It is also valuable as a reserve, preventing interruptions in the work in case of a shutdown of the machine for any cause. When the system described above is used it is necessary at intervals of once every two weeks to raise the voltage of the generator and give the battery what is called an "overcharge."

The second method, which is unquestionably better, is to have two batteries used alternately, one charging while the other is discharging, and do all the plating from the batteries alone, using the generator only for charging. This gives all the advantages derived from the constant current and the ability to run uninterruptedly as well.

The Care of a Storage Battery

It is a well known psychological principle that idleness begets laziness—that the less a man has to do the more unwilling is he to do anything at all; and from this characteristic of human nature the storage battery suffers. The fact that it requires so little attention is apt to create a feeling that it requires none whatever. This feeling is fostered by the fact that a battery will continue for some time to work satisfactorily under abuse or neglect without showing signs of trouble to a casual observer; but the damage is being done all the same, and in the end the penalty must be paid.

Almost any kind of machinery will give danger signals—there will be a squeak or a knock or some other warning. Not so with a battery. The warning is there, but it must be looked for and will not obtrude itself. Hence the necessity for systematic inspection and careful operation. It is really surprising how little attention is necessary, providing only that it be systematic. I have often heard one of the pioneers in storage battery work say that if men were only willing to give one-tenth of the attention to their batteries that they give without question to engines, for instance, there would be an end of battery troubles. There is, perhaps, no case where the old adage, "an ounce of prevention is worth a pound of cure," more aptly applies.

The cardinal principles of operation may be briefly summarized as follows:

Do not allow the battery to discharge below the safe limit. This will be about 1.8 volts per cell at the low rates usually employed in plating work. If the battery has been proportioned

* Address before the National Electroplaters' Association, New York, February 11.
† Chief chemist, Electric Storage Battery Company, Philadelphia, Pa.

to the work as recommended above, this warning becomes unnecessary.

As far as possible, maintain a regular schedule for changing the battery.

Do not overcharge excessively.

Add pure water to the cells often enough to prevent the plates from being uncovered by evaporation. The best time to add water is just before an overcharge, so that the gassing will cause it to mix with the electrolyte.

Carefully inspect all cells at least once in two weeks, preferably just before the overcharge.

Remove the sediment from the jars when within $\frac{1}{2}$ in. of the plates.

Have good ventilation during the charge, and never bring an exposed flame near a charging battery.

Never allow metals or impurities of any kind to get into the cells.

The Diversified Uses to Which Storage Batteries Are Put

Most people are now familiar with their use for running electric automobiles and for ignition and lighting on gasoline cars; but few realize the extent to which they are used in large work, as, for instance, by the public service corporations. To take a local illustration, the New York Edison Company, which furnishes most of the electric lighting in this city, has no less than 44 storage battery installations, having a total capacity of 33,000,000 ampere hours at the eight-hour discharge rate. In Brooklyn there are 11 of these large lighting batteries. Large office buildings and hotels which have their own lighting plants nearly always include a battery as part of their equipment.

Many trolley lines use batteries as a regulator for their load, and as a reserve to help out the generators at times of heavy traffic.

The New York Central Railroad, in connection with its suburban electrification, has very large batteries installed.

The large steel companies are now adopting them for regulating the load in their works, the model plant at Gary, Ind., having a very large installation.

Coming to some of the smaller applications, the telegraph and telephone companies use storage batteries almost exclusively in their work. Nearly all of the new railroad coaches are electrically lighted by means of storage batteries, and none but electrically lighted cars are permitted to run through the new Pennsylvania tunnels on account of the danger from fire with other systems. The electric locomotives which haul these tunnel trains are controlled by means of storage batteries. The modern railroad signal systems are largely operated by storage batteries, one road alone having upward of 30,000 cells in use for this purpose.

A comparatively recent application in which the separate plants are small, but which is growing to very large proportions in the aggregate, is for small isolated lighting plants, in conjunction with a gas engine and dynamo. Since the introduction of the low voltage tungsten lamps, with their small energy consumption, such a plant can be installed for so moderate an outlay that even many small farmers are able to enjoy the well-known advantages of electric lighting.

In closing, I would urge those of you who are not using storage batteries for your plating to study the benefits to be derived from their use, and I feel sure you will be amply repaid. The fact of your work being done at so low a voltage and with comparatively low current rates makes the investment necessary usually a small item—a consideration which should make the proposition all the more attractive.

President Taft on February 15 performed the last act necessary on the part of the United States Government to assure the Panama Canal Exposition to San Francisco, when he signed the bill inviting foreign nations to participate in such an exposition to be held in San Francisco in 1915. The President signed the bill with a pen made from California gold.

Post & McCord, New York, are furnishing and erecting the steel work for a building for the Bankers' Trust Company, at the corner of Wall and Nassau streets, which will be 46 stories high above the street. The steel, of which about 8000 tons will be used, was fabricated by the American Bridge Company.

The Pressed Steel Car Company's Year

The business of the Pressed Steel Car Company in the year ending December 31, 1910, was much larger than that of the previous year. The income account for the year compares as follows:

Income Account

	1910.	1909.
Gross sales.....	\$27,975,978	\$10,346,816
Net earnings from operation.....	\$1,697,495	.....
Other income.....	150,870	.....
Total income.....	\$1,848,366	*\$1,954,583
Depreciation.....	280,000	120,000
Balance.....	\$1,568,366	\$1,834,583
Preferred dividends.....	875,000	875,000
Surplus.....	\$693,366	\$959,583
Previous surplus.....	6,653,639	5,644,057
Total surplus.....	\$7,347,005	\$6,653,640

* Includes \$1,200,000 cash received from sale of Canada Car Company common stock, which had no value placed upon it in the company's books.

Balance Sheet

The general balance sheet, as of December 31, compares as follows:

	Assets.	1910.	1909.
Property and franchises.....		\$26,840,665	\$27,654,968
Securities.....		2,785,095	1,951,740
Taxes and insurance not accrued...		7,796	23,546
Accounts received.....		3,252,966	2,157,671
Inventory.....		640,799	2,842,075
Cash.....		1,610,819	987,360
Totals.....		\$35,138,140	\$35,017,360
	Liabilities.		
Common stock.....		\$12,500,000	\$12,500,000
Preferred stock.....		12,500,000	12,500,000
First mortgage notes.....		500,000	500,000
Purchase money mortgages.....		75,000	75,000
Accounts and bills payable.....		1,062,087	1,639,361
Accrued wages.....		124,674	141,926
Preferred dividends.....		218,750	218,750
Accrued interest.....		10,623	10,623
Contingent reserve.....		800,000	778,060
Profit and loss surplus.....		7,347,005	6,653,640
Totals.....		\$35,138,140	\$35,017,360

President F. N. Hoffstot says, in part:

"The best works operations were from April 1 to December 1, during which period the lowest operating cost in the history of the company was maintained. Dull periods such as this company is now experiencing are quite difficult to contend with, as sellers of raw materials endeavor to maintain prices, and buyers of equipment expect reductions, so that the slack in the car business has to be taken up largely by the manufacturers.

"The usual policy to develop improved methods and facilities for the economic manufacture of cars has been continued, and the company is in position to build cars at the lowest costs, and, therefore, should receive its full share of business when cars are offered. It is, however, quite difficult to predict the business prospects for the year 1911. There were at the opening of the year a number of inquiries, but the competition for business is keen, particularly as manufacturers are actuated by a desire to hold their organizations together in the hopes of a permanent improvement in business.

"There were about 25 per cent. less cars ordered in 1910 than in 1909, and even the orders placed during 1909 were much less than the average annual rated car requirements. In addition, there has been a contraction in the efficiency of car equipment, due largely to idleness, but in some cases failure in up-keep, and it is, therefore, reasonable to expect an average (and perhaps increased) volume of business will be offered during the year 1911, unless some further business disturbance occurs.

"The passenger car department turned out 100 per cent. more business last year than in 1909, and continues to contribute profits, although the margins in this class of business are small. The plants are in good condition. The McKees Rocks plant is still in full operation, but the Allegheny plant was closed down November last. During the year \$304,301 was expended on improvements and betterments, which amount was about equally divided between the McKees Rocks and Allegheny works."

Railroad Efficiency and the Labor Unions

An Irreconcilable Conflict Between Scientific Management and the Closed Shop

BY "EFFICIENCY."

Since the recent hearings before the Interstate Commerce Commission, wherein the railroads operating in the territory north of the Ohio River and east of the Mississippi River have attempted to show the necessity for increases in their charges, a great deal of newspaper and magazine space has been utilized in an effort to tell the railroads how to manage their business. Through these articles such high sounding terms as "efficiency systems" and "scientific management" are becoming household by-words, and, no doubt, those who have read have learned much—in some instances not so much. In particular they have not learned much about the railroads and the manner in which they are bound hand and foot in the meshes of both the open and the closed shop labor unions.

The labor problem, with its manifold ramifications, is one of which magazine writers and many of the clergy and our educators, who write and speak freely on it, have little practical knowledge. In fact, to those dealing daily with some phase of this problem as employers, it would appear that these theorists and altruists had steered as clear of the real subject as possible, and when perchance they have picked it up they have immediately dropped it as one might dispose of the proverbially hot brick.

In dealing with organized labor the managements of the railroads of our country find themselves between the upper and the nether millstones. Their policy of continued conciliation in the treatment of the demands of their organized employees and the recognition of the unions of these workmen has finally brought them to a point where they are compelled to fight every inch of their ground to maintain the slightest semblance of managerial control.

Open Shop and Closed Shop Unions

There are to-day two classes of labor unions among railroad employees. First and foremost are the Brotherhood of Locomotive Engineers, the Order of Railway Conductors and the Brotherhood of Locomotive Firemen and Enginemen. These are what may be termed "open shop" organizations. The second class, and the most difficult to deal with, are the unions of machinists, iron molders, boilermakers, blacksmiths and patternmakers.

The policies of these two classes of unions have not been explained in the many articles lately appearing on the probable obstacles organized labor might put in the way of the railroads in their attempts to introduce certain systems for increasing efficiency. The three organizations named in the first class are commonly known as the "railroad brotherhoods." They are composed of an unusually high grade of workmen, of high moral character, broad minded, and with an eye not alone to their own welfare. They appreciate the necessity of the employer maintaining some rights in the management of his business. They have in many ways assisted in making the railroads what they are in the matter of efficient traffic arrangements and in adding materially to the comfort of the traveling public. Unlike the second class of labor organizations, their membership is selected solely because of its competence, without the slightest regard for mere increase in the numerical strength of the brotherhood. The requirements for initiation are severe and those for the retention of membership are even more so.

Members of the Brotherhood of Locomotive Engineers are credited with never having refused to work with engineers not members of the organization. An engineer may become a member or not, as he chooses, and a new

engineer is given some time in which to decide upon joining. In the interim the brotherhood protects his interests as though he were already a member. This brotherhood is rated to-day as the strongest union of American workmen. Unquestionably it is the wealthiest. Warren S. Stone, grand chief of the engineers, is quoted as saying:

I do not believe in forcing men to join a union. If a man wants to join, all right; but it is contrary to the constitution and the principles of free government to try to make him join. We of the engineers work willingly side by side with other engineers who do not belong to our union, although they enjoy without any objection on our part the advantages we have obtained.

When we come to deal with the second class of labor unions the members of which find employment in the repair and other shops of the railroads, we find a totally divergent class, organized upon principles widely different from those of the railroad brotherhoods. They are the "closed shops" unions. The railroad brotherhoods are the "open shop" unions. The closed shop unions of machinists, iron molders, blacksmiths, and the like, insist that none but their members shall be given employment in shops controlled by them. They are allied with the American Federation of Labor, which in many ways has shown its antagonism to the railroad brotherhoods because the latter have steadfastly declined to become affiliated with the Federation.

Both the closed shop and open shop unions are opposed to the introduction in the railroad shops of efficiency systems or principles of scientific management. The policies of the closed shop unions are still permeated with the must of antiquity, and probably will continue to be until an indignant public sentiment compels a change.

Unions Against Efficiency Systems

In an article on "Efficiency, Freight Rates and Tariff Revision" in the *Review of Reviews* for January, Benjamin Baker says:

One hasty and misleading attack on scientific management that should be "nailed" is the assertion that organized labor stands in the way. In the actual experience of those who testified at the hearings in Washington this has not been the case. Mr. Gilbreth, who has done construction work under the scientific system in such a labor stronghold as San Francisco, said that he dealt by preference with unions and union men. . . . The primary object of the labor unions is to get work for all its members, and to secure for them a minimum daily wage. . . . No union could stand the strain of opposing a maximum wage that is within the reach of every member.

Mr. Baker says these hasty and misleading attacks should be "nailed." I rather think Mr. Baker is the one who should be "nailed." He mentions the experience of Mr. Gilbreth, the contractor, with the bricklayers in San Francisco. Mr. Gilbreth says he has dealt with union labor because of a preference. This may be a correct inference from the testimony of Mr. Gilbreth, but it is well to point out that in San Francisco Mr. Gilbreth could not have used nonunion labor on buildings even if he had so desired. Furthermore on all construction work outside of San Francisco, except in isolated sections, the workmen in crafts employed by builders are so thoroughly organized that there is no question of preference. The language used by Mr. Gilbreth quite possibly was dictated by diplomatic considerations for which, from a business standpoint, he should not be taken to task. In addition to this it is well known that the bricklayers' union is accustomed to limiting the speed at which bricks shall be laid in a wall by placing at the ends the slowest workmen, knowing full well that the center cannot rise with more celerity than the extremities.

Here we see the efficiency of the union bricklayer

regulated entirely by the ability of the incompetent or the laggard. Not only is the efficiency limited, but likewise the earning power of the man wherever piecework or bonus systems are in vogue.

What "Conciliation" Means Practically

The predicament in which building contractors at present find themselves in their efforts to secure a higher efficiency from their workmen is due largely to the same policies adopted in past years by the railroads. Both railroads and builders have, to some extent, acted in concert in meeting the demands of organized labor among their respective employees, but always on the so-called conciliation basis, which can be interpreted in no other way than a "splitting of the difference" when adjustments are concluded. As a natural consequence in these cases, as well as in all others treated by employers in a similar manner, the unions have pursued the practice of demanding double what they expected to receive and trusting to conciliation to secure what they really were after. This is notoriously the situation in the stove foundry industry, even though this product is one depending almost entirely upon workmen for its market.

The cause of this will be found in the unpreparedness of building contractors, railroads or stove founders, through lack of sufficiently comprehensive or aggressive organization, to handle a strike in the event of the failure of conciliation. Little by little the unions employed in these lines have gained on the employers until the comparison of efficiency with unorganized workmen in other crafts shows a shameful disparity.

Efficiency vs. Limitation of Output

"The primary object of the labor union is to get work for all its members and to secure for them a minimum daily wage," says Mr. Baker in arguing that these unions will not oppose the efficiency system. This statement applies with deadly accuracy to the principles of the closed shop labor union, but the conclusions are erroneous. The primary object of these unions, being to secure work for the entire membership, constitutes the very essence of their argument against the efficiency system. Their claim is that the efficiency system will so conclusively expose the "limitation of output"—one of the fundamental principles of the closed shop union—and so increase the product of the plant in which it may be installed that the manufacturer will readily conclude that he can get along with a less number of workmen, even though he may be compelled to pay larger wages to those whom he may retain. Mr. Baker might well read the official journals of the International Association of Machinists and the International Iron Molders' Union if he would know of the antagonism of these particular labor organizations to the efficiency system or to the principles of scientific management.

A short quotation from the report of one of the vice-presidents of the International Association of Machinists, printed in the January, 1911, issue of the *Journal* of that organization, will serve to indicate the attitude of officials of the machinists' union toward the efficiency system. Reference is here made to the hearings before the Interstate Commerce Commission, and the conclusion follows:

Mr. Brandeis made some remarkable statements before the Commission, charging managers of railroads and those responsible for conducting the operation of traffic with great waste, and to prove his contention submitted figures and the testimony of experts to show how mechanical repairs could be made at a great saving. The Santa Fe's method of production was cited as an evidence. Our readers must not forget that Mr. Brandeis' audience was made up largely of all the influential railroad men of the country, and those familiar with the Santa Fe's method of production must know that it is nothing more or less than what is commonly known as the "Emerson Standard Time System," a bonus system or premium system of the most extreme type. To those who may want to know something of the workings of standard time, which Mr. Brandeis urges the railroad managers of the country to adopt, I will respectfully refer them to an extract of a speech delivered before the Pittsburgh Railroad Club by your humble servant on February 25, 1910, and published in the April, 1910, issue of the *Machinists' Journal*, pages 341 and 342. This will give the railroad machinists of our Western States an idea of what they are up against if the advice of Mr. Brandeis is taken seriously. . . . I believe

our members should know what is going on so as to be forewarned against the introduction of methods of production that will relieve the shippers at their (union machinists') expense alone.

Those manufacturers who have had a wide and varied—many of them a most unpleasant—experience in dealing with the closed shop labor union will hardly agree with the statement of Mr. Baker that "no union could stand the strain of opposing a maximum wage that is within the reach of every member." The International Molders' Union has withstood this strain for more than 50 years. The International Association of Machinists has withstood it since its birth. Both organizations are unalterably opposed to piece work or bonus systems of any kind, and the efficiency system can be classified under no other head, although the name be a softer one and less calculated to provoke antagonism among the ignorant.

Union Leaders Against "Efficiency"

The latest, and by all odds the most emphatic, assertion of labor union officials that they were opposed to these efficiency systems was made as recently as January 12 at the annual meeting of the National Civic Federation in New York. The two foremost advocates of the efficiency system presented to this convention most carefully prepared papers. No sooner had they taken their seats than the dogs of war were turned loose upon them and their systems were literally riddled by representatives both of the open and closed shop unions. Furthermore, these efficiency engineers were given scant courtesy by the convention. The chairman, Oscar Straus, adjourned the meeting immediately after the unionists had concluded their attack and the engineers were compelled to content themselves with coming out second best, because they were denied an opportunity to defend themselves and their systems. The entire proceedings seemed to smack very much of a well laid trap for the efficiency system, and its advocates were completely snared.

The first union official to deliver his tirade against scientific management was none other than Grand Chief Warren S. Stone of the open shop union, the Brotherhood of Locomotive Engineers. Mr. Stone did not mince his statements; there was no possibility of misunderstanding him. He came out in flat-footed fashion and said that not only was he opposed to these efficiency systems, but that the organization which he had the honor to represent would oppose their introduction to the limit of its ability. Mr. Stone characterized the present propaganda and scientific management agitation as nothing less and nothing more than the old-fashioned piece work, bonus and premium systems, against which the labor unions had been fighting all their lives, and which they would continue to oppose. John Mitchell, late president of the United Mine Workers, but now an employee of the Civic Federation, followed Mr. Stone and spoke for the closed shop unions. The unions which he represented were unqualifiedly opposed to any and all of these systems. Mitchell closed his remarks with the statement that before any of these systems could be introduced into shops where the unions had anything to say they would have to be consulted.

If doubt ever existed as to the policy of the unions of labor, both open and closed shop organizations, as to their treatment of an attempt to introduce the efficiency system, there need be none now, and even our good friend Dr. Abbott need not express any further surprise at the unearthing of this appalling truth.

Railroad Shops Closed Against Efficiency Methods

When we come to consider the railroads and the closed shop unions let us bear in mind that 56 railroads in the United States are reported as having entered into iron clad written agreements with the International Association of Machinists in 1910 to operate in accordance with the rules and regulations of this union. Railroads and breweries are the most extensive contractors with this and other metal trade unions. Written agreements by machine shops and foundries in other lines with union machinists and union iron molders are the exception. By far the greater majority of these shops are operated

free from the dictation of these unions, and it is in these shops that the efficiency and scientific management systems have had their most pronounced success.

The effect of union opposition to these efficiency systems has actually become so pronounced, and such indifferent success has been encountered by at least one firm of efficiency engineers in plants either partly or wholly under control of the labor organizations, that the advisability of even soliciting these plants for business is seriously doubted.

It is pointed out by this particular firm of engineers that a company which is unwilling or unable, because of union opposition, to insist upon the adoption of the full and complete recommendations of the efficiency engineers will impair the practicability of the system. These union shops, in all probability, will be eliminated by the efficiency engineers from the category of "good business" until such time as the unions may be dislodged.

Restrictions of Metal Working Unions

Let us now glance over the provisions contained in some of the agreements which the railroads have made with the union of machinists. The same restrictions will apply where the railroads are operating union foundries. Railroads are not known as extensive operators of foundries, but where making their own castings it is generally under the dictation of the International Iron Molders' Union, although formal, written agreements are not so prevalent between railroads and this union. The restrictions insisted upon in the union machine shops and foundries are as follows:

About any limitation of the output of the individual workman. The union machinist or molder performs more work in a given time than is paid by his organization, charges are not forced against him for "killing the job," and it found entry he is paid. This must be paid before he may return to work in a union shop. By this means the energy, ability and inclination of the workman are completely curbed.

Arbitrary limitation of the employment of apprentices to one for the shop and one to five journeymen machinists or molders.

Machinists working three hours and twenty minutes or less on railroads on special work shall be paid for not less than five hours' work.

If a union machinist is delegated by his organization to take up a grievance with the management of the road, he shall be granted the requisite leave of absence and free transportation.

Helpers and laborers shall not be permitted to do machinists' work, and no man shall be classed as a machinist until he receives the minimum wage. This constitutes one of the fundamental principles of the "closed shop," and prevents the use of helpers and laborers at a less, though commensurate, rate of wages on lower grades of work.

Union shop committee to be consulted when machinists are discharged for cause, if objection is made.

None but union machinists and molders shall be employed.

No piece work; no premium work; no bonus systems.

Arbitrary insistence upon a minimum wage rate.

The inexperienced student who seeks to investigate the aims and purposes of these unions will not find these inimical provisions in published records. Another set of principles is usually handed out. They deal in such well-meaning and high-sounding terms as "bringing within the folds of our association every machinist who is actively engaged in the trade"; "believing it to be the natural right of those who toil to enjoy to the fullest extent the wealth created by their labor"; and "with a view to restore the common weal of our government to the people."

That leaks exist in railroad management there can be no doubt. Until these unions of labor are dislodged, however, there will be no efficiency systems installed. Abundant proof of this is available on every side. Some more appropriate system must be devised. Scientific management is not necessarily of the same family as the efficiency system, for it may be successfully utilized in many ways for the prevention of leaks. A more perfect co-operation between division superintendents and master mechanics, coupled with the adoption of the policies of many of our large industrial concerns would aid in stopping waste on our railroads. Let us utilize the material already available before clutching at some new fangled scheme merely because it possesses a catchy name.

Our Immigrant Workmen

The Large Numbers Employed in Car and Locomotive Works, Foundries and Machine Shops

BY W. J. LAUCK.

The Southern and Eastern European immigrant is not only a wage earner in the basic industries of the country, such as iron and steel manufacturing, and coal, iron ore and copper mining, but has also found extensive lodgment in the operating forces of practically all branches of mining and manufacturing activity. This condition of affairs is due to a number of causes, the most important of which has been the invention of improved machinery and mechanical devices which have eliminated the skill or period of apprenticeship formerly required for certain classes of occupations. There has also been a gradual advancement in the industrial scale by immigrants who have been in this country for an extended period of time. The extraordinary industrial development of the past 30 years and the consequent demand for labor have also brought about an upward pressure and a tendency to adapt industrial organization and methods to the characteristics of the recent immigrant labor supply. The Southern and Eastern European industrial workers have been marked by a lower degree of efficiency, and have been less acceptable to the employers than the wage earners of past immigration from Great Britain and Northern Europe, but the iron and steel manufacturer and the mine operator have largely found it necessary to use the existing labor supply in the best way that could be devised. The unanimous testimony of employers is that the Southern and Eastern European is not desired as an employee, but is taken for the reason that other labor at the present time cannot be secured. As a result, the recent immigrant is at work to-day in certain occupations and branches of manufacturing which a generation ago were occupied exclusively by Americans or immigrants from Great Britain and Northern Europe who, unlike the foreign born workmen of the present time, had received training and experience before coming to the United States. This situation is well illustrated by the presence of the recent immigrant wage earner in some of the branches of the steel and other metal manufacturing industries which are turning out the more finished and highly fabricated products.

In Foundries and Machine Shops

In the manufacture of foundry and machine shop products, the study of the Immigration Commission, which was based on original information from 16,000 employees of the industry showed only one-fourth of the total number of persons employed to be native Americans, while slightly more than one-half, or 55 per cent., are of foreign birth. The remaining one-fifth, or 20 per cent., of the employees are of the second generation or of native birth, but of foreign born Irish, German, English or Canadian fathers.

Of the immigrant workmen in foundries and machine shops only about one-fifth are representatives of English, Irish, Scotch, German, Swedish, French, English Canadian and other races of past immigration, the German element being predominant. The other foreign born wage earners are Southern and Eastern Europeans who have been in the United States only a short period of time. The Poles with a proportion of 12 per cent., the South Italians with 7 per cent. and the North Italians with 4 per cent. of the total number of employees constitute the largest racial elements. Other races of recent immigration represented in considerable numbers are the Slovaks, Russians, Magyars, Lithuanians, Greeks and Croatians.

In Locomotive Works

Another advanced branch of iron and steel manufacturing which has a large proportion of recent immigrants

among its employees is that of locomotive building; but slightly more than one-fourth of the total operating force of this industry is composed of native Americans. A similar proportion is made up of wage earners of the second generation of immigrants, the descendants of German and Irish being in the majority. Almost one-half of the employees, or 49 per cent., are of foreign birth. The foreign born wage earners are about evenly divided in numbers between the races of the old and the new immigration, the Irish, Germans and English together constituting about one-fourth, and the Poles, North and South Italians, Magyars, Russians and Slovaks combined form a similar proportion of the total number of persons employed in the industry.

Comparatively few recent immigrants are employed in the locomotive works at Richmond and other points in the South. One-half of the wage earners in the plants at Philadelphia, Pa.; Dunkirk, N. Y., and other cities in the Middle and Eastern States are of foreign birth, while only 11 per cent. of those in the South were immigrants. Poles and Russians are the chief races from Southern and Eastern Europe employed in the locomotive establishments in the South, but together they constitute only about 5 per cent. of the operating forces. About 5 per cent. also of all the employees in the South are Negroes. More than three-fourths are native Americans. On the other hand, in New York, Pennsylvania and other Northern States Poles, Magyars, Lithuanians and North and South Italians, of races of recent immigration, are found in large numbers, while the races of the old immigration from Great Britain and Northern Europe are represented in largest proportions by the English, Irish, Germans and Scotch. Native Americans form only 24 per cent. of the total number of wage earners in the locomotive building plants of the North and East.

In Car Building Works

Still another example of the extensive employment of recent immigrants is found in the racial composition of the operating forces of steel and wooden car building and car repairing establishments. More than 21,000 of the workers in this branch of manufacturing were studied by the Immigration Commission, of which number 675 are in the South, 10,300 in the Middle West and 10,900 in the Middle and New England States. In this important industry the immigrant wage earners constitute 54 per cent., the native Americans only 30 per cent. and the persons of the second generation of immigrants 16 per cent. of all the employees. The principal races of wage earners from the South and East of Europe are the Bohemians and Moravians, Croatians, Greeks, North and South Italians, Magyars, Poles, Russians and Slovaks. The Poles constitute one-eighth of the total number of employees.

In the car building and car repairing plants of the States east of the Ohio and north of the Potomac rivers, Slovaks, Ruthenians, Russians, Poles, Magyars, North and South Italians, Croatians, Germans, English and Irish are employed in considerable numbers. In the South 67 per cent., in the East 37 per cent. and in the Middle West only 13 per cent. are native Americans. In the South almost one-fifth of the operating forces are negroes and only 5 per cent. of the total number of employees, composed of a few Germans, Irish, Hebrews and Russians, are of foreign birth. In the States of Ohio, Indiana, Illinois and Michigan the Poles constitute 15 per cent. and the Swedes and Germans each 10 per cent. of the operating forces. The Servians, Russians, Magyars, Lithuanians, North Italians, Dutch and English and French Canadians are also extensively employed in car building plants of this section.

Southern and Eastern Europeans are also extensively employed in other advanced branches of iron and steel manufacturing, such as the production of cutlery and tools, firearms, electrical machinery and supplies, and even such highly specialized products as typewriters and sewing machines in which the working of steel plays an important part. In these industries North and South Italians, Magyars, Poles, Russians and Slovaks are found in large numbers. The employment of the recent immi-

grant, in short, has not been confined to the blast furnaces, steel mills and coal and iron ore mines, but is characteristic of all branches of mining and manufacturing, and even of the establishments making highly fabricated steel products.

It is also a striking fact that a large proportion of the immigrant employees of finished steel products establishments have been in this country only a short time. Of the foreign born wage earners in steel and wooden car building plants, as well as those engaged in the production of electrical supplies and machinery, about one-third have been in the United States less than five years. Of the immigrants employed in foundries and machine shops about two-fifths are of a residence under five years. One-half of those engaged in the manufacture of cutlery, tools and hardware and two-fifths of the immigrant employees of locomotive building plants have been in this country less than 10 years. Since most of the recent immigrants are from the agricultural classes of Southern and Eastern Europe, and without industrial training and experience, their extensive employment after a brief residence in the United States has been made possible by mechanical inventions which have brought about a high division of labor and rendered unnecessary, as already mentioned, any long period of apprenticeship.

The Quebec Bridge.—It is stated that the engineers to whom the Quebec Bridge tenders were referred have reported 4 to 1 in favor of the St. Lawrence Bridge Company's offer. The design prepared by Phelps Johnston, managing director of the Dominion Bridge Company, one of the two corporations composing the St. Lawrence Bridge Company, is said to have been preferred by the experts to the official design. The company submitted tenders on both designs. It is further stated that the St. Lawrence Bridge Company will spend \$2,000,000 on new machinery if it gets the contract, as shops will have to be built.

The blast furnacemen and kilnmen employed at the Ashland, Wis., plant of the Lake Superior Iron & Chemical Company went out on a strike February 15 against a 10 per cent. reduction in wages, notice of which was posted a few weeks ago. The plant was at once closed down. On Saturday morning, February 18, two-thirds of the men who had struck voted to return to work on the terms offered by the management, which were the rate of wages originally posted, and the condition that the men who were considered responsible for the trouble would not be re-employed. On Saturday afternoon operations were resumed without difficulty, no concessions being made to the strikers.

The Annual Motor Boat Show opened on Tuesday in Madison Square Garden, New York City. It will continue until March 4. More than 300 exhibitors and their assistants are to be found there, explaining the different types of the internal combustion engine and its accessories in use. The exhibits range from the tiny launch to the luxurious craft for cruising purposes. Every section of the country is represented with the latest models and designs in motor boating. The exhibitors also include gasoline engine builders and manufacturers of a great variety of products used in equipping or furnishing motor boats.

The Edwards Mfg. Company, "the sheet metal folks," Cincinnati, Ohio, owing to its largely increasing business, has established a traffic department, and has secured the services of J. H. Blanton as traffic manager. He was formerly connected with the Louisville & Nashville Terminal and the Nashville, Chattanooga & St. Louis Railroad, at Nashville, Tenn., and is well qualified to look after the intricate details of his department.

In the Canadian House of Commons the Finance Minister stated in reply to a question that British goods of the kind mentioned in the reciprocity agreement would be admitted on the same basis as United States goods.

"Building Up" Impurities in Steel

A Formula for Accumulations of Copper, Phosphorus and Sulphur in Scrap

BY A. H. JAMIESON.

In steel plants, and particularly in steel foundries where the side blow converter is used, one hears a good deal about the accumulation in the steel of certain of the injurious elements, through the return of the steel scrap to the furnaces. There seems to be much uncertainty as to the extent or limit of this "building up," as it is called, so that some fear to use any scrap, but that lowest in the content of these impurities, selling their own scrap or sending it to a basic furnace and buying what scrap they need for their own uses. Then, too, some refuse to use cupriferous pig iron at all, fearing that an excessive amount of copper will accumulate in the steel, while many insist upon a pig iron much lower in phosphorus than is necessary, for fear of this same "building up" in the steel.

The problem, however, is not a difficult one to solve and may be expressed algebraically. It should be remembered that, through the melting and converting losses, we do condense in the steel any element which does not itself suffer loss in the melting or conversion. But this condensation takes the form of an increase in the percentage by gradually decreasing increments, and theoretically the increase goes on for an infinite number of operations. But it approaches a limit, even though it never reaches this limit, and if we plot a curve to show the increase in percentage by ordinates and the number of operations by abscissae we find that at infinity the curve becomes a straight line.

Practically we are interested in the limit only. We wish to know what will be the maximum content in the steel after a long run, and this we can determine readily.

Let a = the percentage of steel scrap in the cupola charges.
 $100 - a$ = the percentage of pig iron in the cupola charges.
 b = percentage of loss in both melting and converting.
 c = percentage of the element in question in the pig iron used.
 x = the maximum percentage of the element in the steel after an infinite number of operations.

When the limit is reached, and "the curve becomes a straight line," we shall find, of course, that after any operation our steel contains exactly the same percentage of the element in question that was in the steel scrap which was charged to the cupola furnace as stock for that blow, so that

$$x = \frac{(100 - a) c + ax}{100 - b}$$

And by resolving:

$$x = \frac{(100 - a) c}{100 - (a + b)} \text{ or } \frac{100 c - ac}{100 - (a + b)}$$

Let us suppose a case where we are using a pig iron with 0.8 per cent. of copper, where we use 30 per cent. of our own steel scrap in the cupola, and where our melting and conversion losses total 15 per cent.

Then $a = 30$

$100 - a = 70$

$b = 15$

$c = 0.8$ and $x = \frac{70 \times 0.8}{100 - 45} = 1.01818 +$

Now let us see how quickly this limit of 1.01818 + per cent. copper is approached. If we start our first charge, assuming that we have no steel scrap, so that we use pig iron only, we shall have, owing to the 15 per cent. loss in the melting and conversion $\frac{0.8}{0.85} = .9412$ per cent. copper in the resultant steel. The second blow will give us for the pig iron (70 per cent. of the charge) $0.70 \times 0.8 = 0.56$ and the steel scrap (30 per cent. in the charge) $0.30 \times 0.9412 = 0.28236$ and $0.56 + 0.28236 = 0.84236$, and this divided by $0.85 = 0.99094$ per cent. copper in the resultant steel.

Similarly the third blow will yield 1.00857 per cent. of copper in the steel, having used 30 per cent. of the steel scrap containing .99094 per cent. of copper. The fourth

blow will yield a steel containing 1.01473 per cent. of copper; the fifth blow, steel containing 1.0168 per cent. of copper—in each case using 30 per cent. of steel scrap with the copper content yielded in the preceding blow. We find, therefore, that five blows are enough to bring the copper percentage to within .0014 per cent. of the theoretical maximum, quite within the limits of ordinary analytical accuracy.

It will be noted that the foregoing formula and calculation are applicable to an element which, like copper, gains nothing from outside sources. Now, let us see what is the problem in the case of sulphur or phosphorus, which are increased by the amount absorbed from the fuel in the melting. Let d = the percentage of the element which is taken up by the metal in one melting operation; this can be determined readily by analysis of the stock before and after melting, and is a constant for a given fuel and burden. Then our original formula will become

$$x = \frac{(100 - a) c + (c + d) + a + b + d}{100 - b}$$

and by resolving

$$x = \frac{(100 - a) c + 100 d}{100 - (a + b)} \text{ or } \frac{100 (c + d) + ac}{100 - (a + b)}$$

So that this formula is identical with the original except for the addition of the $100 d$, and it is apparent that all we need to do is to add in the first place the amount "picked up" in a single melt to the percentage in the pig iron itself and use this sum as the constant c in the original formula.

Let us assume a melting loss of 15 per cent., a steel scrap burden of 40 per cent. of the charge, a pig iron containing 0.05 per cent. of phosphorus and an addition of 0.01 per cent. of phosphorus by the fuel in one melting operation.

Then $a = 40$

$100 - a = 60$

$b = 15$

$c = 0.05 + 0.01 = 0.06$

$\frac{60 \times 0.06}{100 - (40 + 15)} + \frac{3.6}{45} = 0.08$

which is the maximum amount of phosphorus which can be accumulated in the steel under the conditions assumed. Now, let us perform the calculation for a few blows, as we did for the pig iron containing copper:

$$\frac{0.06}{0.85} = 0.07058824$$

the percentage of phosphorus in the steel from the first blow.

$$\frac{0.60 \times 0.06 = 0.036}{0.40 \times 0.07058824 = 0.028235396} = 0.064235296$$

and this divided by $0.85 = 0.0755709$, the percentage of phosphorus in the steel from the second blow.

Similarly we find 0.077798 per cent. of phosphorus in the steel for the third blow, 0.078963 for the fourth blow, and 0.079512 for the fifth blow, bringing the steel to within 0.00488 per cent. of the theoretical maximum of phosphorus, surely well within the limits of analytical accuracy.

By the use of this formula, then, it is possible to determine just how far these elements will increase in the steel under any given conditions, and consequently what analysis of pig iron one needs to specify in order to obtain steel of any desired content of copper, sulphur or phosphorus.

Since February 1 three more Edgar Thomson blast furnaces of the Carnegie Steel Company, at Bessemer, Pa., have been started, and at present 9 out of the 11 stacks at this plant are in blast. Furnace J, which has recently been rebuilt and remodeled, was started February 6, and has a capacity of about 550 tons per day. This stack had been idle for about seven months.

The Sheffield Foundry Company, Chicago, has purchased the property at the southeast corner of Hawthorne avenue and Herndon street, which it has been occupying under lease.

The Harrington 16-32-In. Extension Lathe

An Entirely New Design of High Speed Machine Tool

A new size and an entirely new design of extension lathe for high speed duty has been recently brought out by Edwin Harrington, Son & Co., Inc., Seventeenth and Callowhill streets, Philadelphia, Pa. All the general fea-

tures of the maker's regular line have been retained, and provision has also been made for the addition of a taper attachment, quick change gear box and motor drive, either separately or in combination, at any time after the lathe has been purchased. Fig. 1 is a general view of the new tool, while Fig. 2 shows some of the details of the headstock and the carriage.

Both the top and the bottom beds are very wide and are carefully fitted and securely braced in position. The movement of the upper bed is controlled by a screw operated by a crank at the end of the lathe. The neces-

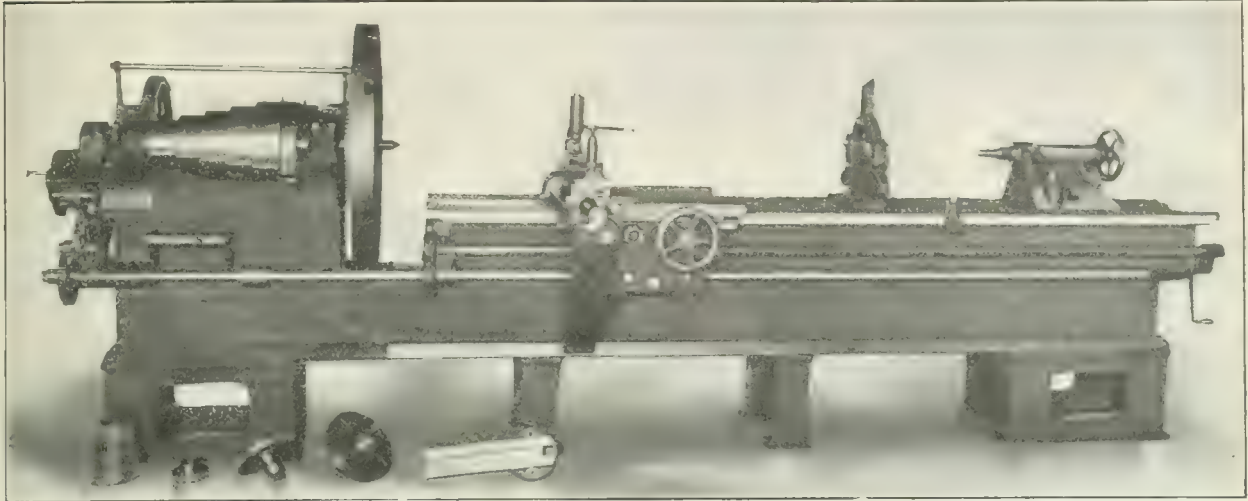


Fig. 1.—The New Extension Lathe Built by Edwin Harrington, Son & Co., Inc., Philadelphia, Pa.

For turning work across the gap an extension tool post is supplied to replace the regular compound rest. The lateral and cross feeds are operated by a geared friction located in the apron, and the reversal of the feed is accomplished at the same point. To prevent the turning and the screw cutting feeds from being engaged at the same time a positive interlocking device is furnished.

The following table gives the principal dimensions and specifications of the lathe:

Swing over bed, inches.....	16
Swing in gap, inches.....	32
Swing over carriage, inches.....	11
Ratio of back gearing.....	6 to 25
Ratio of triple gearing.....	25 to 6
Minimum number of threads cut, per inch.....	2
Maximum number of threads cut, per inch.....	28
Maximum feed, inches.....	0.146
Minimum feed, inches.....	0.0104
Number of cone pulley steps.....	5
Diameter of smallest cone pulley step, inches.....	6
Diameter of largest cone pulley step, inches.....	11½
Face width of cone pulley steps, inches.....	3¼
Diameter of hole in spindle, inches.....	1⅞
Diameter of front spindle bearing, inches.....	3¼
Length of front spindle bearing, inches.....	5½
Diameter of rear spindle bearing, inches.....	2½
Length of rear spindle bearing, inches.....	4¼
Diameter of tailstock spindle, inches.....	2
Length of tailstock spindle, inches.....	12½
Length of bed, inches.....	98
Distance between closed centers, inches.....	48
Distance between extended centers, inches.....	87
Diameter of face plate, inches.....	32
Maximum diameter in steady rest, inches.....	6½
Maximum diameter in follow rest, inches.....	4
Face width of countershaft pulleys, inches.....	8¼
Diameter of countershaft pulleys, inches.....	12
Speed of countershaft, revolutions per minute.....	168
Weight, pounds.....	4,000
Weight per foot of extra length of bed, pounds.....	325

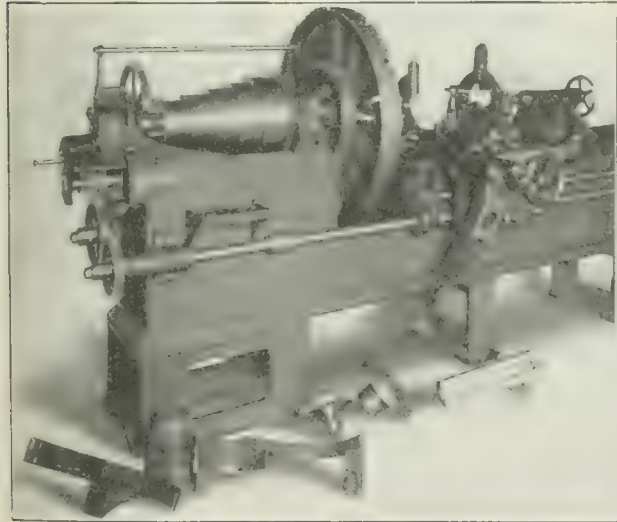


Fig. 2.—Details of the Headstock and the Carriage.

When the lathe is equipped for motor drive, the motor is mounted directly on the headstock and meshes with gears which replace the five-step cone pulley, and a hand wheel at the apron controls the speed of the motor. The taper attachment is connected to the back of the carriage, and special lugs cast on the bed are not required. When the lathe is equipped for belt drive the countershaft has three pulleys, one tight and two loose ones. This gives a means for running the lathe spindle in either direction without employing a crossed belt.

The Kempsmith Mfg. Company's New Plant

A Number of Special Features Are Embodied in Its Design and Construction

The new plant of the Kempsmith Mfg. Company, Milwaukee, Wis., is one of the best equipped machine shops in the Northwest. It is especially interesting as in planning its design and arrangement problems peculiar to the manufacture of milling machines, which is the company's specialty, had to be solved. For this reason special systems and equipment which could not be employed in a company doing a general manufacturing business have been used. Fig. 1 is a plan showing the general arrangement of the buildings, Fig. 2 gives details of the construction of the brackets used to suspend the shafting from the roof trusses and the remaining figures are views of the various departments.

There are four buildings in all—the main factory, the power house, the pattern shop and the office. The first three buildings are of fireproof construction. The factory proper is of the modern type, in which a large amount of structural steel is employed. The floor and the roof which is of the customary saw-tooth type are of concrete. There are no interior partitions, and the

of the large castings, as well as the assembling, testing and shipping departments.

The group drive is used throughout the plant, all machines of one type being assembled in a group and driven by a single motor. Fig. 3, which is a view of the turret

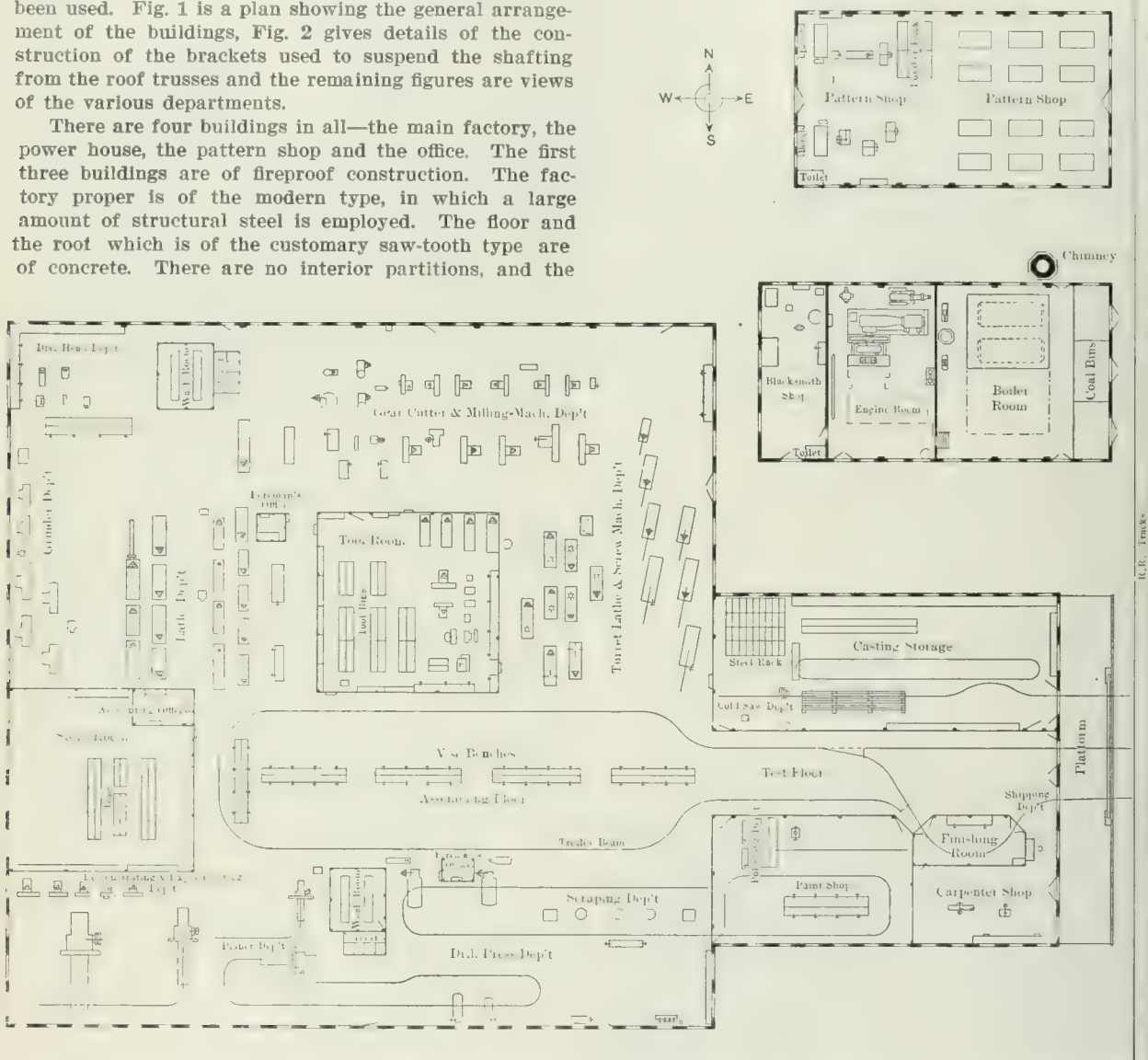


Fig. 1—Plan Showing the Arrangement of the Buildings at the New Plant of the Kempsmith Mfg. Company, Milwaukee, Wis.

entire space, which is 300 ft. long and 250 ft. wide, is a single room. The pattern shop and the power house are of the modern steel girder type, with concrete floor and roof, the former occupying a space measuring 50 x 90 ft., and the latter being the same width and 10 ft. longer. The office building, which is not shown in Fig. 1, is also well equipped.

As far as possible in planning the general layout, the idea of convenience and a minimum amount of handling of the parts in the process of manufacture were the controlling factors. The factory is so arranged that these parts in passing from one machine to another make an automatic circuit of the shop from the machining department to the assembling, testing and shipping departments. A double system of supervision is employed, one superintendent looking after the manufacture of the small parts, while the other has charge of the making

lathe department, shows a typical arrangement of the group drive. The motors are hung from the steel roof trusses on specially designed I-beam frames fastened with U bolts. The manner in which the motors are mounted is shown in both Figs. 3 and 4. Mounting the motors on frames in this way enables them to be shifted when necessary, and at the same time cutting of the steel work is eliminated. The group system of motor drive is more economical in a plant where specialized manufacturing of this kind is carried on than the individual motor drive, as these machines can in most cases be in operation for 75 per cent. of the time. In special cases where the service required of the machines is intermittent and irregular, individual motor drive is used.

On account of the extensive use of the group drive the line shafting is not long in any case. A somewhat novel feature in connection with the line shafting is the

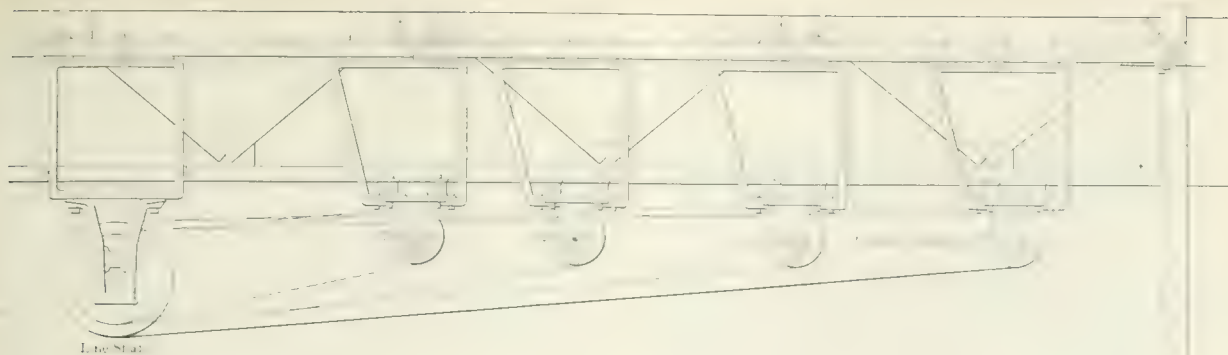


Fig. 2.—Details of the Brackets Supporting the Shafting.

brackets that are employed in lower it about 3 ft. from the main beams. If the bearing brackets were bolted to the horizontal members of the roof trusses the shafting would be so high that the belts would be excessively long. Consequently steel brackets built up of channel and angle sections are used to support the bearings, which are of the Hyatt roller type. The details of the

initial and maintenance costs. It will be noticed by referring to Fig. 1 that there are several of these systems, and a portion of one of them is shown in Fig. 6. In laying out this overhead work the various systems were so planned that the machine parts could be moved from one section of the factory to any other in a few minutes, and in actual operation this has been done. The largest

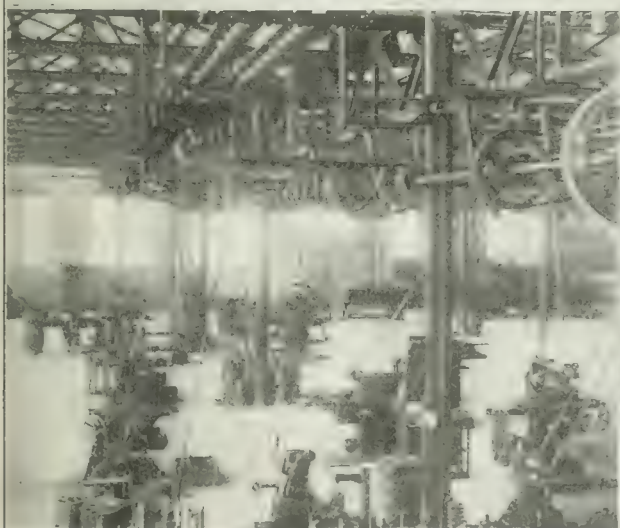
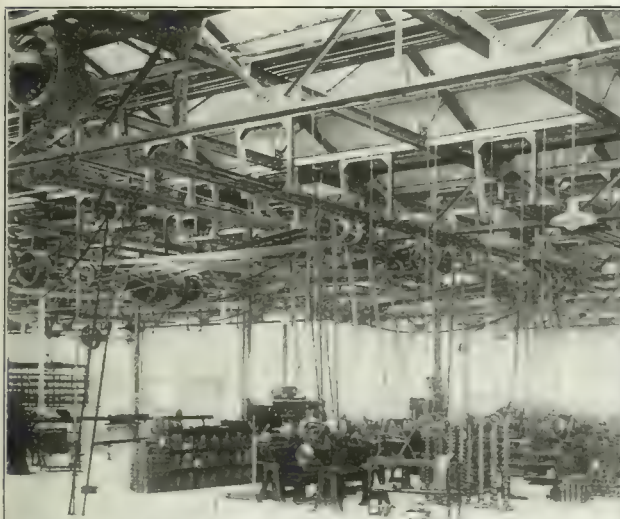


Fig. 3.—The Turbine Lathe Department, Showing Group Metal Drive.

Fig. 5.—The Milling Machine Department.



Fig. 4.—The Foreman's Office, with the Tool Room in the Rear.



Fig. 6.—The Assembling Floor and Benches.

INTERIOR VIEWS OF THE VARIOUS DEPARTMENTS

construction of one of these sets of brackets are given in Fig. 2, and views of the brackets in position are shown in Figs. 3 and 5.

The castings entering into the construction of milling machines are not very large, and a single trolley system with an electric hoist will handle them equally as well as the large traveling crane, having both greater

machine produced in the factory, with all its equipment, fully boxed for export, can be lifted by the electric hoist and moved at the rate of 5 ft. per second, and the trolley with its load can be transferred from one beam to another by a switching device. The trolley system has been omitted from the milling machine department and the lathe and grinder departments, which are shown in

Figs. 5 and 7 respectively, as well as from that portion of the plant in which the automatic machines are installed, since in none of them are large castings machined, and the trolley system is not required to transfer parts being manufactured.

The most easterly section of the main factory, which is the one nearest the railroad track, is used for receiving and shipping. Two I-beam trolley tracks extend over the siding and thus give excellent facilities for unloading and loading cars. This portion of the factory is the natural location for the rough casting storeroom and the finishing and polishing room. The castings are unloaded from the cars and pass through one door, while the completed machines come through the other from the finishing and the polishing rooms for shipment. This latter

experimental department has been fitted up. A row of the company's individual motor driven machines will be set up here for demonstration for buyers, and to enable experiments to be conducted by the maker's engineers. A complete set of electrical instruments and automatic recording devices are included in the equipment of this department.

The power generating equipment for the entire plant is all housed in a separate structure, measuring 50 x 100 ft. over all. The building is of fireproof construction, and a concrete roof is supported by five girders. The building is divided into three rooms, a blacksmith shop measuring 17 ft. 8 in. x 47 ft. 10 in.; the engine room, which is 31 ft. x 47 ft. 10 in., and the boiler room, which is 47 ft. x 47 ft. 10 in. Heavy brick walls are used to separate the three rooms, which connect with each other and also have separate entrance doors. Ample light and ventilation are provided by numerous windows on both sides and one end.

At the present time the boiler equipment consists of two 100-hp. horizontal return tubular boilers built by the Milwaukee Boiler Company, but space is provided for the future installation of two additional boilers of the same size and type. The customary water columns, feed and blow-off connections, gauges and safety valves are included in the equipment, as well as a steam flue cleaner. The smoke breeching is connected with a 100-ft. Costodus radial brick chimney, having

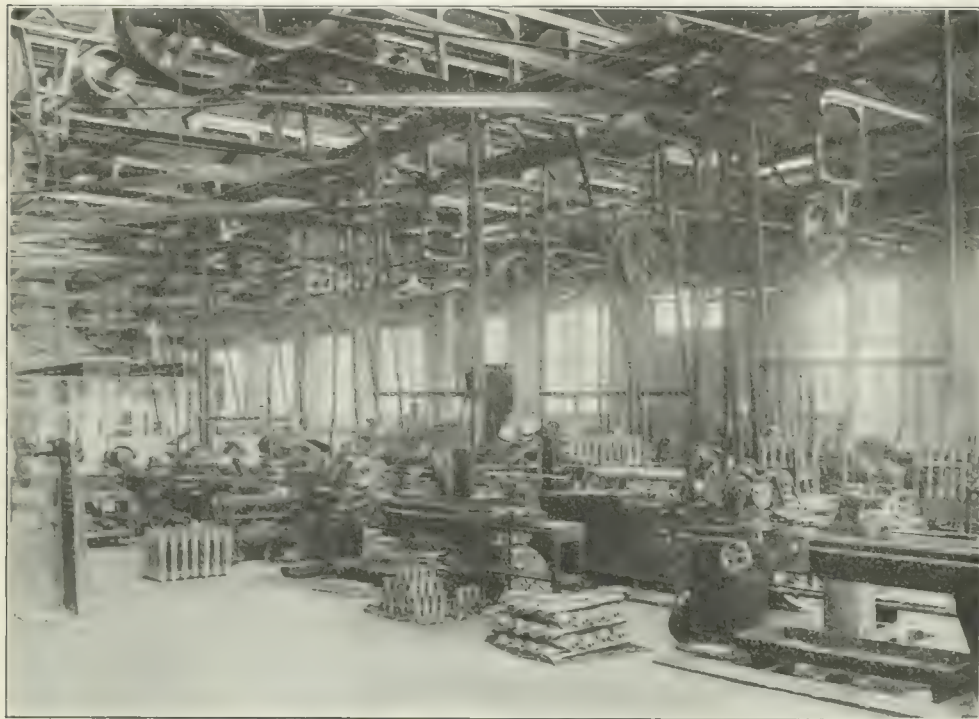


Fig. 7 The Lathe and Grinder Departments.

department is completely inclosed to keep out the dust from the rest of the factory.

The tool room, which is shown in Fig. 4, at the rear of the foreman's office, is located centrally between the assembling and the manufacturing departments. Delivery windows are situated on each side, and enough equipment is carried to avoid any delay due to having a machinist wait for tools. The stock room is also conveniently located. It is equipped with steel bins for storing those machine parts which are completely finished, but are awaiting assembling. As in some cases several months may elapse between the time parts are finished and the machines for which they are designed are assembled, a large amount of space is required. The offices of the stock-keeper, the time-keeper and the cost accountant are in this room, and complete records of the cost of each part and operation, no matter how small, are kept in this plant.

The assembling department, Fig. 6, is located between the large and the small manufacturing departments. The row of benches extending along the center permits machines to be assembled on both sides. The trolley system makes a complete circuit of these benches, and is in constant service for shifting machines being assembled. This loop of the trolley system is clearly shown in the engraving, as well as the rows of partially assembled machines at either side.

The foreman's office, Fig. 4, is completely inclosed by glass. In this way the noise of the machines and unimportant matters do not disturb him. As the room is elevated about a foot above the main shop floor he is enabled to get a complete view of his department at a glance without leaving his desk.

In one corner of the building a demonstrating and

an internal diameter of 4 ft. 6 in. at the top. Hand operated dampers placed in each boiler flue control the draft, and the boilers are hand fired with mine run bituminous coal. The coal bins are located along one end of the boiler room. The boiler feed water supply is taken from the city mains and passes through a 200-hp. Cookson open feed water heater, and is delivered from there to the boiler by a feed pump. The feed water heater, boiler feed pump and the vacuum pump are located in the space between the back of the boilers and the partition separating the boiler and the engine rooms.

The boilers deliver steam to the engine at 125-lb. pressure through a 6-in. extra heavy wrought iron pipe line covered with 85-per cent. magnesia covering, furnished by the H. W. Johns-Manville Company. The engine room equipment consists of one 14 x 30 in., 200-hp. Vilter rolling mill type Corliss engine, direct connected to a 150-kw., 250-volt compound wound direct current Crocker-Wheeler generator operating at a speed of 120 rev. per min. An automatic oiling system is employed. The engine is run noncondensing and the exhaust steam is used for heating. The Webster heating system is installed and the exhaust line from the engine is provided with an automatic back pressure valve. If required live steam can also be used as an automatic reducing valve is installed. In all 13,100 ft. of pipe coils and cast iron radiators are used.

The switchboard, which is installed back of the engine near the brick partition between the engine room and the blacksmith shop, consists of six panels of 2-in. dull black finished slate mounted on a pipe framework. The board consists of one generator panel, a panel for an additional generator for which space is provided in the engine room, one balancer panel and three feeder panels, one for power and two for lighting. A swinging

voltmeter bracket also forms a part of the equipment of the board. I. T. E. independently operating arm circuit breakers are mounted on the feeder panels and no switches are used. Double pole breakers are installed on the power feeder panels and triple pole breakers on the lighting feeder panels. Each feeder circuit has its own individual watt-hour meter, which enables a detailed record of the energy used in each of the various portions of the factory to be secured. A triple pole circuit breaker connected between the generator and the lighting feeder bus bars protects the balancer. Only one release coil is provided and this is on the neutral wire. If the load should become excessively unbalanced and overload the balancer, all three wires are opened simultaneously. This arrangement eliminates any chance of the lamps on the lighting system being burnt out, due to an unbalanced condition.

All the wiring from the generator to the switchboard and from the switchboard to the machine shop, pattern shop and office is run in a bituminized fiber conduit laid underground in concrete. These cables are lead sheathed and the insulating compound used contains 30 per cent. Para rubber. The wiring for the various buildings is done in rigid iron conduit and the insulating compound contains 22 per cent. of Para rubber. The distribution cabinets are located as near as is practicable to the center of distribution and are constructed of sheet steel, with slate panels and copper switches and bus bars. All the conduits terminate in fittings having porcelain covers, which results in a minimum amount of wire being exposed.

With the exception of the motors driving the planers, which are heavily compounded, Allis-Chalmers and Crocker-Wheeler shunt wound motors are employed throughout the plant. The Allen-Bradley Company's motor starters are used exclusively. Each motor has a separate slate panel containing the motor starter and an I. T. E. double arm circuit breaker. Liberal distances between the shaft centers are provided, thus insuring a good belt contact, and the consequent keeping of the motor bearings cool during operation.

Every consideration was given to the principles of modern illuminating engineering in planning the illumination of the shop and the power house. The prime objects desired in the lighting system were uniformity and economy, and these were accomplished by installing units consisting of a shock absorber, a conduit stem, a Benjamin steel porcelain enameled reflector and a 150-watt frosted bowl tungsten Mazda lamp. These units were hung 25 ft. apart and 10 ft. above the floor, as shown in Fig. 6, the plane of illumination being 4 ft. above the floor. The intensity of illumination varies from a maximum of 4.8 foot-candles to a minimum of 2.1 foot-candles. This has been found very satisfactory and individual units are needed only in a few locations. A very interesting feature of this installation is that, although the intensity of illumination is high, only 0.21 watts per square foot of floor area is required.

The office, which is in a separate building, not shown in Fig. 1, is housed in a modern two-story structure. On the first floor are the general office and the private offices of different officials, while the drafting room and the offices of the engineering department are located on the second floor. The basement is equipped for the convenience of the employees and has a dining room and kitchen, as well as a laboratory and a school room, where a weekly class for apprentices under the supervision of an instructor from the University of Wisconsin is held. The time spent by the apprentices in the class is considered as a part of their working hours, and they receive pay for it. All the departments of the various buildings of the plant are connected by an extensive telephone system.

The Greeley Square Realty Company, New York City, recently awarded the general contract to the Thompson-Starrett Company for an immense hotel to be erected on Thirty-third and Thirty-fourth streets and Broadway, near the new Pennsylvania Railroad Station. Over 10,000 tons of structural steel will be required, the contract for which has not yet been given out.

New York's Municipal Building

The 40-story municipal building now under construction in New York City will be one of the largest office buildings in the city, and the largest devoted entirely to housing municipal departments. At present these offices are scattered in various buildings, at considerable inconvenience and an annual expenditure of about \$500,000 for rents.

The new structure is at the Manhattan terminal of the Brooklyn Bridge, and consists of a tower and two 25-story pavilions above the street level and below a triangular shaped space in which the Chambers street station for the bridge loop subway is located. Owing to the subway tracks the columns had to be spaced to clear them. The interior main columns extend as far as the fifth floor and support heavy girders on which the columns for the upper portion of the building rest, and are spaced irrespective of the lower arrangement to suit the layout for office floors.

The total amount of steel required was 26,000 tons. The largest girder weighs 50 tons, is 10 ft. $\frac{1}{2}$ in. deep back to back of angles, and is built up of three $\frac{5}{8}$ -in. web plates, four $8 \times 6 \times \frac{7}{8}$ in. angles and six 14×13 -in. cover plates (three on the top and three on the bottom). The largest column is 34 ft. long, weighs 34 tons, or a ton per foot, and carries a load of 3000 tons. The floor arches above the street level will be of hollow tile and below of reinforced concrete.

The lower columns rest on caissons, 106 in all, 68 of which were sunk to rock, a distance of about 135 ft. below the street, and 38 to a depth of 72 ft. to a good sand foundation.

The boilers for heating and supplying steam for the pumps are in the basement, while the fourth floor is laid out for the uses of plant and service. McKim, Mead & White are the architects for the New York City Bridge Department, the builders; the Thompson-Starrett Company, the contractors for the superstructure and the Pennsylvania Steel Company, the subcontractors for the structural steel fabrication.

New Railroad Equipment Orders.—The Bessemer & Lake Erie Railroad, controlled by the Carnegie Steel Company, has placed an order for 35 heavy road engines, divided between the American Locomotive Company and the Baldwin Locomotive Works. Last year this road leased 32 engines from other roads from May to October, and the order just placed will obviate that necessity this year. The Pennsylvania Railroad has ordered nine electric locomotives of the Westinghouse type. The Lehigh & New England has bought 500 steel hopper cars from the Cambria Steel Company and 300 box cars with steel underframes from the American Car & Foundry Company. The 1000 hopper cars ordered by the Virginian Railway from the Pressed Steel Car Company are part of a specification put out in the spring of 1910. Among inquiries actually made or under consideration are 500 coal cars for the Western Maryland, 110 freight cars for the Ann Arbor, 60 passenger cars for the New York, Westchester & Boston, 50 flat cars for the Vandalia and 12 milk cars for the Lackawanna.

It is stated that the increase of stock to be voted on by the Inland Steel Company's stockholders March 2 will be \$1,500,000, bringing the total to \$7,500,000, and that the proceeds will be applied to the new blast furnace which the company plans to build this year.

Hill, Clarke & Co., Inc., Boston, Mass., have taken the exclusive agency in Maine, New Hampshire and eastern Massachusetts for the line of equipment manufactured by the Geometric Tool Company, New Haven, Conn.

Anti-injunction legislation is dead for this session of Congress, according to advices from Washington. There is no possibility at this time of an agreement by either House on the pending bill providing for a limitation of the power of the federal courts to issue injunctions.

The Story of a Floor Failure

Serious Corrosion of a Steel Beam Protected by Terra Cotta and Concrete

In the course of repairs and additions which were made in a large building containing power plant in an Eastern city lately, some interesting facts were brought out in connection with the use of steel beams inclosed in terra cotta fireproofing material and concrete.

The boiler room was in the basement, and the floor above it was supported on I-beams and channels, between



Fig. 1.—Scales of Rust 1 In. Thick on Upper Flange of Steel Beam.

which were sprung terra cotta tile arches. The lower parts of the beams were protected by terra cotta blocks, and the top was covered with a concrete floor 4 in. thick, which was surmounted with a tile office floor. The boiler room was not properly ventilated, and the domes of the boilers came within a few inches of the bottom of the I-beams. The ashes were raked from the ash pits and wet down in front of the boilers, and the steam rose against the ceiling and passed up through openings which had been cut in the floor to allow steam pipes to pass. It is undoubtedly true that the steam from wetting the ashes carried acid fumes resulting from the sulphur in the ash. The upper surface of the floor was always much cooler than the lower surface, and as there had been no attempt to make water or moisture proof the under surface of the fireproofing tile, the steam could penetrate it with ease.

As a consequence the vapors as they passed up through the tile were condensed against the concrete, and this kept the upper chords of the steel work constantly moist. The floor had been in place about five years. Its condition at one point was as indicated in Fig. 1. The upper portion of the beam had rusted so badly that the scales of rust on top of it were nearly 1 in. thick at the right of the illustration. This rusting had heaved the floor slightly. The paint on the lower portion of the beam is still in place, as in the illustration, and this was true in the case of nearly all of the beams.

An extreme case, Fig. 2, was an 8-in. channel which spanned the space between the I-beam shown in Fig. 1 and the next I-beam in the floor. An opening for a steam pipe had been cut through the floor close to the channel and an iron washer placed about the steam pipe on a level with the upper surface of the floor. The washer, however, was not tight enough to prevent some circulation to the room above. As a consequence, there had been a constant flow of moisture laden air through

this opening, and it had condensed at the level of the relatively cool concrete floor.

As shown, the channel was eaten entirely away and the $\frac{3}{4}$ -in. tie rod which bolted into it was also eaten off to a sharp point. In the illustration the point of the tie rod is shown slightly above the place where it formerly passed through the channel. The nut on the end of the rod was so badly corroded that it crumbled to powder in the hand. The small piece of metal behind the rule at the top of the illustration is a portion of the upper flange of the channel. At the point where the fillet thickens the section, the metal was not eaten away so fast, and this sliver of metal really represents the thick

metal back of the fillets. The paint still remains on the channel at the right of the portion shown in the illustration, showing that the corrosion was local; in fact, 3 ft. from the point where the beam was eaten entirely through there had been practically no corrosion.

One interesting thing in connection with these specimens was the fact that the concrete of the floor slab adhered tenaciously to the scale which formed on the upper flanges of the I-beams. Two of these specimens are shown in Fig. 3. This concrete, however, seems to have been no protection to the metal so far as corrosion is concerned, and inspection shows it to have been of a very open nature, full of voids. The scale which formed on the sides of the I-beams and channels varied in thickness from $\frac{1}{4}$ in. to nearly 1 in., and showed distinct centers of action where the rust had built out into crater-like excrescences, seeming to indicate that the corrosion was due to electrolytic action to some extent,

which probably resulted from the acid nature of the moisture.

The piece of scale shown at the left in Fig. 4 was taken from the face or web of one of the I-beams, while the piece shown in section at the right was taken from the top of the flange of one of the I-beams. Three large pieces of scale are shown in Fig. 5. The one at the left was taken from the face of the web of a 15-in. I-beam.

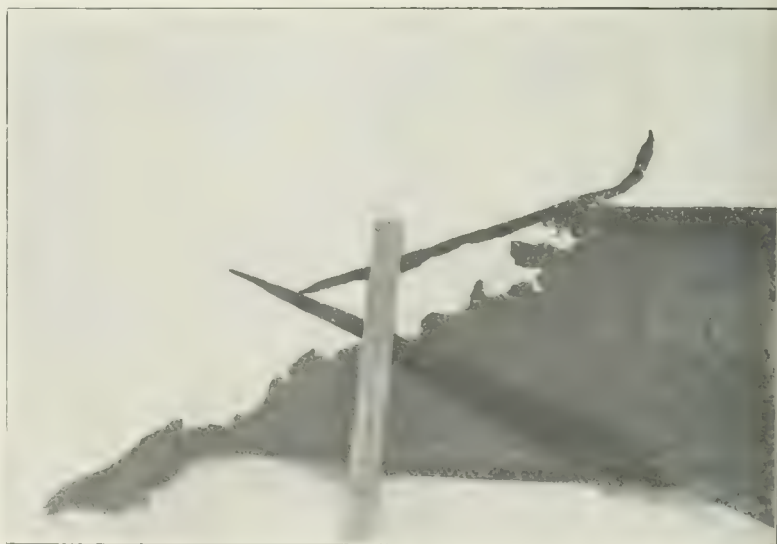


Fig. 2.—Cross-section of 8 In. Channel and Tie Rod.

while the one in the center and that at the right came from the top of the upper flange of the 15-in. I-beam. In Fig. 6 are shown in greater detail the point of the $\frac{3}{4}$ -in. rod illustrated in Fig. 2, and a sliver of metal which was cut from the edge of the upper flange of one of the I-beams, which show considerable corrosion. The front edge of this piece is eaten away very irregularly and to a sharp edge. At the back the metal seemed to be in perfect condition. In fact, in all cases where the scale was removed the metal beneath it was found to be in excellent condition and of good quality.

The excessive corrosion shown took place almost wholly in one floor panel. As soon as it was discovered important points throughout the building were uncovered and investigated. In all cases above the first floor, where there was no moisture present in the shape of heated vapor, no corrosion was discovered, and even in the basement very little corrosion was found in any place except where the tile had been broken to permit the passage of steam pipes. In one case where a dumbwaiter passed through the floor the steel work had been laid bare and had corroded to some extent, and the steel pinion at the top of the dumbwaiter shaft had failed after very short use. Upon investigation it was found that the teeth were cut away to very thin, sharp points, and all of the metal

rooms in the building by ample fan circulation, the dangers of corrosion would be greatly lessened. In this particular boiler room the temperature frequently reached 120 or 130 degrees F., which made it exceedingly difficult for the men to work, and there was no provision for ventilation in the boiler room itself. In remodeling the plant arrangements were made for a forced air circulation and a large exhaust fan to take out the heated air and vapor.

Double Track Railroad Mileage Is Small

The mileage of double track railroads in this country is a much smaller percentage of the whole than generally

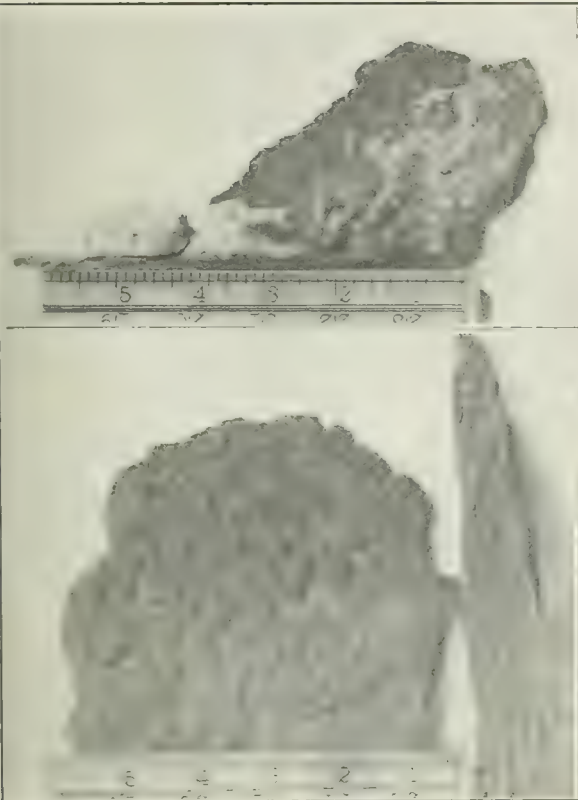


Fig. 3.—Adhesion of Concrete to Scale.
Fig. 4.—Pieces of Scale from I-Beam.



Fig. 5.—Three of the Largest Pieces of Scale.
Fig. 6.—Pointed Form of 3/4-In. Tie Rod Due to Corrosion.

parts about it deeply corroded. This dumbwaiter was used only on rare occasions, and it is evident that when it was used the friction on the faces of the pinion teeth removed the rust and exposed a fresh surface for the moisture to attack. In this way the pinion was very quickly destroyed.

One of the columns near the place where the channel shown in Fig. 2 was located was of the box type, being composed of two channels with plates riveted on the sides. A hole was drilled through one of the plates near the base of the channel to see if it had corroded on the inside, and it was found that the channel was filled with water clear to the top. The moisture had evidently passed up through an opening intended for the pipes, condensed against the concrete floor and flowed into the column. As soon as the column became filled with moisture corrosion ceased and its interior was in excellent condition.

The principal lesson of the conditions described is that ample provision should be made in all boiler rooms for removing moisture laden air as quickly as possible, and the metal work should be so arranged as to prevent any possibility of vapor passing up beside it and condensing against the steel. Exposed steel work which was kept at such a temperature that the moisture could not condense on it, even though it was located in the same boiler room, showed no corrosion, and the paint upon it was in nearly perfect condition after nearly six years exposure.

If the temperature of the boiler room could be kept down to approximately the temperature of the other

supposed. The official statistics of track mileage down to the last year available are as follows:

Year.	Single track.	Second track.	Third track.	Fourth track.	Yard sidings.	Total miles all tracks.
1908	230,494	20,209	2,081	1,409	79,452	333,646
1907	227,475	19,421	1,960	1,390	77,749	327,935
1906	222,340	17,396	1,766	1,279	73,760	317,083
1905	216,973	17,056	1,609	1,215	69,941	306,796
1904	212,243	15,824	1,467	1,046	66,492	297,073
1903	205,303	15,681	1,303	963	61,560	283,821
1902	200,154	13,720	1,204	895	58,220	274,195
1901	195,561	12,845	1,153	876	54,914	265,352
1900	192,556	12,151	1,064	829	52,153	258,784
1899	187,543	11,546	1,047	790	49,223	250,142
1898	184,648	11,293	1,009	793	47,589	245,333
1897	183,284	11,018	995	780	45,934	242,013

Even in England single track lines constitute nearly half of the total railroad trackage. In 1908 there were 23,209 miles of single track out of a total of 53,669 miles of track. The total trackage in England is far less than the miles of siding in the United States.

The Reading Iron Company, Reading, Pa., at its annual meeting last week, re-elected George F. Baer, F. C. Smink, S. R. Seyfert and Heber L. Smith directors, and chose Edward T. Stotesbury to fill the vacancy caused by the decease of Joseph S. Harris. Officers were elected as follows: Chairman, George F. Baer; president, F. C. Smink; vice-president and general manager, George Schuhmann; treasurer, Frederick Butler; secretary, George W. Delaney.

The Browning Pile Driver

A New Self-Propelled Machine Designed Especially for Railroad Use

Pile drivers at the present time are essentially self-contained outfits combining the mechanism necessary for their propulsion from place to place with the pile driving structure. The latter should be capable of driving piles at various angles while at the same time it can be easily and quickly lowered to within the standard railroad clearances for transportation. The new type of railroad pile driver built by the Browning Engineering Company, Cleveland, Ohio, is the latest development in a line of mechanism which had its inception in ancient Egypt, where a man and a maul were used. The drop hammer pile driver operating with a hoist line and driven by steam or gas engines or electric motors was

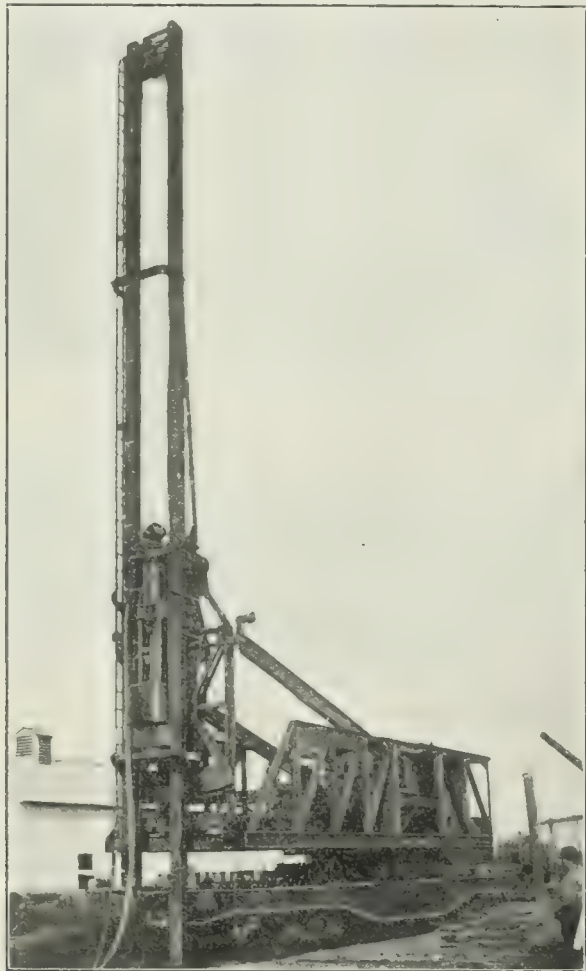


Fig. 1 The Railroad Pile Driver Built by the Browning Engineering Company, Cleveland, Ohio.

developed from this primitive form. The invention of the steam hammer driver in which the driving element rests directly upon the top of the pile to be driven followed, and with these improvements the rapidity of the operations for forcing the pile into the ground has been increased. In railroad work especially to keep pace with this progress it is necessary that the pile should not only be picked up and placed into position quickly by the driver, but that the whole should be capable of rapid movement from place to place. Other requirements to be met include the driving of straight or batter piles either in front of the machine or on the sides of the right of way, and such a design as would permit the outstanding apparatus to be housed easily for transportation when the work was completed. Fig. 1 is a general view of the Browning railroad pile driver, while Figs. 2 and 3 show the machine driving batter and side piles respectively. In Fig. 4 the hammer and the leads are shown being lowered to a horizontal position.

The pile driver is of the steam driven revolving type



Fig. 2 View Showing the Leads Swung to Drive Piles on a Batter.

and is capable of making 3 rev. per min. The truck is of the standard eight-wheel M. C. B. type. It is 45 ft. long and the distance from the center pin to the leads is 30 ft. One axle on each truck is driven by a spur gear



Fig. 3. Driving Piles at the Side of the Track.

and pinion. Bevel gears are located on the pinion shafts and mesh with bevel pinions on a horizontal traveling shaft which extends through from truck to truck. This shaft is splined so that it is possible for the machine to propel itself while the upper base is at any point of its

travel. The bevel gear slides along the horizontal travel shaft and a key in it rides in the spline of the shaft. This bevel gear meshes with a pinion in the vertical shaft, which passes up through the center pin of the auxiliary truck. The auxiliary truck travels back and forth on the lower truck, a distance of 17 ft. 3 in., its movement being controlled by an endless cable attached to a drum at one end of the car, which is operated by a hand lever. The pile driver proper is supported on this auxiliary truck. The driver is self-propelling at the rate

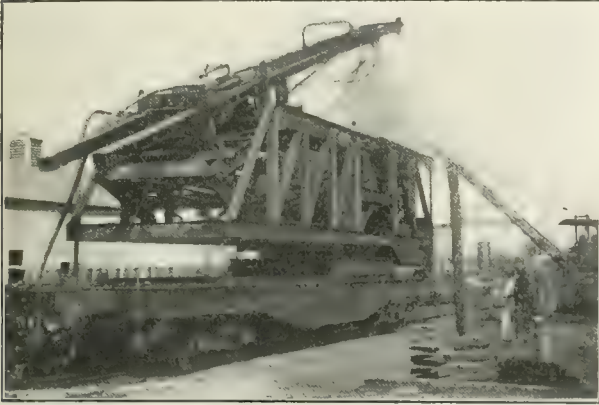


Fig. 4.—Lowering the Hammer and the Leads to a Horizontal Position.

of about six miles per hour, but if it is desired to couple it in a train the pinions driving the axles are taken out of mesh.

The boiler, which is located at the rear end of the structural frame, is 60 in. in diameter and 8 ft. high. It is sufficiently large to furnish steam for both the propelling machinery and the hammer, the supply for the latter being carried through a heavy 4-in. wire wound hose. Channels are used for the pile driving ways, which are 65 ft. long and are carried by the swing frame. This frame is supported at the lower end by rigidly braced short radius arms, and at the upper by longer ones, an arrangement which enables the ways to be lowered into a horizontal position over the car for transportation. The long upper supporting arms are hinged at the ways and extend back to the operating machinery, where they are connected to the engine shaft by racks, pinions, a worm gear, a jaw clutch and a spur gear. The racks are riveted to the ways and roll on the pinion shroudings, which form the supporting flanges for the racks and the arms.

The steam hammer is 12½ ft. long and the cylinders are 13½ in. in diameter, with a normal stroke of 42 in. The weight of the striking part is 5000 lb. and the shipping weight of the complete hammer is 10,150 lb. The standard construction between the ways permits a hammer measuring 20 in. between the jaws to be used, the jaw width being 8¾ in. These dimensions can, however, be varied to suit any special hammer which might be specified. Two drums are used, one for handling the steam hammer, while the other, with its clutch, forms a whip hoist for hauling the piles into position.

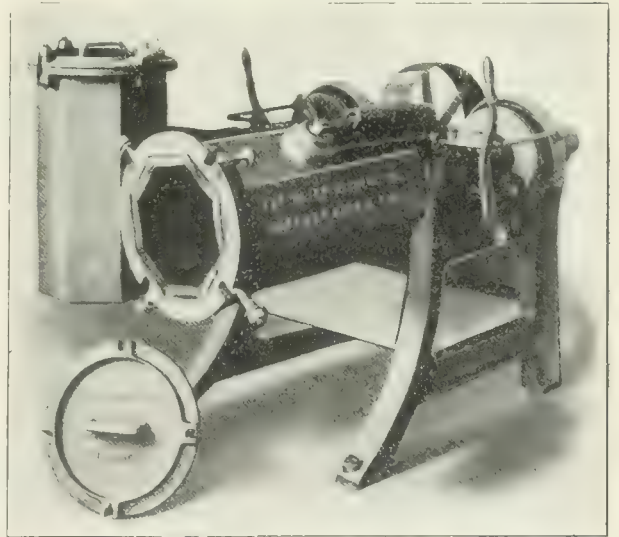
The movement of the leads to drive piles on a batter, as shown in Fig. 2, is controlled by a hand wheel and screw. The screw works a nut attached to the leader framing below the suspension point. A large pin connection at the top of the swing frame supports the ways and enables them to be set at an angle. The maximum side batter at which piles can be driven is 3 in. per foot and the front reach is 19 ft. from the leading truck wheels. All of the piles are hauled into position by an independently driven whip hoist. When driving piles on either side of the track the maximum distance from the center line is 28 ft. The lowering operation shown in Fig. 4 requires about 1½ min., and the hammer and the leads can be raised to the driving position in the same space of time. The machine will handle piles 90 ft. long having a butt diameter of 22 in. The height of the pile driver when locked in position for transportation is 16 ft. The total weight is 150,400 lb.

The Baird Improved Tumbling Barrel

A new type of tumbling barrel for burrishing and buffing small articles with steel balls has been built by the Baird Machine Company, Oakville, Conn. This machine is an improvement on the double horizontal tilting tumbling barrel for the same class of work which was illustrated in *The Iron Age*, July 1, 1909. The success of the older machine has resulted in the development of many new ideas which have been perfected and incorporated in the later machine.

The octagonal barrels are of cast iron lined with maple wood. While the wooden lining is very durable this construction permits all the wearing parts to be renewed easily, thus prolonging the life of the machine. The barrels are kept in a horizontal position while in use, but for emptying or filling they can be easily tilted, as they are supported on trunnions near their centers by heavy yokes, which are secured to the driving shafts. The barrels are held in the horizontal operating position by a lock pin which engages a recess on side of the barrel near the lower end, a slight push on the lever controlling the lock pin being sufficient to disengage the pin and release the barrel for tilting. This locking device is both simple and convenient, and holds the cover in position so as to prevent leakage effectually. It also requires very little time to operate, and there are no loose parts to get lost, since the cover bolts are hinged to the barrel itself and the nuts have only to be loosened and not taken off.

In common with the earlier type of machine a pulley of ample size is employed to drive both barrels through bevel gears and friction clutches so arranged that either one can be operated entirely independently of the other. This arrangement results in a considerable saving of time, as the operator can run one barrel while the other is being emptied or filled. The use of friction clutches in the drive enables the driving pulley to be belted direct to



The Double Horizontal Tilting Tumbling Barrel, for Burrishing with Steel Balls Made by the Baird Machine Company, Oakville, Conn.

the line shaft, thus eliminating a countershaft. Large bronze bushed bearings are used, and those of the main shaft have ring oilers.

The inside dimensions of the barrel are 10½ in. in diameter and 24 in. long. The use of this comparatively small diameter has been found by the builder to lessen the danger of bending, denting or otherwise injuring small or delicate parts which are being burnished, while at the same time the speed at which the work is turned out and the quality of the finish are not affected.

On March 1 all departments of the general offices of the Lozier Motor Company, heretofore located at 1751 Broadway, New York City, will be removed to Detroit, Mich.

The Reilly Friction Clutch

A New Power Transmission Device Suitable for All Classes of Machine Tools and Countershafts

A. S. Baldwin & Co., Sharon, Pa., are manufacturing a new type of friction clutch. It is suitable for all classes of machine tools, automobiles, gas engines, motor boats and countershafts, and in its construction no bolts, studs,

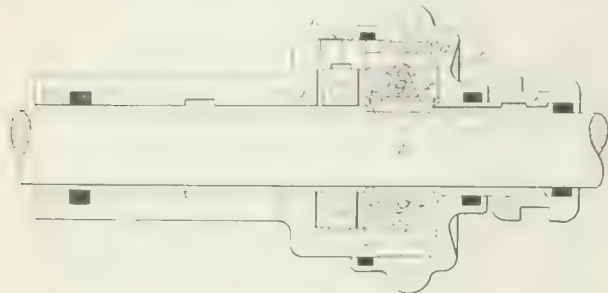


Fig. 1.—The Split Type of Reilly Friction Clutch Made by A. S. Baldwin & Co., Sharon, Pa.

nuts, hinge pins or toggles are employed. The working parts are entirely housed and protected against dirt and grit, while at the same time they are readily assembled, adjusted and removed. In action no end thrust on the shafts is created by the clutch, which, while providing a powerful clutching force, will at the same time slip if the load is too great for it. Fig. 1 shows the split type of clutch, while applications of the standard solid type

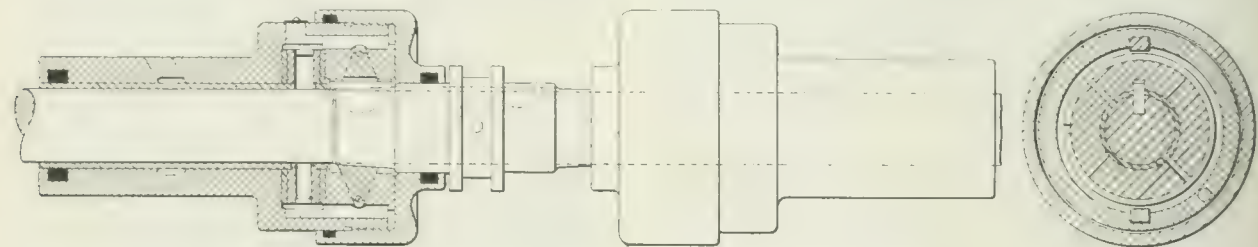


Fig. 2.—The Standard Clutch Used as a Two-Speed Countershaft.

are illustrated in the other three drawings. Fig. 2 shows the use of the clutch as a countershaft, with either two forward speeds or one forward and one reverse speed; Fig. 3 illustrates an application of the clutch to geared head machines, while Fig. 4 shows a two-speed forward and reverse countershaft with one belt.

The outside of the split clutch, Fig. 1, is perfectly smooth and as it is split into halves it is adapted to mill work in places where it is necessary to put the coupling on the shaft in the same way as a split pulley instead of taking the shaft down. As the essential features of the two types of clutches are the same the detailed description given of the split clutch applies equally as well to that of the solid one. The driven member *a*, which can be either a pulley or a spur gear according to the character of the transmission, is mounted loosely on the driving shaft *b*, and is coupled to the latter for rotation with it through the medium of friction devices. There is a housing chamber at one side of the driven member which contains all of the active friction elements of the clutch. This chamber is formed by projecting a laterally offset casing neck, *c*, from one side of the driven member. This offset part is threaded on its outer surface to engage with the internally threaded flange of the

adjusting cap *d* which serves to close the chamber, in addition to furnishing a means for adjusting the friction elements properly. When the proper adjustment has been made this cap is fastened in position by a locking screw. The friction elements include a fast friction collar located inside the housing chamber at its base and fastened to the driving shaft. Friction washers are located on each side of this collar and on its outer side, between it and the body of the adjusting cap, is located the distinctive feature of this clutch. This special feature is the employment of a pair of spaced friction thrust collars, *e* and *f*, with an interposed expandable friction ring, *g*. These collars are keyed to the driven member by locking feathers secured in the inner wall of the casing neck *c* and engaging in notches formed in the peripheries of the collars at diametrically opposite points. In this way the thrust collars can be securely coupled to the driven member so as to turn with it, while at the same time they are free to move laterally under the influence of the friction ring.

The inner of the thrust collars is located next to the outer friction washer of the shaft collar and the other bears against the inner side of the flanged adjusting cap. These collars are constructed in duplicate and have dished contact faces, *h*, in their opposing sides which register with the inclined sides of the friction ring. This ring is of peculiar construction and consists of a spring band, *i*, surrounding a circular series of segmental clutch blocks. These blocks are of triangular or conical shape and have a groove in their apices forming a continuous seat for the spring band. The friction ring is intended to be keyed or feathered to the driving shaft by providing the ring with a key groove in one of

its segments to receive the main shaft key or feather which is secured fast in the driving shaft.

Under normal conditions the ring is contracted and the friction elements are left loose enough to free the driven member *a* from the shaft *b*. The expansion of the friction ring between the thrust collars, which results in forcing these collars laterally into a frictional engagement with the fast shaft collar and the adjusting

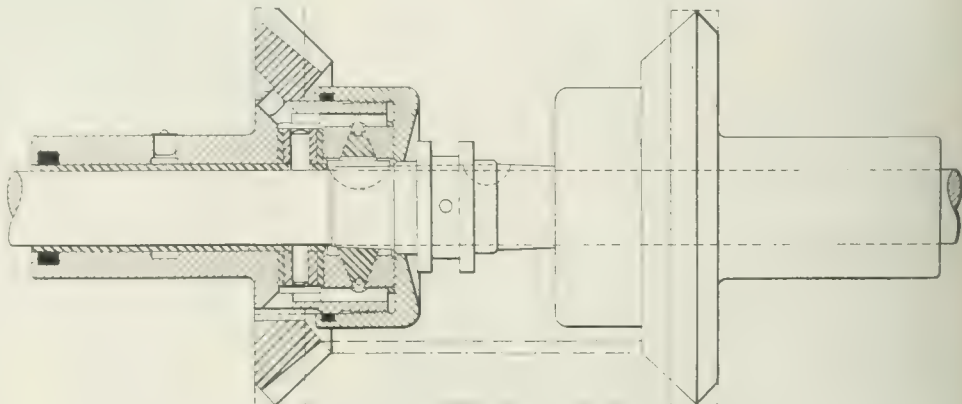


Fig. 3.—An Application of the Clutch to a Geared Head Machine.

cap of the driven member, engages the clutch and presses the driven member tightly upon the shaft collar. The expansion of the friction ring is secured by the movement of a shiftable slide collar mounted on the shaft which can slide along the shaft but is compelled to turn with it. This collar has a grooved hub, *j*, which is designed to receive the usual shipper lever, and at each side of this hub the collar has a taper wedging gland that

is adapted to be thrust through the outer friction collar *f* and into the friction ring *g* inside of the circle of segmental clutching blocks. When the wedging gland is withdrawn from the friction ring the spring band *i* contracts the ring, thus disengaging the clutch.

If desired the slide collar can be so arranged as to alternately engage and disengage the individual clutches or both can be disengaged at the option of the operator. The solid clutches used in Fig. 4 are suspended from the ceiling, as shown, to avoid sudden shock.

Five sizes in all of clutch are made for shafts rang-

the diameter of the shaft 1 in. with a feed of 0.025 in. The diameter of the cast iron piece B was reduced 9-16 in. in 60 seconds at a cutting speed of 165 ft. per minute and a feed of 0.1 in. The tool used in this case was a size C No. 11 right hand tool and the amount of metal removed was 10 lb. C is a bar of machinery steel $3\frac{3}{4}$ in. in diameter, from which a cut 15 in. long was taken in 3 minutes at a cutting speed of 175 ft. per minute. The amount of metal removed in this case was 16 lb., or 5 1-3 lb. per minute. The piece D was finished at a speed of 385 ft. per minute, a cut 1-16 in. deep and 15 in. long

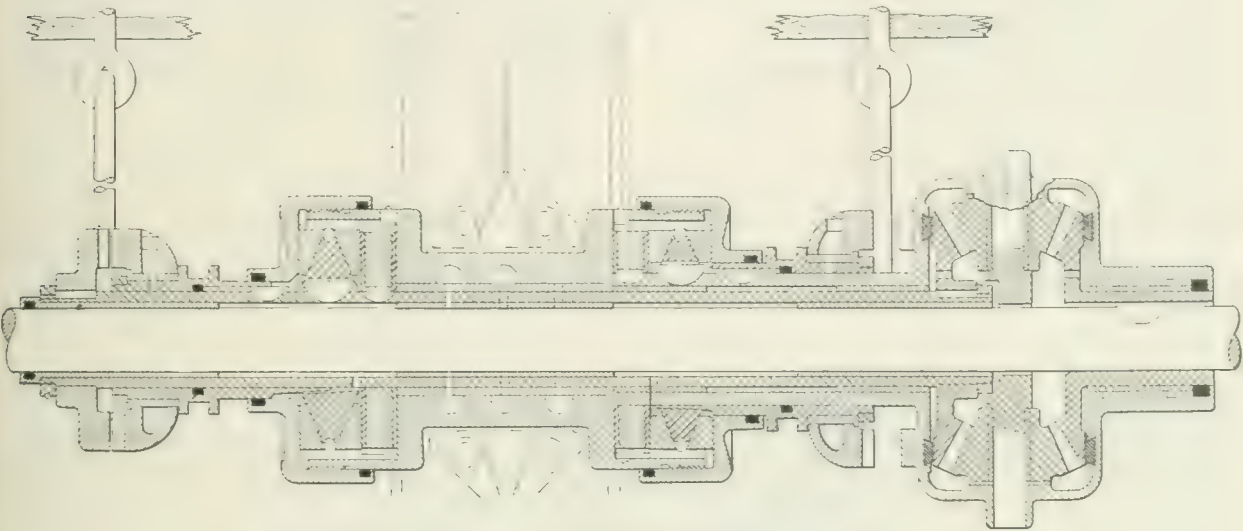
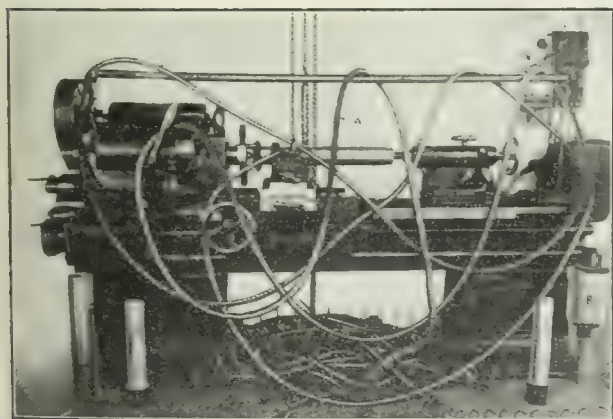


Fig. 4. Clutch Giving a Two-Speed Forward and Reverse Motion, for Control of Its with One Belt

ing from 1 5-16 to 2 15-16 in. in diameter. The smallest clutch which is capable of transmitting 4 hp. at a speed of 200 rev. per min. has an external diameter of 3 15-16 in. The outside diameter of the largest clutch which is capable of transmitting 16 hp. is $8\frac{3}{4}$ in.

A Recent Test of O. K. Tools

A special outfit for testing new steels as soon as they are placed on the market has been fitted up by the O. K. Tool Holder Company, Shelton, Conn. The testing outfit is very complete and consists of a high powered motor driven lathe, a wattmeter to indicate the exact amount of power consumed at all times, a cut meter to show the speed of the cuts taken and a scale for weighing the amount of chips removed. In addition to testing new



Results of Recent Tests of O. K. Tools Made by the O. K. Tool Holder Company, Shelton, Conn.

steels the plant has been also used to show the comparative merits of the tool holders made by this company which use inserted steel cutters as compared with solid forged tool holders of other manufacturers.

The long chip A is 65 ft. in length and was taken from a piece of oil treated steel at a speed of 75 ft. per minute. The composition of this steel was 3.5 per cent. nickel and 0.4 per cent. carbon. One of the maker's size C tools in a $\frac{5}{8} \times 1\frac{1}{4}$ in. holder was used and reduced

being taken in 1 minute. In all of these tests size C tools in a $\frac{5}{8} \times 1\frac{1}{4}$ in. holder were used and in making some of them as high as 25 hp. was consumed.

Exports Increase Heavily

The official statement of imports and exports of the United States in January, just completed by the Bureau of Statistics of the Department of Commerce and Labor, shows exports of \$197,060,557, against \$144,461,435 in January of last year; imports, \$130,283,223, against \$133,670,278 in January of last year. The excess of exports over imports is \$66,777,334, against \$10,791,157 in January of last year.

For the seven months ending with January, exports are \$1,256,792,956, against \$1,084,686,910 in the corresponding months of the prior year; imports during the seven months are \$893,763,376, against \$891,193,710 in the same months a year ago. The excess of exports over imports during the seven months is \$363,029,580, against \$193,493,200 in the corresponding months of last year.

The share of imports entering free of duty in January, 1911, is 55.9 per cent.

The Croxton Motor Company, a reorganization growing out of the Croxton-Keeton Motor Company, Massillon, Ohio, has purchased the old plant of the Baker Motor Vehicle Company in Cleveland, which has been unoccupied for several years, and will remove its equipment from Massillon to Cleveland. The company has been incorporated with a capital stock of \$250,000. It will manufacture taxicabs, commercial vehicles and trucks. Its new site is a five-story brick building with 45,000 sq. ft. of floor space. H. A. Croxton is president and general manager; J. P. Stoltz, New York, vice-president and Eastern sales manager; H. D. Michael, New York, secretary and treasurer. It is expected that but little new equipment will be needed.

The Cleveland Alloys Company, Cleveland, Ohio, has been formed with a capital stock of \$30,000, to manufacture solder under a new process, aluminum solder, bearing metal, and kindred products. The company has established a plant at 6816 Union avenue. M. I. Dryfoos is president and secretary; H. R. Dryfoos, vice-president and treasurer; R. H. Wall, manager.

An Interesting Curtis Turbine Installation

Details of the Turbo-Generator Set at the Bettendorf Axle Company's Plant

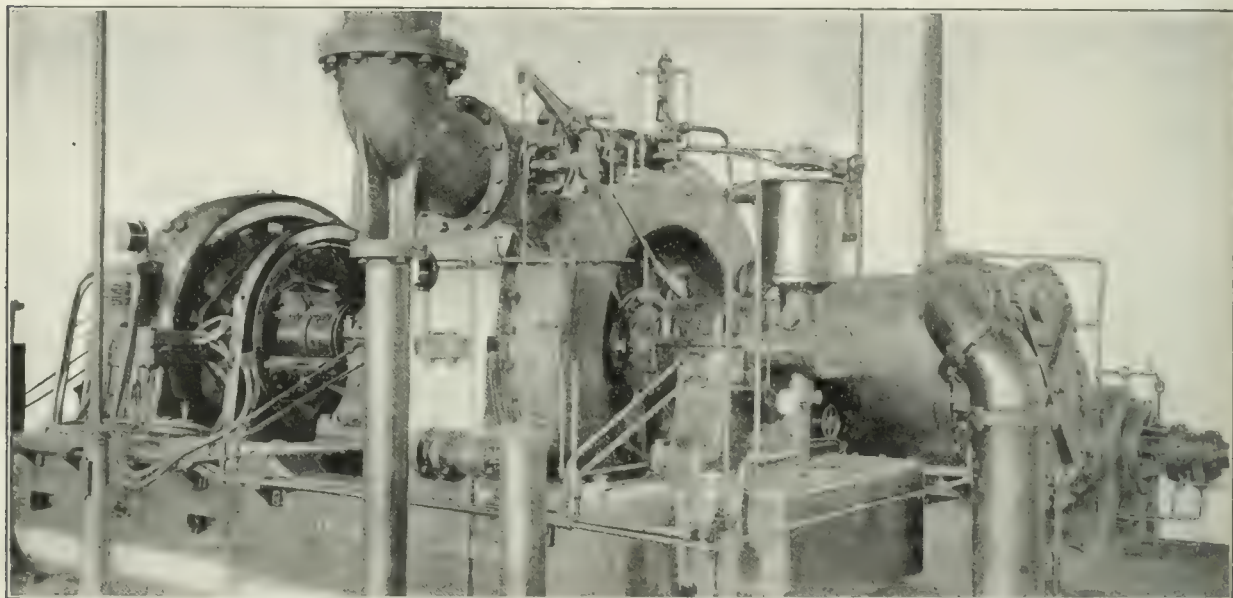
The growth of the plant of the Bettendorf Axle Company, Davenport, Iowa, rendered the installation of additional electrical equipment necessary about two years ago. A thorough investigation of the various prime movers suitable for driving generators was made at that time. The power equipment of the plant, which was run noncondensing, consisted of two 100-kw. direct connected high speed tandem compound engine driven units, a number of hydraulic pumps and an air compressor, all exhausting into a common header. This fact, as well as a consideration of the problem of heating the shop in winter, pointed to the low pressure turbine as the most suitable unit to install when reliability, simplicity, economy and maintenance were all taken into account.

As a result of this study the company decided to install a 500-kw. horizontal Curtis turbine, made by the General Electric Company, Schenectady, N. Y. The unit

cured by the use of a water rheostat. These tests showed that the available supply of exhaust steam was sufficient to furnish 425 kw. continuously, while for short periods 575 kw. could be generated. At the time these tests were made six boilers of about 120-hp. capacity each were in service, and the results would indicate that from 75 to 80 per cent. of the energy delivered to the engines and the auxiliary machinery was recovered.

The regulation of the turbine is very good, as the variation in the potential does not exceed two or three volts with a load fluctuation of approximately 500 amperes. Inclosed and flaming arcs and mercury vapor and incandescent lamps constitute the lighting load, and better illumination is secured when the turbine furnishes the power than when the engine driven units are carrying the load. The increased lighting efficiency is due to the better regulation of the turbine. Testing of the emergency governor every week is a regular part of the operating routine. It responds to an increase in speed instantaneously and trips the stop valve on the turbine.

A few buckets of oil are drawn from the tank every two weeks and replaced by fresh oil, a practice which seems to keep the lubricant in good condition. Circulating water is employed to keep the bearings cool and practically no trouble has been experienced on this



The Low Pressure Curtis Turbo-Generator Set Installed at the Plant of the Bettendorf Axle Company, Davenport, Iowa.

has been operating continuously for 14 hours a day ever since September, 1909, when it was put in service. The average load is 250 kw. and the current supplied by the generator is used principally for the operation of cranes and lifting magnets and for shop lighting. At the present time a number of new machines are being installed and when these are completed the power required will be approximately the capacity of the set, which is 500 kw.

The hydraulic pump exhaust furnishes the bulk of the steam required for operating the turbine, but as breakdowns to the system render the supply subject to interruption, a connection was made from the exhaust header to the high pressure steam line through a 4 x 8 in. Foster pressure reducing valve. In this way the amount of steam necessary to keep the turbine in operation is secured and the arrangement works satisfactorily, as the valve operates within a range of a 1/2-lb. drop in pressure. The average back pressure is about 3 lb., and a 12-in. relief valve, designed to operate at 5 lb. pressure, is located in the exhaust header to take care of any excessive back pressure. The entire steam supply for the turbine passes through an 18-in. two-stage separator, which eliminates all moisture and oil from the steam. The exhaust from the turbine is discharged into a 3150-ft. Worthington condenser and the condensed steam is returned to the boiler feed water heater.

Before the turbine was put in operation it was run for several days under varying loads, which were se-

point. As it is very important that the flow of circulating water should be uniform, the supply is taken direct from the mains and passed through a reducing valve, which takes care of any pressure fluctuations in the supply main.

Comparative statistics show that the attention required by the turbine unit is not as great as that demanded by one of the engine driven units, having only one-fifth as much capacity. The good results which are obtained without using a receiver generator between the various units supplying the steam and the turbine are due to the employment of a reducing valve. This makes up for any deficiency in the steam supply due to the stoppage of one of the engines or pumps, and thus a sufficient supply of steam, which, if necessary, can be taken direct from the boilers, is secured. This arrangement results in making the installation fully as reliable as the high pressure steam engine or turbine and much more economical than either of them when running noncondensing.

Although no figures of the exact performance of the turbine are available, it is believed to be possible to recover 75 per cent. of the energy delivered to the pumps, compressors and reciprocating engines when running with a 28-in. vacuum, while in cool weather it has been possible to run for weeks with a vacuum ranging from 29 to 29 1/2 in., which reduces the steam consumption even still further. It has been found necessary in order to maintain a good vacuum to pipe the steam seal in which

the carbon packing rings are located with high pressure steam to prevent any air from leaking in around the shafts.

The longest continuous run made with the turbine has been five days and nights, although the average amount of time it is in service is only 14 hours per day. Since its installation about 18 months ago no shut-down due to trouble of any kind with the turbine has occurred.

A Very Complete Foundry Trolley System

Details of an Installation at the Torrance Malleable Iron Company's Plant

The use of overhead trolley systems for handling raw material and finished products is becoming more general

a switch and the overhead scale which is used for weighing various loads.

As will be noticed from Fig. 1 the flask storage yard is on one side of the main foundry building, the core room on the other, and the furnace is located near the center of the main building opposite the core room. The coke, pig iron, scrap and coal are stored on the side of the main building along the railroad track. The track for the overhead trolley system is a 7-in. I-beam of light section, having a carrying capacity of from 1500 to 2000 lb. There is approximately 2000 ft. of track around the plant, which enables practically all handling from the raw material to the shipping room to be accomplished by the overhead trolley, hand handling being used only to a

very slight extent. The molten metal is taken from the furnace in bull ladles running on the track. Dorseys receive the metal from the ladle at the point of pouring and discharge it into the molds. Branches of the system run to the flask storage yard, the core room; the coal, pig iron and coke storage piles; the annealing ovens and the rumbling barrels.

A special skip, which allows greater control in dumping, is ordinarily employed for handling castings

from the molding bins to the rumbling barrels and the cleaning room. The cores are handled on a special shelf carrier with a top spring connection to eliminate vibration. The height at which the track could be placed is limited by the depth of the roof trusses in the foundry, and this has made it necessary to construct a section of the core room branch which passes over the railroad

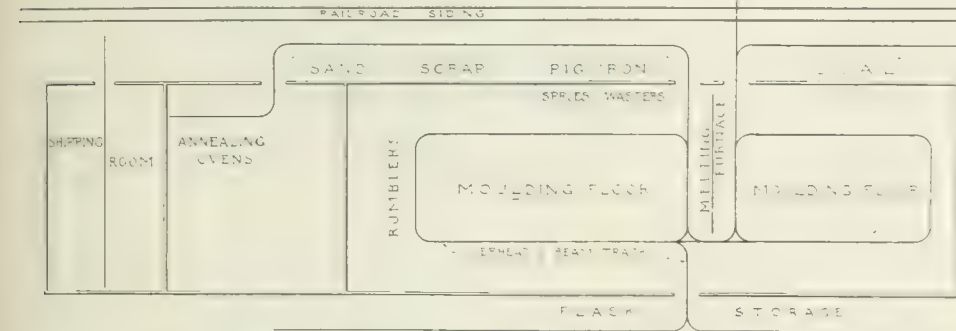


Fig. 1.—Plan Showing the Track Layout for the I-Beam Trolley System at the Foundry of the Torrance Malleable Iron Company, Troy, N. Y.

in foundries. The New Jersey Foundry & Machine Company, 90 West street, New York City, has installed a system in the foundry of the Torrance Malleable Iron Company, Troy, N. Y., which is very complete, and gives a good idea of the standard practice in this respect. Fig. 1 is a plan view of the plant showing the layout of the track, while Figs. 2, 3 and 4 show portions of the



Fig. 2.—One of the Buckets Used.

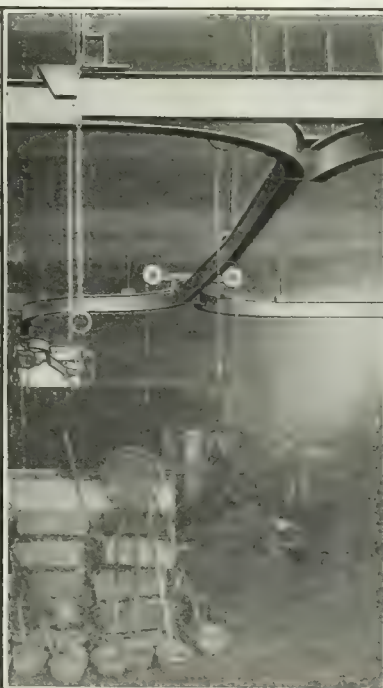


Fig. 3.—The Track Near the Furnace.

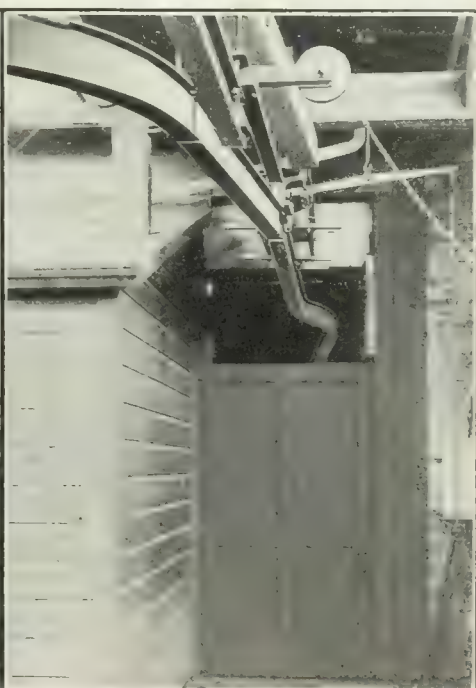


Fig. 4.—A Switch and the Overhead Scale.

Three Views Showing Portions of the Trolley System.

trolley system. Fig. 2 shows one of the heavy removable reinforced bottom, self-righting and self-dumping buckets used for handling coal, sand, coke, pig iron, scrap, castings, sprues, wasters, &c.; Fig. 3 is a view of a portion of the system at the right of the furnace, and Fig. 4 shows

siding, so that it could be raised to clear box cars. An independent system having a capacity of more than 1000 lb. serves the shipping room, and there is a short section of track over the furnace with a trolley and air hoist for charging purposes and handling bungs.

An Unusual Standard Press Installation

A Three-Press Combination Equipment for Piercing Long Pieces

For piercing pieces of unusual length such as angle irons and long flat plates, which cannot be handled in a gang piercing press the Standard Machinery Company, 7 Beverly street, Providence, R. I., has developed a novel press installation. The equipment consists of three presses, one stationary and the other two movable, all mounted on one bed. Fig. 1 is a front view of the installation, and Fig. 2 is a three-quarter or side view.

The presses are of the open side type, and the frames are a modification of the company's No. 7-S press. The middle unit is positively fixed at the center of the bed, while those on either side are fed by a square thread screw actuated by a crank and slide over a dovetail planed in the bed. Each of the presses is fitted with a gib and powerful clamping screws on the back for holding them positively in place. In setting the movable machines a taper draw key with a set screw in the end is employed, the screw acting to force the key out of place when a change is desired. This range is a wide one, and on the particular work for which the equipment was designed there are six different settings in which the minimum and maximum distances between the center of the middle press and those of the side ones are 22 and 43 in., respectively.

The square thread feed screw employed to adjust the presses turns in a hole in the bed, and beneath the out-board presses at the back of the hole is a bronze nut. The bearing of the nut on the screw is 3 in., and the opening in the former is threaded with square threads of $\frac{1}{4}$ -in. pitch and the same diameter as the screw. The bed is 6 in. thick, and the dovetail on which the side

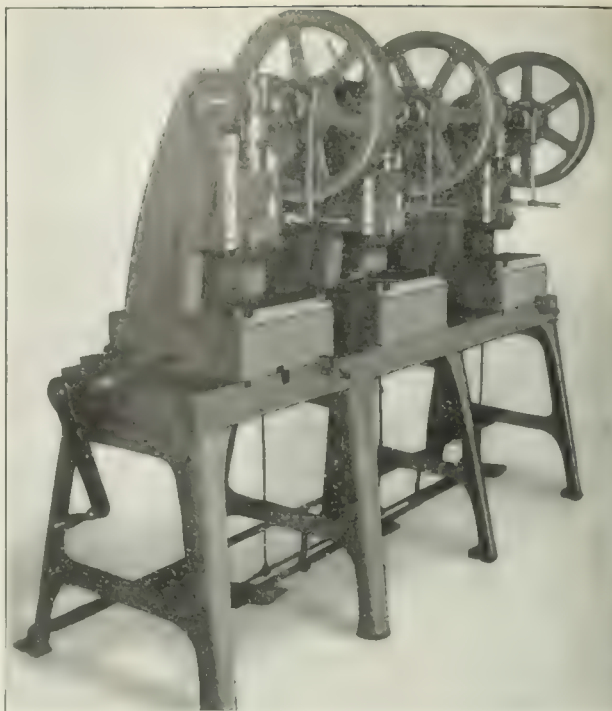


Fig. 2. -Side View of the Triple Press Installation.

nects the three individual ones is used. When the presses are being operated singly a lever at the side of each machine does the tripping. A special countershaft with five hangers enables the machines to be run back and forth while the balance wheel is running. The center press has a countershaft driving pulley with a face 4 in. wide, while those for the outer presses are 18 in. wide, which is the limit of their travel on the bed. The special countershaft is fitted with both tight and loose pulleys for a belt connection with the main line shaft.

The height of the table from the floor is 40 in., and the overall height of the equipment is 6 ft. 8 in., and the overall length is 7 ft. 6 in. Each press has a balance wheel 23 in. in diameter and $3\frac{1}{4}$ in. wide, weighing 200 lb. The stroke is $1\frac{1}{2}$ in. long; the width between the gibs, $4\frac{1}{2}$ in.; the width of the opening at the back of the frame, 7 in., and the adjustment, $1\frac{1}{8}$ in. The bolster plate of each press is 16 in. wide, and $8\frac{1}{2}$ in. deep and 2 in. thick. The speed at which the presses normally operate is 100 rev. per min.

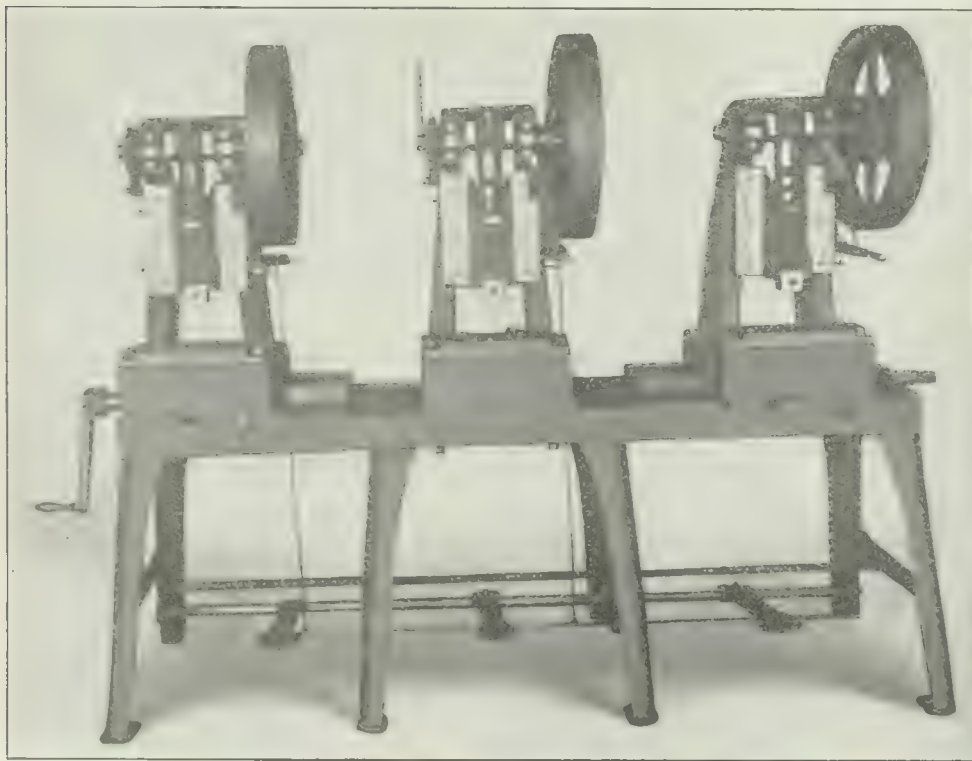


Fig. 1.—Front View of a Triple Installation of Presses for Piercing Long Pieces Built by the Standard Machinery Company, Providence, R. I.

presses slide is 9 in. wide at the top. A forged steel crank is used for feeding the presses, and the key for locating them in position is 6 in. long, and is made from $1\frac{1}{4}$ -in. square stock. The bed is set on eight legs, and there are slots cored through to allow the pieces to drop into boxes or carriers.

These presses can be operated either singly or in unison, and in the latter case a single treadle which con-

nects the three individual ones is used. When the presses are being operated singly a lever at the side of each machine does the tripping. A special countershaft with five hangers enables the machines to be run back and forth while the balance wheel is running. The center press has a countershaft driving pulley with a face 4 in. wide, while those for the outer presses are 18 in. wide, which is the limit of their travel on the bed. The special countershaft is fitted with both tight and loose pulleys for a belt connection with the main line shaft.

Duff Jacks at Buenos Aires.—A notable exhibit at

the late Buenos Aires Exposition was made by the Duff Mfg. Company, Pittsburgh, Pa., who showed every type of jack it manufactures, including the widely known Barrett track and car jacks. These jacks had already been in extensive use in Argentina, as in other foreign countries. The name Barrett, as identified with the Duff product, was registered with the Government of Argentina in 1908.

The Busch Power Sprue Cutter

A new design of power driven sprue cutter has been developed by J. C. Busch, 13C Ferry street, Milwaukee, Wis. The machine is built principally for cutting gates, runners and risers on steel castings and also for trimming

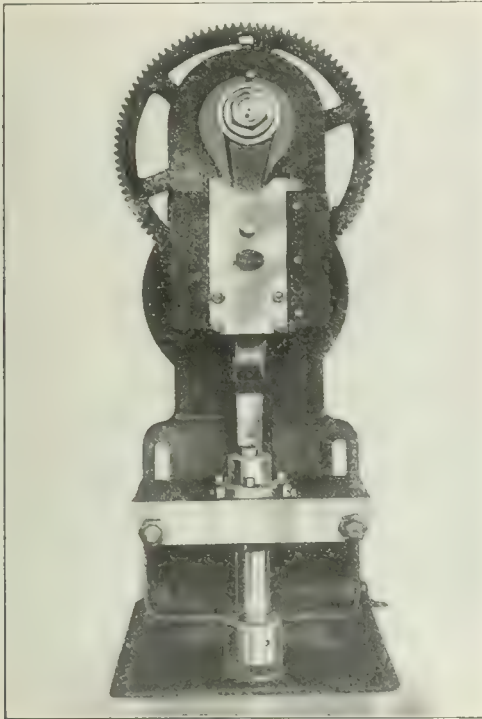


Fig. 1. Front View of a Power Sprue Cutter Built by J. C. Busch, Milwaukee, Wis.

figs. Fig. 1 is a front view and Fig. 2 is a side view giving details of the operating mechanism. As will be noticed from these two views, the construction is very heavy. It is claimed that the machine will do more

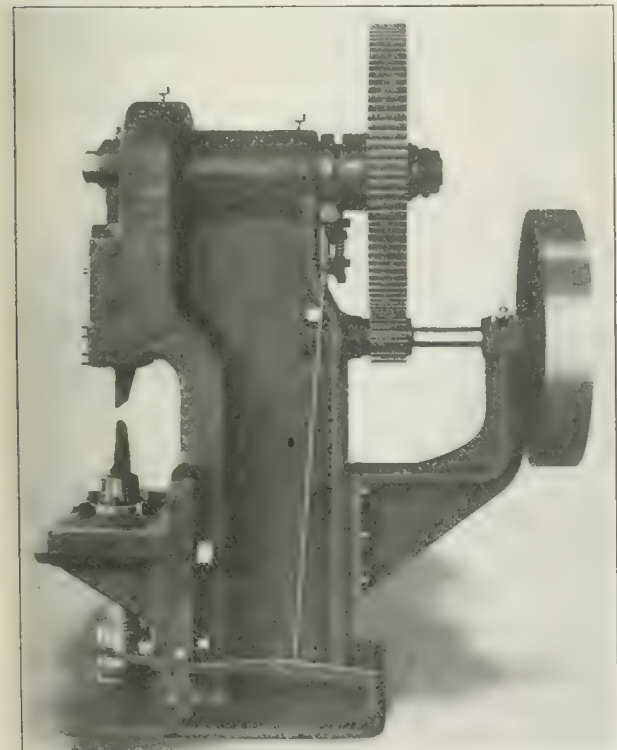


Fig. 2. -Side View, Showing Details of Operating Mechanism.

work within its capacity than eight men, while at the same time the amount of grinding is reduced, as clean cuts close to the casting can be made.

In the construction of the cutter high grade material is employed throughout. The frame, flywheel and

back brackets are of cast iron, and steel castings are used for the gears, connecting rods, cross head and table. The shafts are of forged high carbon steel and have bronze bushings fitted into seats bored in the castings. The gears are cut and the knives are made of 3-in. square steel, with a cutting edge extending across their entire width. The cost of keeping these knives in good condition is said to be far less than for chisels doing the same work, as they will run from three to four weeks without regrinding. Three sets are furnished with each machine.

The machine is driven by a 10-hp. motor or its equivalent, and with a flywheel speed of 200 rev. per min. makes 30 rev. per min. At this speed it will take care of an output of from 10,000 to 12,000 lb. per day. The table has a screw adjustment and a motion of approximately 8 in. The capacity of the machine is 1½-in. square stock or its equivalent, but a piece of 0.3 per cent. carbon steel measuring 1¾ x 3½ in. has been successfully cut.

The following table gives the principal dimensions and specifications of the machine:

Depth of throat, inches.....	91½
Gap, inches.....	27
Height of frame, inches.....	94
Overall height, inches.....	114
Width of table, inches.....	20
Motion of table, inches.....	8
Size of knives, inches.....	3 x 3
Cutting edge, inches.....	3
Capacity of cutter for square stock, inches.....	1½
Diameter of flywheel, inches.....	36
Face width of flywheel, inches.....	6
Speed of flywheel, revolutions per minute.....	200
Power required, horsepower.....	10
Speed of machine, revolutions per minute.....	30
Weight of machine, pounds.....	10,000

This machine can also be used in a crucible foundry to cut runners and gates into suitable lengths for the next heat and thus reduce the amount of handling and the storage space required to a minimum.

Additions to the Steel Corporation's Fleet

The sale to the Pittsburgh Steamship Company of three freight steamers belonging to the Western Transportation Company adds what are among the best of the independent vessels of the lakes to the Steel Corporation fleet. These ships are new, cost something like \$600,000 each to build, are 606 ft. long over all, have carried coal cargoes to Duluth of 13,500 net tons and 450,000 bushels of wheat from that port, and are most modern in every respect. The three are good for 36,000 gross tons of iron ore at a trip, or about 750,000 tons for a season of navigation. They were doubtless bought at a bargain, as the deal was made at a time when 1911 prospects for independent vesselmen on the lakes were at low ebb and the owners were not heavily interested in the control of freights for their ships. The three boats, formerly known as the Mills, Kerr and De Graff, have been renamed, respectively, the Filbert, the House and the Crawford, after officers of the United States Steel Corporation and subsidiaries.

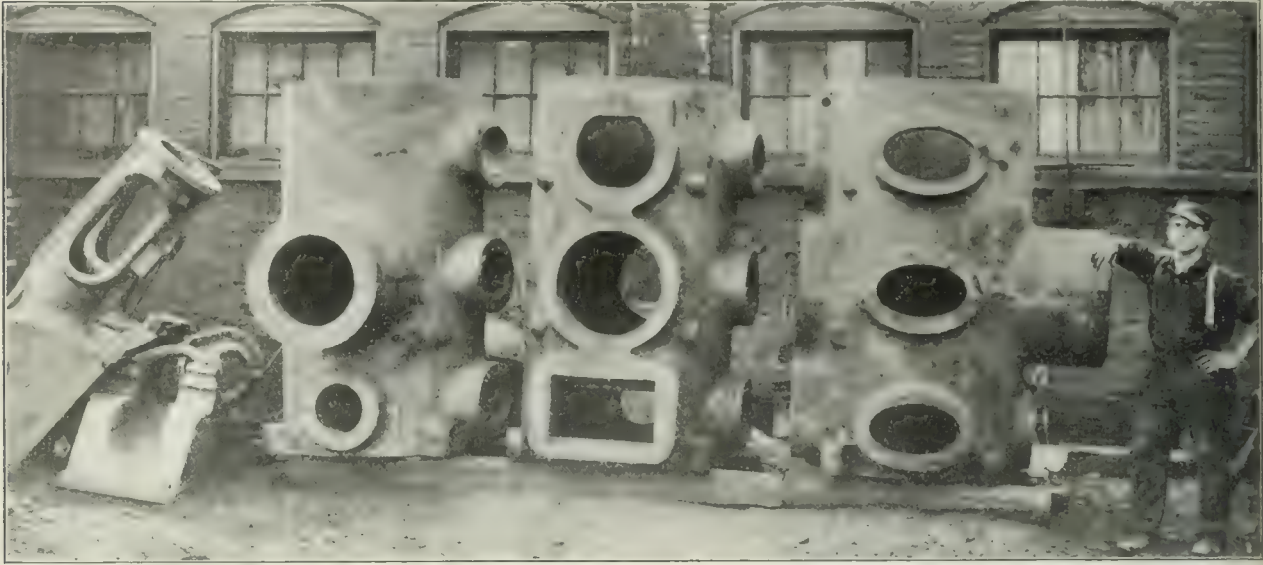
To-day the tonnage aspect of the lake situation for 1911 is improving materially and there will probably be a fair business for most of the independent ships built. Aside from two tremendous vessels for the Shenango interest, each 617 ft. long, little is under construction in lake yards, aside from replacements and special class ships—passenger boats, oil barges, tugs and the like. With a good grain crop next fall in the Northwest, advance prospects for which are now far above the average for this time of year, there will be good business all season for lake bulk carriers.

By completing the steamship Corozal for the New York & Porto Rican Steamship Company in 17 weeks, the Newport News Shipbuilding & Drydock Company, Newport News, Va., claims to have broken the world's shipbuilding record. The Corozal is a freight liner, 347 ft. long, costing \$500,000, and will be employed between New York and Porto Rico.

Cylinder Castings Made on a Mumford Molding Machine

In the description of the additions to the Laidlaw-Dunn-Gordon Company's plant which appeared in *The Iron Age*, February 9, 1911, on page 383, a mistake was made regarding the name of the jarring machines installed in the foundry. The name of these machines was incorrectly given as Mumford & George. The equip-

This holder enables any kind of fitting or valve of uneven surface to be held rigidly, the gripping being effected by a double trunnion arrangement, with a four-point trunnion chuck holder fitted on the face of the barrel. The fittings and the gripping heads are the only revolving parts. The chuck has antifriction thrust bearings, which insure easy motion when moving the fitting from one index point to another. If desired a valve or fitting having four openings can be tapped complete at one setting during each revolution of the chuck. When

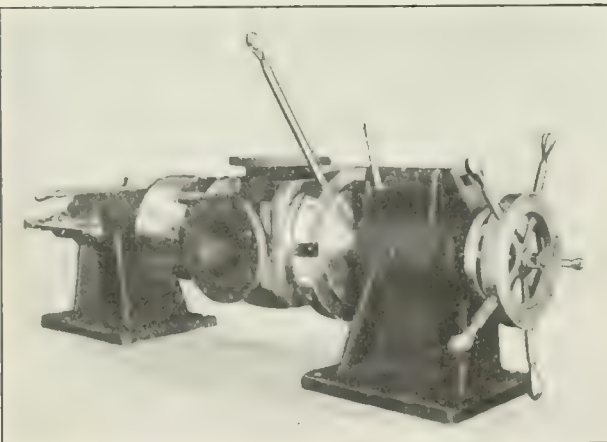


First Castings Made at the Laidlaw-Dunn-Gordon Plant on a 32 In. Jolt Ramming Machine Built by the Mumford Molding Machine Company, New York City.

ment was furnished by the Mumford Molding Machine Company, 30 Church street, New York City, and consists of one 16-in. jolt ramming machine with a table 6 ft. square and a capacity of 9000 lb., and a 32-in. machine with a table measuring 6 x 9 ft., and having a capacity of 40,000 lb. These machines are employed to produce a great variety of molds of all sizes and shapes, and the first castings made from molds rammed on the larger machine are illustrated herewith.

The Murchey Revolving Chuck

A new quick action revolving fitting and valve chuck, capable of attachment to a tapping machine, boring mill, drill press, &c., has been brought out by the Murchey Machine & Tool Company, Detroit, Mich. This chuck is designed to hold fittings and valves ranging from 4 to 10 in. in diameter, as well as flanged fittings. Although a similar tool for holding fittings and valves ranging from 1 to 5 in. has been made by this company, the new chuck, in addition to accommodating larger sizes, possesses a compensating gripping chuck holder, shown at the left side, which is an important feature.



A New Revolving Chuck for Fittings and Valves Made by the Murchey Machine & Tool Company, Cleveland, Ohio.

changing work in the chuck it is not necessary to screw and unscrew the entire diameter of the valve or fitting, as the operation is very simple and can be quickly accomplished. One stroke of the tap lever enables the chuck to be thrown wide open after the screw pressure is released by a short turn of the hand wheel and the pin at the left near the small lever drawn.

In the standard type of chuck there are only four slots, but it can be furnished if desired with eight slots for tapping at an angle of 45 degrees. Cold rolled steel is employed for the center spindles; the pilot wheel is of cast iron, with cold rolled steel handles, and the index head is of cast iron.

Long Distance Transmission of Steam

The University of Wisconsin, Madison, Wis., has issued bulletin No. 347, entitled "Long Distance Transmission of Steam and Its Effect on Power Plant Economies." This bulletin was prepared by H. J. Thorkelson, associate professor of steam engineering, for the purpose of calling the attention of steam engineers to the high efficiencies attainable in transmitting steam over considerable distances. After the discussion of the amount of energy that is unavoidably lost in changing a given quantity of energy in one form to the same amount in some other, the efficiency of the various parts of a steam plant are taken up. Following this, the effect of varying their loads upon the efficiencies of different portions of the plant are discussed. Efficiency curves for the various parts of a plant are included in the bulletin, as well as a curve showing the change in the total efficiency of the plant due to varying the load on the various parts. Curves showing the comparative total efficiencies of steam and electric systems of transmitting energy for various conditions are also included. The data upon which these curves are based were obtained from a test of a superheated steam pipe line 1200 ft. long.

The Raydiant sidewalk lights, manufactured by the Berger Mfg. Company, Canton, Ohio, have been installed in all courts of the new 11-story Onondaga Hotel in Syracuse, N. Y.

Fuel Handling on the Chelsea Piers

The use of a narrow gauge railway for interplant transportation is not a new institution. In larger factories this system has been in use for a number of years, and lately similar methods are being employed in boiler rooms. Instead of shoveling coal from bins or from the floor into the furnaces, it is now possible to see model

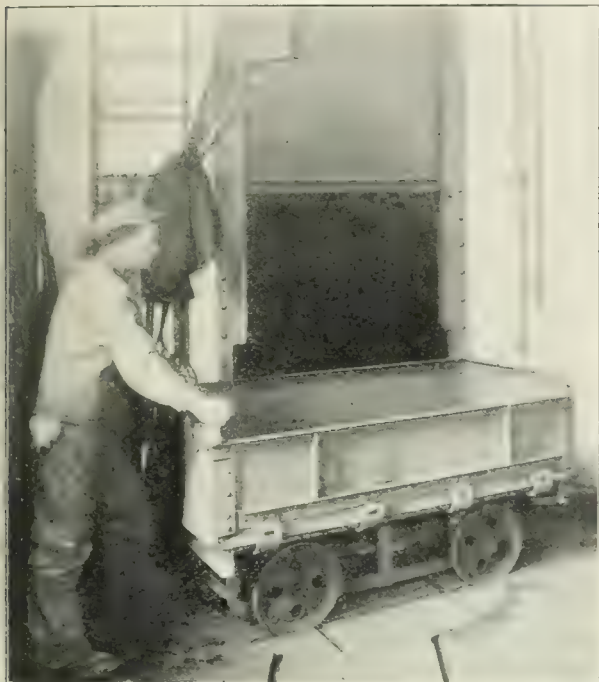


Fig. 1.—Industrial Railway and a Swiveling Wheel Base Car Installed on the Cunard Line Pier by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa.

boiler and furnace rooms where dirt and waste have been reduced to a minimum and economical methods save time. A notable example of this use of the industrial railway is at one of the Chelsea piers on the North River front of New York City. This pier was built by the municipality, and is leased to the Cunard Line. Fig. 1 shows the industrial railway and one of the swiveling wheel base cars installed by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa., and Fig. 2 is a view of the interior of the boiler room showing the coal being shoveled from the cars directly into the furnace.

A narrow gauge railway has been built in the boiler room to facilitate the handling of the fuel used in the boiler

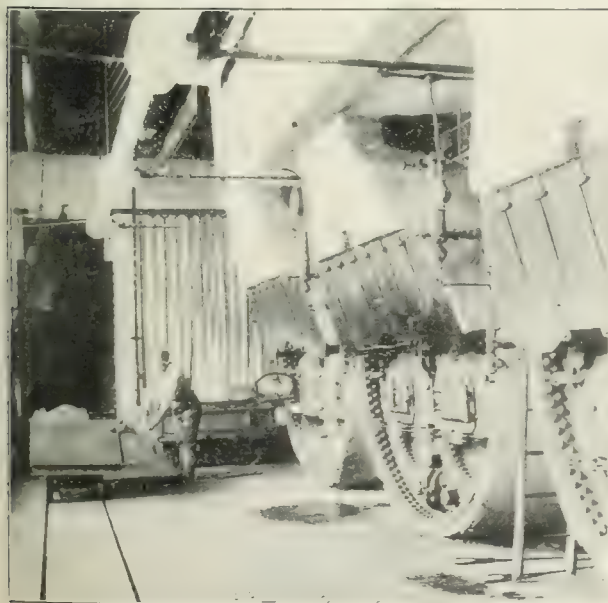


Fig. 2.—Shoveling the Coal Directly from the Car Into the Firebox.

ers furnishing the power for operating the numerous pieces of machinery employed in loading and unloading the vessels. A single cast plate track is laid about 8 ft. from the furnace doors, as shown in Fig. 2. These boilers are built like a row of huge hogsheads down the center of the room, and the track encircles the entire battery. The turns at each end of the boiler room are made by turn tables, one of which is shown in Fig. 1.

The coal for the furnaces is loaded on the cars from large bins at each end of the room, the opening being located at the turn table, as shown in Fig. 1. When the car is filled it is easily pushed along the track by one man. These cars are about 5 ft. long and 2 ft. wide, and one side is an adjustable drop. When the car is stopped in front of a furnace door, this side is lowered and a stoker shovels the coal from the car directly into the firebox, which saves time and also keeps the floor clean. The car travels along past the various boilers and when empty is pushed around to the rear, thus making room for newly loaded cars and enabling the emptied one to be refilled.

In operation this system of fuel handling is said to have been very successful. The amount of coal formerly wasted by being spilled on the floor is saved and the efficiency of the boilers is thus increased. As the coal is always ready for use when wanted, there is also a considerable saving in the amount of labor required to fire the boilers.

The New York State Steel Company

At the annual meeting of the New York State Steel Company, held in Buffalo, January 20, the following directors were elected: Frederick N. Beegle, Beaver Falls, Pa.; Frederick Davidson, Pittsburgh, Pa.; George Davidson, Beaver, Pa., and Spencer Kellogg, Seymour Knox, John D. Larkin and William H. Love of Buffalo. The officers elected were: President, Wm. H. Love; vice-president, Frederick Davidson; secretary and treasurer, George Davidson. The Executive Committee consists of Wm. H. Love, chairman; Frederick N. Beegle and Spencer Kellogg.

Joseph A. Durfee was made general superintendent, effective February 20. He was formerly with the Tennessee Coal, Iron & Railroad Company and with the Colorado Fuel & Iron Company, having been general superintendent of the latter. Prior to his connection with these two companies Mr. Durfee was with the Otis Steel Company. F. E. Porter was made sales manager, with headquarters at Buffalo.

During the year the New York State Steel Company has added a standard 65-ton open hearth furnace to its plant. Its blast furnace, which has been out for relining and repairs since about the first of the year, will be blown in February 25. All departments of the company will be in full operation at that time, including the blast furnace, open hearth plant and billet mill.

Louis R. Davidson, formerly secretary and treasurer of the company, is now in charge of the mining operations of the Davidson Ore Mining Company, whose properties are on the Menominee range, near Iron River, Mich. He is secretary, treasurer and general manager of the latter company.

The American Brass Company's Year.—The American Brass Company reports for the year ended December 31, 1910, net earnings of \$1,264,581, as compared with \$1,089,584 in the year previous; total expenditures, \$1,205,937, compared with \$1,061,958 in 1909; and surplus of \$58,644, contrasted with \$27,626 in 1909. Net earnings of the subsidiary companies of the American Brass Company for 1910 amounted to \$1,887,005, an increase of \$119,459. Dividends received from subsidiary companies in 1910 amounted to \$1,069,800, as against \$1,075,481 in 1909, while the amount paid in dividends was \$900,000, as compared with the same amount in the year previous. The total surplus of the subsidiary companies December 31, 1910, was \$12,250,732, with a contingent reserve of \$1,000,000.

A Model Compensation Code

As Compiled by the Conference of Commissions
After the Long General Discussion at Chicago

The proceedings of the Conference of Commissions on Compensation for Industrial Accidents, held at Chicago last November, have just been published by Amos T. Saunders, the secretary, Clinton, Mass. The report contains a great deal of material of interest to students of the subject, which is now receiving important attention in various States, where the passage of compensation acts is contemplated. Of much value is what is termed the "Conference Uniform Draft of an Employees' Compensation Code."

The importance of the conference may be realized from the representative nature of its membership, comprising the United States Employers' Liability Commission, the Illinois Employers' Liability Commission, the Massachusetts Commission on Compensation for Industrial Accidents, the Minnesota Employees' Compensation Commission, the Employers' Liability Commission of Montana, the New Jersey Employers' Liability Commission, the New York Commission on Employers' Liability, the Employers' Liability Commission of Ohio, the Commission on Compensation for Industrial Accidents of Washington, the Wisconsin Industrial Insurance Committee, a special delegate from Connecticut, the Special Committee on Uniform State Laws to Prepare a Uniform Workmen's Compensation Law, and the United States Bureau of Labor.

The Uniform Draft of an Employees' Compensation Code

This is intended to be a basis for legislation in the various States. In the first section it provides:

The right to compensation and the remedy therefor, herein granted, shall be in lieu of all rights and remedies now existing, either at common law or by statute, either upon the theory of negligence or otherwise, for the injuries covered by this code; and no other compensation, right of action, damages or liability shall hereafter be allowed to either the injured or dependents for such injuries, so long as this code shall remain in force, unless, and to the extent only, that this code shall be specifically amended.

The amendment implies that existing laws be so changed that all rights to sue under the common law shall be eliminated. In many States this means that the constitutional rights of the workman, apart from those given him by statute, in employers' liability acts, shall be abrogated, by constitutional amendment or otherwise. Without such action the purpose of many advocates of workmen's compensation to make it an exclusive remedy would not be carried out.

Section 2 provides that "every employment in which there occurs hereafter to any of the employees personal injuries arising out of and in the course of such employment is for the purpose of this code hereby declared a dangerous employment, and consequently subject to the provisions of this code, and entitled to all the benefits thereof."

Section 3. Every employer engaged in such dangerous employment shall be subject to the provisions of this code and shall pay compensation according to the conditions herein named to every such employee so injured in his employment, or, in case of death caused by such injuries, to the dependents, for all personal injuries received by such employee arising out of and in the course of such employment, and disabling such employee from regular services in such employment, and not purposely self-inflicted to obtain compensation; but on the condition that, in case of dispute between the parties as to the injury or any of the matters herein named relating thereto, the controversy shall be brought before and determined by the Board of Arbitration.

Section 4. No compensation shall be allowed for the first two weeks after injury received, except that covered by sections 5 and 6, nor in any case unless the employer has actual knowledge of the injury or is notified within a period specified.

Sections 5 and 6 state that the employer shall provide reasonable medical and hospital services and medicines not to exceed \$100 in value; and in case of death funeral expenses not to exceed \$100.

It should be noted that two weeks is the limit set, a factor which reduces the liability greatly as compared with a one-week period.

Section 7. In case the injury causes death within the period of years, the compensation shall be in the amounts and to the persons following:

(a) If there be no dependents, then the medical and funeral expenses.

(b) If there are wholly dependent persons at the time of death, then a payment of per cent. of the first dollars of the weekly wage and per cent. of the balance of such wage, to be made at the intervals when such wage was payable, and to continue for the remainder of the period between the death and the end of the years after the occurrence of the injury, but in no case to continue longer than years after the injury or to the amount of more than thousand dollars on account of the compensation for the injury to that person.

(c) If the deceased leave only persons partially dependent, they shall receive only that proportion of the benefits provided for those wholly dependent which the amount of the wage contributed by the deceased to such partial dependents at the time of the injury bore to the total wage of the deceased.

(d) The entire compensation granted by the code in case of death shall be paid to one of the following persons, if dependent, who shall be entitled to receive such payments after the due date, in the order in which they are named: (1) Husband or wife, as the case may be. (2) Guardian of children. (3) Father. (4) Mother. (5) Sister. (6) Brother. Payment to a person subsequent in right shall be lawful, and shall discharge all claim therefor if the person having the prior right has not claimed the payment prior to the time when the same is in fact made.

Further detailed provision is made for the application of payments. In cases of total temporary or total disability, section 8 makes provision similar to that governing compensation for death, the limits being left unfixed, to be filled in by individual statute. In case of temporary or permanent partial disability the employee shall receive per cent. of the decrease of his earnings during the continuance thereof, but not to continue more than years in time from the injury or to amount to more than thousand dollars.

When the employee is employed at the time of the injury in a regular capacity at a fixed and reasonable wage, which remains unaltered substantially throughout the year, either in his own case or in the case of persons engaged in the like employment, the wage taken as the basis of compensation under the foregoing sections shall be the wage he is actually receiving. Where the employee is at the time of his injury employed other than as above, the wage so taken shall be an average or fair wage which the particular employee ought to receive on a reasonable basis, considering the rate he has been getting, his ability and willingness to work, the nature of the service he was performing and all the other circumstances of the case.

An important paragraph, in view of various decisions handed down under the British act, follows:

If the employer shall clearly establish that the injuries, death or disability, was due in whole or in part to the employee's previous injuries, sickness, disease, physical ailments or deficiencies, age or infirmities, then and to that extent only the compensation allowed shall be correspondingly reduced; and if the employee or a beneficiary under this code shall clearly establish that the injured was a minor of such age and experience when injured that under natural conditions he would be expected to increase in wage, this fact may be considered in arriving at his reasonable wage.

Employers' Liability and Compensation Systems

Bulletin No. 90 of the Bureau of Labor of the Department of Commerce and Labor, recently issued, is devoted largely to the subjects of employers' liability and workmen's compensation. An article by Lindley D. Clark summarizes the measures that have been taken recently by the United States Government and by several of the State governments, with the view of modifying the present laws covering these subjects. A brief description of the nature of liability and compensation systems is followed by a short history of Federal and State legislation regarding such systems, and this in turn by an account of the work up to the present time of various Federal and State commissions appointed to inquire into employers' liability and workmen's compensation. The action taken by employers and associations of employers and workmen is also fully shown, and the laws recently enacted by the State of New York relating to the same subjects are printed in full.

Another article gives the results of the recent confer-

ence in Chicago of State commissioners on the subject of compensation for industrial accidents, with the conclusions reached by the conference. A third article discusses and presents in summary from the important features of foreign workmen's compensation systems at present in force in various countries. The summary covers altogether 26 countries which have by legislative enactment provided some system of compensation of workmen in case of industrial accidents.

Still another article relates to the cost of employers' liability and workmen's compensation insurance in the United States and various foreign countries. This article is the result of a study by Miles M. Dawson, the purpose of which was to ascertain the cost to employers for insurance against industrial accidents under the various systems of employers' liability and workmen's compensation at present in operation in the various countries. The premium rates charged, usually in the form of percentages of the payroll, are given for a large list of industries for Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Italy, Netherlands, Norway, Sweden, Switzerland, Canada and the United States.

Workingmen's Compensation

The American Hardware Manufacturers' Association, of which F. D. Mitchell, 309 Broadway, New York, is secretary and treasurer, has invited A. Parker Nevin, attorney, 30 Church street, New York, to address the members of the association by letter on occasional subjects of current legal and industrial interest. Mr. Nevin's first contribution, which is designated as "Serial Letter No. 1," is on the subject of workmen's compensation and is as follows:

"During the past two or three years employers of workmen in this country, and society in general, began to investigate the principles under which compensation was paid to injured employees. These investigations disclose a condition of affairs mutually undesirable both to employer and employee. Under the present system of our various State laws, if a workman contributed in any degree to the cause of his own personal injury he cannot by a lawsuit recover a penny of compensation. This rule is known as the doctrine of 'contributory negligence.' Again, if a workman is injured, through no fault of his own, or his employer, but through the fault of a fellow workman, he is denied recovery of compensatory damages. This principle is known as the 'fellow servant doctrine.' Moreover, if a workman is engaged in an occupation which is obviously dangerous and inherently hazardous, and while so engaged becomes injured, he cannot recover damages, on the theory that he knew what he was doing when he entered such dangerous occupation, and that he shared in its risk. This is known as the doctrine of the 'extra hazardous risk.'

"It is to be noted that these rules are merely defenses which are legally available by the employer in the event of litigation. But men have begun to question the wisdom of such doctrines, and are seeking means to readjust the entire system of workmen's compensation upon a basis of equal justice both to employer and employee. As a result of awakened public interest in this vast problem, some 10 States have special commissions working to discover if a new set of operating principles cannot be devised that will insure a limitation of pecuniary liability on the part of the employer and a beneficial rule of fixed, automatic compensation to the injured workman or his estate, in case of death.

"Briefly stated, the current tendency is to abandon the 'defenses' referred to above and to substitute for personal liability on the part of employers, a liability on the trade or occupation of the employer. In pursuance of such a new relationship, if his trade or business is insufficient to meet the new liability so created, he, the employer, might have to insure by some method that will assure an injured workman that his compensation is safe. Whether these two propositions—the new liability and compulsory indemnity insurance—are in harmony

with the terms of our State and Federal constitutions cannot now be stated. It happens, however, that at this particular time a case (*Ives vs. Buffalo Street Railway Company*) is before the New York Court of Appeals, which will determine the validity and constitutionality of the Compulsory Compensation act, which went into effect in New York, September 1, 1910. The decision in this case is awaited with the greatest interest by all interested in the evolution of industrial accident reform, although, whatever the decision may be, an appeal to the Supreme Court of the United States will most likely be taken. Again, only a few days ago the Supreme Court of the United States handed down a decision which may have a definite relation to the problem of compulsory State indemnity insurance. I refer to the case in which the learned court held that it was within the power of the State to compel banks to set aside, as a guarantee fund, 1 per cent. of the daily deposits.

"Under the present status of this great legal, social and economic problem, every employer, business man and employee should be under the bounden duty to familiarize himself with the progress of the movement, and to do what he can to ameliorate the problem of our industrial life, which so imperatively needs reformation, to the end that a more human and enlightened spirit shall obtain between those who employ and those who are employed. The old order changeth, and it will not be long before the genius of American industrialism will have solved the problem sanely, fairly and honestly."

The American Can Company's Annual Report

The American Can Company's report for the year ending December 31, 1910, has been issued. The income account compares as follows:

	1910.	1909.
Earnings	\$3,456,537	\$3,301,678
Depreciation	633,564	545,526
Net profits.....	\$2,822,972	\$2,756,152

The general balance sheet as of December 31, compares as follows:

<i>Assets.</i>		
	1910.	1909.
Plants, real estate, &c.....	\$73,199,038	\$73,780,826
New construction.....	7,654,480	6,196,459
Other investments.....	856,209	881,572
Cash	1,377,417	2,080,218
Bills and accounts receivable.....	3,622,743	2,724,199
Merchandise inventory.....	4,084,026	4,778,882
Totals.....	\$91,793,913	\$90,437,157
<i>Liabilities.</i>		
	1910.	1909.
Preferred stock.....	\$41,233,300	\$41,233,300
Common stock.....	41,233,300	41,233,300
Accounts payable.....	949,997	996,067
Dividends payable.....	515,416	515,416
Contingent funds.....	1,072,012	430,494
Surplus	6,789,888	6,028,580
Totals.....	\$91,793,913	\$90,437,157

President W. T. Graham says: "The volume of the company's business in 1910 exceeded that of the preceding year by a substantial amount. This improvement was evident as early as January and continued through each of the 12 months, the last quarter making the most favorable showing in this respect. Earnings, however, were not relatively increased, some lines of product selling on a lower basis than ever before and only partially compensated for by improvement of manufacturing facilities and the greater efficiency of the organization. In addition to ordinary improvements and betterments, there was expended during the year, in the purchase of new properties and extension of existing factories, \$1,458,020, and during this same period working capital was increased \$551,956. In the estimate of the management, prospects for 1911 are assured and current conditions at the time of this report justify the expectation of good business. While competition has increased and is aggressive, the company's products are growing in use and new lines of output constantly being developed."

Steam and Exhaust Pipe Size Charts

Their Use Saves a Large Amount of Calculation

To eliminate the necessity of working out the sizes of steam and exhaust piping for each individual installation, W. J. A. London, chief engineer of the Terry Steam Turbine Company, Hartford, Conn., has prepared two charts which are reproduced herewith. Fig. 1 shows the chart used for determining steam pipe sizes, and Fig. 2 is the corresponding one for exhaust piping.

The sizes of the steam pipes are based on the standard steam velocity of 100 ft. per second, and the steam employed in making the calculations was supposed to be dry and saturated. The curves for the exhaust piping were based on the same figure for the atmospheric exhaust curve, and upon a steam velocity of 400 ft. per second for all the vacuum curves. In calculating all of these curves the steam was considered to expand from a pressure of 150 lb. gauge, and the entropy given by Peabody's steam tables, which were used throughout, is 1.56. Where the initial pressure differs from that assumed a small correction should be made for the difference in moisture in order to be theoretically exact. As a matter of fact, the percentage difference which occurs in ordinary work in

expanding from either 100 or 200 lb. to 1 lb. absolute is so small that the curves will be sufficiently correct for all practical purposes.

When the power, water rate and steam pressure are given the size of the steam pipe can be obtained from a chart reproduced in Fig. 1 in the following way: Assuming a case in which a 300-hp. boiler generates steam at a pressure of 175 lb. and a water rate of 30 lb. per horsepower per hour the vertical line corresponding to 300 hp.

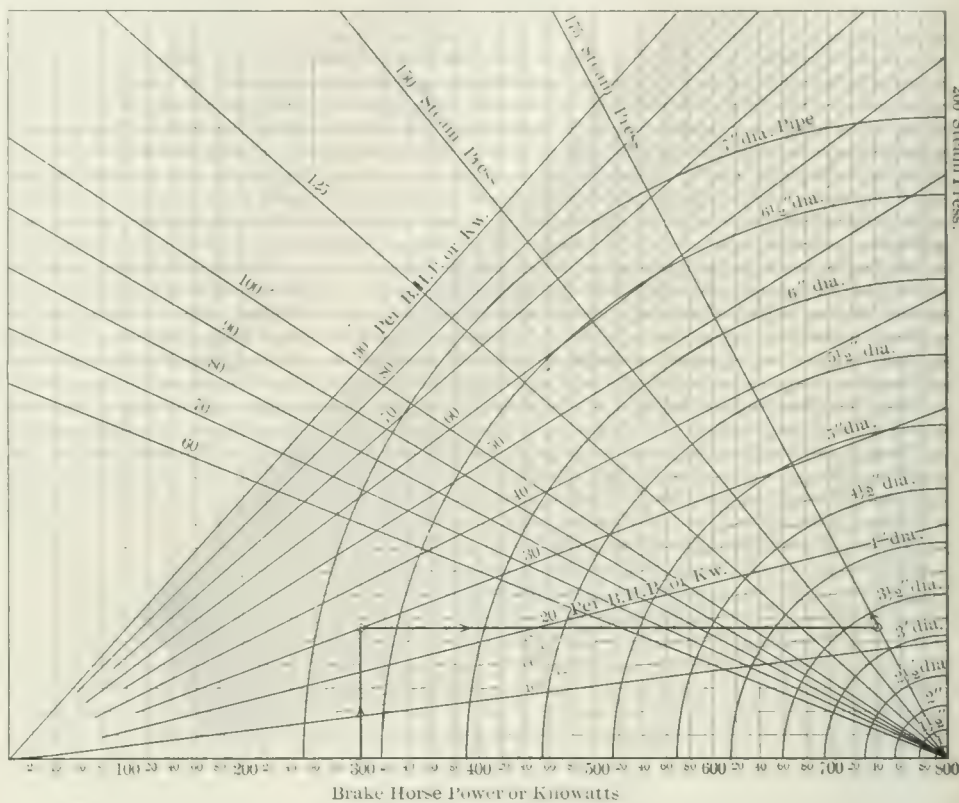


FIG. 1.—Chart for Determining the Size of Steam Piping Prepared by W. J. A. London, Hartford, Conn.

is followed until it intersects the diagonal corresponding to a water rate of 30 lb. This point is carried horizontally to the right until it intersects the 175-lb. steam pressure line. The proper size of piping to use is determined by referring this point of intersection to the larger of the two arcs between which it is located. In this case the point of intersection falls between the arcs corresponding to pipe diameters of 3 and 3½ in., and the latter is the proper size of pipe to be used. To determine the size of the exhaust outlet when the power, water rate and either the back pressure or vacuum is given, the chart in Fig. 2 is used in the same way. In the particular case illustrated the horsepower and water rate are the same as in the previous instance, and the engine is supposed to exhaust into a 28-in. vacuum. In this case it will be found that proper diameter of the exhaust main is 18 in.

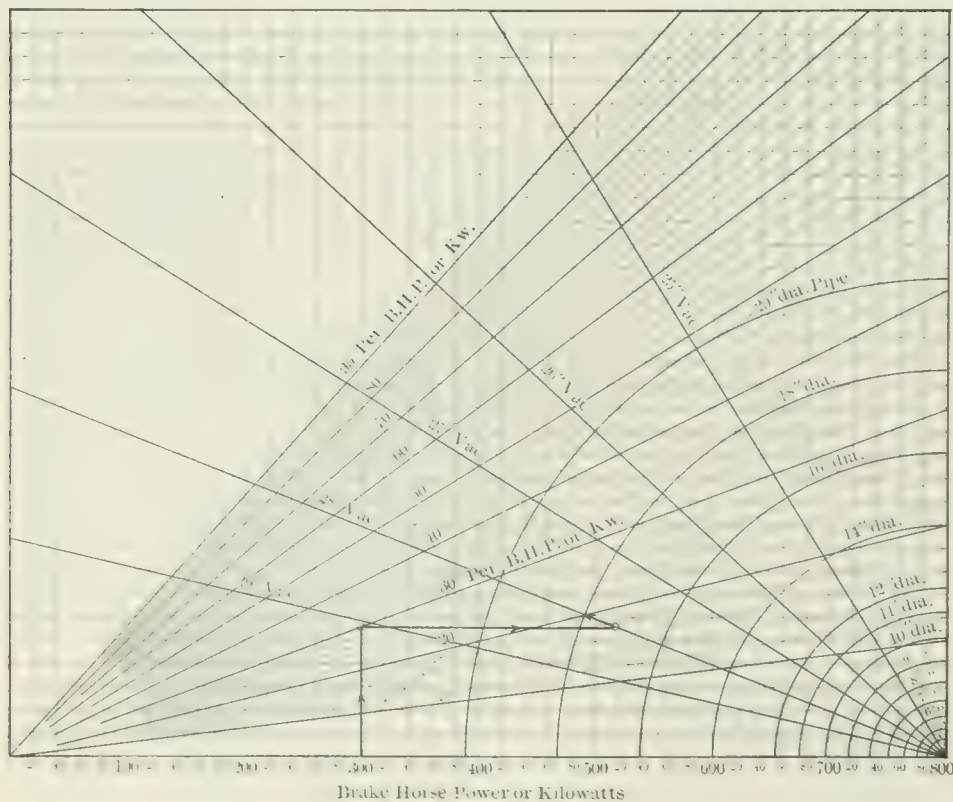


FIG. 2.—Exhaust Pipe Size Chart.

All of the pipe diameters given are based on the net internal area of the various sizes. Where extra heavy or double extra heavy pipe are used an allowance should be made as the net areas of these two grades are frequently considerably less than those of an ordinary pipe of the corresponding diameter.

The Chicago Pneumatic Tool Company's Annual Report

The Chicago Pneumatic Tool Company has issued its annual report for the year ended December 31, 1910. The income account compares as follows with the previous year:

	1910.	1909.
Net profits.....	\$1,054,809	\$558,927
Charges	166,733	168,150
Balance.....	\$888,076	\$390,777
Dividends	257,951	.....
Balance.....	\$630,125	\$390,777
Depreciation, &c.....	193,149	140,168
Surplus.....	\$436,975	\$250,609
Previous surplus.....	1,072,174	821,564
Total surplus.....	\$1,509,149	\$1,072,174

The general balance sheet as of December 31 compares as follows:

<i>Assets.</i>		1910.	1909.
Real estate, plant, &c.....	\$6,922,185	\$6,825,716	
Stock in other companies.....	1,121,669	1,203,257	
Accounts and bills receivable.....	1,116,892	1,009,032	
Inventory	1,109,835	938,379	
Cash	241,966	18,296	
Treasury stock.....	37,000	37,000	
Sinking fund.....	600,787	521,644	
Treasury bonds.....	200,000	200,000	
Totals.....	\$11,350,336	\$10,853,324	
<i>Liabilities.</i>		1910.	1909.
Capital stock.....	\$6,485,800	\$6,485,800	
First mortgage 5s.....	2,500,000	2,500,000	
Mortgage assumed.....	.....	45,000	
Interest and dividends payable.....	122,388	57,829	
Accounts payable.....	119,716	106,981	
Reserved for taxes, &c.....	12,495	3,896	
Sinking fund.....	600,000	521,644	
Bills payable.....	.....	60,000	
Profit and loss surplus.....	1,509,149	1,072,174	
Totals.....	\$11,350,336	\$10,853,324	

President W. O. Duntley says in part:

"The balance of the mortgage assumed on the plant purchased in 1907 amounting to \$45,000, together with the item of \$60,000 of bills payable as shown in the statement for 1909, has been liquidated. The accounts and vouchers payable, shown in the balance sheet, represent current accounts which have since been paid, the company availing itself of discounts wherever possible. While business conditions generally during the past year were not unusually favorable, the volume of business secured by the company was in excess of any former year. Notwithstanding the fact that prices obtained were lower than prevailed a few years ago, the aggregate of sales for the year was only slightly below the maximum, while the net earnings are in excess of any previous year your company has experienced. The past year, therefore, may properly be considered the most prosperous in the history of the company.

"Practically all the plants were operated to their full capacity. During the year the facilities of the Detroit plant were increased by an addition to the buildings, and at present another addition is under construction. Other substantial betterments have been made to the various plants and their physical condition maintained to their usual high standard. . . . All of the foreign subsidiary companies are now on a self-supporting basis and experiencing a steady growth in volume of business and earnings. . . . Early in last year the development and manufacture of a light motor truck for commercial use was successfully begun, and while this branch of the business is yet in its infancy, indications are that it will rapidly develop and should add substantially to the future product and profits of the company."

German Machine Tools

Successful Adaptations of American Models—Competition with This Country

BERLIN, February 9, 1911.—The Association of German Machine Tool Builders has just held its yearly meeting here and it proved to be unusually interesting. Prof. Georg Schlesinger of the Technische Hochschule in Charlottenburg delivered an address on the fundamental features of German and American machine tool building, profusely illustrated with magic lantern views. His main purpose was to show the extremely rapid development of the German industry within 10 years, and in doing so he liberally recognized the fertile influence of the Americans upon the German methods. He claimed, however, that German thoroughness and application of scientific principles had succeeded in making improvements upon the American models, thereby securing greater facility in operation, and this, he said, had given the German industry a steady development. The German exhibit of machine tools at the Brussels World's Fair, he claimed, was one of the chief attractions there.

Dr. Ernst Schiess of Düsseldorf, the owner of one of the best known machine tool shops in Germany, followed with remarks upon the successful work in perfecting German methods of making machine tools—a result that was crowned with due recognition at Brussels. At the same time he pointed out the difficulties the industry had to contend with, owing to the high costs of production and the too low selling prices of machinery. The Germans, he said, must continue to improve and must give close attention to perfecting special machines. This was the only way in which the Germans could hold their own in foreign markets, where their success was endangered by high tariffs.

Dr. Schiess also gave a survey of business conditions in the machine tool trade, which he represented as having greatly improved within the past few months. The shops were described as being nearly all well supplied with work and their orders as being sufficient to last for some months. The brisk demand extended to machinery of all kinds, and it comes from both the home and the foreign market. Lathes, milling and boring machines and other staple models were meeting with ready sale, and the same was true of special machines for the most varied purposes. The heavy iron companies, electrical shops and the automobile making concerns were all active buyers.

The annual report of the association also devotes considerable attention to the struggle between German and American makers. It says that the Americans are making extraordinary efforts to hold their own in the German market, or to recapture lost ground here. It is further asserted that the Americans are making a hard fight against the Germans in Austro-Hungary and other European countries. From all this the report concludes that German builders must be on their guard against their American competitors, who are trying to flood the German market, while their own is protected by an insurmountable tariff wall.

This alarmist talk about the American danger, however, is not borne out by the German trade statistics for 1910, which show imports of American machine tools of only 3500 tons—this in a total of 6000 tons. On the other hand, Germany's exports of machine tools last year amounted to 59,000 tons, a gain of 11,000 tons over 1909, and their value rose from \$14,100,000 to \$17,500,000.

The Joint Electrical and Mechanical Engineers' Meeting.—The American Society of Mechanical Engineers, co-operating with the American Institute of Electrical Engineers, will hold a meeting on the evening of March 10 in the Engineering Societies Building, 29 West Thirty-ninth street, New York City. The subject for discussion is the cost of industrial power, and papers will be presented by members of both societies.

The New Find on the Cuyuna Iron Range

A floating note as to a recent discovery on the Cuyuna range, west of Duluth, has been causing some comment in the financial press. The statement, which is to the effect that a find of ore "better than Bessemer" has been made recently on lands belonging to the Weyerhaeuser Timber Company, showed a great many million tons of ore and would enrich independent lessees, is much exaggerated. This find has been made on the S. ½ of the N. W. ¼ of section 11, T. 46, R. 29, in the center of the Cuyuna and near the new village of Iron-ton. As yet it is impossible to determine its importance. The ores of this new range lie in lenticular form in the steeply dipping ore bearing formation and may not have great length or width. It is therefore utterly out of the question to correlate any drill hole with others lying any considerable distance either way from it, even though these may be in the direct strike of the formation. Tonnage figures made in that way have met with disaster later. It is a fact that the depth of this ore deposit drilled by the Rogers-Brown Ore Company on its Weyerhaeuser lease is considerable, being the deepest good ore yet found on the range, and the deposit is of great interest in that it shows a depth of 750 ft. from surface for good ore, and still ore. It was found at a depth of nearly 500 ft.; at first showed 200 ft. of non-Bessemer ore of medium grade and below that 80 ft. of Bessemer ore of good grade. Its length and width are not yet determined, but are liable to be considerable enough to make the tonnage of much importance.

So far the highest grade of ore ever found on the Cuyuna is probably on the S. E. ¼ of the S. W. ¼ of section 1, T. 46, R. 29, near Iron-ton and a little more than a mile from the above, where drill holes went into material running up to 65 and 66 per cent. iron, ranging between 0.016 and 0.030 per cent. phosphorus. Good enough for anybody, but the lessees abandoned the option after drilling, as they found the deposit to be mere narrow lenses cutting across the strike of the low grade material in the formation as a whole, and on the tract in question there was estimated to be less than 100,000 tons of this high grade ore, at considerable depth and difficult to mine. Original drilling on this 40 had seemed to show that this fine ore extended across the tract. This case is referred to merely to indicate how unsatisfactory and misleading partial drilling is and in no sense to militate against the possibilities of the district. For it is unquestionable that some very large ore bodies have been found there; in one developed mine levels have been run ½ mile in ore that is available for the furnaces.

A few hundred thousand tons will doubtless be shipped from the Cuyuna during 1911; exploration is now active there and will certainly extend for years to come. The area of the possible ore bearing region of that range is increasing with the continuation of dip needle work. The belief of those most closely connected with developments there is that many mines will be found that will rival the Mesaba in grade and will rank well up in tonnage.

Pig Iron Production in Canada in 1910

The pig iron production of Canada in 1910, as shown by the statistics of the American Iron and Steel Association was 740,210 tons (376,271 tons in the first half and 363,939 tons in the second half), against 677,090 tons in 1909, an increase of 63,120 tons, or over 9.3 per cent. The production in 1910 was the largest in the history of the dominion, 1909 coming next. Of the total production in 1910 724,174 tons was made with coke and 16,036 tons with charcoal and electricity.

The production of basic pig iron was 365,090 tons, against 357,965 tons in 1909, and the production of Bessemer pig iron, 221,494 tons, against 169,545 tons in 1909; the remainder was nearly all foundry pig iron. Basic pig iron was made in 1910 by four companies owning nine coke furnaces, and Bessemer pig iron by two com-

panies owning four coke furnaces. All the basic and Bessemer pig iron was made with coke.

In 1910 the Canadian furnaces consumed 1,355,057 tons of iron ore and 98,853 tons of mill clinder, scale, &c., in the manufacture of pig iron. They also consumed 510,650 tons of limestone for fluxing purposes.

On December 31, 1910, Canada had 17 completed furnaces, of which 11 were in blast and 6 were idle. Of the furnaces in blast one was charcoal. Of the grand total 13 usually use coke for fuel and 4 use charcoal. In addition two coke furnaces were being built on December 31.

Trade of the United States with Canada

The pending reciprocity agreement with Canada lends interest to some figures just prepared by the Bureau of Statistics, Department of Commerce and Labor, showing the trade of the United States with Canada during a term of years. The total value of imports from and exports to Canada at decennial years since 1850 is as follows:

Fiscal year.	Total imports into United States		Exports to Canada from the United States.		Total.
	from Canada.	Domestic.	Foreign.		
1850.....	\$5,179,500	87,725,247	\$1,730,744		\$9,515,991
1860.....	23,572,796	18,657,029	4,038,899		22,695,938
1870.....	35,354,247	17,900,701	3,931,525		21,832,226
1880.....	32,988,564	26,757,478	2,702,779		29,460,257
1890.....	39,042,977	37,327,963	2,954,145		40,282,108
1900.....	39,369,074	88,030,336	7,289,634		95,319,970
1910.....	95,128,310	202,548,023	13,441,998		215,990,021

This statement includes trade between the United States and all the area now known as the Dominion of Canada, and in addition thereto, from 1850 to 1870, Newfoundland and Labrador, not separately stated prior to 1873.

Of the domestic merchandise exported in 1910 to Canada \$21,000,000 represented the value of foodstuffs; \$50,000,000 crude materials for use in manufacturing; \$31,000,000 manufactures for further use in manufacturing, and \$96,000,000 manufactures ready for consumption.

The principal articles forming the iron and steel exports to Canada in our trade with that country are shown in the table below:

Steel sheets and plates.....	\$4,875,466
Automobiles	4,363,694
Structural iron and steel.....	2,828,338
Bars or rods of steel, except wire rods.....	2,390,235
Electrical appliances.....	2,356,325
Wire	2,136,653
Plows and cultivators.....	1,614,482
Pipes and fittings.....	1,618,181
Pig iron.....	1,137,357
Locks and hinges.....	1,272,969
Electrical machinery.....	1,151,449
Typewriters	1,266,650

Cooper Engine Contracts.—The C. & G. Cooper Company, Mount Vernon, Ohio, has been awarded contract by the Republic Iron & Steel Company for a 3000-hp. cross compound Cooper Corliss engine to drive its new Morgan continuous merchant mills to be installed at Youngstown, Ohio. The engine will be direct connected to the mills by means of steel return cranks. This engine is practically a duplicate of a Cooper engine of this type driving a mill at the International Harvester Company's South Deering Works. An order has also been received from the Carnegie Technical Schools, Pittsburgh, for a 75-hp. Corliss engine to be installed in the mechanical engineering department for testing and other experimental purposes. This engine will be equipped with a combination rope flywheel, the face of which will be grooved for seven 1-in. ropes. A brake wheel will also be mounted on the main shaft for power measurements and regulation tests. The engine will be built to run 150 rev. per min.

The Christmas distributions to employees by the Crane Company, Chicago, in the past 12 years have reached a total of \$3,160,606.

Trade Publications

Gaskets.—Cincinnati Gasket & Packing Company, Cincinnati, Ohio. Pamphlet. Treats of the Triple and Trinity gaskets, which were illustrated in *The Iron Age* January 19, 1911. Prices are given of the various sizes of gaskets, and in addition space is devoted to the various types of packings made by this company.

Electric Welding Equipment.—Garwood Electric Company, Garwood, N. J. Bulletin No. 508 G. Treats of a line of electric welding equipment for either alternating or direct current. The special fields for which this equipment is adapted are street railway and locomotive shops and steel mills.

Air Compressor.—The Roberts Motor Company, Sandusky, Ohio. Bulletin D-2. Relates to the Roberts motor driven air compressor, which is made for either portable or stationary use. Its special features are a gear driven mechanical oiler, a rigid timer and a noiseless carbureter. The construction of this compressor is described at length and the text is supplemented by half-tones and line drawings. An illustrated description of the compressor appeared in *The Iron Age* January 12, 1911.

Water Meter.—A. M. Lockett & Co., Ltd., New Orleans, La. Pamphlet. Illustrations and descriptive matter explain the operation of the Tulane Pitot tube, which is designed for measuring the flow of large volumes of water in pipes and open channels.

Mechanical Lubricator and Air Compressor.—Ingersoll-Rand Company, 11 Broadway, New York City. Folder No. 515 and bulletin No. 3007. The first deals with the Heart Beat oiler for rock drills, which is operated by the pulsations of air in the supply pipe. The bulletin pertains to the class PB duplex power driven air compressor. The various features of the compressors are illustrated and described and a table of specifications completes the bulletin.

Resistance Material.—Driver-Harris Wire Company, Harrison, N. J. Catalogue H. Contains a number of quick reference tables and lists two new alloys known as Yankee Silver and Therio, which have been recently perfected.

Screw Machines.—The National-Acme Mfg. Company, Cleveland, Ohio. Pamphlet entitled "The Production of Duplicate Parts." Deals with the manufacture of duplicate metal parts made from bars in large quantities. Traces the development of the manufacture of screws from a hand-forged hand-cut one made by a blacksmith to those turned out by the automatic screw machine. The various types of screw machines made by this company are illustrated as well as the special attachments used in connection with them. An illustrated description of the company's standard machine appeared in *The Iron Age* March 4, 1909.

Wrenches.—The Whitman & Barnes Mfg. Company, Akron, Ohio. Catalogue No. 79. Lists the entire line of drop forged wrenches made by this company.

Couplers.—Detroit Steel Casting Company, Detroit, Mich. Pamphlet. Shows the various styles of M. C. B. knuckles and locking parts which this company is prepared to furnish. In addition to illustrating the various styles of couplers there is a list of other obsolete couplers for which this company is also prepared to furnish knuckles and locking parts. A list of car and locomotive parts made completes the pamphlet.

Cranes.—The Whiting Foundry Equipment Company, Harvey, Ill. Catalogue No. 82. Covers the complete line of standard Whiting cranes and presents a few views of typical installations. The various cranes include electric travelers, locomotive and coach hoists, gantry traveling cranes, transfer cranes, cranes with clamshell buckets, handpower travelers, locomotive and truck cranes, mono-rail trolleys and jib cranes. The catalogue is divided into sections each of which is devoted to one of the classes of cranes and in each the various types are shown. The illustrations showing typical installations cover practically all styles, and a partial list of users completes the catalogue.

Boiler Tube Cleaners.—The Lagoda Mfg. Company, Springfield, Ohio. Catalogue L. Size 4% x 6% in.; pages 48. Discusses the relative advantages and different conditions under which the use of various types of boiler cleaners is most suitable. The line includes water driven cleaners, air and steam driven cleaners and a mechanical cleaner for operation by air and steam motors and belting. An illustrated description of the Weinland boiler tube cleaner of this company appeared in *The Iron Age* March 17, 1910. In addition to the boiler tube cleaners space is given to brief descriptions of boiler room devices, which include the Lagoda water strainer, an illustrated description of which appeared in *The Iron Age* October 6, 1910; an automatic feeding device for removing scale from Stirling boilers without entering the drum, a double action cut-off valve and a number of other devices such as tube cutters, reseating machines, etc.

Pressure and Vacuum Recorders and Indicators.—Precision Instrument Company, 49 Larned street, W., Detroit, Mich. Catalogue E. This is the company's 1911 catalogue, describing and illustrating the Precision line of pressure and vacuum recorders and indicators, which this company manufac-

tures under the Simmance-Abady and other patents. The recorders include one with an armored case for use in exposed situations, the dial type for both portable and stationary use, and one in which the record is made upon a continuous tape. The indicators are of the dead beat type for both portable and stationary use. In addition space is also given to detachable straight and U tube gauges, which are installed both singly and in batteries.

Electrical Machinery and Appliances.—General Electric Company, Schenectady, N. Y. Five bulletins. No. 4685, superseding No. 4394 C, illustrates and describes a line of revolving field belt driven alternators ranging in capacity from 30 to 550 kw. No. 4793, superseding No. 4619, illustrates and describes regulators for controlling generator and feeder voltages. Installations of both types of regulators are shown and there are a number of reproductions of charts showing the voltage with and without regulators. No. 4804, superseding No. 4617, is concerned with a line of direct connected generating sets which, while originally designed to meet the severe conditions of marine work, are also well adapted for both light and power work in isolated plants and as exciters for alternating current generators in central stations. No. 4807, superseding No. 4711, describes two types of small switchboard panels designed for use in small isolated plants containing only one alternator. The publication also contains dimension and connection diagrams. No. 4810, superseding No. 4490 A, gives a detailed description of a line of motor driven air compressors having piston displacements of from 15 to 100 cu. ft. per min. These compressors are mounted on three-wheel trucks and were designed for use where it was not feasible to install a piping system.

Air Compressors.—Allis-Chalmers Company, Milwaukee, Wis. Pamphlet No. 4025. Deals with the use of compressed air for industrial purposes and shows a number of applications. Space is given to a description of the construction of the Allis-Chalmers small motor driven compressors and their special features.

Steel Belt Lacing.—The Bristol Company, Waterbury, Conn. Bulletin No. 152. Describes and illustrates various styles of steel belt lacing and shows four different kinds both ready to be applied and applied to actual sections of belts.

Crucible Melting Furnace.—W. S. Rockwell Company, 50 Church street, New York City. Catalogue No. 12. Illustrates the Rockwell stationary crucible melting furnace for aluminum, brass, copper and various other metals which employs either oil or gas as fuel. The special advantage claimed for this furnace is the production of pure, clean metal with a slight shrinkage loss at a very low cost. The construction of the furnace is briefly described and a short table of specifications for the three sizes of furnace built completes the catalogue.

Floating Reamer Holder.—Colburn Machine Tool Company, Franklin, Pa. Bulletin No. 44. Describes a floating reamer holder for holding any make or style of Morse taper shank reamers in all vertical boring and drilling machines. The special advantage claimed for this holder is that the axis of the reamer is maintained parallel with the center of the hole at all times, while at the same time there is a slight self-adjusting tendency in a radial direction. Two sizes of holder are made, one for holding reamers up to 3 in. in diameter while the other has a maximum capacity of 4 in. The details of the holder as well as its application are illustrated.

Roving Machinery.—Woonsocket Machine & Press Company, Woonsocket, R. I. Catalogue. Illustrations and descriptive matter explain the operation of an extensive line of roving machinery for use in cotton mills. The special features of the different machines are described, and there are a number of tables showing the floor space required for various numbers of spindles and the production per 10-hour day. An illustrated list of repair parts is included, and a number of tables of useful information complete the catalogue.

Corliss Engines.—Allis-Chalmers Company, Milwaukee, Wis. Bulletin No. 1510. Deals with the Reynolds heavy duty pattern direct connected Corliss engine. The special features of these engines are described and the illustrations show several installations.

Steam Traps.—William S. Haines Company, Twelfth and Buttonwood streets, Philadelphia, Pa. Pamphlet. Refers to the Heintz apparatus for preventing the escape of steam with the water of condensation. The construction of the device is described and the manner of installing it shown.

Automobile Axles.—Collins Axle Mfg. Company, 310 Frick Building, Pittsburgh, Pa. Pamphlet. Points out the advantages of using the Collins rear axle for furnishing a direct drive to the driving wheels of automobiles at all speeds. The construction of the axle is described at length, and a report of tests showing the amount of power transmitted by the Collins drive, as compared with the ordinary three-speed sliding gear transmission, is included.

Traction Engines.—Woods Brothers Steel Self-Feeder Company, Des Moines, Iowa. Catalogue. Illustrates and describes a line of single and double geared internal combustion traction engines. A special feature of the double geared engine is the use of a center crank and two gear trains, one on each side.

The Machinery Markets

It appears that the machinery demand is better in New York than in other parts of the country, although reports from all sources are encouraging. A good amount of actual buying is being done in and around New York, while elsewhere inquiries rather than orders predominate. New England is an exception to this, as the improvement there is becoming general, and inquiries in sight indicate a further increased business. The outlook for business from the railroads is good everywhere. In Chicago most of the orders recorded of late have been for single machines, but if the inquiries there develop into orders the market will shortly be very satisfactory. A similar condition exists in Cleveland, where actual sales are not good, but inquiries are large. Trade is irregular in Philadelphia, and again there purchases are less pronounced, while the inquiries are large. A decided improvement is noted in Cincinnati, but conditions are not up to normal and export orders are occupying most of the addition.

New York

NEW YORK, February 21, 1911.

All signs point to continued improvement in the machinery trade. Inquiries and orders are steadily increasing. It is also noticeable that inquiries are of a better nature than usual; in other words, most of those inquiring mean to buy as soon as possible and a better percentage of the inquiries results in actual business than was the case a few months ago. The machine tool demand is particularly good, and at least two fair-sized lists of requirements are now before the trade. The New York, Ontario & Western Railroad has not as yet placed orders against the large list sent out two weeks ago, but it is learned that the tools are wanted for the Middletown shops. A contract for these shops has just been let, and it calls for an expenditure of \$350,000. It is thought that a supplementary list of tools will be issued before the shop is fully equipped. The Baltimore & Ohio Railroad is making inquiries which indicate that it will soon come into the market. This company will shortly build large shops at Newark, Ohio, and it is reported to be preparing plans for extensive shops at Cumberland, Md. At present there are no new railroad lists out. Manufacturers of contracting equipment are handling a larger volume of inquiries than they have in a number of months. It is expected that in the spring a great deal of dock building, dredging and highway construction work will come forward, according to construction contractors in that line of work, and many of them are preparing to buy new equipment. Foundries making machinery castings are doing a good business, and from the inquiries they have it is judged that many manufacturers of machinery have disposed of their surplus stock and are now making equipment to order, as many of them are ordering castings with a view to supplying the future demand.

The M. H. Treadwell Company, 140 Cedar street, New York, is buying against a large list of machine tool equipment. The company originally inquired for slightly used machines, but now intends to purchase new tools. A partial list of its requirements follows:

One traverse double head shaper, 24-in. stroke, 16-ft. bed.
One milling machine, horizontal spindle only, table 24 in. by 8 ft.
One wheel press, clearance 6 ft., 300-ton, for car wheels.
One set 8-ft. bending rolls for 1-in. plates.
One combined punch and shear, 24-in. throat.
One punch, 24-in. throat, for 1/2-in. plates.
One 18-in. wood disk grinder.
One patternmakers' lathe, 90-in. face plate.
One patternmakers' lathe, 20-in. by 10-ft.
One patternmakers' wood trimmer, 8 x 24 in.
One 800-lb. steam hammer.
One 1000-lb. steam hammer.
One 36-in. by 12-ft. planer, two heads.
One 36-in. by 28-ft. lathe.
One 16-in. by 8-ft. lathe.
Two 18-in. by 12-ft. lathes.
One 48-in. by 30-ft. lathe.
One 30-ton arbor press.
One 2-in. bolt cutter.
One double end 76 in. or 80 in. driving lathe.
One 14-ft. boring mill.
One 10-ft. boring mill.
One 16 x 6 in. by 20 ft. open side planer.

The list also includes drilling machines, drill grinders, a wet tool grinder, keyseater, &c.

The municipality of Spring Lake, N. J., has issued a list of water works equipment on which bids will be received by E. V. Patterson, Borough Clerk, on March 10. Bidders are asked to include the complete mechanical equipment in their propositions, which will include two triplex expansion direct acting pumping engines, one duplex cross compound steam, two-stage air compressor, one surface condenser, with

combined air and circulating pump, one boiler feed pump, two feed water heaters, three return tubular boilers and stack breeching. Joseph L. Sweigard, Betz Building, Philadelphia, is the engineer.

The International Flexible Rubber Hose Company, which has been incorporated with an authorized capital of \$125,000, with offices at 9 Mulberry street, Newark, N. J., is beginning the manufacture of metallic hose at that address. Louis V. Aronson, president of the Ronsen Wrench Company, is the principal incorporator, and associated with him is Alexander Harris and Frederick Wilkie. The company is having special machines built for the manufacture of flexible metallic tubing, which can be utilized for electric conduit work, steam conveying, acids, &c. The tubing is made by a new process and is air tight and can be made of any flexible metal.

The Public Service Corporation of New Jersey, whose main offices are at Newark, has awarded a contract to E. M. Waldron & Co., of Newark, for construction work on a power house to be erected at Perth Amboy, N. J., on which Payne Brothers, also of Newark, will do the structural iron work. The building will be 200 ft. sq. and 50 ft. high, and the power plant will have a capacity of 400 kw. Westinghouse generators and Alberger condensers will be installed. The building will be so arranged that later on power equipment to develop 200 kw. additional can be installed.

The Leonard Sheet Metal Works, 219 Grand street, Hoboken, N. J., has purchased a site on New York avenue, 209 x 260 ft., adjoining the Fessenden Cooperage Works, on which it will erect a building, 60 x 250 ft., two stories. Wood and metal working machinery for the manufacture of fire doors, skylights and cornices will be installed. L. Meystre & Sons are the architects.

The Calmon Asbestos & Rubber Works, corner of Cliff and John streets, New York, which suffered a loss by fire February 16, has taken temporary offices at 11 Cliff street, where it is ready to take care of its customers.

The Hayes Track Appliance Company, Geneva, N. Y., is arranging to move its plant to Richmond, Ind. The company will not require a great deal of additional machinery.

The Steel Ball Company of America, 350 Broadway, New York, has been incorporated with \$100,000 capital stock to manufacture steel balls for bearings under a patent process. The company will establish a plant as soon as a suitable site can be secured. The incorporators are R. A. Martin, E. N. Lowy, A. E. Dadula, all of New York.

The Federal Milling Company, Lockport, N. Y., which has arranged to move its plant to North Tonawanda, will commence erection early in the spring of a flour mill and grain elevator on the Niagara River and New York Central Railroad industrial tracks in the latter city.

The National Coal Oil Company, Buffalo, N. Y., is completing its three-story factory at Alabama street and the Erie Railroad, that city, and equipping it with requisite machinery piping and reservoirs. C. H. Cotton, formerly of Corning, N. Y., is secretary-treasurer and manager.

The Delaware & Hudson Railroad Company contemplates the erection of a new round house, ashpits and coalpockets at Binghamton, N. Y., which will cost about \$100,000. George H. Burgess is chief engineer, Albany, N. Y.

The Stone Smelting & Refining Company has been incorporated at Niagara Falls, N. Y., with a capital stock of \$50,000, and will engage in smelting of minerals and in mining and dealing in minerals and lands. The incorporators are A. W. Britton, G. E. Holmes and J. S. Stubbs, all of New York City.

The Myers Plane Company, Buffalo, N. Y., has been incorporated to manufacture motors and motor-driven vehicles, boats and aeroplanes. Its specialty is to be the manufacture of the George F. Myers patent self-righting aeroplane. Bronson Rumsey is president; H. Montgomery Gerrans, vice-president; Walter F. Semon, president of the Frontier Iron Works, secretary and treasurer; offices, 674 Ellicott Square.

THE MACHINERY MARKETS

The factory buildings, machinery and equipment of the Herring-Curtiss Company at Hammondsport, N. Y., have been purchased from the trustee in bankruptcy by Glen H. Curtiss, the aviator and founder of the concern, who will reorganize the company, retaining control, and continue upon an enlarged scale the manufacture of aeroplanes, motors and motorcycles.

The Denniston Company, Buffalo, N. Y., has been incorporated with a capital stock of \$150,000, to manufacture motor trucks and vehicles of all kinds, motors, engines, machinery, &c. A manufacturing plant has been arranged for and requisite machinery equipment will soon be ordered. The incorporators are E. E. Denniston, E. C. Anderson and F. U. Brown, Buffalo. E. E. Denniston, 184 West Huron street, will be the president.

The village of New Hartford, N. Y., near Utica, has voted in favor of constructing a sewage system and sewage disposal plant from plans of A. M. Scripture, engineer. M. Baker is president of the Village Board.

Philadelphia

PHILADELPHIA, PA., February 20, 1911

Business has shown a further tendency toward irregularity. Actual purchases are reported, both by merchants and tool builders, to have been less pronounced, notwithstanding the fact that inquiries have for some weeks shown a slight betterment. Prospective buyers still show hesitancy when it comes to placing orders, as they apparently prefer to wait for an actual improvement in conditions rather than anticipate the same. Several fair sized projects which have been under negotiation for some time appear to be getting nearer closing; in fact, against one of these, the requirements of the Treadwell Engineering Company and its associate concerns, for their new plant at Easton, Pa., some little business has already been placed. The railroad demand in this territory has again quieted down and very few inquiries of moment are in immediate sight. The belief that business will improve before a very great while is to be generally noted, and the betterment in the iron and steel trades, with finishing mills at materially increased capacities, is considered a most favorable factor in the future buying of machinery and tools. There is a fair demand for boilers and engines, but no business of importance has been closed. Second-hand machinery has not been in particularly active demand, although in a few instances stocks on sellers' hands are being carefully gone over for desirable equipment. Both iron and steel casting plants report a slight betterment in general trade conditions.

The Pennsylvania Railroad sent out an inquiry last week for a 2-in. pipe threading machine.

Koelle, Speath & Co., engineers, are reported to be preparing plans for a two-story ice manufacturing plant, 40 x 80 ft., which is to be erected and equipped for the Commonwealth Brewing Company at 2736 Cambridge street.

Joseph F. Hasskarl, acting director, Department of Wharves, Docks and Ferries, city of Philadelphia, will receive bids until Tuesday, February 28, for the mill and shop inspection and testing of all structural steel required for the superstructure of the Vine street pier, under department contract No. 40 with W. S. P. Shields, Philadelphia. Specifications in connection with the work to be performed may be obtained at the office of the director, 555 Bourse Building, Philadelphia.

The Philadelphia Roll & Machine Company reports a marked improvement in the demand for heavy charcoal iron castings. A few weeks ago the demand was quiet and the plant operating irregularly, but owing to increased orders the foundry department has since been placed on full time. Among recent contracts closed by this concern was one for a complete rolling mill and drive for Shimer, McGlynn & Co., of this city.

Several building and contracting concerns in this city are estimating on a brick, steel and reinforced concrete pattern shop, to cost, it is said about \$125,000, for the Vulcan Iron Company, Wilkes-Barre, Pa.

The E. G. Schlichter Company, Norristown, Pa., has under consideration, it is reported, the erection of a one-story brick silo and tank factory, 40 x 200 ft.

Cyrus H. K. Curtis has commissioned the engineering firm of Frank C. Roberts & Co. of this city to design a warehouse and coal storage plant, three stories, of brick and concrete, 114 x 173 ft., to be erected on property acquired about a year ago from Robert M. Cunliffe at the northwest corner of Eleventh street and Washington avenue.

D. T. Homan, representing the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., in this territory, reports a material improvement in the demand. Inquiries have been more pronounced and the outlook for future business

is believed to be much more encouraging. Among recent orders taken by this concern may be mentioned: one 80-in. guide bar grinder, for the Louisville and Nashville Railroad; three No. 5 motor-driven, and three belt-driven wet tool grinders, for the Kansas City and Southern Railway; two 156-in. heavy automatic knife grinding machines, motor-driven, for the American Sheet & Tin Plate Company, for its Gary, Ind., plant; one 90-in. heavy automatic knife grinder, for the Nonotuck Paper Company, Holyoke, Mass.; one No. 3 wet-grinder, for the Bury Compressor Company, Erie, Pa., and two No. "E" floor grinders for the Jewell Steel & Malleable Iron Company, Buffalo, N. Y.

Chicago

CHICAGO, ILL., February 21, 1911.

If something would occur in the near future to convert into orders all the inquiries that are pending in the market, Chicago machinery dealers would have a very satisfactory rush of business. Most of these inquiries, however, have been lying dormant for weeks or even months. It is evident that in most cases buyers have been figuring on what they really will need in the near future, but as a rule they will not actually close until there is a definite turn in the business situation, or until their own shop necessities force them to purchase. There is, however, a little improvement right along in the amount of business being done, and at an average, Chicago houses are doing 50 to 75 per cent. of their normal volume of sales. If the improvement of the past month continues steadily the business may reach as good a volume as the dealers had in the first half of last year. The business done is principally in orders for single machines. There is a little scattering railroad business going, but the dealers are still wondering when the Western railroads will begin the work of bringing their shops up to date.

The Comptograph Company, Chicago, has plans prepared for a five-story factory building, 50 x 120 ft., which it will erect at 853 to 863 North Marshfield avenue.

The Northwestern Can Company, Chicago, has closed a deal with the Factory Promoting Club, Brazil, Ind., for the removal of its factory to that city.

The American Insulated Wire & Cable Company, Chicago, has increased its capital stock from \$100,000 to \$200,000, having recently made extensive improvements to its plant.

The Chicago Retort & Fire Brick Company, Chicago, has increased its capital stock from \$120,000 to \$250,000 and is making extensive improvements to its plant at Ottawa, Ill. The company is erecting a new building, increasing its dryers and building new kilns.

The Consolidated Concrete Tie Company, Cairo, Ill., has been incorporated with \$100,000 capital stock, to manufacture concrete ties under the Snedd and Cowan patents. The company has a plant in operation at the present time at Pulaski, Ill., and is having plans prepared for another to be erected at Cairo. All parts necessary to the manufacture of the ties, including the wood and paper cushions, iron reinforcing rods, rail fastenings, &c., will be made by the company. The company has a test set of ties in the tracks of the Illinois Central at Dongola, which have stood very severe tests, and is manufacturing ties for the Mobile & Ohio to be placed at Murphysboro, Ill., and for the Atchison, Topeka & Santa Fe, to be placed at Los Angeles, Cal.

The Bridgeport Light & Power Company, Bridgeport, Ill., has been incorporated, with a capital stock of \$25,000. The incorporators are R. D. Donnelly, W. E. Beyhan and V. H. Lytle.

The Compound Wood Company, Batavia, Ill., has been incorporated, with a capital stock of \$40,000. The incorporators are John R. Newhall, John M. Raymond and Albert J. Kelley. The company will conduct a general manufacturing business.

The Utica Fire Sand Company, Utica, Ill., has been incorporated, with a capital stock of \$30,000. The incorporators are J. J. Neary, John M. Quinlan and W. B. Cunningham. The company will engage in quarrying and manufacturing silica, sand, &c.

Cleveland

CLEVELAND, OHIO, February 21, 1911.

Local machine tool dealers report a good volume of single tool inquiries, mostly for small sizes. Business, however, is slow in coming out, and in actual orders booked during the week the record of one or two weeks earlier in the month, when some fairly good orders were placed, was not

THE MACHINERY MARKETS

kept up. Taken altogether, there is a fair volume of business pending and dealers look for a more active market early in March. While general business is better, it has not improved sufficiently to encourage manufacturers to add new equipment for plant extensions and consequently little business in round lot orders is in prospect at present. The demand for second-hand machinery shows a little improvement. The railroads are still holding off, business from that source being limited to an occasional single tool order. The demand for electrical equipment is light. In the foundry trade some improvement in orders is noticed.

Employers' liability insurance will be one of the important topics to be discussed at the annual meeting of the National Metal Trades Association to be held at the Hotel Astor, New York, April 12 and 13. At a meeting of the Executive Committee of the association held in Cleveland, Ohio, February 15, it was decided that as this was one of the most vital subjects of the day, the entire forenoon of the second day of the meeting should be devoted to its consideration.

The Cleveland Construction Company, 600 Citizens Building, Cleveland, is preparing plans for the new power house to be built by the Northern Ohio Traction & Light Company, at Cuyahoga Falls. Specifications for the equipment are expected to be out about April 1. In addition to building a large plant to supply power for all of its interurban lines the traction company will add to its equipment at its local power house in Akron, for which it has placed an order with the General Electric Company for a 1000-kw. motor-generator set, switchboard and exciter. The order also included motor equipment for eight interurban cars.

The Brightman Mfg. Company will remove from Shelby to Columbus, Ohio, its plant in the former city having been burned in December. A 17-acre site has been purchased, on which a large plant will be built. L. H. Brightman of Cleveland is president of the company. It manufactures steel shafting and other products.

The Universal Machine Tool Company is the name of a new concern that will establish a plant in Canton, Ohio. Orders for its machinery equipment have been placed.

The Superior Iron & Mfg. Company, Toledo, Ohio, has asked for authority to increase its capital stock from \$50,000 to \$100,000. The company makes gray and malleable iron castings, having a plant at Wauseon, Ohio. The proposed increase is to provide more working capital.

The Bremen Mfg. Company, recently organized at Bremen, Ohio, will manufacture engines to be used in the oil and gas fields.

The Cleveland Smelting Company, Cleveland, has been incorporated with a capital stock of \$25,000, to smelt, refine and deal in ores and metals. The incorporators are W. A. Bickford, C. H. Bickford, C. V. Burke, J. A. Burke and W. A. Byrnes.

Julius Weber of Mansfield, Ohio, is contemplating the erection of an ice manufacturing plant at Ashland, Ohio.

The Toledo Screen Company, Toledo, Ohio, has added 85,000 sq. ft. of floor space to its plant by the purchase of the works of the Maclaren & Sprague Company, adjoining. The acquired property is completely equipped with modern machinery which will enable the screen company to immediately double its output. The company will add 150 men to its force, making it one of the largest plants in the country engaged in the production of screens.

It is reported that an agreement has been reached between the Empire Portland Cement Company, Portsmouth, Ohio, and the Menominee Commercial Club, Menominee, Mich., whereby the former will erect a factory on a site to be donated by the city. About \$500,000 will be expended in the construction of the plant, work upon which will be commenced by June 1.

Cincinnati

CINCINNATI, OHIO, February 21, 1911.

With the machine tool builders, February, thus far, is a decided improvement over the corresponding period of the previous month. Some scattered export orders are reported during the past week, and there is also an increase in business booked from the general trade. Conditions, however, are not up to normal, and it may take some heavy buying, either from the railroads or auto truck builders, to bring them up to that standard.

There is a light but steady improvement in the second-hand machinery business. While foundrymen see better times ahead, some of them are not now running over 50 per cent. of capacity.

Attention is called to the large number of new companies recently formed in the central West for the manufacture of household and farm specialties, such as washing machines, &c. The total amount expended for small tools and wood-working machinery to equip these plants is surprisingly large.

The Rahn-Larmon Company, Cincinnati, is making shipment of two of its larger sized gap lathes to Rotterdam, Holland.

Thompson Brothers, with offices now located in the Second National Bank Building, Cincinnati, have leased part of the plant being vacated by the Queen City Punch & Shear Company, and will fit it up with special machinery for the manufacture of its patented washing machines.

Davis & Siehl, Cincinnati, makers of fencing and other iron and steel specialties, have incorporated under the name of the Davis & Siehl Company, with \$30,000 capital stock. The incorporators are J. Frank Davis, C. Fred Siehl, Carl W. Siehl, John D. Berger and Gottfried H. Voicks.

The Buckeye Jack Mfg. Company, Alliance, Ohio, has increased its capital stock from \$30,000 to \$50,000, and it is reported that some additions to its manufacturing facilities are contemplated.

The Doermann-Roehrer Company is a new Cincinnati incorporation, to handle mill, mine and factory supplies. The capital stock is \$10,000 and the incorporators are Charles H. Doermann, Michael Roehrer, O. W. Bennett, John E. Wright and Dora Rehback. The business location has not yet been announced.

The Cincinnati Car Company has increased its capital stock from \$100,000 to \$1,500,000, and it is rumored that work will commence at an early date, on the large extensions to its shops, Winton place, recently mentioned.

The Eddy Auto Company, Cincinnati, is having constructed a large two-story garage, in connection with which there will be a small repair shop.

The Metal Specialty Company, Cincinnati, maker of advertising signs and novelties, whose plant was recently burned, has leased a building at Sixth and Burns streets, which is being fitted up for the manufacture of its specialties.

The recently completed machine tool plants at Oakley, Cincinnati suburb, are attracting a great deal of outside attention. Among visitors lately who have come here to investigate the construction and arrangement of these buildings is Paul B. Kendig, president of the Seneca Falls Mfg. Company, Seneca Falls, N. Y. The Continuation School also receives a great deal of favorable comment from visitors.

New England

BOSTON, MASS., February 21, 1911.

The demand for machine tools and kindred lines and the promise of business based on active inquiries continue along the same substantial line which has characterized the past few weeks. The improvement is not uniform, but is becoming more general. Miscellaneous manufacturing lines are more active; with some of them business is as good as could be desired. But the situation as it applies to various industries and units of individual industries cannot yet be called consistent. Announcements of manufacturing plants are constantly being made, promising large buying of equipment in the spring and summer. It is a noteworthy fact that general building of all kinds, including large business blocks and hotel property, promises to be excellent. The savings banks report an unusual number of real estate mortgages having to do with new construction and improvements.

Landers, Frary & Clark, New Britain, Conn., manufacturers of hardware specialties, have awarded the contract for a factory building, 50 x 350 ft., and seven stories. The company states that plans for the use of this building as to the various departments of the business have not been completed.

The Dosch Mfg. Company, 823 Railroad avenue, Bridgeport, Conn., manufacturer of special machinery, will erect a factory on Third street, 60 x 140 ft., one story, of reinforced concrete. The company states that it will probably require no new machinery for some time.

The Meriden Board of Trade Realty Corporation has been organized at Meriden, Conn., with the intention of erecting an industrial building for rental to small manufacturing concerns, several of which already stand ready to take space.

The L. W. Pond Machine & Foundry Company, Worcester, Mass., manufacturer of gray iron castings, will replace its foundry by an entirely new plant, which will have a largely increased capacity and will be one of the most com-

THE MACHINERY MARKETS

plete in New England in its design and equipment. The building will occupy the site of the present structure and will be erected around and over it, with no interference with the present productive operations until the new equipment, including cupolas, is in readiness. The foundry will be of brick and steel construction, about 100 x 245 ft., one story, and will have a maximum of window area. Three 5-ton electric traveling cranes will be installed. Two new cupolas will be erected, with a capacity of 15 tons an hour, giving a daily output of from 30 to 50 tons of iron. A new blower will be put in, and there will be two new core ovens and two dry sand ovens. In fact the equipment throughout will be new. The company has purchased some molding machines and others will be added. The contract for the cranes has been placed, but no other purchases have been made. The cupolas cannot be built until work on the raising of the tracks of the New York, New Haven & Hartford and Boston & Albany railroads, at the rear of the property, has further advanced, that is to say, about the middle of the year. It is not the intention to go into heavier castings, but to increase the output along present lines of production. The estimated cost of the building is \$75,000; the plans are now being figured by the contractors. M. Thomas O'Leary, Worcester, is the president, treasurer and manager of the company, the other directors being Henry Prentiss and G. L. Wilson, New York, and William F. McCarthy, Boston.

The Gulyer Engineering Company, Boston, has awarded the contract for the new works at South Framingham, Mass., which will be occupied by Marcus Mason & Co., Worcester, Mass., manufacturer of coffee and sugar machinery.

A large amount of machinery was destroyed by a fire in the box factory of J. L. Brackett & Son, Portland, Maine, February 18.

The Penfield Shock Absorber Company, Meriden, Conn., has established a factory for the manufacture of shock absorbers. William A. Penfield is president and treasurer, and Charles L. Penfield, secretary.

The Stanley Works, New Britain, Conn., has increased its capital stock from \$1,500,000 to \$2,000,000, the stock being distributed at par to present stockholders in proportion to their holdings. The new capital is made necessary by the large expansion of the company's business, which is due particularly to the establishment of a large branch plant at Niles, Ohio.

The stockholders of the American Screw Company, Providence, R. I., have authorized the reduction of the capital stock of the corporation from \$3,250,000 to \$3,000,000 through the retirement of 2500 shares purchased by the company of a local banking institution.

The Woonsocket Machine & Press Company, Woonsocket, R. I., manufacturer of textile machinery, will erect large additions to its shops, consisting of a four-story building, 83 x 100 ft., and a one-story building, 105 x 125 ft. The work of construction will begin immediately. The company proposes to add new lines and must have the additional shop space.

The plans of the Baird Machine Company, Oakville, Conn., for its new plant at Bridgeport, Conn., call for about 100,000 sq. ft. of floor space. The particular design and style of buildings, as submitted by the engineers in charge, have not been finally approved.

Schwartz Brothers, Bridgeport, Conn., will erect a new woodworking plant at the corner of River and Winton streets, which will replace the structure partially destroyed by fire a few weeks ago. The building will be 61 x 100 ft., two stories, of concrete blocks.

The Eagle Knife & Bar Company, Lawrence, Mass., manufacturer of machine knives and bars, states that it will build no addition to its works at the present time, the recent purchase of a tract of land adjacent to its property being intended for future expansion.

The Climax Specialty Company, Norwich, Conn., has been organized under Connecticut laws, to manufacture metal specialties and novelties. James C. MacPherson is the president and Tyler Crittenden the secretary and treasurer. The company states that its factory will probably be located in Norwich.

The Willimantic Industrial Company, Willimantic, Conn., is about to place the contract for a new mill building 200 ft. long, with saw-tooth roof, and for a boiler house.

Plans are making for a new hotel building at Hartford, Conn., to be erected by a new company, headed by G. F. Heublein. It will replace the present Heublein Hotel, and will be 110 x 125 ft., and 14 stories.

The Burns & Bassick Company, Bridgeport, Conn., which operates a large plant for the manufacture of furniture trimmings, is making a specialty of producing in large quantities small castings, metal stamping and screw machine products, according to the specifications of customers.

St. Louis

St. Louis, February 20, 1911.

The Beck & Corbitt Iron Company, St. Louis, Mo., will erect an addition to its present plant, which will then cover an entire block. The improvements, when completed, will cost about \$80,000, and will give the company a seven-story building, each floor having an area of 222 x 226 ft. Details regarding equipment to be installed have not been decided upon.

A cut glass factory, in which Eastern parties are interested, which will represent an investment of \$50,000, will soon be established at St. Louis. Leases for the property to be occupied have been drawn and will be signed in a few days, at which time the names will be divulged. It is known, however, that the factory will be located in the northwestern part of the city. It is reported that the concern is Joseph D. Bergen & Co., Meriden, Conn.

The National Ice Cream Company, St. Louis, will locate at 4719 Delmar avenue. This is a new corporation with a capital stock of \$10,000. A. Moll is the head of the new company.

The Owens Paper Box Company, St. Louis, has been incorporated with a capital stock of \$20,000. The incorporators are Jackson J. Owens, Joseph P. Connor, Louis Spelbrink and others.

The Martels Water Heater Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are Charles Von Martels, H. W. Martels and J. E. Diamond.

The citizens of Moberly, Mo., owing to the present small supply of natural gas, are seeking to have a gas plant established in that city.

The Sheffield Ice Company, Kansas City, Mo., has been incorporated, with a capital stock of \$20,000. The incorporators are D. D. Dutton, Sloan Tugeon and Hugh E. Martin.

The United States Steel Doubletree Company, Rolla, Mo., has been incorporated, with a capital stock of \$20,000. The incorporators are William E. Harmon, J. A. Jones and F. A. Webb.

The Savannah Stone Company, Savannah, Mo., has been incorporated, with a capital stock of \$20,000. The incorporators are O. F. Spiers, H. J. Wisehart and J. H. Vanbrunt.

The Commercial League of Fort Smith, Ark., has closed a contract for the removal to that city from Buchanan, Mich., of the Three B Feather Duster Company. The concern will occupy a building giving it manufacturing and storage space of 10,000 sq. ft.

A company of New York capitalists is reported to be seeking to purchase the city water works at Eureka Springs, Ark., and the City Council has applied to the Legislature for permission to hold an election for a vote on the proposition.

A company, to be known as the Little Rock Hydraulic Brick Company, is being organized at Little Rock, Ark., for the purpose of engaging in the manufacture of brick.

Indianapolis

INDIANAPOLIS, IND., February 21, 1911.

The Auto Specialty Mfg. Company has been organized at Indianapolis with \$10,000 capital stock to manufacture auto parts. The directors are A. T. Pursell, M. V. Wiggins, G. W. Dollarhide, F. E. Floyd and J. L. Floyd.

The Hoosier Filling & Sealing Machine Company, Indianapolis, has been organized with \$10,000 capital stock, to manufacture filling and sealing machines. The directors are Thomas Moss, Norman Moss and A. O. Todd.

John J. Appel, Indianapolis, will be the president of a new company formed to take over the De Tangles Motors Company of Anderson, Ind. The new company is composed largely of agents for the old concern who have contracted for this year's output of motor cars and who have advanced about \$40,000 on their contracts. They agree to put \$50,000 cash into the business if a compromise offer submitted to the creditors is accepted. The Anderson Trust Company, appointed receiver for the plant a few days ago, has been discharged.

The Marvel Carbureter Company, Indianapolis, has increased its capital stock from \$15,000 to \$50,000. B. N. Pierce is president of the company.

The Van Camp Cash Register Company, Brookston, Ind., has been dissolved.

The Manufacturers Plant & Power Company, South Bend, Ind., has increased its capital stock from \$100,000 to \$150,000. George Knapp is president of the company.

The S. B. Helm Mfg. Company, Crawfordsville, Ind., has

THE MACHINERY MARKETS

been incorporated, with \$15,000 capital stock, to manufacture metal tanks. The directors are W. H. O'Neal, Charles E. Lacey and Alice S. Lacey.

The Warsaw Chamber of Commerce has been organized at Warsaw, Ind., and at the first meeting an industrial fund of \$17,000 was subscribed. The officers are: President, W. D. Frazer; vice-president, L. W. Royse; secretary, C. H. Ker; treasurer, D. H. Lessig.

The Knott-Van Arman Mfg. Company, Fort Wayne, Ind., has changed its name to Van Arman Mfg. Company.

E. A. Hayman has been appointed receiver of the O-U Handy Tool Company of North Vernon, Ind. The company was organized a few months ago, to manufacture auto jacks and a combination tool for farmers. The people of Mt. Vernon subscribed \$7000 in stock, a site was chosen for a factory and part of the machinery purchased, but financial difficulties interfered with further progress and the directors asked for a receiver.

A. L. Bodie of Milwaukee, Wis., is in Danville, Ind., trying to revive the Cowie Window Sash Company, which was organized there about a year ago to manufacture an adjustable and removable window sash. Buildings were erected by Danville people, but the Indianapolis promoters did not purchase the machinery and the company has been in receiver's hands. Mr. Bodie is organizing a new company composed of local people exclusively.

The George W. Davis Carriage Company, Richmond, Ind., has increased its capital stock from \$30,000 to \$60,000. George W. Davis is president of the company. The Elkhart Brass Mfg. Company, Elkhart, Ind., has increased its capital stock from \$25,000 to \$60,000. A. E. Hanauer is president of the company.

George A. Briggs of Elkhart, Ind., is at the head of the Briggs Mfg. Company, which has been incorporated under the laws of Maine with a capital stock of \$200,000. The company will manufacture electrical apparatus and supplies.

The Kelly Foundry Company, Elkhart, Ind., will erect a foundry building 60 x 200 ft., machine shop 60 x 100 ft., and a pattern shop in connection. The company will manufacture cast iron blow-off basins, exhaust heads and a general foundry line.

The William Garver Tank Works, East Chicago, Ind., has purchased from the German American Car Company a building which was on its property and has improvements under way.

The Brooklyn Tool Company, Brooklyn, Ind., incorporated with \$10,000 capital stock, has contracted with the Bales Forge Company, Indianapolis, for the manufacture of its product for the present.

Formal transfer of the plant of the New Albany Woolen Mills, New Albany, Ind., to the American Automobile Mfg. Company, has been made and the latter company is proceeding with the installation of machinery for the manufacture of motor cars.

The Southwest

Kansas City, Kan., has voted bonds in the sum of \$350,000 for a municipal lighting plant. J. A. Cable is commissioner of lights.

Bonds in the sum of \$25,000 have been voted by Dodge City, Kan., for the construction of electric light plant and sewers.

The City Council of Luray, Kan., is considering the establishment of a water works system.

The Board of Public Works, Hannibal, Mo., has purchased a cross compound condensing engine and a 600-kw. generator, for enlargement of the electric light plant and will purchase a water tube boiler of approximately 400 hp.

Lanpher Brothers, Carthage, Mo., have purchased the business of the Mallory Carriage Works. It is the intention of the firm to incorporate their business the coming spring and erect a two-story factory and repair building which will be equipped for the manufacturing and repairing of automobiles and other vehicles.

The Osage Handle Company, Eldon, Mo., whose plant was destroyed by fire January 21, with a loss of \$75,000, has plans for rebuilding its plant on a much larger and better scale, equipped with modern machinery, details for which are not yet available.

Farmington, N. M., will expend \$50,000 for improvements to its water works system.

The Oklahoma Iron Works, Tulsa, Okla., is considering extensive improvements to its plant, but advises that nothing definite has been decided upon.

A corporation has been organized at Ogden City, Utah, which has been granted a 35-year franchise for the installation of an electric light plant. While the organization has not yet been completed it is proposed that M. S. Browning of that city will be elected president.

The city of Snyder, Ark., has voted for the issuance of

\$4000 in bonds for the extension of its water works and electric light system.

The Chickasaw Cotton Oil Company, Chickasaw, Okla., will purchase second-hand machinery for an electric light plant. R. G. Latting is superintendent of the company.

Toronto

TORONTO, February 18, 1911.

As the spring approaches and the trade conditions for that season and the summer become less uncertain, preparations are being entered upon for the carrying out of projected undertakings and the starting of new industrial work. Makers and sellers of plant and equipment are receiving orders and inquiries on account of such proposed ventures. The railroads are being heard from by the manufacturers of cars and locomotives. Several new lines are to be built in Ontario. Machinery is still going into the mining districts, Porcupine Camp particularly, of northern Ontario. Building operations, which have slackened somewhat on account of unfavorable weather, are to be carried on upon a very large scale throughout the country when spring opens up. As a body the architects of Canada are very busy upon plans for new buildings, many of which are steel structures of large dimensions. There was a considerable interruption of operations at many of the Hamilton factories this week, owing to ice obstructions and the action of heavy east winds upon the power plant of the Cataract Company. Toronto's factories were also somewhat affected by the gale, causing a 12-hour stoppage of the city's water supply.

The Lumby-Stenhouse Foundry Company started up its new plant at Fort William, Ont., this week.

The ratepayers of Windsor, Ont., have approved the by-laws to grant bonuses to a Canadian branch of the Maloney Electric Company of St. Louis, to be established in the town, and to the Canadian Winkley Company, an offshoot of a Detroit concern. The former company will manufacture electrical machines at Windsor, and the latter will make brass goods.

The Canadian Manufacturers' Association has received a letter from the treasurer of an industrial city in Ontario, the name of which is not given, to the effect that the Municipal Council there has decided to discontinue its campaign for new industries because of the reciprocity agreement.

The contract for equipping the ditches, &c., of the new Grand Trunk Hotel at Ottawa has been awarded to the Gurney Mfg. Company, Toronto, the amount being about \$100,000.

Expenditures in Toronto aggregating \$5,000,000 are promised by the vice-president of the Canadian Pacific Railway Company.

The Sawyer & Massey Company, Hamilton, Ont., which expended \$100,000 on capital account during the last year by additions to its molding shop, and the installation of new plant and machinery, proposes to erect warehouses at Regina and Saskatoon in the West. In addition to steam power plants it intends to manufacture gasoline and oil traction engines. Until it has its own works ready for turning out the latter class of articles, it has made arrangements with American and English firms to take care of its orders for gasoline and oil traction engines.

The discovery of oil in the vicinity of Morinville, Alberta, has been followed by the incorporation of scores of companies to sink and operate wells in that district. Several of these are preparing to install plants.

The City Council of Regina, Saskatchewan, has decided to give an order to the Siemens Brothers Dynamo Works, England, for a Bellis-Marcam engine and a dynamo and switchboard, and to buy a C. H. Wheeler condenser from the C. H. Wheeler Company of Philadelphia.

J. D. McArthur, Winnipeg, has secured the contract for the extension of the Algona Central Railway toward Hudson Bay. The cost is about \$4,000,000.

The Municipal Council of Calgary, Alberta, is urging the Canadian Pacific Railway Company to choose that city for the new car shops that are to be established by the company in the West.

The Canadian Pacific Railroad Company has promised to spend \$250,000 on improvements in London, Ont. This will be upon yards, station house and roundhouse.

In the coming summer all the wooden bridges on the section of the Canadian Pacific Railroad between Toronto and Windsor, in Ontario, are to be replaced by steel structures.

The Canada Ford Company, Montreal, has obtained the contract for the cars of the municipal electric railway system in Regina, Sask. The company is having the cars

THE MACHINERY MARKETS

built at the works of the British Company, Loughborough, England. These will be the first English made cars used in the Canadian West. It is thought that the Loughborough company will establish works in Montreal.

The Cowan Construction Company has secured the contract to build 200 miles of line of the Canadian Northern Railway from the Pembina River to Yellowhead Pass, in the Rocky Mountains. The contractors are arranging to get a large number of outfits on the ground in time for an early spring start.

The Canadian General Electric Company proposes to erect in connection with its works at Peterborough, Ont., a large factory in which to make lamps. The estimated cost of the building is \$250,000.

Hering, Fuller & Monahan, New York, have obtained the contract to prepare plans for the water filtration plant to be built in Montreal next summer. The firm will receive \$31,000 for the planing and supervision of the work.

The Sydney Mines Electric Company, Sydney Mines, N. S., is planning an increase of its plant and the addition of apparatus.

The Sheppard & Marse Company, which has several lumber camps on the Montreal River in northern Ontario, is installing an electric plant near Temagami for operating its mills.

A company has been formed to manufacture heating and ventilating apparatus, plumbers' and steam fitters' supplies, &c., on a very large scale at Calgary, Alberta.

The British Canadian Power Company, Cobalt, Ont., is adding largely to its plant.

A company with \$2,000,000 capital stock has been formed to manufacture brick. One plant is to be at La Prairie, and another at another point on the St. Lawrence River.

The Sylvester Mfg. Company at Lindsay, Ont., has been reorganized. Drills and cultivators are to be made.

The Campbell Lumber Company, Weymouth Bridge, N. S., is planning to rebuild its pulp and saw mill which were destroyed by fire January 23, entailing a loss of \$50,000. The plans include permanent buildings of concrete and steel construction, equipped with the most modern machinery, with direct electric drive.

The Oliver Chilled Plow Works is asking for bids for a fireproof malleable and gray iron foundry building at its Hamilton, Ont., plant, to be 135 x 576 ft.

The South

LOUISVILLE, KY., February 21, 1911.

The improvement of roads is one of the liveliest questions in the South, Kentucky and Tennessee especially having aroused sentiment in favor of better highways through the formation of State organizations. One of the results of this has been the opening of many rock quarries and the purchase of rock crushing equipment in preparation for the heavy demand for road making material, which will undoubtedly be in evidence a little later on. Dealers in quarrying equipment of all kinds report sales remarkably stimulated on this account. Other lines of machinery are also in good demand.

The Seelbach Hotel Company of Louisville has announced plans for the construction of a 10-story addition on the present site of its power house, and a new power building will be erected. A good deal of additional equipment for it will be purchased. The cost of the entire improvements is \$200,000.

The Frederick-Ruggles Mfg. Company, Louisville, has been incorporated, with a capital stock of \$6000. Joseph M. Frederick will manage the company, which already has a small shop and will manufacture bottling machinery and beer fillers.

John Rommel has secured the agency for the Brush and Sampson automobiles and will erect a garage and automobile repair shop at Campbell street and Broadway. Equipment for this will be purchased later.

The Murray & Thomas Company, Maysville, Ky., has been incorporated, with a capital stock of \$12,000, and will manufacture granite. John H. Murray, W. A. Whallen, W. Fred Thomas and J. N. Treagar are the incorporators.

Dr. W. E. Grant, city health officer of Louisville, has recommended the establishment of a fertilizer plant as a means of disposing of the city garbage.

The Wheland Machine Works, Chattanooga, Tenn., has sold H. H. Hitt of Danville, Ala., equipment for a stove mill. Prospects in timber-working lines are reported by the company to be considerably improved.

The American Smoke Fuel Company, Louisville, has been incorporated, with \$2000 capital stock, for the purpose of developing patents on smoke consuming machinery.

A. D. Jones, Frank Dunn and C. B. Jones are the incorporators.

Baker & Roberts are equipping a plant at Sparta, Tenn., for the manufacture of spokes and shuttles. Additional machinery will be secured. The firm proposes to utilize timber which is unsalable in any other way.

The Southern Cut Stone Company, Nashville, Tenn., has been incorporated, with \$50,000 capital stock. T. L. Herbert, R. T. Creighton, Robert Elliott, Joseph M. Warren and D. Y. Johnson are the incorporators.

W. L. Regen of Lewisburg, Tenn., has purchased the equipment of the Lynnville Machine Shops, Lynnville, Tenn., and will move it to Lewisburg. He was formerly proprietor of the business.

Ranking & Echola, Dewitt, Ark., are installing a 10-ton refrigerating plant.

The John P. Dale Machinery Company has established quarters at 127 Third avenue south, Nashville, Tenn. It deals in power equipment and woodworking machinery.

N. E. Pitre of Boyle, Miss., will purchase an electric power plant of limited capacity.

C. H. Ruggles of Tuscaloosa, Ala., is inquiring for prices on a 2-hp. and a 7½-hp., three-phase motor.

J. T. Pullen of Laurel, Miss., is purchasing equipment for the operation of a water-gas plant. A franchise has just been awarded to him and others.

An 80-hp. boiler is one of the improvements to be installed in the plant of the Thomaston Ice Company, Thomaston, Ga.

The Coal Creek Electric Light Company, Coal Creek, Tenn., has announced plans for the erection of an ice plant and laundry.

Modern machinery is displacing the faithful mule in levee work in the South. Roach & Stansell, Memphis, Tenn., who have been awarded a contract for the construction of a loop levee near Greenville, Miss., are spending \$50,000 in a plant to handle the job. The equipment will consist of a 90-ton steam shovel of the Bucyrus type, two standard-gauge locomotives, 30 standard-gauge dump cars and an automatic dirt spreader. An electric power plant operated by the steam shovel will keep the dirt spreader at work.

The Urwick Machinery & Supply Company, Louisville, is showing a new bilge pump, driven by a gasoline engine, manufactured by the C. H. & E. Mfg. Company, Milwaukee. It is attracting attention in contract work where trenches must be emptied.

The property of the Knoxville Woolen Mills will be offered for sale March 1 and 2 at Knoxville, Tenn. The holdings consist of four buildings and a large amount of machinery. Boilers, steam engines, electric generators and motors and woolen machinery are included. The equipment will be disposed of in lots.

A movement has been set on foot at Memphis, Tenn., to exempt new industries from taxation for five years.

Two hoisting engines will be purchased as part of the equipment of marine ways which are under construction at Knoxville, Tenn., by Oliver King. The expenditure involved is \$15,000.

The Chesapeake & Ohio Railroad will construct a turntable at Maysville, Ky., at a cost of \$10,000. F. I. Cabell, chief engineer of the company, with offices at Richmond, Va., is in charge of the work.

A bill has been introduced in the Tennessee Legislature providing for an issue of \$1,250,000 of bonds by Chattanooga for the purpose of constructing a water works system. This includes an issue of \$900,000 provided for some time ago. A Water Works League has been formed in Chattanooga and is urging the purchase of the present plant or the construction of a new one.

Dyersburg, Tenn., is outlining plans for a water works plant to cost \$20,000. R. C. Houston, Memphis, Tenn., is drawing plans.

Brick and tile machinery, as well as a 30-hp. engine, are wanted by the Nabring Brick & Tile Company of Tullahoma, Tenn.

New machinery is to be installed in the plant of the Park Woolen Mills at Chattanooga, Tenn., after which operations will be resumed, following a period of idleness.

Improvements which will be made in the Boone County Flour Mills at Petersburg, Ky., include the installation of a 25-hp. gasoline engine.

Plans are being made for the establishment of an electric light plant at Big Sandy, Tenn.

The plant of the Chattanooga Stove Company, Chattanooga, has been purchased by the Wetter Mfg. Company, South Pittsburg, Tenn., which will have its headquarters in Chattanooga hereafter. One of the improvements will be the installation of machinery for the manufacture of a gas stove. Charles Huntington is president of the Wetter Company. The Chattanooga Stove Company has been controlled by Cleveland manufacturers.

The Home Light Company, Grayson, Ky., will largely

THE MACHINERY MARKETS

increase the capacity of its plant, and additional generating equipment will be installed. An 80-hp. boiler will be purchased.

An electric plant will be added to the property of the Hickman Ice & Coal Company of Hickman, Ky. A 150-kw., alternating current, 60-cycle generator is to be secured.

Sargent & Lundy of Chicago, consulting engineers for the Kentucky Electric Company of Louisville, have been conferring here with Chief Engineer Lewis Streng of that company. Details concerning the new power plant of the company, which will cost over \$500,000, will be determined this week.

A gasoline engine will be purchased by the County Board of Education at Memphis, Tenn. It will be used in connection with the heating plant of a high school.

The property of the Somerset Water, Light & Traction Company, Somerset, Ky., was recently sold at auction to end a receivership. J. H. Gibson, who purchased it, has organized the Union Water, Light & Traction Company, with a capital stock of \$100,000. About \$50,000 will be spent on improvements, and additional equipment for the lighting plant will be secured.

It is reported that the Odee Gas Engine Company, Beloit, Wis., will move its plant to Memphis, Tenn. The concern, it is stated, will be reorganized and its capital stock increased.

Coal developments in eastern Kentucky and adjoining territory promise to take a large volume of machinery. The Clinchfield Coal Corporation is reported to have plans for the construction of a \$500,000 electric power plant and a \$100,000 water plant. The Wisconsin Steel Company is pushing work on its coking ovens in that section.

Trenton, Tenn., has secured authority from the Legislature to issue bonds for the construction of a water works system.

Newport, Tenn., will build a water works plant to cost \$50,000 if a bond issue to be voted on shortly is approved.

The Kimberly Coal Company, Trenton, Ky., is to purchase mining machinery for the development of 220 acres of coal lands. S. Y. Trimble, Hopkinsville, Ky., is president of the company.

The Elkhorn Consolidated Coal & Coke Company has been purchased by J. L. Rogers of Greenville, Ky., and others, and the development of 2500 acres of coal land is contemplated. An electric power plant to operate 300 coke ovens will be constructed. Work is planned to begin March 15.

The Union Light, Heat & Power Company of Covington, Ky., has secured a 20-year franchise to serve Dayton, Ky.

The City Council of Dayton, Tenn., is considering an issue of \$25,000 in bonds for the purpose of establishing a municipal water works system.

The city of Waverly, Va., has voted to issue \$7000 in bonds for the construction of an electric light plant.

The city of Portsmouth, Va., has voted to issue \$600,000 in bonds for the purpose of establishing a system of water works.

The city of Richmond, Va., will install two centrifugal electric pumps, with a capacity of 4,000,000 gal., in Byrd Park, at an estimated cost of \$12,000. Charles E. Bolling is city engineer.

The Mayor and Council of Rockmart, Ga., will receive bids until March 7 for the machinery, material and construction of a water works and sewerage system, for which \$35,000 in bonds have been voted. The J. B. McClary Company, Empire Building, Atlanta, Ga., are the engineers in charge.

Dyer, Tenn., contemplates the issuance of bonds for a water works system and will construct a \$1000 reservoir, brick engine house to cost \$2000 and a 40,000-gal. tower and tank. The estimated cost of the machinery to be installed is \$20,000. R. C. Houston, Central Bank Building, Memphis, Tenn., is preparing the plans.

A fire in the warehouse of the Huntsville Foundry & Machine Works, Huntsville, Ala., February 10, destroyed property valued at \$3500.

Milwaukee and the Northwest

The George H. Smith Steel Casting Company, Milwaukee, Wis., is figuring on extensive improvements to its plant, details of which have not been completed.

The proposition of issuing \$30,000 in bonds for the purchase of a water plant will be voted on at the spring election by citizens of Fon du Lac, Wis.

The Duluth-Superior Traction Company, Superior, Wis., is planning an expenditure of about \$400,000 in improvements on its systems in Duluth and Superior.

The Hartmann's Machinery Exchange, Green Bay, Wis., has let contracts for the construction of a new boiler shop,

80 x 80 ft., and a machine shop, 60 x 60 ft., of fire-proof construction. The boiler shop will be equipped with a 25-ton electric crane and a five-ton hand crane. The machine shop will also be equipped with a five-ton electric crane. One end of the building will be of temporary construction, permitting of future extension. A large steam hammer will be installed for heavy forging work, and shop and boiler tools will also be purchased.

C. S. Johnson & Son, Racine, Wis., have just completed a new three-story brick building, which will be used for office and warehouse purposes.

The Racine Mfg. Company, Racine, Wis., is contemplating the erection of a building, 100 x 280 ft., four stories, mill construction, to be equipped with automatic sprinklers throughout. The company advises, however, that it is considering the removal of its plant to a city just outside of Chicago. In this event, new buildings will be erected with a floor space aggregating 450,000 to 500,000 sq. ft. These buildings will also be of mill construction and fully equipped with automatic sprinklers.

The Oak Creek Town, Land & Mining Company, Oak Creek, Colo., has received a franchise for the construction of a water works system for which about \$30,000 will be expended.

The White Iron Lake Iron & Water Power Company, Ely, Minn., is planning the construction of a power dam 12 ft. high at the outlet of White Iron Lake, to develop 25,000 hp.

The City Engineer of Fargo, N. D., is preparing plans for a filtration plant and pumping station. It is also proposed to have an electric light plant included in the plans.

A vote will be taken at Lewiston, Mont., on issuing \$90,000 to \$100,000 in bonds for the reconstruction of the water works system.

The City Council of Hankinson, N. D., is considering the installation of an electric light plant.

The Northern Welding & Mfg. Company, Minneapolis, Minn., whose plant was entirely destroyed by fire on January 14, has purchased a site and now has under construction a new machine shop, 44 x 176 ft., two stories. Several lathes and other metal working machinery and a large Davis-Bournonville oxy-acetylene welding apparatus are being installed. It is understood that other buildings will be erected at a later date.

Farther Central West

The Omaha Heavy Hardware Company, Omaha, Neb., has purchased a building adjoining its warehouse, which it will use for light manufacturing purposes.

A vote will be taken at Afton, Iowa, at the coming election on the installation of an electric lighting system.

The City Council of Belle Plaine, Iowa, is planning improvements to the water works system at an expenditure of \$5000.

B. F. Lichty & Sons, Waterloo, Iowa, have filed articles of incorporation, with \$12,000 authorized capital stock. The company is engaged in the sheet metal business, and will soon move to larger quarters. Hand power machinery will be used for the present and some new equipment will be purchased.

The Cement Tile Machinery Company, Waterloo, Iowa, incorporated for the past five years with \$50,000 capital stock, has made amendments to its articles of incorporation, authorizing an increase of \$75,000. Extensive improvements are under consideration by the company.

The Miller-Manney Cement Products Company, Marshalltown, Iowa, has established a factory for the manufacture of cement building blocks, posts, &c. In addition to the equipment already installed the company will purchase a block machine, post molds and novelty molds and steam plant for heating and curing.

The Walls Frogless Switch & Mfg. Company, Pueblo, Colo., has filed articles of incorporation with \$1,000,000 capital stock. It is the purpose of the company to equip a plant in Pueblo where it will manufacture a frogless switch invented by J. W. Walls. It has not been decided, however, whether new buildings will be erected, or whether the company will occupy a building which has been offered.

The shoe factory of Bentley & Olmsted, Des Moines, Iowa, will temporarily be located at 224-226 Second street. It is probable that the firm will build a new factory on the site of the structure that was burned.

The citizens of Diagonal, Iowa, are desirous of entering into negotiations with parties that will establish a canning factory in their town.

W. H. Smola and J. T. Robinson of Central City, Iowa, have formed a copartnership and will engage in the manufacture of cement blocks, bricks and tile. The work of erecting a temporary factory will begin at once and machinery will be ordered. A large block-making machine has been bought.

The trustees of the water works at Ottumwa, Iowa, have

THE MACHINERY MARKETS

let contracts for \$60,000 worth of improvements to be made to the municipal plant. The installation of a filtering system at a cost of \$38,240 and the extension of old water mains and a supply of new mains amounting to \$22,000 comprise the improvements to be made.

The gas plant at Perry, Iowa, was wrecked February 8 by an explosion which blew out three of the walls of the building.

The Alfalfa Meal Company, Omaha, Neb., is taking steps looking to the building of a new mill to replace the one destroyed by fire January 9. J. T. Brooks is the general manager of the company.

Texas

AUSTIN, TEXAS, February 18, 1911.

Favorable reports of trade conditions in Texas, the Southwest and Mexico continue to be received from various points. It is stated that the small significance of the alleged revolutionary movement in Mexico is beginning to be realized by United States investors and others who are interested in the industrial development of that country and that projects which have been delayed on account of the disturbances in a small and remote part of the country will now be carried out. The influx of home-seekers into the Rio Grande valley and South Texas generally has broken all previous records during the last few weeks. The opening of ranch lands and the enlargement of farms already established are causing a constant increase in the demand for irrigation machinery.

At a recent meeting of the board of directors of the Marshall & East Texas Railroad Company a bond issue of \$5,000,000 was authorized. It is stated that the proceeds from the sale of these bonds will be used to make improvements to the physical condition of the property. New machinery will be installed in the shops and a general work of betterments carried out.

At the Waco election, February 14, the taxpayers voted to issue \$250,000 of bonds for the erection of a municipal electric light and power plant. The plans for installing the new plant will be prepared immediately, and the construction work started as soon as the bonds can be issued and sold.

The Board of County Commissioners of Dallam County are considering the erection of several steel bridges. Steel vaults and cages will also be installed in the county jail. The county seat is Dalhart.

The Chicago, Weatherford & Brazos Valley Railroad Company has let the contract for the erection of all bridges and depot buildings on its proposed line in Texas to J. W. Yarbrough, Temple, Texas.

The Municipal Commission of Dallas has adopted an ordinance granting the Texas Company the right to extend its gas distributing service in that city. The new pipe lines will cover a number of streets.

Announcement is made by the Gulf, Colorado & Santa Fe Railroad that it has appropriated \$60,000 for the enlargement of its shops at Cleburne, Texas. The general offices are at Galveston.

The Texas City Fruit and Produce Growers' Association of Texas City, Texas, contemplates installing a large fruit and vegetable canning factory at that place. W. H. Newby is president.

The Cleburne Sewerage Company will make important extensions to its sewer system in Cleburne, Texas. The City Council of that place is also considering the matter of ordering an election to construct a sewer system in the western part of the town.

At a recent joint meeting of the directors of the San Antonio Gas & Electric and the San Antonio Traction Companies, both of which are owned by the same interests, held in San Antonio a budget of \$250,000 for proposed improvements to the plants and systems of the companies was adopted. It is stated that the electric lighting department will be improved at a cost of \$50,000, exclusive of the reconstruction and remodeling of the power plant at an additional cost of \$35,000. Additional boilers and machinery will be installed in the gas plant and other improvements made to that department at a cost of \$58,000. Nearly \$100,000 will be expended in double tracking lines of the San Antonio Traction Company. About \$50,000 will be expended for additional trolley cars.

W. M. Baugh will construct a dam across Jin Ned bayou, near Brownwood, Texas, and install an irrigation pumping plant.

The City Council of Victoria, Texas, will make large extensions of the local water works distributing system.

New pumps are being installed at the water works plant

of the city of Brenham, Texas. Other improvements to the system will be made.

The Lockhart Water Works & Power Company is installing a new ice manufacturing plant at Lockhart, Texas. The company will also install new motors and other equipment in the power plant.

The Flatonia Ice, Water & Electric Light Company has received its engine and other machinery for its new plant. It will provide electric lights for the town of Flatonia, Texas.

T. J. Majors, J. A. Owen, W. C. Hunt of Alvin, Texas; L. H. Wallis of Houston and H. P. Rhodes of Cuero, Texas, have formed a company to build an ice factory and cold storage plant at Alvin, to cost about \$15,000.

The saw mill formerly owned by S. G. Regney, and which was in the hands of the Texas Banking & Investment Company of Beaumont, and situated near Silsbee, Texas, has been purchased by J. C. Appleman of Pitkin, La. He will overhaul the plant, install new machinery and again place it in operation.

The Fort Worth Wagon Company was recently organized at Fort Worth with a capital stock of \$150,000. The incorporators are Warren Heaton, C. Hightower and John F. Shelton.

The Lee County Cotton Oil Company, Giddings, Texas, has been organized for the purpose of establishing a cotton seed oil mill. The company has a capital stock of \$40,000. The incorporators are P. S. Grogan, J. S. Hillsman and Richard W. Mayfield.

I. Friedman is installing the machinery for his new broom factory at Rock Island, Texas.

The Mission Ice & Fuel Company, San Antonio, Texas, will build a new 25-ton ice plant in that city, in addition to its present plant. The company recently brought in an artesian well of large capacity.

The Gulf, Colorado & Santa Fe Railroad Company will install new machine shops at Somerville, Texas. It is also enlarging its roundhouse at that place.

J. A. Logwood of San Antonio, Texas, and associates have sold their interurban electric railway that they were constructing between San Antonio and San Jose to A. D. Powers, and the latter will complete the line.

The Tyler Turpentine Company is installing a turpentine still and other equipment near Colmesneil, Texas. S. S. Day is general manager.

The St. Louis, Brownsville & Mexico Railroad will establish extensive terminals at Harlingen, Texas, a large tract of land having been purchased recently for the purpose. The opening of the new railroad route into Mexico will make Harlingen an important division point, it is stated.

The Water Works Commission of Temple, Texas, has awarded the contract for the construction of a filtering plant to cost about \$30,000.

W. Prout, Jr., of Denver, Colo., and associates, will erect a large factory for the manufacture of macaroni at El Paso, if a favorable site for the proposed industry is obtained.

The San Marcos Utilities Company has been granted a renewal of its electric light franchise by the City Council of San Marcos, Texas, and the company announces that it will spend at least \$10,000 in increasing its equipment in order to meet the demand for an enlargement of its service. It will give a 24-hour service and make provisions for furnishing power for all purposes.

The City Council of Georgetown, Texas, has let the contract for improvements to the municipal water and light plant to cost about \$35,000. The water works distributing system will be greatly enlarged, new dynamos installed and other improvements made.

The City Council of Farmington, N. M., has under consideration the proposition of submitting to a vote of the people a bond issue for installing a water works pumping plant and distributing system and a municipal electric light plant. It is stated that the water works proposition will be put through, irrespective of what decision is reached as to the proposed lighting plant. In this connection it is announced that the Rockwood Power Company, which has a large electric power plant at Durango, contemplates running a transmission line down the Animas River Valley to Farmington to furnish power for the irrigation pumps of the farmers and power and lights for the towns of Aztec, Flora, Vista, Kirtland, Fruitland and Farmington. A local company is also being organized to install an electric light and power plant.

The Mexico Mines Company, Ltd., will erect a large reduction plant at its mines in the Guanajuato, Mexico, district. Dr. J. L. Hill is president and W. H. Ehlert managing director.

The Compania Minera Bicolos Bravo of Almoleya, State of Chihuahua, Mexico, will install considerable new machinery at its mines.

The Taxco Mines of Mexico, Ltd., will erect a 100-ton

THE MACHINERY MARKETS

reduction mill at its mines at Taxco, State of Guerrero, Mexico.

Overmuller & Wilson of Sobia, State of Sonora, Mexico, will install a 10-stamp mill at their mine at that place.

Carlos von Brandis of Durango, Mexico, will erect a concentrating and cyaniding plant at Avino, State of Durango, Mexico. The Lucia Mining Company of Avino is also interested in the proposed plant.

Dr. Howard A. Kelly of Baltimore, Md., and J. E. McCreary of Oaxaca, Mexico, will erect a custom ore reduction mill at Oaxaca.

A mill will be installed at the Carmon mine at Guanaquato, Mexico, by a French syndicate that owns the property. Ernesto Brunel is manager.

The San Cayetano Mines Company will install a large ore reduction mill at San Cayetano, State of Guanajuato, Mexico.

The Compania Minera de Natividad y Anexas will install a hydroelectric plant of 1000 hp. at its mines near Sierra Juarez, State of Oaxaca, Mexico.

The San Antonio Gas & Electric Company, San Antonio, Texas, has under consideration extensive improvements to its plants during the coming year.

A committee of business men of Wichita Falls, Texas, composed of N. Henderson and others, is conferring with the owners of an engine and boiler works plant at Corinth, Miss., for the removal of the plant to Wichita Falls. A committee representing the company will visit Wichita Falls some time this month for investigation purposes.

The Wichita Falls Foundry & Machine Company, Wichita Falls, Texas, is installing a cupola of eight tons capacity which will increase its capacity to 11 tons per day. The company has also installed a bolt cutter and a 4-in. pipe cutting machine and expects to install an 8-in. pipe cutting machine in the near future.

Ground will be broken at Port Houston, Texas, a suburb of Houston, within a few weeks for the erection of a factory for the manufacture of brass and iron beds. A company has been organized with \$200,000 capital stock, all of which is paid in. Formal organization and election of officers will take place shortly, but as the promoters are at present located in another city they have requested their names to be withheld. An entire new equipment of machinery will be installed in the factory when completed. The matter is at present in charge of the Houston Chamber of Commerce.

The city of Hearne, Texas, is making preparations for the installing of its new water works system, for which bonds were voted.

Pacific Coast

SAN FRANCISCO, CAL., February 15, 1911.

Metal working tools have received a little more attention from local purchasers since the first of the month, though no large amount of heavy machinery has been sold. Practically all local purchases have been for the replacement of old tools. Many of the shops are now fairly busy, but few are working at capacity. Several plans are under consideration, however, for increased facilities, and there is little doubt that more tools will be installed than last year. There is some talk of new railroad shops and other installations of a large nature, but this has not yet taken the shape of definite inquiries. Business through the country has been interfered with by violent storms, but is rapidly getting back to normal.

Orders are now beginning to result from tentative inquiries for heavy machinery of a miscellaneous nature which have been in the market for some time, though there is hardly as much demand for contractors' equipment as was expected, in view of the amount of improvement work planned for this year. The California saw mill and logging interests are placing a few scattered orders, and several local planing mills are coming into the market, but no great activity is expected before the end of the rainy season. Rock crushing equipment is quiet, but several new projects of some importance are being started. A heavy snowfall has delayed business with the northern California mines, which are likely to hold off until the middle of April, but a great deal of new development is scheduled, and conditions are favorable for an unusually active season. There is an increasing demand for water works machinery and irrigating pumps.

W. S. Heger, California manager for the Allis-Chalmers Company, has returned from a trip to Milwaukee.

The United Engineering Works is figuring on the installation of several new machine tools.

The George E. Dow Pumping Engine Company has added a new furnace to its foundry department.

The Natomas Consolidated of California, operating in

the Oroville district, has purchased a large locomotive crane.

The Noble Electric Steel Company is installing several large transformers in connection with its four new furnaces at Hierault, Cal.

Head & Goodman are preparing to install a small machine shop at Chico, Cal.

Matheson Brothers, operating a mining property at Seward, Alaska, intend to put on a steam shovel at a cost of about \$15,000 this season.

Los Angeles parties have placed an order with the George E. Dow Pumping Engine Company for a large two-stage air compressor for an air lift in waterworks service. It will be steam driven, of the cross-compound condensing type. This company is also building a complete plant with a capacity of 300 gal. per minute, to pump from a number of wells 600 ft. deep, to an elevation of over 800 ft., by means of an air lift. The outfit includes boilers, cross-compound surface condensing engines, a two-stage air compressor and all auxiliary machinery.

The Glendora, Cal., Irrigating Company will install a large deep-well pump in the San Dimas wash.

The Hanford, Cal., Water Company is preparing to put in a lot of new pumping machinery.

Placer mining interests of California and Alaska, who have been figuring for some time on gold dredging outfits to be built this year, are beginning to place their orders. The Moore & Scott Iron Works of this city, has taken a contract for steel hulls for two dredges for Alaska, in which about 500 tons of material will be used.

The Union Iron Works has been unusually busy on marine work of late. The rebuilding of the steel steamer Damara has just been completed, and several other steamers are undergoing extensive repairs.

The Zenith Iron Works has been incorporated in San Francisco with a capital stock of \$20,000 by John Clark, J. A. Campbell, W. J. and H. F. Duthie.

Frank P. Clark, representing C. C. Moore & Co. at Honolulu, is taking orders for a large number of oil-burning outfits. This company has just taken a contract for installing piping and machinery in the plant of the Southern California Edison Company at Long Beach.

The city of Alameda, Cal., will receive bids Feb. 27 for a water tube boiler, stack and piping for the municipal electric light plant.

The Warman Steel Casting Company, recently incorporated at Los Angeles, has signed an agreement to erect a plant with three furnaces at Redondo, Cal.

The Gorham Engineering Works of Alameda, Cal., manufacturing gas engines, &c., has let a contract for a new building, and a lot of new equipment will be installed. The company recently purchased a lot 150 x 280 ft., fronting on the tidal canal. Orders have been placed for part of the machinery.

The Indiana Machine Shop Company, Oroville, Cal., is in the market for a set of plate bending rolls for plates 1½ in. thick and 7 ft. wide.

The California Materials Company is preparing to install a large conveyor system to handle sand at its plant near Niles, Cal.

Plans are being completed for a large addition to the general repair shops of the Southern Pacific Railroad at Los Angeles.

Arrangements are being made for replacing the acid plant of the Standard Oil Company at Richmond, Cal., which was destroyed by fire a few days ago.

The Pacific Lumber Company is replacing a lot of the machinery in its old mill near Eureka, Cal., putting in modern log-handling equipment, &c.

Bids will be opened March 1 for installing pumping machinery at the United States Army general hospital at the San Francisco Presidio.

The Development & Securities Company, C. R. Collins of Long Beach manager, is preparing to erect a plant at San Bernardino, Cal., for the manufacture of concrete products. A large rock crushing outfit will also be installed.

The San Diego, Cal., Stone Company is considering the addition of a No. 6 crusher and a complete pneumatic drilling plant at its Sweetwater quarry.

H. B. Babington, president of the Prince Rupert, B. C., Iron Works, was a recent visitor to San Francisco.

It is announced that the Bradrick Power Pump Company will move its shops from Porterville, Cal., to Los Angeles.

The Nevada City, Cal., Miners' Foundry has taken a contract for a 20-stamp ore mill for the Union Hill mine.

The Maricopa Company is preparing to install a lot of mining machinery on its property near Goldfield, Nev. The equipment will include three boilers, a 200-hp. Corliss engine, a steam air compressor and a small electric generator.

The Southern Pacific interests, which now control the electric railway system of Los Angeles, are planning a large amount of tunnel and subway work, on which they are expected to start operations this year.

THE MACHINERY MARKETS

The Southwest Sugar Company is planning to install a beet sugar mill at Ferris, Cal.

The town of Colton, Cal., is taking bids on a lot of machinery, including air compressors, motors and transformers.

The Kingsley Chemical Reduction Company, Spokane, Wash., has let contracts for the construction of a new plant, work upon which will be commenced as soon as the frost is out of the ground.

The Tacoma Foundry & Machine Company, Tacoma, Wash., recently incorporated, has purchased 2½ acres of ground upon which it will immediately start the erection of a large foundry. Those interested in the company are Wilson Webb, John Taylor and T. B. Hall.

The Portland Railway, Light & Power Company, Portland, Ore., is preparing plans for the erection of new repair shops at a cost of \$300,000 to be erected on a tract of 15 acres recently acquired. It is the intention of the company to consolidate all of its present repair shops into the new building, but eventually an adjoining plant will be erected in which the company will build its rolling stock. The building will be of fireproof construction throughout and will be equipped with modern machinery. There will also be a number of other buildings erected, including a blacksmith shop, paint shop, woodworking shop, foundry, machine shop and general repair and reconstruction plant. The company's plans provide for buildings that will cover the entire 15 acres within the next few years.

The California Power & Mfg. Company has filed articles of incorporation at San Francisco, Cal., with \$5,000,000 capital stock. The company proposes to own and operate water plants for power, lighting, irrigation, electricity and heating. F. G. Blaum and Charles W. Slack are two of the directors named in the articles of incorporation.

The Pacific Gas & Electric Company, San Francisco, Cal., is contemplating extensive improvements, including the erection in the vicinity of Sacramento of a large auxiliary power plant to be operated by steam. A site for the plant is now being selected.

The Constructing Quartermaster, Fort Mason, Cal., is asking for bids to be opened March 1 for constructing addition to power house and installing pumping machinery at the United States army general hospital, Presidio, San Francisco, Cal.

The Rogue River Electric Company, Medford, Ore., has begun preliminary work on a hydroelectric power plant which will be equipped with one 5000-hp. unit this season, and other units later on.

The Live Oak & Euclid Light & Power Company, Live Oak, Cal., has been purchased by Berg & Metz of that city, who will make extensive improvements.

Vancouver, Wash., will expend about \$50,000 for the construction of a municipal water works system.

The City Council of Elma, Wash., will employ an engineer to prepare estimates for a water works system.

Government Purchases

WASHINGTON, D. C., February 20, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids March 21, under schedule 3355, for two turbo-generating sets for the Navy Yard, Mare Island, Cal.

The Isthmian Canal Commission, circular 522 A, calls for bids to be opened March 6, for furnishing hoisting chain, wire rope, stranded wire and water tapping machine.

The Department of the Interior, United States Reclamation Service, Washington, will open bids March 10 for furnishing turbine water wheels for the Salt River project, Arizona.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids February 14, as follows:

Class 11.—One 2-ton side blow converter—Bidder 20, Colne & Co., New York, \$2950; 70, Tropenas Converter Company, New York, \$3200; 79, Bradley, Stoughton, New York, \$2200.

Class 21.—One set of gasoline machinery—Bidder 12, Bruns, Kimball & Co., New York, \$3797.35; 18, Clifton Water Works, Cincinnati, Ohio, \$5045; 34, Gas Engine & Power Company and Charles L. Seabury & Co., Morris Heights, N. Y., \$6000; 48, Murray Tregutha Company, South Boston, Mass., \$4480.80; 54, New York Yacht & Engine Company, Morris Heights, N. Y., \$5300.

Class 22.—One Mosher marine water tube boiler—Bidder 4, Almy Water Tube Boiler Company, Providence, R. I., \$2170; 34, Gas Engine & Power Company and Charles L. Seabury & Co., Morris Heights, N. Y., \$2350; 35, Griscom Spencer Company, New York, \$2197; 45, Mosher Water Tube Boiler Company, New York, \$3300; 75, Charles Ward Engine Works, Charleston, W. Va., \$2750 and \$2500.

The Isthmian Canal Commission, Washington, opened bids February 10, under Canal circular 618, for one crane, as follows: Manning, Maxwell & Moore, New York, Shaw crane, \$5752; Niles-Bement-Pond Company, New York, \$6100; Whiting Foundry Equipment Company, Harvey, Ill., \$5445.

Bids were opened February 14 by the Superintendent of

Prisons, Washington, for furnishing electric light and power installation at the United States Penitentiary, Atlanta, Ga., as follows: McCay Engineering Company, Baltimore, Md., \$5635; International Electric Fixture & Contracting Company, St. Louis, Mo., \$4300; Tholen Brothers, Leavenworth, Kan., \$5205; William H. Neville, Leavenworth, Kan., \$2839 and \$2239; Whitall Electric Company, Westerley, R. I., \$5380; National Electrical Supply Company, Washington, D. C., \$4800.

The Collin By-Product Coke Oven

In an unusually well printed and illustrated pamphlet the Coal Distillation Company, 1211 Singer Building, New York, gives an account of the development of the Collin by-product coke oven which was described in *The Iron Age* of August 4, 1910, page 272. By detailed description and the use of illustrations with reference letters the pamphlet brings out the features of the Collin regenerative oven and shows the advantages secured by this type. Its distinguishing principle is that all heating flues are at all times directly heated by live gas instead of by the alternation of live gas and waste heat, as is ordinarily the case with regenerative ovens, and all heating flues of the oven are always under the same draft. Emphasis is put on the large supply of gas produced by the Collin oven and on the building of the regenerative chambers independent of the oven structure. A list is given of 86 European plants employing the Collin oven. The oven is also built without regenerators, this being cheaper and simpler in construction and working. It is recommended for small plants, where there are either existing boilers or existing steam engines which are to use the surplus steam, and where simplicity in working is required owing to the difficulty of getting skilled labor and superintendence. Where gas of a high grade is desired it is stated that the increased yield of gas will much more than compensate for the extra cost of the regenerative oven. The pamphlet is well illustrated with views of European plants.

The Empire Iron & Steel Company, Niles, Ohio, in order to satisfactorily handle the increased demand for its products through the Middle West, has established branch warehouses in Chicago, at 22 Lake street. Customers through that section will doubtless be pleased to learn of this addition to the company's well regulated distributing facilities. All orders received by the Chicago branch from its territory will receive the same prompt attention as that accorded by the home office, plus added advantage in shipment. The company's products comprise black and galvanized sheets, all forms of metal roofing and siding, eaves trough and conductor pipe, metal shingles, ornamental metal ceilings and side-walls.

The Taylor & Boggis Foundry Company, Cleveland, has purchased a large building site from the Standard Oil Company on East Fifty-fifth street and the Erie Railroad, on which it will begin the erection of a plant early in the spring to replace its No. 2 plant. The latter plant has been sold to the Pennsylvania Railroad, which wanted the site for a freight depot. The new plant will include a foundry, machine shop and the builders' hardware manufacturing department. The company has acquired a site of sufficient size to provide a location for its No. 1 foundry plant should it be decided later to abandon the present site of that plant and rebuild.

The stockholders of the National Screw & Tack Company, Cleveland, will vote February 25 on increasing the common stock from \$1,000,000 to \$1,250,000. A stock dividend representing earnings expended on the property has been discussed. A vote will also be taken February 25 by the stockholders of the National-Acme Mfg. Company, Cleveland, on an increase in capital stock from \$1,500,000 to \$2,500,000.

THE IRON AGE

Established
1855

New York, March 2, 1911

VOL. 87: No. 9

Published Every Thursday by the

DAVID WILLIAMS COMPANY

14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Railroad Buying.....	515
The Freight Rate Decision.....	516
Ore Prices and Pig Iron Prices.....	517
Unreliable Export Agents.....	517
Iron and Steel Company Merger Rumors.....	518
Bolt, Nut and Rivet Men Dine Together.....	518
Name Plates on American Machinery.....	518
Connellsville Coke Interests and Railroad Discrimination..	519
The American Manufacturers' Export Association.....	519
Suggestions Wanted for Catalogue Size.....	519
The Proposed Naval Additions.....	519
Jones & Laughlin Improvements.....	519
The Iron and Metal Market Reports.....	520 to 520
Iron and Industrial Stocks.....	530
The Webster Mfg. Company's New Plant.....	530
German Steel Shipments Slightly Less.....	531
Personal	532
The Society of Chemical Industry.....	533
Obituary	533
Conditions in the Foundry Industry.....	533
Cast Iron Pipe Prices from 1900 to 1910. Illustrated.....	534
Officers of the American Institute of Mining Engineers....	534
Railroad Equipment Orders.....	534
Ferrosilicon Imports to the United States.....	535
Apollo Galvanized Sheets for Culverts.....	535
John W. Dougherty. Portrait.....	535
Lackawanna Steel Company.....	536
The Hilger Revolving Grate Gas Producer. Illustrated....	537
"Building Up" Impurities in Steel.....	537
The General Electric Turbine-Driven Compressor. Illus...	538
Machine Molded Piano Plates. Illustrated.....	542
The Whitney Ball Bearing Rotary Hand Punch. Illustrated	544
Mechanical Engineers' Spring Meeting.....	545
The Steptoe 24-In. Back Geared Shaper with Speed Box. Illustrated	545
The New American Lathes. Illustrated.....	546
The Osborn Molders' Bellows. Illustrated.....	548
Cutler-Hammer Alternating Current Motor Speed Control- lers. Illustrated.....	549
The Causes for High Prices.....	549
A Monorail Grab Bucket Coal Hoist. Illustrated.....	550
Accident Compensation in Minnesota.....	551
The Rockford Vertical Miller. Illustrated.....	552
The Pittsburgh Machine Tool Company's New Plant.....	553
The Wiley & Russell Combination Opening Die Machine. Illustrated	554
A New Indianapolis Industrial Suburb.....	554
Shop Cost Accounting. Illustrated.....	554
Shipyards for Rio de Janeiro.....	555
The Landis Solid Adjustable Die Head. Illustrated.....	556
Wood & Spencer Reaming and Drilling Jig. Illustrated....	556
The Machinery Market Reports.....	557 to 567
Current Metal Prices.....	568

Railroad Buying

The Effect of the Rate Decisions

An Impending Advance in Wire—Bessemer Iron Becomes Active

It is too early to say how the iron trade will be affected by the decisions against freight rate advances. There may be some delay in buying by the railroads, and by manufacturers whose product goes largely to railroads. For one thing, replacements and new equipment can now be decided on their merits and not for ulterior reasons. That should not be unfavorable to the steel companies, in view of more than three years of abstemious railroad buying. There is undisguised satisfaction in the iron trade that last week's decision has put a period to the long round of price advances.

That there have been no cancellations of railroad orders now on the books is not surprising, since it is known that the roads placed the material to take care of imperative needs. The present movement in the steel market has had very little help from the railroads, and steel manufacturers expect that they will soon be found rather increasing than reducing their scale of buying.

The Steel Corporation's excellent sales for export make its record of new orders in February relatively better than that of its competitors. With a daily average of 35,000 to 40,000 tons of new orders, the Steel Corporation exceeds its January rate; its shipments last month likewise increased. In the past week the large Pittsburgh companies report some slowing down both in new orders and specifications.

The Steel Corporation now has 65 per cent. of its blast furnace capacity active, against 62 per cent. one week ago, and meanwhile has reduced somewhat its pig iron stocks.

It seems probable that an advance of \$1 in wire products will come sooner than has been expected. There is also a possibility of an advance in merchant pipe, which has long been out of its usual relation to other products.

The Harriman rail order, which is likely to be for 150,000 tons or more, is expected in the near future. A sale of 2000 tons has been made for a Rio Janeiro street car line. Japanese interests are negotiating for a considerable tonnage and must close soon in order to avoid the higher duty, effective July 11. A sale of 5000 tons of girder rails has been made to a street railroad in Kyoto. The Wichita & Midland Valley Railway, in Kansas, has bought 7600 tons.

The pig iron market shows that buyers are testing the ability of the furnaces to secure the advances recently asked. In foundry iron business has been done on the old basis where large amounts were involved. Southern sellers are asking \$11.25 for No. 2 at Birmingham, for third quarter, and \$11.50 for second half. Actual sales reported for third quarter show a

range from \$11 to \$11.25. In the Chicago district prices are stronger and considerable inquiry has come out. A sale of 10,000 tons of malleable iron was made at Milwaukee for delivery in the last half of the year. A Chicago pig iron firm has reports from 500 foundries which show an average of stocks on hand equal to 70 days' consumption.

Bessemer iron has suddenly become active at Pittsburgh. Sales of 20,000 tons are reported, half of it to be delivered before June, and the remainder in the second and third quarters. On the later deliveries as high as \$15.25 was paid. In basic iron there is continued buying at Pittsburgh. At St. Louis 7000 tons of Missouri basic was sold for the second quarter. A St. Louis melter is in the market for 6000 tons for the last half.

The foreign syndicate is reported to have fixed its price at £12 10s. for 50 per cent. ferrosilicon at foreign port, delivery in the second half of the year, making the Atlantic seaboard price, duty paid, above \$73. A sale of 6000 tons of domestic ferrosilicon has been made to the leading Pittsburgh interest.

Sales of ore to eastern Pennsylvania furnaces have amounted thus far to about 500,000 tons of Newfoundland and Spanish grades. For the latter an advance to about 8 cents per unit was asked for shipments in the second half of the year, but this is contingent on the holding of the 1910 price for Lake ores. Some deliveries of Spanish ores are carried over from 1910; this is the case to a greater extent with Swedish ores.

The flurry in the scrap market, which under speculative buying advanced prices from 50 cents to \$1 a ton, is over. Consumers as a rule have been unwilling to pay the prices reached for melting steel under speculative buying by dealers.

The Freight Rate Decisions

An event which the railroad companies and general business interests have been awaiting for nine months occurred the past week. The Interstate Commerce Commission announced its decisions on the proposed advances in railroad freight rates. Most unexpectedly, these decisions have been adverse to the railroads. The opinion had been steadily gaining ground that they would be permitted to put at least part of the proposed advances in effect. The decisions therefore came as a shock. The railroad companies have been asked to withdraw their proposed increased tariffs before March 10, and if such action is not taken there will be further suspension of the rates and an order issued directing the maintenance of the present rates for a period of two years from March 10.

The commission made an exhaustive examination into all the facts having a bearing on the subject. Hearings were held in different parts of the country and the railroad companies and the shippers were afforded ample opportunity to present evidence from their respective viewpoints. It must therefore be admitted that the commission has not acted hastily nor without mature consideration of the whole case. The decisions not to permit rates to be advanced were unanimous.

Conditions have changed to some extent since the companies announced their intention to advance freight rates. At that time the cost of living was at its highest point, and the problem of how to meet it confronted everybody. Higher wages were being de-

manded all along the line and the railroad companies were obliged to give their employees substantial advances. As the payment of higher wages meant a considerable increase in operating expense, the easiest way for the railroads to maintain satisfactory net earnings was to pass along the burden of higher costs by advancing their freight rates. It is apparent now that if the Government had not interposed its objection, so that the matter was referred to the commission for its decision as to whether the proposed advances were justified, another potent influence would have been added to those which have so long made the standard of values in this country higher than elsewhere on the globe. But while the commission has been investigating this subject, giving it the thorough consideration demanded by its importance, prices of staples have fallen considerably, and readjustments of various kinds have been made in business conditions. We have had a sufficient reaction from trade activity to bring about a more sober feeling among business men generally and advances in freight rates at this time would have distinctly been a step in the wrong direction. Apart from this, however, comes the conclusion arrived at by the investigation of the commission that the evidence submitted by the railroad companies did not establish the necessity for higher rates. The decision of the commission further says that the probability is that increased rates will not be necessary in the future, but that, "if actual results should demonstrate that our forecast of the future is wrong, there might be ground for asking a further consideration of this subject."

Although this decision is by no means pleasing to the railroad companies, and the managers of some of them take such a gloomy view of the immediate future that they claim they will be obliged to buy less and to pay less for what they buy, it seems to be better for the country at large than if the proposed advances had been agreed to. To accept increased costs as a finality and to endeavor to shift the burden to others would have been to set in motion a new set of influences toward raising the general level of values. The upward tendency had to be checked somewhere. The brake has therefore been applied where it will be felt. Notice is thus given that the railroad companies are not to be placed in a position where they might soon be asked by their employees to agree to another advance in wages. Evidence exist that they are not yet satisfied that the ultimate in this respect has been reached.

If the railroad companies put in effect the threats which some managers are now making, and institute more drastic economies than they have yet applied and withhold specifications on orders already placed, the country may for some little time suffer from a recession in business. This will be unpleasant for those affected and might perhaps extend to such a point that some distress would be experienced. This would have to be borne as part of the penalty we have for a long time been invoking by our adherence to methods which have been raising the general level of costs.

We cannot believe, however, that the situation will prove to be disastrous either to the railroad companies or to business interests. It must be understood that the decision involves no reductions in freight rates. It merely stops proposed advances. The revenues of the railroad companies are not to be reduced from the

present basis. The railroad companies have been able for several months to meet the greater expense caused by the higher wages paid to their employees and their revenues do not seem to have suffered seriously. If the refusal of the commission to permit the railroad companies to increase their earnings at the expense of the country compels them to study more carefully economies of operation and increase their efficiency with the use of present facilities a great gain will be accomplished.

Ore Prices and Pig Iron Prices

A great deal has been said in the past few months concerning the price of Lake Superior ores for 1911. Merchant furnacemen having no ore supply of their own have suffered heavily through the decline in pig iron prices. For the ores they bought last year they paid 50 cents a ton more than in 1909. They argued in the latter part of 1909 and the early part of 1910 that as ore prices for 1910 had advanced, pig iron sold for delivery after the ore of 1910 entered into their mixtures should bring a higher price. Market conditions were against this theoretical reckoning, however. Not only was there no advance for pig iron made from the higher priced ore of 1910, but the price of pig iron steadily declined, and some furnacemen have sold iron at a loss to get out from under the ore piles based on the high ore prices of 1910.

For some months the Lake Superior ore producers have been hearing that if furnacemen's wishes are consulted, no reduction will be made in 1911 from the ore price of 1910. It has been argued that furnacemen would have no recourse but to charge off the amount of the reduction on the piles of ore which they must carry into the new season of navigation, amounting to several million tons. The harrowing experiences of some of the furnaces in the past six months have been cited, furthermore, as an argument for stable ore prices over a period of years. It has been urged that if there could be general assurance that the price of ore would fluctuate little or not at all, greater stability would be imparted to the pig iron market.

The history of pig iron prices scarcely bears out the argument that its course has any close relation to the fluctuations in ore. We may take as an example the well remembered year, 1899. The ore producers had little hint when their prices were fixed, on a basis of \$2.95 for old range Bessemer ores, that the pig iron market would soar far beyond the levels of the preceding year. Bessemer pig iron had ranged between \$10 and \$11, Pittsburgh, for most of the year 1898. There was a slight advance in the early part of 1899, but the gathering momentum of the buying movement under way was not appreciated. The fact was, however, that from an average price of \$10.87 in January, 1899, Bessemer iron rose by successive leaps until it reached an average of \$24.90 in December of that year. The ore men, who had asked the most moderate margin of profit in 1899, based their price of 1900 on the prosperity the pig iron men had enjoyed in the preceding year, putting it at \$5.50, the highest level in 15 years, with the exception of 1887 and 1890, and one that has not been reached since. The furnacemen, who had promptly taken up all the \$2.95 ore offered in the spring of 1899, were not so keen to buy at \$5.50 the year following, but all made round purchases in view of their

handsome profits from the boom. However, 1900 showed almost a complete reversal of the conditions of 1899. Whereas the price of Bessemer pig iron averaged \$24.99 for January, 1900, it had fallen to \$13.06 by October of that year.

With fluctuations in the price of pig iron amounting to more than \$14 in a single year, it can hardly be said that the price of ore is very influential in determining the price of pig iron. The experience of the past year, in fact, with the recession in pig iron scarcely interrupted by its arrival at the cost mark for ore, bears heavily against the argument for stable ore prices as a means to a stable pig iron market.

There is no blinking the fact that the merchant furnaceman, who must pay the merchant oremen's price, is at a disadvantage in competing with the growing list of pig iron sellers who mine their own ore in whole or in part. Yet it is to be said that the percentage of Lake Superior ore that goes upon the market is much smaller than it was 10 years ago, and the price on that percentage is given an exaggerated importance in all discussions of ore prices as related to the price of pig iron and of finished steel. Naturally, the lower the merchant ore price is, the less the handicap of the merchant furnaceman without ore supply, in competing with the consumer of ore who is at the same time a producer. But a stable low price of ore would not be satisfactory to the ore producer; and, moreover, the particular price the furnacemen are now interested in having maintained is not a low one.

So far as the merchant furnaces are concerned which produce steel making pig iron, their future would seem to be bound up in the very fluctuations in pig iron prices which it is now argued should be avoided. They are becoming more and more opportunists. Their profits will come from those swells in the iron market which find the steel companies with less furnace capacity than will meet the demands of their finishing mills. In the case of the foundry iron furnaces, moreover, there is no reason to look for any change from the alternations of rising and receding prices which have marked their business heretofore. The past year of declining prices and disappearing profits must be averaged up with prosperous years in which pig iron profits were inordinate. Concern about costs of raw materials is great when prices hover about the cost line; when the market is soaring, raw material costs are forgotten. It will be so again.

Unreliable Export Agents

In the last three years many American manufacturers have had their first experience in export business, and some of them have had expensive lessons through their lack of knowledge of foreign trade. A great deal of money has been spent to little purpose, but most of the useless expenditures have merely gone to swell the receipts of unscrupulous export agents. The unsophisticated manufacturer who has never sought business outside of his own country is liable to consider any export agent's proposition with favor, but if he falls into the wrong hands it is likely to be an expensive and unfruitful experience.

There are plenty of export houses whose managers know the foreign trade thoroughly and whose dealings are honest. They will not accept a selling agency to which they cannot do justice. On the other hand,

there are too many so-called export traders who are simply in the business for what they can get out of this country. Their chief aim is to establish as many American connections as possible, with no regard to their ability to effect sales. It is their usual practice to demand a retainer as "export manager," and to demand a commission on all foreign sales, regardless of the source of inquiry. They send out salesmen loaded with lines of samples with which they are unfamiliar, and who go about in a haphazard way seeking trade. Most of their orders are obtained through good luck rather than good management, and too often their sales are not made to reliable customers.

An experienced export salesman who carried just seven lines of equipment, all connected with power transmission, recently encountered one of these export representatives in a machinery supply house in Australia and asked him what his line was. The newcomer explained that he represented 54 different companies and when questioned admitted that he could not name them all. "Even a grocery clerk could not name 54 different articles from memory," was the indignant defense of the salesman when his statement created amusement. It is quite probable that many of the manufacturers represented by this salesman got very little in return for their outlay.

Another instance of the folly of trusting foreign accounts to such concerns is shown in the experience of an American mill supply manufacturer, whose line of samples was sent on a year's tour with a representative of an export firm. On the salesman's return the manufacturer, who had become dissatisfied with the service given, demanded the samples. The export house gave him an order to obtain the goods at the steamship dock and they were found wrapped just as they had left the factory. The seals on the wrappings had not been broken.

There are plenty of legitimate export houses whose salesmen are specialists in certain lines. Manufacturers seeking export business should endeavor to find such houses. They should at least be as careful in making export connections as in arranging for domestic sales agencies.

Iron and Steel Company Merger Rumors.—Rumors of combinations in the steel industry have been frequent of late. In addition to the reported efforts to merge two Wheeling district companies and the alleged revival of a project for uniting two Alabama companies, there has been a rather circumstantial report of negotiations by prominent steel men for a merger including a Pittsburgh, a Youngstown and a Chicago district steel company, the products involved being wire, sheets, bars and wrought pipe. This last report, it can be stated on authority, is unfounded.

The annual meeting of stockholders of the Wheeling Steel & Iron Company was held at Wheeling, W. Va., February 15. The annual report submitted by C. R. Hubbard, president, showed that the net earnings for the past year were \$701,000, of which \$500,000 was distributed among stockholders, being a dividend of 10 per cent. on a capital of \$5,000,000, leaving a surplus for the year of \$201,000. The directors were re-elected as follows: C. R. Hubbard, W. F. Stifel, George K. Wheat, W. A. Issett, Edward Hazlett, H. H. Hornbrook.

The Decatur Bridge Company, Decatur, Ill., has increased its capital stock from \$100,000 to \$200,000, but it does not contemplate any additional improvements at this time.

Bolt, Nut and Rivet Men Dine Together

Through the efforts of A. Schoonmaker, Western sales manager of the Graham Nut Company, the Western representatives of bolt, nut and rivet manufacturers met for a banquet at the Congress Hotel, Chicago, on the evening of February 22. Those in attendance were:

W. J. Phalen, Buffalo Bolt Company.
A. Schoonmaker and C. J. Graham, Graham Nut Company.
J. F. Donahue, Russell, Burdull & Ward Bolt & Nut Company.
Frank W. Davis, Lake Erie Iron Company.
R. P. Zint, Republic Iron & Steel Company.
Chas. W. Clark.
Paul Wendt, Steel Car Forge Company.
B. S. Handwork, National Bolt & Nut Company.
A. U. Klingman, Bourne-Fuller Company.
J. W. O'Leary, Arthur J. O'Leary & Son Company.
P. Joyce, Illinois Bolt, Nut & Forging Company.
Theo. Geissman, Theo. Geissman & Co.
D. P. Donelson and E. Ahrens, Continental Bolt & Iron Works.
W. H. Darrah, Upson Nut Company.
W. H. Taylor and T. F. Donahue, Central Steel & Supply Company.
Max Jones, Buffalo Nut Company.
Charles Phalen, Garlaud Nut & Rivet Company.

Mr. Schoonmaker acted as toastmaster, and, in his introductory remarks, stated the purpose of the gathering, which was to bring together on a social footing the representatives of the various bolt, nut and rivet manufacturers in the Western section of the country, and to promote friendship and harmony among them. The affair was essentially social in nature, and all present entered into the congenial spirit of the occasion. The set speeches of the evening were as follows: "Chicago: Its Present and Future," Judge Fred L. Fake; "A Survey of the Field," Ralph P. Zint; "Salesmanship," Chas. J. Graham; "Co-operation," Frank W. Davis; "The Law and Trade Associations," James S. Wilkerson. It was resolved that some form of organization be arranged, with a view toward maintaining the cordial relations established by the banquet, and that a similar gathering be held at least annually hereafter.

Name Plates on American Machinery

C. A. Tupper, Milwaukee, Wis., who is now in Europe, writes as follows regarding some observations he made *en voyage*:

During a visit to Ponta Delgada, the capital of the Azores Islands, the writer was gratified to find a large woodworking plant, operated by Coelho & Rosa, which has been completely equipped, from band saw to molders, mortisers, &c., with American-built machinery. Of greater significance to our export trade, however, is the fact that from several of the machines, which were unmistakably of recent manufacture, the name plates had been removed, and the manager could not recall the addresses of the makers. Nor did he remember just why or how they had disappeared, except in the case of one of the planers, which appeared to be of the S. A. Wood Machine Company's design. This had been slightly repaired by a local smithy, and, in getting at the broken part, the name plate was wrenched off, only to be cast aside.

The careless or intentional removal of name plates is common enough in our own country, but when American-built machinery suffers this mutilation abroad, the matter is one of more vital import. The reasons are obvious. Most of the machines in the plant above mentioned had the names of the manufacturers cast in the frame, and this is undoubtedly the sensible thing to do. A separate brass plate for giving other details may be desirable, but the maker's name and the pattern number should appear prominently and ineradicably on the main part of the machine. It is even well to have the letters indented, rather than raised, for unscrupulous dealers, in re-handling, do not hesitate to chip them off. Local jealousy of foreign-built machinery also leads to much intentional mutilation. As the same precautions are of service in domestic trade, they would seem to be well worth the attention of American manufacturers, to whom this observation in one of the principal outposts of Europe is respectfully referred.

Connellsville Coke Interests and Railroad Discrimination

On the evening of February 17 Isaac W. Semans gave a dinner to the merchant coke producers and others interested in the development of the Connellsville region at the Uniontown Country Club, Uniontown, Pa. Over 75 were present. An account of the dinner was published in the *Connellsville Courier* of February 18. Ernest H. Rowe, secretary of the Coke Producers' Association, was toastmaster, and in his introductory remarks gave a history of that organization and made a strong plea for its better support.

The principal address was made by Howard D. Manington, commissioner of the Ohio Coal Operators' Association, who first dwelt on the necessity of a stronger organization for mutual advantage and then launched a scathing arraignment of the discrimination against Connellsville coke interests by the railroads which connect the region with centers of consumption. Making the assertion that "the coke rates from the Connellsville region are unreasonable by every standard to which they may be applied," he presented an array of statistics drawn from official sources to support his contention. One of his conclusions was that, as compared with other commodities hauled, coke is bearing more than its share of the burden of sustaining the transportation lines. He further showed that other coke producing districts enjoy lower freight rates in reaching certain consuming centers. John P. Brennan, president of the Thompson-Connellsville Coke Company, made an address somewhat along the same lines. John W. Boileau, coal and coke expert, Pittsburgh, aroused the enthusiasm of his hearers by showing the great extent of territory which the Connellsville region would supply exclusively with coke if fair and nondiscriminatory freight rates were arranged. Other speakers were Henry P. Snyder, editor of the *Courier*, and James R. Cray and E. D. Fulton, Uniontown, attorneys and collateral coke operators.

The American Manufacturers' Export Association

Henry T. Wills, whose name has been long associated with foreign trade matters and who is considered an expert on conditions and methods prevailing in foreign countries, has been engaged to act as secretary for the American Manufacturers' Export Association, 1 Madison avenue, New York City. He performed notable work as secretary of the National Tariff Commission Association. It is hoped that the new association may be made a body of such power as not only to foster foreign commerce but to prove a force in securing from time to time legislation which will prove an uplift to our manufacturers and will impress buyers and consumers as well as competitors in foreign markets.

Among the members of the American Manufacturers' Export Association and those who are taking a vital interest in its management are the following: Adriance Platt Company, Borden Company, Henry Disston's Sons Company, Du Pont de Nemours Powder Company, Eastman Kodak Company, C. A. Edgarton Mfg. Company, General Electric Company, H. J. Heinz Company, National Cash Register Company, Perkins-Campbell Company, Sargent & Co., Sherwin-Williams Company, Simonds Mfg. Company, Studebaker Brothers Company, Victor Talking Machine Company, Westinghouse Electric & Mfg. Company.

Suggestions Wanted for Catalogue Size.—The Henneberry Company, 552-556 Wabash avenue, Chicago, is about to publish a general catalogue of tools for metal workers and woodworkers. It is to be a standard work, issued quarterly. The company desires to learn the opinion of the trade as to the best size of such a publication for universal service. The book will have 1000 pages, and it is desirable to adopt for it a size that will be most approved by the manufacturer, dealer and consumer. The sizes which are under consideration are 6 x 9 in., 7 x 10 in., 8 x 11 in. and 9 x 12 in. The suggestions should be addressed to the company.

The Proposed Naval Additions

The Naval Programme bill, as passed last week by the House of Representatives, provides for the construction of two new battleships, two fleet colliers, eight torpedo boat destroyers and four submarine torpedo boats. The two battleships are to be the largest ever constructed in this country, and while the authorization fixes the displacement of these superdreadnoughts at 27,000 tons, there is a likelihood that they may go up to 30,000 tons. The new battleships will have 12 14-in. rifles, the heaviest battery ever placed on a ship in this country or in the world. These guns will be arranged in four turrets, three guns in each turret.

The bill carries the following provisions, adopted on motion of Representative Stanley of Kentucky:

Provided, That no part of any sum herein appropriated shall be expended for the purchase of structural steel ship plates, armor, armament or machinery from any persons, firms or corporations who have combined or conspired to monopolize the interstate or foreign commerce of the United States, or the commerce between the States and any Territory or the District of Columbia in any of the articles aforesaid, and no purchase of structural steel, ship plates or machinery shall be made at a price in excess of a reasonable profit above the actual cost of manufacture. And no purchase of armor or armament shall be made at a price in excess of 100 per centum above the actual cost of manufacture, but this limitation shall in no case apply to any existing contracts.

Provided, That no part of this appropriation shall be expended for the purchase of armor or armament from any person, firms or corporations who have entered into any combination, agreement, conspiracy or understanding, the effect, object or purpose of which is to deprive the Government of fair, open and unrestricted competition in letting contracts for the furnishing of any of said armor or armament; and no purchase of armor or armament shall be made at a price in excess of 100 per centum above the actual cost of manufacture.

Another proviso declares that "no part of the money shall be paid to any person, firm or corporation which has not at the commencement of and during the construction of the work for which this appropriation is made, established an eight-hour workday for all employees, laborers and mechanics engaged in doing the work for which this money is appropriated."

Jones & Laughlin Improvements

No. 3 blast furnace of the Eliza group of the Jones & Laughlin Steel Company, Pittsburgh, has been blown out and will be completely rebuilt. The furnace was built nine years ago and in that time has made a total of 1,566,110 tons of pig iron on the original lining. The work of rebuilding this stack will be done entirely by the Jones & Laughlin Steel Company, as in the case of stack No. 1 of the same group, which was torn down and rebuilt in the record time of 95 days.

The company has placed a contract with the Standard Engineering Company, Ellwood City, Pa., for the building of another unit of 12 hot tin mills at Aliquippa, Pa., which will make a total of 24 hot mills, 12 of which have been in operation since last summer. The plant is laid out to accommodate 36 hot mills, but the other 12 will probably not be built for some time.

Reports have appeared in the daily press that the La Belle Iron Works, Steubenville, Ohio, and Wheeling Steel & Iron Company, Wheeling, W. Va., will consolidate their interests into one company. It is officially stated that some preliminary work has been done by representatives of both companies with a view of merging them, but the matter is merely in a preliminary stage and nothing may come of it.

Lake shipbuilders will be asked within a few weeks to submit bids for a new car ferryboat to be built by the Mackinaw Transportation Company for service in the Straits of Mackinaw. The boat will be 352 ft. long, 60 ft. wide, and will have capacity for 25 cars as well as passenger accommodations. Frank E. Kirby, Detroit, Mich., is preparing the plans. The American Shipbuilding Company has just closed a contract for a 165-ft. sand sucker, which will go to an upper lake port.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Mar. 1, 1911.	Feb. 21, 1911.	Feb. 1, 1911.	Mar. 2, 1910.
PIG IRON, Per Gross Ton:			
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00
Foundry No. 2, local, Chicago.....	15.50	15.50	15.50
Basic, delivered, eastern Pa.....	15.00	14.50	14.25
Basic, Valley furnace.....	13.75	13.75	13.25
Bessemer, Pittsburgh.....	15.90	15.90	15.90
Gray forge, Pittsburgh.....	14.40	14.40	14.15
Lake Superior charcoal, Chicago.....	17.50	17.50	17.50

BILLETS, &c., Per Gross Ton:			
Bessemer billets, Pittsburgh.....	23.00	23.00	23.00
Forging billets, Pittsburgh.....	28.00	28.00	28.00
Open hearth billets, Philadelphia.....	25.40	25.40	25.40
Wire rods, Pittsburgh.....	29.00	29.00	28.00

OLD MATERIAL, Per Gross Ton:			
Iron rails, Chicago.....	15.50	15.50	14.50
Iron rails, Philadelphia.....	15.50	18.00	17.00
Car wheels, Chicago.....	13.25	13.00	13.00
Car wheels, Philadelphia.....	14.00	14.00	13.00
Heavy steel scrap, Pittsburgh.....	14.75	14.75	13.50
Heavy steel scrap, Chicago.....	12.00	12.50	11.50
Heavy steel scrap, Philadelphia.....	14.50	14.50	12.50

FINISHED IRON AND STEEL,			
Per Pound:	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25
Refined iron bars, Philadelphia.....	1.37½	1.37½	1.30
Common iron bars, Chicago.....	1.27½	1.30	1.30
Common iron bars, Pittsburgh.....	1.35	1.35	1.35
Steel bars, tidewater, New York.....	1.56	1.56	1.56
Steel bars, Pittsburgh.....	1.40	1.40	1.40
Tank plates, tidewater, New York.....	1.56	1.56	1.56
Tank plates, Pittsburgh.....	1.40	1.40	1.40
Beams, tidewater, New York.....	1.56	1.56	1.56
Beams, Pittsburgh.....	1.40	1.40	1.40
Angles, tidewater, New York.....	1.56	1.56	1.56
Angles, Pittsburgh.....	1.40	1.40	1.40
Skelp, grooved steel, Pittsburgh.....	1.30	1.30	1.30
Skelp, sheared steel, Pittsburgh.....	1.35	1.35	1.35

SHEETS, NAILS AND WIRE,			
Per Pound:	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.20	2.20	2.20
Wire nails, Pittsburgh*.....	1.75	1.75	1.75
Cut nails, Pittsburgh.....	1.60	1.60	1.60
Barb wire, galv., Pittsburgh*.....	2.05	2.05	2.05

METALS, Per Pound:			
Lake copper, New York.....	12.75	12.75	12.75
Electrolytic copper, New York.....	12.37½	12.37½	12.37½
Spelter, New York.....	5.70	5.60	5.55
Spelter, St. Louis.....	5.55	5.45	5.40
Lead, New York.....	4.40	4.42½	4.50
Lead, St. Louis.....	4.25	4.27½	4.32
Tin, New York.....	42.25	44.75	42.75
Antimony, Hallett, New York.....	9.25	8.00	7.75
Tin plate, 100-lb. box, New York.....	\$3.94	\$3.94	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zeos, 3 in. and up, 1.40c. to 1.45c., net;

angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c. net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼ in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼ in. to and including 3-16 in. on thinnest edge.....\$0.10
Gauges under 3-16 in. to and including No. 8......15
Gauges under No. 8 to and including No. 9......25
Gauges under No. 9 to and including No. 10......30
Gauges under No. 10 to and including No. 12......40
Sketches (including all straight taper plates), 3 ft. and over in length......10
Complete circles, 3 ft. in diameter and over......20
Boiler and flange steel......10
"A. B. M. A." and ordinary firebox steel......20
Still bottom steel......30
Marine steel......40
Locomotive firebox steel......50
Widths over 100 in. up to 110 in., inclusive......05
Widths over 110 in. up to 115 in., inclusive......10
Widths over 115 in. up to 120 in., inclusive......15
Widths over 120 in. up to 125 in., inclusive......25
Widths over 125 in. up to 130 in., inclusive......50
Widths over 130 in......1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive......25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive......50
Cutting to lengths or diameters under 1 ft......1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½ in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Black Galv.		Black Galv.	
	Steel.		Black Galv.		Black Galv.	
¼, ¾, ¾ in.....	72	58	68	54	68	54
¾ in.....	75	63	71	59	71	59
¾ to 1½ in.....	79	69	75	65	75	65
2 to 3 in.....	80	70	76	66	76	66
Lap Weld.						
2 in.....	76	66	72	62	72	62
2½ to 4 in.....	78	68	74	64	74	64
4½ to 6 in.....	77	67	73	63	73	63
7 to 12 in.....	75	59	71	55	71	55
13 to 15 in.....	51½	..	..	..	..	..
Butt Weld, extra strong, plain ends, card weights.						
¼, ¾, ¾ in.....	69	59	65	55	65	55
¾ in.....	74	68	70	64	70	64
¾ to 1½ in.....	78	72	74	68	74	68
2 to 3 in.....	79	73	75	69	75	69
Lap Weld, extra strong, plain ends, card weight.						
2 in.....	75	69	71	65	71	65
2½ to 4 in.....	77	71	73	67	73	67
4½ to 6 in.....	76	70	72	66	72	66
7 to 8 in.....	69	59	65	55	65	55
9 to 12 in.....	64	54	60	50	60	50
Butt Weld, double extra strong, plain ends, card weight.						
¼ in.....	64	58	60	54	60	54
¾ to 1½ in.....	67	61	63	57	63	57
2 to 3 in.....	69	63	65	59	65	59
Lap Weld, double extra strong, plain ends, card weight.						
2 in.....	65	59	61	55	61	55
2½ to 4 in.....	67	61	63	57	63	57
4½ to 6 in.....	66	60	62	56	62	56
7 to 8 in.....	59	49	55	45	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.
1 to 1½, 2 to 3 in... Butt Weld
2, 2½ to 4 in... Lap Weld
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in charcoal are as follows:

	Steel.	Iron.
1 to 1½ in.....	.49	.43
1½ to 2¼ in.....	.61	.43
2½ in.....	.63	.48
2¾ to 5 in.....	.69	.55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2¾ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$29.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, March 1, 1911.—(By Telegraph.)

Pig Iron.—Bessemer pig iron, which has been lying dormant so long, is beginning to move, and we can report sales of fully 20,000 tons, of which about half is for delivery up to June, and on the other half deliveries run as far ahead as October, the iron running to June bringing \$15, while the third quarter iron brought as high as \$15.25, at Valley furnace. It is said that other inquiries are pending for considerable tonnage. There has also been a heavy movement in basic iron. A sale of 1500 tons of No. 2 foundry iron, for delivery up to June, is reported at \$13.75, Valley furnace. The whole pig iron market is more active in inquiries, while prices are firmer. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Actual orders sent to the mills in the billet and rail sales department of the Carnegie Steel Company in February showed an increase over January of more than 100,000 tons. Consumers of billets and bars are specifying freely against their contracts, and the steel market is quite active, with prices very firm. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

While opinion is somewhat divided as to the effect of the freight rate decisions on the iron trade, the belief predominates that there will be a slowing down in buying by the railroads. Yet it is thought that after a little time orders will commence to come for the supplies which they so badly need. The volume of new orders and specifications against contracts has shown a falling off the past week, as compared with the previous week. This may be due to the fact that buying until a week ago was quite active, and consumers are pretty well covered, but, on the other hand, some believe the recent spurt was only temporary and we now have the reaction. The weak spot in the situation is steel making pig iron, of which heavy stocks are still being carried by the Valley furnaces, which fact is well known to the consumers and they are going slow in placing orders. The new demand and specifications against contracts for billets and sheet and tin bars continues active, and prices on steel are firm. The situation in finished iron and steel is fairly satisfactory. The flurry in scrap seems to be pretty well over. For the first time in some months, coke is showing betterment in inquiry and prices are firmer.

Ferromanganese.—The market is very quiet, being practically bare of new inquiry, and prices are weak. We quote

80 per cent. foreign at \$37.50 to \$37.75, Baltimore, the freight rate to the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—The leading local consumer is reported to have closed for a very large amount of domestic 50 per cent ferrosilicon for forward delivery, said to be above 5000 tons, but neither the name of the seller nor the price paid has been given out. Another local interest is in the market for 300 tons for delivery up to July, and this business is practically closed on the basis of about \$54, Pittsburgh. We quote 50 per cent. at \$54 to \$54.50, f.o.b. Pittsburgh, for delivery up to July. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—The higher prices being asked for gray forge pig iron have had their effect on muck bar, best grades made from all pig iron now being held firmly at \$30, Pittsburgh. There is no new inquiry in this market.

Skelp.—There is a fairly active new inquiry for both iron and steel skelp, and prices are firm. A leading local maker reports a sale of 1500 tons of sheared iron skelp, wide sizes, at 1.75c. delivered at buyer's mill. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The leading consumers of wire rods covered their requirements for some time ahead prior to the recent advance in prices, and as a result new inquiry is light. Specifications against contracts are coming in only in a moderate way. A sale is reported of 500 tons of open hearth chain rods for delivery up to July at \$29, Pittsburgh.

Steel Rails.—No domestic contracts of moment for standard sections have been placed, and new orders for light rails are also quiet, and only for small lots. The demand from the lumber interests for light rails is expected to be much better in the near future. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The Cambria Steel Company has received an order for 500 steel hopper cars for the Lehigh & New England Railroad, and this is the only recent contract of any moment mentioned here. A local interest is reported to have an order for the laying of a 12-in. riveted pipe line in Brazil, which will require a heavy tonnage of plates. The market is firm, and we quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

Structural Material.—Some fair sized contracts have been placed. The Fort Pitt Bridge Works has taken 1600 tons for a new steel pier at New Orleans. The McClintic-Marshall Construction Company has taken about 600 tons for the John B. Stetson Building at Philadelphia, 400 tons for the new office building of the Republic Iron & Steel Company at Youngstown, about 500 tons for a new warehouse at Newark, N. J., and 800 tons for a new Government foundry at Puget Sound Navy Yard, Bremerton, Wash. The Pittsburgh Bridge & Iron Works, Rochester, Pa., has taken 600 tons for new steel buildings for the Hammernill Paper Company, at Erie, Pa. The American Bridge Company has taken 400 tons for an addition to a hotel in Baltimore. A new bridge is to be built across the Allegheny River in Pittsburgh, and bids will be asked in a few days by the Department of Public Works, Pittsburgh, for the erection of the piers, and bids for the structural steel, 3000 to 4000 tons, will likely be invited in the latter part of this month or in April. A great deal of new work is being figured on, but it is slow in coming out. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—While the new demand is slack, large consumers are specifying freely against contracts placed in November and December, and all the leading mills are operating close to full capacity. Last week's shipments by the American Sheet & Tin Plate Company of tin mill products were much the largest in any one week for some months, and the company is now operating to about 90 per cent. of its hot tin mill capacity. Prices are firm on the basis of \$3.70 per base box of 100-lb. cokes, f.o.b. Pittsburgh.

Sheets.—Present conditions in the sheet trade are referred to by the mills as being fairly satisfactory. The new demand is heavier than it was some time ago and specifications against contracts are coming in at a better rate than for some time. The recent meetings of the sheet makers have brought about more stability in prices. The full schedule of prices in effect on the different grades of sheets is printed on a previous page.

Bars.—The new demand is dull, and specifications

THE IRON AND METAL MARKETS

against contracts are only fair. The implement makers are not showing any disposition to place contracts for their season requirements. Prices on iron bars are firmer, due to the recent advance in scrap, but the mills are having trouble in getting any better figures from their customers. We continue to quote steel bars at 1.40c. and iron bars at 1.35c. to 1.40c. in carload and larger lots, f.o.b. Pittsburgh.

Hoops and Bands.—New orders are light and only for small lots to cover actual needs. Large consumers of hoops and bands are specifying in a fairly liberal way against contracts placed in December and January. We quote steel hoops at 1.50c. and bands at 1.40c., extras on the latter as per the present steel bar card. It is stated that prices of hoops and bands are now being quite well maintained.

Spikes.—A local maker reports that in two days recently it entered new orders for 15,000 kegs of railroad spikes for forward delivery. Two of the leading Western railroads are in the market for fairly large lots. It is stated that prices adopted February 1 are being firmly held, and these are as follows:

Railroad Spikes

4 1/2, 5 and 5 1/2 x 1 1/2	Extra	1.55
3, 3 1/2, 4, 4 1/2 and 5 x 1 1/2	Extra	.10
3 1/2, 4 and 4 1/2 x 1 1/2	Extra	.20
3, 3 1/2, 4 and 4 1/2 x 1 1/2	Extra	.30
2 1/2 x 1 1/2	Extra	.40
2 1/2 x 3 and 3 1/2 x 5/16	Extra	.60
2 x 3	Extra	.80

Boat Spikes

3/4 in. square, 12 to 24 in. long	Extra	.15
3/4 in. square, 8 to 14 in. long	Extra	.15
1/2 in. square, 6 to 16 in. long	Extra	.15
1/2 in. square, 6 to 12 in. long	Extra	.20
1/2 in. square, 4 to 12 in. long	Extra	.30
1/2 in. square, 4 to 8 in. long	Extra	.45
1/2 in. square, 4 to 8 in. long	Extra	.55
1/4 in. square, 3 to 3 1/2 in. long	Extra	1.00
3/4 and 1/2 shorter than 4 in. 1/4 cent extra.		

Spelter.—Prices are firm and higher, and the demand is reported more active than for some time. We quote prime grades of Western at 5.45c., East St. Louis, equal to 5.57 1/2c., Pittsburgh. A sale of 25 tons to a local consumer is reported at this price.

Shafting.—The new demand is fair, but specifications from the automobile trade are very slow. The implement makers are specifying satisfactorily against their shafting contracts. We quote cold rolled shafting at 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory.

Merchant Steel.—New orders received by the mills and shipments in February showed a slight increase, as compared with January, in spite of the short month. Prices are reported firm, and we quote as follows, f.o.b. Pittsburgh: Iron finished tire, 1/2 x 1 1/2 in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—New orders for small lots are being received to cover actual needs, but specifications against contracts are not satisfactory. Regular prices of 1.90c. on structural rivets and 2c. on boiler rivets continue to be slightly shaded on desirable orders.

Wire Products.—The new demand for wire nails and wire is quiet, and reports are that specifications against the contracts placed prior to the recent advance in prices are not coming in in a very satisfactory way to the mills. The makers of wire products have a large amount of business on their books, and look for more activity in the near future. It is stated that regular prices are being maintained. We quote galvanized barb wire at \$2.05; painted, \$1.75; annealed fence wire, \$1.55; galvanized, \$1.85; wire nails, \$1.75, and cut nails, \$1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—The order for about 80 miles of 3 to 10 in. line pipe, placed last week by the Tri-State Natural Gas Company, went to the Mark Mfg. Company, and the couplings to the Dayton Coupling Mfg. Company, Dayton, Ohio. Several other gas and oil lines are in the market, and may be given out in the near future. The general demand for merchant pipe is only fair, and the tonnage entered by the mills in February showed a falling off, as compared with January. Discounts on iron and steel pipe, printed on a previous page, are well held.

Boiler Tubes.—The boiler shops are pretty well covered on tubes for some time ahead, but are not specifying very freely against their contracts. The new demand for locomotive tubes is dull, and prices are more or less shaded.

Coke.—For the first time in some weeks, an improvement can be reported in the coke trade, the new demand being more active, while prices are a shade firmer. Best makes of furnace coke for prompt shipment have sold recently at \$1.50 to \$1.55 per net ton at oven. The output

in the upper and lower Connellsville regions last week was 322,765 tons, a gain over the previous week of about 1000 tons. We quote standard makes of furnace coke for spot shipment at \$1.50 to \$1.55 per net ton, at oven; on contracts for delivery over the year from \$1.70 to \$1.75 is being quoted by some coke operators, while others are firm, at \$1.90 to \$2, at oven. Best makes of 72-hour foundry coke are being held at \$2.10 to dealers and from \$2.25 up to \$2.50, at oven, to consumers.

Iron and Steel Scrap.—The recent flurry in prices of scrap, which put the market up fully \$1 a ton or more, seems to be over for the time being. Although prices are firm, the new inquiry is not so active. The market went up so fast for some weeks that several large consumers are now disposed to go slow, to see if the higher prices will hold. Actual sales in the past week have been light, but there is no disposition on the part of dealers to shade prices to secure business, and they continue to quote as follows per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Folsom, Sharon, Monessen and Pittsburgh delivery	\$14.75 to \$15.00
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.75 to 14.00
Bundled sheet scrap, at point of shipment	11.00 to 11.25
Repeating rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.25 to 13.50
Grate bars	11.25 to 11.50
Low phosphorus melting stock	17.25 to 17.50
Iron car axles	24.75 to 25.00
Steel car axles	20.50 to 20.75
Locomotive axles	24.25 to 24.75
No. 1 bushing scrap	12.50 to 12.75
No. 2 bushing scrap	9.00 to 9.25
Old car wheels	13.75 to 14.00
Sheet bar crop ends	16.00 to 16.25
Cast iron borings	9.50 to 9.75
Machine shop turnings	10.25 to 10.50
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50
Stove plate	11.50 to 11.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, March 1, 1911.—(By Telegraph.)

An optimistic tendency prevails throughout the entire market. Specifications and new orders for crude and semi-finished materials, as well as for nearly the entire list of rolled products, are increasing. This was not checked by the railroad rate decisions of the past week, being the outgrowth of improved demand for the products into which this raw material enters. Railroad spikes will be advanced \$1 per ton March 1, and it is rumored that advances in other track supplies may follow. The brisk demand for wire products continues, with prices very firm. Local scrap yard stocks are low, but large accumulations remain in the hands of railway companies. Railroads are ordering freely of structural shapes and plates. No. 2 furnace was blown in at Joliet on Monday, making three blast furnaces now operating there. The Gary merchant mills will go in operation for a workout trial this week, and the 60-in. plate mill at that place will be ready in 30 to 60 days.

Pig Iron.—The general tone of the market is very strong on all grades and particularly on Northern. One sale amounting to 10,000 tons of malleable iron for the last half has been made to a Milwaukee foundry by a furnace in the same city at a price in the neighborhood of \$16, at the furnace. There are numerous inquiries for both Northern and Southern pig iron, and the considerable tonnage placed has been made up of many small orders. No change is noted in the price of Southern iron, which remains at \$11, Birmingham, for the first half, \$11.25 for the third quarter and \$11.75 for the fourth quarter. Orders extending through the entire last half, however, are being accepted on the basis of \$11.50. On Northern pig iron, third quarter prices have advanced \$1 per ton, or to \$16.50, Chicago, for No. 2. It is stated that some sales have been made at this figure for the entire last half to favored customers, but sellers generally are restricting it to the third quarter and are indisposed to sell beyond that period. There is also an effort to secure if possible the maximum prices quoted below for the balance of the first half. It is interesting to note from conversations with buyers that present contracts for pig iron are made against actual orders for castings and not because of any general impression of expected advances in prices. A local iron house had been conducting an inquiry relative to the tonnage in foundry yards along with other questions, and has obtained information from 500 foundries to the effect that the supply of pig iron in their possession is sufficient for about 70 days' use. The following quotations are for March shipment, Chicago delivery:

THE IRON AND METAL MARKETS

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—There is so little new business coming forward that it is difficult to learn the temper of the local market. The best price the leading interest offers on open hearth forging billets is \$30.60, base, Chicago, but other sellers who do not make so great a discard are said to be quoting as low as \$28. Open hearth rerolling billets are quoted at \$25.60, base, Chicago, and wire rods at \$29, f.o.b. Pittsburgh.

Rails and Track Supplies.—Besides a good volume of track materials placed with local mills in the week under review, there were several thousand tons of standard section. The demand for light rails is quiet. Prices on track supplies are very firm, and an advance of \$1 a ton in spikes will be made March 1. Advances in bolts and nuts may follow later. We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 12Sc.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.20½c., Chicago.

Structural Material.—Good conditions prevail in all branches of the trade. Fabricators are specifying very freely and mills have ample shipping instructions on their books. Better prices are also reported for the fabricated material, one or two active bidders for business in this market having filled up and retired. Contracts let last week include the following: City of Rock Island, Ill., bridge spans, 220 tons, let to the Clinton Bridge & Iron Company, Clinton, Iowa; coal storage building for M. A. Hanna & Co., Superior, Wis., 396 tons, to the American Bridge Company; Western Electric Company buildings at Hawthorne, Ill., 208 tons, to the Hansell-Elcock Company, Chicago; Columbia Falls, Mont., two 220-ft. pin spans, 138 tons, to the American Bridge Company; Pier No. 8, United States Navy Yard, Bremerton, Wash., 200 tons, to the American Bridge Company; Pacific Telephone & Telegraph Company, office building at Spokane, Wash., 720 tons, to the American Bridge Company; Interurban terminal building, Columbus, Ohio, 385 tons, to the McMyler-Interstate Company, Cleveland; Bucyrus-Vulcan Company, buildings at Evansville, Ind., 800 tons. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Specifications are considerably in excess of mill capacity. Railroads are pressing for early deliveries, and from other consumptive lines requests are also being made for the anticipation of contract quotas. The 60-in. plate mill at Gary is expected to be in operation within 30 to 60 days, which will relieve the pressure. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Current demand is equal to about 70 per cent. of mill capacity. Store trade is more active. Prices continue to show a strengthening tendency. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The only improvement noted in soft steel bars is a betterment in the volume of specifications. But even this is not so pronounced as to be a special cause for congratulation. Mills have ample specifications on their books for immediate needs, but additions to these are of the hand-to-mouth variety. Inquiry for 1911-1912 requirements has not yet commenced, the low price of bar iron being considered a temporary deterrent in this direction. Bar iron has improved in tone somewhat, but is still selling several dollars a ton below steel bars. The contract awarded at St. Louis last week to the American Car & Foundry Company for 1000 refrigerator cars may aid in narrowing this difference. The improvement in scrap has also served to strengthen iron prices, the minimum of the latter being 50 cents higher than a week ago. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.27½c. to 1.32½c.; hard steel

bars rolled from old rails, 1.30c. to 1.35c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Specifications continue to pour in from every section of the Central, Southern and Western States for all kinds of wire products. That this buying movement is not speculative is evidenced by frequent wires for prompt shipment and by complaints of slow freight deliveries. Urgent demand by active consumers is also evident. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Cast Iron Pipe.—The demand continues active for all sizes of cast iron pipe. The city of Duluth, Minn., closed with the leading interest for 3000 tons of 6 to 20 in., and Rockford, Ill., for 700 tons. Gas companies are inquiring freely, as are numerous municipalities, but railroad buying is somewhat quiet. Prices continue firm, as follows, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—Speculative forces in recent control seem to have spent themselves against the adverse rate decisions of the Interstate Commerce Commission, and the certainty of continued advances in local scrap seems to have been temporarily averted. The entire scrap market is sentimentally weaker, and a few grades actually so. An optimistic opinion, however, seems to prevail, principally as a result of betterment in the bar and pig iron markets. Local scrap yards are comparatively bare, stocks being mainly in the hands of railroads. The Chicago, Burlington & Quincy Railroad list mentioned last week closed February 28, and the price received for 50 tons of car wheels mentioned was \$13.75 per ton. The Rock Island Railroad is out with a list closing May 2, which totals 3000 tons, and the Great Northern with one approximating 10,000 tons, which closes March 1. The principal item on the Great Northern list is 4700 tons of rerolling rails. The Santa Fe's 25,000-ton list is still unsold. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails.....	\$15.50 to \$16.00
Old steel rails, rerolling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	12.00 to 12.50
Frogs, switches and guards, cut apart.....	12.50 to 13.00
Shoveling steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	15.25 to 15.75
Steel angle bars.....	11.50 to 12.00
Iron car axles.....	19.25 to 19.75
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	12.75 to 13.25
No. 2 railroad wrought.....	11.75 to 12.25
Steel knuckles and couplers.....	11.50 to 12.00
Locomotive tires, smooth.....	17.50 to 18.00
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50
Cast and mixed borings.....	6.00 to 6.50
No. 1 busheling.....	10.25 to 10.75
No. 2 busheling.....	7.75 to 8.25
No. 1 boilers, cut to sheets and rigs.....	9.00 to 9.50
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.25 to 12.75
Stove plate and light cast scrap.....	10.50 to 11.00
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	9.00 to 9.50

Cincinnati

CINCINNATI, OHIO, February 28, 1911.

Pig Iron.—The opening of their books for the third quarter and last half delivery on the part of several furnaces has brought out a comparatively large number of inquiries and orders, especially for Southern foundry and Northern malleable. Consumers who have not covered for nearby requirements are also coming into the market. Jackson County high silicon is in better demand, and there is an improved inquiry for Northern foundry. Among recent sales of Southern foundry No. 2 is one for 2500 tons to a nearby agricultural manufacturer, with shipments scattered through the remainder of this year. For delivery from July to December, 1000 tons was sold a St. Louis firm at \$11.50, at furnace. A Michigan melter took 2000 tons on a basis of \$11 for the second quarter and \$11.50 for that shipped during the third quarter. For July, August and September 2000 tons changed hands at \$11.50, Birmingham, and there are numerous other lots running from 100 to 300 tons. It is stated that one or two Southern furnace interests have taken on some business for the third quarter based on \$11, but the quotable price for any deliveries after July 1 is \$11.50. For spot shipment there is no Southern foundry No. 2 obtainable below \$11. An Indiana company bought for last

THE IRON AND METAL MARKETS

half shipment 5000 tons of malleable for delivery from April to July inclusive. A Western manufacturer purchased 1000 tons of malleable at \$14, at furnace, and 500 tons was taken by an Indiana concern for July to September shipment, at \$14.25, Iron-ton. Among sales of Jackson County silvery is one for 500 tons to a southern Ohio consumer and 600 and 2000 tons, respectively, for Michigan purchasers for third quarter shipment. Northern foundry No. 2 is firm at \$14, Iron-ton. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

Coke.—There are three small inquiries out for furnace coke, two of them for 5000 tons each and one for 3000 tons, the latter recently mentioned. Some of this is wanted for spot shipment, but the bulk of it is for delivery the remainder of the year. Connellsville furnace coke, for spot shipment, shows a little improvement in price and is now quotable around \$1.60 to \$1.65 per net ton oven, with a few cents advance on contracts. Pocahontas and Wise County spot shipment prices are between \$1.65 and \$1.75, the latter figure representing also about the price for last half shipment. Foundry coke is very quiet, and prices are unchanged. For prompt shipment \$2 per net ton oven is quoted in all three districts, with an average advance of 25c. per ton asked on time contracts.

Finished Material.—The improvement previously noted in practically all lines continues, and while sales continue to be confined mostly to small tonnages, there have been a few nice sized contracts booked. The inquiry is good and both the agencies and warehousemen feel very much encouraged. The Pittsburgh mill price is 1.40c. on steel bars, plates, beams and channels, and the warehouse quotations are from 1.80c. to 1.90c.

Old Material.—There was a spurt of activity reported by several dealers lately, but the past two or three days has seen conditions fall back into the same old rut. There is, however, more scrap moving quietly than there was the latter part of last month. Quotations are unchanged and prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	5.00 to 5.50
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axes, net ton.....	17.50 to 18.50
Bushel sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton.....	11.00 to 11.50

Philadelphia

PHILADELPHIA, PA., February 28, 1911.

While the freight rate decision had a checking influence in some directions, the restriction in railroad buying will not, it is believed, be as extensive as was first anticipated. The hesitancy noted in the general iron and steel trade is considered of a sentimental nature, and will, it is thought by close observers of trade conditions, be of short duration, as the basic conditions underlying the trade are unchanged. The movement in both crude and finished materials has been well maintained. Pig iron sales have, if anything, slightly increased, and some makers have advanced quotations for foundry grades, although recently quoted prices can still be done. Basic iron has sold at an advance of 50c. above the recent market for prompt shipment, and a further advance of 50c. for third quarter delivery is asked. Sales of gray forge iron at higher figures are also reported. There has been a decidedly better run of business in structural material, plates continue fairly active, but billets and sheets have been in less urgent demand. Both refined iron and steel bars are in moderate demand, with prices firm. Coke remains quiet. While hesitancy is to be noted on the part of buyers of old material, the market is holding its own.

Iron Ore.—One cargo, about 5000 tons, of East Coast Spanish ore, for early delivery, has been sold at 7½c. per unit, on dock at this port, and some further business is under negotiation. Importations here during the week comprised one cargo of 6000 tons, valued at \$16,500.

Pig Iron.—While here and there a little hesitancy is

shown by buyers, due to the combined influences of the rate decisions and slightly higher quotations on the part of some producers, the general volume of business transacted in this district during the week has been fully maintained, and reports received from sellers show the aggregate sales to have been larger. There is a very good inquiry for various foundry grades, both for near future as well as extended delivery, and the recent minimum price level, \$15.50, offered, for No. 2 X foundry, has not been shaded, while sellers report less difficulty in obtaining the recent high range, \$15.75, on fair sales, and in a few instances \$16 continues to be obtained for odd lots from regular customers, who will not change their mixture for the difference in price, although \$16 is considered above the general market. Sales in lots of 200 to 1000 tons of standard brands for early delivery at both \$15.50 and \$15.75, delivered, for No. 2 X are reported, and, while consumers are in the market for more extended delivery, sellers still hold back on anything on which shipment extends beyond the first half of the year. Sales of moderate lots of No. 3 foundry are reported at \$15, delivered. A number of sellers refuse to shade \$15.25 for No. 2 plain, although \$15 can in some instances still be done. Malleable iron makers are making inquiries for both coke and charcoal malleable, but no sales have been reported. The movement in Virginia foundry irons has been more active; little business at \$13.50 for No. 2 X foundry for strictly second quarter has been done in this territory, as the majority of the sellers are still willing to accept \$13, furnace, for that grade, for delivery during the next three months, and have taken considerable business, mostly in small lots, at that basis. Quite a large tonnage of low grade Virginia foundry iron has been sold to the cast iron pipe makers in that district. There has also been some movement in low grade iron in this territory. One Delaware River foundry has purchased several thousand tons, while another is in the market for 4000 tons for delivery in March and April. Forge iron is stronger; a sale of 1000 tons at \$14, furnace, is reported, which would be equal to \$14.50 to \$14.75, delivered in this immediate vicinity. Further inquiry from basic consumers is to be noted, both for prompt, second and third quarter shipment. One sale of several thousand tons for early shipment is reported at \$15, delivered, while for extended shipment sellers appear to be holding firmly at \$15.50. Small sales of low phosphorus iron at the market are reported. Prices generally are firmer, producers and sellers apparently not being affected by the recent disturbing factor in the trade and are looking forward to a higher range of quotations. The following range about represents the market for prompt deliveries in buyers' yards in this district:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.00 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.50 to 14.75
Basic.....	15.00
Standard low phosphorus.....	21.00 to 21.50

Ferromanganese.—There is almost a total absence of inquiry from consumers in this district. Some sellers report a little demand from the West, but no sales are announced. Prices of 80 per cent. are nominally \$37.50, Baltimore, for prompt, and \$38 for forward shipment.

Billets.—Eastern producers note a slight falling off in the demand. Consumers show hesitancy in placing orders for any large quantities, confining their buying to small, prompt lots. Orders for forging billets continue of somewhat larger size than for rolling steel. Notwithstanding reports that prices can be shaded, Eastern mills report sales at the recent level, \$25.40, delivered in this district, for open hearth rolling billets, and \$30.40 for ordinary forging billets.

Plates.—Business continues fairly active, and, while there has been a little hesitancy shown by some consumers, mills on the average are getting enough new work, together with specifications on old contracts, to enable them to maintain their recent productive rate. As a rule orders continue small, but the number is sufficiently large to be quite encouraging. Prices are being fully maintained at 1.55c. minimum, for ordinary plates delivered in this vicinity, and sellers show no disposition to contract for extended shipment.

Structural Material.—More business of fair size has recently developed in building work, both in this and the nearby territory. The Baltimore Bridge Company has the contract for the Woodward Building in Washington, D. C., requiring 1500 tons of material. Bids against revised plans for the new building for the Baltimore Bargain House, original plans requiring 3000 tons, will be opened March 6, while bids for the Curtis Warehouse in this city, requiring 3000 tons, go in this week. There has also been a very fair share of miscellaneous work and mills look forward to more active conditions in the near future. Prices of plain shapes are being maintained at 1.55c., minimum, but com-

THE IRON AND METAL MARKETS

petition for fabricated work is reported as still being very sharp, resulting in comparatively low prices.

Sheets.—Buying has been less active. Eastern mills have in instances decreased their productive rate and depend on day to day orders to maintain their present rate of output. But little forward business is on makers' books and the outlook is hardly as encouraging as it was. Prices, however, are being fully maintained, the following range being named for early shipment by Eastern makers: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Not as much business is being offered and the trade feels the effect of the lessened buying. Mills, however, maintain recent gains and are holding prices firmly; in fact, specifications must be desirable to obtain the minimum rate, 1.37½c., delivered in this district, for refined iron bars, while small lots command 1.42½c. Steel bars are firm at 1.55c., delivered in this vicinity.

Coke.—While there is some little business pending, both in furnace and foundry grades, the market generally continues quiet. Sellers are not inclined to force business for forward delivery, and prices for prompt lots vary according to individual conditions. While \$2 to \$2.25 per net ton at oven represents the general market for foundry coke, as high as \$2.40 has been done on some brands. Furnace coke ranges from \$1.66 to \$2 at oven, dependent on quality, quantity and delivery. The following range represents the market per net ton for deliveries in this district:

Connellsville furnace coke.....	\$3.85 to \$4.25
Foundry coke.....	4.25 to 4.50
Mountain furnace coke.....	3.45 to 3.85
Foundry coke.....	3.85 to 4.10

Old Material.—The demand has developed irregularly. In some instances consumers are entirely unaffected by the rate decisions and continue to take scrap at recent quotations, but others show hesitancy and name lower offering prices, although no instance can be learned where business has been done under the recent market. The rapid advance in prices has, however, been checked. While \$15, delivered, was paid for No. 1 heavy melting steel in 1000-ton lots last week, consumers are in some cases not offering over \$14, but get no steel, as merchants pay higher prices, applying purchases against recent sales. The rolling mill grades do not seem to be as much affected as do the steel making grades of scrap, and moderate sales of the former continue to be made at recent prices. Quotations show but little change, the following range of the market about representing sellers' views for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 steel scrap.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	15.75 to 16.25
Low phosphorus.....	18.50 to 19.00
Old steel axles.....	21.00 to 21.50
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	18.50 to 19.00
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	17.50 to 18.00
Wrought iron pipe.....	14.00 to 14.50
No. 1 forge fire.....	12.5 to 12.75
No. 2 light iron.....	8.00 to 8.50*
Wrought turnings.....	10.00 to 10.50
Cast borings.....	9.50 to 10.00
Machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.50 to 13.00*
Grate bars.....	12.00 to 12.50
Stove plate.....	11.50 to 12.00

* Nominal.

Birmingham

BIRMINGHAM, ALA., February 27, 1911.

Pig Iron.—The volume of business in this market in the past week was more satisfactory than for any week since January 1, some 10,000 tons in comparatively small lots having been sold. The sales were in the main for delivery in the next 90 days, with one or more round lots for shipment over the first half. For shipment through the third quarter \$11.50 for No. 2 foundry has generally been named. Such a basis has not become effective, but \$11 per ton is now considered minimum for any delivery. Three of the leading producers would not accept third quarter shipments at lower than \$11.50 per ton, while two smaller concerns quote this figure for prompt or nearby shipments. The fact that practically all pig iron warrants have been withdrawn from the market is noteworthy, especially since no preparations are under way for any material increase in production. There is a pronounced shortage of high silicon iron and of grades below No. 4 foundry, with but little change in the percentage of such grades being produced. The sale of a small lot of gray forge for spot delivery was made last week at \$10, Birmingham, and mottled is sold at 25c. less. The most significant inquiry pending is for 2500 tons of Nos. 2 and 3 foundry for shipment over the next six months. This is for a stove manufacturer, and

will probably be placed this week. A manufacturer of pumps is in the market for 750 tons for spot shipment, and a pipe manufacturer recently asked for a round tonnage for shipment over the first half and through the third quarter, his offer representing a slight concession from \$11, Birmingham.

Cast Iron Pipe.—It is understood that a contract for 3500 tons of water pipe for Minneapolis, Minn., was placed with a Southern manufacturer last week. The figures have not been given out, neither has there been an announcement of the details in the contract for 3000 tons of water pipe understood to have been placed by the city of Duluth. The prices received for the small lots placed from time to time are very satisfactory, and in view of a stronger pig iron market an advance will no doubt be made. Only about 50 per cent. of the available producing capacity is now in operation, but those plants being operated are well supplied with orders. In a particular instance quotations on any additional tonnage are being made with some reluctance. We quote the following prices for water pipe per net ton, f.o.b. cars here, which are believed to correctly represent the market: 4 to 6 in., \$21; 8 to 12 in., \$20; over 12 in., average \$19, with \$1 per ton extra for gas pipe.

Old Material.—Dealers' quotations are unchanged, but the market is considerably more active. The increased operation at steel mills has brought about a better demand, and there is a considerably larger consumption by the small foundries. Recent additions to dealers' stocks are comparatively small. We quote asking prices as follows, per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axles.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

Buffalo

BUFFALO, N. Y., February 28, 1911.

Pig Iron.—A good volume of inquiry is reported and the trend of indications in this district seems to forecast a clearing up of the situation into a stronger market. About 15,000 tons of foundry grades, 12,000 tons of basic and some malleable are under negotiation. Some improvement in placement is noted, there being a steady run of small lot business in regular foundry grades and an increase in specialties, such as high phosphorus, high silicon and charcoal irons. There has also been increased buying of gray forge for rolling mill use. The New York State Steel Company's furnace, which has been out of blast for some time, was blown in again February 25. Price schedules remain about the same as last reported, with a continued tendency toward stiffening on the part of furnaces. Business for last half delivery is not being considered, except at a material advance over current quotations, furnaces being unwilling to name last half prices until the price of ore for the 1911 period of navigation is determined. For first half delivery we quote as follows, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.50 to \$15.00
No. 2 X foundry.....	14.25 to 14.75
No. 2 plain.....	13.75 to 14.25
No. 3 foundry.....	13.75 to 14.00
Gray forge.....	13.50 to 14.00
Malleable.....	14.25 to 14.75
Basic.....	14.50 to 15.00
Charcoal.....	17.25 to 18.00

Finished Iron and Steel.—Current orders and specifications for most classes of finished materials have shown good volume during the week, although in some quarters a disposition has developed to wait until it is known whether there will be a special session of Congress and the question of tariff revision opened up. Prior to this, there had been an increasing inclination among purchasers to close for forward requirements. Several inquiries from manufacturing consumers desiring to purchase for third and last quarters at current prices were turned down by the mills, which are not inclined to commit themselves beyond the first half of the year. Prices for current delivery are being well maintained. The demand for sheets, both black and galvanized, is active and prices are firm. A good demand is also noted for hoop and band steel. In the Canadian export trade there is every indication of a continued strong demand in all lines and contracts for good tonnages have been closed. There has been some inquiry for car wheels from traction companies, also for special work in the way of crossings for electric and steam railroad lines to be put under construction this spring and for other railroad and car materials. In fabricated structural lines the inquiry has been

THE IRON AND METAL MARKETS

light and confined to small jobs; but specifications on one or two local structures of considerable importance are expected to be out soon, including a 10-story building for light manufacturing purposes. The George Kellogg Structural Company, this city, was last week awarded the contract for fabrication and erection of the steel for a high school building at Ashtabula, Ohio, about 150 tons, and the Buffalo Structural Steel Company took a contract for steel for the first of the Buffalo Orphan Asylum buildings, 100 tons.

Old Material.—The market is less active than for a number of weeks. The slackening, which is believed to be only temporary, evidently being due to purchasers awaiting the outcome of the effect on the railroads of the recent freight rate decisions. Dealers appear to be of the opinion that the decisions will not materially affect business in general and that there will soon be a resumption of active demand, as the mills are continuing to take shipments freely on their present contracts. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$13.75 to \$14.25
Low phosphorus steel	18.00 to 18.50
No. 1 railroad wrought	15.75 to 16.25
No. 1 railroad and machinery cast scrap	14.75 to 15.25
Old steel axles	20.50 to 21.50
Old iron axles	24.00 to 25.00
Old car wheels	15.00 to 15.50
Railroad malleable	14.25 to 14.75
Boiler plate	11.75 to 12.25
Locomotive grate bars	11.75 to 12.25
Pipe	11.25 to 11.75
Wrought iron and soft steel turnings	7.50 to 8.00
Clean cast borings	7.00 to 7.25

St. Louis

ST. LOUIS, MO., February 27, 1911.

The past week has shown an improvement in the demand for all finished iron and steel products. The leading sales agencies for pig iron also find the situation improving, both as to the demand and tone of the market. Scrap iron and steel have advanced. The volume of general business is greater at St. Louis than for the same week last year. Coke is quiet and easier. The demand for metals is fairly good and for finished metals is reported excellent.

Pig Iron.—A good buying movement in pig iron is now on and sales aggregating around 12,000 tons are reported by the leading sales agencies in the past week. Merchant sellers also did a fair business in a jobbing way. There is only a limited volume of inquiry out, but this, as explained by one of the leading houses, is owing to the activity among the sellers, who in seeking new business have anticipated inquiries. There is practically no speculative buying, but it is noted that many buyers are desirous of making contracts to cover the remainder of the year, provided they can secure iron at but a small premium over nearby deliveries. But few furnaces are making prices for delivery beyond July 1, and where prices are quoted a premium is asked. Sales aggregating 7000 tons of Missouri basic for delivery over the second quarter are reported made to local steel foundries. An inquiry is out by an east side steel foundry for 6000 tons of basic for shipment over the last half. We quote Southern No. 2 foundry for shipment to July 1 at \$11, Birmingham; for shipment over the third quarter, \$11.25; for the last quarter, \$11.50, and this price is named for shipment over the last half. Northern No. 2 foundry is quoted at \$14, Iron-ton, for shipment over the remainder of the first half.

Coke.—Merchant sellers report a very good inquiry for coke from small consumers in St. Louis territory, but with the leading sales agencies the inquiry is light, only one office reporting any business of consequence for the past week. This sales agency mentions the sale of 2000 tons of foundry coke for future delivery. The tone of the market is weak. We quote for 72-hour standard Connellsville foundry \$2.15 to \$2.25 per net ton, at oven, for shipment over the remainder of the year. Special brands and carload lots are held 25c. to 50c. per ton higher.

Finished Iron and Steel.—The leading interest reports having closed a contract with the United Railway Company for requirements in rails for the current year; also has received instructions to make delivery of 4000 tons of rails by an outside railroad to apply on previous contract. The demand for structural material is fair, coming mainly from fabricators. Wagon and implement makers and jobbers are in the market for bars, and for track material the inquiry is good. A leading independent interest states that for all its lines the inquiry is increasing each week. Specifications in prior contracts are coming in freely.

Old Material.—Dealers state that the inquiry from consumers is gaining in volume, and prices are held higher in anticipation of a further improvement in the demand and in sympathy with the stronger market for iron, both crude and finished. The Central & Eastern Illinois Railroad is out

with a list of 400 tons and the St. Louis & San Francisco 250 tons. The situation on relaying rails is unchanged. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails	\$14.00 to \$14.50
Old steel rails, rerolling	13.00 to 13.50
Old steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard sections, subject to inspection	22.50 to 23.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.00 to 12.50

The following quotations are per net ton:

Iron fish plates	\$11.50 to 12.00
Iron car axles	19.00 to 19.50
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Railway springs	10.50 to 11.00
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	9.50 to 10.00
Mixed borings	5.00 to 5.50
No. 1 bushing	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	8.50 to 9.00
Pipes and flues	8.50 to 9.00
Railroad sheet and tank scrap	8.50 to 9.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	7.50 to 8.00

The American Refrigerator Transit Company, which is controlled by the Missouri Pacific and Wabash railroads, has placed with the American Car & Foundry Company a contract for 1000 refrigerator cars for delivery in May and June.

It is reported that the Springfield Traction Company and the Springfield Gas & Electric Company, Springfield, Mo., have been purchased by a syndicate of New York City capitalists. The purchasing syndicate, it is said, intends to carry out many improvements started by the old companies.

The contract for the building of the St. Louis-Kansas City Electric Railway has been awarded to the L. J. Smith Construction Company, Kansas City, Mo. The contract calls for the building of 140 miles of road at an approximate cost of \$10,000,000. Work will be started as soon as the weather permits. The officers of the company are D. C. Nevin, president; J. H. Berkshire, vice-president; B. L. Dorsey, second vice-president; H. E. Insley, secretary and auditor; H. V. Johnson, treasurer.

The contracts for the construction of four highway bridges over Cahokin Creek have been let by the East St. Louis Commissioners to the Joliet Bridge & Iron Company for \$54,000.

During 1910 the St. Louis industrial campaign established within the city's limits 135 manufactories.

San Francisco

SAN FRANCISCO, February 21, 1911.

The coast market shows considerable improvement. Orders are being closed on a number of the larger inquiries which have come up within the last two months, and merchants are inclined to enter the market in a larger way than for some time. There is still much room for improvement, but the movement in most departments is slightly larger than at this time last year, and the amount of business in prospect is steadily increasing. With the approach of spring and an excellent agricultural outlook, the small consuming trade through the country is reviving, and a number of orders are coming out from manufacturing concerns. The larger railroads are in the market for ties and lumber, and numerous orders for rails are coming from logging interests, while pipe is in active demand for both municipal and private water systems. A better movement of supplies to the oil fields is expected with the close of the rainy season.

Bars.—A more active business is noted in soft steel bars. The small trade has been the principal feature for some time and the reduction of jobbing prices is causing no hesitation on the part of buyers. Several of the larger consumers have placed orders recently and more business of an important nature is expected in the near future. There is still considerable foreign material in the market and the importers are getting more or less new business, but a larger proportion is going to domestic mills than last year. Purchases of stock are still rather small and local conditions are unsatisfactory to jobbers. Rainy weather has retarded the movement of reinforcing bars, but a good volume of new buying is in sight. The principal business in immediate prospect is for the temporary City Hall, though a fair tonnage is also required for concrete buildings in the Presidio. Jobbing prices are low, in sympathy with soft steel. Bars from store, San Francisco, are quoted at 2c. for both iron and steel.

Structural Material.—Fabricating orders placed the past week include some which have been expected for months. The Lowell High School has been refitted, the Pacific Roll-

THE IRON AND METAL MARKETS

ing Mill Company being the low bidder, though the award has not been announced. The Ralston Iron Works has taken about 450 tons for the Alcazar Theater. Milliken Bros., Inc., have taken several jobs, including about 700 tons for the Lincoln High School, Portland, Ore.; a similar amount for the Los Angeles County Hospital, and an order from the Southern Pacific Railroad for 300 power transmission poles, composed of latticed angles, aggregating some 600 tons, to be used in the Oakland system. No award has been made on the Masonic Temple. Considerable small work is being booked by local contractors. The coming month, however, should bring out quite a large tonnage. The temporary City Hall, on which bids will be taken in a few days, will require some 600 tons of steel columns. Bids have been taken on the Bultnomah Athletic Club at Portland, Ore., and a contract is expected next week on an addition to the court house in that city. The Oakland City Hall job will come up for figuring in a week or two. A steel or suspension bridge is to be built over the American River near Auburn, Cal., and there is some talk of a new bridge over the same stream at Sacramento. Numerous smaller bridge jobs are coming up in various places. Plans are being completed for a 12-story annex to the Hotel Portland, Portland, Ore. It is reported that plans will be drawn shortly for the United States Subtreasury Building in San Francisco. Some steel will be required for a Presbyterian church in this city. The city of Oakland is working on a project for a large municipal auditorium.

Rails.—A number of individual purchases recently closed are somewhat larger than the average, though the total movement has been quite satisfactory since the first of the year. While some of the interurban lines in the interior are coming into the market, a large proportion of the present business comes from logging interests in the North. Buyers show less tendency to delay, being anxious to have the material on the ground at the end of the rainy season. A number of new logging and electric lines are planned for construction the coming summer, and several fairly large inquiries have come up since the first of the month. A great deal of work is to be done in the next few years on the Southern Pacific electric roads in Los Angeles and vicinity.

Sheets.—The jobbing business continues active for this season and local merchants are taking more interest in the market. They are beginning to realize the underlying firmness and a number of large orders for stock have recently been placed. The city of Los Angeles is taking bids on a large lot of sheet steel pipe.

Plates.—Current business in tank plates remains about as before, but plans are being made for tank work which may require a heavy tonnage. The Independent Oil Producers' Agency is considering the construction of tanks with a capacity of 4,000,000 barrels, but has not decided whether to use steel or concrete. Plans are also being made for a number of new gas holders in various parts of the State.

Merchant Pipe.—There has been too much wet weather for much activity in the small trade, but under the conditions the distributive movement is fairly good. The usual spring demand is expected to show itself within the next month, and conditions are favorable both here and in the country. Jobbers are increasing their supplies to some extent, but not beyond the requirements of the immediate future. The city of San Jose, Cal., has been in the market for a lot of 2 and 3 in. black wrought iron pipe. Some new inquiry is coming from the oil fields and a fair movement to that territory is expected in another month, though the difficulty of delivery prevents much business at present.

Cast Iron Pipe.—Prices are held on a slightly higher level than for some time past, and as orders were placed for the most pressing needs before the advance there is less business than in January, though many small orders are still coming in. The requirements of the coming season are still very large in all the coast States, as several gas and water works projects are under way, in each of which a heavy tonnage will be used. Development will be especially active in southern California gas systems. The town of Madera, Cal., has received bids on 400 tons, and Oceanside, Cal., will open bids for 300 tons March 1. Large inquiries are coming from the Oregon Power Company, Portland, Ore., and the Everett Water Company and Everett Gas Company, Everett, Wash.

Pig Iron.—A local firm has received about 1400 tons of European foundry iron recently. Considerable Chinese iron has also arrived, but a large part of it was reshipped to Irondale, Wash., 10,000 tons of Chinese iron having been received there in the last six months. The local market is inactive, the bulk of the business being in small lots. There is considerable irregularity in prices, most importers asking \$23 for ordinary grades of English, Continental and Chinese foundry iron, though occasional offerings are reported at lower figures. There is no movement of domestic foundry iron of any consequence.

Old Material.—Most descriptions are quiet, though good wrought scrap finds a ready market and there is considerable inquiry for steel melting scrap. Some of the larger buyers, however, are slow in placing their contracts. A few dealers are accumulating considerable stock, but the tonnage on the market is much lighter than a few years ago. Cast scrap, except of the heaviest description, finds very little demand. The Sanitary Reduction Works is melting a large amount of scrap for sashweights. Quotations are as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12 to \$15; re-rolling rails, per net ton, \$15.

Metals.—The city of Portland, Ore., is in the market for 100 tons of lead. Shipments of copper from Puget Sound to Europe have been resumed, after an intermission of over a year. According to reports from Alaska, the output of copper in that territory will large this year.

Cleveland

CLEVELAND, OHIO, February 28, 1911.

Iron Ore.—Consumers are taking a little more interest in ore prices, now that inquiries are coming out for pig iron for the last half delivery, but there is no indication that ore sellers will take up the matter in the near future. Last year the price was established by one sale of a round tonnage and there is a possibility that the price may be fixed in a similar way this year without a meeting of the leading ore operators to discuss the situation. So far, in the few orders that have been placed, the buyers have agreed to pay whatever is later fixed as the market price. Shipments from the docks to furnace yards have improved slightly, but are still light. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—There is an improved demand for all grades and inquiries are now pending for quite a number of lots of foundry, basic and malleable grades ranging from 2000 to 5000 tons. The larger inquiries are mostly from Western points, and in most cases are for second and third quarter delivery. There is also an inquiry for 1000 tons of Bessemer for early shipment. The market in this immediate territory shows more activity in Southern as well as Northern foundry iron, and a fair volume of business is coming out in high silicon. Prices are firm at \$13.75 to \$14, Cleveland and Valley furnaces, for No. 2, most sellers holding to the latter price for delivery until July 1. Several furnaces are still declining to quote beyond that date. Others have taken on a limited tonnage for the last half at an advance of 50c. a ton over current prices. The sale of a small tonnage of Southern is reported at \$11.50, Birmingham, for No. 2 for the last half. We note the sale of two lots of No. 2 Southern, of 500 tons each, at \$11, Birmingham, for the first half. A local manufacturer of malleable castings is in the market for 2000 tons of malleable for its Indianapolis plant for the second quarter. A Syracuse, N. Y., implement maker wants 3000 tons of Southern analysis iron for the last half, and a Cleveland foundry has an inquiry for 1000 tons of Southern. From Mansfield, Ohio, there is an inquiry from a stove manufacturer for 800 to 1000 tons of Southern No. 2 soft for the last half, and another inquiry from the same city is for 300 to 400 tons each of Northern and Southern for the same delivery. Another Ohio consumer wants 800 tons, half Northern and half Southern, for the second and third quarter. For prompt shipment and the first half we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	\$14.00 to 14.25
Northern foundry, No. 3	14.00
Gray forge	13.75
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent silicon	18.50

Coke.—The market is inactive, but fairly firm. Practically the only sales reported are small lots of foundry grades for spot shipment. We quote standard Connellsville furnace coke at \$1.45 to \$1.50 per net ton, at oven, for spot shipment and \$1.60 to \$1.65 for the first half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the first half.

Finished Iron and Steel.—Orders in finished lines kept up the past week at about the same volume as in the previous two or three weeks, there being quite a satisfactory number of orders for small lots. When the freight rate decisions were first announced there appeared to be a general feeling that the expansion of business would be seriously checked. This has been followed, however, by the belief that at the most there will be only a temporary lull and that the removal of the uncertainty will eventually have a good effect on business conditions. So far the decisions have not resulted in any suspension or cancellation of orders in the local market. Some steel bar contracts are being placed

THE IRON AND METAL MARKETS

for delivery until July 1. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for structural material is improving. With the opening of the spring building season, local fabricators report that they have a good amount of small work on hand. Inquiries for buildings requiring a round tonnage are slow in coming out. The ore handling plant to be erected by the Pennsylvania Railroad in Cleveland, for which it is expected the contract will be placed shortly, will require about 2000 tons of steel. The demand for sheets is moderate and prices are firm. There is a fair demand for iron bars and prices are a little firmer. We quote iron bars at 1.30c. to 1.35c., at mill.

Old Material.—The market had been quite active for part of the past week, but quieted down somewhat after the rate decisions. Business, however, has been mostly between dealers, a few of whom made sales at high prices, but some tonnage was sold for shipment to outside mills. Local consumers, however, do not appear to have been affected by the flurry and decline to take on tonnage except at prices considerably lower than the present quotations. With the exception of an advance in iron rails and borings, prices are stationary. The Erie Railroad will close March 1 on its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	17.00 to 17.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	13.25 to 13.50
Old car wheels.....	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	7.00 to 7.50
Iron and steel turnings and drillings...	7.50 to 8.00
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	11.50 to 12.00
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	12.00 to 12.50
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

The German Iron Market

BERLIN, February 16, 1911.

Interest is concentrated on the meeting of the bar mills next week for the purpose of trying to perfect their organization. It appears more and more clear as the date draws near for the meeting that the biggest iron companies of the West are deeply interested in establishing a strong organization in the bar trade, since this is regarded a necessary step toward the renewal of the great Steel Works Union. The Gelsenkirchen Company, after Krupps the greatest iron and coal company of Germany, was not represented at last week's meeting, and this gave rise to a report that it was disposed to stay out of the combination; but it has just announced its purpose of being represented at next week's meeting. Hopes are, therefore, running high that the organization will be completed. It is understood that the form of contract drawn up for the organization provides for a drawback of 12 marks per ton on exported bars. It is added in the newspaper reports that this drawback is relied upon to throw a large volume of bars upon the foreign market and thus relieve the home trade.

The trade appears to be more than usually quiet this week, but the regular run of work and delivery of products are going on. In ores there are some large transactions under negotiation in the Siegen region. Ores on order are being called for with some urgency, and it is regarded as certain that consumption will increase within the next few months. The demand for foreign ores remains active. Pig iron continues to be bought for export, chiefly to Russia and Belgium, in considerable amounts. Some of the Siegen furnaces are now competing with the furnaces of the Essen Syndicate in hematite iron.

The mills buying steel material have begun to place contracts for their requirements for the June quarter, and are taking about the same amounts as for the current quarter. Export business in steel material continues good. The outlook for German business in England is reported to be better, since there is less competition from American and Belgian steel. Considerable amounts have been sold there for nearly four months ahead at about 86 marks for billets and 86 to 88 marks for muck bars. Considerable spring business in grooved and mining rails is reported, but steel rails of heavy sizes are quiet. The outlook for structural shapes has not improved, the promised revival of the building trade not yet having materialized.

Heavy plates for shipbuilding purposes are in good demand, and the shipyards continue to take in orders for steamers; nevertheless, it is reported that the heavy plate mills of the Siegen district have work for only about two weeks. Foreign buyers of heavy plates are trying to place orders pretty far ahead.

The value of Germany's exports of wire and wire products for last year is estimated at \$53,000,000, which compares with a little less than \$49,000,000 for 1909.

New York

NEW YORK, March 1, 1911.

Pig Iron.—The effort of producers to establish better prices may account in large part for the lighter buying of the past week. Two or three transactions of 1000 tons for delivery in the first half are reported, and one New Jersey company is in the market for 1000 tons for the same delivery. The most important sales of the week have been at the low prices recently reported, and the ability of the furnaces to secure a definite advance is now being determined. Virginia furnaces have taken some business in New England, including one lot of 1500 tons, following their recent considerable sales of pipe iron for Virginia consumption. New England buyers seem still to get the benefit of sharp competition, where more than ordinary lots for early use are involved. We quote, for tidewater delivery, as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$14.75 to \$15; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Steel Rails.—The order of the Harriman lines is the next large one expected by the rail mills. It may amount to 150,000 tons or more for new work and replacements. The Atlantic Coast Line and the Chesapeake & Ohio have made purchases of several thousand tons each, and the Carnegie Steel Company has a contract for 2000 tons for the Cleveland, Akron & Columbus Railroad. The Wichita & Midland Valley Railway in Kansas has bought 7600 tons of 75-lb. Bessemer rails, which will be rolled at South Chicago. For the Kyoto, Japan, street railroad the United States Steel Products Company has sold 5000 tons of girder rails. A Rio Janeiro street railroad line has bought 2000 tons from the same company. The Pan-American Transcontinental of Uruguay is in the market for 500 tons.

Finished Iron and Steel.—No improvement was evident last week, and February closed a somewhat poorer month than January in all lines except bar iron. For the latter orders have continued to come in the past week in good volume. The buying of bar iron has been quite active for several weeks, and the extremely low prices reported about the first of the year are no longer obtainable. Plates for this territory and this season of the year are doing fairly well, but structural material orders are very slow in coming out in spite of the fact that architects and engineers are unusually busy with building plans. The most important of pending matters closed last week was the contract for the shops for the Delaware & Hudson at Watervliet, N. Y., which went to the McClintic-Marshall Construction Company and will require between 3500 and 4000 tons. The same company obtained 450 tons for the Ontario & Western shops at Middletown, N. Y. The Baltimore Bridge Company has the 1500 tons for the Woodward building in Washington, D. C., for which F. T. Nesbitt & Co. are general contractors, and will use Bethlehem shapes for a part of the work. Ravitch Brothers have the general contract for the Fischel building, New York, which will require about 1000 tons. The American Bridge Company was awarded 800 tons for the addition to the Altman store, New York, and 140 tons in four small bridges for the Boston & Maine, and the Phoenix Bridge Company, 200 tons for three small bridges for the Reading & Columbia Railroad. Bids close March 2 on a hotel to be erected on Copley Square, Boston, 2700 tons. The Pennsylvania Lines West are in the market for about 2000 tons of bridge work for grade crossings at Cleveland. Prices are firm at the following quotations: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Ferroalloys.—The sale of about 6000 tons of ferrosilicon to a large Pittsburgh consumer by a company whose plant is on the American side of Niagara Falls at about \$54.50, Pittsburgh, has strengthened the market, and other holders of domestic ferrosilicon are asking \$55. Reports from England are that the foreign syndicate of ferrosilicon manufacturers has put the price up to £12 10s. a ton, for delivery over the last half, which, considering the duty and other costs of import, would bring the selling price here at about \$73, Pittsburgh. At present, however, there is some foreign ferrosilicon in the country that might be had from \$55 to \$56. Sellers of ferrosilicon in New York are expecting a higher market. The ferromanganese situation is quiet; a few small lots are being called for, and the usual quotation is from \$37.50 to \$38, Baltimore.

Cast Iron Pipe.—The city of New Brunswick, N. J., February 24, bought 230 tons of water pipe from an eastern Pennsylvania manufacturer at a low price. The city of New York will open bids to-day for a contractors' job which will require 350 tons. Norwich, Conn., March 2, will open

THE IRON AND METAL MARKETS

bids on 3000 tons of 16 to 24 in., the 24-in. comprising three miles. Hornell, N. Y., March 10, will award a contract for 1500 tons. The borough of Bristol, Pa., March 20, will open bids on about 10 miles of 4 to 14 in., and on a quantity of fire hydrants, stop valves, special castings, &c. Private buying appears to have subsided, as not much business of this character has been done in the past week. Competition continues keen, and prices are still under pressure. Carload lots of 6-in. can be had at \$21 to \$21.50 per net ton, tidewater.

Old Material.—The Isthmian Canal Commission, 24 State street, New York City, will open bids March 2 on 132 lb. of scrap wire screening, 6814 lb. of scrap rope and various quantities of rubber belting, hose, &c., now to be seen at the foot of Twelfth street, Hoboken, N. J., and will open bids March 4 on 4,442,500 lb. of scrap iron, to be delivered on cars at Port Richmond, Philadelphia, Pa. For a portion of the past week considerable activity prevailed in the local market. It was especially noteworthy in heavy melting steel scrap, of which several good sized lots were sold, among them being one of 2000 tons which brought \$13. This was the high point of the market. While values of other grades of old material were affected sympathetically by the strength of steel scrap, the volume of business was not large. The rolling mills were especially conspicuous for their inactivity in buying. Cast scrap has been in but light demand. While no requests have been received to postpone shipments, dealers and consumers are now quite generally waiting to see more clearly the effect of the freight rate decisions. Meanwhile prices are quite firmly held, as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$11.50	\$12.00
Heavy melting steel scrap.....	11.50	12.00
Relaying rails.....	20.50	21.00
Standard hammered iron car axles.....	23.50	24.00
Old steel car axles.....	17.00	17.50
No. 1 railroad wrought.....	14.00	14.50
Wrought iron track scrap.....	13.00	13.50
No. 1 yard wrought, long.....	13.00	13.50
No. 1 yard wrought, short.....	12.00	12.50
Light iron.....	5.50	6.00
Cast borings.....	6.50	7.00
Wrought turnings.....	6.50	7.00
Wrought pipe.....	10.50	11.00
Old car wheels.....	12.50	13.00
No. 1 heavy cast, broken up.....	12.50	13.00
Stove plate.....	10.00	10.50
Locomotive grate bars.....	9.50	10.00
Malleable cast.....	12.50	13.00

Metal Market

NEW YORK, March 1, 1911.

THE WEEK'S PRICES

Copper, New York.		Copper, New York.		Copper, New York.		Copper, New York.	
Feb.	Lake.	Electrolytic.	Tin.	New York.	Yok.	St. Louis.	St. Louis.
23.....	12.75	12.37½	43.75	4.42½	4.27½	5.60	5.45
24.....	12.75	12.37½	43.00	4.40	4.25	5.65	5.50
25.....	12.75	12.37½	43.00	4.40	4.25	5.65	5.50
26.....	12.75	12.37½	42.75	4.40	4.25	5.65	5.50
27.....	12.75	12.37½	43.00	4.40	4.25	5.65	5.50
28.....	12.75	12.37½	43.00	4.40	4.25	5.65	5.50
March 1.....	12.75	12.37½	42.25	4.40	4.25	5.70	5.55

Tin is 2½c. per lb. cheaper than it was a week ago, although it is still above the cost of import. Copper prices are weak. Spelter shows an advancing tendency. The antimony market is excited over the formation of a syndicate of foreign manufacturers and the price has advanced sharply.

Copper.—Lake copper is being slightly shaded in some quarters, but trading has been good and the market has an encouraging undertone. Electrolytic copper has been fairly firm, and there are reports of sales of about 10,000,000 lb. to various consumers. Many small consumers came into the market during the week and took up lots in quantities of 500,000 lb. or less. There are a few large inquiries out, but some of them are said to have been inspired with a desire to feel the market rather than through any inclination to buy. The leading sellers show no disposition to advance prices, and some of them are known to have made concessions on the usual market quotations, which are 12.75c. for lake and 13.37½c. for electrolytic. Some good round lots of electrolytic have been sold for delivery in the Naugatuck valley, 30 days cash, at 12.45c., which is practically 5 points less than the spot price in New York. The London market closed quiet this afternoon with spot copper selling at £54 13s. 9d., and futures at £55 7s. 6d. The sales amounted to 100 tons of spot and 300 tons of futures. The market closed steady. Exports of copper during February amounted to 18,992 tons.

Pig Tin.—Prophets who regularly forecast the movements of the pig tin market to their own satisfaction admit that they are much at sea over the situation. Although the metal is still selling at above the cost of importation, some small lots which have been in hiding the last two weeks have made their appearance, and the holders show considerable anxiety to sell. While stocks are none too plentiful in this

country as yet, many believe that there is relief in sight. The market has been very erratic, but the premiums on spot have gone lower from day to day. A fair business was done yesterday, when it was expected that prices would advance on the strength of higher London quotations. On the contrary, however, the market here went down. The steamer Minnetonka, which was due to arrive last Monday with a cargo of 625 tons, a large part of which had been previously contracted for, did not arrive until yesterday. During the week tin on board the steamer was sold at 25 to 75 points below the price of spot, and the delay in the arrival of the cargo helped to upset calculations. The steamer Mesaba is expected March 8 with 1175 tons, a great deal of which is still unsold, and those who have holdings on the vessel are offering March delivery at 1c. below the price of spot. The February statistics, compiled by C. Mayer, secretary of the New York Metal Exchange, show that deliveries into consumption in the United States during the month were large, amounting to 3800 tons. The world's visible supply of tin February 28 was 4028 tons below that of February 28, 1910. In New York pig tin was sold this afternoon for 42.25c. The London market closed weak to-day, with spot tin selling at £189 and futures at £184. The sales amounted to 40 tons of spot and 140 tons of futures.

Tin Plates.—Tin plates are steady and the demand is gradually increasing. The quotations on 100-lb. coke plates in New York is \$3.94. Foreign tin plates are slightly lower, the price at Swansea, Wales, being £14 10s. ½d.

Lead.—Lead has weakened, and the leading interest is practically out of the market, as it continues to hold its quotations at 4.50c., New York, fully 10 points above quotations made by outside dealers. A number of prominent sellers reduced their price from 4.42½c. to 4.40c. last Friday, and others promptly followed suit. The St. Louis market is weak and unsatisfactory. Plenty of lead can be had there at 4.25c. It is known that many consumers are in need of lead, and it will not be long until the usual spring demand from the lead pipe mills will develop. Contractors who use large quantities of lead are also expected to come into the market. Manufacturers of white lead have been buying so cautiously in the expectation of lower prices that there is likely to be a shortage in white lead in the near future. The market to-day is 4.40c., New York, and 4.25c., St. Louis.

Spelter.—Spelter has strengthened, although there is very little trading, both dealers and consumers showing reluctance to enter the market. Holders seem to feel that with a stronger iron and steel market spelter will advance. Early in the week consumers bought more freely than they have in some time, but when they found that quotations were steadily advancing they withdrew. Dealers are quoting 5.70c., New York, and 5.55c., St. Louis. The market shows signs of advancing further.

Antimony.—Excited trading in antimony was witnessed during the week because of reports confirming the formation of a syndicate of foreign producers. It is declared that the Cookson interest have engineered the deal, but as yet there are no indications that the makers of Hallett's have been included in the negotiations, although quotations on that grade have advanced 1c. a pound. Most of the transactions made during the week were between dealers, many of whom, in view of the neglected market, had let their stocks run down. It is generally believed that makers of the Chinese grades are not in the syndicate; in any event, Chinese antimony has become an important factor in the situation. Heretofore most of the Chinese brands were smelted in Europe, but of late the Chinese have added to their smelting capacity at home, and are shipping antimony direct to this country. The grade has been improved, and in line with the general advance in other brands the price is higher. Consumers seem to be well stocked, present trade being confined to the dealers. Cookson's is bringing 9.50c.; Hallett's, 9.25c., and Chinese and Hungarian grades, 9c. It is interesting to note that within the last two weeks Hallett's has advanced 1.50c. in value, while Chinese grades have gone up about 1.75c. Hallett's antimony seems to be more scarce than other brands and holders are reluctant to quote for delivery in April and May.

Old Metals.—The demand has fallen off and the market is dull. Dealers' selling prices are as follows:

	Cents
Copper, heavy cut and crucible.....	11.75 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, February 28.—Pig tin has suffered a slight reduction this week, while antimony and spelter have

enjoyed small advances. The copper market is unchanged. The only change in old metals is $\frac{1}{4}$ c. advance on copper bottoms. Chicago prices are as follows: Casting copper, $12\frac{1}{2}$ c.; lake, $12\frac{1}{4}$ c. to $12\frac{3}{4}$ c., in carloads for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; pig tin, carloads, 44c.; small lots, 46c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c. for 50-ton lots; in carloads, $2\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.55c. to 5.60c.; Cookson's antimony, $10\frac{1}{2}$ c., and other grades, $9\frac{1}{2}$ c. to 10c. in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. Old metals are quoted as follows in less than carload lots: Copper wire, crucible shapes, $12\frac{1}{2}$ c.; copper bottoms, $10\frac{1}{4}$ c.; copper clips, 12c.; red brass, $10\frac{1}{2}$ c.; yellow brass, 9c.; lead pipe, $4\frac{3}{4}$ c.; zinc, $4\frac{1}{4}$ c.; pewter No. 1, 29c.; tin foil, 34c.; block tin pipe, 37c.

Metals, St. Louis, February 27.—The market for lead is easy, quoted at 4.25c. to 4.27 $\frac{1}{2}$ c.; spelter is stronger, quoted at $5\frac{1}{2}$ c., both at East St. Louis. Zinc ore is held at \$39 to \$41 per ton, Joplin base. Tin is quoted at 44.35c.; antimony (Cookson's), 8.85c.; lake copper, 13.10c.; electrolytic, 12.85c., all at St. Louis. The demand for finished metals the past week was excellent, about 25 per cent. of which was from railroads. The leading manufacturer reports orders aggregating 225 tons in one day.

Notes on Prices

Rope.—The condition of the cordage market continues about as for some time, with possibly a slight improvement in demand. Quotations on Manila rope of the highest grade are referred to as being more nearly adhered to than in the past. The large trade is alluded to as swinging over to the best grade. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, $8\frac{3}{4}$ c. to $9\frac{1}{4}$ c. per pound; second grade Manila, $7\frac{3}{4}$ c. to $8\frac{1}{4}$ c. per pound; hardware grade, $7\frac{1}{4}$ c. to $7\frac{3}{4}$ c. per pound; pure sisal of the highest grade, $6\frac{3}{4}$ c. per pound; second grade, $6\frac{1}{4}$ c. per pound; rove jute rope, $\frac{1}{4}$ -in. and up, No. 1, $6\frac{1}{2}$ c. to 7c. per pound; No. 2, 6c. to $6\frac{1}{2}$ c. per pound.

White Lead in Oil.—The demand for white lead in oil is for the most part confined to immediate or nearby requirements, business lacking snap. Prices are sustained by the high price of linseed oil. For the best brands, New York quotations are as follows: In lots of 500 lb. and over, $7\frac{1}{2}$ c. in 100, 250 and 500 lb. kegs; $7\frac{3}{4}$ c. in 25 and 50 lb. kegs. In lots of less than 500 lb. the usual advance of $\frac{1}{2}$ c. is charged.

Linseed Oil.—Foreign markets are a little easier, which is given as one reason for consuming manufacturers deferring purchases. Considerable foreign linseed oil is said to be in New York. The holders are finding it difficult to dispose of it, as large buyers are not as familiar with foreign brands as they are with those of home crushers. For carload lots of raw domestic oil, 95 c. per gal. is quoted. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
State, raw.....	96
City, raw.....	96
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—The local turpentine market has been quiet with light demand, but firm at quoted prices. Cold weather at the producing sections in the South may retard the new crop to some extent. New York turpentine quotations in five-barrel lots are as follows:

	Cents.
In oil barrels.....	91
In machine barrels.....	91 $\frac{1}{2}$
Less than 5-bbl. lots, 1 cent advance per gallon.	

The high price of rosins is holding back purchases by consumers, but quotations are maintained owing to the strong position at Southern points. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$7.35 and grade D at \$7.70 in the New York market.

The Canada Ford Company, Montreal, calls attention to an error made in the reference to it on pages 508-9 of *The Iron Age* of February 23. The name of its works in England is the Brush Electrical Engineering Company, Ltd.

The Railway Steel Spring Company has elected the following directors: H. K. Devereaux, to succeed the late Julius E. French; George B. Motheral, to succeed Philo N. French; Charles Scott, Jr., to succeed George G. McMurtry.

E. E. Williams and H. C. Duncan, both of Huntington, W. Va., have been appointed receivers for the Independent Steel Company, Kenova, W. Va.

Iron and Industrial Stocks

NEW YORK, March 1, 1911.

The stock market had been steady, if not strong, under the rather confident belief that the Interstate Commerce Commission would grant the railroad companies permission to advance their rates for at least a part of the increase proposed. Therefore, when the decisions were announced last Thursday afternoon forbidding any advance, a severe shock was administered to security holders, and a sharp drop occurred on Friday. The decline did not run into a panic and some recovery was made on the day following, since which time prices have been steady. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref..	31 - 32	Railway Spr., com.	34 $\frac{1}{2}$ - 35
Beth. Steel, com....	30 - 32 $\frac{1}{2}$	Railway Spr., pref.	97 $\frac{1}{2}$ - 100
Beth. Steel, pref....	59 $\frac{1}{2}$ - 63	Republic, com....	32 $\frac{1}{2}$ - 34 $\frac{1}{2}$
Can. com.....	9 - 9 $\frac{1}{2}$	Republic, pref....	98 $\frac{1}{2}$ - 99
Can. pref.....	79 $\frac{1}{2}$ - 82 $\frac{1}{2}$	Sloss, com.....	52 - 53 $\frac{1}{2}$
Car & Fdry, com....	52 $\frac{1}{2}$ - 56 $\frac{1}{2}$	Sloss, pref.....	112 $\frac{1}{2}$ - 113
Car & Fdry, pref....	116 $\frac{1}{2}$	Pipe, com.....	18 - 19
Steel Foundries....	46 - 50	Pipe, pref.....	58 - 61
Colorado Fuel....	33 - 33 $\frac{3}{4}$	U. S. Steel, com....	76 $\frac{1}{2}$ - 81 $\frac{1}{2}$
General Electric....	152 - 154	U. S. Steel, pref....	117 $\frac{1}{2}$ - 119 $\frac{1}{2}$
Gr. N. ore cert....	58 $\frac{1}{2}$ - 62 $\frac{3}{4}$	Westinghouse Elec.	69 - 70 $\frac{1}{2}$
Int. Harv., com....	116 - 118 $\frac{1}{2}$	Va. I. C. & C.....	61 - 62
Int. Harv., pref....	122 $\frac{1}{2}$ - 123 $\frac{1}{2}$	Am. Ship, com....	75 - 75 $\frac{1}{2}$
Int. Pump, com....	40 - 43	Chl. Pneu. Tool....	52 $\frac{1}{2}$ - 55 $\frac{1}{2}$
Int. Pump, pref....	86 $\frac{1}{2}$ - 88 $\frac{3}{4}$	Cambria Steel....	45 - 48
Locomotive, com....	36 $\frac{1}{2}$ - 42	Lake Sup. Corp....	29 $\frac{1}{2}$ - 31
Locomotive, pref....	109 $\frac{1}{2}$	Pa. Steel, pref....	106 $\frac{1}{2}$
Nat. En. & St., com.	17 $\frac{1}{2}$ - 18	Warwick.....	11 $\frac{1}{2}$
Pressed St., com....	32 $\frac{3}{4}$ - 35 $\frac{1}{2}$	Crucible St., com..	13 $\frac{1}{2}$ - 14 $\frac{1}{2}$
Pressed St., pref....	98 - 99 $\frac{1}{4}$	Crucible St., pref..	79 $\frac{1}{2}$ - 81 $\frac{1}{2}$

Dividends.—The American Car & Foundry Company has declared the regular quarterly dividends of $\frac{1}{2}$ and 1 per cent. on the common and $\frac{1}{4}$ per cent. on the preferred stock. Both payable April 1.

The Barney & Smith Car Company has declared a dividend of 2 per cent. on the preferred stock, payable March 1. This the first dividend on the stock in over two years.

Stockholders of the Pittsburgh Valve, Foundry & Construction Company have ratified the rearrangement of its capital as proposed by the directors. The capital is \$1,750,000, all of one class, on which quarterly dividends of $\frac{1}{4}$ per cent. have been paid. This is to be divided into two classes of equal amounts, \$575,000 6 per cent. cumulative preferred and \$575,000 common. It is provided that the preferred can be retired in any part at any dividend period at 110, on three months' notice.

The Crucible Steel Company of America has declared a quarterly dividend of $\frac{1}{4}$ per cent. on its preferred stock, payable March 31.

The Standard Chain Company, Pittsburgh, has declared a dividend of 1 per cent. on the preferred stock, which is the first since January, 1908.

The Executive Committee of the National Metal Trades Association is preparing an elaborate programme for the thirteenth annual convention of the organization which will be held at the Hotel Astor, New York, April 12 and 13. The committee will meet April 11 to make final arrangements. The programme includes a banquet on the evening of the last day of the convention.

Newspaper statements relative to an attempt to wreck the new plant of the Iroquois Iron Company, at South Chicago, on the night of February 24, are without foundation. Two bombs were exploded in the vicinity, but injury was evidently not intended to this company's property, as the explosions took place on a railroad track at a considerable distance.

The Allen Engineering Company has its new plant near completion at Northeast Memphis and is installing downtown offices in the Exchange Building, Memphis, Tenn. A part of the plant is already running 22 hours a day. The company will devote its attention to transmission apparatus, irrigation pumps, lumber and dry goods trucks, special pattern work, &c.

The Alden-Sampson Mfg. Company has removed its entire business from Pittsfield, Mass., to Detroit, Mich. Communications intended for the company should be addressed to Oakland and Massachusetts avenues, Detroit.

The Pottstown Iron Company, Pottstown, Pa., at its recent annual meeting, re-elected the directors with the exception of Stephen Heckscher, who takes the place of his brother, the late Austin Heckscher.

German Steel Shipments Slightly Less.—The report of the German Steel Syndicate shows that the shipments of A products in January, 1911, were 404,479 tons, against 442,661 tons in December and 378,326 tons in January, 1910. The January shipments of semifinished steel were 140,253 tons, against 143,691 tons in December and 133,609 tons in January, 1910; of railroad material, 161,056 tons, against 193,324 tons in December and 134,290 tons in January, 1910; of structural shapes, 103,170 tons, against 105,646 tons in December and 110,427 tons in January, 1910.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., builder of induction drives, rolling mill machinery, chilled, sand and steel rolls, ingot molds and acid open hearth steel castings, is making extensive improvements in its plant. It has about completed a new erecting shop, 60 x 160 ft., parallel to its present shop, with room for a yard crane runway between the two buildings. It is installing another 25-ton acid open hearth furnace in its steel foundry, which will enable it to make steel castings up to 60 tons. These improvements, together with additional machine shop equipment, will give the company a considerable increase in the capacity of its foundry and machine shops.

The International Municipal Congress and Exposition of which Edward H. Allen, 1107-1108 Great Northern Building, Chicago, Ill., is general manager, has issued a pamphlet giving the special features of the congress and exposition, to be held in Chicago September 18 to 30, 1911. It will be held in the Coliseum, Armory and Exposition Grounds. The pamphlet presents a long list of subjects which have been decided upon for discussion and of exhibits which are desired. A diagram is included showing the floor plan, with the location and sizes of space designated.

The Brazilian Government, according to advices from Rio de Janeiro, has granted to native capitalists a 25-year concession for a 150,000-ton steel plant in the State of Minas Gaeras, with a subsidy of \$3 a ton on ingots, \$8 a ton on rails, plates and structural materials, and \$10 a ton on certain other material. The Government is pledged to take 50,000 tons annually, and is restricted from buying foreign made material, unless inspectors prove that the new plant does inferior work. The company will be exempted from duty on coal and coke, and will receive preferential on the Government railroads.

E. J. Deckman, Frick Building, Pittsburgh, Pa., representing the Hoopes Mfg. Company, Springfield, Ohio, has recently made installations as follows: A. M. Byers & Co., for installation in their Pittsburgh plant, a 3000-hp. exhaust steam feed water heater; Robinson Clay Products Company, Parrel, Ohio, an 800-hp. exhaust steam feed water heater; to Pittsburgh manufacturers, one 2-in., one 2½-in., two 4-in. and one 6-in. steam separators and one 3-in., one 7-in., one 8-in., one 14-in., one 18-in. and two 20-in. cast iron exhaust heads.

The Union Switch & Signal Company will hold its annual meeting in the Westinghouse Building, Pittsburgh, March 14, at which time the stockholders, in addition to electing directors, will take action on the authorization of the Board of Directors to set aside up to 2000 shares of the unissued common stock for the benefit of employees of the company (excluding directors and general officers), with a view to encourage them to become stockholders through such concession in price and such terms of payment as may seem expedient and equitable.

The Westinghouse Machine Company, East Pittsburgh, Pa., has recently received an order from the Northern Indiana Gas & Electric Company, Chesterton, Ill., for two 3750 kva. steam turbines, which will be connected to 750-kva., 13,200-volt, 3-phase, 60-cycle Westinghouse generators; also an order from the Bradford Electric Light & Power Company, Bradford, Pa., for a

17 x 26 in., 375-hp., horizontal gas engine, which will operate on natural gas and will be connected to a Westinghouse 250-kva., 2400-volt, 60-cycle, 3-phase generator.

The general offices of the Des Moines Bridge & Iron Works will shortly be moved from Des Moines, Iowa, to the Curry Building, Pittsburgh, but the Des Moines plant will not be abandoned, as stated in the daily press. Plans are being prepared by the company for considerable enlargements at its Neville Island plant, Pittsburgh, but these improvements will not be carried forward at present.

The Southworth Machine Company, manufacturer of specialties for printers, lithographers, bookbinders and kindred trades, Portland, Maine, has just moved into its large new factory, which is stated to be the first reinforced concrete factory in Portland. A note from the company states that in this building "a room is planned in which can be found *The Iron Age* and other helps for various heads of departments."

President James A. Campbell and other officials of the Youngstown Sheet & Tube Company, Youngstown, Ohio, recently visited and inspected the open hearth plant of the Lackawanna Steel Company at Buffalo, N. Y. Their company has had under consideration for some time the building of an open hearth steel plant at Youngstown, but definite plans have not yet been made, nor has an appropriation been set aside for it by the directors.

The New York office of the Richard D. Kimball Company has been moved from 437 Fifth avenue to 15-17 West Thirty-eighth street. The company also maintains an office at 6 Beacon street, Boston, Mass. It makes a specialty of the design of both steam and electric power plants, as well as the inspecting and the supervision of existing installations with a view to securing greater economy in operation.

The Sturtevant Mill Company, through its Pittsburgh office, has recently made sales of pulverizing and crushing machinery as follows: Carnegie Steel Company, a Newaygo separator; Republic Iron & Steel Company, a rotary crusher; National Malleable Castings Company, balanced rolls 36 x 16, weighing 40,000 lb.; Canton Fertilizer & Chemical Company, a ring roll mill and rotary crusher.

The Lackawanna Steel Company is having plans prepared for a hospital building which it will erect at Ellsworth, Pa., adjacent to the mines of the Ellsworth Coal Company, which it controls. The structure will be fire-proof, of brick and steel, 90 x 130 ft., two stories and basement, with concrete and tile floors, and will be equipped with all modern hospital conveniences and appliances.

The McGill Mfg. Company, electrical specialties, Valparaiso, Ind., is the new name of the Crescent Company. The main office of this company is at the factory, while it maintains a Chicago office as a sales office for the convenience of the local trade. The ownership of the company remains as before, there being no change either in the personnel or policy. J. H. McGill is president; H. W. Harrold, treasurer, and M. L. Sullivan, secretary.

The New York Shipbuilding Company, Camden, N. J., launched February 25 the steamship Suwanee, the first of two steel passenger and freight ships to be built for the Merchants & Miners' Transportation Company, Baltimore, Md. The Suwanee is 330 ft. long, 46-ft. beam, and will have a carrying capacity of 4200 tons.

W. N. Ritchey, Pittsburgh agent for the Bruce-Macbeth Engine Company, Cleveland, Ohio, has sold a 75-hp. gas engine to the Olympic Theater, Pittsburgh, to operate a 50-kw. generator.

Personal

Among notable passengers due to arrive in New York March 7, on the Kronprinz Wilhelm, is Richard Lindenberg, president of the Lindenberg Steel Works, Remscheid-Hasten, Germany. Mr. Lindenberg's name is well known in the United States, particularly in steel and metallurgical circles. It is due to his farsightedness and energy that the manufacture of steel in the electric furnace progressed from the experimental stage to an everyday business basis, and it may well be said that the development of the Heroult furnace system here also traces back to Mr. Lindenberg's works at Remscheid. During the last five years hundreds of engineers from this country have visited these mills, and have a vivid recollection of the hospitable reception tendered them, as well as the broad minded absence of secrecy and the readiness with which all technical and metallurgical information was given. Mr. Lindenberg has not been in the United States since 1904 and keenly desires to be informed as to the progress made during the intervening years, particularly in the manufacture of steel. In Mr. Lindenberg's company is Prof. F. R. Eichhoff, of the Royal Academy of Mining in Berlin. Prof. Eichhoff was formerly the managing expert of the Heroult-Lindenberg electric furnaces, and the rapid developments of electrometallurgical processes are greatly due to him. He left the Lindenberg Steel Works in response to the offer of a chair at the Berlin Academy as the successor to Dr. Wedding, the well-known instructor of metallurgy of iron. Professor Eichhoff is still working on the further development of electrometallurgical processes and problems for which purpose he had a 300-lb. electric furnace erected in his laboratory at the academy.

J. K. Dimmick, Philadelphia, was elected to succeed his son, Fred D. Dimmick, as president of the Dimmick Pipe Company at a meeting of the directors of the company held in Birmingham, Ala., February 21. Fred D. Dimmick, who has resided at Birmingham, will remove to Philadelphia to take charge of the business of J. K. Dimmick & Co. in that city, and J. K. Dimmick, who has heretofore been at Philadelphia, will remove to Birmingham. James H. Goodapple was elected secretary and treasurer of the company. The directors are James Bowron, Culpepper Exum, Erskine Ramsay, A. J. Goodwin, A. J. Brown, J. K. Dimmick and J. H. Goodapple.

Louis M. Zach has resigned his connection as mechanical engineer and expert with the Wells Brothers Company, Greenfield, Mass., and took up his new duties March 1 with Wickes Brothers, Saginaw, Mich., in a designing and estimating capacity.

G. W. Douglas, formerly a salesman in the pig iron department of Rogers, Brown & Co., is now with J. K. Dimmick & Co., Land Title Building, Philadelphia, Pa., as a salesman in their pig iron department.

Thomas C. Clarke, formerly general superintendent of the Lackawanna Iron & Steel Company, and who for the past three years has had charge of the steel sheet piling department of the Lackawanna Steel Company, has resigned to accept a position with the Lehigh Coke Company, which is about to build a large plant at South Bethlehem, Pa.

Hubert Merriweather, recently mine superintendent of the Juragua Iron Company, at Firmeza, Cuba, has been appointed general superintendent of the company, succeeding E. M. Holmes, deceased.

Andrew Carnegie has accepted an invitation of the trustees of Carnegie Institute of Pittsburgh to be their guest on Founder's Day, April 27.

J. C. Ward of Chicago, director and general manager in the United States for Edgar Allen & Co., Ltd., Sheffield, England, sailed February 22 for England, accompanied by Mrs. Ward. Before returning to Chicago Mr. Ward will visit India, China and Japan in connection with the company's foreign agencies, which are under his direct supervision. He will be absent a year.

Ebenezer Francis, superintendent of the steel foundry of the Pennsylvania Steel Company, Steelton, Pa., has resigned to accept the position of superintendent of the

Titan Steel Company, Newark, N. J. He has been connected with the former company for nine years and is particularly well known in connection with the manufacture of manganese steel. B. L. Weaver, who has been assistant superintendent of the frog and switch department of the Pennsylvania Steel Company, succeeds Mr. Francis as superintendent of the steel foundry.

W. C. Fownes, Jr., formerly connected with the Midland Steel Company, has been elected a member of the Board of Directors of the Crucible Steel Company of America, Pittsburgh, succeeding Reuben Miller, recently resigned.

Samuel H. Hart, who has been connected with the Louisville machine shops of the Louisville & Nashville Railroad, has been appointed superintendent of the Seattle Steel Company, Seattle, Wash.

W. E. Dodds, general manager of the Standard Cast Iron Pipe & Foundry Company, Bristol, Pa., has returned from a trip to the Mediterranean.

Charles E. Gates has been made general manager of the Shirley Radiator & Foundry Company, Shirley, Ind. He was for years general manager of the McElwaine-Richards plant at Noblesville, Ind. A. W. Clement has been appointed sales representative. He was formerly engineering salesman of the Ohio Brass Company, Mansfield, Ohio, and later sales manager for the Cleveland Bronze & Brass Works, Cleveland, Ohio. The Union Trust Company of Indianapolis, which is receiver for the plant and has operated it for a number of years, has purchased additional ground and has let the contract for additions to the plant that will double its capacity.

F. B. Nagle, formerly with the Republic Iron & Steel Company, and J. Raymond Young of the general office of the Carnegie Steel Company, Pittsburgh, are now located in Buffalo in the interest of the Carnegie Steel Company's Pittsburgh warehouse.

R. T. McCormick has been appointed manager of sales of the Petroleum Iron Works Company, builder of steel plate construction. This company has discontinued its Pittsburgh office, and will handle Pittsburgh territory business from its general offices at Sharon, Pa. Its branch offices located in various cities will be continued.

William E. Corey sails for Europe Saturday to be absent until the middle of July. On his return he will occupy offices in the Trinity Building, 111 Broadway, New York.

John S. Oursler, manager of the Sharon and New Castle plants of the Carnegie Steel Company, has returned from a trip to Europe.

Phillip E. Wright, sales agent for the Thomas Iron Company in Philadelphia territory, with offices in the Stephen Girard Building, Philadelphia, sailed last week for a short trip to Cuba.

W. H. McFadden, who retired March 1 as vice-president and general manager of Mackintosh, Hemphill & Co., Pittsburgh, was presented with a watch and fob by employees and office associates. Following the presentation Mr. McFadden gave to each of the employees a photograph of himself with his autograph.

D. B. McClelland, vice-president and treasurer of Spang, Chalfant & Co., Inc., Pittsburgh, returned last Saturday from a prolonged visit to the Pacific Coast.

Percival Roberts, Philadelphia, was elected a member of the Finance Committee of the United States Steel Corporation at the meeting of the directors February 28.

Geo. H. Adair, who has been manager for Fairbanks, Morse & Co. of their Seattle branch since it was started five years ago, has severed his connection with that concern, and with his father and others purchased the business of the Kilbourne & Clark Company, Seattle, Wash. The name has been changed to the Geo. B. Adair & Son Company, and among the first lines it selected was that of the Foos Gas Engine Company, Springfield, Ohio. With the large variety of types and sizes of the Foos line, this will be the strongest gas engine agency in that field, and will undoubtedly secure a considerable share of the business.

The Society of Chemical Industry

Treatment and Purification of Boiler Feed Water

A meeting of the New York section of the Society of Chemical Industry was held at the Chemists' Club, 105 West Fifty-fifth street, New York City, February 24. It was devoted to a consideration of papers relating to the treatment and purification of boiler feed water.

The first of these papers, entitled "A New Treatment of Water, Preventing Scale in Boilers Without the Use of Chemicals by the Aid of Aluminum Plates," was read by Thomas R. Duggan, London, England. This paper called attention to the cost of using chemicals for softening water for boiler purposes, and also pointed out the disadvantage of using chemicals in water which was to be used either for dyeing or brewing. The invention of Herr Brandes of a process employing a device known as the aluminator, which led to the softening of old scale and the formation of less new scale, was referred to. With this process the boiler feed water runs down an aluminum plate having a certain slope and various widths and depths of corrugations in its surface according to the character of the water to be treated.

The theory of the operation of the aluminator is that a current of electricity is induced by the passage of the water over this metallic plate and ionization of the salts present in the water takes place. To secure the best results the plate should be placed in a north and south direction and exposed to air. If placed in the opposite direction the water is subjected to electrolytic action, and if air and light are excluded from it it will not operate. The passage of the water over the plate abrades aluminum from the surface of the plate, although the amount lost in this way per 1000 gal. treated is very slight. This abraded aluminum is present in the water when it enters the boiler, either as the metal in a colloidal form or else as aluminum hydroxide, and acts as a nucleus for the salts and causes them to crystallize and drop to the bottom of the boiler instead of forming scale upon it. The principal advantages claimed by Mr. Duggan for the aluminator are the prevention of the formation of hard scale, an entirely automatic action, absence of all chemicals from the process, the metal of the boiler remains unaffected by the salts contained in the water, corrosion and pitting are avoided, fuel economy is secured, free steaming is obtained, no precipitation is required to get rid of the impurities and the whole is accomplished at a lower cost.

In response to questions from different members, the following points were brought out in the discussion: Alkaline waters can be easily treated, as can also acid ones, although those containing ferrous sulphate and other iron salts give trouble. In treating the latter class of water, a chamber filled with marble is placed at the inlet of the plate, but this complicates the process. The changes produced in the water by this treatment are physical and not chemical, the salts having identically the same chemical composition after treatment as before. The physical change that takes place prevents scale formation, although the result of the treatment can be shown only by precipitation after boiling and not by analysis. Aeration plays no part in the change occurring in the salts, and the corrugations are used to increase the surface of the plate as it is practically impossible to get a flat plate of sufficient width to give the same results.

The second paper, entitled "Boiler Water Purification," was presented by William M. Booth, who arbitrarily classified waters according to the quantity of dissolved solids present into soft, hard, saline, alkaline and acid waters. Several methods of purifying boiler waters, ranging from mechanical filtration to the use of boiler compounds and various combinations of thermo-physical, thermo-chemical and the electro-chemical methods, were discussed.

The McKinley Lock Nut Company, whose plant is located on South Eighteenth street, Pittsburgh, has decided to move its works to Washington, Pa.

Obituary

HARRY S. TAYLOR, president of the Michigan Malleable Iron Company, died in Detroit February 23, aged 54 years. He was connected with a number of industrial companies, among them the Monarch Steel Castings Company, Detroit Stoker & Foundry Company, American Motor Casting Company and Chalmers Detroit Motor Company.

DANIEL CONNELLY, president of the D. Connelly Boiler Works Company, Cleveland, Ohio, died February 27, from pneumonia following an operation for an affection of the stomach, aged 57 years. He was born on a farm near Cleveland, and at any early age learned the boilermaker's trade. His first business venture was under the name of the Cleveland Steam Boiler Works, which was succeeded by the present company. He leaves a widow, two daughters and two sons, both of the latter having been associated with him in the business. One son, Lawrence E. Connelly, is vice-president of the company, and the other son, William C. Connelly, is secretary-treasurer.

CHARLES CYRUS KING, chief engineer of the C. W. Hunt Company, died at West New Brighton, N. Y., January 13.

E. M. HOLMES, general superintendent of the Juragua Iron Company, at Firmeza, Cuba, died there February 11, of diabetes. He was previously assistant general superintendent of the Spanish-American Iron Company, at Daiquiri, Cuba. He was an associate member of the American Society of Civil Engineers, member of the American Institute of Mining Engineers, and member of the American Society of Engineering Contractors.

ANDREW MILLIKEN, formerly a prominent manufacturer of Youngstown, Ohio, died February 19, aged 80 years. He was for some years president of the Youngstown Car Mfg. Company. He leaves a widow and three children.

WILLIAM HARRISON CORBETT, Portland, Ore., died February 20. At the time of his death he was president of the Willamette Iron & Steel Works of that city, having taken charge of the establishment some years ago when it was run down very much. Mr. Corbett reorganized the business and made it one of the best in the city. He was born in Brooklyn, N. Y., in 1868. Serving his time as an apprentice machinist in New Haven, Conn., he entered the Stevens Institute of Technology, graduating in 1895 as the class valedictorian. He leaves a widow and two daughters.

Conditions in the Foundry Industry.—Hickman, Williams & Co., The Rookery, Chicago, are making a canvass of the foundry trade "to determine whether the present optimism which seems to be gaining in the foundry business and kindred lines is based on sound conditions, or whether it is sentimental." They have sent out blanks asking information as to pig iron stocks in foundry yards, and the number of days' supply at the present rate of consumption; whether business is good, normal or poor, and also soliciting the foundryman's opinion as to the outlook for 1911. The data obtained in response to these inquiries will be compiled and a condensed report on conditions in the foundry industry will be sent to all those who have furnished information.

The William Tod Company, Youngstown, Ohio, builder of engines and rolling mill equipment, has elected the following officers and directors: John Stambaugh, president; I. H. Reynolds, vice-president and general manager; H. J. Stambaugh, secretary and treasurer; L. A. Woodward, superintendent. Directors: John Stambaugh, I. H. Reynolds, Paul Jones, David Tod and H. H. Stambaugh.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, has elected the following directors: Henry M. Atwood, Joseph T. Speer, C. A. Anderson, S. G. Patterson, John McCaffrey, J. G. Anderson and William Price. Mr. Price, who is president of the Diamond National Bank, is the new director, taking the place of C. R. Rhodes, deceased.

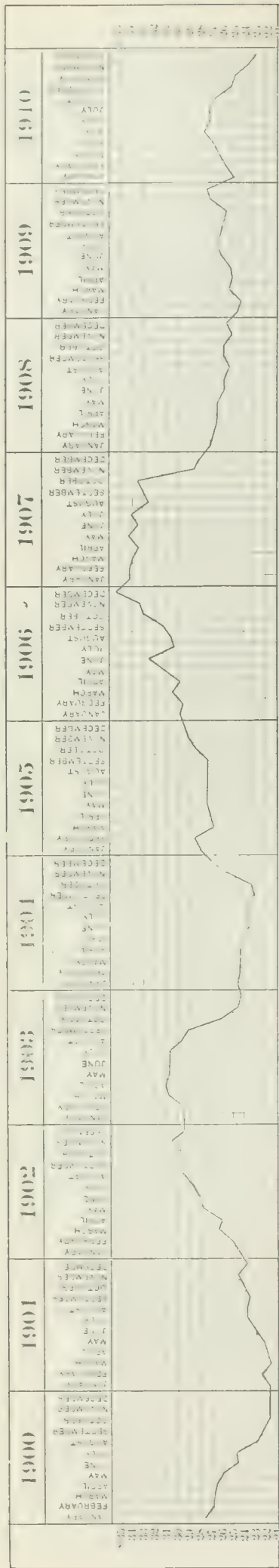


Diagram Showing the Course of Prices of Cast Iron Water Pipe for the Past Eleven Years. The Diagram is Based on the Price of 6 In. Pipe, Weighing 30 Lb. to the Foot, f.o.b. New York City, in Carload Lots, Per Net Ton of 2000 Lb.

Cast Iron Pipe Prices from 1900 to 1910

The accompanying diagram, furnished by Daniel Runkle of the Warren Foundry & Machine Company, 111 Broadway, New York, shows the course of prices for the past 11 years on 6-in. cast iron water pipe, 30 lb. per foot, f.o.b. New York City, in carload lots, per ton of 2000 lb. For those who desire the tabulation of prices on which this diagram is constructed, the following average monthly prices are presented:

	1900.	1901.	1902.	1903.	1904.	
January	\$27.50	\$21.75	\$24.50	\$29.25	\$24.50	
February	26.75	22.15	25.00	29.25	24.25	
March	26.75	21.50	26.25	30.75	24.25	
April	26.50	22.00	26.00	31.00	24.25	
May	26.00	22.25	27.75	30.75	24.00	
June	21.50	23.00	28.00	30.75	23.50	
July	24.75	23.75	28.50	30.75	23.50	
August	23.50	23.75	29.50	29.50	23.50	
September	22.25	23.50	29.50	29.00	23.00	
October	21.75	24.00	29.50	26.00	23.25	
November	21.75	24.50	30.75	24.50	25.00	
December	21.75	23.75	29.25	24.25	27.00	
	1905.	1906.	1907.	1908.	1909.	1910.
January	\$28.00	\$29.75	\$34.25	\$27.00	\$24.50	\$24.75
February	28.50	29.50	34.25	26.75	24.25	25.50
March	26.75	30.50	34.00	26.25	25.25	26.00
April	27.00	29.75	33.50	26.25	25.00	26.75
May	27.25	31.00	34.25	26.25	25.25	27.50
June	27.25	32.50	33.50	25.75	26.00	27.00
July	27.25	30.25	34.00	25.75	26.25	27.00
August	27.25	30.50	32.50	25.25	26.00	26.50
September	27.25	31.00	33.00	25.75	25.75	25.00
October	28.25	33.00	33.50	25.75	25.50	24.75
November	29.00	33.25	28.50	25.00	27.00	23.50
December	29.25	35.50	28.00	25.50	27.25	22.75

Officers of the American Institute of Mining Engineers

At the annual business meeting of the corporation of the American Institute of Mining Engineers, held at the office of the institute, 29 West Thirty-ninth street, New York, February 21, the following officers were elected: President, Charles Kirchhoff, New York; secretary, Dr. R. W. Raymond, New York; vice-presidents, S. B. Christy, Berkeley, Cal.; W. A. Lathrop, Philadelphia, and Gardner F. Williams, Washington, D. C.; councilors, A. E. Carlton, Cripple Creek, Colo.; W. J. Olcott, Duluth, Minn., and E. L. Young, New York. James Douglas, James F. Kemp and A. R. Ledoux were re-elected as directors. Mr. Kirchhoff becomes president of the institute for the second time, his first term being in 1898 and 1899.

For the one hundredth meeting of the institute, to be held in the Pennsylvania anthracite region, headquarters will be at the Glen Summit Springs Hotel, Glen Summit Springs, Luzerne County, near Wilkes-Barre. The first session will be held Tuesday evening, June 6, 1911. A meeting of the institute will be held at San Francisco in the early part of October, 1911. Following this meeting an excursion to Japan is contemplated, the party not to exceed 100 in number. The plan is to sail from San Francisco October 17 in the Pacific Mail steamship Manchuria, arriving at Yokohama November 3, and witnessing the festivities in Tokio connected with the birthday of the Mikado. The returning steamer leaves Yokohama November 21 and arrives at San Francisco December 7.

Railroad Equipment Orders.—The Nickel Plate Railroad is reported to have placed 25 locomotives with the American Locomotive Company. The Atlantic Coast Line is negotiating for 25 locomotives. The *Railway Age Gazette* notes that the Lackawanna is in the market for 35 locomotives and that the Chicago, Indianapolis & Louisville has ordered 10 from the American Locomotive Company. The Grand Rapids & Indiana is in the market for six locomotives. The Virginian Railroad has ordered 1000 steel hopper cars from the Pressed Steel Car Company, and the Boston & Maine, 88 passenger cars from the Laconia Car Company. The Richmond, Fredericksburg & Potomac is in the market for 100 freight cars, and the Great Northern for 35 passenger and baggage cars. The Escanaba & Lake Superior has ordered 15 flat cars.

Ferrosilicon Imports to the United States

The statistics below have recently become available, showing the imports of ferrosilicon into the United States from the time the Payne-Aldrich tariff went into effect up to September 30, 1910. Under the Dingley tariff, it will be recalled, ferrosilicon bore a duty of \$4 a ton, the same as that of pig iron. The new tariff made the duty on ferrosilicon containing not more than 15 per cent. of silicon \$5 a ton, and on ferrosilicon containing more than 15 per cent. of silicon 20 per cent. ad valorem. For a portion of the third quarter of 1909, or from July 1 to August 5, the old duty was in effect. In that time the importations of ferrosilicon of all classes were 3717 tons, advance purchases being made in view of the impending increase in duty. The figures given below for that quarter are for the portion between August 5 and September 30:

Imports of Ferrosilicon to the United States.—Gross Tons.		
Quarter ending—	15 per cent. silicon or less.	More than 15 per cent. silicon.
September 30, 1909.....	616	880
December 31, 1909.....	2,050	1,373
March 31, 1910.....	400	1,752
June 30, 1910.....	750	2,273
September 30, 1910.....	425	2,120
Totals.....	4,241	8,398

No doubt the importations, as shown by the above figures, particularly of ferrosilicon containing more than 15 per cent. silicon, are less than is commonly supposed in the trade. From the Canadian plant producing this metal the importations for a year or more have been at the rate of 4500 tons of 50 per cent. ferrosilicon a year. It would seem that the imports of European ferrosilicon, represented by the difference between 7518 tons, the total of imported ferrosilicon of high silicon content, in the year ending September 30, 1910, and the 4500 tons from Canada, are considerably less than our consumption of the European product in 12 months. There may have been some further accumulation, in anticipation of the higher tariff, prior to July 1, 1909.

Apollo Galvanized Sheets for Culverts

The American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa., has issued an attractive pamphlet entitled "Facts for the Culvert Manufacturer and User." The pamphlet sets forth the special qualifications of Apollo Best Bloom galvanized sheets for use in the manufacture of culverts. The statement is made that since the inception of the metal culvert industry Apollo sheets have been used for this purpose with perfect satisfaction. The company states that the long life of the sheets named "is due to the excellent coating of zinc and not to any special rust resisting properties of the base sheet, which in all instances, irrespective of the name selected for it, is corrodible; if this were not true the use of galvanized sheets would be discontinued in the interest of economy and black sheets substituted." The discussion of the character of stock used in the manufacture of sheets for culvert purposes is exceedingly interesting. The company guarantees these sheets to be equal from the standpoint of actual service and efficiency to any sheets, black or galvanized, now on the market for culvert purposes.

The Berger Mfg. Company, Canton, Ohio, held its annual meeting February 20. The Board of Directors was increased from five to seven members, William Langenbach and A. E. Hockwait being added. The old members re-elected are Ed. A. Langenbach, F. H. Snyder, F. A. Schwertner, R. H. Yancey and C. W. Kreig. Reports showed the past year to have been a very prosperous one. No extensive improvements are contemplated for the coming year.

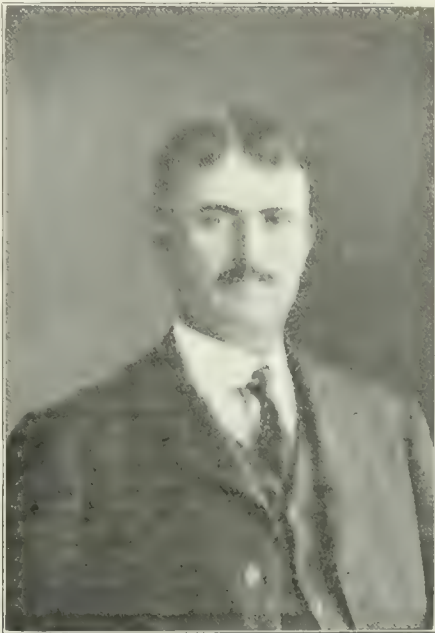
The Canton Art Metal Company, Canton, Ohio, re-elected the old directors at the annual meeting, February 20. The directors re-elected A. B. Clark, president; W. W. Clark, vice-president and secretary, and E. R. Eckis, treasurer.

John W. Dougherty

President of the Pittsburgh Crucible Steel Company

John W. Dougherty, general superintendent of the Steelton plant of the Pennsylvania Steel Company, has resigned his position to become second vice-president of the Crucible Steel Company of America and president of its newly acquired subsidiary, the Pittsburgh Crucible Steel Company. Mr. Dougherty will devote the major portion of his time to the erection and operation of the plant of the Pittsburgh Crucible Steel Company, at Midland, Pa. Before the recent purchase the Midland plant was owned by the Midland Steel Company. It now consists of one 450-ton blast furnace, coke ovens, &c., to which will be added in the near future an open hearth plant.

Mr. Dougherty is a graduate of Lehigh University, class of 1889, from the courses in mining, engineering and metallurgy. Immediately after graduation he went



JOHN W. DOUGHERTY.

with the Pennsylvania Steel Company in the open hearth department, and worked his way from stocker to melter. He was then transferred to the blast furnace department. In 1899 he was made assistant general superintendent, and in 1902 general superintendent. He assumed the duties of his new position with offices in the Oliver Building, Pittsburgh, March 1. Before leaving for Pittsburgh fellow members of the Harrisburg Club tendered him a farewell dinner. He will be succeeded as general superintendent of the Pennsylvania Steel Company by Frank D. Carney, who has been assistant general superintendent.

The Yale & Towne Mfg. Company, 9 Murray street, New York City, has been awarded the contract for installing a complete monorail overhead tramway system for the J. H. Ladew Company's new mammoth tannery, Plank road and Passaic River, Newark, N. J. The equipment comprises about three-quarters of a mile of I-beam, three traveling cranes, transfer devices, automatic fire door attachments, &c., and is notable as showing the tendency toward overhead or aerial transportation for the handling of materials in up-to-date manufacturing establishments.

The Reading Iron Company is preparing plans for a new mill to be located on South Seventh street, Reading, Pa., to take the place of Mill No. 5, which is to be abandoned. The building of the mill is temporarily held up to await action by the city regarding the construction of a storm water sewer in the vicinity.

The Lackawanna Steel Company

Production and Earnings in 1910

The report of President E. A. S. Clarke of the Lackawanna Steel Company for the year ending December 31, 1910, has just been issued. Referring to the properties of the company it says that the open hearth steel producing capacity was increased about 10 per cent. in the year by the construction of one 60-ton open hearth furnace. The new merchant bar mill, with an estimated annual capacity of 100,000 tons, is nearing completion. The \$10,000,000 first consolidated 5 per cent. mortgage gold bonds, convertible into common stock, and the \$10,000,000 gold debentures, convertible into 7 per cent preferred stock, which were issued and sold as of March 1, 1910, were listed on the New York stock exchange in the year, together with \$34,978,000 common stock. A feature of the financial statement is the charging off of the discount and commission on the above issues of bonds and debentures amounting to \$2,800,000. and the New York State tax and other expenses amounting to \$119,467.

In the past year \$750,000 of Ellsworth Collieries Company purchase money notes were paid and \$422,000 of bonds of subsidiary companies were redeemed. The company's working capital, as represented by the surplus of current assets over current liabilities, increased in the year by \$3,485,588, making a total of \$16,987,406. The sinking and reserve funds increased in the year by \$1,090,984 and now amount to \$6,814,218.

Concerning the business conditions of the year and the output of the company the report has the following:

"In the report sent you under date of March 9, 1910. it was stated that prices for your company's products for the year 1910 to that date were higher than those of 1909, and that the outlook for business during the year 1910 was favorable. A little later in the year there appeared indications that steel production was in excess of demand and prices began to decline, so that at the close of 1910 they were, in many lines, from \$3 to \$4 a ton lower than at the beginning of the year. Sales diminished after the middle of the year, and during the last quarter particularly were much reduced. Notwithstanding this, the shipments of the company's products, as shown below, are the largest of any year. The average price of \$28.92 per gross ton received by the company for its products in 1910 is \$1.25 per ton greater than the corresponding price of 1909, and the year shows a surplus earned over all charges and deductions, including liberal allowances for depreciation, of \$2,533,104.71, equivalent to about 7.25 per cent. on the company's outstanding capital stock. Compared with the results of the year 1907, which were the best in the company's previous operations, the shipments show an increase of 90,815 tons, or 9.15 per cent., and the earnings show an increase of \$89,258.55, or 3.65 per cent., notwithstanding the fact that the average prices of 1910 were \$4.36 per gross ton, or 13.10 per cent. less than those of 1907.

"The company received during 1910 from mines which it owns, or is interested in, and from other sources, 2,127,992 gross tons of iron ore, and produced a total of \$54,054 gross tons of coke and 1,008,796 gross tons of pig iron. It also produced 729,638 gross tons of Bessemer ingots and 412,032 gross tons of open hearth ingots, a total of 1,148,670 gross tons of steel ingots of all kinds. Shipments of products were as follows, all in gross tons, the figures for the years 1907, 1908 and 1909 being given for comparison:

	1910.	1909.	1908.	1907.
Standard rails.....	363,577	278,885	190,763	523,200
Light rails.....	26,288	33,787	20,253	48,777
Angle bars, fittings, &c..	60,071	43,901	16,719	33,510
Structural shapes.....	146,641	138,021	72,816	141,455
Plates.....	87,469	60,953	33,832	113,969
Merchant steel products...	67,150	41,607	17,921	61,343
Sheet bars, billets, &c....	159,761	201,455	104,108	61,157
Pig iron and miscellaneous	171,558	115,044	20,438	8,289

Totals.....1,082,515 913,653 476,850 991,700

The profit and loss account, the income account and the consolidated balance sheet December 31, 1910, are given herewith:

Profit and Loss Account.

Gross sales and earnings.....	\$31,302,759.95
Less manufacturing and producing costs and operating expenses.....	24,972,289.48
Total net income from manufacturing and operating.....	\$6,330,470.47
Dividends on investments in companies not controlled:	
Net income from property rented, &c.....	940,062.18
Commercial discount and interest.....	45,996.79
Total income.....	\$7,316,529.44
Deduct:	
Administrative, selling and general expenses, including taxes.....	\$754,713.60
New York State tax on mortgage securing first consolidated mortgage bonds, Series A, 5 per cent., and other expenses connected with the issue of these bonds and of debentures.....	119,467.65
	874,181.25
Net earnings for the year 1910.....	\$6,442,348.19

Income Account.

Total net earnings of all properties after deducting all expenses, including ordinary repairs and maintenance, but not renewal expenditures and other appropriations for the current year, which are deducted below.....	\$6,442,348.19
Deduct:	
Interest on bonds, debentures, gold notes and purchase money obligations—	
Lackawanna Steel Company.....	\$1,729,229.17
Subsidiary companies.....	377,815.01
	\$2,107,044.18
Rentals and royalties.....	115,296.83
	2,222,341.01
Balance.....	\$4,220,007.18
Less appropriations:	
For sinking funds on bonds and exhaustion of minerals.....	\$432,378.57
For depreciation and accruing renewals.....	1,254,523.90
	1,686,902.47
Profit for the year.....	\$2,533,104.71
Surplus at January 1, 1910.....	4,014,599.43
Surplus at December 31, 1910.....	\$6,547,704.14
Less special appropriation for entire discount and commission on first consolidated mortgage bonds and gold debentures issued.....	2,800,000.00
Net surplus at December 31, 1910.....	\$3,747,704.14

CONSOLIDATED BALANCE SHEET, DECEMBER 31, 1910.

Assets.

Cost of property, real estate, buildings, plant, machinery, &c.:	
As at December 31, 1909.....	\$63,105,915.82
Additions during 1910.....	1,050,846.87
	\$64,156,762.69
Investments in ore companies, &c.....	6,253,162.91
Cash in hands of trustees account of bond sinking fund.....	168,082.02
Stock of Lackawanna Steel Company in hands of trustees at par (deducted contra).....	\$250,000.00
Current assets:	
Inventories.....	\$12,215,069.13
Miscellaneous accounts receivable.....	1,056,670.19
Customers' accounts (less reserve).....	4,199,004.47
Notes receivable.....	526,382.09
Cash in banks and on hand.....	2,561,878.12
	20,559,004.00
Deferred charges.....	91,508.29
Total.....	\$91,228,519.91

Liabilities.

Common stock:	
Issued 349,780 shares of \$100 each.....	\$34,978,000.00
Less amount of stock in hands of trustees.....	250,000.00
	\$34,728,000.00
Capital stock of Lackawanna Iron & Steel Company not held by Lackawanna Steel Company, 220 shares.....	22,000.00
Bonded debt.	
Lackawanna Steel Company:	
First mortgage 5 per cent. bonds.....	\$15,000,000.00
First consolidated mortgage 5 per cent. bonds.....	10,000,000.00
	25,000,000.00
Subsidiary companies' bonds.....	7,345,000.00
Debentures—Five year 5 per cent. convertible gold debentures, due 1915.....	10,000,000.00
Current liabilities:	
Current accounts payable and payrolls.....	\$2,666,223.53
Bills payable.....	236,445.73
Taxes and interest accrued.....	668,928.06
	3,571,597.32
Sinking and reserve funds:	
Depreciation and replacement funds.....	\$4,179,914.61
Mines extinguishment and bond sinking funds.....	2,398,592.10
Contingent and miscellaneous operating funds.....	235,711.74
	6,814,218.45
Surplus:	
Balance as at December 31, 1909.....	\$4,014,599.43
Add profits for year 1910, as per income account.....	2,533,104.71
	\$6,547,704.14
Less total discount and commission on first consolidated mortgage bonds and gold debentures issued.....	2,800,000.00
	3,747,704.14
Total.....	\$91,228,519.91

The Hilger Revolving Grate Gas Producer

In the issue of *Stahl und Eisen* for January 19, an article by Dr. George Kassel describes the new Hilger gas producer, which was briefly referred to in *The Iron Age* of August 4, 1910, page 280. It differs from the existing types of revolving grate producers in several

tions to the right. It is described in some detail in the paper, and as may be seen in the illustration consists of a worm rack and a worm, which is driven by a ratchet wheel and a double pawl. Movement is given to the pawl by the eccentric rod shown on the right of the illustration. The action of the pawl is varied, according to the ash of the fuel. If too much ash is expelled the drive is so adjusted that the backward and forward motions are equal, and the resultant effect is nothing.

The ashes are removed by another patented device. A freely swinging shovel is hung in the ash pit, so that on the backward movement it swings freely over the ashes. On the forward movement, however, it locks. In this way no resistance is offered to the backward and forward movement.

The gas furnished by the producer is of uniformly high value, as is shown by the following results, which are averages, and not special analyses:

Gas Analyses.

	1.	2.	3.	4.
CO ₂ ...	3.20 to 3.60	3.40 to 4.00	3.00 to 4.00	3.20 to 3.50
O.....	0.15 to 0.44	0.20 to 0.40	0.00 to 0.50	0.10 to 0.20
CO.....	29.50 to 31.84	25.20 to 27.10	28.40 to 31.30	27.30 to 28.30
H.....	7.60 to 9.00	7.90 to 9.80	10.70 to 12.70	9.50 to 10.40
CH ₄ ...	2.31 to 3.32	3.20 to 3.80	2.10 to 3.30	52.50 to 52.80
N.....	53.57 to 56.77	57.10 to 58.60	50.10 to 52.00	54.10 to 56.70

No. 1 in the above table shows the results of four analyses of gas from an Upper Silesian coal with up to

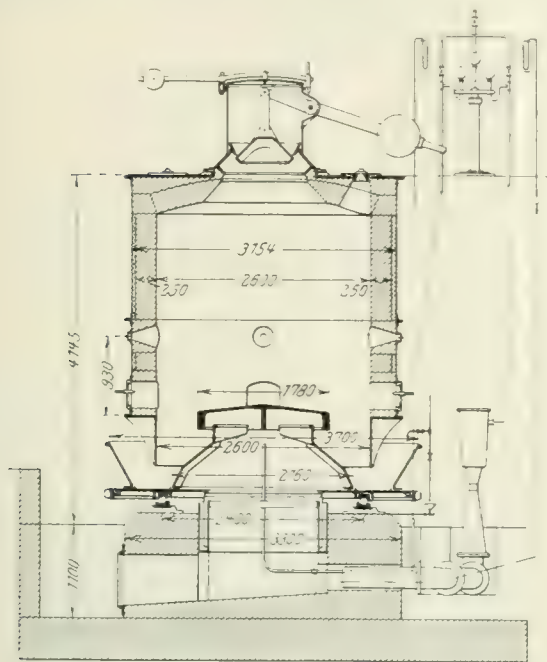


Fig. 1.—The Hilger Gas Producer.—Dimensions in Millimeters.

particulars. The lining is of fire brick throughout, no water cooled casing being used. This has been found to be entirely satisfactory except for certain coals, which carry a high percentage of alkalis. In these cases, a neutral or basic brick lining must be used in the fire zone.

The producer and the grate are shown in Figs. 1 and 2. The grate is seen to consist of an under part and a cap. Both parts form a star, from which the blast of steam and air can be evenly distributed over the whole cross section of the producer. The star shape is most marked in the cap, which fits into the ashes and by its movement affects the whole column of fuel. The grate is of very simple construction and is relatively low, so

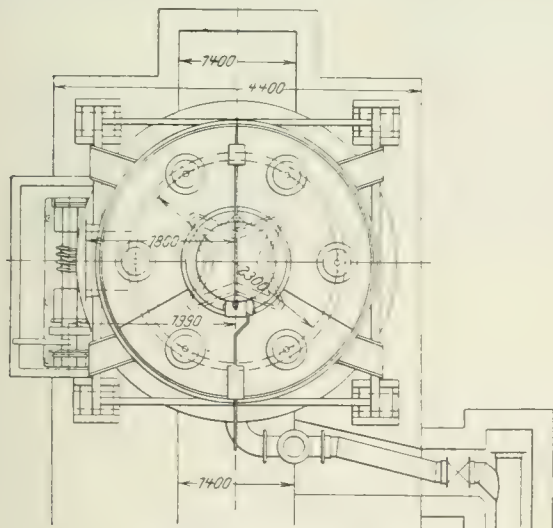


Fig. 2.—The Revolving Grate.

that the producer can be built from 2½ to 3 ft. shorter than revolving grate producers of other types. The drive of the grate and ash pit is another particular feature. The power requirements for one producer vary from ¾ to 1½ hp., according to the size.

The drive, Fig. 3, consists of a forward and backward motion, the effect of both being to give a gradual revolu-

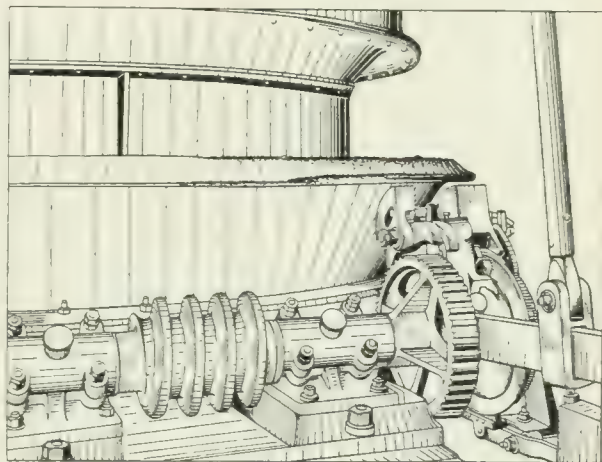


Fig. 3.—The Drive of the Grate.

tion to the right. It is described in some detail in the paper, and as may be seen in the illustration consists of a worm rack and a worm, which is driven by a ratchet wheel and a double pawl. Movement is given to the pawl by the eccentric rod shown on the right of the illustration. The action of the pawl is varied, according to the ash of the fuel. If too much ash is expelled the drive is so adjusted that the backward and forward motions are equal, and the resultant effect is nothing.

G. B. W.

"Building Up" Impurities in Steel.—In the article by A. H. Jameson on "Building Up" Impurities in Steel," page 480 in *The Iron Age* of February 23, the omission of one quantity in the computation for the percentage of phosphorus in the steel from the second blow calls for the printing of the figures below in their correct form:

$$\begin{aligned} 0.60 \times 0.06 &= 0.036; \\ 0.40 \times 0.07058824 &= 0.028235296; \\ 0.036 + 0.028235296 &= 0.064235296, \end{aligned}$$

and this divided by 0.85 = 0.0755709, the percentage of phosphorus in the steel from the second blow.

The Superior Iron Works Company, Superior, Wis., is completing a two-story addition to its plant, 42 x 120 ft., in which it is installing a complete equipment of tools for boiler and structural steel work.

The General Electric Turbine-Driven Compressor*

The First Installation of This Type of Blast Furnace Blowing Engine at the Oxford, N. J., Plant of the Empire Steel & Iron Company

BY RICHARD H. RICE, LYNN, MASS.†

[Great interest has been shown by blast furnace owners and engineers in this new American type of blowing engine; the operation of this installation at the Oxford Furnace has been watched keenly, and the details are now available for the first time. The General Electric Company is building at Lynn three units for the Iroquois Iron Company, Chicago, which follow in general principles the installation which is the subject of Mr. Rice's paper, but differ in many details of design. A three-stage compressor is employed and a five-stage turbine. The capacity is much larger, each compressor delivering 40,000 cu. ft. to the furnace, while the turbine is rated at 5000 hp. More intimate details are not yet available.—EDITOR.]

The General Electric Company recently put in operation at the Oxford, N. J., furnace plant of the Empire Iron & Steel Company, a turbine-driven air compressor for blowing the blast furnace, which is the first installa-

The six stages of the compressor are arranged in series, the air entering at the end nearest the turbine, and passing from the other end, where it enters the discharge pipe. The impeller wheels have no unbalanced

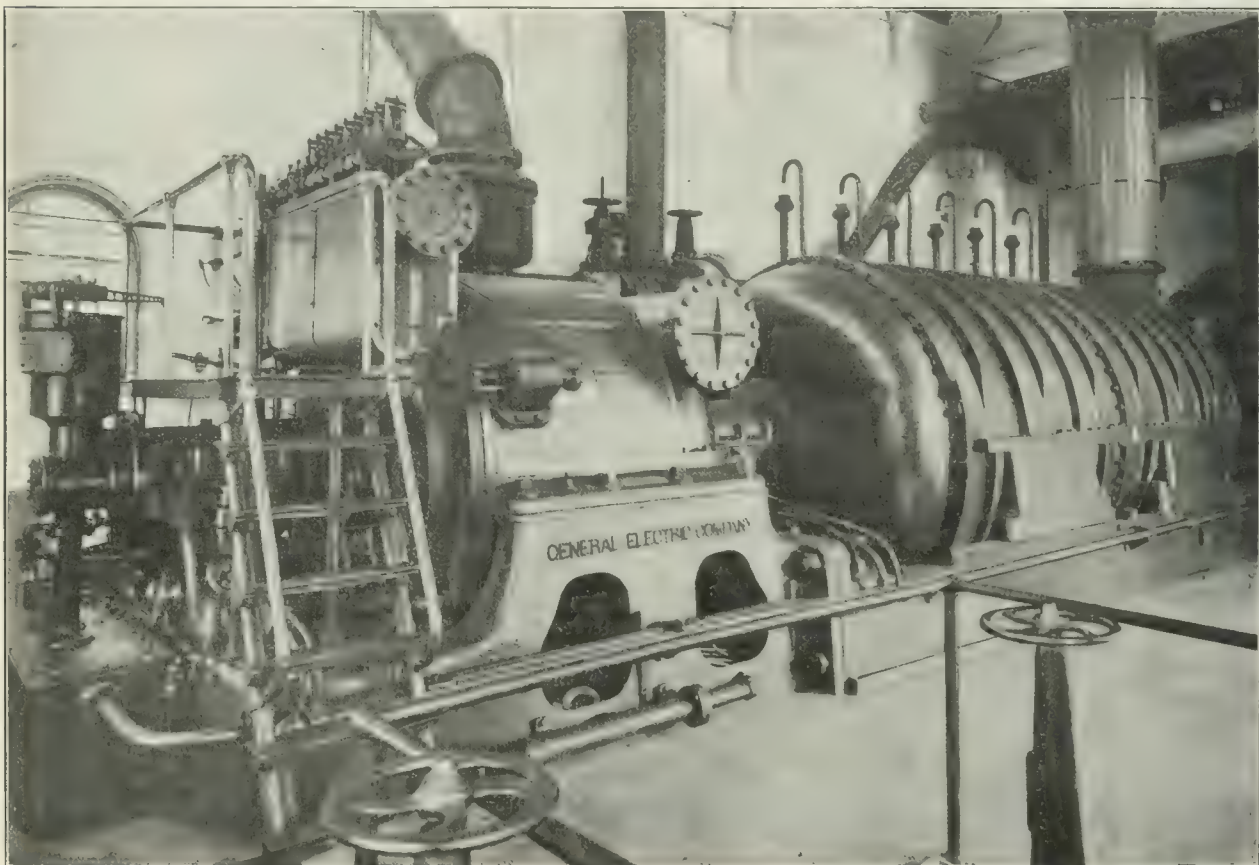


Fig. 1 A Steam Turbine Driven Air Compressor for Blast Furnace Blowing Built by the General Electric Company.

tion of this type of apparatus in this country. Fig. 1 is a view of installation, and Fig. 2 gives details of its placing, piping, &c. The unit consists of a six-stage compressor, operating at a normal speed of 1650 rev. per minute, and a directly connected four-stage Curtis steam turbine. The design is such that this normal speed produces a blast pressure of 15 lb. per sq. in. The unit, however, is designed to regulate the volume of air delivered per minute, so as to keep the rate of discharge constant at any value, within its capacity, determined by the furnace superintendent. The regulation is by speed variation, so that the machine is a constant volume, variable speed apparatus, and not a constant speed one as in other classes of blowing units.

* From a paper prepared for the American Society of Mechanical Engineers.

† Consulting engineer and head of the turbine shops of the General Electric Company's Lynn, Mass., works.

end thrust, so that the ordinary means used in the turbine for locating the rotating elements and preserving proper clearances are sufficient for the entire apparatus. The air is cooled during compression in each stage, and also in passing between stages by water chambers in the diaphragms, and this cooling maintains the compression approximately along the adiabatic line. No valves or rubbing surfaces are used in the compressor, and, as in the turbine, the rotating elements revolve freely with ample clearance, eliminating wear and deterioration; therefore, the efficiency of compression must remain constant.

Fortunately, both turbine and compressor attain their best efficiency at the same speed; therefore, the combination is a logical and efficient one. Further, under conditions usually met with in blast furnace operation involving pressures of blast of 10 to 20 lb. per sq. in.,

the efficiency remains sensibly the same. A curve of efficiency at varying volumes is given in Fig. 4 and above this has been drawn a curve of speeds and pressures which, taken in connection with the first named, shows the variations of efficiency with pressure at rated volume. This latter curve shows graphically the variation of pressure with change of speed, which is as the square

supporting air current decreases its sustaining power, more steam is admitted to the turbine and the speed is increased, resulting in increase of pressure, and this increased pressure re-establishes the desired flow of air. If too much air tends to flow into the furnace, the reverse takes place. In practice, the operation of this device is very regular and satisfactory. This method

of governing by the indications of a properly calibrated scale beam gives an entirely new instrument, which, in the hands of a skilled furnace manager, will undoubtedly enable improved results in furnace operation to be obtained, since an accurate knowledge of the amount of air supply is always at hand. Such accurate knowledge of the amount of air supply cannot be obtained from reciprocating blowing engines; since the expansion of air in clearance spaces causes an error increasing in amount as discharge pressure increases; also since any leakage increases with increase of discharge pressure; also because the slip is variable and uncertain. On the contrary, the air governor is unvarying in its action and will not change its indications with time, since wear and leakage are absent.

In normal blast furnace operation pressures may vary from 10 to 20 lb. per square inch. These pressures require speeds in the particular apparatus under description of about 1500 for 10 lb. pressure to 1800 rev. per min. for 20 lb..

of the speed; hence only moderate changes in speed are necessary to give considerable changes in pressure. These are utilized to maintain a constant rate of flow of air into the furnace, against the varying resistances that occur with clogging of tuyeres and changes in the size and composition of the charge, temperatures, &c.

The Constant Volume Governor

The means for regulating speed to maintain constant delivery of air are shown in Fig. 3. A steel disk, *d*, is

as appears on the curve, Fig. 4. The blast furnace operator therefore instructs the engineer operating the compressor not to maintain a certain number of revolutions, as is customary with reciprocating engines, but to set the scale beam weight for the required volume in cubic feet per minute. The calibration of the scale beam is determined during the shop test of the apparatus before shipment by accurate tests with standard orifices and Pitot tubes, and these graduations are accurate within about 2 per cent. A simple oil dashpot attached to the scale

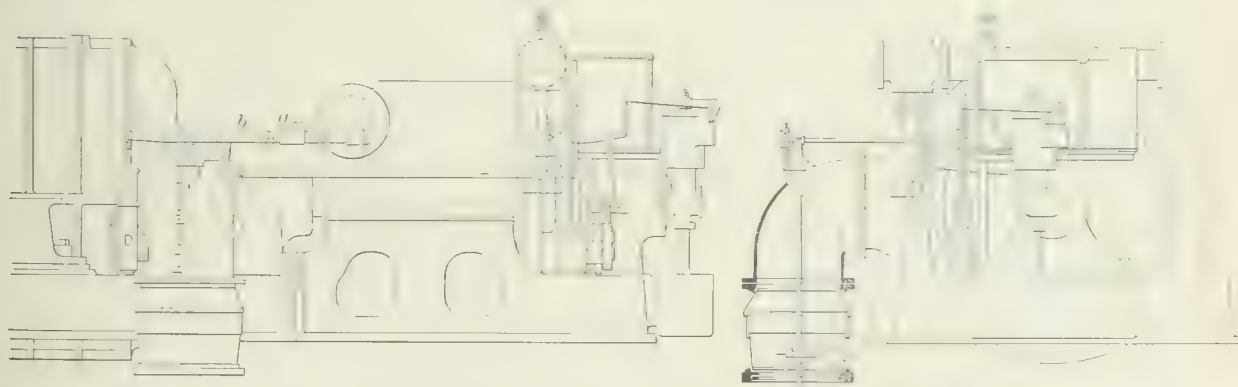


FIG. 3. DETAILS OF THE CONSTANT VOLUME GOVERNOR FOR THE TURBO COMPRESSOR

sustained on the inflowing air current within a conical enlargement, *c*, of the inlet pipe. By a sliding weight, *a*, the resistance of this float and displacement by the air current is adjusted in accordance with a scale on the scale beam *b*, which reads, in cubic feet per minute, volumes of free air. Setting this weight to correspond to the air delivery desired, causes the disk to assume a position which regulates the steam supply to the turbine to give the proper speed and blast pressure for that delivery. If the rate of air flow tends to decrease, the disk sinks to a lower point in the enlargement; since the

beam prevents any racing or undue fluctuations of speed.

A hand throttle valve in the main steam pipe is used to stop the compressor. At all other times, control is effected through the scale beam, with the throttle wide open. At times of checking the furnace, or casting, the weight *a* is moved to the extreme end of the scale beam, and still further decrease of speed and pressure is produced by adding an auxiliary weight at this end of the beam or by depressing it by hand. This manipulation is very simple in practice.

The air governor acts upon the pilot valve of the hy-

hydraulic valve gear commonly used on the larger Curtis turbines, through a system of floating levers, so that when the turbo-compressor nears the maximum speed for which it is designed, 1950 rev. per min., a centrifugal governor of the usual type comes into action and keeps the speed at this maximum as long as the resistance to air flow in the furnace or tuyeres exceeds that for which the air governor is set, 25 lb. per square inch. The air governor again comes into action immediately the furnace resistance decreases. Breaking or sticking of the governor mechanism, permitting the speed to exceed 1950 rev. per min., brings into action an entirely independent emergency governor and closes the main throttle valve.

Oil Supply

In all high speed apparatus certainty of oil supply is important, and particularly so in this service. In this unit three shaft bearings require automatic lubrication, which is furnished by a valveless gear pump, worm driven from the main shaft, which circulates oil under 15 to 25 lb. pressure. The same pump supplies oil to the hydraulic cylinder, which actuates the valve gear. The oil is returned from bearings and cylinder to a tank, where it is settled and strained before being used again. To guard against arrest of oil circulation an

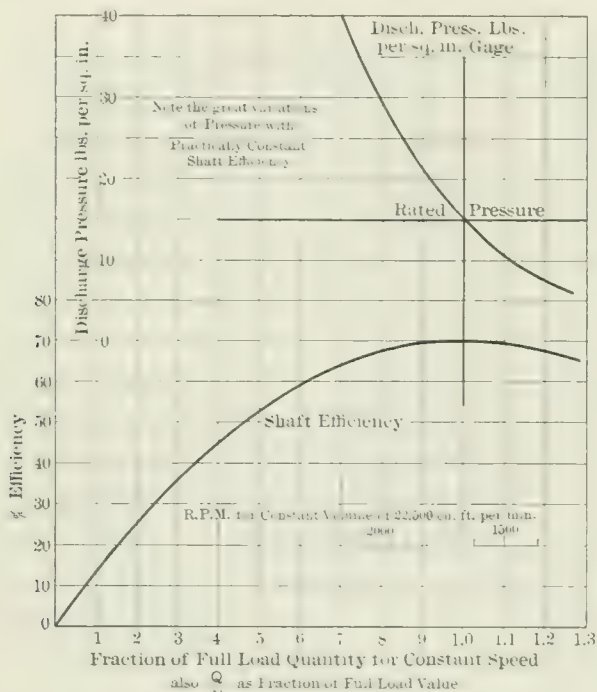


Fig. 4.—Efficiency and Pressure Curves with the Constant Volume Governor.

alarm blows a steam whistle when the oil pressure falls to 5 lb. per square inch. The oil is cooled in the bearings at the point where the heat is generated by water cooled coils embedded in the bearing linings.

The apparatus described uses high pressure steam, but the compressor is equally adapted to drive from low pressure turbines, and so affords means of increasing the efficiency of existing plants containing reciprocating blowing engines, by using their exhaust. The governing by volume of air discharged is equally applicable here and all its advantages can be obtained. Increased efficiency of the plant to the extent of 20 to 50 per cent. may be thus realized with a moderate addition to the cost of the plant.

This installation was put in operation March 8, 1910, and has been in continuous operation since. The machine was designed for a normal volume of 22,500 cu. ft. per minute, but it developed that only about 15,000 cu. ft. of air per minute is required by the furnace, and the pressure corresponding, under furnace conditions, ranged from 10 to 12 lb. Consequently pulsations occurred in the pressure line, the pressure fluctuating about 2 lb., and to overcome this pulsation it was necessary to throttle

the inlet opening. Fig. 5 shows the character and magnitude of these pulsations. Meantime a convenient butterfly valve throttling mechanism has been applied, which eliminates these pulsations without appreciable loss of efficiency.

Characteristics of the Turbo-Compressor

Pulsations in pressure are an inherent characteristic of all centrifugal blowing apparatus of similar construc-

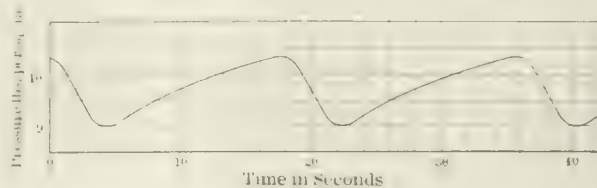


Fig. 5.—Pressure Curve During Pulsations.

tion and occur when the apparatus is operated at loads and pressures differing widely from those for which the apparatus is designed. At any given volume they occur at a certain critical pressure and at all higher pressures, but not at lower pressures. The critical pressure increases also as the volume increases and is slightly affected by the density of the air and the humidity. Fig. 6 gives the characteristic critical pressure-volume curve of this compressor.

The rate and extent of the pulsations are affected by the capacity of the discharge piping, stoves, &c., into which the air flows. The larger the capacity the longer the period or wave length and the greater the wave magnitude, and vice versa. The diagram in Fig. 5 shows the pressure waves from the machine installed at the Oxford Furnace. When tested in the shop, with very short piping of small capacity, the wave length was only a second or so, and of very small height.

The pulsations occur only when the loads are such that the characteristic pressure curve of the apparatus is rising with increase of volume or remains horizontal, and the effect of the throttling is to superpose a drooping pressure curve, falling with increasing volume, which alters the shape of the resultant pressure curve and makes it droop also. As the throttling required to entirely remove such pulsations is only a few inches of water, it has no appreciable effect on the efficiency of compression. Fig. 7 is the curve of pressure and volumes for this compressor at constant speed.

When this was written the blast pressure at the Oxford furnace varied from 10 to 14 lb. during the day

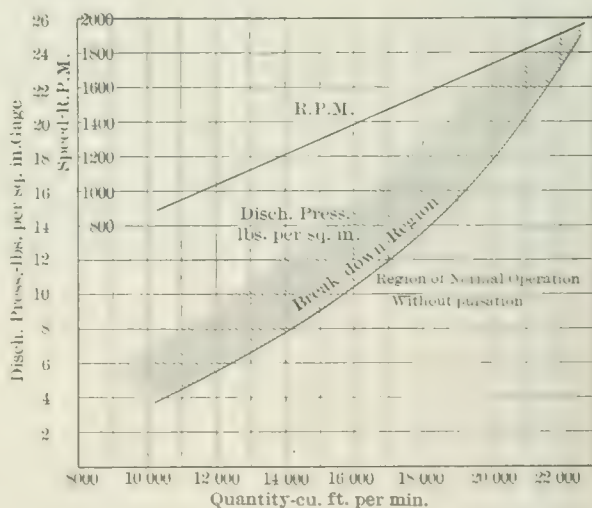


Fig. 6.—Critical Pressure-Volume Curve for the Turbo-Compressor.

with the volume constant at 16,000 cu. ft. per minute. The speed varied from 1500 to 1600 rev. per min. The steam pressure averaged 135 lb.

The figures in the following table are from a typical station log, showing the variation of pressure and volume during a 24-hr. period of operation:

Engine Room Report, Empire Steel & Iron Company, Oxford Furnace, N. J., March 17, 1910.

Time.	Volume Cubic feet.	Blast pressure. Pounds.	Revolutions per minute.	Steam pressure.	Vacuum.
1 a.m.	15,750	13	1,540	140	24
2 a.m.	15,750	12.5	1,490	135	25
3 a.m.	15,750	13.5	1,580	135	25
4 a.m.	15,750	12	1,510	140	24
5 a.m.	15,750	13.5	1,530	155	24
6 a.m.	15,750	13	1,550	150	25
7 a.m.	15,750	12.5	1,550	150	25
8 a.m.	15,750	12	1,490	120	HP.
9 a.m.	15,750	11.5	1,500	130	HP.
10 a.m.	15,750	13.5	1,580	160	26
11 a.m.	15,750	12.5	1,520	155	26
12 m.	15,750	12.5	1,500	150	26
1 p.m.	15,750	13	1,530	140	26
2 p.m.	15,750	12	1,490	150	26
3 p.m.	15,750	13	1,560	130	26
4 p.m.	15,750	13	1,560	150	26
5 p.m.	15,750	11	1,445	145	26
6 p.m.	15,750	11.5	1,450	130	26
7 p.m.	15,750	11	1,490	135	26
8 p.m.	15,750	13	1,510	140	26
9 p.m.	15,750	12.25	1,500	155	25.5
10 p.m.	15,750	11	1,383	140	25
11 p.m.	15,750	11.5	1,410	150	25.5
12 p.m.	15,750	11.5	1,440	145	25

In this 24 hours 208 tons of iron was made.

Comparison with Reciprocating Blowers

The apparatus previously used for blowing the furnace consisted of two vertical reciprocating blowing en-

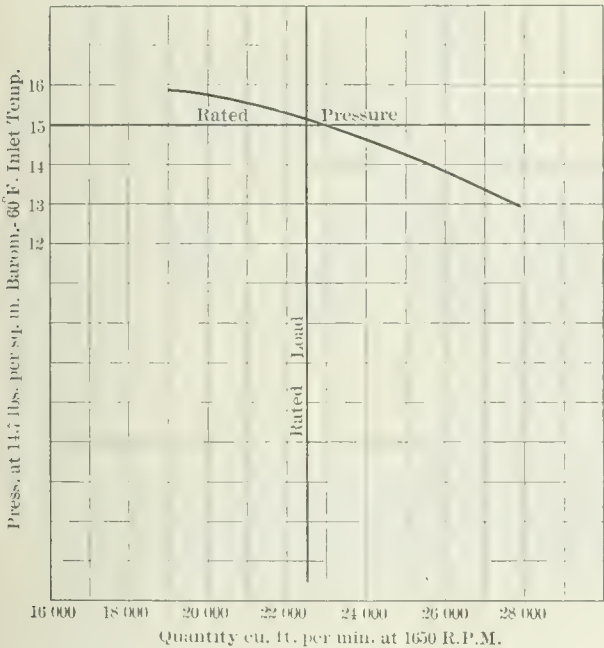


Fig. 7.—Pressure-Volume Curve at Constant Speed.

gines built by the I. P. Morris Company, each having 54-in. steam cylinders, 72-in. blowing cylinders and 72-in. stroke. For each engine the blowing cylinder displacement was 339 cu. ft. per revolution, and the maximum speed rating 30 rev. per min., giving 20,300 cu. ft. per minute total displacement. The actual maximum speed was 23 rev. per min., giving 15,000 cu. ft. per minute total displacement. The average blast pressure was 8 lb. Judging from the speed the volume used was about 14,500 cu. ft. The centrifugal compressor produced an immediate increase in the amount of iron melted by the furnace. The output went up from an average of 139 tons per 24 hours in February, 1910, to 176 tons in April, 1910, and the iron was found to be more uniform and the operation of the furnace was improved. A gradual increase in the amount of air has since taken place and the corresponding increase in pressure required to force the air through the furnace has been necessary as was to be expected. This increase of air has resulted in an increase in the production of the furnace from 176 tons on starting to the present average of about 190 tons. The machine is now operating with 16,000 cu. ft. of air, and the production of ore is 185 tons per 24-hour average. It is proposed to continue this increase to 200 tons per 24

hours, the limit of the charging apparatus. The dimensions of the furnace are: Diameter at bosh, 17 ft. 6 in.; at hearth, 11 ft.; at top throat, 12 ft.; high from hearth to dumping ring, 80 ft.

The condensing apparatus is of the barometric type, and the injection water is supplied by a turbo-driven centrifugal pump placed in the sub-basement. Initially, difficulty was had with the condensing water supply, which made it necessary to operate the machine for a considerable time noncondensing. Owing to unfamiliarity of the fireroom force with the new boilers which had been installed it was even necessary to operate with steam pressures as low as 60 lb. per square inch for various periods under which conditions the compressor operated with entire satisfaction.

Since the condensing apparatus is barometric, the machine operating far below its designed capacity and making an accurate boiler test to determine the amount of feed water difficult under present conditions, no tests have been made to determine the actual efficiency of the machine. It is, however, furnishing considerably more air than the old machines as evidenced by the greatly increased product of the furnace, and at the same time is operating with less boilers, and these boilers are more easily worked than when operating with the engines.

It is difficult to compare the performance of this type of blowing unit with reciprocating types either steam or gas driven, owing to absence of actual test figures; none have been published which permit of accurate and satisfactory comparison. From the results which have been obtained from all sources as to the actual performance of such machines and from actual experience with this machine and the sister machine installed at the Northern Iron Company in line with tests which have been made in the factory, the following conclusions seem correct in reference to this apparatus as compared with reciprocating engines for blowing blast furnaces: That the output of the furnace is increased on account of the greater steadiness of operation and more uniform conditions obtaining in the furnace; that the quality of the product is improved; that the steam consumption is equal to, or less than, that of the best compound engines blowing similar furnaces; that the engine room space occupied is only a fraction of that needed by reciprocating engines, either steam or gas, and that considering all factors, including consumption of fuel; cost of operation, oil and supplies, attendance, &c.; cost of buildings and foundations, interest on the investment; and cost of maintenance of plant, that the centrifugal compressor is a blowing apparatus which can be operated for a lower net cost than any other means of blowing furnaces.

The Optenberg Iron Works, Sheboygan, Wis., has completed and now has in operation an addition to accommodate its steam piping and fitting department. It has installed a 10-in. Cox pipe cutting and threading machine. The company states that it has experienced the most prosperous year in its history in Sheboygan. It recently equipped its plant with machinery for fabricating architectural and structural material for building purposes, besides doing an extensive business in constructing new boilers and tank work of all types, together with equipping complete steam power plants. The company also deals in second-hand boilers and engines, of which it carries a large stock.

The Mount Hood Railway & Power Company, Portland, Ore., has under construction a large auxiliary steam power plant of reinforced concrete and structural steel, resting on piling, work upon which is being rushed with the expectation of having it ready for operation by April 16. The plant is capable of developing 4000 hp., and is being constructed at a cost of \$125,000. The installation of the machinery is progressing simultaneously with the construction of the building, and until completion of the main hydroelectric plant, which the company is constructing, this station will be operated continuously.

Machine Molded Piano Plates

One of the Latest Foundry Achievements—The Casting In of Soft Steel Pins for Strings

By the use of a stripping plate molding machine in the manufacture of piano plates great economies have been effected by the W. W. Kimball Company, Chicago. Not only has the cost of molding been reduced practically two-thirds by the installation of this labor-saving device, but the drilling of the plates and the fitting of the string supporting pins have been eliminated. An improved product is another important benefit derived from the application of new methods to this practice, which has not kept pace with the advancement of other branches of the foundry industry in the last decade. That piano plates, owing to their size and skeleton-like frame could not be successfully machine molded was one of the traditions, which until recently retarded progress in this art. Foundrymen specializing in piano work were of the opinion that the castings were too thin and of too great area

of the process of molding, which will be referred to later.

Casting In the Steel Pins

One of the plates, with the steel pins cast in, is shown in Fig. 6. It will be noted that the casting is cored out to reduce its weight and is well ribbed to prevent warping. The plate is approximately 48 x 60 in., varies from 5-16 to $\frac{3}{8}$ in. in thickness and weighs 132 lb. For supporting the strings 135 pins are required, and it is still the customary practice on hand molded plates to drill holes into the castings into which the pins are driven. Unless the holes are accurately drilled the pins will not withstand the tension of the strings, and the proper spacing of these pins is also essential to correct stringing. The pins are made of soft steel, $\frac{5}{8}$ in. long,



Fig. 1.—A Floor of 60 Piano Plate Molds; the Stripping Plate Molding Machine on Which the Drags Are Made Is Shown in the Foreground at the Left and the Cope Stand at the Right.

to permit of molding the patterns on molding machines, and in addition, it was claimed that the skill of experienced molders was required to insure straight, flat castings.

Less than a year ago the Kimball Company decided to erect a foundry for the manufacture of these plates for use in its factory, which has an annual output of 18,000 pianos. The erection and equipment of the plant were placed in charge of Albert A. Huseby, an engineer connected with the company, who was without previous foundry experience. After a careful investigation of the established hand molding methods, he concluded that the application of molding machines to this class of work was not impossible, and, furthermore, he believed it entirely feasible to cast the pins into the plates, thus obviating subsequent drilling and fitting. For adapting a molding machine to this work he sought the aid of Henry E. Pridmore, molding machine manufacturer, Chicago. It was decided to mount the pattern on a stripping plate machine, as shown in Fig. 1, and after a number of molds were successfully made in this way, at a cost much less than by hand molding. Mr. Huseby developed a process for casting the pins into the plates and the equipment for accomplishing this was applied to the molding machine. Figs. 2 to 5 give various views

and are hammered over to prevent the strings from slipping off. By casting the pins in the plate all of the previous difficulties have been overcome, and in addition they are more firmly secured than when held by a driving fit.

In Figs. 2 and 3 the stripping plate machine on which the drag half of the mold is made is shown, the former illustrating the pattern in molding position, while the latter is a view of the pattern dropped away from the mold. The machine is one of the standard types built by Henry E. Pridmore, which has been equipped with the Huseby device for supporting the pins during the mold forming operation. Before ramming the mold the pins are set into openings drilled into the pattern, Fig. 2. The pins are supported and held in position in the pattern by stools or spindles, clearly shown in Fig. 3. The stools are 5-16 in. below the face of the pattern, and the pins extend this distance beyond the face of the mold, as in Fig. 4. After inserting the pins in the pattern, the drag flask is set in position on the machine, filled with sand and rammed. The sand is tamped firmly about the pins, as well as other parts of the pattern, and when stripping the pattern away from the mold the stools or spindles support the pins, which are embedded in the sand at their opposite ends. When the mold is



Fig. 2.—The Stripping Plate Machine on Which the Drag Is Molded; the Pins Are Shown Inserted in the Pattern.

lifted off the machine, Fig. 4, the pins are carried in the sand and project into the mold half their length, or 5-16 in. The cope half of the mold is rammed on a stand shown at the right in Fig. 1. After ramming, the mold is merely lifted off this stand, this operation being similar to that usually practiced when molding the drag halves of molds on stripping plate machines.

The pins are neither previously prepared nor coated, but are used in the polished condition in which they are received. No difficulty has been found from crystallization, as might have been expected when casting molten metal against so small a surface, and the pins are more firmly embedded in the iron than when driven into the drilled openings in the plate. To obviate the burning or crystallization of the pins, the gates have been so arranged that the ribs carrying the pins do not receive the first flow of hot metal, and the iron is poured at a slightly lower temperature than is customary for thin work. Six gates are provided, as shown in Fig. 2, and the mold is poured simultaneously from six ladles.

Increased Output with Molding Machines

When these plates are made by hand, the daily output of a molder and helper averages from six to seven



Fig. 3.—The Pattern Lowered, Showing the Pin-Supporting Stools or Spindles.

molds. By the use of the stripping plate machine and the cope stand five unskilled men produce 65 molds a day. A floor of 60 molds shortly before pouring off is shown in Fig. 1. To equal the record of machine molding would require 18 men—nine molders and nine helpers—when molding by hand. In addition to performing all of the necessary molding operations the five men set the pins, which is not required of the floor molders. To expedite the machine work special cast iron flasks have been provided, which carry the minimum amount of sand necessary for making the molds. The flasks are lifted off the stripping plate machine and are rolled over by an air hoist, which is also used for closing the molds. As the foundry has a cement floor, a 1-in. bed of sand is prepared for each mold. A frame, slightly larger than the flask, is used for making the bed, and the surplus sand is removed with a rake. The duties of each of the crew of five men are clearly defined, and the work is specialized as much as possible. Two of the operators are assigned to the drag machine and two to the cope stand, while the fifth man of the gang makes the bed, sets cores and closes and clamps the molds. In making these molds a large quantity of sand is handled daily by



Fig. 4.—Drag Half of the Mold, Showing the Pins in the Sand.

the molding machine crew. One of the heaps in the morning, before the commencement of molding operations, is shown at the left, Fig. 5.

A stripping plate molding machine and cope stand for molding larger plates, 50 x 60 in., and weighing 183 lb., are now being built by Henry E. Pridmore. The machine will be similarly equipped for casting the pins in the plate, but in addition to the 135 hitch pins in the smaller casting 45 bridge pins must be inserted.

Melting and Finishing Departments

The foundry built by the W. W. Kimball Company for the exclusive manufacture of piano plates is 80 x 220 ft., and in addition to the molding floor contains a cleaning room equipped with a sand blast and a finishing department in which the plates are japanned and varnished. The iron is melted in a 55-in. cupola lined to 37 in., installed by the Whiting Foundry Equipment Company, Harvey, Ill., and the blast is furnished by a blower built by the P. H. & F. M. Roots Company, Connersville, Ind. The blast is delivered into two branch pipes, the one con-



Fig. 5.—The Cope Stand Is Shown in the Foreground and in the Background a Part of One of the Sand Heaps Before Beginning Molding Operations.

necting with the wind belt of the cupola and the other extending outside of the building. Each pipe is provided with a gate to regulate or shut off the blast, and if too much air is being delivered into the cupola the gate in the other pipe is opened, thereby reducing the volume of air to the furnace. This arrangement permits of the easy regulation of the blast, which is under the control of the melter at all times. No special iron mixture is

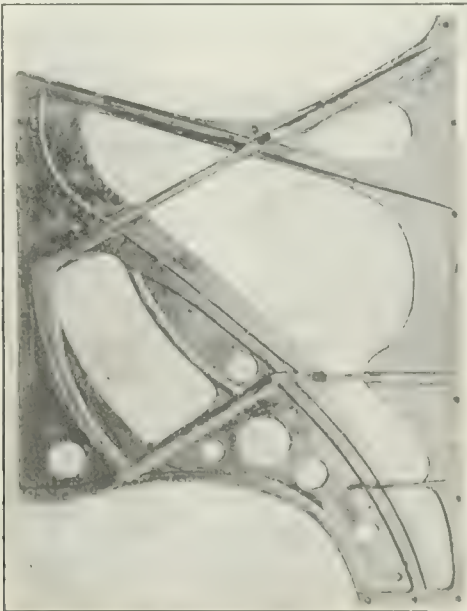


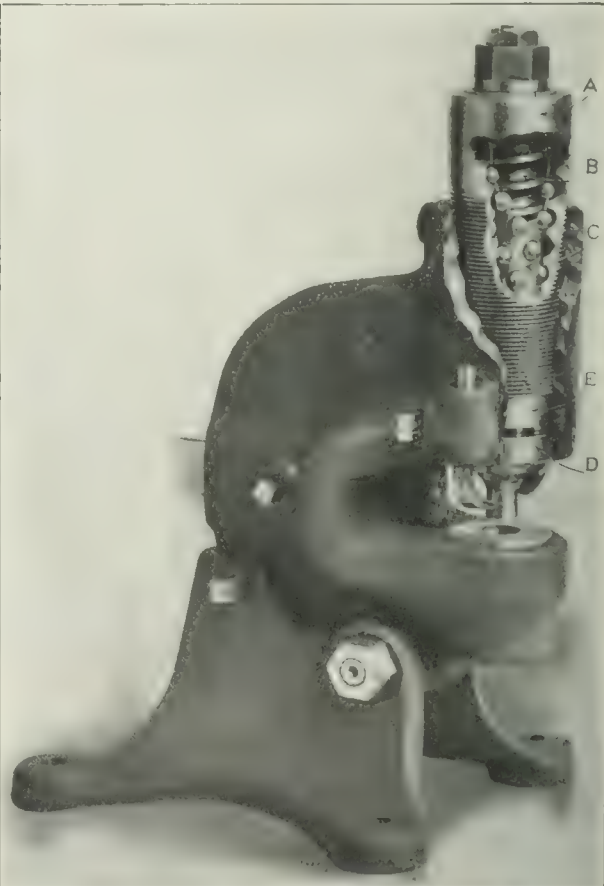
Fig. 6.—One of the Piano Plate Castings with the Pins Cast In.

used, only that ordinarily required for making light castings.

After the castings have been cleaned they are conveyed to the finishing department on trucks operating on an industrial railroad track, shown in Fig. 1. Japan is then applied to the plates, and they are permitted to remain 3 hours in an oven heated to 350 degrees F. After removal from the oven and cooling, the plates are rubbed and varnished and are again placed in an oven heated to 180 degrees F., where they are permitted to remain for 2 hours. The castings are rolled into the ovens on trucks. After finishing they are delivered to the warehouse by an electric car operating in the yard, on the same trucks by which they were conveyed to the finishing department from the casting cleaning room.

The Whitney Ball Bearing Rotary Hand Punch

A new type of hand punch is being manufactured by the Whitney Metal Tool Company, 222 East State street, Rockford, Ill. The special feature of the punch is the



The New Ball Bearing Rotary Hand Punch Made by the Whitney Metal Tool Company, Rockford, Ill.

means by which the rotary motion of the head is converted into a reciprocating one to operate the punch slide. This is one of a number of applications which is covered by the patent secured by W. A. Whitney of this company.

The punch consists of a cylindrical barrel, which forms a part of the frame, the punch stock and a bushing. This last, A, is threaded externally, these threads engaging with the interior threads on the cylindrical portion of the punch frame. The bushing is rigidly secured in place by a set screw and virtually forms a part of the cylindrical barrel. The form of the bushing is that of an elongated cylinder having a spiral groove on its interior for a ball raceway, which corresponds to one in the spindle B. This spindle moves vertically with relation to the bushing as well as rotating in it. A cylindrical ball spacer, C, which has both rotary and longitudinal movement with relation to both the spindle and the bushing, is interposed between them. This

spacer has openings arranged in a spiral series to space the balls in the bearing, which lies partly within the groove on the spindle and partly in that on the bushing, thus constituting a screw engagement with the spindle. The office of the spacer is to hold this series of balls so that they move as a unit.

A punch is fastened to the end of the spindle, but in such a way as to be prevented from rotating. The stem carrying the punch projects through a central opening in the spindle, and on the lower end of this stem is a shoulder forming a ball cup, D, which makes a similar one, E, on the lower end of the spindle, the pressure of the spindle being transmitted to the punch through anti-friction balls interposed between these two cups. A lock nut on the upper end of the stem prevents any longitudinal movement of it with relation to the spindle.

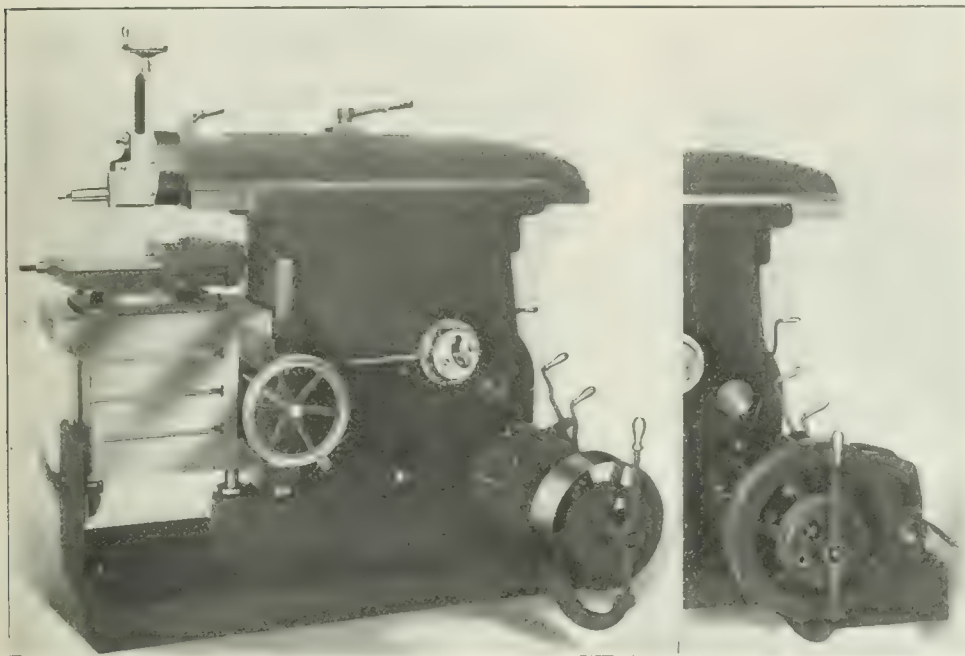


Fig. 1.—The Clutch Pulley Drive.

Fig. 2.—The Motor Drive.

The 24-In. Back Geared Crank Shaper Built by the John Steptoe Shaper Company, Cincinnati, Ohio.

The punch is operated by placing a wrench lever on the nut on the top of the spindle and turning it so as to cause the spindle to move down, following the screw thread formed by the spiral series of balls. The spindle does not slide upon the thread, but the balls composing it roll in the grooves in the spindle and the bushing and travel down when the spindle moves in that direction and upward when its motion is reversed. In this way the friction is reduced to a minimum and practically all the power applied to the spindle is transmitted to the punch. A collar on the upper end of the spindle limits the downward motion.

If desired the entire mechanism can be removed from the punch stock by taking out the bushing. The punch frame is pivoted and can be inclined to various angles to suit the work. Three sizes of punch are made at the present time. The smallest weighs 11 lb. and will punch a $\frac{3}{8}$ -in. hole through a $\frac{3}{8}$ -in. boiler plate. The medium size will punch $\frac{5}{8}$ -in. holes through the same thickness of plate and weighs 25 lb., while the largest punch has a capacity $\frac{1}{2}$ in. larger and weighs 20 lb. more.

Mechanical Engineers' Spring Meeting

The sixty-third meeting of the American Society of Mechanical Engineers will be held in Pittsburgh, Pa., May 30 to June 2, inclusive. It has not met in that city since 1884. Out of a total membership of over 4000 the society has in the Pittsburgh district alone a membership of about 160. An Executive Committee, consisting of E. M. Herr, chairman; George Mesta, J. M. Tate, Jr., Chester B. Albee, D. F. Crawford, Morris Knowles and Elmer K. Hiles, secretary, will have charge

of the Pittsburgh meetings. It is expected that from 300 to 400 members and ladies will be in attendance. In addition to the professional sessions, where papers will be read and discussed, there will be inspection trips through the leading local industrial establishments, besides automobile trips through the parks, a visit to Carnegie Institute, Memorial Hall, &c.

The Steptoe 24-In. Back Geared Shaper with Speed Box

The John Steptoe Shaper Company, 2951 Colerain avenue, Cincinnati, Ohio, has brought out a new type of back geared shaper equipped with a speed box. The special feature of this tool is the simplicity of the drive which consists of a pulley mounted on the end of the speed box shaft when the machine is belt-driven, as shown in Fig. 1. When the motor drive is used, as illustrated in Fig. 2, there is a small gear on the motor armature which meshes with a larger one on the speed box shaft. The construction of the drive is such that no part of it is apt to get out of order.

The machine is started and stopped by a clutch on the end of the shaft, which operates very easily. All of the mechanism is fully inclosed, so that all danger of the operator getting caught is eliminated. The speed

box provides four changes of speed, and this is doubled by the back gears.

The speed box is supported by a heavy brace projecting from the base of the shaper. Its arrangement is such that no clutches are used. There are no idly running gears on the shaft, and all possibility of noise or wear on the hole in the center of the gear is avoided. All the gears are keyed to the shaft, and the only wear is when they are in actual operation. The engagement of one gear shifts the other out of position automatically, an arrangement which results in a very effective drive. All the speed box bearings have ring oilers, and there are spiral channels in the shafts to distribute the oil over the entire bearing.

Where the driving shaft from the shaper enters the feed box there is a large bushing which enters the column of the shaper and also the speed box bearing. This arrangement relieves the driving shaft of any strain which might come from the speed box. This bushing has ring oilers both in the column of the shaper and in the speed box. The intermediate shaft of the shaper also has ring oilers and bushings which can be removed and replaced at any time.

When the tool is equipped for motor drive a General Electric 3-hp. constant speed motor, operating at approximately 1200 rev. per min., is employed and is set on a sub-base, which is cast on the shaper base. In this way the motor has a very solid foundation, which does away with the possibility of the machine vibrating when in operation.

The Chicago Pneumatic Tool Company has re-elected its directors with the exception of John W. Duntley, who was succeeded by J. H. Ward.

The New American Lathes

Great Power, Three Types of Drive and a Special Quick Change Gear Mechanism Characterize These Two Sizes

Two new types of high duty lathes have been brought out by the American Tool Works Company, Cincinnati, Ohio. They are said to be the latest and highest developed type of this class of machine tool and to surpass in power, range and convenience previously designed lathes of similar sizes. These tools are of the triple geared type and are built with a cone pulley head, a belt-driven geared head and a motor-driven geared head. A general view of the cone pulley head lathe is given in Fig. 1, and the headstocks of the other two types are shown in Figs. 3 and 5 respectively. Fig. 2 is a view of the

different feeds or threads, as the coarser ones are all obtained through the cone gears, and at no time does any member in the box run faster than the initial driving gear. An index plate shown in Fig. 2 has been completely worked out and is in full view of the operator on the front of the gear box, showing the exact setting for each thread or feed.

The Drive

In the design of the head care has been taken to do all the driving either by short shafts or sleeves. In this

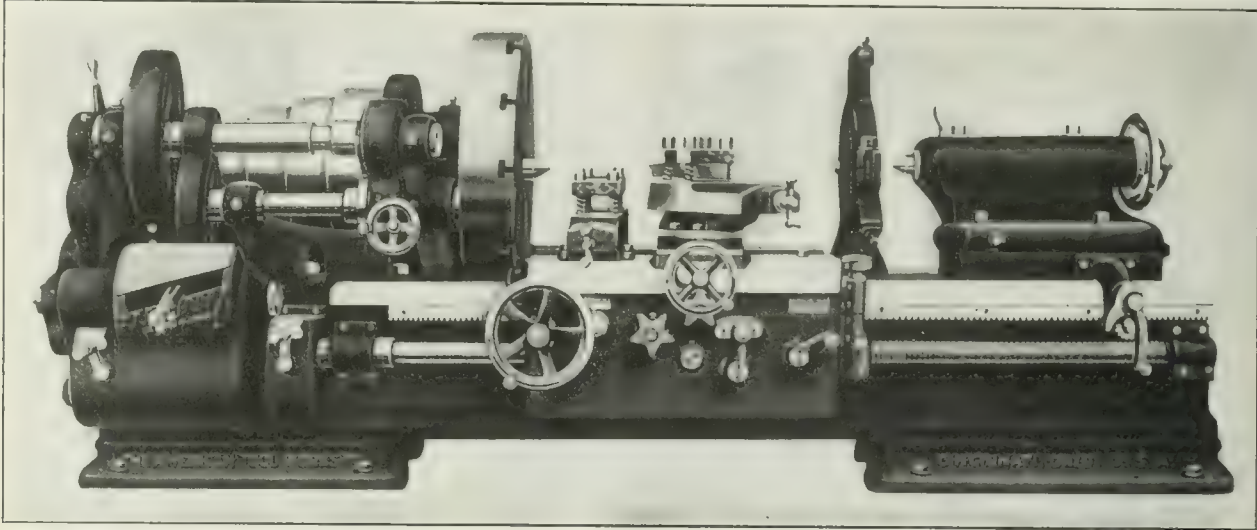


Fig. 1. One of the New Cone Pulley Head Lathes Built by the American Tool Works Company, Cincinnati, Ohio.

feed index plate which forms a part of the equipment of all three types, and Fig. 4 shows the index speed plate furnished with both styles of geared head tool.

Some idea of the enormous power of these tools, which are made with swings of 36 and 42 in. respectively, can be gained from the fact that for the motor-driven one a 20-hp. motor is recommended by the builder who guarantees the lathe to work without strain under a motor overload of 50 per cent. For the belt-driven machine the speed reduction between the countershaft and the spindle is very great. For motor drive a constant speed motor can be advantageously employed or if preferred one of the adjustable speed type with a variation of 35 per cent. can be used.

The Quick Change Gears

The most important feature of these new tools is the rapid change gear mechanism. All of these gears are either made from bar steel or drop forgings, and the mechanism is embodied in a self-contained unit carried on the front of the bed. It provides 32 fundamental thread changes ranging from 1 to 14 per inch, and in addition to this a compound quadrant gear on the end of the bed furnishes 16 additional changes. In this way 48 thread and feed changes ranging from 1 to 28 threads per inch and including the standard 11½ pipe thread and a feed of from 0.25 to 0.0041 in. are provided. All of the 32 changes in the gear box are obtained through the medium of a cone and tumbler gear and two selective sliding clutches, and any change can be instantly obtained while the machine is running. Any odd threads or feeds which may be desired from time to time can be secured through the quadrant at the end of the bed. All of the cone gears are of the Brown & Sharpe 20-degree involute pointed type, which gives an especially strong tooth and facilitates the engagement of the gears while running. The special feature of this mechanism is the elimination of the necessity for speeding up for

way there are no long shafts in torsion at any time, and all possibility of binding or chatter is said to be eliminated. All the gears in the driving mechanism are of exceptionally coarse pitch with wide faces, and the pinions are cut from steel bars. The headstock for the cone pulley lathe, which is illustrated in Fig. 1, is built with triple gearing of the slip gear type and furnishes

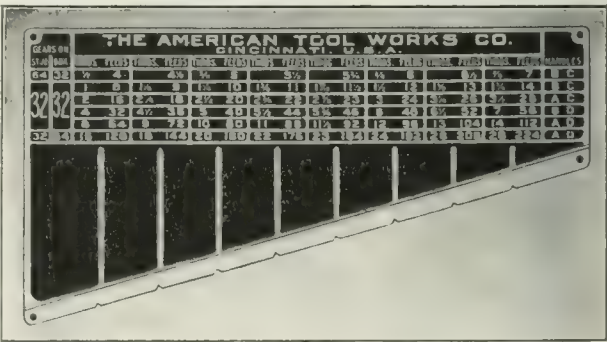


Fig. 2. The Feed Index Plate.

12 spindle speeds. The four steps of the pulley are each 5 15-16 in. wide. The spindle bearings are of high grade phosphor bronze and are provided with means for making all necessary adjustments. The triple gears are readily engaged by a rack and pinion at the front of the head by manipulating the hand wheel. These gears are of coarse pitch with wide faces, and the internal gear is planed integral with the face plate, the pinion being cut solid with the steel shaft.

A single pulley belt drive with the geared head, illustrated in Fig. 3, can be furnished if desired. This headstock is also of the triple geared type and is designed for great power. By supplying a belt speed as

high as is consistent with good practice, the maximum efficiency has been secured. The driving pulley is mounted on an individual shaft supported by a massive boss at the top and back of the head and great power is secured from a narrow belt by making the pulley of a large diameter. In this way there is less wear on the belt, the first cost of the belting is materially lessened and the pull on the bearings greatly reduced. The arrangement of the slip gears used is simplified as far as possible to

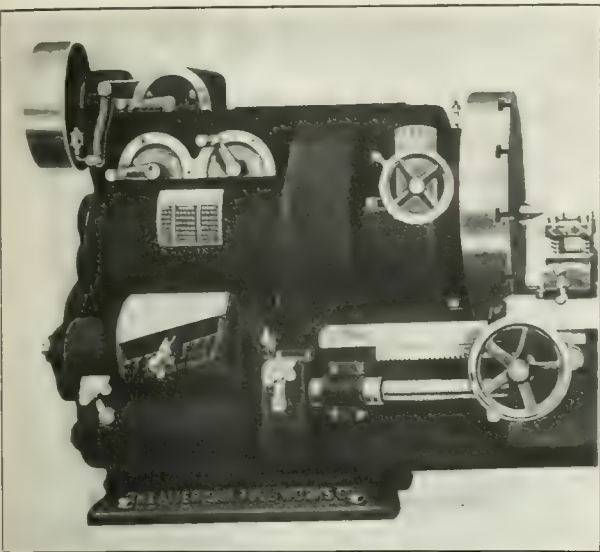


Fig. 3.—The Headstock of the Belt-Driven Geared Head Tool.

secure a direct drive with a minimum friction loss. Handles on the front of the head control the operation of these gears, and their engaging sides are machine rounded, thus enabling them to drop into place without clashing. The driving pulley has a sensitive but at the same time powerful friction clutch, which enables the gears in the head to be stopped or moved slightly without throwing off the countershaft, which is a very convenient feature in making speed changes. At any time after installation the belt-driven headstock can be quickly and easily converted into the motor drive, shown in Fig. 5, by removing the pulley drive and placing the motor on top of the headstock where there is a flat planed surface and connecting the motor to the driving shaft of the headstock through spur gearing. The construction of the driving pulley has been very carefully worked out. It is mounted on a large diameter steel sleeve and relieves the driving shaft of all belt pull. The pulley is also self-oiling, its hub forming a retainer for the lubricant, which is fed to the shaft through felt wipers. In

THE AMERICAN TOOL WORKS CO., CINCINNATI, U.S.A.		
HANDLES ON	SPINDLE R.P.M.	FACEPLATE R.P.M.
ADE	250	19
BDE	180	14
ACE	130	10
BCE	95	7
ADF	70	5½
BDF	50	4
ACF	36	2½
BCF	26	2

Fig. 4.—The Index Plate of the Speed Change Gear Box.

this way a circulation of oil is maintained and a fresh supply is constantly fed to the shaft.

The 16 spindle speeds are obtained through positive selective clutches and slip gears, the former being easily engaged while the gear teeth are machine rounded, thus causing them to slide into mesh easily. All the gears are mounted on a long bronze sleeve lubricated by sight feed oilers from the outside of the head. Eight of the

spindle speeds are obtained through the spindle gear, and the remainder through the face plate drive, which is a distinctive feature of these lathes, as ordinarily only one-third of the speeds are obtained through the face plate drive. With this latter type of tool the spindle gear has to be used for a large amount of heavy turning on work of large diameter, which in these lathes is handled through the face plate drive. All the speed changes can be made without stopping the initial drive, as the machine can be started, stopped or its speed varied by a friction clutch, which engages and disengages the driving pulley or motor gear and the shaft. This clutch is operated by the lever shown at the right side of the pulley, Fig. 3. The control is very sensitive, and the operator is thus enabled to make the various speed changes quickly. The positions of the lever for the various spindle speeds are plainly indicated on the index plate on the front of the head. This plate, which is illustrated in Fig. 4, has been worked out very carefully and affords a simple and easy means for indicating how to obtain the various spindle speeds.

A constant speed motor is located on top of the geared head and connected to the main driving shaft through spur gearing, as shown in Fig. 5. The stopping and starting of the motor is controlled by a conveniently located handle on the right end of the carriage, and the

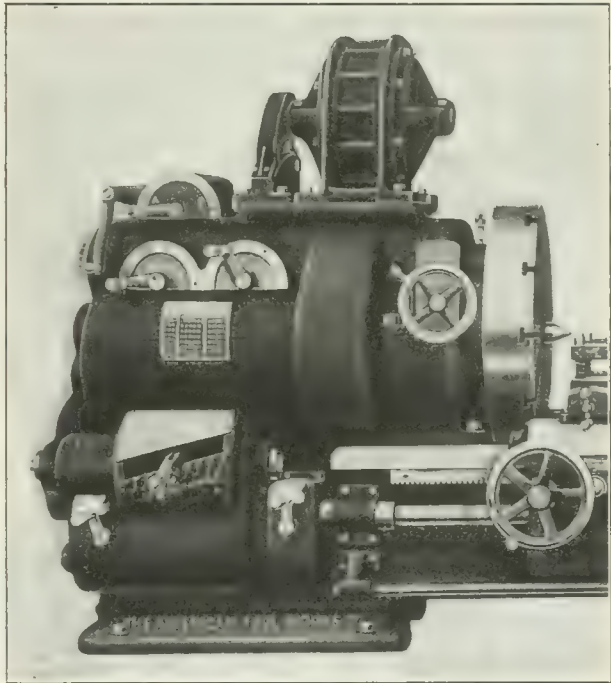


Fig. 5.—The Headstock of the Motor-Driven Geared Head Pattern.

various speed changes are made through the manipulation of the levers on the front of the headstock. The speed of the motor can be comparatively high, 700 to 1000 rev. per min. if desired.

Constructional Details

The bed is of the maker's special drop V pattern, which gives a large additional swing and permits the carriage bridge to be deepened more than is possible with the standard type of bed. It is deep and heavy and is braced by cross-box girts placed at short intervals throughout its entire length. As the construction approaches an I-beam in section instead of making the bed exceptionally wide sufficient rigidity is secured to resist the heaviest cuts without vibration. A web cast through the center, which carries a rack for the tailstock engaging pawl, still further strengthens the bed. The V's are large and accurately scraped. The tailstock can be slipped off without taking out the holding bolts, as the wall at the end of the bed is cut. The bearings for the gear box and the lead screw are seated with a tongue and groove fit, which secures accurate permanent alignment, and the steel feed rack has teeth cut from a solid bar. The carriage is very heavy, especially in the bridge, and has a full continuous bearing of 50½ in. on the outside V's

and additional bearings on the top and the inner surface of the front V. This enables the forward thrust of the tool to be resisted and at the same time gives a bearing directly beneath it. The carriage is gibbed throughout its entire length at the back, and a clamp is provided on each end at the front, the one at the right being used to bind the carriage to the bed. The apron, which extends the entire length of the carriage, is tongued, grooved and firmly bolted to it, and the construction is of the double wall type, which provides all shafts with two bearings. The cross and the longitudinal feeds are reversed through a lever at the front of the apron and not at the headstock, a feature which is especially valuable on long beds where the operator is at some distance from the headstock. The cross feed is positive in action and can be released instantly under the heaviest load. A lever on the front of the apron controls the half nuts. Steel is used for all the gears and pinions in the apron, which are of coarse pitch with wide faces and are cut from the solid by special cutters. When cutting screw threads the rack pinion can be withdrawn from the feed rack and a non-interfering device is furnished which makes it impossible to engage the feed and the screw cutting mechanisms simultaneously.

The spindle is of high carbon hammered steel and has a hole 2½ in. in diameter throughout its entire length. All loose gears have been eliminated together with their attendant vibration. The only gear attached to the spindle is the driving gear, which is located close against the bearing. In this way the spindle is not subjected to severe torsional strains, a feature which adds greatly to the life of the bearing and the alignment of the spindle itself. The taper construction and an extra large diameter are used which insure great rigidity and power. All of the bearings are bored out from the solid and are lined with large phosphor bronze bushings. The spindle speed range for the geared head tools is from 2 to 250 rev. per min.

The construction of the compound rest is very heavy. The top and bottom slides have full length taper gibs with end screw adjustment, thus providing continuous accurate bearings. The top slide has a 14-in. power angular feed micrometer adjustment and a four-stud tool holder. The steel mitre feed gears are planed from the solid. The swivel has four clamping bolts in the base and is graduated to 90 degrees on each side of the zero point. An exceptionally solid bearing is secured on account of the wide carriage bridge.

The tailstock is of massive proportions and has long continuous bearings on the ways. It is moved along the bed by a crank and gear and is of the quadruple clamping stud type with the studs running to the top of the barrel. A further guard against movement is secured by a pawl which engages a rack cast in the center of the bed and which can be lifted out of engagement by a pull rod on the end of the tailstock. The solid large diameter tailstock barrel is equipped with an improved type of plug-binder for clamping the spindle. The tailstock has the set-over feature for turning tapers and is of the off-set type which allows the compound rest to be set parallel with the bed. The travel of the spindle, which is graduated in inches, is very long and is controlled by a dished handwheel, which brings the rim closer to the operator and is free from the motion and back lash of the gear operated type. A projecting nose on the tailstock, which is further reinforced by a wide rib extending from the tip to the base provides an extra support for the spindle when it is extended.

The following table gives the principal dimensions and specifications of the two sizes of lathes:

	36-in.	42-in.
Standard length of bed, feet.....	12	12
Distance between centers tailstock flush geared head, feet.....	4	4
Distance between centers tailstock flush cone head, feet.....	5	5
Diameter of hole through spindle, inches.....	2½	2½
Size of tool regularly used, inches.....	1 x 2	1 x 2
Power angular feed to compound rest, inches... 14	14	14
Swing over bed, inches.....	37¾	44
Swing over carriage, inches.....	23¾	30¾
Width of drawing belt, inches.....	6	6
Diameter of driving pulley, inches.....	20	20
Speed of driving pulley, revolutions per minute. 475	475	475
Morse taper of centers.....	No. 6	No. 6

Special provision for lubrication has been made in both sizes, and every bearing has been carefully provided for, sight feed oilers being extensively used. The regular equipment includes compound, steady and full swing rests; countershaft for belt drive and wrenches. An improved taper turning attachment, a turret on the carriage, a turret on the shears and the geared headstock for belt or motor drive instead of the cone pulley drive can all be furnished as extras.

The Osborn Molders' Bellows

Two new types of molders' bellows have been placed on the market by the Osborn Mfg. Company, Cleveland, Ohio. In making them chemically treated canvas has been substituted for the calfskin or horsehide usually

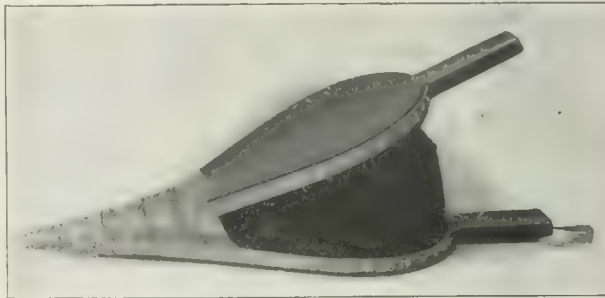


Fig. 1 The Plain Molders' Bellows Made by the Osborn Mfg. Company, Cleveland, Ohio.

employed. Fig. 1 shows the regular plain bellows and Fig. 2 illustrates the Cyclone type.

Both of these styles have been previously made by this company in other materials, but it is claimed for the new canvas bellows that they will be equally efficient and give much longer service without increasing the cost, the results of the tests showing that in some cases the canvas lasted three times as long as the ordinary material. After the canvas has been chemically treated it is said to be very pliable, will not split, tear or crack

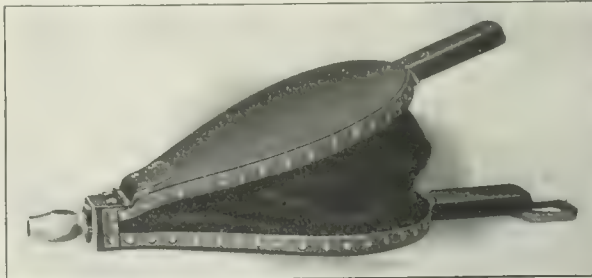


Fig. 2.—The Cyclone Bellows, Made with Chemically Treated Canvas.

and is air tight and moisture proof. Six regular sizes, all of which are made by hand, can be furnished, the width varying from 8 to 14 in. Among the special points claimed for the Cyclone bellows is that there is no interior obstruction to the blast. The hinge is of steel and an aluminum spout in which there are large side holes insuring the maximum amount of wind is used.

The Westinghouse Electric & Mfg. Company, Pittsburgh, is constantly receiving orders for electrical equipment for export, among recent contracts taken being the following: Rio de Janeiro Tramway Light & Power Company, Rio de Janeiro, Brazil, two 2500-kva., 6300-volt, three-phase, 50-cycle turbo-generators, for which the Westinghouse Machine Company will furnish the turbines, which will be equipped with No. 11 Leblanc condensers; Nikkon Gas & Electric Company, Nikkon, Japan, one 200-kva. rotary converter, two 125-kva. O. I. S. C. transformers and one three-panel switch-board; Cia Beneficiadora de Pachuca de Mexico, one 915-kva. O. I. S. C. auto-transformer.

Cutler-Hammer Alternating Current Motor Speed Controllers

Recently a large variety of alternating current apparatus has been standardized by the Cutler-Hammer Mfg. Company, Milwaukee, Wis. This standardization includes apparatus, the greater part of which has heretofore been manufactured with various changes as special apparatus, and was made to meet the demand existing for alternating controlling apparatus to be used in plants where only alternating current was available. Slip ring induction motors are adapted for service where speed regulation is required, and both types of speed regulator and controller are designed for use with this type of motor. Fig. 1 shows the face plate regulator, and Fig. 2 illustrates the drum design for controlling printing presses, machine tools and other similar machines.

The face plate regulator is compact, inexpensive and

per is used for the brushes and contacts which are mounted so as to make replacing easy. All the terminals and other parts are also readily accessible. In this type of controller the resistance for varying the speed of the motor is inserted in the secondary circuit. Standard controllers are made in capacities ranging from 1 to 7½ hp., and a speed reduction of 60 per cent. at full load is possible. These controllers can be easily mounted on the press or machine in locations convenient to the operator.

The Causes for High Prices

According to Prof. Jeremiah W. Jenks of the Chair of Political Economy, at Cornell University, who recently spoke on the increased cost of living at Cooper Union, New York, under the auspices of the Board of Education, the cause of the increase is not the tariff alone but a coalescence of causes. The increased price of meat was

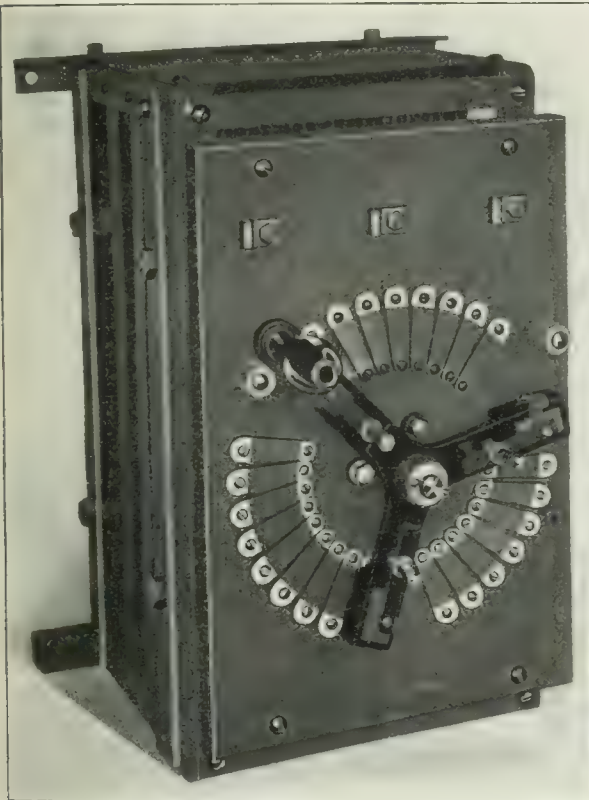


Fig. 1.—Face Plate Type.

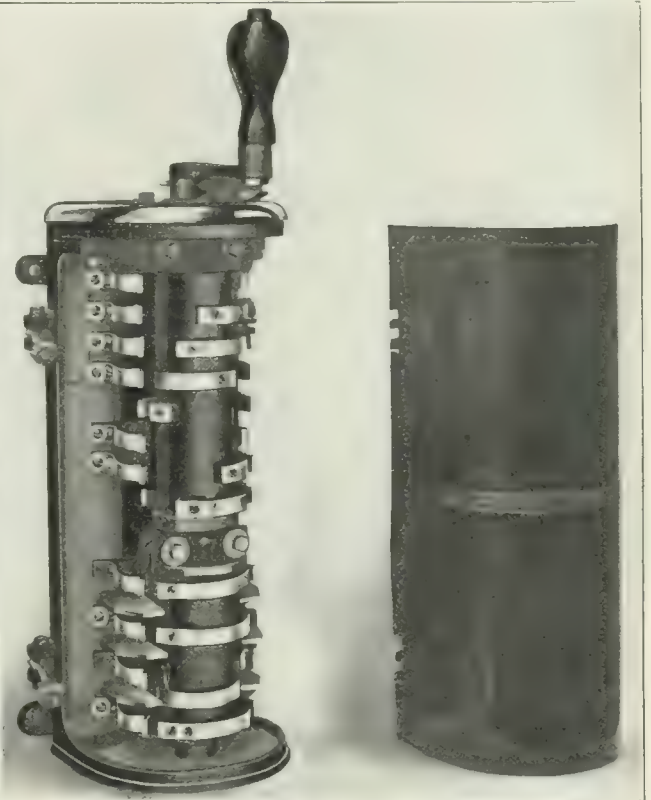


Fig. 2.—Drum Type.

Two New Alternating Current Motor Speed Regulators Built by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

practicable. The contact segments are of hard drawn copper, and can be readily replaced or interchanged without interfering with the interior connections. The resistance is self-contained, and the three sets are star connected, so that equal amounts are inserted in the three phases of the secondary circuit, thus insuring a balanced condition. As the maximum output of the motor can be seriously affected by unbalanced current or voltage in the legs of the circuit, this balancing feature is very important. To insure accurate speed control in the small regulators special resistance wire having practically a zero temperature coefficient is used. Several styles and types of regulator are made in sizes ranging from ¼ to 50 hp., and the standard apparatus is designed to reduce the speed 50 per cent. at full load.

An alternating current drum type controller similar in design to the company's direct current controller of the same type has been designed for controlling the speed of motors operating printing presses, machine tools and other machines of a similar character. It is possible to secure full speeds in either direction with this controller, as a center latching device operated by a push button on the handle prevents injury by throwing the handle past the off point unintentionally. The design is as compact as satisfactory operation will permit. Hard drawn cop-

per, he said, to the fact that most of our cattle are now stall-fed, instead of being grazed upon pastures.

The increased cost of foodstuffs he attributed to advertising and transportation, and of wool to a much larger demand and a smaller supply. Then, again, the increase in the production of gold has much to do with the cost of living. He further said:

"There has been much outcry against the great corporations as factors in increasing prices. Beyond doubt these combinations may, and at times do, affect prices. In some instances they have doubtless raised prices. In other cases they have held prices down. Sometimes they have steadied prices. But the facts show that they, with rare exceptions, have not been prominent factors in the late general increase of prices. The late changes in the tariffs have had little, if any, appreciable effect upon prices. The facts are, of course, that while the various changes have increased rates on certain products and lowered them on others, the average rates have not been materially affected since the war tariffs."

Hall Furnace of the Republic Iron & Steel Company, at Sharon, Pa., has been blown in, after being idle since December.

A Monorail Grab Bucket Coal Hoist

A Recent Installation Made by the Cleveland Crane & Engineering Company

Handling fuel and ashes in a power plant by hand is extremely expensive, hence conveying systems, automatic stokers, industrial railways, &c., are used in all large

the same motor through friction clutches controlled from the operator's cage. The bucket is lowered, opened and closed by gravity, which is considered preferable to using separate motors for the hoisting and lowering, as the speed of a series motor if employed in lowering the load would not exceed twice the hoisting speed. With a gravity fall any lowering speed can be obtained, the motor being inoperative when the bucket is being lowered or opened, which is important especially on high

lifts. After the bucket has been lowered to the coal pile or car and is closed, both drums lift the load. The bucket is held suspended by a self-lubricating mechanical double friction brake, which eliminates the necessity for the operator to watch the buckets constantly. The hoisting drums have band brakes actuated by a foot lever controlled from the operator's cage to relieve the hoisting clutches of wear when the bucket is being lowered, while those employed for raising the load act as safety devices in case of overhoisting, since they will slip before the hoisting ropes are dangerously strained. The hoist has two four-wheel swivel trucks which run on the bot-

tom flange of an I-beam. The hoist is traveled by gear drive to the wheels of one truck from a motor attached directly to the swivel truck. This allows running around short radius curves, which was very important in this installation since short turns were necessary at each end of the boiler room in passing from the coal pit to the stoker hoppers on the opposite side. The

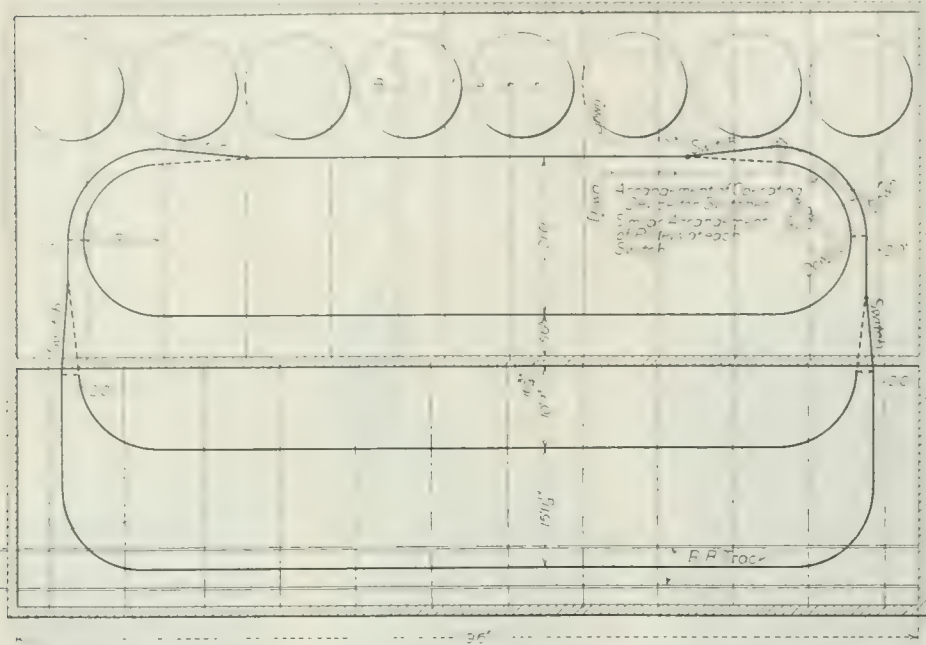


Fig. 1. Plan of the Kalamazoo Paper Company's Boiler Room, Showing Layout of Monorail Hoist Track Installed by the Cleveland Crane & Engineering Company, Cleveland, Ohio.

and modern plants. An interesting equipment for the purpose is the monorail grab bucket hoist that the Cleveland Crane & Engineering Company, Cleveland, Ohio, has recently installed at the plant of the Kalamazoo Paper Company. Fig. 1 is a plan of the boiler room showing the layout of the track and Fig. 2 is a view in the boiler room showing the hoist in operation, while Fig. 3 gives details of the hoist and the grab bucket.

The hourly coal consumption is 35 tons, to handle which cost a great deal with the former facilities, involving considerable hand labor. From Fig. 1 it will be seen that the boiler house has eight vertical boilers along one side, while at the opposite side is a coal shed with a railroad siding. The boiler room floor is about 8 ft. below the track level, and the coal when dumped into pockets runs through arches in the wall separating the coal shed from the boiler room, as shown in Fig. 2. Originally the coal was handled from this point by a small electric traveling crane with scoop buckets, in which the coal was shoveled and then hoisted and carried across the boiler room and discharged into the stoker hoppers extending along the front of the boilers. The coal which would not run through the arches also had to be shoveled until it could be loaded into the buckets.

To reduce this expense a Cleveland monorail bucket hoist and a 1¼-yd. Williams two-rope bucket were installed. The tracks are arranged as shown in Fig. 1 and the switches can be thrown by hand from the operator's cage as the hoist approaches them from either direction, while automatic stops prevent the hoist from running off the end of the rail if the switch is not properly set. Thus a four-track system was laid out, making it possible to take coal directly from the cars on the railroad siding, from the dumping pits in the coal shed or from the pit in the boiler room and carry it directly to the stoker hoppers. The hoist employed was the company's standard two-drum monorail grab bucket hoist, and is peculiarly adapted for the location and the quantity of coal handled.

One of the drums of the hoist winds the closing line and the other the hoisting rope; both are operated by

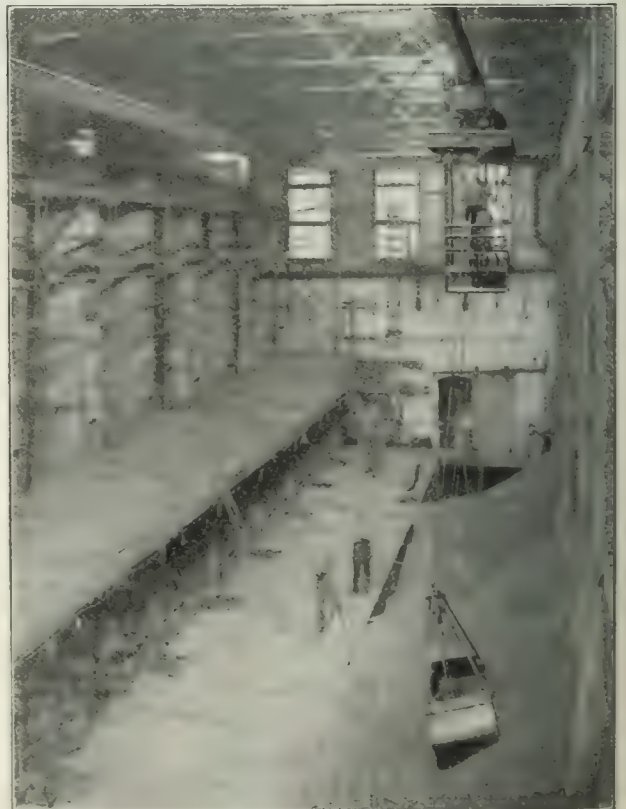


Fig. 2. —View in the Boiler Room.

hoisting motor is a 220-volt direct current 20-hp. General Electric crane motor and the traveling motor one of the same type of 10 hp. The operator's cab is attached to the hoist as shown in Fig. 3. The controllers, switchboard, resistances, levers for operating the friction clutches and the foot levers for the lowering brake are all conveniently located in the cab.

Small cars running on a system of tracks below the firing floor convey the ashes from the boilers to one end of the building, where they are dumped. The grab bucket picks the ashes up at this point and carries them to the coal shed, where they are dumped into cars for

by statute. Employers and employees electing to accept the provisions of Division 2 shall thereafter be subject only to those provisions. Exceptions are made to the rule of compensation for injury to workmen where the injury is purposely self-inflicted to obtain compensation or due to intoxication or willful misconduct. It is also provided that there shall be no compensation for injury or death due to an act of God or to war or riot or for any disease. The liability of the employer is limited to an aggregate of \$50,000 for bodily injuries or death caused by one accident. This limit is put in the bill in order to make the employer's liability

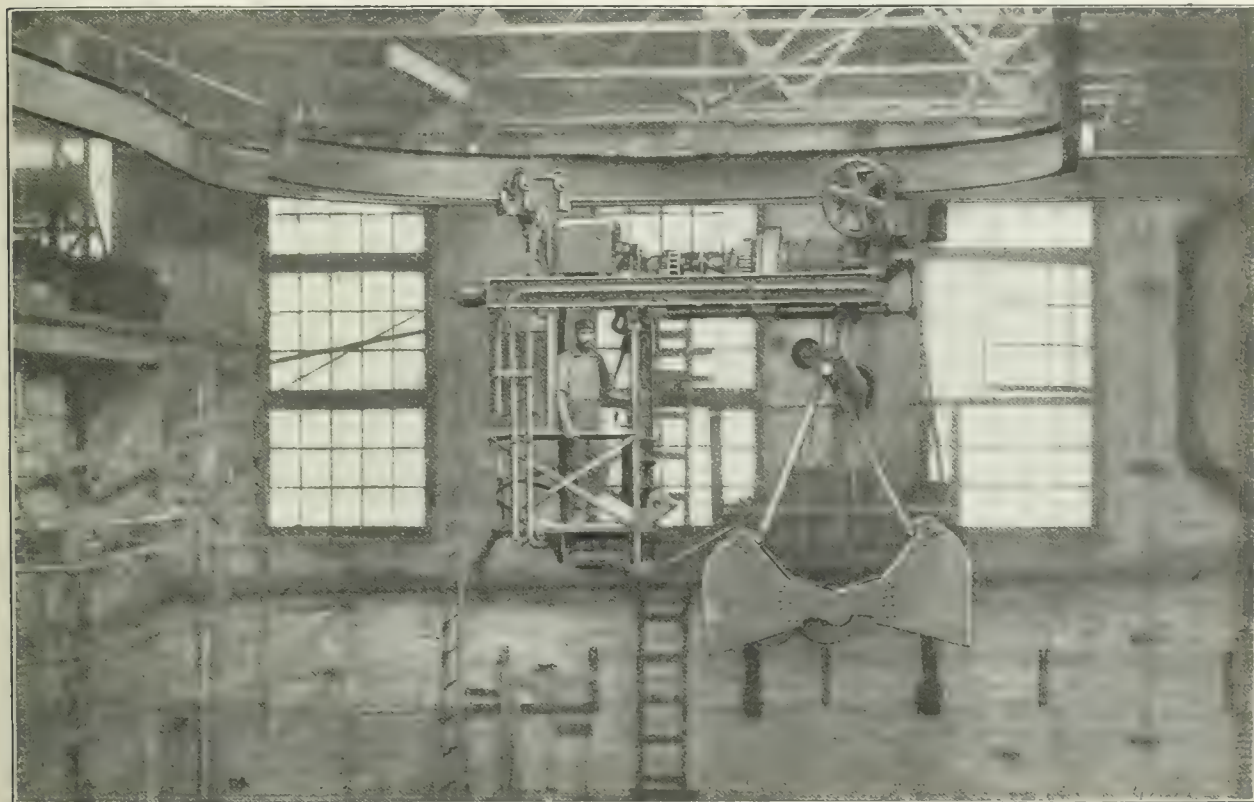


Fig. 3.—Details of the Hoist and the Grab Bucket

removal. Installing this machine has reduced the boiler room force by five, saving approximately \$200 per month in wages, and only about the same amount of current is required as for the old floor operated traveling crane.

Accident Compensation in Minnesota

George M. Gillette, chairman of the executive committee of the Minneapolis Steel & Machinery Company, Minneapolis, Minn., is the author of a bill "to provide a code for the relief of workmen injured in employment, by an elective system of industrial insurance in the State of Minnesota," and it is submitted by him as a member of the Minnesota Workman's Compensation Commission. It accompanies the minority report of that commission. The bill is long and works out with great care the details of a system of industrial insurance and the procedure under it for both employers and employees. There are two general divisions: the first contains provisions annulling the defenses of assumption of risk and act of fellow servant; limiting liability for death resulting from accident to \$3000; providing that employer and employee must elect to come under the code or continue under common law rights; defining liability for injury; also who are employers and who are employees and how each class may elect to come under the code; and finally providing that employees cannot hold both the right to recovery and damages under common law and the right to compensation.

The second division of the bill is devoted to elective compensation. It provides that the right to compensation and the remedy therefor granted in the bill shall be in lieu of all rights and remedies at common law or

insurable. The maximum death benefit is \$3000; for total disability the maximum is \$5000.

It is provided that neither of the two divisions of the code be adopted without the other. It is declared to be the intention that the employer shall not be deprived of the defenses of assumption of risk and act of fellow servant in cases where the employee does not elect to accept the provisions of Division 2 of the act. Where the employer does not elect to accept the provisions of Division 2 the amount of recovery for death by wrongful act is not limited to \$3000 but remains at \$5000 as under Minnesota laws at present.

Mr. Gillette's paper read before the Liability Insurance Association in New York and published in *The Iron Age* of October 28, 1909, page 1312, was a thorough presentation of the advanced view of accident compensation from the employer's standpoint. He spent several months in Europe last year investigating the operation of the workmen's compensation act of the various countries and in studying the problem of accident prevention.

The American Plate Glass Company, Kane, Pa., will add a Westinghouse 23½ x 33 in. 700-h.p. horizontal National gas engine to its power plant at James City. The engine will operate on natural gas. It will be connected to a Westinghouse 625-kva., 600-volt, three-phase, 25-cycle, alternating current generator, which will be used in supplying energy for power and lighting. The new equipment will operate in parallel with three 16 x 26 in. twin tandem and two 23½ x 33 in. single crank horizontal Westinghouse gas engines, which drive three 400-kw. and two 500-kw. Westinghouse generators, respectively.

The Rockford Vertical Miller

A New Machine for Producing Duplicate Parts

A new vertical milling machine particularly adapted for producing duplicate parts built by the Rockford

Machine Tool Company, Rockford, Ill., has its vertical adjustment in the head rather than the knee. This new arrangement is claimed to have all the advantages of the adjustable knee without its undesirable features.

As shown in Fig. 1, the column and the horizontal slide for the saddle are cast in one piece. The table top is at a permanent height of 30 in. from the floor, which is the same as that of a planer platen and is convenient for the operator in handling the castings or other parts

being machined. The bearing of the head of the column is as ample as that of the knee on the column of the usual type machine. The head, however, weighs much less and is counterbalanced, thus relieving the bearing of much overhang and uneven strain which would rapidly destroy its accuracy. The spindle is tapered and adjustable in the head by a sleeve and worm gear. Twelve spindle speeds are provided, nine through back gears and three high speeds for small cutters with open belts. Twelve feed changes are also provided.

The drive is from a three-step cone pulley and three speeds for each step are instantly available through back gears by manipulating the vertical lever A, Fig. 1, on the side of the column. This lever interlocks with the lower one, B, preventing two conflicting combinations of gears being engaged at the same time. When the vertical lever is in its neutral position the sliding gears are all locked out of mesh. By moving the lower of the two levers to the right, the clutch is engaged with its mate which is cut on the end of the shaft carrying the cone pulley, and the three high speeds are trans-

mitted directly from the cone pulley to the bevel gears on the vertical shaft. The driving gear on the spindle is shown in Fig. 2, which is a cross section of the head. Steel is used throughout, the pinion and the spindle being forgings and the large gears castings. The spindle is relieved of side strain by the large bearings with which the spindle gear is provided.

Fig. 3 shows the feed mechanism, which is driven by

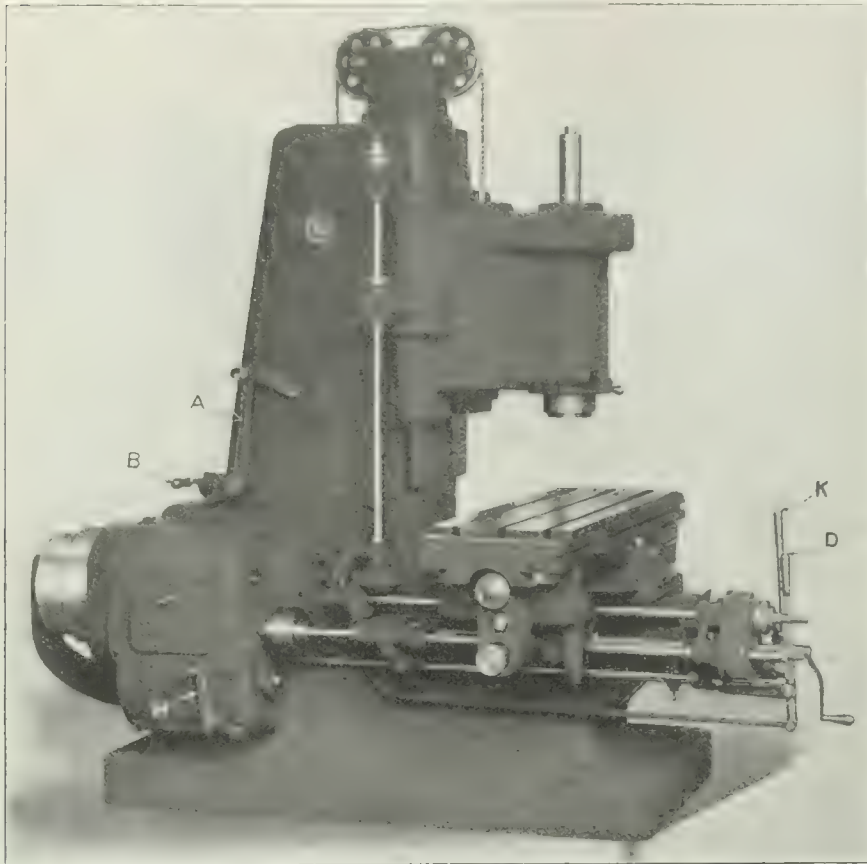


Fig. 1.—The New Vertical Milling Machine Built by the Rockford Machine Tool Company, Rockford, Ill.

Machine Tool Company, Rockford, Ill., has its vertical adjustment in the head rather than the knee. This new arrangement is claimed to have all the advantages of the adjustable knee without its undesirable features.

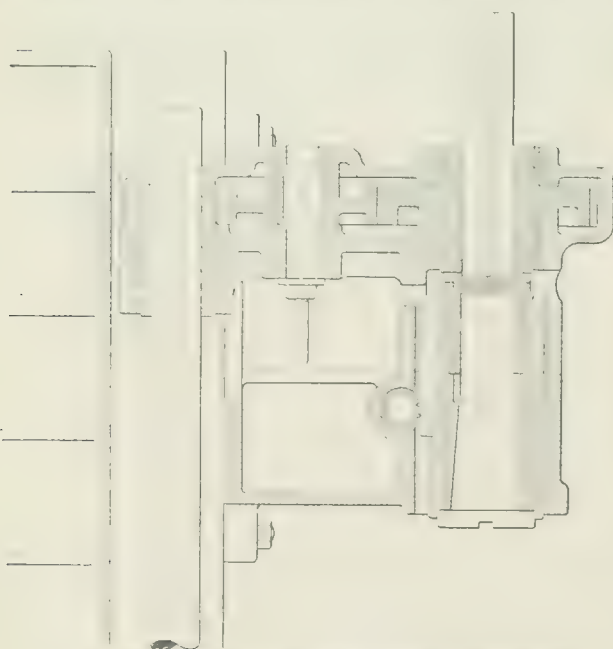


Fig. 2.—Cross Section of the Head, Giving Constructional Details.

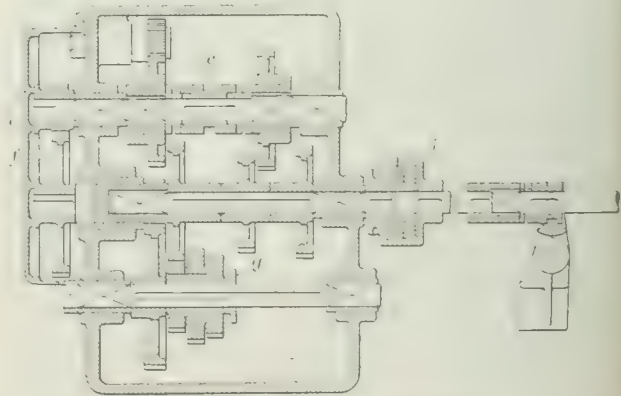


Fig. 3.—Details of the Feed Mechanism.

Fig. 1 is a general view of the machine and Fig. 2 a cross section of the head giving constructional details. Figs. 3 and 4 show the details of the feed gear mechanism

a spur gear on the back gear shaft. The clutch c, for engaging and reversing the feeds, is on the upper shaft, which has the highest speed of any in the box, and the lever D, Fig. 1, for operating the clutch, is conveniently located in front of the machine. Power from the clutch shaft is transmitted through the slip gears e and f, Fig. 3, at the end of the machine. Four changes are obtained by using two pairs of these gears, which are interchangeable.

able. For each position of the slip gears three speed changes are obtained by the sliding gears *g* on the lower shaft, which are operated by the lever *H*, Fig. 1, on the front of the feed box. The 12 feeds, which range from $\frac{3}{4}$ to 17 in. per minute, can be applied to the table, the cross movement and the saddle and also to the head instantaneously. The friction *i*, Fig. 3, has sufficient power to drive any feed, but will slip before the feed

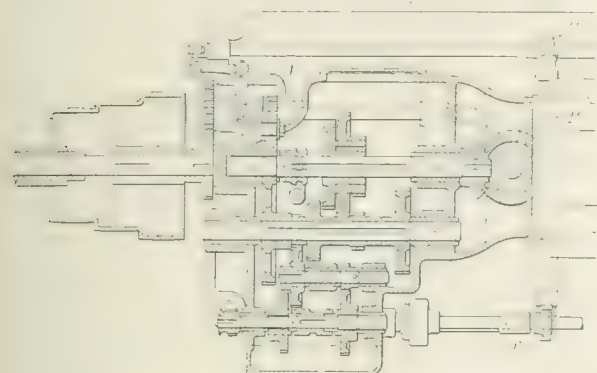


Fig. 4. Details of the Power Quick Adjustment.

gears or other parts will break due to overload, such as accidentally feeding the saddle against the column or the table nut against either end of the saddle.

The power quick adjustment, shown in detail in Fig. 4 and also in Fig. 5, is new and saves time. The power is delivered through the reversible clutch *j*, Fig. 4, by spur gearing direct from the cone pulley shaft, and the transmission from the clutch shaft is through an angle shaft equipped with universal joints to the feed train in front of the machine. Fig. 5 shows the arrangement of the operating lever *K*, which is conveniently placed in front of the machine on the right side. This lever is

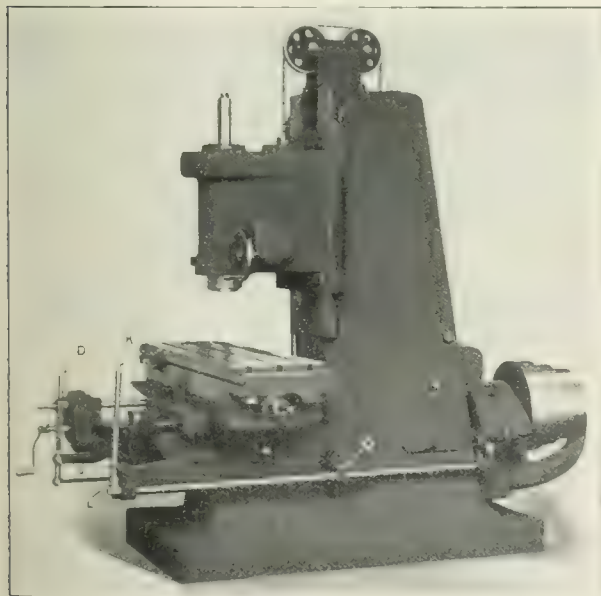


Fig. 5.—Side View, Showing the Power Quick Adjustment Mechanism.

also interlocked, making it impossible for the feed mechanism and the quick return to be engaged at the same time. The device is simple, both in construction and operation. In Fig. 5 the lever is shown with the power quick adjustment clutch locked in neutral position and the feed shaft clutch engaged. The lever is pivoted at *L* with the lower projection engaging a rod, *m*, Fig. 4, passing through the shaft *n*, which is connected to the collar *o* by a key in a slot in the shaft. The shaft *p* passes through the collar and is connected by yokes, *Q*, Fig. 5, at each side to the sliding collar and to the jaw clutch on the feed shaft *r*, Fig. 4. An outward movement of the operating lever disengages the clutch on the feed shaft and the lever is free to be moved in either

direction past the projection on the bearing casting *S*, Fig. 5, which locks it in position, thus engaging the reversible clutch and applying power for the quick adjusting mechanism. When the machine is making duplicate parts all movements can be controlled by this one lever, by pressing which toward the machine again engages the feed. This in no way interferes with the operation and use of the automatic stops on the longitudinal and the cross movements.

All the slides are fitted with taper gibs, which are adjustable longitudinally to compensate for wear. The saddle slide has two gibs, the second one being a taper gib on the inside of the right-hand bearing, which insures perfect alignment when feeding under heavy cuts. All the movements of the table, saddle, head and sleeve are indicated by collars graduated to read in thousandths of an inch.

The following are the principal dimensions and specifications of the machine:

Distance from center of spindle to column, inches.....	15
Total length of table, inches.....	56
Working surface of table, inches.....	14½ x 48
Feed to table, inches.....	32
Maximum distance between table and spindle, inches....	24
Minimum distance between table and spindle, inches....	3
Vertical movement of head, inches.....	21
Width of head bearing on column, inches.....	19
Length of head bearing on column, inches.....	25½
Maximum diameter of spindle, inches.....	4
Minimum diameter of spindle, inches.....	3
Adjustment of spindle, inches.....	6
Diameter of smallest cone pulley step, inches.....	12
Diameter of largest cone pulley step, inches.....	15½
Width of driving belt, inches.....	4
Speed of countershaft, revolutions per minute.....	390
Height of table from floor, inches.....	30
Number of spindle speeds.....	12
Minimum spindle speed, revolutions per minute.....	13
Maximum spindle speed, revolutions per minute.....	200
Minimum feed, inches per minute.....	¾
Maximum feed, inches per minute.....	17
Number of feeds.....	12
Net weight of machine, pounds.....	6,800

All the shaft bearings have wool felt oil retainers, and connected to all bearings are soft brass tubes 5-16 in. in diameter leading from an oil cup with a hinged cover.

The Pittsburgh Machine Tool Company's New Plant

The Pittsburgh Machine Tool Company, which for some years has been located on the North Side, Pittsburgh, and several months ago purchased a site of land in Braddock, Pa., has just placed contracts for the building of a new plant which will increase its capacity from 300 to 400 per cent.

There will be a main building, consisting of a brick structure of mill construction, 100 x 216 ft., with a power house annex, 30 x 40 ft. The power house will be equipped with an 80-hp. gas engine and 100-hp. steam engine. A crane runway with a 30-ft. span, 250 ft. in length, will be erected through the main building, which will extend over a railroad siding, and a 10-ton electric traveling crane will be installed.

The company expects to have the new plant completed and ready for occupancy by May 1, when the equipment of the Pittsburgh plant will be moved there. The products, manufactured by the company comprise lathes and planers, principally engine lathes from 24 to 72 in. swing, and planers of 40 to 72 in. width. About 150 additional workmen will be employed when the new plant is put in operation.

The Oliver Machinery Company, manufacturer of woodworking machinery, Grand Rapids, Mich., has opened a branch office in suite 400-423, Bank of Commerce Building, St. Louis, Mo., in charge of A. S. Kurkjian. This is the sixth branch office opened by the company and has been made necessary by the rapid increase in business in the past year. A complete assortment of the company's catalogues and other literature is carried in the new office, which is in position to take care of all inquiries promptly and satisfactorily.

the purchasing agent daily for his guidance in ordering material. On January 10 one casting was received from the foundry and four were issued on order No. 188, and the Balance column naturally shows none on hand. On January 15 order No. 195 called for two tables, and as none were on hand, notation was made in the Reserved for Requisition column. On January 18 five castings were received from the foundry and two were issued on order No. 195, and the stock clerk made note of this by inserting the date in the Reserve Issued column, thus

as a check against the clock time of a workman, but its principal idea is to enable the cost clerk to calculate the exact operation cost of any particular part of a machine tool. These cards further show whether the premium time allowed on any job is either too liberal or the reverse, and affords a definite basis for a readjustment of premium rates. A time clerk makes the rounds of the shop every hour, personally inspecting the job being worked upon, and he is also able to determine within very narrow limits the exact amount of time

[illegible]

Fig. 2.—The Daily Shortage Report on Raw Stock.

closing this memorandum transaction, and leaving three tables in the Balance column. The advantage of this is that it warns the stock clerk not to put away in stock the full number of parts received, but that he must at once deliver to the machining departments the quantities indicated in this column as being needed on orders previously issued, but held up because of lack of stock.

The daily shortage report on raw stock, shown in Fig. 2, is made up for the purchasing agent by the stock clerk

being devoted to any particular job. At the commencement of every new operation a new time card is filled out by the time clerk, and the card for the previously completed job is turned into the cost department, thus enabling this department to figure the cost of any particular part immediately upon completion of the work.

Shipyard for Rio de Janeiro

Vice-Consul General Joseph J. Slechta forwards the following from Rio de Janeiro to the State Department:

Contract has just been closed by the local representative of an important American manufacturing concern with the Lloyd Brasileiro, which maintains a line of Brazilian steamships plying between Brazil and New York and a very extensive Brazilian coastwise service, for machinery and other equipment for a ship repair yard amounting to about \$500,000. This contract represents a successful effort to obtain for the United States one of the most important, if not actually the most important, single trade operation which has ever been effected by Americans in Brazil. The contract specifies explicitly that all of the material and machinery for equipment shall be of American manufacture.

The plant is to be fully equipped and ready for operation within one year. The present plans are that when the repair plant has been placed in good working order and workmen have become thoroughly familiar with the operation of the machinery a complete ship-building yard will be installed. It is understood that American manufacturers will have the preference in supplying the equipment for this plant as well.

The Consolidated Connellsville Coke Company, at a recent meeting of stockholders at Uniontown, Pa., voted to issue bonds to the sum of \$750,000 for the purpose of liquidating individual mortgages and financing proposed improvements. Plans for the proposed new work have not been made public.

TIME CARD Week Ending 1-11-11 **THE CINCINNATI PLANNER CO.**

Employee Jno. Smith Clock No. 90

Piece No. 2013 Order 84 Mch. 6 Quan. in Lot 10

Name of Piece Planner table Pieces Completed 4

Operation Planing Mch. Tool No. 5

	MORNING		AFTERNOON		OVERTIME		HOURS
	FROM	TO	FROM	TO	FROM	TO	
Thur.							Premium Allowed <u>14 hrs.</u>
Fri.							Time Taken <u>12</u>
Sat.							Gain <u>2 hrs.</u>
Mon.							Time Paid for <u>13</u>
Tues.							
Wed.							
Remarks							

Dept. _____

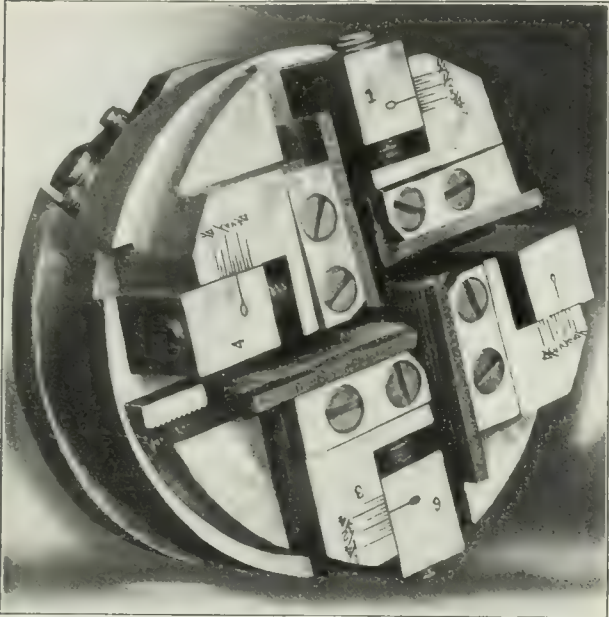
Fig. 3.—A Specimen Time Card.

when posting deliveries from stock to the inventory stock sheets described above, and the former is thus able to see at a glance exactly how stocks stand, as well as what is urgently needed, and the time it will require to get the part, or supplies, delivered; and in the case of the planer table cited, the average time it takes to machine the casting after it has been received. These reports are printed on $8\frac{1}{2} \times 11$ in. sheets and are bound in a loose leaf book in numerical order.

The time card illustrated in Fig. 3 is not only used

The Landis Solid Adjustable Die Head

A new type of die head, known as the solid adjustable die head, has been recently brought out by the Landis Machine Company, Waynesboro, Pa. In its design the maker has endeavored to embody the use of his long life, high speed, free cutting die, and at the same time secure a solid one having a very wide adjustment. The new head is intended to take the place of the solid type of die now used on screw machines where the work is



A New Type of Solid Adjustable Die Head Made by the Landis Machine Company, Waynesboro, Pa.

backed out of the die after the thread has been cut. The special advantages of this new head are that very high cutting speeds which are equal to the turning and the drilling speeds on the other operations of the screw machine are readily acquired. In this way the speed does not have to be reduced for the threading operations to accommodate the die, as frequently has to be done with solid dies. The chasers can be ground to suit the various kinds of material being cut. As any necessary amount of rake can be given, the best possible cutting condition and ideal results are said to be secured. Other advantages of this type of head are: A wide range of work can be accommodated, the ability to adjust any one chaser of a set independently of the others or replace it without replacing the complete set, and the fact that each grinding of the dies gives all the qualities of a new die.

The die head is held in the turret of any ordinary screw machine and trips by retarding the forward movement of the carriage. The tripping arrangement is such that when the desired length of thread has been cut, the die head will trip and revolve with the work until the machine has time to reverse. If desired the die head can be supplied without the tripping device to meet the requirements of special cases.

The dies are made from high speed steel and can be ground and reground many times, which gives a very long life, while at the same time it is never necessary to anneal, hob or retemper them. The dies are adjusted to and from the center on radial lines for work of different diameters and are rigidly held in their seats. In addition an adjustment to compensate for wear is also provided.

If desired one set of chasers can be readily set above or below its rated diameter, as, for example, a 1/2-in. chaser can be set to cut work having diameters varying from 1/4 to 1 in. if desired. While the angle of the thread will not be ideal, it is sufficiently accurate for ordinary screw machine work. A special set of chasers is ordinarily required whenever a pitch other than the standard is cut, but with the Landis head any diameter within

its range can be cut with one set of dies so long as the pitch is the same. Where absolutely correct pitch is required, special holders to set the chasers on the angle corresponding exactly with that of the thread should be used, but ordinarily this is not required.

Two sizes of head are regularly made. The following table gives the principal dimensions:

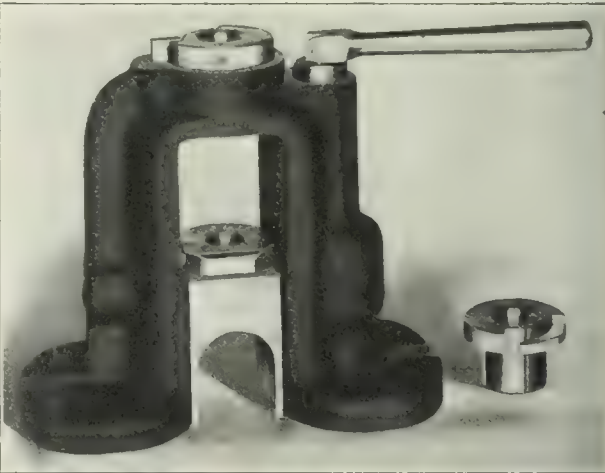
	No. 1/2	No. 1
Range of head, inches.....	3/4 to 1/2	1 1/4 to 1
Diameter of head, inches.....	2 15/16	4 5/8
Length of head, inches.....	1 15/16	3 3/8
Length of shank, inches.....	2 1/16	4 11/16
Diameter of shank, inches.....	7/8	1 1/4
Length of thread, inches.....	1 1/2	2 1/2

The larger of the two heads is the one illustrated, and sizes with special lengths and diameters of shanks can also be supplied.

Wood & Spencer Reaming and Drilling Jig

A new jig designed for high speed boring, drilling and reaming has been brought out by the Wood & Spencer Company, Cleveland, Ohio. This tool has been designated as a standard reaming and drilling jig, as it can be used on a wide range of work. It is said to be especially adapted for handling parts in large quantities on account of the quick action of its mechanism and the ease with which work can be placed and released.

The construction of the jig is very simple, and its operation is equally so, a lever and worm gear being employed to operate the gripping mechanism. A quarter turn of the lever will fasten or release the average piece. The tool will take the place of many special jigs which cannot be used after the work for which they were de-



The Standard Boring, Drilling and Reaming Jig Made by the Wood & Spencer Company, Cleveland, Ohio.

signed is finished. The construction of the tool is strong, all wearing parts being hardened and ground, and it is designed to stand the severest strain of drilling without loosening. Eight sizes of jig, ranging from 1/2 to 2 in. in capacity, are made and the weight is 30 lb.

The Bessemer Limestone Company, Youngstown, Ohio, manufacturer of paving brick and owner of extensive limestone quarries, has made some changes in its organization. The position of chairman of the board of directors was created, and J. G. Butler, Jr., was elected to that office, retiring from the presidency after a service of 24 years. The resignations of C. S. Crook as treasurer and C. M. Crook as general manager were accepted. John Tod was elected president; C. C. Blair, general manager, and John A. Rowland, secretary and treasurer.

Fires have been lighted at the new by-product coke ovens at the Gary Works of the Indiana Steel Company, subsidiary of the United States Steel Corporation, for the purpose of drying out the bricks, and it is expected that 70 of the 560 ovens will be in active operation within the next two or three weeks.

The Machinery Markets

The machinery markets in all sections seem to be gradually and conservatively strengthening. Reports from a number of sources indicate that orders taken during February exceeded those of January, and in many sections a better business was done than at any time since the summer of 1910. The decisions of the Interstate Commerce Commission against the proposed advances of railroad freight rates have not affected the railroad demand for machinery, but, on the contrary, inquiries from the carrying companies have increased. In New England the Boston & Maine Railroad is reported to be about ready to issue a list for its Concord shops, and a list of tools is out in Cincinnati calling for 22 machine tools to be delivered to the Carolina & Northwestern Railroad. The railroads are buying single tools for replacement in the East, and machinery houses in New York are bidding on two large lists issued early in the month. Chicago machinery houses are encouraged by the news that the railroads in the Southwest are letting building contracts for shop extensions, and a list is out in that market from the Santa Fe Railroad for shops at Sweetwater, Texas. A good single tool business is being done in Philadelphia, and there is an excellent call for woodworking machinery in Baltimore. Trade is good in Cleveland. A heavy increase in the volume of business is reported from the South, where development of coal properties and water works is affording an outlet for power equipment and contractors' machinery. An encouraging building movement is on in Oregon and the call for metal working tools there has increased noticeably.

New York

NEW YORK, March 1, 1911.

Several machinery selling houses in New York booked more orders in February than in any month since March of 1910. A marked feature of the month's transactions was that buyers followed their inquiries very closely with orders and a number of lists against which buying had been deferred for several weeks were closed out. During the last week new inquiries have fallen off slightly, but, all things considered, the outlook is entirely satisfactory, as most houses were kept busy filling orders placed against specifications sent out earlier in the month. Inquiries for power equipment have increased of late, and manufacturers and selling agents who handle heavy power machinery are bidding against specifications for power house material required for trolley extensions. Considerable trolley extension work has been planned in New Jersey and Pennsylvania for the coming spring, and builders of power equipment, who a short time ago were cutting prices in order to get work enough to keep their shops busy, have stiffened their terms, as there seems to be enough business in sight to go around. The railroads continue to inquire for mechanical equipment for replacement, and from the way specifications are coming out it does not appear that the recent decision of the Interstate Commerce Commission prohibiting the raising of freight rates will result in any curtailment of railroad expenditures. Machinery men who are close to the railroad situation are informed by men in charge of the mechanical departments of Eastern railroads that they have received no orders to cut down their 1911 budget.

An Industrial Training School List

Bids will be received March 9 by the Board of Education of Jersey City, N. J., for a line of shop equipment to be delivered to Public School No. 2 in that city. The list calls for a general line of mechanical equipment used in manual training, in addition to mill supplies, such as belts, pulleys, shafting, machine guards, &c. Included in the machinery requirements are eight engine lathes, all with a 12-in. swing, six with a 4-ft. bed and two with a 5-ft. bed; one lathe with a 14-in. swing and 6-ft. bed, fitted with power cross feed, belt and gear feed, tapping attachments, &c.; two hand lathes, 12-in. swing, 4-ft. bed; one 24 x 24 in. planer, one shaper, one 20-in. drill press, one milling machine, one universal grinder, one power hack saw, one universal saw bench, one 14-in. cut-off saw, one 14-in. rip saw, eight belt driven wood turning speed lathes, to turn 24 in. between centers; two belt driven speed lathes, 60-in. bed, to turn 36 in. between centers; one band sawing machine, one hand planer and jointer. A quantity of chucks, drill chucks and considerable electrical equipment is also required. Specifications for the equipment can be secured from John T. Rowland, Jr., 15 Exchange place, Jersey City, who is the supervising architect, or the secretary of the Board of Education at the City Hall.

Hazen & Whipple, consulting engineers of 103 Park avenue, New York, have inquiries out for a line of equipment for a sand filtration plant and pumping plant to be installed at Ogdensburg, N. Y. The requirements include

steam and electric pumping machinery, water turbine, electrical equipment, boilers and other appurtenances. Copies of specifications can be obtained from the consulting engineers or from the office of the Board of Water Commissioners at Ogdensburg.

The Defender Photo Supply Company, Rochester, N. Y., has in course of construction an addition to its power plant and has plans under way for an extensive factory addition for the manufacture of dry plates.

Walter E. Sexton, Mineola, has completed plans for the town of Westbury, L. I., for the construction of a system of water works to cost \$60,000.

Payne Brothers, Inc., 275 Emmet street, Newark, N. J., will erect two steel buildings, one 39 x 432 ft., and another, 50 x 160 ft., as an addition to their steel fabricating plant at that address.

The Public Service Corporation of New Jersey, whose main offices are at Newark, is arranging to build a car house at Hilton, N. J., a part of which will be given over to a machine shop for making temporary repairs to its rolling stock. The shops and car house will be one story and will be 50 x 302 ft.

The City Council of Madison, N. J., will expend \$16,678 for additional equipment for the municipal electric light plant.

Bridgeton, N. J., will receive bids until March 7 for the construction of a disposal works and pumping station. C. B. Jones is city clerk.

The Wagener Shoe Company, Penn Yann, N. Y., will erect an addition to its plant, doubling the size of the present building. Considerable new machinery and equipment will be required.

The Newcomb Carburetor Company, Harrison, N. Y., has been incorporated with a capital stock of \$100,000, to manufacture carbureters, gas engines, &c. The incorporators are Edward C. Newcomb, North Scituate, Mass.; Geo. F. Chamberlin, Harrison, N. Y., and Edwin C. Chamberlin, 4 West Eighty-fourth street, New York City.

Plans for a power house to be erected for the city of Buffalo, N. Y., in connection with the new Technical High School and a grammar school adjoining, at Bennett Park, Eagle and Clinton streets, are being prepared by Architects Miller and North, 1003 Mutual Life Building, Buffalo.

The J. W. Storandt Mfg. Company, 322-324 St. Paul street, Rochester, N. Y., manufacturer of show cases and store fixtures, is to build a new factory, 122 x 318 ft., one story, saw-tooth roof, on Lyell avenue. Bids are now being received.

The equipment for the new water works pumping station at the foot of Porter avenue, Buffalo, N. Y., to be purchased by the Commission of Public Works, will include five 30,000,000-gal. triple expansion pumps, eight 750-hp. water-tube boilers and steam mains, with feed pumps and coal and ash handling machinery, and an electric overhead crane.

The Keith Paper Company, Lockport, N. Y., is planning the erection of a paper manufacturing plant on the Niagara River, near North Tonawanda, N. Y. Charles Upson is manager.

The plant of the Brown & Kearney Company, Warsaw, N. Y., manufacturer of wood advertising novelties, is to be moved to Silver Springs, N. Y. About a year ago the company purchased the factory of the Silver Springs Mfg. Company, which it has since been operating, in connection with the Warsaw plant. The business of the company will now be consolidated at Silver Springs.

The Beebe Electric Railway System, Syracuse, N. Y.,

THE MACHINERY MARKETS

will install an additional stationary transformer of 600-hp. capacity in the Brockport substation of the Buffalo, Lockport & Rochester Railway to "step down" the high tension Niagara Falls power current to the lower voltage used for electric railway operation.

The Slater Weather Strip Company, Buffalo, N. Y., has been incorporated and will establish a plant for the manufacture of metallic weather strip. The incorporators include J. J. and H. L. Slater and D. J. Ward, all of Buffalo.

The J. M. Jones Sons Car Company, Watervliet, N. Y., is planning to erect an addition to its plant, necessitated by contracts for forward delivery recently received.

The business and plant of the Morris Machine Works, Baldwinsville, N. Y., has been taken over by the Valley Iron Works of Williamsport, Pa., and will be removed to the latter place, where space has been provided by an addition recently completed. The absorbed company's specialty was the manufacture of the Hendershot patent compression shaft coupling.

The Ridgeway Lime & Sulphur Company, Medina, N. Y., will shortly commence construction of a factory for the manufacture of spraying material and apparatus. John Crowley is president of the company.

The Niagara Radiator & Boiler Works, North Tonawanda, N. Y., E. C. Andrews, president and general manager, has awarded contracts for extensive additions to its plant at Oliver street, Ninth avenue and the Erie Railroad, which will double its present capacity. Eight new buildings will be erected at a cost of about \$100,000. An additional 96-in. cupola and new blowers will be installed; also several thousand feet of electric overhead carrier track, with necessary carriers and cranes. Later on further equipment of grinding and polishing machinery will be provided.

F. T. Elwood, Commissioner of Public Works, Rochester, N. Y., is receiving bids for a refuse incinerating plant to be constructed by the city on Falls street, at an estimated cost of \$100,000.

The Livingston-Niagara Power Company, Mt. Morris, N. Y., will build an electric power transformer station, 30 x 40 ft., 35 ft. high, at Golah, N. Y. Contract for construction has been given to the Alexander Shumway & Utz Company, Rochester, N. Y.

Chicago

CHICAGO, ILL., February 28, 1911.

The Chicago machinery market is brighter this week. Some of the numerous inquiries that have been hanging fire for the past month have been closed. Most business has emanated from farm machinery manufacturers, though some little railroad orders have been sold. The demand from automobile interests is decidedly quieter than last year at this time. Building contracts let by railroads in the Southwest are encouraging, and the activity particularly in Texas, where the Santa Fe Railroad has ordered extensive shop improvements, has lent a stronger tone to the market.

The Witherspoon-Engler Company, Monadnock Block, Chicago, has been awarded contracts by the Santa Fe for the construction at Sweetwater, Texas, of the following buildings: Woodworking machinery and carpenter shop, 40 x 100 ft., one story; open air repair shed for freight cars, 59 x 307 ft., one story; engine supply building, 40 x 80 ft.; hose house, 10 x 12 ft.; machine shop, 60 x 100 ft., two stories; lavatory building, 26 x 54 ft., two stories; roundhouse, 18 stalls, 92 x 464 ft., with 85-ft. turntable pit; blacksmith shop, 45 x 63 ft.; storehouse, 62 x 100 ft., two stories and basement; power house, 60 x 75 ft., two stories, and coal pockets and trestle. The company also has been awarded contracts by the same road for construction of the following buildings at Slaton Junction: Concrete oil reservoir, 15,000 gal.; engine and supply building, 40 x 80 ft.; hose house, 10 x 12 ft.; machine and blacksmith shop, 60 x 100 ft., two stories; lavatory building, 26 x 59 ft., two stories; roundhouse, 12 stalls, 92 x 312 ft., with 85-ft. turntable pit; power house, 36 x 72 ft., including coal pocket and trestle work. Contracts for all material to be used in construction of the buildings have been let by the Witherspoon-Engler Company, and the equipment will be purchased by the Santa Fe. It is also understood that this road is preparing to make improvements to its Cleburne, Texas, shops at a cost of about \$75,000. These improvements will consist of a new power house containing six 300-hp. boilers, dry kiln, 90-in. motor driving wheel lathe, autogenous welding plant and other new machines.

The Maple City Mfg. Company, Monmouth, Ill., manufacturer of oilers and sheet metal goods, incorporated in 1907 with \$30,000, has been reincorporated with \$150,000 capital stock, and has purchased the building in which it is located, the dimensions of which are 114 x 277 ft., four stories. Under the new organization the same officers will be in charge.

William R. Perrin & Co., Chicago, has leased a foundry at Sycamore, Ill., into which it is moving its equipment from its Chicago plant.

The Northwestern Can Company, Chicago, which recently closed a contract with Brazil, Ind., for the removal of its plant to that city, will commence at once the erection of buildings to contain 60,000 sq. ft. of floor space.

The Celfor Tool Company, Railway Exchange Building, Chicago, has under consideration the erection of a factory building at Buchanan, Mich., plans for which have not been prepared.

Sargent & Lundy, consulting engineers, Railway Exchange Building, Chicago, have preliminary plans in progress for the construction at Louisville, Ky., of a central light, heat and power plant at a cost of \$1,000,000, for the Kentucky Electric Company. Equipment will be purchased by the owners, and it is understood that no orders have been placed.

The Chicago Bearing Metal Company, Chicago, has increased its capital stock from \$250,000 to \$500,000.

The Metropolis Foundry Company, Metropolis, Ill., recently incorporated with \$3500 capital stock, has taken over an existing plant, which it expects to enlarge in the near future.

The Western Electric Company, Hawthorne, Ill., has plans prepared for the construction of two manufacturing buildings, the total dimensions of which are 100 x 300 ft. Contracts for the structural steel have been let, but the actual work of construction has not been started.

The Illinois Valley Gas & Electric Company, Streator, Ill., has purchased property upon which it is considering the erection of a power house. Sargent & Lundy, Railway Exchange Building, Chicago, are the consulting engineers.

The Atlas Tool & Implement Works, Rock Island, Ill., incorporated with \$150,000 capital stock, has taken over an existing plant which is thoroughly equipped, and will, therefore, not be in the market at the present time for material or equipment.

The E. A. Preuss Company, La Salle, Ill., has been incorporated with a capital stock of \$6000. The incorporators are Arthur E. Preuss, Geo. A. Wilson, Jr., and Thos. F. Doyle. The company will engage in manufacturing builders' and manufacturers' supplies.

The Savill-Chandler Company, Canton, Ill., has changed its name to the Canton Foundry & Heating Company, and increased its capital stock from \$40,000 to \$150,000.

The Johnson-Bore Switch-Throw Company, Decatur, Ill., has increased its capital stock from \$40,000 to \$200,000.

The city of Wheaton, Ill., will receive bids until March 6 for one 60-hp. gas engine, gas producer and pump. Louis Ellsworth is city clerk.

Philadelphia

PHILADELPHIA, PA., February 27, 1911.

February has, in some instances, proved to be a better month for orders than January, but even at that manufacturers have not booked new business in sufficient quantity to influence very greatly the recent productive rate. With general demand light, it is difficult to measure changes with any degree of certainty in the machine tool business from week to week and under conditions which have recently prevailed. The receipt of one or more fair sized orders is likely to show quite a variation in instances in the monthly percentage basis of the business transacted, which does not represent, however, the average condition in the trade. Developments during the closing week of the month have been unimportant. About the usual run of small lot business has been transacted by merchants. In several instances sales covering a number of tools for small shop equipment have been reported but there has been no fresh demand from any of the customary buyers in larger quantities. No further inquiries from the railroads in this territory have been reported, but the trade looks forward to better conditions. The freight rate decisions, while adverse to the railroads, will, it is believed, have but a temporary unfavorable influence on the business situation. The general improvement in the iron and steel trades is believed to be genuine and buying will continue to improve. In the second-hand machinery field a fair amount of business is under negotiation, but sales have not increased to any marked extent. A moderate demand for power equipment is reported, boiler shops have been quite active and sales of engines of moderate capacity have been a trifle better. The situation in the foundry trade shows little change; a little better demand for steel castings is reported, while some jobbing foundries are a shade more active.

Fire partially destroyed the copper, brass and iron working plant of George F. Ott, 207-213 Buttonwood street, on February 21. The damage was not serious and the plant was in partial operation within the week. The principal

THE MACHINERY MARKETS

damage to the machine shop was in the burning out of the motors, which have been replaced. In a short time the plant is expected to again be in full operation.

The John B. Stetson Company is preparing to build further additions to its plant at Germantown and Montgomery avenues. An eight-story addition, 50 x 81 ft., and a six-story addition, 44 x 98 ft., are proposed. Plans are by the company engineers.

The Department of Wharves, Docks and Ferries, city of Philadelphia, will receive bids until March 6 for furnishing, under schedule A, one deck and coal scow, and under schedule B one stiff leg derrick, to be erected on one of the department deck scows. Specifications may be obtained at the office of the acting director, Joseph F. Hasskarl, 555 Bourse Building.

The Reading Crane & Hoist Company, Reading, Pa., reports inquiries very good, that it has a very satisfactory amount of business on its order books and, while business in hand is not yet up to the capacity of the plant, it has been able to keep its full quota of employees engaged. This company is building two special double I-beam hand power traveling cranes for the United States Government, for use in the Bureau of Standards, which will be fitted with interchangeable parts so that they may be used either as of 4, 6 or 10 tons capacity.

The R. S. Newbold & Son Company, Norristown, Pa., considers the outlook for business decidedly better. The machine and boiler shop departments are both very busy, and while there has been a little improvement in the foundry, the improvement in that department has not been so noticeable. Orders coming in are not very large, as a rule, but in the aggregate are sufficient to keep it going fairly well and a steady increase in business is anticipated.

The Hilles & Jones Company, Wilmington, Del., advises us that its rate of production has increased materially over that of several months ago and the prospect for the future is considered favorable. Among recent shipments are punches, shears and coping machines for new structural steel shops in Baltimore, Md., and Omaha, Neb., these tools being designed for handling Bethlehem as well as standard sections.

The Light Mfg. & Foundry Company, Pottstown, Pa., is operating at pretty close to full capacity, although business generally is still considerably below that at this time a year ago. Several very satisfactory orders have, however, been recently booked, and it is believed that the demand will gradually expand, particularly during the next few months.

The Wilbraham-Green Blower Company, Pottstown, Pa., has been fairly busy for the last three months, but orders have been confined to small lots and of a varied character. New business is still inclined to drag and, while a betterment is looked for, a doubt is expressed that normal conditions in its lines will hardly be reached in the very near future.

Alfred Box & Co., Philadelphia, Pa., have appointed the Central Foundry Supply Company, Columbus, Ohio, its Western selling agent for the Box electric and hand power cranes and hoists.

New England

BOSTON, MASS., February, 28, 1911.

The machinery market has shown little change since last week. The news that the Boston & Maine will soon have out a list of machinery for its Concord shops, a list probably considerably larger than that for the Lyndonville, Vt., shops, will be received with pleasure. The dealers state that other good business is in sight. The Government shops of New England get no great amount of money under the Civil Appropriation bill. Watertown Arsenal is down for \$17,000 for completing its power plant, \$10,000 for an oil burning system and \$15,000 for a testing machine. The Springfield Armory receives \$18,300. The wire business continues good, though the copper market has affected the demand for copper and alloy lines. Business men everywhere are discussing the railroad rate case decision in its effects upon business, the common opinion being that no permanently serious results will follow, though the fear is expressed that some of the railroads will still further postpone needed improvements.

The Boston iron and steel merchants report business slow. January showed a marked decrease over the same month of 1910, and while February may show some improvement, it will probably be disappointing. One of the chief complaints is difficulty in making collections. Even some buyers who have been accustomed to do a spot cash business are permitting some little time to elapse before payment, and that class of trade which requires to be carried is waiting, on the average, beyond its normal time of settlement. Customers are buying from hand to mouth, in the belief, according to the jobbers, that they have nothing to lose by so doing, and prefer to conserve their cash resources for the present. The stocks of consumers are very low, however, and consequently

the demand must be heavy with the resumption of more active trade.

The Boston & Maine Railroad has decided to erect large addition to its repair shop at Concord, N. H., and the engineers are now working on the plans. Details are not yet available, but the officials state that a very good sized list of machine tools will be given to the trade in the near future. The matter of the big shops, to cost \$2,500,000, is not yet decided, the new site not having been selected to date.

The Waterbury Crucible Company, Waterbury, Conn., manufacturer of crucibles, is going out of business and its plant is for sale. The purpose is to move the business to Detroit, Mich., but the arrangements are not yet completed. Edgar B. Seidell, the practical man of the business, will move to Philadelphia as soon as the company's affairs have been fixed up, and proposes to take a considerable rest after 35 years in the crucible business.

The stockholders of the Chapman Mfg. Company, Indian Orchard, Mass., are considering a plan proposed by a committee of their number for a financial reorganization of the business, which includes the creation of a new corporation of similar name which would take over the entire stock and business of the present company. The proposition includes increasing the preferred stock from \$300,000 to \$500,000, but also the decreasing of the common stock from \$1,000,000 to \$500,000. The action is taken at the instance of President Adolph W. Gilbert. The consummation of the plan will place the business on a more advantageous basis.

Two great power projects have been authorized by act of the Vermont Legislature. One is that of a syndicate consisting of L. B. Dow, Boston; John E. Reynolds, New York, and Fred C. Davis, Springfield, Vt., who have acquired a large tract of land on Mill River, in the town of Clarendon, which will be developed as an electro-hydraulic plant, with an estimated capacity of 4000 hp. The Clarendon Power Company has been organized. One dam and one of two power plants will be built in the spring. The other charter provides for the incorporation of the Fifteen Mile Power Company, which proposes to erect a dam across the Connecticut River in the town of Norton, flow 4000 acres of land and create, it is stated, 40,000 hp.

The railroad facilities of New England will be increased by the carrying out of the plans of the New York, New Haven & Hartford Railroad in connection with its purchase of control, with the New York Central system, of the Rutland Railroad. By the building of a link 10 miles long in the Boston & Maine system, between South Vernon and Brattleboro, Vt., the road secures its own line to Montreal. It is believed that Boston shippers and others will be benefited by this shorter and quicker haul.

The second annual exhibition of aerial craft, which was held in Mechanics' Building, Boston, last week, demonstrated most forcibly the progress of aviation as a factor of industry. Many of the well-known American companies were represented by exhibits, most of them by fully equipped machines, and a considerable number of new concerns showed their projected heavier than air craft, or parts or accessories. Even the toy aeroplane was well represented as an established business, most interesting being the standardized parts for the use of amateurs who have taken up the hobby of designing and building models. From the New England point of view the most important exhibit was that of the Burgess Company & Curtis, Marblehead, Mass., which has established works that promise to assume still greater proportions. The Metz Company, Waltham, Mass., showed a new machine and a rotary type gasoline engine. This concern, which builds automobiles, has taken up the aeroplane in a serious way and will extend its works to provide for the new department. Other exhibits by companies not yet very well known in this field were those of the Cameron Car Company, Beverly, Mass.; Sinnott & Swinton, Reading, Mass.; Gillstrom & Johnson, Hartford, Conn.; G. G. Hubbard, Ipswich, Mass.; the J. Pollinger Aeroplane Mfg. Company, Chelsea, Mass.; Saunders & Butler, 341 Newbury street, Boston, Mass.; Boston Aeronautical Mfg. Company, 131 Cole-ridge street, East Boston; Harriman Aeromobile Company, 53 State street, Boston, and the International Airship Company, 50 Congress street, Boston. The Hendee Mfg. Company, Springfield, Mass., showed its new aeroplane engine. The standard types of flying machines were well represented. A feature of the show was the various makes of rotary combustion engines, in which a great interest was shown.

The General Mfg. Company, Waterbury, Conn., manufacturer of special rivets, screws, studs, steel balls for tumbling work, &c., has increased its capital stock to meet the demands of the growing business for new equipment, which has been purchased and installed.

The Wire Novelty Mfg. Company, West Haven, Conn., manufacturer of clothing buckles, tinner's trimmings and specialties, will erect two additions to its factory, one 46 x 64 ft. for an automatic machinery room, the other 26 x 37 ft. for the finishing department. The machinery and equipment is contracted for, the company states.

THE MACHINERY MARKETS

The Connecticut Bed Spring Company, Waterbury, Conn., has been incorporated under Connecticut laws, with capital stock of \$10,000, of which \$2500 has been paid in. Charles Walzer is the president and treasurer and Benjamin Bernstein secretary. The factory will be located in Waterbury.

The Columbia Carriage & Rattan Company, Fitchburg, Mass., is equipping a factory for the manufacture of high grade children's carriages, and proposes to create a business of large size, the available floor space permitting of the employment of 300 hands. The office is at the corner of Water and Newton streets.

The Bradford Dyers' Association, Bradford, Yorkshire, England, has acquired some 800 acres of land between Niantic and Westerly, R. I., and proposes to erect a large plant and create a model factory village on the premises, at a reported cost of \$1,000,000. An important water power is included in the land holdings of the Syndicate, which will be developed for power. A storage reservoir will be established.

The United Drug Company, Boston, Mass., has selected Kansas City as the site of a new Western plant, and states that it will erect a building containing approximately 144,000 sq. ft., five stories and basement, either of brick, steel and concrete, or of mill construction, more probably the latter. The company assumes that the building will cost about \$240,000 and its equipment \$150,000.

The Richard French Iron Works, Worcester, Mass., manufacturer of structural and ornamental steel and iron work, has awarded the contract for a forge shop 36 x 94 ft.

J. L. Brackett & Co., Portland, Maine, box manufacturers, whose large plant was destroyed a week ago, state that they will not rebuild immediately.

Cleveland

CLEVELAND, OHIO, February 28, 1911.

Business in the local machine tool market shows practically no change. Dealers are getting a fair volume of single tool orders and inquiries, but there still is a noticeable absence of inquiries of any size. Large manufacturing concerns as a rule are refraining from coming into the market, practically all of the business being from small manufacturing plants and repair shops. There is about as much inquiry for second-hand as for new tools, second-hand lathes being particularly in demand. The decision of the Interstate Commerce Commission refusing to allow increases in freight rates will, it is expected, have the effect of holding back some prospective business, particularly from the railroads. In addition to machine tool equipment inquiries are pending from several railroads for coal and ore handling plants, and manufacturers of this class of equipment fear that these orders may be held up for a time, although they do not believe that the purchases of plants that are needed will be deferred an indefinite length of time.

The Bryant Heater & Mfg. Company, Cleveland, has been incorporated with a capital stock of \$50,000 by Charles L. Bryant, Otto Fix, B. A. Hendricksen, Guy M. Lee and Albert C. Orth. The company will succeed to the business of the Natural Gas Regulator Company, which has a plant at 978 East Sixty-fourth street, the new name being more representative of the company's present line of products, which are mostly water heating goods in all kinds and radiators. Charles L. Bryant is president and G. M. Lee secretary.

The Colonial Ice Company, Cleveland, will build a new artificial ice manufacturing plant with a daily capacity of 85 tons. The contract for the equipment has been awarded to the Great Lakes Engineering Works of Detroit.

The National Metal Reduction Company, Cleveland, has been incorporated with a capital stock of \$10,000 by A. D. Levy, Max Stotter, S. M. Ploe and others.

It is announced that the Chesapeake & Ohio Railroad has decided to go ahead with the improvements outlined for that road and its subsidiary, the Hocking Valley Railroad, several months ago. The plan contemplates the construction of a new concrete dock in Toledo, Ohio, enlargement of the terminal facilities and yards in Toledo and double tracking the road between Toledo and Columbus.

The plant of the Bonnot Company, Louisville, Ohio, was destroyed by fire February 22, the loss being about \$25,000. This plant was used for the manufacture of warm air furnaces. The company makes its other products at Canton, Ohio, where its headquarters are located. No action has been taken as yet regarding the rebuilding of the plant.

The Canton Rubber Company, Canton, Ohio, of which R. D. Bradley is president, announces that it will soon begin the erection of a new plant. A site has recently been purchased on Marion street adjoining the Pennsylvania Railroad. A three or four story building will be erected, about 50 x 250 ft. The capital stock will be increased from \$24,000 to \$200,000.

The General Fire Extinguisher Company, Providence, R. I., which is erecting an addition, 150 x 350 ft., to its plant at Warren, Ohio, to be used for enlarging its pipe cutting and storage departments, will install 10 new pipe threading machines, two cutting-off machines, a 5-ton crane with 25-ft. lift, a 60-ft. electric traveling crane; and about 30 individual motors for driving the old and new pipe threading machines.

The question of securing a satisfactory water supply which has been the cause of a long drawn out controversy in Akron, Ohio, has been solved by the reaching of an agreement by the city and the Akron Water Works Company, according to the terms of which the latter agrees to install a water purification system within 90 days.

New light, power and water plants are planned in North Brewster, Ohio, by the North Brewster Electric Light, Heat & Power Company and the North Brewster Water Supply Company, which were recently organized.

The business of the Lewis Welding & Mfg. Company, Toledo, Ohio, has been incorporated with \$10,000 capital stock. The business has been established about a year. The company makes a specialty of valves for automobiles, stationary and marine motors, and does a general electrical welding business. No improvements are contemplated at the present time, but the company states that it is increasing its equipment from time to time to take care of its increasing business.

Detroit

DETROIT, MICH., February 27, 1911.

A somewhat peculiar condition exists in this city in the automobile and auto accessories trade. While the former are commenting on the general healthy condition, in fact, excellent, of the motor car industry, the latter are complaining of a very noticeable slump. One city salesman explains the situation as being the natural result of an oversupply of last year's products by the motor car men, and the effort to use this material in 1911 models, which in several cases are practically the same and in one case exactly identical with last year's model. While the manufacturers of the motor cars report excellent sales, these sales are not in Detroit, but to outside agents. Eight salesmen for one concern of this city report the disposal of one lone car between them in this city for January.

The Huron Motor Car Company of this city has filed articles of incorporation with the Secretary of State at Lansing. It is a new addition to this city's automobile colony, and starts operations with a capital stock of \$50,000. The company's products will constitute gas engines and gas engine parts, as well as motor cars.

The new Studebaker corporation, recently organized, will combine the interests of the E. M. F. plant of this city and the Studebaker plant at South Bend, Ind. Clement Studebaker, Jr., states that the new company will erect at Detroit the largest automobile plant in the world.

The Buhl Malleable Company, along with other improvements, will erect a large new annealing room adjoining the main factory.

The John Scott & Co., recently organized, will erect a big ice making plant at Hastings and Trombly avenues. The plant will be one of the largest in the State.

The Chicago Pneumatic Tool Company is engaged in several improvements to its Detroit plant. A subsidiary machine shop, adjoining the main factory, is one of the items.

A new generator house will be erected by the Detroit & Suburban Gas Company. The structure will be a two-story steel frame building.

The Arctic Ice Cream Company has let the contract for a one-story factory at Sycamore and Grand River. The plant will cost around \$12,000.

The Grand Rapids Upholstering Company has the plans completed for the construction of a branch factory at Cadillac, Mich., to manufacture a fireless cooker as a side line. This product has become so important a feature as to justify considerable development.

The Kawneer Mfg. Company, Niles, Mich., originally manufacturer of store fronts and barbers' fixtures, is branching out in other lines. Its growing trade has made necessary the erection of a new factory, 60 x 365 ft. This will give a total floor space of 66,300 sq. ft.

The Brooks Aeroplane Company, lately organized at Saginaw, Mich., has filed articles of incorporation with the Secretary of State. The company will deal in aeroplanes and accessories. C. C. Brooks has the management of the new company in hand.

The Iosco Turpentine Company, Iosco, Mich., will begin work on its plant within the next 60 days. The company is organized under the laws of Ohio, with a capital stock of \$250,000, and will install apparatus to make the finished

THE MACHINERY MARKETS

product. The company will commence operations with a battery of six retorts, which will shortly be increased to 36.

The Bainton Electric Steel Company, Buchanan, Mich., capitalized at \$150,000, is preparing the plans for the erection of a plant.

C. A. Freeland will rebuild his tank factory at Sturgis, Mich., on the site of the one recently burned. The new factory will be of frame construction, covered with steel. The foundry department will be doubled in size and will be separate from the main building.

On account of the rapid advance of the Korf Mfg. Company, the stockholders have decided that the erection of a new factory is an absolute necessity. The new plant is to be practically double the size of the present one.

The W. A. Forbes Company of Caro, Mich., has reorganized and incorporated to manufacture sash doors, with a capital stock of \$10,000. The old plant will be enlarged and several improvements made.

The L'Anse Bay Lumber Company, L'Anse, Mich., was organized last week, with a capital stock of \$250,000, and articles of incorporation filed with the Secretary of State. The company will erect a modern double band saw mill on the site of the one which was burned several years ago. The new mill will have a capacity of 75,000 ft. per day. A lathe and shingle mill, as well as a planing mill, will be run in connection with the main plant.

Harrison, Clare county, will vote at a special election this spring on the question of bonding the city for the construction of a municipal water works and electric lighting plant.

Hillsdale, Mich., is planning to spend \$10,000 for improvements to its lighting plant. The matter is in the hands of the Business Men's Association.

The Fox & Mason Furniture Company, Corunna, Mich., has taken over the plant of the Corunna Furniture Company. The new concern is incorporated, with \$260,000 capital stock, and will combine and remodel the two plants.

The Champion Brewing Company of this city will build a new fireproof engine house and condensing room. The old engine will be replaced by a new.

City Commissioners of Ypsilanti, Mich., are planning numerous improvements. In addition to a new generator for the lighting plant, it is proposed to completely change the lighting system. George G. Scott is chairman of the committee.

The Handy Things Company, Ludington, Mich., suffered a bad loss February 20, when the old turning department was completely destroyed by fire. The loss is estimated at \$60,000, with insurance at \$35,000. It is not known whether the turning plant will be rebuilt.

A new stock organization, to be known as the Michigan Glass Company, Saginaw, Mich., with a capital stock of \$50,000, was incorporated last week. The plant, construction on which will begin at once, will turn out glass bottles and other glass products. F. C. Simon has been made secretary and general manager.

The Newago Engineering Company, Newago, Mich., has started the construction on a two-story factory, to care for its fast increasing business. The Henry Rowe Mfg. Company of the same city is planning similar action. The above concerns formerly occupied jointly the plant of the Newago Chair Company, which will now occupy the entire structure. This will bring considerable new machinery to the little town of Newago.

Ground will be broken within a short time for the erection of a large addition to the plant of the Kellogg Toasted Cornflake Company, Battle Creek, Mich. The new building will be of brick and reinforced concrete, 63 x 150 ft., five stories.

The Acheson Oildag Company, Port Huron, Mich., is being crowded out of its present plant, and in view of this fact will build a new factory late this spring.

Hastings, Mich., is looking forward to the construction of a water power lighting plant. A committee, with C. H. Barber as chairman, has visited several plants in the State, and recommends a \$125,000 structure.

The Grand Rapids Textile Machinery Company filed articles of incorporations at Lansing this week. The company has a capital stock of \$30,000 and will manufacture a patent folding machine for handling fabrics in textile mills.

Another new Grand Rapids concern is the Oswald Motor Car & Supply Company, with a capital stock of \$12,000. The company filed articles of incorporation this week. Charles J. Oswald is the principal stockholder.

The Wilder-Strong Implement Company, Monroe, Mich., suffered a severe fire loss February 24. The damage will cause a cessation of operations until the plant can be rebuilt.

The Pontiac Pouring Block & Brick Company is the name of a new organization formed in Pontiac, Mich., this week. The company will manufacture a new style of brick

cement block invented by A. J. McIntyre of Detroit. A. E. McLintock is the organizer of the company.

Kalamazoo, Mich., is agitating the question of a new lighting plant. Either a new plant will be built or the present one thoroughly overhauled. A committee, with Alderman Maus as chairman, is advising with outside parties as to the probable cost of a new plant.

The B. O. S. S. Company of this city organized this week with a capital stock of \$250,000, to manufacture a car with entirely new features. A peculiar feature of the car will be the adaptability to the wants of the owner. It is to perform all the functions of a passenger, delivery and merchandise car with a 35-hp. engine.

W. H. Steger, who for the past 11 years has been associated with the Whithead & Kales Iron Works, has left that concern to become a partner in the new Daigle-Steger Iron Works.

The South Haven Chemical Works, South Haven, Mich., is the name of a new company organized for the manufacture of a lime-sulphur solution for commercial spraying preparations.

The Rapid Turn Expeller Snow Plow Company is an entirely new industry for Detroit. The concern has a capital stock of \$100,000, and will manufacture a patent snow plow for use on steam and electric railroads. Wm. H. Law has the company's affairs in hand.

The Phipps-Grinnell Auto Company is another addition to this city's auto concerns. The company has a capital stock of \$100,000, with J. G. Phipps as president.

The Johnson Engineering & Construction Company, Battle Creek, has been organized. The purpose of the corporation is to install steel and iron work in buildings and bridges and to manufacture steel and other metals.

The Acme Screw Company has been incorporated, and will engage in business with a capital stock of \$30,000.

The Seitz Automobile & Transmission Company, manufacturer of motor trucks and delivery wagons, Detroit, Mich., has had its foundry in operation since January 20, and for the present will make crucible steel castings only. Malcolm MacLeod, who is one of the oldest men in the crucible steel business in this country, and has been with well-known foundries in Chicago, Milwaukee and Minneapolis, is in charge.

The business of the Grand Rapids Machine Tool Company, Grand Rapids, Mich., has been incorporated, with \$20,000 capital stock. The officers are: Matthew Lund, president; J. F. Nellist, vice-president; G. C. Mason, secretary and treasurer.

The Detroit Foundry & Mfg. Company has been incorporated at Detroit, Mich., with \$50,000 capital stock. The company has leased a factory building at 13 and 15 Macomb street, which it has equipped for the manufacture of brass and aluminum, sheet metal work, automobile parts and accessories. John T. Rich is president; Dr. D. A. MacLachlan, vice-president; Jonathan Palmer, Jr., secretary; George E. Lawson, treasurer.

The Alma Mfg. Company, Alma, Mich., is making changes in its factory preparatory to the manufacture of motor trucks. Some new equipment will be purchased, although the company does not expect to greatly enlarge its facilities until later on.

The Michigan United Railways Company, Jackson, Mich., has a force of engineers on its lines taking measurements and obtaining sites and preparing specifications and estimates for the installation of power plants to be owned and operated by the company.

It is reported that the Gogebic & Iron Counties Railway & Light Company, Ironwood, Mich., is about to commence the construction of an electric light plant and railroad.

Indianapolis

INDIANAPOLIS, IND., February 27, 1911.

The Indiana Furnace Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture furnaces. The directors are Edward H. Robinson, William M. Bliss and H. B. McKee.

The Wilson Window Guard Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture window guards and other appliances. The directors are R. H. Wilson, W. W. Wilson and M. E. Nebeker.

The Bedford Stone & Construction Company, Indianapolis, has increased its capital stock from \$100,000 to \$200,000.

The Citizens Light & Fuel Company has been incorporated at Washington, Ind., with \$75,000 capital stock, to supply light and fuel. The directors are Paul M. Taylor, Thomas Burns and L. P. Boyle.

The Oolitic Operative Quarries Company, Bedford, Ind., has increased its capital stock from \$25,000 to \$50,000.

The Southern Railway's repair shops at Youngstown,

THE MACHINERY MARKETS

Ky., have been sold to the Kentucky & Indiana Bridge Company, and the repair work of the Louisville division of the road will be done hereafter at Princeton, Ind., probably making necessary the enlargement of the company's shops there.

The Contract Company, Evansville, Ind., has been incorporated with \$10,000 capital stock to do a construction business. The directors are B. C. Hubbard, E. J. Avis and C. Jones.

The New-Idea Specialty Mfg. Company has been organized at Fort Wayne, Ind., to manufacture novelties. The directors are L. J. Libbing, H. L. Sommers, A. C. McCoy, G. A. Dehm, John Wilding.

The Beers-Offutt Construction Company, Fort Wayne, Ind., has increased its capital stock from \$10,000 to \$25,000.

Baltimore

BALTIMORE, MD., February 25, 1911.

While the general business situation in lines identified with the machinery, tool, iron and steel trades has changed but little, in some lines the month of February will show a slight gain over January. There is a feeling that a betterment is in sight, although some hesitancy is anticipated in lines identified with railroad work. It is too early to estimate the full effect which the adverse rate decisions will have on railroad buying, but it is thought that it will result in but a temporary check, as many roads are understood to be actually in need of equipment of various kinds.

Machine tool merchants report a somewhat better demand; while metal working tools have not been particularly active, woodworking machinery has been in much better demand and inquiries in most lines have been quite plentiful. The general market for tools continues along rather narrow lines, buying being confined principally to small lots and single tool propositions. The volume of business in small tools and machine shop supplies rules somewhat better, and in instances a very fair total for the month is reported. In the foundry trade irregularity characterizes the demand, particularly for machinery castings, but a fair business is being done in architectural and builders' castings.

While there have been no new building propositions of large size projected recently, work of fair size is quite plentiful. A few good contracts for buildings have come to fabricators of structural material, for which class of work competition is sharp, as few plants have more than enough work to enable them just to keep wheels turning. Considerable estimating is being done, but the major portion of the work offered is small. There has been a better proportion of municipal work offered and more is in prospect, but there has been little of late which directly interested machinery and tool makers. In some lines the demand from the Southern territory has been fairly active, in others the movement continues light. A moderate amount of work has been contracted for by heating and ventilating engineers, but the major portion of the orders recently taken have been small. Boilermakers are more active and an increase in engine sales is reported. While the trade scarcely anticipated any large volume of business during February, it is believed that with the opening of the spring season, near at hand, more active conditions generally will prevail and a betterment in practically all lines is expected during March.

Bids under revised plans for the construction of the new buildings for the Baltimore Bargain House are due on March 6. Local as well as out of town builders and contractors are estimating.

The Maryland, Delaware & Virginia Railway will make considerable improvements to its Light street piers. Information is to be obtained at the office of the company, Pier 1, Light street.

The Dix Mfg. Company, manufacturer of door hangers, reports a fair volume of business, principally from the South, business in the West and East being still somewhat irregular. From present indications a better demand is anticipated in the near future.

Painter & Posey, engineers, will supervise the engineering features of a heating plant and laundry to be installed in Frederick, Md. Details are not available at this time, although Mullett & Co., architects, are understood to be preparing plans for the necessary building.

It is reported that a company, to be known as the Maryland Metallizing Company, will be formed, with a capital stock of \$100,000, and will erect a plant and engage in the manufacture of metallized products, particularly for interior finish. The process involves the metallizing of wood, plaster paris and other substances. George M. Griffith, Calvert Building, is reported as being directly interested in the new enterprise.

The Crook-Kries Company, while it has not booked any heavy heating and ventilating contracts recently, is actively engaged on several large orders. A very satisfactory amount

of small work has been taken, and February will show a greater volume of actual business under way than was the case in January, prominently among which is the installation of the power, heating and ventilating equipment of the Fidelity Building, under the direction of Pearson Noah, consulting engineer.

Work of demolishing the old Munsey News Building, at Calvert and Fayette streets, has been begun, and city permits for the erection of the new building, designed by McKim, Mead & White and Baldwin & Pennington, architect, have been taken out. The new building will be 18 stories and fireproof throughout.

John S. Biddison and J. C. Bowen, receivers of the Baltimore Foundry Company, sold at public sale, under authority of the court, on February 24, the foundry equipment, tools, power equipment and supply of materials on hand, at its plant at Bush and Wicomico streets. The real estate was not sold, having been leased. The plant has been idle for something over a year.

John D. Adt reports a continued fair volume of business; the demand for elevators, tobacco machinery and other specialties has been good, and it is still necessary to operate various departments of the plant overtime in order to keep up with the demand. While the major portion of the orders recently received have been individually small, the aggregate is sufficient to bring the volume in February above that of the previous month.

The Baltimore Bridge Company has been awarded the contract for the structural work, 1500 tons, for the Woodward Building, Washington, D. C., and will also fabricate the steel work for the Empire Theater in this city. Orders have also been taken for the steel work for three small buildings for the Tidewater Portland Cement Company, Union Bridge, Md. This company is quite busy in its various departments and has sufficient work on hand to keep it fairly actively engaged for several months.

The T. C. Bashor Company notes a steady betterment in the demand for its various lines. Several moderate contracts for heating and ventilating have been taken, and estimates on further work of this character are out. Considerable business in boilers, tanks and special equipment has recently been booked and its boiler shop is fully engaged. A contract for a large amount of special pipe work in connection with the new addition of the Hochschild-Kohn Company has also been taken by this company. February business, however, has not been up to that of the previous month, which with this concern was particularly active.

Plans and specifications have been approved and bids for the erection of a power house and two cottages at the Springfield State Hospital, Sykesville, Md., have been asked by Dr. J. Clement Clarke, superintendent, at the address named.

Dietrich Brothers have recently taken a number of orders for small buildings, on which the quantity of structural and ornamental work runs from 25 to 100 tons. A good order for concrete bars from the Andrew Miller Company, contractor, for use in the construction of the Back River Bridge, in Baltimore County, is also noted, and the month's business will be ahead of that for January. Business in jobbing lines is reported light. Dietrich Brothers will move into their new office building, adjoining their present plant and which has just been completed, on March 9. The new ornamental and structural shop, now building, is progressing favorably and will be under roof in a few weeks.

Agreements have been filed covering the lease of the large factory property at Bayard and Nanticoke streets from the Consolidated Gas, Electric Light & Power Company by Harry W. Hunter, president of the Baltimore Gas Appliance & Mfg. Company, a new concern, which will manufacture gas ranges, heaters, &c.

The Baltimore Retort & Fire Brick Company has booked considerable business, particularly in work identified with boiler settings, orders for materials connected with that character of work for the Emmerson Hotel, Emmerson Tower Building, Hochschild-Kohn Company, Steiner Mantel Company and Mathai Ingram branch of the National Enameling & Stamping Company being recently taken. Good orders from interests in Washington, D. C., Wilmington, Del., and other points are also reported. The outlook for future business is good and the plant of this company, which has been particularly active of late, will in a few weeks be operated on full time.

The Aumen Machinery & Supply Company reports a better demand for machinery and tools. While the demand for metal working machinery has not shown any marked betterment, that for woodworking tools and machinery has been decidedly more active. Inquiries have increased and a large number of moderate propositions as well as a few sizable ones are being figured on. The general supply trade, while not yet fully up to normal, shows a betterment, and the outlook for more active business conditions is considered favorable.

A can packing plant is projected by Wm. Numsen & Sons, Inc. The proposed plant is to be erected at Chestertown,

THE MACHINERY MARKETS

Md., and it is stated that further information in reference to it may be obtained by addressing J. H. Thomas, secretary, 18 Light street, Baltimore, Md.

Plans are in course of preparation for the erection of a light manufacturing plant to be erected for the Beehive commission, of which D. C. Amindon is chairman, at Preston street and Clifton place. The proposed building is to be fireproof, seven stories. Theodore W. Pietsch is the architect and P. C. Keilholtz, consulting engineer.

Plans and specifications for the erection of a large warehouse for the Western Maryland Railroad are, it is reported, to be revised. The proposed structure is to be four stories, of concrete and stone. It will be fireproof throughout and the latest facilities for warehousing installed.

The Consolidated Gas, Electric Light & Power Company has had plans and specifications prepared for the erection of a large storage battery plant adjoining its substation on McClellan alley, between Baltimore and Fayette streets. The building is to be two stories, of brick and concrete, with steel girders. The building will cost about \$50,000, while the cost of the electrical equipment to be installed will aggregate \$250,000. Bids for the construction of the plant will shortly be asked.

Bids for the new addition for the Polytechnic Institute, North avenue, between Guilford avenue and St. Paul street, were opened February 24. Plans are by Baldwin & Pennington, architects. The lowest bid, that of Charles L. Stockhausen, aggregating \$385,000, is understood to be slightly above the appropriation, but it is probable that the contract will be awarded to the bidder mentioned. About 500 tons of structural material will be required under the present plans, and important heating and ventilation work is to be done. Henry Adams is the consulting engineer.

Considerable municipal work is expected to come out the next month or so. The Board of Awards of the city of Baltimore is now considering bids received last week for extensive sewer work and for water piping and heating apparatus in connection with the new sewage pumping station. Proposals for furnishing the Department of Street Cleaning with supplies for the year ending March 15, 1912, will be received by the board until March 1. These include hose and supplies, carts and bodies, hardware, tools, iron and steel, &c. Bids will also be received until March 15 for extensive work for the Sewage Commission, under contract No. 12, specifications for which may be obtained by application to the commission. Among other items mentioned under this contract are 110,000 lb. of steel reinforcement and a number of manholes, inlets and inlet connections.

Cincinnati

CINCINNATI, OHIO, February 28, 1911.

The South has recently furnished local machine tool builders some excellent but scattered business. Orders are mostly for lathes, and February is reported by a few lathe makers as being a better month than any since June of last year.

The recent decision of the freight rate question is expected to bring out some good business soon from the railroads, as there is now no incentive for them to hold back on orders for equipment needed. Thus far, however, the railroads in this vicinity have made no move toward placing any large orders for machine tools.

There is said to be some improvement in the demand for boilers. Inquiries for sawmill and woodworking machinery are also increasing.

Cincinnati manufacturers are taking a great deal more interest in foreign business. S. P. Eagan of the J. A. Fay & Eagan Company, one of the largest exporters here, is one of the leading spirits in trying to impress on local manufacturers the importance of this trade, especially with nearby Spanish-American countries, and it was largely through his efforts that a series of meetings were arranged for the latter part of next week, which will be addressed by J. Nelson Polhamus, Cuban Consul at New Orleans. Mr. Polhamus intends to give some interesting information as to why European merchants are able to control so large a percentage of business in Cuba in competition with America.

To manufacture and deal in machinery the Beard-Stephan Company has been incorporated at Columbiana, Ohio, with \$10,000 capital stock. The incorporators are Clement E. Beard, Fred Thomason, J. R. Jeffrey, Fred D. Lodge and J. E. Hazard.

The Imperial Motor Car Company, Cincinnati, is to build a large garage on Madison avenue, which will probably be fitted up with a small repair shop later.

It is reported that the Greenville Light & Power Company, Greenville, Ohio, has plans under way for an addition to its plant. The company's capital stock was recently increased from \$30,000 to \$50,000.

The Carolina & Northwestern Railroad, L. T. Nichols, general manager, Chester, S. C., is inquiring in this market

for prices on the machinery list given below. It is understood that purchase of this equipment will be made within the next few days:

One 24-in. back geared shaper.
One 3-ft. heavy duty, high speed, back geared radial drill.
One 21-in. back geared upright drill, with tilting table.
One iron planer, 24 x 42 in. by 15 ft., having two or more speeds; one head on cross rail and one head on side.
One 36 x 36 in. by 13 ft. planer, similar specifications as above.
One 18-in. by 12-ft. engine lathe.
One 24-in. by 12-ft. engine lathe.
One 36-in. by 12-ft. engine lathe.
One 42-in. by 18-ft. engine lathe.
One 24-48-in. by 12-ft. extension lathe.
Two 16 in. by 16-ft. gap lathes, equipped with taper attachment.
One car wheel boring machine.
One individual rotary flue cleaning machine.
One 2-in. bolt cutter, with dies to cut all U. S. standard threads from $\frac{1}{8}$ to 2 in.
One belt driven air compressor.
One two-wheel Benck twist drill grinding machine.
One 50-hp. steam engine.
One 50-hp. steam boiler.
One combination rip and cut off saw, to take saws up to 14 or 18 in. in diameter.
One 12-in. universal woodworking machine with large back table top, &c.
One 48-in. heavy duty band saw (make price for motor driven saw also).

Plans for the new factory of Kirk & Blum, Cincinnati, have about been completed and the company is soliciting quotations on the necessary metal working machinery. They are especially desirous of getting in touch with a manufacturer who can furnish them a machine for cutting, edging, forming and seaming of galvanized iron rectangular ducts.

Connill, Demers & Co., Bahia, Brazil, have written the Cincinnati Commercial Association asking for the names of manufacturers of sawmill machinery here. It is stated this company is in the market for a large lot of machinery for its own account.

To operate a canning factory the Mason Canning Company has been incorporated at Mason, Ohio, with \$12,000 capital stock. The incorporators are Newton E. Rummell, C. C. Enloss, W. R. Chase, W. E. Scott, George W. Tetrick, M. C. Wikoff and W. H. Williamson.

The Jaeger Machine Company, Columbus, Ohio, has increased its capital stock from \$25,000 to \$40,000.

The City Council of Sandusky, Ohio, is preparing to establish a municipal electric light and power plant.

The Superior Gas Engine Company, Springfield, Ohio, is considering the erection of an addition to its plant this spring, 200 x 600 ft., two stories. This addition will practically double the capacity of the company.

The Foos Gas Engine Company, Springfield, Ohio, is making preparations to build an addition to its plant this spring, 80 x 300 ft., at an estimated cost of \$50,000.

Toronto

TORONTO, February 25, 1911.

The reciprocity agreement and the chances of its being established are occupying the thoughts of the great mass of the Canadian people. The uncertainty of the issue has evidently a quieting influence upon business. There are some projects that will not be carried out if the agreement becomes law, and there are others that will be undertaken only in the event of its becoming law. From several towns come reports that construction on proposed American branch factories is being delayed, and will be abandoned if reciprocity is established. From the West come assurances that Hill lines from the border will at once be built into the interior if the agreement passes. Few careful people will venture an opinion as to whether the sum of the effects of reciprocity would be immediately good or bad. All agree that the present state of indecision on the subject is bad, and hope that it will not be unduly prolonged. Unquestionably the sense of Canadian manufacturers is against reciprocity, but to chronicle that as a fact is not to report that they are convinced their business will suffer from the present measure of reciprocity. They are afraid of the wedge being driven farther in the near future if the edge is inserted now. One instalment of reciprocity will, they think, bring on another, and, however that might affect other Canadian industries, the manufacturers have no doubt it would be bad for theirs.

The Beach-Edison Car Company has written to the City Engineer, Toronto, offering to supply the municipality with double track storage battery cars at \$12,500 each in Jersey City, N. J. This would mean a price of about \$16,000 for the cars delivered in Toronto. The city would require 40 of such cars for the lines proposed to be operated at present.

The first part of Winnipeg's municipal hydroelectric power plant is nearly completed. When the whole plant is completed it will contain 14 generator units of 5200 hp. each, and two exciters of 500 hp. each. The five generators and two exciter sets that make up the present installation

THE MACHINERY MARKETS

have been supplied by Jens Orten-Böving & Co., London, England.

The Spanish River Pulp & Paper Company has completed arrangements for the building of a paper mill in connection with its big pulp mill at Espanola, Ont., the capacity to be 100 tons per day, and the cost to be \$1,000,000. It is expected that the mill will be ready for operation by next October. Tenders are being called for the construction of the buildings and the machinery is being arranged for with Canadian and American makers of such plant.

The principal boards of trade throughout Canada have passed resolutions disapproving the reciprocity agreement.

It is announced that the Oliver Chilled Plow Works Company of Canada, which recently took out a permit for the construction of an additional \$200,000 building in Hamilton, Ont., will spend \$600,000 on its plant there as fast as it can get the work done for that outlay.

Hamilton manufacturers using hydroelectric power are complaining loudly of the interruption of the Cataract Power Company's service because of accidents to generators.

H. E. Vautelet has tendered to the Dominion Government his resignation from the Board of Commissioners appointed for the construction of the Quebec Bridge. The official design, which was largely his work, was not the one finally adopted, the two engineers appointed after the tenders were in having, it is understood, decided the choice in favor of a plan submitted by the St. Lawrence Bridge Company, along with a tender for building the bridge in accordance therewith. Within a few days it will be announced in Parliament what firm is to get the contract. Representatives of the St. Lawrence Bridge Company are now in Ottawa presumably in connection with the business.

To induce manufacturers to use the power the municipality is taking from the Hydro-Electric Power Commission the City Council of Guelph, Ont., has been agreeing to install motors and sell the power at a price that is supposed to be attractive. To this exception has been taken by the commission, but the City Council is disinclined to change its policy, which means an increased demand for motors.

Edwin L. Gould of the Gould, Shapley & Muir Company, Brantford, Ont., manufacturer of gasoline engines, pumps, &c., is in favor of the reciprocity agreement.

The North American Smelting Company has purchased a site for a lead smelter in Kingston, Ont.

The Engineers' & Plumbers' Supplies Company is planning to erect a large warehouse in Regina, Saskatchewan, in the spring.

The Ideal Foundry Company is building a new foundry in Chatham, Ont.

Announcement is made that the British Columbia Marine Railway Company will build a dry dock to cost \$3,000,000 at Lang's Cove, Esquimalt, on Vancouver Island.

A United States company using iron and steel as raw materials is in negotiation with the Industries Committee of Chatham, Ont., for the establishing of branch works there to cost between \$50,000 and \$100,000, and employ 150 men.

It is stated that a depot to cost \$1,000,000 will be built at Winnipeg, Man., for the Hill railroads.

The Canadian Gate Company, Ltd., has been incorporated at Guelph, Ont., with \$40,000 capital stock, and will commence the erection of a factory building about March 1. H. Ralph Steele is manager of the company.

The Welland Machine & Foundry Company, Welland, Ont., has been organized by J. H. Crow, W. H. Crowther, G. W. Sutherland and others, who will obtain a provincial charter. The new company will take over and continue the manufacturing business of the Robertson Machinery Company at Welland.

The Climax Good Roads Machinery Company, Hamilton, Ont., has been granted a charter by the Dominion Government, with a capital stock of \$40,000, to manufacture road machinery. Among the directors are John Robinson, Hanlan Robinson and Wm. J. Robinson.

The Pratt & Letchworth Company, Buffalo, N. Y., manufacturer of iron, steel and malleable castings, will establish a Canadian branch at Brantford, Ont., having obtained a provincial charter under the name of the Pratt & Letchworth Company, Ltd., with a capital stock of \$350,000, to manufacture iron and steel products. Ogden P. Letchworth of Buffalo is president of the company.

The City Council of St. Catharines, Ont., has passed an ordinance granting the Steel & Radiation Company 35 acres of land on which to build the extension plant it is planning to erect in that city.

The F. N. Burt Company, Ltd., Toronto, the Canadian branch of the F. N. Burt Company, Buffalo, N. Y., has increased its capital stock from \$1,500,000 to \$2,250,000 by the issuance of \$750,000 additional preferred stock. Of this new stock between \$300,000 and \$350,000 will go as purchase price for the Dominion Paper Box Company of Toronto, recently acquired by the Burt Company, which will operate the plant from now on.

The Adam Hall Company, Ltd., Peterborough, Ont., has been granted a charter, with a capital stock of \$100,000, by the Dominion Government to manufacture stoves and ranges. The provincial directors are Adam L. Hall, Wm. T. Hall, Robt. R. Hall and F. Hall, all of Peterborough, Ont.

Milwaukee and the Northwest

The I. B. Rowell Company, Menominee Falls, Wis., is preparing plans to build a complete new and up to date manufacturing plant with a floor space of approximately 200,000 sq. ft., which will be equipped with the necessary machinery for the manufacture of agricultural implements.

The Dillingham Mfg. Company, Sheboygan, Wis., has recently completed the erection of a warehouse, 35 x 150 ft., for the storage of refrigerators.

The Brandt-Dent Company, Watertown, Wis., is contemplating the erection of a brass foundry, 32 x 32 ft.

The City Council of Menasha, Wis., is considering ways and means of increasing the capacity of the municipal light plant.

Baraboo, Wis., has under consideration the construction of a light, heat and power plant at an estimated cost of \$45,000.

The Phoenix Chair Company, Sheboygan, Wis., will place a contract within the next 15 days for a three-compartment dry kiln, cross pile, moist air system. The structure will be 58 x 94 ft. A considerable amount of 30-lb. steel rails and 1-in. steam piping will be purchased.

The Fort Madison Chair Company, Fort Madison, Wis., has increased its capital stock from \$75,000 to \$100,000, and will increase the capacity of its plant by the installation of new machinery. Wood boring machines, beaded post and back post sanders, and possibly additional equipment for the finishing department, will be purchased.

The Four Wheel Drive Auto Company, Clintonville, Wis., will let contracts March 8 for the construction of a factory building, 60 x 120 ft., and a power house, 30 x 40 ft., to include everything but composition roofing, power plant, transmission machinery and machine tool equipment. The power house will be equipped with a 100-hp. engine and two boilers of about 60 hp. capacity each, to be purchased during the latter part of March. The machine tool equipment will be purchased some time in April.

The McClintock Mfg. Company, for the past six years located in St. Paul, Minn., has been reorganized and has decided to remove its plant to Minneapolis, where it will erect a new factory building in case a suitable building cannot be found. The company states that it will be in the market from time to time for light and heavy machinery as conditions warrant.

The Watertown Plow Company, Watertown, S. D., will erect an addition to its plant this spring, 80 x 100 ft., one story.

The Southwest

The Merchants' Light & Power Company, Ogden, Utah, has filed articles of incorporation with \$500,000 capital stock. The company has been granted a franchise to operate a lighting system and will begin work immediately on the construction of a power plant. M. S. Browning is president of the company.

A bill is before the Legislature of the State of Utah for an appropriation of \$40,000 for the construction of an electric power house at the Agricultural College at Logan.

Seneca, Kan., will expend \$15,000 to improve its water works system.

The City Council of Durant, Okla., has voted to adopt plans and specifications for the construction of an electric light plant. The City Clerk has been instructed to advertise for bids.

The city of Pine Bluff, Ark., is petitioning the Legislature for authority to include Jefferson county, with a view to building a free bridge across the Arkansas River at that point.

The Jonesboro Roller Mill Company of Jonesboro, Ark., will soon erect a 50,000-bu. grain elevator of steel and concrete.

W. H. Echols and Edward Rankin, formerly of Faxon, Okla., will erect at De Witt, Ark., a plant for the manufacture of ice and a creamery.

The Williams Lumber & Mfg. Company, Springfield, Mo., has been incorporated, with a capital stock of \$15,000. The incorporators are T. E. Williams, J. F. Legan, H. B. McDaniel and others.

The N. A. Kennedy Butter Tub Company, Kansas City, Mo., has been incorporated. The capital stock is \$20,000. The incorporators are N. A. Kennedy, H. C. Offutt, J. O.

THE MACHINERY MARKETS

Forrest and others. The company will engage in the manufacture of butter tubs, &c.

The citizens of the town of Billings, Mo., are agitating the question of a water works system.

The Crushed Rock & Concrete Company, Kansas City, Mo., has been incorporated. The capital stock is \$50,000. The incorporators are W. H. Caffrey, C. A. Roe and R. L. Caffrey.

The South

LOUISVILLE, KY., February 28, 1911.

Power equipment manufacturers and dealers report a heavy increase in the volume of business from all over the South. One of the largest factors in the improvement in the demand is the noticeable increase in the number of water works projects. In Kentucky and Tennessee, also, the development of coal properties is affording an outlet for a large quantity of power machinery. The completion of the Wasioto & Black Mountain Railroad from Wasioto to Haxlan, Ky., which will open up new coal deposits, is expected to stimulate business in that direction.

The Henry Vogt Machine Company, Louisville, has sold an 1800-hp. boiler to the Louisville & Nashville Railroad for its new shops at Boyles, Ala., which are now being completed. Other recent sales include a 300-hp. boiler to the Delta Electric Light, Power & Mfg. Company, Greenville, Miss.; a 150-hp. boiler to the Independent Ice Company, Nashville, Tenn.; a 500-hp. boiler to the William Gerst Brewing Company, Nashville, and a 400-hp. boiler to the Center-Freze Ice Mfg. Company, Atlantic City, N. J.

Following the death of C. J. Walton, head of the boiler manufacturing firm of C. J. Walton & Son of Louisville, the business has been incorporated under that name with a capital stock of \$50,000, by D. A. Walton, E. O. Jones and J. E. Coleman. No changes in the plant are contemplated.

The repair shops of the Southern Railway at Louisville have been turned over to the Kentucky & Indiana Terminal Railroad Company, which it partially controls. They will be improved and enlarged in order to take care of the increased business of the terminal company, which is now constructing a \$2,000,000 bridge over the Ohio River.

The Barbourville Brick & Tile Company, Barbourville, Ky., plans to double its capacity, and is already purchasing equipment with that end in view.

The Nortonville Coal & Coke Company, Nortonville, Ky., is planning the erection of a power house and the improvement of its facilities. It will also furnish the municipality with electric lights.

The Foltz Mfg. Company, Humboldt, Tenn., ice manufacturer, is purchasing new equipment, which will double its capacity.

The Dominion Iron Works, Bristol, Tenn., has increased its capital stock from \$50,000 to \$100,000.

The Humboldt Marble & Granite Works, Humboldt, Tenn., has purchased adjoining property, and will greatly enlarge its capacity. Most of the equipment has been purchased.

The American Metallic Packing Company, Lexington, Ky., is in the market for woodworking machinery, including a 7-ft. band mill, engines and boilers, and is also to purchase logging equipment and railroad supplies.

The Wisconsin Steel Company, which is erecting coke ovens of large capacity at Yowell, Ky., is in the market for considerable equipment. Bids are now being taken on eight 150-hp. tubular boilers, two 250-kw. generators, a 100-kw. generator, two twin 160-hp. engines, to be used in driving coal crushers, and a 150-hp. wide crank engine to operate the ventilating system.

The Severance Mfg. Company has filed articles of incorporation at Nashville, Tenn. It has a capital stock of \$100,000, and the principal incorporators are V. C. Severance, W. M. Joseph, A. F. Whitman and Henry Sperry. The company will manufacture patented hardware specialties, including domestic gas plants, lamps, carbureters, burners and similar appliances. A plant will be erected at Nashville, it is announced.

A bill has been introduced in the Tennessee Legislature authorizing the Knoxville Power Company to construct a dam on the Little Tennessee River.

Jackson, Tenn., has rejected the proposition of the Jackson Railway & Light Company to illuminate the streets, and will operate its own plant, as heretofore. The plant will be improved, however, and a bond issue of \$20,000 will be made in order to secure funds for the purchase of new equipment.

The Glendale Lumber Company, Glendale, Ky., is building a planing mill, and besides installing the necessary wood-working machinery will purchase a 15-hp. gasoline engine.

Favorable action has been taken in the Tennessee Legislature on the proposal to allow Gallatin to issue \$10,000 of

bonds for the purpose of establishing an electric light plant and water works.

The Queen City Machinery Company is being organized at Gadsden, Ala. It will have \$6000 capital stock. Under an arrangement made by a commercial organization of Gadsden for the encouragement of new enterprises, a bonus of 10 per cent. of its investment, or \$600, will be given the new company.

The Ross-Meehan Company, Chattanooga, Tenn., is erecting an addition to its foundry to take the place of a building which burned recently.

The Lexington Marble & Granite Works has been organized at Lexington, Tenn., and will be managed by Joseph W. Fuller. A plant will be equipped and put in operation in the near future.

The Multiple Phonograph Company, Chattanooga, Tenn., has completed organization, and is now selecting a site for its plant, which will be erected and equipped at once. D. T. Blakey is general manager of the company, which, as the name indicates, will manufacture a phonograph capable of reproducing several records successively. Moving picture machines will be manufactured later, it is announced.

The West Kentucky Coal Company, Sturgis, Ky., is planning an increase in its annual output from 500,000 to 2,000,000 tons. The company is operated by the North American Company of New York.

L. A. Long of Long's Towel Supply, Louisville, is organizing a company for the manufacture of a patented smoke preventer. He states that a plant will be erected here following organization.

The Meridian Planing Mill Company, Meridian, Miss., which incorporated recently, with \$25,000 capital stock, will purchase a large timber sizer and fast-feed matcher, together with other wood-working and power equipment, for its mill, which is now in course of erection.

A bill has been introduced in the Arkansas Legislature providing an appropriation of \$75,000 for a heating plant for the new capitol building. The appropriation will probably be authorized.

Gadsden, Ala., is completing the construction of a new water works system. The cost of the remaining part of the plant is estimated at \$50,000.

The Humboldt Cotton Mills, Humboldt, Tenn., is considering the installation of new textile machinery.

J. F. Norman, representing Eastern capital, is to ask for a franchise for a water works system at Lonsdale, Tenn. The company, which is to be formed, will invest \$75,000 in a plant if the franchise is granted.

It is reported from Chattanooga, Tenn., that with the completion of the plant of the East Tennessee Power Company on the Ocoee River a large number of manufacturers in that city will substitute electric for steam power. Changes in equipment will, of course, be necessary.

The Kosmos Portland Cement Company, which has general offices in Louisville, is considering making improvements in its plant at Kosmosdale, Ky. The exact nature of the improvements has not been stated.

The Mengel Box Company, Louisville, is now equipping a large factory in Jersey City, N. J., which will be used for the manufacture of cigar boxes. It will be one of the largest plants of the kind in the country.

H. L. Witt & Sons, Morristown, Tenn., are considering the establishment of a plant for the manufacture of wagons.

W. H. Isabell of Bowling Green, Ky., is interested in an electric light plant to be established at Bay Minette, Ala., at a cost of \$200,000.

A bond issue of \$50,000 is to be authorized by Tupelo, Miss., for the enlargement of the water works and other improvements.

Brinton B. Davis of Louisville is the architect for the new \$750,000 hotel to be built here by Sam P. Jones and J. E. Gamble on Walnut street, near Fourth. The building will have its own power plant.

Bids have been received by the Bond Commission of Gainesville, Ga., for the construction of a water works system. R. D. Mitchell is chairman of the commission.

Mansfield, La., is offering a franchise and bonus for the establishment of a water works plant.

The Sybilla Elevator & Mfg. Company has been incorporated at Chattanooga, Tenn., for the manufacture of passenger and freight elevators. The company has \$50,000 capital stock. Frank Sybilla, John I. Quentel and others are the incorporators.

It is reported that the National Adding Machine Company, recently incorporated at Nashville, Tenn., with \$15,000 capital stock, has leased a building and will equip it for the manufacture of adding machines. Charles Wales is general manager of the company.

The Chick-Wood Safe Company, Memphis, Tenn., manufacturer of steel safes, is inquiring for pressed steel shapes, drop forgings, castings and malleable iron parts.

B. J. Robinson, Vicksburg, Miss., will shortly begin the

THE MACHINERY MARKETS

erection of a new machine shop and foundry, and later on will install mechanical equipment.

The Thornhill Wagon Works, Lynchburg, Va., has completed plans for the erection of new factory buildings to replace the plant recently burned. The main building will be 100 x 600 ft., of mill and slow burning construction, and will be equipped with the most modern sprinkling devices. In addition there will be several smaller buildings which when completed will give the company more than twice the floor space formerly occupied.

The Henderson Buggy Mfg. Company, Henderson, N. C., has been incorporated with \$25,000 capital stock. The incorporators are R. J. Corbitt, R. A. Jones and A. C. Zollcoffer.

The cotton gin owned by Wallace Ratcliff, Washington, Miss., was destroyed by fire February 16, causing a loss of \$3500.

The Southern Foundry Company, Nashville, Tenn., has been incorporated with a capital stock of \$10,000 by W. L. Looney, A. J. Witt, Paul Huggins, O. H. Looney and S. B. Duggan.

Pacific Coast

PORTLAND, ORE., February 21, 1911.

A fairly good demand for metal working tools is being experienced in Portland and other manufacturing points of the north Pacific Coast. A few orders are being placed, and more are in prospect, for large assortments, while the volume of small purchases from a scattered territory is gradually increasing. Much of the equipment used in logging and development work is manufactured here and on Puget Sound, and indications are favorable for an extremely active year in all the shops. Among the principal local items are additions to the equipment of the Willamette Iron & Steel Works and purchases for railroad shops.

The present building activity in Portland will furnish a market for a large amount of machinery. The lumber industry, which has been among the principal features of this territory, is beginning to revive after the quiet winter period, and many inquiries are coming in for both mill and logging equipment. Logging railroad development will be carried out on an unusually large scale, and many new locomotives will be required. The larger railroad interests are also beginning work on extensive improvements. Salmon packers are purchasing considering machinery for canneries in Oregon, Washington and Alaska, and are installing more improvements than usual in their vessels. Agricultural development in Oregon, Washington and Idaho is proceeding very rapidly and implement manufacturers, who had an excellent year in 1910, anticipate even more activity this season. Figures are now being taken on several large electric power installations, on which orders are expected within the coming month.

Dredging plans for Oregon ports, if carried out, will require a large amount of machinery. Arrangements are now being made for the construction of two large suction dredges to deepen the channel from Portland to the mouth of the Columbia. Plans are also being drawn for a dredge, for which the Government has appropriated \$300,000, for service on Coos Bay, on which local manufacturers will have an opportunity to bid.

The Portland Shipbuilding Company has taken a contract for the hull of a ladder dredge for the Portland Sand Company, at \$17,000.

It is announced that contracts will be let in a few days by the Portland Railway, Light & Power Company for the third and largest of its hydroelectric plants on the Clackamas River. The estimated cost is about \$3,000,000. This company also has plans under way for a large repair plant and car shop adjoining the Southern Pacific shops in this city.

Bids are being taken for a power house for the Multnomah County, Ore., farm.

The Tacoma Foundry & Machine Company, Tacoma, Wash., recently incorporated by W. Webb, John Taylor and T. B. Hall, has purchased a 2½-acre factory site at Tacoma, and will erect a foundry and pattern shop. It expects to have the plant in operation this spring.

John A. Stein of the Grays Harbor Iron Works, Hoquiam, Wash., announces that the company will erect a new building and install considerable machinery this spring.

The city of Tacoma, Wash., is taking bids on machinery for the municipal hydroelectric plant, known as the Nisqually River development.

Contracts are to be let shortly for construction work on the North Coast Railroad, a subsidiary of the Oregon Railroad & Navigation Company, between Spokane, Wash., and the Snake River.

A contract is pending for the construction of large tanks for the storage of fuel oil for the Cascade division of the Great Northern Railroad. In addition to the tanks, a large

amount of work will be involved in preparing the locomotives for the use of oil for fuel.

Broughton & Wiggins of this city are making arrangements for the construction of a logging railroad from their timber tracts on Barber Mountain to the Columbia River.

The Washington-Oregon Corporation has taken over a number of light and power plants in Washington towns, and intends to add new units to several of the plants.

The Olympic Portland Cement Company, with a capital stock of approximately \$1,500,000, has been organized in London by interests connected with the English and American shipping firm of Balfour, Guthrie & Co. Its purpose is to carry out the project started by the latter concern, to install a large cement plant near Bellingham, Wash.

The Lovegren Lumber Company is working on a project for extensive development near Gaston, Ore. It includes five miles of railroad, for which contracts have been let, a large sawmill and a hydroelectric lighting plant.

The Grant's Pass Lumber Company, Grant's Pass, Ore., has purchased an old mill at that place, the equipment of which will be sold. About 15 new woodworking machines, with electric motors, will be installed.

The Southern Pacific Railroad shops in Portland were but slightly damaged by fire February 14.

Representatives of the Hercules Steel & Iron Works of Texas have been looking over the ground at Oregon City, Ore., with a view to establishing a plant there.

The Brown-Lewis Company, manufacturing agricultural machinery at Walla Walla, Wash., is planning to enlarge its plant.

The Curtis Power Boat Company, Milwaukee, Ore., has increased its capital stock, and is planning to erect a new factory at Vancouver, Wash.

R. E. Wattenberg of Klamath Falls, Ore., has ordered a number of woodworking machines from local dealers.

The Colfax Harvester Company has been incorporated at Colfax, Wash., by A. McRae, P. B. Stravens, J. Hampton and others, and is planning to install a factory for agricultural machinery.

The Newberg Mfg. & Construction Company, Newberg, Ore., is planning to add a lot of machinery, including a dust collecting system.

The Spokane Asbestos Fire Brick Company, now operating a small plant at Spokane, Wash., is making arrangements to spend about \$10,000 on new equipment this summer.

The city of Lewiston, Idaho, has ordered a 350-hp. pump engine from Chas. C. Moore & Co.

The Inman-Poulson Lumber Company will start work shortly on a large sawmill at St. Johns, Ore.

The Puyallup Veneer Panel & Fir Door Company, Puyallup, Wash., recently incorporated, has secured an old mill in which several new machines will be installed.

The town of Goldendale, Wash., is in the market for a small rock crushing outfit.

The Umatilla Storage & Commission Company, Hermiston, Ore., will enlarge its plant by the erection of new buildings and the installation of a steam roller feed mill this season.

St. Louis

ST. LOUIS, February 27, 1911.

The week has been rather quiet in machine tool circles here, although some fair orders have been booked. In the opinion of machine tool men, the rate decision will not affect buying adversely to any great extent, and most of them consider it likely to make confidence increase.

The Ludlow-Saylor Wire Company is quite busy at this time on its specialties.

The Moran Bolt & Nut Company finds business materially improving.

The Mount Vernon Car Mfg. Company, Mount Vernon, Ill., is now getting its large new steel car plant into good operating order. It has purchased all the equipment required.

The firm of Albert B. Rowman has been superseded by the Rowman-Blackman Machine Tool Company, due to the entrance into the firm of G. H. Blackman, who is an experienced machine tool man, a graduate of the mechanical engineering department of the University of Missouri, and has been with the Rowman establishment for nearly two years. The business will be continued at 720 North Second street, where a good assortment of sample machines is carried. The firm represents exclusively, among others, the American Tool Works Company, King Machine Tool Company, Barnes Drill Company, Kempsmith Mfg. Company, Lea Equipment Company, Massillon Foundry & Machine Company, Mechanics Machine Company, Cleveland Planer Works, Foote-Purt Company (on bolt cutters), Cincinnati Pulley Machinery Company and Greenfield Machine Company.

THE MACHINERY MARKETS

The Mound City Brewing Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are Hermann Hannibal, John M. Hannibal, T. L. Pepperling and others.

The Universal Gas Machine & Mfg. Company, St. Louis, has been incorporated with a capital stock of \$15,000. The incorporators are F. L. Pohlmann, Edward Huber, Geo. Brandt and others. The company will engage in the manufacture of gas machines, window lighting fixtures, &c.

The Miller Cigar Vending Machine Mfg. Company of St. Louis has been incorporated with a capital stock of \$50,000. The incorporators are O. S. Miller, Maude C. Miller and Lucille Miller. The company will engage in the manufacture of vending and other machinery.

The A. Leschen & Sons Rope Company, at the annual gathering of branch managers and salesmen, reported that the outlook in the wire rope business for the present year is very gratifying. There is a growing demand for aerial wire rope tramways, some of which have been built to the length of 16 miles.

The Dildine Bridge & Iron Company, Cameron, Mo., will remove its plant in about two months to Hannibal, Mo., where it is erecting new fireproof buildings.

Texas

AUSTIN, TEXAS, February 25, 1911.

The recent heavy rains in the irrigated sections of Texas and northern Mexico filled up the newly constructed water storage reservoirs and enabled many pumping plants to be placed in operation. The water storage movement has gained great headway in the semiarid region of the Southwest and Mexico during the last year, and by this means of conservation big areas of land are being reclaimed and placed in cultivation. It has created an increased demand for irrigation machinery and encouraged activity in other lines of industry.

James W. Arnold of South Charleston, W. Va., contemplates establishing an iron foundry and rolling mill at Austin. He has taken the matter up with the Manufacturers' Committee of the Austin Business League.

John C. Underwood has been awarded the contract by the Board of Commissioners of Dallas for the construction of a large sanitary sewer through South Dallas. The work will cost about \$32,000. Mr. Underwood gave bond in the sum of \$16,000 for the completion of the work in 120 working days.

The contract for the equipment of the proposed modern filtration plant that is to be installed at Temple, Texas, has been let to the Pittsburg Filter Mfg. Company of Pittsburgh, Pa. The contract for the building and other work connected with the plant was let to W. C. Rettiger of Belton, Texas. The plant will cost \$27,190 and will have a capacity of 2,000,000 gal. every 24 hours.

The City Commissioners of Corpus Christi, Texas, have under consideration plans for enlarging the water works plant and increasing the water supply. The completion of the sewer system will double the city's consumption of water, it is stated.

Taylor H. Allen and H. J. Price will establish a plant at Gonzales, Texas, for the manufacture of steel bridges and road machinery. The site for the proposed industry was recently purchased, and it is stated that the erection of the plant will soon be started.

A branch factory of the Cotto-Waxo Products Company, St. Louis, Mo., will be located at Waco, Texas. The machinery that is to be installed in the new plant will cost about \$20,000. J. C. Bunch of St. Louis is president of the company and is giving the matter of establishing the branch factory his personal attention.

The McDade Brick Company, Houston, Texas, has been incorporated with a capital stock of \$40,000. The incorporators are E. F. Brown, Geo. L. Teat, S. J. Spencer and N. F. Delatte.

The Christopher Mfg. & Lumber Company of Beaumont, Texas, has been incorporated with a capital stock of \$25,000. The incorporators are F. E. Howard Newcomb, T. E. Christopher and J. C. Christopher.

Farther Central West

The One Minute Mfg. Company, Newton, Iowa, washing machines, has recently completed the erection of a two-story brick building, 50 x 160 ft., to provide additional facilities for the manufacture of gasoline engines.

Voss Brothers Mfg. Company, Davenport, Iowa, has just completed a new factory, which will be used exclusively for the Voss line of washers.

The Wixcel Mfg. Company, Marcus, Iowa, farm implements, will move to Sioux City, Iowa, where it will erect extensive manufacturing buildings which will cost in the neighborhood of \$40,000. Details of the plant and equipment to be installed have not been decided upon at this time.

The McDonnell Boiler & Iron Works, Des Moines, Iowa, has just completed an addition to its foundry, 66 x 100 ft., and the installation of new core oven equipment and several molding machines.

The Hall Mfg. Company, Monticello, Iowa, steel safety hoists, wire stretchers, garden plows and post hole augers, has increased its capital stock from \$50,000 to \$100,000, and will raise its main factory building, 64 x 100 ft., another story, and install a central steam heating plant. A large warehouse will also be erected, but plans have not been made.

The Aluminum Mfg. Company, Des Moines, Iowa, is moving into new quarters, which will practically double its capacity. Considerable new machinery will be installed.

The Cedar Rapids Machinery & Supply Company, Cedar Rapids, Iowa, will move into new quarters in the near future.

The Zimmerman Steel Company, Lone Tree, Iowa, is at present equipping a sand grinding and casting cleaning room, having a floor space of 30 x 40 ft., with a 72-in. sand grinder, with two 14 x 36 in. crushing rolls, one 40 x 48 in. and one 48 x 72 in. tumbling mill and electro magnetic separators. Later on the company expects to build a 48-in. concrete stack 60 ft. high and a boiler and engine room of concrete about 60 x 72 ft., roof to be constructed of steel and lined with asbestos. The new equipment being installed will be electric driven.

J. H. Hart, Danbury, Iowa, will install an ammonia refrigerating plant at his market establishment. The best type of power driven machinery will be purchased.

The Sioux City Packing Company, Sioux City, Iowa, will erect a new plant of large capacity, which will cost upward of \$125,000.

The Shenandoah Heat & Light Company, Shenandoah, Iowa, is contemplating the erection of an ice making plant, to cost \$12,000.

McCullough & Son, Sioux City, Iowa, manufacturers of feed troughs, will build a large addition to their factory.

The Des Moines Structural Steel Works, Des Moines, Iowa, is in the market for an air compressor.

Government Purchases

WASHINGTON, D. C., February 27, 1911.

The Paymaster-General, Navy Department, Washington, will open bids March 7, under schedule 3340, class 21, item A, for one barge, steam boiler and pumps; item B, one self-propelling barge, steam boiler and pumps, and item C, one barge, self-propelling, steam boiler and pumps, combustion engines.

The Bureau of Supplies and Accounts, Navy Department, will open bids March 21, schedule 3366, for one mortising machine, and schedule 3667, for two motor driven lathes.

The Paymaster-General, Navy Department, Washington, will open bids March 7, under schedule 3354, for one steam brake windlass with warping attachment.

The Construction Quartermaster, Fort Sam Houston, Texas, will open bids March 21 for furnishing and installing one compound or triple expansion pumping engine, capacity 1,000,000 gal. in 24 hours.

The Constructing Quartermaster, Fort Bayard, N. M., will open bids March 18 for furnishing and installing one motor driven submerged type centrifugal or impeller type pump, capacity not less than 200 gal. per minute.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids April 4 for one electrical crane, schedule 3368.

Bids were opened February 16 by the superintendent of prisons, Department of Justice, Washington, D. C., for furnishing an electric light and power installation for the United States Penitentiary, Leavenworth, Kan., as follows: F. E. Newbery Electric Company, St. Louis, Mo., \$4470; Guarantee Electric Company, St. Louis, Mo., \$5114; International Electric Fixture & Contracting Company, St. Louis, Mo., \$6445; Nebraska Engineering Company, Lincoln, Neb., \$6733.50.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids February 21, as follows:

Class 1.—One plain gear grinder.—Bidder 116, Hallide Machinery Company, Seattle, Wash., \$4580; 176, Manning, Maxwell & Moore, New York, \$5400.

Class 51.—Turbo turning gear equipment.—Bidder 47, Cutler-Hammer Mfg. Company, Milwaukee, Wis., \$104,000; 72, Diehl Mfg. Company, Elizabethport, N. J., \$3545, part, and \$3425, part; 111, General Electric Company, Schenectady, N. Y., \$3360, part; 266, Waterbury Tool Company, New Britain, Conn., \$3400, part.

Class 52.—One necessary variable speed power transmission apparatus.—Bidder 47, Cutler-Hammer Mfg. Company, Milwaukee, Wis., \$27,150; 72, Diehl Mfg. Company, Elizabethport, N. J., units; 111, General Electric Company, Schenectady, N. Y., \$996, part; 266, Waterbury Tool Company, New Britain, Conn., \$8700.

Class 54.—Two electric ventilating sets.—Bidder 72, Diehl Mfg. Company, Elizabethport, N. J., \$557.50; 111, General Electric Company, Schenectady, N. Y., \$915; 237, B. F. Sturtevant Company, Hyde Park, Mass., \$7540; 286, Griscom, Spencer Company, New York, \$620.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL - Bar Iron from store—

Refined Iron:

1 to 1 1/2 in. round and square	per lb 1.70
1 1/2 to 4 in. x 8 to 1 in.	per lb 1.80
1 1/2 to 4 in. x 1 to 1/2	per lb 1.80
Rods—3 in. and 1 1/2 in. round and square	per lb 1.80
Angles—	per lb 1.80
3 in. x 1/2 in. and larger	per lb 2.00
3 in. x 1/2 in. and 3 in.	per lb 2.00
1 1/2 to 2 1/2 in. x 3/4 in. and thicker	per lb 2.00
1 to 1 1/2 in. x 3/4 in.	per lb 2.00
1 to 1 1/2 in. x 1/2 in.	per lb 2.00
7/8 x 1/2 in.	per lb 2.30
3/4 x 1/2 in.	per lb 2.30
5/8 x 1/2 in.	per lb 2.30
1/2 x 3/4 in.	per lb 1.25

Tees:	
1 in.	per lb 2.65
1 1/2 in.	per lb 2.45
1 1/2 to 2 1/2 in.	per lb 2.35
3 in. and larger	per lb 2.00
Beams—	
Channels, 3 in. and larger	per lb 2.00
1 1/2 to 2 1/2 in. x 1/2 in.	per lb 2.30
Burden's Best "I" Iron, base price	per lb 1.50
Burden's "H B & S" Iron, base price	per lb 2.95
Norway Bars	per lb 3.00

Merchant Steel from Store—

Bessemer Machinery	per lb 1.90
Toe Calk, Tire and Sleigh Shoe	per lb 2.50
Best Cast Steel, base price in small lots	per lb 2.70

Sheets from Store— Black

No.	One Pass, C R	Soft Steel	R G, Cleaned
No. 16	per lb 2.50	per lb 2.50	per lb 2.50
No. 18 to 20	per lb 2.70	per lb 2.70	per lb 2.70
No. 22 and 24	per lb 2.75	per lb 2.75	per lb 2.75
No. 26	per lb 2.80	per lb 2.80	per lb 2.80
No. 28	per lb 2.90	per lb 2.90	per lb 2.90

Russia, Planished, &c.

Genuine Russia, according to assortment	per lb 12 @ 14
Patent Planished, W. De weeg Wood	per lb A, 10¢; B, 9¢ net

Galvanized.

Nos 12 and 14	per lb 2.95
Nos 22 to 24	per lb 3.30
No 26	per lb 3.50
No 28	per lb 3.80
No 20 and lighter 36 inches wide, 25¢ higher	

Genuine Iron Sheets— Galvanized.

Nos 22 and 24	per lb 2.75
No 26	per lb 2.95
No 28	per lb 3.15

Corrugated Roofing—

No.	2 1/2 in. corrugation	Painted	Galv'd
No. 24	per 100 sq ft. \$3.85	4.80	
No. 26	per 100 sq ft. 2.95	4.00	
No. 28	per 100 sq ft. 2.60	3.75	

Tin Plates—

American Charcoal Plates (per box.)

A. A. A. Charcoal:	
10, 14 x 20	per box \$5.60
IX, 14 x 20	per box 4.90
A. Charcoal:	
10, 14 x 20	per box \$5.60
IX, 14 x 20	per box 5.70

American Coke Plates—Bessemer—

10, 14 x 20	per box \$4.50
IX, 14 x 20	per box 5.50

American Terne Plates—

10, 20 x 28 with an 8 lb. coating	per box \$8.70
IX, 20 x 28 with an 8 lb. coating	per box 10.70

Seamless Brass Tubes—

List November 11, 1908	Base price 18¢
------------------------	----------------

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908	Base price 18¢
------------------------	----------------

Copper Tubes—

List November 13, 1908	Base price 21¢
------------------------	----------------

Brazed Brass Tubes—

List August 1, 1908	19¢ per lb
---------------------	------------

High Brass Rods—

List August 1, 1908	14¢ per lb
---------------------	------------

Roll and Sheet Brass—

List August 1, 1908	14¢ per lb
---------------------	------------

Brass Wire—

List August 1, 1908	14¢ per lb
---------------------	------------

Copper Wire—

Base Price.	Carload lots mfr 13¢
-------------	----------------------

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. quantity (1-15) per lb 18	
Sheet Copper Cold Rolled, 1¢ advance over Hot Rolled	
Sheet Copper Polished 26 in. wide and under, 1¢ square foot	
Sheet Copper Polished over 20 in. wide, 2¢ square foot	
Polished Copper, 1¢ square foot more than Polished	

METALS— Tin—

Straits Pig	per lb 13¢ @ 19¢
-------------	------------------

Copper—

Cake Ingot	per lb 14¢ @ 15¢
Electrolytic	per lb 14¢ @ 15¢
Casting	per lb 14¢ @ 15¢

Spelter—

Western	per lb 6¢ @ 6 1/2¢
---------	--------------------

Zinc.

No 9, base, casks	per lb 5¢ @ 5 1/2¢
-------------------	--------------------

Lead.

American Pig	per lb 5¢ @ 5 1/2¢
Bar	per lb 6¢ @ 6 1/2¢

Solder.

1/2 & 1/2, guaranteed	per lb 28¢ @ 28 1/2¢
No. 1	per lb 26¢ @ 26 1/2¢
Reamed	per lb 24¢ @ 24 1/2¢
Prices of Solder indicated by private brand vary according to composition.	

Antimony—

Cookson	per lb 99¢
Others	per lb 98¢
Other Brands	per lb 98¢

Bismuth—

Per lb	\$2.00 @ \$2.25
--------	-----------------

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure, in ingot for remelting)	per lb 24¢
Rods & Wire	Base Price 31¢
Sheets	Base Price 33¢

Old Metals.

Dealers Purchasing Prices Paid in New York

	Cents—
Copper, Heavy cut and crucible	per lb 10 7/8 @ 11.00
Copper, Heavy and Wire	per lb 10 5/8 @ 10.75
Copper, Light and Bottoms	per lb 9 5/8 @ 9.75
Brass, Heavy	per lb 7 00 @ 7.25
Brass, Light	per lb 5 50 @ 5.75
Heavy Machine Composition	per lb 9 25 @ 9.50
Clean Brass Turnings	per lb 7 00 @ 7.25
Composition Turnings	per lb 8 25 @ 8.50
Lead, Heavy	per lb 6 75 @ 6.75
Lead, Tea	per lb 6 30 @ 6.30
Zinc Scrap	per lb 4 00 @ 4.00

NICHOLSON

Granted that just ONE mechanic in your shop can save from ten to twenty minutes time per day through the use of NICHOLSON FILES—how great will be the saving when from fifty to one hundred or more men "get busy" with the fast cutting

NICHOLSON?



Nicholson File Company
Providence, R. I.

THE IRON AGE

Established
1855

New York, March 9, 1911

VOL. 87: No. 10

Published Every Thursday by the

DAVID WILLIAMS COMPANY

14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada, \$7.00 per Annum; to Other Foreign Countries, \$10.00 per Annum. Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEORGE W. COPE,	-	-	-	-	} EDITORS
A. L. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Conservative Buying.....	569
The Rate Decisions and Other Price Questions.....	570
A Railroad Educational Bureau.....	570
America and the Foreign Patent.....	571
A Novelty in Apprentice Systems.....	571
A Machinery Exhibit That Paid.....	572
What "Depreciation" Means.....	572
Carting a 60-Ton Girder.....	572
New Publications.....	573
Analysis Books of Lake Superior Ores.....	573
Pig Iron Production. Illustrated.....	574
Employment Bureau of Pittsburgh Manufacturers' Association.....	575
The Ferro Machine & Foundry Company's Improvements..	575
The Iron and Metal Market Reports.....	576 to 585
Iron and Industrial Stocks.....	585
Tonnage of the Bessemer Railroad.....	585
Notes on Prices.....	585
Personal.....	586
Obituary.....	586
Gasoline Engine Speed Regulator.....	586
Industrial Safety.....	587
The Philadelphia Foundrymen's Association.....	588
The Producers' Coke Company.....	588
Coke Ovens at Lorain, Ohio.....	588
Metal Trades Annual Meetings.....	589
Two New Metals.....	589
International Association for Testing Materials.....	590
Customs Decisions.....	590
The Cambria Steel Company.....	591
The Railway Steel Spring Company's Earnings.....	591
Workmen's Insurance in Europe.....	592
A Congress of Technology at Boston.....	592
New Pennsylvania Electric Locomotives.....	593
The Wisconsin Engine Company.....	593
January Exports and Imports of Iron and Steel.....	594
Foundrymen Report on Pig Iron Stocks and Outlook.....	594
A Gröndal Iron Ore Briquetting Plant.....	594
Judicial Decisions of Interest to Manufacturers.....	595
The Diamond Toggle Bolt. Illustrated.....	596
The Chicago Railway Equipment Company.....	596
A New Underwood Power Bender and Straightener. Illus..	596
The Five New Merchant Mills at Gary. Illustrated.....	597
A New Charcoal Pig Iron for Chilled Car Wheels.....	605
The Keystone Steel Casting Company.....	605
American Rolling Mill Equipment of Hagan Furnaces.....	606
Making Duplicate Automobile Parts. Illustrated.....	606
The George V. Cresson Company's Affairs.....	607
Iron Mining Beyond the Arctic Circle. Illustrated.....	608
The Webster Mfg. Company's New Plant.....	616
Pneumatic Handling of Sulphuric Acid. Illustrated.....	616
A Motor-Driven Colburn Boring Mill. Illustrated.....	617
A Barnes Special Horizontal Drilling Machine. Illustrated	617
Iron Ore in Hundreds of Millions of Tons. Illustrated....	618
Grinding Car Wheels Without Removing Them.....	620
The Green Foundry Blowers. Illustrated.....	621
The Wood & Spencer Adjustable Snap Thread Gauge. Illus.	621
Steel Cutting with the Oxy-Acetylene Torch. Illustrated..	622
The Osgood Valveless Force Feed Oilier. Illustrated.....	625
The Dalton Adding Machine Company's New Factory.....	625
The Garvin Automatic Chuck. Illustrated.....	626
Alliance Crane Business.....	627
New Tools and Appliances.....	628
Trade Publications.....	629
The Machinery Market Reports.....	630 to 639
Newport Rust-Resisting Iron.....	639
Current Metal Prices.....	640

Conservative Buying

But Political Factors Are Not Feared

Steel Corporation Production Growing Faster Than That of Independent Companies

Some hesitancy has been noticed in iron and steel markets in the past week, attributable to political developments, and it has helped to emphasize the conservatism which buyers are showing in all lines. But leading steel manufacturers consider that the programme for the extra session of Congress, limiting tariff action to two schedules, is not one that should cause more than a temporary halt, and they are not uneasy.

Pig iron production increased steadily in February. The total of coke and anthracite iron for the 28 days was 1,794,509 tons, or 64,090 tons a day, against 56,752 tons a day in January, a gain of 13 per cent. The number of active steel works furnaces increased by 17 in the month, while there was a net loss of one in active merchant furnaces. The daily capacity of the 222 furnaces in blast March 1 was 66,562 tons, against 59,568 tons a day for 206 furnaces February 1. Production to-day, including charcoal iron, is at the rate of 24,450,000 tons a year, against a rate of 22,000,000 tons a year February 1 and 19,700,000 tons at the low point at the opening of the year. The high rate of 1910 was 31,600,000 tons in February.

The United States Steel Corporation has blown in one New Castle, one Ensley and one Clairton furnace since March 1, and when one more furnace in the Pittsburgh district is blown in this week, will have 68 per cent. of capacity active, against 46½ per cent. January 1. Its stocks have been cut down to 100,000 tons at its Northern furnaces.

The scale of the Steel Corporation's operations is plainly in closer relation to that of independent steel companies than was the case two and three months ago. With prices better maintained it is apparently getting a larger share of the business. Its heavy foreign shipments are also a factor. In the 22 business days of February it booked new orders at an average daily rate of 40,775 tons. Shipments were about 20 per cent. greater than in January. The gain in unfilled orders will probably be between 200,000 and 300,000 tons.

In rails a 17,000-ton purchase to be closed this week by the Pere Marquette is the chief item. The Nickel Plate has divided 5000 tons between South Chicago and Buffalo, and the New York, West Chester & Boston has placed 6000 tons at Sparrows Point. The Manila Railroad has bought 10,000 tons from the Lackawanna Steel Company.

The sold up condition of Canadian mills makes it certain that Canadian railroads will place considerable orders in this country. The Canadian Pacific has awarded 100,000 tons and the Transcontinental 62,000

tons to the Algoma and Dominion companies. The former road will want 25,000 tons more and the Canadian Northern is yet to buy.

The Steel Corporation decided this week that no more wooden ties will be bought for renewals on its 3500 miles of railroads. Its Bessemer railroad has placed a good sized order for steel ties.

The expected advance of \$1 a ton in wire products was made March 4, bringing wire nails to \$1.80 and plain wire to \$1.60, Pittsburgh. The important spring buying was over before it came.

New demand for bars is coming out slowly. Buying by jobbers is restricted somewhat, as there is some doubt as to the ultimate effect on their business of the warehouse policy of the leading interest.

Pig iron has been quieter at Chicago and Pittsburgh, but more active at Cincinnati, Buffalo and in eastern Pennsylvania. Prices are firm at recent minimums, and slight advances have been secured for deliveries beyond July 1. Southern iron has sold at \$11 for third quarter, but \$11.25 has also been obtained. Philadelphia reports sales of 15,000 tons of basic at \$15 for second quarter, and \$15.25 for third quarter; also 15,000 tons of Southern pipe iron on the basis of \$11 for No. 2.

The copper statistics show an increase of 14,000,000 lb. in stocks last month. The market is weaker and sales of electrolytic were made at 12.25c. for early delivery, though contracts for later deliveries are reported at 12.37½c.

In addition to the large requisition for a Southern plant, recently reported, several Steel Corporation subsidiaries are about to make heavy purchases of machine tools.

The Rate Decisions and Other Price Questions

In connection with the freight rate decisions the point has been made that they definitely put an end to wage advances to railroad employees and no doubt headed off wage demands in iron and steel and other industries. Ever since the sanction given the anthracite miners' claim that the operators should not withhold wage advances, since these could be recouped by simply adding them to the price of coal, the country has been traveling a seemingly unending spiral of advancing prices. There was bitter complaint from time to time of the prices paid for commodities, and the cupidity of various producers, middlemen, combines and trusts was assailed in the press and by orators in high places. Legislation of various sorts was urged, the remedy most advocated being the lowering or removal of tariffs on certain imports.

But never in all the years of rebellion against the high cost of living in this country has anything occurred that has borne so heavily against high prices as these decisions of the Interstate Commerce Commission. While they touch only certain proposed tariffs of the railroads, they have a moral effect upon the whole vexed question of prices and profits that is great and far reaching. Not only do they suggest that the efforts of labor must now be directed toward greater efficiency rather than continually toward higher rates, but they address themselves equally to the very shippers who were actively opposing the raising of rates. It is not unlikely that the railroads, which have raised a question as to the high prices of the things they buy,

referring particularly to certain iron and steel products and the equipment into which these enter, will some day bring prominently before the country the fairness of the level of iron and steel prices. Since the best customers of the iron trade must give a reason for the price of what they sell, and must reduce that price when the Government's tribunal says it is excessive, more and more will public attention be directed to the relation of the railroads' costs to the level of their charges to the public.

The bearing of such a condition upon the iron and steel market should not be overlooked in canvassing the effects of the recent decisions. It points definitely in the direction of moderate levels for iron and steel and the avoidance of such advances as will limit consumption and, as has often happened, give way to unprofitably low levels. In other words, one of the later and less obvious effects of the check to freight rate advances may prove to be quite in line with the aims of the co-operative movement among manufacturers of iron and steel—namely, the prevention of sharp fluctuations and the maintenance of a more stable level of prices.

A Railroad Educational Bureau

The Union Pacific Railroad, after a year's preliminary trial, has established a permanent educational bureau for its employees, modeled along the lines of the more successful correspondence schools. A marked advantage that the students of the Union Pacific bureau have, however, is that they can apply their knowledge as they acquire it to practical work. There are very few books of actual value treating on railroad operation and management, and the average railroad man ambitious to learn is obliged to depend for his advancement largely on the knowledge he can pick up during his working hours.

About a year ago the company established a Bureau of Information and employees were notified that questions relating to railroad matters would be answered. The response was so great that the work of the bureau grew rapidly until those in charge were obliged to prepare printed matter covering certain lines of much desired information. From this the bureau grew until now the company has a well-organized teaching force and is issuing to the students properly compiled text books. The remarkable success of the scheme is illustrated by the fact that more than 80 per cent. of the employees have taken advantage of the opportunity offered for qualifying for better positions.

There are 29 courses of instruction, and the number is being increased. They include a block signal course, where the principles of electricity and magnetism are taught; an electrical course for shop employees, a railroad accounting course, freight and passenger traffic courses and a general course for candidates for positions, such as train master, yard superintendent, &c. The bureau also teaches by correspondence locomotive engineering, mechanical drawing, boilermaking, shop practice and other lines. One course, called the track course, has been translated into Japanese for the use of Japanese section foremen and track laborers, of whom the Union Pacific employs about 900. The students who average a good percentage in that grade can advance themselves further by taking up the study of railroad civil engineering.

In correcting the students' papers, writing, spelling, grammar and punctuation are not criticised except where the student is qualifying for a position that calls for clerical training. The text books are all illustrated from photographs taken in the company's shops and along its system. Students are requested to take up studies along the lines in which they are engaged, but this is not compulsory. An employee is privileged to obtain any text book he desires and enroll as a student in any of the branches taught by the bureau.

This is a new field for industrial educational work. The plan commends itself to other railroad companies.

America and the Foreign Patent

The annual report of the Commissioner of Patents contains much information, including statistics, having an important bearing upon the problem of the compulsory working of patents. Of the total of 35,778 patents issued, 3719 were to citizens of foreign countries. The classification according to nations includes Germany, 1083; England, 894; Scotland, 67; Ireland, 12; Canada, 534; France, 315; Austria-Hungary, 139; Sweden, 124; Switzerland, 77; Victoria, 66; Belgium, 61; Italy, 47; Russia, 47; Norway, 35; Mexico, 31; New Zealand, 30; Denmark, 28; Transvaal, 28; New South Wales, 23; Netherlands, 18; Cuba, 9; Spain, 9; Argentina, 8, and Japan, 8, and thence through a long list of countries which make a still smaller showing.

In most of these countries the compulsory working of all patents is required. The chief exception in regard to the patents of Americans is Germany, with which country a special treaty exists. The commissioner states that treaties of like import with other countries are now pending. Should this interchange be established as a general practice, especially covering those nations which are most important to industrial and commercial America, an essential element of the need of a compulsory working clause in our own patent laws would be eliminated. However, Germany is fretting over the existing arrangement, and legislation to remove a discrimination in favor of American inventors is proposed. Probably much depends, in the negotiations with other countries and the permanency of their results, upon the success of what may be termed this experimental treaty with Germany.

Including Germany, some 10 per cent. of patents issued by the United States are to citizens of other countries. Excluding Germany, some 7 per cent. of American patents are issued to citizens of other countries which require the working of patents issued by them to Americans. The American manufacturer cannot use foreign inventions because of United States patents. The foreign industry can procure the cancellation of any patent issued by his country, if it is not worked commercially. The outcome is the establishment of many American branch plants abroad.

It must also be taken into important account that a very much higher percentage of the foreign inventions patented at Washington are really useful in the industrial arts than with domestic patents, for an invention must usually be assured of some practical value before the inventor or the assignor will go to the cost of covering the device or process in the other industrial countries.

The need of some change covering the entire situation is undoubted. If by treaty the American inventor

shall secure the same protection in foreign countries as is accorded to the citizens of those countries by the United States, probably the end will be served very well. But difficulties exist as to the permanency of such a practice, if, as under the German treaty, the American has greater privileges in the foreign country than those of the citizen, who is not exempt from the compulsory working principle. The agitation should speedily lead to a satisfactory solution of the question.

A Novelty in Apprentice Systems

A machine shop employing some 150 men is establishing an apprentice system on an essentially different principle from the common practice. The boy is given direct financial benefits from a premium system; he receives instruction from an expert whose time is devoted to increasing the general efficiency of the works; and, which is very exceptional, the apprentice's term of service is based not on a series or periods of proscribed lengths, but on his progress in acquiring the skill and knowledge of his trade. The course is divided into the usual number of terms, each having its wage scale, gradually ascending. But the marking points of advance from one wage to another are standards of labor. When an apprentice arrives at a predetermined degree of efficiency, he passes to the next period of the course. What may require four years for one boy to accomplish, another may do in two. It depends upon himself entirely; upon his adaptability, his native mechanical intellect, his application and his ambition.

The instructor's duties extend beyond the apprentice class. He is the efficiency man of the shop system. His duty is to study the processes of manufacture of every part and piece going through the plant; the methods of handling work; to search for wasted effort and those traditional customs among the men which in some plants establish the rate of production. Comparisons of methods are made; the speeds of various workmen on the same class of work are put side by side and improvement made on the best previous practice. The important factor of periods of relaxation, scientifically determined, is given attention, that undue physical and mental fatigue may not result from increasing tension. The atmosphere in which the boy is employed is one of constant striving after the most economical and effective methods of manufacture. The instructor gives him the benefits of the results of these studies; in fact, the apprentice participates directly in them. In many shops the apprentice receives little direct attention. His instructor is a foreman, a busy man whose time is divided among a group of workmen and apprentices and many other details of routine and emergency. The boy is expected to learn largely from observation, frequently of the work of men whose mechanical ability is limited. In the shop in question, the management after a study extending over several months found that the foreman of the most important department of the shop—the department, in fact, in which the apprentices receive the most valuable part of their training—could be expected to give to the student hardly more than five minutes of the average day. Such instruction was inadequate. The obvious deduction was that the boys had merely been learning from what they saw about them and from questions asked of older workmen. Therefore they were able to

do justice neither to themselves nor to their employer.

The premium system as laid down has originality. The worker gets all of the saving over the fixed time. If 50 hours are allotted for a job, and the apprentice or workman does it in 40 hours, he has earned for himself 10 hours' pay at his regular wage rate. He does not divide the saving over the charted schedule. The boy earning 9 cents an hour receives 90 cents extra if he saves 10 hours. But the original 50 hours is not the previous rate for the job. It is an arbitrary unit based on what reasonably might be expected, as a result of the investigations of the efficiency man. In the case cited, the former average time for the job may have been 60 hours. The arbitrary time once set, it remains. What is saved beyond that time goes to the employee. The division of the saving is made in advance, the employer taking his share first, but not begrudging whatever his workmen may get afterward. He has the additional benefit which comes with the increase in machine efficiency and the other resultant economies in overhead expenses. The workmen and apprentices receive the continued assistance of the expert, after the original calculations have been made, and experience has shown that efficiency increases with the passage of time.

Upon his successes in this inspiring atmosphere depends the progress of the apprentice. A first period, in most shops of six months, may be covered in two months. Previous shop experience of the boy may make this possible. So it goes throughout the course. Exact limits of service are destroyed. The reward of ability and intelligent energy is the earlier attainment of increased pay and the earlier final advancement to the dignity of journeyman, and also the extra dollars from the premium system. The principle has its strong points. Probably the new inducement will make it easier to get desirable boys. Classroom studies are not included, nor is shop time devoted to the drafting room. But the instructor's influence will doubtless send many of the students to evening school. The system is one of automatic reward for ambition and aptitude, a reward applied without prejudice or favor.

A Machinery Exhibit That Paid

Whether machinery exhibits at expositions held in the past in this and other countries have brought adequate financial returns for the investment is a much mooted question among manufacturers, but at least one international show held last summer gave good returns to a group of English exhibitors. This was the Buenos Ayres Centenary Exposition at which a representative display of metal working machinery and agricultural implements was shown by British manufacturers. According to Commissioner-General Akers, who had charge of the British section, the exhibitors in that division received \$200 in orders for every dollar they spent in its organization. The total cost of fitting up and maintaining the section was \$70,000, and already \$12,500,000 worth of orders have gone from Argentina to the British firms participating in the show. The chief exhibitors in the section were the makers of metal working machinery and agricultural implements, and it is stated that some of the manufacturers in this line booked orders far exceeding the average of \$200 for every dollar spent.

American agricultural machinery and dairy equip-

ment were well represented at the Buenos Ayres Exposition, and the United States Steel Products Company had a representative display. Efforts were made to get our makers of metal working machinery interested in the show, but with poor success. The United States Steel Products Company worked along these lines, and some of its officials spent valuable time in efforts to organize a representative American machinery exhibit, but the majority of those approached had the Jamestown fiasco fresh in their minds and refused to give the enterprise any consideration. It is on record that the few American manufacturers who did participate in the show were well rewarded.

What "Depreciation" Means

Wm. B. Jackson of the engineering firm of D. C. & Wm. B. Jackson, Boston, Mass., says that in considering the depreciation problem it is essential to understand clearly what the word "depreciation" actually represents. Every part of a properly constructed and well equipped property can be maintained in good operative condition by current repairs for a period of years, but the time comes with every building and unit of equipment when it, like a suit of clothes, can no longer be kept serviceable by repairs or current maintenance, and when it must consequently be replaced substantially in its entirety.

The length of useful life of a unit is determined by one or both of two factors: First, the inherent quality of most physical property to deteriorate, on account of the effects of use and of the elements, to a point where it cannot be longer economically maintained in satisfactory operative condition by ordinary repairs—that is, a unit ultimately reaches a point of "decrepitude" when it is either impossible to keep it in satisfactory operative condition by current repairs or the cost for such repairs becomes so great that it is more economical to replace the old unit by a new one. Second, the effects of changes whereby the character of the service required is so changed, or the efficiency of apparatus for providing corresponding service is so improved, that the plant, though still physically capable of doing the work for which it was designed, is no longer able to economically provide the service required, and it is therefore obsolete. This second factor is well designated "obsolescence."

A third division, called "inadequacy," is sometimes considered in estimating depreciation. This is intended to cover the effect upon the useful life of apparatus or plant of expansion in business, whereby otherwise serviceable apparatus is outgrown and must be replaced by larger apparatus. Mr. Jackson does not consider such a division necessary, for any effect caused by inadequacy which can be estimated may properly be considered under "obsolescence."

Carting a 60-Ton Girder.—Six of the large steel girders, fabricated by the Pennsylvania Steel Company, to support the columns for the upper portion of the 40-story Municipal Building in New York City, were moved from a pier on the Hudson River to the building at Center and Chambers streets, on Sunday last. The building will extend on both sides of Chambers street and these girders will span that thoroughfare. One of the girders weighed 60 tons and the others about 30 tons each. The depth of the largest girder is 10 ft. ½ in. from back to back of the angles. In transporting this girder a 20-ton truck drawn by 34 horses was used. Each wheel of the truck was made of steel, was 14 in. wide and weighed 3000 lb. The street pavement was only slightly damaged but numerous manhole covers were broken by the weight of the girders and in some cases the same cover had to be replaced after each trip.

The Hubbard Steel Foundry Company, East Chicago, Ind., has increased its capital stock from \$300,000 to \$400,000.

New Publications.

The Aeroplane. By T. O'B. Hubbard, J. H. Ledeboer and C. C. Turner. Size 5 x 7½ in.; 128 pages, 4 plates and 35 diagrams. Bound in cloth. Price \$1.00 net. Published by Longmans, Green & Co., Fourth avenue and Thirtieth street, New York City.

The purpose of the present volume is to provide a complete textbook of the elements of dynamic flight and to give in simple language the laws governing aviation. This is a new branch of engineering science as well as a new and important industry and bearing in mind the requirements of education along the former line, the authors have endeavored to produce a book suitable for use in schools and colleges, as well as for the student and general reader.

The book is divided into nine chapters, a bibliography, a glossary and a number of useful tables. Except for the opening chapter, the divisions are purely arbitrary. The factors involved in a consideration of the science and its practice are so interdependent that a certain amount of repetition is unavoidable and is really essential for the sake of clearness. In chapter I, the properties of the air are discussed and in the next two the resistance and the flow of the air are taken up. Chapter IV. deals with theory of the aeroplane, while the next two chapters are given over to stability and steering and propulsion. In the next chapter the various points entering into the design of aeroplane are considered and the various types described. Instruction in the art of navigating the air is given in chapter VIII, and the final chapter deals with the various forms of motors employed for propulsion. The bibliography of aeroplaning, a glossary, a number of tables of conversion factors, velocity and pressure of wind and a barometric height table complete the book.

Smoley's Parallel Tables of Logarithms and Squares.—

By Constantine Smoley, C. E. Fifth edition revised and enlarged. Size 4½ x 7 in.; 174 pages. Bound in flexible leather. Price \$3.50. Published by the Engineering News Publishing Company, 220 Broadway, New York City.

In this new edition, the second part containing the logarithmic-trigonometric tables, has been augmented by extending the table of natural functions and the including of numerous other tables. The table of natural functions gives the sine, cosine, tangent, cotangent, secant and cosecant for every minute in the quadrant and replaces the older table in which the functions were given by intervals of 10 minutes. The other additions comprise tables of squares, cubes, square and cube roots and reciprocals of all numbers from 1 to 1000 and tables of areas and circumferences of circles with diameters of from 1 to 1000. These additions enable a large field of theoretical and practical work to be covered, but at the same time the increase in the number of pages, 44, is not so great as to detract from the value of the book as a handy pocket manual for engineers, architects and students.

Drop Forging, Die Sinking and the Machine Forming of Steel.—By Joseph V. Woodworth. Size 6 x 9 in.; 320 pages, 304 illustrations. Bound in cloth. Price \$2.50. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York City.

This book is a practical treatise on the hot and cold machine forming of steel and iron into finished shapes, together with the tools, dies and machinery involved in the manufacture of duplicate forgings and interchangeable hot and cold pressed parts from bar and sheet metal. The author has endeavored to treat the subject comprehensively and thoroughly, and with that end in view technical and ambiguous terms have been replaced by practical and familiar shop words, and all the illustrations and descriptions are plain and easy to understand.

The volume is divided into 11 chapters and the first deals with die sinking and drop forging practice and designs for the production of duplicate metal parts. A description of the use of embossing and drop forging dies and the design and the construction of drop forging and hardening plants follows. Chapter V. is devoted to the subject of drop hammers and treats of their development

and weight, the foundations required by them and the dies which they use. The treatment of steel and iron for working in machine forging is discussed in the next chapter, and chapter VII. describes the press and the hammer forming of heavy hot and cold bar and sheet stock in dies and the assembling and manufacture of finished products. The next two chapters contain descriptions of the various types of machines and processes supplemented by examples of modern practice in the manufacture of machine forgings. Hydraulic forging methods, autogenous welding and general shop practice are considered in chapter X., while the final chapter is given over to the making of various types of cutting tools, the use of drop presses for making flatwear and the hardening of drop dies.

The Engineering Directory for 1911. Size 4 x 6½ in.; 1378 pages. Bound in boards. Price \$5. Published by the Crawford Publishing Company, 209 North Jefferson street, Chicago, Ill.

The latest edition is very much enlarged over the previous ones, which were largely devoted to heating and plumbing goods. In addition to bringing the matter contained in former editions up to date, there is a 150-page directory of jobbers and dealers in mill, steam, mine, railroad and heating supplies and tools and machinery as well as directories of electric light and power plants, gas companies, water works, architects and purchasing and manufacturers' agents. An exhaustive classified list of products with the maker's name completes the book.

Analysis Books of Lake Superior Ores

M. A. Hanna & Co., Cleveland, Ohio, have issued their analysis book of the Lake Superior ores they will ship during 1911. Cargo analysis for 1910 and guarantees for 1911 are given. Of the 40 ores listed, 12 are Bessemer, 25 non-Bessemer, 1 manganiferous and 2 silicious. Twenty-one are from the Mesaba range and 19 are distributed between the Gogebic, Marquette and Menominee ranges. Among the ores listed are those from the Newport mine in the Gogebic range. The output of this underground mine has increased rapidly in the past two years, the shipments in 1910 having reached 1,189,000 tons. Among other ores listed are those of the Republic mine in the Marquette range, one of the oldest mines in the Lake Superior district. From this mine 150,732 tons of ore were taken in 1910 and its total output has been 6,343,000 tons.

The Tod-Stambaugh Company, Cleveland, announces the analysis of its Mesaba range ore, which will be offered in the season of 1911. These comprise Biwabik ore and Schilling ore from the Biwabik mine, the former a Bessemer and the latter a non-Bessemer; the Morton ore, a Bessemer, and the Crawford ore, a non-Bessemer, from the Morton mine; the Ruddy ore, a Bessemer, from the Ruddy mine, and the Helmer No. 2 ore, a non-Bessemer from the Helmer mine. The Ruddy ore runs 62.03 per cent. in iron, 0.038 per cent. in phosphorus, and 5.75 per cent. in silica, with 10 per cent. moisture. The iron natural is thus 55.827 per cent.

Pickands, Mather & Co., Cleveland, present in their new annual pamphlet exhaustive analyses of their Lake Superior iron ores based in most cases on the shipments of 1910, while in a few instances expected analyses for 1911 are given. There are 10 old range Bessemer ores, 13 Mesaba Bessemer, 13 old range non-Bessemer ores, 12 Mesaba range non-Bessemer and 3 silicious ores. The ore on the list which is highest in iron is Section 30 Bessemer, which runs 63.10, dried at 212 deg., and 59.57 natural, the phosphorus being 0.045 and 0.0425 per cent., respectively.

The monthly meeting of the Pittsburgh Foundrymen's Association was held in Engineers' Hall, Oliver Building, Pittsburgh, on the evening of March 6. The meeting was addressed by B. D. Fuller, superintendent of the foundries of the Westinghouse Electric & Mfg. Company, Cleveland, Ohio, on "Conservation of Foundry Materials."

Pig Iron Production

A Marked Increase in February

Capacity Active March 1 Represents 24,450,000 Tons a Year

There was a steady increase in pig iron production throughout February. The total of coke and anthracite iron for the 28 days was 1,794,509 tons, or 64,090 tons a day, against 56,752 tons a day in January, a gain of 13 per cent. There was a gain of 16 active furnaces in the month, all due to the resumption of steel works furnaces, the active merchant furnaces showing a net loss of one, though the daily output of merchant iron increased over that of January, due to somewhat faster driving at a number of plants. The daily capacity of the 222 furnaces in blast March 1 was 66,562 tons against 59,568 tons a day for 206 furnaces February 1. Production to-day, including charcoal iron (which is about 350,000 tons a year) is at the rate of 24,450,000 tons a year, against a rate of 22,000,000 tons a year February 1, and 19,700,000 tons at the low point to which it had fallen at the opening of the year. The high mark reached in early 1910 was a rate of 31,600,000 tons a year in February. Thus about 40 per cent. of the falling off between February, 1910, and the end of last year, has now been recovered.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with February, 1910, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.

	Steel Works.	Merchant.	Total.
February, 1910.....	57,876	27,740	85,616
March	56,113	28,346	84,459
April	55,663	27,129	82,792
May	52,235	24,867	77,102
June	51,637	23,879	75,516
July	47,183	22,122	69,305
August	46,534	21,429	67,963
September	47,007	21,536	68,542
October	45,794	21,726	67,520
November	41,427	22,232	63,659
December	35,909	21,440	57,349
January, 1911.....	36,401	20,351	56,752
February	42,349	21,741	64,090

February Output by Districts

The table below gives the production of all coke and anthracite furnaces in February and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.

	October. (31 days)	November. (30 days)	December. (31 days)	January. (31 days)	February. (28 days)
New York....	147,894	142,610	142,674	136,519	131,238
New Jersey....	19,115	18,284	15,437	12,627	6,101
Lehigh Valley.	69,327	62,161	68,531	68,324	56,367
Schuylkill Val.	61,673	54,642	51,466	60,592	57,321
Lower Susquehanna and Lebanon Val.	54,072	50,370	51,888	43,942	42,729
Pittsburgh dis.	507,508	445,083	397,379	409,698	424,517
Shenango Val.	112,026	82,904	82,706	82,922	86,908
West. Penn....	126,098	97,568	81,957	94,118	96,616
Md., Va. and Kentucky...	67,926	58,772	59,945	56,424	57,759
Wheeling dis.	76,581	84,390	74,225	77,715	95,571
Mahoning Val.	202,667	180,717	162,349	174,318	201,624
Central and North. Ohio.	117,902	108,599	112,662	127,579	144,806
Hocking Valley, Hanging Rock and S.W. Ohio.	24,029	25,008	29,959	33,253	32,396
Mich., Minn., Mo., Wis., Col., Wash.	72,825	78,927	68,313	60,941	61,406
Chicago dis....	246,504	239,469	197,340	165,826	155,498
Alabama	160,077	165,512	154,025	128,188	118,594
Tenn., Georgia and Texas....	26,897	24,764	26,961	26,340	25,153
Totals.....	2,093,121	1,909,780	1,777,817	1,759,326	1,794,509

Among furnaces blown in in February were one Lackawanna and New York State Steel Company in New York, Delaware River in Eastern Pennsylvania, one Duquesne, two Edgar Thompson, one Isabella and Clinton in the Pittsburgh district, Hall in the Shenango Valley, one Cambria in Western Pennsylvania, one Maryland at Sparrows Point, two Mingo, Benwood and Riverside in the Wheeling district, one Newburg and one Lorain in Northern Ohio, and two Joliet and two South Chicago in Illinois.

The furnaces blown out last month were one Wharton in New Jersey, one Eliza in the Pittsburgh district, Colonial in Western Pennsylvania, one Ohio in the Mahoning Valley and one Iroquois in Illinois.

Capacity in Blast March 1 and February 1

The following table shows the daily capacity of furnaces in blast March 1 and February 1. These figures are based largely on the performance of the furnaces in the past two months:

Coke and Anthracite Furnaces in Blast and Capacity.—Gross Tons.

Location of furnaces.	Total number of stacks.	March 1. Number in blast.	Capacity per day.	February 1. Number in blast.	Capacity per day.
New York:					
Buffalo	17	14	4,865	12	3,931
Other New York....	7	3	529	3	558
New Jersey.....	7	1	156	2	410
Spiegel	2	..	..	..	..
Pennsylvania:					
Lehigh Valley....	23	11	1,928	11	2,110
Spiegel	3	1	85	1	95
Schuylkill Valley....	16	8	2,178	7	1,965
Low. Susquehanna..	7	4	716	4	705
Lebanon Valley....	10	5	810	5	712
Pittsburgh dis....	50	38	15,620	35	14,215
Spiegel	3	2	373	1	130
Shenango Valley....	20	10	3,250	9	2,997
West. Penn.....	27	11	3,375	11	2,990
Maryland	4	3	820	2	575
Wheeling dis.....	14	12	4,350	8	2,850
Ohio:					
Mahoning Valley....	23	17	6,425	18	6,240
Central and North..	22	14	5,232	12	4,244
Hocking Val., Hanging Rock and S. W. Ohio.....	15	8	1,157	8	1,120
Illinois and Indiana.	34	16	6,275	13	5,208
Michigan, Wisconsin and Minnesota....	10	5	1,093	5	1,058
Colorado, Missouri and Washington	7	4	1,104	4	1,185
The South:					
Virginia	23	8	937	8	906
Kentucky	5	2	344	2	340
Alabama	46	17	4,235	17	4,134
Tenn. and Georgia..	20	8	905	8	890
Totals.....	415	222	66,562	206	59,568

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1909.	1910.	1911.	1910.	1911.
January	1,117,823	1,773,201	1,128,448	19,538	8,360
February	1,073,333	1,620,539	1,185,782	21,396	12,821
March	1,140,553	1,739,212	.....	25,591	.....
April	1,093,092	1,669,898	.....	22,304	.....
May	1,256,418	1,619,283	.....	26,529	.....
June	1,365,527	1,549,112	.....	27,680	.....
July	1,508,762	1,462,689	.....	22,924	.....
August	1,591,991	1,442,572	.....	25,756	.....
September	1,660,839	1,410,221	.....	15,151	.....
October	1,769,094	1,419,624	.....	8,500	.....
November	1,689,094	1,242,804	.....	9,032	.....
December	1,768,799	1,113,174	.....	12,178	.....

Graphic Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.	1911.
January	71,149	33,718	57,975	84,148	56,752
February	73,038	37,163	60,976	85,616	64,090
March	71,821	39,619	59,232	84,459	.....
April	73,885	38,289	57,962	82,792	.....
May	74,048	37,603	60,753	77,102	.....
June	74,483	36,444	64,656	75,516	.....
July	72,763	39,287	67,793	69,305	.....
August	72,591	43,851	72,546	67,963	.....
September	72,783	47,300	79,507	68,476	.....
October	75,386	50,554	83,856	67,520	.....
November	60,937	52,595	84,917	63,659	.....
December	39,815	56,158	85,022	57,349	.....

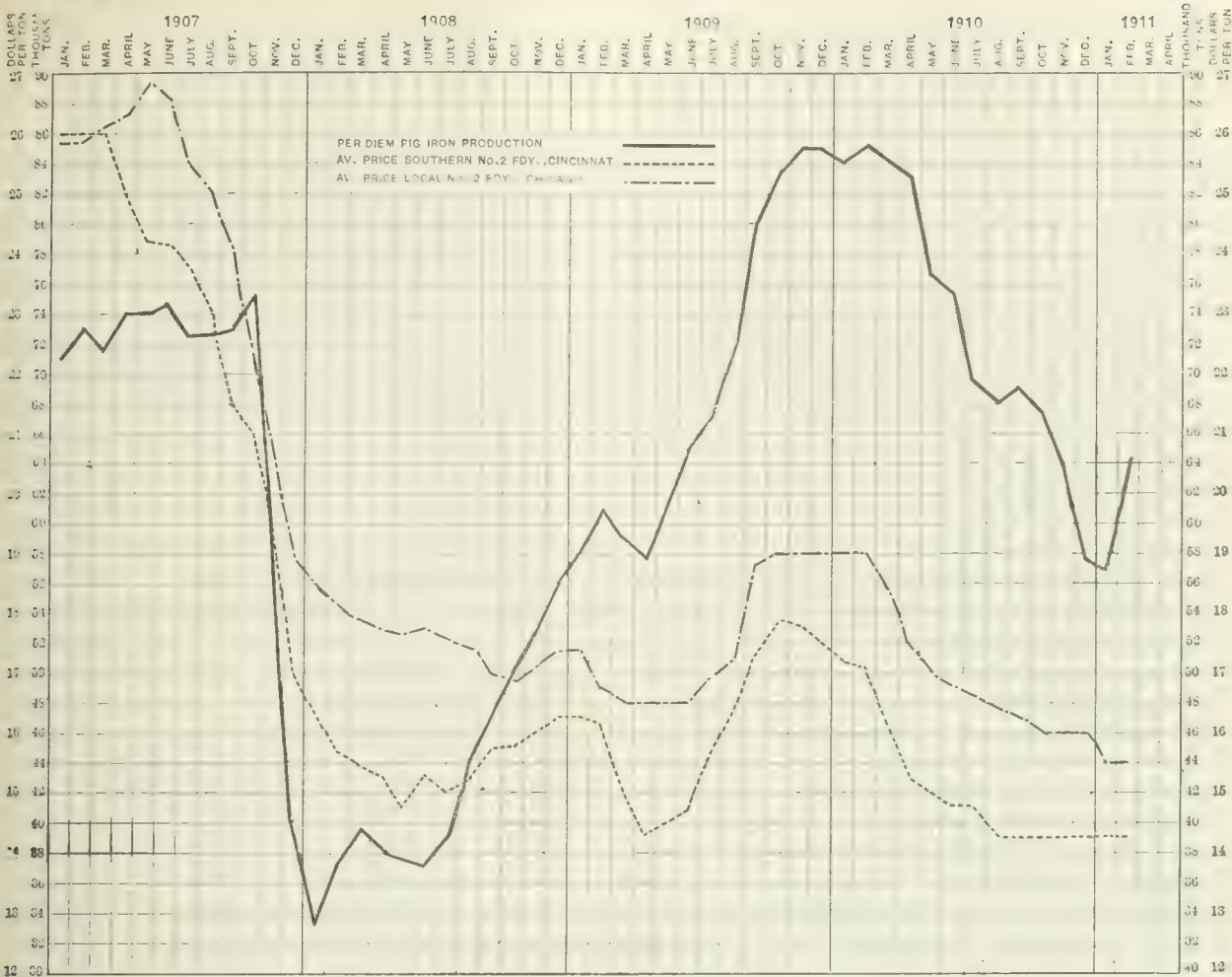


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to March 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron Delivered at Chicago.

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou.	Loc.	Sou.	Loc.	Sou.	Loc.	Sou.	Loc.
	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Jan.	26.00	25.85	16.15	18.45	16.25	17.35	17.25	19.00
Feb.	26.00	25.85	15.75	18.16	16.13	16.75	17.06	19.00
March	26.00	26.10	15.50	17.85	15.05	16.50	16.30	18.30
April	25.06	26.35	15.20	17.73	14.25	16.50	15.37	17.50
May	24.25	26.85	14.75	17.63	14.50	16.50	15.00	17.06
June	24.10	26.60	15.25	17.73	14.70	16.50	14.85	16.75
July	23.85	25.55	15.00	17.55	15.75	17.00	14.75	16.56
Aug.	23.00	24.85	15.25	17.35	16.38	17.13	14.31	16.50
Sept.	21.50	24.10	15.65	17.05	17.35	18.70	14.25	16.40
Oct.	20.95	22.45	15.75	16.85	17.88	19.00	14.25	16.06
Nov.	19.50	20.68	16.00	17.10	17.75	19.00	14.25	16.00
Dec.	17.00	18.80	16.25	17.35	17.45	19.00	14.25	16.00
Jan., 1911	14.25	15.50	Feb., 1911	14.25	15.50			

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.
January	2,205,607	1,045,250	1,797,560	2,608,605
February	2,045,068	1,077,740	1,707,340	2,397,254
March	2,226,457	1,228,204	1,832,194	2,617,949
April	2,216,558	1,149,602	1,738,877	2,483,763
May	2,295,505	1,165,688	1,883,330	2,390,180
June	2,234,575	1,092,131	1,930,866	2,265,478
July	2,255,660	1,218,129	2,103,431	2,148,442
August	2,250,410	1,359,831	2,248,930	2,106,847
September	2,183,487	1,418,998	2,385,206	2,056,275
October	2,336,972	1,567,198	2,599,541	2,093,121
November	1,828,125	1,577,854	2,547,508	1,909,780
December	1,234,279	1,740,912	2,635,680	1,777,817
January, 1911	1,759,326	February, 1911	1,794,509	

Employment Bureau of Pittsburgh Manufacturers' Association

For some years the Manufacturers' Association, with offices in the Lewis Building, Pittsburgh, has conducted an employment bureau very successfully. It is in charge of D. H. Crieder, secretary of the association. In reply to questions recently asked as to the operations of this bureau, the association has made a statement from which the following is taken:

"The employment bureau aims to establish the principle of fair dealing between employee and employer, and

to protect both in the exercise of their free rights as individuals, given by the constitution of the United States. The main purpose of the bureau is to make it easy for the employer to find men who want work, and for the men, when they want work, to find an employer—a plain, simple proposition, making it possible for men out of work to learn at one place which employers are in need of men, and, by leaving their applications, making it possible for employers to learn at the same place what men want work.

"One of the principal objects of the bureau is to show both employer and employee that their interest are identical, and that the greatest good can be secured for both by their united efforts. The bureau keeps no black list."

The Ferro Machine & Foundry Company's Improvements

The Ferro Machine & Foundry Company, Cleveland, Ohio, has just completed at its factory a large office building in which are combined the two divisions of its office force, one of which had previously been in the downtown section of the city. The rapid growth of the company's business compelled it to increase its office facilities. This building is two stories and has a floor space of 15,000 sq. ft. A careful study of some of the largest offices in the country was made and the Ferro office was laid out so as to facilitate in every way the rapid handling of the business. The most modern improvements and equipment are installed throughout. Other important additions have been made to the company's plant within the last 12 months. Among these was a large extension of the foundry and a new corerom, the latter being generally conceded to be the finest of its kind. The Ferro factory now covers an area which makes it one of the largest in the world devoted to the casting of automobile parts. All of the machinery, a large percentage of it being of special design, is electrically driven. In addition to making automobile parts the company builds marine engines.

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.

2, 2½ to 4 in. Lap Weld The above discounts are for card weight, subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—discounts on lap welded steel and charcoal iron boiler tubes to jobbers in charcoal are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2¼ in.	61	43
2½ in.	63	48
2½ to 5 in.	69	55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$29.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ¾ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, March 8, 1911. —(By Telegraph.)

Pig Iron.—Following the fairly heavy sales of Bessemer and basic iron, made recently for delivery running into the third quarter of this year on the basis of about \$13.75 for basic and \$15 for Bessemer, at Valley furnace, the market has quieted down considerably and new inquiry is light. In fact, it is understood that some consumers who held options on both Bessemer and basic iron have allowed these to lapse, and have decided not to buy on account of the somewhat uncertain business outlook. Stocks of pig iron held by the furnaces are still very heavy and would seem to preclude any further advance in prices until there is a material improvement in demand. The consumption of pig iron is not yet satisfactory, and shipments are being held up to some extent. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Consumers of billets and sheet and tin bars are urging the mills to make prompt shipment. The actual consumption of steel at present is heavier than for some months. Consumers are pretty well covered to April 30, or beyond, and there is very little new business. Producers of steel are working in close harmony with each other and regular prices are being very firmly held. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Consumers have returned to the policy of placing orders conservatively, and apprehension is expressed as to the future. While it is true that actual orders entered and sent to the mills in February showed a material increase over January, the February rate has not been maintained so far this month, but nearly all lines have shown a falling off. While there has been some buying of Bessemer and basic pig iron recently, the market has quieted down again and is dull. Consumers of billets and sheet bars are specifying liberally against their contracts, and the movement of steel from the mills to consumers is heavier than for some time. The advance of \$1 a ton in wire products, effective from March 6, was not unexpected by the trade, but large consumers were pretty well covered, and buying at the higher prices will probably be light for some time. Prices on scrap are about stationary, with new demand quiet. Coke is showing a stronger tone and standard makes of furnace coke have sold at \$1.75 at oven for delivery over this year. Some prominent makers of coke will not meet this price but are asking \$1.90 to \$2.

Ferromanganese.—The very low prices now being made are stirring up some business. Two sales of foreign 80 per cent. have been made, part for delivery prior to July at \$37.50, and the rest for the remainder of this year at \$37.75, Baltimore. We quote 80 per cent. foreign for prompt ship-

ment at \$37.50, and for delivery over the last half of the year at \$37.75 to \$38, Baltimore. The rate for delivery in Pittsburgh district is \$1.95 a ton.

Ferrosilicon.—A sale of 300 tons of 50 per cent. has been made for forward delivery to a local consumer at very close to \$53, Pittsburgh. Some further inquiry is in the market, but prices on that grade are weak. We quote 50 per cent. at \$53.50 to \$54, f.o.b. Pittsburgh, for delivery up to July; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—No new inquiry has come out. Best grades, made from all pig iron, are still quoted at about \$30, Pittsburgh. The Wilkes Rolling Mill Company, Sharon, Pa., has started up its muck bar mill, which has been idle for some time.

Skelp.—A sale of about 1000 tons of wide sheared iron plates is reported at a price equal to about 1.75c., delivered at buyer's mill in the Pittsburgh district. New inquiry is fairly active and prices are firm. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—Wire rods, being a semi-finished product, are not strictly governed by advances in prices of wire products; however, one leading maker of rods is now quoting \$30, while another producer is still quoting \$29. There is not much new inquiry, leading consumers having covered some time ago when prices were lower. We quote Bessemer, open hearth and chain rods at \$29 to \$30, Pittsburgh.

Steel Rails.—The situation in standard sections is very dull, but the Carnegie Steel Company is receiving some fair sized orders for export through the United States Steel Products Company. The new demand for light rails is more active, especially from the lumber interests, and in the past week the Carnegie Company received specifications and new orders for about 5000 tons. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The Wabash-Pittsburgh Terminal Railroad has at last given a contract to the Pressed Steel Car Company for 500 50-ton steel hopper cars and a similar order to the Standard Steel Car Company. The New York Central has placed orders with the Pressed Steel Car Company and Standard Steel Car Company, each for 25 all-steel postal cars. The latter has taken an order for the Boston Elevated for 30 all-steel coaches, and the Western Maryland Railroad has an inquiry out for 500 all-steel hopper cars. The general demand for plates is only fair, and none of the mills has orders enough to run to more than 60 to 75 per cent. of capacity. Prices are firm, and we quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

Structural Material.—Very few contracts were placed in the past week. New inquiry is light, and only for small jobs. The McClintic-Marshall Construction Company has taken 400 tons for steel buildings for the Rome Brass Company, Rome, N. Y. Complaints are made about the very low prices at which work is going, and it is claimed that in some cases it is being taken at less than cost. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—While the new demand is light and is not expected to open up for several months yet, specifications against contracts are coming in freely. Shipments of tin mill products by the American Sheet & Tin Plate Company in February were the heaviest in any one month since March of last year; it is now operating to 88 per cent. of its tin mill capacity, which is practically normal. The market is firm, and we quote 100-lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Sheets.—The demand is not as heavy at this time as had been anticipated. Betterment, especially in roofing sheets, is expected in the near future, as the outside building trade will soon take on activity. Regular prices on the different grades of sheets, printed on a previous page, are referred to as being well maintained. The Youngstown Sheet & Tube Company is operating this week all of its 14 hot sheet mills, the first time in some months.

Bars.—Specifications against contracts for steel bars are a little better, but new demand is dull. The implement makers and wagon builders have not yet shown a tendency to come in the market and contract for their supply of steel bars for 1911-1912. Prices on iron bars are referred to as being a little stronger, but all the mills are in need of new orders and specifications are not very satisfactory. We quote steel bars at 1.40c. and iron bars at 1.35c., f.o.b. Pittsburgh, Pa.

THE IRON AND METAL MARKETS

Hoops and Bands.—A fair run of new orders is being placed and specifications against contracts in February are reported to have been slightly better than in January. We quote steel hoops at 1.50c, and bands at 1.40c, extras on the latter as per the present steel bar card.

Spikes.—No orders of moment have been placed in the past week, but one of the large Western roads is in the market for 5000 kegs for early delivery. Prices are reported as being firmly held as follows:

Railroad Spikes.

4 1/2, 5 and 5 1/2 x 9 1/2	Extra	\$1.55
3, 3 1/2, 4, 4 1/2 and 5 x 9 1/2	Extra	.10
3, 3 1/2, 4 and 4 1/2 x 8 1/2	Extra	.20
3, 3 1/2, 4 and 4 1/2 x 8	Extra	.30
2 1/2 x 8 1/2	Extra	.40
2 1/2, 3 and 3 1/2 x 7 1/2	Extra	.60
2 x 7 1/2	Extra	.80

Boat Spikes.

3 1/2 in. square, 12 to 24 in. long	Extra	.15
3 in. square, 8 to 16 in. long	Extra	.15
3 in. square, 6 to 16 in. long	Extra	.15
2 1/2 in. square, 6 to 12 in. long	Extra	.20
2 1/2 in. square, 4 to 12 in. long	Extra	.30
2 1/2 in. square, 4 to 8 in. long	Extra	.45
1 1/2 in. square, 4 to 8 in. long	Extra	.75
3/4 in. square, 3 to 3 1/2 in. long	Extra	1.00
3/8 and 5/16 shorter than 4 in., 1/4 cent extra.		

Spelter.—Stocks are said to be low, and while consumers are merely buying as their needs require, they are compelled to pay full prices. A sale of 100 tons for March delivery is reported at 5.50c, East St. Louis, equal to 5.62 1/2c, Pittsburgh.

Merchant Steel.—New orders and specifications so far this month are keeping up the pace set last month, and it is believed that March will show a material gain in new orders and shipments over February. Prices are said to be very firm, and we quote, f.o.b. Pittsburgh: Iron finished tire, 1/2 x 1 1/2 in. and heavier, 1.40c, base; under these sizes, 1.55c; planished tire, 1.60c; channel tire, 1.80c, base; toe calk, 1.90c; flat sleigh shoe, 1.55c; concave or convex, 1.75c; cutter shoes, tapered or bent, 2.25c; spring steel, 2c; machinery steel, smooth finish, 1.90c.

Rivets.—A fair amount of new business is being placed, made up mostly of small orders to meet current needs, and specifications against contracts are reported to be heavier than for some time. Regular prices of 1.90c. on rivets and 2c. on boiler rivets are fairly strong, but are sometimes shaded for desirable orders.

Wire Products.—Effective Monday, March 6, the wire makers announced an advance of \$1 a ton, which was not unexpected by the trade. Large jobbers and distributors were pretty well covered at the \$1.70 and \$1.75 prices on wire nails, so that new orders at this advance will likely be light for some time. It is stated that specifications against contracts are coming in at a very satisfactory rate. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.55; galvanized, \$1.90; wire nails, \$1.80; and cut nails, \$1.60 to \$1.65, f.o.b. Pittsburgh, full freight to destination added.

Merchant Pipe.—The new demand for merchant pipe is showing gradual betterment; orders and specifications entered by the mills in February showed a slight gain over January. Inquiries are in the market for 20 miles of 8-in. and about five miles of 4-in. pipe. There are also several large gas and oil lines being figured on, but these may not develop for some time. Reports of an advance in prices of pipe to be made at an early date do not come from official sources, and there are no indications at this time that such action will be taken in the near future. Discounts on iron and steel pipe printed on a previous page are referred to as being fairly well maintained.

Boiler Tubes.—The new demand for both locomotive and merchant tubes is light and specifications against contracts are not coming in at a satisfactory rate. Prices on tubes are still pretty badly demoralized.

Coke.—A Valley furnace interest closed in the past week for about 10,000 tons of blast furnace coke for March shipment at a price said to be about \$1.60 per net ton, at oven, and also for 10,000 tons a month commencing April and running through the year at about \$1.75 or \$1.80, at oven. The market is showing more signs of improvement than for some time. The output in the Upper and Lower Connellsville regions last week was 339,338 tons, an increase over the previous week of more than 17,000 tons. We have advanced prices on standard grades of furnace coke for prompt shipment, and now quote \$1.55 to \$1.60 per net ton, at oven; on contracts for delivery over the remainder of this year \$1.75 to \$1.80 is being quoted by some makers, while others that have their product pretty well sold up are asking \$1.90 to \$2. Best makes of 72-hour foundry coke are held at about \$2.10 per net ton, at oven, to dealers, and from \$2.25 to \$2.50 to consumers.

Iron and Steel Scrap.—The scrap market has quieted down to some extent. While prices remain firm, the upward

movement seems to have stopped for the time being. Consumers are fairly well covered and are inclined to stay out of the market until assured that prices will not decline. The recent scrap list sent out by the Pennsylvania Railroad shows the largest offerings by that road for some months. While the general asking price for heavy steel scrap is \$14.75, delivered at nearby consuming points, it is stated that \$14.50 has been done on some recent sales of heavy steel scrap for delivery at Sharon, Pa., and one or two other points. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere, as noted:

Heavy steel scrap, Steubenville, Pa., delivered at Sharon, Pa., and Pitts.	
No. 1 foundry cast	\$14.75 to \$15.00
No. 2 foundry cast	14.50 to 14.75
Bundled sheet scrap, at point of shipment	13.75 to 14.00
Revolting rails, Newark and Cambridge, Ohio, and Cumberland, Md.	11.00 to 11.25
No. 1 railroad malleable stock	15.00 to 15.25
Grate bars	13.25 to 13.50
Low phosphorus melting stock	11.25 to 11.50
Iron car axles	17.25 to 17.50
Steel car axles	24.75 to 25.00
Locomotive axles	20.50 to 20.75
No. 1 busheling scrap	24.25 to 24.75
No. 2 busheling scrap	12.50 to 12.75
Old car wheels	9.00 to 9.25
Sheet bar crop ends	13.75 to 14.00
*Cast iron borings	16.00 to 16.25
*Machine shop turnings	9.50 to 9.75
Old iron rails	10.25 to 10.50
No. 1 wrought scrap	16.00 to 16.25
Heavy steel axle turnings	14.50 to 14.75
Stove plate	10.25 to 10.50
	11.50 to 11.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, March 8, 1911.—(By Telegraph.)

The prevalent quietness of pig iron in this market is regarded as a return to normal conditions. Orders for structural material are being received in good volume as the building season advances. A raise of \$1 per ton in the price of wire products went into effect March 6. Activity has been exceptional in this line for a number of weeks, and mills are crowded to their utmost capacity. The advance of \$1 a ton on track spikes, which was reported last week to have been made March 1, will take effect April 1. This week's scrap market has been well in the hands of buyers. Prices have fallen off on several grades, and local scrap yards have somewhat replenished their stocks. Railroad offerings have been active and the entire scrap market, though somewhat reduced in price, is steadier.

Pig Iron.—The market is quieter, but prices are firm. Inquiries are fair for both Northern and Southern iron, but these are principally for the last half, and few sales are being made. The price of Southern iron remains at \$11, Birmingham, for No. 2 foundry for the first half; \$11.25 for third quarter, and \$11.75 for fourth quarter, but \$11.50 continues to be quoted for the entire last half. Among the inquiries pending is 3000 tons of basic from a local steel foundry. Sales aggregating 6000 tons of Northern iron have been made by one selling interest, this week at \$16, f.o.b. furnaces, for deliveries extending through the last half. Stocks in foundry yards are sufficient in many cases for the first half, and both furnaces and foundries seem to be lying on their oars awaiting developments. The following quotations are for March shipment, Chicago delivery, with the exception of Northern irons, which are quoted f.o.b. furnace:

Lake Superior charcoal	\$17.50 to \$18.00
Northern coke foundry, No. 1	16.00 to 16.50
Northern coke foundry, No. 2	15.50 to 16.00
Northern coke foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.50 to 16.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

(By Mail.)

Billets.—The demand for billets continues light, and a maximum price of \$30.60, base, Chicago, is being maintained on open hearth forging billets by the leading interest. Open hearth rerolling billets are quoted at \$25.60, base, Chicago.

Rails and Track Supplies.—Business continues in good volume for track material and contracts from small roads for approximately 7000 tons were received by the leading

THE IRON AND METAL MARKETS

mill the past week. Prices are firm. We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20 $\frac{1}{2}$ c.; 30 to 35 lb., 1.19 $\frac{1}{2}$ c. to 1.24c.; 16, 20 and 25 lb., 1.20 $\frac{1}{2}$ c. to 1.25c.; 12-lb., 1.25c. to 1.20 $\frac{1}{2}$ c., Chicago.

Structural Material.—Good conditions prevail in every branch of the trade. Fabricators are specifying freely and shipping instructions continue normal. The Rock Island Railroad is in the market for 1600 tons of structural shapes, and the Chicago, Milwaukee & St. Paul is also out with a small list. Contracts let last week include the following: Metropolitan theatre, Seattle, Wash., 320 tons, to A. Bolter's Sons; Marshall Field loft building, Chicago, 1281 tons, to Vierling Steel Works, Chicago; William A. Kernagham, wharf shed, New Orleans, 1622 tons, to Fort Pitt Bridge & Iron Company; Furst-Kerber Stone Company, stone mill, Bedford, Ind., 277 tons, to Bedford Construction Company, Bedford, Ind.; Chicago, Milwaukee & St. Paul Railroad, viaduct over small creek in Idaho, 390 tons, to Milwaukee Bridge Company, Milwaukee, Wis.; temporary city hall, San Francisco, Cal., 570 tons, to Pacific Rolling Mill Company, San Francisco, Cal.; Jefferson Hotel, Peoria, Ill., 980 tons, to Noelke & Richards Iron Company, Indianapolis, Ind. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Liberal specifications continue to keep mills very busy. A normal volume of these are from railroad and car builders and with the letting in the near future of several contracts for rolling stock now pending this tonnage is expected to increase. Haskell & Barker, Michigan City, Ind., were awarded a contract recently for 1000 cars. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—There is little change in the situation on this product. Mills are operating about two-thirds of their capacity. Prices are well maintained and without change. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar iron market is steadier than it has been for some weeks. Specifications on contracts for steel bars are about normal, but with the approach of spring better business is anticipated. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.27 $\frac{1}{2}$ c. to 1.32 $\frac{1}{2}$ c.; hard steel bars rolled from old rails, 1.30c. to 1.35c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Old Material.—Scrap prices are lower, and there is a decided tendency to move speculative scrap on a buyer's market. The gambling tendency of the past few weeks has caused many local yards to buy country scrap at premium prices. This material they are holding. The Rock Island list of last week has been sold and the price for No. 1 wrought was \$12.50, f.o.b. cars, Rock Island tracks. The Great Northern list, approximating 10,000 tons, will be awarded to-morrow. The Soo Line is out with a list of about 800 tons, which will close March 8, and the Chicago, Milwaukee & St. Paul with a list totaling 2000 tons, which closes on the same date. The market is uncertain. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails.....	\$15.50 to \$16.00
Old steel rails, rerolling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	12.00 to 12.50
Frogs, switches and guards, cut apart.....	12.25 to 12.75
Shoveling steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	15.25 to 15.75
Steel angle bars.....	11.50 to 12.00
Iron car axles.....	19.25 to 19.75
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	12.25 to 12.75
No. 2 railroad wrought.....	11.25 to 11.75
Steel knuckles and couplers.....	11.50 to 12.00
Locomotive tires, smooth.....	17.50 to 18.00
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50
Cast and mixed borings.....	6.00 to 6.50
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	7.75 to 8.25
No. 1 boilers, cut to sheets and rings.....	8.75 to 9.25
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.25 to 12.75
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	9.00 to 9.50

Wire Products.—The anticipated raise of \$1 a ton in the price of wire products went into effect March 6. Specifications for the past week have been enormous, and if con-

tinued will crowd mills in excess of capacity. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized staples, 2.28c., all Chicago.

Cast Iron Pipe.—The approach of the working season has increased demand from small municipalities. Toledo, Ohio, has contracted with the leading interest for 1000 tons. Minneapolis, Minn., is in the market for about 3500 tons, and Kalamazoo, Mich., for 700 tons. Gas companies are purchasing freely. Prices continue firm, as follows, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., March 7, 1911.

Recent gains, both in new business taken and the rate of production, appear to be fully maintained, and the trade looks forward to increasing activity. The effect of the recent freight rate decisions has been small, and it is believed that further railroad orders will be released at an early date. In the pig iron markets there is a gradual upward movement in prices. Basic iron has sold at a higher level, and producers of foundry and forge iron have, in a number of instances, withdrawn recent low quotations. Inquiry for pig iron for forward delivery continues in good volume, with few producers ready to accept business. The demand for finished materials has been fully maintained, with plates and shapes a trifle more active. Billets, bars and sheets also show an increased movement. In all classes of rolled products prices are firmly maintained. Old materials are quieter, with heavy melting steel selling at prices slightly under last week's quotations. Coke is in better inquiry and prices are distinctly harder.

Iron Ore.—While negotiations are pending for both foreign and local ores, no sales are reported. No movement in Swedish ore has yet taken place, although sellers expect to dispose of several hundred thousand tons for this season's consumption. Importations at this port during the week aggregated 16,776 tons, valued at \$45,453.

Pig Iron.—Recent transactions have been on a broader scale, and the aggregate of sales shows an increase. Consumers are inquiring freely for forward deliveries. While sales of steel making grades have been made for third quarter delivery, producers in this district are still holding back when it comes to taking contracts for foundry grades for shipment beyond the first half. Prices are decidedly firmer and in a number of instances slight advances have been obtained. The recent inside quotation, \$15.50, delivered, for No. 2 X foundry, for shipment up to the end of the first half, has been freely done, although sales at \$15.75 and \$16 have been more numerous. At the lower quotation sales of lots running from 100 to 500, and in several instances 1000, tons are reported. At the higher level transactions are still largely confined to non-competitive business, the amounts involved ranging from carloads to a few hundred tons. In several instances producers of standard brands in this territory have withdrawn recent low price quotations and state that for the time they are out of the market. Transactions in low grade foundry iron have been more pronounced. While some little Northern iron has figured in this business, the principal sales have been in Southern iron, one lot of 12,000 and another of 3000 tons being reported at the \$11, Birmingham, basis for No. 2 foundry, delivery extending in one instance over the next five months. Cast iron pipe makers are still in the market, and several moderate lots are being figured on. A decrease in the amount of Southern low grade iron available for early delivery is reported. Malleable iron makers are in the market for forward delivery, and one sale of 750 tons of coke malleable for second and third quarter at \$17.10, delivered in this vicinity, is reported. A larger range of business in this district is reported by makers of Virginia foundry irons. From statistics available at the meeting of the Virginia Pig Iron Association, held in this city last week, it is noted that unfilled orders in February increased 20 per cent. over those for the previous month, while stocks on hand showed a slight decrease as compared with the statistics for January. Virginia producers are holding firmly at \$13, furnace, for No. 2 X or No. 2 plain foundry, for delivery in the next three months, although the leading interest quotes \$13.50, furnace, for strictly second quarter shipment, while one interest will, it is stated, shade \$13, furnace, 25c. a ton on No. 2 plain. Sales cover a wider range as to size, and at least one of 1000 tons for March, April and May shipment is reported. Rolling mills have been quietly covering requirements in forge iron; sales during the past two weeks, it has developed, will aggregate close to 10,000 tons, mostly for delivery during the next

THE IRON AND METAL MARKETS

three to five months, at prices above recent quotations. The minimum for this grade is now \$14, furnace, equal to \$14.50 to \$15, delivered in this vicinity, dependent on point of destination. A further movement in basic iron is noted; purchases have been largely on the part of one Eastern plate mill, which has bought from 12,000 to 15,000 tons, at \$15.25, delivered, for shipment extending over various periods, which may be summed up as practically second and third quarter. One purchase of about 3,000 tons for early delivery was also made at something over \$15, delivered. The latter quotation has now practically disappeared and the principal sellers contend that they have all the business they want at \$15.25, and are now holding firmly at \$15.50, delivered. Negotiations are pending for further supplies, but business moves slowly, as prices gradually advance. Small sales of low phosphorus iron ore are reported, and prices of this grade also show a slight upward movement. The following range of prices is named for standard brands, delivered in buyers' yards in this district, delivery for the greater part being confined to prompt and second quarter:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.50 to 16.00
Gray forge.....	14.50 to 15.00
Basic.....	15.25 to 15.50
Standard low phosphorus.....	21.25 to 21.75

Ferromanganese.—No fresh demand is reported from consumers in this district, and the market is nominally quoted at \$37.50, Baltimore, for prompt, and \$38 for forward delivery.

Billets.—A slightly better demand for prompt material is reported; there is also more business being figured on, and makers are encouraged with the outlook. Current orders, however, are almost entirely for prompt lots or for delivery beginning at once and extending over a limited period. Prices are well maintained, efforts to shade quotations being quite unsuccessful. For open hearth rolling billets, delivered in this vicinity, \$25.40 is named, with ordinary forging billets at \$30.40.

Plates.—Plate makers have been receiving a very fair run of business and have been fully able to maintain their recent productive rate of 75 to 80 per cent. of capacity. Orders for tank and boiler steel have been numerous, and specifications are of slightly better size. Specifications for car and bridge work are coming out more freely; in fact, more work of a general nature has, it is stated, been released. Prices are very firm at 1.55c. minimum for ordinary heavy plates, delivered in this vicinity.

Structural Material.—While there is some fairly good business pending in this territory no large contracts have been placed. The contract for the Curtis Building is still unclosed. Bids for the new building for the Baltimore Bargain House have been opened, but no awards made. The Reading Iron Company will erect a new mill building during the summer, for which, it is said, 1,000 tons will be required. Requirements for the new Ritz-Carlton Hotel, in this city, have not yet been announced. There has been a very fair run of miscellaneous orders, and the outlook is more encouraging. Prices for plain shapes are firm at 1.55c., minimum, for delivery in this territory, but fabricated prices are said to be low. It is understood that 1.96c. per pound, delivered, was named for the Baltimore Bargain House contract, covering fabrication and painting, but not including erection.

Sheets.—Orders showed an increase during the week, but are still below the capacity of mills in this district. Current business is confined to day to day orders, which are almost entirely for small and moderate lots. Prices are being firmly maintained, Eastern makers naming the following range for prompt deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Quite a fair proportion of business is being offered both in steel and refined iron bars. Eastern bar iron mills are gradually advancing prices, and while 1.30c., mill, can still be done for specifications of a desirable nature, a larger proportion of makers are now holding at 1.35c., mill. For delivery in this vicinity, quotations for refined iron bars still range from 1.37½c. to 1.42½c. Steel bars are firm at 1.55c., delivered.

Coke.—The demand for both furnace and foundry coke shows an improvement, particularly furnace coke, for which several large inquiries are out, one Eastern concern being in the market for 150,000 tons for delivery over 12 months. Several smaller consumers are also in the market. The demand for foundry coke, while not large individually, is broadening. Prices are on the upward move; there is less spot coke available, and prices for both prompt and forward delivery are slightly higher, furnace coke ranging from \$1.65 to \$1.80 per net ton, at oven, for prompt, and \$1.80 to \$2 for forward shipment. Foundry coke is firm at \$2.20

to \$2.40, at oven. The following range, per net ton, is named for deliveries in this vicinity:

Connellsville furnace coke.....	\$2.30 to \$2.55
Foundry coke.....	4.40 to 4.65
Mountain furnace coke.....	3.50 to 3.85
Foundry coke.....	4.00 to 4.25

Old Material.—The recent excitement in the market has quieted down. Transactions during the week were largely confined to small lots, and in the majority of cases recent quotations were fully maintained, the only exception being in heavy melting steel, which sold in moderate lots at 50c. and 75c. under last week's top price. Melters are offering \$14, delivered, for No. 1 heavy melting steel, and sales are reported at \$14.25, although the majority of the sellers hold at \$14.50, delivered. One interesting transaction was the purchase of a cargo of about 2,000 tons of Panama scrap, by the Alan Wood Iron & Steel Company, at \$13.61 on dock in this city, to which must be added 60c. freight to destination. Rolling mill scrap has been moderately active, turnings and borings showing a slight advance owing to increased demand. The general tone of the market is good, and an early betterment in the demand is anticipated. The following range of prices about represents the market for deliveries in buyers' yards, Eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 steel scrap.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	15.50 to 16.00
Low phosphorus.....	18.50 to 19.00
Old steel axles.....	21.00 to 21.50
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	18.50 to 19.00
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	17.50 to 18.00
Wrought iron pipe.....	14.00 to 14.50
No. 1 forge fire.....	12.25 to 12.75
No. 2 light iron.....	8.00 to 8.50*
Wrought turnings.....	10.25 to 10.75
Cast borings.....	10.00 to 10.50
Machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.50 to 13.00*
Grate bars.....	12.00 to 12.50
Stove plate.....	11.50 to 12.00

* Nominal.

Matthew Addy & Co., Real Estate Trust Building, Philadelphia, Pa., have been appointed exclusive selling agents in the Philadelphia territory for Clare Old Basin Connellsville foundry coke, produced by the Clare Coke Company, Trauger, Pa.

Birmingham

BIRMINGHAM, ALA., March 6, 1911.

Pig Iron.—The price of \$11.50, Birmingham, for deliveries after the first half, has become effective in this market, and prompt or nearby deliveries have a tendency to advance. The aggregate of sales for the past week was very satisfactory, and in view of the fact that the bulk of the tonnage placed went to the concerns who would ordinarily be most likely to make concessions, owing to the stocks on hand, the situation as a whole is considered very materially improved. All stock reports as of March 1 are not yet in hand, but those who have reported show a decrease in the month of February. The movement so far this month has been at a rate in excess of that for the month just ended, and the tonnage now actually on books for shipment in the next 90 days is considerably larger than the anticipated output; this is after taking into consideration the addition of one active stack March 1 and another stack which is to be blown in March 15 to 20. The interest recently manifested by the manufacturers of cast iron pipe has had to strengthen the situation, as it is understood that the consumption by such concerns will be materially increased at an early date. An inquiry for 1,000 tons of No. 4 foundry from such a manufacturer as just mentioned is now pending, owing to the inability of any one of the local producers to furnish such a quantity within the time required. The price for No. 4 foundry and for the lower grades for any delivery is practically established on the \$11.50, Birmingham, basis for No. 2. All quotations on future shipments are made with some reluctance. There is considerable credence given to rumors relative to the merger of certain producing interests at this time, by reason of the presence in this district of the officials of the concerns interested, but nothing definite in that connection has yet been made public. The developments in this regard are being awaited with much interest by all local producers, as the properties to be affected are among the most valuable in this district.

Cast Iron Pipe.—Announcements of proposed lettings at Fort Worth, Texas; Nashville, Tenn., and Rockmar, Ga., have been received, while the demand for small lots continues good. By reason of the advance in asking prices for pig iron for future deliveries the pipe manufacturers have advanced their asking prices, and the market for small lots

THE IRON AND METAL MARKETS

is believed to be correctly represented by an advance of \$1 per ton in the quotation on small sizes. The status of prices for large contracts cannot be stated with accuracy, by reason of the fact that no large orders have recently been placed, but producers will no doubt insist on higher figures than have ruled heretofore. No definite announcement has been made relative to the resumption of operations at the plants now closed down, but it is understood that all will be operated to normal capacity at an early date. We quote revised asking prices as follows, per net ton, on cars here, for water pipe, with the usual advance of \$1 per ton for gas pipe: 4 to 6 in., \$22; 8 to 12 in., \$20; over 12-in., average \$19.

Old Material.—The average price received the past week indicates that the market has improved very materially and dealers are less disposed to move their accumulations. The aggregate of shipments was fairly satisfactory and effected a decrease in the total of stocks. The schedule of asking prices has not been changed, but they are believed to be firm, as follows, per gross ton, f.o.b. cars here:

Old iron axes.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axes.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, March 7, 1911.

Iron Ore.—No inquiries for ore are developing, and it is doubtful if the market will open up within the next month or six weeks. In previous years the bulk of the ore for the season has been sold within a very few weeks, but this year it is expected that buying will drag along, as many consumers will not need any additional ore until late in the season. The Pittsburgh Steamship Company is getting its boats ready for the opening of navigation and will probably make a start with some of its large carriers about April 20. Last year the first boats started April 15. Nothing is being done as yet regarding ore prices. Shipments from the docks continue light. We quote prices as follows: Old range Bessemer, \$5; Mesaba Bessemer, \$4.75; old range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—There is not a great deal of activity, but in spite of this the general tone of the market is firmer than two weeks ago. A few sales of small lots of foundry and malleable grades are reported, mostly for second and third quarter deliveries. Large inquiries, however, are lacking. There is still considerable uncertainty among buyers and sellers regarding the last half. Some furnaces are still declining to quote prices for delivery beyond July 1. Those that are willing to take on tonnage for the last half are quoting No. 2 foundry at \$14.50, Valley furnace, for that delivery. While many consumers appear to be willing to buy for their last half requirements at current prices, few are willing to pay an advance of 50c. a ton for that delivery, and after feeling the market and being given the higher quotations have allowed the matter of placing contracts for the last half to drop for the present. While conditions in the general foundry trade show some improvement, orders are not very plentiful, and many foundrymen feel that a little later they will be able to place contracts for the last half at current prices. For delivery until July 1 No. 2 foundry is firm at \$13.75 to \$14, Cleveland and Valley furnace, nearly all of the furnaces holding to the higher price. We note the sale of one 300-ton lot by a local furnace for shipment to a point near the Valley at \$14 for No. 2 for the second quarter. Southern iron is quoted at \$11.25, Birmingham, for No. 2 for the third quarter, which can probably be shaded, and \$11.50 for the last half. A northern Ohio implement maker is in the market for about 1000 tons of Southern iron for delivery through the second, third and fourth quarters. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.00
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	13.75 to 14.00
Gray forge.....	14.00
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—The market continues quiet. The only demand is in foundry grades, and that mostly for small lots for spot shipment. We quote standard Connellsville furnace coke at \$1.55 to \$1.60, per net ton, at oven, for spot shipment, and \$1.75 to \$2 for the last half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the remainder of the year.

Finished Iron and Steel.—Mill agencies are getting a good volume of small orders for all lines of finished products, the aggregate being about the same as in the previous two or three weeks. The railroad rate decisions seem to have had no injurious effect on the market; in fact, the general feeling is more optimistic than it has been for some time. Manufacturers in a number of lines report a better volume of inquiries and much improvement in the outlook. The leading interest reports an increase of 42 per cent. in tonnage in actual orders booked in its Cleveland office in February, as compared with January, and this probably fairly represents the increased demand in this territory. The Nickel Plate Railroad has placed orders for 5000 tons of ferrotitanium rails, the tonnage being equally divided between the Illinois Steel Company and the Lackawanna Steel Company. The former company was given the contract for the track supplies for the entire tonnage. The Cleveland, Alliance & Mahoning Valley Railroad Company has an inquiry out for 2000 tons of 70-lb. rails for a new interurban line. In structural lines the outlook is improving. The Lake Shore Railroad has placed the contract for about 1800 tons of structural material for bridges for grade crossing elimination in Cleveland and Chicago. Of this, 800 tons went to the American Bridge Company and the remainder was divided between the King Bridge Company and the McClintic-Marshall Construction Company. It has been decided to go ahead with the superstructure of the new City Hall in Cleveland early this spring, and bids for the structural steel will probably be asked for shortly. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for both black and galvanized sheets has become quite active and mills are maintaining regular prices. Occasionally there is a report of shading of \$1 a ton by a jobber whose contract with mills at the old prices has not expired. Efforts to stiffen up rivet prices appear so far to have been unsuccessful and regular quotations are still being shaded \$2 a ton. The demand for iron bars is moderate. Prices are fairly firm at 1.30c. at mill.

Old Material.—The recent flurry has entirely subsided and the market is generally quiet. The advance in quotations is being nominally maintained, but values are somewhat unsettled and the market is not firm. Both dealers and mills are holding off to see what effect the rate decisions will have on the placing of orders by railroads. Dealers are not eager to buy country mixed scrap at present. Some small lot sales to consumers are reported, but very little business is coming from local mills. The Norfolk & Western Railroad will close March 16 on its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	17.00 to 17.50
Steel car axes.....	19.50 to 20.00
Heavy melting steel.....	13.25 to 13.50
Old car wheels.....	13.00 to 13.50
Rolling rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axes.....	\$21.00 to \$21.50
Cast borings.....	7.00 to 7.50
Iron and steel turnings and drillings.....	7.50 to 8.00
Steel axle turnings.....	9.00 to 9.25
No. 1 bushing.....	11.50 to 12.00
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	12.00 to 12.50
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, March 8, 1911.

Pig Iron.—The improvement previously noted has apparently not quite kept up to the standard set in the last two weeks of February. Inquiries have thinned down somewhat and sales have not been so numerous. But even then the past week was far ahead of the corresponding period of January and February, and it is believed that the market is only experiencing a temporary lull in activity. Ohio silvery is still in demand, and among recent sales are 1500 tons going to northern Ohio, three lots of 200, 500 and 1000 tons respectively, for Michigan consumers, and 200 tons for an Illinois melter, with shipments generally extending through the third quarter. Based on 8 per cent. silicon, prices range from \$16.50 to \$17 at furnace. Malleable is unchanged at \$14, and at this figure an Indiana manufacturer contracted for 2000 tons, deliveries running from March to June, inclusive. Southern foundry continues more active than Northern, and included in recent sales are 500 tons for a northern Ohio melter, two similar sized lots for Illinois users for second and third quarter shipments, and 1200 tons for an Illinois manufacturer, July to December delivery. A Northwestern farm implement maker also took 2200 tons for third quarter. As a result, Southern furnaces

THE IRON AND METAL MARKETS

are asking \$11.50, Birmingham, for any delivery after July 1, but it is known that several lots of No. 2 foundry have been sold at \$11 for the third quarter and around \$11.25 for the last half. The St. Louis territory contributed an order for 1000 tons of car wheel iron and some scattering orders for Northern foundry have been booked at \$14, Ironton, which is the quoted figure up to July, but most of the furnaces feel disinclined to take on business at this figure for any later delivery. Illinois territory furnished an inquiry for 2000 to 3000 tons of basic pig for third and fourth quarter shipment, and there are a number of small inquiries out from nearby melters for both Northern and Southern foundry iron. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent, silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—The reported closing of a contract for furnace coke, averaging about 2000 tons per month for the remainder of the year, has helped to stiffen the Connellsville price, which has been lower than the quotable figures in other fields. This contract was made by an Eastern interest, and it is stated that a much larger one for Connellsville furnace coke, to be shipped East, was closed by an agency in another center, deliveries to be made during the next 12 months. Small quantities of foundry coke have been contracted for, but no large amounts are expected to be bought for some time. Furnace coke is now quotable in all three fields around \$1.60 to \$1.65 per net ton at oven for spot shipment, with probably a 5c. to 10c. premium being asked by Pocahontas operators. Foundry coke is sold at \$1.90 to \$2 for immediate shipment, with the usual advance of 25c. per net ton asked on contract shipments. These prices apply to the Connellsville, Pocahontas and Wise County fields.

Finished Material.—With the exception of plates, which appear to be moving slowly, there can be no doubt that the situation is steadily improving. Structural material is in better demand, and steel bars are not slow sellers. Hoops and bands also continue to show improvement. The Pittsburgh mill price is unchanged at 1.40c., and on structural material and steel bars local warehouses are asking from 1.80c. to 1.95c.

Old Material.—It is stated that the settlement of the railroad freight rate question has adversely affected the scrap market, but this does not hold good, so far as prices are concerned, which are firm at figures previously quoted. Cast borings were in demand last week more than any other class of scrap. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	5.00 to 5.50
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Bundled sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton.....	11.00 to 11.50

St. Louis

ST. LOUIS, March 6, 1911.

Reviewing the past month, the leading pig iron houses and the principal steel interest state they did a satisfactory business, and merchant sellers report an active trade, with the outlook good for the present month. The bank clearings, which show a gain of 14 per cent. over February, 1910, reflect the improvement going on in general business in this city. Railroad buying of rails, equipment and track material is gaining in volume. Money is in plentiful supply, and collections are reported good. The outlook for the coming winter wheat crop is favorable, since its condition is quite generally reported as satisfactory.

Pig Iron.—Interest in the pig iron market continues unabated. Inquiries during the past week were reported to be quite numerous, and after making due allowance for such as have in view keeping posted as to prices and prospects of an advance, the leading sellers express themselves as being satisfied with the indications for continued buying.

In the aggregate the inquiries totaled about 10,000 tons, mainly for last half delivery. This does not include pending inquiries, among which is one for 6000 tons of basic, already reported. A sale of 1200 tons of Southern foundry to a local company is reported for shipment over the last half. An inquiry is out for 500 tons of Southern No. 2 foundry for shipment from April to August, and the same tonnage of Northern malleable for shipment from May to September. The advance asked for Virginia iron, and the difficulty in working last half business, except at a premium above the price for shipment over the remainder of the first half, are causing a firmer tone. A feature of the situation is that the position is shifting from a buyers' to a sellers' market, a condition which has not obtained for nearly a year, during which time the bulk of the business transacted has been done through the acceptance of firm offers. We continue quotations for Southern No. 2 foundry for shipment over the remainder of the first half, \$11; over the third quarter, \$11.25; for fourth quarter, \$11.50; over the second half, \$11.50, f.o.b. Birmingham. Low grade Southern iron is reported in short supply; Northern iron is quoted at \$14, Ironton, for No. 2 foundry.

Coke.—No large inquiries or sales are reported, but merchant sellers state that a fairly good business is being done with small consumers, one house reporting sales for the week of 20 carloads to various outside parties. We quote selected Connellsville 72-hour foundry at \$2.15 per net ton, f.o.b., oven, for shipment over the remainder of the year; special brands and carload lots 25c. to 50c. per ton higher.

Finished Iron and Steel.—The improvement in the demand is gaining ground. Among the transactions for the past week was the closing of a contract with the Midland Valley Railroad for 100 miles of standard rails. Two or three other railroads have inquiries out for round lots which will soon be placed. Lumber interests are putting in more inquiries for light rails. There is more doing in structural material. Steel bars are in good demand, caused by the advance in iron. The call for track material is increasing.

Old Material.—The speculative interest existing in other markets is reflected in the stronger views of leading sellers of scrap iron and steel, and tends to check free buying by consumers. Holders look for a more active demand in the near future. They regard the pig iron market as hardening, and believe that old materials should share in the prospective appreciation in prices. Old car wheels are in especial request by accumulative buyers. Several items in the list have advanced in price, including relaying rails. The following railroad lists are on the market: Vandalia Line, 200 tons; St. Louis & San Francisco, 100 tons; Wabash, 500 tons. Dealers' selling prices are as follows, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	12.50 to 13.00
Relaying rails, standard sections, subject to inspection.....	23.50 to 24.00
Old car wheels.....	13.50 to 14.00
Heavy melting steel scrap.....	12.00 to 12.50
Frogs, switches and guards, cut apart..	12.00 to 12.50

The following quotations are per net ton:

Iron fish plates.....	\$12.00 to \$12.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.00 to 11.50
Railway springs.....	10.50 to 11.00
Locomotive tires, smooth.....	16.50 to 17.00
No. 1 dealers' forge.....	9.50 to 10.00
Mixed borings.....	5.00 to 5.50
No. 1 busheling.....	10.50 to 11.00
No. 1 boilers, cut to sheets and rings..	8.50 to 9.00
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	9.50 to 10.00
Railroad malleable.....	9.50 to 10.00
Agricultural malleable.....	9.00 to 9.50
Pipes and flues.....	9.00 to 9.50
Railroad sheet and tank scrap.....	9.00 to 9.50
Railroad grate bars.....	9.50 to 10.00
Machine shop turnings.....	8.00 to 8.50

The Mt. Vernon Car Company has just closed a contract for 100 freight cars.

The United States Treasury Department has selected, it is reported, the site for the new subtreasury building, for which Congress appropriated \$300,000. The location given is the corner of Fourth and Chestnut streets. The cost of the building will be \$1,500,000.

On Tuesday the Hammur Brothers White Lead Company shipped a solid train load of lead to New England over the Baltimore & Ohio Railroad.

Of concentrated zinc ore 234,418 tons were shipped to the various smelters in 1910 from the southwest Missouri field, exceeding the record of all other States combined. More smelters are needed to conserve by-products now lost in preparing blends.

THE IRON AND METAL MARKETS

Buffalo

BUFFALO, N. Y., March 7, 1911.

Pig Iron.—A more optimistic feeling is evident among producers; price views are firming and less aggressiveness is apparent in the seeking of business. Prices have stiffened about 25c. per ton for the current half and business for the last half is not being solicited. Most furnaces report good inquiry, although many buyers have covered for first half requirements. One interest reports inquiries aggregating 50,000 tons under negotiation for foundry grades and malleable, with some basic, including 30,000 tons from a large concern using both foundry and malleable irons, also the practical closing of a contract for 10,000 tons of basic and malleable for a manufacturer of railroad material. Another furnace interest states that a number of medium sized orders have been placed by New England consumers, including one of 1000 tons and one of 750 tons of foundry grades. Other producers state that considerable interest is being manifested in malleable as well as foundry grades, although the firming tendency in prices is having a restraining effect on placement. We quote as follows for first half delivery, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.75 to \$15.00
No. 2 X foundry.....	14.50 to 14.75
No. 2 plain.....	14.00 to 14.50
No. 3 foundry.....	14.00 to 14.25
Gray forge.....	13.75 to 14.00
Malleable.....	14.50 to 15.00
Basic.....	14.50 to 15.00
Charcoal.....	17.00 to 17.50

Finished Iron and Steel.—Specifications are coming forward more freely than for the previous week, particularly for bar products and plain structural material, and a good increase in small lot new business for first half delivery is noted. Prices are firm, and there is a growing disposition to contract for forward needs. The advance of \$1 per ton on wire products has had no appreciable effect in this market, as practically all users were under contract at the old prices for their spring requirements. The demand for black and galvanized sheets continues active. Canadian export trade also continues to be of good proportions. In fabricated structural materials a slight improvement in demand is noted, and considerable small lot business is developing. Specifications are being figured this week for two or three local factory buildings requiring small tonnages, and specifications will soon be out for steel for the children's hospital building for the Buffalo Orphan Asylum. Figures are being taken this week for about 200 tons of steel for the exposition buildings at Rochester. Plans for the Eastman Kodak Company's factory building No. 42, at Rochester, for which bids for steel frame construction have been in for several weeks, have been changed to specify reinforced concrete construction, and the contract has been placed.

Old Material.—The market has recovered from the lull in demand reported last week, and orders for current consumption are coming in more freely, although there does not appear to be any large demand for forward requirements. Shipments on contracts are going forward in good volume. There has been no material change in prices from the schedule reported last week. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$13.75 to \$14.25
Low phosphorus steel.....	18.00 to 18.50
No. 1 railroad wrought.....	15.75 to 16.25
No. 1 railroad and machinery cast scrap..	14.75 to 15.25
Old steel axles.....	20.50 to 21.50
Old iron axles.....	24.00 to 25.00
Old car wheels.....	15.00 to 15.50
Railroad malleable.....	14.25 to 14.75
Boiler plate.....	11.75 to 12.25
Locomotive grate bars.....	11.75 to 12.25
Pipe.....	11.25 to 11.75
Wrought iron and soft steel turnings..	7.50 to 8.00
Clean cast borings.....	7.00 to 7.25

The German Iron Market

BERLIN, February 23, 1911.

The great question of the hour for the iron trade, the renewal of the bar iron convention, has not yet been fully settled. The further conference for the subject met yesterday, but only a partial agreement was reached. It appears, however, that the larger plan had in mind by many of the companies, namely, to effect a firmer organization with a common selling agency, has failed. Most of the companies consented to a prolongation of the present price arrangement till the end of June; and it was also agreed to make a reduction in prices to 105 marks per ton, shipping basis Oberhausen, which means a cut of 7 to 9 marks per ton, but the consent of several companies is still necessary before this arrangement becomes valid. An agreement was also reached respecting the drawback on exported goods, the Steel Works Union contributing 2.50 marks and the

open-hearth works 1.50 marks per ton toward a drawback of 4 marks; but the further details in the case are not accessible. The most significant fact in all this is that the bar manufacturers are willing to make a considerable cut in prices—a clear indication that the trade situation has weakened. This reduction for the home market, however, is doubtless a recognition of the fact that prices for export have been kept at a considerably lower level than for home consumption.

The Steel Works Union met at Düsseldorf to-day and gave out the usual monthly report. The foreign market shows a satisfactory demand and still tries to place orders for long periods. In steel rails it is mentioned that the requirements of the Prussian authorities for 1911 turned out to be 50,000 to 60,000 tons greater than for 1910. The calls for delivery of light rails have greatly increased within the past few weeks and a number of good foreign contracts have again been taken, with further inquiries on hand. Business in grooved rails is good; some big contracts with both home and foreign buyers have recently been made, but foreign competition continues to keep prices low in outside markets. There is a considerable improvement in the demand for mining rails, and the arrivals of specifications within the past few weeks have been very heavy. The market for structural shapes remains quiet, with little disposition on the part of consumers to place orders. Shipments this month, however, have been a little better than hitherto. The question of fixing prices and opening sales for the next quarter was to have been decided to-day, but it was postponed for two weeks.

The big Gelsenkirchen Company, the second largest iron and coal company in Germany, has just announced a dividend of 10 per cent. for 1910, which compares with 9 per cent. for 1909. It had gross profits of \$10,370,000, or about \$1,500,000 more than for 1909. The Aumetz-Friede Company of Lorraine, which has forged to the front strongly within a few years, reports net profits of \$1,180,000 for the past half year, which is a gain of \$157,000.

New York

NEW YORK, March 8, 1911.

Pig Iron.—Foundries seem fairly well supplied with iron for the next three or four months, and on neither side of the market is there strong disposition to do business for the second half of the year. Producers expect to get higher prices in that period and consumers are not yet persuaded that they should pay 50c. to \$1 more for second half delivery than for second quarter. Several transactions of 1000 tons are reported for the past week. One New England foundry has bought that amount, chiefly high phosphorus iron. Two inquiries from New York State foundries are before the trade. A pump interest is in the market for 1000 tons of No. 2 for an Ohio plant. Several transactions in pipe iron are reported, but these were largely put through in eastern Pennsylvania and involved Southern iron for the most part. Eastern Pennsylvania furnaces have secured advances of 25c. or more over prices recently prevailing, and there is more firmness in the attitude of Buffalo furnaces, some of which quote from 50c. to \$1 a ton above the extremely low prices of two or three weeks ago. Virginia furnaces are firmer at \$13 for No. 2 and are asking \$13.25 to \$13.50 for delivery after the middle of the year. The foundry situation seems slightly improved, but there are still enough factors of uncertainty to make buyers move cautiously. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$14.75 to \$15; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15 to \$15.25.

Steel Rails.—The New York, Westchester & Boston, after months of negotiating, has bought 6000 tons of Bessemer rails from the Maryland Steel Company. The Pere Marquette will close for 17,000 tons this week, the greater part of it going to Buffalo. The Nickel Plate has bought 5000 tons, divided between South Chicago and Buffalo. The Manila Railroad contract for 10,000 tons was taken by the Lackawanna Steel Company. Export orders of the Steel Corporation amounted to 7000 tons for the week, including 2500 tons for Cuba. The Atlantic Coast Line has ordered 1650 tons additional, which will be rolled at Ensley, Ala. The Illinois Steel Company booked 15,000 tons last week, one contract, which was with a construction company, amounting to 7600 tons.

Ferroalloys.—There are inquiries for good round lots of ferrosilicon, and fair-sized sales have been made in this market at \$54.50 to \$55, Pittsburgh. Dealers here are stiffening their quotations in expectation of a higher market. Ferromanganese is in little demand, and is quoted from \$37.50 to \$38, Baltimore.

Finished Iron and Steel.—There has been no appreciable change in conditions in these lines in the past three

THE IRON AND METAL MARKETS

weeks. Steel contracts from the larger buyers are slow in being placed, and the accumulation of jobbers to carry very little stock on hand reduces the new demand. Specifications that have been sufficient to occasion no shortening of capacity. Such business as is going in structural material is in active competition. Twenty bids were submitted for the Communipaw pier sheds for the Central Railroad of New Jersey, which will require 800 to 1000 tons. The Hay Foundry & Iron Works was low bidder, and is expected to receive the award. Hamilton & Chambers have the steel contract for the Kirkman Soap factory building, 200 tons, Brooklyn, N. Y.; Ravitch Brothers, 100 tons for a loft building on West Thirty-sixth street, New York, and Lewis F. Shoemaker & Co., 50 tons for a highway bridge for the New York, New Haven & Hartford at Windsor, Conn. The latter is also in the market for three small spans, the Boston & Maine two or three small bridges requiring perhaps 300 tons in all, and the Chicago, Milwaukee & St. Paul and the Canadian Pacific also have some small inquiries. The only large railroad inquiry for bridge material is from the Chicago, Rock Island & Pacific, which will need about 5000 tons for its 1911 requirements. Bids will close April 1 on 2700 tons for the Williamsburg Bridge terminal, New York, and the American Candy Company is inquiring for 2000 tons for a warehouse in Boston. Plans for the Masonic Temple, New York, are now being revised. The George A. Fuller Company holds the general contract, and about 600 tons will be needed. Quotations remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Store prices for plain material and plates, New York, are 1.85c. to 1.95c.

Cast Iron Pipe.—Rochester, N. Y., opens bids to-day on 2100 tons of a variety of sizes. Westbury, N. Y., will open bids March 20 on 630 tons of pipe, 76 fire hydrants and 58 gate valves and boxes. The general demand continues quiet. Prices appear to be no stronger. Carload lots of 6-in. are quoted at \$21 to \$22 per net ton, tidewater.

Old Material.—While general conditions have tended to quietness, some transactions are reported in heavy melting steel scrap. A few brokers having contracts for this class of material are pressing for shipments and certain consumers are apparently in need of a little stock. The largest steel mills in eastern Pennsylvania are evidently well supplied, and one of them has such an accumulation of cars in its yards that an embargo has been laid on further shipments there. Borings and turnings, especially turnings, are in good demand. The foundry trade is also purchasing in fair quantities. The rolling mills are still doing little in the market. Railroad lists now coming out are quite heavy, and it is felt that prices may yield somewhat in the presence of such an addition to the supply. The stock now in dealers' hands, nevertheless, is firmly held. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$11.50 to	\$12.00
Heavy melting steel scrap.....	11.50 to	12.00
Relaying rails.....	20.50 to	21.00
Standard hammered iron car axles.....	23.50 to	24.00
Old steel car axles.....	7.00 to	7.50
No. 1 railroad wrought.....	14.00 to	14.50
Wrought iron track scrap.....	13.00 to	13.50
No. 1 yard wrought, long.....	13.00 to	13.50
No. 1 yard wrought, short.....	12.00 to	12.50
Light iron.....	5.00 to	5.50
Cast borings.....	6.50 to	7.00
Wrought turnings.....	6.50 to	7.00
Wrought pipe.....	11.00 to	11.50
Old car wheels.....	12.50 to	13.00
No. 1 heavy cast, broken up.....	12.50 to	13.00
Stove plate.....	9.50 to	10.00
Locomotive grate bars.....	9.50 to	10.00
Malleable cast.....	11.50 to	12.00

Metal Market

NEW YORK, March 8, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

	Copper, New York.		Lead.		Spelter.	
	Electro.	Tin.	New York.	St. Louis.	New York.	St. Louis.
March, Lake.	12.75	12.37½	41.70	4.40	4.25	5.65
2.....	12.75	12.37½	41.10	4.40	4.25	5.65
3.....	12.75	12.37½	41.10	4.40	4.25	5.65
4.....	12.62½	12.25	40.00	4.40	4.25	5.65
5.....	12.62½	12.25	40.00	4.40	4.25	5.65
6.....	12.62½	12.25	40.00	4.40	4.25	5.65
7.....	12.62½	12.25	40.00	4.40	4.25	5.65
8.....	12.62½	12.25	41.75	4.40	4.25	5.65

Premiums are still demanded on tin for spot delivery, although the price is lower than a week ago. Copper is lower. Spelter is softer, but prices are largely nominal. Antimony continues high, although consumers are uninterested.

Copper.—Copper prices have fallen off, but sellers do not seem anxious to do business at prevailing quotations. At least three important selling interests in New York re-

fused to make quotations yesterday and to-day, apparently awaiting the figures of the Copper Producers' report which came out this afternoon, showing an increase in stocks of 14,198,280 lb. from February 1 to March 1. Good sales were made on Saturday and Monday at lower prices than were asked last week, and some consumers appeared anxious this morning to place orders for lake copper which in many quarters was quoted at 12.50c., although it could not be discovered that actual offers to sell were made at less than 12.62½c. Lake copper appears to be relatively stronger than electrolytic, which has been offered freely for spot delivery at 12.25c. Some good sales of electrolytic were made for delivery in the Naugatuck Valley, 30 days cash, at 12.37½c. In London to-day the market closed firm with spot copper selling at £54 17s. 6d. and futures at £53 11s. 3d. The sales amounted to 400 tons of spot and 600 tons of futures. Exports of copper so far this month amounted to 3693 tons.

Waterbury Average.—The Waterbury average for February was 12.75c. The average price of lake copper in New York for the month was 12.75c., and the average price of electrolytic copper was 12.37½c.

Pig Tin.—A good business could have been done in pig tin during the week if New York prices for spot delivery were equal to the London quotations, but available stocks are so scarce here that holders of the metal are demanding substantial premiums. To many consumers the lower price quoted in London looked tempting and they offered to buy here at a corresponding figure. Supplies were so scant, however, that those who had tin to sell refused to consider the offers, and only those who had to have some for immediate use made purchases. On Monday spot tin was selling at 39.70c., and tin on the steamer Mesaba, due to-day, was sold at the same price. Yesterday spot tin went as high as 40.25c., while Mesaba tin could be had for 39.25c. A price corresponding to that asked on board the steamer was demanded for March delivery. Judging from inquiries, stocks in consumers' hands in the East are very scarce, but if the London market continues to decline it is thought that some consumers who are heavily stocked in other sections of the country will offer part of their holdings for resale. It is believed that the London syndicate is unloading, but the operators there have not lost control of the situation, by any means. Pig tin for spot delivery was sold in New York this afternoon for 41.75c., and tin on board the steamer Mesaba was offered at 40.75c. The London market closed strong to-day, with spot tin selling at £183 10s. and futures at £183. The sales amounted to 200 tons of spot and 600 tons of futures.

Tin Plates.—The demand for tin plates is steadily on the increase. Some good business has been done in this market with manufacturers of household tinware and can manufacturers who are specifying freely for stocks required for delivery this spring. The quotation on 100-lb. coke plates remains unchanged at \$3.94, New York. Although quotations on foreign tin plates have fallen off slightly, present prices seem somewhat prohibitive, and there is little demand.

Lead.—The lead situation is decidedly unsatisfactory to consumers. Because of the lack of statistics regarding supplies and stocks, the trade is unable to ascertain the real position of the metal. Outside sellers are shading prices and underselling the leading interest in the New York market. A great many consumers who regularly buy from the principal producer have been holding off with the idea that its quotations would be reduced to meet the price made by outside sellers, but they seem to be unable to get information as to its future policy in that respect. Many consumers seem to think that it is to their advantage to remain loyal to their usual source of supply, but some of them have been obliged to act and have placed good-sized orders during the week with independent sellers. It is known that shipments of lead ore from the Joplin district have been especially heavy of late, but there is no way of getting at the actual production figures. Outside sellers are offering lead freely in the New York market at 4.40c. and the St. Louis market is weak with lead selling at 4.25c.

Spelter.—Spelter receded slightly during the week, but the market is fairly strong. Sellers are stiff in their demands, and many of them show a disposition to ignore inquiries, as they are predicting that prices will advance. It is hard to gauge the situation. Some New York houses are in recent private information to the effect that quotations have been shaded under 5.50c., St. Louis, which is the price generally asked for prompt shipment to the East. There is so little spelter in New York that some dealers are asking premiums over the usual quotation of 5.65c.

Antimony.—Regardless of the recent excited trading among dealers in antimony, the consumers continue to ignore the market. Actual confirmation of the reports of the formation of a syndicate of foreign makers of antimony is lacking, and some of those who bought heavily during the

THE IRON AND METAL MARKETS

flurry of 10 days ago are now wondering whether they acted wisely. It is said that the tip regarding the proposed syndicate got out before the makers of Chinese antimony had been approached in the deal, and while attempts have been made by interested parties to find out where those makers stand they have been unsuccessful. The following prices are largely nominal: Cookson's, 9.50c.; Hallett's, 9.25c.; Chinese, 8.27½c.; Hungarian grades, 9c. Some sellers are offering Chinese and Hungarian grades for delivery in April and May at 8.80c.

Old Metals.—The market is weak in sympathy with new ingot copper. Prices are nominally unchanged, but would no doubt be shaded if necessary to effect business. Selling quotations are as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, St. Louis, March 6.—Lead is quiet at 4.25c.; spelter is firm at 5.50c. to 5.55c., both at East St. Louis. Zinc ore is firm at \$39 to \$41 per ton, Joplin, base. Tin is quoted at 40.60c.; antimony (Cookson's) is sharply higher at 9.85c.; lake copper unchanged at 13.10c.; electrolytic also unchanged at 12.85c., all at St. Louis. The demand for finished metals the past week was fairly good.

L. Vogelstein & Co., 42 Broadway, New York, furnish the following figures of German consumption of foreign copper in January, 1911: Imports, 13,329 tons, of which 11,714 tons came from the United States; exports, 639 tons; apparent consumption, 12,690 tons, as compared with apparent consumption of 14,750 tons in January, 1910.

Iron and Industrial Stocks

NEW YORK, March 8, 1911.

Security values have sagged somewhat under the shadow of the approaching extra session of Congress, which may have an unsettling influence on general business. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref., 30½-31	Railway Spr., com., 33-35
Beth. Steel, com., 30-31¼	Railway Spr., pref., 32-34
Beth. Steel, pref., 60½-61½	Republic, com., 32-33½
Can. com., 9½-10½	Republic, pref., 98½-99½
Can. pref., 85½-82	Steel, com., 52½-53½
Car & Fdry., com., 52½-54	Tipe, com., 18
Car & Fdry., pref., 118	Pipe, pref., 58-58½
Steel Foundries., 45½-48	U. S. Steel, com., 74½-75½
Colorado Fuel., 31-33	U. S. Steel, pref., 118-119
General Electric., 147-149½	Westinghouse Elec., 67-70
Gr. N. ore cert., 58-59½	Am. L. C. & C., 60½-61
Int. Harv., com., 116-117	Am. Steel, com., 76-77
Int. Harv., pref., 123-124	Chi. Pneu. Tool., 51-54½
Int. Pump, com., 39½-41½	Cambria Steel., 46½-47½
Int. Pump, pref., 87½-88½	Lake Sup. Corp., 30-30½
Locomotive, com., 36½-39	Pa. Steel, pref., 106-106½
Locomotive, pref., 109½-110½	Warwick, 11
Nat. En. & St., com., 17-18	Crucible St., com., 13½-14½
Pressed St., com., 31½-33	Crucible St., pref., 79½-81
Pressed St., pref., 97-97½	Harb.-W. Ref., com., 41

* Ex dividend.

Dividends.—The Youngstown Sheet & Tube Company has declared the regular quarterly dividend of 2 per cent.

The American Can Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable April 1.

Notes on Prices

Rope.—Under aggressive competition, owing to the limited demand for rope, prices of Manila cordage have dropped off ¼c. per pound, and as a consequence sisal products are generally quoted at a like reduction in price. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8½c. to 9c. per pound; second grade Manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—Prices have been hammered down 1c. per gallon as the result of large buyers testing the market and the lack of demand, but no large amount of business has developed at the lower price. For carload lots of domestic oil 94c. per gallon is quoted. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	
State, tank.....	95
City, raw.....	95

Naval Stores.—The demand for turpentine continues moderate, as manufacturing consumers show little interest and are buying in jobbing lots. While receipts have been light at Southern points, they have been enough to supply requirements. New York quotations on turpentine in five-barrel lots are as follows:

	Cents.
In oil barrels.....	91
In machine barrels.....	91½
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins are moving slowly, in about the same volume as for the past two weeks. On the basis of 250 lb. to the barrel, common to good strained is quoted at \$7.45 and grade D at \$7.70 in the New York market.

Tonnage of the Bessemer Railroad

The following table shows the tonnage of the Bessemer & Lake Erie Railroad, which is owned by the Carnegie Steel Company, and extends from Conneaut Harbor, on Lake Erie, to a connection with the Union Railroad, the industrial road of the company, distributing ore to the Edgar Thomson, Duquesne and Carrie furnaces, a total of 24 stacks:

	Iron ore.		Other freight.	Total.
	Gross tons.	Net tons.	Net tons.	Net tons.
1897.....	446,810	500,428	650,928	1,151,356
1898.....	1,477,768	1,655,101	812,273	2,467,374
1899.....	2,176,525	2,437,708	1,054,455	3,492,163
1900.....	2,396,474	2,684,051	1,496,340	4,180,391
1901.....	3,233,962	3,622,038	1,803,316	5,425,354
1902.....	4,183,868	4,685,933	1,993,435	6,679,368
1903.....	3,909,982	4,379,180	2,507,317	6,886,497
1904.....	4,087,675	4,578,196	2,629,233	7,207,429
1905.....	5,196,668	5,820,268	9,685,171	9,505,439
1906.....	5,316,338	5,820,268	3,685,171	9,505,439
1907.....	5,843,186	6,544,369	4,790,992	11,335,361
1908.....	4,715,023	5,280,825	4,077,141	9,357,966
1909.....	6,745,802	7,555,298	5,034,741	12,590,039
1910.....	6,441,336	7,214,296	6,191,105	13,405,401

A committee of the New Jersey Senate held a hearing at Trenton on Tuesday to consider the proposition to appropriate about \$500,000 to purchase the right of way for the proposed ship canal from Newark Bay to the Delaware River. Notable waterway advocates were present from other States to speak in favor of the project. It is considered a most important link in the proposed coast canal from Massachusetts to Florida. There were no speakers in opposition.

The Mimmack Foundry Company has purchased what was left of the Wolverine Foundry Company, and is intending to carry on a general foundry business at 936 Bellevue avenue, Detroit, Mich., manufacturing fine gray iron castings, stove and furnace repairs, plumbers' supplies, hardware specialties, &c. J. M. Weidinger is president, A. R. Mimmack, vice-president and manager, and W. Kulewatz, secretary and treasurer.

The annual meeting of the New York Metal Exchange will be held at the board rooms, 111 Broadway, on Wednesday, March 15, when the reports of the Board of Managers and the treasurer will be acted upon. The election of the officers and managers to serve during the ensuing year will take place on Monday, April 3.

The officials of the Crucible Steel Company of America, Pittsburgh, made an inspection trip last week to the plant of the Midland Steel Company, Midland, Pa., which their company took over on March 1.

The United States Treasury deficit to March 7 for this fiscal year is \$4,413,074, as against \$23,314,654 at the same time last year. These figures exclude Panama Canal and public debt transactions.

Personal

C. W. Gennett, Jr., head of the rail department inspection for Robert W. Hunt & Co., Chicago, has just returned to Chicago from an extensive trip through Mexico. While in that country he spent some time at the plant of the Monterey Iron & Steel Company, Monterey, Mexico. His stay there completed a record of inspection in every rail mill on the North American continent.

Announcement is made that Fred Collins is now connected with the Dearborn Drug & Chemical Works, with offices at 299 Broadway, New York.

A. C. Scherer, of Robert W. Hunt & Co., has succeeded C. A. Hanson as permanent rail inspector at the plant of the Monterey Iron & Steel Company, Monterey, Mexico, the Chicago firm having the rail inspection contract for the National Railways of Mexico.

H. B. Van Pelt, who has been connected for the past 10 years with the Standard Tool Company, Cleveland, Ohio, as purchasing agent and for part of the time in charge of the advertising department, has resigned, to take effect March 11. He has taken the position of manager of the Cleveland sales office of the Pittsburgh Shafting Company, Detroit, Mich.

E. M. Sutliff, chief engineer and director of the American Trading Company, 25 Broad street, New York, has returned from a business trip to China and Japan.

Knut W. Bildt, mechanical and electrical engineer, in charge of the works of the Luossavaara-Kiirunavaara Mining Company, Kiruna, Sweden, and chief engineer of the Gellivaara Company's mines in Sweden, and Fredrik Jonson and Tosten Holmgren, royal engineers of Sweden, connected with the Government Board of Water Power, are now in this country. They were the guests of the Ingersoll-Rand Company for a few days, before starting on a tour which may extend to Seattle, in the course of which they will collect data which will be of use to them in the extensive water works development which the Swedish Government has under way in Lapland.

Wallace Buell, who has been connected with Abendroth Brothers, Port Chester, N. Y., as general manager, has severed his connection with that company. He is succeeded by John Mason Ellis, who is to act in the capacity of comptroller.

R. C. Yates, formerly sales manager for the Bethlehem Steel Company in the Chicago district, has identified himself with the Union Drop Forge Company, Chicago, as sales manager.

John Mitchell, formerly president of the United Mine Workers of America, has tendered his resignation as chairman of the trade agreement department of the National Civic Federation, to take effect March 31. An authorized statement says that the United Mine Workers asked Mr. Mitchell to withdraw from the Civic Federation or give up his membership in their organization.

L. F. Walter of the firm of Walter-Wallingford & Co., Cincinnati, has left for a two months' pleasure trip to California and the West.

A. P. Gowen has resigned as purchasing agent of the Republic Iron & Steel Company, Pittsburgh, to become director of purchases of the Pullman Company, effective March 1. C. I. Starrett has been appointed acting purchasing agent of the Republic Iron & Steel Company.

Carl Falk, late sales manager for the Harman Pneumatic Machine Company, has become the Buffalo representative of the Mumford Molding Machine Company, 30 Church street, New York, beginning March 1. He is now located in Buffalo.

Harvey De T. Kramer has become associated with Liveright Brothers, manufacturers of Gold Medal files, Philadelphia, Pa., as direct factory representative in the Philadelphia territory. He was formerly connected with Lowell Clouds & Co. and Henry Disston & Sons, Inc.

James W. Keffer has been appointed manager of the Shelby Iron Company, Shelby, Ala., succeeding J. H. Walker, resigned.

The Tariff Board, as it now stands, is constituted as follows: Henry W. Emery, Alvin H. Sanders, Wm. M.

Howard, James B. Reynolds and Thomas W. Page. Messrs. Howard and Page are Democrats, the former being a former Georgia Congressman and the latter a professor of economics at the University of Virginia.

Frank J. Krouse, who has been connected with the Cambria Steel Company, Philadelphia, Pa., for the past 15 years, and recently chief clerk in the sales department in that office, has been appointed assistant sales agent in the Philadelphia territory, succeeding the late M. C. Edwards.

Robert L. Windholz, who has for several years been vice-president of the Vandyck Churchill Company, has resigned from that company and will shortly open an office in New York City, acting as special Eastern representative for several prominent machine tool manufacturers. His temporary address is room 1558, 50 Church street, New York City.

Frank B. Baird, president of the Buffalo Union Furnace Company, Buffalo, N. Y., returns this week on the Adriatic from a two months' trip to the Mediterranean and the Nile. His route back was through France and England.

Obituary

JOHN CORRIGAN, at one time largely interested in lake vessel companies in Cleveland, was killed in an automobile accident in Los Angeles, Cal., March 1, aged 65 years. He was a brother of the late James Corrigan of Corrigan, McKinney & Co., and was at one time president and treasurer of the Aurania Transit Company, vice-president of the American Transit Company and a director of the Lake County Transportation Company. Since his retirement from business in Cleveland he had been living on a farm at Perry, Ohio.

FREDERICK K. MAUS, Chicago, through grief over the death of his wife, which happened five years ago, committed suicide March 1, with a pistol shot. He was born at Belleville, Ill., in 1846, and received his early education in the public schools of St. Louis. Later he attended the United States Naval Academy and served as midshipman during the last two years of the Civil War. He left the navy in 1864 and engaged in business in St. Joseph, Mo., where he entered the firm of D. A. Constable & Co., iron and steel merchants. Some 10 years afterward he severed that connection, becoming identified with the firm of Robinson & Maus. In 1879 Mr. Maus and David Kelley founded the firm of Kelley, Maus & Co., Chicago, which for a long time conducted a large business in jobbing iron, steel and heavy hardware. Two years ago he became a director of the Scully Steel & Iron Company when that concern absorbed Kelley, Maus & Co.

WILLIAM AVERY GRIPPIN, president of the Bridgeport Malleable Iron Company, Bridgeport, Conn., died March 1 at Grand Canyon, Ariz., aged 60 years. He was born in Corinth, N. Y., and worked his way up in the foundry business, which he entered as a boy. He leaves a widow.

Gasoline Engine Speed Regulator.—The Cedar Rapids Foundry & Machine Company, 841 Second avenue, West, Cedar Rapids, Iowa, has placed on the market a speed regulator designed especially for use in operating cream separators and other machinery of this nature with gasoline engines. Shafting of various lengths can be furnished, mounted on a platform with the necessary pulleys for driving a number of machines. This platform is fastened to the ceiling, wall or floor, as may be desired, and gives a self-contained variable speed line of shafting. The variation in the speed is secured while the governor is in motion by giving the small wheel one or two turns. It is also possible to stop or start the machinery while the engine is running at full speed.

A Canadian Associated Press dispatch quotes the chairman of Bilton's, Ltd., Birmingham, England, as saying at the annual meeting held a few days ago that the company's trade with Canada had been greatly increased by the British preference.

Industrial Safety

A Movement to Secure Wider Use of Safety Appliances in Factories

Under the auspices of the Industrial Safety Association, David Williams, former president of the David Williams Company, entertained representatives of the technical press at a dinner at the Engineers' Club, New York, on the evening of March 1. On this occasion the purposes of this association were explained. Mr. Williams addressed those present from the standpoint of a man who had spent a large part of his life in the field of technical journalism and is therefore still deeply interested in movements in which the technical press may properly use its influence for the general welfare. He also spoke as a large employer of labor, being the owner of a publishing establishment having a force of several hundred work people. His remarks were well calculated to excite interest in the subsequent proceedings.

Prof. F. R. Hutton delivered a fascinating address on the use of safety appliances in factories, illustrated by a large number of lantern slides, showing appliances used in manufacturing establishments in Europe and in this country. These illustrations showed the increasing attention which is being given to the introduction of devices for the safety of workmen. They also included descriptions of methods employed for securing greater safety in the danger zone of factories generally, as well as in the yards or grounds in their immediate vicinity, and the facilities introduced into many large works for the care of employees meeting with accidents or seized with sudden illness. Henry R. Towne, president of the Yale & Towne Mfg. Company, stated that, as showing the important function exercised by an emergency hospital, the well-equipped hospital at the company's works at Stamford, Conn., had in the past year administered 14,000 treatments to members of a force comprising 3000 work people. It is a rule of his company that those suffering even from slight injuries shall immediately report to the hospital for treatment. The cases were not all accidents but included a large number of instances of illness arising from causes apart from those incidental to employment in the factory.

The American Museum of Safety

At the conclusion of the addresses, those present were taken to the rooms of the American Museum of Safety in the adjoining United Engineering Building, where they were given an opportunity to inspect the large collection of safety and sanitary appliances now to be found there. Dr. William H. Tolman, director of the museum, took much pleasure in describing the various appliances and in giving some interesting incidents showing the attention which the subject of introducing safety devices is now receiving among large employers of labor. Representatives of important manufacturing establishments have spent days at a time in examining and making note of these devices for the purpose of making practical use of them.

Dr. Tolman has prepared a large number of lantern slides which are available at a very moderate price for superintendents or others in charge of industrial establishments who may desire to deliver illustrated lectures to their employees for the purpose of impressing upon them the necessity of using such safety devices when installed. He has also under preparation photographs for use in the same way, showing improved safety devices adapted to machines involving some danger in their operation. This work is constantly being extended for the purpose of more thoroughly educating employers and employees in this direction. Dr. Tolman has devoted the past 10 years to this work, which he is untiringly pursuing in the interests of true philanthropy.

The Industrial Safety Association

For the purpose of securing permanent financial support for this movement, including the maintenance of the American Museum of Safety, the Industrial Safety Association has been formed. As Professor Hutton stated

in his address, it is the useful function of somebody to standardize shop rules so that a man will not have to learn over again a new set of rules when he changes his place of employment; a reduction in the number of accidents will naturally be the consequence. It is therefore believed that a separate body can be of much more service in doing this than the engineering societies, which are now conducting such useful work in their respective fields of endeavor. The Industrial Safety Association will undoubtedly draw much of its support from the members of the various engineering societies and those who are interested in the particular branches of industry they cover.

The objects of the association, as stated in its constitution, are as follows: "To prevent accidents to life, limb or body of persons engaged in productive industry, or in the occupations contributory thereto in which mechanical or other sources of power are employed; and to promote the health and well-being of persons engaged in the wage-earning processes and other occupations of life, by disseminating knowledge of sanitation and hygiene. These objects shall be sought by the association through the gathering together of knowledge on these subjects and by its distribution among the members and the public generally, by means of publications, lectures, and other educational processes." Its methods shall "consist in collecting models, photographs, illustrations and examples of safety devices and apparatus designed to prevent or lessen accidents in industrial and other occupations; in collecting literature and other information on the subjects of accidents and industrial hygiene and the maintenance of a library for free public references on these topics; the conduct of research work and investigations into the effectiveness and improvements of safety apparatus; the maintenance and support of collections of such safety devices and their exhibitions in museums in New York and other cities as may from time to time seem desirable; and the conduct in every way of diminishing accidents and promoting better sanitation and hygiene."

The Officers and Some Other Details

The officers of this association, for the first year, are: President, F. R. Hutton, consulting engineer Department of Water, Gas and Electricity, New York City. Vice-Presidents, T. Commerford Martin, secretary National Electric Light Association; Charles Kirchhoff, president American Institute of Mining Engineers; Henry R. Towne, president Yale & Towne Mfg. Company. Managers: Philip T. Dodge, president Mergenthaler Linotype Company; Frank E. Law, vice-president Fidelity and Casualty Company; Arthur Williams, electrical engineer New York Edison Company; Ira H. Woolson, consulting engineer National Board of Fire Underwriters. Treasurer, Robert A. Franks, president Home Trust Company. Secretary, William J. Moran, counsel. A good list of members has already been secured, so that an excellent start has been made.

The association invites participation in its work by all engineers, on the philosophy of the national bodies already at work, each in its own field. A small annual due, \$10, from a large number of members will make it possible to do great things. The association has further arranged for corporate memberships and will be glad to work with labor unions also in the furtherance of safeguarding their members. Contributing members paying \$100 a year may command an illustrated lecture on safety in their own plant every year by one of the experts attached to the association.

The association will issue, as its principal agency for carrying these ideas into practical effect, a monthly to be known as the *Journal of Industrial Safety*, which is to present illustrations of designs of safety apparatus and do general educational work in hygiene and sanitation for factories. The first issue of this journal, for February, 1911, was laid before those who participated in the banquet. This issue consists of 20 pages. Its contents comprise a salutatory by Prof. F. R. Hutton; "Safety Attachment for Valves on Steam or Acid Mains"; "Safety Attachment for Repair and Inspection Ladders"; "Safety Attachment for Crane or Hoisting Hooks"; "Safety Grabs for Handling Metal Plate";

"Safety Pinch Bar," &c. Professor Hutton invites articles descriptive of new appliances or devices for securing the safety of workmen.

The movement which has thus been inaugurated is one which must appeal to all those who are interested in the welfare of their fellow men. It is essential that some organization should conduct a work of this kind, which is beyond the ability of any one individual. The purpose is eminently benevolent and the influence of the new association should be far-reaching.

The Philadelphia Foundrymen's Association

Address by James M. Dodge

The fact that James M. Dodge, chairman of the Link-Belt Company, Nicetown, Philadelphia, was to address the Philadelphia Foundrymen's Association, at its regular monthly meeting at the Manufacturers' Club in that city, on the evening of March 1, on "Conservation of Human Effort as Applied to the Scientific Management of the Office and Shop," brought out the largest gathering of foundrymen, both local and out of the city, that has attended the association meetings for a long time, over 70 being present. President Thomas Devlin occupied the chair and after routine business had been transacted appropriate resolutions were adopted on the deaths of H. W. Coleman, of J. K. Dimmick & Co., and Charles Nicholson, of the Carborundum Company. A formal invitation to attend the annual convention of the American Foundrymen's Association, to be held in Pittsburgh, Pa., May 22 to 27, was read by the secretary, and plans will be made for a representative attendance from Philadelphia. Mr. Dodge was then introduced and said, in part:

Mr. Dodge's Address

"Scientific management, so called, was launched on the manufacturing world by Fred W. Taylor, of Philadelphia, in a paper called 'Shop Management,' presented before the American Society of Mechanical Engineers, in which he summed up experience and information gathered from various sources during a period of 25 years. The system outlined became known as the Taylor system, and later was spoken of as scientific management, but I consider the proper name for the subject as 'Conservation of Human Effort by Scientific Management.'

"The Link-Belt Company decided upon the introduction of the Taylor system before the publication of Mr. Taylor's paper, previously referred to, and, I believe, was the first manufacturing concern to introduce the system in its entirety, in its different plants. The reason of its adoption was largely based on the fact that I had been acquainted with Mr. Taylor and his development of high-speed steel cutting tools at the Bethlehem Steel Company, which led to the adoption of the use of these tools at the Link-Belt plant. Incident to the increased production with these tools, then only adaptable for cutting steel and later developed for equally satisfactory work in gray iron, it became necessary to arrive at a new basis of payment for work done, realizing that the old methods of piece rate prices were at best but a guess of more or less accuracy, and to increase the pay on the basis of the productive rate would simply be multiplying the error.

"No past experience was available under the new conditions, and it was only by long and painstaking work, running over several years, that a system was reached, the accuracy of which could not be questioned. In all this work of development Mr. Taylor aided with his knowledge and experience. At times it was extremely difficult to get our mechanics accustomed to the new order of things; everything had to be changed, some things eliminated and other methods substituted. The policy that 'a rate once set must not be reduced unless the shape of the piece be changed, or the tool by which it is made, or the method by which it is made, and, that a man must be paid when he did his work without a quibble,' was a hard dose to swallow but after a while,

we got so that we were complaisant when a man made twice or three times the wages he had been perfectly satisfied to work for, if we had hired him by the day. The system gradually developed a new relationship between the employer and the employee, based on set rates; friction was eliminated and a man's time was not bartered for, but rather his product. In fact, the employee himself became the petty manufacturer.

"The application of this system has, after careful and exhaustive study, been carried to every department of our plants; it is a cost system intensified, and the data for basing estimates of cost and selling prices are practically immediately available. Under the new system of scientific shop management, it is the employer's aim to search out and help the laggard in the ranks; to aid him in obtaining the proficiency of those in the front ranks and become an active producer for the good of all. While I speak from the standpoint of one who has helped to build up this scientific system in my own plants, I would state that it is fully applicable to the conduct of all lines of business. The old idea of doing business has been given a tremendous set back by the adoption of scientific methods and the opportunity to acquire knowledge and education, which are the important factors in today's business affairs."

Mr. Dodge was given a unanimous vote of thanks for his most interesting address.

The Producers' Coke Company

With an annual output of more than 1,000,000 tons of the very best Connellsville coke available, the Producers' Coke Company, Uniontown, Pa., recently incorporated, commences business auspiciously. The new corporation will be the selling agency for six or eight producing companies. As the organization matures and its plans evolve, the productions of other companies will be accepted and marketed by the company.

This corporation is not to be confused with the much discussed central selling agency of the operators. Its capitalization is held entirely by the five gentlemen who constitute the board of directors. It will not undertake to handle the productions of all the independents, but only of those as it will be enabled to supply with regular business. It has been capitalized at \$50,000, and the following are the directors: J. W. Abraham, F. E. Peabody, H. W. Semans, J. E. Hustead, all of Uniontown, and R. W. Gilmore, of Dunbar. Mr. Abraham is president; Mr. Peabody, vice-president and general manager, and Mr. Semans, secretary and treasurer.

The company has a strikingly substantial personnel, which bespeaks success and prosperity for it. The president, Mr. Abraham, is one of I. W. Semans's partners in a number of coke companies, being president and general manager of the South Fayette Coke Company, and occupying positions of responsibility with several other producing companies.

Coke Ovens at Lorain, Ohio.—The statement was made in a recent newspaper dispatch that a large plant of by-product coke ovens will be built in the near future at the Lorain, Ohio, plant of the National Tube Company. It has been understood for some time that the Lorain and Cleveland groups of blast furnaces would eventually be supplied with coke from by-product ovens built alongside, but no plans have been made for such plants, nor have any appropriations been passed.

At the annual meeting of stockholders of the Drigg-Seabury Ordnance Corporation, recently held in Sharon, Pa., the various reports submitted showed that its business has recently improved very materially. More orders were received in February than during the three preceding months. The board of directors was re-elected and also the officers, the latter being John Stevenson, Jr., president; C. W. Blackman, secretary and F. E. Gross, treasurer.

The Keystone Bronze Company, Pittsburgh, Pa., has increased its capital stock from \$5000 to \$250,000.

Metal Trades Annual Meetings

Cleveland Branch

The annual meeting and banquet of the Cleveland, Ohio, Branch of the National Metal Trades Association took place at the Hollenden Hotel in that city March 2. The meeting, which was an unusually interesting one, was attended by about 70 leading manufacturers. Harmony between the employer and employee and the workmen's compensation bill now pending before the Ohio Legislature were the principal subjects of discussion.

In his annual report President Bartlett referred to the friendly relations existing between manufacturers and their employees in Cleveland. Other speakers were Hon. W. T. Smith, Marion, Ohio, a member of the Ohio Legislature; Ernest Ludwig, consul for Austro-Hungary in Cleveland; J. P. Smith, a member of the Ohio Employers' Liability Commission, and Dr. W. A. Knowlton of Cleveland. Mr. Ludwig objected to a provision in the proposed law that allows only one-half the amount of the regular compensation for death in the case of an alien whose dependents are living in the old country. Attention was called to the fact that labor organizations and liability insurance companies are maintaining lobbies at Columbus to fight the proposed law and it was decided to send a delegation to appear before the legislative committees in behalf of the bill. W. D. Sayle, Cleveland Punch & Shear Works, acted as toastmaster at the banquet.

C. O. Bartlett, C. O. Bartlett & Snow Company, was re-elected president and Fred H. White, Baker Motor Vehicle Company, was re-elected vice-president. Other officers were elected as follows: Treasurer, James H. Foster, Hydraulic Pressed Steel Company; Executive Committee: J. H. Champ, Bishop & Babcock Company; J. C. Sparrow, National Safe & Lock Company; W. A. Comstock, Cleveland Wire Spring Company; C. B. Wilson, Ferro Machine & Foundry Company, and Fred Metcalf, Chase Machine Company.

Boston Branch

The Boston Branch elected these officers at the annual meeting, held at Boston, March 1: President, Winslow Blanchard, Blanchard Machine Company, Cambridge; vice-president, H. I. Illingworth, Boston Machine Works Company, Lynn; treasurer, Duncan D. Russell, James Russell Boiler Works, South Boston; executive committee, to serve to 1913, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge, and W. S. Martin, Mead-Morrison Mfg. Company, Cambridge, together with E. P. Robinson, Atlantic Works, East Boston, as an honorary member.

Cincinnati Branch

The annual meeting of the Cincinnati Branch was held at the Business Men's Club, Cincinnati, March 2. Secretary J. M. Manley had arranged a sumptuous banquet, which was very much enjoyed by the local members and their friends, as well as the following out-of-town guests: Ed. Knauss, H. J. Coleman, W. C. Carter, R. K. Leonard, George O'Connor, Charles E. Fink, William Ganshow, Gus. Kuehn, A. Moore, J. A. Scully, W. B. Lewis, O. A. Oisen, H. J. Starke, Thomas Wagstaff, J. D. Wiggins, E. H. Wachs, Jr., Paul Blatchford, Alfred Marshall, John Blatchford, S. J. Moran, C. E. Hoyt, C. E. DePuy, Herbert Cobb, F. K. Copeland, R. E. Gould, Anton Skofsrud, Tom. Vaughan and J. L. Wagner, all of Chicago; H. S. Buttenheim of *The Iron Age*, New York; H. P. Eels, Cleveland; W. A. Layman, St. Louis; D. C. Buell, Omaha; H. H. Rice, Indianapolis; W. H. Vandervoort, Moline, Ill., and M. C. Cokeley, Lima, Ohio.

Following the banquet, the annual election was held and Henry Ritter, Lunkenheimer Company, was chosen president to succeed R. K. LeBlond. P. O. Geier was elected vice-president, E. Von Wyck, treasurer, and George W. Knapp, secretary. The new executive committee is composed of George McG. Morris, J. C. Hobart and W. J. Friedlander.

Among those called on for toasts, after the regular business matters had been disposed of, were the following: President J. H. Schwacke, of the National Metal

Trades Association; John Uri Lloyd, D. C. Buell, H. H. Rice, W. H. Vandervoort, William Ganshow, Franklin Alter, William Lodge and Fred A. Geier.

On March 3 the visitors were taken to the different machine tool plants in Cincinnati, including those in Oakley. Some time was also spent in the University of Cincinnati and in the Continuation School, as guests, respectively, of Profs. Hermann Schneider and J. H. Renshaw. In the evening a beefsteak dinner was served at Wiedemann's in Newport.

Two New Metals

At the Motor Boat Show held in New York City recently two new metals were exhibited. One of these, which has copper and aluminum as its base and is known as Cupror, is being marketed by the Cupror Company, 50 Church street, New York City. This new metal is not corrodible and will not oxidize, and its luster, which is higher than that of any other metal, is permanent. Sea water and salt air have no effect upon the metal, and it is not affected by acids. Its color is that of 18 carat gold, and when examined with the microscope its texture is exactly like that metal, while its specific gravity is 8.11 as compared with 19.36 for gold. Any discoloration due to the weather can be removed quite easily by merely rubbing or washing with soap and water. This metal can be furnished in sheets of any gauge and width and desired degree of hardness, tubing, castings, ingots, wire as fine as 0.00175 in. in diameter and rods. Some of the important uses for the metal are the manufacture of jewelry, table ware, lamps, ornaments, signs, automobile, boat and furniture trimmings and watch chains. In casting Cupror borax is used as a flux, and the temperature required is from 2200 to 2400 degrees F. The pouring must be made as quickly as possible after this temperature is reached and an ample gate provided for shrinkage. In working the sheet metal with tools the fact must be borne in mind that this hardens and stiffens the metal considerably, thus enabling a thinner gauge to be employed. Tests made on Cupror wire showed a tensile strength of 138,550 lb. for spring wire and 125,540 lb. for soft wire, while round test bars gave results of from 59,570 to 93,100 lb. square inch.

The other metal, Hardened Copper, was exhibited by the Dawson Hardened Copper Company, 123 Liberty street, New York City. This metal contains 80 per cent. of copper, the remainder being tin with very minute traces of two other elements. This metal can be used for a number of different kinds of work, and is capable of taking a keen edge. One of its special uses is the manufacture of fish knives, as it is not affected by the action of sea water. It is claimed that this metal can be recast an unlimited number of times without any change whatsoever, and when the metal is first made there is no loss by oxidation. In making castings from the metal or in making the metal itself, the mechanical operations do not materially differ from those in making ordinary bronze or brass castings. The tensile strength of this metal is 37,500 lb. per square inch.

The cost of power generation will be the topic for discussion at a meeting of the American Society of Mechanical Engineers co-operating with the American Institute of Electrical Engineers on the evening of March 10 at the United Engineering Societies Building, 29 West Thirty-ninth street, New York. In view of the fact that New York City contains the largest collection of steam plants in the world, with close competition between the central stations and isolated plants, this promises to be a most interesting and important meeting. It will be of interest to every owner of large buildings, hotels and shops.

The Anderson Engine Company, manufacturer of gas and gasoline engines, Shelbyville, Ill., has sold to the Ketler-Elliott Erection Company, Chicago, a 50-hp. two-cylinder Anderson marine engine for operating an air compressor to be used in connection with bridge construction &c.

International Association for Testing Materials

The current number of the *Proceedings* of the International Association for Testing Materials gives a report of the meeting of the Council of the association held at Brussels, August 13, 1910, at which President Henry M. Howe presided. Professor Howe brought up the matter of stamping the specifications for structural and other steel sold in international markets. He said that the Executive Committee of the American Society for Testing Materials had recommended the following form of stamp for such specifications:

Certified by the International Association for Testing Materials as Standard Specifications for (designation of material) Manufactured in (name of country).

In Professor Howe's opinion the general "recommendation" of the standard specifications of the various countries for export orders as drawn up at the last Council meeting was not so good as the simple certifications as standard specifications of the countries in question. The stamp should do more than to say that the specifications in question were drawn up, for example, by the American Society for Testing Materials. It should certify that the American Society, drawing up these specifications, is really a trustworthy one.

It was stated by George C. Lloyd, representing Great Britain, that the British members of Committee 1a intended to recommend the standard specifications of the three national societies for use in the respective countries for export orders, as distinct from the specifications prepared by other bodies or individuals in those countries. The Council passed the following resolution:

The Council sees no formal objection to the suggested modification of the text as to stamping proposed by the Executive Committee of the American Society for Testing Materials, in case Committee 1a wishes to adopt it.

It was decided to appoint a special subcommittee of Committee 1a for cast iron in order to put forward the work of that committee.

A resolution was passed, as presented by Professor Howe, to the effect that the universal adoption of the metric system would greatly facilitate progress in the unification of specifications for materials of construction. Government authorities and the learned and industrial bodies in all countries in which the metric system is not yet obligatory are urged in the resolution to promote its early adoption. The resolution will be distributed to all Government authorities and appropriate bodies of Great Britain, North America and Australia.

For the Sixth Congress, which will be held in New York in 1912, the following are published as the principal questions and the technical problems which will be presented so far as relates to metals:

PRINCIPAL QUESTIONS.

- Special steel. Referee: L. Guillet, Paris.
- Metallography (slag inclusions, homogeneity, welding). Referee: E. Heyn, Gr.-Lichterfelde.
- Hardness testing and resistance to mechanical wear. Referee: E. H. Saniter, Sheffield.
- Impact tests. Referee: G. Charpy, Montluçon.
- Testing metals by alternating stresses. Referee: H. Le Chatelier, Paris.
- Testing of cast iron. Referee: E. Damour, Bayard.
- Influence of increased temperature on the quality of metal. James E. Howard, Washington, D. C.
- Paints on metallic structures. A. S. Cushman, Washington, D. C.

TECHNICAL PROBLEMS.

1. Preliminary work for the introduction of international specifications for iron and steel. (Chairman of Committee 1: A. Rieppel.)
- 1a and 1b. Introduction of international specifications for iron and steel. a. Steel and steel products. b. Cast iron and castings. (Chairman of both committees: A. Rieppel.)
4. Welding and weldability.
44. Special steels.
53. Defining the microscopic constituents of iron and steel. (Chairman of Committee 53: H. M. Howe.)
45. Inclusions of metallurgical products.
25. Methods of testing cast iron.
49. Classification of pig iron. (Committee 1b.)
26. Notched bar tests. (Chairman of Committee 26: G. Charpy.)
27. Hardness tests.
46. Mechanical wear of metals.

47. Alternating stresses.
54. Importance of the six qualities: Elastic limit, yield point, proportionality, tensile strength, resistance as notched bars, endurance, as to the safe working stress of structures.
28. Magnetic and electric properties.
38. Specifications for copper. (Chairman of Committee 38: G. Guillet.)
48. Influence of increased temperature.
24. Nomenclature of iron and steel. (Chairman of Committee 24: H. M. Howe.)

Customs Decisions

Chiropodists' Knives

The Board of United States General Appraisers has decided that so-called "corn" knives cannot be returned for duty at the rates specified for manicure knives. The Collector of Customs at New York held that the knives in question were similar to manicure knives, duty being assessed at the rate of 5 cents each and 40 per cent. ad valorem. Wiebusch & Hilger, New York, the importers, alleged that the duty should be 45 per cent. under the provision in the law for manufactures composed in chief value of metal. The knives have fixed blades, and are used by chiropodists for treating the feet. It seems that corn knives are not provided for by name in the present tariff act. General Appraiser Fischer, who writes the decision for the board, says that the articles are not included in the term "manicure" knives or in the provision for all knives having folding or other than fixed blades or attachments. Mr. Fischer states that it is apparent that the collector erred in assessing the merchandise under the similitude clause. The corn knives, it is held, must be classified, as claimed under the metal paragraph at 45 per cent. The collector is reversed.

Metal Cans

Small cans made of steel or iron used for holding powder and as containers for thermit in welding and other work are held by the Board of United States General Appraisers to be dutiable at the rate of 30 per cent. under the provision in the tariff of 1909 for "cylindrical vessels, for holding gas, liquids or other material whether full or empty." The cans, which were imported by the Goldschmidt Thermit Company, New York, were brought in empty, and were assessed for duty by the collector at the rate of 45 per cent. under the provision in the law for "manufactures in chief value of metal." The decision for the board says that in view of the evidence submitted it appears that the articles are properly classifiable as claimed under paragraph 151. The collector's action is reversed.

Miners' Rescue Appliances

A claim filed by Eduard Schenk, in which free entry was sought for tools claimed to be of the character of the goods exempted from duty under the act of 1909, was denied. According to the importer, the articles are miners' rescue appliances. They were classified by the customs officials as manufactures of metal with a duty of 45 per cent. It appeared to the satisfaction of the board that the tools in question consisted of different varieties, most of which, it is stated, are suitable for many other uses than in connection with the rescue of miners.

The Sterling Lubricator Company, Rochester, N. Y., announces the removal of its factory to Norwich, Conn., where its shops will be combined with those of the Uncas Specialty Company, the new combination to be known as the Sterling Machine Company. The increased shop capacity and generally improved manufacturing facilities will allow room for expansion and furnish better service for the trade. It is further hinted that Yankee ideas are at work on new things of interest. On and after March 15 all communications should be directed to the Sterling Machine Company, Norwich, Conn.

The Harris Pump & Supply Company, Pittsburgh, Pa., has increased its capital stock from \$60,000 to \$80,000.

The Cambria Steel Company

Report for the Year Ending December 31, 1910

The annual report of the president and directors of the Cambria Steel Company for the 12 months ending December 31, 1910, shows a net income of \$4,553,332.72, against \$2,538,086.64 in 1909 and \$1,493,756.39 in 1908. The income account for 1910 and the balance sheet as of December 31, 1910, are as follows:

Income Account for 1910.

Income from operation, after deducting all expenses (including ordinary repairs and maintenance, approximately \$3,200,000, currently charged during year to cost of production).....	\$5,230,930.45
Income from rentals, investments and interest....	230,405.32
Earnings.....	\$5,461,335.77
*Less expended for extraordinary replacements....	514,529.29
Net earnings.....	\$4,946,806.48
Deduct fixed charges under Cambria Iron Company lease	393,473.76
Net income	\$4,553,332.72
Dividends	2,250,000.00
Surplus net income for year.....	\$2,303,332.72
Which has been expended as follows:	
General depreciation.....	\$100,000.00
Betterments and improvements....	2,090,039.07
	2,190,039.07
Balance to profit and loss account.....	\$113,293.65
Profit and loss account December 31, 1909.....	\$2,398,728.62
Balance of income account transferred as above...	113,293.65
	\$2,512,022.27
Reduced by bad or doubtful accounts	
in 1910.....	\$113,841.02
Less collection of accounts charged off	
in previous years.....	15,908.61
	97,932.41
Profit and loss account December 31, 1910...	\$2,414,089.86

* In former reports this item was deducted before arriving at earnings from operation and not shown separately.

BALANCE SHEET DECEMBER 31, 1910.

Assets.

Lease hold in Cambria Steel Company:	
Property, works, coal, ore lands, &c., subject to payment of \$338,720 annual rental, under Cambria Iron Company lease for 999 years, being 4 per cent. on \$8,368,000 Cambria Iron Company's stock.....	\$33,090,304.68
Plant additions to December 31,	
1909	\$12,635,124.18
Less one-half cost of office building on Steel Company property....	88,219.38
	\$12,546,904.80
Plant additions year ended December 31, 1910.....	2,090,039.07
	14,636,943.87
Total leasehold.....	\$47,727,248.55
Ownership in Cambria Steel Company:	
Equipment additions.....	\$1,188,723.93
Real estate.....	424,892.37
Stock in ore and steamship companies, &c.....	1,594,109.92
Inventory account:	
Materials, supplies and products	10,467,502.22
Cash	655,463.62
Accounts receivable.....	3,139,776.22
Bills receivable.....	93,681.64
Total ownership.....	\$17,564,149.92
Total.....	\$65,291,398.47

Liabilities.

*Capital stock.....	\$45,000,000.00
General depreciation.....	3,850,000.00
Betterment and improvement account.....	11,690,039.07
Accounts payable, including Dividend No. 21, \$562,500	2,337,269.54
Profit and loss.....	2,414,089.86
Total.....	\$65,291,398.47

* The authorized capital stock named in charter is \$50,000,000, of which \$45,000,000 have been issued. The remaining \$5,000,000 of stock cannot be issued at less than par.

The statement by President Charles S. Price and Chairman Effingham B. Morris shows that notwithstanding the curtailment in demand which was evident by mid-summer last year and became acute by October, when it represented only about 50 per cent. of capacity, the shipments of steel products for the year were the largest

in the company's history, exceeding the previous record of 1906 by 6 per cent. The average of prices for the year was about \$4 a ton below those for the same products in 1906, apart from rails.

Improvements and New Plant

A review is given of the condition of the company's properties, together with a statement of improvements made in 1910. The Johnstown coal mines produced 1,450,600 gross tons of coal. The building of a plant of 400 by-product coke ovens in the Hickston's Run Valley coal field, adjoining the works, has not yet been undertaken owing to uncertainties surrounding the engineering development of the larger sized ovens. Four 50-ton furnaces were added to the open hearth department of the Cambria plant, making it an 8-furnace group. The 18-in. continuous billet mill was completed and operative in March. At the Gautier plant the 8-in. semi-continuous mill was completed and tried out November 1. The 12-in. mill there is under construction and will be completed in the spring of 1911. The new rod mill is completed and the wire mill begins production this month.

Progress is reported on the construction of the Quemahoning reservoir and pipe line. The breast of the dam is 90 ft. high by 800 ft. long; the storage capacity, 11,000,000 gal.; the pipe line 66 in. diameter and 13.8 miles long, running down the valley of the Stony Creek River. The pipe line involves 9050 ft. of concrete lined tunnels and 13 river crossings, aggregating 4072 ft. of river bed work, mainly in rock, all concreted in place. The pipe line is of steel plate construction, the steel being fabricated in the company's own shop. This improvement will be completed in the summer of 1912, though partial storage will be possible by the fall of 1911.

In the early months of the year the average number of employees was 17,380, while in December only 14,116 were employed, most of these on partial time.

Additions to the plant since the organization of the Cambria Steel Company August 17, 1901, as shown on the balance sheet for December 31, 1910, amounted to \$14,636,943.

The Railway Steel Spring Company's Earnings.

At the annual meeting of stockholders of the Railway Steel Spring Company, held recently, the financial statement for the year ended December 31, 1910, was presented, showing gross earnings of \$10,035,435, against \$7,843,292 in the previous year. Manufacturing operations and administration expenses amounted to \$7,734,535, against \$5,782,754, while \$350,000 was charged off for depreciation, against \$194,077. This left net earnings of \$1,950,900, an increase of \$84,439.

The income account compares as follows:

	1910.	1909.
Net earnings.....	\$1,950,900	\$1,866,461
Interest	195,823	202,701
Surplus.....	\$1,755,077	\$1,663,760
Preferred dividends.....	745,000	945,000
Surplus.....	\$810,077	\$718,759
Previous surplus.....	2,989,701	2,270,942
Total surplus.....	\$3,799,778	\$2,989,701

In his report to the stockholders President F. F. Fitzpatrick says: "The latter part of the year 1910 has shown a tendency toward a period of dullness, but it is not the belief of the company's management that this period will be prolonged, and a fair business is anticipated for the current year."

At the meeting Otis H. Cutler was elected a director to succeed the late Frank S. Laying. Other directors were re-elected. Mr. Cutler is president of the American Brake Shoe & Foundry Company.

The United Steel Company, Canton, Ohio, has removed its Chicago office from 33 Dearborn street to 1132 Commercial National Bank Building. A. Schaeffer is Chicago manager. The company established its Chicago office two years ago, and has found it desirable to seek a more central location. The Commercial National Bank Building is occupied chiefly by the offices of steel manufacturers.

Workmen's Insurance in Europe

Report by the United States Bureau of Labor

The remarkable progress made in recent years by foreign countries on the subject of employers' liability and workmen's compensation is brought out by the first of two volumes comprising the Twenty-fourth Annual Report, just issued by the United States Bureau of Labor, Department of Commerce and Labor, entitled "Workmen's Insurance and Compensation Systems in Europe." This volume treats of Austria, Belgium, Denmark, France and Germany. Volume II, now in the hands of the printer, relates to Great Britain, Italy, Norway, Russia, Spain and Sweden.

The German System

The country with the most complete system of workmen's insurance is Germany, where practically the entire wage earning population is required by law to be provided with some form of insurance against industrial accidents, sickness, invalidity and old age. Benefits are also provided in case of maternity for wage earning women, while for some industries there is a system of insurance to provide benefits for the widows and orphans of wage earners. German employers defray the entire cost of accident insurance, and it includes practically all the industrial workers in the country. The most striking evidence of the wide scope of this system is contained in the figures for the operations of the year 1908. In this year the number of persons insured against accident was about 27,000,000, the total receipts were about \$57,000,000, and the total expenditures were about \$48,000,000. The number of workmen compensated for the first time in the year 1908 was 143,000. Separate laws provide a system of compulsory sickness insurance for wage earners, in which the employers pay one-third and the workmen two-thirds of the expense. In 1908 the number of persons (not including agricultural laborers) insured against sickness was about 13,000,000, the receipts were \$95,000,000, and the expenditures were \$91,000,000. Besides these two branches there is a third national compulsory system relating to insurance for old age and invalidity, in which the employers and the workmen each pay equal amounts, while the Imperial Government provides a liberal subsidy. In 1908 the number of persons insured under this branch was 15,000,000, the receipts were \$68,000,000, and the expenditures were \$48,000,000.

A number of cities in Germany are now providing subsidies for organizations providing benefits in case of unemployment; this is usually done by repaying to trade unions and similar organizations a percentage of the expenditures they make for out-of-work, travel, &c., benefits.

The Austrian and French Systems

In Austria the system of workmen's insurance is patterned closely after that of Germany, and provides relief for cases of sickness and accident to workmen engaged in manufacturing and similar industries, though there is a separate organization for the mining industries. The expense of the accident insurance is borne nine-tenths by the employers and one-tenth by the workmen, while the expense of the sickness insurance is defrayed in the proportion of one-third by the employer and two-thirds by the workmen. For the mining employees there is insurance for sickness, accident and old age. One feature of workmen's insurance in Austria which no other country possesses is a national compulsory system of old age and invalidity insurance for salaried persons, such as clerical employees of all kinds; the expense of this is defrayed partly by the employer and partly by the insured person.

In France the different types of insurance are provided by a great variety of institutions and regulated by a series of separate laws and decrees. The insurance of workmen against industrial accidents is regulated mainly by the law of 1898. The employer is required to provide at his own expense a specified system of benefits to injured workmen, and to protect himself he is allowed

to insure his liability under the law in a variety of institutions, such as voluntary associations of workmen or of employers, private insurance companies, Government insurance funds, &c. In some industries insurance against sickness is compulsory, but in the main the French Government has preferred to grant certain privileges to mutual sickness insurance societies, and those complying with certain requirements receive subsidies from the National Government. In 1910 a law was enacted providing for a system of old age pensions, though a previous law of 1905 had already put into operation a system of relief for indigent and disabled aged persons. The activities of the French Government also extend to the field of unemployment insurance.

The Belgian and Danish Systems

The situation in Belgium resembles that existing in France; at the present time the various forms of workmen's insurance in operation relate to distress caused by accident, sickness, old age and invalidity, and unemployment. The Belgian law of 1903 requires employers to pay at their own expense a specified scale of benefits to workmen injured in the course of their employment. A government institution offers to workmen old age insurance policies on favorable terms, while both the employers and the workmen have organized mutual aid societies to provide sickness insurance. The system of subsidizing unemployment insurance, now called the Ghent plan, originated in Belgium and has reached its greatest extent there; the cities, provinces, &c., in practically every part of the kingdom are now liberally subsidizing trade unions and similar organizations which provide systems of insurance for unemployed workmen.

In Denmark, the report shows that there are now in operation systems of accident insurance for the principal groups of wage earners in the kingdom, systems of sickness insurance through mutual aid societies subsidized by the State, and systems of old age relief for those not able to support themselves. In addition the laws of 1907 and 1908 permit the local and national governments to subsidize trade unions and other organizations providing relief in case of unemployment not due to the fault of the worker.

In practically all of the countries just mentioned the accident insurance and compensation laws provide for the award of fixed sums to injured employees without the necessity of a lawsuit and without reference to the negligence of the workman, unless the employer can prove gross negligence on the latter's part.

The information contained in the report shows that in no case has any country, after having adopted a system of compensation or insurance, ever gone back to the liability system; in practically all of these countries there is a widespread demand for the improvement and extension of the existing systems and in the largest of these countries—Austria, France and Germany—government commissions are now at work planning for the revision and enlargement of the systems.

A Congress of Technology at Boston

A congress of technology will be held in Boston, Mass., April 10 and 11, in celebration of the fiftieth anniversary of the granting of the charter of the Massachusetts Institute of Technology. In line with this idea, the 50 or more papers which will be presented at the congress will be written by graduates of the institute, and will thus serve to record the part the alumni of the institution have taken in the development of scientific industry.

As the titles of these papers are sent in by the writers it is becoming evident that the managers of the congress will succeed in their effort to make the proceedings show from another point of view the general industrial advance that has taken place during the past 50 years under the guidance of trained engineers. The papers will cover a wide range of subjects, from architecture to sewage purification, and the names and professional standing of the writers show that they will together discuss authoritatively every important problem of modern industrial technique and management. It is already

clear that this record is not limited to any narrow activity within merely technical lines, but that it covers the broader problem of the relations of science to industry, the place of the engineer in erecting a more efficient type of industrial management, and the general shaping of material conditions to serve alike the changing conditions of business and the improving conditions of labor.

New Pennsylvania Electric Locomotives

An order has recently been placed by the Pennsylvania Railroad with the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., for nine electric locomotives aggregating about 40,000 hp. These will be of the same type as and will supplement the 24 already in use for handling trains between the Manhattan Transfer station, near Harrison, N. J., and the company's terminal at Seventh avenue and Thirty-second street, New York City. The mechanical part of the locomotives, including the cabs, frames and running gear, will be built by the railroad company at its Juniata shops, while the air brakes will be supplied by the Westinghouse Air Brake Company and the electrical equipment will be built by the Westinghouse Electric & Mfg. Company. The complete locomotives will be assembled at the East Pittsburgh shops of the last named firm and the contract date for completion is July 1, 1911.

These locomotives, which are articulated machines of the double cab design, are by far the most powerful ever built. A 2000-hp. 600-volt direct current interpole motor with a cast steel frame and complete electrical equipment are carried on each half. The two halves are coupled together at their driving wheel ends by permanent couplings of twin draw bars and Westinghouse friction draft gears, and the arrangement is such that one half serves as a leading truck and the other as a trailer in whichever direction the locomotive may be moving. The motors are directly connected to the driving wheels through jack shafts and side rods. In general character the driving wheels and trucks are similar to the American type of steam locomotive. This arrangement of wheels and motors was decided upon after a number of different forms of motor drive and wheel arrangement had been experimented with in an effort to secure the maximum amount of steadiness when running at full speed. If one motor is cut out, the locomotive can be operated from either cab by the remaining motor. As the halves are interchangeable, it is possible to replace either one by another part if repairs have to be made. The unit switch field control system is employed and permits two or more locomotives to be coupled together, the whole being operated from either end of any one cab. In this way flexibility of speed regulation is secured, while at the same time two additional running notches are made available and economical power consumption during the acceleration period is made possible.

The following table gives some of the characteristic features of these locomotives:

Weight of each motor complete with cranks, pounds....	43,000
Height of motor frame above cab floor, feet and inches..	5. 6½
Height of center of shaft above cab floor, feet and inches.	2. 1½
Weight of locomotive complete, pounds.....	312,000
Weight on drivers, pounds.....	200,000
Weight on each driving axle, pounds.....	50,000
Weight on each bogie truck, pounds.....	57,000
Total overall length, feet and inches.....	64 11
Rigid wheel base of each half, feet and inches.....	7 2
Total wheel base of each half, feet and inches.....	23 1
Total wheel base of locomotive, feet and inches.....	55 11
Diameter of drivers, inches.....	72
Tractive effort, pounds.....	60,000
Normal speed, miles per hour.....	60

The equipment of each cab includes both automatic and straight Westinghouse air brake mechanism, train lighting apparatus, electric headlights, pneumatically operated whistle and track sanding device, as well as the motor unit switches and the master controller.

The Hercules Motor Truck & Car Company, Grove City, Pa., is about to extend its operations by taking over the space that another line of work has occupied

heretofore. The whole plant is to be devoted to the manufacture of Hercules high grade commercial vehicles and pleasure cars. Some new ideas have been incorporated in the engine and transmission. The company will specialize in light and medium weight trucks.

The Wisconsin Engine Company

The Wisconsin Engine Company, Corliss, Wis., has made a very considerable addition to its equipment and working capital, in order to allow it to enter extensively into new lines of manufacture. Up to the present time this company has been controlled by strong Pittsburgh interests. On account of the location of the plant, it became desirable to bring Milwaukee capital into the company and changes just made in the directorate will bring about far more intimate connection with the details of the business than has been possible heretofore when the company was controlled in Pittsburgh.

The principal business of the Wisconsin Engine Company has been the manufacture of Wisconsin-Corliss engines, and in this field it has won an enviable reputation, as such engines, including some of the largest which have ever been built, may be found in operation in every section of the country. Due to certain distinctive features of design, these engines are satisfactorily operated at higher speeds than are desirable with the ordinary design of Corliss engine, and it is probably due to this fact that the company has maintained a large and growing business in Corliss engines in the face of competition by the steam turbine.

It is the purpose of the new organization to foster and to build up the existing Corliss engine business, but the addition of new capital and new equipment is chiefly for the purpose of enabling the company to enter extensively into new lines of manufacture. Chief of these will be the Adams gas engine, which will be manufactured in sizes from 200 to 3000 hp. in a single unit. The company was fortunate, even before its new organization was perfected, in securing orders for upward of 10,000 hp. of the Adams engines, and increased shop facilities and new equipment are now being installed to permit of the rapid and economical production of this additional line of manufacture.

E. T. Adams, the new president of the company, is an engineer who is well known among the users of heavy machinery throughout the country. He has been identified with the manufacture of heavy machinery for many years, dating back to the early days of the Edward P. Allis Company in Milwaukee, where under Mr. Reynolds he was connected with the design and installation of most of the important power and pumping installations in the country. Mr. Adams was a pioneer in the heavy gas engine business in the United States, being identified with the first large gas engines put out by the Westinghouse Company, and later as manager and chief engineer of the gas and mill engine department of the Allis-Chalmers Company. He inaugurated the department and built up for that company the largest gas engine business ever enjoyed by any company in the world. It is probable that considerably over half of the large gas engines now in operation in this country are of Mr. Adams's design, including the well-known plant of the United States Steel Corporation at Gary, Ind.

During the past few years there has been far greater advancement than is generally realized in knowledge of the practical operation of large gas engines, and the large engine designed in the light of this experience has become as simple and reliable as a Corliss engine and has crystallized into a form that will, undoubtedly, remain as a standard for many years to come. It is interesting to note that the German builders of large engines take the same view of this matter, and the larger German firms are this year doing what the Wisconsin Engine Company is doing, namely, redesigning their engine in the light of past experience in this field. They are preparing to enter upon its manufacture, as is the Wisconsin Company, with jigs and special tools for the accurate duplication of parts, firm in the belief that gas engine design has now reached a basis where such standardization is commercially possible.

January Exports and Imports of Iron and Steel

The January report of the Bureau of Statistics of the Department of Commerce and Labor shows an increase in our iron and steel exports and a decrease in imports as compared with December. The total value of the exports of iron and steel and manufactures thereof, not including ore, in January, was \$18,739,961, against \$18,300,710 in December. The value of similar imports in January was \$2,874,740, against \$3,145,706 in December.

The December exports of commodities for which quantities are given totaled 152,140 gross tons, against 149,645 tons in December. Details of the exports of such commodities for January and for the seven months of the current fiscal year ending with January are as follows, compared with corresponding periods of the previous fiscal year:

Exports of Iron and Steel.		Seven months ending January,			
January,		January,		January,	
1911.	1910.	1911.	1910.	1911.	1910.
Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	10,848	4,307	96,524	42,369	
Scrap	5,066	383	19,052	6,992	
Bar iron.....	1,194	1,308	9,725	7,835	
Wire rods.....	471	856	9,743	12,197	
Steel bars.....	7,648	7,342	67,278	49,918	
Billets, blooms and plates.....	11,731	3,080	62,430	47,103	
Steel rails.....	43,127	41,999	205,675	220,945	
Iron sheets and plates.	9,009	9,119	57,274	50,471	
Steel sheets and plates.	12,225	12,774	103,580	71,576	
Tin and terne plates.	2,857	851	8,631	5,849	
Structural iron and steel	12,152	8,319	83,859	53,533	
Barb wire.....	6,014	4,365	48,685	42,596	
Wire	9,307	8,555	55,843	43,601	
Cut nails.....	916	472	5,802	6,045	
Wire nails.....	4,485	2,760	26,510	18,314	
All other nails, including tacks.....	782	595	6,486	4,462	
Pipe and fittings....	14,308	11,189	95,978	100,857	
Totals.....	152,140	118,274	963,075	784,663	

The imports of commodities for which quantities are given totaled 32,795 gross tons in January, against 31,619 tons in December. Details of the imports of such commodities for January and for the seven months of the current fiscal year ending with January are as follows, compared with corresponding periods of the previous fiscal year:

Imports of Iron and Steel.		Seven months ending January,			
January,		January,		January,	
1911.	1910.	1911.	1910.	1911.	1910.
Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	19,177	22,796	136,357	140,337	
Scrap	303	19,047	15,711	80,301	
Bar iron.....	2,325	2,178	18,544	14,238	
Billets, bars and steel in forms n.e.s.....	2,865	5,167	25,131	18,082	
Sheets and plates.....	292	609	2,672	3,690	
Tin and terne plates.	5,677	5,309	36,097	38,091	
Wire rods.....	2,156	1,101	11,669	5,958	
Totals.....	32,795	56,207	246,181	300,697	

The imports of iron ore in January were 102,600 gross tons, against 173,710 tons in December and 284,823 tons in January, 1910. The total quantity of iron ore imported in the seven months of the current fiscal year ending with January was 1,434,365 gross tons, against 1,407,233 tons in the corresponding period of the previous fiscal year. Of the imports in January, 80,150 tons came from Cuba, 17,687 tons from Spain, 363 tons from Canada and 4400 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, excluding ore, in the seven months of the current fiscal year ending with January was \$123,600,379, against \$97,235,095 in the corresponding period of the previous fiscal year. The total value of similar imports was, respectively, \$21,152,356 and \$21,245,874.

The Tennessee Coal, Iron & Railroad Company has blown in an additional furnace at Ensley, Ala., making a total of three stacks now being operated at Ensley and one at Bessemer.

Foundrymen Report on Pig Iron Stocks and the Outlook

The pig iron firm of Hickman, Williams & Co. recently sent out from its Chicago office a letter to foundrymen, asking concerning stocks of pig iron in foundry yards and also as to business conditions and the outlook. Over 500 answers were received. Some of these gave an incomplete record, so that the tabulation below represents only 473. The average supply of pig iron in foundry yards is about 70 days. The reports on the condition of business are classified under good, normal and poor, and opinions on the outlook are under four heads—good, improving, questionable and poor:

State.	No.	cos.	Days.	Av. sup.—Business.—			Outlook.			
				G.	N.	P.	G.	I.	Q.	P.
Alabama.....	7	26	4	5	2	5	3	1	2	
Arkansas.....	1	230	1	1	1	1	1	1	1	
Colorado.....	3	55	1	2	1	3	3	1	1	
Connecticut.....	11	103	4	9	2	5	8	1	1	
Florida.....	1	60	1	1	1	1	1	1	1	
Georgia.....	7	41	4	1	2	3	3	1	1	
Delaware.....	1	75	1	1	1	1	1	1	1	
Indiana.....	29	84	12	19	2	17	13	1	2	
Illinois.....	67	78	17	34	22	27	35	1	10	
Iowa.....	11	109	6	5	5	6	6	1	1	
Kansas.....	2	157	3	1	1	1	1	1	1	
Kentucky.....	5	99	3	1	1	3	1	1	1	
Louisiana.....	1	300	1	1	1	1	1	1	1	
Maryland.....	2	32	1	1	1	1	1	1	1	
Massachusetts.....	27	93	5	15	9	10	12	4	3	
Maine.....	1	60	1	1	1	1	1	1	1	
Michigan.....	32	57	19	8	7	20	9	2	3	
Minnesota.....	6	85	3	3	2	4	4	1	1	
Mississippi.....	2	82	1	1	1	1	1	1	1	
Missouri.....	16	88	2	11	5	4	12	1	2	
N. Hampshire.....	2	136	1	1	1	2	1	1	1	
New Jersey.....	10	40	4	2	5	4	5	1	1	
New York.....	46	71	14	28	7	23	22	1	2	
North Carolina.....	7	37	4	3	2	4	2	1	2	
Ohio.....	71	60	27	40	16	27	39	7	3	
Pennsylvania.....	55	39	17	32	13	22	31	4	6	
Rhode Island.....	4	193	2	1	1	2	1	1	1	
South Carolina.....	1	30	1	1	1	1	1	1	1	
Tennessee.....	9	28	5	4	4	6	5	1	2	
Texas.....	4	76	2	1	2	3	1	1	2	
Vermont.....	2	30	1	1	1	1	1	1	1	
Virginia.....	3	33	1	1	1	2	1	1	1	
West Virginia.....	4	35	1	2	1	2	1	1	1	
Wisconsin.....	23	92	8	9	6	12	7	1	3	

RECAPITULATION.	
Number of concerns.....	473
Average days supply.....	69.66
Business—Good.....	170
Normal.....	245
Poor.....	117
Outlook—Good.....	218
Improving.....	229
Questionable.....	29
Poor.....	54

A Gröndal Iron Ore Briquetting Plant

The Northwestern Iron Company, Mayville, Wis., has contracted with the American Gröndal-Kjellin Company, New York, for the building at its Mayville blast furnace plant of a Gröndal briquetting plant of two kilns with a combined capacity of 200 tons of briquettes a day. Construction will begin at once, and it is expected the plant will be in operation in June of this year. Briquettes will be made both from the furnace company's Mayville ore and from the accumulations of flue dust at its two blast furnaces. The new plant will be laid out so that two kilns can be added later. The briquettes will be 6 x 6 x 3 in., as charged into the kiln and the final product will be about 2½ in. thick.

There are now in operation in the United States seven Gröndal kilns for the briquetting of ores, and three under contract, the third of these being now under construction at the plant of the Electric Smelting & Aluminum Company, at Sewaren, N. J.

The Great Lakes Engineering Works, Detroit, Mich., is reported to have secured orders from New England interests for four ocean-going steamers and several barges for the Atlantic coastwise coal trade. The contract involves \$1,650,000. The boats will be of the Welland canal size, 257 ft. in length and 43 ft. beam, being the maximum sized vessels that can go through the canal. The steamers will have a capacity of 4000 tons and the barges 2500 tons.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Right to Rescind Contract to Purchase for Delay in Delivering.—An agreement to sell an account register, to be delivered April 1 or as soon thereafter as practicable, cannot be canceled by the buyer for failure to deliver until May 30, where the delay is explained.—New York Supreme Court, American Case & Register Company vs. Griswold, 125 New York Supplement 4.

Buyer's Right to Recover for Loss of Profits Caused by Seller's Breach of Warranty.—On a breach of an express or an implied warranty of articles sold, recovery can be had by the buyer for loss of profits not dependent upon speculative contingencies, but shown to be certain, fixed in amount and reasonably to be anticipated from the breach, where it appears that the loss of the profits is due solely to the seller's breach of his contract.—Georgia Court of Appeals, Hirsch vs. J. S. Schofield's Sons Company, 68 Southeastern Reporter 1077.

Buyer's Right to Recover Payment for Freight on Canceling Contract.—An agreement for a sale of machinery which requires the buyer to settle for the machinery by paying freight charges and by giving notes for the price, and which entitles him to six days' trial of the machinery, and a return thereof on the seller being unable to comply with the warranty, gives to the buyer the right to recover from the seller the freight charges paid, on breach of the warranty.—Iowa Supreme Court, Reeves & Co. vs. Younglove, 127 Northwestern Reporter 1017.

Measure of Damages for Breach of Contract.—Those damages which are the natural and probable result of a breach of a contract, those which the parties may reasonably anticipate as the effect of the breach under the particular circumstances of the case which are known to them when the contract is made, and those only, may be recovered in an action upon a contract.—United States Circuit Court of Appeals, Eighth Circuit, Northwestern Steam Boiler & Mfg. Company vs. Great Lakes Engineering Works, 181 Federal Reporter 38.

Right of Buyer to Rely on Warranties.—Provision in a contract of sale that machinery is warranted to do the work for which it is intended, and that if the buyer does not notify the seller to the contrary within five days from first day's use, the machinery shall be considered satisfactory, gives to the buyer five days within which to give notice, and where he does not do so, and there is no waiver of the condition, he cannot rely on the warranties.—Texas Court of Civil Appeals, Caples vs. Port Huron Engine & Thresher Company, 131 Southwestern Reporter 303.

Rights of Seller of Engine Under Warranty.—Where a company sold a stationary engine under a special warranty that the complete equipment should be free from defects in material or workmanship, it was entitled to a reasonable time in which to get everything adjusted and put in good running order.—Kentucky Court of Appeals, Higgins vs. Dean Gas Engine & Foundry Company, 130 Southwestern Reporter 800.

Validity of Provisions for Liquidated Damages Under Contract of Sale.—An agreement to pay \$25 as liquidated damages for each day's delay in delivering electric cranes will be enforced as a reasonable provision where the damage resulting from the delay is not readily ascertainable or subject to estimate.—Alabama Supreme Court, Cleveland Crane & Car Company vs. American Cast Iron Pipe Company, 53 Southern Reporter 313.

When Articles Sold Should Be Delivered—Acceptance of Orders.—If an agreement for a sale of articles does not provide the time within which they are to be delivered, the law requires delivery within a reasonable time. If a dealer has sought an order he is deemed to have accepted it at once, and if signed by the buyer it becomes a binding contract; no other acceptance or notice of acceptance by the dealer being necessary.—Oklahoma Supreme Court, Cameron Coal & Mercantile Company vs. Universal Metal Company, 110 Pacific Reporter 720.

Rights Under Sales Agency Contracts.—The employment of a sales agent does not, in the absence of an agreement to that effect, preclude the principal from making a sale, and if the contract should expressly provide that the principal would not appoint any other agent to sell a specific article, or to sell in a specified territory, still, if the contract did not give the agent the exclusive right to sell such article, or to sell in such territory, such agent would not be entitled to commission upon a sale made by the principal without the assistance of the agent.—Texas Court of Civil Appeals, J. I. Case Threshing Machine Company vs. Wright Hardware Company, 130 Southwestern Reporter 729.

Authority of Traveling Salesmen in Collecting.—The mere fact that a traveling salesman is authorized to make collections does not authorize him to indorse and discount notes executed by customers to his house.—Michigan Su-

perior Court, Lumber Co. And Arbor Street Bank, 127 Northwestern Reporter 685.

Passing of Title and Measure of Damages Under Contracts of Sale.—Where there is a sale of articles generally no title in them passes until delivery, because until then the very goods are not ascertained. But where by the contract itself the seller appropriates to the buyer a specific article and the latter thereby agrees to take it and to pay the stipulated price, the parties are then in the same situation as they would be after a delivery of goods in pursuance of the general contract. The very appropriation of the article is equivalent to delivery by the seller, and the assent of the buyer to take the specific article and to pay the price is equivalent to his accepting possession. The effect of the contract, therefore, is to vest the property in the buyer. Where the seller appropriates to the buyer a specific article which the buyer agrees to take and pay for, the measure of damages on a breach of contract by the buyer is the contract price and not the excess of the contract price over the market value at the time actual delivery was to be made, though the article has merely a potential existence when the contract is made, and does not actually exist until thereafter.—Pennsylvania Supreme Court, Henderson vs. Jennings, 77 Atlantic Reporter 453.

The Association of American Steel Manufacturers

PITTSBURGH, PA., March 8, 1911. (By Telegraph.)—The annual meeting of the Association of American Steel Manufacturers was held in the Fort Pitt Hotel, Pittsburgh, on Tuesday, March 7. The meeting was well attended, 26 representatives being present in person from the largest steel concerns in the country, the association now having a total membership of 31 of the important steel companies. Encouraging reports were made as to the progress reached in having the steel manufacturers adopt the specifications on different materials as suggested at the meeting held in Pittsburgh early last year, particularly in the specifications for concrete reinforcement bars. Reports submitted show that these specifications have been adopted by many leading engineering concerns throughout the country, including the Isthmian Canal Commission. The subject of boiler plate specifications was discussed at some length.

A pleasing feature of the meeting was the presentation of a silver coffee set to W. A. Bostwick, the retiring president, who has also resigned from the Carnegie Steel Company to become vice-president of the Orford Copper Company, New York City. The presentation speech was made by J. L. Haines of the Jones & Laughlin Co., and was happily responded to by Mr. Bostwick. New officers of the association were elected as follows: A. A. Stevenson, vice-president Standard Steel Works, Burnham, Pa., president; P. E. Carhart, inspecting engineer Illinois Steel Company, vice-president, and J. J. Shuman, Jones & Laughlin Steel Company, who has very acceptably filled the dual position of secretary and treasurer, was unanimously re-elected.

Lake Superior Iron Ore Shipments in 1910

Statistics of shipments by mines from the Lake Superior iron ranges in 1910 are compiled by the Iron Trade Review. They show that the estimate of 43,500,000 tons made heretofore on the basis of the shipments by water in the season of navigation, was close to the actual. The total by lake, as already given in these columns, was 42,628,758 gross tons and the total by rail 813,639 tons, making the grand total 43,442,397 tons. The following table shows the shipments by ranges for 1910 and the preceding three years:

	1910.	1909.	1908.	1907.
Marquette range...	4,392,726	4,256,172	2,414,632	4,388,073
Menominee range...	4,237,738	4,875,385	2,679,156	4,964,728
Gogebic range....	4,315,314	4,088,057	2,609,356	3,637,102
Vermillion range...	1,203,177	1,108,215	841,544	1,685,267
Mesaba range....	29,201,760	28,176,281	17,257,350	27,495,708
Miscellaneous	91,682	82,759	122,449	95,790
Totals.....	43,442,397	42,586,869	26,014,987	42,266,668

In the above total "miscellaneous" refers to the ore mined in Wisconsin. Last year it all came from the Iron Ridge and Mayville mines.

The Diamond Toggle Bolt

A new type of toggle bolt in which no rivets are used and which is said to possess great strength has been recently brought out by the Diamond Expansion Bolt Company, 90 West Street, New York City. These bolts are so designed that as soon as the bolt is turned the

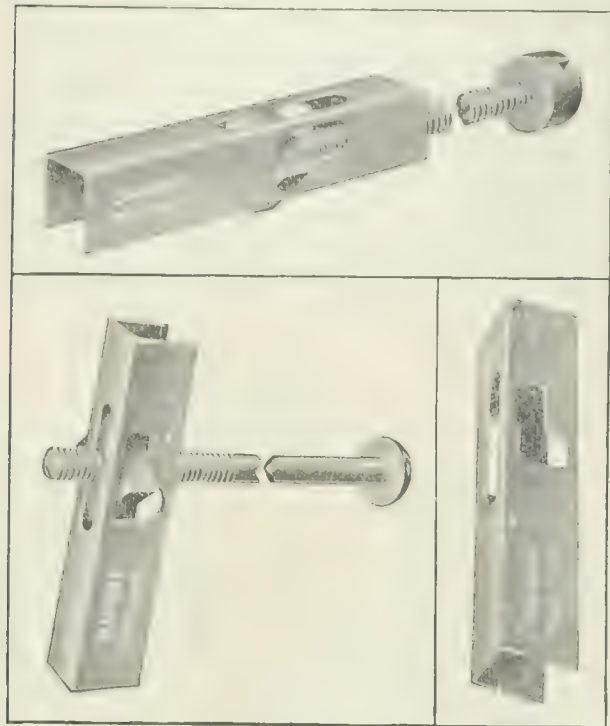


Fig. 1.—The Bolt Complete for Insertion in Hole.

Fig. 2.—The Bolt Inserted in the Head.

Fig. 3.—The Head.

Three Views of the New Diamond Toggle Bolt and Head Made by the Diamond Expansion Bolt Company, New York City.

job is completed and no cutting off of threaded ends is required. The strength of this bolt is said to be due to the fact that there is a bearing on both sides of the head against the surface of the hollow wall to which it is attached.

The bolt has a pressed one-piece head, which is shown in Fig. 3. In use an ordinary stove bolt nut is inserted diagonally across the channel through the slot in the toggle head. The bolt is inserted for a few threads through the open end of the channel, as shown in Fig. 2, and the channel is then turned back over the bolt, Fig. 1, and placed in the hole. These bolts are furnished with two sizes of head, having slots 3-16 and $\frac{1}{4}$ in. wide, respectively. If desired the bolts can be furnished with screws ranging in length from 3 to 6 in. for the smaller size of head and from $3\frac{1}{2}$ to 6 in. for the larger.

The Chicago Railway Equipment Company

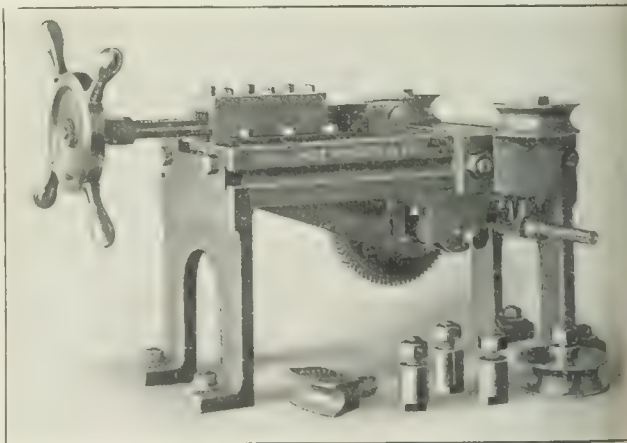
The eighteenth annual report of the Chicago Railway Equipment Company presents the balance sheet of December 31, 1910, which shows current assets of \$1,310,014, to which are added \$1,247,994, representing property account and \$867,720 for good will and patents. The above amounts with \$20,149 of deferred charges for future operations make a total of \$3,345,877. The total capital liabilities are \$2,535,000; the current liabilities, \$85,925; the reserves for contingencies and shrinkage in inventory, \$45,000, and for depreciation, &c., including appropriations from earnings during the year, \$156,926. The surplus is \$523,027. The dividends paid in 1910 and charged to surplus account were \$173,906. The report says that the earnings in 1910 were sufficient to provide for the 7 per cent. dividend, and make a substantial addition to surplus. Referring to business conditions in the past year, particularly as affecting the purchases of the railroads, President E. B. Leigh says that in the first half of 1910 the company secured a fair volume of busi-

ness; that in the second half the attempt of the railroads to increase freight rates precipitated a bitter controversy, "the immediate and continuing effect of which was and has been to cause great conservatism on the part of railroad managers with a very marked curtailment of purchases, a condition which still exists."

A New Underwood Power Bender and Straightener

A new power bending and straightening machine has been placed on the market by H. B. Underwood & Co., 1026 Hamilton street, Philadelphia, Pa. This machine will handle a variety of work, and will not only bend various kinds and sizes of pipe, structural shapes and round and flat bars, but will also straighten material quickly and very effectively. One of its special features is that instead of requiring a number of dies and formers it is only necessary to have sets for the different diameters. These can be set in different positions, and enable a great variety of shapes and radii of bends to be secured.

The machine is belt driven, and has tight and loose pulleys requiring no countershaft. It is declared to be more economical than a machine driven by compressed air, and is not limited to use where a supply of air is available. The machine is not complicated, and little skill is required to operate it. As the bend proceeds the stock is moved along, and the hand wheel, controlling the movement of the bending ram, turned. It is possible to bring a large amount of power to bear on the work. A powerfully back geared eccentric shaft having a small throw and moving with a fixed stroke actuates a reciprocating ram in which slides a second ram carrying the former to be used; its movement is controlled by the hand wheel operated screw. In this way a very fine means of adjustment is secured, and the work can be bent exactly to the required curvature. This hand wheel adjustment also facilitates producing duplicate work, as any number of pieces can be bent exactly alike by returning the hand wheel to the same position each time. The formers or resistance studs on each edge of the bed slide in a T-slot, and others are cut across the bed so that the formers can be fastened in very many different positions. In bending



A New Power Bending and Straightening Machine for Pipe, Bars and Flats Built by H. B. Underwood & Co., Philadelphia, Pa.

pipe in this machine the former follows up the work and exerts a little more pressure at each succeeding stroke, an arrangement which is more effective than a sudden bend or trying to shape the piece at one stroke. The machine is said to be equally effective for straightening bent work and pieces of pipe which have been bent into various complicated shapes have been easily and quickly straightened.

The Rogers-Brown Iron Company is sinking a concrete shaft at its Rogers mine at Iron River, Mich. The company has also removed 2,500,000 cubic yards of overburden from its Susquehanna mine at Hibbing, Minnesota, leaving 4,500,000 cubic yards still to be removed.

The Five New Merchant Mills at Gary

Details of a Notable Group of Electrically Driven Mills of the Indiana Steel Company,
Each with a Capacity Above 100,000 Tons a Year

In keeping with the advanced construction exemplified in all that has been built at the Gary Works of the Indiana Steel Company, there is nearing completion at Gary a modern arrangement of five merchant bar mills for the production of small structural shapes, special shapes and merchant bars of various kinds required by the merchant trade. Following the policy of the company in the construction of previous mills, all of the machinery is driven by electric motors. Thus the loss by leakage of hydraulic systems and the low efficiency due to the transmission of liquids through numerous pipes are avoided; also the installation of steam boiler plants for the operation of engines, the company planning to have enough power from the gas engines using blast furnace gas to furnish all necessary current for the operation of the motors. The mills are compactly arranged in order to facilitate handling raw material and the disposal of the finished product. Fig. 1 gives a general plan view.

The merchant bar mill plant consists of five mills of the following sizes: 18-in., 14-in., 12-in. Nos. 1 and 2, and 10-in. No. 1. Each mill will have a capacity of 8000 to 12,000 tons per month. The sizes to be rolled will include everything from 6-in. I-beams down to 1/2-in. bars, for which billets of a wide range of sizes are available from the billet mill located at these works, described in *The Iron Age* of October 21, 1909, p. 1226. The billets for these various mills are stored in the billet and bloom storage yard at the east end of the mills, this yard being served by two overhead traveling cranes of 20 tons capacity each and 102 ft. span, equipped with trolleys having two hooks and built by the Alliance Machine Company, Alliance, Ohio.

Billet Handling and Heating

For the 18-in. and 14-in. mills, the billets are deposited near the west crane runway of the billet storage yard crane in a space between two crane runway extensions for the billet crane running into the mill. Thence they are taken by small cranes, equipped with magnets, running under the west girder mentioned above and carried into the mill and placed on the skids of the billet pushers. These latter are self-contained pushers, built by the American Sheet & Tin Plate Company in its roll and machine department and are located entirely outside of the furnace and have skid rails, upon which the billets are laid until the pusher is put in operation when, by means of heavy dogs driven by motor-driven gearing working in a rack, all the billets on the pusher and those in the furnace are forced to move ahead. The billets are fed into the furnace by these pushers through end doors and pass through the furnace on water cooled skid pipes, dropping out at the opposite end through doors on the roller tables which carry them to the mill to be rolled. The re-heating furnaces for the 14-in. and 18-in. merchant mills are of the recuperator type with chambers below the furnace, in which are placed cast iron U-pipes set into cast iron base castings. Through these recuperators the air for the furnace is forced by high pressure blowers. These furnaces have flat roofs set at an incline and composed of special fire brick tile resting on water cooled pipes which are supported by means of hangers. The furnaces are 17 ft. wide inside to accommodate billets 15 ft. long, the length of the furnaces being 46 ft. 6 in. The furnaces are heated with producer gas made in gas producers furnished by the Morgan Construction Company.

The 18-In. Mill

The 18-in. mill, Fig. 2, consists of seven stands of rolls—five two-high and two (Nos. 5 and 6) three-high. Trains 1 to 6 are driven by a 3200-hp. Westinghouse in-

duction motor, three phase, 25 cycle, 6000 volts, 3000 alternations per minute, running at 93.8 rev. per min., synchronous speed. The drive is effected by means of bevel gears. Train No. 7 is driven by a 650-hp. Westinghouse induction motor, three phase, 6000 volts, 3000 alternations per minute, running at 187.5 rev. per min., synchronous speed, this motor also driving by means of gearing the vertical roll stand which is used for edging flats when desired.

These stands of rolls are arranged so that the pieces being rolled will not be operated on by more than one stand of rolls at a time. This is accomplished by having a sufficient space between stands, with roller table to carry the pieces from one stand to the next. The roller tables are driven by General Electric Company mill type motors. The first four passes are through two-high mills and the fifth pass through a three-high mill, train No. 5. Coming out of the upper pass of train No. 5 the bar goes up an inclined chute equipped with rollers and returns through the lower pass running back to another three-high stand—No. 6—and then back towards the furnaces, when it is reversed in direction again. It now goes through the lower pass of train No. 6, and then on through the edging rolls if flat material (except when it is desired to edge the flats by turning them up and edging through some of the horizontal rolls) and through the ninth pass—train No. 7—and from there on out to the hot runout table of the cooling beds. The speeds of the bars through the various trains are as follows:

	Feet per minute.		Feet per minute.
Train No. 1.....	145.2	Train No. 6 (passes 7 and 8).....	692.5
Train No. 2.....	187.8	Train No. 7 (the 9th pass).....	748.0
Train No. 3.....	268.3		
Train No. 4.....	352.5		
Train No. 5 (passes 5 and 6).....	521.0		

These speeds are based on the synchronous speed of the motor, the full load speeds of the motor being 91 rev. per min. for the 3200-hp. motor and 182 rev. per min. for the 650-hp. motor. The motor drive, mills and roller tables for the 18-in. mill were built at the Pencoyd works of the American Bridge Company, this company also providing the same equipment for the 14-in. and both 12-in. mills.

The cooling beds for the 18-in. and 14-in. merchant mills are flat beds about 150 ft. long, with a width from center to center of cold runout tables of 45 ft. 7 in., with rails for the rolled shapes to rest on, the bars being pushed off from the hot runout table by a long straight edge, which alternately pushes them to the sides of the cooling beds. After cooling they are carried over to the runout tables at the sides of the cooling beds by means of the cold pull dogs. When angles are being rolled, they are passed through roll straighteners and then pass on to the bar shears in the distributing building. When sections are being rolled which cannot be straightened in the angle straightening machines, the latter are pulled back out of the way to one side and the space they had occupied is filled with short tables. The bar shears in the distributing building are of the open type with 30-in. knives and about 3 1/2-in. stroke, designed and built by the Morgan Construction Company. Following the bar shears are the 60-ft. gauge tables, also designed and built by the Morgan Construction Company. These have adjustable gauges for cutting the pieces to length. The pieces are then pushed off from the shear gauge tables into cradles alongsides which are placed on two, 30-ft. platform scales of 30 tons capacity each, arranged so that stock 60 ft. long may be weighed as it is cut off. For channels, I-beams and any sections which cannot be sheared to advantage, provision is made for cutting them with cold saws which are located beyond the tables following the

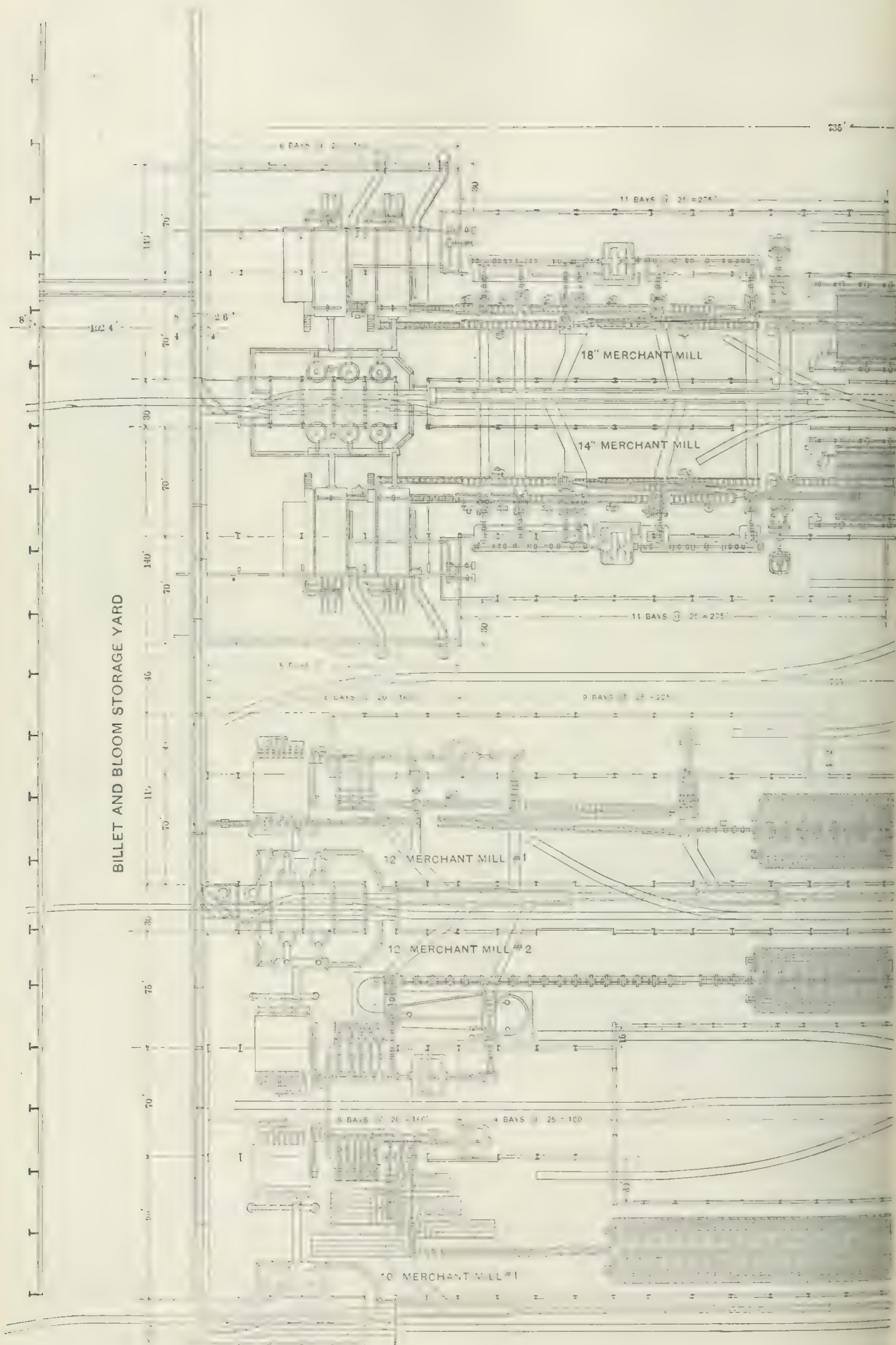
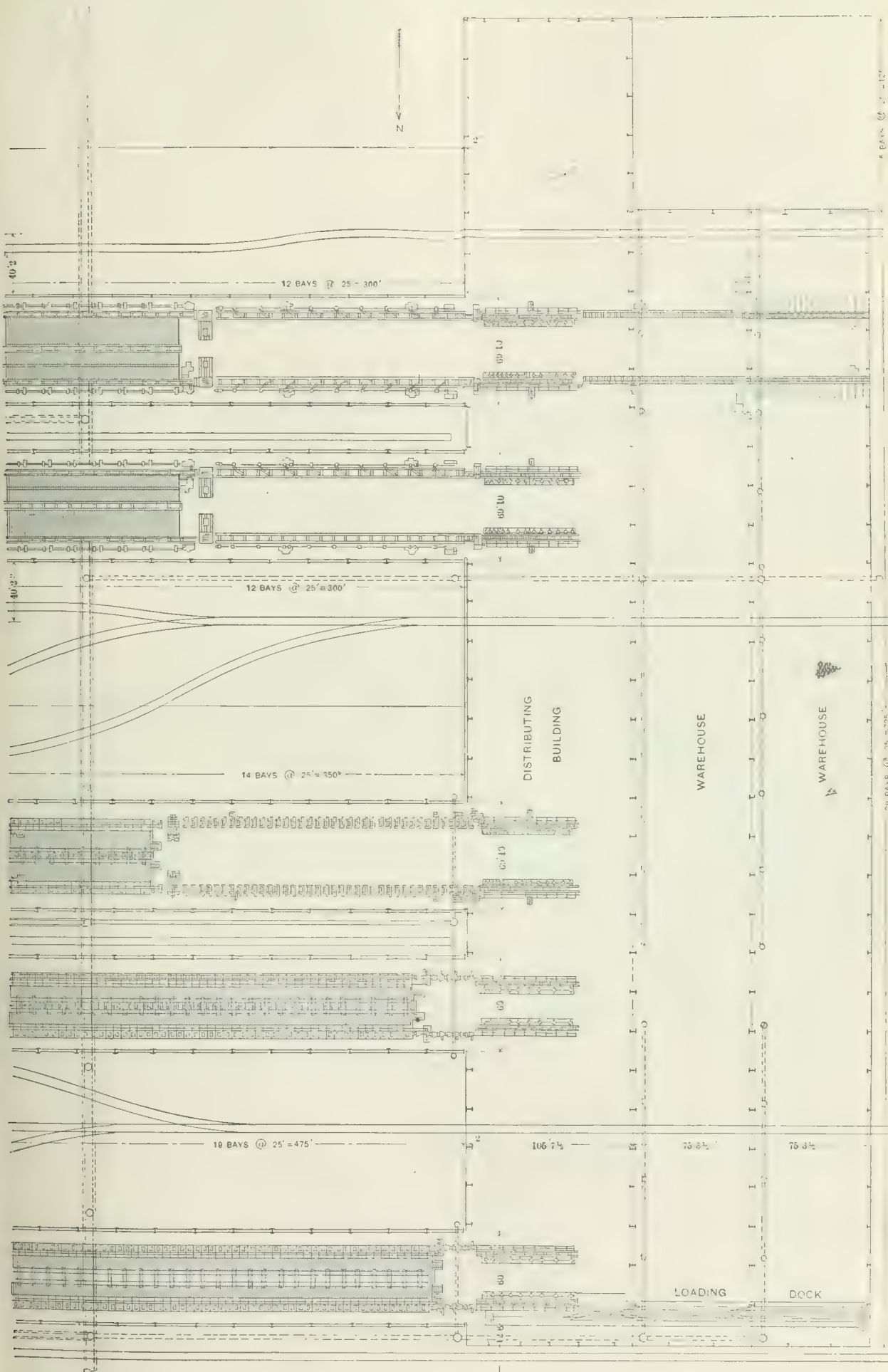


FIG. 1 — GENERAL PLAN OF THE FIVE NEW MERCHANT



MILLS OF THE INDIANA STEEL COMPANY, GABY, IND.

bar shear gauge tables. The 18-in. mill is served by a 30-ton crane, 36 ft. 6 in. span, in the motor room; one 20-ton crane, 66 ft. 6 in. span, in the main building, and one 10-ton crane, 42 ft. span, for handling the billets in the furnace building—all furnished by the Alliance Machine Company.

14-In. Merchant Mill

The 14-in. mill, Fig. 3, is practically the same as the 18-in. mill, only the opposite hand to the 18-in. mill, and arranged to run on lighter sections. The speeds of the passes are somewhat different, being as follows:

	Feet per minute.		Feet per minute.
Train No. 1	149.8	Train No. 5	594.8
Train No. 2	199.4	Train No. 6	687.7
Train No. 3	279.7	Train No. 7	685.8
Train No. 4	343.9		

Motor speeds are the same as those for the 18-in. mill. In addition this mill is provided with straighteners designed and built by the Brightman Mfg. Company for

rollers. The furnace for the 12-in. mill No. 1 has a width of 33 ft. to accommodate billets 30 ft. long. The inside length of the furnace is 34 ft. 11½ in. The roof of this furnace is unlike that of the furnaces of the 14-in. and 18-in. mills, being level instead of inclined. It is composed of special fire brick tile, supported by water cooled pipes similar to the 14-in. and 18-in. mills. These water cooled pipes are carried by means of hangers to a heavy supporting structure above the furnace. The roof structure is designed with an excess of strength so that it will not fail through weakening of the members on account of the heat of the furnace playing on the roof structure, causing the falling out of some of the roof tile.

The recuperator principle is adopted here the same as for the 14-in. and 18-in. furnaces, but the 12-in. mill furnaces have side doors at both ends instead of end doors. After the billets are pushed into the furnace on the water cooled rollers, they slide on water cooled skid pipes to the other end at which point the skid pipes are bent downward, going through the bed of the furnace.



Fig. 2—View in 18-In. Merchant Mill Looking from East End.

straightening large round bars. The 14-in. mill is equipped with one 30-ton crane, 36-ft. 6-in. span, located in the motor room; one 20-ton crane, 66-ft. 6-in. span, located in the main mill building; one 10-ton crane, 42-ft. span, for handling the billets in the furnace building. A view of the latter is given in Fig. 4.

12-In. Merchant Mill, No. 1

The 12-in. mill No. 1 is arranged somewhat similar to the 18-in. mill as will be noted by an inspection of the drawing. In this case, however, the billets to be rolled are deposited upon double billet skids, Fig. 5, located in the billet and bloom storage yards, and as they are needed are pushed down on a roller table between the two sides of the billet skids. The roller tables between the billet skids delivering the billets to the side of the furnace were made by the United Engineering & Foundry Company, Pittsburgh. The billets are carried in through side doors in the furnace which is provided with water cooled rollers inside between the bars of the billet pusher. This billet pusher was built by the Morgan Engineering Company, Alliance, Ohio, and differs from those in the 14-in. and 18-in. mills in that, while the principal parts of the pusher are outside of the furnace the billets are forced ahead by means of rams or bars which pass through the end of the furnace between the water cooled

The billets slide over the curved ends of the skid pipe on a bed of fire brick at a slightly lower elevation than the skid pipes. A push bar between pinch rollers forces them far enough out on the mill side so that they enter another set of pinch rollers which drags them out of the furnace. On the mill side of the furnace there is located a small billet shear built by the Morgan Engineering Company, Alliance, Ohio, which is for the purpose of cutting the billets into shorter lengths than the full length at which they are handled in the furnace. This is done in order that the final product going through the mill will not be too long to be handled on the cooling bed when rolled into small sections. This billet shear is driven from the end of the motor drive shaft, and a clutch is thrown in whenever it is desired to make a cut. A similar billet shear is provided at the furnaces of the 12-in. mill No. 2 and the 10-in. mill No. 1. The motors driving the 12-in. merchant mill No. 1 consist of one 2000-hp. Westinghouse induction motor, three phase, 25 cycle, 6000 volts, 3000 alternations per minute, running at 112 rev. per min., full load speed; and a 650-hp. Westinghouse induction motor, three phase, 25 cycle, 6000 volts, 3000 alternations per minute, running at 182 rev. per min., full load speed. The first rolling operations are performed in a continuous mill of four stands of 14-in. rolls, following which there are two two-high stands of 12-in.

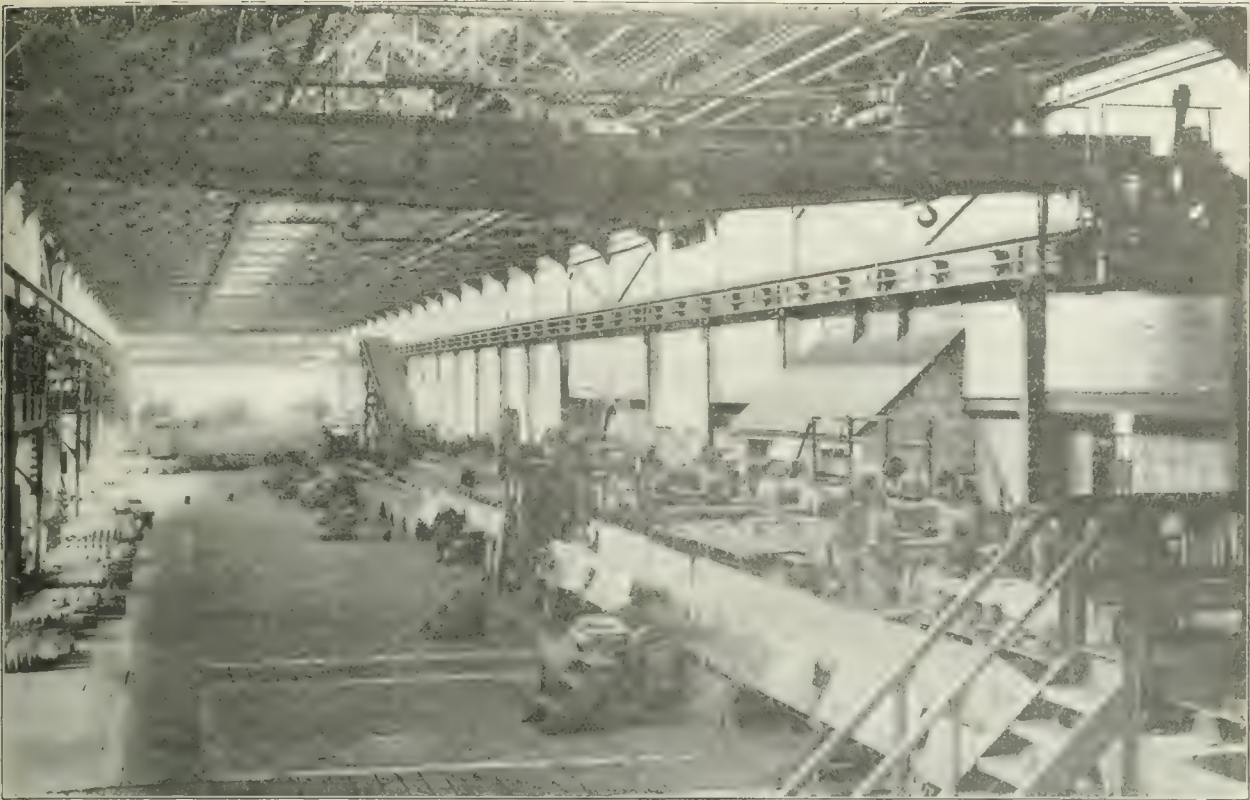


Fig. 3.—View in 14-In. Merchant Mill Looking from the East End.

rolls and one three-high stand of 12-in. rolls, driven by the 2000-hp. motor which also drives the continuous mill of four stands; and one two-high stand and one three-high stand which are driven by the 650-hp. motor. The speeds of the various passes are as follows:

	Feet per minute		Feet per minute.
Train No. 1.....	123.4	Train No. 6 (6th and 7th	
Train No. 2.....	175.5	passes).....	477.0
Train No. 3.....	230.5	Train No. 7 (8th and 9th	
Train No. 4.....	329.0	passes).....	671.5
Train No. 5.....	434.0	Train No. 8 (10th pass).....	715.0

These speeds are based on the full load speed of the motor. The pieces being rolled in the sixth and seventh passes of train No. 6 go out on an elevated inclined chute fitted with motor-driven rollers, as is done in the 18-in. mill, and then go back alongside the furnace and up another inclined chute fitted with idle rollers. Returning they go through the ninth pass—train No. 7—and on

through the tenth pass—train No. 8—and then on the hot runout table to the cooling bed. The cooling bed is flat, of the shuffle bar type, designed and built by the Morgan Construction Company. Its length is 180 ft. and the width from center to center of cold runout tables, 44 ft. 7 in. As the bars are shuffled off to the side of the cooling bed, assembling bars push them together so that several bars may be arranged side by side to go to the bar shears to be cut in multiple. The bar shears, gauge tables and cradles are similar to those in the 14-in. and 18-in. mills. The 12-in. mill is also provided, like the 14-in. mill, with angle bar straighteners, which may be pulled back out of the way and in their place may be put a bar straightener of the Brightman Mfg. Company's design for straightening rounds as is done in the 14-in. mill. The 12-in. mill No. 1 is served with one 30-ton crane, 36-ft. 6-in. span, located in the motor room; one 15-ton crane, 66-ft. 6-in. span, located in the main building, and one



Fig. 4.—East End of 14-In. Mill, Showing Heating Furnaces

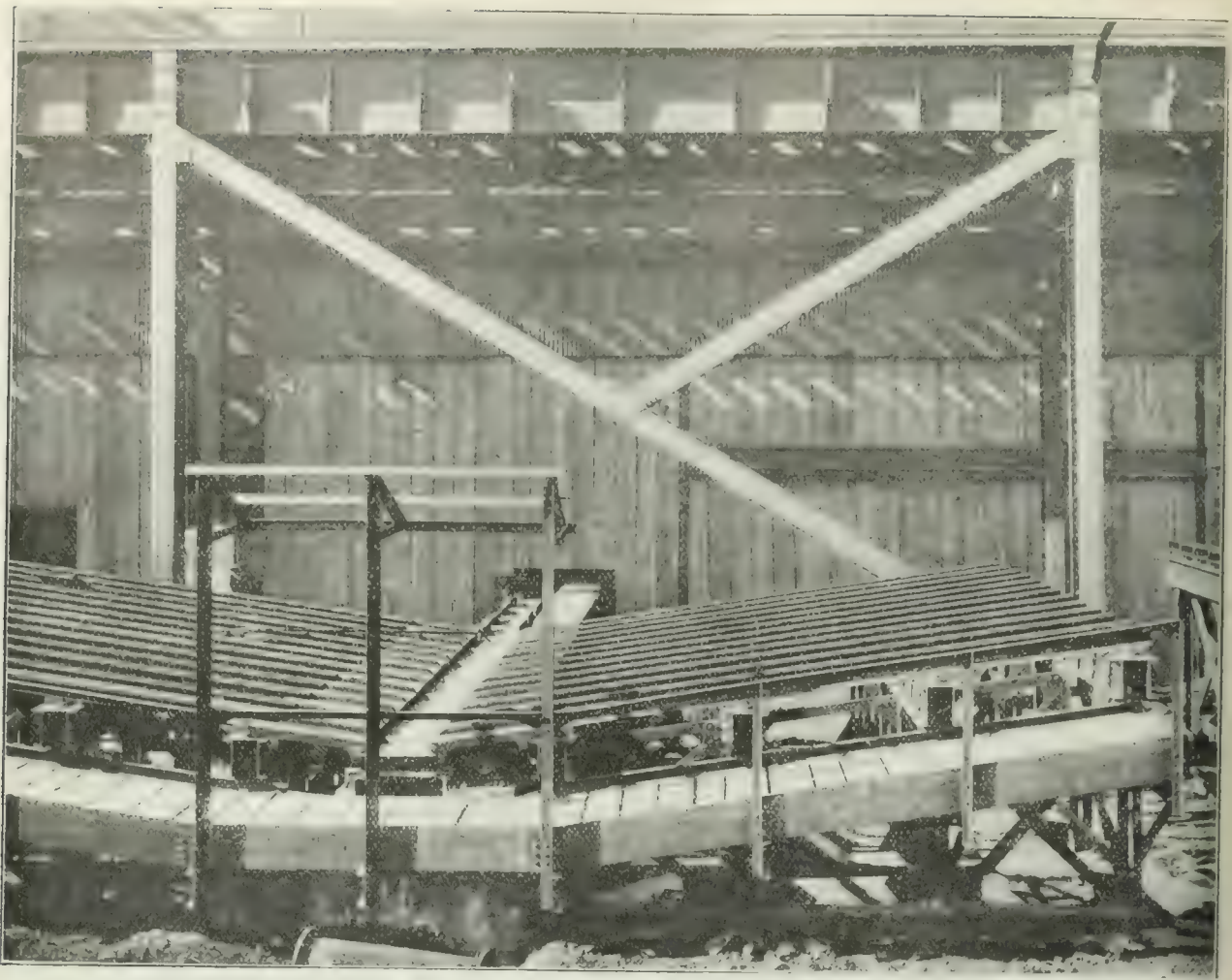


Fig. 5.—Yard Skids on Which Billets Are Pushed Down for Conveying to Heating Furnaces of 12-In. Merchant Mill No. 1. Similar Double Skids Are Provided for 12-In. Mill No. 2.



Fig. 6.—Cooling Beds, 12-In. Merchant Mill No. 2.

5-ton crane, 26-ft. 8-in. span, for handling the scale and ashes between the buildings of 12-in. mills Nos. 1 and 2.

12-In. Mill No. 2

The 12-in. merchant mill No. 2 differs from the 12-in. mill No. 1 in that it has two repeaters which are used instead of reversing the direction of the bars in the course of rolling. The furnace for the 12-in. mill No. 2 is the same as that for the 12-in. No. 1 mill, only built the opposite hand. The billets are fed to the furnace from billet skids in the billet and bloom storage yard in a manner similar to that in the No. 1 mill. The motor drive for the 12-in. mill No. 2 consists of one 2500-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, designed to run at two speeds, 92 rev. per min. and 113 rev. per min., full load speed.

handling the same length of billets, 30 ft. Instead of the billets being carried on water cooled rollers inside the furnace, there is a water jacketed pinch roller at the entrance to the furnace which forces the billets to slide lengthwise over water cooled skids between the bars of the pusher. The billets to be handled in this furnace will come from the billet skids in the billet and bloom storage yard, similar to those used at the 12-in. mills Nos. 1 and 2. The motor drive for 10-in. mill No. 1 consists of one 2000-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, running at 133 rev. per min. and 162 rev. per min. full load speed. The roughing train is a continuous mill consisting of six stands of 12-in. rolls. The main rolls and the concrete runways are shown in Fig. 8. Following the roughing train, the bars go to the 10-in. trains between the

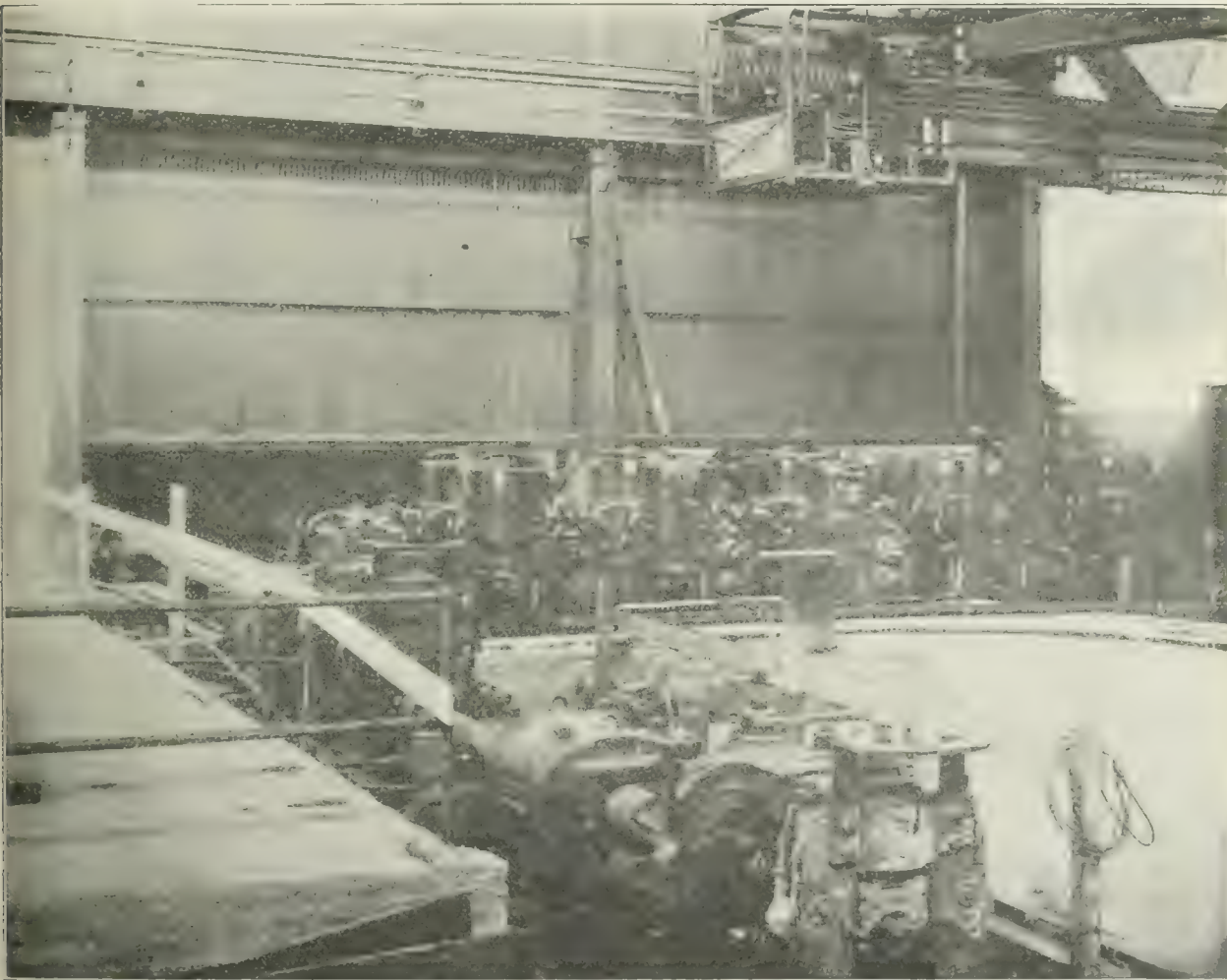


Fig. 7.—Main Rolls of 12 In. Merchant Mill No. 2

The roughing train is a continuous mill consisting of five stands of 14-in. rolls, while the balance of the trains are fitted with 12-in. rolls. The main rolls are shown in Fig. 7. The bars after passing through the five roughing stands go to the sixth stand; then through the repeater to the seventh stand; back to the eighth stand; through the other repeater; then to the ninth stand and on the hot runout table leading to the cooling bed (Fig. 6), which is 350 ft. long and 36 ft. 3 in. wide from center to center of cold runout tables. It is of the same type as that in the 12-in. mill No. 1, designed and built by the Morgan Construction Company. From the cooling bed in 12-in. mill No. 2, the bars run out to similar bar shears and gauge tables to those following the No. 1 mill.

The 12-in. mill No. 2 is served by one 15-ton crane, 71-ft. 6-in. span in the main building and one 5-ton crane, 56-ft. 6-in. span, in the motor room between 12-in. mill No. 2 and 10-in. mill No. 1.

10-In. Mill No. 1

The 10-in. merchant mill No. 1 is partly a hand mill. The furnace is similar to those in 12-in. mills Nos. 1 and 2 except that it is shorter, being only 27 ft. 4 in. long, but

looping floors 1, 2, 3, 4 and 5, for as many passes as are required for the section being rolled, after which they pass on to the hot runout table leading to the cooling bed, which for the 10-in. mill No. 1 is 450 ft. long and 36 ft. 3 in. wide, center to center of cold runout tables. This bed is also of the Morgan Construction Company's flat shuffle bar type, similar to that in the 12-in. mills Nos. 1 and 2. The 10-in. mill is also equipped with bar shears and gauge tables similar to those in the other merchant mills. The cutting off machine in this mill is shown in Fig. 9. The speeds of the bars through the various trains of the 10-in. mill No. 1 will be as follows, based on the full load speed of the motor driving the trains:

	Feet per minute.		Feet per minute.
Train No. 1...	77.2 and 93.8	Trains Nos. 7	
Train No. 2...	101.4 and 120.6	and 8.....	521.0 and 636.0
Train No. 3...	132.5 and 161.0	Trains Nos. 9	
Train No. 4...	198.5 and 248.0	and 10.....	672.5 and 822.0
Train No. 5...	273.8 and 344.5	Trains Nos. 11	
Train No. 6...	406.0 and 494.0	and 12.....	682.0 and 834.0

The 10-in. mill No. 1 is served by one 15-ton crane, 86-ft. 6-in. span in the main building, and one 5-ton crane, 56-ft. 6-in. span over the cooling beds. The motor drive,



Fig. 8. View of Main Rolls of 10-In. Mill, Showing Concrete Runways

mills and looping floors for this mill were furnished by the United Engineering & Foundry Company of Pittsburgh.

Gas Producers

The furnaces for the 12-in. mills Nos. 1 and 2 and the 10-in. mill No. 1 are heated with producer gas made in gas producers furnished by the Wellman-Seaver-Morgan Company. Two producers are provided for each furnace. The coal for feeding the gas producers of all the merchant mills is transferred on an elevated coal track by narrow gauge dump cars of special design drawn by an electric locomotive, which brings the coal from the coal crushing and elevating plant south of the axle mill and deposits it in elevated coal bins alongside of the gas producers.

In all of the merchant mills the scale from the roll trains is washed away from the mills in scale trenches to scale pits which are outside of the buildings, from which the scale is removed by means of bucket cranes over the scale pits and placed on cars.

All of the large motors driving the trains of the merchant mills are placed in separate motor rooms to remove them from the mill dust, the electrical controlling appara-

tus being installed in the same motor rooms. An elaborate system of railroad tracks is provided for entering all mills for the purpose of handling the billets to be rolled and the finished product, also machinery needed for repairs or replacements.

Warehouses and Distributing Buildings

In the warehouses and distributing building at the end of the 10-in. mill there is provided a loading dock with small narrow gauge cars running on tracks elevated to the level of standard gauge car platforms. This loading dock is for the purpose of loading box cars with small material. The warehouses are equipped with several bar shears and straighteners for making up orders of short stock, regardless of the mill in which it is rolled. These are placed in various parts of the warehouses and distributing building to facilitate the handling of material. The distributing building and the warehouse are not for the laying up of stocks of material to be cut for miscellaneous orders so much as they are intended to be an avenue of distribution for the mill products that will enable the prompt delivery to freight cars of all material rolled as fast as the mills turn it out. Only that material

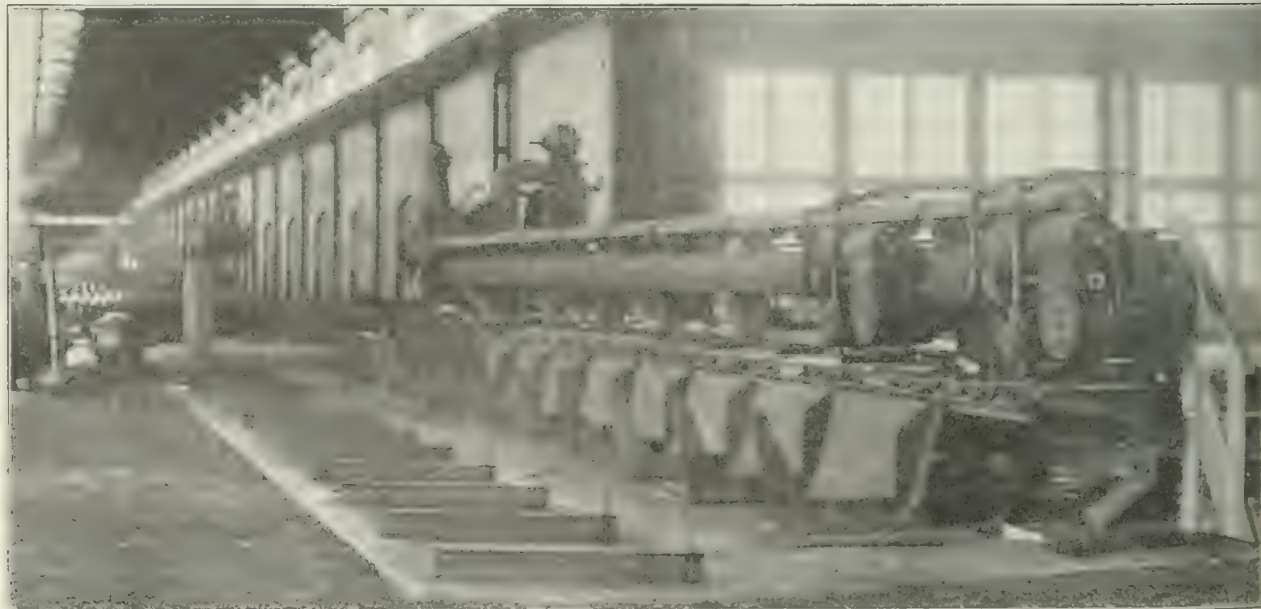


Fig. 9.—Cutting-off Machine in 10-In. Mill.

will be allowed to remain on hand in the warehouses which is being held for carload shipments or the over-rolling of an order giving an excess production of that particular stock.

Tie Plate Department

At the south end of the distributing building there is an extension which is used for the cutting and punching of tie plates. This is arranged with skids for receiving the bars from the mill and is provided with four combination punches and shears, designed and built by the Long & Allstatter Company, Hamilton, Ohio. These are arranged to punch one tie plate at the same time cutting off another one which has been punched, thereby making a tie plate complete at one stroke of the machine. The distributing building is equipped with five 20-ton cranes, 102-ft. span, and the warehouses are each equipped with two 10-ton cranes, 71-ft. 9-in.-span.



A New Charcoal Pig Iron for Chilled Car Wheels

A recent pamphlet of the Superior Charcoal Iron Company, Grand Rapids, Mich., is devoted to that company's Special charcoal pig iron and its uses, particularly in the manufacture of high grade cast iron car wheels and of chilled rolls. The results from the use of Lake Superior charcoal iron in car wheels in the period of 1870-1885 are referred to in a discussion of the present day demand for a car wheel of cast iron that will stand all conditions of service under 100,000-lb. capacity cars. The company set out to produce charcoal iron which would be not only like that of the early days but be able to carry the scrap wheel of to-day, "a scrap wheel inferior in quality to the scrap wheel of 1880, which was made almost entirely from charcoal iron." The result of the experiments is the Special charcoal pig iron now made at Marquette, Pioneer, Excelsior and Antrim furnaces in Michigan. In the chilling grades this iron is spoken of as very uniformly close grained in structure and of fine grained chilling quality. The grades No. 3 and 4 give transverse tests from 22,000 to 28,000 lb. on a 2-in. square bar broken 12 in. between supports, and tensile tests from 30,000 to 38,000 lb. per square inch, according to grade. The grading card of these irons is as follows:

Non-Chilling Open Grain Iron.

Grade.	Silicon.		
	Minimum. Per cent.	Average. Per cent.	Maximum Per cent.
A Scotch.....	.238 and over.		
B Scotch.....	.213	2.25	2.37
C Scotch.....	.188	2.00	2.12
Low 1.....	.163	1.75	1.87
High 1.....	.138	1.50	1.62
Low 2.....	.113	1.25	1.37
High 2.....	.075	1.00	1.12

Chilling Close-Grained Iron.

Grade.	Approximate average.		Silicon. Per cent.
	Chill.		
Low 3.....	Trace to ¼ in.		.075
High 3.....	¼ to ½ in.		.056
Low 4.....	½ to 1 in.		.044
High 4.....	1 to 1½ in.		.035
Low 5.....	Low mottled.		.025
High 5.....	High mottled.		.015
6.....	Clear white.		.010
Phosphorus .....			.015 to .022
Manganese .....			.020 to .060
Sulphur .....			.0015 to .0025

Phosphorus in higher percentage can be supplied if desired.

While the chilling irons are graded entirely by fracture grain and chill, chemical analysis is made on each shipment, the phosphorus, manganese, silicon and sulphur content being marked on each invoice. The company makes the following observations as to the use of manganese in car wheel manufacture and the ends aimed at in the production of its Special pig iron:

Up to the year 1880 the use of manganese had never occupied any particular place in car wheel practice except as it was found in charcoal pig iron. As previously stated, it took some years to bring the use of ferromanganese into general practice, but, as this increased from year to year, together with the elimination of charcoal iron from many wheel mixtures, its influence

became more and more apparent, its effect being more in evidence after the introduction of 50-ton capacity cars, and which exercised a powerful influence on the life of the chilled wheel.

The effect of the use of ferromanganese on the crystalline structure is very marked, particularly when in combination with high proportion of other elements: high sulphur with manganese effecting a combination which produces a coarse chilled crystallization, which can be readily separated under distinct lines of cleavage, and which, under excessive heating and cooling due to brake service, causes cracking and disintegration of tread and flange.

The strength of the ordinary cast iron wheel of to-day is dependent entirely on the use of ferromanganese, and with its use there is no difficulty in meeting the "M. C. B." Specifications of "drop" and "thermal" tests. But while strength can be maintained with the use of ferromanganese, its effect on chill structure becomes more marked with every re-melt, so that it is safe to say that with the present method of manufacture the cast iron car wheel is deteriorating in quality, and, if this is continued, it will undoubtedly lead to the point where it will pass out of use for heavy equipment. If the railroads wish to establish the very best cast iron wheel for heavy equipment, something more must be done than adhere to the "M. C. B. Specification" and the lowest competitive price. In the manufacture of Special pig iron, its strength is obtained with manganese reduced to a minimum, and with its fine chill structure, in which the cleavage feature is also reduced to a minimum, it is possible, with a good percentage of this iron and selected old wheels that have stood service, to produce wheels of sufficient strength to greatly exceed all required tests without the use of ferromanganese, and establish the fine, well knit chill structure that will stand service. But it must be obvious that wheels made in this way will cost more than the ferro-made product.

For a number of years the opinion was quite general there was not sufficient high grade charcoal iron available to change the method of making wheels. This opinion is not warranted by the facts. If demand is made upon charcoal iron makers for the high quality indicated in Special iron, to the extent of breaking away from the "ferro" wheel for heavy equipment, the railroads will find them equal to the occasion: as with the vast iron ore resources of Lake Superior and the immense tracts of cordwood lands in absolute control, the Special iron can be supplied in quantity to meet such demand for many years to come. The manufacture of Special charcoal pig iron calls for high order of furnace management; a careful selection and preparation of uniform ores; the reconstruction of furnace lines and a radical change in furnace manipulation.

Special iron is also brought to the attention of chilled roll makers, as being high grade material for their product. The general reduction in the production of cold blast irons, and the diminishing production of Southern charcoal pig iron, must soon make it necessary for roll makers to look for such material elsewhere.

For the manufacture of gas and steam cylinders the close grained structure of Special iron will produce dense castings of medium hardness that will machine to a fine finish. Also in ordinary foundry mixtures where additional strength is desired without disturbing the usual mixture, we recommend the use of our Special irons.

The Keystone Steel Casting Company.—This company succeeds the Keystone Steel Foundry Company, Avonmore, Pa., and is capitalized at \$700,000, equally divided into preferred and common stock. A good working capital is thereby provided. Charles Biehl, Tarentum, Pa., is president; John Sauers, North Side, Pittsburgh, vice-president; and John Weilersbacher, Pittsburgh, treasurer. The concern makes a specialty of steel castings from one pound to 10 tons, and caters directly to the requirements of the Government and of mills, in which lines its castings have proved highly satisfactory. The company maintains a sales office at 431 Frick Building, Pittsburgh, and one in Washington, D. C., the latter in charge of W. S. Bishop. Improvements, including the erection of an additional acid open hearth furnace, are contemplated at a little later date. The present buildings and floor space are sufficient for its immediate needs.

Hubbard & Co., Pittsburg, manufacturers of railroad track tools, shovels, scoops, pole line material and Peirce brackets, will show their complete line of goods in booths 197-198 at the exhibit of the Railway Appliances Association to be held in the Coliseum, Chicago, March 20 to 25 inclusive. This exhibit is given in connection with the convention of the American Railway Engineering & Maintenance of Way Association. Hubbard & Co. will be represented by R. L. Mason, Jr., C. L. Peirse, Jr., B. S. Handwork and J. A. McLaughlin, Jr.

The Scott Iron & Steel Company, Pittsburgh, has increased its capital stock from \$100,000 to \$750,000.

American Rolling Mill Equipment of Hagan Furnaces

The American Rolling Mill Company, Middletown and Zanesville, Ohio, has awarded to George J. Hagan, furnace engineer, Pittsburgh, Pa., the contract to erect all of its sheet and pair furnaces, jobbing mill furnaces and annealing furnaces that constitute a large department of its new East Works, now being constructed at Middletown at a cost of about \$4,000,000. The company aims to make this plant the best of its kind in the world. No pains or expense is spared in installing machinery and furnaces that will not only maintain but still further improve the already high standard of American Ingot iron which the American Rolling Mill Company has the enviable reputation of making.

After exhaustive experiments with the American underfeed stoker at the company's Zanesville plant and careful observation of the working of this stoker at several other plants having it in successful operation, the American Rolling Mill Company decided to adopt it as the best means of heating its new sheet and pair furnaces.

Making Duplicate Automobile Parts

Some Uses of Potter & Johnston Automatic Machines for This Work

The extensive production of automobiles during the past few years has practically revolutionized the methods employed in manufacturing small gas engines. Formerly the standard line of machine tools was employed for this purpose, but now special machinery for finishing each part is demanded. The manufacturers find that employing machinery of this type not only for finishing small parts such as screws, bolts, nuts, studs, &c., but also for all classes of duplicate parts, both large and small, made from castings, drop forgings or material cut from large bar stock and parts drawn from sheet metal where a final finish is desired on some surfaces results in not only maintaining the extreme accuracy required of this class of work but at the same time reduces the production costs to a minimum.

Another feature which has made it possible to employ

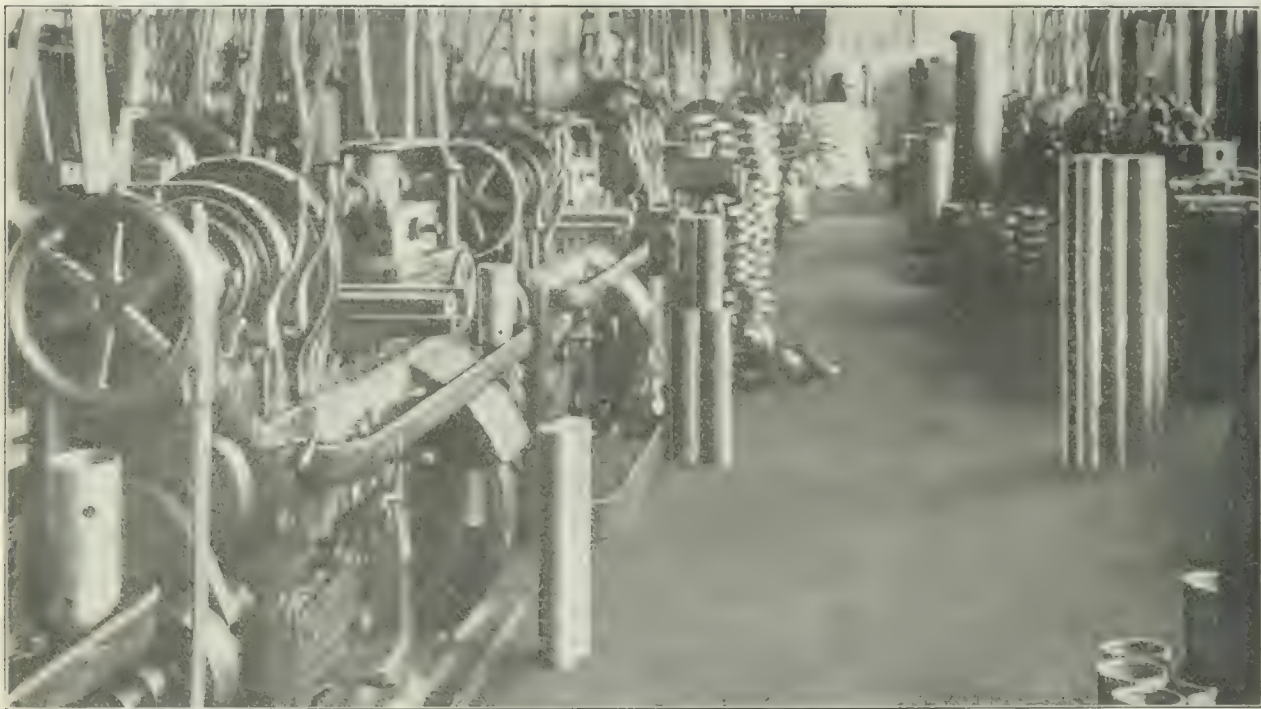


Fig. 1. View in the Plant of the E-M-F Company, Showing the Special Automatic Machines Built by the Potter & Johnston Machine Company, Pawtucket, R. I.

in which an even temperature and absence of scale are the ruling desiderata. Reduced consumption of fuel per ton of metal heated also influenced the installation of the American underfeed stoker.

The Allis continuous pair heating furnaces being installed will heat 25 per cent. of the high grade ingot iron bars rolled into sheets at the new East Works. The Allis improved hearth not only constitutes a thoroughly practical means of heating sheet bars continuously, which are charged at one end of the furnace and drawn at the other, but it also may be used to great advantage in ordinary hand manipulated pair heating furnaces, as it increases their hearth capacity about two and one-half times, which enables the bars to be thoroughly and evenly heated at sheet furnace temperatures and consequently without scaling.

The Damascus Bronze Company, Pittsburgh, Pa., is now extensively manufacturing copper containing 5, 10 and 15 per cent phosphorus. This product is made by very few concerns, and consumers will no doubt be glad to know of the above-named source of supply. The company has recently opened offices in room 506 Franklin Bank Building, Philadelphia, in charge of Maurice Joy, the territory to include the entire East. It also maintains offices in room 42 Tood Building, Louisville, Ky., in charge of the Chandler & Burgoyne Company.

automatic machinery so extensively for finishing this class of work are the great improvements made in foundry practice during the past few years that have resulted in the production of castings which were uniform both as regards quality and size. Owing to imperfections in castings and drop forgings it was not possible a few years ago to realize all the advantages resulting from the use of automatic machinery. When nickel and other alloy steels were first adopted for automobile use drop forgings made from these materials were not uniform and considerable variation in the hardness of the material was found in different parts of the same forging. The combined efforts of the steel manufacturers and the producers of drop forgings have practically overcome this difficulty and it is now possible to obtain drop forgings which conform exactly to the purchaser's analysis and that are uniform throughout when properly treated.

In a large number of automobile plants automatic and special machines are used exclusively for the production of duplicate parts. A portion of one of these plants at Detroit, Mich., the No. 1 plant of the E-M-F Company, is shown in Fig. 1. In the foreground can be seen some special automatic machines built by the Potter & Johnston Machine Company, Pawtucket, R. I., which are used exclusively for finishing pistons, several machines operating on this class of work alone. The special automatic machinery shown in the background is employed

for finishing fly wheels, brake shoes, piston rings, clutch parts, and gears of all kinds and views of the machines performing these operations are given in the remaining engravings. A cast iron fly wheel is being finished in Fig. 2; in Fig. 3 oil grooves and those for the oil rings are being cut in a piston and a piston ring is being machined in Fig. 4. Figs. 5 and 6 illustrate two operations upon clutch parts, Fig. 5, showing the rim of a clutch cone being tapered while Fig. 6 illustrates the operation of machining the drop forged hubs.

The automatic machine illustrated in Fig. 2 was especially designed for finishing the cast iron fly wheels of the smaller sizes of gas engines. A three-jaw chuck is used to hold the casting and as the gripping is done inside the rim, the wheel is completely finished at one chucking, which insures all the finished surfaces being concentric. The plan of using several cutting tools simultaneously enables work to be produced in a very short time. One of the special features of this machine is not brought out in the engraving. This is a facing and counterboring tool which operates automatically through

operation this machine is entirely automatic and the rings are completely finished, even to marking the thin point where each ring is afterward split. The step tools for cutting the rings off are brought into action when the boring and the turning has proceeded a short distance so that practically all the finishing tools are in operation simultaneously.

The method of finishing an aluminum clutch cone is shown in Fig. 5. This part has a tapered rim which when brought into action fits around the fly wheel that is attached directly to the shaft of the motor. A taper turning tool mounted directly on the cross slide is used instead of adopting the somewhat cumbersome form of taper turning tool generally employed on turret lathes for finishing work of this character. The cutting tool is fed by an arm attached directly to the turret and the spindle revolves at the high rate of speed necessary for rapid production on aluminum.

The machine shown in Fig. 6, which is employed for finishing drop forged clutch hubs, is not especially novel. At the same time the part is not large and a number of

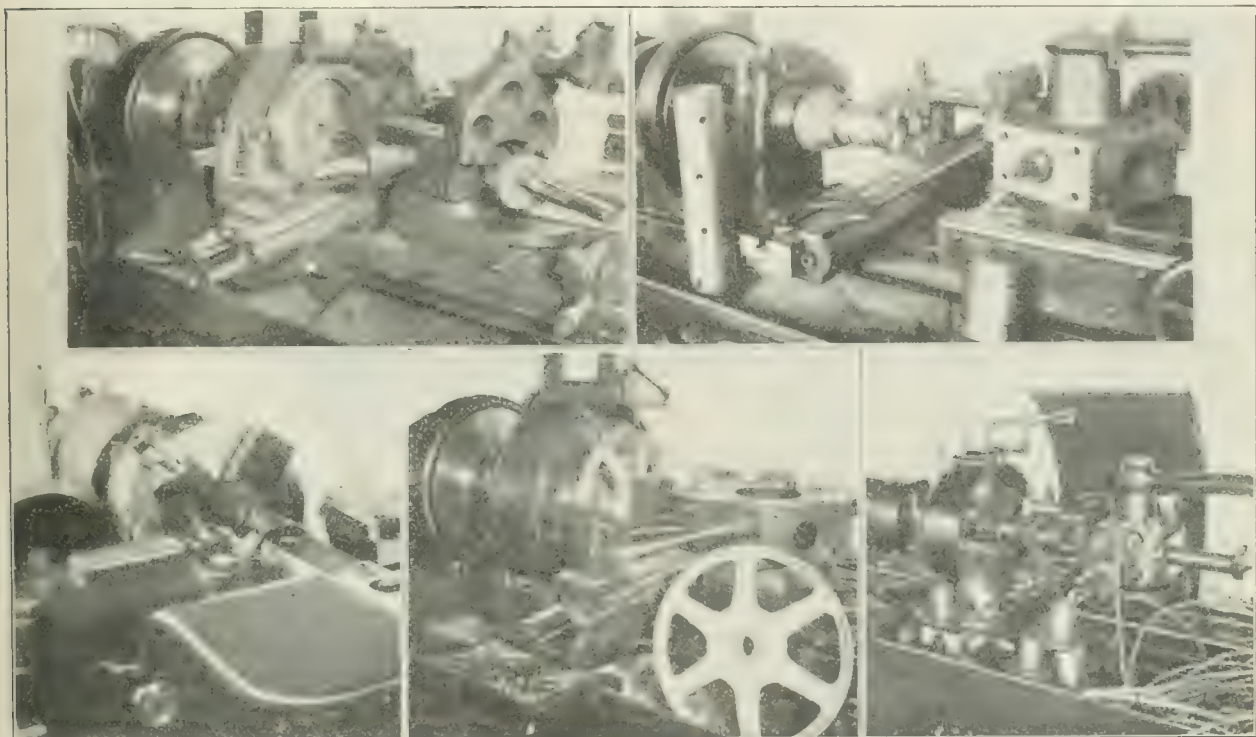


Fig. 2.—Finishing Flywheels.

Fig. 4.—Finishing a Piston Ring.

Fig. 5.—Tapering a Clutch Cone Rim.

Fig. 3.—Cutting Grooves in a Piston.

Fig. 6.—Machining Clutch Hubs.

ADAPTATIONS OF THE AUTOMATIC MACHINE FOR FINISHING VARIOUS AUTOMOBILE PARTS

the hollow spindle and finishes the side of the hub adjacent to the chuck.

An automatic machine which is especially adapted for finishing pistons is shown in Fig. 3. Before being brought to this machine, the open or crank end of the piston is faced and bored and the hole for the pin drilled. A special holding device mounted on the spindle supports the piston and the entire surface, including the grooves for the oiling rings and those for distributing the lubricant itself is finished. While this is being done the head end of the piston is being centered and when the piece leaves this machine it is ready to be mounted on the centers of a grinder for the final finishing.

Piston rings are now made from a sleeve casting having sufficient length for a number of them to be cut from one piece and a flange at one end for chucking. For finishing the rings an interesting machine of the type illustrated in Fig. 4 is extensively employed. The casting is held in an ordinary three-jaw chuck and the turning tools used are mounted on a turret. When eccentric rings are being finished this tool receives a motion of that nature which is transmitted to the spindle shaft by an arm carrying a roller running on an eccentric ring on the outside of the chuck. The turret also supports the boring bar, which is piloted by a bushing carried in the chuck, this being an efficient and rigid arrangement. In

tools mounted on the cross slide and the turret are cutting simultaneously. This feature, coupled with the automatic speed changes provided, gives the rapid production rate which is desired by manufacturers.

The George V. Cresson Company's Affairs.—Charles H. Moyer, manager of the New York office of the George V. Cresson Company, Philadelphia, and Charles G. Buchanan have been appointed receivers for the interests of the company in New York City. Webster King Wetherill, the receiver for the company in Philadelphia, will continue the business until its affairs are straightened out. The receivers have found the business in fairly good shape. The company was organized with a capital stock of \$1,000,000, of which \$306,800 in preferred stock and \$500,000 in common stock have been issued. The assets are \$1,327,270, against which there are liabilities of \$516,100, including a mortgage of \$175,000.

The Chamber of Commerce of Guthrie, Okla., is negotiating with a number of manufacturing concerns for the removal of their factories to that place, and has recently organized a company for the purpose of drilling for oil and gas which expects to commence operations within the next three months.

Iron Mining Beyond the Arctic Circle

CONCENTRATING AND BRIQUETTING OPERATIONS IN THE SYDVARANGER DISTRICT IN NORTHERN NORWAY

An Output of 1,000,000 Tons a Year—Details of a Vast Undertaking Employing in Part American Machinery

BY N. V. HANSILL.

Away north on the shore of the Arctic Ocean, where until recently only a few dilapidated huts of fishermen existed and where the great stillness of the Arctic night seldom was broken unless it were by the raging snowstorms—there one of the most gigantic iron mining undertakings of the world will soon have modified the whole appearance of the country. It was, perhaps, a trading post to which Laplanders from the inland fjelds came with their herds of reindeer or where a whaling schooner would seek refuge; otherwise, it rarely had communication with the outside world.

The change has come quickly. In 1902 exploration parties prospecting for copper discovered vast iron ore deposits on the peninsula between the two fjord arms at Sydvaranger. The place is in the northern extremity of Norway. In 1904 Aktieselskabet Sydvaranger was formed to exploit the deposits; and when in 1910 operations were started Kirkenes, which is the new town at Sydvaranger, 5 miles distant from the mines, was already a thrifty community with 3000 inhabitants, electric light, excellent water and sewerage systems, a hotel and a number of stores, with mail steamer service twice weekly.

Location and Climatic Conditions

The only ways of reaching Sydvaranger are by one of these steamers from one of the more southerly ports of Norway or by railroad through Sweden to Narvik, the shipping port of the Kiruna ore of Sweden. From Narvik it takes four days and four nights to reach Sydvaranger, the journey carrying one through the characteristic Norwegian scenery of fjords and fjelds. On the last day of the voyage the steamer circles North Cape.

Although Sydvaranger is at so high a latitude as 69 degrees 40 minutes—not less than 220 miles north of the Arctic Circle—the climate does not impose as great hardships on the inhabitants as would be supposed. The Gulf Stream, which circles northern Norway, makes navigation possible all the year round, although it might freeze in the fjords. Against emergency the mining company keeps two ice breakers; this chiefly to satisfy the steamship companies. The monthly average temperatures are given below:

	Deg. F.		Deg. F.
January	13	July	52.7
February	10.4	August	52.5
March	17.8	September	43.8
April	28	October	41.8
May	36	November	22
June	46	December	13.3

It can be seen that the average temperature is below freezing point during seven months of the year; but it only occasionally drops as low as 30 or 40 degrees below zero. Vegetation is, of course, very sparse. Rugged birches, growing low and bushy, are nearly the only representatives of the tree group. The country is most desolate. Agriculture is impossible, and the few natives are either fishermen or nomadic Laps.

Ore Occurrence

The whole territory is covered by old eruptive rocks, chiefly granites and gabbros, which have been pressed and folded so that they are partly metamorphosed and everywhere have a stratified gneissic appearance. The ore occurs in this granitic gneiss in numerous lens-shaped

layers, with the same strike and dip as the surrounding country rock, the ore bearing territory being limited to a zone about 8 miles long in general direction from north to south and 1 to 3 miles wide. The relative locations of the various ore deposits can be seen on Fig. 1. Some of them, especially in the northern end of the field north of the little lake, Björnevand, Fig. 2, are very large—1

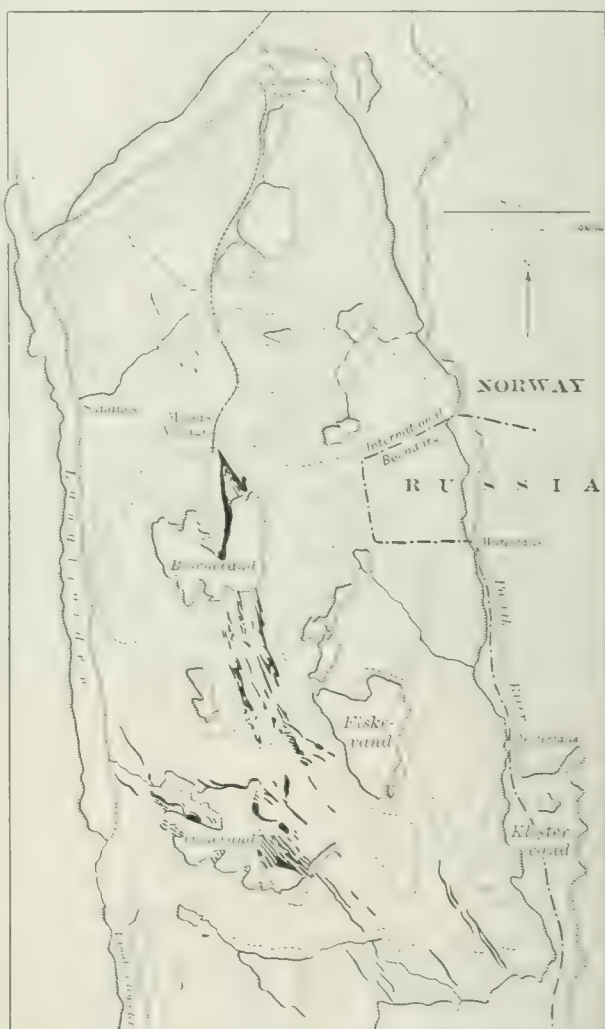


Fig. 1.—Map of the Sydvaranger Iron Ore District. Black Patches Represent Ore Deposits.

mile in length by 600 ft. in their widest parts. From this size there are all gradations down to small lenses only a few feet long. Generally the dip is very steep, being 60 to 70 degrees from the horizon.

The ore is of banded structure, consisting of narrow layers alternately high and low in iron. The richer layers consist of magnetite with some quartz and hornblende, the leaner ones of quartz with some magnetite and hornblende, Fig. 3. The banded structure is also characterized by intensive folding of the layers, Fig. 4. Here and there the ore bodies are cut by dykes of diabase or granite.

From Vogt's description of the ore occurrence most of

these notes of the geology of the field have been taken, as the snow on the ground at the time of the writer's visit prevented any examination by him. Vogt is of the opinion that the ore bodies were formed by magmatic differentiation, and that therefore some of the larger ones, which at the surface are from ½ to 1 mile long, continue to great depth, with practically the same cross section.

The ore bodies have offered greater resistance to erosion than the wall rock, and therefore generally appear in the terrain as long ridges, higher where the ore bodies are wider. For instance, the eastern branch of the V-shaped one at Lake Björnevand, Fig. 2, rises 250 ft. over the lake level, or about 500 ft. above tidewater.

The iron percentage of the ore varies between 30 and

to include that part of the deposit in the calculations. Probably over 40,000,000 tons can be excavated in open cut before it will be necessary to resort to underground mining. To the tidewater level the estimated amount of available ore is 400,000,000 tons.

In the southern part of the field at Lake Ornevand are a number of lenses of ore of higher iron content—52 to 53 per cent. Fe. To a depth of 600 ft. it is estimated that

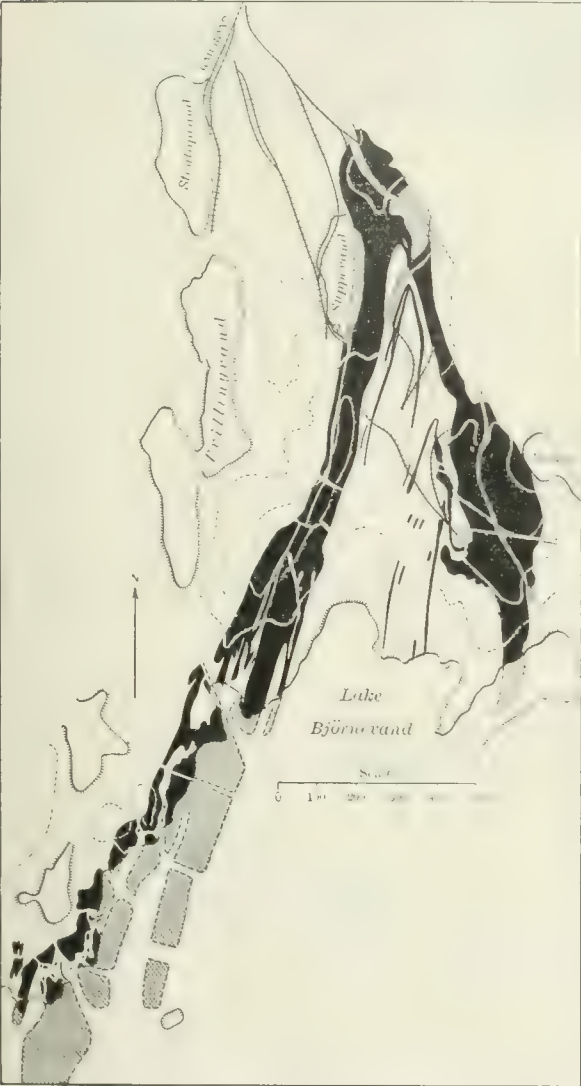


Fig. 2.—Ore Deposits North of Lake Björnevand. Enlargement of a Portion of Fig. 1.

38 per cent., but it averages 35 to 37 per cent. A complete analysis representative of the ore at Björnevand shows the following:

Fe ₂ O ₃	36.71	TiO ₂	0.08
FeO	15.40	P ₂ O ₅	0.07
SiO ₂	43.92	S	0.04
Al ₂ O ₃	0.83		
MnO	0.58	Total	99.23
MgO	1.12	Fe	37.68
CaO	0.48		

Extent of Ore Deposits

To begin with, the deposits north of Björnevand are being exploited. These are of tremendous dimensions, varying in thickness from 175 to 600 ft., the average probably being 300 ft. The ore area of this part of the field is calculated to be not less than 400,000 sq. yd., of which, however, 120,000 sq. yd. is covered by Lake Björnevand. By magnetometric survey the outlines of the deposit have been well defined. In due course Björnevand will be drained by a tunnel to the fjord, so there is no reason not

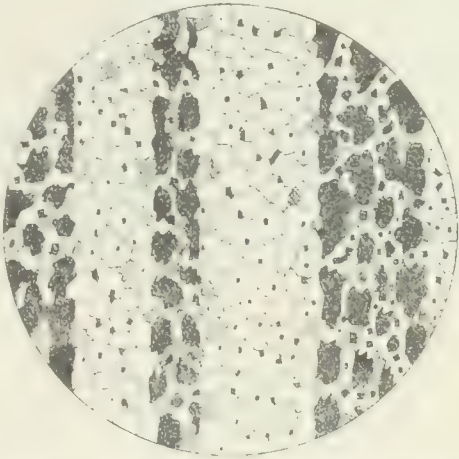


Fig. 3—Micro-section of Sydvaranger Ore. Magnified 25 Diameters. Black, Magnetite; Shaded, Hornblende; White, Quartz.

at least 4,000,000 tons of this high class ore can be mined. The distance here from the main part of the field is nearly 6 miles. It is the intention to leave this ore intact for the time being.

Mine and Mine Equipment

A general view of the Sydvaranger field is given in Fig. 5. The quarry is laid out in benches 65 ft. in high, two of which have been opened; 3¼-in. Ingersoll rock drills are used. The broken ore is loaded by two 90-ton Marion steam shovels on flat cars with loose 10-ton buckets of the Edison system. Fireless locomotives haul the ore to the preliminary coarse crushing plant, which is about 2000 ft. from the nearest opening. At intervals

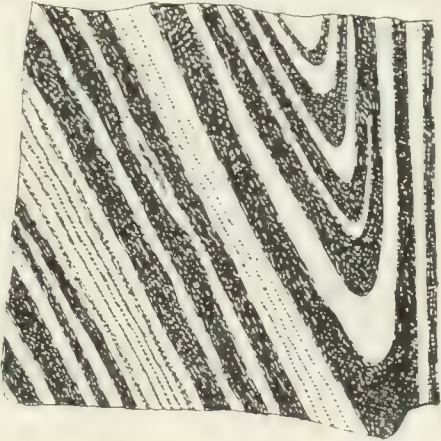


Fig. 4 Folding of Layers of Magnetite and Quartz.

the locomotives are charged from a stationary boiler plant with steam of 200 lb. pressure. With one charging they will run 21 miles. Their weight empty is 21 tons, and in operation, when the boiler is half filled with hot water, they weigh about 30 tons. The advantage in their use lies chiefly in the possibility of using cheap coal under the stationary boiler, which is of Babcock & Wilcox make, furnished with mechanical stoker. Locomotive coal at this distance from coal producing centers costs 75 to 80 per cent. more than the boiler coal they are employing. The train crew consists of only two men, the engineer and one brakeman.

At the mine's crushing plant the preliminary crushing of the ore takes place. At present there is installed here only one No. 18 gyratory crusher of Allis-Chalmers make. This is giving very satisfactory service, crushing the ore

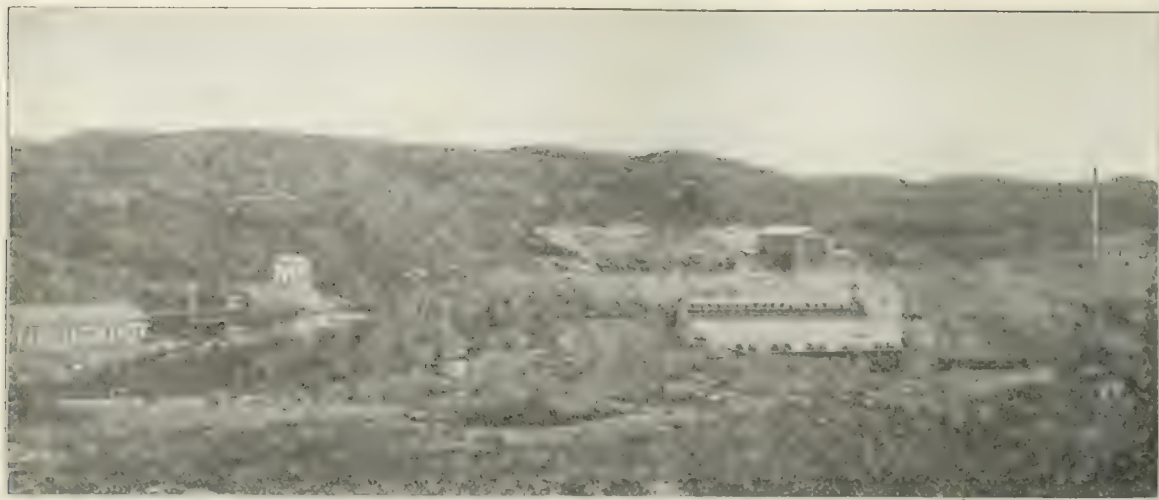


Fig. 5.—General View of Sydvaranger Ore Field North of Lake Björnerand, Showing Crushing Plant and Ore Bins. Machine Shop on the Left.

down to 10 in. or less. The only fault that could be found with it was said to be that it would not take the largest pieces that the steam shovel could load, the receiving opening being only 36 in. in width, and therefore some bulldozing has to be done—an expensive operation in a large quarry.* The crusher is mounted on a concrete base. In the bottom of a shaft sunk in the rock for this purpose. It is driven by a 250-hp. motor. At full operating load the ammeter indicates that 160 to 170 hp. are consumed. Fig. 6 shows the general arrangement. The crushed ore is transported on a 36-in. conveying belt through an inclined tunnel to a series of bins at the side of the hill, inside which is the crushing plant. The total capacity of the bins is 4000 tons. By means of a cross conveyor leading over their tops and an automatic movable tipper they

* Since this crusher was bought and installed, others of the same type with greatly increased receiving openings have been constructed.

can all be well filled. The bins have for their base the solid rock. Six 45-ton railroad cars can be loaded at the same time.

The railroad to the separating plant at Kirkenes is very well equipped with modern 40-ton locomotives and 45-ton steel cars with hopper bottoms. The track is standard broad gauge. The grade to the separating plant is very favorable, with a drop of 56 ft. in the distance of 5 miles.

Concentrating and Briquetting Plant

Fig. 7 gives a view of the concentrating and briquetting buildings. They are on a side hill not far from the fjord. The plant is laid out in every detail according to the Gröndal wet system, and, being the latest and largest of the kind, it is going to serve as a model for many to be built elsewhere. It is constructed in a very substantial way; consideration of cost has been secondary.

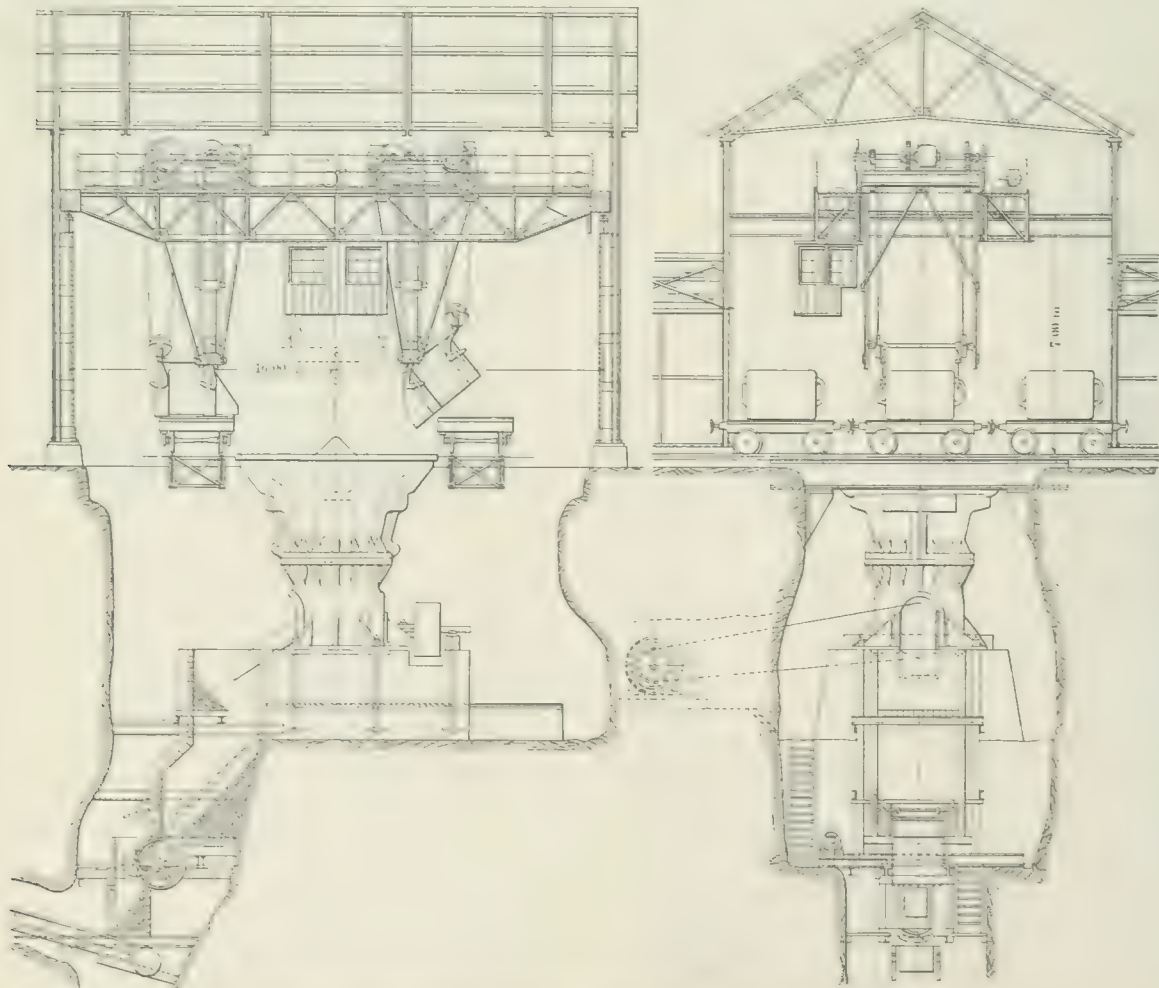


Fig. 6.—End and Side Elevations, Showing General Arrangement of Crushing Plant.



Fig. 7.—Concentrating and Briquetting Plant at Kirkenes.

The concentrating plant is laid out in 20 similar parallel units. Eight of these are now completed and in operation. The programme calls for the immediate installation of four additional units and the work on these is now going on. The capacity of each unit was calculated as 300 tons per 24 hours, a figure that the operations to date indicate will probably be exceeded. Still, with 12 units going at that rate, the plant will handle 3600 tons of crude ore daily.

The arrangement of the concentrating and briquetting plant is shown in Fig. 8. Each unit comprises a crude ore bin preceding a Hadfield jaw crusher, one conveyor belt taking the ore from the crusher to a distributing bin, two ball mills fed by automatic feeders, two sets of tandem Gröndal separators, two tube mills, and two sets of finishing separators, also tandem. The finished concentrates are collected in settling tanks, where the water

drains off, and are, after a certain interval, transferred by grab buckets to the shipping track or to the briquetting plant. The whole plant is built in a series of steps or terraces, one step being provided for each operation of the process. On account of this general incline of the plant the ore passes from the distributing bins through the whole plant by gravity, the flow of water assisting its travel.

Highest up are the crude ore bins. They are constructed entirely of concrete and rest upon the rock. The ore is drawn from them automatically by means of roller feeders to the Hadfield crushers standing in front of them. The construction of these crushers is quite different from that of the usual American type. The swinging jaw, for instance, is so shaped that the upper half of it makes a smaller angle with the stationary jaw than the lower half. The fulcrum of the movement is raised rather high over

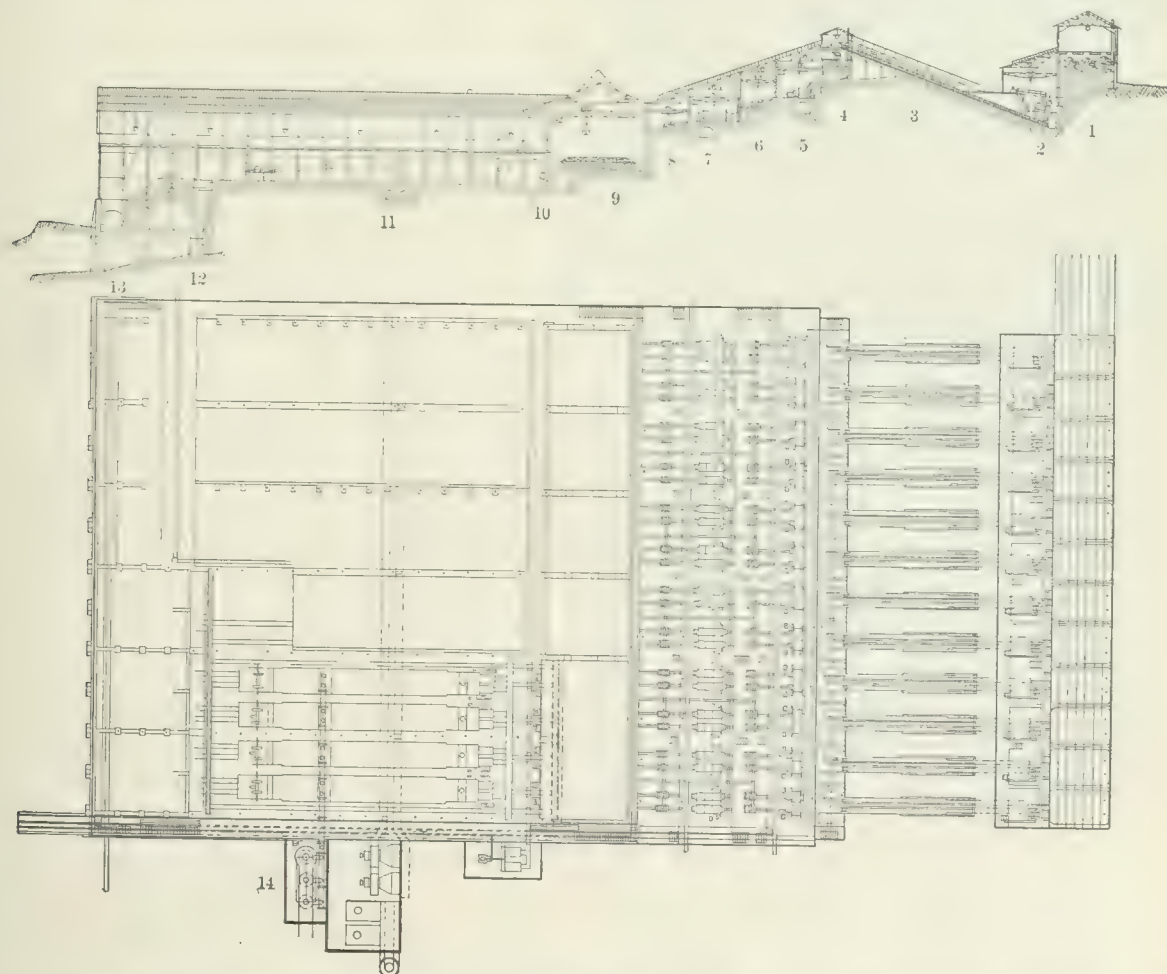


Fig. 8.—General Arrangement of Concentrating and Briquetting Plant. 1, Crude Ore Bin; 2, Hadfield Jaw Crushers; 3, Conveyor Belts; 4, Distributing Bins; 5, Ball Mills; 6, Tandem Gröndal Separators; 7, Tube Mills; 8, Finishing Separators; 9, Settling Tanks for Concentrates; 10, Gröndal Briquetting Presses; 11, Gröndal Briquetting Kilns; 12, Storage Place for Briquettes; 13, Railroad Track for Outgoing Finished Product; 14, Gas Producers.

the mill. In this way a clear strip of large pieces of ore is obtained, so that they are not so likely to jump out of the crusher. In these crushers the ore is reduced to a maximum size of 1½ to 2 in. After this it is carried by means of conveyor belts from the crushers to the distributing bins over the ball mills. From this place down, including the briquetting plant, there is one continuous open building through which the ore gradually passes.

The ball mills are fed by automatic feeders of the type in which the ore is scraped by a stationary knife from a revolving disk. At this place is added the water which carries the ore through the grinding mills and the separators. The ball mills, Fig. 9, are of the Gröndal type, built of cast iron cylinders lined with chilled cast iron bars, which form a corrugated surface similar to what is known in this country as the El Oro lining. It has been used in the Gröndal mills for 10 years or more. The mills are charged with 4 tons of cast iron or steel balls. In one operation they grind ore fed to them from a size

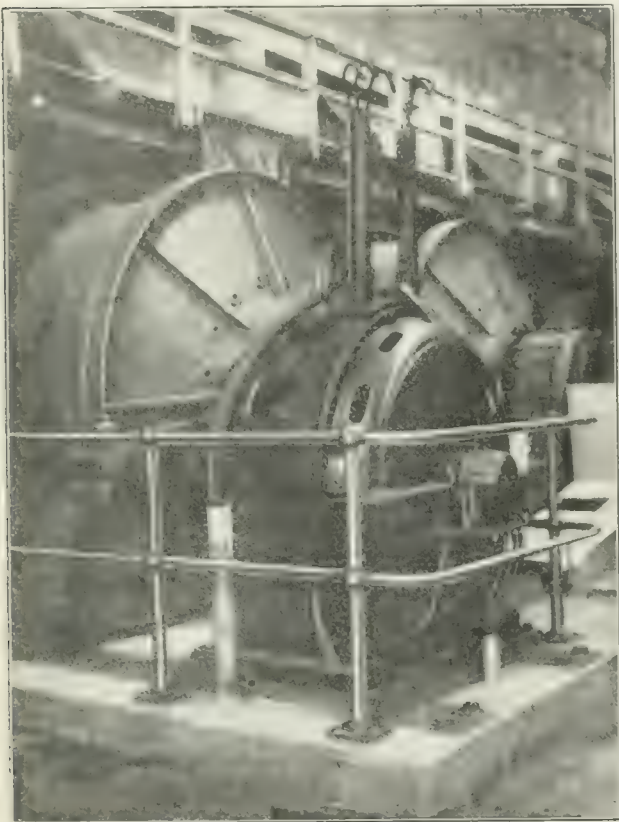


Fig. 9.—Electrically Driven Gröndal Ball Mill.

of 1½ to 2 in. down to about 20 mesh. The size of the discharge is governed by the amount of ore and of water fed to the mill. The illustration shows the mill with its individual motor drive. Its capacity varies between 150 and 200 tons of crude ore in 24 hours.

From the ball mills the ore continues to the first set of magnetic separators. These are of the standard Gröndal type, with 34-in. face and 28-in. diameter of the drums, and, as mentioned, are arranged in tandem. The brass drum rotates around a fixed system of electromagnets of alternating polarity, Fig. 10, with its lowest point about ½ in. above the water level of a weir box. The characteristic feature of the separator is that the pulp is not fed directly on the drum, but is brought into the field of magnetic influence by being flushed by the water current from the preceding ball mill through the weir box under the drum. The magnetic particles are drawn out of the water and against the drum. Carried by its rotation out of the field, they are easily washed off by water. By the operation of the machines in tandem the first machine, which receives the whole output of the ball mill, can be allowed to run considerably overloaded. The intense magnetic field will extract all magnetic particles, but in their on-rush they may envelop and carry with them a portion of the non-magnetic tailings. The second machine, receiving the concentrates from the first

one, is relieved of the bulk of non-magnetic material. It operates under better conditions and delivers a product higher in iron. Together the two machines make a thorough separation of more than 150 tons of crude ore per day of 24 hours. The current required for magnetizing purposes amounts to 8 amperes at 220 volts for each separator. They are belt driven by the same 3-hp. motor.

From the tandem separators the magnetic pulp runs directly into tube mills mounted on the next terrace of the building. Fig. 11 gives a view of the separators and tube mills. The latter are of somewhat modified type, with the bearings especially well designed. The object of the tube mills is to further comminute the concentrate from the first tandem separators, making it possible to raise the iron content a little more. In certain cases, when the ore is of fine granulation, the rule is to run the ball mills so that a portion of the discharge stays on, say, 20-mesh screen; then in the concentration of it the iron percentage may be raised only to 50 to 55 per cent., and therefore a retreatment is required. The Sydvaranger ore is very fine grained and therefore contains a large percentage of middlings in this product, necessitating the tube mill grinding. The final separation afterward on the finishing separators, which are entirely like the first set, like them running tandem, raises the iron content in this case to 69 per cent., the sulphur and phosphorus being lowered to respectively 0.015 and 0.006 per cent.

The finished concentrates are delivered by means of distributing launders to big settling tanks, of which there are six, constructed entirely of concrete and occupying the entire width of the building. They have each a capacity of 3000 tons of wet concentrate. While some of them are being filled by means of distributing launders, the others which have had the surplus water drained off are emptied by means of a grab bucket. Fig. 12 gives an interior view of this part of the mill.

Briquetting Kilns

At present only eight briquette kilns are installed. They are built in pairs, each one operated entirely independently of the other. They will take care of half the output of the mill, the capacity of each being about 100 tons of briquettes in 24 hours. It is proposed to ship the remainder of the concentrates without briquetting, and the company has therefore installed two rotary dryers, through which this part of the product will be passed to eliminate such water as cannot be drained off. This means that the purchaser will have to briquette the fine material. It probably is impossible to use it in blast furnace operations in its fine condition, as too large a part of it would be blown over into the flues. The drying is done in order to escape the freight charges on the 8 to 10 per cent. of moisture that cannot be drained off.

The fine ore taken by the grab buckets from the settling tanks is dumped into hoppers which deliver it to presses of the Gröndal type. The briquettes are 6 in. square with a thickness of 2½ in., and weigh when burnt about 12 lb. each. When delivered by the presses, they are placed by hand edgewise in two tiers on flat cars. Each car will hold 1¼ tons. No binder whatever is used, but the moisture of the concentrate is sufficient to hold the briquettes together so that they can be easily handled.

The kilns are of the well known Gröndal type, consisting of long channel furnaces, through which the briquetted ore on the flat cars slowly passes. The cars together form a continuous intermittently moving platform dividing the kiln into two compartments. Through the lower one, cold air is drawn in order to protect the trucks from the heat of the upper one. The kilns are fired with producer gas entering through the arched roof not far from the discharge end. The combustion gases travel toward the inlet end of the kiln, meeting the damp briquettes, drying them, and slowly heating them to the intense temperature of the combustion zone. Here is the greatest heat, reaching 2500 degrees F. The briquettes agglutinate, with a complete recrystallization of the whole mass. There is a highly oxidizing atmosphere throughout the whole kiln, caused by the blowing in of

several times the amount of air required for the combustion, this air having been highly heated in cooling off the briquettes when they have passed the combustion zone and before they leave the kiln. Thus the magnetic concentrate is converted into a ferric oxide of iron. This material has all the characteristics of hematite and

within the buildings melts the snow as soon as it falls on them. Floors throughout are of concrete with all launders from grinding mill, &c., sunk into them, so that there are no obstructions to free passage in front of the machinery and on its sides. All units of machinery are driven by individual motors, so that the plant is entirely free from shafting and belting. Over each step or terrace of the mill, a traveling crane is arranged for hauling machinery and parts while making repairs, the cranes running at right angles to the slope of the building.

The Heating of the Plant

It is natural to suppose that in a cold climate like that at Sydvaranger it would be necessary to take great precautions to keep the plant warm in winter time, so as to prevent the water conduits, &c., from freezing. As a matter of fact, the only means of heating the enormous building is an arrangement by which some of the waste heat of the combustion gases when leaving the briquette kilns is employed to warm the air. The combustion gases are drawn by means of an exhaust fan from the kilns and before being discharged into the atmosphere they are forced through radiators in a heating chamber above the kilns. Cold air from the outside is forced by a blower to circulate around the heating elements and then allowed to escape into the briquetting building. From there it naturally rises gradually through the whole plant.

Water Supply

The water required for the concentrating process is pumped by centrifugal pumps to the ball mill floor; there it is introduced into the system and gradually descends with the ore. As condenser water from the surface condenser of the plant is used, it has a temperature of 10 to 12 degrees above freezing point when it reaches the mill. All the water except the drainage water from the settling tanks, which is re-introduced into the sys-

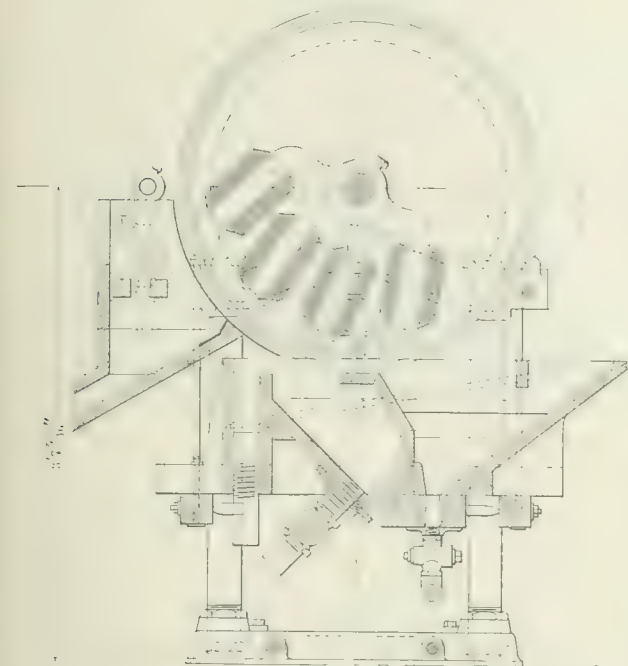


Fig. 10.—Sectional Elevation of Grindal No. 5 Separator.

therefore is not open to the objections sometimes raised to magnetites by blast furnace operators.

When the cars are discharged from the kiln, the briquettes are taken directly to the dock to be loaded into steamers, or, when no steamer is at hand, they are stored in a place provided opposite the loading dock. There is also some space available inside the briquetting plant, just at the end of the kilns.

It has been said that the kilns are fired with producer gas. This is obtained from a battery of gas producers of standard type in an adjoining building. The coal consumption per ton of briquettes is about 6 per cent. of the weight of the finished product.

No other labor is employed around the plant than the pressmen, who are expected to handle 25 tons per man and shift, and the discharge men, who transfer the briquettes from the cars to the 10-ton buckets, in which they are conveyed to the harbor. The empty briquette cars are returned to the presses by means of an endless chain haulage.

Analysis of Concentrates

The fine concentrates when ready for shipment are of remarkable purity. A representative analysis is as follows:

Per cent.		Per cent.	
Fe	69.00	Al ₂ O ₃	0.16
CaO	0.25	SiO ₂	3.80
MgO	0.24	P	0.006
MnO	0.07	S	0.015

In the briquetting of this material, the percentage of iron will be reduced 1½ to 2 per cent. on account of the up-oxidation of the magnetite. The weight will naturally increase correspondingly from the weight of the dried concentrates. The analysis shows: Fe, 67 per cent.; P, 0.006 per cent.; and S, 0.008 per cent.

General Features of Construction

The buildings are of steel with brick filling between the columns. Light in them is especially well provided by sky and side lights. Although they are in a country of heavy snow fall, no special precautions have been required to take care of heavy snow loads, as the heat



Fig. 11.—Separators and Tube Mills

tem, is wasted with the outgoing tailings. As salt water from the fjord is used, there has been no need for economizing, as is the case at other places where the tailings are caused to settle in large settling ponds and the cleared water is reused indefinitely. Here the tailings are run directly into the fjord through a cast iron pipe, discharging at some distance from the shore.

Ore Loading Cranes

The briquettes to be shipped are loaded into self-dumping buckets holding 10 tons each. Three of these are placed on a flat car and hauled by an electric locomotive with third rail system to the harbor, a distance of about 1200 ft. They reach the loading place at an elevation of about 85 ft. above water level. Two loading machines similar to the Brown Holst system have been provided to convey the buckets to the hold of the steamer. The loading machines are built by Becham & Keetman, Duisburg, Germany. They are 172 ft. in length, of steel throughout. The lower leg of the traveler, as in Fig. 13, is supported on a concrete dock 330 ft. in length, outside which there is a depth of water of 26 ft. The loading capacity of each crane is 100 tons per hour. Fig. 14 shows one of the travelers completed.

Power Plant

It was originally intended to build a steam power plant at Kirkenes and at the same time exploit the waterfalls of the Pasvik River, which are only about five miles from the mines. As the river at this place forms the boundary line between Norway and Russia, it involved such difficulties to make proper arrangements that eventually the idea had to be abandoned and steam was adopted as the sole power.

The DeLaval Steam Turbine Company of Stockholm was entrusted with the construction of the whole plant; and by its courtesy the data given have been obtained. For the fully completed plant, the programme provides for three steam turbine generators for three-phase alternating current of 800 to 850 volts each of a maximum of 3750 effective horsepower; one steam turbine generator for three-phase alternating current, 800 to 850 volts of 360 effective horsepower; one steam turbine generator for continuous current, 220 volts of 275 effective horsepower; and four large centrifugal directly-driven pumps. The motors are for three-phase alternating current, and the capacity of each pump is 1660 gal. per min. with 230-ft. head.

Only two of the three steam turbine generators have been installed with their auxiliary machines and boilers, but room for the additions is reserved in the building.

The boiler plant will contain, when completed, seven Babcock & Wilcox boilers with superheaters, mechanical stokers, and three 240-tube economizers. Five of the boilers have now been installed. One of these is held in reserve and two boilers are required for each steam

turbine. Each boiler has a heating surface of 5375 sq. ft., and the working pressure is 180 lb. per sq. in. The boilers are of standard type and the stoking apparatus is the Babcock & Wilcox chain type. The two economizers are of the Hartmann type, with the water and the waste gases moving in opposite directions. Two boilers and one economizer, with chimney, form a group for one steam turbine. The odd fifth boiler can be coupled to any economizer.

The coal transport arrangement consists of an aerial tramway from the harbor, which delivers the coal to a stock pile in front of the power plant. From here it is elevated in small cars to a large storage bin above the boilers and is drawn in the ordinary way through iron conduits to the mechanical stokers.

In the upper portion of the engine room the two steam turbines are installed. They are run at a speed of 1500 revolutions per minute, and by means of spring couplings are direct-connected to the 2100-kw., three-phase generators. The generators are fitted with direct-coupled exciters. The exhaust steam from the turbines passes to a surface condenser directly below them in the basement of the engine house.

The power plant was ready for trial runs in October, 1909. It was tested by a special committee the following month. Some figures from the report are sufficiently interesting to repeat. The contract with the DeLaval Steam Turbine Company stipulated a coal consumption not exceeding 22 lb. per kilowatt hour, with both the 2100-kw. turbines fully loaded and working condensing with superheated steam. Inasmuch as this stipulation is for net kilowatt hours, it comprises all the coal for the auxiliary machinery. The test, as it turned out, could not be undertaken in full accordance with the contract, as difficulties arose regarding the simultaneous loading of both the generators. Each generator had therefore to be tested separately. The results of the tests were as follows:

Date of tests.....	Nov. 15-16.	Nov. 16-17.
Steam turbine.....	I	II
Duration of test in hours.....	6.5	6
Steam pressure in boilers per square inch, pounds	175	175
Steam temperature at boilers, Cent.....	300	300
Steam pressure at steam turbine, pounds per square inch.....	165	166
Steam temperature at steam turbine, Cent.	274.2	272.6
Back pressure in steam exhaust pipe, pounds per square inch.....	1	0.818
Steam per hour for steam turbine, pounds.	35,520	33,913

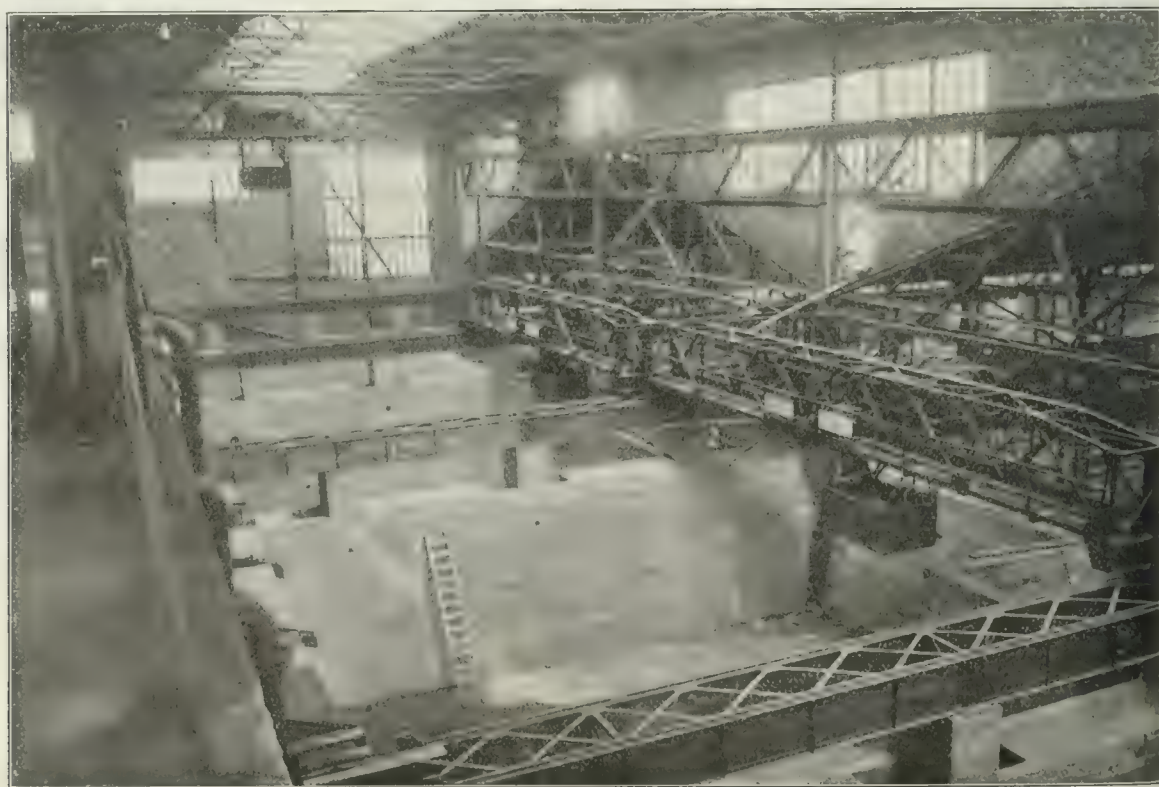


Fig. 12.—Interior View, Showing Settling Tanks.



Fig. 13.—Traveling Cranes for Loading the Ore at the Kirkenes Dock.

Kilowatts yielded by generator.....	2,140	2,135
Steam per kilowatt-hour, pounds.....	16.61	16
Auxiliary machines, kilowatt-hours.....	52	56
Net kilowatts.....	2,088	2,079
Pounds coal per net kilowatt hour.....	1.91	1.95

The power plant has now been in operation for some time to the entire satisfaction of the company.

In so short a description as this of an undertaking of such vast proportions, it is obvious that only the more important features, those of more general interest, can be described. Nothing has been mentioned of the complete electric equipment for power and lighting purposes; the transmission line from the central power plant at Kirkenes to the mine; the transformer stations; the large air compressors directly driven by motors; the lighting of all the workings by big arc lights—a necessity here where night reigns a great part of the year. Nothing has been said of the repair shops at the mine or the machine shops and foundry at Kirkenes. The great distance from any manufacturing center has made neces-

sary the most complete machine equipment, and the tools installed were selected to meet any kind of emergency, including locomotive breakdowns. Seldom have all the details of a mine undertaking been so well taken care of and in so finished a condition, before the mine was yet in a producing state, as here. The thoroughness of all the engineering work is remarkable.

Labor and Market Features

As everything else in the place had to be imported from more Southern regions, so also all the labor has been brought in from the South. Labor cost is rather high, wages varying between 13.3 cents and 17.6 cents per hour with eight hour shifts in all branches of the work. The men live in well built houses, for which they pay no rent or a very low one; they have in their houses water and electric light, for which they pay nothing, and have free doctor's attention, medicine, &c. The general impression in this country that labor in Sweden and Norway is much cheaper than in the United States is, as can be seen, hardly correct.

In summing up, the writer wishes to pay the tribute that is due to the courageous men who have conceived this great undertaking and have not hesitated to invest \$3,000,000 to \$4,000,000 in a venture that was possible and will be profitable chiefly on account of its magnitude. They must have had great confidence in the successful employment of the Gröndal method, by which 1,000,000 tons of a hard ore containing only 36 per cent. iron will every year be ground to a fineness of 60 or 100 mesh—a seemingly expensive treatment for such a cheap commodity. But only after this comminution is a thorough separation feasible. The briquetted product that they are putting on the market will have no superior in either physical or chemical respects. It will be comparable with the highest class Rubio ore; and hematite like that will command a high price and will therefore be able to stand high freight rates to German and English iron works.

The United Engineering & Foundry Company, Pittsburgh, Pa., shipped March 4 one of its high speed steam hydraulic forging presses to the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. The Westinghouse Company had purchased a 7-ton steam hammer, but, on investigating the forging press, decided in its favor, and for this reason will not set up the hammer. The company found that to maintain the high standard attained by its products, it was absolutely necessary to obtain a better class of forged material.

The Link-Belt Company, Philadelphia, Chicago and Indianapolis, announces a reduction in the price of original Ewart link-belt, with the assurance that it will always maintain the high quality of its product.

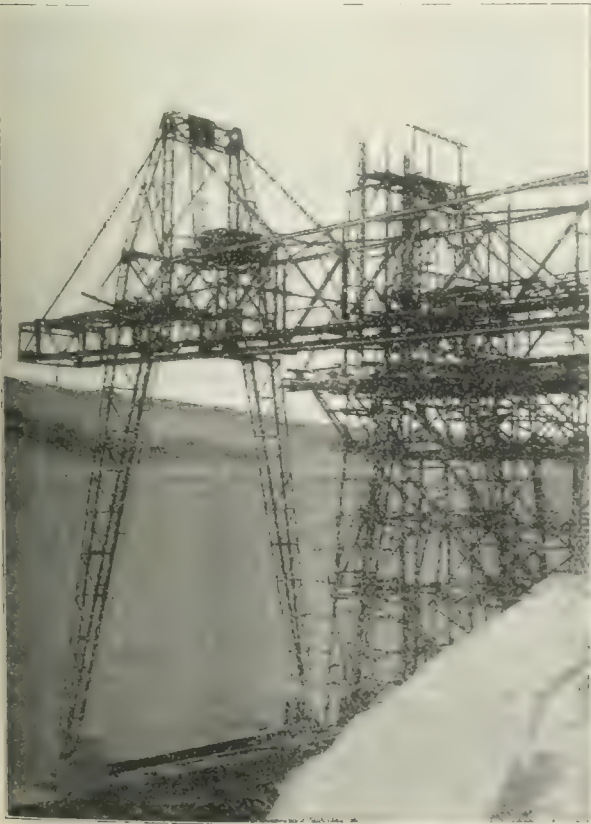


Fig. 14.—One of the Travelers Complete.

The Webster Mfg. Company's New Plant

About three years ago the Webster Mfg. Company erected two new shops at Tiffin, Ohio, one for the manufacture of its line of sheet metal goods, elevator legs, spouting, &c., and the other a malleable iron plant for the manufacture of detachable chain, malleable buckets, &c. The operation of these two shops immediately proved the desirability of Tiffin as a manufacturing and distributing point, and the directors of the company decided to move the entire plant there. Suitable buildings for housing the plant have been erected on 38 acres of land which the company secured. The new plant has about four acres under roof. It is equipped with every modern appliance for the economical manufacture of elevating and conveying apparatus.

The buildings consist of the following: Sheet metal shop, 100 x 300 ft.; malleable iron foundry, 120 x 330 ft.; engine room, 30 x 50 ft.; shipping and storage room, 90 x 270 ft.; machine shop, 120 x 300 ft.; gray iron foundry, 110 x 250 ft.; office building, 100 x 210 ft.; pattern vault, 80 x 120 ft. These buildings are of steel frame, with brick walls. They are equipped with traveling cranes of 5 to 30 tons capacity.

The arrangement of the buildings is such that the product is handled but once. The gray iron foundry is supplied with a 30-ton crane, which brings the castings to the machine shop, where they are handled by a 20-ton crane direct to the cars or into the shipping room. The sheet metal shop is furnished with a crane in the same manner. The shipping and storage room being in the center of the plant, everything gravitates toward that one point.

The machinery is all electrically direct driven. A total of 700 hp. operates the plant and equipment. The sheet metal shop has a modern equipment of immense shears, presses and pneumatic riveters, and is further equipped with an air compressor for driving the pneumatic tools of all description. The machine shop has a full equipment of large lathes, boring mills, &c., can take in 18 ft. to 20 ft. sheaves or pulleys, and is thus prepared to do the work of the largest character. This shop is also equipped with a complete air handling apparatus. The gray iron foundry has two cupolas, one of 30 tons capacity and one smaller. The handling of the flasks is done by air hoists and the larger work by electric cranes. The malleable iron foundry has a capacity of some 20 tons per day and is equipped with automatic machines for assembling the chain, as well as apparatus for testing, measuring, oiling, &c.

The shipping facilities are excellent. The Baltimore & Ohio and the Pennsylvania lines both run directly into the shipping room, and besides this the company enjoys the use of the Big Four, which also puts cars into the factory. The gray iron foundry and malleable foundry are served by tracks of their own for delivering coal, iron and coke.

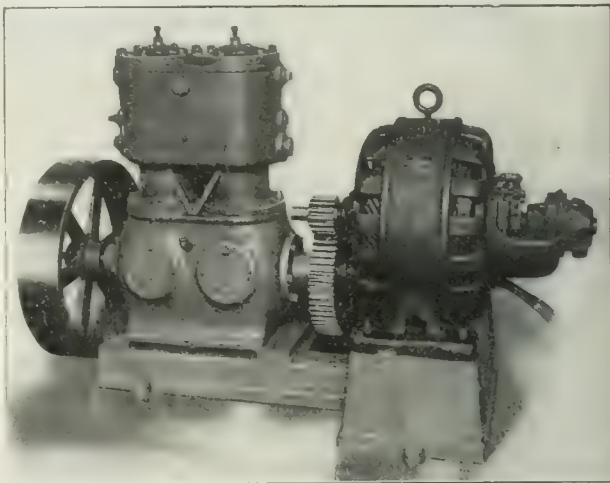
The buildings have been constructed with especial regard to the health and comfort of the employees. The roofs are of the saw-tooth design, with a north light. The artificial lighting of the plant is done by the Cooper-Hewitt system. The heating and ventilating are done by blowers. Commodious lockers have been installed in connection with the toilet and wash rooms. Shower baths have been provided for the employees, and there is also a well equipped hospital room. A system of co-operative insurance has been put in force, under which the employees are cared for in cases of accident or sickness.

The company has just secured the contract for the complete equipment of elevating and conveying machinery, screens, gates, spouts, &c., for the M. A. Hanna Dock Company's new anthracite coal shed, to be erected at Superior, Wis. This equipment will handle, screen and load 200 tons per hour of anthracite coal. The Webster Company is also furnishing the new anthracite coal shed of the Pittsburgh Coal Company at Duluth, Minn., with similar machinery. This plant is designed to handle, screen and load 300 tons of coal per hour. Both of these plants are expected to be the best equipped of their character now in operation or being built.

Pneumatic Handling of Sulphuric Acid

Replacements of piping and other receptacles form an item of considerable expense in chemical manufacturing plants. This is occasioned by the rapid deterioration of these pieces of equipment as a result of acids and fumes coming in contact with them. One especially destructive substance is sulphuric acid and its manufacture is beset with many serious difficulties. Pumps cannot be employed to handle it, as it would be necessary to replace them constantly on account of the exceptionally rapid deterioration. Air furnishes a very satisfactory method of pumping this and other destructive acids and the United Iron Works, Oakland, Cal., has brought out a motor-driven compressor especially designed for this work.

This compressor was installed in the new plant of the Nichol Syndicate at Bay View, Cal., and is one of the 6 x 6 in. Gardner Rix duplex type having a capacity of 40 cu. ft. of free air per minute and operating at a speed of 200 rev. per min., and a pressure of



The Westinghouse Motor-Driven Air Compressor Supplying Air for the Pneumatic Handling of Sulphuric Acid at the Nichol Plant, Bay View, Cal.

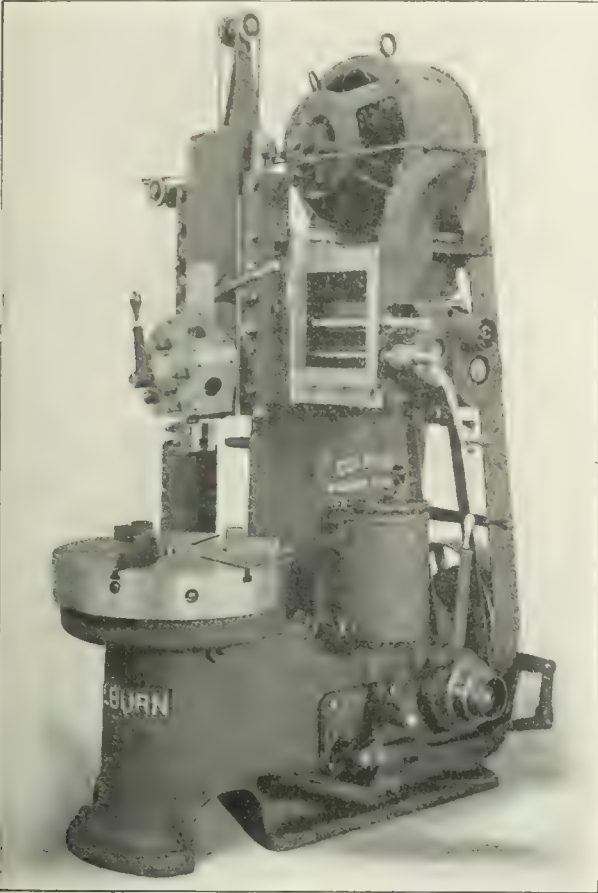
from 60 to 100 lb. The motor was supplied to the United Iron Works by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., and is one of the maker's HF three-phase, 60-cycle, 550-volt, 10-hp. motors. It operates at a speed of 800 rev. per min. and reduction gearing of the spur type is used to bring its speed down to that of the compressor. A motor of this type is very well suited to the work which it is called upon to perform. The armature is wound for each phase, and the windings are connected to the three collector rings shown at the right end of the motor. A starting resistance is employed and is connected to the armature through the collector rings. The motor is so designed that an exceptionally high starting torque is developed with a comparatively low current and when the motor is put in operation, the resistance is gradually cut out by the controller.

This compressor is used to supply the air required to pump the acid from a cylindrical tank in which it is allowed to accumulate at one stage of the process of manufacture to other receptacles. This tank has inlet and outlet valves, and when it becomes necessary to pump any of the acid, the inlet valve is closed and air is admitted at a pressure of from 60 to 100 lb. This forces the liquid through the outlet valve to other parts of the plant, its flow being controlled by a number of valves in different parts of the piping system.

The Cleveland Crane & Engineering Company, Wickliffe, Ohio, has received a contract through its branch office, 1402 Park Building, Pittsburgh, for an 80-ton 6-motor ladle crane with 65-ft. span for installation in the plant of the Iroquois Iron Company, South Chicago, Ill., of which Julian Kennedy, Pittsburgh, is consulting engineer.

A Motor-Driven Colburn Boring Mill

An especially good application of motor drive to a small boring mill is the one recently made by the Colburn Machine Tool Company, Franklin, Pa. It is a 30-in. mill and the motor a 4-hp. adjustable speed Westinghouse type SA direct current motor, with a speed range



A Neat Motor Drive as Applied to a Small Colburn Boring Mill.

of 400 to 1600 rev. per min., with its speed controlled by a drum type machine tool controller with 16 notches. The motor is mounted on a bracket at the top of the machine, where it is out of the way and beyond reach of chips falling upon it, and is belted to a friction clutch pulley which replaces the cone pulley used with shaft drive. The clutch is controlled by a lever, so that the

machine may be stopped for short intervals without stopping the motor. A friction brake operated by foot power permits the ready stopping of the table in any position.

The machine will take work 32 in. in diameter and 16 in. high, where a chuck is used, and 17 in. with a plain table. The 16 table speeds range from 3 to 106 rev. per min. The turret slide has a vertical travel of 21 in. and may be set at any angle up to 30 degrees on either side of the vertical. A graduated scale attached to the slide indicates the depth of holes bored, &c. The five-sided turret has 2¼-in. holes and also ⅝-in. tapped holes for attaching special tools. In addition to the regular clamping device for the tool holder shanks, special provision is made to keep the tool holders from twisting under heavy cuts. The lock bolt is of hardened steel, ground true, and works in a hardened and ground steel index ring. Special taper gibs take up any wear in the lock nut easily and quickly, thus keeping the turret holes aligned with the main spindle.

A Barnes Special Horizontal Drilling Machine

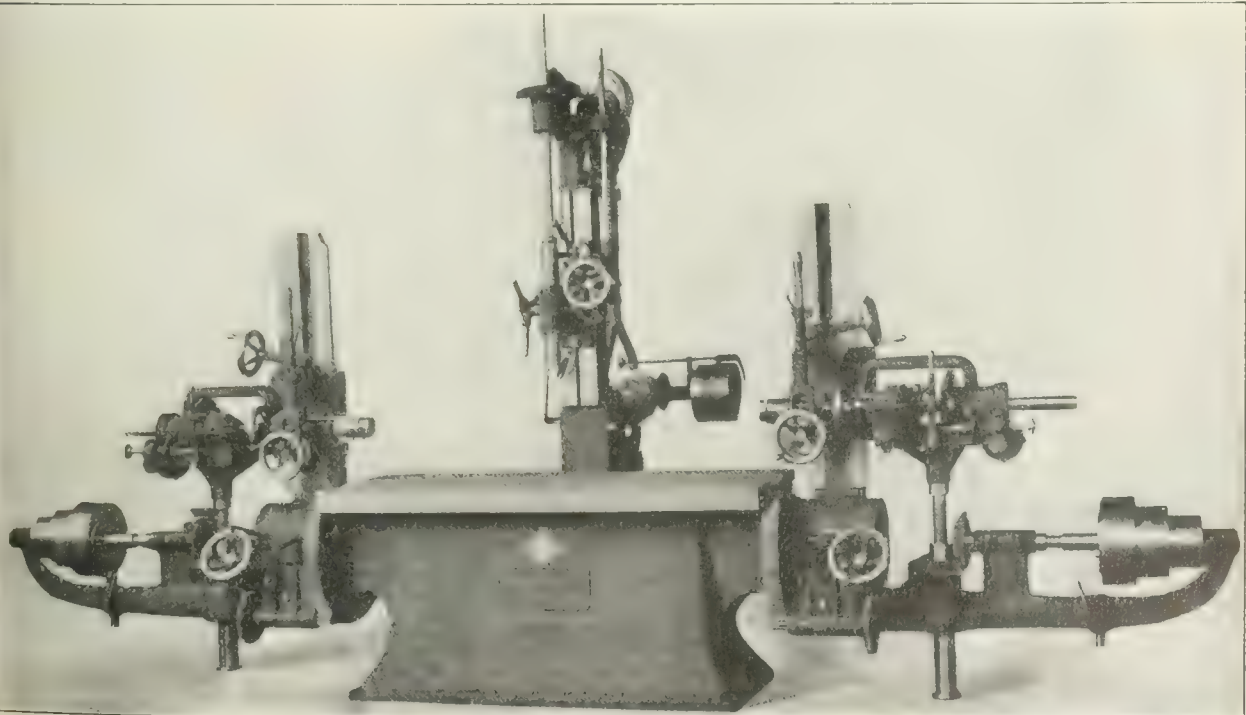
The W. F. & John Barnes Company, Rockford, Ill., has recently completed a special horizontal drill for a manufacturer who desired to bore one or two holes in each end of a casting and also one in the top. To enable this to be done without changing the position of the work after it was once set, the company made a special machine by combining the main parts of its No. 3 horizontal radial drill with a 28-in. sliding-head gang drill. One of the special features of this machine is that the vertical head is capable of horizontal adjustment as well as a vertical one. This horizontal movement is secured by attaching the head to a sliding rail at the rear of the machine table, and it is thus possible to locate the vertical head at any distance between the horizontal ones.

This machine is practically the same as the regular No. 3 drill made by this company with the exception of the additional head. All the cone pulleys on the drill heads are of the three-step type and all the heads are back geared. An automatic stop is furnished for each of the spindles.

The following table gives the principal dimensions and specifications of the machine:

Vertical spindle travel, inches.....	14¾
Horizontal spindle travel, inches.....	18
Size of table, inches.....	24 x 65
Morse taper of spindles.....	No. 4
Width of driving belt, inches.....	4
Floor space, feet.....	16 x 7
Weight, pounds.....	7,000

The machine is well built, is provided with back gears and all parts are within easy reach of the operator.



A Special Horizontal Drilling Machine with Three Heads Built by the W. F. & John Barnes Company, Rockford, Ill.

Iron Ore in Hundreds of Millions of Tons

Deposits in the Baraboo District of Wisconsin Vastly Greater Than Appeared from Earlier Operations—The Steel Corporation's Large Holdings

Amid a most praiseworthy absence of newspaper publicity, the merchantable iron ore deposits of the United States have been increased by hundreds of millions of tons in the past few years, as the result of the discoveries of W. G. LaRue in Sauk county, Wisconsin.

Baraboo District Geology

This is what is known as the Baraboo district, from the chief town of the region. It lies near the center of the southern half of Wisconsin, in Sauk and Columbia counties, with an approximate length, northeast and

quartzite, but the whole region, except where the quartzite outcrops, is covered by a heavy bed of Cambrian sandstone or by the drift of the Baraboo River Valley. This effectually masked the geological structure and hid the important Huronian rocks. Figs. 2 and 3 show the relations of the iron bearing formation to the inclosing rock, also the locations of the mines.

Important Interests at Work

Iron was discovered in the district by W. G. LaRue of Duluth in 1900, after the abandonment of the region by the Douglas Iron Company, which had done considerable work prior to that time. On the conclusion of work by the Douglas Iron Company the Chicago & Northwestern Railroad took its property as a mineral paint mine, and upon the lapse of its lease Messrs. LaRue and Whiteside, of Duluth, and Herman Gotophorst, of Baraboo, took it over and commenced systematic exploration by diamond and other drills. In April, 1900, Mr. LaRue first found ore.

In due course these owners leased a part of their lands to the Deering Harvester Company, subsequently a part of the International Harvester Company, and this company has shipped from its mine, to the time of closing down about one year ago, a total of 310,400 tons, averaging 55 per cent. iron, dried, and about 0.045 per cent. phosphorus. The Iroquois Iron Company, controlled by Rogers, Brown & Co., also sank a shaft 355 ft. deep and did some exploratory work. At about the same time W. H. Donner, in connection with various well-known Pittsburgh interests, in which the Mellen Bank was predominant, carried on extensive work on the westerly side of Columbia county, some 12 miles east of North Freedom, spending not far from \$200,000 in drilling, &c. Some 600 to 800 acres were taken as the result of this work. Later this party secured lands two miles south of North Freedom, and is now preparing to sink a shaft and begin mining ore. Machinery for this work has recently been ordered. Mr. Donner and his friends are believed to have spent nearly \$500,000 in the district.

The Steel Corporation's Holdings

Before T. F. Cole resigned the presidency of the Steel Corporation's mining interest, negotiations were entered into between that company and Messrs. LaRue, Whiteside and Gotophorst, under which the Corporation finally secured a stretch of land along the formation and some three miles in length. This land began at a point a mile southwest from North Freedom and continued on southwesterly through sections 10, 9, 15, 16, 17, 18 and 19. All the land in this area supposed to be valuable for iron ore is held under this lease to the Corporation, aside from that occupied by the Illinois mine (Fig. 4) in section 16, and a small tract that was bought some years ago by the Grand Crossing Tack Company, and which has passed by lease into the hands of John M. Thomas of the Thomas Furnace Company, Milwaukee, who is mining steadily therefrom at the present time. Included in the negotiations of the Steel Corporation was the Iroquois mine of Rogers, Brown & Co. (formerly known

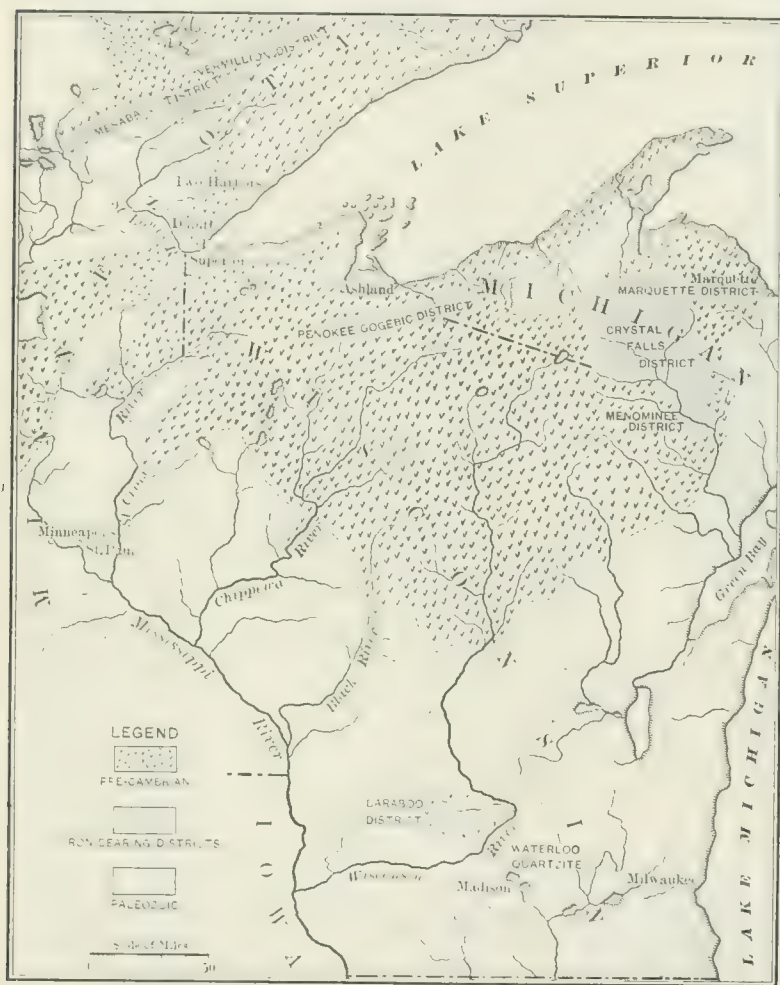


Fig. 1.—Map of Pre-Cambrian Iron Bearing Districts, Showing the Geographic Relation of the Baraboo District to the Lake Superior Districts.

southwest, of about 25 miles, and with a width of two miles at the easterly end to 10 and 12 miles in the western and central portions. Its relation to the Lake Superior ranges is shown in Fig. 1. The area of the district is approximately 225 square miles, in which the chief rock exposures are of a dense vitreous quartzite, called by the Wisconsin Geological Survey the "Baraboo quartzite." This seems to form a somewhat canoe-shaped syncline, whose axis is approximately northeast and southwest, and whose greatest depth from surface may be about 2000 ft. Included within the impervious walls of this quartzite lie, first, a gray slate; above that the iron bearing member, in the upper part of which lie the higher grades of ore; above that a dolomite, and still higher, filling the remainder of the trough, a sandstone quite thoroughly water-soaked. The quartzite is of the Huronian series, the same rock as is found associated with the iron formations of the general Lake Superior ranges. Knowing this, it would seem natural to expect iron deposits of some nature in connection with the

as the Sauk), for which the Corporation is understood to have paid something like \$100,000, and which is now held by it under a 99-year lease.

Before exercising its option the Steel Corporation's Oliver Iron Mining Company expended some \$250,000 in drillings operations, and had as high as eighteen diamond drills at work for a year, with a large force of men.

An Estimate of 1,000,000,000 Tons

It is estimated that the Steel Corporation's holdings in the three mile stretch of lands held by it under the LaRue lease, together with other lands under lease and fee to the Oliver Iron Mining Co., contain considerably more than 400,000,000 tons of ore, of which there may be, upon the LaRue lease alone, say 80,000,000 tons of 55 per



Fig. 2.—Sketch Map of the Area of Exploration Southwest of North Freedom, Showing Drill Holes 1 to 34. This Map Is Prior to Steel Corporation Drill Work.

Ore has been proved for almost the entire distance of three miles and to various depths on the underlay of the formation. This formation dips rather steeply near the surface and flattens lower down, while the ore becomes thicker as depth is reached. To what depth ore extends is not yet known, but drill holes 1800 ft. deep have cut it, and there are several of about 1000 ft. in depth that

cent. ore (dried at 212 deg.) some 200,000,000 tons averaging from 40 per cent. to 50 per cent. iron, and the remainder better than 30 or 35 per cent. These ores so lie in the ground that the higher grades can be taken out without injuring the possibility of subsequently mining the leaner. It is estimated by some operators there that the probabilities of the district are in the neighbor-

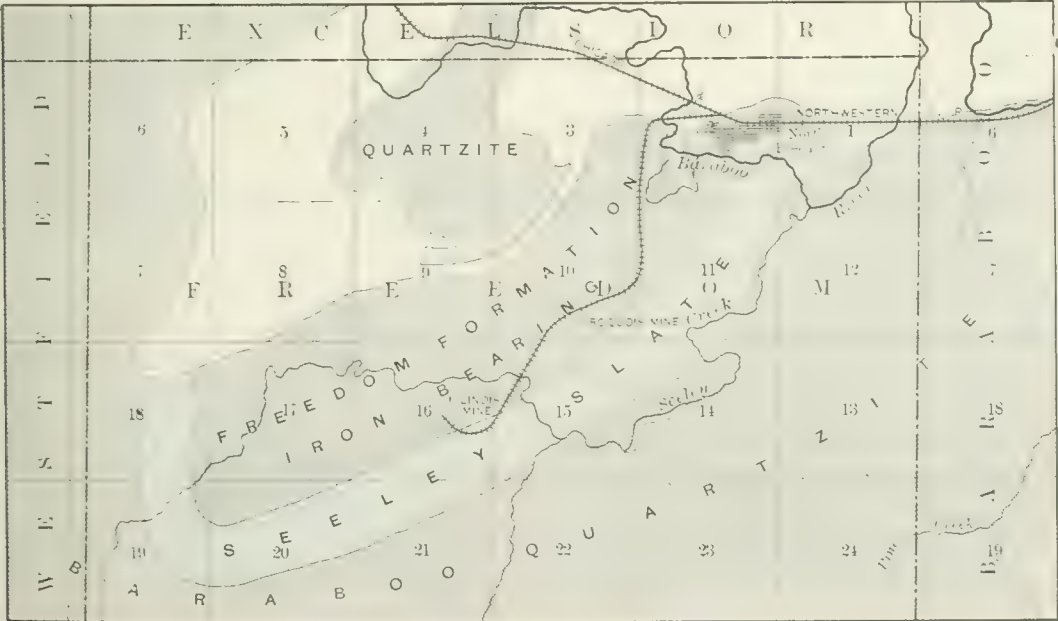


Fig. 3.—Geological Map of the Baraboo District.

show the identical conditions as above and as elsewhere along the strike, with good ore at the bottom of the holes.

The average of some 50 drill holes along the formation showed more than 100 ft. of ore vertically. The Illinois mine is estimated to contain—not entirely from drill holes, but somewhat hypothetically—about 60,000,000 tons of ore, all above 40 per cent. The Steel Corporation controls by lease and fee, nearly 2000 acres, all of which is reasonably certain to be underlain by ore.

hood of a billion tons. The ore as it stands in the ground is not especially wet, but in mining it becomes a pasty mass, full of hygroscopic moisture. It was the idea of T. F. Cole and of W. J. Olcott, who succeeded him as president of the Steel Corporation mining interests, that a long campaign of pumping should precede mining on any commercial scale, thus draining the sandstones and making operations simpler. This is now under way. The Oliver Iron Mining Company has erected extensive im-

provements at its Iroquois shaft, including its standard stone and brick engine and boiler houses, and stacks, a steel headframe, etc., and is now pumping about 800 gallons of water daily. This is far less than was being pumped under the operations of the Iroquois Iron Company, in the same ground, indicating either that the overlying formations are being drained or that the former operators were repumping much water. Doubtless this pumping will be continued for some time before any considerable tonnage of ore will be extracted from the Oliver properties. As stated above, Mr. Thomas is now mining steadily, and the Donner party is arranging to mine soon. It is quite possible that the Illinois mine of the International Harvester Company, which is surrounded by Steel Corporation properties, will be reopened in a short time. It is about twelve miles from the early work of the Donner party, in the west side of Columbia county, and the scene of greatest activity, southwest from North Freedom. So far no ore has been found along the probable trend of the formation between these points. But in due time it is not impossible that a fairly continuous ore bearing formation may be located in this now

Grinding Car Wheels Without Removing Them

The editorial in *The Iron Age* February 23 on "The Cast Iron Car Wheel and the Grinding Machine" prompted the Quincy, Manchester, Sargent Company, Plainfield, N. J., to write regarding an equipment it builds for grinding car wheels when they have developed flat spots, without removing the wheels from the car. Although such equipments have been used by the Public Service Corporation of New Jersey for some time, the essential details are of enough interest to deserve calling attention to in connection with the editorial already referred to. The grinder is installed in a pit in the car barn, so that the car may be run directly over it, and has two grinding wheels, one to act on each of the two wheels on one car axle. Usually the drive is by belt from a motor of about 20 hp. and the emery wheels are

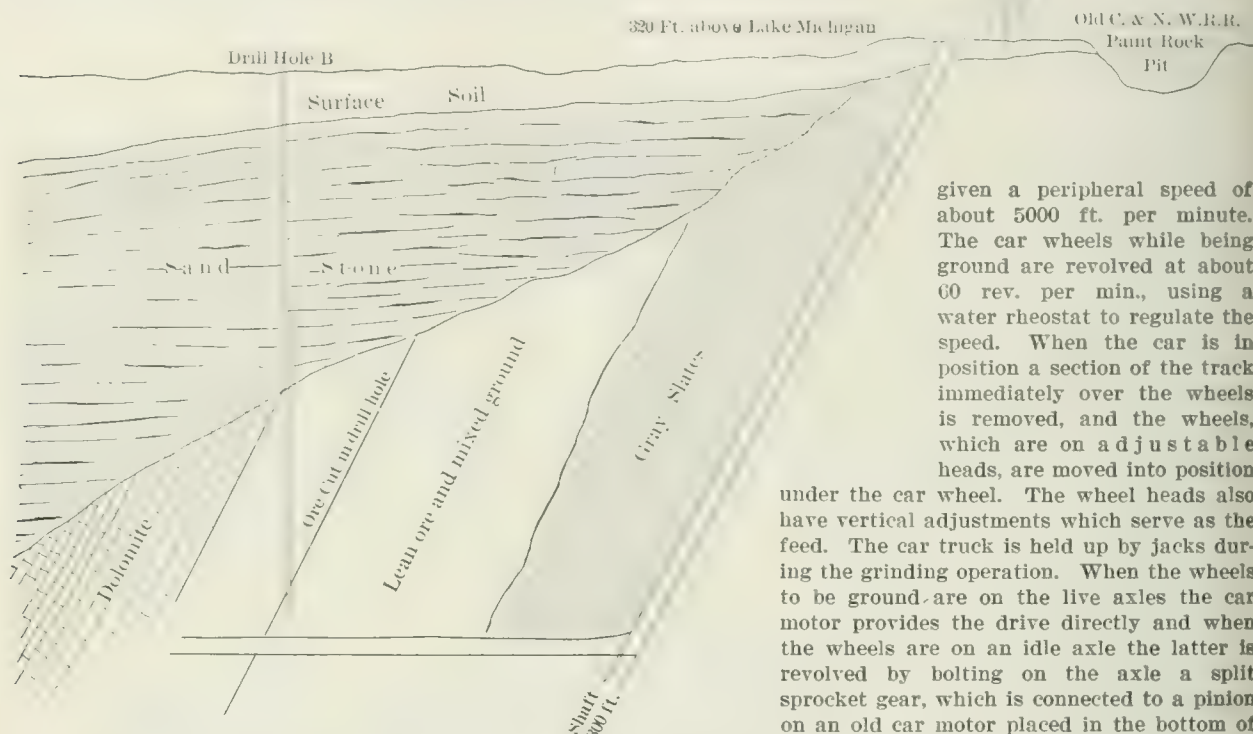


Fig. 4.—Cross Section of No. 1 Shaft, Illinois Mine of the International Harvester Company.

barren territory; in which case the tonnage possibilities of the district will be greatly augmented.

The Oliver Iron Mining Company holds its lands under a 99-year lease and at royalties materially less than those current on Lake Superior. A few of these are at so low a figure as 10 cents a ton, but most are far higher. The annual minimum for which the Oliver Company is obligated to the LaRue interest is 150,000 tons only.

Freight rates on these ores to the Chicago district are now 70 cents a ton, less by 10 cents than the rate from Mesaba range points to Lake Superior ports, and it is supposed that when a large tonnage is assured railroad companies a lower rate may be secured. But, be that as it may, the 70 cents must be compared with \$1.50 from Mesaba range points to Chicago points.

D. E. W.

The Foote Brothers Gear & Machine Company, Chicago, has received an order from the Universal Portland Cement Company, Buffington, Ill., for 50 spur gear reducers of 30 hp. each; also a contract from the Milwaukee Grain Feed Company, Milwaukee, Wis., for 16 spur gear reducers of 25 hp. each, with a reduction of 20 to 1. Both of these contracts were secured in competition with similar equipment made by other concerns.

given a peripheral speed of about 5000 ft. per minute. The car wheels while being ground are revolved at about 60 rev. per min., using a water rheostat to regulate the speed. When the car is in position a section of the track immediately over the wheels is removed, and the wheels, which are on adjustable heads, are moved into position under the car wheel. The wheel heads also have vertical adjustments which serve as the feed. The car truck is held up by jacks during the grinding operation. When the wheels to be ground are on the live axles the car motor provides the drive directly and when the wheels are on an idle axle the latter is revolved by bolting on the axle a split sprocket gear, which is connected to a pinion on an old car motor placed in the bottom of the wheel grinder pit. The emery dust and grindings are taken care of through an exhaust system.

Records from the use of the machine by the Public Service Corporation in a number of its shops show that the average cost for grinding wheels is 59 cents per pair, and the time required 17 min. One pair of grinding wheels will last for from 50 to 90 grinding jobs. In one particular test a car was run over the pit at 2:50 p.m. Fifteen minutes was required to jack up and connect the car motor to the water rheostat. The grinder was started at 3:05, and, running at a medium feed, ground down a 1-in. flat spot in 30 min. At 3:40 the car was out in service again. The scheme possesses undoubted advantages as compared with the one of removing the car wheels for grinding in the shorter time that the car is out of service and is also cheaper, as where wheels are removed it has been estimated that it costs from \$4 to \$5 a pair to grind out their flat spots.

The Leader Foundry & Machine Company, Quincy, Ill., recently took over the Reliable Foundry & Machine Company, Fort Madison, Iowa, manufacturer of dustless tumbling mills, and the Quincy Enameling Company. It is also associated with the Hayton Pump Company and the Hydman-Hess Magneto Company, Quincy. It is equipping its foundry to give special attention to the manufacture of supplies for wagon manufacturers, and is further erecting an enameling plant which will shortly be in operation. It also manufactures power presses and other machinery for sheet metal workers.

The Green Foundry Blowers

The Wilbraham-Green Blower Company, Pottstown, Pa., is manufacturing under the Green patents a type of blower which is especially adapted for foundry use. These blowers are made for motor, engine or belt drive, and Fig. 1 shows the second of two motor-driven blowers having a capacity of 112 cu. ft. per rev., which has been installed at the plant of the Standard Cast Iron Pipe & Foundry Company, Bristol, Pa. The pulley-driven blower illustrated in Fig. 2 has a displacement of 25 cu. ft. per rev., and its special feature is the placing of the driving pulley close to the bearing.

The working parts of these blowers are two balanced impellers. Each of these is a single casting which is well ribbed internally and firmly cast on a forged steel shaft

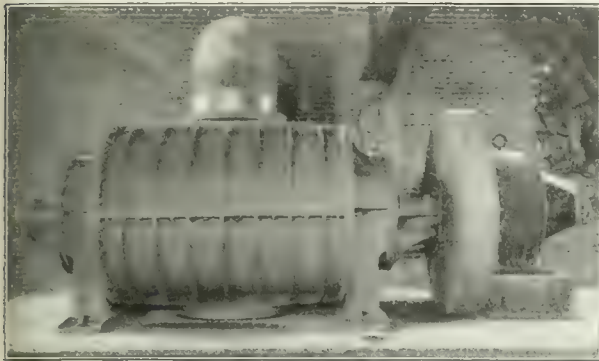


Fig. 1.—One of Two Motor-Driven Blowers Installed at the Plant of the Standard Cast Iron Pipe & Foundry Company by the Wilbraham-Green Blower Company, Pottstown, Pa.

extending the full length of the blower. The finished surfaces of these impellers are two circles, which will roll together without friction. An even and continuous contact is thus secured, the point of contact being always on the pitch line of the gears and traveling at the same speed through the entire revolution. To reinforce the impellers and to form a protection in case the shafts should become worn, the heads of the impeller castings are disks, the diameter of which is the same as the pitch diameter of the gears. In this way, even though the shafts or bearings should wear, the impeller heads will roll together without friction and keep the bodies from coming into actual contact.

The gear wheels are of ample proportions, run continuously in oil and are keyed to the impeller shaft close to the faced projections on the exterior of the head plate, which form collars at each end of the blower, thus preventing the impellers from rubbing endwise against the interior of the head plates. The casing for the gears is formed by an extension of the head plate and the

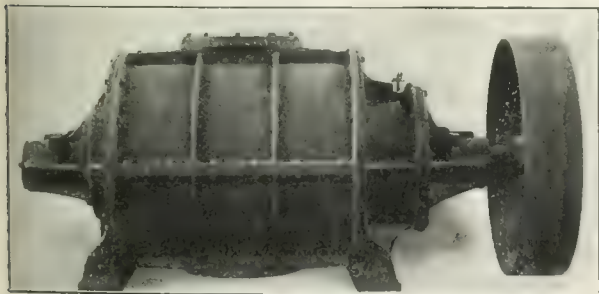


Fig. 2.—A Belt-Driven Blower Having a Displacement of 25 Cu. Ft. Per Revolution.

journal bearing castings which avoids the use of light castings. Inclosing the gear wheels in this way affords protection against accidents and prevents dirt from accumulating while the blower is in transit or operation. The head plates are well ribbed and are further strengthened by making the hoods or extensions into which the circular ends of the impellers project a part of the head plate casting.

The journal bearings are bushed with phosphor bronze and fitted with ring oilers. As they are bolted and fastened with dowel pins to the head plate they can be detached from the blower and removed and returned to their original position easily. The blower casing has additional reinforcement and is made rigid and firm by inserting pipe plates between the head plates and the circular casing.

The Wood & Spencer Adjustable Snap Thread Gauge

A new snap thread gauge has been brought out by the Wood & Spencer Company, Cleveland, Ohio. Although designed for the rapid and accurate inspection of automobile parts having large diameters and fine pitch threads, the gauge is equally well suited for the inspection of other work. Fig. 1 is a view of the gauge in use, while Fig. 2 gives details of the adjustable blade em-

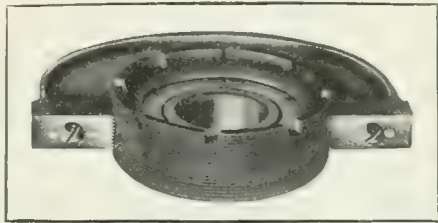


Fig. 1.—The New Adjustable Snap Thread Gauge Made by the Wood & Spencer Company, Cleveland, Ohio.

ployed. One of the advantages claimed for this gauge is its speed, as in use it is unnecessary to catch the thread and screw the work into the gauge. Thus wear does not take place, and it is claimed that its dimensions will remain the same indefinitely.

The adjustment of the movable blade is very simple and can be quickly made. The blade *b*, Fig. 2, is fastened to a sliding bar, *e*, by dowel pins *c*, and is adjusted by turning the stop screw *d* after the clamping screw *a* has

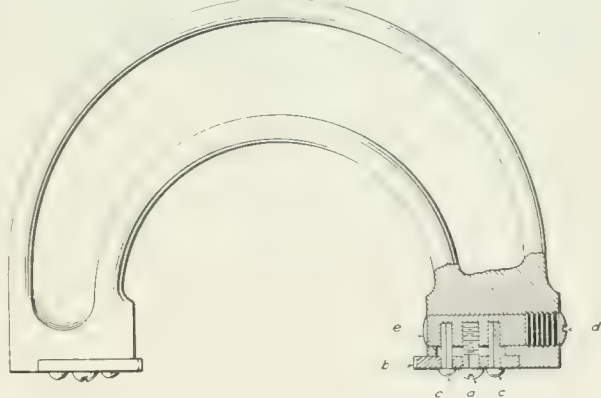


Fig. 2.—Sectional View Giving Details of the Adjustable Blade.

been loosened. When the adjustment has been made the clamping screw is again tightened and locks the blade in position. The maximum adjustment which can be secured is 1-16 in.

The gauge is rigid in construction and accuracy in indicating whether the pitch angle at the top or the bottom of the thread is correct is secured, as the various parts are simple and the working surfaces can be accurately cut and lapped to any desired shape. The body is made of cast iron, and hardened and ground tool steel is used for the blades which are interchangeable.

Two different styles of gauges are made, one being adjustable and the other non-adjustable. Both types of gauge are made in various sizes ranging from 1/4 to 12 in.

The 600-ft. lake freighter that is being built for the Jones & Laughlin Steel Company will be named for Thomas Walters, Ishpeming, Mich., who is mining expert for the company.

Steel Cutting with the Oxy-Acetylene Torch

Data Regarding Costs and Special Uses

Anything to burn must be heated in the presence of oxygen, and the temperature necessary to start combustion varies with the material. Steel, for example, requires a very high temperature, and the more directly the oxygen is supplied the more rapidly will it burn. Intimate contact with pure oxygen, rather than air, in which the oxygen is greatly diluted with nitrogen, will hasten the starting and increase the rate of the combustion. The cutting of steel by actual burning has

occupies 0.7 cu. ft. at atmospheric pressure. To make a cut $\frac{1}{4}$ in. wide 1 ft. long in 1-in. steel would remove 3 cu. in. of metal weighing about 13½ oz. The small amount of carbon contained is negligible and, assuming the iron to be burned entirely to oxide, the cutting will take 5 1-7 oz. of oxygen, or 3.55 cu. ft., at atmospheric pressure. This amount of oxygen must be supplied in the time of making the 1-ft. length of cut. Temperature will not take the place of oxygen, nor will



Fig. 1.—The Wreck of a Pier Destroyed by Fire, the Steel Work of Which Was Cut Up with Davis-Bournonville Oxy-Acetylene Cutting Apparatus.

become commercially practicable only since there have been available torches giving a flame of sufficient heat intensity, such as the oxy-acetylene blow pipe, the flame of which has a temperature of about 6300 degrees F. After the steel to be cut has been heated to the melting point, a special supply of oxygen under higher pressure than that used for the torch flame is delivered through a separate tube directly at the cutting point.

In the cutting apparatus manufactured by the Davis-Bournonville Company, 90 West street, New York City, the oxygen and acetylene for the flame are supplied in the ratio of 1.28 to 1, by volume. The other jet is of oxygen alone, and is arranged close to the flame jet to take advantage of the high temperature created by the latter. By moving the double nozzle along at proper speed a smooth cut is obtained by burning that can be made practically as deep and narrow as one made by a tool, due to the localization of heat possible with the very high temperature. The metal disappearing from the cut is in great measure combined with the oxygen to form oxide of iron, passing off in the form of fine particles. The carbon probably goes off as carbon monoxide or carbon dioxide. These are both gases and so pass off into the atmosphere. A part of the metal runs out of the cut in molten condition, but is still iron.

The oxide is the reason for the considerable supply of oxygen necessary. Its chemical formula is Fe_2O_3 , and the atomic weights of iron and oxygen being 56 and 16 respectively, the oxide mixture is in the ratio of 21 to 8 by weight, so that each ounce of iron burned to iron oxide requires 8-21 oz. of oxygen. An ounce of oxygen

oxygen take the place of temperature. So it is useless to attempt to make up for the lack of either by an over-supply of the other.

Why Cast Iron Cannot Be Cut

A curious fact is that steel can be cut by the oxy-acetylene process, but not cast iron. The difference between steel and gray cast iron lies in the carbon and its condition. In steel all the carbon present is chemically combined with the iron and cannot exceed about 2 per cent. Gray cast iron contains more than this and much of its carbon exists uncombined. Whether it is because of a difficulty in getting a sufficiently high temperature, or what, it seems to be the carbon that makes the trouble. It may not be so much because of the total amount present as the manner in which it exists, partly uncombined. That the difficulty relates to the necessary temperature would seem to be corroborated by what is seen in connection with arc lights. The temperature is very high and oxygen is present, though in a diluted form; still the carbon burns away rather slowly. In fact, carbon is used for electrodes largely because of its slow combustibility. Cast iron can be fused and welded readily enough by the oxy-acetylene process, but not cut. The materials to which the cutting process is applicable are commercial wrought iron and steel. Steel can be cut in any form, whether rolled, forged or cast, and very thick sections as well as thin ones. The metal loss is but little, as the activity is purely local. Thus, a bar of steel 6 in. square can be cut in two with a cut about $\frac{1}{8}$ in. wide. A little more metal is involved because of slight irregularities, but this is a small matter.

Steel 6 in. thick can be cut at the rate of about 1 ft. in 3 min. The oxygen requisite for such a cut is about 20 cu. ft., plus the oxygen for the heating tip, which costs about 2½ cents a cubic foot. If there is considerable similar work to do an inexpensive man can readily learn to do it. For cutting various thicknesses different nozzles may be easily substituted. The apparatus is readily portable, and can be taken up on a scaffold at the side wall of a building to cut off projecting ends of steel girders, or can be taken down into a confined space at the side of a boiler, or other steel structure, to cut it up into manageable pieces.

Comparison of Costs

A comparison of the cost of removing risers from steel castings by sawing and by oxy-acetylene cutting is interesting. In a certain case 181.69 sq. in. were cut with a saw in 405 min. The labor involved amounted to \$1.90 and the grinding of the saw \$0.86. Exclusive of power the total cost of cutting was \$2.76, or 1.52 cents per

181.69 sq. in. cut, gives an average of 2.23 min. per square inch. This is 11 times the time required by the oxy-acetylene.

Costs of Individual Torch Cuts

One of the cuts with the torch was through 3½ x 1½ in steel (5.25 sq. in.). In 5 sec. the preliminary heating was done and in 1 min. more the cut was made, the average time per sq. in. being 12 1-3 sec. Another cut was 9 x 4 in. and the whole cut of 36 sq. in. was made in 9 min. or 1 sq. in. in 15 sec. The preliminary work here occupied 1½ min. Another cut, 40 sq. in. was done in the same total time and with the same preliminary time. Still another, a cut of 6 x 2½ in. (15 sq. in.), took 20 sec. preliminary work and the whole operation 80 sec., or 5 1-3 sec. per square inch. This example shows the possibilities of rapidity and consequently economy, in doing duplicate work. Where the conditions are practically the same a little experimenting would show the best sizes of nozzle and the best pressures for the jets, es-



Copyright, 1910, by the Acetylene Welding Company.

Fig. 2 Scotch Marine Boilers in Process of Being Cut Up with Oxy-Acetylene Torches

square inch. With the oxy-acetylene process on similar work 135 sq. in. were cut per hour.

Estimating the labor at 25 cents per hour, the oxygen used at 2 cents per cubic foot and the acetylene at 1 cent, it has been calculated that the expense was 0.8 cents per square inch, or not much more than half the cost of cutting with the saw.

In cutting a lot of miscellaneous sizes the oxygen used by the heating tip was 55 cu. ft. and by the cutting tip 140 cu. ft. There were 38 cuts in all, the areas ranging from 1.56 to 75.6 sq. in. The total area amounted to 615.56 sq. in. or an average of 16.2 sq. in. per cut. The total time occupied in doing this work was 82 min. 40 sec. Of this 19 min. 5 sec. was spent in preparing for the actual cutting, leaving for the cutting operations proper 63 min. 35 sec. On the average it required half a minute preparatory work for each cut, 1 2-3 min. for the cutting operation proper, a total of 2 1-6 min. per cut of 16.2 sq. in. Per sq. in. cut the total time required amounted to a little over 8 sec. Including delays amounting to 36 min., or an average of nearly a minute for each cut, each cut may be considered to have taken 3 1-6 min. Instead of 2 1-6 min., or something less than 12 sec. per square inch. In the cutting of cast steel risers with the cold saw, the time actually spent in cutting, 405 min. for

pecially the cutting jet. The question of nozzle size is important. The waste of steel involved in making too wide a cut may be disregarded but not the waste of gas and labor. A cut 3-16 in. wide when ½ in. is practicable, means the disintegration of 50 per cent. more metal and employment of 50 per cent. more gas and labor. The effort should be to use the smallest nozzles practicable, to save, not merely steel, but the expense required to consume it. Very deep cuts can be made with very thin jets.

In another series of tests 16 miscellaneous cuts were made ranging in area from 3.53 to 21 sq. in. and totaling 187.46 sq. in. The heating jet consumed 5 cu. ft. oxygen; the cutting jet, 37.5 cu. ft. Five cuts were precisely the same (2¼ x 3½ in.) but the total times varied from 1 to 1.42 min. The cutting jet was used for a series of intervals ranging from 55 to 70 sec. The cut was made twice in the 55 sec. Here is an example of the possibilities of reducing expense by attention to the conditions under which the work is done when that work is largely duplicate. The preliminary in one of these cases was only 5 sec. the whole operation being completed in 1 min. Among the 16 cuts, two were made with steel having 1 per cent. carbon content. One of these was a round bar 3 in. in diameter, 7.07 sq. in. sectional area.

This cut was made in 100 sec. or at the rate of 1 sq. in. in 22.7 sec. The other was a half round 3 x 2½ in. having a cross section area of 3.55 sq. in. The time consumed in the whole operation was not kept, but the pure oxygen jet was used for 100 sec. as compared with 135 sec. for the former case where the area was double. If this area was calculated correctly the total time consumed per sq. in. was still greater than 22.7 sec. These results would seem to show that high carbon steels are harder to cut than the mild varieties.

For the total of 187.46 sq. in. the oxygen cost \$1.0625, or 0.567 cents per square inch, estimating oxygen at 2½ cents per cubic foot. With the acetylene at 0.048 cents and labor at 0.107 cents the total cost was 0.722 cents per square inch. In the series of 38 cuts the total area amounted to 615.56 sq. in., and the oxygen expense \$4.875, or 0.792 cents per square inch. The acetylene and labor

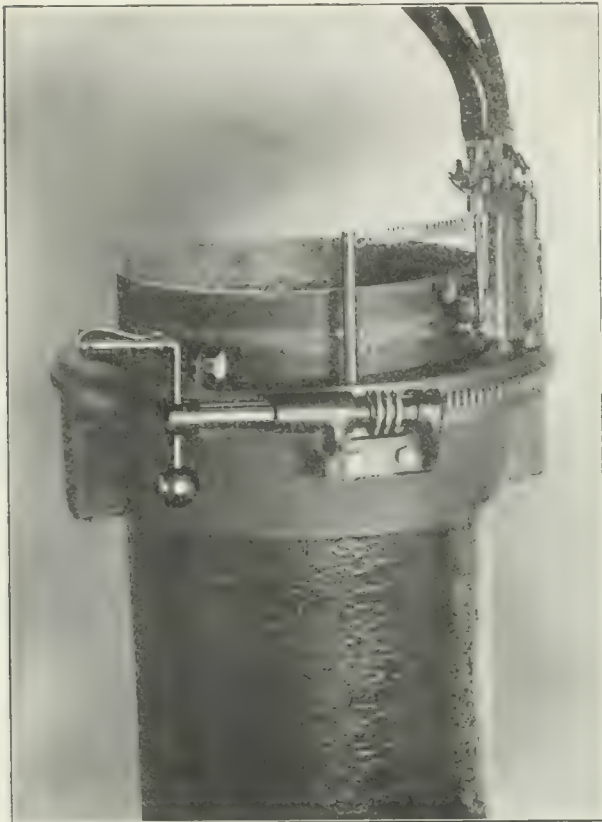


Fig. 3 - A Davis-Bournonville Device for Guiding a Torch Cutting Off the Top of a Pile Shell.

costs just used were really ascertained in this test; consequently, the total expense per square inch was 0.947 cents. This is higher than the amount disclosed by the other series of cuts. For miscellaneous work, perhaps, it would be fair to estimate the cost at 1 cent per square inch.

Some Notable Cutting Operations

This process of cutting steel is attractive not merely for its economy but also because of the portability of the apparatus. An example serving to cover both matters was the wrecking of Pier 14 on the North River, New York, following its destruction by fire July 9, 1910. It extended about 700 ft. into the stream and carried a steel structure 50 ft. wide and 700 ft. long, containing upwards of 2000 tons of steel. A Philadelphia firm agreed to wreck it in 30 days, or forfeit \$300 for each day excess of that time. It had been expected to use as many as 35 men, doing the work in the usual way, but it was found that by using Davis-Bournonville oxy-acetylene apparatus the force could be reduced. In fact only about 18 men were required, and the work was completed in 23 working days. Only a small amount of the cutting was done without the torch. Fig 1 shows the conditions when work was begun.

The removal of the swing span of the Madison avenue bridge across the Harlem River at New York is another striking example of the suitability of oxy-acetylene cut-

ting. This span was 330 ft. long and weighed 450 tons. While removing weight from one side it was necessary, since the span was supported at the center, to block up the other side, and this kind of work consumed much of the time. As each section was removed its weight was taken by a floating derrick and the piece cut off was lowered to the grillage of the fender. The first pair of sections weighed about 25 tons each; the next about 66 tons each. The remainder of about 270 tons was then removed in three pieces. The cutting time was about four days; the total time, one week. It is said that under the older methods it would have taken six weeks or two months for the job. Two outfits were employed. Of oxygen about 1500 cu. ft. was used; of acetylene about 450 cu. ft. The expense for the gases at 2½ cents for oxygen and 1 cent for acetylene was about \$42.

Such examples show the economy of torch cutting, but it is also especially adapted to difficult situations. At 95 William street, New York, a tank of ½-in. steel plate, 4 x 8 x 10 ft., was to be removed, and there was only 1 ft. working space around it. A sledge could not be swung to cut the rivets, and it could not be moved so as to help matters. With the oxy-acetylene torch, however, it was cut up into 12 pieces in one day, whereas by other means it would have taken a week or 10 days.

A similar case was the removing of two old boilers from a North River ferry boat. The steel was ¾ in. thick. By ordinary methods it would have taken 12 days and 16 men, and cost at \$2.50 per day per man, \$480. With the torch the job was done in 11 hours by one man at but a very small fraction of that cost. Fig. 2 shows a number of Scotch marine boilers in process of being reduced to scrap, all of the cutting upon which was done with torches. The pressure on the cutting oxygen was 45 lb. per square inch.

Mechanical Torch Guiding Devices

Attention is now being turned to the use of mechanical means for guiding the torch when cutting work. Fig. 3 shows an arrangement designed for cutting off the tops of the outer steel shells of a certain kind of bearing pile after they are in final position. It is desirable to have the cut perfectly horizontal. This device was designed by the Davis-Bournonville Company and with it the cut can be made evenly and expeditiously.

Another device regulates the cutting of flat plate steel and with it a cut 78 in. long has been made in ⅞-in. steel in 195 sec. or at the rate of 1 ft. in 30 sec. and a cut 6 ft. long in ⅝-in. plate in 149 sec. or at 1 ft. in 25 sec. A circular cut, 19½-in. periphery, was made in 1-in. steel plate in 45 sec. The oxygen pressure with ⅞-in. steel was 40 lb. per square inch. With 15-lb. pressure, ½-in. steel may be cut at the rate of 1½ ft. per minute; with the same pressure, 9-16-in. plate at the rate of 1¼ ft. per minute, and with pressures ranging from 25 to 42 lb., plate ¾, 1 and 1½ in. thick can be cut at the rate of 1 ft. per minute. The width of the cuts as made in these operations is about ⅜ in.

Where a manufacturer has much work of a standard character, as, for example, the cutting of 1-in. plate the best adjustments can be made after a little experimentation. Thus the precise pressures and sizes of nozzles and rate of movement of the hand screw controlling the torch can be determined to the best advantage as regard the work, the time and the consumption of gases.

The Phoenix Iron Works Company, Meadville, Pa., announces the appointment of W. M. Bastable as its New York City district sales agent. The company manufactures high-grade automatic cut-off engines, boilers, feed water heaters, &c. Mr. Bastable has been for a number of years with the Franklin Boiler Works Company, and will hereafter be located at 135 William Street, New York City.

The National Alloy Company, Ltd., has assumed control, by purchase, of the Metal Mfg. Company, Twenty-fifth and Dickinson streets, Philadelphia, Pa., where it will continue to manufacture and prepare ferromanganese, ferrosilicon, ferrochrome and other alloys for the foundry trade. Henry P. Miller is president and Daniel B. McAllister is secretary and treasurer.

The Osgood Valveless Force Feed Oiler

The J. L. Osgood Lubricator Company, 131 Erie County Bank Building, Buffalo, N. Y., has brought out a mechanical valveless force feed oiler which is especially adapted for gas, gasoline and steam engines of all classes, machine tools, high speed machinery and all kinds of general service. Fig. 1 is a view of the maker's type A oiler, and Fig. 2 is a sectional view showing the simplicity of its construction and the positiveness of its action.

Springs and valves of all descriptions have been elim-

into the lower half of the discharge coupling. The upper half of this coupling is then screwed down tightly and compresses a composition gasket which is inserted in the union firmly and tightly around the pipe. The flow of oil is adjusted by the regulating head, Fig. 2, which has six complete turns between the limits of delivering no oil and delivering the full capacity. To deliver the full capacity of the oiler the head is turned to the left until it bears against a stop. To shut off or decrease the feed the head is turned to the right, and when it bears against another stop the feed is completely closed off. Any adjustment between these two extremes can be secured by turning the regulating head in either direction. A sight feed glass is provided which enables the rate at which the oiler is feeding to be seen from a considerable distance. In addition to this box type of oiler, a cylindrical oiler with glass or brass sides can be supplied. The capacity of the square type of oiler varies from 4 to 14 pints.

The Dalton Adding Machine Company's New Factory

The Dalton Adding Machine Company, Poplar Bluff, Mo., celebrated the completion of its new factory February 14 with receptions in the afternoon and evening. Among those present were the representatives of the company, assembled from all parts of the United States. Among the guests were Henrik Bechsofft and his father of Riga, Russia. The structure is two stories of brick and concrete, covering a ground space of 45 x 250 ft. It is built with unusually large window areas. The main floor will be used for a machine shop and tool department, while the second floor will be used as an assembling room and for offices, &c. The ground floor has hard maple flooring, and the second floor concrete. Artificial lighting is provided for by 196 tungsten lamps on each floor, making a total of over 31,000 candle power; in addition to this a large electric sign has been placed on the roof. It is expected that all the machinery will be in place and the factory in running order by March 15. The total cost of the building is \$200,000. The company manufactures adding, listing and calculating machines. J. L. Dalton is president; Griff. Glover, vice-president; Byrd Duncan, treasurer.

The American Ship Windlass Company, Providence, R. I., reports the following recent orders for Taylor gravity underfeed stokers: 16 7-retort stokers, from Stone & Webster, for the new Boston Elevated Railway plant at South Boston; 56 7-retort stokers for the New York Edison Company's two Waterside stations; 3 4-retort stokers, repeat order, for the Detroit public lighting plant, Detroit, Mich.; 1 6-retort stoker for the Pfister & Vogel Leather Company, Milwaukee, Wis. The selection of Taylor stokers for the New York Edison Company's plants is of particular interest, because of the fact that this company has conducted extensive experiments on various types of stokers since the completion of Waterside station No. 2. The 56 stokers ordered will be installed under 56 650 hp. Babcock & Wilcox boilers, which have heretofore been hand fired. That the stokers ordered should be of the Taylor type, of which there are already 13 in this station, should prove of unusual interest to combustion engineers.

The Newark Foundrymen's Association, Newark, N. J., at a meeting on March 1 amended its constitution so that foundrymen in New Jersey outside of Newark can be admitted to membership. It will hold a regular meeting in May, to which foundrymen and foundry supply men throughout the State will be invited. It is the purpose of the association to extend its scope and make it a State wide organization.

The Taylor-Wilson Mfg. Company, Pittsburgh, Pa., recently received an order from J. P. Piedboeuf & Cie, Dusseldorf-Eller, Germany, for pipe threading and coupling screwing machines.

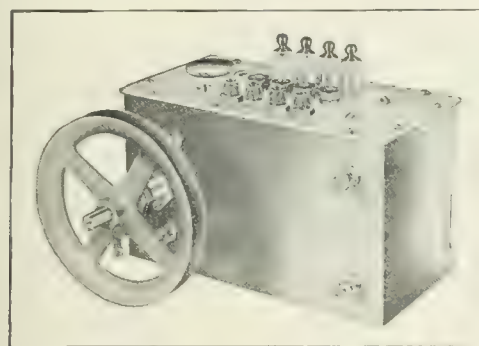


Fig. 1.—The Type A Valveless Oiler Manufactured by the J. L. Osgood Lubricator Company, Buffalo, N. Y.

inated in the oil passages, and also as a part of the feed controlling mechanism. It is thus possible to pump heavy and even dirty oils where an oiler with valves would either feed irregularly on account of foreign substances lodging underneath the valves or clogging them, which would render the oiler inoperative. These oilers are manufactured with any number of feeds, that having four feeds being the one illustrated. Each feed is adjusted independently, and can be regulated to feed any number of drops from none to over 300 per minute.

One of the special features of the oiler is that the operating spindle can be revolved in either direction without using cross belts. For this reason it is possible to use the oiler on an engine which has to be reversed frequently, as the direction of rotation of the spindle can

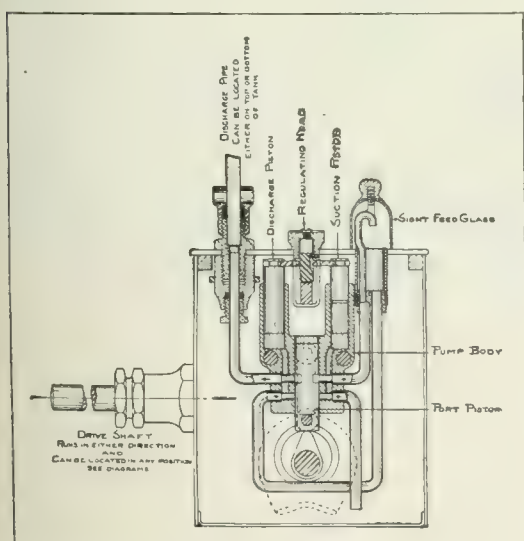


Fig. 2.—Sectional Elevation of the Oiler.

be changed quickly without breaking a feed. The mechanism is simple, and runs constantly in oil, which reduces wear to a minimum. As the mechanism, regardless of the number of feeds, is attached as one unit to the underside of the oil reservoir, it is possible to inspect it by simply removing the drive shaft and the cover screws.

In installing one of these oilers it is set in a level horizontal position and bolted securely in place. The ends of the pipes connecting the points of lubrication with the oiler are inserted in the discharge pipe, care being taken to force the end of the discharge pipe down

The Garvin Automatic Chuck

A New and Labor Saving Device Which Is Either Spring or Air Operated

A new type of automatic chuck which is made in various sizes with two or three jaws is being placed on the market by the Garvin Machine Company, Spring and Varick streets, New York City. These chucks can be operated either by springs or by air and a number of different styles of operating mechanism can be applied to the device, thus adapting it to meet conditions ex-

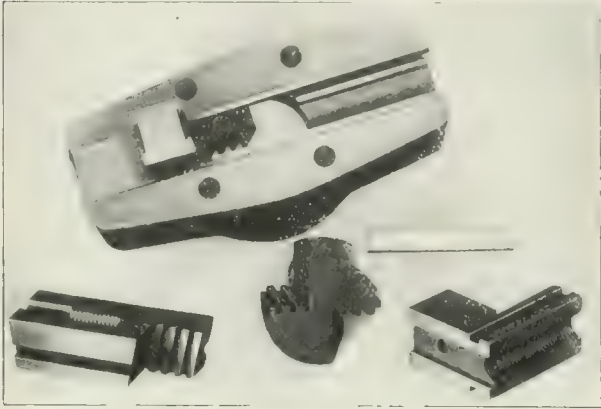


Fig. 1—The Parts of the Automatic Chuck Made by the Garvin Machine Company, New York City.

isting in all classes of industrial plants. Fig. 1 shows the details of one of the two-jaw chucks, and Figs. 2 and 3 show the construction of spring and air operated stop and open design chucks respectively, while Figs. 4 and 5 are corresponding views of the open only type. Fig. 6 shows a special chuck for holding bevel pinions, and Fig. 7 illustrates what is known as the automatic index chuck which is intended to be used on that class of work where two or more points lying in the same plane are to be operated on.

As will be noticed from Fig. 1, the body of this chuck is similar to that of the ordinary types and carries an actuating jaw, which has a series of multiple wedges milled at an angle on its end. The wedges in the central draw plug fit into these wedges on the jaw and by moving the plug to the rear both jaws are pulled to the center. For adjusting the dovetailed jaw to and away from the center, there is an adjusting screw which carries on its inside a locking screw for clamping the jaws

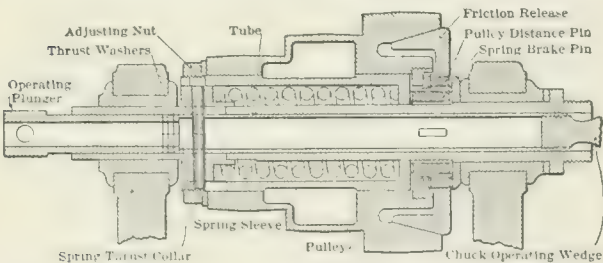


Fig. 2—Details of the Stop and Open Design of Spring Operated Chuck.

in position when the required adjustment has been made. The dovetails on this jaw are cut on both sides so that it can be reversed. The adjustment of the jaws is independent and their operation universal. The two-jaw chucks are the same as the three-jaw type, and the jaws regularly furnished are of the step type, although various other styles can be furnished if desired. The chuck is fastened to the nose of the spindle in the customary way, and a pull rod or tube is screwed into the central plug of the chuck, the other end being attached to the operating mechanism.

The stop and open spring mechanism which the maker furnishes on all of his machines is illustrated in Fig. 2. A heavy spring mounted inside the cone pulley and around the spindle bears at its rear end against a spring

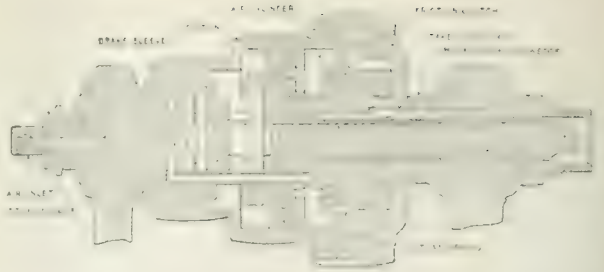


Fig. 3.—Sectional Drawing of the Air Operated Chuck.

thrust collar. A taper pin which extends through an elongated slot in the spindle and then passes through the draw rod passes through this collar. A pull of 800 lb. is exerted by this spring on the draw rod, and as the multiple wedges in the chuck are cut on an angle, a leverage of 4 to 1 is secured with the result that the work is gripped at a pressure of 3200 lb. A foot treadle attachment is connected to the operating plunger at the rear of spindle, and a downward pressure on the treadle automatically carries the friction out of the cone pulley. The brake pins and the washer at the rear of the front bearing check the momentum of the spindle and the cone pulley is now running idle. The full movement of the treadle opens the chuck jaws and the machine is ready to receive the next piece. When the treadle is released, the pressure of the spring closes the jaws on the work, carries the friction into the cone pulley and starts the spindle forward at full speed, an automatic arrangement which results in the saving of a large amount of time. The

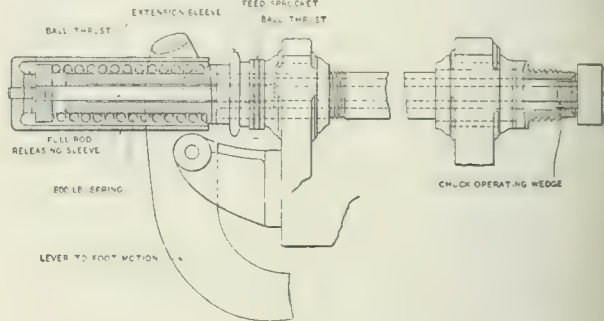


Fig. 4.—Details of the Open Only Outside Spring Chuck.

rapidity attained in the operation of these automatic chucks bears the same relation to a lathe handling irregularly shaped pieces as a collet does to a screw machine.

Where plants are equipped with compressed air, the air operated chuck shown in Fig. 3 can be furnished. This consists of a piston inside the cone pulley, and the piping is attached to the air inlet at the end of the spindle, the operating valve being placed in a convenient location. When the air is turned on it passes through the chamber in front of the piston and forces it back. This closes the chuck jaws on the work, and the pressure of the air in the opposite direction carries the friction into the cone pulley and starts the pulley forward at full speed. When the air is released, the spring inside of the spindle retracts the friction from the pulley while a multiple disk brake on the rear spindle bearing checks the spindle momentum, thus leaving the cone pulley free to run. The pull tube is carried forward by the pressure of the spring in the opposite direction, the chuck jaws are opened and the machine is now ready to receive the next piece.

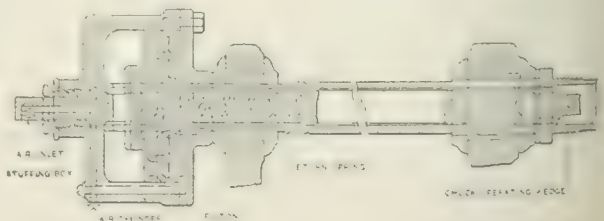


Fig. 5—Drawing Showing Details of the Open Only Air Operated Chuck.

In chucking work in this way no time is lost in getting the piece into the chuck as is frequently the case with the ordinary type. With these chucks the operator centers and tightens the jaws and possibly one of them grips a high spot on the casting. When the tools are brought into operation the torsional strain shifts the cast-

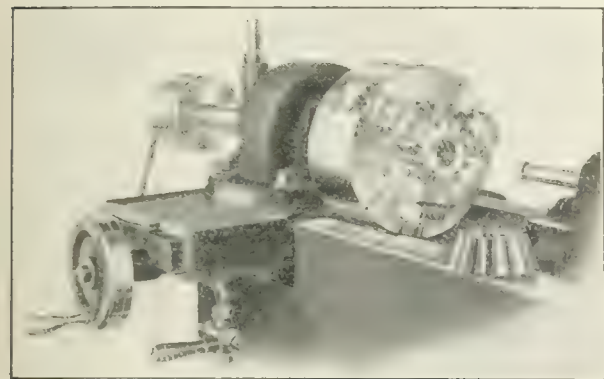


Fig. 6.—The Special Arrangement of Chuck Jaws for Holding Bevel Pinions.

ing from this high spot, and it becomes loose and the operator has to stop the machine and recenter and tighten all of the jaws. With the automatic chuck this loss of time is eliminated, as the grip is a continuous one, and if there is any tendency to slip, the grip increases and holds the casting securely at all times. This operating mechanism is self-contained, and there is no pressure against the bearing boxes while the spindle is running. The air system is very powerful and convenient and is especially desirable where the operations are rapid and where 1000 or more pieces are turned out per day. The gauge pressure recommended is approximately 70 lb. or over, although for that class of work which does not require a heavy grip, a reducing valve can be placed on the air pipe and adjusted to give the required pressure.

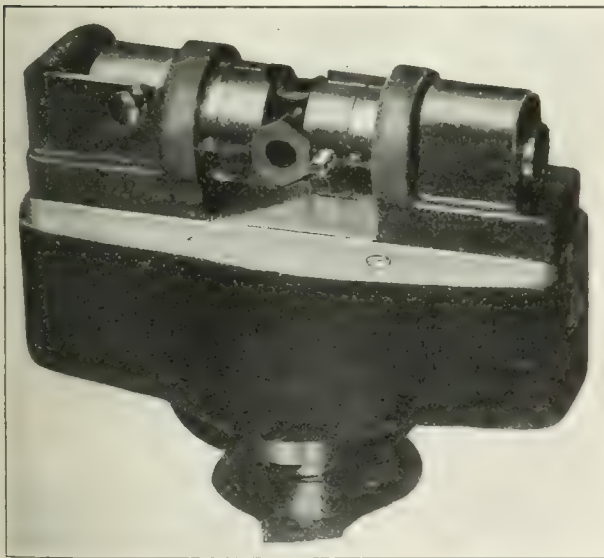


Fig. 7.—The Garvin Automatic Index Chuck.

Where machines are already in use they can be equipped with the spring type of chuck shown in Fig. 4, or with the air operated type shown in Fig. 5. These mechanisms are mounted on the rear of the spindle, the former being operated by a foot treadle and the latter by a valve. In these chucks the opening is controlled by the treadle or the valve and the stopping or the starting of the spindle is done through the countershaft. If desired the maker can supply a double acting air cylinder which takes air in on either side of the piston and does away with the interior releasing spring, as the gripping and the releasing are done by air pressure. This arrangement has been found very convenient for gripping work either internally or externally without reversing the jaws of the chuck. When the spring or the single acting air

system is used, it is necessary to reverse the actuating jaws and insert the internal wedge plug for gripping work internally.

Fig. 6 shows a three-jaw chuck arranged for gripping a bevel pinion on the pitch line as well as the application of an air operated chuck to the hole grinding machine of this company, which was illustrated in *The Iron Age* December 29, 1910. A similar arrangement of jaws can be furnished for gripping a spur gear on the pitch line and both types are being used extensively by motor car manufacturers. The jaws in both of these chucks are adjustable to and from the center for gears of different sizes, and they also carry a hardened plate on which a roller is mounted that fits down into the space between the teeth and grips the gear on the pitch line. A side-wise adjustment is also provided for the plate to enable gears where the number of teeth is not divisible by three to be gripped.

The automatic index chuck illustrated in Fig. 7 is intended for work having two or more points to be operated on which lie in the same plane. The construction of this chuck is identical with the others described except that it has index jaws. These chucks can be operated by any of the different mechanisms. When the inside spring is used, the application of pressure to the foot treadle stops the spindle and releases the heavy pressure on the jaws, while an auxiliary pressure is applied to hold the piece firmly in position while it is being indexed. Releasing the treadle causes the piece to be gripped heavily again and the spindle starts forward. To remove work from the chuck, the treadle is pressed down and the spindle stopped; a turn of the finger lever at the left releases the auxiliary grip and the piece can then be taken out. In this way it is possible to finish work at one chucking much quicker than can be done in the ordinary way. Index plates can be furnished for different divisions and all are fully protected from chips. For work where one end of a piece is to be finished from a thread on the opposite one, a special chuck operated in the same way can be furnished. With this chuck the piece can be screwed into the plug and if the chuck is air operated, the turning on of the air presses the piece against the face plate and holds it firmly while the work of machining is carried on. When the air is released, the piece is moved away from the face plate and can be unscrewed from the plug by hand.

Alliance Crane Business

The Alliance Machine Company, Alliance, Ohio, reports a decided increase in inquiries for cranes and general machinery in the past two or three weeks and a very promising outlook for a good year's business. During the recent quiet spell this company has been able to keep its plant running full at double turn in all departments. In one day in the past week it received orders for six cranes, four for the Inland Steel Company and two traveling cranes for the Republic Iron & Steel Company.

Among recent shipments have been a 75-ton ladle crane to a copper plant in Chile, S. A., this crane, with auxiliary machinery going with it, making seven car loads of machinery; a crane to the Inland Steel Company, a crane for the new plant of the Treadwell Engineering Company, Easton, Pa., two slab charging and drawing cranes for the new plant of the American Sheet & Tin Plate Company, Gary, Ind., and a special 4-roll set of bending rolls specially designed for rolling 20-ft. lengths, weighing 100 tons. Among other orders taken this year the company reports the following: Open hearth charging machine and trolley for the Tremont Nail Company, Boston, crane for the Bethlehem Steel Company, open hearth charging trolley for the Inland Steel Company, 40-ton crane for the Portsmouth Steel Company, crane for the Tennessee Coal, Iron & Railroad Company for its coke oven plant, and large gantry crane for the National Enameling & Stamping Company, St. Louis.

The Ohio Seamless Tube Company, Shelby, Ohio, has increased its capital stock from \$350,000 to \$1,000,000.

New Tools and Appliances

This is essentially a news department for which information is invited.

A Special Duplex Drilling Machine.—A duplex drilling machine which is intended principally for drilling pipe and also for bar drilling where the holes are spaced so closely that they cannot ordinarily be drilled at one setting has been recently built by the Moline Tool Company, Moline, Ill. In designing this machine an effort has been made to overcome the difficulties encountered in previous tools of this type. The pipe is drilled from each side which eliminates the time required for feeding the drill through the hole in the pipe, and the burrs are on the inside, where they are not objectionable. Drilling the pipe from both sides also prevents the breaking of drills, as the tool does not go through and strike the opposite wall of the pipe where it is said practically all the breakage occurs. The pipe is held in adjustable V-blocks and is clamped by plunger rods which are connected to the rails. Both the blocks and the plunger rods can be removed easily if it desired to use any other type of jig. The heads can be adjusted to any position along the rails, and they have the spiral drive regularly employed by the builder. Ball thrust bearings are provided for the spindles and wear can be compensated for. Causing the rails to approach and recede from each other provides the feed and in ordinary operations this movement should be continuous, the number of strokes being so timed that the operator can remove and replace the work while the plungers holding it are withdrawn. An automatic stop is provided to disengage the feed at the back end of the stroke, while the feed can be thrown in or out at any point by a double ended foot treadle.

Spark Plug and Wrench.—A wrench which combines in one a number of different devices has been recently placed on the market by J. H. Williams & Co., Brooklyn, N. Y. The box end of the wrench is adapted for a $\frac{1}{2}$ -in. spark plug and the open end for a tire lug, a $\frac{3}{8}$ -in. standard cap screw, a $\frac{3}{8}$ -in. A. L. A. M. standard nut and cap screw and a 9-16-in. set screw, thus giving considerable range of capacity with relatively few openings.

Hydraulic Pipe Flanging.—A new pipe flanger employing the cold hydraulic process is being developed by the Patterson-Allen Engineering Company, 2 Rector street, New York City. The machine is automatic in its operation and will flange bent and straight pipe equally well. It does its work rapidly, having a capacity of between 250 and 300 8-in. flanges per day.

Electric Motors.—The Reno-Kaetker Electric Company, Cincinnati, Ohio, has developed a line of direct current motors embodying a number of new features. Probably the most important of these is the fact that the speeds have been designed to correspond to those of 60-cycle alternating current motors, five different speeds, namely, 600, 720, 900, 1200 and 1800 rev. per min. being available. This is a decided advantage where motors are to be used for driving machine tools, as heretofore there have been no standard speeds for direct current motors. The gearing on machine tools is generally designed for operation by an alternating current motor, and when a direct current machine is used a special gear has to be designed to meet the requirements of each individual case which has resulted in a greatly increased cost of production.

Woodworkers' Vise.—The Emmert Mfg. Company, Waynesboro, Pa., is placing on the market a new vise for woodworkers, which is rapid in action and possesses a new type of locking device that is operated by turning the vise handle or lever about a quarter turn. This device operates on a screw having a full thread and engages a case hardened $\frac{3}{8}$ -in. square steel lock rod placed within 3-16 in. of the main screw of the vise. The lock rod passes through a nut and is gripped on two sides. A triangular toothed wedge of hardened steel is also contained in the nut and operates against an angle in the nut so that when the main screw of the vise is

turned to the right the nut moves forward and the angle in the lower part of the nut lifts the wedge into engagement with the grip rod. After the wedge has been forced into this position the nut becomes rigid with the grip rod, and is to all intents and purposes a part of the rear vise jaw. The screw then passes through the nut, drawing the front jaw inward against the work to be held. A tilting or angle jaw is provided for holding taper or wedge like shapes. A wood pad form can be attached to the angle jaw, and if a greater angle is desired this pad can also be of the wedge shape.

Pistol Rifling Machine.—The Pratt & Whitney Company, Hartford, Conn., has recently developed a pistol rifling machine capable of accommodating any style of barrel up to 10 in. in length. The machine is entirely automatic in operation, and when once set requires but little attention other than supplying the necessary work. As two barrels can be operated upon at once its production capacity is greatly augmented. In the design care has been taken to make the various operating mechanisms as simple as possible and to locate them in the most accessible manner. The lead for the rifling is obtained in the same manner as in the maker's other machines. The traveling action of the head is positively and accurately controlled, and an exceptionally rapid quick return reduces the idle time to a minimum.

Internal Thread Gauge and Tool Setter.—William Avery & Co., Foxboro, Mass., are making a device that enables one to reset internal threading tools of the customary types, after they have been reground, easily. The tool has two V's separated from each other by exactly 1 in. One is a male V, which engages the internal thread and the other is a female V turned in the rod. When the former meshes with the internal thread and the tool is set to the latter, the tool will catch the thread correctly if it is not fractional. The customary thread gauge also forms a part of the device.

Radius Gauge and Pliers.—Two recent additions made by the L. S. Starrett Company, Athol, Mass., to its line of small tools are a radius gauge having two sets of leaves and pair of pliers having a wide range of adjustment. One of the two sets of leaves in the former has concave ends and the other convex, thus enabling the radii of surfaces of these formations to be measured. Two sizes of tool are manufactured, one having 26 leaves for measuring radii varying by 1-64 in. from 1-16 to $\frac{1}{4}$ in. and the other having 32 leaves for radii from 17-64 to $\frac{1}{2}$ in. In adjusting the pliers the lower jaw can be moved either in or out by turning a knurled worm that engages a rack cut on one side of the jaw. As the handles are pivoted to each other and move in unison, they are always the right distance apart for the hand to grip. The jaws have a capacity for pieces ranging up to $1\frac{1}{4}$ in. and can be adjusted to grip either a straight or a taper surface evenly. The gripping power of the tool is considerable, as the pivoted jaw has a short fulcrum.

A Universal Oil Stone Slip.—Through a most annoying inadvertence an article was published in *The Iron Age* of February 2 crediting a new product, a universal oil stone slip, to the Norton Grinding Company, Worcester, Mass. This product is made by the Norton Company, also of Worcester. The Norton Grinding Company is a manufacturer of grinding machinery, while the Norton Company makes Norton grinding wheels of Alundum and oil stones.

The Detroit Core Machine.—Augustus N. Kelley, foundry superintendent of the American Blower Company, Detroit, Mich., has applied for patents on a new type of core machine which is very simple and is also adaptable for making all kinds of cores. It is claimed that with this machine any man who is able to shovel sand can make a core. The sand is rammed by jarring, the core box and plate are rolled over and the box drawn from the core without the operator moving from his position, the necessary power being produced by the pressure of his foot on a treadle. One of the special features of this machine is that the core box can be taken off and another substituted in a very short space of time, or if the core boxes are small two or more can be attached at once.

Trade Publications

Decimal Equivalents.—The Garvin Machine Company, Spring and Varick streets, New York City. Wall hanger measuring 30 in. square. Gives a list of the decimal equivalents of fractional parts of an inch. These vary by sixty-fourths and are arranged in four columns. The figures are $\frac{3}{8}$ in. high, and are printed in black on a contrasting background, which makes them easily read.

Automatic Screw Machine Work.—National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. The piece is one of two diameters threaded with different pitch screws and with a knurled head. Illustrations show the operations performed in each of the four positions in the machine. There are nine operations performed in the four positions. The thread is cut during the other operations, but at the correct speed for the size, pitch and material. It does not retard the forming and other operations, where high spindle speed is essential to accuracy and rapid production. The sample is offered as typical of work possible on the Acme automatic multiple spindle screw machine.

Rock Drill Accessories.—Ingersoll Rand Company, 11 Broadway, New York City. Bulletin No. 9003. Describes and illustrates the complete line of drill mountings and steam hose, drill steels and other accessories usually entering into a complete rock drilling equipment, which the company is prepared to furnish. Tables giving the sizes, weights and prices of the equipment are included, and a reprint of an article on the use and care of rock drill bits from the *Mining and Scientific Press* completes the bulletin.

Steam Turbines.—De Laval Steam Turbine Company, Trenton, N. J. Catalogue A. Size 6 x 9 in.; pages 120. Devoted to single stage turbines with and without gears, but various questions relating to other types are briefly discussed. The adaptability of this turbine for all kinds of service and the results of tests showing its economy and steam consumption are included. The construction of the De Laval turbine is fully described, and its special features, such as the safety groove which allows the buckets to be thrown before the wheel itself will rupture and the safety rings embracing the hub of the wheel, are pointed out.

Elevator Controllers.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Booklet. Pertains to the Schureman line of elevator controllers, which are made for both direct and alternating current. The various types are illustrated and described, and space is given to various accessories.

Frogs, Switches and Crossings.—L. A. Green Company, Park Building, Pittsburgh, Pa. Catalogue No. 25. Illustrates different types of frogs, switches and railroad crossings, switch stands, connecting rods, lever catches, rail braces and other products for railroad equipment. Instructions are given for ordering. Tables are presented showing the tonnage of rails in the various weights per mile of track, and also the fastenings per mile for different lengths of rails. The catalogue is very complete.

Electric Pyrometers.—The Bristol Company, Waterbury, Conn. Bulletin No. 130. Size 8 x 10 $\frac{1}{2}$ in.; pages 56. Illustrates and describes both the indicating and the recording types of the William H. Bristol electric pyrometers, and calls attention to their special features, among which is an automatic compensator which makes the readings independent of any atmospheric changes at the cold end of the thermo-couple.

Portable Elevator.—The New York Revolving Elevator Company, Jersey City, N. J. Bulletin No. 10. Gives general description and specifications for the Revolver portable tiering machine, which can be wheeled to any place in a storeroom or warehouse and used for stacking barrels, boxes, bales, &c. In use the box or bale is placed on an elevating platform, which is raised by a crank and gears. Two double gears are provided, one for high speed and the other for low. The capacity of the elevator when operating with the high speed gear is 800 lb. and 1500 lb. when the low speed gear is employed.

Marine Gasoline Engines.—Grimm Mfg. Company, 39 Erie street, Buffalo, N. Y. Devoted to a line of two and four cycle marine gasoline engines for medium duty and high speed. The construction of the engines is described at length, and this is followed by illustrations and brief specifications of the different sizes. The line comprises three four-cycle engines with two, four and six cylinders, respectively, and 12 two-cycle engines having from one to six cylinders.

Electric Lighting.—The Holophane Company, Newark, Ohio. Loose leaf catalogue. Calls attention to the various types of glass reflectors and globes for electric lamps which this company is prepared to furnish. The different styles are illustrated and described with tables of the various kinds of lamps recommended for each and a price-list. Curves showing characteristic distribution of light with the various reflectors and globes are included.

Direct Current Electrical Apparatus.—Fairbanks, Morse & Co., Chicago, Ill. Bulletin No. 25. Gives in simple language the definitions of electrical terms and describes the construction and uses of the various types of direct current

apparatus. The bulletin is gotten up in the form of a catechism with questions and answers, and many of the latter are supplemented by illustrations.

Cranes.—Northern Engineering Works, Detroit, Mich. Catalogue No. 25. Treats in a condensed form of the different kinds of cranes made by this company. The various types shown include electric traveling cranes of several sizes and designs, hoists, hand-power traveling cranes and jib and pillar cranes. All of the various styles are illustrated, and in addition, there are a number of views showing typical installations.

Oxy-Acetylene Welding.—The Linde Air Products Company, Buffalo, N. Y. Pamphlet. Relates to the use of the oxy-acetylene process for cutting and welding metals, and shows several samples of work done. Space is given to the process of manufacturing the oxygen and generating the acetylene. Views of stationary and portable acetylene generators are given, as well as of the plant where the oxygen is manufactured.

Pile Driver.—The Browning Engineering Company, Cleveland, Ohio. Catalogue. Deals with a self-propelling railroad pile driver for either straight or batter piles. This machine is of the steam driven revolving type, and can be operated over the line at a speed of approximately 6 miles per hour. One of the special features of the pile driver in addition to its ability to drive batter piles is its reach, which is 19 ft. in front of the leading truck wheels and 28 ft. from the center of the track when driving piles on either side of the right of way. For transportation over the road the hammer and leads can be lowered in approximately 1 $\frac{1}{2}$ minutes. An illustrated description of this machine appeared in *The Iron Age* February 23, 1911.

Electric Drive.—General Electric Company, Schenectady, N. Y. Two bulletins. No. 4784, superseding No. 4665, is devoted to the electric drive in pulp and paper mills. The advantages to be derived from the use of electric power are set forth, and descriptions of a number of important installations are included. No. 4785 points out the advantages to be secured from employing electric motors in woodworking plants. The bulletin illustrates and describes the electric motor as a part of woodworking machines, drills; band, circular, jig, rip and swing saws and planers.

Drill Press.—Colburn Machine Tool Company, Franklin, Pa. Bulletin No. 43. Illustrates and describes a 24-in. heavy duty drill press with a compound table, an illustrated description of which appeared in *The Iron Age*, September 22, 1910. A record of tests made with Celfor drills on this machine is also included.

Steel Specialties.—The P. Wall Mfg. Supply Company, 718 Preble avenue, Pittsburgh, N. S., Pa. Catalogue. Treats of a line of steel specialties which include brazed steel and copper plated oilers and torches, steel gongs, galvanized steel ice cans and sheet metal specialties. The oilers are made in various sizes and styles for bench and engine use. The special advantages claimed for them are great strength due to the use of brazed joints and freedom from leakage. In addition to the different articles shown in the catalogue the company is prepared to furnish special sizes and shapes as may be required.

Calendar.—The Worth Brothers Company, Coatesville, Pa., manufacturer of steel plates and sheets for boilers, tanks and boiler tubes, has issued an annual calendar. The various plants of the company are illustrated in the upper portion, and a pad with large figures occupies the remainder.

Metal Working Machinery.—Prentiss Tool & Supply Company, 115 Liberty street, New York City. Loose leaf catalogue. Illustrates and describes a complete and varied line of tools and machinery adapted to the use of high speed tool steels. Practically all of the tools have a single page devoted to each particular one, the illustration being given in the upper portion while a description or brief table of specifications occupies the remainder. All of the standard makes are shown, and a general index enables machines to be located easily.

Steel Window Sash.—The Detroit Steel Products Company, Detroit, Mich. Catalogue. Size 9 $\frac{1}{2}$ x 12 in.; pages 36. Describes Detroit Fenestra solid steel window sash for manufacturing plants, machine shops and other industrial construction. Joints, sections, standards and near standards are described and illustrated, and dimensions and details are given so that provision for the use of the sash may be made in the preparation of building plans. Instructions for erection are also given. There are numerous illustrations showing industrial buildings equipped with the sash.

Foundry and Platers' Supplies.—Frederic B. Stevens, Larned and Third streets, Detroit, Mich. Catalogue. Size 6 x 9 in.; 700 pages. Concerned with an extensive line of supplies for foundries and plating establishments. Each of the articles is illustrated and described and is accompanied by a table of sizes and prices. Among the various lines covered are facings, core compounds and binders, cupolas, ladles, rammers, flasks, flask equipment, molding machines pattern shop equipment and supplies, molders' tools, brass melting furnaces, crucibles, core-room equipment, tumbling mills, pneumatic tools and accessories, fans, industrial railways and platers' supplies and equipment. Valuable suggestions, tables, formulas, &c., for foundrymen and platers are also included.

The Machinery Markets

Inquiries and orders continue to increase in the machinery trade. Some especially good business was placed in the New York market during the week and more is in sight. In Chicago machinery houses are bidding on a list calling for an outlay of \$25,000, which has been issued by the International Harvester Company, and the Union Pacific Railroad has issued inquiries for requirements necessitating an equal expenditure. The demand for second-hand machinery in that market is in excess of the supply, and used machines in all sections are increasing in value. A decided improvement is noted in Cleveland, where inquiries for cranes and steel plant equipment are occupying the attention of the trade in addition to a few small lists of tools. Foundries making machinery castings are busy in Cincinnati, and a better call for machinery of all kinds and particularly for drilling machinery and lathes is noted in that territory. Water works development and other municipal improvements have increased the machinery demand in Texas. In Detroit a better volume of orders is coming in for all lines than at any other time this year. A good single tool business has been booked in San Francisco, and there are prospects of some excellent sales of mechanical equipment for the Mare Island Navy Yard. Special can machinery for delivery to the packing plants along the Pacific coast is being sold in good quantities by San Francisco machinery houses. Conditions continue rather quiet in both St. Louis and Philadelphia. In the latter market, while the demand is not up to normal, it is better than during February. The export trade continues noticeably good. Some good inquiries for machine tools are being distributed and New England metal working machinery manufacturers are bidding on a large lot of heavy machinery for a Japanese account.

New York

NEW YORK, March 8, 1911.

Scattered inquiries for diversified lines of mechanical equipment are coming into the New York machinery market in better volume than at any time last month, which is a surprise to even the optimistic machinery men, as there was a lull last week that made it appear to some that the buying movement was off for a time. In addition to this some excellent orders were placed during the week. The Simms Magneto Company closed for a large part of the machine tool equipment for its new plant at Watsessing, N. J., and it is estimated that the company has spent about \$100,000 in this market during the last four weeks. The New York, Ontario & Western Railroad Company has not closed out for its extensive list issued several weeks ago, but supplementary inquiries indicate that the business will be placed in the near future. The call for woodworking equipment has increased, and automobile builders are asking for small lots of tools. The Eastern steel plants have placed some good sized orders in this market of late for conveying machinery and charging apparatus. Foundrymen in this vicinity note an increased demand for machinery castings, and at least two large plants have increased their business 10 per cent. within the last 30 days. Stocks of some classes of machine tools in dealers' hands are getting low and makers are being urged to hurry shipments.

The Terry & Tench Company, iron and steel structural contractor, whose plant is at Lexington avenue and 131st street, New York, has bought a 20-acre tract of land on the Newark meadows, New Jersey, fronting on the Passaic River, on which it proposes to build a large fabricating plant. Plans have been made to erect seven buildings, which will include a structural shop, 80 x 210 ft.; a large machine shop, blacksmith shop, template room, boiler house, engine house and storerooms. A large traveling crane will be installed in the main building. Other additions to the plant will be made as they are needed. The company will fabricate its own material for the construction of the buildings, and arrangements have been made for machinery covering its immediate needs.

John Riddell, mechanical superintendent of the General Electric Company, Schenectady, N. Y., has sent out inquiries for machinery calling for the expenditure of at least \$18,000 to be installed in the lighting arrester laboratory of Union College of Schenectady. The list includes one 14-in. x 8-ft. lathe and one 11-in. x 5-ft. lathe, one sensitive drill press, one 20-in. upright back geared drill, a combination milling and drilling machine, one saw table, one jacksaw, one double end tool grinder, one saw bench and one wood finisher. The equipment is required for early delivery.

The Crucible Steel Company of America has requested the town of Harrison, N. J., to turn over to the company several unimproved streets in the vicinity of its plant at Harrison in order to allow for the construction of several additional manufacturing buildings. The company has prepared plans for structures which will cost about \$600,000 to be built on property abutting on the streets, and it desires to extend its entire plant over the area. A request has been made that a price be set upon the property, and the town officials have asked \$23,000 for its land, and exact a guar-

antee that the property will be used for building purposes only. The acceptance now rests with the directors of the steel company.

Bids will be received March 15 by the New York State Commission of Lunacy, in the capitol at Albany, for the equipment of an electric generating plant for the State Hospital at Poughkeepsie, N. Y. Included in the requirements are feeders and transformers, motors and a general line of power equipment. The total surety required is \$20,000, and specifications can be obtained from T. E. McGarr, secretary of the commission, who can be addressed at Albany.

The Twombly Motors Company, 220 East Fifty-first street, New York, is planning to erect a large plant for the manufacture of the Twombly touring car, auto trucks and delivery wagons. The company contemplated the purchase of about 15 acres of land in Baltimore. Inquiries for some of the desired machinery have been made in this market, but nothing has been bought as yet.

The Board of Water Commissioners of Westbury, N. Y., will receive bids March 20 on equipment for a water works installation for that town, which will include a 100,000-gal. tank, a steel tower, 164 ft. high, 58 gate valves, two deep well triplex power pumps, with a total capacity of 1,000,000 gal., two 35-hp. multiple cylinder vertical gas engines with gas producers.

Bids will be received March 21 by the Board of Water Supply of the City of New York at its offices, 165 Broadway, for installing a complete drainage equipment for unwatering the shafts and tunnel of the Rondout siphon of the Catskill aqueduct. A bond of \$16,000 is required of the successful bidder, and it is specified that the work be completed within 18 months.

The Ideal Electric Vehicle Company has been organized under a New Jersey charter with an authorized capital stock of \$250,000. Herman A. Tufel, Maplewood, N. J., is the principal incorporator.

The Pure Carbon Company, Wellsville, N. Y., is in the market for a large line of steel shafting, shafting couplings, post hangers, drop hangers, pulleys, leather belting, friction clutches, &c., in addition to one water pump, capacity not less than 480 gal. an hour, one water jacketed air pump, one oil pump to handle 80 gal. an hour and one belt shifter.

The Grain Storage Construction Company, Mutual Life Building, Buffalo, N. Y., will build a coal elevator, 1200 tons capacity, at Fairport, N. Y., for A. M. Loomis, and a coal elevator, 1000 tons capacity, at North East, Pa., for W. L. Stowe.

The Spalding Bros. Mfg. Company, North Rochester, N. Y., manufacturer of fiber board, &c., contemplates locating a new factory at North Tonawanda, N. Y., where an available site has been secured.

The Republic Metalware Company, Buffalo, N. Y., is adding to its plant at Republic and Alabama streets and the Erie Railroad, a building, 55 x 224 ft., to be used by its pickling department.

The Samson Mfg. Company has been incorporated at Buffalo, N. Y., and will establish a plant for the manufacture of wire ladders, fire escapes, &c. The incorporators are James J. Lanahan, J. L. Kenefick and Morey C. Bartholomew, 1104 Prudential Building, Buffalo.

The Union Cutlery Company, Tideout, Pa., will build a new factory at Olean, N. Y. The building will be 40 x 130 ft.

The Camillus Cutlery Company, Camillus, near Syracuse, N. Y., is arranging to make a large addition to its

THE MACHINERY MARKETS

factory and equipment to provide for a material increase in output.

The F. M. Curtis Company, Jamestown, N. Y., will build a two-story, 60 x 120 ft., addition to its furniture factory on Cheney street.

The Findlay Motor Company, Findlay, Ohio, has purchased the American Motor Truck Company and the Lockport Stamping Company of Lockport, N. Y., and will move the plants of both companies to Findlay, where they will be merged with the present plant of the purchasing company. The first named of the companies to be transferred manufactures freight trucks and the other mail boxes and other stamped metal articles.

O. Bryant & Sons Company, manufacturer of special and general machinery, 15 Bradley street, Buffalo, N. Y., is erecting and will equip a two-story brick machine shop at West and Fernwood avenues, that city.

M. J. Bernhard, manufacturer of bar fixtures, Buffalo, N. Y., is erecting a four-story and basement factory, 50 x 110 ft., on Jefferson street, near Genesee street. Considerable new machinery and equipment will be required.

Chicago

CHICAGO, ILL., March 7, 1911.

A general spirit of optimism seems to prevail in the machinery market. This is not due to the closing of any large contracts during the past week, but rather to a general feeling that seems insistent on betterment. The International Harvester Company is out with a list approximating \$25,000, and the Union Pacific Railway with another which totals a like amount. Most of the business closed during the past week has been with small manufacturers. There is a demand quite in excess of the supply for good second-hand machine tools.

The Peerless-V-Belt Company, Chicago, has closed a contract with the Commercial Club of Cedar Rapids, Iowa, for the removal of its factory to that city. The company is having plans prepared and will commence work at once on the erection of a factory building, 100 x 200 ft., two stories, which will be rushed to completion. The authorized capital stock of the company will be increased to \$300,000, the Commercial Club having agreed to take \$50,000 worth of first mortgage bonds on the new plant. The company will purchase an entire machine shop equipment and will install a 60-hp. boiler for heating purposes. A number of motors will also be purchased.

The Foote Bros. Gear & Machine Company, 214 North Carpenter street, Chicago, manufacturer of metal and rawhide gears, has let contracts for a 30-ft. addition to its plant, three stories and basement. This will increase the company's floor space to approximately 30,000 sq. ft.

McDowell, Stocker & Co., Chicago, are now carrying in stock a complete line of Bardons & Oliver's turret machines.

The Minerallac Electric Company, Chicago, has increased its capital stock from \$24,000 to \$100,000.

The Central Locomotive & Car Works, Chicago, has been incorporated with \$600,000 capital stock by Fred W. Craft, Alexander E. Arkin and David Jetjinger, 59 Clark street, Chicago.

An effort is being made in Tuscola, Ill., to secure the necessary money for the installation of a modern lighting plant.

The Stover Engine Works, Freeport, Ill., is preparing to enlarge its plant. A new foundry, which will double the present capacity, will be erected, also an addition to the machine shop, a fireproof pattern storage and a new building for the storage of castings.

Altorf Brothers, Roanoke, Ill., will build an addition to their plant, 54 x 65 ft., two stories and basement, which they will equip with woodworking machinery, lathes, drill keyseaters, &c.

The Canton Heating & Foundry Company, Canton, Ill., recently organized to succeed the Savill-Chandler Company of that city, has taken over the plant formerly operated by that company, in which it is making extensive improvements with the expectation of having it in operation in about 60 days. The company proposes to manufacture heating boilers, radiation supplies and valves and do general foundry work. The company will require additional factory room and will seek the assistance of the Canton Commercial Club in erecting a new building.

The City Council of Eldora, Iowa, is planning the installation of an electric light plant.

The Decker Mfg. Company, Keokuk, Iowa, is erecting a new factory building, 50 x 140 ft., three stories. The company manufactures hardware specialties, and will move the equipment from its present factory into the new building about June 1. Additional equipment for the manufacture of special lines which the company will make will be added later.

Webster City, Iowa, is advertising for bids for the construction of an electric light plant at an estimated cost of \$40,000. Bids will be opened March 21, and work on the building is to begin May 1.

The Citizens' Water Company, Burlington, Iowa, is planning extensive improvements to its water works system.

La Crosse, Wis., will spend \$30,000 for improvements to its water works system.

The citizens of Antigo, Wis., are planning to install a new water works system.

The city of Anna, Ill., will install a water works system, consisting of a water tank and tower and all necessary appliances and machinery at a cost of \$6500.

The Greenview Electric Light & Power Company, Greenview, Ill., has been incorporated with a capital stock of \$10,000. The incorporators are James A. Brocken, A. H. Cleveland and John Larson.

The Fulton Electric Light & Power Company, Fulton, Ill., has increased its capital stock for the purpose of engaging in the manufacture of gas.

The Maple City Mfg. Company, Monmouth, Ill., has increased its capital stock from \$30,000 to \$150,000.

The Security Coal & Mining Company, Duquoin, Ill., has been incorporated with a capital stock of \$30,000. The incorporators are M. L. Bowen of Duquoin; Jas. E. Rutledge, Wm. A. Lafont and others of St. Louis. The company will engage in mining coal.

The Peoria Washed Sand & Gravel Company, Peoria, Ill., has been incorporated with a capital stock of \$5000. The incorporators are D. S. Brown, H. K. Patch and Wm. Swords, Jr.

The Rock Island Sand & Gravel Company of Rock Island, Ill., has increased its capital stock from \$15,000 to \$25,000.

The Buettner & Shelburne Machine Company, Terre Haute, Ind., is planning the erection of a large addition to its plant, which will require a large amount of special machinery for the manufacture of mining machinery.

The Genton Mfg. Company, Terre Haute, Ind., has plans prepared for the erection of a three-story factory building, which will be equipped with new machinery.

At a meeting of the directors and stockholders of the Haynes Automobile Company, Kokomo, Ind., it was decided to proceed at once to rebuild the factory which was recently destroyed by fire. It is understood that considerable new equipment will be purchased for the purpose of fitting up temporary quarters.

The Elliot & Reid Company, Richmond, Ind., has under construction a new warehouse, 175 x 300 ft., which will have a capacity of about 5000 tons. The building will be equipped with an electric traveling crane of sufficient capacity to handle about 200 tons of wire products in 10 hours.

Philadelphia

PHILADELPHIA, March 6, 1911.

A somewhat better volume of business has been transacted by merchants in this district; manufacturers also report, in some instances, a slightly increased number of orders, although the demand generally is still much below the average. Inquiries are reported as being in better number, and from the nature of the demand the trade feels a trifle more encouraged with the outlook. Current orders are for the most part confined to single tool propositions, with a few exceptions, where moderate quantities have been taken, notable among which are the requirements of the Treadwell Engineering Company, for its new plant at Easton, Pa., which are now being contracted for. One or more small shop equipments have also been recently closed. The demand has not been confined to any particular class of equipment, the general range of shop tools being included in recent transactions. Better reports are being made by makers of special tools and machinery, and in some cases the volume of business taken during the past month has exceeded that for the same period last year. The railroad demand continues rather quiet.

The foundry trade reports quiet conditions, particularly where machinery castings are a factor. Steel castings have been quieter and few foundries in this district are running at anything like ordinary capacity. Prices are also understood to be in quite unsatisfactory shape. In the boiler and engine trade business continues to drag, particularly as far as equipment of any size is concerned. Second-hand machinery merchants have had a moderate volume of business offered and in a few cases fair sales have been made, but the demand is not up to the average.

McCaffrey & Farley, iron founders, Third street and Girard avenue, are having plans prepared for a new foundry plant, 40 x 144 ft., to be erected at 2314 and 2316 Washington avenue.

The Ford & Kendig Company, Callowhill above Broad

THE MACHINERY MARKETS

street, has received bids for the erection of a two-story brick warehouse, 60 x 200 ft., to be built at Twenty-fourth and Wood streets, which will be used for the storage of fittings, pipe and supplies.

The contract for the erection of the new garage and sub-delivery station for Strawbridge & Clothier, at the corner of Sixty-second and Locust streets, was awarded to John R. Wiggins & Co., contractors, who will begin work at once. Plans were by Savery, Sheets & Savery, and call for a reinforced concrete structure, three stories, 80 x 115 ft.

W. Hunter, chief engineer, Philadelphia & Reading Railroad, will receive bids until March 15 under contract No. 40, in connection with the work appurtenant to the abolishment of the grade crossings on the Port Richmond branch, for the reconstruction of the coal yards between Somerset street and Aramingo avenue, also under contract No. 55 for the erection of a trianmaster's office at Frankford and Lehigh avenues.

The Department of Public Health and Charities, city of Philadelphia, will take bids to-morrow for the installation of new boilers and repairs to old boilers, under item 41, at the Philadelphia General Hospital, and under item 44 for fire-proof stairways in the Hospital Department. The amount to be expended under the former item is \$15,000, while for the latter, \$6000 is available.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for two heavy Mogul type standard gauge locomotives, also for a number of flat and box cars, dump cars and cabooses.

The Parkersburg Iron Company, Parkersburg, Pa., has recently installed additional equipment, including an Ajax Mfg. Company's upsetting machine, to be used for upsetting charcoal iron stay tubes, up to 4 in. diameter, this being particularly necessary in filling numerous orders for marine work. The company notes an improved demand for its product.

The Standard Novelty Works, Duncannon, Pa., will erect a two-story addition to its plant. The building will be 50 x 52 ft., and has been necessitated by the heavy demand for its line of Lightning Guider Sleds. On completion of the new addition this company will also manufacture a line of coaster wagons and other novelties.

The Royersford Foundry & Machine Company, Royersford, Pa., reports a very satisfactory demand for its line of power transmission machinery, although in punch and shearing machinery business has not been up to the average. Indications favor a better volume of general business.

The Link-Belt Company reports business in January and February to have been very good, more than twice as large in volume as that taken during the same months in 1910. The company's estimating department is fully engaged, and inquiries for practically all classes of work are coming out freely, that for coal handling machinery, however, being the most active. General business has also shown a material betterment. Among recent orders taken is one for a coal tippie of 300 tons hourly capacity, for the New River & Pocahontas Consolidated Coal Company at Minden, W. Va., and another of slightly less capacity for the New River Collieries Company at Eckels, W. Va. A coal handling plant will be installed at the Ninety-sixth street station for the Metropolitan Street Railway, New York, and a like plant furnished the Cambria Steel Company, Johnstown, Pa. Export business in sugar handling machinery has also been good. A marked demand for stone and fertilizer handling and special machinery is also noted, while that for its Maximum Silent high speed chain drive has been exceptionally good.

Cincinnati

CINCINNATI, OHIO, March 7, 1911.

The present conditions with the machine tool trade are so spotty that it is hard to form an opinion as to the actual situation. With but few exceptions, however, conditions are reported as improving and in a steady way. Lately manufacturers of drilling machines have experienced a little spurt in the demand, and the smaller sizes of lathes are also good sellers. Unless orders have been placed quietly, there has been no railroad buying here recently, with the exception of that already noted.

Local foundries are reported to be busier, and the manufacturers of woodworking machinery also note a continued improvement.

To manufacture and deal in machinery the Swing & Bickett Special Machine Company has been incorporated in Cincinnati, with \$10,000 capital stock. The incorporators are A. J. Swing, C. A. Bickett, A. S. King, John C. Herrmann and W. B. Young.

The addition to the metal working plant of the Edwards Mfg. Company, Cincinnati, recently mentioned, will be 56

x 80 ft., two stories, and of steel and concrete construction. The building will be covered with the Edwards patent metal roofing.

Some large additions are planned for the Modern Foundry Company's plant in Oakley, and work will be commenced at an early date. Another Oakley factory will also be enlarged, and there is a rumor that a large new machine tool shop will be located there some time during the summer.

The new buildings for the Webster Mfg. Company, at Tiffin, Ohio, are well under way, and contract for the heating system was recently let to the American Radiator Company through its Cincinnati office.

It is rumored that the Dayton Steel Foundry, Dayton, Ohio, will make some large additions to its plant during the spring.

Work is progressing satisfactorily on the new large additions to the plant of the American Rolling Mill Company at Middletown, Ohio, and the company expects to have the mill in full operation before next fall.

Adam Benz & Son, machinists, Bank street and Central avenue, Cincinnati, have purchased the building occupied by them formerly under a lease, and it is reported will make some additions to their shop.

On February 28 fire destroyed the large garbage plant of the Cincinnati Reduction Company, in which was some valuable machinery. Plans are already under way for rebuilding. H. M. Chamberlain is president of the company.

To operate a sawmill the West Union Lumber Company has been incorporated at West Union, W. Va., with \$25,000 capital stock. The incorporators are F. B. Lyons, C. H. Gifford, D. C. Watson and L. M. Scott of West Union, and W. B. Taylor of Smithfield, W. Va.

Thoms & Breneman, Cincinnati, have let contract to the W. F. Pothoff Construction Company, for an eight-story reinforced concrete building, to be erected at the corner of Ninth and Sycamore streets. It is understood the building will be used for light manufacturing purposes.

The R. K. Le Blond Machine Tool Company, Cincinnati, has been distributing a very valuable handbook for mechanics and engineers, and the demand for this book has exhausted the supply. The Le Blond Company also gave to the National Metal Trades Association visitors, entertained at its plant last week, a very beautiful souvenir, showing the officers of the association as well as different views of Cincinnati, and of the company's plant in East End.

New England

BOSTON, MASS., March 7, 1911.

While the volume of orders in machinery lines is not increasing to any marked extent, reports received by the builders should afford much encouragement. It seems probable that the railroads will not be influenced unduly by the rate decision. Eastern visitors to the Middle West bring back bright reports of manufacturing conditions in those States, especially among the automobile builders. Some of the managers frankly state that they have been fooled as to the condition of their market and curtailed production too greatly. With some grades of cars a shortage is prophesied. Some of the large builders of high grade cars are rushing preparations for producing 1912 models. This change is already reflected to some extent among the manufacturers of machinery specially sought by the automobile people, and among the producers of accessories, parts and materials. As to the last named element, the builders had large stocks in hand when the depression struck them and these will have to be worked off before their buying becomes brisk.

Some of the builders of heavy machinery have received inquiries from the Japanese Government for large lots of tools. Other smaller miscellaneous lists are coming out soon.

The Uncas Specialty Company, Norwich, Conn., has purchased the Rochester Machine Tool Company and the Sterling Lubricator Company, both of Rochester, N. Y., and will move the equipment to Norwich. The corporation will hereafter be known as the Sterling Machine Company. The Uncas Company manufactures automobile accessories; the Rochester Machine Tool Company, the Acme double cylinder engine, a type much used in automatic stokers, and the Buckley boiler, which supplies this class of engine. The Sterling Company makes an automatic lubricator for steam engines. In concentrating the manufacture of the several lines at Norwich the Uncas plant will be increased, though details are not yet available. The equipment already owned in the several factories will be augmented by some new machinery. The company has increased its capital stock from \$50,000 to \$100,000. Frank S. Jerome, Norwich, is the president; Frank W. Browning, Norwich, treasurer, and A. K. Paul, Boston, clerk.

The Hendey Machine Company, Torrington, Conn., manu-

THE MACHINERY MARKETS

facturer of machine tools, has increased its capital stock from \$600,000 to \$900,000. The works are running 60 hours a week with a full operating force. Some machinery is being put into stock.

The Springfield Mfg. Company, Bridgeport, Conn., manufacturer of grinding machinery and abrasive wheels, has brought out a new line of dry grinders. Three sizes are regularly manufactured, having wheels respectively 12 x 2 in., 18 x 2 in. and 24 x 3 in.

The Gardner Central Foundry Company, Gardner, Mass., has put on the market a six-wheel grinding machine, designed for woodworking shops and other similar establishments, for grinding molder knives, cutters, drills and other tools where different shapes and grades of wheels are necessary. It is furnished equipped either for belt or motor drive.

The Union Twist Drill Company, Athol, Mass., manufacturer of twist drills and cutters, will build an addition, 40 x 80 ft., one story.

The Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., is making very important improvements to its works, a process which has been in progress for some time and which will continue until the entire armory is modernized to the highest degree. The great buildings are ample for the purpose of the business, but are now practically all occupied by its departments. Much new equipment has been purchased, much of it special, and more will be added from time to time in the immediate future.

The upper floor of the new factory building which will be erected by Landers, Frary & Clark, New Britain, will be given over to offices. The remaining stories will be used for manufacturing. The structure will be 50 x 360 ft. and seven stories.

The New York, New Haven & Hartford, New York Central and Boston & Maine railroads and the city of Springfield, Mass., are making plans for costly improvements in that city. The plans, just issued by William Barclay Parsons, the engineer of the Massachusetts Railroad Commission, call for the expenditure of \$11,500,000, including a bridge across the Connecticut River to cost \$615,000, four new lines for the New York, New Haven & Hartford, two on each side of the river; the remodeling of the Union Station, the abolishing of certain grade crossings and other important improvements. The bridge specifications call for 8,750,000 lb. of steel. The track specifications will be large.

The Springfield Foundry Company, Springfield, Mass., has awarded the contract for its new foundry on Pasco street. It will be of steel and concrete, 100 x 150 ft., one story.

The R. P. K. Pressed Metal Company, Bridgeport, Conn., manufacturer of pressed metal goods, is increasing its equipment by the addition of a heavy Waterbury-Farrel press. The works are running to fullest capacity, in spite of the fact that the increase in manufacturing facilities has been constant during the past two years. Much new machinery has been installed and a model toolroom has been created. The company makes a specialty of difficult draw die work up to moderately large sizes. The management reports a brisk demand from a wide variety of industry, inquiries being especially numerous.

Additions to general manufacturing plants include: United States Finishing Company, Norwich, Conn., three-story brick factory, 130 x 158 ft., the plans calling for other additions later; J. H. McIlroy Son & Co., North Monmouth, Maine, blankets, four-story factory, 75 x 200 ft.; Bartelow Bros., Chelsea, Mass., tanners' extracts, four-story brick and cement factory; Salts Textile Mfg. Company, Bridgeport, Conn., addition 75 x 120 ft., one story.

Cleveland

CLEVELAND, OHIO, March 7, 1911.

The general machinery market shows a decided improvement in the volume of inquiries in some lines, particularly in cranes and steel plant equipment. Orders in these lines have picked up somewhat, and manufacturers of cranes feel that most of the new inquiries are of a character that will result in the early placing of orders. There is a fairly good demand for locomotive cranes. Builders of industrial cars and locomotives also report a good volume of orders. In heavy handling machinery the market continues quiet. The demand for steam engines, which has been quiet for some time, has become fairly active. Some good orders have been placed within the past week or two, and a good volume of inquiries has come out. Engine builders report a constantly increasing demand for heavier units adapted for higher steam pressure, the higher pressure in many cases now being regarded as more economical. It is stated that five years ago 150 lb. was about the highest pressure asked for, but now buyers are frequently asking for engines for a pressure of 180 to 200 lb.

In machine tool lines the market remains about station-

ary. A few lists of a half a dozen tools have come out, but buying is mainly in single tools. The machine tool list for the new Lake Shore Railroad shops in Elkhart, Ind., which was expected early this year, has not yet come out, and the indications are that it will not be issued within the next 60 days.

The Bishop & Babcock Company, Cleveland, manufacturer of soda water fountains, beer pumps and allied lines, has absorbed the Becker Company, Chicago, maker of similar products. The name of the consolidated company has been changed to the Bishop-Babcock-Becker Company, and its capital stock has been increased from \$4,500,000 to \$8,500,000. K. D. Bishop, president of the Bishop & Babcock Company, will serve the new company in the same capacity, and L. A. Becker, head of the Chicago company, will be vice-president. The Bishop & Babcock Company has recently greatly enlarged its Cleveland plant, has rebuilt its Indianapolis plant and is building a new plant in Dallas, Texas.

The Cleveland & Pittsburgh Coal Company, Cleveland, has completed plans for the erection of a new coal and coke handling plant, to be erected at Lakeside avenue and East Thirty-eighth street, and contracts will be let shortly. In addition to the ground storage, there will be 16 bins with a total capacity of 250 tons. The bins will be of concrete reinforced with bars and expanded metal. There will be 16 sets of gates, shoots and screens. The coal will be handled with a gantry crane with 120-ft. span and 20-ton bucket. Bids have already been received for the crane, motors and trolley.

At a meeting of the stockholders of the National-Acme Mfg. Company, February 25, it was decided to secure authority to increase the capital stock from \$1,500,000 to \$2,500,000. Only a portion of the new stock will be issued for the present. The increase is due to the larger investment caused by the recent extensions to the Cleveland plant and the building of a plant in Montreal, Canada, for the manufacture of screw machine products. The Canadian plant is practically completed and will be placed in operation in about two weeks.

The National Screw & Tack Company, Cleveland, was authorized at a meeting of its stockholders, February 25, to increase its capital stock from \$1,461,000 to \$1,711,000. The increase will be made in a common stock issue of \$250,000, increasing the common stock to \$1,250,000. The new stock will be distributed among the stockholders as a dividend, as it represents earnings that have been put into the plant.

The Aluminum Pump Valve Company, Cleveland, has been incorporated with a capital stock of \$20,000, to manufacture a new pump valve. The company is located at the plant of the Industrial Pattern & Bronze Company, 988 East Sixty-seventh street. James E. Householder is the manager. Some machinery equipment will be purchased.

Joseph T. Ryerson & Son, Chicago, have opened a district office and display room in Cleveland in the Western Reserve Building, corner of Superior avenue and West Ninth street. They will shortly have on display a large line of general machinery and specialties. L. E. Skinner is manager of the office.

The Ideal Stamping & Mfg. Company, now located at 1555 Columbus road, Cleveland, will move to a new plant at Bessemer avenue and the Cleveland & Pittsburgh Railroad. This company and the Gorham Mfg. Company, which is engaged in a similar line of work, will be combined. The Ideal Stamping & Mfg. Company has recently incorporated with a capital stock of \$10,000. J. G. Roquett is the manager.

A committee of the stockholders of the Bucyrus Steel Castings Company, Bucyrus, Ohio, has reported favorably on a plan to consolidate that company and the Carroll Foundry Company in Bucyrus. The formation of a new company with a capital stock of \$500,000 will be formed if present plans are carried out.

With a capital stock of \$40,000 the Great Lakes Welding Company, Cleveland, has been incorporated by Henry R. Swartley, George R. Hall, Arthur L. Betts and others.

The Board of Public Service, Cleveland, will receive bids March 15 for electrical equipment for a traveling crane at the Kirtland pumping station.

The erection of the new plant of the Great Lakes Engineering Works at Ashtabula, Ohio, is progressing rapidly. The seven buildings are under roof and will soon be ready for the installation of machinery. It is expected that the dry dock will be ready for operation July 1 and the ship-building plant October 1.

The Bremen Mfg. Company, Bremen, Ohio, recently incorporated with \$50,000 capital stock, is erecting a factory building, 35 x 150 ft. The company will manufacture caloric pumping machinery, and will install about \$5000 worth of equipment. The officers of the company are: Will S. Turner, president; C. D. Hoskins, vice-president; H. M. Shelhamer, secretary and treasurer.

THE MACHINERY MARKETS

St. Louis

ST. LOUIS, Mo., March 6, 1911.

Business among machine tool dealers was rather quiet the past week, though some report February a satisfactory month. Dealers look forward to a period of moderate business movement.

The Brown Shoe Company has let contract for a new seven-story factory building to cost \$100,000.

The Jeanne D'Arc Mfg. Company, maker of valves, &c., will remove to Belleville, Ill., a suburb of St. Louis, and contract for a new building there has been let. It has also bought a plant in Louisville, Ky.

The St. Louis Car Company is now getting its affairs into good shape, and the plant will be running with its full force of about 5000 men in the course of a week or 10 days.

The Moon Motor Car Company is extremely busy and unable to catch up with its orders.

The Igou Motor Car Company has been incorporated with a capital stock of \$6000 by S. C. Igou and associates to do a general garage and agency business at Grand and Cass avenues. Mr. Igou has been for several years superintendent of the Moon Motor Car Company.

The several manufacturers of motor boat engines here are all very busy. St. Louis has within the last few years become quite a center for the manufacture of gasoline motors of this type.

Business in the woodworking machinery industries is gradually picking up, as reported by the Hall & Brown Wood Working Machinery Company, maker of planers and matchers and a large line of other saw mill and planing mill equipment.

The W. H. Putnam Lumber Company, St. Louis, has been incorporated with a capital stock of \$25,000. The incorporators are Chas. Stark, Victor E. Rhodes, W. H. Putnam and others. The company will engage in the manufacture of building material.

The Imperial Clock Company, now located in Granite City, Ill., has purchased a site on Forest Park boulevard and will erect a new factory to accommodate its increasing business. G. Gorlander is the president. The new factory will cost upward of \$50,000.

The plant of the Heinann-Miller Mfg. Company, 1819 North Seventeenth street, was destroyed by fire March 2, causing a loss estimated at \$45,000 on stock and fixtures and \$6000 on the building. The company manufactures show-cases and store fixtures.

The Elliot Frog & Switch Company has taken a railroad contract for 800 frogs, and finds the outlook improving.

The town of Warren, Ark., proposes to erect a 200-ft. bridge over the Saline River.

It is reported that the Otis Elevator Company, St. Louis, is negotiating with the Board of Trade at Little Rock, Ark., with a view to opening a branch office in that city.

Detroit

DETROIT, MICH., March 7, 1911.

Industrially as well as in a weather way March came in like a lion. The past week has seen a general spring awakening in practically all lines. Spring orders have poured in as in no other week this year. R. B. Jackson, manager of the Hudson Motor Car Company, states that the week has been one of the most phenomenally prosperous periods that the motor car industry has seen in the last three years. Saturday morning his company received orders for the immediate shipment of 400 cars.

The latest among Detroit's motor accessory industries is the Renfro's Speed-o-Meter Company, which manufactures a contrivance designed to place a check on the owner's car in his absence. It gives an accurate report each day of every movement of the car, each trip, every start and all speeds attained for every minute of the 24 hours.

The \$8,000,000 bond issue authorized by the Michigan Railway Commission will allow the Pere Marquette to spend \$2,000,000 in improvements. The Toledo division will be double tracked for a distance of about 40 miles. Yard trackage will be increased to about 100 per cent. Saginaw will have a new warehouse, Harbor Beach a new round-house and Ludington many yard improvements. A number of divisions will receive new stations as well as general improvements.

The Standard Foundry Company of this city increased its capital stock from \$40,000 to \$100,000. With new capital it is intended to enlarge facilities to meet the requirements of its trade.

The Modern Machinery & Engineering Company, composed of Detroit stockholders, was organized last week with

a capital stock of \$25,000. Thomas G. Ahern, who is the principal stockholder, has the company's affairs in hand.

Each week sees an addition to Detroit's motor car industry. The Kinsey Motor Car Company is the name of a new concern. Articles of incorporation were filed last week with a capital stock of \$150,000. Solomon W. Kinsey holds the office of president.

Organized to manufacture motor engines the Morton Motor Company was incorporated last week, with Chas. N. McNaughton as president. Mr. McNaughton is prominently identified in financial circles.

The Peninsular Car Seal Company, Benton Harbor, Mich., organized to make car seals, the invention of J. C. Davis of that city, has filed articles of incorporation with the State Secretary.

A stock company has been organized at Mt. Clemens to take over the old Wolcott mill property, which has been in the hands of a receiver. The company has a capital stock of \$45,000, and its organization is in the hands of Wm. F. Edmunds, president of the New Haven Savings Bank.

The Bates Tractor Company plans to complete its plant by April 1. The new factory is a frame building and covers 40 x 250 ft. So far three carloads of machinery have been ordered, scheduled to arrive by March 15. More will be ordered as it is needed. A machine shop, 56 x 65 ft., is to be built in connection with the factory, to be equipped with appliances for repairing purposes.

At the spring elections Marquette electors will vote on the proposition to bond the city for \$100,000 to build two dams on the Dead River. The dams will be for the purpose of increasing the water power and generating capacity of the public lighting system.

Harrison, Mich., will spend \$7800 for improvements to its water works and lighting plant, if the small bond issue passes at the spring election.

The National Chicory Company will build a branch plant at Kawkawlin, Mich., in the spring. Plans for the building are being prepared by the company's engineers at Flushing, N. Y.

Plans have been completed for an addition to the building of the Lieberman Trunk Company, Saginaw, Mich. The building will be used as a factory to care for the extra demands of the company.

Big Rapids will vote on the issuing of \$100,000 in bonds to be used in securing the location of new industries.

The Clarke-Carter Automobile Company, Jackson, Mich., has increased its capital stock from \$100,000 to \$250,000.

A vinegar plant is to be built at Lowell, Mich., by John Kellogg. The plant will be 40 x 70 ft., with two stories above basement, and will have 24 generators.

The Cadillac Handle Company, Cadillac, Mich., will erect a complete chemical plant in conjunction with its factory, to use up the large amount of waste material it now sells for stove wood.

The old Beers table factory of Marine City, Mich., has been taken over by Langely & Dale of this city. The factory will be rebuilt and will be used for the manufacture of automobile parts.

The Leisen & Henes Brewing Company, Menominee, Mich., will erect a new ice plant of 50 tons daily capacity.

The Johnson Furniture Company, Grand Rapids, Mich., will erect a four-story factory adjoining its present plant. The old building will be used in conjunction with the new.

The Standard Oil Company will erect storage plants at Bay City, Mich., to cost around \$150,000. The deal has been pending for some time, and is received with considerable satisfaction at Bay City. It is also stated that an immense coopeage plant will be built after the erection of storage tanks is completed.

The Northern Brick & Tile Company, operating at Reavie, Mich., is preparing to largely increase its plant capacity. Three kilns and one giant clay digger are among the improvements.

The D. F. Poyer Company, Menominee, Mich., has been organized to manufacture a particular type of automobile designed by D. F. Poyer.

The Hailey Carriage Company, Tecumseh, Mich., will be reopened by Frank J. Hailey, son of the former manufacturer. The plant will undergo numerous improvements and will be modernized in every way.

The Citizens' Light & Power Company, Adrian, Mich., is in the market for a new boiler of 500 hp. capacity, and a smoke stack of complementary height. Official action will be taken in a few days relative to the purchasing of new machinery.

Members of the executive force of the Lozier Motor Company, formerly of New York City, are fast arriving at the new factory in this city. The factory has been completed and 80 per cent. of the machinery has been transferred.

Flint has secured the new Standard Rule Company

THE MACHINERY MARKETS

which was incorporated a short time ago. The company has a capital stock of \$25,000.

The Dodge Chemical Company is the name of a new addition to the chemical plants of this city. The company has a capital stock of \$25,000.

The City Engineer of Kalamazoo, Mich., has been directed to secure estimates for the construction of a municipal lighting plant.

The South

LOUISVILLE, Ky., March 7, 1911.

The attitude of the railroads in the matter of purchases is giving local manufacturers of machinery something to think about. As yet there have been no direct indications as to what change, if any, will be made in railroad plans regarding purchases. One large order, which was bid on several weeks ago by boiler manufacturers all over the country, has not yet been acted on by the railroad affected, though what the reason is is not known. It is reported on good authority from another source that the most important railroad operating in this territory has given orders that all purchases, which heretofore have been made on the approval of the purchasing agent, will be required to be submitted for approval to higher officials before being authorized.

Manufacturers of smoke consumers will be able to market their devices to better advantage in the South, as many municipalities have taken up an active campaign to reduce smoke emission. The Board of Trade of Louisville is working on this project, while Nashville and Knoxville, in Tennessee, have strict ordinances under consideration. In this connection the formation of the National Smoke Preventer Company, at Louisville, is of interest. It will sell a smoke preventer manufactured by L. H. Long, a local launderer. W. P. Davis, sales agent for a number of iron and steel companies, is interested in the project. Agents will be appointed in a good many cities.

C. J. Walton & Sons are installing three boilers having a combined capacity of 1000 hp. in the rolling mill of the Ewald Iron Company, Louisville.

The Peter-Burghard Stone Company, Louisville, is considering the addition of some new machinery in its cut stone department.

The George Panke Company, Louisville, will install a polishing machine in its monument works.

The Tycrete-Concrete Products Company has been organized in Louisville with a capital stock of \$35,000 by C. D. Moody, H. A. Collins and A. M. Rutledge. It will manufacture a plastic cement dressing, and will establish a plant in the immediate future. C. D. Moody is the principal stockholder.

The Barringer-McKnight Company has been incorporated in Louisville with \$25,000 capital stock, to manufacture harness and saddlery.

Louisville men are interested in the Great Southern Oil & Mining Company, which is developing several hundred acres of oil and gas lands in Tipton County, Tenn. The company, which has headquarters at Covington, Tenn., is now receiving bids on its equipment, including pumps, drills, &c.

The Health Officer of Louisville will confer this week with proprietors of slaughter houses in the interest of having a modern abattoir constructed for general use.

George L. Smith has purchased a controlling interest in the Cadiz Water Company, Cadiz, Ky., terminating a stockholders' fight which has been on for several months. Mr. Smith has become president of the company, and is planning improvements in the plant.

Activity in the Bowling Green limestone district of Kentucky is interesting quarry machinery manufacturers. The Tegart Stone Company has been organized at Bowling Green with \$10,000 capital stock by John F. Tegart, James C. Tegart and James H. Wilkinson, and will operate quarries, while the Kentucky Limestone Company has also been organized at Bowling Green with \$12,000 capital stock. Cleveland, Ohio, capital is largely interested, H. B. Brackenridge, C. H. Felton, R. H. Felton and John W. Smith included. The company has already purchased a large part of the machinery it will need in operating quarries, 700 acres having been leased. It is also announced that plans are being made for the establishment of a cut-stone plant in Bowling Green to handle the output of some of the quarries.

Andrew J. House and C. F. Chenault are leading a movement to establish a tobacco factory at Richmond, Ky. A building has already been secured.

Gebhardt & Norris, Augusta, Ky., will erect a flour mill at Maysville, Ky. A site for the mill, for which equipment will be purchased at once, was given free by the Business Men's Club of Maysville.

H. H. Chapman, Pembroke, Ky., is organizing the Pembroke Milling Company, which will take over the Pembroke Roller Mills. Extensive improvements in the plant will be made, it is stated.

Evansville, Ind., officials have inspected the water works of Paducah and other western Kentucky towns and have announced that a new plant will be constructed in that city.

Additions to the equipment of the Straight Creek Coal Company, Cary, Ky., are to be purchased. Prices are now being asked on gasoline motors.

Work has been begun by the Jones Machine Company, Chattanooga, Tenn., on a foundry adjoining its present plant. The foundry will have a complete equipment, including a traveling crane, and will make gray iron castings exclusively.

The DeLoach Mfg. Company, which manufactures sawmills, is apparently in a quandary as to the location of its plant. It was originally located at Atlanta, and later established at Bridgeport, Ala. It decided to leave there, however, and to return to Atlanta, but negotiations which have been on with the Business Men's Club of Memphis, Tenn., indicate that the plant will be established there.

The Fidelity Investment Company has been formed at Nashville, with \$200,000 capital stock and \$100,000 surplus. The construction of electric railroads, electric power houses, &c., is given as the purpose of the corporation. H. H. Mayberry of Nashville is one of the principal stockholders.

The Lonsdale Water Company has been organized at Lonsdale, Tenn., to construct a plant following the creation of a franchise which has been asked for. Alex McMillan is to be president of the company, which will have \$75,000 capital stock, and will begin action as soon as the franchise, an ordinance creating which has already been introduced in the Council, is disposed of.

Following the authorization of a bond issue of \$20,000 by the Legislature, Manchester, Tenn., is preparing to erect an electric light plant and water works.

Direct current generators and motors for haulage, as well as a pump to be used in its machine shops, will be purchased by the Darby Coal Mining Company, Knoxville, Tenn., which is operating mines at Darby, Va. Other improvements will be made, the total outlay being \$25,000. C. H. Thompson is manager of the company.

An electric light system will be built at Lynnville, Tenn., by the Lynnville Mill & Elevator Company. The same company is remodeling an old mill and installing new machinery.

The electric light plant to be built at Jackson, Tenn., by the municipality will be new. The old plant will not be utilized in its construction. R. L. Beare is making arrangements for the city.

It is reported that new shops will be built at Memphis, Tenn., by the Frisco lines, which are said to have secured a site for that purpose. The cost of the investment will be \$300,000. The railroad is planning the erection of a steel viaduct at Otey street in Memphis.

The Eastern Tennessee Power Company, Ducktown, Tenn., has increased its capital stock from \$3,750,000 to \$4,000,000.

A. C. Foster is president and L. J. Haley, Jr., secretary of the Automatic Electric Railway Block & Signal Company, which has been organized in Birmingham, Ala. Articles of incorporation have been filed in Arizona.

Armour & Co. are to erect a modern plant in South Chattanooga, Tenn., at a cost of \$75,000. It is reported. Refrigerating and other equipment will be needed.

William H. Day is organizing the Dixie Clay Products Company, at Graysville, Tenn. It will manufacture roofing tile, face brick, &c., and will construct a plant which will cost \$45,000.

Additional machinery will be installed in the veneer mill of George L. Carter, at Johnson City, Tenn. The cost of the proposed improvement will be \$4000.

J. P. Winn of the Chamber of Commerce of Chattanooga, Tenn., announces that a fireproof cabinet manufacturing concern is contemplating the establishment of a plant there.

W. O. Bunn & Co. are building a plant at Henry, Tenn., for the manufacture of washing machines. They are purchasing woodworking and power equipment.

The Nashville, Tenn., Electric Light Company will install a steam turbine and make other improvements in its plant.

The Cement Tile Machinery Company, Waterloo, Iowa, is to establish a branch office at Memphis, Tenn. W. L. Northrup will have charge of the office.

New interests have purchased the control of the Huntsville Gas Light Company, Huntsville, Ala., and will make extensive improvements in the plant. Philadelphia capital is now interested in the company.

The Queen & Crescent, which controls the Gadsden Car Works, Gadsden, Ala., is planning large extensions of the plant and the addition of several new departments which

THE MACHINERY MARKETS

will require the purchase of considerable machinery. Four hundred cars a month will be the capacity when the improvements are completed.

The estimates of the artesian water department submitted to the City Commissioners of Memphis call for an expenditure within the next five years of \$165,000 for miscellaneous improvements, including new boilers. The department also estimates an expenditure of \$500,000 for new mains.

The sale of the machinery of the Knoxville Woolen Mills was held last week, and the equipment was disposed of to a large number of textile manufacturers.

Monticello, Ark., will rebuild its electric light plant which was destroyed by fire recently. Bids will be received on the equipment, including 16 x 72 in. return tubular boilers, 75 and 100 kw. direct connected alternating generators, with pumps and other necessary equipment, until March 15.

The Steere Home Construction Company, Shreveport, La., will purchase concrete machinery, including block machines and molds.

New equipment is to be purchased by the Standard Oil Company of Louisiana in connection with the enlargement of the company's refinery at Baton Rouge to a capacity of 5000 barrels a day. The equipment to be bought includes stills, both crude and steam, tankage, &c.

Sylvania, Ga., will build a water works plant. J. B. McCrary & Co., Atlanta, drew the plans for the plant. The municipality has taken over the property of the Sylvania Water Supply Company.

Th city of Rutherfordton, N. C., voted the issuance of \$35,000 in bonds for the construction of a water works and electric light system.

The New Orleans Furniture Mfg. Company, New Orleans, La., is considering the enlargement of its plant, but states that the matter is contingent upon the policy of the Levee Board, which exercises some control over its river front property.

The city of Smithfield, N. C., has voted the issuance of \$55,000 in bonds for the construction of an electric light and sewerage system.

The Atlantic Compress Company, Troy, Ala., has bought the site from the Troy Compress Company, on which the compress was burned last November, and in a short time will erect a first-class compress plant.

Toronto

TORONTO, ONT., March 4, 1911.

The very fine weather has had a tonic effect upon trade and enterprise. Sunshine, a fairly high temperature and absence of storms are conditions seldom present as they have been this year in the latter days of February and the early days of March. From the West come reports of spring plowing, and railroad contractors are making preparations for beginning the campaign of 1911 very early. Unless the promise of an early spring proves delusive, activity in building and all construction operations will have a start five or six weeks in advance of the time of year it usually commences. Large sums are held on deposit for many of the undertakings that are in hand or are projected. If the Western crops are got in early and have thus a chance to attain to a state of vigor before the hot season arrives, the effect will be good upon the spirits of all engaged in trade and industry, and will be sustaining of the general credit, which is expected to be freely used this year to raise money for various undertakings. Competition from outside countries grows in aggressiveness in the Canadian market. Americans are as keen as ever, British selling agents are much keener than ever, and German firms are pushing business here as they never did before. There is more business to be scrambled for and there is more scrambling for it. A veritable boom is opening in the Porcupine gold mining field of Northern Ontario, where large capital is being applied to test and work properties. Much machinery is now being ordered for that camp, and the Ontario Government is making the construction of its railroad thereto.

The Canadian Pacific Railway Company has called for tenders for the construction of 30 miles of the Kootenai Central Railway southward from Golden, B. C. In the prairie provinces the company's branch extensions alone will run into a total of 312 miles this year. Tenders for most of this construction have already been called for. According to an announcement made in Toronto by the company yesterday, the Canadian Pacific Railway will spend several millions this year on new work in Ontario—on new stations, freight buildings, yards, double tracking, track ex-

tensions and the laying of rails on sections of road now completed. Wooden bridges are to be replaced by steel structures.

As an indication of the state of business in Ontario and Quebec, railroad earnings are encouraging. Last month the Grand Trunk's earnings exceeded those of any former February in the road's history.

The Grand Trunk has placed orders with the Dunkirk Locomotive Works for 20 new engines.

The premises of the Ives Bedstead Company, Montreal, were damaged to the amount of \$150,000 by fire on February 27. About 67,000 new beds were in the building.

At a mass meeting of the citizens of London, Ont., it was decided to open a manufacturers' investment fund, to be made up of popular contributions of \$1 each, the price of a share in the fund, the money to be put in the hands of 10 trustees and by them used to secure sites and induce industrial concerns to come to the city and locate factories thereon.

It is expected that the turbines and generators will be installed in the power house at Sandy Falls, on the Mattagami River, Northern Ontario, next month. That will be a source of energy for working the mines of the Porcupine field.

E. H. Ford of the Ford Iron Company represents an English syndicate that proposes to establish a chain of summer hotels in Canada.

The Hamilton Steel & Iron Company's ore docks at Point Edward, Ont., are to be greatly extended, and an additional hoisting machine is to be installed there.

L. O. Armstrong, industrial agent of the Canadian Pacific Railway Company, was advised some days ago by the representatives of two large American concerns that were negotiating for the establishment of Canadian branches on the company's system that, pending the outcome of the reciprocity business, nothing further will be done in the matter.

The London Electric Company, London, Ont., is preparing to purchase a lot of new machinery.

The contract to build the Dominion Government steamer Bellechasse has been awarded to the Kingston Shipbuilding Company, Kingston, Ont. She is to be 130 ft. long and 27 ft. beam.

Several steel scows are to be built at the Western Dry Dock plant, Port Arthur, Ont., for the Great Lakes Dredging Company.

The Dewesley Spring & Axle Company, Chatham, Ont., has let a contract for a large extension of its works.

A linseed oil factory is to be built in Calgary, Alberta.

The Ontario Government is to float a new loan of \$5,500,000. Some of the proceeds will be applied to the extension of the Government's railroad line, but almost the half of it will be turned over to the Hydroelectric Power Commission, which will spend \$2,000,000 to extend its transmission line to Windsor and to other Ontario points.

It is announced that the Richardson Mica-Washer Works will be removed from Kingston, Ont., to Trenton, N. J.

The Grand Trunk will shortly begin the laying of 100-lb. rails on the double track line between Niagara Falls and London, Ont., in the place of the 80-lb. rails there now. Extensions are to be made to the company's telephone despatching service. This will call for between 250 and 300 miles of wire between Toronto and Sarnia. The Canadian Pacific Railway is also arranging for large extensions of its telephone despatching service.

Three boilers, an air compressor, a hoist and a complete five-stamp mill have been ordered from the Jenckes Machine Company, Sherbrooke, Que., by the Thelma Gold Mining Company, in Bryce Township, northern Ontario.

Road making by the British Columbia Government is calling for the purchase of machinery for the purpose.

Geo. F. Driscoll, Montreal, has formed a company there, with a capital stock of \$100,000, to manufacture and sell the Herbst full light moving picture machines.

The British-Canadian Lumber Company, with a capital stock of \$20,000,000, has been formed by a group of British, Canadian and American capitalists. Its headquarters are to be in Vancouver, B. C. It is to build several large mills in that Province.

The Dome Mining Company, Porcupine, Ont., has made arrangements for the erection of a 50-stamp mill, the first unit in a proposed plant of 200 stamps. It is expected that all the machinery of this 50-stamp installation will be in place this year. Machinery costing \$250,000 is either already on the ground or forthcoming.

A company to make gasoline tractors is looking over the advantages of Chatham, Ont.

The Mayor of Medicine Hat, Alberta, says that the Lucky Jim smelting works, a wire nail factory, a glass plant, an artificial stone and marble industry, a foundry and machine shops will be established in that town in pursuance of arrangements entered into with the town.

THE MACHINERY MARKETS

Seven million dollars will be expended by the Canadian Pacific Railway for irrigation in the Calgary district.

The Oliver Chilled Plow Works, South Bend, Ind., has completed plans for the erection of new buildings at its works in Hamilton, Ont. The plans comprise an assembly building, 90 x 375 ft., three stories; paint shop, 60 x 375 ft., three stories; office building, 60 x 100 ft., two stories. The foundry and remaining buildings included in the plans will not be erected until 1912. The machinery to be installed will consist largely of rough grinding wheels and small drill presses. There will be a few special machines, including thread rollers, riveters and punch presses.

San Francisco

SAN FRANCISCO, CAL., March 1, 1911.

Very few of the orders recently placed with local dealers have included any notable number of machine tools, and from the nature of current inquiries it is evident that few of the shops around San Francisco require any great increase of equipment. Purchases of single tools, however, are more numerous and often individually larger than during the fall, and the movement of small shop equipment to country points is very satisfactory for this time of year. There is some business in prospect from the Government navy yard at Mare Island, but it is practically certain that no very important purchases will be made this year.

Railroad interests are buying few tools at present, but there is a prospect of considerable business later in the year and a large amount of general equipment will be required for new railroad construction. Nothing very definite is known of the plans for double tracking the mountain section of the Union Pacific, but it is believed that work will be started this year, and dealers handling steam shovels, pneumatic tools, &c., look for a number of orders on this account. The Southern Pacific has taken bids on a new substation for its electric railroad system in Berkeley, and the first shipment of cars for this system has just arrived. To eliminate a curve on this line the railroad is endeavoring to secure a right of way through the foundry of Dalton & Sons in Oakland.

Figures are being taken by the United Railroads of San Francisco for a new shop and car barn on Geneva street. This company is now getting in a large number of new cars which were ordered last year.

The Santa Fé is planning extensive improvements to its terminal facilities at Richmond, Cal., and it is announced that the capacity of its car shops will be greatly increased this spring.

Cannery equipment forms a comparatively small item, but a good many orders have recently been placed by both fruit and salmon packing interests. Sanitary can machines especially are in demand. The Alaska Packers' Association will put in about 14 of these machines this season. This concern has had a small steamer and several gasoline boats built, and has ordered a lot of S. F. Standard marine gas engines for shipment to its stations.

The Natomas Consolidated of California has purchased a 3½-yd. Bucyrus drag line excavator, equipped with a variable dumping device, for reclamation work in the Sacramento Valley.

The San Francisco Merchants' Association is greatly interested in the recent purchase by the city of New York of 500 street flushing machines, and is working for the purchase of similar equipment by this city.

The Union Iron Works recently installed its forge shop in a new building and has added a new 7000-lb. hammer.

The Geo. E. Dow Pumping Engine Company has just completed a vertical triplex double acting pump, with a daily capacity of 4,000,000 gal., to be used for orange irrigation in southern California. This company is also building a deep well pump of large capacity for the oil fields, to be driven by a gas engine.

The Mountain Quarries Company, whose plant is near Auburn, Cal., is preparing to install a machine shop.

A meeting of the creditors of the G. W. Price Pump & Engine Company, San Francisco, will be held March 2. In a statement to the creditors the company places its assets at \$133,047 and liabilities at \$76,065, but admits its inability to meet its obligations as they become due. As it is believed that further continuation of business under local conditions would offer no relief, the company proposes to turn over its properties to the creditors.

The Golden State & Miners' Iron Works, San Francisco, is working on a clam shell dredge for the Vulcan Dredging Company, to be used in levee work on the Sacramento and San Joaquin rivers. The bucket capacity is 6 yd., and as a whole the dredge is said to be the largest of which there is any record.

The recently organized Union Construction Company, with offices in the Atlas Building, is working on a contract for a large gold dredge, to be shipped to Alaska in April. The hull is being built at Seattle.

A number of inquiries for steam shovels have come out recently, and while little or no actual business has been done, the outlook in this line is considered good.

The Chicago Pneumatic Tool Company was the lowest bidder on two direct connected gasoline air compressors for the lighthouse service, the bid being about \$3000.

Plans have been made for a large addition to the Bakersfield, Cal., Iron Works, which is preparing for a busy year in oil well machinery.

A. W. Fairfield of the Stockton, Cal., establishment of the Holt Mfg. Company has left for Salt Lake City to establish a branch office.

The Hansen Combination Tool Company has been incorporated at Sacramento, Cal., with a capital stock of \$150,000, by R. P. Hansen, J. G. Bamber, J. H. Tibbetts, C. E. McLaughlin and Ralph Brown.

The Oakland Gas Light & Heat Company will start work shortly on a large central steam heating system in the business district of Oakland.

Bishop & Co., large candy manufacturers, have purchased machinery for a complete plant at San Diego, Cal.

The town of Colton, Cal., has placed orders for a lot of water works machinery, including compressors, air lifts and electric motors.

Libby, McNeill & Libby are installing an electric power plant and a lot of ice machinery at their milk condensing plant at Ferndale, Cal.

The Union Dredging Company has completed plans for a dredge to be used near Folsom, Cal.

The Bendixsen Shipbuilding Company, Eureka, Cal., has contracts for three lumber steamers to be built this spring, machinery for which will be purchased in San Francisco.

A lot of new machinery has been purchased for both departments of the Valley Ice & Laundry Company, Hemet, Cal.

The Exchequer Mining & Power Company is planning to rebuild its power plant near Merced, Cal., which was badly damaged by a recent flood.

The American Can Company has just completed a large concrete building for its plant at Honolulu, T. H.

The National City Lumber Company, National City, Cal., has purchased several woodworking machines and electric motors.

The Rodney Burns Redwood Novelty Company, Eureka, Cal., is preparing to install a number of new woodworking machines.

The Pacific Basket & Barrel Company is installing a box and veneer package factory at Lodi, Cal.

The Terry Lumber Company is planning to rebuild its box factory at Chico, Cal.

Contracts have been let for the installation of water works for the town of Gerber, Cal. An electric light plant is under consideration.

The Phoenix Lighting Fixture Company has secured quarters for a manufacturing plant at Los Angeles.

The Hanford Water Company, Hanford, Cal., has let a contract for a pumping plant to F. C. Roberts of San Francisco.

The Southern Pacific Railroad is planning the installation of a pumping plant near Suisun, Cal.

Louis G. Henes, coast representative of Manning, Maxwell & Moore, is expected back from an Eastern trip about March 5.

The city of Ellensburg, Wash., will improve its lighting plant at an expenditure of \$30,000.

The Warman Steel Casting Company, Los Angeles, Cal., has under construction at Redondo Beach, Cal., a foundry building which will soon be ready for the erection of furnaces and the installation of machinery.

The Gypsoil Company, recently organized at Los Angeles, Cal., is planning the erection of a large plant at Moapa, Nev., which will call for an expenditure of from \$35,000 to \$125,000 for machinery, details of which are being prepared by the engineers. M. J. Bouse, 917 Story Building, Los Angeles, is general manager.

The Southwest

Rollins & Westover, Beals Building, Kansas City, Mo., have plans prepared for an electric light plant for Monroeville, Mo.

The City Council of Diller, Neb., is planning to install a \$15,000 water works system.

The City Council of Liberty, Neb., is planning the installation of an electric lighting system.

Salpuga, Okla., has disposed of bonds in the sum of \$260,000, recently voted, and will use the proceeds to improve its water works system and street paving.

THE MACHINERY MARKETS

Work will be commenced in the near future by Waukomis, Okla., for the construction of an electric light plant, a vote having recently been taken by the citizens of that city on the proposition.

The Oklahoma Spring Bed Company, Muskogee, Okla., has been organized and expects to have a factory in operation in about 60 days.

The Okeene Commercial Club, Okeene, Okla., has closed a deal with capitalists of Oklahoma City for the installation at Okeene of a salt plant that will cost approximately \$150,000, with a capacity of 1500 barrels per day. An ice plant will be operated in connection with it. It is understood that the necessary equipment has not been purchased.

Plans are being completed to erect at Wichita, Kan., a large terminal grain elevator. It will have a capacity of 700,000 bushels, and be equal in height to a seven-story building. The cost, according to the Kaufman-Boyle Grain Company, proprietors, will be between \$100,000 and \$125,000. Work will be started soon.

The Ponca City Mill & Elevator Company's plant at Wakita, Okla., was destroyed by fire February 28, causing a loss of \$12,000, partially covered by insurance.

The Nelson Grain Company, Kansas City, Mo., has bought a site on the Belt Line tracks at Thirtieth street and Fairmount avenue, on which a new three-story grain mill will be erected, with the requisite warehouse room, involving an investment of about \$87,000.

The Cliffwood Mining Company, Joplin, Mo., has let the contract for a 200-ton electric mill to be built on shaft No. 2 of the Clifford property. The mill will be operated by electrically driven motors. The electric hoist is to be one of the newest types, and is the first of its kind to be installed in that district. Cliffwood No. 1 is to be rebuilt and electric motors installed. B. L. Van Hoose is the manager.

The Kansas City Rock & Sand Company, Kansas City, Mo., has been incorporated. The capital stock is \$5000. The incorporators are J. T. McGrew, Henry McGrew and Geo. Grindle.

The Honniwell-Calvin Iron Company, Kansas City, Mo., has increased its capital stock from \$100,000 to \$200,000.

Texas

AUSTIN, TEXAS, March 4, 1911.

Machinery dealers report an increased demand in their various lines. The public utilities improvement movement is growing and plans are on foot for the establishment of a number of new water works and sewer systems and electric light and power plants. Many of the existing public utility concerns are to be extended and improved.

The Legislature has enacted a law granting the county of Galveston the right to sell or lease a right of way for an electric or steam railroad over or on the sea wall that has been constructed along the Gulf. This sea wall is about five miles long.

E. C. Robinson, St. Louis, Mo., is arranging to install an electric light and ice plant at Crystal City, Texas.

Elmer S. Farwell, Orange, Texas, is promoting the establishment at that place of a large mill for the manufacture of lumber from yellow pine. He is connected with the yellow pine paper mill that is already in operation at Orange.

The Bay Shore Traction Company, Houston, Texas, will begin the construction of its proposed interurban electric line that is to run from South Houston to La Porte within the next 90 days.

J. C. Ward, Waco, Texas, and associates are arranging to install a 20-ton ice plant at Jasper, Texas. Local capital is also interested in the project.

J. W. Horton, Shiro, Texas, will install a water works plant and distributing system at that place. The water supply will be obtained from an artesian well.

The Price-Booker Company, San Antonio, Texas, will establish a large vegetable canning factory and pickling plant at Smithville, Texas.

W. B. Walker & Sons will greatly enlarge the capacity of their canning factory at Austin.

The Dallas Street Railway Company, Dallas, Texas, has been organized with a capital stock of \$20,000, for the purpose of maintaining and operating suburban railways. George W. Works, W. Leslie Williams and A. C. Moser are the incorporators.

The new plant of the Houston Brick & Tile Company that is being erected at Houston will have a capacity of 1,000,000 brick per month.

The City Council of Cameron, Texas, will spend about \$15,000 for the construction of a sewer system for that place.

Steps have been taken to erect a cotton seed oil mill and install an ice plant at Hutto, Texas. Among those interested are R. E. L. Miller, Charles Hanstrom, W. H. Farley, A. B. Walling and John Busch.

H. P. Rhodes, Houston, Texas, and associates will install a water works plant and distributing system, an electric light plant, an ice plant and bottling works at Alvin, Texas.

G. Denton, who is locating a colony of farmers upon his 16,000-acre tract near Asherton, Texas, will erect a canning factory, which will have a daily capacity of 20,000 cans. Both vegetables and meats will be tinned.

Fred Sutton, Little Rock, Ark., and associates are reported to have selected Sanderson, Texas, as a location for their proposed factory for the manufacture of wax from the candleilla plant.

A. G. Walker, Hondo, Texas, and associates have taken preliminary steps toward the organization of a company with \$30,000 capital stock for the installation of an ice factory at that place.

The Texas & Pacific Railroad will install a pumping station at Kent, Texas. The water will be brought from a point four miles west of Kent through a pipe line.

The City Council of Snyder, Texas, has let the contract for the construction of a complete sewer system for that town.

The Taylor Cotton Seed Oil Works, which operates the cotton seed oil mill at Taylor, Texas, is to be reorganized and the plant enlarged and otherwise improved.

The Keith Lumber Company will rebuild the planer and box factory at Voth, Texas, recently destroyed by fire, entailing a loss of about \$40,000.

T. O. Henry, Roswell, N. M., will establish a large creamery at Plainview, Texas.

The Mission Cotton Oil Company, which was recently organized with a capital stock of \$60,000, will establish a cotton seed oil mill, a water works plant and distributing system and an electric light plant at Mission, Texas.

The Tioga Gravel Company, which was recently organized with a capital stock of \$200,000, will install a plant for washing and screening gravel at Tioga, La. Among those interested in the enterprise are C. L. Dwyer, George K. Force, K. C. Barkley and A. D. Anderson of Houston, Texas, and E. S. Brasher of Tioga, La.

The City Council of Tucumcari, N. M., is considering the question of purchasing the local water works plant and distributing system. A price of \$50,000 has been set upon the property, it is stated.

The National Railways of Mexico will soon begin the erection of shops at Irapuato, State of Guanajuato.

The Mexico Traction Company of the city of Mexico is having surveys made for its proposed interurban electric line that is to be constructed between that city and Puebla, 160 miles. The construction work will be started in a short time. It is reported that the company also contemplates constructing an interurban electric line from the city of Mexico to Cuernavaca, about 75 miles.

The Guanajuato Power & Electric Company, Guanajuato, Mexico, is very active at this time in the installation of irrigating pumps on farms in the central part of the State of Guanajuato. In the vicinity of Silao transformers and motors to operate the irrigation pumping plants are being installed on a number of farms by the company under the direction of Pablo Rocha, local manager. The country all through the agricultural portions of the State is dotted with newly-built transformer houses and electricity for both light and power is being furnished the people of the rural districts.

George M. Howat will erect a plant for the manufacture of galvanized sheet iron, sheet tin and other iron products at Tampico, Mexico. He has obtained a concession from the Federal Government for the proposed enterprise. It is stated that about \$500,000, gold, will be invested in the plant.

Herculano Cerda and Vicente Garcia Fuentes, Saltillo, Mexico, will install a hydroelectric plant near that city for the purpose of furnishing power and lights for the towns and industries of that region. The same men are promoting the erection of a cotton seed oil mill to cost about \$1,000,000, Mexican currency, at Saltillo.

The Zinc Smelter Company, Saltillo, Mexico, will soon begin the erection of its zinc smelting plant.

W. H. Ellis, New York, and associates will erect a number of factories in Mexico for the manufacture of crude rubber from the palo amarillo tree under a concession which they hold from the Mexican Government.

The Legislature of Texas has passed a bill providing for the installation of a cotton goods factory at Rusk, Texas, to be operated by penitentiary convicts. An appropriation of \$150,000 is made for the proposed plant.

The Bering Tire & Rubber Company, Houston, Texas, contemplates the erection of a plant suitable for the manufacture of heavy mechanical rubber goods and automobile accessories. Tentative plans call for a two-story building

THE MACHINERY MARKETS

with basement, the construction of which will begin in about three months.

The city of Jacksboro, Texas, will receive bids until March 15 for the construction of a water works system, for which \$25,500 in bonds have been voted. N. Werenskiold, Flateau Building, Dallas, Texas, is engineer in charge.

Bids will be received March 21 by the Mayor and City Council of St. Augustine, Texas, for material required in the construction of a water works system, including electric motor or gasoline engine, triplex pumps, steam pumps, boilers, &c. The O'Neil Engineering Company, 1503 Praetorian Building, Dallas, Texas, is the engineer in charge.

An automobile factory is to be erected at Wichita Falls, Texas, from plans designed in Detroit, which call for two buildings, one 100 x 240 ft., and another 25 x 100 ft. The plant will be located at the junction of the Wichita Falls & Southern and Wichita Valley railroads.

The Missouri Ice & Fuel Company, San Antonio, Texas, will add to their equipment a 25-ton ice plant. A new artesian well, flowing 1,000,000 gal. daily, has just been brought in, which makes the enlargement possible.

The Orient Consolidated Pure Ice Company, Hantlin, Jones County, Texas, has been incorporated with a capital stock of \$7500.

The Modern Ice Machine Company, San Antonio, Texas, has been incorporated with a capital stock of \$30,000. The incorporators are W. G. Roloff, H. Zork and Chas. M. Dickson.

The Fort Worth Wagon Company, Fort Worth, Texas, has been incorporated with a capital stock of \$15,000. The incorporators are Warren Heaton, C. Hightower and John F. Shelton.

The Alba Lignite Company, Dallas, Texas, has increased its capital stock from \$15,000 to \$30,000, and changed its name to the Alba Malakoff Lignite Company.

The Kaufman Ice Company, Kaufman, Texas, has been incorporated with a capital stock of \$20,000. The incorporators are J. W. Singleton, P. C. Bacon, Geo. G. Shaw, and others.

C. J. Hardy, an engineer representing the firm of Ford, Bacon & Davis of New Orleans, contractors, has been investigating the situation at Austin with a view of making a proposition to the city on behalf of his principals for the reconstruction of the large dam across the Colorado River and the installation of a hydroelectric plant in connection with the proposed water storage reservoir.

The Nixon Ice Company of Nixon, Texas, is installing a water works system for that town.

The Board of Commissioners of Menard County have adopted plans for a new steel bridge that it will construct across the San Saba River, near Menard, at a cost of \$20,000, bonds for which purpose have already been issued. The structure will be 1121 ft. long.

The town of Lubbock, Texas, has issued \$55,000 of bonds for the construction of a sewer system and \$25,000 of bonds for installing a water works plant and distributing system. F. E. Wheelock is Mayor.

The Gulf Coast Brick & Tile Company, Brownsville, Texas, recently closed a contract with the American Clay Machinery Company of Bucyrus, Ohio, for the installation of machinery at its plant for the manufacture of hollow building blocks and drain tile.

The Seguin Water Works Company, Seguin, Texas, will extend its water distributing system by laying 6000 ft. of 6-in. pipe, 2000 ft. of 4-in. pipe and 1000 ft. of 8-in. pipe. Twenty new fire plugs will also be installed.

The City Council has taken preliminary steps toward issuing bonds for the construction of a modern and complete sewer system for the town of Rockdale, Texas.

The Boards of County Commissioners of Llano and Burnet counties, Texas, will soon let the contract for the construction of a joint steel bridge across the Colorado River, connecting the two counties.

R. B. George of Houston, who recently purchased from George T. Allen large limestone quarries at Leander, Texas, will install machinery and make other improvements, with the view of increasing the output of stone.

The taxpayers of Rusk, Texas, have voted \$18,000 of bonds for the installation of a water works plant and distributing system.

The city of El Paso is installing a new pumping plant, including a compressor and 125-hp. boiler. Ten additional wells, each to a depth of about 600 ft., will be sunk and 10 new fire hydrants installed.

Newton Sheppard is constructing a water storage reservoir near Tucumcari, N. M., and will install an irrigation pumping plant.

The Illinois Irrigation Company has let the contract to the Standard Construction Company for the construction of its proposed large system of irrigation near Farmington, N. M. The contract price is \$480,000.

The City Council of Vera Cruz, Mexico, will install a

cold storage plant in that city for the benefit of butchers and fishermen.

The Sautena Agricultural Syndicate, which is constructing a large system of irrigation in the State of Tamaulipas, Mexico, near Matamoros, has completed the first of a series of dams for creating water storage reservoirs. The main canal of the proposed system will be 96 miles long, and it will have several hundred miles of laterals extending to every part of a tract of land embracing 600,000 acres that is to be placed under irrigation by the syndicate. Large pumping plants will be installed. The main water supply will be obtained from the San Juan River. Antonio G. Canaliza of the City of Mexico is at the head of the project.

The Bishop & Babcock Company, Cleveland, Ohio, is opening up a branch warehouse at Dallas, Texas, and expects to erect a carbonic acid gas plant during the coming spring.

The Texas City Electric Light & Power Company, Texas City, Texas, has been incorporated with \$100,000 capital stock, by R. C. Trube, F. M. Danforth and William Dossett.

Brady, Texas, will hold an election March 4 to vote on the question of issuing \$40,000 in bonds for the construction of a water works system.

The Northern Produce Company, Cuero, Texas, will erect a fertilizer plant near its packing houses.

S. L. Gill and James Lagro, Raymondsville, Texas, contemplate, in the near future, putting in a water works system and installing an electric light plant. These parties have recently purchased large real estate holdings in the town.

Newport Rust-Resisting Iron.—The Newport Rolling Mill Company, Newport, Ky., at its exhibit last week at the Ohio Hardware Association convention at Music Hall, Cincinnati, had many interesting articles made from its Genuine Open Hearth Iron, a superior rust-resisting, anti-corrosive iron sheet adapted for places where an ordinary steel sheet does not give satisfactory service. Among them were the following: A metal house entirely covered with roofing and siding, a horseshoe and bars twisted and forged cold, garbage cans, pumps, elbows, shoes, conductor pipe and eaves-trough, stoves and ranges, boiler tubes, corrugated roofing and siding of all styles and description. Tests were conducted, showing its superior rust-resisting qualities over ordinary steel and iron. A recent large shipment of this product was made on order of the United States Government for use in the Philippines, it being adopted after a competitive rust-resisting test with various other makes of iron and steel.

The Reading Iron Company, Reading, Pa., announces that plans have been prepared for the reconstruction of its Ninth street mill. It will be of steel frame, and work is expected to be started during the early summer months. The present mill was erected by the Philadelphia & Reading Railroad Company in 1868, and was used for years by that company for the manufacture of rails. In 1889 the plant was remodeled by Cofrode & Saylor and structural shapes manufactured. The Reading Iron Company subsequently took over the property. The new puddling mill near the Oley street mill is nearing completion. The Roe mechanical puddling process will be installed in this mill. Reports that the Reading Iron Company would engage in the manufacture of steel are without foundation.

The Western Hinge & Mfg. Company, Brookfield, Mo., has been organized with \$25,000 capital stock to succeed the Twentieth Century Hinge Company. The company has under consideration the selection of a location, a number of propositions having been offered it by different cities. It will manufacture a general line of builders' hardware and expects to have its factory erected and ready for operation by January 1, 1912.

The Buckeye Engine Company, Salem, Ohio, recently sold a 150-hp. engine to Elliott & Co., Pittsburgh, manufacturers of steam water heaters and steam specialties. The latter firm is also installing a 10-ft. boring mill in its machine shop for work on the larger sizes of feed water heaters.

CURRENT METAL PRICES.

The following quotations are for small lots New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL		Genuine Iron Sheets—		METALS—	
Bar Iron from store—		Galvanized.		Tin—	
Refined Iron		No. 12 and 24		Strait Tin	
1 to 1 in round and square	\$ 1.75	No. 20	\$ 2.10	Copper—	
1 to 1 in x 1/2 in	\$ 1.50	No. 28	\$ 2.10	Lake Ingot	
1 to 1 in x 1/2 in	\$ 1.50	Corrugated Roofing—		Cast in Atlantic	
1 to 1 in x 1/2 in and 11 to 12 in round and square	\$ 1.50	2 1/2 in. corrugated, Painted		Cast in Atlantic	
Angles		No. 24		Spelter—	
3 in x 3 in and larger	\$ 2.50	No. 24		Weston	
3 in x 3 in and 3 in	\$ 2.50	Tin Plates—		Zinc.	
1 to 2 1/2 in x 3/4 in	\$ 1.00	American Charcoal Plates (per box.)		No. 9 base, caaks. 1/2 in x 1/2 in, Open	
1 to 2 1/2 in x 3/4 in	\$ 1.00	"A.A.A." Charcoal		Lead.	
1 to 2 1/2 in x 3/4 in	\$ 1.00	A. Charcoal		American Pig	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Solder.	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		No. 1	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Reinforced	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Prices of Solder indicated by private brand vary according to composition	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Antimony—	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Cooked	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Bismuth—	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Aluminum—	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Rods & Wire	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Sheets	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Old Metals.	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Dealers Purchasing Prices Paid in New York	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Copper, Heavy cut and crucible	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Copper, Heavy and Wire	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Copper, Light and Bottoms	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Brass, Heavy	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Brass, Light	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Heavy Machine Composition	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Clean Brass Turnings	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Composition Turnings	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Lead, Heavy	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Lead, Tea	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2		Zinc Scrap	
1 to 2 1/2 in x 3/4 in	\$ 1.00	IX, 14 x 2			

NICHOLSON
U.S.A.
TRADE MARK



Time is not the only saving effected through the use of **Nicholson Files.**

Their hard cutting surface and perfect temper gives them a **lasting quality** that makes them by far the most **economical** of all files to use.

Our Catalog shows what styles to use. Our book, "File Philosophy," tells how best to use them.

NICHOLSON
U.S.A.
TRADE MARK



NICHOLSON

FILE

PROVIDENCE,

COMPANY

R. I., U. S. A.

THE IRON AGE

Established
1855

New York, March 16, 1911

VOL. 87: No. 11

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
				-	MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
New Buying Less Active.....	641
Efficiency and Its Broader Application.....	642
Trade Co-operation and Government Oversight.....	642
A New Metal Perforating Process.....	643
Checking Unfair Complaints of Subordinates.....	643
Navy Department Perplexity.....	644
Correspondence	644
New Publications.....	645
The Iron and Metal Market Reports.....	646 to 656
Notes on Prices.....	656
President Mahan on Pig Iron Conditions.....	656
The Cincinnati Foremen's Club.....	657
The Effect of Titanium Alloy on Slags.....	657
The Ducharne Wrench & Novelty Mfg. Company's Removal.....	657
The Pipe Jobbers' Convention.....	658
British Steel Companies Not Prosperous in 1910.....	658
The R. D. Nuttall Company Buys the Hydraulic Machine Company's Plant.....	658
Philadelphia Foundry Foremen.....	658
Personal	659
Obituary	660
Railroad Equipment Orders.....	660
A Great Power Development in Eastern Pennsylvania.....	660
Republic Blast Furnaces All Active.....	660
A Coal Miners' Compensation Plan.....	661
The British Iron Market.....	661
Business Administration as a Constructive Science.....	662
Core Room Management and Materials.....	664
Unfilled Orders of the Steel Corporation.....	666
Worcester Metal Trades Annual Meeting.....	666
February Copper Production and Stocks.....	666
Obermann Acid Fume Removing Devices. Illustrated.....	667
European Methods of Accident Prevention and Relief.....	667
The Cambria Boiler Shop and Dipping Tank. Illustrated.....	668
The Smith Metal Perforating Process. Illustrated.....	672
The Gardner Six-Wheel Grinder.....	674
The Kant-Leak Kleats and Press. Illustrated.....	675
The Thomas Meter. Illustrated.....	676
A Shuster Special Riveter. Illustrated.....	678
The American Radiator Company's Annual Report.....	679
The New Cresco Monkey Wrench. Illustrated.....	679
A New Edith Furnace.....	679
The Cutler-Hammer Solenoid Operated Valve. Illustrated.....	680
The Leighton Combination Punch and Shear. Illustrated.....	680
The Machine Shop in the Ritz-Carlton Hotel. Illustrated.....	681
A Huge Bronze Drum Casting. Illustrated.....	681
Gas Producer-Gas Engine Plants. Illustrated.....	682
Fenestra Solid Steel Window Sash.....	684
The Fafnir Bearing Company.....	684
A Small Ferracut Punching and Riveting Press. Illustrated.....	685
A Large Order for Buffalo Fans.....	685
Italian Workmen's Insurance Prizes.....	685
The Newton Rotary Planer. Illustrated.....	686
The Congress of Technology.....	686
New Tools and Appliances.....	687
The Machinery Market Reports.....	688 to 697
Another Jones & Laughlin Rod Mill.....	697
Trade Publications.....	698
Current Metal Prices.....	700

New Buying Less Active

Mill Shipments the Largest Since October

Canadian Railroads Will Buy in This Country— Pig Iron Markets Quieter

Our reports from the leading iron and steel centers this week refer to some falling off in new orders for finished materials, though mill operations are now on a larger scale than in any month since October.

In the case of the United States Steel Corporation, while no figures are given for the new bookings since March 1, it is understood that the average in most products is up to that of February, while counting the expected rail tonnage from the Harriman roads, which would offset in large part the Pennsylvania and New York Central contracts in February, the average of the latter month would be equaled.

The steel industry's contribution to the improvement in our export trade for February was more than is generally appreciated. Something is to be said, also, of the bearing upon general business conditions of an excess of \$418,000,000 in our total exports over imports in the eight months ending with February. Yet the disposition is shown everywhere to go forward cautiously and to await the clearing up of what is unsettled.

It is evident that Canadian railroads must place some good-sized rail orders with American or British mills, if they are to get deliveries this year. The Canadian Pacific is now inquiring for 25,000 tons in this country. The Canadian Northern is reported to have bought 90,000 tons, but will need a further amount which Canadian mills cannot supply. The Queensland Government has entered the market for 25,000 tons of rails and New Zealand for 8000 tons.

Domestic rail orders this week include 5000 tons for the Chicago & Northwestern, in addition to the recent contract for 40,000 tons, and 3000 tons for the Ocala Northern in Florida.

Structural steel work is a little more active, but the number of very low priced fabricating contracts is still a disturbing factor, since it is evident that in some of these cases mill prices are also dragged down. For the New York Post-Office at the Pennsylvania Terminal, 6400 tons of steel is about to be awarded, and 3700 tons for the Masonic Temple in New York. The Jones & Laughlin Steel Company has the steel contract for the new prison at Wingdale, N. Y., about 3500 tons. Two railroads placed bridge orders last week amounting to 2700 tons, but railroad buying in general is not robust.

Plate manufacturers will confer this week over conditions in that trade, but there are no other conferences, as reported, apart from regular meetings of presidents and sales managers of Steel Corporation subsidiaries. The contract for 6000 to 7000 tons of hull plates for the new battleship to be built at the

Brooklyn Navy Yard will be awarded at once. Worth Brothers were low bidders.

A Canadian mill has bought a further 5000 tons of billets in the Chicago district, paying \$1 advance over the basis for 25,000 tons placed in January and February.

In pig iron sentiment has been helped by the statistical reports of March 1. Eastern Pennsylvania and Virginia furnaces together showed a gain of 50,000 tons in unfilled orders in February, and a net decrease of less than 2000 tons in stocks. Alabama stocks were reduced. In the Central West stocks showed a small decrease, the first in many months. The volume of foundry iron sales is small, but furnaces are getting advances of 50c. over the low basis of February, particularly for deliveries past the middle of the year. At Buffalo a sale of 10,000 tons of basic and malleable iron is reported, with 25,000 to 30,000 tons for implement works either closed or under negotiation.

Two lots of basic iron, 5000 tons each, were sold in eastern Pennsylvania at \$15.25 for second and third quarter delivery. In the Pittsburgh district there is a decided lull in steel making iron.

No important reservations of Lake Superior ores have been made beyond those noted a few weeks ago, and reports of the establishment of last year's prices are untrue.

The coke market shows more life, and makers are standing out for better prices. An Eastern furnace interest is in the market for 10,000 tons a month for the remainder of the year. A Valley buyer has paid \$1.60 for 8000 to 10,000 tons a month up to July 1, and \$1.80 for a like amount through the second half.

Efficiency and Its Broader Application

The voluminous discussion of greater efficiency as the thing most needful in our industries to-day has dealt with it almost entirely as applied to production. The analysis of manual and machine operations, with a view to the elimination of superfluous motions by the workman and for the use of the machine in the most effective way, has been put forward as a chief feature of the new campaign. Much has been said, also, concerning functional foremanship as an essential to intensive production. The tendency has been to concentrate expert study upon the problems of the operating department, particularly on the devising of means of increasing the output of men and machines, with larger earnings to the workman for his co-operation in the plan.

It is pointed out in the article on another page, discussing "Business Administration as a Constructive Science," that emphasis has been thus put upon the manufacturing department as the field of administrative effort, almost to the ignoring of the other highly important co-ordinate branches of industrial organization, as selling, purchasing and financing. Management has been so often interpreted as the managing of men employed in the manufacturing processes, that its far broader scope has been missed. Administration as the science of all the forms of power employed in business is found to be vastly more than finding ways of speeding up the human machine and every other form of power employed in turning out product.

Practical examples of the mistake of putting operating experience in the saddle will come readily to mind.

The economies strained after in the production department are often minute. In steel manufacture they are frequently measured in cents per ton of product. Yet mistakes in cost finding, in the price at which product is sold, in the price paid for materials, or in credit improperly extended, may often neutralize all that the best equipped manufacturing department has accomplished in lowering the unit of production cost. President Farrell, of the United States Steel Corporation, said in his paper at the New York meeting of the American Iron and Steel Institute last year:

Without any desire to belittle the practical value and importance of effecting a saving in cost of production, however small, it has always seemed particularly hard upon the men who have accomplished what may appear as an insignificant reduction of the previous month's costs of producing pig iron or ingots or wire rods, to have this saving in mill costs dissipated by the sales department "quietly meeting the market" with a reduction of \$1 or \$2 per ton at the first sign of any cloud on the commercial horizon. Good salesmanship and sound business principles in the conduct of the selling of iron and steel are just as essential and vital to the prosperity and continued success of the industry as low costs and up-to-date machinery and manufacturing practice.

While Mr. Farrell's argument was intended to bear directly on the policy of co-operation in the selling departments of the large steel companies, it illustrates well how far the study of operating problems falls short of meeting the demands of successful business administration. It is probably true, so far as the steel industry is concerned, that what is commonly thought of as its engineering side—the field of economical production—has been more highly developed in the past 20 years than any other department. With all the boasted economies in administration, due to consolidation in the steel trade, it is a question if the selling side of the United States Steel Corporation, for example, with its duplication of organizations along product lines, does not offer opportunities for savings that have been missed in the strain to shade mill cost sheet figures.

What is here said of the steel industry is merely illustrative; in other form it may be applied to other industries. So much has been made of the wage issue in recent years that it is not surprising that the outlay for work done in the manufacture of product has been a special challenge to efficiency engineers. Works management and production systems, moreover, were lines of least resistance; the study to improve them did not involve the status of individuals "higher up." Naturally the advance of the efficiency engineer upon the broader problems of administration, in which the organization of a business as a whole comes under review, will be much more difficult.

Trade Co-operation and Government Oversight

There was no novelty in the proposal made by George W. Perkins of New York in an address before the Southern Commercial Congress at Atlanta last week for Government regulation of corporations. But the speaker offered one suggestion which has arrested attention, in proposing a Federal court for business questions, especially the supervision of corporations—a court in which no man could sit who had not had a business training with an honorable record. It is a sign of the times that whereas only a few years ago Government oversight of business was resisted by the leaders in industry and finance, so many men in control of large affairs are now acquiescing in the

proposal or actively advocating it. But with or without the consent of large interests, Government regulation is at hand, and its scope may prove to be greater than the business interests of the country have commonly entertained in their thinking. It may be questioned, indeed, whether those who have so warmly advocated co-operation among manufacturers making like products have given full consideration to some of the things to which co-operation is likely to lead. In his Atlanta address Mr. Perkins said:

As surely as you cannot have competition unless competes, just as surely you can only have co-operation that co-operates. I mean by this, co-operation in any given line of business will fail unless it is co-operation between labor and capital, between capital and consumer, between company and Government. Co-operation between labor and capital cannot be effected by the mere paying of wages and by the giving of gratuities or voluntary rewards at the end of the year. . . . The question between capital and labor to-day is not so much the amount of wage a man should be paid as it is whether that wage is a fair proportion of the earnings of the business.

The closer the world is drawn together and the better people know each other, the better they understand each other and the more impossible it is to adopt and pursue secretive methods—to obtain for any one branch of a business unfair and improper profits; and one of the things that intercommunication has done has been to sound the death knell of secretive methods.

The Government interpretation of the passing of secretiveness in business has been seen in the investigations carried on in the past few years by the Bureau of Corporations. So far as the United States Steel Corporation is concerned, taking it as a conspicuous example, it is probable that the records at Washington contain every material fact as to its costs, its methods and its properties. The idea of the present executive at Washington is well indicated in his public reference to the value of the Corporation Tax act, which has just been declared constitutional, in bringing to the public records information concerning the acts of corporations and the amount of their profits.

It is not hard to see that co-operation among manufacturers to maintain reasonable prices in a period of business depression, or at any time when demand is less than the capacity to produce, will entail obligations which must be met when trade conditions are favorable. If co-operating manufacturers are to say what is a reasonable price, at a time when competition would result in lower prices, they must also satisfy buyers (and shall we say, too, the Government?) that their prices are reasonable when demand is in excess of capacity. It need not surprise them, moreover, if there is a public demand that co-operation be not limited to the manufacturers, but that it include also co-operation between manufacturers and employees. If the question of the reasonableness of the prices of their product is decided by the manufacturers themselves, they may have to satisfy public opinion as to the reasonableness of the wages they pay. The focusing of attention upon co-operative movements in steel and other important industries is bound to bring public opinion to bear more and more upon all the problems of those industries. In this aspect co-operation becomes something more than a temporary expedient for tiding over a period of special difficulty. It must be regarded as a consistent policy, restraining advances when booms set in; always having in mind the interests of the consumer as well as the producer; satisfying the workman, as well as enlightened public sentiment, that the wages paid are "a fair proportion of the earnings of the business." In short, co-operat-

ing manufacturers must accept responsibilities corresponding with the important functions they assume in deciding at what level prices for their products shall be maintained. In this aspect of the present movement in the American steel trade, we may expect to see, under the new régime, only moderate prices and profits. Pointing in the same direction, as has been already indicated in these columns, is the Government check to freight rate advances, with its effect upon the prices of railroad labor and of those commodities for which the railroads make the largest outlay.

A New Metal Perforating Process

If the reader were to be asked how metal a quarter of an inch thick or thicker might be perforated with slots 1/1000 or even 1/32 in. wide he would probably answer, as did all experts who were consulted in the matter, that he did not know. Some men went so far as to say that it is impossible, and that the inquirer was wasting time to look for means to do it. By all orthodox methods of punching, it is impossible, and the rule is well established that it is impracticable to punch slots narrower than the thickness of the metal through which they are punched. How the inquirer, Andrew Smith of San Mateo, Cal., succeeded in obtaining his end is explained in an article in another part of this issue. Interesting as were his first schemes for approximating the desired results, the final solution so perfectly accomplished it and was so altogether novel, that it deserves recognition as a new process for metal perforating. Briefly it consists of cracking the metal on rows of parallel lines of cleavage perpendicular to its surface and then opening the cracks by stretching the metal. The cracking is done by depressing and raising alternate sections so that the metal is sheared on the intermediate lines and then after rolling them back the stretching is done by rolling the metal in the solid parts between the rows of cracks. While the process was one developed specifically for perforating well casings, it is very probable that many other useful applications will be found for it. Pipes so perforated have already been put to two closely allied uses: the draining of surface soil by buried pipes and, reversely used, the irrigating of soil by water distributed through such pipes laid in the ground.

Checking Unfair Complaints of Subordinates

When a controversy arises with a house operating large works concerning a machine delivered by a dealer or builder, the latter should make the effort to bring the details of the case before some higher official. A recent analysis of a typical case showed that the complaint of a department superintendent which had caused a machine to be shipped back to the factory had never reached any one higher in authority except as a mere generality. An injustice had been wrought because the affair had not been forced beyond the sphere of subordinates.

Many buyers build equipment entirely foreign to machine tools, concerning which they know very little. A great many purchases are for machine shops used only for the building and repair of equipment employed in manufacturing, so that the management is still farther removed in its knowledge of what is good and what is not. Dependence must be placed upon the

statements of those who superintend the operation of the tools. If such a man makes complaint of a machine the manager must believe him, unless the machinery house gets a hearing. It has been demonstrated that fair treatment usually follows the hearing of the other side of the affair.

In one case a perfectly good machine was rejected as unfit because of alleged imperfections in design and construction, when as a matter of fact it was a duplicate of several already in successful use in the customer's works. These had exceeded expectations and the later order was unnecessary. A subordinate, who had recommended the additional purchase, undertook to put the machine back on its builder and was successful. Had the details of this transaction come to the personal attention of the man higher up, the chances are that justice would have prevailed and a friendly adjustment would have been effected. A great majority of the men big enough to be chosen for the higher executive offices of a large concern are broad-gauge and fair minded. Even a personal letter to secure the requisite attention may be justified, where the seller stands to suffer not only an immediate money loss but the more serious menace of a damaged reputation for his products.

Navy Department Perplexity

An interesting condition of affairs confronts the United States Navy Department in consequence of the attempt to placate organized labor and anti-corporation sentiment in Government appropriation bills. It will be remembered that the Navy Department was balked last year in its efforts to keep within the appropriation the cost of building a battleship at a Government yard, by the provision inserted in the appropriation act restricting the working day on it to 8 hours. The appropriation act for this year's naval programme introduces some new restrictive features. Not only is the attempt made to enforce the 8-hour provision on private shipbuilding companies, who may take contracts for building battleships, but the Navy Department is prevented from expending any part of the amount appropriated for the purchase of structural steel, ship plates, armor, armament or machinery "from any persons or firms or corporations who have combined in monopoly or in any restraint of trade," and the department is forbidden to buy any steel at a price in excess of a reasonable profit above the actual cost.

It is possible that the legal advisers of the Government may point out a way by which these provisions of the appropriation act can be complied with, or at least how they may be construed so as to enable the department to advertise for bids with some certainty that shipbuilders will respond. The shipbuilders are unquestionably anxious for work and Government contracts would be most acceptable to them, but, as a matter of course, the first consideration will be to assure themselves that the work can be turned out with some margin of profit. It would by no means be surprising if the Government should be unable to place these contracts.

The Ajax Mfg. Company, Cleveland, has received an order from the Atlantic Coast Line Railroad for a set of reclaiming rolls for rerolling railroad scrap into smaller sizes of commercial bars. A similar order was recently received from the Central Railroad of Georgia.

Correspondence

Ferromanganese in Car Wheel Iron

To the Editor: In *The Iron Age* of March 9, page 605, there is an article entitled "A New Charcoal Pig Iron for Chilled Car Wheels," being mainly excerpts from a pamphlet issued by a concern making the so-called new metal. Indisputable statements of fact are here interwoven ingeniously with plausible special pleading, the net result of which is, in my judgment, altogether misleading. For example:

High sulphur with manganese effects a combination which produces a coarse chilled crystallization, which can be readily separated under distinct lines of cleavage, and which, under excessive heating and cooling, due to brake service, causes cracking and disintegration of tread and flange. The strength of the ordinary cast iron wheel of to-day is dependent entirely on the use of ferromanganese, and with its use there is no difficulty in meeting the M. C. B. specifications of "drop" and "thermal" tests.

The foregoing statements are correct, but immediately following comes the special pleading which, I claim, is altogether wrong, and, as I was responsible for the original introduction of 80 per cent. ferromanganese into car wheel mixtures 30 years ago (without any patent reservations or other restrictions or emoluments), I feel called upon to defend the process from unwarrantable aspersions cast upon it at this late day.

Between the years 1880 and 1888 I made considerably more than a thousand tests of the deleterious effect of high manganese (initially existing in some irons) upon the crystalline structure and wearing quality of the "chill" in a car wheel, and also upon the remarkably beneficial effect produced upon the unchilled or gray iron portion of a chilled cast iron car wheel without injuring the chill by adding to the ladle, a moment before pouring the metal into the mold, a minute quantity (actually 1 lb. in 600 lb. or more of iron) of powdered ferromanganese containing about 80 per cent. manganese. The total quantity of manganese thus added to the metal, even assuming that it all entered into combination and alloyed with the iron is entirely too small to produce any harmful influence, or even visible change in the character of the chilled iron crystals, such as is stated in the article referred to. In point of fact, the very small quantity of manganese thus added in form of ferromanganese is instantly seized upon by the sulphur and the oxygen in the iron, on account of the strong affinity of these elements for each other, and a characteristic surface action on the molten metal is at once noticeable, due to the rising to the surface of these impurities in the form of a light slag. The visible effect upon the gray iron in the plate and arms or ribs of a car wheel thus treated is striking indeed, changing it from a light gray color to dark gray, and from close grain to open grain; the "chill" is slightly diminished in depth, but is not otherwise changed.

The strength of the gray iron in the car wheel thus treated is increased nearly 50 per cent., and I believe it is universally admitted now that the introduction of ferromanganese in the precise manner and quantity that I described in my original paper, printed in the *Journal* of the Franklin Institute March, 1888, saved the day for the chilled cast iron car wheel when the Pennsylvania Railroad subsequently devised its severe "thermal test." Without this treatment the best annealed wheels cracked under this novel test, but, owing to the increase in ductility and strength of the metal, caused by this remarkable deoxidizing and desulphurizing agent, there is, as stated in your paper, no difficulty to-day in meeting the M. C. B. specifications of drop and thermal tests. On remelting, the effect of the small addition of ferromanganese disappears. It is *not* cumulative.

These facts were all set forth succinctly in the paper alluded to, a copy of which is forwarded herewith and have never been refuted.

ALEXANDER E. OUTERBRIDGE, JR.

Philadelphia, March 10, 1911.

NOTE.—The pamphlet containing Mr. Outerbridge's paper of 1888, as referred to above, has the following on the difference between high manganese iron and a

normal iron treated with a small amount of 80 per cent. ferromanganese.—EDITOR.

Manganese is commonly supposed to exert a hardening tendency upon pig iron, but experience has taught me to regard this as another mistaken notion, it undoubtedly produces a marked effect upon the character of the white crystalline structure. You may readily recognize "a manganese chill" by its coarse lamellar or foliated filaments and by the tendency which it produces to form white iron or "hard spots" in isolated places throughout the gray portion of a casting. Manganiferous pig iron has been used to produce chilled castings, but it does not make a durable wearing surface; the chilled tread of a car wheel, for example, produced by this method, presents to the eye, when broken through the section, a handsome appearance, but the white metal is comparatively soft; it may be easily bored, and, what is more serious, it crumbles readily under the impact of rapid shocks on the rail.

A remarkable effect is produced upon the character of hard iron by adding to the molten metal, a moment before pouring it into the mold, a very small quantity of powdered ferromanganese, say 1 lb. of ferromanganese in 600 lb. of iron, and thoroughly diffusing it through the molten mass by stirring with an iron rod. The result of several hundred carefully conducted experiments which I have made enables me to say that the transverse strength of the metal is increased from 30 to 40 per cent., the shrinkage is decreased from 20 to 30 per cent., and the depth of the chill is decreased about 25 per cent., while nearly one-half of the combined carbon is changed into free carbon; the percentage of manganese in the iron is not sensibly increased by this dose, the small proportion of manganese which was added being found in the form of oxide in the scoria. The philosophical explanation of this extraordinary effect is, in my opinion, to be found in the fact that the ferromanganese acts simply as a de-oxidizing agent, the manganese seizing any oxygen which has combined with the iron, forming manganic oxide, which being lighter than the molten metal, rises to the surface and floats off with the scoria. When a casting which has been artificially softened by this novel treatment is remelted, the effect of the ferromanganese disappears and hard iron results as a consequence.

New Publications.

Applications Industrielles de l'Electricité. (Industrial Applications of Electricity). By L. Creplet, chief service engineer of the International Electricity Company, Liege, Belgium. Size 6 x 9 in., 274 pages, 300 illustrations. On sale at the Association of Liege Engineers, Quai de l'Université, Liege, Belgium.

Electricity has been characterized as a form of energy, in the same sense as light, heat and mechanical energy and capable of transformation into any of the other forms of energy. What it is and how and why it may be transformed into work are questions of theory affecting only the relatively smaller number of electrical experts, but what it does, or its practical application, is the phase of the subject which is of interest to manufacturers at large.

Appealing rather to the mechanical than to the electrical engineer, the carefully prepared work of M. Creplet, which has now reached its second edition, covers the ground in concise and practical form. It is avowedly written for the benefit of technical men who have not had the opportunity of making a special study of electricity, but who, in their professional capacity, are called upon to deal with its industrial applications. As the author remarks, those already versed in electricity will find but little to interest them in his work, which is rather intended to afford engineers in general the guidance they require for determining the elements without which the constructors of electrical machinery could not furnish dynamos or other apparatus suitable for fulfilling the conditions required. It may, however, be doubted whether M. Creplet's work may not still prove of value to the expert desirous of following out to their solution questions affecting the applications of electricity. Liberal use is made of algebraic formulas in the 107 practical examples with which the text is interspersed.

In dealing with general principles, it is remarked that the mechanical energy utilized in dynamos is almost integrally converted into electricity; it being through these means that the latter is, in the majority of cases, produced for industrial purposes. Another source of electricity is the chemical energy put in action in piles and accumulators. M. Creplet adds:

"The machines which produce electricity hold a close analogy to steam-boilers. The latter receive energy

in the form of heat. We are totally ignorant as to the phenomena by which the energy is converted into steam under pressure. This appears to us, however, quite natural. So true is it that we get accustomed to the strangest things, provided they are frequently manifested to us. It is apparently an analogous mystery which attends the transformation of mechanical energy into electricity."

From the manufacturer's point of view, much interest attaches to the chapter dealing with the tests of electrical machinery, which will permit of judgment being formed of its construction and working capacity. Such tests would naturally deal with the questions of insulation, temperature, speed, overloading and other points more or less of a mechanical character. Another chapter of special importance is that treating of the various accessory instruments and appliances intended to insure the regular operation and preservation of the equipment, as well as the immunity from danger, of the working staff. The discussion of the relative merits of direct and alternating current in certain given cases will likewise be appreciated from a practical standpoint.

The arrangement of the book is singularly clear, and M. Creplet has unquestionably accomplished his object of producing a work that may facilitate the increased use of electricity for industrial purposes by spreading practical knowledge on the subject.

Engineering Index Annual, 1910. Compiled from the Engineering Index, published monthly in the Engineering Magazine during 1910. Twenty-seventh year. Size, 7 x 9½ in.; pages, 496. Price, \$2. Published by the Engineering Magazine, New York and London.

So well known is this index of the engineering matter appearing in some 250 of the leading periodicals that it scarcely calls for comment. An important innovation made in the 1910 volume just issued is the condensed classification of the index in the introductory pages giving all of the catch-words under the various subjects in the main classifications and the page references. It has greatly added to convenience in the use of the book, being a compact summary of all subjects treated, so that by the turning of a relatively few pages the user will quickly discover whether or not anything has appeared on the subject he is interested in, without the slower and more tedious examination of the body of the book.

Other than this the book is similar to previous issues, but shows a growth and development natural with the progress of industry and the increased amount of published information, and its subheadings and cross references have been somewhat amplified correspondingly. The first four volumes of the work appeared at five-year intervals, but since 1906 the index has been issued annually to keep it up to date, and particularly as a great deal of engineering matter becomes obsolete in a five-year period. In this book as in the annual volumes previously issued the classified system of arranging the items is followed in place of the strict alphabetical order of the earlier volumes, the great advantage of which is that it brings together the items of interest to any individual instead of scattering them through the entire work. The classifications themselves and the subdivisions under them do follow alphabetical arrangement. Unquestionably the arrangement accomplishes all that is possible to facilitate a search of the book.

The Baldwin Locomotive Works, Philadelphia, reports the bulk of recent orders as being small individually, although several very satisfactory inquiries, including one for 29 engines for the Atlantic Coast Line and another from the Illinois Central for a considerable number, are being figured on. One order for six engines for the Georgia Railroad has just been entered. The Baldwin Works is hardly as busy as it was a few months ago; working forces have not been reduced, but in some instances full time is not being made.

The American Bridge Company shipped by river from its plant at Ambridge, Pa., a steel dry dock for the Third District Government fleet, which arrived at Vicksburg, Miss., last week.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

FIG IRON, Per Gross Ton :	Mar.15, 1911.	Mar.8, 1911.	Feb.15, 1911.	Mar.16, 1910.
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$18.00
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	16.25
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00	13.00
Foundry No. 2, local, Chicago.....	15.50	15.50	15.50	18.25
Basic, delivered, eastern Pa.....	15.25	15.25	14.50	18.50
Basic, Valley furnace.....	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	18.65
Gray forge, Pittsburgh.....	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago.....	17.50	17.50	17.50	19.50

BILLETS, &c., Per Gross Ton :

Bessemer billets, Pittsburgh.....	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia.....	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh.....	29.00	29.00	29.00	33.00

OLD MATERIAL, Per Gross Ton :

Iron rails, Chicago.....	15.50	15.50	15.50	19.00
Iron rails, Philadelphia.....	18.50	18.50	17.50	20.50
Car wheels, Chicago.....	13.25	13.25	13.00	17.00
Car wheels, Philadelphia.....	14.00	14.00	13.50	16.75
Heavy steel scrap, Pittsburgh.....	14.25	14.75	14.50	17.00
Heavy steel scrap, Chicago.....	12.00	12.00	11.75	15.00
Heavy steel scrap, Philadelphia.....	14.00	14.00	14.00	16.50

FINISHED IRON AND STEEL,

Per Pound :	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.....	1.37½	1.37½	1.35	1.57½
Common iron bars, Chicago.....	1.27½	1.27½	1.30	1.55
Common iron bars, Pittsburgh.....	1.35	1.35	1.35	1.65
Steel bars, tidewater, New York.....	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York.....	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York.....	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York.....	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.....	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.....	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound :	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.75	1.85
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.85
Barb wire, galv., Pittsburgh.....	2.10	2.10	2.05	2.15

METALS, Per Pound :

Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.50	12.62½	12.75
Electrolytic copper, New York.....	12.25	12.25	12.37½
Spelter, New York.....	5.65	5.65	5.77½
Spelter, St. Louis.....	5.50	5.50	5.42½
Lead, New York.....	4.37½	4.40	4.45
Lead, St. Louis.....	4.22½	4.25	4.30
Tin, New York.....	39.75	41.75	45.75
Antimony, Hallett, New York.....	9.25	9.25	7.75
Tin plate, 100-lb. box, New York.....	\$3.94	\$3.94	\$3.94

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zeos, 3 in. and up, 1.40c. to 1.45c., net;

angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¾-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	So. 10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.10
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS. Net cash 30 days

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, 20, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.	Steel.	Black. Galv.	Iron.	Black. Galv.
1, 1½, & 2 in.....	72	58	68	54	
1 in.....	75	63	71	59	
3 to 10 in.....	79	69	75	65	
2 to 3 in.....	80	70	76	66	
Lap Weld.....					
2 in.....	76	66	72	62	
2½ to 4 in.....	78	68	74	64	
4½ to 6 in.....	77	67	73	63	
7 to 12 in.....	75	59	71	55	
13 to 15 in.....	51½				
Butt Weld, extra strong, plain ends, card weights.....					
1, 1½, & 2 in.....	69	59	65	55	
1 in.....	74	68	70	64	
¾ to 1½ in.....	78	72	74	68	
2 to 3 in.....	79	73	75	69	
Lap Weld, extra strong, plain ends, card weight.....					
2 in.....	75	69	71	65	
2½ to 4 in.....	77	71	73	67	
4½ to 6 in.....	76	70	72	66	
7 to 8 in.....	69	59	65	55	
9 to 12 in.....	64	54	60	50	
Butt Weld, double extra strong, plain ends, card weight.....					
1 in.....	64	58	60	54	
¾ to 1½ in.....	67	61	63	57	
2 to 3 in.....	69	63	65	59	
Lap Weld, double extra strong, plain ends, card weight.....					
2 in.....	65	59	61	55	
2½ to 4 in.....	67	61	63	57	
4½ to 6 in.....	66	60	62	56	
7 to 8 in.....	59	49	55	45	

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1 1/2 in. Butt Weld Will be sold at two (2) points lower basing higher prices than merchant or card weight pipe. Butt

2, 2 1/2 to 4 in. Lap Weld or Lap Weld as specified. The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1 1/2 in.	49	43
1 3/4 to 2 1/4 in.	61	43
2 1/2 in.	63	48
2 3/4 to 5 in.	69	55
2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.		
2 1/2 in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$29.

Steel Rivets.—Structural rivets, 3/4 in. and larger, 1.90c., base; cone head boiler rivets, 3/4 in. and larger, 2c., base; 5/8 in. and 11-16 in. take an advance of 15c., and 1/2 in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, March 15, 1911. (By Telegraph.)

Pig Iron.—The market continues very quiet, inquiry being light and only for small lots. Prices are weak. A sale of 1000 tons of standard Bessemer for April, May and June is reported at \$15, at furnace, the maker paying a small commission to the broker. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—New buying of steel is very light. Most consumers of billets and sheet and tin bars are covered ahead and are specifying freely on their contracts. The Cambria Steel Company is operating this week 24 of its 25 open hearth furnaces and will blow in the last of this week another blast furnace, making all its eight stacks in blast. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1 1/2-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Reports from the heads of the sales departments of a number of the leading steel interests show clearly that the volume of new business in iron and steel products has fallen off very much as compared with two or three weeks ago. Consumers do not take much interest in the market, usually buying only such material as they absolutely must have. The calling of an extra session of Congress seems to have put a damper on trade. While former prices are still being quoted on pig iron, there is very little buying and only in small lots. Specifications from consumers of billets and sheet bars are still coming in quite freely, and the steel market is fairly active. In finished lines of iron and steel the new demand is quiet. The recent advance in wire products is being maintained, but jobbers and retailers were covered ahead for 60 days or more, and new buying in the last 10 days has been light. The scrap market is also dull, and prices on heavy steel scrap, cast iron borings and wrought turnings have gone off. There is more inquiry for coke and the tone of that trade is a little stronger. A leading Valley furnace interest has bought about 60,000 tons of furnace coke for last half delivery on the basis of about \$1.80 per net ton, at oven.

Ferromanganese.—The market is very dull and prices are weak. Dealers are asking \$37.50 to \$37.75, Baltimore, for 80 per cent. for the remainder of this year, but it is reported that the lower price has been shaded in some re-

cent transactions. We quote 80 per cent. foreign for prompt shipment at about \$37.25, and for forward delivery at \$37.50 to \$37.75, Baltimore. The freight rate for delivery in the Pittsburgh district is \$1.95 a ton.

Ferrosilicon.—The demand has subsided and prices are extremely weak. We quote 50 per cent. at \$53.50 to \$54, f.o.b. Pittsburgh, for delivery up to July; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—In the absence of sales, we quote best grades of muck bar made from all pig iron at nominally \$30, Pittsburgh.

Skelp.—No sales of moment have recently been made, but prices are firm. The skelp mills in this district are pretty well filled up for some time. We quote grooved steel skelp at 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—Most consumers covered their requirements to July 1 or longer before the recent advances in prices were made, so that the new demand is light. Specifications against contracts are coming in at only a fairly satisfactory rate. We quote Bessemer, open hearth and chain rods at \$29 to \$30, Pittsburgh, most makers quoting the higher price.

Steel Rails.—No important orders for standard sections have been taken by the Carnegie Steel Company in the past week, but it is receiving some good sized orders for standard section rails for export. This business coming through the United States Steel Products Company. Business in light rails in the past week was fairly active, new orders and specifications against contracts aggregating about 4000 tons. The three rail mills of the Carnegie Steel Company at Bessemer, Pa., are operating to about only 50 per cent. of capacity at present. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c. and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—There is a fair amount of new buying of a hand to mouth character, but no contracts calling for large tonnages are being placed. Car orders are scarce. The Pressed Steel Car Company took in the past week 100 steel mine cars for the Gulf Smokeless Coal Company and 10 flat cars for the Berwind Lumber Company, and the Standard Steel Car Company took 60 box cars and 50 refrigerator cars for the Ann Arbor Railroad and 50 box cars for the Richmond, Fredericksburg & Potomac Railroad, the latter to be built at its South Baltimore, Md., shops. The Atlantic Coast Line is in the market for 1200 cars and the Western Maryland for about 500 cars. The Carnegie Steel Company is now rolling about 3500 tons of plates and shapes for a new passenger boat for the Cleveland & Detroit Navigation Company, and the Philadelphia Company of this city is in the market for 2500 to 3000 tons of plates for a gas holder. We quote plates 1/4 in. and heavier in the wide sizes at 1.40c., Pittsburgh.

Structural Material.—New inquiry is rather light, especially from the railroads, which have been buying very little material for some time. The Jones & Laughlin Steel Company has taken about 4000 tons for the new prison at Wingdale, N. Y., and about 800 tons for a highway bridge in Venango County, Pa. The McClintic-Marshall Construction Company has taken 400 to 500 tons for new buildings for the Brightman Mfg. Company, Columbus, Ohio, and the McMyer Interstate Engineering Company, Bedford, Ohio, has taken about 350 tons for a new interurban depot at Columbus, Ohio. The Dravo Contracting Company of this city is the lowest bidder on the piers for the new bridge across the Allegheny River in this city, which will require about 500 tons of sheet steel piling and shapes for the substructure; the main structure will take from 5000 to 7000 tons, but this will probably not be let for some time. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—Specifications from heavy consumers are coming in quite freely, but the new demand is light, as is usual at this season. The American Sheet & Tin Plate Company started up on Monday its Chester Works at Chester, W. Va., containing seven hot tin mills, this plant having been closed for about three weeks for boiler and engine repairs. It closed six mills at its American Works at Gas City, Ind., to rebuild some heating furnaces. The company is operating this week 198 out of a total of 235 hot tin mills, or about 86 per cent. Reports are that plans are under way for the building of another large tin plate plant in the Pittsburgh district, but nothing official regarding this has been given out. Prices on tin plate are being

THE IRON AND METAL MARKETS

maintained at \$3.70 per base box of 100-lb. cokes, f.o.b. Pittsburgh.

Sheets.—The demand is below expectations, and specifications against contracts are not coming in as freely as desired; in fact, the present condition of the sheet trade is a disappointment to the mills. The American Sheet & Tin Plate Company is operating this week about 60 per cent. of its capacity in sheet mill products, and a majority of the outside mills are operating at about the same rate. With two or three weeks of good weather the demand for roofing sheets and other grades as well would probably show betterment. Regular prices in the different grades of sheets are printed on a previous page.

Bars.—The implement makers are specifying in a fairly liberal way against their contracts, but so far have shown no disposition to enter the market to make new contracts for their 1911-1912 requirements. The implement makers are covered up to July 1, and as long as there is no probability of higher prices for steel bars they will likely be slow in making new contracts. The demand for concrete bars is light, but will probably improve when the building season opens. The tone of the market on iron bars is only fairly strong, and new orders and specifications are not satisfactory. We quote steel bars at 1.40c. and iron bars at 1.35c., f.o.b. Pittsburgh.

Hoops and Bands.—Consumers are buying mostly in small lots, merely to cover actual needs, and specifications against contracts are coming in only at a fairly satisfactory rate. We continue to quote steel hoops at 1.50c. and bands at 1.40c., with extras on the latter as per the present steel card, but are advised that on some contracts taken recently the prices on both hoops and bands were slightly shaded.

Spikes.—A fair tonnage in spikes is moving out from the mills to the railroads, and the Pittsburgh & Lake Erie of the New York Central Lines has recently placed a contract for 5000 kegs, while the Northern Pacific has an inquiry out for 3000 kegs. Prices on spikes are firm, at \$1.55 for base sizes, but this price holds good only until March 31, and commencing April 1 all spike makers will quote on the basis of \$1.60. Prices on railroad spikes, with extras in effect until March 31, are as follows:

Railroad Spikes.

4 1/2, 5 and 5 1/2 x 9 1/2	.....	\$1.55
3, 3 1/2, 4, 4 1/2 and 5 x 9 1/2	.....	Extra .10
3 1/2, 4 and 4 1/2 x 7 1/2	.....	Extra .20
3, 3 1/2, 4 and 4 1/2 x 8	.....	Extra .30
2 1/2 x 9 1/2	.....	Extra .40
2 1/2, 3 and 3 1/2 x 8 1/2	.....	Extra .60
2 x 9	.....	Extra .80

Roof Spikes.

3/4 in. square, 12 to 24 in. long	.....	Extra .15
3/4 in. square, 8 to 16 in. long	.....	Extra .15
3/4 in. square, 6 to 16 in. long	.....	Extra .15
1/2 in. square, 6 to 12 in. long	.....	Extra .20
3/8 in. square, 4 to 12 in. long	.....	Extra .30
1/2 in. square, 4 to 8 in. long	.....	Extra .45
1/4 in. square, 4 to 8 in. long	.....	Extra .75
1/4 in. square, 3 to 3 1/2 in. long	.....	Extra 1.00
3/8 and 1/2 in. square or more than 4 in., 1/4 cent extra.		

Spelter.—The market is slightly easier, and while most of the Western smelters are quoting on the basis of 5.50c., East St. Louis, some consumers report they have been able to place orders at slightly under this price. We quote prime grades at 5.45c. to 5.50c., East St. Louis, equal to 5.57 1/2c. and 5.62 1/2c., Pittsburgh.

Merchant Steel.—New orders continue to be closely confined to small lots, and specifications against contracts are not quite as active so far this month as in the same period in February. Consumers are disposed to go slow in making contracts. Prices are said to be very firm, and we quote, f.o.b. Pittsburgh: Iron finished tire, 1/2 x 1 1/2 in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—The demand is only fair, mostly for small lots, and specifications against orders are not coming in as they should. There is a slight betterment in the demand for boiler rivets, but structural rivets are very quiet. Prices are shaded on attractive orders.

Wire Products.—Jobbers and retailers were pretty well covered prior to the advance in prices March 6, and as a result the new demand has been rather quiet for the past week or more. Specifications against jobbers' contracts are being received by the mills very freely. The outlook is promising for a very heavy consumption of wire for fence building and other purposes this year. We quote galvanized barbed wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.55; galvanized, \$1.90; wire nails, \$1.80; and cut nails, \$1.60 to \$1.65, f.o.b. Pittsburgh, full freight to destination added.

Merchant Pipe.—The new demand for merchant pipe from jobbers and retailers has been showing a slow but gradual increase for some time, and the amount of new

business entered by the mills so far this month is as large as in the same period last month. With two or three weeks of mild weather there would, no doubt, be quite a spurt in the demand for merchant pipe. Stocks held by jobbers are probably lighter than for some months. The only inquiry reported in the market for line pipe is one for 45 miles of 16-in. from one of the gas companies at Shreveport, La. It is stated that regular discounts on iron and steel pipe, printed on a previous page, are being fairly well maintained.

Boiler Tubes.—There is no improvement in the new demand for either locomotive or merchant tubes. The boiler tube trade has been very unsatisfactory to the mills for more than a year. It is said that boiler tubes have sometimes sold at prices that, to some mills at least, were below cost.

Coke.—The coke market is showing signs of a betterment in demand, and prices are firmer. A Valley interest closed for 8000 to 10,000 tons monthly of furnace coke for delivery up to July 1, on the basis of \$1.60 per net ton, at oven, and for the same tonnage for July to December, at \$1.80. These prices are probably lower than the actual market. An Eastern furnace interest is in the market for about 10,000 tons of coke per month over the remainder of the year. There is more disposition among consumers of furnace and foundry coke to close for their full requirements for the remainder of the year. It is recognized that present prices are now low and any improvement in the pig iron trade would probably result in higher prices on coke. We quote standard grades of furnace coke for prompt shipment at \$1.55 to \$1.60 per net ton at oven, and on contracts for delivery over the remainder of the year from \$1.80 to \$1.90 with some makers firm for second half of the year delivery at \$1.90 to \$2 at oven. Standard makes of 72-hour foundry coke are held at about \$2.10 per net ton at oven to dealers and from \$2.25 up to \$2.50 to consumers. We are advised that several makers of the best grades of 72-hour foundry coke have considerable business on their books based on \$2.50 at oven.

Iron and Steel Scrap.—The new demand is light and part of the late advance in prices on heavy steel scrap, borings and turnings has been lost. There is not much pressure on the part of dealers to sell, however, so that it can be said that prices are fairly strong. We note sales of 1200 to 1500 tons of heavy steel scrap on the basis of about \$14.25. Pittsburgh; 200 tons of borings at \$9.50, delivered; 1000 tons of bundled sheet scrap at about \$11.25 at loading point, and 1000 tons of low phosphorus scrap at \$17.50, delivered in the Pittsburgh district. Dealers are naming lower prices on heavy steel scrap, borings and turnings, and now quote as follows, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Fd-lanshee, Sharon, Monessen and Pittsburgh delivery	.....	\$14.25 to \$14.50
No. 1 foundry cast	.....	14.50 to 14.75
No. 2 foundry cast	.....	13.75 to 14.00
Bundled sheet scrap, at point of shipment	.....	11.00 to 11.25
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	.....	15.00 to 15.25
No. 1 railroad malleable stock	.....	13.25 to 13.50
Gate bars	.....	11.25 to 11.50
Low phosphorus melting stock	.....	17.25 to 17.50
Iron car axles	.....	24.75 to 25.00
Steel car axles	.....	20.50 to 20.75
Locomotive axles	.....	24.25 to 24.75
No. 1 busheling scrap	.....	12.50 to 12.75
No. 2 busheling scrap	.....	9.00 to 9.25
Old car wheels	.....	13.75 to 14.00
Sheet bar crop ends	.....	16.00 to 16.25
Cast iron borings	.....	9.15 to 9.50
*Machine shop turnings	.....	10.00 to 10.25
Old iron rails	.....	16.00 to 16.25
No. 1 wrought scrap	.....	14.50 to 14.75
Heavy steel axle turnings	.....	10.25 to 10.50
Stove plate	.....	11.50 to 11.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

The Pittsburgh office of Naylor & Co., Frick Building, dealers in pig iron, steel, wire rods and coke, has been abolished.

Chicago

FISHER BUILDING, March 15, 1911.—(By Telegraph.)

The market is quiet. Inquiries for pig iron have somewhat dropped off, and no sales of importance have been made. Scrap iron has further weakened, and the market is well in the hands of buyers. The demand for structural material is improving as spring advances. Sheet mills have somewhat curtailed their production, but the lull is considered temporary. The advance in the price of wire products which went into effect March 6 has netted more orders this week than were placed the week preceding the well-heralded advance. This speaks convincingly of healthy country conditions. Spring has been coming on gradually in the central and northern States, and frost is pretty well

THE IRON AND METAL MARKETS

out of the ground as far north as Chicago. This condition is welcomed in agricultural districts, where winter froze a dry soil, and puts it in condition to make the most of spring rains.

Pig Iron.—Quietness is noticeable in the entire market. Inquiries for both Northern and Southern irons have somewhat slackened off and few orders are being placed. The price of Southern iron remains at \$11, Birmingham, for No. 2 foundry, for the first half, and \$11.50 for the last half; \$11.50 is also being quoted for the third quarter, supplementing a price of \$11.25, which has been named for some weeks by certain Southern producers. A local foundry is reported to be in the market for 2000 tons of iron, this quantity being about equally divided between Northern and Southern. The inquiry for 3000 tons of basic, reported last week from a local steel foundry, is still pending. The following quotations are for March shipment, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—Business continues light and the maximum price of \$30.60, base, Chicago, is being maintained on open hearth forging billets by the leading interest. Open hearth rerolling billets remain at \$25.60, base, Chicago.

Rails and Track Supplies.—Orders for track materials have been of good volume. Contracts approximating 16,000 tons of standard sections have been received by the leading interest. This business has come in small lots from numerous railroads. Prices are unchanged and firm, as follows: We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—The condition of this trade continues good. Specifications are improving and shipping instructions are normal. Railroad buying is quiet. Contracts let last week include the following: Minneapolis General Electric Company, power station, 484 tons, let to Minneapolis Steel & Machinery Company; addition to McCormick Building, Chicago, 1914 tons, to Hansell-Elcock Company; Pantages Amusement Company, theatre and office building, Portland, Ore., 286 tons, to American Bridge Company; city of Janesville, Wis., highway bridges, 325 tons, to Central States Bridge Company; Wabash Railroad Company, bridge No. 390, Peru Division, 490 tons, to American Bridge Company; High School Building, Spokane, Wash., 650 tons, to Minneapolis Steel & Machinery Company; Dearborn Street bridge, Seattle, Wash., 625 tons, to Pennsylvania Steel Company. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Generous specifications continue to improve business on this product. Mills are very busy and the prospect of a continuance of this activity is bright. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Specifications against contracts are coming in fairly well, but buying has dropped off. Mills are operating at about 45 per cent. of their capacity. This is believed to be but a temporary lull. Prices are well maintained. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Bar iron has continued to firm up and is now considered steady. Steel bars have been fairly active, the demand being improved by specifications for concrete reinforcement material. An optimistic trend governs the market. Prices are firm, as follows: Soft steel bars, 1.58c.; bar iron, 1.27½c. to 1.32½c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Following the recent advance in the price of wire products has come an increase rather than a decrease in business. This is something of a surprise, as buyers were well warned. It speaks volumes for the good

condition of farming districts. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized staples, 2.28c., all Chicago.

Cast Iron Pipe.—Business is quite active and numerous small sales have been made. The city of Minneapolis, Minn., has contracted with the leading interest here for 3500 tons. Dayton, Ohio, is in the market for 500 tons. Gas companies have been liberal buyers though most contracts have come from smaller companies. Prices continue firm, as follows, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—A further decline in the price of scrap is noted this week. The apparent scarcity of scrap during the past few weeks has been forgotten and mills are receiving offers of material from every quarter. It is purely a buyer's market. The Santa Fe's list, containing approximately 24,000 tons, closed March 10 and has not been sold. prices bid on practically every item being decidedly less than those of a month ago. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails.....	\$15.50 to \$16.00
Old steel rails, reselling.....	14.00 to 14.50
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, some let to inspection.....	21.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	12.00 to 12.50
Frogs, switches and guards, cut apart.....	12.00 to 12.50
Shoveling steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$13.00 to \$13.50
Iron arch bars and transoms.....	15.00 to 15.50
Steel angle bars.....	11.50 to 12.00
Iron car axles.....	19.25 to 19.75
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.25 to 11.75
Steel knuckles and couplers.....	11.50 to 12.00
Locomotive tires, smooth.....	17.50 to 18.00
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	7.00 to 7.50
Cast and mixed borings.....	5.75 to 6.25
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	7.75 to 8.25
No. 1 boilers, cut to sheets and rings.....	8.50 to 9.00
Boiler punchings.....	13.00 to 13.50
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	10.25 to 10.75
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.75 to 9.25

Philadelphia

PHILADELPHIA, PA., March 14, 1911.

While there may have been some slight recession in pig iron buying during the week, owing, to a certain extent, to stiffening prices, the movement in finished materials appears to have been fully maintained, and, in some instances, it exceeded that for the previous week. One Eastern plate mill began the week at full rolling capacity, for the first time in months. Higher prices are being paid for foundry iron, particularly on non-competitive business. The Eastern Pig Iron Association, which met in this city, reports more favorable general conditions. Orders have increased, while stocks have receded. In some grades of pig iron a shortage for early delivery is believed not unlikely. There is still considerable inquiry for iron for forward delivery, although little business has been placed. Plates and shapes have been more active, but the demand for billets and sheets continues quiet. The old material market remains quiet. Considerable business in coke is pending, but no important transactions have been closed.

Iron Ore.—While more interest is shown by consumers, with a fair amount of business pending, no sales of importance have been recently reported. Importations at this port for the week ending March 11 aggregated 14,758 tons, valued at \$69,959.

Pig Iron.—While some sellers report continued active buying, others note a decline in sales. Hesitancy has been largely due, it is believed, to the upward tendency of prices. A higher range has been obtained for foundry grades in a number of instances, both for competitive and non-competitive business, although several producers are still willing to sell No. 2 X at \$15.50, delivered, for shipment over the remainder of the first half. At the same time standard brands of that grade have been sold in moderate lots at \$15.75 and \$16, delivered. Transactions in foundry iron have been largely confined to quantities ranging from carloads to a few hundred tons, for either prompt or second quarter. While there is considerable inquiry for iron for delivery in the third quarter, or even for more extended periods, sellers still hesitate when it comes to quoting for

THE IRON AND METAL MARKETS

such delivery, because of the uncertainty as to prices of ore still prevailing. Melters of low grade iron continue active inquirers for prompt and forward iron. One interest would take on a large block if favorable prices could be had, while another is out with an inquiry for 5000 tons for May and June shipment. Northern low grade irons have been gradually becoming scarce and sellers have decidedly higher ideas regarding prices. Northern forge iron is still in good demand, one inquiry for 3000 tons being in hand, but no large sales are reported. The movement in Virginia foundry grades has been active, with a number of moderate sales of No. 2 X and No. 2 plain for delivery in this vicinity, including one lot of 1000 tons at \$13, furnace, for delivery extending up to June. A sale of a round lot of low grade iron, understood to have been 3000 tons, to a Virginia cast iron pipe maker, is also reported. Virginia makers are now holding firmly at \$13, furnace, for No. 2 X foundry, for prompt or second quarter shipment. A further movement of basic iron in this territory is noted. Apparently it is still possible to do \$15.25, delivered, eastern Pennsylvania mill, for this grade, one interest which has been buying quite freely of late having taken two 5000-ton blocks at that price, for delivery in the second and third quarters. Makers contend that there is little iron available at that figure, and several producers state that they will accept no further business at that level. Sales of moderate lots of low phosphorus iron continue to be made for early shipment, and prices are gradually advancing, due to the probability of a shortage in the supply. One producer of standard iron of this grade is preparing to blow out its furnace for needed repairs. The following range of prices is named for standard brands, delivered in buyers' yards in this vicinity, shipments for the most part not extending beyond the first half of the year:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.50 to 15.00
Basic.....	15.25 to 15.50
Standard low phosphorus.....	21.50 to 22.00

Ferromanganese.—The past week has brought out a few inquiries from consumers in this district. Several 100-ton lots for early delivery and one 500-ton lot for shipment over the remainder of the year are under negotiation. In the absence of sales prices are nominally quoted at \$37.50, Baltimore, for second quarter, and \$38, Baltimore, for second half delivery.

Billets.—While there is an occasional betterment in the demand, the market drags. Consumers are confining themselves to small purchases for near future requirement, and are not disposed to place business for extended requirements. Makers in this district are not very fully engaged and have little forward business on their books. Prices, however, are fully maintained at \$25.40, for rolling and \$30.40 for ordinary forging billets, delivered in this vicinity.

Plates.—Eastern mills report an increase in orders, which in some instances are of larger size, upward of 500-ton lots being more frequent. Specifications have also been heavier. The range of the demand is wider, although that for tank plates has been the more pronounced. One Eastern mill began operations on Monday at full rolling capacity, and, from present indications, will be able to continue that rate for some time against business already on its books. Prices are firmly held at 1.55c., minimum, for ordinary plates delivered in this territory, and makers are not anxious to contract for extended shipment.

Structural Material.—A trifle better demand for plain shapes, as well as small fabricated work, is reported. The larger propositions, however, such as the Curtis warehouse and the Baltimore Bargain House, are still unclosed, although expected to be placed at an early date. Some small bridge work has been placed and the Eastern Steel Company has the contract for a 125-ton bridge for the Pennsylvania Railroad at Fricks Lock, Pa. A number of small building contracts, ranging from 50 to 200 tons, are under negotiation, and both makers of shapes and fabricators look forward to a better demand in the near future. Prices of plain shapes are firm at 1.55c., delivered in this vicinity.

Sheets.—Eastern mills are still working on day to day orders and have not been able to get up to the full capacity mark. Orders are plentiful, but confined to small lots for early delivery. There is no indication of immediate buying in quantity. The following range of prices is maintained by Eastern makers, for prompt and near future shipments: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—A moderate demand for refined iron bars continues. While recent sales have been small, some fair business is pending. Eastern bar iron makers are holding prices firmly; while 1.30c. to 1.32½c., mill, is quoted by some sellers, dependent on specifications, others are maintaining

1.35c., minimum, and further advances are considered. For delivery in this vicinity refined iron bars are quoted at 1.37½c. to 1.45c., delivered. Steel bars are fairly active, at 1.55c., delivered here.

Coke.—Negotiations are still pending for furnace coke for forward delivery, as buyers and sellers have not yet been able to agree on prices. For early delivery, however, business has been done at prices ranging from \$1.65 to \$1.75, at oven, although for extended delivery from \$1.85 to \$2 is named. A moderate business in foundry coke has been done at prices ranging from \$2.20 to \$2.50 at oven, dependent on brand and delivery. The following range of quotations, per net ton, is named for deliveries in this vicinity:

Connellsville furnace coke.....	\$3.90 to \$4.25
Foundry coke.....	4.10 to 4.65
Mountain furnace coke.....	3.50 to 3.85
Foundry coke.....	4.00 to 4.25

Old Material.—Conditions are practically unchanged, buying being quiet, awaiting awards against bids for railroad scrap. It is said that at least close to the top of the market has been bid for various grades of material offered by railroads in this district. Small lot buying in No. 1 heavy melting steel scrap is reported at \$14.25, delivered Eastern mill, although some buyers do not offer over \$14, delivered, for this grade. Rolling mill scrap is firm, but the business transacted has been small. Notwithstanding the inactivity, the tone of the market is strong and prices are firm at the following range, for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton.

No. 1 heavy melting steel scrap.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	15.50 to 16.00
Low phosphorus heavy melting steel scrap.....	18.50 to 19.00
Old steel axles.....	21.00 to 21.50
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	18.50 to 19.00
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	17.50 to 18.00
Wrought iron pipe.....	14.00 to 14.50
No. 1 forge fire.....	12.25 to 12.75
No. 2 light iron.....	8.00 to 8.50*
Wrought turnings.....	10.25 to 10.75
Cast borings.....	10.00 to 10.50
Machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.50 to 13.00*
Grate bars.....	12.00 to 12.50
Stove plate.....	11.50 to 12.00

* Nominal.

The Princess Furnace Company is preparing to blow in its furnace at Glen Wilton, Va., this week. It has been undergoing extensive repairs.

St. Louis

ST. LOUIS, March 13, 1911.

In the main, a conservative if not a cautious spirit is indicative of the attitude of buyers of most heavy material and there is little if any disposition to speculate for a rise. On the other hand, in pig iron at least, there are no signs of short selling. In coke, the low prices are attracting purchasers. Old material is easier in the absence of demand from consumers. The indications for freer buying on the part of railroads are improving, especially with respect to standard rails.

Pig Iron.—A lull in the demand for pig iron was experienced by the leading sellers during the past week, but merchant houses reported that their salesmen were meeting with satisfactory success among the small buyers in St. Louis territory. The largest transaction mentioned was the sale of 6000 tons of Northern basic to an east side steel foundry. One of the principal agencies reported the sale of 1500 tons of 6 per cent. silicon, and 500 tons of Southern No. 2 foundry, both for future delivery. The representative of a leading Southern interest, in the past ten days, has placed 2700 tons of Southern No. 2 foundry, principally. Scattering sales of lots of 100 to 500 tons have also been made by the leading officers. The inquiry is now mainly for last half delivery. Special inducements are offered for iron for prompt shipment, on a cash basis, without takers. We quote the market unchanged and steady to firm at \$11. Birmingham, for Southern No. 2 for shipment over the remainder of the first half and including third quarter and \$11.50 for fourth quarter only, with the notation that some furnaces are holding at higher figures. Northern No. 2 foundry is quoted at \$14 to \$14.50 Iron-ton.

Coke.—The developments in coke the past week indicate that some large interests are in the market, since we note the following inquiries: One for 4000 tons of foundry coke for shipment over the remainder of the year; one for 2400 tons of furnace coke and another inquiry for 12 cars of foundry coke. The sale of 1000 tons of foundry coke for future delivery is reported. Merchant sellers also report doing a fair carload business. The low prices at which coke has

THE IRON AND METAL MARKETS

been offered of late are bringing some large consumers into the market and, while there is no advance, the tendency is stronger. We quote for 72-hour Connellsville foundry, for shipment over the remainder of the year, \$2.15 to \$2.25 per net ton at oven. Special brands and carload lots are held 25c. to 50c. per ton higher.

Finished Iron and Steel.—The leading interest reports closing a contract with a Kansas railroad for 2200 tons of standard rails. Lumbermen are making better inquiry for light rails. In structural material there is a steady but moderate demand. Bars are holding a fair average demand, with some improvement in orders from jobbers as the spring season draws nearer. There is a fair inquiry for track material, and the outlook for railroad business is better, particularly on rails.

Old Material.—The market for scrap iron and steel has weakened under a let-up in the demand from consumers, and most of the business that is passing is between dealers and filling specifications on previous contracts. The following offerings by railroads are reported: Mobile & Ohio, 400 to 500 tons; Southern, 500 tons. Prices on most of the list are about 50c. per ton lower. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, peeling.....	13.50 to 14.00
Old steel rails, less than 3 ft.....	12.50 to 13.00
Relaying rails, standard sections, set just to inspection.....	23.50 to 24.00
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	12.00 to 12.50
Frogs, switches and guards, cut apart.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$11.50 to \$12.00
Iron car axles.....	18.50 to 19.00
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.00 to 11.50
Railway springs.....	10.50 to 11.00
Locomotive tires, smooth.....	16.50 to 17.00
No. 1 dealers' tires.....	9.50 to 10.00
Mixed borings.....	5.00 to 5.50
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers, cut to sheets and rings.....	8.50 to 9.00
No. 1 cast scrap.....	12.00 to 12.50
Stove plate and light cast scrap.....	9.50 to 10.00
Railroad malleable.....	9.50 to 10.00
Agricultural malleable.....	9.00 to 9.50
Pipes and flues.....	8.50 to 9.00
Railroad sheet and tank scrap.....	8.50 to 9.00
Railroad grate bars.....	9.00 to 9.50
Machine shop turnings.....	7.50 to 8.00

Matthew Addy & Co., St. Louis, have been appointed selling agents for the Pittsburg & Ohio Mining Company, miner and shipper of Pando smithing coal.

Birmingham

BIRMINGHAM, ALA., March 13, 1911.

Pig Iron.—With the exception of one or more small lots of low grade iron for spot shipment, the sales in this market the past week were not at a higher price than the basis of \$11, Birmingham, for No. 2 foundry, but none of the transactions recorded involves deliveries after July 1. The largest single transaction reported covered 2500 tons of No. 3 for shipment in May and June, while 1500 tons of No. 4 was sold for delivery as produced. The local office of a leading interest reports aggregate sales of 1250 tons for shipment during the remainder of the first half, and 6500 tons for practically the same delivery was reported through their Northern and Eastern agencies. Such small lots of gray forge and mottled as were available were readily disposed of on the basis of \$11.50 for spot shipments of No. 2. An inquiry for 2500 tons of gray forge for shipment within the next ninety days was received at local offices, but no report has yet been made of the quotations submitted. An offer of \$11 for 7500 tons of Nos. 2 and 3 foundry for shipment through the remainder of this year was recently refused, and a basis of \$11.50 is known to have been the lowest quoted on lots of 5000, 3000 and 2500 tons each for shipment in the last half. There seems no doubt that the \$11.50 basis is firm for strictly last half deliveries and for the third quarter where the tonnage offered is comparatively small, but there is a possibility that second quarter shipments could be made to extend into the third quarter at the \$11 price. The actual reduction in furnace stocks the month of February was approximately 33,000 tons.

Cast Iron Pipe.—The tonnage placed since last report consists principally of comparatively small lots but the prices received indicate the maintenance of the recent advance. Of course, in the absence of a criterion, it is not claimed that the higher asking prices have become effective for the large contracts, but it is known that the competition for large tonnages would not be keen even at the prices that are now being asked. No new lettings have been added to those that are to come up within a short time, but inquiries are

being received in quite a significant volume. We consider the market as a whole stronger than for some weeks and quote prices firmly at the following, for water pipe, per net ton, f.o.b. cars here: 4 to 6 in., \$22; 8 to 12 in., \$20; over 12 in., average \$19, with \$1 per ton extra for gas pipe.

Old Material.—This market is quiet and probably less was moved the past week than in the week previous. This is considered largely due to the falling off in the demand from local consumers; however, the inquiry from other quarters of the trade has not been equal to expectations. There is no reason to believe that prices are weaker, but the condition existing is such that all quotations are considered nominal. We quote as follows, per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axles.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 car wheels.....	10.00 to 10.50
No. 2 car wheels.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, March 14, 1911.

Iron Ore.—Local ore firms are not looking for much demand for Lake Superior ores from Eastern furnace interests, although sales in the East would doubtless be stimulated considerable if a reduction of 50c. a ton should be decided upon. Shipments to the East were light last year. Foreign ores are now being delivered at the Atlantic seaboard at about the same prices as a year ago, so that there is little change in the Eastern situation as regards competition of foreign ores. There is no indication of any activity in the Lake Superior ore market in the near future, and ore firms are still deferring the consideration of the price question. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—A moderate volume of business in small lots is coming out, largely for foundry iron for the second quarter, and there is an increasing number of inquiries for the last half. Many of the latter, however, are market feelers and are not resulting in the placing of orders. The largest inquiry was from the Best Foundry Company, Bedford, Ohio, for 5000 tons, for the last half. Of this, 1500 tons of Ohio 6 per cent. silicon has been purchased at \$17, delivered. The remainder, half No. 2 Northern and half Southern, will probably be contracted for within a day or two. The Northern inquiry brought out a price of about \$14, at furnace, for the last half, which is the general quotation for the second quarter. Most of the furnace interests are still asking \$14.50 for No. 2 foundry for the last half, but one Valley producer is now understood to be making a quotation of \$14.25 for that delivery. The Bedford inquiry is the first one of any size to test the last half market in this territory, but in view of the firmness of most sellers the price quoted does not appear to fairly represent the market at the present time. A number of producers feel that if last season's ore prices are re-established this year they will have no trouble in holding up last half prices at an advance of 50c. a ton over the second quarter. We note the sale of 1000 tons of malleable and 900 tons of No. 2 Southern. The latter went to a northern Ohio foundry, 500 tons being for the second quarter, at \$11, Birmingham, and 400 tons for the third quarter, at \$11.50, the latter price being about 25c. a ton above the usual quotation for that delivery. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	13.75 to 14.00
Gray forge.....	13.50 to 14.00
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—A northern Ohio furnace interest has bought 2000 tons of furnace coke for March delivery at \$1.60 per net ton, at oven. With this exception there is no activity in furnace grades, on which prices continue firm. The foundry coke market is quiet, about the only sales reported being in carload lots. We quote standard Connellsville furnace coke at \$1.55 to \$1.60 per net ton, at oven, for spot shipment; \$1.65 for the second quarter and \$1.75 to \$1.90 for the last half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the remainder of the year.

Finished Iron and Steel.—The demand in finished lines

THE IRON AND METAL MARKETS

is holding up at about the same volume as for the past two or three weeks. Mills are getting a fair number of small orders, and specifications are very satisfactory. More liberal orders on contracts are coming from the bolt and nut manufacturers than for some time. No large inquiries are coming out, but the general situation is regarded as quite satisfactory. In structural lines there is considerable improvement in the prospect for a good volume of business in the near future. Several railroads are considering the placing of orders for considerable tonnage for bridge construction. The Pere Marquette Railroad now has plans out for estimates on a number of bridges. The new city hall in Cleveland will require 2000 tons of steel. Bids for the superstructure of this building will be received about May 15. A number of inquiries are pending for lots ranging from 200 to 300 tons. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for sheets is holding up nicely and regular prices are being well maintained. The demand for iron bars is only fair, but prices seem to be slightly firmer. We quote iron bars at 1.30c. to 1.35c., at mill. Jobbers report a good volume of warehouse orders.

Old Material.—The scrap market has been very dull. Prices have weakened, and buyers are offering about 50c. a ton less on all grades than a week ago. Dealers decline to change recent quotations, with the exception of heavy melting steel, because of the absence of transactions to establish prices, but it is admitted that present quotations are largely nominal. Some of the mills are ordering the holding back of shipments of scrap recently bought, and there is practically no new demand. Dealers appear willing to wait for a better market, and little scrap is being offered from yard stocks. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	17.00 to 17.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.75 to 13.00
Old car wheels.....	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	7.00 to 7.50
Iron and steel turnings and drillings.....	7.50 to 8.00
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	11.50 to 12.00
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	12.00 to 12.50
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

The Ohio Iron & Metal Company, an important dealer in iron and steel scrap, with main offices in Chicago and branch offices in Pittsburgh and New York, has also opened a branch office in Cleveland, in suite 803 Citizens Building in charge of Armand Alexandre.

Cincinnati

CINCINNATI, OHIO, March 15, 1911.

Pig Iron.—Prices are well settled and maintained up to July 1 at \$11, Birmingham, for Southern No. 2 foundry, and \$14, Ironton, for Northern, but after that date there are numerous rumors afloat regarding the correct quotable figures. It is understood that several Southern furnaces are willing to take on business extending through the third quarter at \$11 to \$11.25, but for the last half they are generally asking \$11.50. Northern producers are quoting \$14.50 for any shipment beyond June, but sales have been made below this, among which were 300 tons for a southern Ohio manufacturer and 500 tons going to Indiana, both booked at \$14 for third quarter delivery. Furnace coke producers are stiffening prices, and, as there does not appear to be any chance for cheaper ore, Northern furnaces may be compelled to carry out their long-announced intention of advancing the present market price. Included in sales of Southern iron are 500 tons of No. 1 soft to an Illinois melter, March to July delivery, inclusive; 800 tons to a northern Ohio consumer, May to September shipment; 500 tons of No. 3 to a Wisconsin manufacturer and numerous small lots of No. 2 foundry. The low grades are still scarce, but a southern Ohio firm bought 1000 tons of No. 4 foundry at \$10.25, Birmingham, for immediate shipment and 500 tons was contracted for by a Southern manufacturer for extended delivery. A central Ohio stovemaker purchased 2000 tons of Southern No. 2 foundry and 1000 tons of Ohio silvery shipments extended through the last half. Very few large inquiries are being figured on. A northern Ohio melter is asking for 3000 to 4000 tons of Northern and about 3000 tons of Southern foundry for last half shipment. Indiana furnishes several inquiries on small lots, and there

are a few requests for prices on foundry iron from nearby consumers. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—Inquiries from three to four consumers for a year's supply of foundry coke have been received lately. The amounts range from 20 to 100 carloads. There is no activity in furnace coke, but in the face of this there is some talk of stiffening prices. In the Connellsville, Pocahontas and Wise County fields furnace coke is quoted around \$1.60 for prompt shipment and \$1.65 to \$1.75, per net ton, at oven, on contracts. Foundry coke remains around \$2 for spot shipment, with \$2.25 asked for future delivery.

Finished Material.—Reinforcing concrete bars are moving better than for some time. Structural material also continues to show signs of improvement, but plates remain rather slow. Railroad track spikes and bolts appear to be holding their own, and the demand is an improvement over that of three months ago. The mill price on structural material and steel bars is 1.40c. and the local warehouse price 1.80c. to 1.95c.

Old Material.—Offerings of scrap are said to be lighter, and the demand from consumers is also slack. No change in prices is contemplated for the near future, although should there be any marked improvement in the pig iron situation it would be quickly reflected in the old material market. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	5.00 to 5.50
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Bundled sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton.....	11.00 to 11.50

J. K. Dimmick & Co., Philadelphia, Pa., have opened a branch sales office at 810 Union Trust Building, Cincinnati, with Charles E. Pool as manager. The firm has recently taken over several New River and Pocahontas coal companies, and Mr. Pool will look after all of its Western trade on Pocahontas and New River coal and coke. In addition to this coal, he will attend to the pig iron and coke trade in the immediate vicinity of Cincinnati.

San Francisco

SAN FRANCISCO, MARCH 8, 1911.

Business this week has been hampered by a heavy storm, which has delayed both rail and coastwise traffic, and caused extensive damage to railroad equipment, bridges, &c., in various parts of the State. The improvement expected at the beginning of March has not materialized, the tonnage in most departments being smaller than for the latter part of February. The curtailment of demand, however, is attributed entirely to temporary conditions, and a few weeks of fair weather should bring out a general buying movement. The majority of consuming industries are making liberal estimates of their requirements for the summer. Inquiries are beginning to come from the mining and oil interests, and there is an immediate prospect of business from numerous development projects.

Bars.—The distributive movement of soft steel bars is quiet at the moment, but the requirements of the small trade are certain to increase materially this month. Business is gradually coming out from the larger manufacturing interests, though most of the buying covers only requirements of the near future. Merchants are amply supplied for the business in sight, and are buying only in a small way. Several of them are holding off pending a further demonstration of the Western Steel Corporation's ability to establish a place in the market. This concern has already sold considerable material in this city, but its position is still somewhat uncertain. Jobbing prices are unchanged, but there is a firmer feeling, and any material increase in demand would probably cause an advance. A

THE IRON AND METAL MARKETS

few substantial orders have been booked for reinforcing material, but no general demand is expected until the weather clears. Bars from store, San Francisco, are quoted at 2c. for both iron and steel.

Wire and Wire Products.—Jobbing and resale prices were advanced \$1 per ton this week, in sympathy with Eastern conditions, and a rising market has brought out a substantial volume of new business. Merchants are placing liberal orders for nails and fence wire of all descriptions, and the resumption of logging operations throughout the Coast district is bringing out an increased demand for wire rope.

Structural Material.—Local building operations decreased somewhat in February, the valuation of buildings for which permits were issued being \$1,455,824, compared with \$1,617,608 for January and \$1,780,230 for February, 1910. The decrease is the natural result of weather conditions, which have made active operations almost impossible. A fair number of fabricating contracts have come out, however, and figures are to be taken before the end of the month on a substantial amount of new work. Any material improvement due to the Panama-Pacific Exposition will be delayed until the site for this event is selected and definite work started on the plans. The Pacific Rolling Mill Company has taken a fair order for the temporary City Hall, and has signed the contract for the Lowell High School. The Northwest Steel Company will fabricate about 250 tons for the Multnomah Athletic Club, Portland, Ore. Bids on the Multnomah County court house have been rejected. Locally, figures are being taken on a small job for the Children's Hospital, and the city will soon be in the market for the Girls' and Polytechnic high schools. Figures are also to be taken within 10 days on 700 tons for the St. Joseph's Orphanage, about 100 tons for the St. Dominic's Church, and the new plans for the Knights of Columbus Building. Bids will also be taken soon on the Van Nuys Building in Los Angeles. The Washington Portland Cement Company is in the market for about 500 tons for a cement mill near Seattle. Specifications of the Oakland City Hall are being published in book form, and will be out about the end of the month. General contracts have been let on the Chester building, and the Union Oil Company's building at Los Angeles, and the Odd Fellows of that city are planning a large structure. Designs are being drawn for a large steel bridge for Tacoma, Wash. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.65c.

Rails.—The tonnage actually ordered since the first of the month is comparatively light, but the inquiry is increasing, and while no immediate result is expected from many of the inquiries the outlook is considered good. Several operating concerns in California are coming into the market, and there is a steady run of small orders from the timber districts of Oregon and Washington. Mining companies in the mountain district are just beginning to take an interest in light rails, but more business than usual is expected from this quarter during the early summer.

Sheets.—The distributive movement is comparatively light, but a general demand for black and galvanized sheets is expected in the next two months, and merchants are buying quite freely. The tin plate requirements of the salmon and fruit canning industries on the Pacific Coast will be exceptionally large this year.

Plates.—There has been considerable activity in a jobbing way, and a few fairly large inquiries are in the market. Considerable small boiler work is being done locally, but the principal requirements are for oil and gas tanks and riveted pipe.

Merchant Pipe.—The movement of small pipe through the country has been very small this month, due principally to weather conditions. There is some inquiry, however, and a strong demand is expected from now on, though merchants are very conservative in placing orders for stock. Considerable business has been booked in connection with water works and gas systems, but the individual orders are small. While immediate delivery to the oil fields is attended with some difficulty, there are indications of a revival in that quarter. Small inquiries for casing and line pipe for spring delivery are increasing, and a fairly large tonnage has been ordered by the Kern Trading & Oil Company.

Cast Iron Pipe.—Prices show increasing firmness, and in expectation of a further advance a large volume of business has been booked in the past two weeks. Small municipal projects are doing most of the buying, though a very fair tonnage has been taken by private corporations in all the coast States. The Los Angeles Gas & Electric Company has just taken bids on 2000 tons of 8, 10, 12 and 30 in. pipe. Bids will be taken March 13 for a lot of pipe for Porterville, Cal., and 248 tons for Los Angeles, and the town of Kingsburg, Cal., will open bids March 15 for a complete water works system. Prices at Pacific Coast

terminal points are \$3 for 6 in. to 12 in. and \$35 for 4-in. pipe, per net ton.

Pig Iron.—The local foundry trade remains quiet, and there is less demand from the north coast than for some time. A cargo of 900 tons of English iron has just arrived here. Spot supplies are fairly large, and it is difficult to sell anything to arrive. The tonnage of foreign iron in transit is lighter than usual. Most of the steel plants on the coast are using Chinese iron, but the foundry trade is buying Southern iron to a larger extent than usual. English, Continental and Chinese foundry iron is quoted at \$23, with occasional sales at lower figures. No. 2 Southern foundry iron, f.o.b. San Francisco, is held at \$21 to \$22.

Old Material.—Cast iron scrap is rather closely cleaned up, and a lively demand fails to bring out any large offerings. Very little business has recently materialized on steel melting scrap, though a number of substantial inquiries are still in the market. The most important transaction is a contract for 120,000 tons, to be delivered in five years to the Western Steel Corporation by M. Brade & Son, Portland, Ore. Quotations are unchanged, as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12 to \$15; re-rolling rails, per net ton, \$15.

The Colorado Fuel & Iron Company, Denver, Colo., is placing on the market a new line of wire field fence, for which the San Francisco office is now taking orders.

The German Iron Market

BERLIN, March 2, 1911.

The conference of the bar producers last week finally adjourned without any tangible result, and a further meeting is to be held March 7 to make another effort toward completing the organization. The prospects for reaching such a result, however, look unpromising. The Hoesch Company, one of the largest producers of bars, finally took a very strong position against fixing any specific prices, and it is reported that the Gutehoffnungshütte, another very important concern, also refuses to be brought into line. On the other hand, an understanding with the open hearth mills was reached at a moment when all hopes of such a result had been about given up.

It is now admitted freely that the existing price convention has latterly sunk into a mere nominal affair. As a matter of fact, bar prices now average around 105 and 106 marks, and even as low as 100 marks is mentioned as occurring in extreme cases; whereas the nominal price of the convention is 112 to 114 marks. The export price is about 95 marks aboard ship at Antwerp. At these low prices there is a very heavy demand both from the home and the foreign market; and specifications on orders goods are coming in with some urgency. If the convention breaks up it is regarded as probable that prices will go even somewhat lower.

This whole controversy over bars gives a foretaste of the difficulties that will confront the big Steel Works Union within a few months when it undertakes to secure its prolongation. Most of the large companies belonging to it have been developing their establishments in various ways. Many have been adding plants for producing special lines of finished products, or annexing existing independent mills of this kind. Some of the outside mills, too, have built open hearth steel plants of their own in order to render themselves independent of the Union. The great establishments of varied production will be in a position to put forward demands for increased allotments. Moreover, it is generally regarded as necessary that the full syndication of the B class of products—that is, all forms of steel except semi-finished steel, rails and ties and structural shapes—be undertaken along with the renewal of the Union; that is to say, it will be necessary, not only to assign allotments in the B products, but to fix prices also, besides having all sales made through the Union. That is the goal which the great steel works have before their eyes; but there are such obstacles in the way of reaching it that it already seems probable that the Union will go to pieces in the attempt to harmonize all interests.

The market situation has barely changed since a week ago, and little can be said about it; but the tendency seems to be somewhat better in certain directions. The news from the Belgian market continues favorable.

A report on the state of business in the hardware trade indicates that manufacturers are pretty well satisfied with orders and with the outlook. In the cutlery trade at Solingen, manufacturers are satisfied with business, but work is considerably disturbed through labor troubles. Prices there are fairly satisfactory. The tool manufacturers at Remscheid and the adjacent country are planning a general

THE IRON AND METAL MARKETS

advance in prices this spring. The demand for tools is quite active; the iron works, machine shops, and similar establishments are sending in good orders, and the foreign market is buying heavily of certain specialties. The makers of screws, after having organized themselves, have been able to enforce better prices. The manufacturers of wire nails complain of unsatisfactory business. The automobile and bicycle industries are in excellent shape.

Buffalo

BUFFALO, N. Y., March 14, 1911.

Pig Iron.—Underlying conditions appear to be strengthening, with a decrease in stocks on furnace banks and a continued tendency toward a rise in prices. A number of transactions involving fairly good tonnages have been closed, one interest having taken an order for 10,000 tons, comprised of basic and malleable, from a manufacturer of railroad supplies, which was reported last week as under negotiation. Inquiries for 25,000 to 30,000 tons of foundry and malleable from agricultural implement makers, mentioned in last report, are still under negotiation, a portion being for extended deliveries. Prices are held stiffly at current price schedules and there is an increasing disposition among producers to decline to make contracts for forward delivery on the basis of first half schedules. The Lackawanna Steel Company now has five of its seven furnaces in blast. We quote as follows, f.o.b. Buffalo, for prompt and second quarter delivery:

No. 1 X foundry.....	\$14.75 to \$15.00
No. 2 X foundry.....	14.50 to 14.75
No. 2 plain.....	14.00 to 14.50
No. 3 foundry.....	14.00 to 14.25
Gray force.....	13.75 to 14.00
Malleable.....	14.50 to 15.00
Basic.....	14.50 to 15.00
Charcoal.....	17.00 to 17.50

Old Material.—The market has not been quite as active as in the preceding week. Although no large blocks of material are pressing the market, some few lots of scrap are being sold at prices approximately represented by the schedule shown below. Dealers, however, are not inclined to dispose of their stocks on the basis of the prevailing market prices, for the reason that the current supply of scrap is very limited and any increase in demand would have a tendency to strengthen the market. Shipments moving on contracts are going into actual consumption, which would indicate that any new finished business placed would create further buying of scrap. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$13.75 to \$14.25
Low phosphorus steel.....	18.00 to 18.50
No. 1 railroad wrought.....	15.75 to 16.25
No. 1 railroad and machinery cast scrap.....	14.75 to 15.25
Old steel axles.....	20.50 to 21.50
Old iron axles.....	24.00 to 25.00
Old car wheels.....	14.75 to 15.00
Railroad malleable.....	14.25 to 14.75
Boiler plate.....	11.75 to 12.25
Locomotive grate bars.....	11.75 to 12.25
Pipe.....	11.25 to 11.75
Wrought iron and soft steel turnings.....	7.50 to 8.00
Clean cast borings.....	7.00 to 7.25

Finished Iron and Steel.—Most of the selling agencies report that orders coming in show an increase in number and tonnage for nearly all lines of finished products; specifications on contracts continue in good volume, and prices in all lines are holding firm. The local agency of the leading interest has closed contract for a good-sized tonnage of steel bars, and states that orders both currently and on contracts have been extremely heavy during the week, orders for Canadian export being particularly good. Tenders are out for 1500 tons of steel rails for electric traction lines at Toronto. In structural shapes a considerable increase in activity is in evidence. An order for 100 tons of sheet piling has been taken by the Jones & Laughlin Steel Company for completion of bridge abutment construction on the Rochester, Syracuse & Eastern Railroad. The Lane Bridge Company, Painted Post, N. Y., has secured contract for 170 tons for the three-span highway bridge over Rondout Creek, at Kingston, N. Y. Plans are soon to be out for the construction of two double track railroad bridges for the New York Central, one over the Oswego River, at Oswego, and the other over the Black River, at Watertown, N. Y. The Lackawanna Bridge Company has received the contract for fabrication and erection of the Eleventh street viaduct over the New York Central tracks at Niagara Falls, about 200 tons. Specifications are to be figured this week for 1500 tons of bridge work for the Western division of the Grand Trunk Railroad between Port Huron and Chicago. Bids are being advertised for this week for the Hutchinson High School, Buffalo, which will require about 800 tons. Bids are also being received this week for additions to the manufacturing plants of the Frontier Iron Works, Buffalo, and Buffalo Bolt Company and Niagara Radiator & Boiler Company, North

Tonawanda, each of which will require approximately 100 tons. The A. Fredericks & Son Company, Rochester, has received the contract for the Eastman Kodak Company's factory building No. 42, and has placed an order for the steel concrete reinforcing bars required, aggregating 250 tons.

Construction work on the new bar mill of the Lackawanna Steel Company, Buffalo, is making good progress, and it is expected that the mill will be equipped and ready for operation in July. Its completion will enable the company to produce a greater diversity of lighter weight products, such as flats and bands.

New York

NEW YORK, March 15, 1911.

Pig Iron.—The tone of the market is somewhat improved, but the volume of business expands slowly. Transactions of the past week have been largely with foundries in New England and in New York State, chiefly in the former district. One Connecticut foundry bought about 1000 tons of foundry grades. Another Connecticut buyer took 1000 tons of high phosphorus iron and about 2000 tons of other grades, chiefly No. 2 plain iron, deliveries running well toward the end of the year. Eastern Pennsylvania furnaces have been able to get about 50 cents a ton more on recent sales than the basis reached in the low prices of early February. Sales are now being made for the second quarter, the third quarter and the second half. For these later deliveries advances are secured, but as a rule the asking prices of furnaces for the second half are more than the average buyer expects to pay, and business of this sort is closed only after considerable negotiation. It is understood that from \$14.50 to \$15, Buffalo, is the range on business carrying deliveries as late as October, one transaction involving deliveries from July to October being on a basis of \$15, Buffalo. Considerably lower prices, however, are made for the second quarter. A New Jersey pipe foundry is in the market for 1000 to 1500 tons of second quarter iron running 1.25 to 1.75 per cent. in silicon. A sale of 1000 tons of foundry iron is reported, an Eastern buyer taking the iron for one of its plants located in the Middle West. For tidewater delivery in the second quarter we quote as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15 to \$15.25.

Finished Iron and Steel.—While little is to be judged from a week by week comparison, it is believed that the slight improvement last week over the previous week presages increasingly better conditions throughout the spring at least. No really marked activity, however, is looked for until the railroads come more prominently into the market, and there is no immediate prospect of that. The local demand for plates is greater, as the tank and ship repair shops are somewhat busier. Interest turns again to the battleship No. 35, authorized by Congress last year and which was to be built at the Brooklyn Navy Yard but was held up when the lowest bids for materials exceeded the appropriation. Congress on the day of adjournment of the last session passed an amendment increasing the appropriation, and the vessel will be built by the Government according to the original plans. Contracts for the materials are expected to be placed shortly. Steel bars are quiet but mills are receiving fair specifications, and replace orders are looked for in the near future. Bar iron orders have fallen off a little in volume in the past week, but the recent advance of price seems to be well maintained. The structural interests would be quite well content for a season if the numerous deferred matters were placed. It is anticipated that two or three of the larger ones will be closed within the next week or two. One of these is the post office at the Pennsylvania terminal in this city, the general contract for which has at last been awarded the George A. Fuller Company. About 6400 tons of steel will be required. The same company will have 3700 tons of steel to give out for the Masonic Temple, bids on which closed yesterday. The New England Structural Company has the general contract for the Plaza Hotel to be erected on Copley Square, Boston, and the steel, 2500 tons, will be furnished by the American Bridge Company. The latter also has 400 tons in two bridges for the Boston & Maine, and the Pennsylvania Steel Company a bridge of 100 tons for the same road. Levering & Garrigues have 1500 tons for the Forbes & Wallace store in Springfield, Mass., and 600 tons for the Southern New England Telephone Company building at Hartford, Conn. Bethlehem shapes will be used in the last named job and possibly in both to a large extent. Hamilton & Chambers have given the steel for the Kirkman soap factory, Brooklyn, 200 tons, to the Eastern Steel Company. The New Haven is in the market for a small highway bridge at Randolph, Mass. Snare & Triest were low bidders as general contractors for

THE IRON AND METAL MARKETS

the improvements to the Queensboro Bridge, which will require 600 tons. Prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Store prices for plain material and plates, New York, are 1.85c. to 1.95c.

Steel Rails.—The Chicago & Northwestern, which recently ordered 40,000 tons for this year, has just increased that amount by 5000 tons. The Carnegie Steel Company has sold 3000 tons to the Ocala Northern in Florida. Two other Southern orders are 625 tons for Stone & Webster, to be delivered at Houston, Texas, placed with the Maryland Steel Company, and 1030 tons for the Vicksburg Shreveport & Pacific, to be rolled by the Tennessee Coal, Iron & Railroad Company. The Canadian Pacific is inquiring for 25,000 tons in this country. The Harriman order is considered practically closed, but no announcement has been made.

Ferroalloys.—Very little ferrosilicon is being asked for and prices seem to be advancing on foreign grades. Considering the price asked abroad, ferrosilicon cannot be imported here from Europe now for less than \$59, Pittsburgh, but is being offered at around \$55, Pittsburgh. Ferromanganese is very quiet, with quotations \$37.50 to \$38, Baltimore.

Cast Iron Pipe.—The city of Boston opened bids on Tuesday on 2800 tons of water pipe. Waltham, Mass., opens bids to-day on 125 tons; Medford, Mass., 130 tons, March 20; Westbury, N. Y., 630 tons, March 20; Lewiston, Mont., 1100 tons, March 24. The general market shows a renewal of activity, with quite a number of inquiries from private consumers and some sales. Competition for business is still keen. Carload lots of 6 in. are quoted at \$21 to \$22 per net ton, tidewater.

Old Material.—The railroad companies have fared much better than dealers in disposing of their old material. The railroad lists this month were closed at quite satisfactory prices, largely to dealers. The demand from consumers is slow. Offerings by dealers have met with very little response. Heavy melting steel scrap is especially quiet. Rolling mill grades are only moving in small lots. It is worthy of remark that wrought turnings have parted company with cast iron borings, now selling at about the usual difference instead of at the same price as has recently been the case. Foundries are not doing much buying at present. A special demand for locomotive grate bars has slightly advanced their price. The general tendency of the market appears to be toward lower prices. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$11.25 to \$11.75
Heavy melting steel scrap.....	11.25 to 11.75
Relaying rails.....	20.50 to 21.00
Standard hammered iron car axles.....	23.00 to 23.50
Old steel car axles.....	16.50 to 17.00
No. 1 railroad wrought.....	14.00 to 14.50
Wrought iron track scrap.....	13.00 to 13.50
No. 1 yard wrought, long.....	13.00 to 13.50
No. 1 yard wrought, short.....	12.00 to 12.50
Light iron.....	5.00 to 5.50
Cast borings.....	6.50 to 7.00
Wrought turnings.....	7.50 to 8.00
Wrought pipe.....	11.00 to 11.50
Old car wheels.....	12.50 to 13.00
No. 1 heavy cast, broken up.....	12.50 to 13.00
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.50
Malleable cast.....	11.50 to 12.00

Metal Market

NEW YORK, March 15, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

Copper, New York.	Electro-lytic.	Lead.		Spelter.	
		Tin.	New York.	St. Louis.	New York.
March. Lake.	12.25	40.35	4.40	4.25	5.65
9.....	12.75	39.70	4.40	4.25	5.65
10.....	12.75	40.00	4.37½	4.22½	5.65
11.....	12.50	40.25	4.37½	4.22½	5.65
12.....	12.50	40.00	4.37½	4.22½	5.65
13.....	12.50	39.75	4.37½	4.22½	5.65
14.....	12.50				
15.....	12.50				

Arrivals of tin in American ports were unusually large for the first half of the month, but the scarcity of spot supplies continues, as there is a heavy demand. Lake copper is ¼c. lower and is sagging. Spelter is unchanged and in little demand. Independent sellers of lead have lowered their price again. The syndicate of European antimony producers is a certainty and the high prices are held.

Copper.—Prominent sellers of lake copper made sharp reductions on Saturday and better sales are reported, but on the whole consumers are awaiting a still lower price. Calumet & Hecla copper has been freely offered by those in control of that brand at 12.50c., and some other large sellers have followed suit. As a result, the price of electrolytic promptly dropped off in many quarters where a higher figure had been asked, and it was freely offered in this market at 12.25c. Buyers of electrolytic came back with the an-

nouncement that they were willing to take the metal at 12.25c., delivered in the Naugatuck Valley 30 days, which would make the price for immediate delivery in New York 12.12½c. It seems that buyers of both lake and electrolytic have set the price ¼c. lower than that demanded by the selling interest, and considering the weakness of the market it is assumed that holders of copper will soon make offerings at those prices. There are reports that intimations have been given to some preferred customers that sales of electrolytic will shortly be made at 12.12½c., and, as most consumers are not in actual need, buyers generally are playing a waiting game. Copper could be bought in New York this afternoon at 12.50c. for lake, 12.25c. for electrolytic, and around 12.20c. for casting. The exports of copper so far this month have been very light, amounting in all to 10,742 tons. The London market closed strong to-day with spot copper selling at £55 1s. 3d. and futures at £55 13s. 9d. The sales amounted to 400 tons of spot and 1200 tons of futures.

Pig Tin.—Notwithstanding that the arrivals of pig tin in American ports for the first half of the month amounted to 3133 tons, spot tin is decidedly scarce. It is expected that fully 2000 tons more will come into this country before the month is out, and it is very likely that a high record will be established for a month's arrivals. Nevertheless, about all of the tin here, with a great deal of that expected to arrive, has been contracted for, and heavy premiums are demanded for spot. The steamer Mesaba arrived last week with 1175 tons, and the steamer Minnewaska is at dock to-day with 600 tons, while there are 300 tons on board a steamer at Brooklyn. This is an unusual amount to be in port at one time, but practically all of it has been taken and much of it has been sold and resold. If the metal were available at a price reasonably close to the London quotations a good business could be done, but buyers seem to think that the premiums demanded for what little stock is available are unreasonable. The leading consumer controls a large part of the tin now in port and has need of it for early use. Yesterday spot tin was so scarce that tin on board the Minnewaska, which will not be available for a day or so, was quoted as spot. The situation may be slightly bettered at the end of the month, but from all accounts consumers will continue to be at the mercy of the speculative interests to some extent for the next 30 days. Sales of pig tin for spot delivery were made in New York this morning at 39.75c. In London to-day the market closed firm, with spot tin offered at £177 15s. and futures at £177 17s. 6d. The sales amounted to 200 tons of spot and the unusually heavy aggregate of 1150 tons of futures.

Tin Plates.—Tin plates are firm and the demand is steadily and conservatively increasing. Can manufacturers seem to be the largest buyers in this market. Quotations on 100-lb. coke plates remain at \$3.94, New York.

Lead.—Some fairly good sales of lead have been made by outside sellers at lower prices than prevailed a week ago. The leading interest continues to keep its quotation at 4.50c., New York, which is now fully 12½ points above the price set by independent sellers. As a matter of fact, the American Smelting & Refining Company is practically out of the market, except that it is making a few sales of selected brands. The St. Louis market is ragged, and there are reports that the price of 4.22½c. has been slightly shaded there. Plenty of lead can be had in New York at 4.37½c.

Spelter.—Spelter is dull and uninteresting. Prices are nominal, but producers are, as a rule, firm in their demands. It has been said that the generally quoted price in St. Louis of 5.50c. has been cut, but from all accounts this is for resale lots. Sellers are asking 5.50c., St. Louis, and 5.65c., New York, but consumers do not seem interested. Some Western consumers have been inquiring for large lots, but have declined to pay the price asked.

Old Metals.—The market is steadier. Selling quotations are nominally unchanged, as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Antimony.—Dealers are eager to sell antimony at recently advanced prices, but buyers are wary and seem to be well supplied, although inquiries indicate that they are watching developments. The report of the formation of a syndicate of foreign makers of antimony has been confirmed to the satisfaction of people in this country most concerned. It is stated that an agreement has been made covering a period of three years. The agreement does not affect all the best known brands of antimony, but producers who are not in the deal are taking advantage of the situation and are

THE IRON AND METAL MARKETS

demanding advances equivalent to those made by the syndicate operators. Cookson's is quoted at 9.50c.; Hallett's, 9.25c.; Hungarian grades, 8.75c.; Chinese, 8.75c. These prices hold good for Cookson's and Hallett's during April and May, but other grades can be had for delivery in those months at 8.60c. The growing demand for Chinese and Hungarian antimony is bringing about an increased production of those brands.

Metals, St. Louis, March 13.—Lead is quiet and steady at 4.25c.; spelter slow and firm at 5.47½c. to 5.50c., both at East St. Louis. Zinc ore is steady and firm at \$39 to \$41 per ton Joplin base. Tin is higher at 42.35c.; antimony (Cookson's) unchanged at 9.55c.; lake copper quoted at 12.95c.; electrolytic copper is easier, quoted at 12.70c., all at St. Louis. The demand for finished metals for the week was moderate.

Metals, Chicago, March 14.—There has been little change in the market. Copper has dropped off a little and is being closely watched. Practically all sales are for spot delivery. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12¾c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 42½c.; small lots, 44½c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.45c. to 4.50c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter No. 1, 29c.; tin foil, 32c.; block tin pipe, 35c.

Iron and Industrial Stocks

NEW YORK, March 15, 1911.

While transactions have been light, the prices of stocks have been fairly well maintained. The stock market is now almost in a state of suspense, waiting for the Supreme Court's Standard Oil and American Tobacco decisions. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalmers, pref.	31½	Railway Spr., com. 32½	34
Beth. Steel, com.	31¼	Railway Spr., pref.	98*
Beth. Steel, pref.	60	Republic, com.	31½
Can. com.	94½	Republic, pref.	98
Can. pref.	81	Sloss, com.	52
Car & Fdry., com.	52½	Pipe, com.	17
Car & Fdry., pref.	114¼	Pipe, pref.	58¾
Steel Foundries, com.	46½	U. S. Steel, com.	75½
Colorado Fuel, com.	32½	U. S. Steel, pref.	118½
General Electric, com.	149	Westinghouse Elec.	67
Gr. N. ore cert.	59	Va. I. C. & C., com.	54
Int. Harv., com.	115½	Am. Ship, com.	76
Int. Harv., pref.	124	Am. Ship, pref.	112
Int. Pump, com.	40	Chi. Pneu. Tool.	51½
Int. Pump, pref.	88½	Cambria Steel, com.	47
Lackawanna, com.	37½	Lake Sup. Corp., com.	30
Locomotive, com.	37½	Crucible St., com.	138
Nat. En. & St., com.	17½	Crucible St., pref.	80¾
Pressed St., com.	32½	Harb.-W. Ref., pref.	95½
Pressed St., pref.	97		

* Ex dividend.

The Empire Steel & Iron Company, Catsauqua, Pa., reports its total net earnings for the year ending December 31, 1910, at \$257,690 and the total net profits, after deducting the customary allowance for improvement, permanent repairs and depreciation of property, \$154,834, leaving a balance, after deduction of dividends, of \$29,834.

The Crucible Steel Company of America, Pittsburgh, for the five months ending January 31, shows net earnings, after deducting all charges for maintenance and repairs, of \$1,098,650, which added to the surplus of \$2,448,040 reported in August, 1910, makes \$3,546,690; subtracting two dividend payments amounting to \$855,278, leaves an undivided surplus of \$2,691,412.

The Western Electric Company has declared the regular quarterly dividend of 2 per cent., payable March 31.

The Boston Belting Company has declared the regular quarterly dividend of 2 per cent., payable April 1.

The American Iron & Steel Mfg. Company has declared the regular quarterly dividend of 1¼ per cent. on both common and preferred stocks, payable April 1.

The Otis Elevator Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock and a quarterly dividend of 1 per cent. on the common stock. The last quarterly dividend on the common stock was ¾ of 1 per cent. Both are payable April 15.

The Westinghouse Air Brake Company has declared the regular quarterly dividend of 2½ per cent., an extra dividend of 1½ per cent., and a special dividend of 1 per cent., the same as three months ago, payable April 10.

The Sloss-Sheffield Steel & Iron Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable April 1.

The American Brake Shoe & Foundry Company has declared the regular quarterly dividends of 1¼ per cent. on the preferred stock and 1¼ per cent. on the common stock, both payable March 31.

Notes on Prices

Rope.—The troubles in Mexico have not affected the price of sisal fiber one way or the other, which has been somewhat of a surprise to some in the cordage business. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8½c. to 9c. per pound; second grade Manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6¼c. per pound.

Linseed Oil.—The market is strong, but with little buying, although about this time of year the demand usually increases. Foreign markets are short of oil and are unable to procure seed, as is shown by the action of some foreign crushers in offering to pay a premium to be permitted to cancel contracts which had been placed by American buyers. This is the second time within a comparatively short period that foreign manufacturers have asked to be relieved from filling American orders. For carloads of raw domestic oil 94c. to 95c. per gallon is quoted. The following quotations represent New York prices in five-barrel lots or more:

State, raw,	Cents. 95
City, raw,	95
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—Turpentine prices have advanced at this point in sympathy with Southern markets, where receipts are light and find ready buyers. Higher prices are predicted by some in the trade. New York turpentine quotations in five-barrel lots are as follows:

In oil barrels,	Cents. 95½
In machine barrels,	96
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins are firm and higher, following Southern markets. On the basis of 280 lb. to the barrel common to good strained is quoted at \$7.70 and grade D at \$7.85 in the New York market.

President Maben on Pig Iron Conditions

J. C. Maben, president of the Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., in a newspaper interview given in New York this week, says that his company is now operating about 60 per cent. of its capacity, and that it now has 98,000 tons of pig iron in its yards, which is large compared with stocks in other years. The company, he says, has sold some large blocks of iron, and is still selling, mostly for third and fourth quarter deliveries. Its price for early delivery is \$11 for No. 2, at Birmingham, \$11.25 for third quarter and \$11.50 for fourth quarter. His company sold very little iron below \$11 when conditions were most stagnant. Concerning the outlook, he says: "I am at a loss to make any prediction as to the future course of the iron market. Things still seem to be unsettled, notwithstanding forthcoming reports of prosperity for steel manufacturers. In my opinion everything will depend upon the action of the railroads. We undoubtedly have to look forward to this source of outlet more, in fact, than previously. There is no doubt that the railroads are curtailing expenses, but for how long and to what extent remains to be seen. Industrial conditions have been lagging for more than a year now, and it would seem that an upward trend is in sight. However, conditions are still too unsettled to venture anything definite as to the future."

The plant of the Independent Steel Company, Kenova, W. Va., with the sole exception of the spring department, has been shut down by the receiver.

The Cincinnati Foremen's Club

Other industrial centers would probably be interested in the success of the Foremen's Club of the Cincinnati Continuation School. At its night session March 10 about 60 members were present, and the main question discussed was "What Constitutes a Successful Foreman?" One of the chief points brought out was that of the willingness of a foreman to sacrifice his own department to make other departments successful, if it meant a saving to the company financially. The proposition also as to the limits a foreman ought to go in giving his operatives liberties brought out the fact that it was frequently necessary to give one man more liberty than another, depending largely on the class of his operation on a machine, as in numbers of cases there was a greater strain on the workman's eyes, or his nervous system was more severely taxed.

The question of premiums or bonuses was discussed at length, the general conclusion being that nothing satisfactory had yet been developed along that line, although it was agreed that the system is more satisfactory in plants where a close study is made of individuals. Social relations between a foreman and his workmen, as well as those that exist between the foreman and his employer, were very intelligently discussed, many agreeing that it was a commendable and profitable idea to join as much as possible in the social pastimes of a workman. The sentiment seemed strongly in favor of the idea that a man who never made mistakes was "too slow to drive snails to water," as one foreman expressed it. The ideal foreman was agreed on as one who corrected his operatives privately; cooled them down when spoiled work and bad conditions angered them, and relaxed them when the work taxed their nerves, due to too constant application.

The following foremen read papers and were frequently interrupted to discuss different points brought out: Frank Kamerer of the J. A. Fay & Egan Company; William Siebert, R. K. Le Blond Machine Tool Company, and William Eggebrecht, Kern Machine Tool Company. Prof. J. H. Renshaw, dean of the Continuation School, inaugurated these foremen's meetings that have developed into enthusiastic gatherings where there has been an interchange of many valuable ideas between the participants.

The Effect of Titanium Alloy on Slags.—The Titanium Alloy Mfg. Company, 1225 Oliver Building, Pittsburgh, publishes a new pamphlet entitled "Titanium in Steel." It presents interesting details of the results of more recent practice in the use of ferrotitanium in rail and other steels. Some new material is given in a discussion of the effect of titanium alloy on slags. Testimony on this point is given by a number of well-known metallurgists to the effect that titanium not only eliminates nitrogen and oxygen, but also by forming titanium oxide imparts fluidity and causes the elimination of slags. The fluidity due to the presence of titanitic acid has been found to be greater than is imparted by the oxidation of manganese, aluminum or silicon, and titanium secures the entire removal of slags, as is not the case with the other elements that have been used for the cleansing of steel.

W. W. Lindsay & Co., Harrison Building, Philadelphia, Pa., have purchased a tract of six acres of land on the Pennsylvania Railroad below Chester, Pa., on which they will erect a large building for the storage of structural material and miscellaneous contractors' equipment and tools. Details are not yet decided upon, as they will draw their own plans and do their own erecting work. Reports that a shop for fabricating structural material would be erected are denied, although some time in the future they may decide to engage in that character of work.

The Standard Chain Company, Pittsburgh, has received an order from the Isthmian Canal Commission, Washington, D. C., for 2600 ft. of 1½-in. hoisting chain.

The Ducharme Wrench & Novelty Mfg. Company's Removal

The Du Charme Wrench & Novelty Mfg. Company, Johnstown, Pa., announces that owing to the fact that it has been located in leased quarters, and that the Baltimore & Ohio Railroad Company has appropriated its site, it is now moving to Cambridge, Ohio. The Cambridge Board of Trade gave the company as a bonus a most desirable site of 2 acres along a continuous switch, with common privileges to the Baltimore & Ohio and the Pennsylvania railroads. It is erecting a large brick building, 60 x 300 ft., in which it is installing the most improved machinery for the manufacture of wrenches, pipe vises and pipe cutters. The tools which the company manufactures are all patented, are novel and practical, and consist of the following: A quick adjusting open top pipe vise, a quick adjusting bench vise, a wall or ceiling fixture wrench, a self-adjusting wrench, an adjustable alligator wrench, an automobile turret head wrench and a combination roller chain pipe cutter and wrench. These tools are manufactured of all drop forgings. The new plant will be in operation and in position to ship goods about June 1.

The Tacoma Foundry & Machine Company, Tacoma, Wash., is erecting a new jobbing foundry plant on about a 3-acre site, within a mile and a half of the business center of the city. It contemplates at present the foundry line only, without any machine shop. It has secured the valuable outfit of patterns owned by the late Gawley Foundry & Machine Works, has purchased its complete foundry equipment, and expects to be in operation the latter part of this month. The company will then be in position to take care of the large foundry requirements of the lumbering interests of the district. John Taylor is president; Wilson Webb, vice-president, and Thomas B. Hall, secretary and treasurer.

Samuel W. Hays' Sons, manufacturers' agents, Keenan Building, Pittsburgh, have sold to the Diamond Alkali Company, Fairport, Ohio, three cross compound four-valve Corliss engines made by the Ridgway Dynamo & Engine Company, direct connected to 250-kw. direct current Ridgway generators; to the Republic Iron & Steel Company, Youngstown, Ohio, three Whiting electric cranes; to the A. M. Byers Company, Pittsburgh, one Whiting crane, and to J. J. Kennedy, for installation at Darlington, Pa., a 16 x 18 in. Ridgway engine.

The Morris Machine Works, Baldwinsville, N. Y., corrects an erroneous item which appeared in *The Iron Age* of March 2, on page 558, stating that the business and plant of the company had been taken over by the Valley Iron Works, Williamsport, Pa. The fact is that the Valley Iron Works has purchased the Morris Coupling Company, Baldwinsville, which manufactures compression couplings and is in no way connected with the Morris Machine Works.

A report in Philadelphia and Reading newspapers last week announced a serious accident at one of the Empire Steel & Iron Company's crane furnaces at Catasauqua, Pa., with a reported loss of \$20,000. This was nothing more than a "break out" at the No. 2 furnace, a not unusual occurrence in blast furnace practice, and the loss entailed was less than \$500. The furnace was stopped but 12 hours and has since been operating regularly.

The Cleveland Crane & Engineering Company, Wickliffe, Ohio, has received a contract from the United States Government for eight motor-driven traveling wharf cranes for installation at Balboa on the Panama Canal for loading and unloading vessels and freight cars.

On petition of creditors, R. L. Blackmore has been appointed receiver of the Standard Nipple & Tool Company, West Newton, Pa. Insufficient capital is given as the cause.

The Pipe Jobbers' Convention

The second annual convention of the National Association of Jobbers of Wrought Iron Pipe and Fittings was held at the Hollenden Hotel, Cleveland, Ohio, March 14 and 15. About 125 members were present. The organization is in a flourishing condition and now has a membership of about 220. It is stated that at present 90 per cent. of the tonnage in pipe and fittings is handled by jobbers who are members of the association.

The convention opened Tuesday morning with an open session. The other sessions, Tuesday afternoon and Wednesday morning and afternoon, were executive. President A. E. Ford, Ford & Kendig Company, Philadelphia, presided at the opening session, his introductory remarks largely relating to the improved outlook in business conditions. A general discussion of the business situation followed, both manufacturers (a number of whom attended this session) and jobbers being called upon for an expression of opinion. The reports were optimistic from all sections of the country.

At the first executive session Tuesday afternoon President Ford made his annual address, reports were submitted by other officers, new business was taken up and there were discussions on the following subjects: "Unintelligent Competition," "Price-List on Malleable Fittings" and "Cost of Doing Business." The programme Wednesday morning included reports of the pipe, fittings and seamless brass and copper tubing committees with discussions of these reports, reports of members of the Territorial Committee on conditions in their territory, discussion of "Standardization of Weight of Wrought Pipe, Sizes $\frac{1}{8}$ to 6-In.," opened by W. B. Henion, Henion & Hubbell, Chicago; discussion of "Resale Prices," opened by W. M. Pattison, Pattison Supply Company, Cleveland, and discussion of "Manufacturers' Competition," opened by W. L. Rodgers, Pittsburgh Gage & Supply Company, Pittsburgh, Pa.

The topics of discussion Wednesday afternoon were "Competition Based on Vindictiveness," opened by J. P. Fell, W. A. Case & Son Mfg. Company, Buffalo, N. Y.; "Competition Based on Honesty, Quality and Service," opened by George W. K. Taylor, McMann & Taylor, New York City, and "Should We Not at All Times Be Reluctant for Decline in Price on Stock on Hand at Time of Such Decline?" opened by Francis J. Baker, George H. Tay Company, San Francisco, Cal. The convention closed late Wednesday with the election of officers. The entertainment included a vaudeville programme, smoker and luncheon at the Hollenden Hotel Tuesday evening and a theater party at the Hippodrome Wednesday evening. On Monday the delegates were taken to Lorain, Ohio, to inspect the plant of the National Tube Company.

British Steel Companies Not Prosperous in 1910.—

In connection with the forty-seventh annual meeting of the Barrow Hematite Steel Company, Ltd., in London recently, the fact was again emphasized that 1910 was not a good year for British iron and steel works. Early in the year the outlook was favorable, partly because of the then excellent condition of the American iron industry, but unfavorable influences appeared before the first half of the year was over. The company produced 270,000 tons of pig iron, against 215,000 tons in 1909, but while this indicated improvement attention was called to the small margin between cost and selling price, the latter being low while the price of iron ore was abnormally high. The company kept its rail mill quite well employed, but it also made sheet bars and billets, for which prices were not well maintained. But for the desire to keep down overhead charges and to retain its men the company would not have entered these latter lines at all.

The report of the American Railway Association shows that on March 1 the number of idle freight cars in the United States was 189,841, compared with 173,667 on February 15. At the beginning of March, 1910, idle cars numbered about 15,000.

The R. D. Nuttall Company Buys the Hydraulic Machine Company's Plant

Negotiations were consummated March 13 by which the R. D. Nuttall Company, Pittsburgh, bought the entire plant of the Hydraulic Machine Company, belonging to the Henry Aiken Estate, which has been idle for some time. The transaction is one of the largest of its kind that has taken place in the Pittsburgh district for some years. The Hydraulic Machine Company is located at Fifty-fourth street and the Allegheny Valley Railroad, and has about six acres of ground. It embraces buildings and other appointments of modern construction, comprising a large foundry with two open hearth steel furnaces, a large structural shop with a full equipment of tools, an erecting shop of large size, a fine well-furnished machine shop, power house and several auxiliary buildings. It is the intention of the R. D. Nuttall Company to take possession of the plant as soon as possible and to put it in partial operation in the manufacture of cut gears. The equipment will be moved from the present plant of the R. D. Nuttall Company, at Fayette street and Garrison place, Pittsburgh, to the works just purchased, concentrating all manufacturing operations there as soon as it can be done, when the old plant will be abandoned. The company will more than double its capacity in the manufacture of cut gears, and will make it much the largest in the country in the manufacture of this product. The R. D. Nuttall Company is one of the Westinghouse interests, and has built up a very large domestic and foreign trade.

Philadelphia Foundry Foremen.—The regular monthly meeting of the Associated Foundry Foremen of Philadelphia and Vicinity was held at the Manufacturers' Club, Philadelphia, on the evening of March 14, with President Clarence R. Brown in the chair. George M. Beukert, treasurer, tendered his resignation, and D. M. Kittenger, secretary, was elected acting treasurer, pending the auditing of the retiring treasurer's accounts. John Birkinbine and Dr. Elmer E. Brown were elected honorary members. The paper for the evening's discussion was on "Some Incidents in the History of the Iron Trade," by George C. Davis, official chemist of the association. Mr. Davis illustrated his paper by numerous lantern slides, showing the progress from the early furnaces in Virginia to the present day types, and referred to the various methods of making pig iron, wrought iron and steel from the old crude processes to those of the present day.

At the annual meeting of the stockholders of the Taylor Iron & Steel Company, held at High Bridge, N. J., March 7, reports showed that the earnings for the year 1910 were so satisfactory that besides the regular 7 per cent. dividend on the preferred stock, amounting to \$35,000, a 3 per cent. dividend on the common stock, amounting to \$15,000, had been paid February 1, 1911, and in addition thereto substantial sums passed to the surplus and reserve accounts. The company reports its business as being in a most prosperous condition, and, with its recently completed additions to its plant and equipment, believes it has every reason to look forward to an increase for the coming year. The retiring Board of Directors was re-elected.

The plant of the Hicks Locomotive & Car Works, Chicago Heights, Ill., which has been in the hands of a receiver for some time, has been purchased for the sum of \$470,000 by William Barbour, who has conveyed the property to the Central Locomotive & Car Works. This company has filed articles of incorporation with \$600,000 capital stock. It is the intention of the new company to operate the plant at full capacity. The officers of the company are: William McInnes, president; A. M. Gardner, vice-president; William Barbour, treasurer; C. B. Bruce, secretary. The headquarters of the company are in the Fisher Building, Chicago.

Personal

The rumor has been current in the past week that Wm. B. Dickson has tendered his resignation as first vice-president of the United States Steel Corporation, effective May 1.

H. W. Bryant has sold his interest in the Rolfe Iron Company, Chicago, to Marcus C. Aurelius, cashier of the Pullman Trust & Savings Bank. Mr. Aurelius will occupy Mr. Bryant's position as secretary and treasurer of the company.

The Pawling & Harnischfeger Company, crane manufacturer, Milwaukee, Wis., at a recent meeting of the Board of Directors, elected S. H. Squier, who has been with the company for a number of years, a director and secretary of the company. W. H. Hassenplug, sales manager, was elected a director and second vice-president, and F. P. Breck, also associated with the company for many years, was elected a director. A. Pawling, president of the company, is on an extended automobile trip through the Southern and Pacific Coast States, and will return to Milwaukee in June.

J. E. A. Moore, who was associated with the late John W. Seaver, consulting engineer, Cleveland, Ohio, has accepted the position of chief engineer for the C. O. Bartlett & Snow Company, Cleveland.

John F. Nisbet, in addition to his duties as advertising manager of the Triumph Electric Company, Oakley-Cincinnati, Ohio, has been selected as manager of the publicity department of the Triumph Ice Machine Company.

Mitchell Pier, formerly foreman of the transformer department, Canadian General Electric Company, has joined the staff of the Triumph Electric Company, at Oakley-Cincinnati, Ohio.

Charles A. Schieren, Jr., of the Charles A. Schieren Company, leather belting manufacturer, 37 Ferry street, New York, has returned from a stay of several weeks in Europe, where he visited the company's branch offices.

Moses Nelson Baker, editor *Engineering News*, New York, will address the Thomas S. Clarkson Memorial School of Technology, Potsdam, N. Y., at the charter day exercises of the fifteenth anniversary, on the evening of March 17. His subject will be "The Engineer and Social Service."

Ellsworth M. Taylor, who has been connected for a number of years with Touche, Niven & Co., New York, as a specialist in works organization, production costs and accounting, has opened an office in his own name at 30 Broad street New York. He has taken over all of his personal business and will continue in the same line of work.

George K. F. Cotton, who has been selling mining equipment in Johannesburg, South Africa, is spending several weeks in this country.

Henry Metzler of the New York Metals Selling Company and A. Burton Cliff of the United States Smelting Works, Philadelphia, have been elected members of the New York Metal Exchange.

The Shelby Iron Company, Shelby, Ala., states that the name of the new manager of that company is Joseph W. Keffer and not James, as printed in the last issue of *The Iron Age*.

Dr. Ing. F. A. Springorum of Dortmund, Germany, son of the president of the Verein deutscher Eisenhuettenleute, who has been in this country since October, has returned home. While here he filled important engagements as a metallurgist with the Illinois Steel Company and the Tennessee Coal, Iron & Railroad Company, and now returns to Germany to take a responsible position in a similar capacity.

Werner F. von Siemens, junior chief engineer of the Siemens-Schuckert Works, Berlin, which is the largest German electrical manufacturing firm, and Kurt Maleyta and Johannes Buppe, who are assistant engineers, are spending several weeks in this country visiting American machinery manufacturing plants. Accompanying the party is Prof. Adolph Wallich, instructor of metallurgy in the

Technical High School of Aix la Chapelle, who is visiting American industrial schools.

R. A. McKinney, Farmers' Bank Building, Pittsburgh, formerly purchasing agent of the American Sheet & Tin Plate Company, has taken the Pittsburgh agency for the Manhattan Rubber Company, Passaic, N. J., which manufactures mechanical rubber goods. It will open a warehouse in Pittsburgh in the near future.

D. B. Meacham of Rogers, Brown & Co., Cincinnati, has returned from a stay of several weeks in Bermuda.

The March meeting of the Cleveland Branch of the American Chemical Society was addressed by W. R. Hulbert, manager of sales of the Goldschmidt Thermit Company, on the thermit welding process, illustrating the process and its various applications with lantern slides, and giving a demonstration of thermit welding. Much interest was shown in the demonstration, which was witnessed not only by the local members of the society, but by members of the American Society of Mechanical Engineers, and others who came from places as remote as Akron and Lorain.

Arthur J. MacBride, Chicago manager of the Pochontas Fuel Company, has been promoted to the position of assistant general manager of that company, with headquarters in New York. He will be succeeded by L. M. Breeden, one of the company's traveling salesmen out of Detroit.

George B. Mitchell has been appointed to succeed Walter G. Miller, deceased, as assistant to Roland Gerry in the cold rolled and power transmission sales departments of the Jones & Laughlin Steel Company, Pittsburgh, Pa.

Edwin P. Brown, Newton, Mass., has been elected general manager of the United Shoe Machinery Company, Beverly, Mass., to succeed Charles H. Wilson, deceased.

The Universal Stenotype Company, Dallas, Texas, has completed the plans for its factory. The plant will consist of three buildings. The main building and office building will be two stories and the foundry one story. The specifications call for 47,000 sq. ft. of floor space. All buildings will be of absolutely fireproof construction, and in all probability of reinforced concrete, with steel sash. The machinery will be direct motor driven, but as the company will purchase its electric power, it will not be interested in boilers or generators. The company is in the market for office, factory, foundry, woodworking and tempering equipment. It is desirous of getting in touch with manufacturers of heating and electrical apparatus, as well as contractors for their installation.

The Elevator Safeguards Company, Indianapolis, Ind., has been incorporated with \$50,000 capital stock to manufacture an automatic elevator safety device formerly made by the Elevator Safety Equipment Company of the same city. The device prevents the elevator shaft door from being opened except while the car is level with the landing and prevents the starting of the car before the door has been closed. The company will be under the management of John W. Stearns. A factory building will not be erected at present, the company having made arrangements for the manufacture of its product.

The Hart-Parr Company, Charles City, Iowa, issues an interesting pamphlet describing what it terms "the modern farm horse." This is a 30 to 45 hp. kerosene tractor which will at one time pull five or six plows, turning furrows 14 in. deep, or two 10-ft. harrow discs and a drill, or three 8-ft. grain binders. It is claimed that in all kinds of ground two men will average 25 acres a day in plowing with this tractor. The company has a very large plant devoted to the manufacture of these tractors, which shows the striking progress that has been made in their introduction for farm purposes.

The Pennsylvania Railroad has placed a contract with the Wellman-Seaver-Morgan Company for a new ore handling plant in Cleveland, Ohio, consisting of four 15-ton unloaders and a 612-ft. bridge, equipped with 15-ton buckets.

Obituary

CURTIS GUILD, SR., founder and editor of the *Commercial Bulletin*, Boston, Mass., died March 12, aged 84 years. He was born in Boston and was educated in the local public schools. He entered newspaper life on the *Boston Daily Journal*, and later went to the *Boston Daily Traveler*, becoming one of the proprietors of that paper under the firm name of Worthington, Flanders & Guild. About 1858 he began the publication of the *Commercial Bulletin* which is one of the leading business journals of the country. His son, Curtis Guild, Jr., was recently Governor of Massachusetts.

ROBERT WALLACE, Cleveland, Ohio, a pioneer ship-builder on the Great Lakes, died at St. Petersburg, Fla., March 7, aged 76 years. He was born in Ireland and located in Cleveland when about 20 years of age, securing employment in a machine shop. In 1869, with others, he purchased a machine shop which the new owners named the Globe Iron Works. Later he was one of the organizers of the Cleveland Drydock Company and of the Globe Shipbuilding Company, the latter afterward being taken over by the Globe Iron Works Company. In 1886 Mr. Wallace and associates formed the Cleveland Shipbuilding Company, of which he was made president. In 1899 the American Shipbuilding Company was formed to take in the shipbuilding plants at Cleveland and several other lake ports and Mr. Wallace took an active interest in the latter company until seven years ago. He leaves a widow, three sons and two daughters. The sons are connected with the American Shipbuilding Company, James C. Wallace being president; R. B. Wallace, general manager, and Lindsay H. Wallace, assistant manager.

CHARLES S. DICK, for 18 years connected with the McKenna Brothers Brass Company, Pittsburgh, died at his home at Sheridan, Pa., March 7, after a long illness, aged 38 years. He leaves a widow and three children.

FRANK S. LAYNG, president of the Illinois Zinc Company, Peru, Ill., died at his residence in New York City February 11.

Railroad Equipment Orders.—The B. & O. has ordered 1000 box cars and the Nashville, Chattanooga & Southern 100 from the American Car & Foundry Company. The recent order of the American Refrigerator Transit Company was for 1000 cars. The Ann Arbor has bought 110 freight cars, the Chicago, Indianapolis & Louisville 300, and the Richmond, Fredericksburg & Potomac 50. The Illinois Central will build 500 refrigerator cars in its own shops. The Algoma Central & Hudson Bay Railroad has ordered 175 steel under frame flat cars from the Canadian Car & Foundry Company, and 50 ore cars from the Hart-Otis Car Company. The New York, Westchester & Boston has bought 30 passenger cars from the Pressed Steel Car Company. The Rock Island is expected to buy 1450 freight cars, the Atlantic Coast Line 1200 to 1400, the Seaboard Air Line 1200 and the Western Maryland 500. The Lackawanna has ordered 35 locomotives, the Atlantic Coast Line 29 and the Illinois Central 40. The Pere Marquette is inquiring for 50, the Kansas City Southern for 20 and the Western Maryland for 40.

At the annual meeting of the stockholders of the Lackawanna Steel Company, held March 8 at the new general offices of the company at its plant at Lackawanna City, near Buffalo, N. Y., the following, whose terms expired, were re-elected for the full term of three years: E. A. S. Clarke, William L. Brown, Edwin S. Marston, Samuel Mather, Ogden Mills, Moses Taylor Pine and William K. Vanderbilt. James A. Campbell was also elected a director, his term expiring in March, 1913.

Sidney Wheelhouse, Pittsburgh representative of the Hoover-Owens-Rentschler Company, Hamilton, Ohio, has sold to the Portsmouth Steel Company, Portsmouth, Ohio, a 32 x 54 in. heavy duty Hamilton-Corliss engine for rolling mill work.

A Great Power Development in Eastern Pennsylvania

Generation of electric power from anthracite coal directly at the mine, with the distribution of such power by high voltage transmission lines to industries in surrounding territory, ultimately even as far as Philadelphia, is to be undertaken on a big scale by the Lehigh Coal & Navigation Company. The project contemplates an expenditure of \$3,000,000 now, and of \$10,000,000 in all. This electric power plant will, according to proposed plans, be located 10 miles west of Mauch Chunk, at Hauto, Pa., adjacent to one of the company's coal mines, and also where an abundant supply of water is available. An existing reservoir will be increased by the construction of a higher dam to a storage capacity of 1,000,000,000 gal. and an area of about 400 acres. The company owns the entire drainage basin.

The first unit of the power plant will have a supply capacity of 20,000 kw. To insure this, three electric generators of 10,000 kw. will be installed. Gradually the plant is to be enlarged to 100,000 kw. capacity. Within a year the company expects to have the first section of the Hauto electric power plant in operation. The plan is to supply electric current first to the cement and slate industries in Lehigh and Northampton counties. These are in a territory from 20 to 40 miles distant from the proposed plant. From the Hauto plant alternating current of a very high voltage will be carried by transmission lines to four transforming stations at Slatintown, Nazareth, Bath and Bangor, Pa., where it will be stepped down, and, where necessary, transformed into direct current for delivery to consumers. The transmission lines will be constructed largely along the Lehigh Navigation Canal and on the right of way on the controlled Lehigh & New England Railroad. As the plant is increased the idea is to carry electric power to Allentown, Easton, Trenton, and, ultimately, probably throughout the section to Philadelphia.

The electric power and distribution service, which the Lehigh Coal & Navigation Company is preparing to introduce, will be conducted by subsidiary companies controlled by it and through which it will finance the undertaking. Charters for 25 such companies have been applied for under the laws of the State of Pennsylvania, the incorporators in each case being W. A. Lathrop, Rollin H. Wilbur and H. F. Baker, all officers of the Lehigh Coal & Navigation Company.

Republic Blast Furnaces All Active.—The Republic Iron & Steel Company blew in its No. 3 Pioneer furnace at Thomas, Ala., March 12. It now has all of its nine furnaces in blast, Hall furnace in the Shenango Valley having gone in in February. Its Bessemer steel department at Youngstown is operating at 100 per cent. of capacity, while its new tube works are now running at about 70 per cent. of their rated output. The Brown-Bonnell mills at Youngstown are running practically full, though some of the hand mills at this plant and the Mahoning Valley works are not fully employed.

The United Engineering & Foundry Company, Pittsburgh, put in operation March 6 one of its high speed steam hydraulic forging presses at the Mare Island Navyyard, another March 7 at the works of the Titusville Forge Company, Titusville, Pa., and March 8 shipped one to the Westinghouse Electric & Mfg. Company, East Pittsburgh, which will be in operation about April 1. The first named press is of the single frame type, of 300 tons capacity, and the other two are of the four-column type of 1,000 tons capacity.

The Fort Pitt Bridge Works, House Building, Pittsburgh, is making an addition, 65 x 400 ft., to its plant at Canonsburg, Pa. Contracts on hand include a steel pier at New Orleans, La., and a steel bridge across the Ohio River at Sewickley, Pa., which is more than half completed.

A Coal Miners' Compensation Plan

A Fund to Be Raised by a State Tax of One Cent Per Ton

The American Mining Congress is distributing copies of a proposed plan to provide compensation for the victims of coal mine accidents and a pension for aged coal mine workers. The plan takes the form of a bill and has been in preparation for a considerable time by a committee of that organization composed of John H. Jones, David Ross, W. R. Woodford and J. W. Dawson. The following are some of its principal provisions:

Section 1 authorizes the legal taxing authority of a county to levy a special tax of 1 cent per ton on all coal mined and shipped or sold locally.

Section 3 requires State treasurers to keep the proceeds of such taxes in a separate fund to be known as the Employers' Accident Indemnity Fund.

Section 4 provides that all employees in and around coal mines, coal washers and tipples shall be entitled to receive indemnity for all injuries caused by accidents, and a monthly benefit during disability occasioned by old age, the basis of compensation to be the average monthly wages received for the five years immediately preceding such accident, but in no case to exceed \$70 for each month, the monthly benefit to be in no case more than \$35 or less than \$25. If an accident results within 30 days in the death of the workman the legal representatives of each single man shall receive from the fund \$500; the legal representatives of each head of a family living with or supporting such family shall receive \$500, and in addition thereto a monthly benefit for three years following the accident a sum equal to 50 per cent. of such workman's average wages plus 10 per cent. of such average wages for each child under 16 years of age at the time such benefits are payable, and 10 per cent. of such wages additional for five or more years of continuous service with his then employer, but in any case such monthly payments shall not exceed the average wage of such employee nor the total sum of \$3000. If the injuries incapacitate the workman from the pursuance of his usual work, he shall during such incapacity receive a monthly benefit equal to one-half of the amount of his average monthly wages during the preceding year plus 10 per cent. of such wages for each child under 16 at the time such benefits are payable and 10 per cent. of such wages for five or more years of continuous service with his then employer, but such benefits are not to exceed the total sum of \$2000. It is provided that a workman shall receive for the loss of one hand 12 months' wages; one arm, 18 months' wages; one foot, 9 months' wages; one leg, 12 months' wages; one eye, 6 months' wages; both hands or both arms or both feet or both legs or both eyes, a sum equal to his average wages for a period of four years, but not to exceed the sum of \$3000. Any workman employed for 25 years in the coal mining industry, for the last 10 years of which he shall have been so employed within the State, when he reaches the age of 65 years and becomes unable to perform his usual labor or labor of any sort about any mine, washer or tippie, by reason of old age, shall be entitled to receive a sum equal to 50 per cent. of his average monthly wages during the preceding 10 years. Proper restrictions are made so as to guard against imposition.

Section 8 provides for an Advisory Board of three to be appointed by the Governor, one of whom shall be a representative coal operator and one a representative coal miner, who will have general control and supervision of the administration and execution of the provisions of the act.

Section 9 provides that if the special tax shall be found at the end of three years to be in excess of the amount needed the State Auditor is authorized to change the amount of the levy provided for.

It is the intention of the American Mining Congress to submit the bill to the legislatures of the several coal producing States as a practical solution of a problem

which is now causing a very great deal of trouble. It is the purpose of the bill to provide means by which the necessary victims of the mining industry may be cared for. By the plan proposed the burden of losses entailed by such accidents is equalized, certainty of settlement is insured and the opportunity is given to add this expense to the cost of production in such a way as to place the burden upon the ultimate consumer who should be willing to pay the actual cost of production plus a reasonable profit. The permanent headquarters of the association are at 1510 Court place, Denver, Colo. The secretary, J. F. Callbreath, Jr., has a temporary office at Bancroft Hotel, Washington, D. C.

The British Iron Market

Reports from the British iron trade indicate that conditions are not as favorable in pig iron as they were at the opening of the year, while in finished material they are only fairly satisfactory. Makers of Cleveland pig iron do not take a very hopeful view, chiefly for the reason that pig iron stocks in Connal's stores have been steadily increasing. On March 2, 1911, the total of Cleveland iron in store was 570,707 tons, against 411,357 tons on March 3, 1910. The increase in February was 17,151 tons, against 21,769 tons in January, 23,334 tons in December and 20,575 tons in November. Cleveland warrants have touched 48 shillings 7½ pence, which was the minimum in 1910. The idea entertained at the beginning of the year that prices might advance in the first quarter has been given up. The East Coast hematite pig iron trade is less satisfactory and prices are weaker. Producers are asking 65 shillings for delivery in the first half, while hematite iron in second hands is sold at 64 shillings 6 pence. Spanish ores continue high, quotations on Rubic ore being 22 shillings 6 pence, delivered. The coke trade is also suffering from overproduction. The usual price is 15 shillings 6 pence for furnace coke, delivered at Middlesbrough.

New orders for finished steel are not plentiful, but mills still have good specifications, particularly in ship-building material. Rails have been in a little better demand and the basis of £5 15 shillings is firmly held. On the Northeast Coast steel ship plates are quoted at £6 15 shillings, which is 10 shillings above the basis of one year ago. In South Staffordshire, the finished iron trade is feeling Belgian competition on bars. The tin plate trade is quiet, but Welsh mills are very well occupied. The common quotation for Bessemer I. C. coke plates, South Wales, is 15 shillings. Reference is made by the *Ironmonger* to the sale of black plates covered with aluminum on one side only. Arrangements have been made by the British patentees for their manufacture in Germany, Holland and France.

The United States Supreme Court, March 13, in an opinion read by Justice Day, upheld the constitutionality of the corporation tax. The decision was unanimous. The court held that the corporation tax was enacted by Congress, and that the Constitution clothed it with the taxing power; that it was uniform throughout the United States, and affected all alike; that it did not invade the rights of the State; that Congress, having the power of taxation, when it exercised it, without discrimination, the question resolved itself as to the wisdom of Congress, which, even if wrong, was a matter for the voters, and not the courts, to pass upon. The corporation tax law is a section of the tariff law of 1909.

The Lehigh Valley Railroad is planning new and improved iron ore and coal docks at its Blackwell Canal terminals at South Buffalo, N. Y., to cost approximately \$500,000. The ore docks will be constructed of concrete for surface storage and will be equipped with a number of the latest type of electrically operated Hewlitt unloaders. On the opposite side of the canal from the ore docks, the coal docks and chutes heretofore in use will be replaced by a series of trestles and coal pockets to provide for the more expeditious loading of anthracite into vessel holds.

Business Administration as a Constructive Science

Its Field of Application Not Confined to Production or Any Other Single Department— The Various Divisions Co-ordinate

BY H. F. STIMPSON.*

In a recent article in these columns,† I endeavored to show that administration may be considered as an exact science, having its own particular formulae, which can be applied to any line of business as well as the science of applied mechanics or that of arithmetic. The object of this article is to correct a somewhat common misapprehension as to the real purpose for which this science is employed.

Interviews with prominent men in many of the larger cities of the United States have furnished me with abundant evidence that the purpose of administration is commonly believed to be the direct control of physical force, either human, animal or mechanical. This belief, however, does not seem to be warranted by the facts.

Mental Force and Physical Force

Man differs from an animal or a machine in that he possesses a mental force through which he can direct not only his own physical force and that of other men, together with that of animals and machines, but by which also he can control the mental force of other men and through them the physical forces which they may control or direct.

If such are the facts it is even of more importance that we should understand the laws governing the control and direction of this mental force than the laws regarding physical force. That such are the facts may be inferred from the following:

1. Man is dependent on commodities for both existence and pleasure.
2. A commodity is material to which force has been applied with such results as to fit it for the use of man.
3. Force may be divided into two types: (a) Physical force, which is applied directly to the material and may be of either animal or mechanical origin; (b) Mental force, by which the physical force of men, animals or machines is either controlled or directed.
4. Mental force is a prerequisite to the intelligent use of physical force toward a given end.
5. Mental force is one of the peculiar possessions of man which distinguishes him from animals.
6. The real value of a commodity among men is, then, proportionate to the amount of mental force, even more than to the amount of physical force, which has entered into its production. Real commerce, therefore, is to be found in the exchange of mental force far more than of physical force, or of the commodities produced by force, or even of money, which is not a force at all but a mere token of force.
7. Mental force is an inherent possession of man from birth and is, therefore, his prime trading capital.
8. Education develops but does not create mental force.

It is easy enough to say that the force produced by falling water or that produced by animals working in a treadmill is due to the action of gravity and that the force produced by the utilization of steam is due to the liberation and transformation of the energy which the sun long since stored up in coal or other fuel. But how much do we really know about it after all? What we really know the most about is not the origin of the force but what it will do under given conditions. If, then, we consider mental force as of unknown origin and are content, for the present, with observing its effects under given conditions, may we not by analogical reasoning

rob it of some of its mysteries and predict its behavior with somewhat reasonable certainty?

Measurement of Force

We have demonstrated above that mental force controls physical force, and we know that—

9. Physical force can be and now is measured by a compound unit composed of distance, weight and time, commonly known as a horsepower.

10. The amount of physical force which a normal man can generate daily is now known with some degree of certainty and is expressed in units known as man power, having a definite relation to a horsepower.

11. It is therefore possible to determine the amount of physical force which a man can physically control as well as that which he can generate.

12. Either of these may be the measure of a "fair day's work" according to conditions.

13. Until the units by which mental force can be measured are discovered we may measure it by the units of physical force controlled or directed by the mental force.

14. It should be possible to determine, on this basis, the amount of a fair day's mental work.

Apportionment of Physical Force

Let us now consider the use of physical force. We already determine, with a fair degree of certainty, the amount of force which must be imparted to the machine by its individual motor, and we regulate the size and capacity of the feed wires, cables, generator, engine, throttle valve, and boilers accordingly. We also determine the amount of coal, according to its richness in thermal units, which will be necessary as being, humanly speaking, the prime source of the desired force. The knowledge by which we are enabled to do these things has been obtained by specialists through study and experiment, and they have placed their discoveries at the disposal of all mankind. By such means we are enabled to determine either the number of machines which a given amount of coal will operate or the amount of coal and other things which are necessary to the operation of a given number of machines.

The physical force of the human body is comparable to the force of an inert machine; and while we have some information on the subject it is not as definite or as extensive as it should or might be. Hence the frequent and bitter strife between capital and labor over the amount of a "fair day's work." It is true that certain experiments have shown that a man power is about one-tenth of a horsepower, but what we sorely need is an exhaustive investigation into the relation which should exist between the periods of rest and relaxation for different volumes of load, in order that they may be so adjusted in the predetermination of industrial operations that the maximum of work may be obtained without exceeding the elastic limit of the worker any more than in the case of inert machinery.

The High Cost of Man Power

The reason why this investigation has been neglected is, perhaps, our monumental failure to grasp the tremendous excess of the cost of human over mechanical physical force. The large electric power companies will quote prices per kilowatt hour of from 10 cents per kilowatt hour for as little as 200 kilowatt hours per month down to 6 cents per kilowatt hour for as much as 3500 kilowatt

* Chief engineer, Universal Audit Company, New York.

† *The Iron Age*, January 26, 1911, page 248.

hours per month. And I have known current to be bought for as little as 2 cents per kilowatt hour in very large quantities. If a man power, as has been stated by a recognized engineering authority, is about one-tenth of a horsepower, then, on the basis that a horsepower is seven-eighths of a kilowatt, and that labor is paid 15 cents per hour, human physical force is from 16.5 to 82.5 times as expensive as electro-motive force—the force in each case being purchased from the generator.

Consider the elaborate investigations which are made into questions of mechanical and electrical engineering; the money and effort put into educational institutions for the education of the young along these lines; the struggle to produce mechanical refinements and power saving devices; the tests of coal and other fuels; the gauges for measuring the use of power—and then consider the great lack of consideration, along anything like parallel lines, of the economical use of human power, each unit of which costs so many more of our dear American dollars, which we are supposed to chase so madly.

The Waste of Skilled Man Power

In our employment of "unskilled" labor—the man who sweeps the street or office, the porter in the store or terminal, the roustabout in the factory yard or on the wharf—we are madly extravagant, but even more so in the case of skilled labor, which costs several times as much. And the consumer pays the bill. Yet the efficiency engineer, who has discovered this waste and is able and ready to remedy it, is the scorn and the jest of the average manager from Maine to 'Frisco; and even the laborer, who is more to be excused, not understanding the matter correctly, does not always recognize him as the friend he really is to all men. The most efficient way to utilize the physical strength of man is to employ it in the control of machinery by which the work is actually performed, rather than in the actual manipulation of the tool itself. The locomotive engineer, through his valves and levers, controls a far greater amount of force than he can personally generate, and in such cases any lack of efficiency is all the more manifest and deplorable.

Apportionment of Mental Force

Passing now to the control of the mental force, let us compare the mind of the worker to the individual motor on the machine tool; the foremen to the feed wires; the superintendents to the feed cables; the managers and vice-presidents to the generator and engine; the general manager to the engineer; the board of directors to the boilers, where the latent force of the stockholders, who in turn correspond to the coal, is collected and transformed. Is it not reasonable to take the ground that, in the transmission of this force, the same fundamental principles may be made applicable as in the handling of any other force? May we not measure the amount of mental force expended by the amount of physical force controlled, as in the case of the foremen; or the amount directed, as in the case of the higher official, who deals with sub-administrators only? Must we not secure proper proportions between the administrators and the demands upon them, as well as proper connections between them through which this force may flow? Must we not determine proper standards for their performances and obtain proper records of the results which they produce? Must we not adequately insulate the lines over which this force is transmitted and guard against cross-connections and short circuits, which tend to produce waste and confusion? And should we not also introduce intensifying forces at the proper points, even as oxygen is introduced into a flame with a blowpipe, in the shape of specialists who have special knowledge of certain subjects which can only be attained by long and special study? All these things would appear to be reasonable assumptions in the light of our experience with more tangible matters.

Production Only One Field of Application

From both the previous article and the foregoing it may have been erroneously inferred that this conception of administration as the science of the control of power, both mental and physical, is of value in connec-

tion with only one certain department of a business variously designated as the producing, operating or manufacturing department, and that the other departments—those concerned in selling, financing, &c.—are controlled along other lines.

This is one of two ideas which are tremendous stumbling blocks in the way of progress. In every line of effort it is the mental force of those who are behind the movement which not only energizes those at the head of the active operations, but is by them so transmitted and directed as to energize all whom they control or direct. This is the force that "gets things done." Money is not itself, as said above, any kind or type of force.

Co-ordinate Divisions of Business

The other idea which is a stumbling block is that one of the fundamental divisions of a business is superior to or inferior to another. Unless a logical and true balance is preserved among these the development of the business will be one-sided, resulting in maladministration. Many businesses are far less successful than they might be, because the manager has gained his experience largely in one or two divisions and thus has been unable to acquire a comprehensive grasp of the business as a whole.

We need men who are trained chiefly in the fundamentals of administration and supplementarily in the details of all of the divisions. It is only because administration has not been and as yet is not generally recognized as a science in itself that men have failed to recognize its dignity and importance; have been content with this one-sided training and have given the first place in their minds and attention to one of the subdivisions of a business rather than to the business as a whole. No man can be a good general manager because he is an exceptionally good financier, salesman or producer. If he gains eminence it will be in spite of this fact. It is the ability to surround oneself with able men in the different lines; to give directions as to what is desired in such a manner as properly to supplement the information at present possessed by the subordinates; to determine proper standards for performance; to secure proper records of achievements and to judge departmental results broadly and equitably from a comparison of these, that insures success.

The field of application of the science of administration, or the direct control of mental force, and through it of physical force, lies, therefore, in the direction of the business as a whole, and it must be so applied in order to secure the best results. If, then, we are dealing with a very real, if somewhat intangible, force and one which is amenable to much the same formulae as are other forces with which we deal more complacently, though we know but little more about them, may it not be possible that men who have made a long study of this subject are better able to devise effective means for the utilization of this force than those who have not approached the subject from this point of view? Is it not even more important that the control of this mighty force, over and above all lesser forces, should be intrusted to those men who have demonstrated, when dealing with other matters, their right to the title of engineer, who has been defined as one who "controls the forces of nature for the use and convenience of man"?

The Follansbee Brothers Company, Pittsburgh, Pa., manufacturer of polished and blue steel sheets, electrical sheets, tin plate, &c., will, on April 1, commence mailing to architects, sheet metal workers and those interested in building generally, a series of four-page pictorial descriptions of roofs on which Follansbee products were used. The series will be known as "The Tin Truth Bulletins of Good Tin Roofs," and will reach the architects semimonthly and the sheet metal workers monthly. The views shown will include residences, schools, churches, factories, depots, municipal buildings, warehouses, hotels, &c. Every sheet metal worker, roofer and architect desiring the series should write to the advertising department of the company requesting his name added to the mailing list.

Core Room Management and Materials*

Examples of Economies Due to a Study of Sand and Binder Problems

BY H. M. LANE.

In many cases by the proper selection of supplies and equipment a core room manager may more than cut core costs in half. Such savings as this can rarely be made in other departments of the foundry. An automobile concern sent patterns and core boxes for a cylinder to a foundry requesting an output of 30 odd cylinders per day. The cores and core boxes as designed were complicated, had many drawbacks and loose pieces, and were of heavy wooden construction. In order to get the job started, the management had to use these boxes at first, but it was necessary to work three gangs of core-makers for the entire 24 hours to get the proper number of cores from the boxes. The core boxes were redesigned and made in metal in such a way as to simplify the core arrangements. With the new boxes more cores could be turned out in one eight-hour day than were required for a day's molding. In fact, the capacity of the new boxes was so great that cores accumulated without forcing the workmen at all, and it is probable that nearly double the number of cores required per day could have been made by this equipment. The redesign of these boxes meant nearly six times the production per day from the equipment with the same amount of labor expended, and incidentally it may be stated that the resulting cores were cheaper, as there was no wax wire used in them and hence the finished core cost less.

A Saving in Binder

In another case an equipment man entered a foundry to look over the core room with the foundry manager. They were using rye flour as a binder and told him that they were mixing it at the ratio of 1 to 18. After watching the workmen for a little while he was convinced that they were using it much stronger, and asked them to weigh up the mixture for a day and find out what they were doing. This investigation showed that the workmen were actually using one part of flour to six parts of sand. On the amount they were consuming, they were wasting four barrels of rye flour a day, even with hand mixing. A mixing machine was installed and with this equally good cores so far as strength was concerned and very much superior as to venting quality, were made at a ratio of one part of flour to 36 of sand, which saved another four barrels of flour per day.

In another plant they were using \$115 worth of binder per day for mixing 80 tons of core sand. It required 12 men to do the hand mixing, and the following ratios were in use: Flour, 1 to 12; rosin, 1 to 12; oil, 1 to 40. For their work, after installing a sand mixing plant they doubled the ratio in all cases—that is they mixed the flour 1 to 24, rosin 1 to 24, and oil 1 to 80. By changing the brand of sand it is probable that they could have made a still greater showing.

Frequently it pays to have two or more brands of sand for different classes of work; for instance, a sharp silica sand or beach sand for oil sand cores and clay or loam sand for very heavy work, and a finer sand containing some clay for small work which must be smooth on the inside.

Another case was that of a steel foundry in which they had a \$2-a-day man in charge of the facing sand mill. They put a \$3-a-day man on the job and told him to use his head and stick to the right mixtures. From the start he saved them \$10 a day in binders.

If such savings as this can be made by better management in details, it stands to reason that corresponding savings can be made all along the line by more careful management of the core room. The effects of good core

room management are not seen in the core room alone, but in the foundry and machine shop as well. When cores are properly turned out the castings loss from bad cores should disappear, and in many plants this is a serious item. With properly made cores which clean out of the castings readily the machine shop will not be constantly complaining of dirt and hard scale in hollow castings, with their attendant bad effect upon tools.

The high grade core oils cost at present anywhere from 60 cents to \$1 a gallon, and it is evident that a comparatively small saving in the amount used will make a substantial showing on the right side of the cash balance. If a cheaper binder can be substituted for a part or all of the oil sand work it is evident that a greater saving can be effected, and there are many cases in which this can be done.

To resist heat we must use a material for cores which will not fuse at the temperature of molten metal, and which at the same time is capable in itself of resisting great pressure. Silicon in the form of sand has come to be universally recognized as the base of a core. The grains must be united with something which will be disintegrated by heat, and this has led to the universal use of some carbon compound; hence all core binders are carbon compounds, and most of them char or burn out at relatively low temperatures. The one exception to this binder rule is found in the use of the natural binder, clay, but where this is relied upon to any great extent the friability of the core must be insured by incorporating sawdust, coke, or some other material which will burn out and crush. . . .

Green and Dry Binders

The binder must act not only after the core is dry, but must hold it in position during the drying, and prevent its sagging or deforming. George H. Wadsworth in discussing the core problem has referred to the green and the dry binders; that is, the binder which holds the sand in position while green and that which holds it after it is dried. For certain classes of machine made cores it has been found necessary to add some binder like flour to act as a green binder, while oil acts as the dry binder. In cores made on the jarring machine, or in many cases of hand-made cores, water forms the green binder, while the oil or compound forms the dry binder. In most cases the binder ratio can be cut down by working the mixture fairly wet, and frequently the driving of the moisture out of the sand seems to steam or carry the binder through the entire mass. In some cases it even concentrates it near the surface, giving a strong skin with a soft interior, which is frequently the most desirable arrangement.

Where cores are made up several days in advance of the time they are used and stored they have a tendency to absorb moisture; also in certain foundries it has been the practice to leave cores in damp molds over night or for a considerable number of hours. In this case the core must be able to resist moisture. It is commonly supposed that this practice necessitates a core made with oil, rosin or pitch (black compound) as a binder. A change in the core room management, however, with proper provision for taking care of and protecting cores may make it possible to use cheaper binders to advantage, and it is here that the management of the core room should co-operate with that of the foundry, and so arrange the practice as to permit the use of the cheapest efficient binder available. Some of the other binders, such as flour, dextrine, molasses or glutrin, possess special advantages over the more distinctly moisture resisting classes, and hence a wise management will provide

* Extracts from an address before the Buffalo Foundrymen's Association, February 28, 1911.

a dry place for storing stock cores and arrange to have the cores placed in the molds shortly before the molds are to be poured. This will frequently permit the use of much cheaper binders and the additional expense of keeping the cores in a dry place or of keeping them out of the mold until they are wanted is but a small part of the saving which may be effected.

Machine Mixing

Any compound can be mixed much better by machine than by hand. A splendid example of this came under the writer's observation some time ago. A certain foundry had had a great deal of trouble with its core department, and had changed foremen repeatedly. At last a man was put in who had a mind of his own. He asked for a batch mixer, which was promptly refused, the owner saying that one man had always mixed all of their core sand, and he saw no need of a batch mixer. The foreman immediately put five men to work mixing the sand for the cores which had been giving them trouble in the foundry, and he saw to it that they put in a faithful day's work, shoveling, tramping, and working the sand over and over. The trouble in the foundry disappeared as if by magic, and the castings all came good. The owner came to the foreman and asked what he had done. The foreman pointed to the five men industriously tramping and shoveling sand. The owner could not deny that with this mechanical work the results in the foundry were satisfactory. In the ensuing conversation the foreman managed to make it clear that one batch mixer with its untiring paddles would do as much work in a day on the sand as 150 men sweating profusely. As it was mechanical work that counted in this job, the owner at once came forward with the mixer.

Methods of Testing

The core room man should be capable of testing and comparing sands and binders. When purchasing the sand from the same company different shipments may vary so greatly as to upset all of the calculations in the core room. One firm keeps on hand a quantity of a standard brand of raw linseed oil to be used as a test for comparing either sands or other binders. Cores are made of sand, and this oil in the form of bars, 1 in. square by 15 in. long. If two sands are to be compared, an equal number of cores is made from the known and the unknown sand, while if it is binders that are to be compared a known sand is used and an equal number of cores made with each of the binders to be tested. The cores are then broken on supports 12 in. apart. It has been found that two batches of cores made from the standard linseed oil and baked under different oven temperatures may vary greatly in strength, but by baking a set of cores from the standard oil and a set of the unknown class on the same plate at the same time, a good comparison may always be obtained. By this means a working idea as to the value of either sands or binders can easily be obtained.

In many cases where intricate or delicate cores are required it is cheaper to purchase a clear washed silica sand than to use local bank sand. This is particularly true when oil is used as a binder. Cores made of oil and silica sand require few rods, as they are strong. For other classes of work, and particularly where a smooth surface is wanted, it is frequently advisable to use a little clay with the sand. In all cases, however, where cores that will vent freely are wanted care should be taken to avoid the presence of any fine material in the core which does not partake of the nature of a bond. In most cases in purchasing core sand freight is the largest item, and frequently the removal of the burnt sand from the foundry is also an expensive item; hence for economy's sake the foundryman must get as much life or use from the sand while it is on hand as possible. In carrying out this idea water barrels or washing devices have been perfected and are used successfully for removing fine dust from the sand, and thus permitting the re-use of the coarser particles. This sand washing costs but little and gives superior product for making cores for many classes of work.

Core Sand Storage

The storage of core sand is an important item. Where possible it should be stored under shelter, and it should contain as small an amount of moisture as possible previous to mixing. Serious irregularities in core room practice are frequently traceable to variations in the amount of moisture in the sand, as it comes to the mixer, no account usually being taken of this original content of sand. Where sand is used in considerable quantity provision should be made for handling it economically. At the plant of the Bettendorf Axle Company in Bettendorf, Iowa, large concrete bins have been installed. These are under shelter and room is provided for a siding that will hold four flat cars inside of the building, so that four cars of sand can be put in at the same time and unloaded by an electric crane and a grab bucket. As sand in the winter may frequently be received containing moisture, provision has been made for heating the bins at the bottom. In the division walls between the bins are passages containing steam pipes, the divisions between the bins are of steel plates in place of concrete, and it has been found in practice that the heat from these steam pipes slowly passes through the sand mass, thawing the frozen material and keeping the sand in good condition.

At the plant of Baxter D. Whitney & Co. of Winchendon, Mass., where a much smaller amount of sand is used, this being a foundry auxiliary to a manufacturing concern, the bins are in a basement or lower floor, and the runway extends from the railroad track on top of the bins, so that the sand may be wheeled in wheelbarrows and dumped through hatches in the roof of the sand storage. In this case, as should be the case with all small foundries, the year's supply of sand is put in during the summer, when there is no frost. With very large plants this is not always possible. If a blend is being used which requires clay and comparatively small quantities are being handled the clay can be added in the form of clay wash to the batch mixer or to the material mixed by hand. Any foundryman melting over 5 tons of iron per day can afford a batch mixer, and would find it an excellent investment for preparing both core sand and facing sand.

Core Drying

For the drying of cores an efficient oven is necessary. The temperature should be uniform throughout the oven, and the length of time necessary to dry any given core will necessarily depend to a considerable extent upon the bulk or volume to be considered. First the water which is used with the binder must be expelled. This passes off as steam, and ample provision must be made for its exit from the core oven. After the moisture has been removed there is a chemical or mechanical action which goes on in the binder, according to the binder employed. Flour or dextrine must be baked just as bread or pie crust is baked. Oil like linseed oil must be oxidized and dried down to an adhesive skin. Black compound and rosin must be melted and caused to flow through the sand, and any volatile constituents driven off. Molasses must have its excess water driven off and be charred. Glutrin must have the excess water expelled and the material reduced to a solid consistency.

The temperatures required for drying different cores vary greatly, and the same binder treated under different temperatures has different properties. For instance, a core made with pure linseed oil will harden sufficiently for use in the air if given time enough. This is on account of the fact that the oil is slowly oxidized just as linseed oil hardens in an ordinary paint. Ordinary core oils, however, contain other constituents which have to be volatilized and driven out, and for this purpose a comparatively high temperature is necessary. Like oil a glutrin core will harden in the air if exposed in a dry place, but the material is hygroscopic and takes up moisture again if exposed in a damp place. If glutrin is baked at such a temperature that some of the constituents are charred it attains considerable moisture resisting properties, and it is right here that the success or failure with many plants with the use of this binder

has occurred, the trouble being with the temperature obtainable in the core oven used.

In many foundries everything is sacrificed to rapid drying. The writer visited a foundry recently where they were using flour for most of their cores. The ovens were driven with coke fires directly beneath the cores, and frequently the core pans at the lower part of the oven when removed would be red hot around the edges and the cores smoking like a house afire. Upon breaking the cores open as they came from the oven the interior of the larger ones was found to be green or doughy. Many of them were baked in 10 minutes or less. On account of this oven practice it was necessary to use about three times as much binder as would have served had a slower baking been practiced. In another foundry using glutrin the cores were hurried through the oven so fast that the interior was still moist. As the metal poured in this case was brass, and as the cores remained in the mold but a few minutes before pouring, no bad results followed, but had this been an iron foundry and the cores left in the mold several hours, there would have been serious softening of the exterior portion of the core from the large amount of moisture remaining inside the core.

Unfilled Orders of the Steel Corporation

Another increase in unfilled orders is shown by the statement of the United States Steel Corporation published March 10. It amounts to 289,624 tons for February, against 436,162 tons increase in January, which was the first interruption to a 12 months series of decreases. The figures below compare the February 28 statement of unfilled tonnage with those issued monthly since the middle of 1910 and with the quarterly statements beginning with December 31, 1908:

February 28, 1911...	289,624	June 30, 1910.....	4,257,794
January 31, 1911....	3,110,919	March 31, 1910.....	5,402,514
December 31, 1910..	2,674,757	December 31, 1909..	5,927,031
November 30, 1910..	2,760,413	September 30, 1909..	4,796,833
October 31, 1910....	2,871,949	June 30, 1909.....	4,057,939
September 30, 1910..	3,158,106	March 31, 1909.....	3,542,595
August 31, 1910....	3,537,128	December 31, 1908..	3,603,527
July 31, 1910.....	3,970,931		

The unfilled orders at the close of the years preceding 1908 were as follows: 1907, 4,624,552 net tons; 1906, 8,489,718 tons; 1905, 7,605,086 tons; 1904, 4,696,203 tons; 1903, 3,215,123 tons; 1902, 5,347,523 tons.

It is stated in connection with the February figures just published that the shipments in February were at a rate considerably in excess of those for January, so that the rate at which new business came in last month represents a substantial increase over January.

Worcester Metal Trades Annual Meeting.—The Worcester Branch National Metal Trades Association held its annual business meeting March 9, and elected these officers: President, Albert E. Newton, Prentice Bros. Company, Worcester, Mass.; vice-president John W. Higgins, Worcester Pressed Steel Company, Worcester; treasurer, A. W. Beaman, Stockbridge Machine Company, Worcester; members of the Executive Board for two years, Alonzo W. Whitcomb, Whitcomb-Blaisdell Machine Tool Company, Worcester; H. B. McDonald, Simonds Mfg. Company, Finchburg, Mass.; Frank H. Orr, Dupaul-Young Optical Company, Southbridge, Mass. The members of the board whose terms hold over are George F. Brooks, Harrington & Richardson Arms Company; Clarence W. Hobbs, Hobbs Mfg. Company, and George I. Aiden, Norton Grinding Company, all of Worcester. The reports of the officers showed that the year has been a prosperous one in the affairs of the branch.

The Parkersburg Iron & Steel Company, Parkersburg, W. Va., manufacturer of sheets, has declared an annual dividend of 5 per cent. Officers have been re-elected as follows: C. F. Niemann, president and treasurer; A. E. Niemann, vice-president; A. H. Geilfuss, secretary; C. A. Orr, auditor; John Stephens, general superintendent.

February Copper Production and Stocks

The Copper Producers' Association has issued its monthly statement for February. It shows an increase of 14,198,280 lb. in stocks. Following is the statement:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States February 1.....	142,439,490
Production of marketable copper in the United States from all domestic and foreign sources during February	109,828,297
Deliveries of marketable copper during February:	
For domestic consumption.....	50,518,998
For export	45,111,019
Total.....	95,630,017
Stock of marketable copper of all kinds on hand at all points in the United States March 1.....	156,637,770

The association has also issued the following explanation of the disagreement between its export figures and those of the United States Bureau of Statistics, which has caused much comment among students of statistics:

"The exports of copper from the United States for the calendar year 1910 as reported by the Government and by the Copper Producers' Association were as follows:

	Pounds.
Government	695,162,900
Copper Producers' Association.....	722,431,494
Difference.....	27,268,594

"Of this difference of nearly 4 per cent., the Copper Producers' Association began early in December an exhaustive investigation. It comprised a critical review of the data on which the producers' reports were based, and a detailed comparison of these data with the original records in the custom houses at New York and Baltimore, which two ports cleared nearly 98 per cent. of all copper exported in 1910.

"This investigation, which has just been completed, confirms the accuracy of the statistics issued by the Copper Producers' Association. The chief cause of disparity is a time difference in the two sets of reports. The Copper Producers' Association reports the copper exported as soon as it is loaded on the lighters that are to transfer it to the steamships, whereas the customs authorities do not consider the copper exported till the ship is cleared through the port. Furthermore, the New York Custom House observes a fiscal month, whereby all the clearances of the last four business days of any calendar month are included in the month following. It results, therefore, that for nearly 70 per cent. of all copper exported there is an average difference in time of reporting of from 8 to 11 days, and for the remaining 30 per cent. a difference of 4 to 6 days. This time difference at the two ports, New York and Baltimore, accounts for the amount shown below:

	Pounds.
Total difference.....	27,268,594
Amount explained by difference in time.....	17,902,306
Remaining difference to be explained.....	9,366,288

"The remaining discrepancy of over 9,000,000 lb. has also been satisfactorily accounted for, but the explanation of this may best be reserved till the receipt of findings from the Government officials, who are now investigating the matter."

The Vulcan Mfg. Company, Fond du Lac, Wis., has been incorporated with \$30,000 capital stock. The new company has purchased the property in Fond du Lac known as the blast furnace property and is making extensive improvements preparatory to the installation of new equipment for the fabrication of structural iron and steel, steel bridges, boilers, &c. It will also build the steel centering for the Adjustable Steel Centering Company, a number of whose stockholders are interested in the new company.

The Diamond Iron Works, Minneapolis, Minn., states that it has recently increased its capacity 50 per cent. and has added to its line of sawmill machinery the building of gasoline tractor engines and stationary gas engines.

Obermann Acid Fume Removing Devices

A. W. Obermann, president of the American Specialty Stamping Company, Johnstown, Pa., is the inventor of devices for confining and removing fumes in plants where acid is employed for cleaning or plating metals. Two forms of apparatus have been designed: one for use with acid tanks located above the floor line, and the

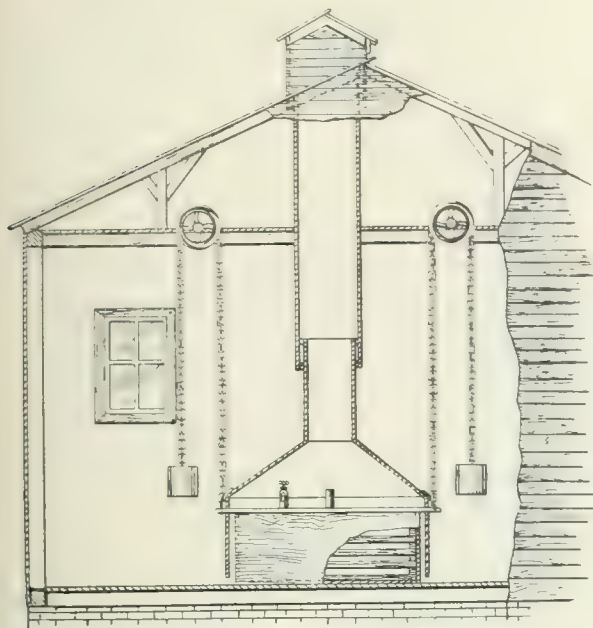


Fig. 1.—A Fume Removing Ventilator for Acid Tanks Located Above the Floor Line. Patented by A. W. Obermann, Johnstown, Pa.

other where the tanks are below the floor. Fig. 1 is a view of one of the former type, while Fig. 2 shows a large installation of the other style at the plant of the American Specialty Stamping Company.

When the acid tank is located above the floor line a hood is suspended over it by chains on each side, to which counter weights are fastened, so that the hood may be easily raised when materials are to be placed in the tank to be pickled or are to be removed. The movable hood has a stack telescoping in a fixed chimney leading through the roof. The natural draft created under the hood and through the openings between the telescoping sections and in the slatted upper part is generally sufficient to carry the fumes away from the tanks and discharge them to the outside air, but a steam jet is also provided to give artificial draft when needed so that there is no chance of injury coming to the workmen from escaping fumes. A further advantage is that

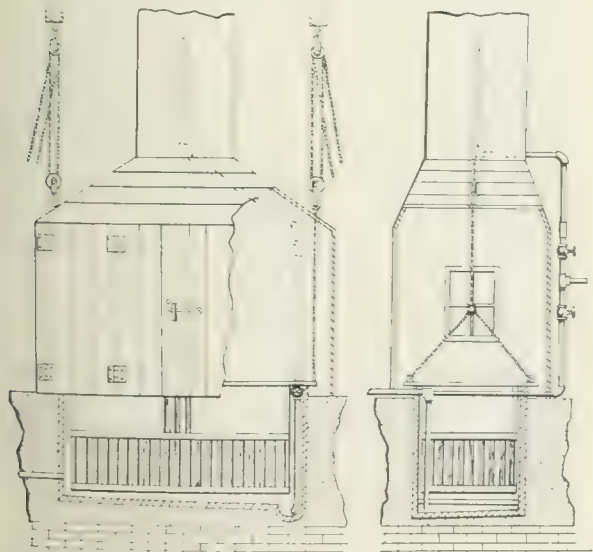


Fig. 2.—The Obermann Fume Removing Apparatus as Applied to an Acid Tank Set Below the Floor Level.

the room where the pickling is done is kept free from mist, &c. Incidentally more and better work is done by the men working under such improved conditions. The tank is so constructed as to eliminate chance of leakage, and thus effects a considerable saving in acid, which ordinarily is a dead loss.

In the larger installation, with the tank below the floor line, shown in Fig. 2, doors are located at the front of the hood to permit access to the tank, instead of lifting the hood. The crate for holding the materials to be cleaned is raised and lowered on pulleys. In this case the acid fumes are discharged immediately to the outer air, and if the atmospheric conditions are not favorable the draft is augmented by injecting steam through a pipe provided for this purpose, so as to force the fumes out. This system has been used in the plant of the American Specialty Stamping Company for several years with such success that the inventor applied for patents; one on the apparatus shown in Fig. 1 was granted October 5, 1909, and one on that shown in Fig. 2, June 21, 1910.

European Methods of Accident Prevention and Relief

The March issue of *American Industries*, published by the National Association of Manufacturers, 30 Church street, New York, announces that the association will soon issue a volume giving the results of investigations of accident prevention and relief methods in Europe by Ferd. C. Schwedtmann and James A. Emery, who were appointed a commission for that purpose by President John Kirby, Jr., under resolutions passed at the last annual convention of the association held in May, 1910. The commissioners selected were ideal men for the task. Mr. Schwedtmann has had long experience as a civil and mechanical engineer and manufacturer, while Mr. Emery has devoted the greater part of his life to the study and practice of industrial law, and both brought enthusiasm and a deep earnestness to the task of investigation.

The book is described as profusely illustrated with colored charts and diagrams and is giving exhaustive descriptions of accident prevention and relief methods in England, Germany and several other countries, while a most important section gives recommendations for action in the United States. It has an appendix of statistical and general material. The testimony of the more than 30 members of the association's Advisory Committee, composed of manufacturers of note from various parts of the country, is unanimous in approval of the book, which is characterized as the most helpful and practical work of its kind yet undertaken. The plan of the association is to afford all classes an opportunity intelligently to readjust existing conditions to the end that industrial accidents will be reduced to a minimum and the injured or incapacitated given the maximum relief for every dollar expended for that purpose.

The Reliance Electric & Engineering Company announces its removal to its new offices and shops on Ivanhoe road, Collinwood Station, Cleveland, Ohio. The new plant is of reinforced concrete construction with saw tooth roof, and particular attention has been paid to arrangement, lighting and all other features which tend to manufacturing efficiency. It gives the company double its former capacity, thereby enabling much better service to be rendered to customers. A circular is issued showing a graphic record of progress in the demand for Reliance motors. The growth in the past four years is striking, the shipments for 1910 being five times as great as those of 1907. The company is prepared to manufacture all brackets, gears, etc., for changing machines from belt to motor drives. Recent orders received by the company include contracts by the A. M. Byers Company, Pittsburgh, and the Wheeling Steel & Iron Company, Wheeling, W. Va., for adjustable speed motor equipment ranging from 7½ to 15 hp., for changing a number of machines in their pipe mills from belt to motor drive.

The Cambria Boiler Shop and Dipping Tank

Interesting Problems Solved in the Manufacture of Asphaltum Covered Steel Plate Water Pipe for the Cambria Steel Company's Private Water System

The Cambria Steel Company, Johnstown, Pa., is creating great hydraulic works to insure a supply of water capable of meeting the enormous needs of the plant at all seasons of the year. At present about 80,000,000 gal. are required daily, and although the existing sources of private supply are large, the river water must be used over and over again. It passes through the Franklin Works first, then the Gautier and finally the Cambria Plant, and large pumping stations are main-

pipe in position above the stove, a dipped pipe just removed from the tank and at the lower left corner a pair of pipes loaded on a flat car ready for transporting to the field. Figs. 3 and 4 are a plan view and a transverse section of the boiler shop and the dipping plant respectively. In Fig. 5, a section of the pipe 30 ft. long is being riveted by the 17-ft. vertical gap riveter. Figs. 6 and 8 give details of the stove employed to heat the pipe before dipping and of the dipping tank and the bustle pipe re-



Fig. 1.—The 32-Ft. Horizontal Bending Rolls Installed in the Boiler Shop of the Cambria Steel Company, Johnstown, Pa.

tained to supply the various plants. Due to growth of the business, it has now become necessary to procure a much larger supply, and to this end a reservoir having a capacity of 11,000,000,000 gal. is being created on Quemahoning Creek at a point about 14 miles from the works. A 66-in. pipe line, which must carry 90,000,000 gal. a day, connects the reservoir with the works. The water is under a heavy head for a considerable portion of the distance and the pipe line is remarkable in many respects, not the least of which is the nature of the pipe itself. As the line passes through an exceedingly hilly country, its various parts are at widely varying levels, although extreme differences are avoided by tunneling the four most pronounced elevations along its route.

After carefully studying the question, the company decided to manufacture the pipe in its own works from boiler plate rolled in its mills, and the capacity of the boiler shop was largely increased, including much new equipment. Some means of protecting the pipe against corrosion had to be developed and a dipping plant for covering the steel with a special asphaltum was constructed and an efficient method of applying it evolved. Much of this pipe has now been made. During its production perplexing questions have arisen and been solved, until, in the Cambria plant, a highly specialized process has been developed and will be turned to commercial account, the company proposing to enter the market with the highest grades of water pipes and with other specialties manufactured in the boiler shop.

Fig. 1 is a view of the 32-ft. horizontal bending rolls installed in the boiler shop for forming the pipe. Fig. 2 shows a portion of the dipping plant and an undipped

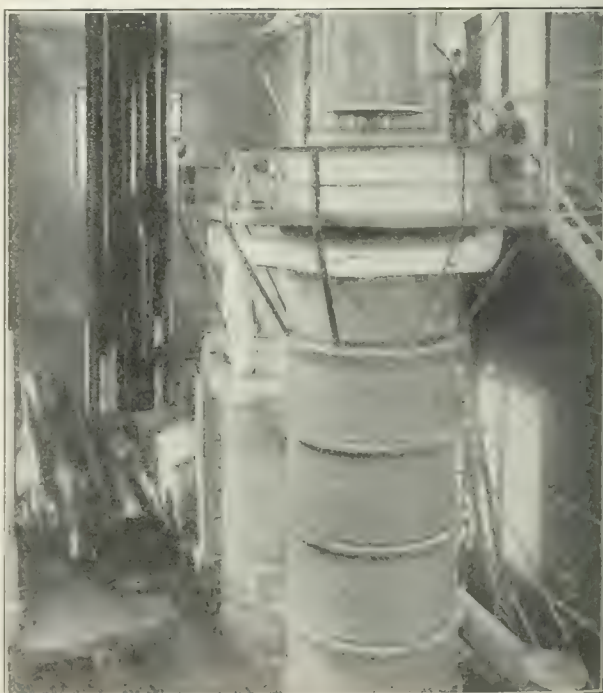
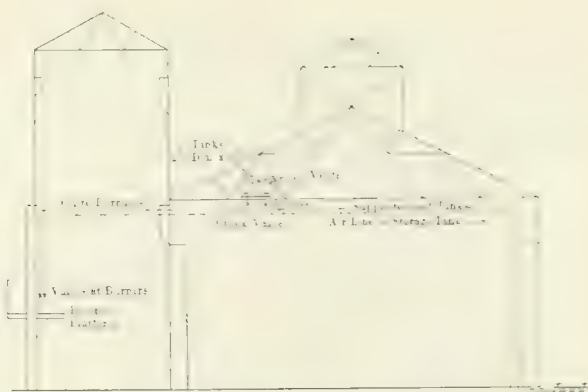
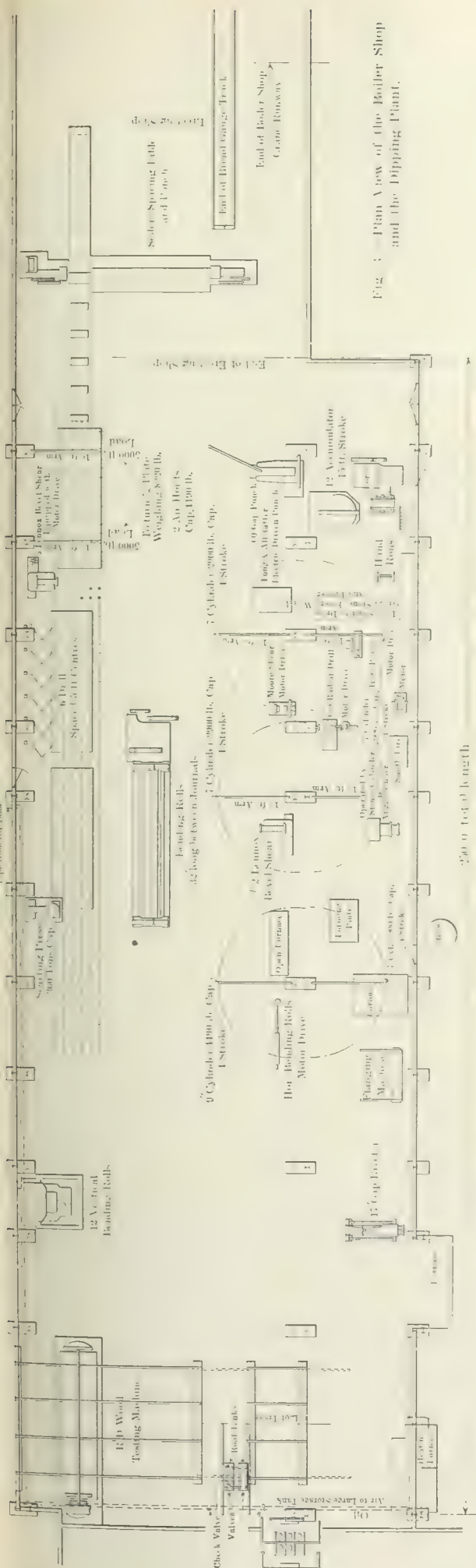
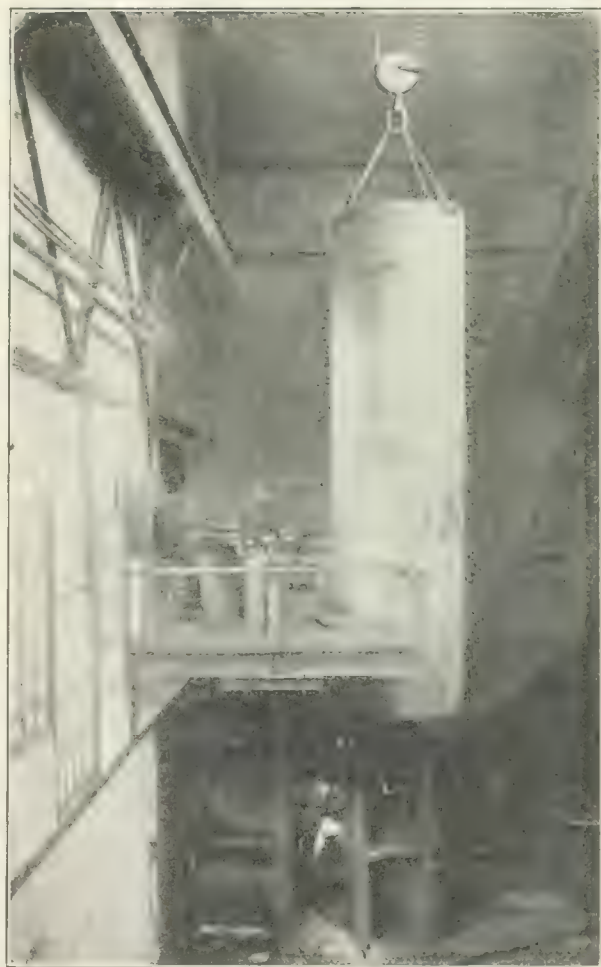


Fig. 2.—A View in the Dipping Plant.

spectively. Fig. 7 is a section of the dipping tank showing its construction.



The layout of the boiler shop is shown in detail in Fig. 3. The plates are taken from flat cars to the Sellers spacing table and punch, at the upper left corner of the engraving, and thence pass down the shop, undergoing the various operations of punching, counter-sinking and scarfing, to the 32-ft. bending rolls, illustrated in Fig. 1, which form them, each as a 120-degree section of the pipe. The pipe is assembled at this point, its sections



being bolted together temporarily for conveying by a traveling crane to the 17-ft. vertical gap riveter, shown in Fig. 5. One-half of the section is riveted, and its position is then reversed, end on end, for riveting the other half. The pipe then goes to the caulking machine, and upon completion is subjected to severe hydraulic tests. The 5-16-in. pipe is tested at 135 lb., the $\frac{3}{8}$ -in. at 160 lb., the 7-16-in. at 190 lb., the $\frac{1}{2}$ -in. at 220 lb. and the $\frac{5}{8}$ -in. at 290 lb. These may be termed preliminary tests, as in the field long sections of the line of laid pipe are cut off and subjected to high pressures, so that any leaks which may develop at circumferential seams or elsewhere may be repaired.

The pipe is manufactured in lengths measuring 30 ft. between rivet centers. There are no circumferential seams, except those riveted in the field. The pipe thickness varies from 5-16 to $\frac{5}{8}$ in., according to the head of water to which it is subjected. Each section of the $\frac{5}{8}$ -in. pipe weighs seven tons. One important problem to be

raised by a hoist and lowered at an angle until the uppermost point of the end enters the pipe in the ground at its corresponding point. A bolt is then inserted and constitutes a fulcrum, so that the pipe, as it is lowered, forces itself into position by its own weight. Pneumatic riveters and caulkers complete the joint.

The building occupied by the dipping department, a section of which is shown at the left of Fig. 4, is of unusual design. Great height was necessary because the stove and the dipping tank are upright, and there must be space above them in which to lift the 30-ft. sections when placing them in these receptacles. Another reason for the design of the building is its location, which is in a narrow space between railroad tracks on the one side and the boiler shop on the other. From the ground level to the bottom of the lower chord of the roof is 76 ft., the width of the building is 32 ft. and its length 90 ft.

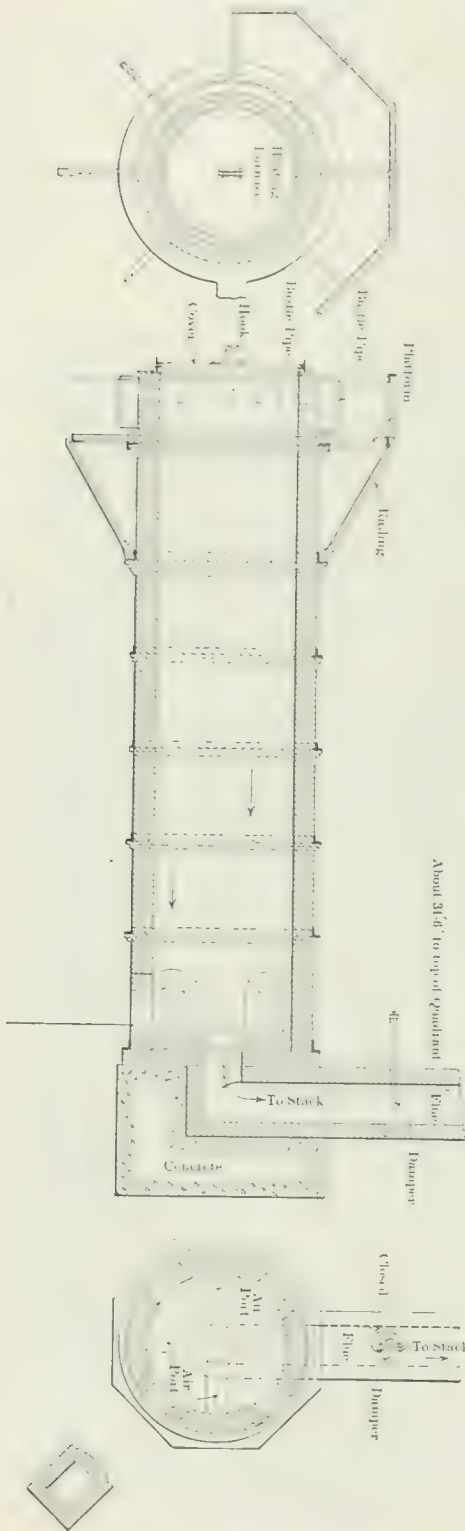


Fig. 6.—Details of the Stove.

solved was that of skin friction. Owing to the long distance from the source of water supply to the works, increasing the diameter of the pipe meant a large additional outlay of money. The only material friction occurs at the seams, particularly from the rivet heads, and this is practically eliminated by countersinking the rivet holes, so that the heads are practically flush with the interior pipe surface.

In the field the method of laying the pipe insures a tight fit at the joints. Each section is formed with a taper, so that the smaller end of one pipe enters the larger end of its neighbor. Each section as it is laid is

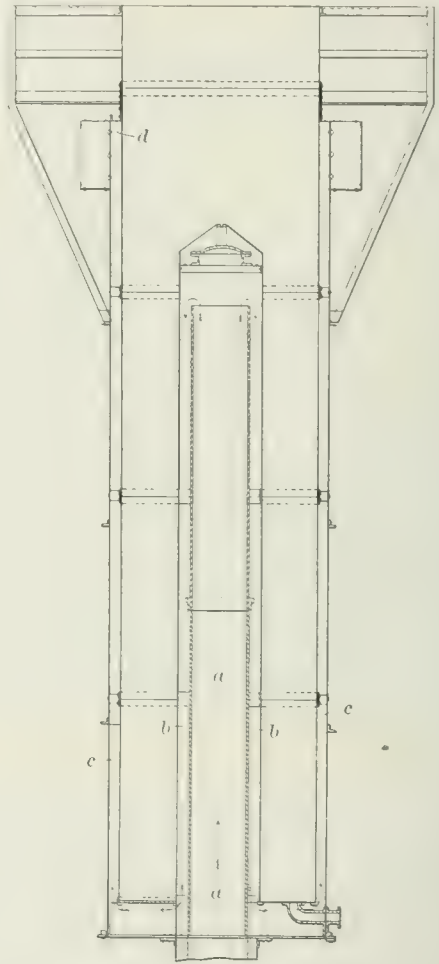


Fig. 7.—Section of the Dipping Tank.

The entire width is spanned by two 10-ton Alliance cranes.

The apparatus installed consists of a stove and a dipping tank, the former to heat the pipe to a proper temperature before dipping, and the latter for its immersion in a bath of hot asphaltum. The heating is accomplished by coke furnaces. The common practice has been to use superheated steam coils in keeping the asphaltum warm. This necessitated the use of two heaters, in order that it might be absolutely certain that one would be available continuously, giving a temperature of 700 degrees. The engineers designing the plant decided that coke-fired furnaces would be more satisfactory and the results have justified this conclusion. Originally a single furnace was employed on the theory that the heat remaining in the gas after passing through the dipping tank would be sufficient for the stove, but this proved to be unsatisfactory, and a second furnace was constructed, which is used as an auxiliary. In the melting pot the heat of the furnace enters at the bottom of a central drum at *a*, Fig. 7, having a double wall, and passes down between the walls at *b* and up again through the outside jacket *c*, exhaust-

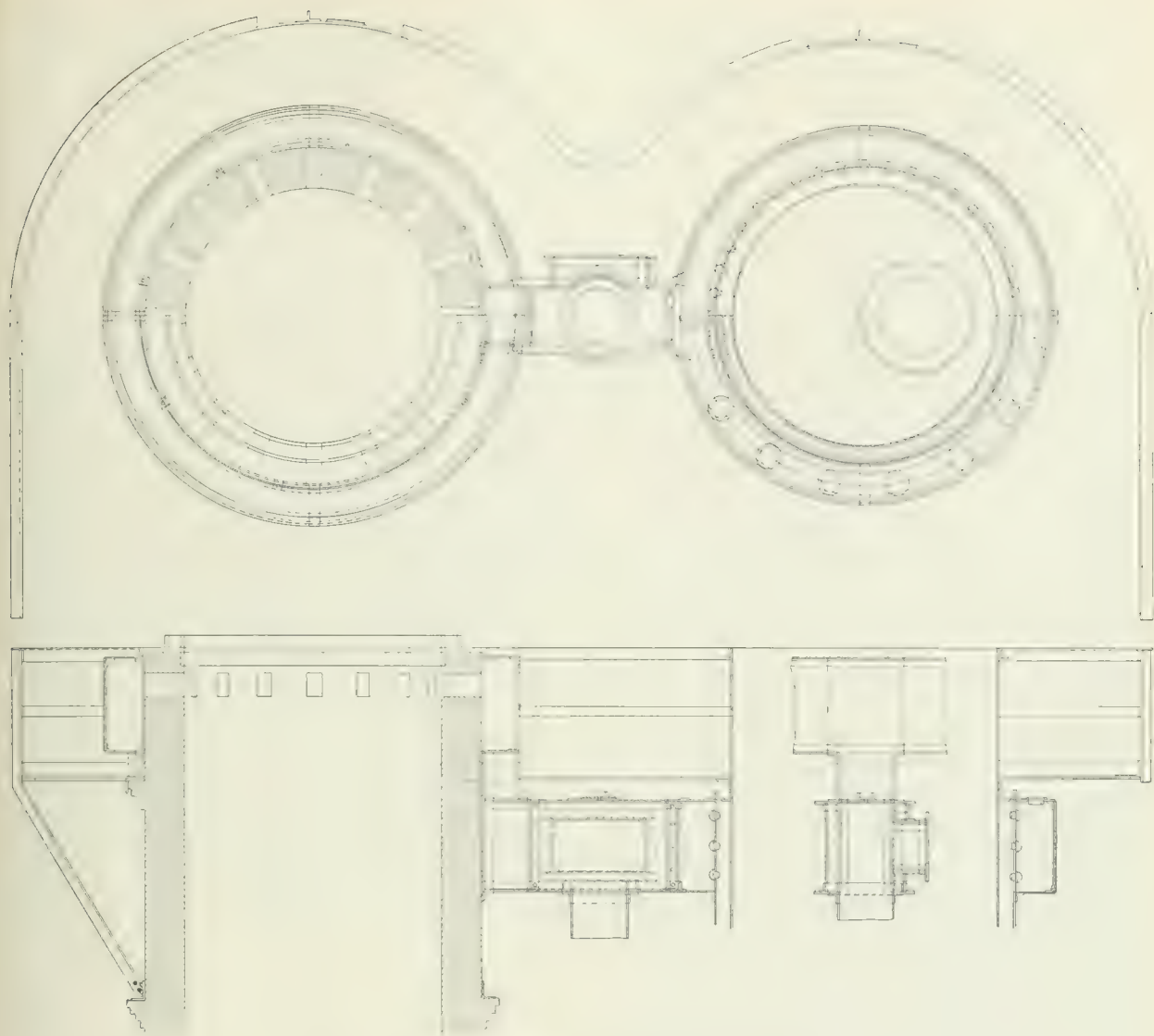


Fig. 8.—Details of the Dipping Tank and the Bustle Pipe.

ing into the bustle pipe at *d*. The temperature for 7-16-in. pipe is about 420 degrees, and is correspondingly higher or lower for the other thicknesses. After entering the bustle pipe, the temperature of the gas is increased to the desired degree by a pipe leading from the auxiliary furnace. A mixer operates in connection with the heat supply a cold air pipe being arranged to regulate the temperature. The final exhaust is into a stack, and an exhaust fan draws the gases through the furnaces.

Coating the Pipe

When the pipe is received from the boiler shop it is first carefully cleaned. In the field the asphaltum is removed from the outside of the small end and the inside of the large end of the pipe, where the joint is to be made. Consequently before dipping, these portions of the pipe surface are covered with whitewash, which allows the asphaltum to be easily peeled off. On each end of the pipe are bolted two lugs, each having a 3-in. hole to receive the crane hooks.

The pipe having been cleaned and otherwise prepared is lifted by the crane and lowered into the oven, which has an iron cover manipulated by a jib crane and a chain hoist, the dipping tank having a similar arrangement. An undipped pipe is shown suspended above the stove at the right of Fig. 2, while a dipped pipe is hanging at the left. After the pipe has been heated the cover is removed and it is lifted and carried to the melting pot into which it is dropped. It remains immersed for about 4 min. The department had to learn much from experience, for there was little precedent to assist it. It was found that the pipe must be withdrawn very slowly from the melting pot, as to hoist it quickly meant that the slowly draining asphaltum accumulated thickness until at the lower end of the pipe there was a great ex-

cess of the material. Practice showed that the speed of removal depends largely on the temperature of the atmosphere. On very cold days the pipe must leave the tank no faster than 2 in. at a time. On hot days the rate may be 2 ft. or more. Under the skilled direction of the operator the pipes are given an even, varnish-like coating, as shown at the left of Fig. 2, which is good looking as well as proof against the elements.

Very careful attention is paid to the stove and dipping tank temperatures. Bristol pyrometers give readings for the bottom, the top and the middle sections of the stove and the tank and these records are kept. Each pipe is numbered and may be traced in the field. The dipping department turns out about 23 sections a day, which is the producing capacity of the boiler shop. The pipes are dried in the building and are then placed on cradles mounted on standard flat cars, two sections to a car, as shown in the lower left corner of Fig. 2. They are then hauled to the field. Much care is taken in handling the pipe in order that the asphaltum may not be seriously marred. Where such accidents occur, a special preparation is applied to the surface and this is also used at the circumferential joints to further insure their watertight properties and more particularly to guard against corrosion.

The Association of German Iron Foundries is offering prizes of \$250, \$125 and \$75, respectively, for the three best essays on the development of the cast iron stove. The questions to be considered are the means of using cast iron stoves in heating systems from economical, hygienic and commercial standpoints, with suggestions for increasing the use of such stoves. The manuscripts are to be addressed to the Verein Deutscher Eisen-giessereien, Graf-Adolphstrasse 47, Düsseldorf 3, Germany.

The Smith Metal Perforating Process

A Means of Puncturing Narrow Slots in Thick Metal—Originally Developed for Well Casing

After several ingenious attempts to improve on the ordinary well casing, each successful in its way, but still failing to overcome all objections to the older type, Andrew Smith, San Mateo, Cal., has finally developed what proves to be an entirely new process for perforating metal. The disadvantages of the old style cracked casing, which has been used for more than 30 years, are that if the perforations are made before the casing is driven the protuberances produced on the outside make it difficult to drive the casing, and when made after the casing is driven, by means of a wheel perforator, hydraulic jacks or other tools, there are still the objections that the perforations are irregular in size of opening, jagged at the cracks, not closely enough spaced to give a desirable total inlet area and, being perforated after galvanizing, the broken edges exposed the iron at those points to corrosion. There is also more tendency for these slits to be clogged with the outlying material carried into them by the water.

Fig. 1 shows a section of metal perforated by the old process. Both sides are shown indicating the nature of

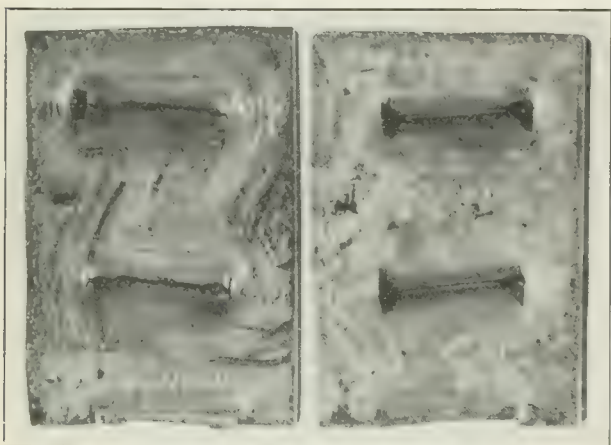


Fig. 1.—The Outside and Inside of a Section of Well Casing with the Ordinary Cracked Perforations

the deformation. Up to the present it is the only casing that has been used in sandy formations. It is made from galvanized sheet steel of No. 16 to No. 10 gauge and from 8 to 18 in. diameter. The joints are 30 in. long, riveted together, using 8-in. collars to join one length to another. The collars, every 30 in. apart, offer considerable resistance, and the rivets have a tendency to fall out.

Fig. 2 is a sample of the first improvement for well casings, patented by Mr. Smith, in which he followed the established rule that a punched slot must be as wide as the thickness of the metal. To obtain fine slots two perforated tubes were used, one inside of the other, and the openings were staggered; the annular space between the tubes (or, in the sample, the amount the plates are separated) determines the width of the openings. The second improvement, shown at the left in Fig. 3, was somewhat similar, consisting of two tubes again, but the separation was dispensed with and the width of opening was made adjustable by turning one tube with reference to the other to give any required overlap of the holes. An advantage that is obtained with this well casing is that sections at different depths can be given different sized openings according to the soil penetrated. For example, at the bottom where possibly coarse gravel would be encountered, the openings can be made relatively large, while those in sections above, going through fine gravel or sand, can be more nearly closed, and throughout the casing the greatest amount of allowable opening will be obtained.

The first attempt to get the required width of slot in a single pipe was that shown by the sample at the right in Fig. 3, which is of a piece of No. 10 sheet steel.

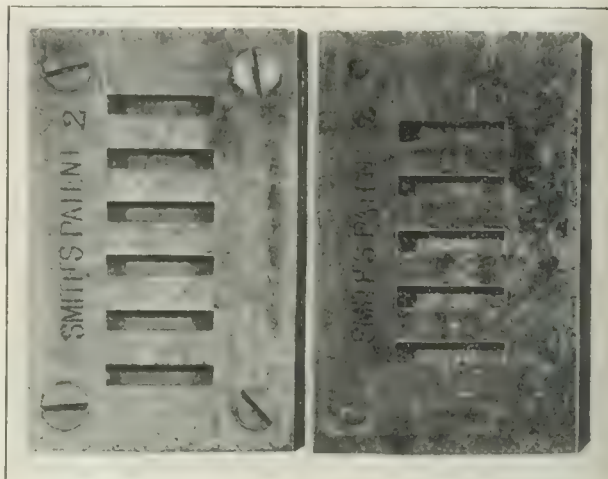


Fig. 2.—Views of Both Sides of a Section of Double Wall Casing with Staggered Perforations, and a Slight Space Between Plates to Give the Screening Apertures.

It has a clean cut shear and one edge is depressed a little more than the thickness of the metal, thus forming an opening that is not jagged like the old style cracked perforation, but the deformation does increase the driving resistance. There are many uses to which this style of perforated metal can be put, however, one of which is its use as a reinforcing inner pipe for well casing as referred to later and shown at B in Fig. 6.

The Perforating Process

It was but a step from the last named process to produce perforations after the manner indicated in sample 5, Fig. 4. This is a piece of No. 10 sheet steel with a clear cut shear produced by depressing alternating sec-



Fig. 3.—Another Double Wall Casing with the Screening Apertures Determined by the Amount of Offset of the Perforations and the First Attempt to Get Narrow Slots in a Single Casing.

tions of the metal in opposite directions. In this condition the protruded portions can be cut again or upset to make any desired size opening, or the uncut portions can be rolled so as to stretch the metal and so make the openings. Herein lies the most ingenious part of this new process of perforating metal. The perforating can

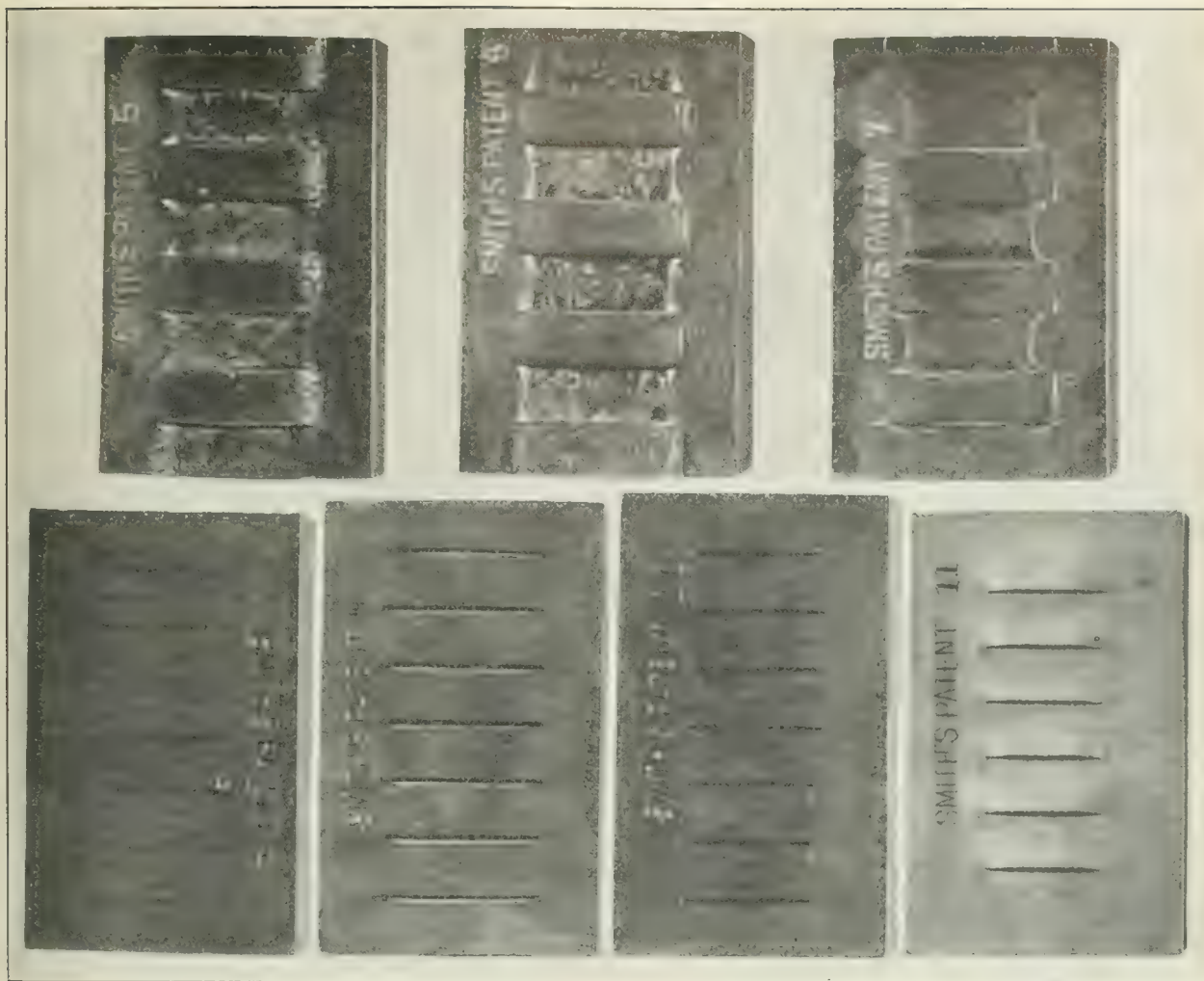


Fig. 4. Samples Showing Stages in the Smith Process for Perforating Narrow Slots in Thick Metal and a Type of Perforation Used for Casing Lining.

be done by having suitable dies in rolls as well as it can be done in a gang punching machine. Sample No. 6, Fig. 4, shows a piece of 5-16-in. sheet steel depressed as in sample 5, and sample No. 7 shows the next step (which happens to be a piece of $\frac{1}{4}$ -in. steel), where the deformed parts have been rolled down and the plate made flat again. In this condition the metal is cracked through entirely on each line, and it but remains to stretch the uncut portions, thus opening the cracks up any required amount.

Sample No. 8, Fig. 4, is of a piece of $\frac{1}{4}$ -in. steel deformed, rolled flat again and the surface then ground to show the cracks as very fine slits before the metal has been stretched at all on the edges. Sample 9, Fig. 4, is a finished piece of metal of No. 12 gauge, which has been stretched to give a substantial opening in the perforations. A similar piece of $\frac{1}{4}$ -in. sheet steel is shown in sample No. 10. Sample 11 is a piece of sheet steel slotted after the manner indicated in sample No. 4, Fig. 3, but of lighter gauge, such as is used for reinforcing the larger well casings. Sample 12, Fig. 5, shows the smallest slot that can be perforated in thin sheet steel by the ordinary punching process. This is of course entirely too thin to be used for well casing.

Cross sections through metal with different widths of perforation of both straight and tapered form are shown at A, Fig. 6. By this system of sheet metal perforating it is possible to make finer slots than can be produced in thick metal with a punching machine by any other means. It does away with the use of fine saws, fine milling tools and fine punches, such as were required by the old processes, resulting in the saving of considerable money for tools. Screens with slots 1-1000 of an inch wide can be made in metal $\frac{1}{2}$ in. thick if desired.

The Well Casing

A section of the patented well casing, using two tubes perforated in the two different ways before described, is shown by B, Fig. 6. No rivets are used and all seams are

welded. It is claimed to be the only casing in which the perforations close when undue pressure is applied to them. The casings are electrogalvanized after the perforating operations, so that no part of the water ways is left unprotected. A 10-in. well of this type has perforations equal in area to those of a well 10 ft. in diameter made of the old cracked casing, and it is at the same time over 10 times as strong. It can be forced to a greater depth in the ground because it is smooth on the outside. There are no rivets to fall out and let in the sand, no bulging cracked perforations nor collars to offer resistance, and no thin, jagged, unprotected waterways to clog up with rust. The reinforcing inner pipe is corrugated so that its cut or perforated rings are out of contact with the outer casing and its solid portion in contact with it. These points of contact with the outer casing are in line with the perforations in it, so as to provide reinforcing strength where the outer pipe is weakest. The corrugated reinforcing inner tube is not necessary in small casings but is intended for dug wells, 4, 5 or 6 ft. in diameter, to be used instead of wooden cullings.

The Smith well casing is the only one which uses the walls of the casing as the strainer. C, Fig. 6, shows a casing without interior reinforcing. It can be made as

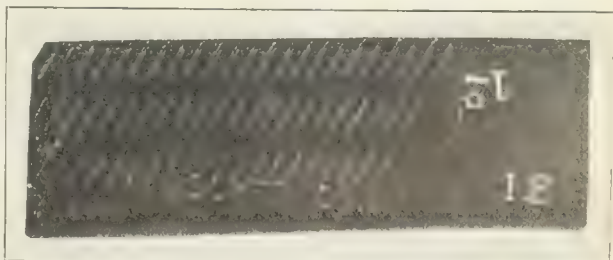


Fig. 5.—The Limit of Narrow Slot Perforating by Direct Punching and Possible Only in Thin Metal.

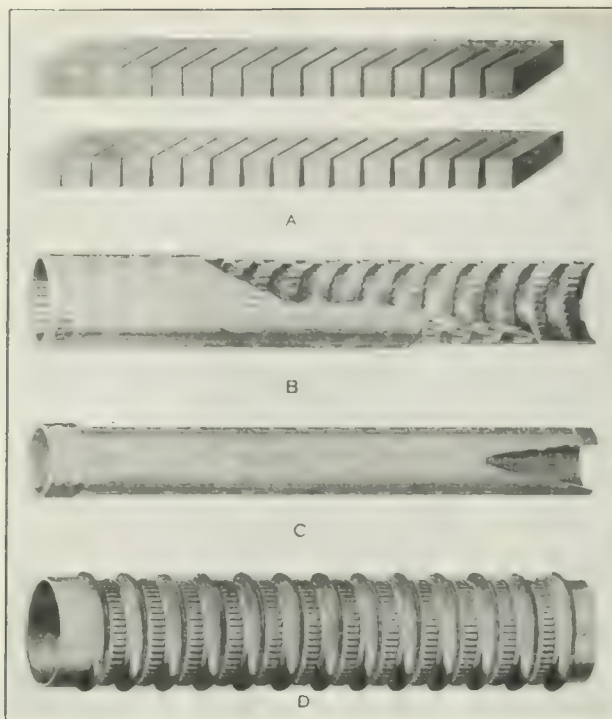


Fig. 6. Sections of Perforated Thick Metal, Reinforced and Plain Well Casing and Perforated Metal Tile as Manufactured by the Smith Process.

thick as $\frac{1}{2}$ in. and with perforations 1-1000 in. wide if desired. The advantage of using V slotted perforations is that any sand which enters at all will pass entirely through the pipe and can be pumped out. The tapering form of the slots in the lower plate A, Fig. 6, may be produced by upsetting one side of the depressed part before the deformations are rolled down flat again. The nature of the punching may also be such as to produce the tapering of the perforations, the depressed parts

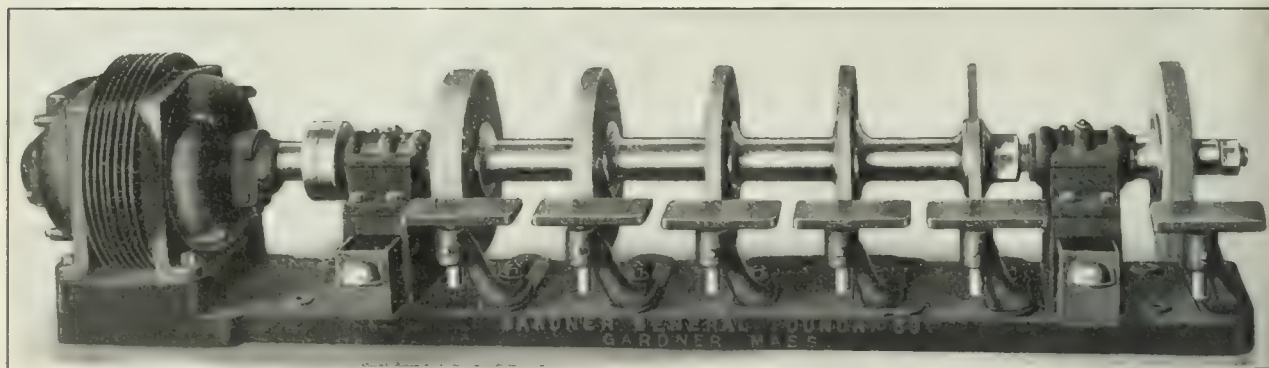
1 in. than clay tiles have to a foot and one of 2-in. diameter has more openings than a 24-in. diameter clay tile. The metal tile is especially suitable for drainage, sub-irrigation and filtration systems, and the aeration of land. It is cheaper to transport, not subject to breakage, does not have to be dug up to put the tiles in line and puts an end to stoppages in the draining system. It may be used for watering lawns and gardens by simply turning on a valve, doing away with hose and unsightly hydrants and leaving the grass substantially dry on the ground.

The Gardner Six-Wheel Grinder

A six-wheel grinding machine is being built by the Gardner General Foundry Company, Gardner, Mass., which has special serviceability in woodworking shops and other manufacturing establishments. On the one machine can be ground molder knives, cutters, drills and other tools, where different shapes and grades of wheels are needed, and if desired two or more can be ground simultaneously. Of most importance is the time saved, unless an equivalent equipment in separate machines was provided, and that would require a greater outlay and more space.

The machine is of the bench type, with a single spindle carrying all the wheels and driven either by a directly connected electric motor or a belt, the former being the one illustrated. The wheels used can be as large as 14 in. in diameter and range from $\frac{1}{8}$ to $2\frac{1}{2}$ in. in thickness. The tool rests swivel, and can be adjusted vertically. The bearings have the renewable sleeve type of ring oilers and are $1\frac{1}{4}$ in. in diameter. The diameter of the arbor is $1\frac{1}{2}$ in. in the bearings and 1 in. at the end. The coupling used is of the flexible detachable type, which in the motor driven machine enables the wheel arbor to be removed from the bearings without disturbing the motor.

As illustrated, the grinder is driven by a $\frac{3}{4}$ -hp. single-phase 110-volt alternating current General Electric motor running at 1800 rev. per min. If desired a two or three phase alternating current motor wound for any



A Six-Wheel Motor Driven Grinder Built by the Gardner General Foundry Company, Gardner, Mass.

being driven into dies which shear or compress the metal to a slight angle.

When the oil sands are struck the gas and oil at once enter the perforations, thereby relieving the pressure and preventing the oil sands from heaving up in the casing. When the perforated casing has been put down the required depth the well casing itself acts as a strainer and will drain the last drop of oil from the sand. It is not necessary to pull the casings to perforate them, nor to insert perforating tools. No strainer has to be lowered into the well after the casing is driven, nor does earth have to be pumped out for weeks after it is installed. Even in the event that these wells become clogged the obstructions can be dislodged by lowering a pneumatic hammer into the well, causing it to deliver blows against the inside of the pipe.

Drain Tiles

Another use for this perforated metal is for drain tiles as shown by D, Fig. 6. These are designed to replace the old style clay tiling and can be made in any diameter and length. They have more perforations to

standard voltage, or a direct current motor can be furnished. The overall length, including the motor, is $5\frac{1}{2}$ ft., and the height from the table to the center of the arbor 7 in. The shipping weight is 530 lb. with the motor and 375 lb. without it. In the belt driven machine, tight and loose pulleys 5 in. in diameter with 4-in. face are used, thus doing away with a countershaft.

S. F. Bowser & Co., Inc., Fort Wayne, Ind., instead of establishing a branch plant at Dallas, Texas, have located a branch office there, which will have complete jurisdiction over the Southwest territory. The increased demand for their product in that section has been such that this step was found desirable. J. G. Rodman will be district manager, in charge of the office. They further state that increased business has warranted them in establishing other new branch offices this year in St. Louis, Minneapolis and Atlanta. They now have 10 branch offices in the United States and Canada and one in the city of Mexico. They manufacture the Perfect self-measuring oil tank and oil storage systems.

The Kant-Leak Kleets and Press

A New Type of Roofing Cleat and the Machine Making It

A new type of roofing cleat, which is a radical departure from the commonly used washers or buttons made from light scrap tin or lead, and a press for making it have been developed by the Fred J. Swaine Mfg. Company, Seventh and O'Fallon streets, St. Louis, Mo. A special advantage of the cleat is that it keeps the edges of the roofing from buckling. The press is entirely automatic in operation and effects a maximum economy in the material used. Fig. 1 is a view of the cleat, while

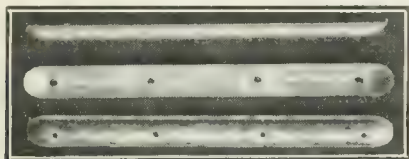


Fig. 1.—The Kant-Leak Kleat Made by the Fred J. Swaine Mfg. Company, St. Louis, Mo.

Figs. 2 and 3 show the press and the dies employed in its manufacture. The minimizing of the material wasted by this press is fully brought out in Figs. 4 and 5, the former showing a sheet in which the older dies were used and the latter illustrating a sheet stamped with the new die.

The cleats are 6 in. long, $\frac{5}{8}$ in. wide and $\frac{1}{4}$ in. deep, and are made complete from a No. 28 gauge galvanized sheet, with practically no waste. The operation of the

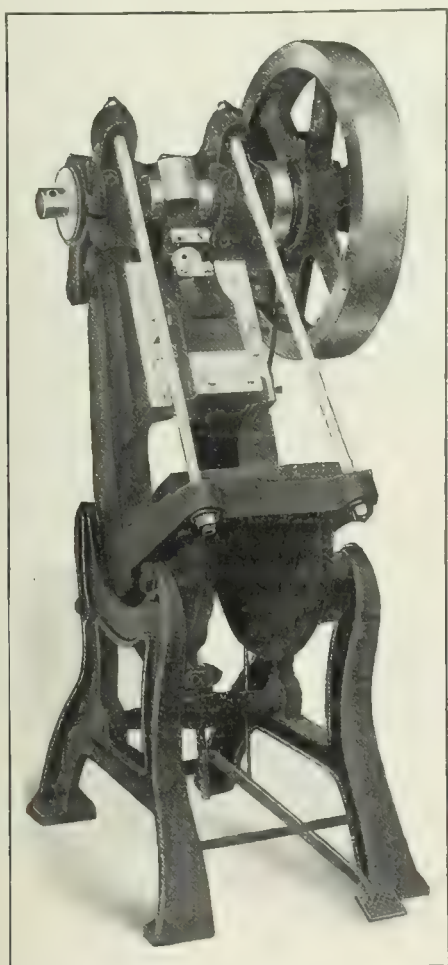


Fig. 2.—The Press in Which the Cleats Are Formed.

press is entirely automatic from the time the metal strip is placed on the gravity feed slide. The press is inclined, as shown in Fig. 2, so that the strips of metal are fed to the die by gravity. A complete cleat is made at each stroke of the press, and is discharged from the die by an automatic knock-out and drops by gravity through the

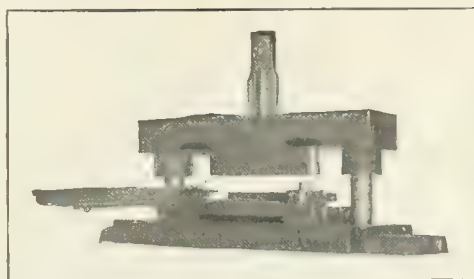


Fig. 3.—The Dies Used to Punch the Cleats.

open back into a chute, which carries it to the packing department on the floor below. In use these cleats are placed end to end, which prevents the edges of the sheets of roofing felt from buckling, while the edges of the cleats are imbedded in the roofing, thus preventing their rusting.

The press, Fig. 2, is one of the maker's improved incline open-back machines, and has an average capacity of 1,250,000 cleats per month. Among its new features are the use of vanadium steel in the clutch parts and shaft; providing lugs for tie rods, which may be easily inserted or removed; an increase in the die space from the slide to the bolster plate and the use of a larger bed. An additional locking point for the clutch has been provided which makes its operation instantaneous, and enables the press to be used even if one of the clutch bolts or connections should break or get out of order, as the broken or defective part can be very quickly removed and the press operated with the remaining bolt. Even

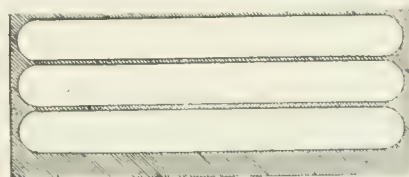


Fig. 4.—A Sheet from Which the First Cleats Were Stamped.

when the press is inclined, the front of the bed is not at an awkward height, since the swiveling point is toward the front and that edge of the bed remains at practically the same height whether the press is upright or inclined. The back of the press is raised and lowered by a screw and nut, the latter operated by inserting a round bar in holes in its faces. All of the bearings are self-oiling and scraped to a fit. Three parallel lines for gripping punch shanks are obtained with the box cap grip, and there is an improved bearing of ample proportions for the end of the pitman on the slide. The press is made in

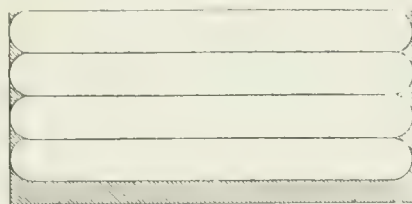


Fig. 5.—A Sheet Showing the Small Amount of Waste with the New Dies.

11 different sizes, either plain or geared, and weighing from 350 to 9500 lb.

The simplicity of the dies, which are shown in Fig. 3, deserves mention. This is secured by eliminating the stripper and avoiding the complication of a roll or other mechanical automatic feed. At first the dies were made to leave a trimming of 1-16 in. on all sides of the cleats, as shown in Fig. 4, but they have been developed until now the strips are made only as wide as the length of the cleat, and no metal is left between cleats, the back gauge serving as a guide for the punch. The only scrap portion is the shaded part, shown in Fig. 5. This change in the method of stamping the cleats allows 14 per cent. more cleats to be made from the same quantity of metal, and saves in the amount of scrap for each press operated on this work 3500 lb., or more than \$100 worth per month.

The Thomas Meter

An Electrically Operated Device for Measuring Gases of All Kinds, Including Air

At the annual meeting of the American Society of Mechanical Engineers, held in New York City, December, 1909, Prof. Carl C. Thomas of the University of Wisconsin presented a paper dealing with a new type of meter, which he had invented. A brief abstract of this paper, together with the discussion on it, was printed in *The Iron Age*, December 16, 1909. This instrument, which is now being made by the Cutler-Hammer Mfg. Company, Milwaukee, Wis., is the commercial outgrowth of a very thorough and extensive laboratory investiga-

important features are that there are no moving parts inside the gas main, its operation is independent of temperature or pressure, and meters of large capacity occupy little space.

Fig. 1 is an exterior view of the meter casing, which constitutes that portion of the apparatus which is inserted in the pipe line carrying the gas or air that is to be measured. The two parts of the meter located in this casing, the electric heater, and one of the resistance thermometers, are illustrated in Figs. 2 and 3 respectively, while Fig. 4, which is a section of the casing, shows their relative positions. The switchboard and the recording mechanism of the meter, which, if desired, can be placed as far as a mile away from the other portion, is illustrated in Fig. 5, and a diagram of the connections is given in Fig. 6. A portion of the continuous autographic record, produced by the meter, showing the rate of flow and its variations in standard cubic feet of gas,

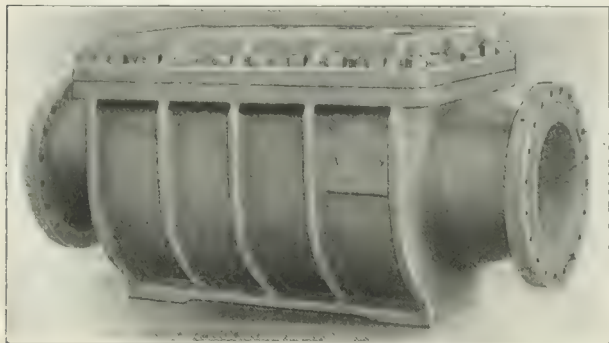


Fig. 1.—Exterior View of the Thomas Meter Made by the Cutler-Hammer Mfg Company, Milwaukee, Wis.

tion of the specific heat of superheated steam, which Prof. Thomas has carried on for a number of years. The meter is designed for indicating, integrating or graphically recording the quantity of flow of gases, including blast furnace gas, natural gas, illuminating gas or air at any temperature or pressure, and is entirely independent of variations in either. The operation of the meter depends upon the principle of adding a known quantity of heat to the gas electrically, and determining the rate

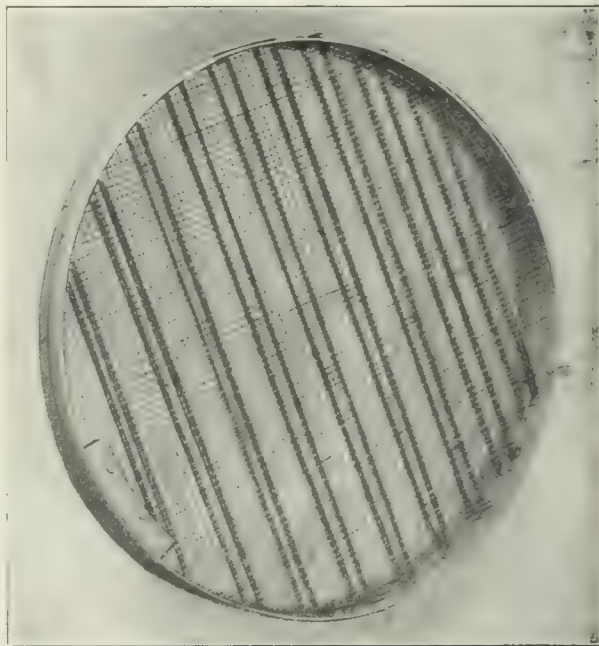


Fig. 3.—The Nickel Wire Resistance Thermometer.

referred to a standard of 60 degrees F. and 30 in. of mercury, is reproduced in Fig. 7.

The Construction of the Meter

A diagrammatic view of the meter is given in Fig. 4. The meter consists of an electric heater, *b*, which is formed of resistance material and placed across the gas passage *a* in such a way as to impart heat to all of the gas passing through the pipe line. A view of the heater proper is given in Fig. 2. In this way the temperature of the gas is raised from that at which it enters the meter to some higher exit one, and this rise is controlled by the two electrical resistance thermometers *c*, Fig. 4, in connection with the automatic regulating mechanism shown on the switchboard.

These thermometers, one of which is illustrated in Fig. 3, are in the form of screens of nickel wire, which change its electrical resistance in direct proportion to temperature changes. These screens are placed so as to come in contact with all the gas passing through the meter, and constitute two arms of a Wheatstone bridge. Any variation in the difference of temperature between them, which results in a corresponding variation of their resistance, causes a galvanometer needle to be deflected and increase or decrease the amount of electrical energy required to maintain a fixed temperature change in the gas. The record of the gas flow is read directly from

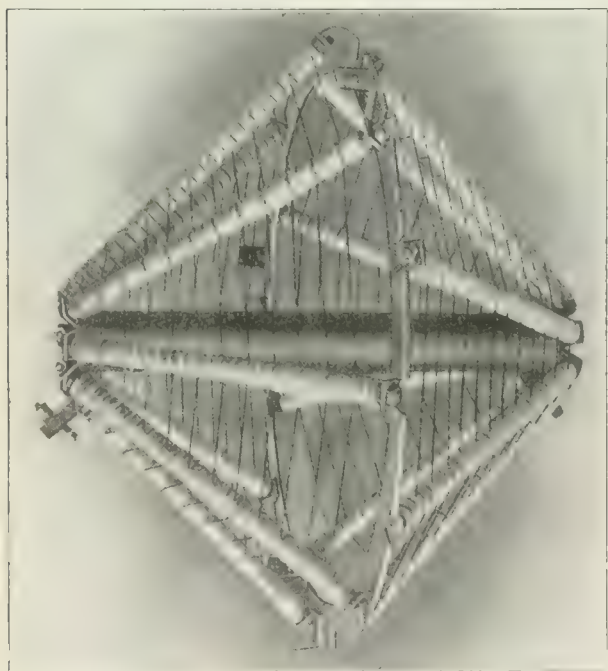


Fig. 2.—The Electric Heater.

of flow, by the rise in temperature between the two ends of the apparatus. It is thus possible to measure gas or air at any temperature and at any pressure, and the accuracy of the meter is not affected by fluctuations of pressure or temperature, since in heating the gas or air, the weight and not the volume is dealt with. Its most

the dials of an integrating wattmeter or from the curves drawn by a recording instrument.

The Operating Principle

If gas or air is flowing at a uniform rate through the passage *a*, Fig. 4, and there is in this passage an electric heater, *b*, consisting of resistance material through which a current of electricity is passing and

by the addition of a known amount of heat to the gas. One of these records is reproduced in Fig. 7. While this method is excellent for research work where it is possible to secure a constant voltage, it cannot be applied to meters in commercial service where the voltage is seldom, if ever, constant. In commercial meters such as the one described, instead of measuring a varying temperature difference, the temperature difference is kept

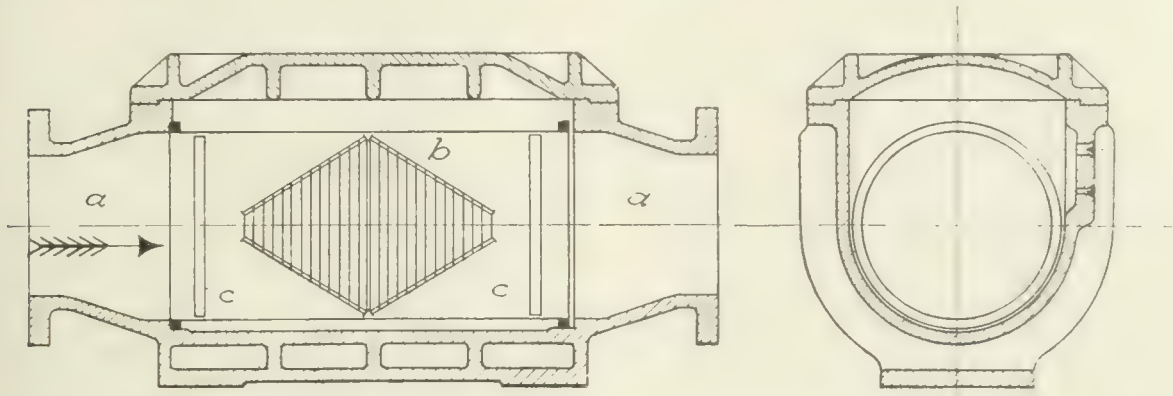


Fig. 4.—Diagrammatic View of the Meter Casing

from which heat is being liberated at a constant rate, it is evident that if the rate of flow of the gas and the liberation of heat are both uniform and constant, that the gas will have its temperature raised a certain fixed number of degrees by its passage through the heater. If the rate of flow of gas is increased but the heat radiation remains the same, the temperature difference will

uniform, and the number of watts required to maintain this constant difference between the temperature at the inlet and that at the outlet varies directly as the quantity of gas or air flowing. In this way the input of energy in watts forms the measure of the quantity of air or gas flowing, and is measured by a wattmeter of either the graphically recording or the integrating type.

The fixed temperature difference, which is about 2 degrees F., is maintained by the action of a device made upon the same general principle as the autographic temperature recorders used in connection with resistance thermometers. This device is constructed on the principle of the Wheatstone bridge, and operates to change the energy input to the heater, according to the difference in the electrical resistance of the two thermometers. This difference depends upon the extent to which the temperature of the gas passing through the screen at the

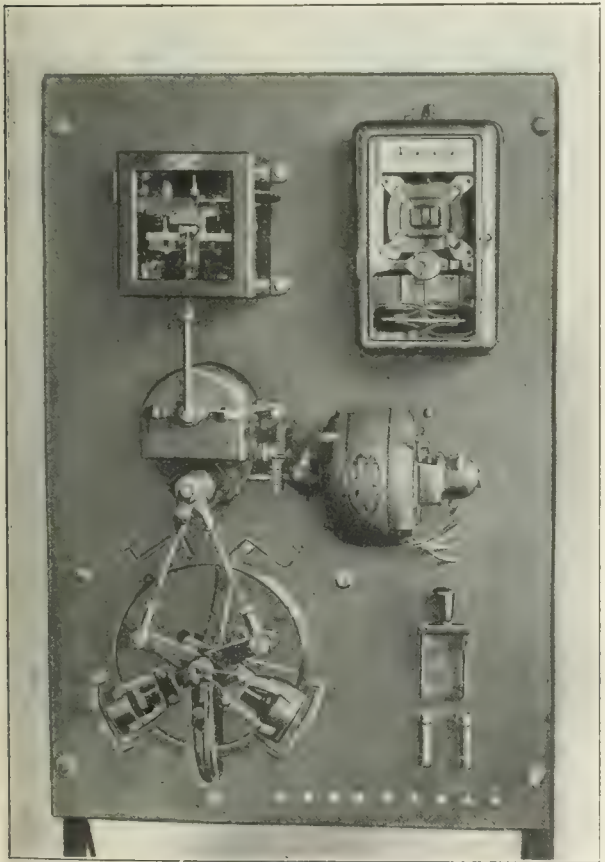


Fig. 5.—The Switchboard and the Recording Mechanism of the Meter.

decrease, as the heat given off will be insufficient to raise the temperature of the larger quantity of gas. Briefly, this temperature difference varies inversely as the rate of flow of the gas so long as the rate of heat radiation is constant. During the development of the meter, this method of measurement was used. The rate of flow of the gas was measured by a graphical temperature recorder, showing the temperature rise produced

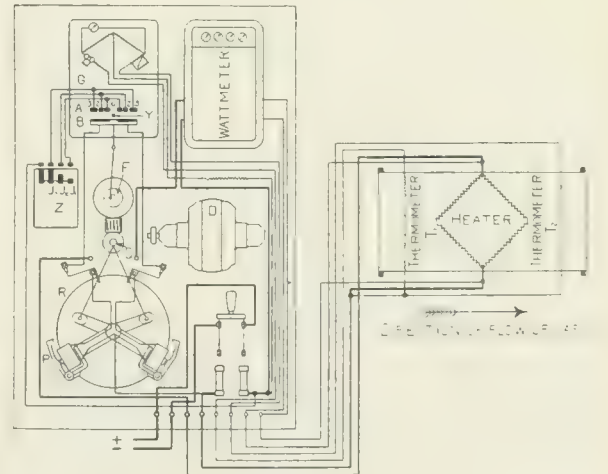


Fig. 6.—Connection Diagram of the Meter.

outlet end of the meter has been raised by the heater, and as soon as it becomes greater or less than that corresponding to the desired difference of 2 degrees, the amount of current flowing is varied so as to produce the standard temperature difference. In this way as the flow of gas increases, the temperature difference has a tendency to decrease, and additional energy is introduced at once to heat the increased weight of gas so as to maintain the constant temperature difference of 2 degrees.

The Operating Mechanism

Referring to the operating mechanism, which is shown mounted on the switchboard in Fig. 5 and diagrammatically in Fig. 6, the measuring of the gas or air is done

in the following way. In Fig. 6 the controller G is in reality a combined galvanometer and Wheatstone bridge. Changes in the difference in the resistance of the thermometers from that corresponding to the standard temperature difference of 2 degrees between the inlet and the outlet of the meter causes the movable member Y to swing to one side or the other of the neutral position O, movement to the left corresponding to an increase in

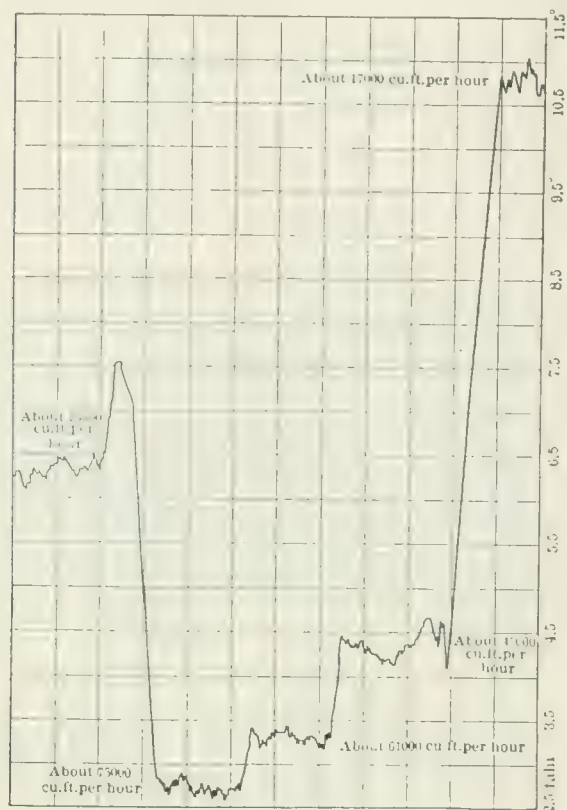


Fig. 7.—Typical Curve Made by the Meter.

the temperature difference, while that in the opposite one corresponds to a decrease. A $\frac{1}{8}$ -hp. motor, D, operates continuously and transmits motion to the bar B through the crank F, causing it to move up and down and clamp the movable needle Y when the bar is at the upper end of its travel. The contact drum Z is driven at a slow and a constant speed through gearing, as shown in Fig. 5. It also drives the two eccentrics S, Fig. 6, which impart a reciprocating vertical motion to the rheostat pawls P through a small arc on the periphery of the toothed wheel R on the rheostat shaft. The wheel and the pawls are clearly shown in the lower left corner of Fig. 5. There are three segments, J₁, J₂ and J₃, on the contact drum Z, Fig. 6. These are of different lengths and correspond to the distance between one, two and three teeth on the periphery of the wheel R. If the moving needle Y is clamped into position 1 at the right of the zero position, the pawl is engaged at such a time in its stroke as to increase the amount of energy supplied to the heater by one step on the rheostat, while if the connection is made to the corresponding contact on the left side, the energy is decreased in the same proportion. If the needle is clamped in position 2 the energy input is varied by two steps, according to the side of the neutral point on which the contact is made, and a variation of three steps is secured if the needle is clamped in the position 3. The needle is returned toward the neutral point after the change in resistance is made, and this change continues until that point is reached. If the needle is clamped in the zero position the rheostat is not moved. The wattmeter in the upper right corner of the switchboard shows the energy which has been supplied to maintain the constant temperature difference. If the instrument used is of the integrating type, the dials are arranged to register the total number of cubic feet of air or gas passing the meter, but if desired a recording instrument can be used to show graphically the variation in the flow.

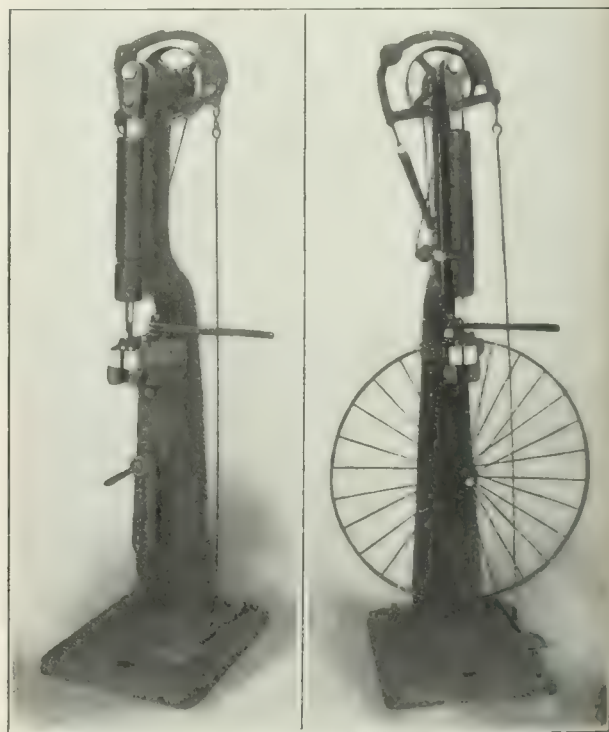
The meter can be used for measuring the discharge

of gas or air from compressors, blowers, &c., because the small and rapid periodic fluctuations of pressure due to either suction or discharge conditions do not interfere with the steady action of the thermometers. The time lag in the latter is sufficient to smooth out the curve, and true average results are thus indicated. As the meter is capable of measuring gas under varying pressures and temperatures accurately, it is especially valuable for measuring natural gas and also compressed air. The gas or the air being measured can also be either dry, saturated or superheated. If the water present is carried along mechanically, as a fog or a mist, its evaporation by the meter would interfere with the securing of accurate results, but this fog or mist can be transformed into dry vapor readily by introducing heat at the inlet of the meter. This is generally supplied by a small steam radiator, consisting of a coil of pipe and the steam can be introduced either at or above atmospheric pressure, as may be most convenient.

The electrical energy required to operate the meter is approximately about 1 kw. per 75,000 cu. ft. per hour at atmospheric pressure. The chart reproduced in Fig. 7 shows a variation in the rate of flow of from approximately 17,000 cu. ft. to 75,000 cu. ft. per hour, and the energy input was about 1.15 kw.

A Shuster Special Riveter

Wheels with wire or round rod spokes, such as are used for agricultural machinery, are manufactured in this country by the thousands every year. For the special task of riveting the spokes of these wheels to the rim, and at the same preserving a uniform radius, the F. B. Shuster Company, New Haven, Conn., has specially



A Special Wheel Spoke Riveter Built by the F. B. Shuster Company, New Haven, Conn.

equipped its elastic blow riveting machine. Fig. 1 is a view of the machine itself, and Fig. 2 shows it in operation.

The mandrel upon which the hub of the wheel is mounted has an adjustment on the base of the column to care for varying diameters. On the table are jaws operated by a cam, the movement of which opens and closes the jaws under the control of a lever handle. A piece of steel grooved to grip the wire spoke is set in each jaw. These two pieces constitute the anvil, the upper surface of which has the proper curvature. The distance between the top of the anvil and the center of the mandrel is fixed and consequently the radius of the

wheel remains constant as the rim is turned from one spoke position to another. The diameter of the spokes which can be riveted ranges from 3-16 to $\frac{1}{2}$ in., and if there is any inequality in their length, the only effect of this is to change the size of the riveted head on the rim. The mandrel has sufficient length to enable the wheel to be slid to a plane in front of the jaws before turning to the next position.

The American Radiator Company's Annual Report

Increase in Net Profits of \$225,917.91

The American Radiator Company's twelfth annual report, covering the operations of the fiscal year ending January 31, 1911, shows the profits to have been as follows, compared with the previous year:

	1909-10.	1910-11.
Net profits.....	\$971,599.52	*\$1,772,517.43
Less dividends—Preferred stock.....	210,000.00	210,000.00
Common stock.....	400,000.00	569,000.00
Totals.....	\$610,000.00	\$779,000.00
Balance.....	\$361,599.52	\$993,517.43

* Includes \$575,000 surplus from sale of common stock to stockholders. Trading profits for the year \$1,197,517.43.

The balance sheet at the close of the fiscal year compares as follows:

	Assets.	1909-10.	1910-11.
Real estate, plants, machinery, patents, &c., February 1.....	\$8,611,259.14		\$8,693,179.94
Additions during year.....	281,920.50		1,344,581.86
Totals.....	\$8,893,179.94		\$10,037,761.80
Less depreciation.....	200,000.00		200,000.00
Net.....	\$8,693,179.94		\$9,837,761.80
Cash.....	\$774,408.30		\$1,115,058.47
Notes receivable.....	10,834.03		111,395.81
Accounts receivable.....	1,167,051.21		1,911,725.68
Raw materials, supplies and finished products.....	2,192,556.46		2,030,270.43
Total quick assets.....	\$4,144,850.00		\$5,168,450.39
Totals.....	\$12,838,029.94		\$15,006,212.19
	Liabilities.		
Capital stock, preferred.....	\$3,000,000.00		\$3,000,000.00
Capital stock, common.....	5,000,000.00		6,150,000.00
	\$8,000,000.00		\$9,150,000.00
Accounts and bills payable.....	311,379.98		336,044.80
Totals.....	\$8,311,379.98		\$9,486,044.80
Balance.....	4,526,649.96		5,520,167.39
Totals.....	\$12,838,029.94		\$15,006,212.19

The following extracts are taken from President Clarence M. Woolley's accompanying statement:

"A substantial increase in the volume of sales was accomplished. The results in this respect eclipse the records of all former years. The net profits are likewise greater than for any preceding year.

Cheaper Raw Materials Beneficial

"While the general business conditions which prevailed throughout the country during the year were not exceptionally favorable, the construction of new buildings was maintained on a broad scale. This offered an opportunity for a very large volume of business. The cost of raw materials required for the production of radiators and boilers was lower than for many years. This enabled us to establish lower selling prices for the finished product, thereby encouraging the purchasing public more extensively to employ our sanitary methods of heating and ventilation, while the further elaboration of selling methods and the economies realized by enhancing the efficiency of the individuals connected therewith resulted in a generous increase in the volume of business and the net profits.

"The producing capacity of the company was increased during the year by additions to existing plants and their equipment. A large plant was built at Kansas City, which is now in active operation, and has proved

of distinct advantage, in offering prompt and adequate service throughout the territory it covers. Further improvements have been made in methods of manufacture and in standardizing every important process connected therewith. A distinct advance has been made along the line of specialization and co-operation. The progress in this regard is particularly encouraging.

"During the past year the plan authorized at the last annual meeting, to allot shares of stock on easy terms of payment to employees, has been carried into effect and has further strengthened the enthusiastic co-operation of all, while increasing their efficiency by creating a sense of proprietary interest in the company.

The European Subsidiaries

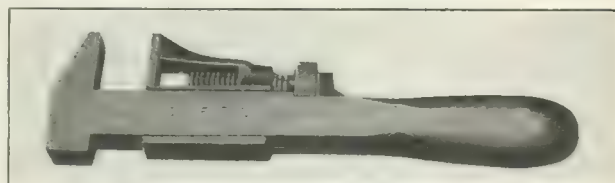
"The German company has enjoyed another year of prosperity. The new plant which it constructed last year at Neuss, on the Rhine, is now in successful operation. This offers the necessary increase of producing capacity, so that, in conjunction with the plant at Schoenebeck, on the Elbe, an adequate supply can be produced to satisfy the requirements of the growing business in Germany, in The Netherlands, Scandinavia and over-sea countries. The French company has made further additions to its plant at Dole, and has increased its business and profits during the past year. The English company has also enjoyed another year of prosperity. It has further increased its producing capacity, its volume of business and profits. Its plant at Hull is provided with adequate capacity for the trade it serves in Great Britain and in foreign countries. The Italian company, which was organized last year, has completed its new plant at Brescia, 30 miles east of Milan, and is about to begin operations. A large demand has already been created in Italy, which heretofore had been supplied by the other European factories.

"The profits realized by the European companies have been employed in extending their business and in establishing the new plants herein mentioned, all of which have been paid for by the reservation of their earnings. Inasmuch as these European companies have declared no dividends, having utilized their earnings for further development of the business abroad, such income is not included in the annual statements of this company."

The New Cresco Monkey Wrench

A new monkey wrench, brought out by the Crescent Forgings Company, Oakmont, Pa., known as the Cresco, has only three parts, all drop forged, no malleable iron castings being used.

The wrench is very durable and easily operated. The three parts are case hardened all over. The nut is placed very near the handle, where it is easily adjusted



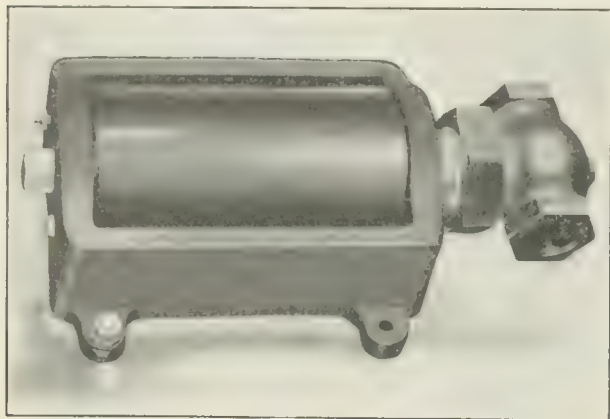
The Cresco Drop Forged Monkey Wrench Made by the Crescent Forgings Company, Oakmont, Pa.

by the operator, eliminating one of the objections to other steel wrenches now on the market. The T-shaped movable jaw is put into the slot in which it slides in the shank, while the latter is hot, the slot having been previously opened up. When the jaw is in place the slot is closed down upon it and all tendency for the jaw to become loose is done away with.

A New Edith Furnace.—The Carnegie Steel Company will rebuild its Edith furnace in the Pittsburgh district. About four months will be required for the work.

The Cutler-Hammer Solenoid Operated Valve

Electric solenoids have been applied to various devices, but it is only recently that they have been developed to control valves. As the result of several years' experimenting, the Cutler-Hammer Mfg. Company, Milwaukee, Wis., is introducing a device in which a solenoid is employed to give remote or automatic con-



A Solenoid Operated Valve Made by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

trol of a valve. Some of its special uses are in connection with double-acting compressors, as a part of hydraulic or pneumatic systems, with self-starters and for the remote control of valves used for setting brakes in pneumatic brake control systems.

The plunger of the solenoid is inclosed, so that it is virtually within the piping system and stuffing box friction is entirely avoided. Only a very small amount of

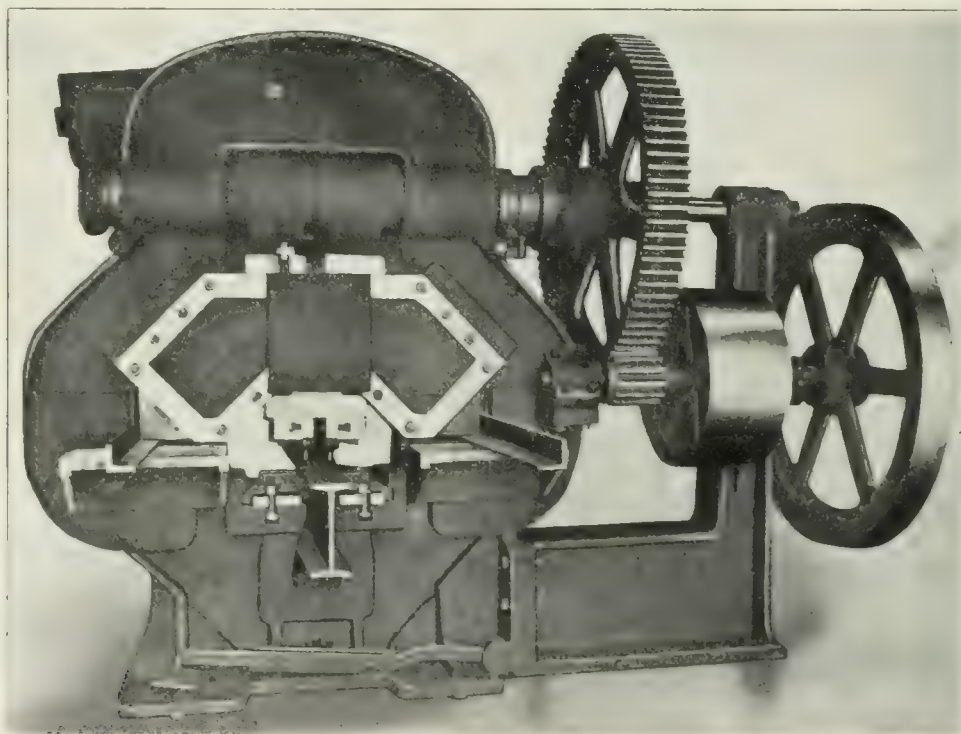
type and can be wound for voltages of 115, 230 and 500.

Considerable difficulty is frequently experienced in starting double-acting compressors under compression. This trouble can be obviated by employing a solenoid-operated valve to control a by-pass automatically, so that pressure can be released from the compression cylinder in starting. After the desired speed has been obtained, the load is thrown on the compressor by automatically closing the by-pass. Another application of the device is with a thermostat in a heating system to control the flow of steam automatically. Where air operated whistles are used for signaling purposes, it is possible to control all of them from a central location by installing these valves, thus saving long runs of piping. These devices can also be employed to control the amount of air in the compression tanks used for inflating tires in garages and the operating switches can be placed in the most convenient location.

The Leighton Combination Punch and Shear

A new type of combination punch and shear has been recently built at the Cincinnati Punch & Shear Company, Cincinnati, Ohio, by the inventor, George F. Leighton. The special advantage of this machine is that its complete weight is 8000 lb., which is the approximate weight of a shear of the same capacity.

The shears are located on each side of the machine, and if the material to be cut is light, two pieces may be operated on at the same time. The motion for the shears is derived from the center plunger, which is one of three driven by a single eccentric shaft. The machine is fitted with the inventor's automatic clutch, and at the point where the clutch is attached to the shaft, the latter is square. The punches and dies are adjustable, and it is possible to shear a piece at any desired angle. Three



A New Type of Punching and Shearing Machine Designed by George F. Leighton, Cincinnati, Ohio.

current is required to energize the coil, which lifts the solenoid plunger through a short free travel and unseats the valve by a hammer blow. When the valve is started, the pressure becomes almost balanced. The circuit in which the coil is included can be run so that the valve can be operated from one or a series of different places, as desired. Four standard sizes of valves are built, having diameters of $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 in. These valves are threaded for standard iron pipe and the area of the opening is approximately equal to that of the same size of pipe. The coils used are of the maker's standard

sizes of machine are built, having capacities of 12, 18 and 24 in., respectively, the first being the size illustrated. This machine will cope and punch a 12-in. I-beam and shear a 4 x 4 x $\frac{1}{2}$ in. angle iron.

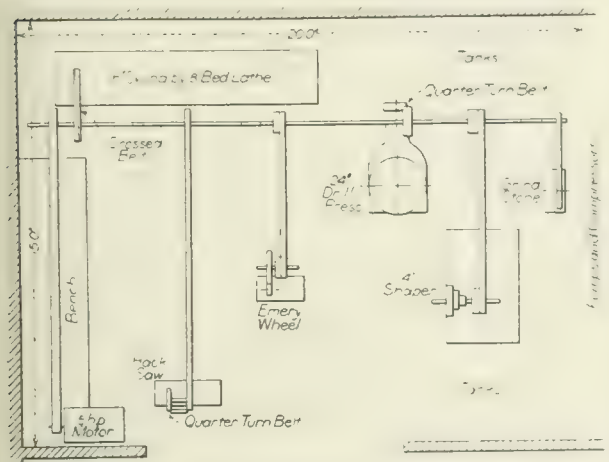
The Worth Brothers Company, Coatesville, Pa., states that its second blast furnace, now under construction, is not expected to be blown in before summer. This statement is made because reports have been in circulation that the furnace was completed and blown in last week.

The Machine Shop in the Ritz-Carlton Hotel

Not many years ago the engines, dynamos, boilers and a few pumps practically made up the mechanical and electrical plant equipment of a hotel. Now a modern hotel has a complete refrigerating system for making artificial ice, laundry machinery, air compressors, vacuum cleaning system, air washing machines and often many other special labor-saving devices. With such a varied equipment repairs and alterations requiring considerable machine work are often necessary, and instead of having this done by outside shops it has been found more satisfactory in many cases to do it on the premises.

The machine shop of the new Ritz-Carlton Hotel, New York City, is a good example of one required to keep the plant of a first-class hotel in repair. It was at first planned to devote a space about 20x35 ft. to the shop, but, owing to changes in the location of several compressors, the size was cut down, and the arrangement was materially modified.

The accompanying diagram shows the layout of the shop, which is on the same level as the engine room floor. A 5-hp. electric motor, fastened on the wall, drives a



Plan of the Layout of the Tools in the Machine Shop of the New Ritz-Carlton Hotel, New York.

main shaft, from which are driven a 16-in. swing by an 8-ft. bed Prentice lathe, a 24-in. Sibley heavy pattern drill press and a grindstone, and from countershafts a hack saw, an emery wheel and a 14-in. Gould & Eberhardt double-triple, quick-stroke, heavy duty shaper. On one side of the shop is a bench with vises. The tools are located so that the piston rods of the nearby engines and pumps can be removed without interfering with them.

On the mezzanine engine room floor is the electrician's workshop. Here an electric motor drives from a countershaft an 11-in. swing by 5-ft. bed engine lathe, a sensitive bench drill and an emery wheel. There are also benches for assembling work. On the same level are storerooms for bolts, wrenches, tools, &c.

In the boiler room is a blacksmith's forge, having a hearth 23 x 35 in.; a motor-driven Williams pipe threading and cutting machine, with a capacity of 1½ to 6 in. pipe; a 100-lb. anvil, hammers, tools and accessories.

With the above tools, machine, forge and pipe fitting jobs which are constantly arising can be readily done by the machinists employed by the hotel. It is expected that the shop will prove a great convenience, and that the cost of repairs to the operating plant will be kept at a minimum.

The J. B. & J. M. Cornell Iron Company's property and assets are to be sold. Judge Holt in the United States Circuit Court, New York, has signed an order directing A. Gordon Murray, trustee in bankruptcy, to sell all the company's effects March 20 at his office, 60 Wall street, to the highest bidder. Mr. Murray has been authorized to continue the business of the bankrupt company until March 27, when delivery is to be made to the purchaser as a going concern.

A Huge Bronze Drum Casting

The Buffalo Foundry & Machine Company, Buffalo, N. Y., recently made a very large bronze drum casting. It is interesting not only for its size and the material from which it was made, but the manner in which the metal was melted.

The casting is to be used as the drying surface in a large vacuum rotary drum dryer and is 12 ft. long and 5 ft. in diameter. Generally these drums are made of dense air furnace iron, but as this particular drum was to be used for drying vegetable extract it was necessary to use a good quality of bronze, as contact with the iron would discolor the extract.

Dry sand was used for the mold and loam for the core, both being swept up. The mold was placed in a



A Large Bronze Drum Casting, Weighing 16,000 Lb., Made by the Buffalo Foundry & Machine Company, Buffalo, N. Y.

vertical position when the casting was poured, which accounts for the very clean surface and the freedom from blowholes which was secured. About 16,000 lb. of metal was required to pour the casting, and this large quantity made it expedient to melt the metal in a 48-in. cupola. While this is rather unusual, the maker has followed this practice successfully where large quantities of metal are required.

The Sterling Machine Company, Norwich, Conn., states that its business has so increased as to compel the doubling of its capital stock for the second time. At a meeting of the stockholders held February 27 it was voted to increase the capital stock from \$50,000 to \$100,000 and to change the name from the Uncas Specialty Company to the Sterling Machine Company. Hereafter the business will be conducted under the new name, continuing the manufacture of Uncas specialties, comprising timers, distributors, automobile horns, hardened and ground parts for the motor trade and an automatic line of lubricators for automobiles and steam engine

Gas Producer-Gas Engine Plants

Details of Installation and Maintenance Cost

BY WILLIAM O. WEBBER, BOSTON, MASS.

Considerable misunderstanding exists at present concerning gas producer-gas engine power plants. Two or three erroneous opinions are prevalent, one of which is that initial cost of such plants is greatly in excess of

The cost of operation, expressed in dollars per horsepower year, assuming fuel and labor to be the same for both types of plants; that is, coal at \$5 a ton, whether used in the steam boiler or in the gas producer, and

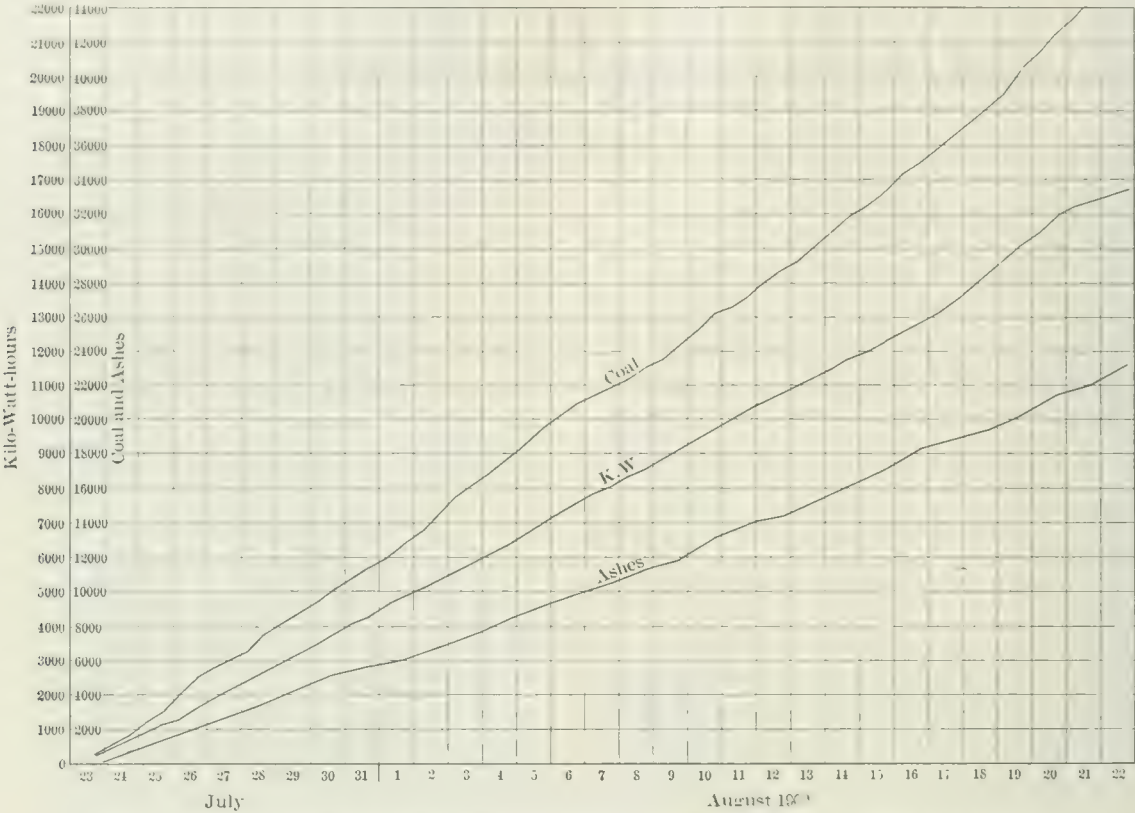


Fig. 1.—Log of a 30-Day Acceptance Test Showing the Relation Between Fuel, Ashes and Output.

steam engine or steam turbine plants. This is not always so, as is shown by the accompanying table giving the costs of complete plants of various sizes and both types. In preparing this table the cost of the land, the buildings and the generator have been excluded since they would be the same in either case, but all the auxiliaries together with the cost of foundations, setting, piping, cartage, freight and all other items which go to make up the initial cost of a complete working plant have been included.

Horsepower of plant.	Cost of steam plant.	Cost of gas producer-vertical gas engine plant. Belted. Direct connected.
31.....	\$100	\$132
60.....	90	99
100.....	85	76
140.....	80	69
190.....	75	68
280.....	70	68
380.....	65	68
420.....	63	69
500.....	62	..
620.....	60	..
1,000.....	65	..

* Horizontal.

With reference to the comparative weights per horsepower of gas and steam engines, the following figures may prove of interest:

Horsepower.	Pounds per horsepower vertical gas engines.	Direct connected Corliss steam engines.
60.....	240	148
140.....	275	143
190.....	280	140
300.....	290	140
*500.....	300	250
750.....	300	213
1,000.....	340	213
1,200.....	350	215
1,500.....	375	219
2,000.....	400	210
2,500.....	400	250
3,985.....	400	270

* Horizontal.

labor varying is given below. Fixed charges are also included in this table.

Horsepower.	Labor.	Steam engines.	Gas producer-gas engines.
20.....	\$30	\$146	\$75
40.....	20	120	42
60.....	15	105	38.65
80.....	12	95	35
100.....	12	86.40	30
200.....	10	77.10	27
300.....	8.60	69.22	25
400.....	7.25	61.90	24.5
500.....	6.20	55.29	24
600.....	5.40	49.28	23.5
700.....	4.70	43.79	23
800.....	4.15	39.73	22.5
900.....	3.75	34.05	22
1,000.....	3.50	29.80	21.5
1,500.....	3.25	25.77	18.75
2,000.....	3.00	21.75	17.25

In gas producer-gas engine plants the coal consumption varies from 1 lb. in the largest sizes, to 2½ lb. per horsepower per hour in the smaller sizes, while in steam plants this figure will vary from 12 lb. in a small 20-hp. plant to 7 lb. in a 100-hp. plant 5 lb. in a 500-hp. plant, 2½ lb. in a 1000-hp. plant, and 2 lb. in a 2000-hp. plant, where strict account is kept of all the coal used throughout the 24 hr., including the banking of fires during the night and the standover losses in both cases. These figures, from repeated experience under actual conditions, the writer knows to be correct.

Water Consumption

The water consumption of gas engines is larger than it is generally supposed to be, being practically the same amount per horsepower for either the gas or steam plant, that is, on the smaller sizes, 5 gal. per engine horsepower per hour for the jacket water to probably about 4 gal. on the larger sizes, besides which a similar amount

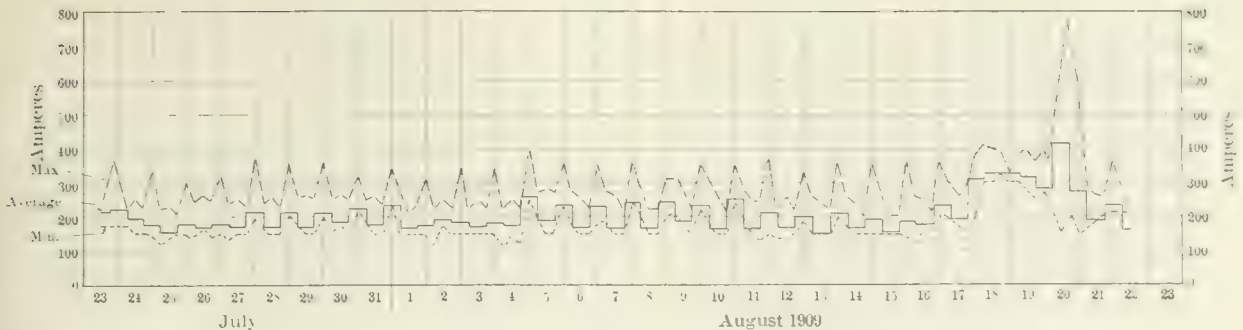


Fig. 2.—Generator Load Curve.

must be used in the producer per horsepower for washing purposes. The steam plant uses about 5 gal. of water per horsepower per hour for the simple plant down to 3 gal. per horsepower per hour on a condensing engine of 200 or 300 hp. or over for the generation of steam.

In condensing plants, approximately 26 times the water used by the engine is required by the condenser. All the waste heat escaping from the steam boilers is lost, except such as is utilized through a feed water heater or an economizer, or in building heating during the cold months. At present, through a gas engine, quantities of gases as great as 800 cu. ft. per horsepower per hour are wasted at temperatures of from 1800 to 1000 degrees. This is a field in which much work can be done, as these waste gases from the gas engine should all be absorbed preferably in heating hot air, which may be then utilized by being blown around the buildings for heating purposes, or in heating water which is then circulated, as has been successfully tried in a few plants.

Another very interesting question is that of getting rid of the cylinder jacket cooling water, so that the same water can be used over and over again. This is readily possible by using cooling towers preferably of the open type, placed upon exposed parts of the roofs of buildings and the water from the jackets forced there by electrically-driven centrifugal pumps. A cooling of 10 degrees, as a minimum, to 30 degrees, as a maximum, accomplishes all that is required and can be very inexpensively done by constructing a wooden cooling tower, where sprays of water are caused to fall over a set of louveres into an exposed tank, from which they flow by gravity to the jacket spaces.

Load Table

The engineer, in each case, should make up a table showing the horsepower hours of the different elements which go toward making up the whole load. This load should then be tabulated and the number of tons of fuel which would be required per annum ascertained. The writer recently made such a compilation, including the hours required on the ammonia compressor for a refrigerating plant, a laundry, the elevators, the ventilating and lighting, all of which required an estimated amount of 311 tons of coal. The actual consumption, last year, for this installation was 334 tons.

The writer also made another estimate showing the actual performance per brake horsepower for the producer gas plant, including coal, water, interest and depreciation, the lamp renewals and the attendance, or labor, which amounted to 1.227 cents per brake horsepower per hour. The actual returns from the year's run was 1.2 cents. The estimate of the total cost of wages, repairs and all expenses was \$6007, and the actual costs for the year were \$6026.62.

Further, there is no question as to the relative econ-

omy of gas producer-gas engine plants, which practically can be made to reduce the cost of power from one-third to one-half, but in the present state of the art it requires that all plans and specifications should be carefully drawn by a competent, disinterested engineer, with the details carefully planned out and adhered to strictly, and with the specifications clearly stating what the performance shall be, and maintained in actual working conditions over a sufficient length of time so as to preclude jockeying of the plant.

Plotting Test Results

Nothing less than a 30-day run should ever be accepted as a practical performance of any plant, and such performance should always include a period at the average load as it occurs, a period of at least a week at the capacity of the plant, and a period of at least 24 hours at the maximum which the plant might be forced up to in case of emergency or breakdown. In the results of these tests the number of running hours, the average load in percentage of engine rating, the pounds of coal gasified per hour, the ashes removed in pounds, the ratio

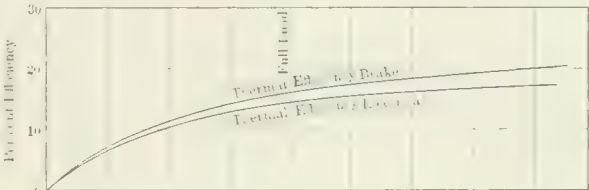


Fig. 4.—Efficiency Curves of the Generator.

of ashes to coal, the pounds of coal per brake horsepower hour, as well as similar values per kilowatt, should all be definitely stated. A statement of the average heat value of the coal, the British thermal units per brake horsepower per hour, from the engine, the thermal efficiency from the brake horsepower and the thermal efficiency as obtained from the electrical instruments on the switchboard should also be included.

A chart should always be prepared showing the consumption of coal, ashes, the kilowatt hours and the average daily and nightly load, in amperes, at six-hour intervals, at least, and the data should be kept at hourly intervals. This should also be supplemented by a recording watt meter, from which the kilowatt hours can be transcribed at regular intervals. These two parts of the chart are shown separately in Figs. 1 and 2. A curve, Fig. 3, should be plotted showing the fuel consumption per kilowatt and per brake horsepower per hour, from nothing up to full load, and similar curves, Fig. 4, plotted for the thermal efficiency covering the same ranges.

There are very many items regarding the location and the arrangement of producers, the position of the main pipes and the size of pipes in the connection between producer and engines, the type of shut-off valves, the location of the exhaust pipes and the exhaust pit outside of the building, sewer connections, or, if there is no sewer, a system of handling the exhaust water and the wash water, which should be insisted upon. The types of igniter batteries and igniter plugs, means of accumulating air in the air starting tanks should the electrical part of the plant give out for any temporary reason, means for starting the blowers independently, the location and the

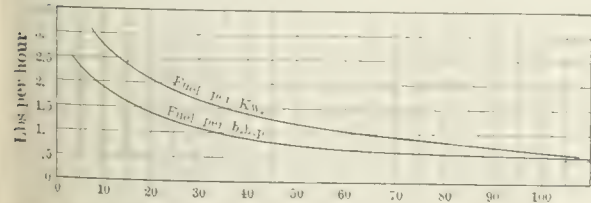


Fig. 3.—Curves Showing Fuel Consumed per Kilowatt and Brake Horsepower.

description of the switchboard and in fact a number of items, should be very carefully specified so as to make the plant as nearly fool proof as possible.

The whole amount of work to be done per annum should be carefully estimated in the first place, and a daily load sheet, such as that produced in Fig. 5, drawn, so as to see what the requirements should actually be

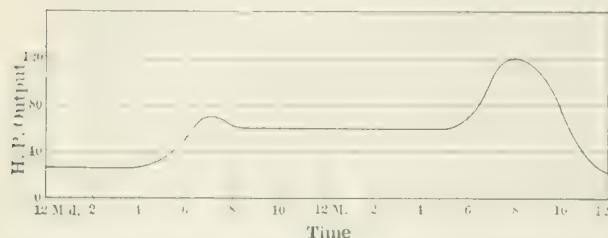


Fig. 5.—A Typical Daily Load Curve of the Plant at the Soldiers' Home, Chelsea, Mass.

during any given hour of the day. This will determine how the power units should be divided and must be very carefully done, as it is not possible to carry an overload upon a gas producer-gas engine plant which can be carried up on a steam engine for a moderate length of time. There should always be an engine unit and a producer unit, which can stand idle most of the time, so that they can be properly cleaned, kept in repair and generally taken care of. This is practically imperative in a plant which is to be operated 24 hr. a day, but is not required in a plant which is only in operation during the day time.

Fenestra Solid Steel Window Sash

Fenestra solid steel window sash, for factories, power house, garages, &c., manufactured by the Detroit Steel Products Company, Detroit, Mich., is a new product of steel that has won unusual recognition in the last few years. In scores of large new plants that have been erected recently this material has been specified. In several important large plants steel columns and curtain walls of Fenestra design have replaced the customary brick wall, with very satisfactory results. It makes a wall of glass with a steel frame that offers the least obstruction to the light, so that the interior of a building is flooded with soft light instead of depending upon small windows in a brick or concrete wall. When the conventional window is retained the Fenestra sash makes it possible to have larger openings, with a convenient plan of ventilation.

The Fenestra sash is made of steel bars, rolled in a special section. It is manufactured in units, each unit containing as many panes of glass as may be specified. The peculiar and original feature of this steel sash, covered by patents, is in the joint where the bars cross. The T bar which is to form the vertical member in a sash has a slot punched in the web. The head and the remaining outer edge of the web are then spread so that the horizontal bar can be inserted, after which the portion of the web which has been bent out is pressed into a notch in the horizontal bar. This makes a very strong joint and renders it possible to construct walls with openings of large area with light steel bars. While it is not expected to meet the aesthetic requirements of an office or public building, it is particularly suitable for factories, warehouses and other structures in which perfect light and economy in cost and maintenance are the prime considerations.

Double flange bars are used for the outside members of the sash, of a special section, which is adapted to either brickwork or concrete. Only two sections of bars are used in the manufacture of the standard sash—the T bar for the inner mullions and the double flange for the outer members. The sash is shipped in units, unglazed, and the standard construction is adapted to take standard sizes of glass, from 10 x 16 to 12 x 18 in. panes. One of the important features in the construction of windows or walls of this type is the opportunity for ventilation. Each unit of the sash is readily arranged to

carry a tilting inner sash or two ventilating sections which open and close together by the same mechanism. In this way 20 to 30 per cent. or more of the total area can be used for ventilation.

While the cost of steel window sash is necessarily a little greater than wood, the maintenance and depreciation charges are very light. If the mullions are kept painted their life is practically indefinite, and even if painting is neglected corrosion does not have the same effect that it would have on sash constructed of sheet steel. The maintenance of windows in a large plant is a considerable item of expense, and architects and engineers for this reason look with great favor on the introduction of solid steel in window construction.

Light has been found an important factor in efficiency, especially where a large number of operatives are engaged in work which requires constant attention of the eye. A large window area affords the largest possible volume of soft light, which does not throw shadows on the work and at the same time creates more cheerful conditions for the operatives. An appreciable gain in efficiency is said to have been noted in large plants where the Fenestra system of lighting has been adopted. The perfect ventilation secured by this construction has also been found to have a marked influence on the health of the operatives.

The question of fire hazard is always an important one in factory construction, and on this point the Fenestra sash has recently stood a severe test. In a New England factory a shed containing 2000 barrels of rosin burned, requiring the combined efforts of the fire departments of several cities to protect surrounding property. Adjoining this shed was a small concrete building equipped with Fenestra steel window sash and wire glass panes. When the fire was eventually extinguished it was found that the Fenestra sash was apparently as good as when installed, and the only damage done to the building which it protected was the loss of a few panes of wire glass, which had been melted by the intense heat. This would indicate that windows or walls of Fenestra construction may be safely used in any ordinary exposure.

The Detroit Steel Products Company has just become the exclusive distributor in the United States for the metal casement windows manufactured by the Crittall Mfg. Company, Ltd., London, England. These windows are used in office buildings, banks, public buildings and high-class residences.

The Fafnir Bearing Company.—At the meeting of the incorporators of the Fafnir Bearing Company, held in New Britain, Conn., March 8, the following Board of Directors was elected: Howard S. Hart, president Hart & Cooley Company, formerly president of the Russell & Erwin Mfg. Company and Corbin Motor Vehicle Company; N. P. Cooley, treasurer Hart & Cooley Company; E. C. Goodwin, assistant treasurer and superintendent Hart & Cooley Company; E. A. Moore, second vice-president and superintendent Stanley Works; F. G. Vibberts, treasurer New Britain Trust Company; Judge James E. Cooper, corporation counsel for the city of New Britain; Elisha H. Cooper, formerly secretary and manager E. E. Hilliard Company, Buckland, Conn. The directors afterward elected the following officers: H. S. Hart, president; E. C. Goodwin, vice-president; E. H. Cooper, secretary and treasurer. The company is organized for the manufacture of a strictly high grade ball bearing in accordance with the best European practice. Nearly two years have been already spent in the study of foreign processes and in tests and experiments leading finally to the establishment of a factory in New Britain, which is now in operation in the plant of the Hart & Cooley Company. The organization of the new company will provide abundant means for the development of the new enterprise, not only in capital but in the well recognized business ability and experience represented in its board.

The E. & G. Brooke Iron Company, Birdshoro, Pa., resumed operations in its nail works and rolling mill department March 6, after being idle since February 1.

A Small Ferracute Punching and Riveting Press

A new line of presses for punching holes and forcing down rivets at a distance from the edge of a sheet has been placed on the market by the Ferracute Machine Company, Bridgeton, N. J. The frame is solid and well proportioned, and the section subjected to tensile stress is larger than that subjected to compression. A treadle controls the clutch on the press shaft, instantly starting it by connecting it to the constantly revolving flywheel. The ram goes down, makes a stroke and returns to the up position where it stops. The ordinary length of stroke is $1\frac{1}{2}$ in., but may be shorter or longer up to a maximum of $2\frac{1}{2}$ in. The ram is double gibbed and has a



The No. P-21 Press for Punching and Riveting Built by the Ferracute Machine Company, Bridgeton, N. J.

vertical adjustment of 3 in. The throat depth is 18 in., which allows considerable latitude in handling the work. The flywheel is 25 in. in diameter, 4 in. across the face and weighs about 275 lb. The shaft upon which the flywheel is keyed is forged from high carbon steel. The press illustrated is the smallest of the line and weighs about 2300 lb. The pressure which it is capable of exerting is approximately 15 tons. In addition to the narrow bed type, these presses are also built with gearing and wider beds.

A Large Order for Buffalo Fans.—The New Jersey Zinc Company recently placed an order with the Buffalo Forge Company, Buffalo, N. Y., for 54 large special fans. The order was placed after three or four different manufacturers had each been given an opportunity to install an experimental blower to be tested for efficiency under special but identical conditions. The Buffalo fan was found to make the best showing. An exceedingly high efficiency is claimed to have been obtained. In comparison with the fans already in use by the New Jersey Zinc Company, the Buffalo fan showed a saving

in power consumption of fully 30 per cent. This exceptional performance is ascribed to the accuracy with which the dimensions of inlet, outlet, length of blades, diameter of wheel, width, &c., were proportioned to meet the special conditions. It is estimated that the fans will make over eight carloads.

Italian Workmen's Insurance Prizes

By the Marchese di Cambiano, president of the International Prize Competition Committee of the International Exposition of Industry and Labor, Turin, 1911, the American Museum of Safety, New York, is informed that the Minister of Agriculture, Industry and Commerce and the National Board for Workmen's Insurance have offered the following prizes:

(A) \$2000 for the best experimental study on the groundings or connecting to earth in industrial electric plants. It must especially deal with: (a) the phenomena occurring when any point of the electric circuit comes into contact with the ground; (b) the influence of the nature and composition of the soil on such phenomena; (c) the influence of the form of the currents and their voltage on said phenomena; (d) the protective efficiency of the grounding or connecting to earth, whether permanent or consequent to phenomena of abnormal voltage; (e) by means of keeping and checking the groundings. The study may be written in Italian, French, English or German, each section to take into consideration both the industrial currents of the circuit and those caused by internal or external disturbances of the same circuit; the study and the provisions suggested therein to be accompanied by sufficient experimental data. This competition closes September 30.

(B) \$1000 offered by the Minister of Agriculture, Industry and Commerce for the best device for shifting a belt. It must be applicable to belts with a linear velocity of at least 18 metres (59 ft.), with a width of 100 to 150 millimetres (3.9 to 5.8 in.); it must be of comparatively cheap construction and installation; should occupy the least possible space and should be easily operated by a single workman. The apparatus must be submitted in working form, so that it may be submitted to practical and prolonged tests. This competition closes April 30, 1911.

(C) Another prize of \$1000 is offered by the same minister for a portable apparatus for moving belts and pulleys with different diameters and mounted on shafts with different diameters. Conditions are the same as for B. This competition closes April 30, 1911.

(D) A prize of \$500 is offered by the same minister for the prevention of accidents in connection with the working of cold metals and introducing between the cylinders of rolling mills lead, pewter, copper and brass plates and sheets. The safety device must be simple, strong and with no interference with the work, nor the subjection of the sheet to a second rolling between the same pair of cylinders. The apparatus is to be presented with the accompanying machine. This competition closes April 30, 1911.

(E) A prize of \$2500 is offered by the same minister for devices lessening the danger of carbuncular infection, to which tannery employees are subjected in carrying and tanning hides. The safety system must be such as not to alter the value of the hides and must be subjected to practical tests. The essay may be written in Italian, German, French or English. This competition closes September 30, 1911.

(F) A prize of \$1000 is offered by the National Fund for Workmen's Insurance for a device by which an electric line at a high potential may be cut out as soon as the conductor breaks. The apparatus required should be mounted on any electric or sub-station of the plant, and should not cause any important alteration or increase in the installation of the overhead wires; nor should it in any way disturb the working of the plant. This competition closes September 30, 1911.

Any further details desired will be furnished by the American Museum of Safety, 29 West Thirty-ninth street, New York.

The Newton Rotary Planer

A new type of rotary planing machine has been recently brought out by the Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa. This machine is especially adapted for rapid production in finishing cast iron and structural steel columns on both ends and one was recently furnished Joseph T. Ryerson & Son, Chicago, Ill., for use at their Boonton, N. J., warehouse. Fig. 1 is a front view of the machine, and



Fig. 1. Front View of a New Rotary Planer Built by the Newton Machine Tool Works, Inc., Philadelphia, Pa.

Fig. 2 shows the arrangement of the drive for the right head.

In the design of this machine the cutters were arranged to be pulled to the work, as this eliminates the chatter produced when the cutters are pushed. For this reason both right and left hand heads were used. The driving pinion is mounted immediately back of the cutting position of the tools, and as the motion for the feed is taken from opposite sides of the internal gear, the stresses are opposed and the tendency to chatter on the webs of structural work is overcome.

The cutter heads of all the machines are steel castings having angular slots cut from the solid for the reception of tools and a steel band shrunk on the periphery into which the tool retaining set screws are fitted. The internal driving face plate gear has the teeth cut from the solid and those of the driving pinion as well as those of the gears transmitting the feed are made in the same way. The large diameter spindles revolve

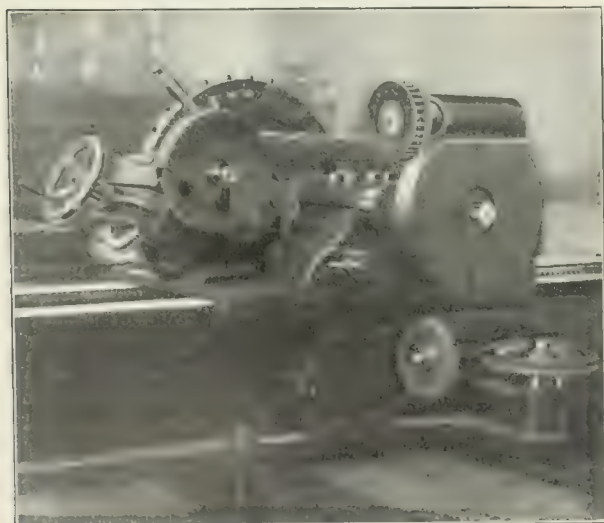


Fig. 2—View Showing the Arrangement of the Drive for the Adjustable Head

in capped bearings in the saddle which has a hand adjustment on the carriage for slight variations in the depth of the cut. An angular rack and spiral gears provide four geared changes for the cross feed to the heads which can be reversed as well as the fast power transverse. All the operating levers are mounted upon the saddle and travel with it. The saddles are provided with square locked gibbed bearings on the base with the underlocking gibs cast solid. Taper shoes provide a means for making adjustments, and the saddle bearings

extend the full length of the saddle and the full width of each shear.

Each head is driven by a 7½-hp. Westinghouse type S motor, operating at a speed of 975 rev. per min. Power is transmitted from the motor through spiral gears to the driving worm wheel, which is a bronze ring with teeth of steep lead. The driving worm is of hardened steel, and together with the worm wheel, is incased for lubrication, and both are provided with roller bearings where necessary. The machine at the left end, Fig. 1, is stationary, while the other machine can be ad-

justed to any distance from 6 ft. 3¼ in. to 30 ft., by a 5-hp. motor, mounted on the back of the base as shown in Fig. 2. Motion is transmitted from this motor through spiral gears to the worm wheel shaft, which meshes with the worm wheel, controlling the movement of the rack pinion.

The following table gives the principal dimensions and specifications of the planer:

Diameter of cutter head over tools, inches.....	26
Hand adjustment for each head, inches.....	2½
Cross feed to saddle, feet.....	5
Size of work tables, feet.....	3 x 6
Length of cross slide, feet.....	10
Maximum distance between faces of cutting tools, feet..	30
Minimum distance between faces of cutting tools, feet....	6¼
Floor space, feet.....	37 x 5½

A cutter grinding machine has also been developed to be used in conjunction with this planer. It is arranged to grind the tools in position and duplicate their length and contour, thus effecting a considerable saving in the idle time of the machine, as compared with former conditions, when it was necessary to remove the tools from the head for grinding.

The Congress of Technology

Roger W. Babson, well known as a statistician, will present before the Congress of Technology, to be held April 10 and 11, in Boston, Mass., a paper on the new profession of economic engineering. Mr. Babson would add to conservation and scientific management a training in the fundamental principles of economics, to the end that a scientific study of trade and financial conditions may be used in shaping the conduct and the expansion of our industries.

One of the newest problems in scientific management—namely, that of decreasing the present rising proportion of manufacturing burden to labor cost in factories—will be strikingly presented by J. B. Stanwood, vice-president and chief engineer, Houston, Stanwood & Gamble Company, Cincinnati.

Under the title, "The Conservation of Our Metal Resources," the heavy losses of metal occurring in some existing processes of metal production, and how these losses may be reduced or avoided, will be discussed in a paper by Albert E. Greene, electrometallurgist, American Electric Smelting & Engineering Company.

At a meeting recently held at the Institution of Mechanical Engineers, London, it was decided to form a London branch of the British Foundrymen's Association. The association has now nearly 700 members and branches have been established at Sheffield, Manchester, Glasgow and elsewhere.

New Tools and Appliances

This is essentially a news department for which information is invited.

Special Drilling, Tapping and Turning Machine.—

The Rockford Drilling Machine Company, Rockford, Ill., has recently built a special machine for finishing the stands of ordinary force pumps at one setting. Fourteen operations in all, including boring, drilling, facing and tapping or threading, are performed in this machine in about 5 min. per casting as compared with from 40 to 50 min., which was the time required when this work was formerly done in the upright drill press. With this machine the castings are taken from the tumbling barrel and finished ready for the paint shop and the assembling floor. The machine is controlled from the front and the spindles can be adjusted to handle various sizes of castings.

A Three-Spindle Tapping Machine and Universal Jig.—

The Rockford Drilling Machine Company, Rockford, Ill., has built a special three-spindle tapping machine to meet the requirements of one of its customers. The heads with which this machine is equipped differ considerably in size, thus enabling a variety of tapping operations to be performed. All of them have the maker's tapping attachment and are similar in construction to those used on his regular 14-in., 20-in. and 23-in. back geared machines. The tapping capacity ranges from 3-16 to 1¼ in. A special base is furnished upon which the work and a special universal jig are mounted. The latter is designed for use on a casting requiring holes to be tapped on every side. The double trunnion type of construction is employed and the work is attached to a bracket mounted on trunnions on an outer frame which in turn has trunnions in the supporting stand. In this way a universal adjustment is provided and to locate the casting for tapping the different holes at the proper angles positively and quickly each of the swiveling frames has an indexing plate containing as many holes as are needed for locating the work in the different positions. These holes are engaged by indexing pins, one of which is in the outer frame and the other in the supporting stand. This enables the casting to be held for the various operations without employing supporting blocks and it can be quickly and accurately adjusted to the different positions with but little effort on the part of the operator. When the casting is placed in the jig it remains in the same position relative to the inner work holding bracket until all the operations are completed. To enable the jig and the work to be readily removed to any desired position beneath the spindles of the tapping machine it is mounted on four casters, each of which is equipped with a ball bearing.

Perforating Machine.—

Chronik Brothers, 73 Gold street, New York City, have developed and placed on the market a perforating machine which, although primarily intended for perforating moving picture films, where accurate spacing is required, can also be used for sheet metal work. The punches and the dies are movable in a longitudinal direction, and the amount of their travel is governed mechanically. The end of the film passes between presser feet and strippers attached to the receiving reel. The punches descend and perforate the film and immediately the presser feet are released. The main shaft in its movement holds the punches and dies together with the film between them, and all three are carried forward a predetermined amount. When this movement ceases the presser feet are forced into engagement with the film and hold it while the punches travel back to their former position.

A Vertical Keyseater with Motor Drive.—The No. 1 keyseater built by the Lapointe Machine Tool Company, Hudson, Mass., has been equipped with motor drive. The cutters used with this machine have from 10 to 20 teeth, and each one cuts 0.01 in. at each of the 16 strokes made per minute. On the return stroke the cutters automatically clear the work, thus avoiding drag. An index plate and a locked finger which is positive in action regulate the depth of the keyway, the feeding being entirely automatic. The machine when equipped with a 2-hp. motor weighs about 975 lb., and occupies a floor space of 36 x 40 in.

Adjustable Shop Stand. For saving time in handling machinery to be built or rebuilt and especially automobile engines the Standard Motor Car Company, Scranton, Pa., is building a shop stand. This new piece of equipment is adjustable to accommodate various widths of machines and contains a tilting and reversible table, which can be locked in either position and also when the stand has been set to the desired width. An automobile engine can be clamped in position and after the cylinder, commutator, carbureter, water pump and other parts on the upper half have been dismantled, the two locking pins can be disengaged and the engine turned over without removing it from the stand so that the lower half of the crank case and the fly wheel can be disassembled.

A New Cylinder Grinder. The cylinder grinding machine built by the Brown & Sharpe Mfg. Company, Providence, R. I., has been redesigned so that the grinding spindle travels in a circular path and the cylinder remains stationary. This is a very desirable feature in grinding cylinders where the weight is not distributed uniformly around a central axis. The head is thoroughly inclosed to prevent the entrance of dirt and to protect the operator, and the table travels under it. A belt from a swinging floor stand drives the spindle and also cares for the rotary motion due to its travel. Another special feature of the grinder is the exhaust fan, hose and receiver which is an integral part of the machine and makes it independent of the general exhaust system of the shop. This tends to improve the quality of the work and also the health of the operator. The maximum size of cylinder handled by this grinder is one having a 7-in. bore and a 4-in. stroke.

Combination Tool Room Furnace. The Rockwell Furnace Company, New York City, is manufacturing a furnace for heat treating a variety of small tools made from both high speed and carbon steels, where accurate temperatures are required. An entrance in the end of the furnace enables it to be used for end heating, while an opening in the front makes it available as an oven furnace. For hardening high speed steel tools, the muffle and the bottom tiles are removed and tools up to 8 in. long can be suspended in the heating chamber. For lead hardening and oil and sand tempering, an iron pot can be placed in the entrance in the top of the furnace. The furnace is made of cast iron throughout and is lined with fire tile. It occupies a floor space 16 in. square and is 3 ft. 10½ in. high.

Motor Driven Turret Lathe.—A motor driven geared head turret lathe in which the convenience of control has received special attention has been brought out by Bardons & Oliver, Cleveland, Ohio. The equipment of the tool includes an automatic chuck, wire feed, power feeds to the turret and the cross slide and an automatic throw out for the cross and the longitudinal feeding movements. Two mechanical speed changes having a ratio of about 3½ to 1 are provided and these with an adjustable speed motor having a variation of 3 to 1 give a total range of about 10 to 1. Friction clutches on the spindle provide a reverse speed mechanically and all the mechanical changes in either direction are secured by operating two vertical levers on the headstock. One of the special features of the lathe is the method of reversing the spindle. The reverse gear is mounted on the spindle, which is not only the slowest running member of the driving train but is also the only part reversed, all the other parts continuing to run in the same direction for either movement of the spindle.

Boring and Facing Mill.—A new machine which is adapted for both milling and boring operations is now being built by the Burke Machinery Company, Conneaut, Ohio. Milling cutters can be mounted on the horizontal spindle, which is also fitted for driving boring bars. The work table is mounted on a large base made in two sections and joined by angular ways. The vertical adjustment is effected by an angular screw and when the desired height is secured the two members of the supporting base are rigidly locked by bolts passing through elongated slots in the ways. Power cross and longitudinal feeds are provided for the table and are conveniently controlled by hand wheels. The spindle is driven by powerful gears and the feeding and the driving gears are all inclosed by the frame, thus affording protection to the operator and giving a very rigid design.

The Machinery Markets

An apparent irregularity in the machinery demand exists. Inquiries have fallen off in New York, but orders continue fairly good and the trade is cheered by the announcement that the United States Steel Corporation intends to spend about \$300,000, principally for machine tools. The demand from the railroads is not so heavy, and New England machinery dealers are interested in the announcement that the New York, New Haven & Hartford Railroad Company intends to curtail its expenses. The automobile show in Boston has brought some business to New England and the demand for textile machinery has improved. A betterment is noticed in Cincinnati, where makers of mechanical electrical equipment are busy, and there is a good call for woodworking machinery. Small orders are being placed in the Cleveland market in good volume, and a better demand for forging equipment and automatic screw machines and drilling machinery is noted. In Chicago the Power Mining & Machinery Company is out with a small list, and the Rock Island Railroad is asking for bids on about \$7000 worth of equipment. Machinery men on the Pacific Coast are active and logging camp requirements are attracting attention. Donkey engines and mill supplies for that industry are selling well. Trade is quieter in the South, although quarrying and crushing machinery is selling well. Increased mining developments in Texas are keeping business on a satisfactory basis there, and the only effect of the Mexican disturbances is that transportation facilities to mining camps are somewhat tied up. The export business is still contributing generously to the support of the market, and the requisitions for machine tools for export are especially heavy.

New York

NEW YORK, March 15, 1911.

The volume of inquiries has not been so heavy in the last few days as it was a week ago, but orders are coming in freely for a general line of mechanical equipment. Railroad buying for the time has ceased and there are no new inquiries out even for machines for replacement. The Ontario & Western Railroad continues to hold off in making purchases against the large list which has been out several weeks, but machinery men who have bid against the inquiries have been assured that the purchases will be made. It will be remembered that the General Electric Company, through the Pennsylvania Electric Company, asked for bids on a large list of requirements about four months ago for installation at Erie, Pa. The company took no further action in the matter until late in February when the list was pretty well cut. Since then some more cutting has been done, but notwithstanding the apparent retrenchment the list as it now stands still calls for heavy expenditures. Judging from the company's renewed activity in the matter it is expected that purchases will be made against the curtailed list in the near future. The United States Steel Corporation, through the Carnegie Steel Company and the American Steel & Wire Company, has been making scattered inquiries for a line of machinery, principally in the way of machine tools. It is stated that the company expects to spend about \$300,000 for machinery to be added to the plants of its subsidiary corporations. Nothing like a list has yet appeared, but several machinery houses in New York have received extensive inquiries from the Steel Corporation. Manufacturers of small power units are getting some good business at this time, principally for power plants for office buildings and large apartment houses in Long Island and New Jersey. The building business is not very brisk in New York, but in nearby cities there are some good contracts pending in this line.

The Newark Automobile Mfg. Company has been organized at Newark, N. J., to make light delivery automobile cars, and ground has been bought on Frelinghuysen avenue, on which there are a number of buildings which will be reconstructed and enlarged. The company proposes to equip a complete plant for the manufacture of motor cars and delivery wagons, a feature of the construction of which will be the placing of the transmission and differential on the rear axle of the vehicle in one gear box. The company has had a sample car built in Detroit and it is claimed that there are 150 less parts used in the Newark car, as it is to be called, than in any other car, but has the same number of reverse and forward speeds. C. G. Paul, who is at the head of the enterprise, has established temporary offices in the Continental Hotel at Newark.

Newark, N. J., is rapidly becoming an automobile center, particularly in the manufacture of motor trucks and automobile bodies. The city is also a state center for automobile repair work and New York machine tool men have done some good business there during the last few months in filling orders for repair shops and garages. Among the new enterprises of this kind planned in Newark is the erection of a repair plant and garage for the Ellis Motor Car Company,

which will be built at Central avenue and Second street. The building will cost \$25,000 and will be equipped with a full line of repair equipment. The Christian Feigenspan Corporation will build a garage and repair shop at 266 Passaic avenue, Newark, which will be one story, 76 x 115 ft. The structure will cost \$20,000 and in addition to affording housing facilities for 50 large automobile trucks, repair equipment will be installed to take care of the vehicles.

The Kennedy Mfg. & Engineering Company has been organized with offices at 120 Liberty street, New York, to manufacture mining, cement making machinery and supplies. The company will not build its own plant as yet, but will have its product manufactured to order.

The International Slot Machine Company, 54 Nassau street, New York, has been organized with an authorized capital stock of \$100,000 to make automatic machinery. The company proposes to let its manufacturing work out by contract for a time.

The Georgian Mfg. Company, Binghamton, N. Y., is making additions to its plant, including a blacksmith shop, a core room and a test car store house, all of concrete and brick.

Plans and specifications have been prepared for the Board of Water Commissioners, Niagara Falls, N. Y., for the construction of a new water works system to cost approximately \$250,000. William D. Robins is city engineer.

The city of Buffalo, N. Y., has introduced a bill in the New York State Legislature authorizing the issue of bonds for \$200,000 for the establishment of a municipal electric lighting plant at the new waterworks pumping station at the foot of Porter avenue; the money to be used for the purchase of three turbine electric generators. Francis G. Ward, Commissioner of Public Works, will advertise for bids.

The United States Government will establish and equip a new light and fog signal station at the north end of the breakwater, Buffalo harbor entrance, for which an appropriation of \$60,000 was provided by Congress at its last session.

The Steel Conduit Company has been incorporated with a capital stock of \$150,000 at Penn Yan, N. Y., to manufacture electrical conduits and insulating devices. The incorporators are W. T. Morris, H. M. Short and E. R. Ramsay, Penn Yan.

The Ox fibre Brush Company, Frederick, Md., has purchased a site of six acres for a new manufacturing plant at Albany, N. Y., on Broadway near Ferry street. Plans are being prepared for a three-story reinforced concrete building 80 x 400 ft. which will be erected at once as the first of a series of manufacturing buildings of which the plant will be comprised.

The National Tanners' Supply Company, Buffalo, N. Y., recently incorporated with a capital stock of \$250,000, will establish a plant for the manufacture of tanning oils, dyes and tanners' supplies of all kinds. H. Sloan, W. Brereton and D. Bunchaft, Buffalo, are the incorporators.

The large machine shop additions to the plant of the American District Steam Company at North Tonawanda, N. Y., and its new general office building there are nearing completion and as soon as finished the company's machine shops and main offices, now located at Lockport, N. Y., will be removed to North Tonawanda.

The New York Central Iron Works, Geneva, N. Y., has about completed arrangements for building a new plant at Hagerstown, Md. Plans for the proposed plant have not

THE MACHINERY MARKETS

been prepared as yet and the machinery details are to be arranged later.

Catalogues Wanted

The Union Iron Works, Hill and Burnett streets, Houston, Texas, desires catalogues of manufacturers of oil feed boilers and engines with a view to making agency connections.

Philadelphia

PHILADELPHIA, Pa., March 13, 1911.

Merchants and manufacturers report continued irregularity in the demand. In instances a trifle better inquiry for tools of the heavier types is noted, but there is still a lack of buying in any quantity, transactions being confined largely to single tool propositions. Some industrial concerns are ordering supplies more liberally, due to gradually increasing activity, but conservatism prevails when it comes to placing orders for any quantity of machine tool equipment. Special tools and machinery have been a shade more active, as requirements along special lines increase, a number of the smaller shops being pretty fully engaged on work of that character. A moderate increase in the demand for machinery castings is reported by foundries making a specialty of work of that character, but the betterment has not been sufficient as yet to have any general effect on the productive rate. The railroad demand has been practically at a standstill for the past few weeks. It is said that lists of requirements from the various shops have been prepared for some time but prospective purchases still lack authorization. A scattered demand for second-hand machinery is reported; the range of inquiry is somewhat more general and sales are less active than they were a few weeks ago. The market for boilers is fair but that for engines of moderate capacity continues dull, while very little has been done in power equipment of the heavier type.

Edwin J. Rooksby, who for a number of years has been a member of the firm of H. B. Underwood & Co., manufacturers of special tools for railroad repair and general machine shops, has withdrawn. The business will be conducted as heretofore by the remaining partners, Morris G. Condon, Albert D. Pedrick, Howard A. Pedrick and Daniel W. Pedrick, Sr., under the old firm name, H. B. Underwood & Co.

Paul Richardson, who for a number of years was connected with the selling forces of the Fairbanks Company in this city, particularly in the scale and general sales department, is now associated in a like capacity with the local branch of the Standard Scale & Supply Company, 35 South Fourth street.

Fire destroyed the machine shop of W. D. Haines, manufacturer of the Haines farming machinery, Haddonfield, N. J., on March 6. Plans have been made for temporary quarters and the rebuilding of the shop will be deferred until later in the season. The loss by the fire is said to have been about \$5000.

The Industrial Supply & Equipment Company has added several important lines and reports business as being somewhat improved. This company has been appointed exclusive selling agent for the Johnson hopper door, under patents of St. Clair J. Johnson, for application on cars of all classes. It also has the agency for the territory east of Ohio and extending along the Atlantic Coast, for the D. & L. Throttle rod stuffing box and plunger plastic packing, manufactured by the Union Machine Company, St. Paul, Minn.

George W. Garrett & Sons, wagon builders, 3908 Spring Garden street, are taking bids for an additional manufacturing building, 50 x 107 ft., three stories, to be erected at 3002-3006 Spring Garden street, for general work in connection with the building of wagons. Requirements in the way of power equipment and machinery have not yet been decided upon. The new plant when completed will increase the manufacturing capacity of the concern fully one-third.

Otto C. Wolf, architect and engineer, is preparing plans for a manufacturing building to be erected for F. X. Zirkilton, at Twelfth and St. James streets. The new building, which is to be used to a considerable extent for the manufacture of jewelry, will be 47 x 132 ft., five stories, and alternate bids on a concrete and a steel and brick structure will be asked.

It is stated that subbids are being taken by the Harrisburg Mfg. & Boiler Company, Harrisburg, Pa., for a one story machine shop, 400 x 600 ft. Particulars are not obtainable at this time.

The Commissioners of the District of Columbia, Washington, D. C., are receiving bids for the erection of a manual training school building at Wisconsin avenue and Thirty-

third street, in that city. The building programme is under the direction of C. H. Rudolf, John A. Johnson and William V. Judson, commissioners. Plans are by the Engineering Department of the district, 427 District Building, Washington, D. C.

Bids for the widening of Chestnut Street Bridge, in this city, opened by the Highway Department a few days ago, were found to be in excess of the appropriation, \$90,000. Bids ranged from \$108,600 to \$135,000, and specifications will have to be withdrawn and new bids asked.

Contractors are estimating on a new loft building, for light manufacturing purposes, to be erected at 1427 to 1433 Vine street for L. A. Belmont, on the site of the warehouse destroyed by fire several months ago. Plans call for a concrete building, 72 x 125 ft., with all modern conveniences.

A contract is reported closed for an extension of the Stroudsburg & Water Gap Railway, connecting Water Gap and Portland, Pa., a distance of five miles. E. P. Arbogast is said to have the contract and the cost for the roadway work and other improvements is stated as being \$80,000. This extension will form the last link in the electric service between this city and Delaware Water Gap, Pa.

A dispatch from Scranton, Pa., states that the Scranton Electric Company has announced its plans for the expenditure of \$1,000,000 to modernize its power plant. These include the making of steam and electricity at central plants, which will be located in the suburbs at Green Ridge and at its plant on the Lackawanna River. A new plant for the generating of electricity at Carbondale, Pa., is included. Particulars regarding the reported plans of the company are not available at this time.

The borough of Bristol, Bucks County, Pa., will open bids March 20 for a sewerage system and water works. William H. Boardman, 426 Walnut street, Philadelphia, is consulting engineer for the sewerage and disposal plant, which will require considerable mechanical equipment, including engines, pumps and boilers. J. M. Whitham, 607 Bullitt Building, Philadelphia, is consulting engineer for the water works, which will include a filter plant with a capacity of 2,000,000 gal., a water tower with a capacity of 150,000,000 gal., pumping station and power house.

Chicago

CHICAGO, ILL., March 14, 1911.

A general quietness prevails in the local machinery market. Inquiries are small and infrequent. Last year at this period automobile industries were ordering freely and with the fair volume from small manufacturers business was in better condition. This season most automobile manufacturers are restricting their purchases to bare necessities of the day. A feeling that this retrenchment has been overdone prevails in some quarters and as the activities of spring produce buyers this condition is expected to mend. The good crop conditions of the Mississippi Valley last year are looked upon as being advantageous to automobile business in the smaller towns and cities. The Power Mining & Machinery Company, Cudahy, Wis., is out with a list approximating \$5,000 and the Rock Island Railway Company with one amounting to about \$7,000. Floor sales are reported to be fair by local machinery houses, but no large inquiries are afloat.

The Parmelee Wrench Company, Chicago, has increased its capital stock from \$2,500 to \$10,000, and is installing new machinery which will enable it to triple its output.

The Reliance Mill-Work Company, Chicago, has purchased a tract of ground at Gary, Ind., upon which it will erect a warehouse and factory building in the near future, to be equipped with wood working machinery.

The Havana-American Tobacco Company, a branch of the American Tobacco Company of New York, will erect a manufacturing building at a cost of \$175,000 on West Twelfth street, between Robey and Lincoln streets, Chicago. The building will be 112 x 456 ft. and will be equipped with a mechanical ventilating system. Plans for the building were prepared by George C. Nimmons of this city.

The Moline Pressed Steel Company, Moline, Ill., has increased its capital stock from \$25,000 to \$50,000 and will double the capacity of its plant.

The Root & Vandervoort Engineering Company, Moline, Ill., has under construction a machine shop adjoining its foundry which will greatly facilitate work when completed.

The Excel Mfg. Company, Rockford, Ill., furniture, will in the near future hold a meeting to consider an increase in its capital stock from \$20,000 to \$50,000, the increase to be used to extend its business.

The city of Lincoln, Ill., has under consideration the installation of a municipal lighting plant.

THE MACHINERY MARKETS

New England

Boston, Mass., March 14, 1911.

The trade will watch with some anxiety the results of the announcement of the New York, New Haven & Hartford Railroad that it proposes to curtail expenditures. A vast amount of new work is projected, including that of the Boston & Maine system, with the new shops, for which great amounts of machinery will be required. Many of the improvements are considered absolutely necessary, and it is not supposed that a postponement will follow. The Automobile Show last week contained many elements of encouragement for this trade. The machinery dealers found February a fair month; this is always one of the dull months of the year in many branches of industry. The machine tool builders are accumulating stocks. Seldom has the industry gone ahead in preparing for a future market with such confidence. When the tide of demand sets in the market will be exceptionally well supplied in most lines of tools. A very hopeful factor is the improvement in the textile machinery business, which has been dull for some time. Manufacturers of repair parts are feeling a very decided change for the better, and the great manufacturers of this class of machinery are busier than they have been for a year.

The Union Caliper Company, Fitchburg, Mass., has purchased the business of the Hill Tool Company, Anderson, Ind., and the industries will be consolidated in a new plant at Orange, Mass. The Union Caliper Company manufactures a line of machinists' small tools, including calipers, scales and kindred appliances, while the Hill Company makes a line of tool holders, for use with lathes, planers and other machinery. A modern building, admirably suited to the purposes of the industry, has been secured at Orange, and the work of removing the Fitchburg factory will begin immediately. When this has been completed the equipment and stock of the Anderson factory will be taken to Orange. Both of the consolidated companies require additional manufacturing facilities, and the new location will accomplish the desired end. Some new equipment will be needed later, but just what is not yet known. The present shops have considerable modern machinery. New tools will be used to balance the equipment, to give a maximum of productive capacity. Emory E. Ellis is president of the Union Caliper Company, and M. D. Johnson the treasurer, both being residents of Fitchburg.

The Barker Company, Pine Island, Norwalk, Conn., manufacturer of gasoline engines, will erect an addition to its works, 30 x 140 ft.

Additions to general manufacturing facilities include the following: M. J. Riordan, Norwalk, Conn., woodworking shop, 35 x 60 ft., three stories; Omo Company, Middletown, Conn., dress shields, one-story addition, 40 x 240 ft.; Gaynor-Mitchell Company, Bridgeport, Conn., addition contemplated.

The Massachusetts Saw Works, Chicopee, Mass., has awarded the contract for a new factory to be located at the corner of Fiske and Roland avenues, in the Brightwood section of Springfield, Mass. The main building will be 70 x 170 ft., two stories, with a one-story wing, 60 x 80 ft. A building to house the engine and gas producer plant will be 30 x 50 ft. The plant will be of brick, mill construction.

The Bay State Tap & Die Company, Mansfield, Mass., manufacturer of screw cutting tools, which suffered a loss of \$8000 by fire February 26, has made repairs so that the factory is now running at full capacity. It will be necessary to rebuild only a small part of the works.

The Lynn Machine Company, 523 Union street, Lynn, Mass., has been organized to carry on a machine shop making a specialty of repairs.

The stockholders of the Chapman Valve Mfg. Company, Indian Orchard, Mass., have voted to accept the recommendation of the Board of Directors for a financial reorganization, by which the corporation will be capitalized for \$1,000,000, equally divided between common and preferred stock, an increase of preferred stock of \$200,000, but a decrease in common stock from \$1,000,000 to \$500,000. The stockholders were practically unanimous in their action, which will put the finances of the business on a most substantial basis.

The last of rapidly succeeding railroad changes in New England is the acquiring by the Boston & Maine system, through the controlling corporation, the New York, New Haven & Hartford, of the Montpelier & Wells River Railroad, the Barre Railroad and the Barre Railway. These purchases have important connection with the recent acquirement of rights in the Rutland Railroad. The Montpelier & Vermont connects the two places from which it is named, a distance of 45 miles, together with a seven-mile branch to Barre. The Barre Railroad and Barre Railway are shorter lines, operating in the quarry country.

The report is revived that the Vermont Central, or its

The Perfect Stove & Mfg. Company, Belleville, Ill., has been incorporated with a capital stock of \$10,000. The incorporators are A. B. Deeb, Paul Moeller and Charles Webb. The company will engage in the manufacture of stoves and ranges.

The plant of the Aviston Condensed Milk Company at Aviston, Ill., was practically destroyed by fire March 5. The loss is estimated at \$50,000. The insurance is \$22,500.

The Hamilton Lumber & Mill Company, Hamilton, Ill., has increased its capital stock from \$22,000 to \$40,000.

Hillsboro, Ill., has secured a new enterprise, a zinc smelter. Options on 43,000 acres of coal lands were secured six miles southwest of Hillsboro, by H. S. Hargrove and Frank Brown, who sold the options to Wm. Lanyon, a St. Louis capitalist, who intends to develop them for his own use in smelting zinc. The smelter will cover 30 acres, and 12 or more buildings will be erected.

Cincinnati

CINCINNATI, OHIO, March 14, 1911.

Inquiries and orders for machine tools from the South and the Pacific Coast now lead other sections of the country. Business is still improving, but is not yet what it should be. Machine tool builders are not now laying off any men, nor are they taking on any new operatives.

Manufacturers of electrical equipment are very busy, and at least one local factory has had to make some extra night runs. Woodworking and saw mill machinery also continues to show some improvement.

Increased attention is being paid to the export trade. One lathe builder, who in former years rarely received an export order, now reports fully 15 per cent. of its output as going to foreign countries, with a steady improvement shown each month.

On March 9 fire destroyed the plant and salesrooms of the Murdock Mfg. Company, Cincinnati, manufacturer and dealer in plumbing supplies. The loss is estimated at about \$50,000, partially covered by insurance. The company has leased temporary quarters on Sycamore street, near Ninth. Its plant will be rebuilt without delay.

The new Mechanics Institute building, Cincinnati, is now under cover, and the interior finishing work is being rushed all possible.

The Means Engineering & Foundry Company, Toronto, Ohio, has increased its capital stock from \$50,000 to \$75,000.

The Findlay Motor Company, Findlay, Ohio, announces an increase in its capital stock from \$300,000 to \$400,000.

The Ahrens Iron Works Company is a new Cincinnati incorporation with \$100,000 capital stock, and it is rumored that this company will soon take over the Union Iron Works plant on Colerain avenue. The incorporators of the new company are Robert Puff, Otto Loesche, John C. Hermann, A. E. Otte, Jr., and G. F. Ahrens.

The Atwood Wrench, Tool & Mfg. Company has been incorporated at Conneaut, Ohio, by William Atwood and others.

The executive committee of the Cincinnati Branch, National Metal Trades Association, held a meeting March 9 and completed arrangements for attending the annual convention to be held in New York in April. Members from Cincinnati and vicinity will travel in special cars over the Pennsylvania Railroad.

The plant of the United States Carriage Company, Columbus, Ohio, suffered a \$20,000 fire loss last week. Repairs are already under way.

Rapp, Zettel & Rapp, architects, Johnston Building, Cincinnati, have drawn up plans for an addition to the plant of the Cincinnati Milling Machine Company, in Oakley. The improvements will add about 75,000 sq. ft. of floor space to the factory in question, and will be constructed of brick, steel and concrete.

The J. A. Fay & Eagan Company, Cincinnati, manufacturer of sawmill and woodworking machinery, has consolidated its Chattanooga, Tenn., Greensboro, N. C., and Atlanta, Ga., offices, and the latter point has been selected as headquarters for handling business in that territory.

The Williams Shoe Company, Cincinnati, has more than doubled its capital stock, and will, in the near future, make some large additions to its shoe factory.

It is reported that the Packers Motor Car Works, Pittsburgh, Pa., is negotiating for a site at Glenova, W. Va., on which it will erect a plant for the manufacture of automobiles and auto trucks.

There is a rumor, that cannot now be confirmed, that the Proctor & Gamble Company, Ivorydale, Ohio, has completed plans for erecting a 100-ton cottonseed oil mill and refinery at Memphis, Tenn.

THE MACHINERY MARKETS

lessee, the Grand Trunk, will build modern repair shops at the southern end of the system. The need of largely increased shop facilities will be accentuated when the new line from Palmer, Mass., to Providence, R. I., is completed within the next two years. The Vermont Central has had plans for large improvements in repair shops for some time, but has not acted definitely in the matter to date.

An increase in the capital stock of the Lockwood Mfg. Company, South Norwalk, Conn., builders' hardware, is for the purpose of putting surplus into capital. The management states that no enlargement of the plant or business is contemplated at this time.

The Marine Specialty Company, Inc., Norwich, Conn., has been incorporated in Connecticut, with capital stock of \$4000, to manufacture marine indicators and other instruments. The incorporators are Charles H. Kenney, New London, and Frank H. Allen and Archibald Mitchell, Jr., Norwich. The company states that no factory will be established at present, but that the products will be made by outside parties.

The Hutchinson Vacuum Cleaner Company, Bridgeport, Conn., has been incorporated in Connecticut to manufacture a low priced vacuum cleaner, which will retail for \$5. It will be manufactured by the R. P. K. Pressed Metal Company, Bridgeport, and marketed from the New York office of that corporation, under the direction of the Vacuum Cleaner Company. Charles G. Hutchinson is president; A. L. Ruland, vice-president, and Howard McK. Kirkland, secretary and treasurer.

The addition to the works of the Union Twist Drill Company, Athol, Mass., mentioned in last week's issue, will be used to take care of the increased business of the cutter department.

The Springfield Foundry Company, Springfield, Mass., states in connection with its new works, that they will be run strictly as a jobbing foundry and will make a high grade of gray iron castings. The structure will be 100 x 150 ft.

The Boston Automobile Show was a surprise in the great attendance, which exceeded that of the 1910 show, and in the number of orders for cars placed with exhibitors. The industry apparently received much encouragement from direct results, as well as from large promises of indirect results a little later in the season. A certainty exists that there will be a shortage of certain makes of cars. The show had no extended exhibits of machinery or appliances used in the manufacture of cars. The Norton Company, Worcester, Mass., showed its line of abrasive wheels and materials, including its new Crystolon, the Norton Carborundum. The Norton Grinding Company, Worcester, had in operation its cam grinding machine and machine for procuring a running balance of cylindrical parts. The Chandler & Farquhar Company, Boston, occupied its usual space, showing in operation a 5-ft. full universal high-speed radial drill and a 3-ft. sensitive drilling machine of the American Tool Works, Cincinnati; the improved cold saw and saw sharpening machine of the Cochrane-Bly Company, Rochester, N. Y.; the ball bearing disc grinder of the Rowbottom Machine Company, Waterbury, Conn.; the combination milling and drilling machine of the W. B. Knight Machinery Company, St. Louis, and the gear cutter of the Standard Machinery Company, Bridgeport, Conn. A machine in the Chandler & Farquhar exhibit which attracted a good deal of attention was a new type of ball bearing high duty polishing and buffing machine, which has just been brought out by the Central Autogenous Welding Company, Worcester, Mass.

The saw shop of the West Haven Mfg. Company, West Haven, Conn., was destroyed by fire March 8. Other parts of the plant were saved and the company is able to continue its manufacturing and fill orders.

Milwaukee and the Northwest

The Miller Brewing Company, Milwaukee, Wis., is erecting an addition to its boiler house 50 x 75 ft., two stories, in which it will install three new boilers. An iron smoke stack 150 ft. high will also be erected.

The Davis Mfg. Company, Milwaukee, Wis., manufacturers of gasoline engines, is considering the erection of a testing room. The company states that it is buying a few tools, but is not in the market for any special class of equipment at the present time.

The Lewiston Brick & Tile Mfg. Company, Lewiston, Mont., incorporated with \$75,000 capital stock, has plans prepared for the construction of a brick and tile plant.

The St. Paul Foundry Company, St. Paul, Minn., has under consideration the erection of additions to its plant. definite plans for which will be decided upon at its annual meeting, to be held some time in April.

The Northern Cold Storage & Warehouse Company, Duluth, Minn., is erecting a new warehouse, 100 x 100 ft.,

in which will be installed an electric elevator of 6000 lbs. capacity.

The Gas Traction Company, Minneapolis, Minn., will commence work as soon as the frost is out of the ground on a new office building, 40 x 100 ft., two stories. The present office room will be used for increasing the machinery equipment.

The Kinnard-Haines Company, Minneapolis, Minn., gasoline engines, has under consideration the erection of an assembling building, 60 x 200 ft., during the fall of 1911.

The Segerstrom Piano Mfg. Company, Minneapolis, Minn., is contemplating the erection this spring of a factory to contain about 50,000 sq. ft. of floor space. Considerable new equipment will be purchased, all of which will be operated by electric power, with individual motors.

The Moore Boat Works, Wayzata, Minn., is contemplating the erection of a steel boat house, 75 x 150 ft., two stories, to be arranged with tracks, and equipped with elevators for the handling of boats and launches.

A water works system to cost \$10,000 will be established by the City Council of Cuyuna, Minn.

The Manchester Light, Heat & Power Company, Manchester, Iowa, will enlarge its plant by the installation of an additional engine and dynamo.

Roland, Iowa, is having estimates prepared for an electric light plant to be constructed at a cost of \$8,000.

The Waterloo Chemical Works, Waterloo, Iowa, is erecting a new factory, 40 x 150 ft., two stories and basement, which it will equip with modern machinery. A steam heating plant will be installed, and arranged, so that the steam may also be used for power and glueing purposes. Tanks for the storage of gasoline and kerosene will be erected. Many of the improvements have not been definitely decided upon, and contracts for the equipment have not been placed. The company is considering the use of motive power.

It is reported that the Sioux City Foundry & Mfg. Company, Sioux City, Iowa, is to be reorganized, and its capital stock increased from \$60,000 to \$150,000. It is the intention of the company to manufacture a gasoline tractor, invented by H. H. Boehman, Holstein, Iowa.

The Independent Mfg. Company, Waterloo, Iowa, has been incorporated with \$10,000 authorized capital stock, and will engage in the manufacture of agricultural implements, tools, &c. The officers of the company are: President, A. C. Ryan; Secretary, H. W. Christoph; Treasurer, J. C. Farr.

Cleveland

CLEVELAND, OHIO, March 14, 1911.

Some of the local machine tool builders report an improvement in the volume of orders and inquiries. Makers of forging machinery, drilling machines and automatic screw machines find the demand better than a few weeks ago. With the machinery dealers there is very little change in the situation. They are getting a moderate volume of orders for single tools and lots of three and four in small and medium sizes. Much of the business is coming from small new concerns that are starting to manufacture automobile accessories or small specialties. Some business is coming from the automobile manufacturers, but it is largely in the line of special tools. The improved condition of the automobile trade is noticed by the manufacturers of automobile parts, many plants engaged in this class of work now being well filled with orders. In electrical equipment the demand for small motors is quite active, showing considerable improvement.

Conditions are improving in the foundry trade, some of the light gray foundries now being fairly well filled with work.

The controlling interest in the Novelty Iron Company, Canton, Ohio, has been sold to George E. Downe and Eastern associates, and the company has been reorganized by the election of the following officers: President, Huntlie Gordon, Boston, Mass.; vice-president and general sales manager, George E. Downe, Canton; secretary and treasurer, H. H. Bryan, Johnstown, Pa. The directors include the officers and William Sherlock, D. R. McCallum, Sol Torenski and J. J. Grant. The company manufactures hot water and steam boilers and radiators.

The Bowling Green Motor Car Company, Bowling Green, Ohio, has been incorporated with a capital stock of \$100,000 to manufacture light delivery trucks. The company will occupy the plant in that city formerly occupied by the Gramm Motor Car Company. The incorporators are Stanley F. Sawyer, John B. Wilson, F. C. Moore, F. L. Rouch, J. W. Underwood and T. J. Miller.

Finding the present capacity of its plant too small to keep up with orders, the O. O. Poorman Company, New Bremen, Ohio, has decided to increase its capital stock from

THE MACHINERY MARKETS

\$30,000 to \$50,000. The additional capital will be used in erecting another factory building and equipping it with machinery.

The Zeroze Mfg. Company, Cleveland, Ohio, has been incorporated with a capital stock of \$100,000, to manufacture glass-lined tin cans. A one-story factory building, 75 x 300 ft., will be erected. The company has established offices at 522 Rockefeller Building. The officers are: President, L. R. Steel; vice-president, S. C. Clark; secretary and treasurer, John D. Lloyd.

The Board of Trustees of Public Affairs, Andover, Ohio, will receive bids March 30 for the construction of a water works system. The specifications call for about 20,000 ft. of 4 to 8 in. pipe, 35 hydrants, 24 grate valves, and a 60,000-gal. tank on a steel tower.

The Board of Trustees of Public Affairs, Lakewood, Ohio, will receive bids April 4 for the erection of a steel water tower. Plans are on file at the office of the W. H. Evers Engineering Company, The Arcade, Cleveland.

The Steel Products Company, recently organized at Columbus, Ohio, has leased the steel castings plant at Plain City, Ohio, and is now operating it.

The Ragan-Brown-Lange Company, a new concern, has purchased the plant of the Napoleon Mfg. Company, Napoleon, Ohio, and expects to place it in operation shortly, the nature of the products not yet being made public. It is stated that a foundry will be built and some new machinery installed.

The McLean Lock Wrench Company, Cleveland, has been incorporated with a capital stock of \$15,000 by John C. McLean, C. H. Knight and others. The company is planning the starting of a factory for the manufacture of wrenches.

The Portage Rubber Company, Akron, Ohio, has decided to build a new plant at Barberton, Ohio, adjoining its present reclaiming plant. The plant will be used largely for the manufacture of molded and mechanical rubber goods.

The Canton Boiler & Engineering Company, Canton, Ohio, has increased its capital stock from \$100,000 to \$125,000.

The Phelps Can Company, Baltimore, Md., will build a large can factory at Weirton, W. Va., near Steubenville, Ohio. Five buildings will be erected, the contract for one of which has been placed. This will be 150 x 160 ft.

The Gallion Iron Works Company, Gallion, Ohio, will enlarge its plant by the erection of a building, 50 x 100 ft., for storage purposes, and will probably shortly build an extension, 150-ft. long, to its brick factory building.

Plans for a new plant to be built by the Peck, Stow & Wilcox Company, Cleveland, at Southington, Conn., are being prepared by Anton Burchard, engineer, Cuyahoga Building, Cleveland. The new buildings will include a machine shop and warehouse combined 50 x 300 ft., five stories, of mill construction; a forge shop, 60 x 300 ft., one story, of steel and concrete construction; a foundry irregular in shape, containing 14,000-sq. ft. of floor space, of brick and steel construction; wood mill, 40 x 140 ft., two stories, mill construction; miscellaneous building, 112 x 40 ft., one story, brick and steel construction, and a power plant. An engine and generator to provide 750-hp. will be purchased. It is stated that little if any new machinery will be required for the machine shop, as the company's old plant is well equipped with machine tools. Contracts for the new buildings will be placed shortly.

St. Louis

ST. LOUIS, Mo., March 13, 1911.

Business the past week has been rather slow, although a fair run of miscellaneous orders has been entered by the various dealers.

The McKinney Traction Cultivator Company, with \$2,000,000 capital stock, has opened an office in St. Louis and will build a factory in East St. Louis as soon as a site is determined upon.

The Emerson-Bishop Refrigerator Machinery Company has incorporated with a capital stock of \$400,000, and will later on erect a factory for making its equipment, which for the present will be contracted out.

The Scullin-Gallagher Iron & Steel Company has some improvements under way.

Manufacturers of brewers' machinery seem quite busy, some of these being booked ahead for several months for their maximum output.

The street car manufacturing companies are well occupied with work, and business with the structural shops is improving.

The United Drug Company's representatives have been visiting St. Louis for the purpose of inspecting sites for a mammoth drug manufacturing plant, which will employ upward of 1,000 persons. The location will lie between the cities of St. Louis and Kansas City. The parties who are

charged with the decision are L. K. Liggett and Louis I. Schriener of Boston. The company has a capital stock of \$5,000,000, and has a home plant at Boston, Mass.

The Spring Pipe Threader Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are Chas. Maxwell, Roy M. Ellers and J. W. Calhoun. The company will engage in the manufacture of machinery, &c.

The Automatic Mailing Machine Company, Kansas City, Mo., has been incorporated with a capital stock of \$100,000. The incorporators are W. C. Renfro, F. R. S. Ditmars and L. A. Robertson.

The Hannibal Bag Company, Hannibal, Mo., has been incorporated with a capital stock of \$30,000. The incorporators are C. R. Hamilton, Geo. T. Hamilton and Dora E. Hamilton.

The Board of Public Works, St. Louis, Mo., will install a new electric plant in the basement of the city hall at a cost of \$70,000.

The Hempstead Structural Steel Company, St. Louis, Mo., is erecting a bridge shop, 75 x 114 ft., with sawtooth skylights covering the entire roof. The equipment for the present will consist of one large and one small punch, air compressor, with all necessary appliances, drill presses, cold saw, emery wheels, &c. All machines will be direct motor driven.

The Star Bucket Pump Company, St. Louis, Mo., will erect a factory building, 75 x 125 ft., four stories, which will be equipped with sprinkler system and electric elevators.

The Missouri Lamp & Mfg. Company, St. Louis, Mo., is adding an additional story to its factory building, and will install an electric elevator.

Cole Camp, Mo., is planning the construction of a \$10,000 waterworks system.

The Harrisburg Electric Light & Power Company, Harrisburg, Ark., has been purchased by Morris Hayutin of that city, who will make extensive improvements.

A company to be known as the Farmers' Elevator Company is being organized at Bradish, Neb. The president is David Fitch. The erection of an elevator will be begun at once.

A syndicate has been organized by the firm of C. E. Foote & Co., Topeka, Kan., with \$100,000 capital stock to develop the Hoffman copper mine in Mohave county, Arizona. C. J. Price of Topeka has been engaged as consulting engineer, and work will begin immediately on the construction of a mill which will be equipped with crushers, rolls, tables, boilers, engines, and power plant. Purchases will be made by the engineer who now has the matter under consideration.

Woodward, Okla., has under consideration the question of issuing \$30,000 in bonds for a municipal lighting plant.

The Hospital & Health Board, Kansas City, Mo., has under consideration the installation of an ice plant at the General Hospital.

The Zonri Mfg. Company, St. Louis, has been incorporated. The capital stock is \$35,000. The incorporators are Daniel J. Murnane, James B. Bettis and C. C. Collins. The company will engage in the manufacture of building materials and fixtures of all kinds.

The American Fillers Company, St. Louis, has been incorporated. The capital stock is \$200,000. The incorporators are J. W. Willan, Lewis Lipton, Jr., and Homer Carroll. The company will do general mining, milling and manufacturing.

Detroit

DETROIT, MICH., March 13, 1911.

Manufacturers in general are well satisfied with the past week. The volume of orders, characteristic of the first week of March, continues unabated. For some reason orders held off the first of the year, but many pending deals justified predictions of a banner year. Now, however, predictions are being fulfilled by the great influx of orders, and all manufacturers are elated over the excellent outlook. The Alden-Sampson Company recently removed from Pittsfield, Mass., made a record shipment of motor trucks this week, a consignment of over \$80,000 worth leaving Thursday. The Hupp-Yeats Electric Car Company has exhausted its capacity, and all orders for cars are now required to be made in advance. The accessories trade is recovering from the slump of the first of the year, and is running to the normal output.

In all probability the Henry & Wright Mfg. Company, at present located at Hartford, Conn., will remove its drill press plant to Detroit. For several days the principals of the company have been in conference with the Board of Commerce, with the view of obtaining a suitable factory

THE MACHINERY MARKETS

site. They desire about 40 acres, and plan to group together several manufacturing establishments, turning out mechanical equipment employed in connection with drill presses.

The Huyp Motor Car Company has selected Windsor, Ont., as its Canadian factory branch. The factory will be a two-story structure, and will be fitted complete throughout.

The Auto Accessories Company, makers of motor car equipments, has filed notice of dissolution. The action has been contemplated for some time past.

With a capital stock of \$10,000 the Detroit Insulator Company has filed articles of incorporation with the state secretary. The company will engage in the manufacture of wire insulation. Harry A. Robertson is the principal stockholder.

The Detroit-Chatham Mfg. Company, has incorporated with a capital stock of \$100,000. The company is organized to take over the plant of the Barnes Motor Car Company. Plants will be operated, both in this city and Chatham, Ont. The equipment will not be enlarged at present, but the plants will be increased in capacity as soon as conditions warrant it. The company starts with plenty of paid in capital, and is in good standing. Louis Lemberg is a large stockholder.

The Gilmore Cragg Motor Mfg. Company is the name of a new company organized to manufacture gas engine motors. The organization is in the hands of George Gilmore.

Holland, Mich., will vote at the April election on the question of bonding the city for \$15,000 for water works improvements.

Hastings, Mich., is planning to erect a water works and electric lighting plant. The proposed bond issue of \$120,000 has been given every assurance of being passed at the spring election.

H. I. Norton of Marinette, and H. S. Duquaine of Crivitz, Mich., are organizing a company with a capital stock of \$100,000, to erect a large fibre plant on the Pike River. The company proposes to make use of the water power available.

The Kenmore Mfg. Company, Chicago, Ill., is planning to remove its present plant to Battle Creek, Mich. Representatives of the company are in the latter city conferring with the Industrial Association.

The Detroit Edison Company made considerable improvements during the past year. The wonderful growth during the past year will mean still more equipment. The capacity of the Delray plants will be increased to 62,000 kw. by the addition of a new 14,000 kw. turbine generator, if present plans carry.

The Curtis & Reichhelm Company incorporated the past week with a capital stock of \$400,000. The company's product will be a patent press feeder, tests of which are to be made by two large concerns, who will install the feeders. Details of the organization are in the hands of Frederick L. Curtis.

The Brillion Mfg. Company, Menominee, has been formed to succeed the Brillion Woodenware Company. The factory will be opened at once for the manufacture of cheese boxes.

The Duryea Automobile Works, Reading, Pa., will move its large plant to Port Huron, Mich. The Chamber of Commerce of the latter city has been working for its location for some time past, and feels highly elated over its success.

The Traverse City Canning Company, Traverse City, Mich., has been sold to R. J. McDonald of the same city. Mr. McDonald plans to put the concern on a firm financial basis, and will overhaul and enlarge the equipment of the plant.

The Otsego Chair Company, Otsego, Mich., is making plans for the erection of a branch chair factory at Cadillac.

William E. Polhemus, of the Battle Creek Roofing Company, Battle Creek, Mich., has plans completed for the organization of a paint and varnish plant, to be located at the latter city. Consturction on the building has been started already.

The Universal Implement Company, Orion, Mich., has increased its capital stock from \$15,000 to \$25,000.

The American Electrical Heater Company, of this city, has plans under way for the building of an addition to its plant that will increase its capacity by about one-half. The building will be reinforced concrete 120 x 130 ft. and two stories.

E. A. Clements and Cornelius A. Harvey, the former president of the Grand Rapids Board of Trade, have organized a pearl button plant, to be located at Grand Rapids, Mich., with a capital stock of \$150,000.

The plant of the Quaker Oats Company, Battle Creek, Mich., was burned to the ground March 7. The plant is a total loss, and will require entire reconstruction. The loss will reach \$100,000.

Included in the list of improvements, to be undertaken by the Pere Marquette system, is an item of nearly \$400,000,

to be spent in Grand Rapids, Mich. The most important improvement will be the erection of a 40-stall round house. This, with an addition to be built to the present machine shops, will double the capacity of this department, and cost in the neighborhood of \$135,000.

An electric line from Benton Harbor to Dowagiac, Mich., is being actively promoted. Manager Mason, of the Benton Harbor line, proposes to the City Council to float an issue of \$200,000 second mortgage bonds to finance the line.

Menominee, Mich., is planning to erect a main middle bridge over the Menominee River. The plans are in the hands of City Engineer Haas, who makes his report this week to the council.

The T. C. Beach Company, St. Johns, Mich., has incorporated with a capital stock of \$10,000. The firm will manufacture sectional furniture to be sold direct to customers.

The new factory of the Empire Cement Company, Menominee, Mich., will cost in the neighborhood of \$200,000. Work on the plant will commence this summer. According to a contract with the city the company must have spent \$50,000 before the first of next year, to acquire the factory site, which is valued at \$12,000.

The Ayers Engine & Motor Company, Trenton, Mich., has increased its capital stock from \$100,000 to \$160,000. The increase will allow the company to enlarge the plant's capacity.

The Williams Gas Machine Company, with a capital stock of \$25,000, filed articles of incorporation with the secretary of state this week. The new firm will locate at Grand Rapids, Mich.

A new motor boat company, to be known as the Hacker-Pouliot Boat Company, has filed articles of incorporation with a capital of \$10,000. The company's plant will be located in this city.

Bread making machinery will be the product of the American Bread Machinery Company, a concern organized at Lansing, Mich., last week. The company will start with a capital stock of \$5,000.

The Little Tour Transmission & Motor Company has organized with a capital stock of \$15,000. The plant will locate in this city, and will make a light running engine.

The Upjohn Company, Kalamazoo, Mich., maker of medicines and pills, suffered a \$100,000 fire loss last week. The company will rebuild immediately.

W. J. Mead, general manager of the Olds Motor Works, Lansing, Mich., states that surveyors will be put to work immediately to survey land adjoining the present structures, with the intention of erecting a large factory building to increase the plant capacity by 50 per cent. The building will be a three-story and basement structure, 74 x 758 ft.

The Newaygo Engineering Company, Newaygo, Mich., which was in course of construction a new two-story factory, will be in the market for a 15-in. lathe and one or two drill presses about April 15.

The Pittmans & Dean Company, Detroit, Mich., is having plans prepared by John Scott & Co., architects of that city for the installation of an artificial ice plant.

The Automatic Faucet & Spigot Company, Saginaw, Mich., will erect a new building, 40 x 80 ft., in place of the one recently destroyed by fire.

The Industrial Works, Bay City, Mich., manufacturer of locomotive cranes, contemplates building an addition to its machine shop some time this spring.

Indianapolis

INDIANAPOLIS, IND., March 14, 1911.

The Auto Keyless Lock Company, Indianapolis, Ind., has been incorporated with \$50,000 capital stock to manufacture locks. The directors are: Andrew J. Coppock, Charles Mabey and S. A. Clinehens.

The Hydraulic Drive Company has been organized at Indianapolis, with \$50,000 capital stock, to manufacture transmission devices. The directors are F. H. Cheyne, Charles S. Walker and Thomas H. Endicott.

The Roth-Murphy Engine Starter Company, Indianapolis, Ind., has been incorporated with \$50,000 capital stock, to manufacture an engine starter. The directors are G. W. Roth, W. H. Murphy and David R. Murray.

The Compeer Cigar Company, Indianapolis, Ind., is preparing plans for the erection of a six-story building, to be used for manufacturing cigars. The building will be of reinforced concrete, equipped with elevators and other modern conveniences. L. M. Crump is president of the company.

The Westerfield Gas Engine Company, Indianapolis, Ind., has increased its capital stock from \$50,000 to \$75,000.

The Warren Electric & Machine Company, Indianapolis, Ind., has been incorporated with \$10,000 capital stock, to manufacture electrical machinery. The directors are E. F. Warren, L. W. MacNought and E. C. Strathmann.

The Upland Electric Company, Marion, Ind., has been

THE MACHINERY MARKETS

Toronto

TORONTO, ONT., March 11, 1911.

There is every indication that vessels will be able to come up the St. Lawrence earlier this year than usual. The weather is uncommonly mild for March, and unless there is a return of winter temperature, the ice should not long remain a hindrance to navigation. That prospect is favorable for trade, and especially for trade with the United Kingdom and other European countries. Assurance that delivery will not be delayed is a consideration with persons who have orders to place that can be filled by British and German houses. It is understood that a larger volume of merchandise than usually comes in on the first boats, will arrive from the other side of the Atlantic at the beginning of this season. Machinery and equipment are lines in which competition is growing keener. There are few branches of merchandise in which so many outside countries are so nearly on an equal footing to supply the goods. In textile lines, in paper goods, some one country has usually a great advantage over others, such as the United States has in the matter of cotton.

Canadian buyers of machinery and equipment are turning the competition to account. They still present a good demand, and they find that makers of plant are not so busy as to be above offering inducements to those who have good orders to place.

The Commissioners of Queen Victoria Niagara Falls Park are calling for tenders for the construction of steel concrete bridges for the boulevard they are making. Information can be obtained from the superintendent, John H. Jackson, Niagara Falls, Ont.

A large quantity of machinery is being hauled to the Porcupine gold field from the railway line. Special efforts are being made to get engines, compressors, drills, stamps, &c., forward before the winter road breaks up. The railway branch will be completed as soon as possible, but it is deemed important to get plant in position with the least loss of time.

United Motors, Ltd. will erect a factory in Welland, Ont., this summer. The plant of Electro-Metals, Ltd. in that town is to be doubled.

Low water at the Chaudiere is making difficulties for the manufacturers in Ottawa and Hull, who depend upon power from that source.

The Bishop Silver Mines, Ltd., proposes to put in a compressor plant at its West Ridge properties, Gowganda, Ont.

The Canadian Pacific Railway Company will spend from \$1,000,000 to \$1,500,000 this year on the mountain section between Revelstoke and Field.

The Medicine Hat Milling Company, Medicine Hat, Alberta, will treble the capacity of its plant.

The Canadian Pacific Railway Company has called for tenders for the construction of a round-house in London, Ont., to accommodate 22 locomotives. Machine and boiler shops are to be built in connection with the round-house.

It is reported from St. Thomas, Ont., that the Monarch Knitting Company has cancelled its order for machinery to equip the branch factory it was to erect in that city, and that nothing will be done in pursuance of the building plans until the reciprocity agreement is disposed of.

Advices received in Toronto and Montreal by banks and loan companies doing business in the Canadian West, are to the effect that more money will be required this season in that part of the country than ever before, and that building operations there are likely to run to larger figures than in any former year.

Toronto's Board of Control has decided to ask for tenders for plant to be used in the construction of new street railway lines. It is estimated that the outfit will cost \$95,374. Tenders are also asked for the providing of the rails required.

The Minister of Railways and Canals has announced that the construction of the Hudson Bay Railway will be begun by the Dominion Government without delay.

The Premier of Quebec announces that his government will not alter its purpose to maintain an embargo on the exportation of pulpwood cut on the Crown lands of the Province. Everything should be done, he says, to foster the domestic paper industry. A similar announcement of policy was made sometime ago by the Premier of Ontario. In both Provinces large pulp and paper projects are being entered upon, and there are expectations of great development in that line for some time to come.

The management of the Montreal Light, Heat & Power Company announces that the directors have decided upon

the construction of a new electric plant. The directors are George M. Tabor, H. F. Purley and Frank D. Ball.

The McDonald Bros. Pulverizing Stone Company, Newcastle, Ind., has been incorporated with \$10,000 capital stock, to manufacture stone. The directors are R. E. McDonald, B. L. McDonald, Jr., and Paul Brown.

F. C. Buel, of Oakland City, Ind., has leased coal lands near there, and is going to open a mine. The equipment will be for a capacity of 100 tons a day.

The Decatur Motor Car Company, Decatur, Ind., has increased its capital stock from \$150,000 to \$200,000. The president is M. E. Brackett.

The Keystone Mfg. Company has been organized at Muncie, Ind., by L. S. Ganter, E. G. Burke and J. D. Allen, to manufacture portable water.

The Evansville Marine Motor & Foundry Company, Evansville, Ind., has been incorporated with \$20,000 capital stock, to do a machinery manufacturing business. The directors are Benjamin F. Drury, Charles F. Donnelly and Charles L. Bloner.

Henry Nyberg of Chicago has purchased at receiver's sale the Rider-Lewis Motor Car Company's plant at Anderson, Ind., for \$40,000.

The St. Paul Stone Quarries Company, St. Paul, Ind., is endeavoring to interest additional stockholders for the purpose of enlarging the present stone crushing plant.

Rertsch & Co., machinists, Cambridge City, Ind., last week shipped to the American Car & Foundry Company, at Jeffersonville, a 10-ft. metal shear, weighing 30,000 lbs.

The City Carriage Works, Ft. Wayne, Ind., has been incorporated with \$20,000 capital stock, to manufacture vehicles. The directors are John B. Rolape, Chas. J. Homary and T. C. Harges.

The Arnold-Wagner Company has been incorporated at South Bend, Ind., with \$10,000 capital stock, to manufacture electrical supplies. The directors are Earl H. Arnold, John W. Arnold and Joseph W. Wagner.

Donald MacGregor has been appointed receiver for the Pioneer Metal Mfg. Company, South Bend, Ind., on the petition of John V. Meyer, wholesale hardware dealer, who alleged that the capital stock was abnormally larger than the assets. The liabilities are placed at \$44,000, the assets at \$4,500. The capital stock is \$50,000.

The Fort Wayne Motor Sales Company, Fort Wayne, Ind., has been organized to manufacture and deal in automobiles and automobile parts. The capital stock is \$10,000. The directors are Charles R. Dancer, H. R. Fullenwider and H. S. Morrison.

The Caldwell & Drake Construction Company, Columbus, Ind., has been awarded the contract for the erection of a 12-story hotel in Louisville; contract price being between \$700,000 and \$800,000.

The New Idea Specialty Mfg. Company, Fort Wayne, Ind., recently incorporated to take over the business of the Pen Ejector Pen Holder Company, is planning the erection of a new factory. The company will be in the market for some automatic wood working machinery and equipment for making steel springs for the manufacture of the pens, pen holders, &c. L. J. Libbing is president of the company.

Bolner & Peck, Eaton, Ind., are making inquiries for some second-hand machinery, including one lathe, 24 or 30 in. swing, and one gasoline engine, 16 to 20 hp.

The Westerfield Gas Engine Company, Indianapolis, Ind., has been incorporated with \$50,000 capital stock by G. G. Westerfield, J. E. Westerfield and A. H. Nordyke.

The Winona Electric Light & Water Company, Warsaw, Ind., will make improvements to its plant, including the installation of new pumps.

Plans and specifications for the new plant of the Northwestern Can Company to be erected at Brazil, Ind., are on file at the office of the Commercial Club of that city. The building to be erected will contain approximately 60,000 sq. ft. of floor space. A power plant will also be installed by the company.

The I-X-L Furniture Company, Goshen, Ind., is erecting a two-story and basement brick machine room, 50 x 100 ft., which it will fully equip with wood working machinery. A two-story brick warehouse and packing room, 55 x 125 ft., is also being erected by the company.

The Elkhart Paper Company, Elkhart, Ind., is having plans prepared for a new building, 40 x 200 ft., one-story and basement, and an addition, 55 x 136 ft., one-story and basement. The large building will be equipped with a paper making machine, and the other will be used for a finishing room.

The Miller-Kemper Company, Richmond, Ind., recently incorporated, has acquired a site of seven acres, on which it is erecting two buildings, one 50 x 100 ft., and the other 30 x 200 ft. The company will do a general contracting and building business, and has purchased all necessary equipment, with the exception of 40 hp. motors and dry kiln, with independent boiler for heating.

THE MACHINERY MARKETS

an expenditure of \$1,000,000 for the enlargement and improvement of the plant this year.

The Prairie Fuel Gas Company has just been organized with a capital stock of \$8,000,000 to take over the interests of the Calgary Electric Light & Gas Company, in Calgary, Alberta.

The Winnipeg Electric Street Railway Company is preparing to erect a new power house at the foot of Portage avenue, East. About 16,000 hp. will be generated there.

The Southern Alberta Land Company is building a very extensive irrigation system south of the Canadian Pacific Railway main line. Hundreds of miles of irrigation ditch, together with weirs, aqueducts, and pipe lines, and a stretch of railway, are being made. Water is being taken from the Bow River in the vicinity of Namaka.

The Pacific Coast Coal Mines, Ltd., Victoria, proposes to double the output of its South Wellington properties. Improvements calling for the expenditure of \$500,000 are planned.

A syndicate of Winnipeg men has acquired the assets of the Fort George Lumber & Navigation Company. Extensive improvements are planned. J. D. McArthur, railway contractor, Winnipeg, Man., is at the head of the syndicate.

Application has been made to the Dominion Government for a charter for the Alberta Electric Railway Company, with a capital stock of \$10,000,000.

The Bell Telephone Company of Canada is about to provide for further improvements by a new bond issue of \$1,250,000.

The Board of Trade, at Dawson, Yukon District, has adopted a resolution in favor of the placing of mining machinery unqualifiedly upon the free list.

It is stated that the British Columbia Steel Corporation, to which charter has just been issued by the Dominion Government, with a capital stock of \$10,000,000, has received a communication from American interests to establish large car and foundry works in connection with its plant at or near Port Mann.

The Regina Tractor Company, Regina, Saskatchewan, has reorganized, and is taking over the Regent Gasoline Tractor Company. The new company's capital stock is \$250,000.

The Moncton Tramway Electricity & Gas Company, Moncton, N. B., has submitted to the city final plans showing the routes of proposed lines and for a complete natural gas installation. Thirty miles of gas mains are to be put down.

The Electrical Maintenance & Repair Company, Ltd., Toronto, Ont., recently incorporated with \$40,000 capital stock, has taken over an existing plant, but will erect a new factory in the near future, 20 x 80 ft., to be equipped with traveling crane, hot water heating system, &c.

Adam Hall, Ltd., Peterborough, Ont., manufacturer of steel ranges and heaters, recently incorporated with \$100,000 capital stock, has just completed the erection of a foundry building, 46 x 114 ft., fully equipped with traveling crane, drills, emery wheels, rattlers, hoist and all other necessary tools.

The Dowsley Spring & Axle Company, Ltd., Chatham, Ontario, Canada, is erecting an addition to its plant, 46 x 135 ft., of brick and frame, and is installing a new engine of 100 hp. and other new machinery. It manufactures car springs, carriage springs, seat springs, axles, gears, &c.

The South

LOUISVILLE, KY., March 14, 1911.

There has been a slackening up of business, according to reports received from some machinery manufacturers, although the number of inquiries for general equipment apparently indicates that there is a lot of prospective business in the market. Complaint is also being heard that some manufacturers are quoting prices which are far below normal and below the level which others have fixed as their minimum. Quarrying and crushing machinery continues to be in good demand.

The Kentucky Electric Company, Louisville, which is to build a new and larger plant, has begun to buy its equipment. The machinery purchased thus far includes one 2000-kw. turbo-generator, from the General Electric Company; one 4000-kw. turbo-generator from the General Electric Company and one 100-kw. turbo-exciter and one 100-kw. motor-generator exciter from the same company. In addition the company has purchased from the Babcock & Wilcox Company four 1000-hp. boilers, four superheaters

and four stokers. It has still to buy its condensers and several other important items. Work on the construction of its new buildings, for which additional ground has been bought, will begin before April 1.

R. B. Tyler & Co., Louisville, who have bought the Tucker quarries at Tucker, Ky., will purchase a complete crushing outfit, including boilers, compressors and drills, and will extend the operations at Tucker. Several local concerns are figuring on the contract.

E. D. Morton & Co., dealers in machine tools, conveying machinery and mill supplies, have removed from the Board of Trade Building to 516 West Main street, Louisville, where they will carry a large amount of machinery in stock.

The Urwick Machinery & Supply Company has changed its name to the Brandeis Machinery & Supply Company, Robert E. Brandeis purchasing the interest of C. Urwick in the company. Among the interests which it represents are the Nye Steam Pump & Engine Company, the Ingersoll-Rand Company, the Lidgerwood Mfg. Company, the Hayward Company, John H. McCowan Company and others.

The Moran Flexible Steam Joint Company, Louisville, has decreased its capital stock from \$250,000 to \$25,000. Thomas W. Moran is president of the company.

A company has been formed at Jeffersonton, Ky., for the establishment of an electric light plant, a franchise for which has been created by the town council. The new plant is to cost \$15,000.

County Judge Gilbert, County Attorney Pickett and members of the Fiscal Court at Shelbyville, Ky., have been authorized to purchase road machinery, including two steam rollers, graders, harrows, &c.

The Kentucky-Tennessee Traction Company, of which Charles Vanden Burgh, of Hopkinsville, Ky., is general manager, will erect a power-house for the operation of several interurban lines in western Kentucky. The Arnold Company, Chicago, is engineer.

The Maysville Public Service Corporation, Maysville, Ky., has been formed with \$150,000 capital stock to take over the gas, electric light and street railway properties. The electric light plant will be considerably enlarged.

The Uniontown Brick & Tile Company, Uniontown, Ky., is planning improvements, including the installation of machinery for the manufacture of tile shingles.

The Maysville Milling Company, Maysville, Ky., of which J. F. Gebhart is president, is receiving bids on the equipment of a \$20,000 meal and flour mill.

The Lewisport Electric Light Plant, of which J. C. Emmick is manager, and which recently received an electric light franchise at LaGrange, Ky., is to open bids April 1 for the installation of a 65-hp. gas engine, a 45-kw. direct current 250-volt generator, and other equipment needed for the LaGrange plant.

N. L. Gilbert, manager of the Kentucky Tobacco Works, of Murray, Ky., is asking for prices on a 60-hp. boiler.

The Board of Public Works, of Bowling Green, Ky., is preparing to advertise for bids for a new engine to be installed in the electric light plant and a new pump for the water works plant will be bought. The present engine has been in use 23 years. The machinery, it is expected, will cost \$8000.

Thomas L. Fitch, of Louisville, has purchased an interest in the Richmond (Ky.) Electric & Power Company. The company recently increased its capital stock, and it is understood that some improvements will be made.

Construction of the hydroelectric plant of the Eastern Tennessee Power Company on the Ocee River, near Chattanooga, is progressing rapidly, it is reported, and may be completed by January 1, 1912. Six 200-hp. boilers have been installed.

M. L. Jack, of Philadelphia, is promoting the organization of a company at Morristown, Tenn., for the manufacture of furniture. It is expected that the proposed plant will cost \$15,000.

A bond issue of \$60,000 has been authorized at Clarksville, Tenn., for the purpose of improving the waterworks. A new pumping station will be installed.

The Severance Mfg. Company, Nashville, Tenn., recently incorporated, is to purchase machinery for the manufacture of gas mantles.

The J. C. Tassey Automatic Motor & Flue Press Company has been incorporated at Nashville, Tenn., with \$10,000 capital stock by Lorenz Neuhoof, L. C. Holt and others. Automatic flue machines and boiler flue presses will be made.

Maryville, Tenn., has petitioned the Legislature for authority to issue \$100,000 of bonds for the construction of a water system.

It is reported that the Steinhauer Truck & Motor Car Company, of St. Louis, of which R. Shaul is president, is

THE MACHINERY MARKETS

contemplating the establishment of a factory at Memphis, Tenn.

Memphis, Tenn., is considering the erection of a municipal electric light plant, and officials of the city will make a tour of inspection for the purpose of investigating plants in other cities.

The Nashville Gas Company, Nashville, Tenn., has increased its capital stock from \$1,150,000 to \$1,500,000. It has not been announced whether the increase is for the purpose of making improvements in the plant.

The Nashville, Chattanooga & St. Louis Railroad has purchased ground in Memphis, Tenn., and will erect shops and roundhouses there. The cost of the improvements is to be \$125,000.

Stokeley Bros. & Co., Newport, Tenn., have purchased the building and power equipment of the Bellevue Cotton Mill Company and will convert the plant into a cannery, purchasing a large amount of additional equipment.

A new plant is to be constructed by the Newport, Tenn., Tanning Company.

David G. Baker, Philadelphia, is reported to be working on plans for a new blast furnace at Chattanooga, Tenn., to be built by the Citico Furnace Company. Improved hot-blast stoves and an electrical power plant will be built if the proposed plans are carried out.

The St. Louis & San Francisco Railroad, which is to make improvements at Bellevue, near Memphis, Tenn., will build a six-stall roundhouse at a cost of \$150,000.

Gadsden, Ala., is considering the issue of \$40,000 of bonds for the completion of the waterworks system.

The Edmondson Electric Plant & Mfg. Company, Edmondson, Ark., has been incorporated with \$50,000 capital stock. It will operate a lighting plant and manufacture lumber.

Morris Hayutin, Harrisburg, Ark., has purchased the controlling interest in the Harrisburg Electric Light & Power Company, and will make extensive improvements.

Equipment is being purchased by Sam J. Beck, of the Jennings Oil Company, Pittsburg, in connection with operations at Bison, Ark.

The Laurel Light, Heat & Power Company, Laurel, Miss., has been incorporated with \$30,000 capital stock by J. T. Pullen, R. T. Young and others.

Improvements in the gas plant at Huntsville, Ala., which was recently taken over by new interests, will be made a new corporation, known as the Huntsville Gas, Light & Fuel Company, having been organized to operate the property. M. Rea Gano, of Philadelphia, is president, and Ed. P. Vogels secretary of the new company.

A Philadelphia syndicate has purchased the control of the Helena Gas & Electric Light Company, Helena, Ark., and will make improvements which will involve the expenditure of \$350,000. A new powerhouse will be built at once. Newberger, Henderson & Loeb are the Helena representatives of the syndicate.

Byhalia, Miss., will issue \$10,000 of bonds for the construction of an electric light plant.

The Darrough Warehouse Company will erect a \$30,000 elevator at Little Rock, Ark. Bids for its equipment will be called for at once.

The Alexandria Street Railways Company, Alexandria, La., has been taken over by J. A. White and others, and will be reorganized. Improvements will be made in the property by its new owners.

The City Council of Clarkville, Tenn., has decided to issue \$60,000 in bonds to install water meters and erect a new pumping station.

The Gulf Iron Works, Tampa, Fla., has in course of construction an iron and brass foundry and machine shop. The building is of corrugated iron and steel, 50 x 100 ft., two stories, and will be equipped with a 5-ton traveling crane and machinery for the manufacture of phosphate mining machinery and general repairing.

The Southern Airship Company, Columbia, S. C., has been incorporated with \$500,000 capital stock, and will erect a plant to manufacture an aeroplane designed by Victor Jossenberger, of Toronto. The company is now making tests with its machine, and is in the market for gasoline engines from 30 hp. upward, radiators, &c.

The Owens West Virginia Bottle Machine Company, Fairmont, W. Va., has plans for improvements to its plant to almost double its present capacity. The company will spend about \$250,000 for extensions and equipment, details for which are being prepared.

The Carver Buggy Company, Morristown, Tenn., which has been doing a business under a partnership agreement, has been incorporated with a Tennessee charter for \$50,000. The company will manufacture buggies, surreys, traps and kindred lines for the Southern trade. O. K. Carver, is president of the new company.

The City Council of Newton, Miss., is considering the installation of an electric light plant at a cost of \$11,000.

Texas

AUSTIN, TEXAS, March 10, 1911.

Settled weather and satisfactory business conditions are the reports that come from all parts of Texas. In Arizona and New Mexico increase in mine development is reported, and this has augmented the demand for machinery for the different lines of that industry. The revolutionary situation in Mexico, while it is annoying to the Government, and is paralyzing business interests in some of the Northern States of that country, is not generally regarded as being of sufficient importance to menace the administration of President Diaz. The most serious result of the operations of the bands of rebels is the tying up of lines of transportation, thus preventing machinery, supplies and other commodities from reaching the mining camps and different towns and industrial centers.

The Corpus Christi Street & Interurban Railway Company, Corpus Christi, Texas, has been granted a franchise by the City Council to extend its lines to suburban parts of the town.

The system of interurban railway that is being constructed in the lower Rio Grande valley by S. A. Robertson, of San Benito, Texas, and associates, will be extended from San Benito to Mission, about 75 miles. The route of the proposed extension is through a number of irrigated plantations.

C. C. Frampton and H. A. Clapp are arranging to erect a large brick manufacturing plant at Corpus Christi.

The Kettler Brass Mfg. Company, Houston, Texas, has increased its capital stock from \$30,000 to \$60,000. It will make improvements.

The Boards of County Commissioners of Nueces and San Patricio counties contemplate joining in the construction of a new steel bridge across the Nueces River. Corpus Christi is the county seat of Nueces County.

The Board of Trade of Cleburne, Texas, is promoting the organizing of a local company to erect and operate a factory for the manufacture of automobiles at that place.

The large sawmill of Saner & Whiteman, at Caro, Texas, which was destroyed by fire a few days ago, entailing a loss of about \$100,000, will be rebuilt.

The reorganization of the Corsicana Cotton Mills has been effected, and the plant will be overhauled and placed in operation. It is situated at Corsicana, Texas.

E. C. Robinson, of St. Louis, Mo., who has been investigating the situation at Crystal City, Texas, with the view of installing an electric light and power plant there, is reported to have decided favorably upon the proposition.

The Brownsville Irrigation Company, which recently passed into new hands, will greatly enlarge the capacity of its pumping plant. The present capacity of the plant is sufficient to water about 15,000 acres, and it will be enlarged to water about 40,000 acres. The company's system of irrigation is situated near Brownsville, Texas.

The cotton gin of the Industrial Cotton Company at Denison, Texas, will be equipped with new machinery.

A new cotton ginning plant will be installed at Lavernia, Texas, by Kott & Wiseman, of that place.

J. C. Saunders, of Bonham, Texas, and associates, will take immediate steps toward enlarging the cotton mill at Cuero, Texas. The reorganized company that has taken over this plant, has a capital stock of \$125,000.

The Goliad Supply Company has been organized for the purpose of installing a water works system, an ice factory and electric light plant at Goliad, Texas.

The City Council of Timpson, Texas, will order an election to vote on the proposition of issuing \$20,000 of bonds for constructing a water-works system.

Wallace & St. John, Detroit, Mich., have taken preliminary steps toward applying to the City Council of Temple, Texas, for a franchise for a gas plant and distributing system for that place. The estimated cost of the proposed works is \$100,000.

T. B. Love is installing a water distributing system in the North Sierra Blanca subdivision of Sierra Blanca, Texas.

The Wagner Mfg. Company, Cedar Falls, Iowa, contemplates establishing a branch factory at Houston, Texas, for the manufacture of hardware specialties.

The sawmill of William Cameron & Co., at Saron, Texas, which was recently destroyed by fire, causing a loss of about \$100,000, will be rebuilt as soon as the plans can be prepared and the contracts let.

L. T. Hands, Sandusky, Ohio, has been investigating the situation at Roswell, N. M., as the representative of the American Roller Mills, of Middletown, Ohio, with the view of erecting a flour mill at Roswell.

The Roswell Gas & Electric Company, Roswell, N. M.,

THE MACHINERY MARKETS

is rebuilding its electric power plant and enlarging its capacity with the view of providing power for irrigation pumping plants in that part of the Pecos River valley. The Berrendo Farms Company will install 65 pumping plants, each of a capacity of 1000 gal. per minute, all to be operated by electricity. The Roswell Gas & Electric Company will construct a system of transmission lines to cover the valley territory.

The Guanajuato Foundry & Sheet Iron Works of Guanajuato, Mexico, owned by Andrew Ennis, is being enlarged and otherwise improved.

The City of Lufkin, Texas, will open bids March 24 for two 100-hp. return tubular boilers, two boiler feed pumps, one 200-hp. open type feed water heater, two compound duplex pumps, one condenser and wet vacuum pump, two 75-hp. motors. Specifications can be had from the city clerk, or by addressing the O'Neil Engineering Company, Dallas, Texas.

Pacific Coast

PORTLAND, ORE., March 8, 1911.

The machine tool trade continues moderately active, the principal demand being for tools of comparatively small size for shops doing work of a miscellaneous character. Conditions in the lumber market are hardly up to expectations, but many logging camps are opening for the spring season, and there is considerable demand for donkey engines and general equipment, as well as for sawmill and woodworking machinery. Local building continues extremely active, and numerous contracts are being let for elevator equipment, &c. A large amount of municipal work is offered in both Oregon and Washington, giving rise to some inquiry for general contractors' equipment, as well as power and water works machinery. Traveling men report unusual activity in heavy power machinery, both steam and hydroelectric, throughout Oregon and in parts of California, though aside from the Tacoma development the Washington market appears rather quiet.

Hans Pederson, Seattle, Wash., has taken the general contract for completing the Nisqually power plant for the city of Tacoma on a bid of \$1,074,918. The contract includes the erection of a steel bridge over the Nisqually canyon. The city of Tacoma has just taken bids on a 10-in. horizontal series centrifugal pressure pump of 2500 gal. per minute capacity at 115 lbs. pressure per square inch direct connected to a 200-hp. 2200-volt induction motor.

The demand for sawmill machinery has been increased by the destruction of several large mills by fire. A. B. Praena, Seattle, Wash., is designing a resaw mill to replace that of the Anacortes Lumber & Box Company, Anacortes, Wash., which was burned February 9. The plant of the A. J. West Lumber Company, near Aberdeen, Wash., was burned February 27, with a loss of about \$100,000, and plans are being made for the immediate reconstruction of the mill. A fire in South Portland, February 28, destroyed the plants of the Oregon & Washington Lumber Company, the Gold Medal Shingle Company, and the Multnomah Lumber Company.

Several important Government contracts have come out recently, and there is considerable other work of this nature in prospect. C. E. Graff, Seattle, Wash., has taken the contract for oil storage equipment at the Puget Sound Navy Yard at \$26,000, and the Moran Brothers Company, Seattle, Wash., has the steel caisson contract for drydock No. 2 at the same place at \$125,000. A caisson contract for the Pearl Harbor drydock in Hawaii, T. H., has been awarded to the Union Iron Works, San Francisco, at \$133,892.

Capt. Thomas H. Jackson, United States Engineers Corps, San Francisco, has invited Portland firms to bid on the construction of two 20-in. suction dredges to be used by the Government on San Francisco Bay.

It is understood that the Crook County Water, Light & Power Company is having plans made for its power project at Cline Falls, on the Deschutes River. The plant is to supply light and power to a number of towns in the vicinity.

The Astoria Iron Works, Astoria, Ore., has taken a contract for a gasoline power boat for the DuPont Powder Company.

The Stetson-Ross Machine Works, Seattle, Wash., has established a branch office at Spokane, Wash.

The Coin Machine Mfg. Company has let contracts for its tool and laboratory building in this city.

The Corvallis Lumber Company, Corvallis, Ore., is preparing for a material increase of its equipment this spring.

Work is to be started shortly on a new round house for the Southern Pacific Railroad at Klamath Falls, Ore.

J. F. Brallier, Seattle, Wash., is working on a project to establish a woolen mill at Roseburg, Ore.

The Lister Mfg. Company is preparing to install a lot of woodworking machinery at Tacoma, Wash.

The new foundry of the Phoenix Iron Works, this city, has started operations with a run of 10 tons the first day. The company has a number of large contracts for pipe castings.

The Rogers Company, Tacoma, Wash., is preparing to install a spice mill at Spokane.

The Western Coopers Company, Aberdeen, Wash., has ordered a small hoisting engine, and is making a number of minor improvements. The Saginaw Timber Company of the same place has ordered three large logging engines.

Demerest & Miller, Tacoma, Wash., have purchased a saw mill at South Prairie, Wash., and are installing a lot of new machinery, including a J. A. Fay & Egan resaw, and independent electric drive for all machines.

The C. L. Best Gas Traction Company, Oakland, Cal., has installed a two-ton converter, and in addition to doing its own casting work, is soliciting outside business in steel castings.

Gladding, McBean & Co., Lincoln, Cal., are building a railroad from their large pottery plant to the clay beds.

The Lincoln Clay Products Company, Sacramento, Cal., is preparing to increase the equipment of its brick plant at Lincoln, Cal.

Fred B. Wright, formerly of Chicago, has opened an office at 741 Monadnock building, San Francisco, Cal., as representative of E. P. Jamison & Co., dealers in railroad and contractors' equipment.

The Washington Portland Cement Company is tripling the capacity of its plant at Concrete, near Seattle, Wash.

J. Locke, Tacoma, Wash., is working on a large pumping plant project for irrigation purposes, to be carried out at North Yakima, Wash.

A large amount of Eastern dredging machinery is being delivered at Portland for the Spokane, Portland & Seattle Railway.

The Seattle Cornice Works, Seattle, Wash., will build a branch factory at Portland, Ore., having recently received a number of large contracts in that city.

A resolution has been passed by the City Council of Newport, Cal., providing for the construction of a municipal electric light plant, for the installation of which bonds in the sum of \$55,000 will be issued.

J. L. Hughes and associates of North Yakima, Wash., are organizing a company to establish a pumping plant of sufficient capacity for watering 25,000 acres.

The City Council of Pendleton, Ore., is planning to improve the water works system at an estimated cost of \$200,000.

Government Purchases

WASHINGTON, D. C., March 13, 1911.

The Paymaster-General, Navy Department, will open bids April 4 under schedule 3368, class 1, for one 10-ton 3-motor electric jib crane for Mare Island, Cal.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids March 28 as follows:

Class 51.—For four hydraulic variable speed gears—Bidder 36, Diehl Mfg. Company, Elizabethport, N. J., \$3408.80 and \$740. part; 146, Waterbury Tool Company, New Britain, Conn., \$2100.

Class 52.—Variable speed power transmission apparatus—Bidder 27, Cutler-Hammer Mfg. Company, Milwaukee, Wis., \$7950 and \$41,550; 36, Diehl Mfg. Company, Elizabethport, N. J., \$3408.80 and \$740. part; 49, General Electric Company, Schenectady, N. Y., \$891. part.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids March 7 as follows:

Class 21.—Bid A, one barge steam boiler and pumps, not self-propelling. Bidder 71, Maryland Steel Company, Sparrows Point, Md., \$120,000; 73, Newport News Shipbuilding & Dry Dock Company, Newport News, Va., \$101,500.

Bid B, one self-propelling barge, steam boilers and pumps. Bidder 72, Maryland Steel Company, Sparrows Point, Md., one steamer, \$73,000, \$143,000, 28 tons.

Bid C, one barge internal combustion engine, not self-propelling, no bids.

Another Jones & Laughlin Rod Mill.—The Morgan Construction Company, Worcester, Mass., has received a contract from the Jones & Laughlin Steel Company, Pittsburgh, for a double strand Morgan continuous rod mill, which will be a duplicate of the one recently furnished by the Morgan Company to the Jones & Laughlin Company, and which is in successful operation. The mill consists of 16 trains of rolls, and is of the pure continuous type. Billets 13 in. x 13 in. x 30 ft. will be used. The capacity of the mill will be from 9000 to 10,000 tons per month.

Trade Publications

Extension Lathes.—Edwin Harrington, Son & Co., Inc., Seventeenth and Chestnut streets, Philadelphia, Pa. Catalogue E. Illustrations and descriptive matter explain the operation of a line of extension lathes having swings ranging from 25 to 48 in. over the top shears. The general features of the lathes are described, and this is followed by illustrations and brief specifications of the different tools, the latter being given on the pages facing the engravings.

Marine Gas Engines and Automobile Parts.—Ferro Machine & Foundry Company, East Sixty-sixth and Hubbard streets, Cleveland, Ohio. Pamphlet. Is a souvenir of the formal opening of the new offices of the company on February 7.

Radial Drills.—Baush Machine Tool Company, Springfield, Mass. Several loose leaf circulars. These deal with the various types of drills built by this company. The make-up of the circulars is uniform, a view of the tool being given on the left inside page, while brief specifications occupy the facing one.

Mechanical Lubricator.—The Richardson-Phenix Company, Milwaukee, Wis. Bulletin No. 53. Illustrations and descriptive matter explain the operation of the Richardson model M mechanical lubricator, which was illustrated in *The Iron Age* February 2, 1911. This lubricator is designed to feed oil drop by drop from the feed nozzle at any desired rate so that the lubricant is broken up into a number of small particles which are mixed with the entering steam. It can be furnished with as many feeds as may be desired, and among the illustrations are those of a 22-feed lubricator for supplying automatic bearing lubrication to high duty elevator pumps and one having 14 feeds. The construction of the lubricator is shown by a line drawing and its operation is explained at length.

Fire Brick.—Chicago Refrort & Fire Brick Company, 837 Commercial National Bank Building, Chicago, Ill. Catalogue. Deals with the various types of fire brick which this company is prepared to furnish in a variety of standard and special shapes. All of these different shapes are illustrated, and there are a number of tables giving the number of brick required to form arches of various spans and springs.

Steam Turbines.—De Laval Steam Turbine Company, Trenton, N. J. Pamphlet. Contains a reprint of an article descriptive of the company's steam turbines for both high and low pressures, which appeared in *The Iron Age* September 15, 1910.

Foundry Tram Rails.—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin T. Describes and illustrates the use of the Moyer tram rail in modern foundry practice. The various parts of the system and its applications are shown and the advantages of using the tram rail instead of a man for transportation purposes are pointed out.

Electrical Machinery and Appliances.—Fort Wayne Electrical Works, Fort Wayne, Ind. Two leaflets and four bulletins. Leaflets Nos. 4511 and 4512 illustrate two types of transformers, one for operating electric bells, buzzers, annunciators, burglar alarms and similar apparatus from the electric lighting circuit, and the other for transforming ordinary lighting current and rendering it available for lighting signs and houses with low voltage tungsten lamps. Bulletin No. 1120 describes an electric rock drill of the rotary design, which is operated by an electric motor mounted on the frame of the drill proper. Its mechanism consists of two parts, a revolving helve containing the hammers and the chuck mechanism for holding and rotating the drill steel. The illustrations show the various parts of the drill as well as the complete tool. No. 1122, superseding 1093, deals with the construction of the small motors made by this company, and their application to a number of different types of machines. The various motors are illustrated, together with some of the devices to which they are applied, and a partial list of the applications completes the bulletin. No. 1123, superseding No. 1066, shows a single-phase induction watt-hour meter, which is made with either a separate or a combined prepayment device. The construction of the various parts of the meter are described, and the illustrations show the operation of the interior mechanism. No. 1126, superseding No. 1114, covers the line of electric fans which this company can supply. The assortment is very complete, and the different styles and sizes are designed for all standard voltages and frequencies.

Small Milling Machines.—Chicago Machine Tool Company, 127 North Canal street, Chicago, Ill. Catalogue. Size $3\frac{3}{4} \times 6\frac{1}{2}$ in.; pages 71. This catalogue differs very much from the general run, as the net prices of the machines as well as the attachments that can be supplied are given. All the styles of millers are illustrated from the stripped machine to one completely equipped, and in each case brief specifications of the tool are given on the facing page. The construction of the machines is described at length, and there are a number of illustrations and descriptions of special work that has been done on them.

Acetylene Burners.—American Lava Company, Chattanooga, Tenn. Pamphlet. Concerned with the various types of German lava burners which this company manufactures for

use with acetylene gas. The different styles of burners are shown and the particular classes of service for which they are adapted pointed out. A page showing special tips and other gas burning parts and appliances which this company has made to order completes the pamphlet.

Power Plant Supplies.—Schutte & Koerting Company, Twelfth and Thompson streets, Philadelphia, Pa. Several catalogue sections. No. 4C refers to the use of the Koerting air-jet chimney ventilator for creating a draft. No. 7G is concerned with blast governor for Corliss engines, which control the speed by air or gas pressure furnished by a blower. No. 7L points out the advantages of using the S. & K. automatic engine lubricator, which is said to insure positive lubrication of all bearings with a complete control of the oil supply. No. 8E illustrates various types of free exhaust and back pressure valves for marine engine and steam turbine work, while No. 8V gives general description and specifications for the Schutte-Koerting vacuum breaking valve. No. 9E calls attention to the Koerting grease extractor and feed water filter for marine and stationary use. All of these sections are printed on standard 8 x 11 sheets and are punched for binding.

Gasoline Engines.—Anderson Engine Company, Shelbyville, Ill. Brochure. Relates to the Anderson marine engine, which is built in sizes ranging from $2\frac{1}{4}$ to 150 hp. The construction of all of the sizes is described, some of them are illustrated, and a complete table of dimensions is included.

Woodworking Machinery.—The Oliver Machinery Company, Grand Rapids, Mich. Catalogue No. 16. Size 6 x 9 in.; pages 448. Deals with a line of woodworking machinery and factory supplies for navy yards, colleges, technical and trade schools, pattern shops, cabinet works, planing mills, builders, carpenters, contractors and all others who use power tools for reducing wood. In illustrating the different machines, for the most part a full page is given to the half-tone or line cut and brief specifications are given on the facing page. There are a number of views of different parts of the factory as well as installations of the company's machinery, and a comprehensive six-page index completes the catalogue.

Automatic Nut Tappers.—Robert J. Rodd, Cuyahoga Falls, Ohio. Pamphlet. Illustrations and descriptive matter explain the operation of a line of machines for automatically tapping hot or cold pressed nuts. These are built in six sizes, handle work ranging from 3-32 to $\frac{7}{8}$ in., and are either belt or gear driven.

Internal Combustion Engines.—The Foos Gas Engine Company, Springfield, Ohio. Catalogue No. 23. Describes a single-cylinder horizontal engine which is built in sizes of from 3 to 90 hp. These engines are built in stationary and portable types, the latter being mounted on skids or a steel truck. The special features of the engines are touched upon, and the engravings not only show the different styles of stationary engine but also a number of applications of the portable one.

Air Compressors, Gold Milling Machinery and Water Tube Boilers.—The Risdon Iron & Locomotive Works, San Francisco, Cal. Three catalogues. No. 7 calls attention to an extensive line of air compressing machinery and pneumatic mining drills. All of these are illustrated by half-tones and line engravings, and tables of specifications are included. No. 12 illustrates and describes a complete outfit of gold milling machinery, and No. 19 treats of the Risdon water tube boiler, which is built in sizes ranging from 60 to 600 hp. The various parts of these boilers are illustrated, and their special features are described at length.

Metal Culverts.—The Canton Culvert Company, Canton, Ohio. Pamphlet. Treats of the Acme metal culverts made from No-Co-Ro metal, which is said to be absolutely non-corrodible, and guaranteed to give satisfactory service for at least 25 years, when properly installed. The various factors producing corrosion in iron and steel are discussed, and comparative chemical analyses and the results of 12-hour corrosion tests of steel, charcoal iron and this metal are given.

Wheelbarrows and Trucks.—J. W. Paxson Company, Philadelphia, Pa. Bulletin No. 21. Pertains to the line of iron, steel and wooden wheelbarrows and bag, barrel and platform trucks which this company manufactures for foundries and industrial establishments.

Pipe Fittings.—McNab & Harlin Mfg. Company, 56 John street, New York City. Two circulars. One describes the Jenkins disk valves which this company makes, and the other shows some of the cast iron drainage fittings manufactured by it.

Gear Hobbers.—The Adams Company, Dubuque, Iowa. Circular No. 805. Describes and illustrates the Farwell gear hobber and covers both sizes of machine built. The various special features of the hobbers are pointed out, and a brief table of specifications completes the circular. Illustrated descriptions of the two sizes of machine appeared in *The Iron Age* June 4, 1908, and September 8, 1910, respectively.

Lap Welded Pipe.—American Spiral Works, P. O. Box 485, Chicago, Ill. Circular. Calls attention to the line of lap welded steel pipe made in sizes ranging from 12 to 72 in. in diameter, which was illustrated in *The Iron Age* February 2, 1911. This pipe is made from low carbon open hearth steel

and is especially suited for gas, compressed air, vacuum and high pressure hydraulic lines. The illustrations show some 30-in. lap welded pipe and fittings and an 11-ft. lap welded steel drum.

Air Brush.—F. J. Lederer Company, 400 Guilford street, Buffalo, N. Y. Pamphlet. Describes and illustrates the Buffalo air brush, which is a small automatic hand device, superseding the hair paint brush and all other devices for spraying or atomizing of paint. Some of its special uses are the application of paints, varnishes, japans, lacquers, enamels, liquid bronzes, glass enamels, asphaltums, shellacs, &c., to wood and metal, and it is stated that one man with this device can accomplish as much as four or five using the hair brush.

Refillable Cartridge Fuse Shells.—A. F. Daum Company, Pittsburgh, Pa. Pamphlet. Concerned with the Daum refillable cartridge fuse shell. Traces the development of the electric fuse from its earliest form, which was a simple piece of fusible wire to the cartridge type so extensively used at the present time. The various parts of this device, which are the shell, the caps fitting upon the ends and the special washers supporting the head of the fuse, are shown, as well as the different types of contacts which can be supplied.

Light and Power Transformers.—Triumph Electric Company, Cincinnati, Ohio. Bulletin No. 451. Contains a complete description with illustrations of the Triumph type L transformers, which are designed for use on overhead single phase circuits of all standard voltages and frequencies. One of the special features of these transformers is excellent regulation. *The Iron Age*, February 2, 1911, contained an illustrated description of these transformers.

Roller Jaw Chucks.—Weaver Mfg. Company, Springfield, Ill. Folder. Illustrates the Weaver roller jaw chuck for driving straight shank drills and reamers without slipping. As the name of the chuck indicates, the gripping is accomplished by three hardened tool steel rolls which hold the tool shank by friction. An illustrated description of this chuck appeared in *The Iron Age*, January 19, 1911.

Boring, Drilling and Milling Machines and Power Millers.—Franklin Machinery Company, Franklin, Pa. Booklet. Describes a line of horizontal and universal boring, drilling and milling machines and power milling machines. The construction of these machines is especially rigid and they are able to handle a wide range of work. The different machines and their special parts are illustrated and brief tables of specifications occupy the facing pages.

Upright Power Hammers.—E. R. Caldwell & Co., 34 Hilton street, Bradford, Pa. Circular No. 46. Shows the Scranton upright power hammer, the special features of which are the absence of any horizontal movement, the use of few parts and the avoidance of wear and jar. The construction of the hammer is described at length and a partial list of users completes the circular.

Lathe Mandrels and Steam Traps.—W. H. Nicholson & Co., Wilkes-Barre, Pa. Two pamphlets. The first refers to the use of expanding mandrels as a substitute for measuring pieces turned out in the lathe by caliper. These mandrels are made in sets of nine and will fit any size of hole from 1 to 7 in. in diameter. The special advantage claimed for their use is a saving of time. The various sizes of mandrels are shown and there are a number of illustrations showing them in use. The other pamphlet points out the advantages of using the Wyoming automatic eliminator to secure dry steam. This device is made in a number of sizes ranging from 3 to 16 in., for use in steam lines from 25 to 5000 ft. long supplying steam for all purposes. Two types of eliminator, a vertical and a horizontal one, are made. Both of these are illustrated and sectional drawings show their construction. Tables of dimensions of the two types and a partial list of users complete the pamphlet.

Generators and Conduits.—Sprague Electric Company, 527 West Thirty-fourth street, New York City. Bulletin and catalogue. The first, No. 111, contains a partial list of installations of engine generators and also shows some of them. The catalogue, which is No. 436, is of the standard 6 x 9 in. size. It contains illustrations, descriptions and prices of the various types of conduits made by this company, as well as the boxes, fittings and tools.

Electric Fans.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Circular and two folders. The first, No. 1165, shows the company's standard line of electric fan motors for the 1911 season. These motors are designed to operate on regular lighting circuits at the ordinary frequencies and voltages. Folder No. 4101 is devoted to direct current fan motors and No. 4108 concerned with motor exhaust fans.

Monel Metal.—The Bayonne Casting Company, East Tenth street, Bayonne, N. J. Brochure. Concerned with the various forms in which this metal is sold and its different uses. The special advantages of it are that it has a high tensile strength, is noncorrosive, machines readily and can be forged, soldered, brazed or electrically welded. Reports on tests of different shapes of this metal are included, and there are a number of useful tables of information. An illustrated description of some special castings made in this metal appeared in *The Iron Age* January 26, 1910.

Ventilators.—Bicalky Fan Company, 866 Prospect avenue, Buffalo, N. Y. Booklet. Shows some installations of the Bicalky roof fan ventilator, in which a rotating fan wheel creates a vacuum and causes an upward circulation of air at all times. The power and the suction portions of the wheel are entirely separate, so that the air current driving the wheel and the other exhausting the foul air from the building do not interfere with each other.

Autogenous Welding and Cutting.—The Waterhouse Company, Pelham street, Boston, Mass. Pamphlet. Points out the adaptability of the oxy-acetylene process for welding and cutting metals. The pamphlet is almost entirely made up of illustrations showing the great variety of work which it is possible to handle in this way.

Castings.—The Hartford Foundry Corporation, Windsor and Suffield streets, Hartford, Conn. Pamphlet. Calls attention to a number of gray iron castings which this firm has made, ranging from small automobile parts weighing, in some cases, about 1 oz., up to 12 and 15 ton castings for engine beds and steam turbines.

Castings for Municipal Work. The Murray Iron Works Company, Burlington, Iowa. Pamphlet. Devoted to a line of castings for sewer, water and street lighting work. All of these castings are illustrated and two of them, a catch basin and a sewer outlet, both of which are patented, are described at length.

Tool Steels.—Edgar T. Ward & Sons, 25 Purchase street, Boston, Mass. Catalogue H. Size 5 x 7½ in.; pages 128. Treats of the various kinds and shapes of tool steel which this firm handles. These include cold rolled bars, strips and sheets; fine finished wire and rods, Capital and Dannemora tool steels, seamless steel tubing, twist drills, gear and milling cutters, taps, reamers and hack saws. Hints on the working of tool steel are given, with a table giving information on the treatment of ordinary tool steels. The labels of the various brands are reproduced and lists are given of the various sizes in which the different shapes can be furnished.

Basket Handling Machinery.—Taylor Machine Company, Penn Yan, N. Y. Folder. Calls attention to a machine for nailing the handles on fruit baskets. In operation the tacks and the nails used are placed in a hopper and the four holding the handle in place are driven simultaneously by foot power.

Expansion Bolts.—Diamond Expansion Bolt Company, 90 West street, New York City. Pamphlet. Relates to the different types of Diamond bolts. The various sizes in which these bolts can be supplied are listed, together with the price per hundred. Among the bolts described are the Diamond expansion and the Diamond boiler repair bolts, which were illustrated in *The Iron Age* November 17, 1910, and February 9, 1911, respectively.

Feed Mills and Wood Saws.—Victor Feed Mill Company, Springfield, Ohio. Catalogue No. 16. Treats of the Victor feed mills for grinding all kinds of grain and fodder, and a steel frame wood saw for poles, slabs and cordwood.

Friction Clutches.—The Moore & White Company, Philadelphia, Pa. Catalogue. Size 6 x 9 in.; pages 83. This is the company's 1911 catalogue illustrating and describing its patent friction clutches and speed changes. The description is brief, but comprehensive, and tables giving the speeds, horsepower, weight and dimensions of the various sizes are included.

Gear Cutters and Shapers.—Gould & Eberhardt, Newark, N. J. Two pamphlets. The first, entitled "Practical Hints," is intended to be used as a ready reference in connection with the correct operation of the patented automatic gear cutting machines and the cutter grinders of this firm. Directions are given for operating the machines, and this is followed by hints on spur gear cutting. Illustrations showing the comparative sizes of involute gear teeth, and tables of tooth parts and correction factors for the addendum and the thickness of the teeth, are included. The other pamphlet pertains to the line of High Duty shapers and attachments, and shows a number of the different styles and sizes of tools. In this pamphlet a general description of the line of shapers and their special features is first given, and this is followed by illustrations and brief specifications of the various sizes.

Recording Thermometers.—The Bristol Company, Waterbury, Conn. Bulletin No. 127. Describes with numerous illustrations the Bristol class III. recording thermometers for temperatures between 60 degrees below zero and 800 degrees F. Among the instruments covered is the compensating gas filled recording thermometer, which was illustrated in *The Iron Age* January 19, 1911. Various kinds of charts used with these instruments are reproduced, and a partial list of users and uses completes the bulletin.

Molding Machine.—The Tabor Mfg. Company, Eighteenth and Hamilton streets, Philadelphia, Pa. Bulletin M-R. Covers the line of power squeezing molding machines made by this company, and describes their construction with considerable detail. The operation of the machines is gone into at length, and there are a number of illustrations showing patterns cast from match plates made from various metals.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—		Genuine Iron Sheets— Galvanized.		METALS— Tin—	
Refined Iron:		Nos. 22 and 24.....		Straits Pig.....	
1 to 1 in. round and square.....		No. 26.....		Lake Ingot.....	
1 to 1 in. x 1/2 to 1 in.....		No. 28.....		Electrolytic.....	
1 to 1 in. x 1/2 to 1 in.....		Corrugated Roofing—		Cast Iron.....	
1 to 1 in. x 1/2 to 1 in.....		2 1/2 in. corrugated.....		Spelter—	
1 to 1 in. x 1/2 to 1 in.....		No. 24.....		Western.....	
1 to 1 in. x 1/2 to 1 in.....		No. 26.....		Zinc.	
1 to 1 in. x 1/2 to 1 in.....		No. 28.....		No. 9, base, casks.....	
1 to 1 in. x 1/2 to 1 in.....		Tin Plates—		Lead.	
1 to 1 in. x 1/2 to 1 in.....		American Charcoal Plates (per box.)		American Pig.....	
1 to 1 in. x 1/2 to 1 in.....		"A. A. A." Charcoal:		Bar.....	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Solder.	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		No. 1, guaranteed.....	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Refined.....	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Prices of Solder indicated by private brand vary according to composition.	
1 to 1 in. x 1/2 to 1 in.....		American Coke Plates—Bessemer—		Antimony—	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Cookson.....	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Halletts.....	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Other Brands.....	
1 to 1 in. x 1/2 to 1 in.....		American Terne Plates—		Bismuth—	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Per lb.....	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		Aluminum—	
1 to 1 in. x 1/2 to 1 in.....		No. 11 x 20.....		No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting.....	
1 to 1 in. x 1/2 to 1 in.....		Seamless Brass Tubes—		Rods & Wire.....	
1 to 1 in. x 1/2 to 1 in.....		List November 11 1908.....		Sheets.....	
1 to 1 in. x 1/2 to 1 in.....		Base price 13¢		Old Metals.	
1 to 1 in. x 1/2 to 1 in.....		Brass Tubes, Iron Pipe Sizes—		Dealers Purchasing Prices Paid in New York	
1 to 1 in. x 1/2 to 1 in.....		List November 13 1908.....		Copper, Heavy cut and crucible.....	
1 to 1 in. x 1/2 to 1 in.....		Base price 13¢		Copper, Heavy and Wire.....	
1 to 1 in. x 1/2 to 1 in.....		Copper Tubes—		Copper, Light and Bottoms.....	
1 to 1 in. x 1/2 to 1 in.....		List November 13 1908.....		Brass, Heavy.....	
1 to 1 in. x 1/2 to 1 in.....		Base price 21¢		Brass, Light.....	
1 to 1 in. x 1/2 to 1 in.....		Braze Brass Tubes—		Heavy Machine Composition.....	
1 to 1 in. x 1/2 to 1 in.....		List August 1, 1908.....		Clean Brass Turnings.....	
1 to 1 in. x 1/2 to 1 in.....		193¢		Composition Turnings.....	
1 to 1 in. x 1/2 to 1 in.....		High Brass Rods—		Lead, Heavy.....	
1 to 1 in. x 1/2 to 1 in.....		List August 1, 1908.....		Lead, Tea.....	
1 to 1 in. x 1/2 to 1 in.....		14 1/2¢		Zinc Scrap.....	
1 to 1 in. x 1/2 to 1 in.....		Roll and Sheet Brass—			
1 to 1 in. x 1/2 to 1 in.....		List August 1, 1908.....			
1 to 1 in. x 1/2 to 1 in.....		14 1/2¢			
1 to 1 in. x 1/2 to 1 in.....		Brass Wire—			
1 to 1 in. x 1/2 to 1 in.....		List August 1, 1908.....			
1 to 1 in. x 1/2 to 1 in.....		14 1/2¢			
1 to 1 in. x 1/2 to 1 in.....		Copper Wire—			
1 to 1 in. x 1/2 to 1 in.....		Base Price.....			
1 to 1 in. x 1/2 to 1 in.....		Carload lots mill 13 1/2¢			
1 to 1 in. x 1/2 to 1 in.....		Copper Sheets—			
1 to 1 in. x 1/2 to 1 in.....		Sheet Copper Hot Rolled, 16 oz. quantity lots.....			
1 to 1 in. x 1/2 to 1 in.....		Sheet Copper Cold Rolled, 1¢ per lb. advance over Hot Rolled.....			
1 to 1 in. x 1/2 to 1 in.....		Sheet Copper Polished 20 in. wide and under, 1¢ per square foot.....			
1 to 1 in. x 1/2 to 1 in.....		Sheet Copper Polished over 20 in. wide, 2¢ per square foot.....			
1 to 1 in. x 1/2 to 1 in.....		Planished Copper, 1¢ per square foot more than Polished.....			



NICHOLSON

We have had over forty years' experience in making Files and Rasps; we not only know what KIND of steel to use, but HOW to use it.

If NICHOLSON FILES did not hold their CUTTING edge—our order books would not hold so many CUSTOMERS.

We make over 3,000 different styles and sizes. Send for Catalog.

NICHOLSON FILE COMPANY

PROVIDENCE, R. I., U. S. A.

THE IRON AGE

Established
1855

New York, March 23, 1911

VOL. 87: No. 12

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Advance Buying Is Lacking.....	701
Our Approaching Removal.....	702
The Steel Corporation's Production Statement.....	702
Accidents and Safeguards in England.....	703
Our Record Production of Steel in 1910.....	704
Thomas J. Brady. Portrait.....	704
New Publications.....	705
The Iron and Metal Market Reports.....	706 to 715
Iron and Industrial Stocks.....	715
Notes on prices.....	715
Open Hearth Furnaces with Magnesite End Blocks.....	716
New York City's Largest Steel Girder.....	716
The Asa W. Whitney Car Wheels.....	716
Personal	717
A Story of the Freight Rate Hearing.....	717
Cleveland Superintendents and Foremen.....	717
The United States Steel Corporation's 1910 Report.....	718
Obituary	721
Business Administration as a Constructive Science.....	722
The Foundry Exhibit at the Pittsburgh Convention.....	724
Railroad Efficiency and the Labor Unions.....	724
The Great Northern Ore Report.....	725
Pittsburgh Standard Reinforcement for Concrete.....	725
Pipe and Plumbing Jobbers' Conventions.....	726
Annealing Malleable Castings. Illustrated.....	726
Vice-President Dickson's Resignation.....	727
The National Metal Trades Association's New Officers.....	727
The Sloss-Sheffield Steel & Iron Company Report.....	728
Conditions in the Foundry Trade.....	728
The International Molding Machine Company.....	728
A Cincinnati Shaper with Jib Crane. Illustrated.....	729
The Erie Railroad Ore Docks in Cleveland.....	729
Canada's Mineral Output in 1910.....	729
The Cambria Steel Company's New Wire Plant. Illustrated.....	730
The Coke Producers' Association.....	734
The Autogenous Welding Company's High Duty Polishing Machine. Illustrated.....	735
Rateau Steam Regenerator Installations.....	735
Railroad Equipment Orders.....	735
Bath Duplex Internal Grinders. Illustrated.....	736
Rapid Construction of a Mesta Blowing Engine. Illustrated.....	738
The Improved Berg Cinder Car. Illustrated.....	739
Data for Blast Furnace Piping.....	740
The Chicago Metal Trades' Annual Meeting.....	740
Tools for Foundry and Shop.....	741
The Almond Tool Holder. Illustrated.....	742
The New Springfield Dry Grinder. Illustrated.....	743
White Irons and the Prevention of Growth in Castings....	744
Advantages of Long Stroke Motors for Commercial Vehicles	744
New Tools and Appliances.....	745
The Machinery Market Reports.....	746 to 755
Current Metal Prices.....	756

Advance Buying Is Lacking

About 75 Per Cent. of Finishing Capacity Active

Pig Iron Output Growing—Central Western Stocks Slightly Less

The indications in the iron and steel trades are not so plain nor so uniform as to make reports from the various markets of one tenor. In the main developments are still favorable. Steel works and rolling mills are making larger outputs than in February, and consumers generally are specifying to the maximum amounts stipulated in their contracts. New orders in some lines, however, are not meeting recent expectations.

The lack of the advance buying that has marked every great year in the steel trade may be given undue emphasis, in view of an average output up to 75 per cent. of capacity. But the bar trade, for example, recalls that just one year ago agricultural works were making large contracts running more than 12 months ahead. To-day consumers find no incentive to buy far ahead, either to insure deliveries or to forestall advances.

Some measure of the railroads' abstention from the market is found in a compilation by the leading interest showing that only 8 per cent. of last month's business was for railroad consumption, either directly or through car and other industries.

Structural work is more active, most of the larger new contracts being reported from the East, while the West has a good total of smaller business. The post-office at the Pennsylvania Railroad terminal, New York, 6400 tons, and the Masonic Temple, 3700 tons, have been closed by the leading interest, together with the Curtis Publishing Company warehouse at Philadelphia, 4000 to 5000 tons, and the American Building, Chicago, 5200 tons. At Los Angeles the Earle Building has been awarded, calling for 2200 tons.

The Great Northern has bought 10,000 tons of open hearth rails at Chicago, and an additional 10,000 tons closed there this week includes 6600 tons for two traction lines and a contracting company. The Chicago City Railways are in the market for 4000 tons, and the Pittsburgh Railways for 1700 tons of girder rails. Little railroad bridge work is pending, but the St. Paul is in the market for its requirements.

The wire mills have been running almost to capacity for some weeks and manufacturers are counting on a season of heavy consumption.

Merchant pipe and sheets have been backward lines, but specifications are now picking up.

Cut nail manufacturers at a meeting in Philadelphia advanced prices to \$1.70. The trade is understood to have been well filled up on the old basis. The bolt and nut meeting left prices unchanged.

In cast iron pipe the demand from private water and gas companies keeps up quite well. Pittsfield,

Mass., will open bids March 27 on 3800 tons of water pipe, and bids will soon be asked on 7000 to 10,000 tons of 48-in. pipe for delivery in the Bronx, New York.

Pig iron production is growing, but the increase is almost all for steel making. The Steel Corporation blew in one Ohio, one South Chicago and one Gary furnace last week, and is now operating 72 per cent. of its pig iron capacity. Stocks at Ohio and Western Pennsylvania furnaces, including those of steel companies, decreased 7000 tons in February and 23,000 tons in the first half of March.

Foundry pig iron is less active and the advances recently asked for delivery in the second half of the year have not been established in all markets. In Southern iron several good sales have been made, and one 25,000-ton transaction in pipe iron is pending in the East. Buyers have been able to push the \$11, Birmingham, basis farther into the year—at least to the end of the third quarter in some cases. In Northern Ohio, foundry iron for the second half has sold at \$14.25, at furnace, which was also the Valley furnace basis on a round lot closed at Pittsburgh for the same delivery.

A sale of 5000 tons of ferromanganese has been made at less than \$36.75, Baltimore, delivery in Western Pennsylvania from October, 1911, to March, 1912.

Old material prices are receding. Rolling mills are not taking deliveries as fast as dealers would like and steel works are buying sparingly.

Arrivals of tin have been very heavy—a total of 4437 tons for March thus far, and nearly all of it for delivery into consumption. The unusual premiums paid recently on New York sales have dwindled to $\frac{1}{8}$ c. and $\frac{1}{4}$ c.

Our Approaching Removal

The David Williams Company, publisher of *The Iron Age*, *Iron Age-Hardware*, *Metal Worker*, *Plumber and Steam Fitter* and *Building Age*, will remove its entire business from 14 Park place to 239 West Thirty-ninth street, between Seventh and Eighth avenues, New York City, and expects to be established in its new quarters in the week beginning April 10.

Several reasons have influenced the company when making this selection of a new habitation so far from the district in which it has so long conducted its operations. During the history of these various publications, the office has been frequently removed, but it has always been within a short distance of the central post-office. Convenience to the post-office was the prime consideration. This motive no longer applies, arrangements with the New York post-office now being in effect whereby our publications are sent directly to the Pennsylvania and New York Central trains without passing through the post-office. For some time many of the business interests of New York have found it advisable to seek locations further north in the city. The trend has been steadily in the direction of the district extending from Twenty-third street to Forty-second street. In this locality are found most of the important hotels, great retail stores and leading places of amusement. The out-of-town visitor finds himself in that locality more frequently than in any other part of the city. The recent opening of the great Pennsylvania Railroad station at Thirty-third street and Seventh avenue has emphasized this movement.

The new location of our office is almost midway between the Pennsylvania Railroad and New York Central stations and is within walking distance from either. It will therefore be easy of access to out-of-town visitors traveling on lines using these terminals. It will also be within easy reach of the great new post-office which will occupy a portion of the Pennsylvania Railroad Company's ground on Eighth avenue. An important advantage which will be gained will consist in having the printing office under the same roof with the business and editorial offices. Much inconvenience has been suffered for a long time in the separation of the mechanical and editorial departments, the printing office being at some distance. The new quarters will also afford much more room for the present working force, as well as provide ample space for growth, which, we are pleased to say, seems assured.

Visitors will be welcomed in the new quarters, as they always have been in the old ones. Ample provision will be made for them, including writing facilities for those living out of the city and who sometimes may find it difficult to secure conveniences of this kind while temporarily in the city. The files of our various publications and our extensive collection of trade catalogues will also be at their service for reference.

The Steel Corporation's Production Statement

Since the United States Steel Corporation rounds out a decade with the end of the present month, its last annual report which has just been made public is of peculiar interest. Repeatedly attention has been called to the relation between the production of the Steel Corporation and the total output of the other steel companies. Opportunely the American Iron and Steel Association's statistics of the country's steel ingot and castings production in 1910 are published this week, making possible a computation of the Steel Corporation's percentage for that year. The country produced the stupendous total of 26,094,919 gross tons of steel ingots and castings, and the Steel Corporation 14,179,369 tons, or 54.3 per cent. The production of independent companies last year was greater than any preliminary estimate had allowed for, and the Steel Corporation's percentage thus falls to its lowest. For several years it has been a fraction over 56, while in 1901, the Steel Corporation's first year, it was 66.2. However, this falling off in the percentage of steel produced by the Corporation can only be rightly interpreted in the light of one outstanding fact—the increasing percentage of its ingot production which enters into the more highly finished forms. The Corporation has been steadily at work diversifying its output and the higher priced forms—those which represent the greatest amount of work in the mill—are a larger proportion than ever. Mere tonnage is, therefore, of less significance in a study of these statistics than character of tonnage.

A very interesting comparison of the four pre-eminent years in the steel trade is possible, with the Steel Corporation's complete figures for 1910 before us. From the following table we have omitted 1908, as being an interval of suspended animation. The items selected give an epitome of the Corporation's operations—the production of Lake Superior ore, of pig iron and steel ingots, of finished products for sale, total earnings and earnings per ton of product. The last of

these items is not to be taken as an accurate average of finished steel prices. It is greater than such average price, since it includes the important factor of railroad earnings as well as profits from cement and various by-products. As is well known, the earnings of the two Minnesota ore roads and its Bessemer road from outside traffic are considerable:

United States Steel Corporation's Production in 1906, 1907, 1909 and 1910.—Gross Tons.

	1910.	1909.	1907.	1906.
Lake ore*...	23,264,515	21,606,184	22,403,801	20,645,148
Pig iron†...	11,831,398	11,618,350	11,422,795	11,267,377
Bess. ingots	5,796,223	5,846,300	7,556,460	8,072,655
O. H. ingots.	8,333,146	7,508,889	5,786,532	5,438,494
Total ingots.	14,179,369	13,355,189	13,342,992	13,511,149
Steel rails..	2,118,473	1,719,486	1,879,985	1,982,042
Fin. products	10,733,995	9,859,660	10,376,742	10,578,433
Earnings ...	\$141,054,754	\$131,491,413	\$160,964,673	\$156,624,273
Earn. per ton.	\$13.14	\$13.34	\$15.51	\$14.80

* Shipments. † Includes ferro and spiegel.

With due allowance for earnings apart from those on steel, the above averages per ton are much above those of the various independent steel companies. The reports of the latter in recent years have shown profits of from \$4 to \$6 a ton. Without going narrowly into all the reasons for the difference between these figures and the average of more than \$14 in the above table, it may be attributed in the main to the great diversity of the Steel Corporation's output and its large tonnage of the lighter and more highly finished products. It is to be noted in connection with the table that the profits in the omitted year of depression, 1908, were \$91,847,710 on 6,206,932 tons, or an average of \$14.80, exactly the same as for 1906.

In the following table a comparison is made between the production of the Steel Corporation subsidiaries in 1902, the first full year of the Corporation, and that of 1910:

Production of the United States Steel Corporation in 1902 and 1910.—Gross Tons, Except Wire Products and Finished Structural Work, Which Are in Net Tons.

	1910.	1902.
Blast furnace products.....	11,831,398	7,975,530
Bessemer ingots.....	5,796,223	6,759,210
Open hearth ingots.....	8,383,146	2,984,708
Total ingots.....	14,179,369	9,743,918
Finished products.....	2,118,473	1,920,786
Steel rails.....	682,364	782,637
Blooms, billets, sheet bars, &c. (a).....	929,020	649,541
Plates.....		
Merchant steel, bars, skelp, hoops, bands, &c. (b).....	1,527,506	1,254,560
Heavy structural shapes.....	556,797	
Tubing and pipe (c).....	868,550	744,062
Wire rods.....	133,722	109,330
Wire and products of wire (d).....	1,490,318	1,122,809
Sheets and tin plates (e).....	1,082,787	783,576
Finished structural work (f).....	589,228	481,020
Angle splice bars and joints.....	235,998	139,954
Spikes, bolts, nuts and rivets.....	71,326	42,984
Axles.....	101,066	136,787
Steel car wheels.....	98,105	
Sundry iron and steel products.....	148,735	29,177
Total finished products.....	10,733,995	8,197,232
Spelter.....	26,777	23,982
Copperas.....	33,684	14,224
Cement, barrels.....	7,001,500	486,357

(a) Maximum, 1,253,682 tons in 1905. (b) Includes shapes in 1902. (c) Maximum, 1,174,629 tons in 1907. (d) Maximum, 1,607,689 tons in 1909. (e) Maximum, 1,112,542 tons in 1906. (f) Maximum, 719,887 tons in 1907.

The total for 1910—10,733,995 tons—is not so much beyond that of 1902 as might be expected from the important additions to capacity which eight years have brought. The report just issued says that about 80 per cent. of capacity was utilized last year, so that in a year of full demand more than 13,400,000 tons of finished steel could be produced. What is of chief interest in the table is the indication it gives of the lines followed in the expansion of the Corporation's business.

Rails have practically stood still, and blooms, billets and sheet bars have declined. From the maximum of 1,253,682 tons of semi-finished steel marketed as such in 1905, the falling off has been nearly 50 per cent. Sheets and tin plates have grown, but last year did not reach their maximum of 1,112,542 tons in 1906. Wire products expanded to 1,607,689 tons in 1909, but fell away from that maximum last year. A remarkable increase is that in merchant steel bars and shapes. These were grouped together in 1902, when the total was 1,254,560 tons. Last year merchant steel, bars, etc., and the now separated item of "heavy structural shapes" amounted together to 2,184,303 tons, an increase of more than 70 per cent. Tubing and pipe at 868,550 tons last year was considerably short of the maximum of 1,174,629 tons in 1907.

A striking feature of the table is the decline in Bessemer steel ingots from 6,759,210 tons in 1902 to 5,796,223 tons last year, while open hearth ingots made the remarkable increase of 5,398,438 tons or more than 180 per cent.

Accidents and Safeguards in England

The report of the British Home Office Departmental Committee on Accidents in Factories and Workshops contains much material of value to American employers of labor in connection with the workmen's compensation acts projected or already in operation in this country. The committee goes into many details of the causes of accidents and the means which should be adopted for their prevention. The investigation had its origin in certain alarmist statements made in the House of Commons—similar to those frequently heard on this side of the ocean—to the effect that there was a large increase in the number of accidents and an augmentation in accident risks. The committee finds that the accident risk for the 10 years 1897 to 1907 probably remained almost constant, and that since that period the tendency of the risk has been to decrease, though it is still much too great. Any increase due to the greater amount of machinery in use and the higher pressure of working conditions has been counteracted by improved inspection, by the greater care resulting from the adoption of the workmen's compensation acts and by the circumstances that in many instances of themselves introduced elements of safety.

Including all factories, the committee finds that the number of injured workers compensated under the workmen's compensation act equaled 27 per 1000 persons employed, and that in metal working the proportion was 67.3; in engine building, 65.1; in woodwork-ing, 44.7, and in other metal industries, 33.9. When docks, mines and transport trades are included, the average number is 50.7 per 1000, those in the mines numbering 158.6; on docks, 90.1; on constructional work, 79.6; in collieries, 63.2, and on railroads, 47.2. Contrary to the usual belief, the rate of accidents in cotton factories was 16.7 and in woolen factories 8.8, both exceedingly low.

As to the contention that the risk of accident is augmented by the increased speed of production and the pressure imposed on the worker owing to modern competitive conditions, the committee states that it is unable to get any scientific evidence as to industrial fatigue, and thinks it would be instructive to take, by some of the recognized scientific tests, fatigue measure-

ments of a number of workers, with a view to discover whether there is any correlation between the degree of fatigue and the accident risk. The report quotes the factory inspectors employed under the factory act as believing that machinery is not run so fast as to be dangerous, and as not being able to trace particular accidents to the speed of the machines. In their opinion higher speed can only be regarded as a minor tendency toward increased accident risk. The trouble, according to these observers, is that machine operators when engaged in piecework or on the premium system adopt expedients which are not prudent, which in some measure nullifies the provisions made for the prevention of accidents. In this connection the committee urges most rigid inspection of equipment on the part of men employed for the purpose by the manufacturer, as well as by the Government inspectors, the two working jointly with the inspectors of the companies which insure against loss through workmen's compensation.

The committee strongly recommends the use of preventive measures as a matter of the first importance, but at the same time the avoidance as far as possible of any departure radically affecting inevitable economic conditions. The difficulty of the employer and the factory inspector getting together in these details has been a lack of uniformity in the requirements, and the consequent handicap of one firm as compared with another in meeting these requirements. The committee strongly advocates that a conference between the representatives of employers, work people and inspectors, and also, in some cases, of manufacturers of machinery, should be held at reasonable intervals for the purpose of discussing the requirements in a particular trade or in a particular district, and the best means of preventing accidents. Such a conference would deal not only with the guarding of particular types of machines, but the planning of works so as to avoid overcrowding of machinery, methods of avoiding injurious weight carrying, the maintenance of floors in a safe condition, arrangements for cleaning machinery, the lighting of factories and other matters. When agreements are arrived at regarding any condition applicable in all works, compliance should be enforced at once by prosecution under the factory act.

The committee found no evidence of the view sometimes taken that employers feel relieved of their responsibility, both from the moral and financial point of view, by insuring under the workmen's compensation act. Augmented risks, due to whatever cause, and indicated by increased numbers of accidents, involve higher insurance premiums both in the mutual and in the regular line companies. Every insurance company, in view of competition, must take steps to keep the accident rate as low as possible. These companies have inspectors, make regulations, call attention to dangers and arrange differential rates according to the degrees of danger associated with particular industries and even with particular works.

Our Record Production of Steel in 1910

The American Iron & Steel Association has ascertained the production of all kinds of steel in the United States in the calendar year 1910, both ingots and direct castings being included. A new record was made, all previous years having been far surpassed. The production of Bessemer steel was 9,412,772 gross tons; of open-hearth steel,

16,504,509 tons; of crucible steel, 122,303 tons; of electric and miscellaneous steel, 55,335 tons. The total production of steel was 26,094,919 tons, against a total production of 23,955,021 tons in 1909, when the largest output up to that time was reached.

Thomas J. Bray

President of the Republic Iron & Steel Company

Chairman John A. Topping of the Republic Iron & Steel Company announces that Tracy W. Guthrie, president of the company, has tendered his resignation as president and director to engage in other business. Chairman Topping adds that the resignation has been accepted with regret by the Executive Committee, and



THOMAS J. BRAY.

that Mr. Guthrie leaves the company with the good will of his associates. He will continue to act in a consulting capacity temporarily. Mr. Guthrie is succeeded by J. T. Bray, formerly vice-president, in charge of the operating department. H. L. Rownd, formerly secretary and treasurer, becomes vice-president and treasurer, and Richard Jones, Jr., general attorney for the company, has been elected secretary.

Mr. Guthrie, who had previously been connected with Hocking Valley coal interests, with headquarters at Columbus, Ohio, came into the Republic Iron & Steel Company in 1906 as assistant to President Topping. In 1907, when Mr. Topping was made chairman, Mr. Guthrie was elected president.

Thomas J. Bray, the new president, was born in Pittsburgh in 1867 and attended the Pittsburgh schools and high school in that city. His first employment was as an apprentice in the machine shops of the Lewis Foundry & Machine Company on the South Side, Pittsburgh. He then worked a short time at the Riverside Iron Works, Wheeling, W. Va., as a patternmaker and afterward was employed in the drawing offices of the Lewis Foundry & Machine Company for three years. He left that company in 1890, going to Lehigh University, where he graduated in 1894 as a mechanical engineer. He went with the Ohio Steel Company in 1894 for a short time and then entered the employ of McGill & Co., founders and machinists, Pittsburgh. Upon the taking over of that company by the United Engineering & Foundry Company, he was made

chief engineer of the latter concern from its organization, continuing in that capacity up to 1905. From 1905 he has been connected with the Republic Iron & Steel Company. He was assistant to the president, and in 1907 was made vice-president in charge of the operating department. His promotion to the presidency of the company is a well deserved recognition of ability. Mr. Bray is a brother of Charles W. Bray, who for some years was president of the American Sheet & Tin Plate Company, but retired from active business a few years ago.

New Publications.

Mechanics for Engineers. By Arthur Morley. Bound in cloth. Size, 5 x 7½ in.; 290 pages; 199 diagrams. Price \$1.20. Published by Longmans, Green & Co., Fourth avenue and Thirtieth street, New York City.

The work is a text book of the intermediate standard intended to provide a suitable course in the principles of mechanics for engineering students. The ground covered by the book is that required by several of the prominent English educational institutions. The aim has been to select a course through which the student can work in a year rather than to treat a wide range of academic problems, and the principles have been illustrated as far as the exclusion of technical knowledge and terms would allow by examples likely to be most useful to the engineer. Graphical methods of solving problems have in some cases been used, as the author believes that such exercises while taking more time than the easy arithmetical ones, which are framed to give exact answers, compel the student to think of the relations existing between the quantities involved instead of merely performing the operations by fixed rules.

The book is divided into 10 chapters and an appendix contains a number of questions selected from the examination papers of the London University, the Institution of Civil Engineers and the Board of Education. The first three chapters are devoted to kinematics, laws of motion and work, power and energy, and a simple harmonic motion, together with motion in a circle, is discussed in chapter IV. Statics, concurrent forces and friction are covered in the next chapter, and in chapter VI the statics of rigid bodies is taken up. The next two chapters are concerned with the centers of inertia and gravity and their properties and applications, while chapter IX is given over to moments of inertia and rotation. The final chapter is devoted to the elements of graphical statics and deals with the preparation of diagrams and scales showing the action of various forces upon a point and the different stresses occurring in framed structures, girders, roofs, loaded chains and strings. Problems are given at the end of each chapter and the answers to these follow the appendix containing the examination questions. A comprehensive index of the different subjects treated completes the volume.

A Practical Guide to Iron and Steel Works Analyses. By Walter Macfarlane. Size, 5 x 7 in.; pages, 184; 9 illustrations. Bound in cloth. Price, \$1.25 net. Published by Longmans, Green & Co., Fourth avenue and Thirtieth street, New York City.

This book is a series of selections from "Laboratory Notes on Iron and Steel Analyses," to meet the requirements of those who do not wish to pursue a full analytical course. These notes were first written for the guidance of a staff in an iron and steel works laboratory, which was for some years under the supervision of the author and were the results of over 40,000 estimations placed on record annually. The methods had to be reliable and rapid so as to control and keep pace with the manufacturing operations. An effort has been made to give the complete course of an assay or an analysis in full detail, and precise quantities of chemicals and the most convenient sizes of beakers and other laboratory apparatus are specified.

This book is divided into nine sections dealing with the analysis of steel, pig iron, limestone, calcined limestone, dolomite and solid fuels; the estimation of iron, general notes on laboratory operations and appliances

and notes on preparing and storing solutions. In each of the first two sections the processes by which carbon, silicon, phosphorus, manganese and sulphur are estimated are given in considerable detail. In the section dealing with the analysis of solid fuels, which is a new one, the estimations of moisture, ash, coke and sulphur are all described. Various methods of estimating iron are described, and in the last two sections instructions are given on the performing of the various laboratory operations and the preparation and storing of the different solutions required in iron and steel works analysis.

Dynamo Electric Machinery. By Samuel Sheldon, Ph.D., and Erich Hausmann. Eighth edition, completely rewritten. Bound in cloth. Size, 5½ x 8 in.; pages, 328; 210 illustrations and diagrams. Price, \$2.50 net. Published by D. Van Nostrand Company, New York City.

The latest edition of this book dealing with the construction, design and operation of direct current machines, like its predecessors, is primarily a text book for students. The matter is presented in a way which is especially adapted for a course consisting of recitations and occasional lectures supplemented by work in the laboratory. The sequence of the treatment is such that any part not required by students taking other than electrical courses can be omitted without destroying the continuity in the remaining matter, or the volume can be used by one who is not a student to gain a knowledge of certain particular phases of the subject.

With the exception of the first two chapters the book has been entirely rewritten, and its scope considerably extended. The new matter includes problems at the end of each chapter, a presentation of the theory of commutation, means for predetermining the operating characteristics of direct current generators and motors, a discussion of the storage battery from an engineering viewpoint, a treatment of the theory of balancers and boosters and a discussion of cost prices and operating expenses of different types of machines and plants. An almost entirely new set of illustrations has been substituted, most of which were specially drawn to make clear methods of construction or characteristics of operation. Certain chapters on design of machines and tests have been omitted, because adequate treatment requires more space than can be spared in so general a book.

The first two of the nine chapters deal with electrical and magnetic laws. Following these are chapters on armatures, field magnets and armature reaction. Chapter VI. is devoted to generators, and is divided into three sections, the first dealing with efficiency of operation, the next with constant-potential generators and the last with constant-current machines. In the next chapter motors are similarly treated, and after a general discussion of the principle of action, armature reaction and power, the shunt and the series types are described, and special reference is made to the industrial applications of both kinds for driving machine tools and in rolling mills. Chapter VIII. deals with auxiliary apparatus, such as dynamotors, motor generators, boosters and storage batteries, and the final chapter contains instructions for operating central station equipment.

About 100 molders and core makers employed by the Goulds Mfg. Company, Seneca Falls, N. Y., are on a strike. No question of wages is involved, but the molders objected to an increase in the number of molding machine operatives. Heretofore the machine issue has not been raised as molding machine men were counted as apprentices, but when the company increased the number of machine men beyond the basis of the apprentice ratio the molders protested and later went out.

The Fort Worth Wagon Factory, Fort Worth, Tex., is now finishing its buildings and hopes to be turning out wagons within 90 days. This company is incorporated for \$150,000, and not \$15,000, as reported in *The Iron Age* of March 9. It will manufacture high grade farm wagons. I. H. Burney is president; Van Zandt Jarvis, vice-president; C. Hightower, secretary and treasurer; Warren Heaton, manager.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Mar. 22, 1911.	Mar. 15, 1911.	Feb. 22, 1911.	Mar. 23, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$18.00
Foundry No. 2, Valley furnace..	13.75	13.75	13.75	16.25
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	16.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	13.00
Foundry No. 2, local, Chicago..	15.50	15.50	15.50	18.25
Basic, delivered, eastern Pa....	15.25	15.25	14.50	18.00
Basic, Valley furnace.....	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	18.40
Gray forge, Pittsburgh.....	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00

COKE, CONNELLSVILLE.

Per Net Ton, at car.

	1911.	1911.	1911.	1910.
Furnace coke, prompt shipment.	1.55	1.55	1.45	2.00
Furnace coke, future delivery...	1.75	1.75	1.60	2.25
Foundry coke, prompt shipment.	2.00	2.00	2.00	2.60
Foundry coke, future delivery...	2.25	2.25	2.25	2.75

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh.....	29.00	29.00	29.00	33.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.50	15.50	15.50	19.00
Iron rails, Philadelphia.....	18.50	18.50	18.00	20.50
Car wheels, Chicago.....	13.25	13.25	13.00	17.00
Car wheels, Philadelphia.....	14.00	14.00	14.00	16.75
Heavy steel scrap, Pittsburgh..	14.00	14.25	14.75	17.00
Heavy steel scrap, Chicago.....	12.00	12.00	12.50	15.00
Heavy steel scrap, Philadelphia.	14.00	14.00	14.50	16.50

FINISHED IRON AND STEEL.

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.37½	1.37½	1.37½	1.55
Common iron bars, Chicago....	1.27½	1.27½	1.30	1.55
Common iron bars, Pittsburgh..	1.35	1.35	1.35	1.65
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York...	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York...	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE.

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*.....	1.80	1.80	1.75	1.85
Cut nails, Pittsburgh.....	1.70	1.60	1.60	1.85
Barb wire, galv., Pittsburgh*...	2.10	2.10	2.05	2.15

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.50	12.50	12.75	13.75
Electrolytic copper, New York..	12.25	12.25	12.37½	13.37½
Spelter, New York.....	5.65	5.65	5.60	5.73
Spelter, St. Louis.....	5.50	5.50	5.45	5.58
Lead, New York.....	4.40	4.37½	4.42½	4.45
Lead, St. Louis.....	4.25	4.22½	4.27½	4.30
Tin, New York.....	40.50	39.75	44.75	32.35
Antimony, Hallett, New York...	9.12½	9.25	8.00	8.25
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter, 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in. 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in.

and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Terms.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, 20, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

Butt Weld.				
	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
1/8, 1/4, 3/8 in.....	72	58	68	54
1/2 in.....	75	63	71	59
3/4 to 1 1/4 in.....	79	69	75	65
2 to 3 in.....	80	70	76	66
Lap Weld.				
2 in.....	76	66	72	62
2 1/2 to 4 in.....	78	68	74	64
4 1/2 to 6 in.....	77	67	73	63
7 to 12 in.....	75	59	71	55
13 to 15 in.....	51 1/2			
Butt Weld, extra strong, plain ends, card weights.				
1/8, 1/4, 3/8 in.....	69	59	65	55
1/2 in.....	74	68	70	64
3/4 to 1 1/4 in.....	78	72	74	68
2 to 3 in.....	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.....	75	69	71	65
2 1/2 to 4 in.....	77	71	73	67
4 1/2 to 6 in.....	76	70	72	66
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
1/8 in.....	64	58	60	54
1/4 to 1 1/4 in.....	67	61	63	57
2 to 3 in.....	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.....	65	59	61	55
2 1/2 to 4 in.....	67	61	63	57
4 1/2 to 6 in.....	66	60	62	56
7 to 8 in.....	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.

2, 2½ to 4 in. Lap Weld The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2½ in.	61	43
2½ in.	63	48
2½ to 5 in.	69	53
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29 to \$30 per gross ton. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12	13	14	15	16
Annealed	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.50	2.60

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2½
27 to 36	80 and 5
Galvanized:	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72½ and 10
27 to 36	72½
Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, March 22, 1911.—(By Telegraph.)

Pig Iron.—There is a good deal of new inquiry for malleable Bessemer and foundry iron, but there is very little doing in standard Bessemer or basic. The Iron City Sanitary Mfg. Company has bought a round tonnage of Northern No. 2 foundry at a little under \$14, Valley furnace, for delivery prior to July 1, and \$14.25, Valley furnace, for second half delivery. The Westinghouse Machine Company is in the market for about 2000 tons of No. 2 for third quarter delivery. We note sales of close to 1500 tons of malleable Bessemer at about \$13.75, Valley furnace, for second quarter delivery. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—There is not much new inquiry, nearly all consumers being covered by special contracts, but specifications for billets and sheet and tin bars are quite active. Shipments of steel by the mills are heavier than for some time. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Some lines are holding up well in demand, while others have fallen off, a fair average being maintained. The billet and rail sales department of the Carnegie Steel Company reports that actual orders so far this month show a slight increase over the same period in February, which was a very good month. Pig iron consumers as a rule are buying cautiously, not being convinced that present prices will hold. Bessemer and basic iron are quiet, but foundry is fairly active. A sanitary interest has bought quite a large tonnage, and one of the Westinghouse companies has also been a buyer. Bessemer remains firm at \$15, basic \$14 for forward delivery, No. 2 foundry \$13.75 to \$14 and malleable Bessemer about \$14, all at furnace. Consumers are specifying quite freely against their contracts for billets and sheet bars and the steel market is firm. In finished iron and steel the demand on the whole is not as active as it was a month ago, but there is a hopeful feeling that with the advent of spring trade it will show an increase. The scrap market is dull and prices have declined. Coke is in better demand with prices slightly higher.

Ferromanganese.—Prices continue weak, and new demand is quiet. A sale of about 200 tons of foreign 80 per cent., for delivery over the second half of the year, has been made at a price very close to \$38, Baltimore. We quote 80 per cent. foreign for prompt shipment at \$37.25 to \$37.50 and for the second half at about \$38, Baltimore. The freight rate to the Pittsburgh district is \$1.95 a ton.

Ferrosilicon.—Inquiry is light and prices are weak. A recent sale of about 250 tons for forward delivery is reported at a price very close to \$53, Pittsburgh. We quote 50 per cent. at \$53.50 to \$54, f.o.b. Pittsburgh, for delivery up to July; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—An inquiry for 500 tons is reported in the market, on which quotations of \$29.50 to \$30 have been made. We quote best grades of muck bar, made from all pig iron, at \$29.50 to \$30, Pittsburgh.

Skelp.—A sale of 1500 tons of sheared iron plates for second quarter delivery is reported on the basis of about 1.72½c., Pittsburgh. The demand is fairly active. The mills in this district have a moderate amount of business on their books. We quote grooved steel skelp at 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—New inquiry is light. Most consumers covered their requirements some time ago up to July 1 or longer, specifications against which are coming in at a satisfactory rate. Few surplus rods are being offered in this market, most producers needing their entire output for their own wire mills. The second rod mill just contracted for by the Jones & Laughlin Steel Company, to be built at Aliquippa, Pa., will make that company one of the largest producers of rods in this district. Prices are firm, and we quote Bessemer, open hearth and chain rods at \$29 to \$30, Pittsburgh.

Steel Rails.—The Carnegie Steel Company has taken an order for 3000 tons of standard sections for a domestic railroad in addition to numerous smaller orders, and has also booked considerable tonnage in standard sections for export. The demand for light rails is active, and in the past week the same company received new orders for about 3200 tons and specifications against contracts for about 900 tons. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The Pittsburgh & Lake Erie is in the market for 1000 hopper and 1000 gondola cars; Western Maryland for 500 hopper cars; New York, Westchester & Boston for 30 pay-as-you-enter steel street cars; Barrett Mfg. Company for 50 to 75 100,000-lb. tank cars; General Chemical Company for 20 steel tank cars; Montreal Street Railway Company for 50 steel street cars; Pittsburgh Steel Company for 25 steel flat cars; Duluth, Mesabi & Northern for 6 steel passenger and 2 steel baggage and mail cars; Eastern Kentucky Railroad for 20 flat cars and American Limestone Company for 12 steel cars. It is said that several of the leading railroads that had inquiries about ready for a large number of steel cars have withdrawn these and will not buy for the present. The contract for the gas holder for the Philadelphia Company in this city has not been given out, and it now looks as though the company will not build it at present. New demand for plates in the past two or three weeks has been dull, and all the mills are in need of orders. We quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

THE IRON AND METAL MARKETS

Structural Material.—The American Bridge Company has taken 500 to 600 tons of bridge work for the Wabash Railroad but aside from this no local jobs have been given out and fabricating concerns report conditions quieter than for some months. There is not much inquiry, and it is nearly all for small work. It is also stated that the small business that is being placed is being taken at very low prices. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—Part of the present activity among the tin plate mills is due to the fact that domestic makers have been able to secure a larger proportion than usual of the re-export business in tin plate. The Standard Oil Company, Texas Company and one or two other concerns have placed heavy contracts with American mills which otherwise would have gone to Welsh mills but for the fact that the latter are so well filled with work that they cannot take care of such orders. This business has been done at prices that give the mills a fair margin of profit. While the new demand for tin plate is dull, the large consumers are specifying freely against contracts they placed in the last two months of 1910. We quote 100-lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Sheets.—The present condition of the sheet trade is not satisfactory to the mills, the demand being only fair, while specifications against contracts are not coming in as they should. The leading sheet mills generally are not operating to more than about 60 per cent. of capacity. Regular prices in effect on the different grades are printed on a previous page.

Bars.—Prices on iron bars are reported a little firmer, and the regular price of 1.40c. on steel bars, which has prevailed for so long, is being firmly held. The demand for both iron and steel bars is light, and specifications against contracts are coming in only moderately well. We quote steel bars at 1.40c. and common iron bars at 1.35c. to 1.40c., Pittsburgh.

Spelter.—The market is dull and prices are weak. We quote prime grades of Western at 5.40c., East St. Louis, equal to 5.52½c., Pittsburgh.

Merchant Steel.—Several mills report that specifications against contracts are coming in reasonably well, but the new demand is only for small lots to cover actual needs. Consumers are apparently not convinced that present prices will be maintained. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—The new demand is mostly for small lots, but specifications against orders are rather satisfactory. Regular prices of 1.90c. on structural rivets and 2c. on boiler rivets are being shaded on desirable orders.

Wire Products.—The wire trade is active, several makers reporting that old contracts taken on the basis of \$1.70 for wire nails have been about cleaned up, and most contracts on their books are now at \$1.75 and \$1.80. Consumption this year promises to be heavy. Several of the leading makers of fencing report that they are oversold and considerably behind in deliveries. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80; and cut nails, \$1.60 to \$1.65, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—Inquiries for considerable tonnage are in the market from two or three of the Western roads. The Northern Pacific is reported to have placed 3000 to 5000 kegs with a Western mill. Prices are reported firm, at \$1.55 for base sizes. Commencing April 1 the price will be \$1.60. Following is the list of extras now in force:

Railroad Spikes.	
4½, 5 and 5½ x 7/16	Extra \$1.55
3, 3½, 4, 4½ and 5 x 1/2	Extra .10
3½, 4 and 4½ x 7/16	Extra .20
3, 3½, 4 and 4½ x 3/8	Extra .30
2½ x 3/8	Extra .40
2½, 3 and 3½ x 7/16	Extra .60
2 x 5/16	Extra .80

Boat Spikes.	
¾ in. square, 12 to 24 in. long	Extra .15
¾ in. square, 8 to 16 in. long	Extra .15
¾ in. square, 6 to 16 in. long	Extra .15
7/16 in. square, 6 to 12 in. long	Extra .20
¾ in. square, 4 to 12 in. long	Extra .30
7/16 in. square, 4 to 8 in. long	Extra .45
¾ in. square, 4 to 8 in. long	Extra .75
¾ in. square, 3 to 3½ in. long	Extra 1.00
¾ and 5/8 shorter than 4 in., ¼ cent extra.	

Merchant Pipe.—Jobbers are placing orders only for such quantities as are needed to maintain a complete assortment of stocks, which are said to be lower than for several years. The total business being booked by the mills is

reasonably large, but none of them is running full time. The Wichita Natural Gas Company is inquiring for 20 miles of 6-in., the High Grade Refining Company for 40 miles of 3-in., the Dominion Oil Company for about 20 miles of 8-in., and a Canadian interest is reported to be inquiring for 10 miles of 6 to 8 in., but second-hand pipe may be used. It is stated that discounts on both iron and steel pipe printed on a previous page are being maintained.

Hoops and Bands.—A slightly better demand is noted for both hoops and bands, but it consists mostly of small lots. Several makers state that specifications on contracts are coming in at a better rate than for some time, but none of the mills is yet so pushed as to operate to full capacity. We continue to quote steel hoops at 1.50c. and bands at 1.40c., extras on the latter as per present steel card, but in exceptional cases, and for very desirable orders, slight concessions on these prices might be made.

Boiler Tubes.—All the large consumers of both locomotive and merchant tubes are covered by contracts against which they are specifying, but new buying is light, and mostly in small lots. The recent adjustment in discounts on boiler tubes has put the market on a better basis, and it is said that prices are being more firmly held.

Iron and Steel Scrap.—The scrap market has quieted materially, and prices are weak. Some dealers had chances to sell round tonnages of scrap two or three weeks ago when prices were higher than they are now and refused to do so to their regret. Consumers are pretty well covered and are not willing to take more scrap unless attractive prices are made. We have lowered our prices on nearly all grades of scrap, and unless the demand soon improves still lower prices are likely. In the last day or two prices on cast iron borings and wrought turnings have gone off materially, borings being freely offered as low as \$9, and turnings at \$10, delivered in the Pittsburgh district. Sales are noted of 500 tons of heavy steel scrap at \$14, 500 tons at a shade under this price; 1500 tons of heavy axles turnings at about \$11; 1000 tons of cast iron borings at about \$9.50; and 1000 tons of wrought turnings at about \$10.25. Dealers quote as follows, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Folsom, Sharon, Monessen and Pittsburgh delivery	\$14.00
No. 1 foundry cast	14.00 to 14.25
No. 2 foundry cast	13.25 to 13.50
Bundled sheet scrap, at point of shipment	10.50 to 10.75
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.00
Grate bars	11.00
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.25 to 24.50
Steel car axles	20.00 to 20.25
Locomotive axles	24.00
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.50 to 15.75
*Cast iron borings	9.00 to 9.25
*Machine shop turnings	10.00 to 10.25
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.25
Stove plate	11.00 to 11.25

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Coke.—Several quite large inquiries for furnace coke for the last half of the year are in the market, but so far most makers are declining to quote flat prices, not knowing what course the market may take between now and July 1. A good many contracts for furnace coke are now made on a sliding scale, based on the price of basic or Bessemer iron, and some of these that expire June 30 have recently been renewed for the second half of the year. Prices for prompt shipment are a little better, and we note sales of 16,000 to 17,000 tons of furnace coke for April shipment at \$1.65 per net ton at oven. The output of coke in the Upper and Lower Connellsville regions last week was 357,471 tons, an increase over the previous week of over 5000 tons. We quote standard makes of 72-hour foundry coke at \$2.10 per net ton at oven to dealers, and from \$2.25 to \$2.50 to consumers; standard grades of furnace coke for April shipment, \$1.60 to \$1.65, and for last half \$1.85 to \$2.

Fletcher Collins, for seven years connected with the office of Naylor & Co., dealers in pig iron and coke, will engage in the same lines on his own account, with offices in the Berger Building, Pittsburgh. For some years he was Pittsburgh agent for the Adrian Furnace Company, and later was connected with the Pittsburgh office of Rogers, Brown & Co., then engaging with Naylor & Co.

The Ohio Iron & Metal Company's new branch office in Cleveland, of which the local manager will be Armand Alexandre, will be in direct charge of the Pittsburgh office

THE IRON AND METAL MARKETS

of the company in the Farmers' Bank Building, and of which H. D. Stalnaker is district manager.

On April 1 the Pittsburgh office of the Cambria Steel Company will be removed from Room 917, Park Building, to Rooms 2424-5-6 in the Oliver Building.

Chicago

FISHER BUILDING, March 22, 1911.—(By Telegraph.)

The only activity in pig iron seems to be emanating from small orders from foundries doing work for machinery manufacturers. Prominent in this business are the makers of traction engines, who are enjoying one of the most active periods in their history. The automobile business is also on the increase, as indicated this week by orders for steel going into those channels. Bar iron has strengthened, in contrast to lower prices and a buyer's market on scrap. Structural materials are active and this week's lettings show good totals. The Illinois Steel Company blew in No. 5 blast furnace, at Gary, and No. 7, at South Chicago, March 18. This makes a total of four furnaces in blast at Gary and five at South Chicago. The four furnaces at Joliet are all in operation. A number of sales of open hearth forging billets has been made at \$30.60, Chicago, which price had been maintained for some weeks by the leading interest. Liberal orders for track supplies keep mills running to their capacity. With the early spring weather has come magnificent business for all kinds of wire products, which are going to actual consumers, as is indicated by telephone and telegraph orders for prompt shipments. It is the general belief in this market that, regardless of the way the Supreme Court decisions on the trust cases may go, business will improve.

Pig Iron.—The general market is quiet. The principal inquiries are coming from manufacturers of traction engines and automobiles. A Milwaukee manufacturer of plumbers' supplies is reported to have bought 1000 tons of Southern iron for last half delivery. No other recent inquiries of note have been closed in this market. The price of Southern iron remains at \$11, Birmingham, for No. 2 foundry for the first half. The following quotations are for March shipment, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%..	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%..	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%..	19.90 to 20.40

(By Mail.)

Billets.—There is a slight improvement in the sale of billets in this market. The leading interest still maintains the maximum price of \$30.60, base, Chicago. The price on open hearth rerolling billets continues to be \$25.60, base, Chicago.

Rails and Track Supplies.—A good steady volume of business continues on track supplies, and mills are running full. Approximately 20,000 tons of standard section rail contracts have been received this week by the leading interest, 10,000 tons going to the Great Northern and the balance to numerous small railroads. Contracts approximating 1500 tons of light rails have also been received. Prices are unchanged and firm as follows: We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—The demand for structural material has somewhat improved. Building operations are active through the entire West. Contracts let last week include the following: Skagit River bridge, Skagit County, Wash., 333 tons, let to Central States Bridge Company; Washington Portland Cement Company, building frames at Concrete, Wash., 492 tons, to Worden-Allen Company; Oriental Hotel, Dallas, Texas, 1780 tons, to Noelke-Richards Iron Works, Indianapolis, Ind.; coal tippie for Virginia Iron Coal & Coke Company at Toms Creek, Va., 230 tons; Coal Washery for American Coal Company at McComas, W. Va., 130 tons; post-office, North Yakima, Wash., 134 tons, to American Bridge Company; Earle Building, Los Angeles, Cal., 2200 tons, to Llewellyn Iron Works; Chicago, Mil-

waukee & St. Paul, bridge work, 644 tons, 254 tons to Worden-Allen Company and 390 tons to Milwaukee Bridge Company; Commercial National Bank, Shreveport, La., 490 tons, to Thomas Fordyce, Little Rock, Ark.; American Radiator Company, warehouse, Denver, Colo., 134 tons, to Paterson & Burkhardt, Denver; 150 ft. riveted span for Midland Valley Railroad, 112 tons, to Pennsylvania Steel Company; grillage for Rothschild & Co.'s building, Chicago, 278 tons, to American Bridge Company; Y. W. C. A. building, St. Louis, Mo., 488 tons, general contract let to Selden-Breck Construction Company, reinforced concrete. We quote plain material from mill, 1.38c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—The plate business in this market is a trifle halting. Mills are not running to their full capacity, though the prospect of brightening conditions is good. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Specifications against contracts, as well as new business, have somewhat improved this week. Mills have increased their operations to about two-thirds their capacity in order to care for the increase. Prices are well maintained. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—With the recent firming up of bar iron prices mills have increased their output and in some instances are now running five days a week, with good prospects for a continuance. Steel bars are active. Prices are firm, as follows: Soft steel bars, 1.58c.; bar iron, 1.27½c. to 1.32½c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The demand for wire products in this market continues very good. Inquiries and specifications are both holding their own with the high record of the past two weeks. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; wire staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—Activity in the pipe business is noted as small municipalities continue to come into the market with the opening of spring. Grand Rapids, Mich., has contracted with the leading interest here for 600 tons of water pipe and Sheridan, Wyo., for 700 tons. Columbus, Ohio, has closed its bids for 1000 tons of water pipe, which will be awarded in the near future. Gas companies have been liberal buyers this week, having closed with the leading interest for a total of about 3000 tons. Routine business is very regular and small orders of 50 to 200 tons each are numerous and furnish the bulk of business at this season. Prices continue firm, as follows, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—A still further decline in prices is noted this week. Prices have fallen off continually for the past three weeks, and a dealer's opinion that he can neither buy nor sell just about expresses it. The Chicago, Milwaukee & St. Paul has issued a list approximating 1000 tons which closes March 22. The Chicago, Burlington & Quincy is out with a list approximating 3000 tons which closes March 23. The condition of the scrap market is far from parallel with that of bar iron. It is strongly a buyers' market. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.25 to 13.75
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	12.00 to 12.50
Frogs, switches and guards, cut apart.....	12.00 to 12.50
Shoveling steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	14.50 to 15.00
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	11.75 to 12.25
No. 2 railroad wrought.....	10.75 to 11.25
Steel knuckles and couplers.....	11.00 to 11.50
Locomotive tires, smooth.....	17.25 to 17.75
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	6.75 to 7.25
Cast and mixed borings.....	5.25 to 5.75
No. 1 bushing.....	9.75 to 10.25
No. 2 bushing.....	7.50 to 8.00
No. 1 boilers, cut to sheets and rings..	8.50 to 9.00
Boiler punchings.....	12.50 to 13.00
No. 1 cast scrap.....	11.75 to 12.25
Stove plate and light cast scrap.....	10.00 to 10.50
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.75 to 9.25

THE IRON AND METAL MARKETS

Philadelphia

PHILADELPHIA, PA., March 21, 1911.

Small lot buying characterizes the pig iron market. A little quiet business has been done for third quarter delivery, and consumers would place orders for round lots if producers would be willing to accept forward business. Consumers of low grade iron show the most active interest in the market at this time. In finished materials buying continues fairly active and mills in this territory are, for the most part, operating at an unchanged productive rate. Eastern billet makers still note a lack of interest among usual large buyers. Sheets have been more active. A moderate demand for bars is noted at unchanged prices. Negotiations for round lots of furnace coke are pending. Prices of both furnace and foundry coke are firm. Old materials are duller and prices of some of the leading grades show a decline.

Iron Ore.—Inquiry for low phosphorus ores is reported and negotiations for other grades are under way, but no sales have been reported. Imports at this port during the week ending March 18 aggregated 11,300 tons, valued at \$34,829.

Pig Iron.—Transactions, particularly in the foundry grades, have been closely confined to small lots for prompt and near future delivery. In some instances the volume of business of this character is reported to have been quite large, so that the recent large lot movement has not been missed. Other sellers, however, report much quieter conditions as far as the demand for prompt and second quarter iron is concerned. Inquiry for extended delivery is active, but in very few cases will sellers consider business of that character. Some quiet sales for third quarter have been made to regular customers, who, as a rule, do not come openly into the market, and it is stated that such business has been done either at the top of the market or slightly above it. While in quite a few cases \$15.75 to \$16 is being done for No. 2 X foundry, delivered in this territory, there is still iron of that grade available at \$15.50 for prompt and second quarter shipment. The amount of iron available at the inside quotation is reported as gradually becoming smaller. Cast iron pipe makers have taken on several lots of low grade iron, one sale of 1000 tons of eastern Pennsylvania iron for prompt shipment being reported at \$15, delivered. One concern, it is understood, is negotiating for a block of 25,000 tons of Southern iron, including Nos. 2, 3 and 4 grades. Both Northern and Southern low grade irons for early delivery are reported as somewhat scarce. The movement in Virginia foundry irons has been less active, but prices are being firmly maintained at the recent level. Inquiries for forge iron for mill purposes continue to come out in moderate quantities, and a scarcity of this grade is believed likely; quotations have advanced on moderate sales, business being done at prices ranging from \$14.75 to \$15, delivered, and several makers are now quoting \$15.25. The demand for steel making iron has quieted down. No further inquiries for basic are reported, and, while \$15.25 could probably be done, some makers name \$15.50 as their minimum price. Small sales of low phosphorus iron are reported at the recent market. Notwithstanding the decreased demand, prices are very strong, several producers being well sold up for delivery over the remainder of the first half and awaiting developments before quoting for more extended shipment. For near future delivery in buyers' yards in this territory the following range of prices is named for standard brands:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.25
Basic.....	15.25 to 15.50
Standard low phosphorus.....	21.50 to 22.00

Ferromanganese.—The market has been somewhat exercised over a reported sale of 5000 tons to a central Pennsylvania steel mill, for delivery from October, 1911, to March, 1912, at a price said to be under \$36.75. Baltimore. The general tone of the market is weaker, and while \$37.50. Baltimore, is generally quoted for small lots for prompt delivery, \$37.25 is understood to have been done for a 500-ton lot for near future shipment.

Billets.—Consumers still place orders in small lots for immediate needs, few being in excess of 100 tons, and show practically no interest in forward business. Mills are anxious for orders, but will make no price concessions. Open hearth rolling billets are quoted at \$25.40, delivered in this vicinity, with ordinary forging billets at \$30.40, delivered.

Plates.—The volume of business continues on about an even basis, and mills are fully maintaining recent gains in the productive rate. General orders are more numerous and some fair sized business is pending. The Pennsylvania Railroad is reported as negotiating for plates against its pro-

gramme for building cars, announced earlier in the year. The recent meeting of the steel plate interests had no bearing, it is stated, on the general market situation. Prices are being well maintained at 1.55c. minimum for ordinary plates, delivered in this vicinity.

Structural Material.—Several large propositions under consideration in this district are still held up, although one or more good contracts are expected to be closed this week. Current business consists usually of small prompt lots, together with some small building work. Fabricators continue to name low prices, which are not due, it is said, to lower prices for plain shapes, but rather with the view of obtaining work to maintain their operating forces intact. For plain shapes, delivered in this vicinity, 1.55c. minimum continues to be named.

Sheets.—While the demand is still of the miscellaneous lot class, Eastern mills report a larger number of orders, and in instances are now operating at full capacity. Consumers, however, show little interest in anything beyond requirements for immediate needs, and but a small proportion of forward business is under negotiation. Prices are being fully maintained by Eastern mills, the following range being named for early shipment: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—A moderate and small lot demand continues to come out, and while there is still considerable competition on business with desirable specifications, particularly when the proportion of sizes carrying extras is large, makers in this district are maintaining recent quotations. For refined iron bars prices at Eastern mills range from 1.30c. to 1.35c., with various producers holding firmly at both rates named, which are equivalent to 1.37½c. to 1.45c., delivered in this vicinity. Steel bars are in fair demand, with prices firm at 1.55c., delivered.

Coke.—Considerable business is pending in furnace coke, while consumers of foundry coke show a little more interest in the market in view of placing usual contracts in the near future. Current business has been confined to moderate lots at unchanged prices. Quotations are being firmly maintained, the following range, per net ton, about representing the market for deliveries in buyers' yards in this district:

Connellsville furnace coke.....	\$3.90 to \$4.25
Foundry coke.....	4.40 to 4.65
Mountain furnace coke.....	3.50 to 3.85
Foundry coke.....	4.00 to 4.25

Old Material.—Consumers show little interest in the market, and prices in leading grades have undergone a slight decline. As the mills are pretty well supplied with various grades of scrap, they have, in a number of cases, reduced offering prices, and sales have been made at the lower levels. No. 1 heavy melting steel has been sold in 1000-ton lots at \$14 and \$14.25, delivered. Railroad wrought has sold at \$17.25, wrought turnings at \$10, and cast borings at \$9.50, delivered, in each case a decline of 50 cents a ton being noted. Considerable interest is shown in the Government's offering of a cargo of Panama scrap, approximating 1700 tons, at Pier G, Port Richmond, this city, on which bids go in on Wednesday, March 22. The following range of prices is named for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to 1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	15.00 to 15.50
Low phosphorus heavy melting steel scrap.....	18.00 to 18.50
Old steel axles.....	21.00 to 21.50
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	18.50 to 19.00
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	17.00 to 17.50
Wrought iron pipe.....	14.00 to 14.50
No. 1 forge fire.....	12.25 to 12.75
No. 2 light iron.....	8.00 to 8.50*
Wrought turnings.....	9.75 to 10.25
Cast borings.....	9.25 to 9.75
Machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.50 to 13.00*
Grate bars.....	12.00 to 12.50
Stove plate.....	11.50 to 12.00

*Nominal

Cleveland

CLEVELAND, OHIO, March 22, 1911.

Iron Ore.—No inquiries are coming from furnace interests and sellers are deferring the consideration of prices until consumers appear ready to buy. Shipments from the docks continue light, showing little improvement over a month ago. Vessels are preparing for a late start in ore shipping, and it is probable that many boats operated by companies having connections with ore or furnace interests will not be placed in commission till late in May. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Besse-

THE IRON AND METAL MARKETS

mer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—The Best Foundry Company, Bedford, Ohio, whose inquiry was noted last week, has purchased through the St. Louis office of the American Stove Company, of which it is a subsidiary concern, 1000 tons of Northern No. 2 foundry iron and 1500 tons of Southern No. 2 for last half delivery. With the Ohio silvery iron contracted for a week ago, this company has bought in all 400 tons for last half delivery. The Northern iron went to a Cleveland furnace at \$14.25, at furnace, the buyer having the advantage of a 45c. freight rate, as compared with a 90c. rate from the Valley. For the Southern iron a price of \$11, Birmingham, for No. 2, was secured. The market is not active, most other sales reported being in small lots of foundry grades. We note the sale of 800 tons of malleable by a Cleveland agency for last half delivery. A Canton, Ohio, consumer is feeling the market on prices for 3000 tons of basic, which appears very firm at a minimum price of \$13.75. There is an inquiry from a Barberton, Ohio, consumer for 6000 tons for the last half, of which 3000 tons is Southern and the remainder foundry, Bessemer and high silicon. We note the sale in northern Ohio of a 500-ton lot and a 300-ton lot of No. 2 Southern for the second quarter. The general asking prices on Southern iron are \$11.25 for No. 2 for the third quarter and \$11.50 for the fourth quarter. Valley and Cleveland furnace prices are firm at \$13.75 to \$14 at furnace for No. 2 foundry for the second quarter and \$14.25 to \$14.50 for the last half. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.50
Southern foundry, No. 2.....	13.75
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—A local furnace interest has closed a contract for 7000 tons of furnace coke per month for the second quarter delivery. There is a moderate demand for small lots of foundry coke, mostly for spot shipment. Prices are firm. We quote standard Connellsville furnace coke at \$1.55 to \$1.60, per net ton, at oven, for spot shipment; about \$1.65 for the second quarter, and \$1.75 to \$1.90 for the last half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the remainder of the year.

Old Material.—There is some demand for small lots of steel scrap, but the market is not active and prices are not firm. The maximum price that local mills are willing to pay for heavy melting steel appears to be \$13. Dealers are complaining that some consumers are not taking scrap already bought, but they expect prices to stiffen up again in a short time and are making no attempts to move yard stocks in the present market. The Nickel Plate Railroad receives bids March 22 on about its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	17.00 to 17.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.75 to 13.00
Old car wheels.....	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	7.00 to 7.50
Iron and steel turnings and drillings.....	7.50 to 8.00
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	11.25 to 11.75
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	11.75 to 12.25
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

Finished Iron and Steel.—While no large inquiries are coming out, mill agencies report a good volume of small orders and specifications. Specifications continue to come freely from the implement manufacturers, and bolt makers are ordering quite well. Some of the latter have taken on considerable business in track bolts. Rivet makers are also getting a better volume of orders than for some time. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. While the demand for plates is not active, there is an improvement in small orders. The demand for structural material is fairly good, considerable tonnage coming out in small lots. A large amount of work requiring round tonnages is in prospect. Bids have been received for the new Technical High School, Cleveland, 330 tons, and the Harper Hospital in Detroit, 300 tons. The Dyer Company, Cleveland, has placed a contract with the Minneapolis Steel & Machinery Company, Minneapolis, for 300 tons for a sugar plant in Elsinore, Utah. The American Bridge Company has taken 110 tons for a bridge for the Detroit United Rail-

ways, Detroit, Mich. The demand for sheets is fair and regular prices are being maintained. The demand for iron bars is only moderate; the price of 1.30c. at mill is being generally maintained, although a Western mill has recently shaded this price \$2 a ton. Toledo, Ohio, has placed a contract with the United States Cast Iron Pipe & Foundry Company for 1500 tons of pipe for its Water Works Department, mostly 8 and 12 in., at \$22.80 a net ton.

The Bassett-Presley Company, Cleveland, Ohio, jobber in iron and steel, will move its offices April 1 from the Western Reserve Building to the Brotherhood of Locomotive Engineers' Building.

Cincinnati

CINCINNATI, OHIO, March 22, 1911.

Pig Iron.—The past few days show a falling off in both inquiries and orders. The actual business booked was much behind the corresponding week in February. An encouraging feature is the movement of contract iron, as consumers are not asking the furnaces to hold up deliveries, but, on the other hand, are generally urging more prompt shipment. No inquiries for large tonnages are coming in, and the majority of those being worked on are from either the Indiana or St. Louis territory with a fair number of requests for prices on small lots from nearby melters. Consumers of Southern iron who are now in the market appear willing to close for last half shipment on a basis of \$11, Birmingham, and there are several producers who are taking care of their old customers at this figure for third quarter movement, while it is rumored that a few contracts have been made at the same price extending through the last half. Northern iron is firm at \$14, at furnace, for either prompt shipment or for delivery through the third quarter. Several producers are asking \$14.50 for shipment after July 1, but they are not booking any business with the exception of a few small orders for special brands. Sales include 500 tons of Southern No. 3 foundry to an Illinois consumer at \$11, Birmingham, for last half shipment; two lots of 300 tons each to Michigan manufacturers at \$11 for second quarter; 2000 tons of Jackson County silvery, on a basis of \$16.50 for 8 per cent. silicon, July-December shipment, to a Northern foundry; two lots of Northern No. 2 foundry aggregating about 1000 tons at \$14, April-September, to Illinois users. Malleable is quiet and quoted around \$14 to \$14.25 for any shipment up to October 1. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Old silvery, 8 per cent. silicon.....	17.75
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—Eastern consumers have inquiries out for furnace coke aggregating about 1000 tons a month. Deliveries are to commence April 1, and the tonnage involved will be divided about equally in contracts for six months' and one year's supply. Connellsville furnace coke is firmer and is now quoted on the same basis as the Wise County and Pocahontas product. In all three fields furnace coke, for spot shipment, is sold around \$1.60 to \$1.65 per net ton at oven; for the second quarter, \$1.65 to \$1.75 is asked, and for shipment the remainder of the year, all the way from \$1.70 to \$2 is quoted, which also represents the figures for 12 months' contracts. Foundry coke is quiet, and only carload lots are being sold. The prompt shipment price is about \$2 per net ton at oven, with the usual premium of 25c. per ton asked on future shipment contracts.

Finished Material.—A slight improvement is noted in structural material, and if the inquiries now being figured on all develop into orders, there certainly will be no cause for complaint with either the local jobbers or mill agents. Sheets are better sellers than plates. Hoops and bands are contracted for only moderately well. Railroad track material is not in great demand, and only small orders to fill immediate requirements are reported as placed during the past few days. The mill price of structural material and plates remains at 1.40c., Pittsburgh, and the local warehouse quotations are from 1.85c. to 1.95c.

Old Material.—While there has been a lull in business, prices do not seem to have changed appreciably. The Norfolk & Western and the Southern each sold last week about 5000 tons of scrap, but none of this was taken by local

THE IRON AND METAL MARKETS

dealers. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to	\$12.50
Cast borings, net ton.....	5.00 to	5.50
Steel turnings, net ton.....	6.00 to	6.50
No. 1 cast scrap, net ton.....	11.00 to	11.50
Burnt scrap, net ton.....	8.00 to	9.00
Old iron axles, net ton.....	17.50 to	18.50
Bundled sheet scrap, gross ton.....	8.50 to	9.00
Old iron rails, gross ton.....	14.50 to	15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to	22.50
Old car wheels, gross ton.....	12.00 to	12.50
Heavy melting steel scrap, gross ton.....	11.00 to	11.50

St. Louis

St. Louis, Mo., March 20, 1911.

An encouraging feature is the marked improvement since March 1 in the demand for all kinds of building material. Leading contractors state that the outlook for activity in building is good. The prospect for railroad buying is better and further sales of standard rails have been made. Sales of cement are very heavy here and at Kansas City, where 400,000 barrels were contracted for last week, of which 50,000 barrels were purchased by the Kansas City Southern Railroad.

Pig Iron.—So far as large inquiries or sales are concerned the market for pig iron was dull the past week, but merchant sellers reported a fair business with small consumers. Large buyers are taking iron due on contracts close up to the time specified. The sale of 1200 tons of No. 2 Northern foundry and 1000 tons of No. 2 Southern foundry to a stove company is reported for shipment over the last half. A leading agency mentions sales to various parties aggregating 800 tons of No. 2 Southern foundry, for shipment over the second and third quarters. Another office reports a sale of 1000 tons of 5 per cent. silicon iron and 500 tons of No. 2 Southern foundry, both for future delivery, and the representative of a leading interest mentions sales of 400 tons of No. 2 Southern foundry. An inquiry is out for 1200 tons of No. 2 Southern soft and 400 tons of No. 2 Southern foundry, both for shipment over the last half; also for 400 tons of ferromanganese for the same delivery. There is some irregularity in Southern prices, but there are sufficient offerings to make the price of No. 2 Southern foundry \$11, Birmingham, for shipment over the second and third quarters, and \$11.50 for the fourth quarter only. Low grade Southern continues scarce. Northern No. 2 foundry is quoted at \$14 to \$14.50. Iron-ton.

Coke.—The market is not as active as it was, but the tone is strong. As far as reported the sales for the past week were quite small in volume, but there are some inquiries covering large tonnages that are said to be pending and likely to be closed within a few days. We quote standard Connellsville 72-hour foundry at \$2.15 to \$2.25 per net ton, at oven, for shipment over the remainder of the first half, and \$2.25 to \$2.50 for delivery over the remainder of the year.

Old Material.—Continued dullness in the demand for scrap iron and steel is reported, and the situation has lapsed again into a dealers' market. Prices have eased off and the tone of the market is weaker. The only railroad offerings the past week were the following: Chicago & Alton, 200 tons; Chicago & Eastern Illinois, 400 tons. We quote dealers' prices, per gross ton, f.o.b. St. Louis, as follows:

Old iron rails.....	\$13.50 to	\$14.00
Old steel rails, rerolling.....	13.00 to	13.50
Old steel rails, less than 3 ft.....	12.00 to	12.50
Relaying rails, standard sections, subject to inspection.....	23.50 to	24.00
Old car wheels.....	12.50 to	13.00
Heavy melting steel scrap.....	11.50 to	12.00
Frogs, switches and guards, cut apart.....	11.00 to	11.50

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to	\$11.50
Iron car axles.....	18.00 to	18.50
Steel car axles.....	17.50 to	18.00
No. 1 railroad wrought.....	11.50 to	12.00
No. 2 railroad wrought.....	10.50 to	11.00
Railway springs.....	10.00 to	10.50
Locomotive tires, smooth.....	16.00 to	16.50
No. 1 boiler forgings.....	9.00 to	9.50
Mixed borings.....	4.50 to	5.00
No. 1 bushing.....	9.50 to	10.00
No. 1 boilers, cut to sheets and rings.....	8.00 to	8.50
No. 1 cast scrap.....	11.50 to	12.00
Sheet and plate scrap.....	9.00 to	9.50
Roller scrap.....	9.00 to	9.50
Apex scrap.....	8.50 to	9.00
Pipes and flues.....	8.00 to	8.50
Railroad sheet and tank scrap.....	8.00 to	8.50
Railroad grate bars.....	8.50 to	9.00
Machine shop turnings.....	7.00 to	7.50

Finished Iron and Steel.—The demand for standard rails is improving, and the leading interest reports closing contracts with five railroads for a tonnage aggregating 70 miles. There is a fair inquiry coming from lumber interests for light rails. The demand for structural material is

moderate. For bars there are only scattering inquiries. The demand for track material is steady and fairly good. A sale of 1565 kegs of spikes is reported.

The contract for the erection of the Jefferson Memorial Building, to be erected at the De Baliviere entrance to Forest Park, has been awarded to James Stewart & Co. at their bid of \$360,000.

The Miller Coal & Coke Company, St. Louis, has been incorporated. The capital stock is \$20,000. The incorporators are Howard E. Miller, Webb T. Miller, W. S. Sands and others.

Birmingham

BIRMINGHAM, ALA., March 20, 1911.

Pig Iron.—Inquiry keeps up very satisfactorily, though nothing large is pending, and the volume of business booked the past week has been relatively light. Shipments on February sales are moving out at a good rate, and it is believed that Alabama stocks on furnace yards will this month show a still further decline. Consumers generally are not believed to have any large accumulations in foundry yards. This is surely true as to the foundries of the South. One of the large interests here announces its schedule of prices on No. 2 foundry basis, Birmingham, at \$11 for prompt shipment or for deliveries extending through the second quarter; for the third quarter, \$11.25, and for the final quarter of 1911 the price is held firm at \$11.50.

Cast Iron Pipe.—The past week has shown little, if any, change. New business appears to have been light, but better prices are undoubtedly being maintained for all the pipe now selling. An inquiry for Los Angeles has had careful consideration, but contracts have not yet been closed on this lot. It is thought that without doubt this business will come to the Birmingham district foundries. No change is recorded in the rate of production, while stocks on foundry yards have been slightly reduced. Manufacturers here report that the following quotations, per net ton, f.o.b. foundries here, correctly represent minimum figures: 4 to 6 in., \$22; 8 to 12 in., \$20; over 12 in., an average of \$19. Gas pipe \$1 per ton higher.

Old Material.—Very little has been doing. For some months this line has been a very slow and unprofitable one. Stocks are less and, therefore, quotations are slightly firmer. The future, however, appears to hold no great promise of much better things. Quotations remain as follows, per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to	\$14.50
Old iron rails.....	12.50 to	13.00
Old steel axles.....	12.50 to	13.00
No. 1 railroad wrought.....	12.00 to	12.50
No. 2 railroad wrought.....	9.50 to	10.00
No. 1 country wrought.....	8.00 to	8.50
No. 2 country wrought.....	7.50 to	8.00
No. 1 machinery.....	10.00 to	10.50
No. 1 steel.....	9.50 to	10.00
Tram car wheels.....	9.00 to	9.50
Standard car wheels.....	10.50 to	11.00
Light cast and stove plate.....	8.00 to	8.50

Buffalo

BUFFALO, N. Y., March 21, 1911.

Pig Iron.—The aggregate of inquiry for the week will total 15,000 to 20,000 tons, principally foundry grades, with some malleable and basic. It is understood that the contract for the 25,000 to 30,000 tons of foundry and malleable for an agricultural implement maker, which was mentioned as under negotiation last week, was taken by a Buffalo furnace, the bulk of it being for first half delivery. In addition to this, orders aggregating a fair tonnage have been taken, comprised of foundry, basic and malleable grades. As a rule, not much active solicitation is being made by producers, as prices obtainable have not yet reached a remunerative point, although there has been a gradual hardening during the past two or three weeks, and most furnaces are holding prices stiffly at the somewhat higher level of the current schedule. Comparatively little business is being taken for delivery beyond the first half, except at an advance. We quote for first half delivery as follows, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.75 to	\$15.00
No. 2 X foundry.....	14.50 to	14.75
No. 2 plain.....	14.25 to	14.50
No. 3 foundry.....	14.00 to	14.25
Gray forge.....	13.75 to	14.00
Malleable.....	14.50 to	15.00
Basic.....	14.50 to	15.00
Charcoal.....	17.00 to	17.50

Finished Iron and Steel.—A good amount of business is being done in most lines of finished products and prices are firm. The demand for steel bars is a little more active as well as for sheets. The agency of the leading interest has secured the contract for the 250 tons of reinforcing bars re-

THE IRON AND METAL MARKETS

quired for the additional factory building to be erected by the Eastman Kodak Company, Rochester. Considerable inquiry is coming from Canada for track materials for both steam and electric railroads and the Canadian demand is also good in general lines. In fabricated structural work the prospects are bright, with more business in sight than for some months; although much of the work in architects' hands is not yet ready for announcement. Specifications are to be out next week for the structural material for a large foundry plant to be erected here at once.

Old Material.—New buying in scrap has been limited in the past few days, but some small lots have been sold at slightly easier prices than quoted the preceding week. No large offerings are to be had on this easier price basis, however, as scrap from outside points which generally comes to this district is being taken by dealers for shipment to other consuming markets on orders contracted for some time ago for future delivery. Shipments to mills on contracts are moving in good volume. We quote as follows for immediate shipment, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$13.75 to \$14.00
Low phosphorus steel.....	17.50 to 18.00
No. 1 railroad wrought.....	15.75 to 16.25
No. 1 railroad and machinery cast scrap	14.75 to 15.25
Old steel axles.....	20.00 to 20.50
Old iron axles.....	24.00 to 25.00
Old car wheels.....	14.75 to 15.00
Railroad malleable.....	14.00 to 14.25
Boiler plate.....	11.75 to 12.00
Locomotive grate bars.....	11.75 to 12.25
Pipe.....	10.50 to 11.00
Wrought iron and soft steel turnings..	7.50 to 8.00
Clean cast borings.....	7.00 to 7.25

The German Iron Market

An Open Market on Steel Bars

BERLIN, March 10, 1911.

The adjourned meeting of the steel bar manufacturers, which was held several days ago, had the result foreshadowed in this correspondence. The price convention was not renewed, and all the other points agreed upon in a preliminary way have also been dropped. The failure to reach an agreement was due to the refusal of the Hoersch Company to have prices fixed; the other companies regarded it impossible to carry out a combination successfully which did not include that great interest. It is generally conceded that this failure to reach an agreement will prove final—for this year, at any rate. As to the future tendency of bar prices, it is asserted in some quarters that the figures will not go much lower than now, if any; but this is probably a too optimistic view of the matter, even assuming present prices to be about 105 to 107 marks for the home market. It is also rather difficult to say what is the state of business in the bar trade. Some reports assert that business has been practically at a standstill during the negotiations for the combination, but others assert with equal positiveness that orders have been arriving in pretty good volume all along, and from this it is argued that there is really a big demand still to be satisfied. Since the breakdown of the negotiations no news has reached Berlin indicating that buying has grown more active.

Increased Activity in Beams

This week the Steel Works Union has voted business open in structural shapes for the June quarter at unchanged prices. There had been a considerably increased activity in beams, consumers having feared that prices would be raised, and in this way the mills have more work on hand than last month. There are, however, still no indications that the building trade will have the expected strong revival this spring; hence it is doubtful whether the business in structural shapes will reach a satisfactory volume. Orders for semimanufactured steel are fairly good, consumers having begun to contract for their next quarter's requirements since the Union opened business in this specialty a fortnight ago. A good export demand is reported; England in particular is trying to place orders pretty far ahead, but German mills usually succeed in obtaining price advances in such cases. The outlook for the rail business is better. There will be heavier domestic orders, and the foreign market continues to take heavy rails in good quantities. The home demand for light rails is also looking up, and the business in grooved rails remains quite good, both home and foreign buyers taking a hand. The shipments of the Union in semimanufactured material, structural shapes and rails in February amounted to about 417,000 metric tons, as compared with 404,000 in January. The gain was wholly in structural shapes.

Heavy plates have grown more active. The foreign market is especially showing a big demand. Home construction shops are sending in good orders, and the shipbuilding industry is increasing its takings. Business is also good in medium plates, and a moderate improvement in thinner quali-

ties is mentioned. Orders for wire rods are coming in better since the price question was settled a few weeks ago, but there is no urgency in the demand. The foreign demand is steady. The mills are pretty well supplied with orders, and in some cases higher prices are demanded and allowed.

Pig Iron Quiet

The pig iron market continues quiet. New ordering is of light volume. Scrap is coming on the market in larger volume, but prices are held pretty firmly, there being a good demand. The production of pig in February was 1,179,100 metric tons, with a gain of 87,858 tons over February, 1910; whereas January had gained 143,100 tons over the corresponding month of 1910. The ore trade is active, but there is little ordering for home ores, as arrangements had already been made far ahead. The imports of ores in February showed a big gain—729,600 tons, against 184,400 tons in February, 1910. The heavy movement was largely a reaction from the tight imports in January.

The good reports from the Belgian market continue. Another advance of about 2 shillings a ton for plates of all qualities for export is mentioned. From the Luxembourg-Lorraine district the pig iron trade is reported as very quiet. Production is increasing there rapidly and a number of new furnaces are coming into blast soon. From that district comes the news that another consolidation is about to be carried out. The Burbacher Hütte, the Düdelingen Eisenhüttenverein and the Eicher Hüttenverein are to be amalgamated into a powerful combination. The new concern will own 22 blast furnaces, a number of basic and open hearth steel works and an electrical furnace plant at Eich. The new company will also own very extensive ore properties. The amount of its capital has not yet been mentioned, but it will probably reach \$12,000,000 to \$15,000,000.

The stock market to-day was considerably encouraged by the half yearly report of the Laura Hütte, the most important concern of the Silesian district. It showed earnings for the past half year of \$785,000, as against \$635,000 for the second half of 1909.

According to a Vienna dispatch of yesterday the general manager of the Prager Eisenindustrie Gesellschaft stated in the annual meeting that a conference would be held at Brussels in July of the iron interests of all exporting countries, for the purpose of trying to arrange an understanding in regard to the export trade and markets.

New York

NEW YORK, March 22, 1911.

Pig Iron.—The market is quiet, but firm—more so, apparently, than the foundry iron market in Central Western districts. Several New Jersey foundries have been buyers in the past week, but only an occasional transaction is reported above 1000 tons. On the whole there is less activity in the past two weeks. Foundries are generally covered for the second quarter, and are waiting for more definite developments as to the second half. Eastern Pennsylvania and New Jersey furnaces are holding quite firmly for advances for the last half, and the indications are that the market will drift for a little time. We quote tidewater deliveries as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15 to \$15.25.

Steel Rails.—The Illinois Steel Company's sales in the past week amounted to 20,000 tons, of which 10,000 tons went to the Great Northern, 1800 tons to the Interurban Construction Company, 2200 tons to the Interurban Traction Company, and 2600 tons to the Illinois Contracting Company. The Pittsburgh Railways are in the market for 1700 tons of girder rails and the Chicago City Railways for 4000 tons. The Boston Elevated is inquiring for 600 tons of 85-lb. rails.

Ferroalloys.—A sale of 5000 tons of ferromanganese was made in the New York market for a western Pennsylvania steel company for delivery over the last quarter of this year and the first quarter of next year at a price less than \$36.90. Baltimore. It is hardly probable that ferromanganese could be bought in this market at present, however, at less than \$37, Baltimore, as several small lots sold during the week brought that price. Ferrosilicon is in little demand, and it can be had at about \$55, Pittsburgh.

Finished Iron and Steel.—In the past two weeks several of the long held-up building contracts have been placed. The release of the considerable tonnage involved directly benefits only the successful bidders, but indirectly it will have a stimulating influence on all finished lines by encouraging the placing of the remaining deferred contracts and decreasing the tendency to delay on new matters that are still to come into the market. In the past week the plate business in this territory has not been up to the preceding week, but it represents only a normal fluctuation and does

THE IRON AND METAL MARKETS

not impair confidence in good spring prospects. Steel bars show little change, but bar iron orders were a little better last week than the week before and prices are well maintained. The principal large structural contracts released during the week were for the post-office at the Pennsylvania Railroad terminal, 6400 tons, and the Masonic Temple, 3700 tons, both of which have gone to Post & McCord, and the Curtis Publishing Company's storage warehouse, Philadelphia, the steel for which, 4000 to 5000 tons, has been awarded the American Bridge Company by the general contractors, Wells Brothers. The American Bridge Company also has 1700 tons for an express building in Jersey City for the Central Railroad of New Jersey and about 800 tons for a pier for the same road at about Fortieth street on the New York side of the Hudson River. Other structural awards were as follows: To Levering & Garrigues, 1800 tons for the Lewis & Conger store, Forty-sixth street and Sixth avenue, New York City; to Ravitch Brothers, 500 tons for the Felt Construction Company's loft on West Twenty-ninth street, and 600 tons for the Dominick Abbati loft, 237-9 Lafayette street, New York City; to the Hay Foundry & Iron Works, 850 tons for the Communipaw pier sheds for the Central Railroad of New Jersey; to the Virginia Bridge Company, 700 tons for the Oxnard Company's sugar refinery at Adeline, La., and to the Buffalo Structural Company, 160 tons for the Hower building at Akron, Ohio. Bids closed Monday on a printing house, 2500 tons, to be built by the Trinity Corporation at Hudson and Delancey streets, New York, and 1500 tons of bridge material for the Western division of the Grand Trunk Railway. Bids go in to-day on 1600 tons for a bridge for the Lehigh & New England Railroad at Bethlehem, Pa. Bids are now being received on 900 tons for a grand stand on the Fair Grounds at Allentown, Pa., and 700 to 800 tons for the Leh building in the same city, and on 250 tons for a pier shed for the New York Dock Company in Brooklyn. The New York Central is in the market for a bridge of about 75 tons at Troy, N. Y., and the Delaware & Hudson for one of about 50 tons at Plattsburgh, N. Y. The American Building Company is reported to be about to come into the market for a large tonnage of steel for a number of warehouses to be erected in Boston. Prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Store prices for plain material and plates, New York, are 1.85c. to 1.95c.

Cast Iron Pipe.—The city of Pittsfield, Mass., will open bids March 27 on 3800 tons of water pipe. It is expected that the New York Department of Water Supply, Gas and Electricity will shortly ask for bids on 7000 to 10,000 tons of 48-in. pipe for delivery in the Borough of the Bronx. The United States Government opened bids last Thursday on 700 tons of bell and spigot pipe and 200 tons of flange pipe for shipment to the Philippine Islands. The lowest bid on the bell and spigot pipe was \$20.90, New York, by the Standard Cast Iron Pipe and Foundry Company, and \$31.20 on the flange pipe, by R. D. Wood & Co. The demand from private water and gas companies is keeping up quite well. Carload lots of 6 in. are quoted at \$21 to \$22 per net ton, tidewater.

Old Material.—The market is moderately active in heavy melting steel scrap. The steel companies are only purchasing small quantities, but dealers are buying to a somewhat greater extent for shipment on contracts. The rolling mills are doing very little, and dealers are having an exceedingly trying experience in endeavoring to make shipments which will not be open to rejections on comparatively slight pretexts. Cast scrap is in fair demand, and some pressure is noted for shipments of cast borings on contracts. The outlook generally is not very promising and dealers are looking for lower prices. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	\$11.25 to \$11.75
Re-rolling rails	12.50 to 13.00
Heavy melting steel scrap	11.25 to 11.75
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	22.50 to 23.00
Old steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
Wrought iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	12.50 to 13.00
No. 1 yard wrought, short	11.50 to 12.00
Light iron	5.00 to 5.50
Cast borings	6.50 to 7.00
Wrought turnings	7.00 to 7.50
Wrought pipe	11.00 to 11.50
Old car wheels	12.50 to 13.00
No. 1 heavy cast, broken up	12.50 to 13.00
Stove plate	9.50 to 10.00
Locomotive grate bars	10.00 to 10.50
Malleable cast	11.50 to 12.00

The first battery of 55 Koppers by-product coke ovens at the plant of the Lake Superior Corporation, Sault Ste. Marie, Mich., is completed, and the first coke was made March 11. A total of 110 ovens will be built at this plant.

Metal Market

NEW YORK, March 22, 1911.

THE WEEK'S PRICES

Copper, New York.		Tin.		Lead.		Spelter.	
March.	Lake.	Electric.	New York.	New York.	St. Louis.	New York.	St. Louis.
16.....	12.50	12.25	39.00	4.37½	4.22½	5.65	5.50
17.....	12.50	12.25	39.35	4.37½	4.22½	5.65	5.50
18.....	12.40	12.17½	39.60	4.40	4.25	5.65	5.50
19.....	12.45	12.20	40.00	4.40	4.25	5.65	5.50
21.....	12.50	12.25	40.50	4.40	4.25	5.65	5.50
22.....	12.50	12.25	40.50	4.40	4.25	5.65	5.50

Tin maintains its high price, but premiums on spot are lower. Copper sagged during the week but is now firmer. The nominal price for spelter is unchanged, but there are reports of price cutting. Buyers are taking more interest in lead, and the market is stronger.

Copper.—Good sales of both lake and electrolytic copper were made during the week at slightly lower prices than were in effect seven days ago. The market is stronger to-day than yesterday, with resultant stiffening in quotations. While there have been reports of unusually large sales of copper for export, it is generally believed that they were more talk than fact. Sales of good round lots of electrolytic copper have been made both for domestic consumption and export. Sellers who have made concessions to obtain good orders are reluctant to state how much metal they have disposed of and the result of their transactions will probably not be known for several weeks, when their sales to foreign accounts will be shown in the exports. It is certain that considerable electrolytic copper was disposed of at around 12.17½c. on Saturday and Monday, and lake copper was offered by some sellers at 12.40c. on those days. The apparent anxiety to sell by some holders unsettled the market, and quotations were irregular and in some cases they were split one-half point in order to induce consumers to buy. Electrolytic copper to-day is fairly firm at 12.25c., and lake is held at 12.50c. The exports of copper so far this month have been 13,821 tons. The London market closed quiet to-day with spot copper bringing £55 and futures selling at £55 11s. 3d. The sales amounted to 150 tons of spot and 600 tons of futures.

Pig Tin.—Consumers are still at the mercy of the London syndicate. Notwithstanding the fact that arrivals in this country have been unusually heavy so far this month, the spot supply is scarce. In all 4437 tons of pig tin have come into American ports during the month and most has gone into the hands of consumers. These deliveries have satisfied the demand to some extent, and consequently premiums on spot are much lower. During the week they ranged from ½c. to ¼c. per pound over the London market. There are 2680 tons of tin afloat, but much of it will not arrive here until after the end of the month. Little buying has been done, as most of the tin arriving at this port was contracted for weeks ago. In New York to-day pig tin was sold for 40.50c. The London market closed weak, with spot tin selling at £182 15s. and futures at £182 5s. The sales amounted to 70 tons of spot and 570 tons of futures.

Tin Plates.—A good, steady demand exists, but there is a dearth of large inquiries, most of the buying being in small lots. Quotations on 100-lb. coke plates remain at \$3.94, New York. The price of foreign tin plates is still prohibitive to many who buy for re-export, and it is hard to get early deliveries, as the mills in Great Britain have more business than they can handle. The quotation for tin plates at Swansea, Wales, to-day was 14s. 7½d.

Lead.—The lead market is stronger and some good business has been done, especially in St. Louis. The leading interest seems firm in its intention to keep its quotation at 4.50c. and outside sellers have advanced their price to 4.40c., New York. The price in St. Louis is now 4.25c., and in view of the increasing demand the market may go higher.

Spelter.—The spelter situation is hard to define. Consumers are taking so little interest in the market that prices are largely nominal, but it is generally believed that some sellers have been making concessions to induce business. The usual quotations are 5.50c., St. Louis, and 5.65c., New York, but it might be possible for consumers to get better prices than these.

Antimony.—Antimony is dull and easy. It appears that this time the ultimate consumer, as a whole, has not lost anything through the decline in prices, as most of the recent trading has been between dealers, consumers having apparently been well stocked before the announcement of the formation of the antimony syndicate. Cookson's is nominally 9.50c.; Hallett's, 9.12½c.; Hungarian and Chinese grades, 8.60c. Dealers are asking 9.25c. for Hallett's for delivery during June and July, while Hungarian and Chinese grades can be had for delivery during those months at 8.35c.

THE IRON AND METAL MARKETS

Old Metals.—The market holds up well. Selling quotations are unchanged, as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, March 21.—The market for metals is somewhat improved, although prices have not strengthened very perceptibly. There is some shading on the price of lead. The market for old metals continues very quiet. We quote Chicago prices as follows: Casting copper, 12½c. to 12¾c.; lake, 12¾c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 41½c.; small lots, 43¼c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 29c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, March 20.—Lead is quiet at 4.22½c.; spelter dull, but firm, at 5.45c., both at East St. Louis. Zinc ore is in very large supply and quiet at \$38 to \$40 per ton, Joplin base. Tin is easier at 40.15c.; antimony (Cookson's) unchanged at 9.85c.; lake copper easier at 12.85c.; electrolytic, 12.60c., all at St. Louis. The demand for finished metals the past week was quieter.

Iron and Industrial Stocks

NEW YORK, March 22, 1911.

The stock market has been surprisingly strong in view of somewhat unfavorable conditions now existing as well as the very moderate volume of transactions. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	8	Pressed St., pref.....	97½
Allis-Chalm., pref. 31 - 32½		Railway Spr., com. 84 - 84¾	
Beth. Steel, com. 31¼ - 32¾		Railway Spr., pref. 98 - 98½	
Beth. Steel, pref. 61 - 61½		Republic, com. 93½ - 94	
Can. com. 91 - 97		Republic, pref. 97 - 98	
Can. pref. 80½ - 80¾		Sloss, com. 52½ - 52½	
Car & Fdry, com. 53 - 54½		Sloss, pref. 112 - 112½	
Steel Foundries. 47½ - 48		Pipe, com. 173 - 173½	
Colorado Fuel. 32¼ - 33		Pipe, pref. 58 - 58	
General Electric. 149½ - 150½		U. S. Steel, com. 77½ - 79¾	
Gr. N. ore cert. 58¾ - 61¾		U. S. Steel, pref. 118½ - 119½	
Int. Harv., com. 116¾ - 118		Westinghouse Elec. 68¾ - 68½	
Int. Harv., pref. 123 - 124½		Va. I. C. & C. 60 - 61	
Int. Pump, com. 41 - 41½		Am. Ship, com. 75 - 75¾	
Int. Pump, pref. 89 - 89¾		Am. Ship, pref. 112½ - 112¾	
Lackawanna Steel. 44 - 44		Chi. Pneu. Tool. 50 - 51½	
Locomotive, com. 38¾ - 39½		Cambria Steel. 47½ - 48½	
Locomotive, pref. 109½ - 109¾		Lake Sup. Corp. 29½ - 31¼	
Nat. En. & St., com. 17½ - 18		Crucible St., com. 13½ - 13¾	
Nat. En. & St., pref. 88½ - 88¾		Crucible St., pref. 80 - 81½	
Pressed St., com. 33 - 33½			

* Ex dividend.

The Otis Elevator Company has issued its report for the year ended December 31, 1910, which shows net earnings, after deducting all charges for interest and patent expenses and for renewals and repairs, of \$1,157,371, against \$1,048,689 in 1909. The surplus, after payment of dividends on the preferred and common stock, was \$130,125, against \$115,985 in 1909. The balance sheet shows a surplus of \$2,130,535 December 31, 1910, against \$2,000,410 at the end of the previous year. The report states that special attention was given last year to the further extension and development of the company's business in Europe and South America. The Canadian subsidiary, operating shops in Hamilton, Ont., is showing satisfactory results. The outlook for business in 1911 is not in some respects as favorable as it was last year, although the contracts closed up to this time indicate that there will be a fair demand for the company's product.

Dividends.—The Yale & Towne Mfg. Company has declared the regular quarterly dividend of 1½ per cent. and an extra of 1 per cent., payable to stock of record March 28.

The Union Switch & Signal Company has declared the regular quarterly dividends of 3 per cent. on the common and 3 per cent. on the preferred stock, payable April 10.

The Dominion Iron & Steel Company, Ltd., has declared the semiannual dividend of 3½ per cent. on the preferred stock, payable April 1.

The American Locomotive Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable April 21.

Manning, Maxwell & Moore, Inc., have declared the regular quarterly dividend of 1¼ per cent., payable March 31.

The E. W. Bliss Company has declared the regular quarterly dividends of 2½ per cent. on the common and 2 per cent. on the preferred stocks, payable April 1.

The Walworth Mfg. Company has declared the regular quarterly dividend of 3 per cent., payable March 31.

Notes on Prices

Rope.—Some manufacturers report an improvement in demand, especially on the best grades of Manila rope, while sisal rope shows less activity. Manila fiber has advanced slightly in price, as has also sisal fiber, but with the moderate demand for the finished product regular quotations have not been affected. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8½c. to 9c. per pound; second grade Manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6¼c. per pound.

Linseed Oil.—While oil is procurable in carload lots at a little under former prices, the inducement does not appear attractive to buyers. The following quotations represent New York prices in 5-barrel lots or more:

State, raw.....	Cents. 95
City, raw.....	95
Oil in lots of less than 5 bbls., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—Turpentine has made a sharp advance at this point, following higher prices at Savannah, where receipts are being taken freely. There is some fear that the new crop will be late, as a result of cold weather in the turpentine belt. New York turpentine quotations in 5-barrel lots are as follows:

In oil barrels.....	\$1.05¼
In machine barrels.....	1.06
Less than 5-bbl. lots, ¼ cent advance per gallon.	

Rosins are quiet but higher in price, owing to advances in the Southern markets. On the basis of 280 lb. of the barrel, common to good strained is quoted at \$8, and grade D at \$8.55 in the New York market.

The Standard Chain Company, on Tuesday, lost its entire Schmidt plant at York, Pa., by fire, causing a loss of \$35,000 to \$40,000, fully covered by insurance. There will be no interruption whatever in the filling of orders, as all contracts originally intended to be filled at that plant will be transferred to other works of the company and will be shipped out promptly. The Schmidt plant will be rebuilt as soon as possible and probably on a larger scale than before.

The Link-Belt Company states that its sales office formerly located at 84 State street, Boston, Mass., has been moved to more commodious quarters at 131 State street, Boston, to take care properly of the increasing demand for Link-Belt elevating, conveying and power transmission machinery and chains. Lawrence Spillan is in charge.

The Best Mfg. Company, Pittsburgh, has secured the contract for the piping (water, steam and oil), with valves and fittings for the new blast furnace plant being built at South Buffalo, N. Y., by the Rogers-Brown Iron Company. This contract involves a large amount of material.

The Sweet's Steel Company, Williamsport, Pa., states that its capital stock has been increased from \$200,000 to \$600,000. This increase has been effected for the purpose of making additions and improvements to the plant, and to furnish the capital necessary for steadily expanding business.

The Carbon Iron & Steel Company, Ltd., Parryville, Pa., will blow out its blast furnace about May 1, for needed repairs. In addition to relining the furnace, the stoves will be relined and some additions made to the boiler plant.

Open Hearth Furnaces with Magnesite End Blocks

An interesting statement is made by the Blair Engineering Company, 21 Park Row, New York, comparing the outputs of two open hearth furnaces, known as Nos. 1 and 3, in the same plant and having the same capacity. They were rebuilt and started at the same time, July 1, 1910. Furnace No. 1 was equipped with Blair ports, and No. 3 furnace had silica brick ports. Furnace No. 3 was out for general repairs twice in the eight months and at the time of the second repair was equipped with Blair ports. The comparison is as follows:

	No. 1. Tons.	No. 3. Tons.
July, 1910.....	2,972	2,906
August, 1910.....	2,999	2,496
September, 1910.....	2,828 (\$5,000 repair)	1,062
October, 1910.....	2,880	2,860
November, 1910.....	2,967	2,831
December, 1910 (Air checkers re- pair, \$500).....	2,530 (\$6,000 repair)	1,968
January, 1911.....	2,950	1,767
February, 1911.....	2,927	2,907
Totals.....	23,053	18,797

New York City's Largest Steel Girder.—The record made on March 5, when a 60-ton steel girder for the new Municipal Building was carted through the streets of New York City has been broken. On Sunday last, two still heavier girders were transported from the pier at the foot of West Forty-third street to Fifth avenue and Thirty-eighth street, where they will form the lintel over what is to be one of the largest show windows in the city. The girders weighed approximately 65¾ tons, and in moving each 46 horses were used. In hauling the truck two long steel cables were employed, 11 teams being hitched to each. For guiding the truck the two wheel horses were hitched in a double pair of shafts. After each trip it was necessary to replace a number of broken manhole covers.

The J. B. & J. M. Cornell Company's proceeds promise little for unsecured creditors. The bids received March 20 by Trustee A. Gordon Murray comprised four for some part of the assets and one for the entire property, which was made by the New York Trust Company, Sarah K. Cornell, Jones & Laughlin Steel Company, Phoenix Iron Company and Lukens Iron & Steel Company, representing bondholders and a few of the large creditors. They propose to form a new company to take over the assets and carry on the business, issuing certificates of indebtedness for the obligations incurred by the receivers. Bondholders are to receive 10 per cent. in stock of the new company, and the capital stock of which is to be put in a voting trust pending the payment of the receiver's obligations. The United States District Court will pass on the bids March 27.

The new railroad bridge for the transfer of hot metal from the Heckscher furnaces at Swedeland to the steel works of the Alan Wood Iron & Steel Company, at Ivy Rock, Pa., will be completed in a few days. The bridge is 887 ft. in length and crosses the Schuylkill River, the Pennsylvania Railroad and the Philadelphia & Reading Railroad. It was designed and built under the supervision of Frank C. Roberts & Co., engineers, Philadelphia. Several weeks will elapse before the actual transfer of hot metal will be begun, as there still remains some work to be done before the Alan Wood Company will be prepared to use the hot metal in its steel making furnaces.

The McMinn & Quigley Steel Company, Boston, Mass., dealer in tool steels, has taken the store at 259 Atlantic avenue, where a complete stock will be carried. The company has already moved from its offices in the Mason Building. The business was recently changed from a co-partnership to a Massachusetts corporation, with Harry F. McMinn as president, and H. T. Quigley, treasurer. The company represents the John Illingworth Steel

Company, the Griffin Mfg. Company's line of cold rolled strip steel, and the Bleekmann-Phenix Steel Works, Styria, Austria, the last being a recently formed connection.

The Asa W. Whitney Car Wheels

The Enterprise Foundry & Machine Works, Bristol, Tenn., is making unusually excellent chilled car wheels under the direction of its metallurgist, Asa W. Whitney, whose experience began in 1884 with A. W. Whitney & Sons, Philadelphia. The process by which these wheels are made has been developed by Mr. Whitney, who claims that his method of close regulation of the microstructure of metal by careful chemical calculation of the cupola mixture, by his improved form of contracting chill ring, and by his original method of rapid annealing makes a better wheel at less cost than heretofore. The Bristol *Herald-Courier* reports an excellent performance of a set of eight standard M. C. B. 33-in. Whitney wheels. These have run about 34,000 miles in six months, under a heavy switching engine, which makes about 180 to 200 miles per day, and are evidently good for more than the maximum service ever rendered under this engine by other standard makes of chilled wheels, and probably will give 120,000 miles where others failed at 40,000.

The Western Brass Mfg. Works, Campbell avenue and West Twenty-first street, Chicago, is now erecting at 2007 to 2011 Marshall boulevard a strictly modern foundry building which is expected to be completed at an early date. This will give the company much more space and will enable it to meet any demand that may be made on its facilities and resources. The company claims that it now has the largest and best brass foundry in Chicago. It was established in 1876 and incorporated in 1891. It manufactures standard and special hardware and auto accessories in brass, bronze, aluminum and iron. Joseph Hadka is president.

The American Sheet & Tin Plate Company's plant at Elwood, Ind., has been obliged to lay off temporarily 6 of the 26 hot mills, owing to the congested condition of the tin house, which has not been able to care for the output of the hot mill department since the limit was removed and workmen are permitted to turn out all the product the mills can handle. Ten new tin stacks are to be added to the finishing department. The largest month's business ever done by the Elwood plant was reported for February, although there were only 26 working days.

The Richardson-Phenix Company, manufacturer of oiling devices, Milwaukee, Wis., has opened a branch office in the Keystone Building, 324 Fourth avenue, Pittsburgh, Pa. This office will be under the management of H. M. Laughlin, who has been with the company for several years.

The Browning Foundry Company, Ravenna, Ohio, will shortly begin the erection of a new power house and new pattern shop. This company has also acquired a site for a new steel foundry, but states that it has not yet decided whether to build the foundry during the present year.

Wickwire Brothers, Cortland, N. Y., have completed arrangements for the installation at their wire manufacturing plant of two large gas producers, with coal hoist, two 500 hp. gas engines and two large dynamos to replace the present 800 hp. steam engine.

The Casey & Hedges Company, Chattanooga, Tenn., well-known manufacturer of boilers and plumbing specialties, has closed its Cincinnati office. T. R. McDonnell, manager, was transferred to the New Orleans office, of which he had charge before going to Cincinnati.

The Princess Furnace Company blew in its blast furnace at Glen Wilton, Va., March 17.

Personal

Charles T. Root, president of the David Williams Company, has sailed from San Francisco for Japan. He will spend some time in that interesting country, and may extend his trip to China and Manila. He expects to be absent three months.

R. N. Palmer has resigned as instructor in foundry practice at the Worcester Polytechnic Institute, Worcester, Mass., to become foundry superintendent of the Buckeye Engine Company, Salem, O.

Earle R. Knight has been appointed superintendent of the Bullock Electric Mfg. Company, Norwood-Cincinnati, O., to succeed T. L. Loose, who resigned to accept the superintendency of a manufacturing plant in Toledo, O.

R. R. Freer, who has installed many cost accounting systems for machine shops in the Central West for Miller, Franklin & Stevenson, Boston, Mass., has severed his connection with that firm, and in future will conduct a similar business of his own. His headquarters will be in Norwood, O., a Cincinnati suburb.

A. B. Sanders announces that he has severed his connection with John B. Watson as manager of his electrical department, and has established a similar business in electric railway equipment under the style of A. B. Sanders & Co., Witherspoon Building, Philadelphia, Pa.

James L. Ferguson, manager of the Milwaukee office of Joseph T. Ryerson & Son, Chicago, and more recently general manager of the Joliet Rolling Mills Company, Joliet, Ill., has resigned the latter connection to accept a position at Buffalo, with the Lackawanna Bridge Company.

The Herman Pneumatic Machine Company, Zelienople, Pa., desires to correct the statement in our last issue that Carl Falk, who recently left that company, was its sales manager. The company states that he was merely an employee.

An address on gas engines was given before the Cleveland Shop Superintendents and Foremen's Club March 18 by R. R. Stewart, mechanical engineer Tygard Engine Company, Pittsburgh, Pa.

Franklin T. Reese, for some years connected with the engineering department of the Westinghouse Air Brake Company, Wilmerding, Pa., and well known in mechanical engineering and railroad circles, is now general sales manager of the Vanadium Mines Company, with headquarters in the Frick Annex Building, Pittsburgh.

Adolph F. Ellfeldt, president and treasurer of the Ellfeldt Hardware & Machinists' Supply Company, Kansas City, Mo., expects to visit Germany, his old home, and other parts of Europe during May, June and July. He will be accompanied by his son Howard.

J. W. Gardner, president of the Gardner Governor Company, Quincy, Ill., will sail shortly for Europe accompanied by his wife and son.

Clinton H. Scovell of Clinton H. Scovell & Co., whose offices are at 110 State street, Boston, and 90 West street, New York, has been appointed by Governor Foss of Massachusetts as one of three experts to investigate the departments, commissions and institutions of that State. Mr. Scovell's investigations will relate particularly to public works and buildings, public utilities and the natural resources of the State.

The Crocker-Wheeler Company, Ampere, N. J., has appointed Clarence E. Delafield district manager, with headquarters at its offices in the Boston Safe Deposit and Trust Building, 201 Devonshire street, Boston, Mass., succeeding R. N. C. Barnes, resigned.

W. L. Schellenbach, chief engineer Lodge & Shipley Machine Tool Company, delivered an interesting address on the evening of March 17 to the students of the manual training department of the Hughes High School, Cincinnati. The address dealt with the early establishment of manufacturing industries in Cincinnati and the importance attained by them at the present time.

Prof. W. F. Schaphorst of the mechanical engineering department of the New Mexico College of Mechanic Arts has resigned his position there to become a technical

writer on the staff of A. Eugene Michel, advertising engineer, New York City.

J. Raymond Young, formerly with the sales department of the Buffalo office of the Carnegie Steel Company, is now representing that company's Pittsburgh warehouse at Charleston, W. Va. He has been succeeded in the Buffalo district by Robert G. Lea, formerly with the same company at Pittsburgh.

On April 1 Will McLain, who has been connected with the Cambria Steel Company, Johnstown, Pa., for 20 years, will resign the active duties of sales agent in the Pittsburgh territory, to be succeeded by his son, J. E. McLain, but will remain with the Pittsburgh office of the company and continue to serve his many friends.

J. W. Deetrick, formerly superintendent of the Youngstown plants of the Republic Iron & Steel Company, embracing blast furnaces, steel works and rolling mills, has been appointed manager of the entire operating department of the company for all its plants, succeeding to the duties formerly performed by T. J. Bray, who has been made president.

A Story of the Freight Rate Hearing.—A pamphlet of 47 pages has been prepared by Frank W. Noxon, secretary of the Railway Business Association, under the title "The Rate Decision and Railway Credit." It is Bulletin No. 6 of that association and is a graphic narrative of the hearings on the freight rate cases. Mr. Noxon attended most of the hearings and had access to all the stenographic reports so that his story is comprehensive and authoritative. He says that the object of the Railway Business Association in publishing his sketch is to "lend a hand in lubricating with friendliness that friction which generates heat and enervates judgment." Though the association was organized for the promotion of good will between the railroads and the public and is avowedly friendly to the railroads, the pamphlet expresses no opinion as to the wisdom or unwisdom of the decision of the commission. Naturally, in presenting the testimony, it puts more emphasis upon the developments favorable to the contention of the railroads than appears in publications designed to emphasize the need for greater efficiency in railroad management.

Cleveland Superintendents and Foremen.—The annual meeting of the Cleveland Shop Superintendents' and Foremen's Club was held March 18. Reports indicated that the club is in a flourishing condition. Its membership has now reached about 200. Officers for the ensuing year were elected as follows: President, B. S. Blosson, Foote-Burt Company; vice-president, John Mortimer, Central Brass Mfg. Company; treasurer, Fred Seberlin, P. A. Geier Company; sergeant-at-arms, Charles Schock, W. M. Pattison Supply Company; executive committee, J. H. White, Baker Motor Vehicle Company; L. W. Dosley, Cleveland Hardware Company; B. D. Fuller, Westinghouse Electric & Mfg. Company; J. H. Francis, Kilby Mfg. Company; membership committee, Joseph Burrows, American Railway Signal Company; John Tiplady, Variety Iron & Steel Works Company; Adam Herkner, Warner & Swasey Company; D. L. Larimer and J. G. Walt, Cleveland Punch & Shear Works Company. The club will hold a banquet some time in April.

The Atlas Steel Casting Company has been incorporated at Buffalo, under the laws of the State of New York, with a capital stock of \$100,000, and will build a modern fireproof foundry of concrete and steel for the manufacture of steel castings by the acid open hearth process. A site for the plant has been selected, and construction will be commenced at once. The plant will be equipped with electric cranes and monorails and all up to date facilities for the handling of raw materials and finished products. The officers and directors are: George H. Chisholm, president; E. C. Strong, vice-president and general manager; Frederick C. Gratwick, Newcomb Carlton and Wm. A. McMahon. Temporary offices have been established at 410 Prudential Building. Mr. Strong, the vice-president and general manager, was formerly general manager of the Strong Steel Foundry Company, Buffalo.

The United States Steel Corporation's 1910 Report

Gross Receipts, \$703,961,424.41. Increase on Previous Year, \$57,579,173.12, or 9 Per Cent. Net Earnings, \$141,054,754.51. Increase on Previous Year, \$9,563,340.57, or 7 1-3 Per Cent.

The ninth annual report of the United States Steel Corporation, which gives the results of the year ending December 31, 1910, shows a most substantial growth in the business of that great institution. The gross sales and earnings increased \$57,579,173.12, or 9 per cent., on the previous year, while the net earnings increased \$9,563,340.57, or 7 1-3 per cent. The report, which covers operating results of all the subsidiaries, including the Tennessee Coal, Iron & Railroad Company, enables the following comparisons of the financial results to be made:

INCOME AND SURPLUS.		
	1910.	1909.
Gross receipts, sales and earnings	\$703,961,424.41	\$646,382,251.29
Manufacturing cost and ordinary maintenance.....	\$529,215,788.12	\$483,417,842.21
Administrative and general expenses	17,155,807.27	15,460,613.78
Taxes	9,161,436.95	8,704,193.39
Discounts and interest.....	3,545,810.90	3,621,613.12
Balance.....	\$144,882,581.17	\$135,177,988.79
Sundry manufacturing and operating revenues and rentals	2,728,348.14	3,385,382.24
Income from investments, &c.	3,124,820.65	3,432,616.63
Total income.....	\$150,735,749.96	\$141,995,987.66
Interest charges subsidiary companies	7,263,453.66	7,887,178.18
Balance.....	\$143,472,296.30	\$134,108,809.48
Less net balance profits earned by subsidiary companies	2,417,541.79	2,617,395.54
Net earnings.....	\$141,054,754.51	\$131,491,413.94
Depreciation funds.....	24,316,596.71	23,718,313.98
Balance.....	\$116,738,157.80	\$107,773,099.96
Bond interest and sinking fund	29,247,850.00	29,247,850.00
Balance.....	\$87,490,307.80	\$78,525,249.96
Sundry credit adjustments..	83,122.98	548,445.08
Total available for dividends, &c.....	\$87,407,184.82	\$79,073,695.04
Preferred dividends paid...	25,219,677.00	25,219,677.00
Common dividends paid....	25,415,125.00	20,332,100.00
Balance, surplus.....	\$36,772,382.82	\$33,521,918.04
Appropriations for new construction, &c.....	26,000,000.00	18,200,000.00
Balance carried to surplus	\$10,772,382.82	\$15,321,918.04
Net increase in surplus of subsidiary companies, &c.	2,016,247.42	2,617,395.54
Previous surplus.....	151,354,527.75	133,415,214.17
Surplus, December 31..	\$164,143,157.99	\$151,354,527.75

Condensed Balance Sheet, December 31

The balance sheet as of December 31, 1910, shows an apparent reduction in assets as compared with that for the previous year end. This is due to the fact that a change has been made as compared with previous years' balance sheets as to the location therein of the "accrued depreciation and replacement fund reserves," and of the account "bond sinking funds with accretions." These funds, being reserved from earnings and income to cover accruing amortization and depreciation in respect of the assets included in the "property investment" account, it has been considered advisable to state the balances thereof in the expanded balance sheet as a credit in connection with the gross property investment rather than to show them on the liability side of the balance sheet,

as has been done in previous years. This makes the "property account" for December 31, 1910, in the assets shown below \$117,671,520.47 less than it would have been if presented on the same basis as in former balance sheets. The following table gives the condensed balance sheet for the past two years:

Assets.		
	1910.	1909.
Property account.....	\$1,430,212,860.76	\$1,500,092,134.63
Deferred charges.....	8,331,704.91	6,763,191.22
Investments	2,369,394.04	2,353,109.56
Sinking and reserve fund..	16,067,905.24	21,738,953.06
Inventories	176,537,823.71	163,811,279.58
Accounts receivable.....	44,603,273.53	56,421,438.19
Bills receivable.....	5,540,180.77	6,711,427.28
Agents' balances.....	696,833.76	788,654.21
Marketable stocks and bonds	4,410,793.61	4,764,254.65
Cash	56,953,514.16	58,521,113.04
Total assets.....	\$1,745,724,284.49	\$1,821,965,555.42
Liabilities.		
Common stock.....	\$508,302,500.00	\$508,302,500.00
Preferred stock.....	360,281,100.00	360,281,100.00
Outstanding stock subsidiary companies	620,352.50	619,002.50
Bonded and debenture debt.	596,351,866.70	606,384,118.84
Mortgage and purchase money obligations subsidiary companies	3,097,792.38	2,763,786.03
Accounts payable and payrolls	23,695,264.04	29,734,951.20
Bills payable.....	813,500.00	827,000.00
Special deposits or loans due employees	886,122.16	862,767.06
Accrued taxes.....	6,789,827.16	5,937,244.48
Accrued interest.....	7,991,373.15	8,582,549.81
Preferred dividend, payable February 28.....	6,304,919.25	6,304,919.25
Common dividend, payable March 30.....	6,353,781.25	8,895,293.75
Reserve funds.....	20,092,727.91	69,979,985.93
Bond sinking fund.....	.....	44,756,000.87
Appropriations for capital expenditures	40,060,000.00	16,379,807.95
P. and L. surplus.....	164,143,157.99	151,354,527.75
Total liabilities.....	\$1,745,724,284.49	\$1,821,965,555.42

Maintenance and Extraordinary Replacements

The expenditures made by all subsidiary companies during the year 1910 for maintenance and renewals, including the relining of blast furnaces, and for extraordinary replacements, in comparison with expenditures for the same purposes during the preceding year, were as follows:

	1910.	1909.
Ordinary maintenance and repairs.....	\$40,818,899.32	\$34,002,389.15
Extraordinary replacements.....	8,489,285.64	8,514,716.32
Totals.....	\$49,308,184.96	\$42,517,105.47

The entire amount was charged to current operating expenses and to replacement funds reserved from earnings.

Expenditures for the Gary Plant

The appropriations made from surplus net income in previous years for account of this fund, as shown in annual report for 1909, amounted to the aggregate sum of \$55,000,000 and there was appropriated from surplus net income of the year 1910 the further sum of \$10,000,000, making a total of \$65,000,000. To December 31, 1910, a net amount of advances has been made from this fund to cover expenditures for acquirement of real estate and for construction work as follows:

Gary Land Company, for the real estate, including that for steel plant (less credits for land and houses sold).....	\$10,509,325.07
Indiana Steel Company, for construction of the steel plant, but exclusive of land required.....	49,693,864.15
Total advanced from above fund.....	\$60,203,189.22

This leaves a balance in the fund December 31, 1910, of \$4,796,810.78.

A summary of property expenditures at Gary, to December 31, 1910, is made as follows:

Paid from the special surplus fund for Gary:	
Expenditures for land and for construction of steel plant and city of Gary, as above.....	\$60,203,189.22
Financed by the following subsidiary companies, in whose interest the work was done:	
Construction of sheet plant, by American Sheet & Tin Plate Company.....	2,151,158.44
Construction of bridge and structural plant, by American Bridge Company.....	1,949,854.24
Terminal railroad work adjacent to and in connection with the manufacturing plants, by Chicago, Lake Shore & Eastern Railway Company.....	5,683,493.25
Total.....	\$69,978,695.15

Employees and Payrolls

The average number of employees in the service of all companies during the fiscal year 1910, in comparison with the fiscal year 1909, was as follows:

	1910.	1909.
Manufacturing properties.....	154,563	138,865
Coal and coke properties.....	23,528	21,867
Iron ore properties.....	16,956	15,077
Transportation properties.....	20,758	17,104
Miscellaneous properties.....	2,630	2,587
Totals.....	218,435	195,500
Total annual salaries and wages.....	\$174,955,139	\$151,663,394

Production

The production of the subsidiary companies in 1910 compared with 1909 was as follows:

Products.	1910.	1909.
Iron ore mined:	Tons	Tons.
Superior—Marquette Range.....	830,094	899,009
Lake Superior—Menominee Range.....	1,384,465	1,359,415
Gogebic Range.....	1,801,480	1,812,701
Vermilion Range.....	1,338,110	1,066,474
Missabe Range.....	17,910,366	16,968,592
Southern—Tennessee Coal, Iron & Railroad Company's mines.....	1,981,301	1,824,863
Totals.....	25,245,816	23,431,047
Coke manufactured:		
In beehive ovens.....	11,641,105	11,896,211
In by-product ovens.....	2,008,473	1,693,901
Totals.....	13,649,578	13,590,112
Coal mined, not including that used in making coke.....	4,850,111	3,089,021
Limestone quarried.....	5,005,087	4,715,708
Blast furnace production:		
Pig iron.....	11,645,510	11,436,570
Spiegel.....	102,260	80,942
Ferromanganese and silicon.....	83,628	100,838
Totals.....	11,831,398	11,618,350
Steel ingot production:		
Bessemer ingots.....	5,796,223	5,846,300
Open hearth ingots.....	8,383,146	7,508,889
Totals.....	14,179,369	13,355,189
Rolled and other finished steel products for sale:		
Steel rails (heavy and light tee and girder).....	2,118,473	1,719,486
Blooms, billets, slabs, sheet and tin plate bars.....	682,364	675,614
Plates.....	929,020	729,790
Heavy structural shapes.....	656,797	*614,971
Merchant steel, bars, hoops, bands, skelp, &c.....	1,527,506	*1,290,467
Tubing and pipe.....	868,550	1,013,071
Wire rods.....	133,722	139,149
Wire and products of wire.....	1,490,318	1,607,689
Sheets (black and galvanized) and tin plate.....	1,082,787	1,024,985
Finished structural work.....	589,228	530,766
Angle splice bars and all other rail joints.....	235,998	190,226
Spikes, bolts, nuts and rivets.....	71,328	*71,881
Axles.....	101,066	68,366
Steel car wheels.....	98,105	67,985
Sundry steel and iron products.....	148,735	*115,214
Totals.....	10,733,995	9,859,660
Spelter.....	26,777	27,853
Sulphate of iron.....	33,684	33,582
Universal Portland cement.....	7,001,500	5,786,000

* These tonnages differ slightly from the figures shown in last year's report, but such changes do not affect the aggregate for all products. The individual differences are due entirely to a rearrangement of the 1909 results so as to conform to the classification observed in 1910.

From the general statement, which forms part of the report, as signed by Elbert H. Gary, chairman, the following excerpt is taken:

General Statement

The volume of business conducted by the subsidiary companies during 1910, as indicated both by production and shipments to the trade, showed a substantial increase over the operations in 1909. Although a material diminution occurred in the placing of orders by customers during the early summer and continued during the remainder of the year, there was not any appreciable withholding of specifications nor requests for cancellations of tonnage previously booked. Based on production of finished products for sale, the output during the first nine months equaled about 85 per cent. of normal maximum capacity; during the last quarter, 67 per cent.; and for the entire year, 80 per cent.

The shipments of all classes of products to customers outside of the organization during 1910, in comparison with 1909 were as follows:

	1910.	1909.
Domestic.	Tons.	Tons.
Rolled steel and other finished products..	9,511,694	8,690,133
Pig iron, spiegel, ferro and scrap.....	388,872	444,562
Iron ore, coal and coke.....	1,360,090	1,409,751
Sundry materials and by-products.....	77,223	42,435
Total tons all kinds of material, except cement.....	11,337,879	10,586,881
Cement (barrels).....	6,679,415	5,690,891
Export.		
Rolled steel and other finished products..	1,216,057	1,001,157
Pig iron and scrap.....	6,974	8,337
Sundry materials and by-products.....	465	252
Total tons all kinds of materials....	1,223,496	1,009,746
Aggregate tonnage of rolled steel and other finished products shipped....	10,727,751	9,691,290

The prices received for shipments made to the trade during 1910 of all classes of rolled steel and other finished products, including fabricated structural work, averaged somewhat more than those obtained in the preceding year, both in respect of domestic and export shipments.

The tonnage shipped for export in 1910 was the largest for any year since the organization of the corporation, and evidences the satisfactory progress which has been made in the extension of this branch of the business. The advantages of possessing a fair volume of export trade have been pointed out in previous annual reports.

During the year \$17,295,983.29 of bonds, mortgages and purchase money obligations of the corporation and subsidiary companies were paid and retired. Of this total \$7,504,000 represents bonds retired under sinking fund provisions of the mortgages securing them. Bonds of subsidiary companies to the amount of \$6,279,000 were issued and sold during the year. Of this total \$4,710,000 were issued and sold in lieu of an equal amount of other bonds, which matured and were paid off in 1910; the balance, \$1,569,000, represents new issues made and sold to cover outlays by the subsidiary companies for additions and construction. There were also issued by subsidiary companies during the year purchase obligations to the amount of \$1,300,000 in part payment for ore property acquired; and real estate mortgages amounting to \$27,237.50 were assumed in connection with purchase of coal property.

The expenditures made by the corporation and the subsidiary companies during the year for additional property, extensions and construction, and for stripping and development work at mines, were as follows:

For the Gary, Ind., properties.....	\$16,072,850.92
For Tennessee Coal, Iron & Railroad properties..	3,887,078.73
For all other properties.....	33,141,292.15
Total.....	\$53,101,221.80

At January 1, 1911, the amount unexpended on authorizations given for additional property, extensions, construction and extraordinary replacements, including the 1911 programme of stripping and development operations at mines, was approximately \$50,000,000, divided as follows: For the properties at Gary, Ind., \$15,500,000; for all other properties, \$34,500,000. It is estimated that a large percentage of this total will be expended in 1911.

DEVELOPMENT AT GARY.

The construction and development work at Gary, Ind., progressed continuously and satisfactorily during the

year 1910. At the steel plant of the Indiana Steel Company six of the eight blast furnaces constructed have been satisfactorily operated. Of the three units constructed, each comprising 14 65-ton open hearth furnaces, two units have been in operation. The rail mill has been in operation since February 17, 1909; the billet mill since August 16, 1909; the 18-in. merchant bar mill since December 16, 1909, and the 14-in. merchant mill since April 1, 1910. The axle plant is completed; the 160-in. plate mill will be ready for operation by April 1, 1911, and the three remaining merchant bar mills by May 1, 1911. Since the publication of the last annual report, the construction of a continuous sheet bar mill was started. This mill will supply sheet bars for the sheet plant being constructed at Gary by the American Sheet & Tin Plate Company, a subsidiary of this corporation. The new bar mill will be ready for operation by July 1, 1911. The by-product coke plant, construction of which was begun in June, 1909, is rapidly nearing completion. This plant will have a total of 500 ovens of the Koppers type, and an annual capacity of about 2,500,000 tons. A gas distributing system is being installed, by which all of the excess gas from the coke oven plant will be utilized in mill operations.

The output of the Gary steel plant of the Indiana Steel Company in 1910 was as follows: 729,072 tons pig iron, 1,006,252 tons open hearth ingots, 435,142 tons open hearth steel rails, and 340,993 tons shapes, merchant bars and miscellaneous steel products.

In the construction of the sheet plant at Gary by the American Sheet & Tin Plate Company, there were completed during the year buildings for the four jobbing mills and for the two plate mills. Substantial progress was made toward the completion of the buildings for the 16 sheet mills. A considerable quantity of the machinery and equipment has been received and installed. It is anticipated that the jobbing mills will be placed in operation by May 1, 1911, and the remainder of the plant during the fall of 1911. The product of the mill will be light plates, black and galvanized sheets, and it will have an annual capacity of about 200,000 gross tons.

In the construction by the American Bridge Company of the bridge and structural plant at Gary, which is to consist of two units (together with auxiliary departments), one unit was practically completed at the close of the year and was placed in operation March 9, 1911. The second unit, it is expected, will be ready for operation about May 1, 1911. Each of these units is 300 x 700 ft., and will have an annual capacity of 60,000 tons of the heaviest bridge and fabricated structural work.

COAL AND CEMENT PROPERTIES.

Reference was made in the annual report of 1909 to the acquisition of coal properties in the Danville district, Illinois, and the Clinton field, Indiana. Subsequent to the publication of the report for 1909 negotiations were concluded for the acquirement of an extensive acreage of coal in Franklin County, Illinois. To the close of 1910 there had been acquired in these three fields 55,624 acres of coal rights and 742 acres of surface. An additional acreage of about 6000 acres of coal is now under option, the larger part of which will probably be acquired. On the properties in the Danville district there are opened and in operation five mine workings. In the Clinton, Ind., field there is now being constructed a double mining plant, with complete equipment, which will have a capacity of 3300 tons of coal per day. No development work has as yet been commenced in the Franklin County field. Prior to making the foregoing purchases the subsidiary companies already owned in the Illinois and Indiana fields 3742 acres of coal lands, thus giving at December 31, 1910, a total of coal territory owned in these fields of 59,366 acres. The acquisition of this substantial acreage of coal should, when developed, insure to the subsidiary companies in the Chicago district for many years a constant supply of coal satisfactory both as to quality and cost.

The extension to the cement plant at Buffington, Ind., as stated in last year's report, contemplated an addition to the producing capacity of 2,000,000 barrels of cement annually. Subsequent to the issuance of the report, it

was concluded to double the size of the extension proposed, thus increasing the capacity by 4,000,000 barrels annually. Construction work has accordingly been prosecuted on this basis. It is expected that the extension will be completed and go into operation some time during the summer of 1911. With the completion of such extension the productive capacity of cement of the plants of the Universal Portland Cement Company will be 40,000 barrels per working day, a total of 12,000,000 barrels annually. This annual capacity stated in weight is equal to 2,035,000 gross tons.

IMPORTANT IRON AND STEEL WORKS EXTENSIONS.

Of the new rod mill and wire plant at Birmingham, Ala., about 40 per cent. of the entire proposed work was completed at the close of the year. All building foundations were completed, and practically all the steel framework of the buildings erected; the sewers and foundation work for the machinery were practically finished, and substantial progress had been made in the installation of machinery and equipment. It is expected that the plant will be completed and ready for operation by October 1, 1911. It will have a capacity of finished wire products of about 400 tons daily. All machinery will be electrically driven, the current being supplied from the manufacturing plant of the Tennessee Coal, Iron & Railroad Company, which company will also supply the plant with the raw steel required for its operations.

Additions were made to the manufacturing plants of the Tennessee Coal, Iron & Railroad Company at Ensley, Ala., as follows: New 34 in. billet mill to supply billets to the new wire plant above described; new electrical power plant to supply power to the wire plant and to afford additional requirements for the Ensley plant; new by-product coke plant, to consist of 280 ovens of the Koppers type; new water supply system to serve the manufacturing interests in the Birmingham district, consisting of a reservoir having a capacity for impounding 2,500,000,000 gal. of water, together with intake channel and tunnel for transmitting water to central pumping station, and distributing pipe lines therefrom. On all of the foregoing it is expected that all further work will be completed, and the several facilities be placed in operation at various dates during 1911.

Satisfactory progress was made during the year toward the completion of a new light structural mill at the South Works of the Illinois Steel Company and of a new blast furnace at Central furnaces, Cleveland, of the American Steel & Wire Company. Both of these additions will be completed during the year 1911. At Lorain works of the National Tube Company a new motor driven continuous mill for rolling skelp was completed and placed in operation. Extensive outlays were made during the year by subsidiary transportation companies for the acquirement of additional equipment and for other construction work, including additional second tracks, new spurs, yards, terminals, &c. There were purchased by the subsidiary railroad companies 117 additional locomotives and 3212 cars of various kinds as additions to the equipment lists of the companies. There were also delivered and placed in service five 12,000-ton steamships for service in the ore carrying trade on the Great Lakes. Of these five vessels, two were on replacement account, and three added to the complement of the fleet. There was purchased one ocean-going freight steamship for service in the export trade.

Reference was made in the annual report for 1907 to the acquirement of a site for and the proposed construction of a moderate sized steel plant at Duluth, Minn. During 1908 and 1909 the work done in connection with this proposition consisted only of preparing the site for the steel plant, the acquirement of right of way for and some construction work on the terminal railroad connecting the proposed steel plant with all trunk lines entering Duluth. In the early part of 1910 construction work was actively undertaken on both the steel plant and railroad. During the year 1910 a total of \$1,715,517.70 was expended on these properties. It is expected that further construction will be prosecuted during 1911. The plant as proposed will include the following producing departments: two blast furnaces, seven open

hearth steel furnaces, one 40 in. booming mill, one 28 and 18 in. rail and bar mill, 16, 12 and 8 in. merchant mill, and by-product coke plant of 90 ovens, together with the necessary complement of auxiliary departments, such as power plants, pumping stations, machine and other shops, &c.

LABOR MATTERS.

A general increase was made during the year in the salaries and wages of a large proportion of the employees of the subsidiary companies, such advances extending to about 83 per cent. of the total number of employees. The advances were made as of January 16, 1910, in the case of the coke companies, and as of May 1, 1910, in the case of substantially all of the other subsidiary companies. These advances averaged for all employees effected an increase of about 6.23 per cent. in the salary and wage rates previously paid. The increased amount paid out in salaries and wages during the year 1910 by reason of the foregoing advances in rates was, approximately, \$5,968,000, equal to an increased annual payment, on basis of the same number of employees as were in service during 1910, of about \$8,400,000.

On May 1, 1910, the several subsidiary companies inaugurated a voluntary accident relief plan under which provision is made for relief of employees injured in service, and for the families of men killed in work accidents. The provisions are purely voluntary on behalf of the companies without any contribution whatsoever from the employees. In principle, the plan is similar to the German and other foreign laws, and to recommendations which have been made by employers' liability commissions in the United States. Payments of relief are to be made in respect of all fatal accidents, and of injuries necessitating the loss of more than ten days' service; payments are also made irrespective of the question of legal liability on the part of the employer, this feature being largely disregarded under the plan. There is no obligation upon employees to accept relief under the plan if they otherwise elect. The relief is greater for married than for single men, and increases according to the number of children and length of service. During temporary disablement single men receive 35 per cent. of the rate of wages they were receiving when injured, and married men 50 per cent., with an additional 5 per cent. for each child under 16, and 2 per cent. for each year of service above five years. For permanent injuries or death, lump sum payments are provided. Experience will perhaps lead to some modification of the details of the plan. The plan has been well received by the employees and is considered entirely successful.

On January 1, 1911, there was inaugurated a system of old age pensions for employees of the corporation and its subsidiary companies to be paid from the United States Steel and Carnegie Pension Fund, under rules established by its Board of Trustees. This fund was created by the joint action of the United States Steel Corporation and Andrew Carnegie. For this purpose the corporation is to provide an aggregate principal sum of \$8,000,000, which, with the Carnegie Relief Fund of \$4,000,000, created by Mr. Carnegie in 1901, makes a joint fund of \$12,000,000. This fund will be administered and the net income from it will be distributed in pensions by a board of twelve trustees. Under the pension rules adopted by this board three classes of pensions are provided: 1. Pensions by compulsory retirement, granted to employees who have been 20 years or longer in the service, and have reached the age of 70 years for men and 60 years for women; 2. Pensions by retirement at request, granted to employees who have been 20 years or longer in the service, and have reached the age of 60 years for men and 50 years for women; 3. Pensions for permanent incapacity, granted to employees who have been 20 years or longer in the service, and have become permanently and totally incapacitated through no fault of their own. The monthly rates of pension are: For each year of service, 1 per cent. of the average regular monthly pay received during the last 10 years of service, provided, however, that no pension shall be more than \$100 per month nor less than \$12 per month. The pension plan involves no contribution whatsoever by the employees themselves.

Obituary

ANTHONY G. BRUNSMAN, president of the Anchor Buggy Company and Lion Buggy Company, Cincinnati, Ohio, and one of the best known vehicle manufacturers in the West, died March 16, at his home in Avondale suburb, aged 45 years. He was president of the National Carriage Builders' Association and a member of several prominent clubs in Cincinnati. He leaves a widow.

CHARLES ELLIOTT MITCHELL, New Britain, Conn., prominent as a lawyer, president of the Stanley Rule & Level Company, and United States Commissioner of Patents under President Grant, died March 17, aged 73 years. After graduating from Brown University he studied law at the Albany Law School, and upon taking his degree began the practice of his profession in New Britain.

NATHANIEL THAYER, Boston, Mass., died March 21, aged 60 years. He was a director of the United States Steel Corporation at the time of his death, having been a director from its organization. He was vice-president of the old North Chicago Rolling Mill Company, which was merged into the Illinois Steel Company.

JOHN B. McDONALD, New York City, died March 17, aged 67 years. He was born in Ireland and was brought to this country when three years old. He received a public school education and spent his early manhood helping his father who had become a contractor. Embarking in the contracting business on his own account, he was successful from the outset. His name has been identified with many important projects. He built Baltimore's underground belt line system. His most important work was the construction of the New York Subway.

COL. LEWIS T. BROWN, for many years superintendent of the Pittsburgh city mills of the Carnegie Steel Company, died at Atlantic City, March 19, aged 66 years. He was born in Pittsburgh and resided there practically all his life until five years ago. His first connection with steel manufacture was with the Shoenberger Steel Company. He became superintendent at the Union Mills of the Carnegie firm in 1872 and later was put in charge of the Carnegie Steel Company's city mills, acting in the latter capacity until January 1, 1905. He enlisted in the 13th Regiment, Pennsylvania Volunteers, in 1861 and took part in all the important battles of the Army of the Potomac. After three years' service he was transferred to the 2d U. S. Cavalry with which he served in the Indian campaign of 1866 and 1867. He was an officer in the Pennsylvania National Guard and was aide-de-camp on the staff of Governor Pennypacker with the rank of lieutenant-colonel. He was also appointed on the staff of Governor Stuart of Pennsylvania.

EPHRAIM SMITH, Boston, Mass., for many years identified with the steel industry, died March 14, aged 70 years. A native of Clinton, Allegheny County, Pa., he learned the trade of gunmaker with his father. He served in the Civil War in the 149th Pennsylvania Regiment, was with Sherman in Georgia, and was a captive in Libby Prison. At the close of the war he entered the steel business, and several patents were issued to him for processes in manufacturing high grade steels. He was associated with Hussey, Howe & Co., Pittsburgh, afterward Howe, Brown & Co., and 20 years ago went to Boston as the agent for the house. He represented the Colonial Steel Company in Boston from the beginning of that industry until his retirement a year ago. He leaves a widow and two daughters.

The West Penn Plating & Mfg. Company, 1308-10 East Ohio street, North Side, Pittsburgh, which does high grade electroplating in all metals, has recently extended its operations in the manufacture of pipe hooks, straps and hangers, and is about to make these articles in a variety of sizes and in larger quantities. Additional floor space has been secured, new punch presses have been installed, and the installation is being considered of a small foundry to produce aluminum and brass castings, which will be required in the manufacture of a new specialty.

Business Administration as a Constructive Science*

A Discussion of Organization, Standards and Records, the Stimulation of Administrators as Well as Operatives—The Work of Efficiency Specialists

BY H. F. STIMPSON.

The old proverb says: "First catch your hare; then cook it." So, in considering the application of the science of administration to business, we must first select the business itself. This will depend upon various things—the personal tastes, experience and abilities of the individual, the location, the conditions of supply and demand, &c., of the proceedings. The individual will find, as at all future stages, that while he can and should get the advice of many, he cannot delegate the responsibility of digesting and applying the advice. Having carefully considered various lines of business in the light of the above, and having settled upon some line as the most suitable one for him under the circumstances, the prospective business man will find that this one decision, together with the circumstances in connection with it and him, has practically established a foundation from which all future action must be developed and with which it must be in harmony.

Assuming that the intention is to manufacture, a unit of the product must be minutely separated into its prime or indivisible factors as to material, form and process. This reveals the physical operations which are necessary for its production, and the operations determine the apparatus which must be employed to perform them, each successive step being a logical development from that preceding it.

The Production of Force

At this point we are confronted with the problems of producing the force by which this apparatus is energized, and, as has been seen in the foregoing article, it is of two principal types: physical, which may be either of mechanical or animal origin, and mental.

The mechanical force must be determined, both as to character and quality, and traced back to its origin, which may be in coal or other fuel, in the rushing stream, in the wind, or in an animal, and the necessary apparatus for transmitting, controlling and generating it must then be determined. Each unit of mechanical force and of animal force, except that of human origin, requires human physical force to control it and human mental force to direct it; so that we must not only determine the quantities of these, but trace the mental force back to its point of origin in the minds of the owners of the business, and determine the necessary means for its transmission, control and generation.

Relation of Departments

It is at this time that we discover the relations which exist between the producing, selling, financing and other divisions of a business and their natural and logical sequence; this sequence being one of chronology, rather than of intrinsic importance. It is only when these relations and sequences are properly adjusted that the ultimate measure of success can be achieved. Because the possibilities resulting from such an adjustment are realized, or even imagined, by only a very few men, such adjustments are rarely made at present. One hears much complaint regarding the burden imposed by the large number of so-called "nonproducers." The real trouble is not with their large numbers, but with their small numbers and low efficiency. As the case usually presents itself, most of the administrators are simply "human

telephones" who merely transmit descriptions of desired results. The formulation of the methods by which these results are to be obtained is largely in the hands of the actual workers or their immediate supervisors. This is all wrong. A number of comparatively poorly trained workers, ably directed, will be more efficient than an equal number of skilled workers, poorly directed. If then, in any concrete instance, we consider the training of the workers as a fixed quantity, for the time being, it is obvious that in order to bring about the most immediate improvement, the primary effort in that direction should be exerted by the directors or administrators of the enterprise.

Owners and Managers

At this point consideration must be given to the dual character, seldom realized to the fullest extent, of organizations. First, we have the owning element, which may be either one or more individuals. This element possesses and exercises the right of decision as to what things are to be done. Second, we have the operating element, always composed of many individuals of varying degrees of authority and responsibility, which does or should possess and exercise the right to decide how things are to be done.

The science of administration is manifestly applicable almost solely to the second element; and the point of application should, therefore, be at its head, which is also the point of contact with the first element. This point of contact is usually personified by the individual acting as president and general manager. He is the "dividend maker" for the business, and is, therefore, presumably open to every influence which will legitimately increase their volume. But because, as has been said in the last article, the general manager is frequently without broad administrative training, but has attained his position through marked ability in one of the divisions of a business, he is so bound up in such division that he sacrifices, or at least is indifferent to, the interest of the other divisions. Hence, when the dividends become impaired, the first element often finds itself obliged to decide that one of the things to be done is the application to the business of the services of a specialist, in order to determine what must be done to restore the destroyed balance between the divisions. This condition is always to be deplored, because the man who should eagerly receive, assimilate and act upon the advice so tendered, makes its reception needlessly difficult. When, however, the application is made at a point much further down the line, or when the specialist is unable to cover the entire field, an infinitely worse condition is created. This is the reason why many specialists in betterment lines, where work is excellent so far as it goes, are unable to produce as great or as lasting benefit as they and their clients desire. The different phases of a business are so interwoven that it is almost impossible to improve one division without coming in contact with the others. Because it is far more difficult to co-ordinate the work of several specialists than to do the work of any of them, such co-ordination is generally far beyond the client's ability, and therefore, what should be sought is the advice of an aggregation of specialists, co-ordinated under a competent head.

Planning of Organizations

In the design of a building the engineer begins with the arrangement of the features for which it is neces-

* A series of three articles. The first appeared in *The Iron Age* of January 26, 1911, page 248; the second in *The Iron Age* of March 16, page 662.

† Chief engineer Universal Audit Company, New York.

sary to make provision in the first story of the structure. Subsequently he determines the necessity for and arrangements of succeeding stories until all the accommodations required have been planned for. The engineer then retraces his path, working downward from the roof to the foundations because the supports in each story must carry the accumulated weight of the part of the building which lies above, and designs the structural work accordingly. He then goes over the work a third time, and actually constructs the building from the ground up.

In like manner an organization must be studied: First, the workers necessary for the operation; second, the various grades of supervisors and directors, gradually decreasing in number with increase in rank, until the apex is reached. Means for the formulation and transmission of directions (not merely the telephoning of orders) as to performance, including the necessary standards, from the chief administrative officer down to the lowest employee, must then be devised. The next step is the provision of means for the collection and transmission of accurate records of actual performances, from the lowest worker to the chief executive, in such a manner as to correspond exactly with the standards accompanying the directions. This will facilitate the making of the comparisons which are essential to the efficient conduct of the business.

Standards and Records

From this analysis we perceive a curious thing which has taken place in the development of most lines of business—namely, that cost and other records were developed *before* standards. Their development, therefore, has been largely empirical rather than logical. Hence many elaborate systems have failed to produce satisfactory results. This trend of effort, moreover, has had the effect of causing business men to endeavor to get the information from one element which can only be obtained from a comparison of two elements. It has also blinded their eyes to the omission of the determination of standards from its proper place in the sequence, which is before the records.

In this connection, another circumstance, previously alluded to, is of interest. The employer, being pushed further and further away from the worker, by the size of the business, has decreased in the ability to give clear directions as to the desired performances, without making provision for the supplementing of his ability in this respect. His directions, acquired by experience, having been given orally, he does not realize that they are no longer given. Because he has generally recruited his administrative assistants from the clerical ranks, these directions are less and less frequently supplied, and the workers are forced more and more to depend on their own initiative. The result is to-day that the majority of information as to proper methods is possessed by the workers rather than by the administrators or executives. This information is at present largely in the nature of transmitted legend, and grows more and more vague with each generation. Unless scientific men are not only allowed, but urged, to take up the study of the productive methods for the operation of human minds and hands, as well as the operations of machinery, we shall surely and certainly come to a standstill. We know very little to-day about the possibilities of human physical effort and next to nothing about mental effort.

The Work of the Specialists

When the business man, therefore, decides to avail himself of the services of an association of specialists in the development of his business, he should give them his full confidence and co-operation. This should be warranted by his previous investigation of their standing. Every facility should then be afforded for a thorough examination of the business as a whole. They should first make an exact statement by text and charts of the conditions encountered. From this should be evolved a comprehensive plan of the remodeled organization and its methods of operation. This should be earnestly studied by the client in conjunction with the advisor.

When the plan has been perfected and the client is

thoroughly conversant and in harmony therewith, the work of installation may begin. It will generally be found that the administrators and supervisors are far too few to handle the work properly. No new man should be brought in from the outside, if any present employee can be developed to fit the demands. It is not necessary to wait for the full development of the subject matter of the directions and records before filling up the gaps in and realigning the organization, providing the proper lines of transmission have been worked out. Direct improvement, in a considerable measure, can be secured from a correctly apportioned organization, even if some of the members are rather new to their duties. It is manifest that, in an electric installation, all the units of apparatus must be in place before the current can be made effective in any degree. The service, however, can be greatly improved by careful adjustment as time goes on. Hence, the full complement of organization, by being enabled to give greater attention to the methods then in use, can secure better results from the start.

Standards are the basis of directions. These must next be determined by the client's employees delegated for the purpose and acting under the guidance and instruction of the specialists. Standards for human performance must be based on the amount of force a normal man can generate without loss of elasticity under proper conditions. As these are determined it will gradually become possible to comprehend the conditions which do or should exist, and hence to issue more adequate directions.

The next step is to revise the conditions so as to make it possible for the workers to comply with the standards. Every stumbling block in their pathway must be removed, if they are to achieve the anticipated results. Simultaneously the records must be so developed as to correspond accurately with the standards and directions in every detail. There must be both a record and a standard for every operation performed. The comparison between these two is of the most vital importance and cannot be overestimated.

Stimulation for Administrators

When a proper organization and conditions have been created, together with safe and sane standards for desired performances and accurate records of actual achievements in every department, it is possible to stimulate and encourage the workers to come up to the standards by making their compensation dependent in part upon their effort and commensurate with its amount. In considering this phase of the subject too much stress cannot be laid on the importance of applying this principle to the administrators and supervisors as well as to the manual workers. One of these individuals, since he controls many workers, is responsible for a larger amount of concrete results than any one of them; therefore his compensation should be determined on a corresponding basis.

The usual supervisor or administrator is too often a human telephone, and is of correspondingly little value. The trained supervisor or administrator must be developed by his employer, in view of the shortcomings of our educational system in this respect, and is correspondingly valuable. This principle is applicable to the entire operating organization, from errand boy up to General manager.

After these methods have been installed and placed in operation much thought should be given to their maintenance and continued improvement. The records should be continually searched for indications as to the possibility of improvement. Suggestions from the operating organization should be referred to the standardizers who can work them out to the best advantage, and should do so as a part of their routine work. The makers of the suggestions should, of course, be adequately rewarded.

What Specialists' Study Discloses

The specialist, as has been said, should be an association of specialists, rather than an individual. It is to the client's interest to place the matter in the hands of such an organization from the start. This will result

in his being supplied with the proper men whom he needs as permanent advisors, and in placing him in a position to secure from time to time harmonious advice in other lines where only occasional assistance is required.

No specialist, whether permanently or temporarily a part of the organization, should ever give an order or direction. The exercise of this power should be confined strictly to the members of the operating organization. The function of the specialist in administration is to intensify the mind of the administrator by his advice just as the gas flame is intensified by the oxygen introduced by the blowpipe.

The specialist should make close observations of operations, deduce his conclusions and communicate them to the administrator of the proper grade, but it is only as he can inject his mental force into the mental force of the administrator that he can attain success. He should only discuss the work on the spot as a last resort, and when the mind of the administrator is such that an ocular demonstration is essential to his receipt of the suggestion. A study of the usual administrative methods from the scientific standpoint discloses:

(a) The terrific load of petty detail carried by men whose time is too valuable to devote to such things.

(b) The inability of administrators to work at arms' length through the mediums of standards and records and their infatuation for close contact and its consequent loss of perspective.

(c) The widespread failure to use well known, effort saving devices—telephone, telautograph, pneumatic tube, &c.

(d) The lack of realization of the necessity of using the cheapest man for the job in administration as well as manual work and, coincidentally, that the best is always the cheapest.

(e) The lack of realization that the coal, boilers, engine and generator must be adequate to the task or the lamps will not burn or the motors move.

(f) The lack of realization that the advice of specialists is absolutely essential in order to create a proper organization.

(g) The lack of realization that the chief executives must devote their personal time and effort to the study of the advice of the specialist and to its application.

(h) The lack of realization that administration, or the operation of this human machine, is a science in itself.

The Foundry Exhibit at the Pittsburgh Convention

Announcement is made that the exhibit of foundry equipment and supplies by the Foundry and Machine Exhibition Company, which will be held in connection with the convention of the allied foundrymen's associations at Pittsburgh, beginning Tuesday, May 23, will be kept open until Thursday, June 1. This extension of time is due to the fact that the American Society of Mechanical Engineers will hold its spring meeting in Pittsburgh in the week following the foundrymen's convention. The applications for space in the Exhibition Building were so many that much more room has been required than was originally laid out. The entire main building of the Western Pennsylvania Exposition Society on Duquesne way has now been secured, giving space larger than is afforded by the Madison Square Garden, New York.

The Buffalo Chamber of Commerce and the foundrymen of that city are actively at work to secure for Buffalo the next convention of the allied foundrymen's associations. The Buffalo foundrymen are arranging for special cars to the Pittsburgh convention in May, and are planning to make a strong bid for the meeting of 1912.

The heating and ventilating contract for the new 10-story Hartman Building, Columbus, Ohio, was awarded to the William H. Conklin Company, heating contractor of that city. The Buffalo Forge Company, through its Cincinnati office, will furnish the ventilating apparatus, which consists of four fans of the multivane type, with direct-connected motors furnished by the Allis-Chalmers Company, and 3,000 ft. of Vento hot blast radiation.

Railroad Efficiency and the Labor Unions

Strikes of Machinists and Boilermakers Show the Attitude of Organized Labor

BY "EFFICIENCY."

Our magazines and periodicals are still devoting much space to efficiency systems and scientific management for the railroads. "Saving \$1,000,000 a Day for American Commerce" and "Wonderful Economics Possible for Our Railroads Through Scientific Management" are catch phrases which make good headlines. But the authors of these articles do not produce anything practical. They go over the old story without suggesting a single practical remedy.

Hampton's for March contains a long article by Cleveland Moffett under the above captions. Mr. Moffett follows the easy method of the ordinary chronicler of "news," and assumes that there is no barrier to the introduction of these systems into the railroad shops except the alleged stupidity of the railroad managers. In other words, all that is required of them is that they educate themselves up to an efficient standard and then insist that their workmen adopt the same standard.

In treating of the predicament in which the railroads find themselves to-day in any effort they may make to install efficiency and scientific management systems in their shops, I called attention in your issue of February 23 to the manner in which these railroads are being ground between the upper and nether millstones of the open and the closed shop labor unions. The open shop unions are those known as the railroad brotherhoods—engineers, firemen and conductors. Those organized upon the principles of the closed shop are machinists, boilermakers, iron molders, switchmen, blacksmiths, patternmakers. Those of the latter class are affiliated with the American Federation of Labor; the former are not. Every railroad in the United States and Canada enters into annual agreements covering methods and conditions of employment for members of the brotherhoods. In 1910 fifty-six railroads are reported as having entered into agreements with the machinists' union. Other metal trade craft employees in railroad shops are handled in much the same manner, and all operate in compliance with union rules and restrictions.

Efficiency or scientific management systems are simply refined bonus, piecework or premium systems. When the efficiency system was first exploited before the Interstate Commerce Commission in the hearings on freight rates recently the unions of labor throughout the country, both open and closed shop, were quick to observe its relation to the old-time bonus, piecework or premium system which they had been fighting for many decades—some of them for more than half a century. Promptly the officials of all these unions decided that they must oppose the introduction of these old systems, even though under new names, into the railroad shops of which they had control. There was absolutely nothing new in this decision of the unions. It was simply the continuation of an old policy, as so patently exemplified in the strikes of machinists from the shops of the Baltimore & Ohio Railroad beginning in the year 1909, and those even of so recent occurrence as February of this year in the machine shops of the Lake Shore & Michigan Southern.

Efficiency Systems Create Differentials

Manufacturers accustomed to dealing with labor unions are quite familiar with the opposition of the latter to what is known as a "differential." This term when applied to the employment of labor comprehends varying rates of wages for the competent, the incompetent, the energetic man and the laggard. The same is true in the application of the efficiency system, and quite properly so. But to the labor union all its members look alike. The union must depend for its income upon the competent as well as the incompetent; it is no respecter of ability. Quantity in membership is much more to its

liking, and this it must have if it is to succeed. It is absolutely out of the question for the labor union, as at present organized, to attempt to say to one member that his wages shall be dependent upon his ability; consequently a flat or minimum rate must be provided below which the employer must pay at his peril. Likewise the union member accepting compensation below the minimum specified by his organization does so at his peril.

Nowhere is this position more clearly shown than in a resolution adopted at the 1907 convention of the International Molders' Union. It reads as follows:

Resolution No. 56: That the incoming officers use their best endeavors to eliminate the differential in the molding industry.

Imagine a railroad or any employer attempting to introduce an efficiency system into a shop in which the union standing sponsor for a resolution such as this had full control! The result would be a strike forthwith. It has meant a strike wherever it has been attempted for fifty years or more.

Prolific Strike Causes

In a report prepared by the president of the International Association of Machinists and printed in the *Journal* of that organization in September, 1910, page 835, the statement is made that the most prolific causes of strikes among members of this organization for that year had been:

(1) The introduction of piecework, (2) the introduction of running two or more machines by one man.

The principal strikes in which members of the machinists' union were involved in that year were on the Baltimore & Ohio Railroad, including the B. & O. Southwestern Railroad, to prevent the introduction of piecework and the enforcement of the agreement existing between this railroad and the union. During the period July 1, 1909, to June 30, 1910, the machinists' union struck all the shops on six different railroads in its attempts to compel the operation of these shops in accordance with its rules and regulations, which comprehend most emphatic objections to any and all forms of efficiency or scientific management systems.

The Latest "Efficiency" Strike

The latest strike from railroad shops against efficiency and piecework systems is that of the boilermakers employed by the Lake Shore & Michigan Southern Railroad in 14 different cities. This particular railroad established a piecework system for its boilermakers on January 3 of this year, by which it is acknowledged by the workmen their wages were materially increased and conditions were otherwise satisfactory. An edict issued from the headquarters of the boilermakers' union, however, commanded its members to strike against the system, and they were compelled to obey. Whether the machinists will go out in sympathy with the boilermakers remains to be seen.

The unfamiliarity of railroad managers with the methods of unionism, however, is definitely shown in this statement given out by an official of the Lake Shore road at Cleveland:

The boilermakers really have no grievance. Half of them were put on piecework and their wages were increased from 30 to 50 per cent. as a result. It appears, however, that piecework is contrary to their constitution and a change was demanded.

"It appears" that piecework is contrary to the boilermakers' constitution. In these few words is told the whole story of railroads and the labor unions. Not only are the constitutions of these unions opposed to piecework now, but they have been ever since the birth of labor unionism. The very fact that the railroad officials, as well as those who are urging them to put the efficiency systems into effect, are no more familiar with the principles of these unions than to state that "it appears" that piecework is contrary to their constitution demonstrates beyond question that none of them has studied the question sufficiently to deal with the problem effectively.

The crux of the whole situation lies in the unpreparedness of the railroads and their management to deal with the labor problem. What they know of it they have learned from but one side. They have even gone so far as to enter into an unholy alliance with their workmen

to create a favorable public sentiment for increased freight rates, which might be compared to the pouring of water in a sieve.

Let the railroads take a leaf from the book of the manufacturer in the handling of the labor problem. Let them descend from the lofty position they have occupied for years and profit by the experience of others—co-operate with them, if need be—and by far the greater portion of their labor difficulties will disappear. Thus only is there a possibility of realizing the highest efficiency both in management and operation. Then, and then only, would it be possible to save a million dollars a day both to the railroads and the shippers of the country.

The Great Northern Ore Report

The trustees of the Great Northern Iron Ore Properties have made their report for the year ending December 31, 1910. The income account, compared with the two years preceding is as follows:

	1910	1909	1908
Dividends	\$2,105,000	\$1,560,000	\$1,745,000
Interest and amortization on debits	6,479	.....	4,214
Totals	\$2,111,479	\$1,560,000	\$1,749,214
Expense of trustees	\$67,628	\$77,094	\$75,390
Distributed to certificate hold- ers	2,250,000	1,500,000	1,500,000
Totals	\$2,317,628	\$1,577,094	\$1,575,390
Deficit	\$206,148	\$17,094	*\$173,424
Previous surplus	238,979	256,073	82,249
Profit and loss surplus ..	\$32,831	\$238,979	\$256,073

* Surplus

Referring to the operation of the Hill ore properties, particularly those of the United States Steel Corporation, whose mining company for the Hill properties is known as the Great Western Mining Company, the report says:

During the year 1910 the shipments of ore from the properties of the companies in which the trust is interested amounted to 5,470,270 tons, as against 3,016,619 tons in 1909. From the notices received from the Great Western Mining Company and other lessees of their contemplated operations during the year 1911 it is expected that the ore shipments will be increased the coming season. The work of exploration and development called for by the lease of the Great Western Mining Company has continued to be prosecuted during the year 1910, with the result of putting the properties in such condition that shipments therefrom can be made to the full extent provided by the terms of the lease. In January, 1911, the Great Western Mining Company paid the minimum royalty called for by the lease for the year 1910. The amount of this royalty stands as a credit against future shipments to be made by the Great Western Mining Company and can only be distributed to the various companies whose stocks are held in trust by the trustees, when their respective properties thereof shall have been ascertained by the results of actual mining. In the meantime these funds will be placed so as to earn the best rate of interest consistent with safety; and such sums as may be collected hereafter, which may not be immediately apportionable, will be similarly placed from time to time as collected.

Pittsburgh Standard Reinforcement for Concrete.—

A leather bound handbook of 399 pages 4 x 6½ in., has been issued by the Pittsburgh Steel Products Company, an identified interest of the Pittsburgh Steel Company, Wallace H. Rowe, president. It gives tables and other data relative to Pittsburgh standardized reinforcement for concrete. The company has prepared this blue book to enable engineers, architects and builders to design concrete structures without laborious mathematical computations. The girder, beam and slab tables have been computed so that under a dead and live load and figured on the basis of the "straight line formula" the tensile stress in the steel will not exceed 16,000 lb. per square inch and the compressive stress in the concrete will not exceed 650 lb. per square inch. Illustrations are given of the Pittsburgh standard bars and of typical frames and standard reinforcement for beams, girders and slabs. The tables have been prepared after formulas recommended by a joint committee on concrete of the American Society for Civil Engineers, American Society for Testing Materials, American Railway Engineering and Maintenance of Way Association and the Association of American Portland Cement Manufacturers.

Pipe and Plumbing Jobbers' Conventions

At the closing session, March 15, of the second annual convention of the National Association of Jobbers of Wrought Iron Pipe at the Hollenden Hotel, Cleveland, new officers for the ensuing year were elected as follows:

President, C. H. Simmons, John Simmons Company, New York City; first vice-president, O. F. Felix, Pittsburgh Supply Company, Pittsburgh, Pa.; second vice-president, A. L. Scott, Pacific Hardware & Steel Company, San Francisco, Cal.; treasurer, C. G. Cornell, Jr., Cornell & Underhill, New York City; advisory secretary, T. James Fernley, Philadelphia, and secretary, Thomas A. Feruley, Philadelphia. W. M. Pattison, W. M. Pattison Supply Company, Cleveland, Ohio, was elected a member of the Executive Committee, succeeding A. L. Scott. Other members of that committee were re-elected as follows: F. M. Sheldon, Braman, Dow & Co., Boston, Mass.; E. G. Cuyler, Cuyler & McIver, Baltimore, Md.; C. V. Kellogg, Kellogg-Mackay Company, Chicago, Ill.; Samuel H. Moon, Ahrens & Ott Mfg. Company, Louisville, Ky., and J. P. Hartnett, L. M. Rumsey Mfg. Company, St. Louis, Mo.

Plumbers' Supply Jobbers

The convention of the wrought iron pipe jobbers was followed March 16 and 17 by the first annual convention of the National Association of Jobbers of Plumbers' Supplies, quite a number of jobbers being members of both organizations. With the exception of the opening meeting, the sessions were executive. Among the topics discussed were discount sheets, resale prices, inventory of stock, inroads made by specialty houses on profitable

Annealing Malleable Castings*

Differing Physical Properties Due to Varying Heat Treatment

BY W. P. PUTNAM.

To emphasize the importance of exercising greater care in manufacturing malleable castings and to point out some sources of the errors that are so frequent in foundries leaving the annealing process to the judgment of some individual with a "trained eye," the work of this paper was undertaken. There is no branch of the foundry business that needs closer supervision than the process of annealing iron; no greater source of economy; no one department where greater skill is required. And yet it is safe to say that very few foundries recognize the importance of equipping their annealing ovens with proper appliances to insure a uniform product.

To call attention to the variations that can be produced in the annealing process, a set of test bars was made and sent out to 11 malleable iron foundries to be annealed in accordance with their usual practice. The bars were all made from the same metal and an attempt was made to obtain a bar free from shrink or draw in the center by casting the bars with large ends. In all of the bars that were broken but very little draw was found. The analysis of the metal poured into the bars was as follows:

	Per cent.		Per cent.
Silicon	0.74	Manganese	0.24
Sulphur	0.041	Combined carbon	2.70
Phosphorus	0.148		

Table 1.—Results of Annealing Bars of the Same Composition at Different Foundries.

Foundry No.	Total carbon.		G. C.	C. C.	E. L.	T. S.	Elongation		Reduction in area.	Kind of packing.	Time of annealing. Hours.	Annealing temperature. Deg. F.
					Lb. per sq. in.	Lb. per sq. in.	Per cent.	Per cent.				
1.....	1.49	1.49	Trace		20,823	40,996	8.59	12.13	Slag	112	1,450	
2.....	1.94	1.94	Trace		34,134	44,034	10.15	13.87	Mill scale	144	1,700	
3.....	1.47	1.47	Trace		29,276	39,638	8.59	17.63	Mill scale	101	1,620	
4.....	0.86	0.77	0.09		31,428	48,489	8.59	19.18	Not given	Not given	Not given	
5.....	1.74	1.74	Trace		30,960	45,760	8.59	14.88	Not given	Not given	Not given	
6.....	1.71	1.71	Trace		28,326	40,408	8.59	15.00	None	72	1,650	
7.....	1.32	1.18	0.14		32,224	49,107	8.59	13.23	Not given	Not given	Not given	
8.....	0.80	0.80	Trace		33,333	47,336	7.60	17.27	Slag	208	1,620	
9.....	1.58	1.58	Trace		30,833	39,862	7.03	19.51	Mill scale	168	Not given	
10.....	0.40	0.40	Trace		41,792	50,849	7.45	20.92	Mill scale	96	2,200	
11.....	1.32	1.32	Trace		35,042	45,213	7.80	12.56	Slag	144	1,700	
Hard Iron.....			2.70			50,846						

lines of the plumbing supply business, cost of doing business and unreliable salesmen. Action was taken favoring the sale of plumbing supplies direct by plumbers if buyers want such supplies without the services of the plumber to do the installing. The president and secretary were instructed to present this matter to the National Association of Master Plumbers, and urge the adoption of this policy by the latter organization. This action was taken with the view of having the plumbers meet the competition of the mail order houses.

At the annual election, C. V. Kellogg, Kellogg-Mackay Company, Chicago, was re-elected president. Other officers were chosen as follows: First vice-president, O. J. Saxe, Dalton-Ingersoll Mfg. Company, Boston, Mass.; second vice-president, J. P. Fell, W. A. Case Sons Company, Buffalo, N. Y.; treasurer, J. Harvey Borton, Haines, Jones & Cadbury Company, Philadelphia; secretary, Thomas A. Fernley, Philadelphia. Executive Committee: George H. Bailey, Bailey-Farrell Mfg. Company, Pittsburgh, Pa.; J. B. Rahm, United States Supply Company, Omaha, Neb.; Charles W. Frean, John Simmons Company, New York City; A. A. Tomlinson, Virginia-Carolina Supply Company, Norfolk, Va.; A. B. Pierce, N. O. Nelson Mfg. Company, St. Louis, Mo., and A. A. Merkel, Merkel Brothers, Cincinnati, Ohio.

Both associations selected Atlantic City as the next meeting place.

The new blast furnace F of the Bethlehem Steel Company, at its Lehigh plant, South Bethlehem, Pa., was blown in last week. Furnace G, which, like furnace F, is 22 x 90 ft., and has five stoves, is nearing completion.

The results obtained on the annealed bars are given in Table 1. It will be noticed that in each case under too high temperature or a long period of annealing, the carbon was nearly all removed. Either practice is wasteful and produces poor malleables for some purposes.

The annealing process should be conducted to produce definite results. Metal intended for parts where

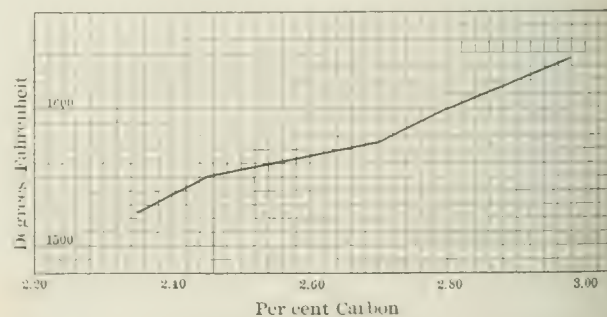


Chart 1.—Proper Finishing Temperature for the Annealing of White Iron, in Relation to Carbon Contents.

machining is necessary should be given a different treatment in the annealing process from that of metal that does not need to be machined.

To arrive at the proper annealing temperature the critical and proper annealing temperature was ascertained on a number of hard iron specimens ranging

* A paper read before the Detroit Foundrymen's Association.
† President Detroit Testing Laboratory.

from 2.35 to 3 per cent. total carbon. These temperatures are diagrammatically shown in chart No. 1. They are accurate within 10 deg. Fahr.

In chart No. 2 is shown the curve of a typical annealing cycle in an oven containing 14 tons of castings. The carbon in this lot of iron was 2.65 per cent. After reaching the annealing temperature there is no further rise in the temperature of the metal until all of the carbon has changed into the graphitic condition. As soon as the change has been completed the temperature will rise in accordance with the temperature of the oven. It has been found that to heat the castings much above the proper annealing temperature for a long period is not only unnecessary but a waste of fuel, and

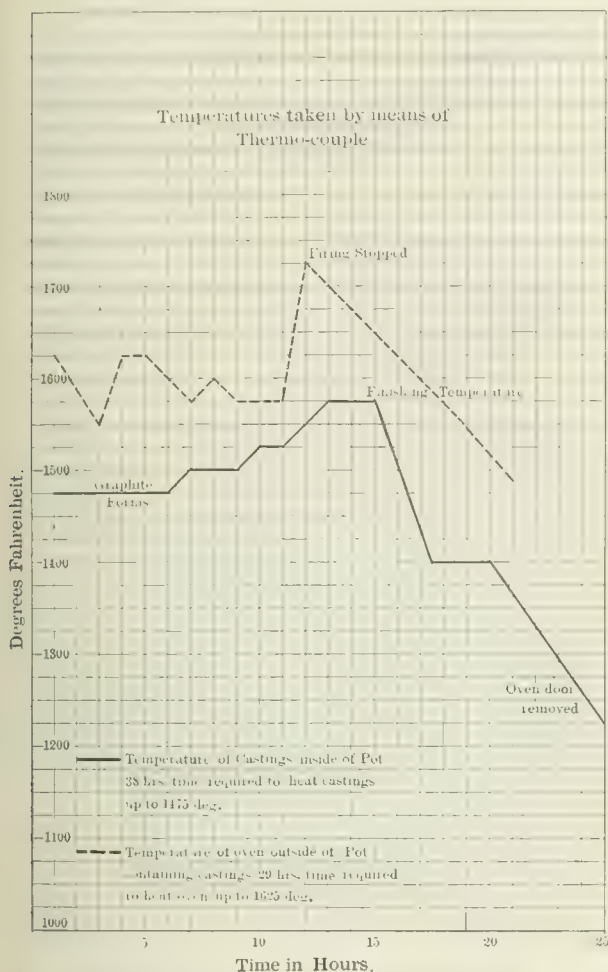


Chart 2.—Curve of a Typical Annealing Cycle.

produces poor castings for some purposes. After the carbon has all been changed the oven need not be fired for more than six hours. When the metal has gradually cooled to 1200 deg. Fahr., the cooling can be hastened as rapidly as desired without harming the quality of the castings.

Some of the reasons why hard and brittle castings are occasionally found may be given as follows:

1. Under annealing (which may be caused by too low temperature or by holding the castings at the proper temperature for too short a period).
2. Too rapid cooling of the castings after being annealed.
3. Heating annealed castings above the critical temperature to straighten without subsequent annealing.

That there is great need of the systematic handling of the annealing process is clearly evident from the results tabulated in Table 1. The variations shown there are typical of castings in general.

The Gregg Company, Ltd., has just completed a large and modern factory at Hackensack, N. J., of more than three times the capacity of its present plant at Newburgh, N. Y. The company expects to begin manufacturing operations in the new plant about April 1, and will continue to confine its efforts entirely to standard and

narrow gauge sugar plantation railway equipment. It will remove its general offices to Hackensack. The company maintains branch offices at 80 Wall street, New York; New Orleans, La.; Havana, Cuba; San Juan, Porto Rico, and Honolulu, Hawaii.

Vice-President Dickson's Resignation

The resignation of Wm. B. Dickson as first vice-president of the United States Steel Corporation was announced in the past week by Chairman Gary as follows:

Mr. Dickson has to leave his position as vice-president, to take effect May 1, much to my regret, for he has been a most efficient and loyal officer. I am sorry he is not in the city, as I would prefer to have him make the announcement. The resignation will, of course, be accepted. Mr. Dickson has the best wishes of all of his associates for the future.

When the United States Steel Corporation was formed Mr. Dickson was made assistant to the president, Charles M. Schwab, going to New York from Pittsburgh, where he was a managing director of the Carnegie Steel Company. He entered the steel industry in 1881, and for three years was active in the converting, blooming and rail mills at Homestead of what was then the Pittsburgh Bessemer Steel Company, later taken over by the Carnegie Steel Company. He was transferred to the general office of the Carnegie Steel Company in 1889, and in 1899 became a partner. In 1902 he became second vice-president of the United States Steel Corporation, and was made first vice-president on the resignation of James Gayley late in 1908. He was president of two subsidiary companies, the Minnesota Steel Company and the Union Steel Company.

Mr. Dickson's identification with the corporation's betterment work is well known. He took a strong stand in favor of the reduction of Sunday labor to a minimum at the plants of all the Steel Corporation's subsidiaries. His paper read at the American Iron and Steel Institute's New York meeting of May 27, 1910, advocating the adoption of a plan whereby no individual workman should be on duty more than six consecutive days, helped to create sentiment for the six-day week, and resulted in the appointment of a committee of steel manufacturers to report on the subject. At the October, 1910, meeting of the Institute in New York he read a paper on the "Betterment of Labor Conditions in the Steel Industry," in which he described some of the work of the United States Steel Corporation in reducing seven-day labor to a minimum and in establishing accident relief and pension systems. Mr. Dickson's work in these lines carried weight not only without but within the steel trade, because it was appreciated that he advocated betterment not as an idealist, but as one whose experience in the mill and on the commercial side of the business made his suggestions practical and reasonable.

The National Metal Trades Association's New Officers

Following is the list of officers which will in all probability be elected at the coming thirteenth annual convention, at the Hotel Astor, New York City, April 12 and 13:

President, F. C. Caldwell, H. W. Caldwell & Son Company, Chicago, Ill.; first vice-president, Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I.; second vice-president, W. A. Layman, Wagner Electric Mfg. Company, St. Louis, Mo.; treasurer, Howard P. Eells, Bucyrus Company, South Milwaukee, Wis. Councillors for two years, J. H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia, Pa.; C. Bermingham, Canadian Locomotive Company, Ltd., Kingston, Ont.; L. H. Kittredge, Peerless Motor Car Company, Cleveland, Ohio; W. H. Van Dervoort, Root & Van Dervoort Engineering Company, East Moline, Ill.; A. E. Newton, Prentice Bros. Company, Worcester, Mass.; P. O. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio. Councillor to serve unexpired term, Stevenson Taylor, Quintard Iron Works, New York City.

The Sloss-Sheffield Steel & Iron Company Report

In its report for the year ended November 30, 1910, the Sloss-Sheffield Steel & Iron Company shows the following income account statement, which is compared with those for 1909 and 1908.

	1910.	1909.	1908.
Profit on pig iron.....	\$474,407	\$896,816	\$889,652
Profit on coal.....	113,189	119,635	99,190
Profit on coke.....	159,401	162,013	132,829
Ore and dolomite sales.....			388
Rent, royalties, &c.....	219,029	233,356	141,684
Interest and exchange.....	34,975	52,466	21,996
Total income.....	\$1,001,002	\$1,454,347	\$1,285,740
Taxes and licenses.....	68,285	57,964	55,593
Balance.....	\$932,717	\$1,396,383	\$1,230,147
General expenses.....	51,193	59,435	56,187
Net earnings.....	\$881,522	\$1,336,947	\$1,173,960
Bond interest.....	210,000	210,000	210,000
Surplus.....	\$671,522	\$1,126,947	\$963,960
Preferred dividends.....	469,000	469,000	469,000
Balance.....	*\$202,522	\$657,947	\$494,960
Common dividends.....	375,000	500,000	425,000
Deficit.....	\$172,477	†\$157,947	†\$69,960
Previous surplus.....	3,279,522	3,121,574	3,146,386
Total surplus.....	\$3,107,044	\$3,279,522	\$3,216,346

† Surplus.

* Equal to 2.02 per cent. earned on \$10,000,000 common stock, as compared with 6.58 per cent. earned on same stock last year.

† After charges against coal, for depreciation on iron ore, 25 cents per ton on iron for extraordinary repairs and renewals, and 35 cents per ton profit on coke manufactured.

The profits for 1907, which was the last good year the company had, were \$493,286 after paying common stock dividends of \$500,000. The gross sales and earnings last year were \$5,020,177, against \$6,397,961 in 1909, \$5,536,811 in 1908 and \$6,654,303 in 1907. The working capital fell from \$2,070,575 November 30, 1909, to \$1,624,227. The cash and bills and accounts receivable November 30, 1910, were \$933,149, against \$1,623,560 one year previous. The payrolls and bills and accounts payable were \$934,772, against \$576,708 on November 30, 1909. The general balance sheet as of November 30 compares as follows:

	1910.	1909.
Assets.		
Property account.....	\$21,998,492	\$21,746,010
Treasury account.....	244,243	244,218
Stocks and bonds in other companies...	399,157	399,157
Cash bills and accounts receivable.....	933,149	1,623,559
Supplies raw and finished material....	976,506	341,009
Stocks in company's stores.....	73,460	75,676
Extension, renewal and replacement fund	110,466	121,222
Unexpired insurance and taxes.....	6,342	5,379
Totals.....	\$24,741,816	\$24,556,230
Liabilities.		
Preferred stock.....	\$6,700,000	\$6,700,000
Common stock.....	10,000,000	10,000,000
Bonds.....	4,000,000	4,000,000
Current accounts.....	837,948	480,784
Payrolls.....	76,823	95,924
Surplus.....	3,107,044	3,279,522
Totals.....	\$24,741,816	\$24,556,230

Comment on an Unsatisfactory Year

President J. C. Maben has the following on the course of the company's business in 1910:

"We delivered during the fiscal year 120,000 tons less iron than in 1909, which caused us to add largely to the accumulated stock of iron on our furnace yards. The result of the year's business of the company was not satisfactory; but this was due not so much to the conditions of the trade as to the misfortune which overtook the company near the close of the last fiscal year, in the flooding of the two slopes of its Sloss ore mines, to which reference was made in the last annual report; and there is reason for believing that but for this the business of 1910 would have proved about as satisfactory as for 1909. No ore was taken from these mines from the beginning of the fiscal year until June, when we began producing a limited amount from No. 2 slope, which forced us to use ore not carrying sufficient lime to flux the furnace burden, and lean ores which we were compelled to buy from others to keep even three of the Birmingham furnaces working, which increased the cost of our iron very much, at a time when the pig iron market was depressed and prices declining.

"Had we had the use of the Sloss ore, even in an amount equal to what we are now receiving we could have met the market and showed a reasonable profit on iron. The output of these mines is now steadily increasing, and we hope before long to have the output up to normal. While the output has not as yet reached the tonnage for producing the best furnace results, either as to production or cost, we are receiving sufficient tonnage of this ore to reduce the cost of iron for January in the Birmingham furnaces over \$1.50 per ton below the average cost of the first six months of the year. The poor results of business must, therefore, be charged not against the property or plants, but to the misfortune which befell the Sloss mines, and which is being overcome.

"The fiscal year closed with over 74,000 tons of iron on our furnace yards, and this tonnage has been considerably increased since then, which has caused the creation of a floating debt, from which the company, with the exception of a temporary loan in 1907, has been entirely free for six years. The working capital showed a decrease in the year of \$446,000, which is due to decline in the market value of securities as of November 30, the heavy expenditures necessitated by the flooding of the ore mines, the opening of the third iron ore mine at Irondale, refitting Nos. 1 and 2 furnaces, and a deficit for the year of \$172,000 after dividend payments."

Conditions in the Foundry Trade

Reports furnished the *International Molders' Journal* by the various local unions indicate in general that the foundry trade in most lines is not satisfactory. Here and there improvement is noted but in other cases dullness has been accentuated. It would probably be correct to say that the number of molders employed throughout the country has varied little in the past three months. The reports referred to indicate that the foundry trade is fair at Philadelphia; St. Louis (stove); Rochester, N. Y.; Indianapolis, Ind.; Louisville, Ky.; New York; Toronto, Ont.; Detroit, Mich.; Erie, Pa.; Atlanta, Ga. Reports of bad, poor, slack or dull trade come from Troy and Albany, N. Y.; Buffalo, N. Y.; Pittsburgh, Pa.; Brooklyn, N. Y.; Newark, N. J.; Wilmington, Del.; St. Louis, (machinery and bench); Utica, N. Y.; Schenectady, N. Y.; Milwaukee, Wis.; Peoria, Ill.; Denver, Colo. (strike), and Moline, Ill. For the most part the above statements refer to the machinery trade. In some cities different local unions represent malleable, brass, stove plate and machinery lines, and conditions are not uniform in all.

The International Molding Machine Company

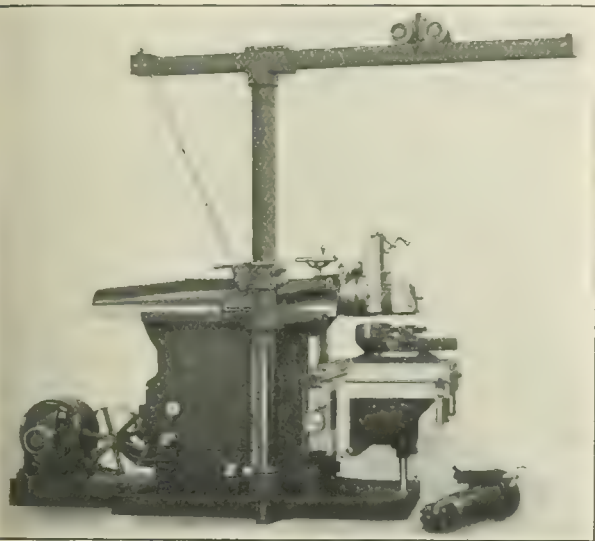
The Edward A. Pridmore Company, Chicago, Ill., the name under which Edward A. Pridmore, W. W. Miller and D. C. Snow of Chicago have been doing business, has been changed to the International Molding Machine Company. The molding machines designed and manufactured by this company will hereafter be known to the trade as the International machines. The company's office and shops will be at 2300-2319 South Western avenue, as heretofore. J. W. Dopp, formerly Western sales manager of the Tabor Mfg. Company, Philadelphia, has accepted the position of general sales manager of the company. Mr. Dopp is a foundryman of large practical experience and a molding machine expert, having had charge for a number of years of the molding machine departments of several of the largest shops in the country, one of which was the Cambridge, Mass., Works of the International Steam Pump Company.

The Ives Modern Bedstead Company, Ltd., Cornwall, Ontario, Canada, states that the loss of stock by the fire in its branch warehouse in Montreal, February 27, amounted to about \$16,000, fully covered by insurance. Occurring in a warehouse, it in no way affected the company's general trade. New premises have been secured, and the Montreal business is continued without any interruption.

A Cincinnati Shaper with Jib Crane

Recently the Cincinnati Shaper Company, Elam street and Garrard avenue, Cincinnati, Ohio, completed a 32-in. heavy duty back geared crank shaper which is of interest on account of the special equipment furnished with it. The most noteworthy feature is a revolving jib crane 9 ft. high and having a capacity of 1500 lb. Other portions of the equipment include a 10-hp. constant speed motor, transmitting its power through a belt to the gear box; a power driven concaving attachment, an extended circular feeding head with both hand and power feed and a special type of table with a tilting top.

The shaper is of the maker's standard type, and in designing it care was taken not only to secure ample power but to provide the rigidity necessary to withstand the strains to which it is subjected in service. The bearing of the ram in the column is wide and long. The rail is deep and of heavy construction, reinforced with horizontal ribs and securely gibbed to the column, with felt wipers between these two parts. The cross traverse screw has a graduated collar reading to 0.001 in., and a



A 32-In. Back Geared Crank Shaper with Locomotive Outfit and Jib Crane Built by the Cincinnati Shaper Company, Cincinnati, Ohio.

variable automatic feed which can be adjusted from zero to full feed while the machine is running.

The head swivels to any angle and is locked in the desired position by a simple and efficient locking device. The desired angle is secured by a set of graduations on the base. The down feed screw has a graduated collar reading to thousandths of an inch. Full length taper gibs which are adjustable endwise by single screws are used throughout for the ram, head, rail, apron and crank wheel slides. An automatic adjustment for the cross feed connecting rod is furnished for any height of rail, which does not depend upon frictional contact. The construction of the rocker arm is strong and heavy, and convenient means for lubricating the arm are furnished. A table support is regularly furnished with each machine which has a base stiff enough to withstand the thrust put upon it and a sliding surface under it exactly parallel with the table. The telescopic elevating screw is under the rail, where it is free from falling chips, and has ball bearings. The vise is of the maker's improved double screw form and has a graduated swivel base. Its construction enables straight or tapered pieces to be clamped with equal facility and rapidity. Annealed tool steel is used for the vise jaw plates. An opening through the column under the ram enables key-seats to be cut in shafting and similar pieces. The length of the stroke and its position can be changed while the machine is in motion or at rest. The length of the stroke is controlled from the working side of the machine and its position by a handwheel on top of the ram.

The following table gives the principal dimensions and specifications of the tool:

Extreme length of stroke, inches.....	33
Horizontal travel of table, inches.....	32
Vertical travel of table, inches.....	15
Maximum distance between table and ram, inches.....	17 1/4
Minimum distance between table and ram, inches.....	2 1/4
Diameter of head, inches.....	11
Feed to head, inches.....	10
Length of table top, inches.....	30
Width of table top, inches.....	24
Depth of table, inches.....	20
Length of ram bearing in column, inches.....	46
Width of ram bearing in column, inches.....	13
Key seating capacity, inches.....	4
Size of tool handled, inches.....	1 x 2 1/4
Size of vise jaws, inches.....	16 x 3 1/2
Opening of vise, inches.....	12
Width of belt, inches.....	4
Ratio of single gear.....	7.2 to 1
Ratio of back gear.....	30 to 1
Number of ram speeds.....	8
Maximum number of cutting strokes per minute.....	71
Minimum number of cutting strokes per minute.....	6
Size of motor, horsepower.....	10
Capacity of crane, pounds.....	1,500
Height of crane, feet.....	9
Weight of machine, pounds.....	9,370

Carbon steel is used for the shafts, and all the bearings are long and well braced in the column. The gears and T-slots are cut from the solid, and all the flat sliding surfaces are hand scraped. Cast steel pinions are used throughout, and the miter gears are cut from a solid bar.

The Erie Railroad Ore Docks in Cleveland

The Erie Railroad Company, through H. E. Gilpin, general agent, Garfield Building, Cleveland, Ohio, is sending out a circular calling attention to the extension of its ore handling facilities in Cleveland during the past year, and its new coal handling plant, now in the course of erection. The ore docks of the Erie Railroad in Cleveland are operated by the N. Y. P. & O. Dock Company, for which Pickands, Mather & Co. are the agents. These docks have a frontage of 2700 ft. They are equipped with four Brown Hoist electrically operated 5-ton and five Hoover & Mason steam operated 5-ton unloaders, having a total maximum unloading capacity of 30,000 tons a day. The recent erection at Randall, a suburb of Cleveland, of a Wellman-Seaver-Morgan car dump, with an unloading capacity of 15,000 tons in 10 hours, and a Heyl & Patterson 10-ton ore bridge, electrically operated, and covering an area of about 15 acres, provides storage facilities for a practically unlimited quantity of ore. The railroad is installing a new car dump, built by the Wellman-Seaver-Morgan Company, on the west bank of the Cuyahoga River in Cleveland. This plant will have a capacity of 15,000 tons a day and a dock frontage of 3000 ft. It will be ready for service at the opening of navigation.

Canada's Mineral Output in 1910

All previous records in the output of Canada's mines were broken in 1910, according to the report of the mines branch of the Geological Survey issued at Ottawa, March 6, which shows the value of the output to be \$105,040,958, an increase of more than \$13,000,000 over 1909 classified as follows:

Gold, \$10,224,910; copper, \$7,209,463; pig iron, \$11,245,630; nickel, \$11,181,310; silver, \$17,106,604; asbestos, \$2,476,558; coal, \$29,811,750; natural gas, \$1,312,614; cement, \$6,414,315; clay products, lime, \$1,131,407; stone, \$3,449,772.

During the year there was an increased production in every province, except New Brunswick, which showed a falling off of less than \$100,000. Nova Scotia increased from \$12,504,810 to \$14,050,534, Quebec from \$7,086,265 to \$8,193,275. Ontario from \$37,374,577 to \$43,017,026. Manitoba from \$1,193,377 to \$1,470,776, Saskatchewan from \$456,246 to \$557,506, Alberta from \$6,047,447 to \$7,876,458, British Columbia from \$22,479,006 to \$24,547,817, and the Yukon from \$4,032,678 to \$4,737,375.

The Cambria Steel Company's New Wire Plant

Re-entrance of This Company in the Wire Trade

The ever-memorable Johnstown flood, which took place May 31, 1889, completely wiped out the wire rod and wire mills of the Cambria Steel Company at Johnstown, Pa., which had for many years been operated under the name of the Gautier Steel Department of the Cambria Iron Company. About a year ago it was decided to re-enter the wire trade and on a more extensive scale than before. Plans were made and contracts were placed with the Morgan Construction Company, Worcester, Mass., for the erection of a rod mill with its necessary equipment of heating furnaces and gas producers.

The site selected for the new mill comprises about 21 acres, located on the main line of the Pennsylvania Railroad at Sheridan Station, a short distance west of Johnstown, along the Conemaugh River. The new works are connected with its other plants by the extensive inter-works railroad system operated by the Cambria Steel Company. Actual work on the erection of the new plant was started October 8, 1910, when the first excavation was made, and in spite of many delays, on account of bad weather and other causes, fast progress was made, and the rod mill was completed and put in operation February 14. The whole plant has been designed to secure the lowest possible cost in operation and has the most modern equipment throughout. The ground plan is shown in Fig. 1. Descriptions of the various departments follow.

The Boiler House

This is a brick and steel building, 44 x 85 ft. It houses three 524 h.p. Babcock & Wilcox vertical water tube boilers, with Babcock & Wilcox superheaters in the same setting, equipped with Taylor stokers furnished by the Lenher Engineering Company, New York City. These boilers are equipped with sufficient stoker capacity to operate normally at about 50 per cent. higher than rated capacity, giving about 2400 h.p. capacity at 150 lbs. gauge and 150 degrees superheat. The coal is delivered from hopper bottom cars to a track hopper and is then taken in elevators and conveyors to storage bins, suspended from the roof of the boiler house, from which it is delivered through pipes to the stokers. The ashes are collected in dump buckets running on a tramrail suspended under the boiler-room floor and delivered to a skip which elevates them to an overhead bin, from which they drop through a chute into standard gauge cars.

The Rod Mill

As a preliminary step to the building of the rod and wire mills, the company erected billet and sheet bar mills, which were completed early in 1910, and which were fully illustrated and described in the issue of *The Iron Age* of May 5, 1910. The rod mill, just completed, is of the Morgan two-strand continuous type. The billets, which are 30 ft. in length and 1¾ in. square, are brought from the billet mill by the inter-works railroad system, and delivered to the billet storage yard, which is 480 ft. in length by 100 ft. wide and commanded by a 15-ton electric overhead crane, furnished by the Alliance Machine Company, Alliance, Ohio.

The billets are conveyed to the Morgan continuous heating furnaces, Fig. 2, with an inclined floor, by a Morgan conveyor of the usual type, and after being heated are delivered directly to the first stand of the roughing train. The rod mill has six roughing stands and 10 finishing stands, or 16 in all. Fig. 3 presents a general view of this mill, while Fig. 4 illustrates the roughing train alone for the purpose of showing the location of the Edwards flying shear. The finished rods, on leaving the last stand of the finishing train, run through water cooled pipes to Morgan improved vertical pouring reels, shown in Figs. 5 and 6. The bundled rods are mechanically

dumped from the reels on an endless chain conveyor, which delivers them directly on rod trucks of standard type in the rod storage building.

The Rod Mill Engine

The rod mill is driven by a cross compound Corliss engine of exceptionally substantial design built by the Southwark Foundry & Machine Company, Philadelphia, Pa. It is shown in Fig. 7. The high-pressure steam cylinder is 34 in. in diameter, and the low-pressure steam cylinder is 64 in. in diameter, both 54 in. stroke. The engine runs at 85 to 100 rev. per min. It is designed to run condensing, with a steam pressure of 160 lb. The pistons are of the marine type and are supported clear of the cylinders, by the main and tail rod cross-heads. The high-pressure and low-pressure piston rods are 8 in. and 11 in. diameter, respectively, and are extended to form tail rods. The bed plates are of the bored type and are in one piece, with especially large bearing surface on the foundation. Substantial sub-bases extend under the cylinders and support the tail rod guides.

The shaft arrangement is unusual. On one end of the main shaft is a steel disk crank, on the other a steel fan-tail crank. The pin in this latter crank, which is 18 in. in diameter, extends beyond the connecting rod into a floating box in a third crank, which is on a separate shaft driving the mill. The engine has four bearings, three 20 in. in diameter by 38 in. long and one 20 in. in diameter by 45 in. long. On the extended crank shaft is a pulley weighing 100,000 lb., 18½ ft. in diameter by 50 in. face and made in two pieces. There is no pulley or fly-wheel on the main shaft. The connection between the crank shaft carrying the pulley and the main crank shaft is through a spherical adjustable box amply lubricated, so that the engine will run without strain on the shafts even if the bearings are not kept in perfect alignment. This feature has been used successfully at various places by the Southwark Foundry & Machine Company and has given long service.

One of the most interesting features of the engine is the valve gear. The high-pressure cylinder is provided with one eccentric so that steam may follow nearly the full stroke when required, but nevertheless the Corliss valves will be positively pushed shut before the end of the stroke and there is no possibility of steam blowing through during the exhaust stroke. The high-pressure cylinder is provided also with the Edwards secondary cam on the admission valves. This cam, which is entirely independent of the ordinary cut-off cams, comes into action only when the load is very light and prevents the engine from taking only a very small quantity of steam each stroke. The engine either takes sufficient steam to carry in the lubricant and give proper action, or else it takes none at all. Running light, it therefore takes no steam on most of the strokes but takes a fair amount every now and then, somewhat after the fashion of a gas engine. This system is found to work well to keep the engine properly lubricated and to avoid the racking of the engine and valve gear which occurs in most Corliss engines when they are running under very light load.

The fly-wheel is sufficiently heavy and the governor sufficiently sensitive so that no appreciable irregularity of speed results. The steam valves are of unusually large area as compared with the areas of the pistons. The valve stems are massive and are supported at their inner ends in sockets in the valves, and do not rub on the holes in the bonnets. The outer ends of these valve stems are supported in spherical bearings which adjust themselves automatically to any wear in the valves and prevent the bending strains which would otherwise occur in the valve stems.



Between the wire drawing room and the main line of the Pennsylvania Railroad will be located the annealing house, which

will be 46x360 ft., of steel and brick construction, and will be equipped with 10 annealing pots of the usual type. The firing rooms for these pots and for the Humphrey bakers will be located on the same sub-floor level and will be served by coal bins under a track to be located between the bakers and annealers, this arrange-

other special products, but definite plans for this have not yet been made.

Galvanizing, Wire Nail, Barb Wire and Fence Departments

The galvanizing room will occupy a portion of a building 330 ft. in length and 280 ft. in width. This building

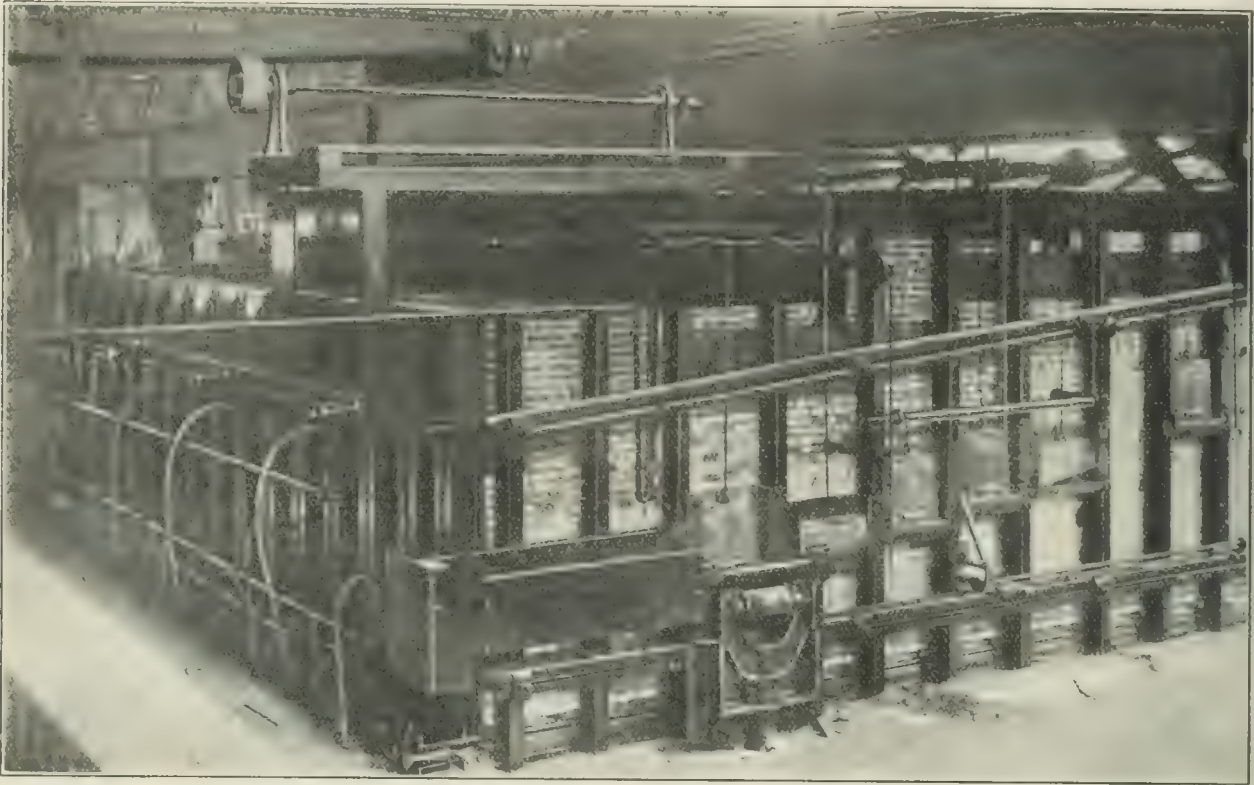


Fig. 2.—The Morgan Continuous Heating Furnace for Heating Billets.

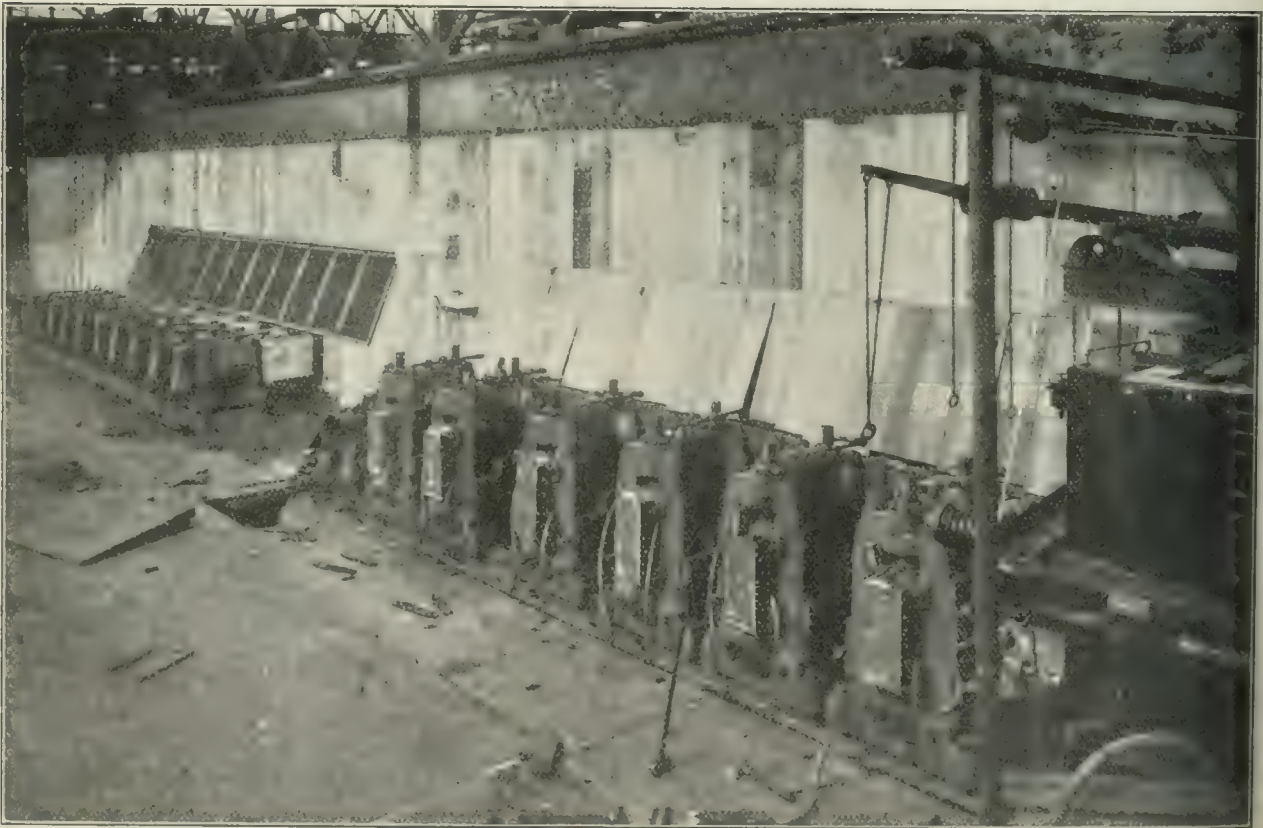


Fig. 3. General View of the Roughing and Finishing Trains of the Morgan Rod Mill of the Cambria Steel Company.

ment reducing the firing labor to a minimum. The annealing pots will be served by a 5-ton electric traveling crane of the Shaw type. In one end of the annealing house will be located machines for making bale ties and probably machinery for making fine annealed wire and

will be divided into three sections, each 110 ft. wide, one of which will be occupied by the galvanizing room, another by the barb wire, field fencing and poultry netting departments and the third by the wire nail machines.

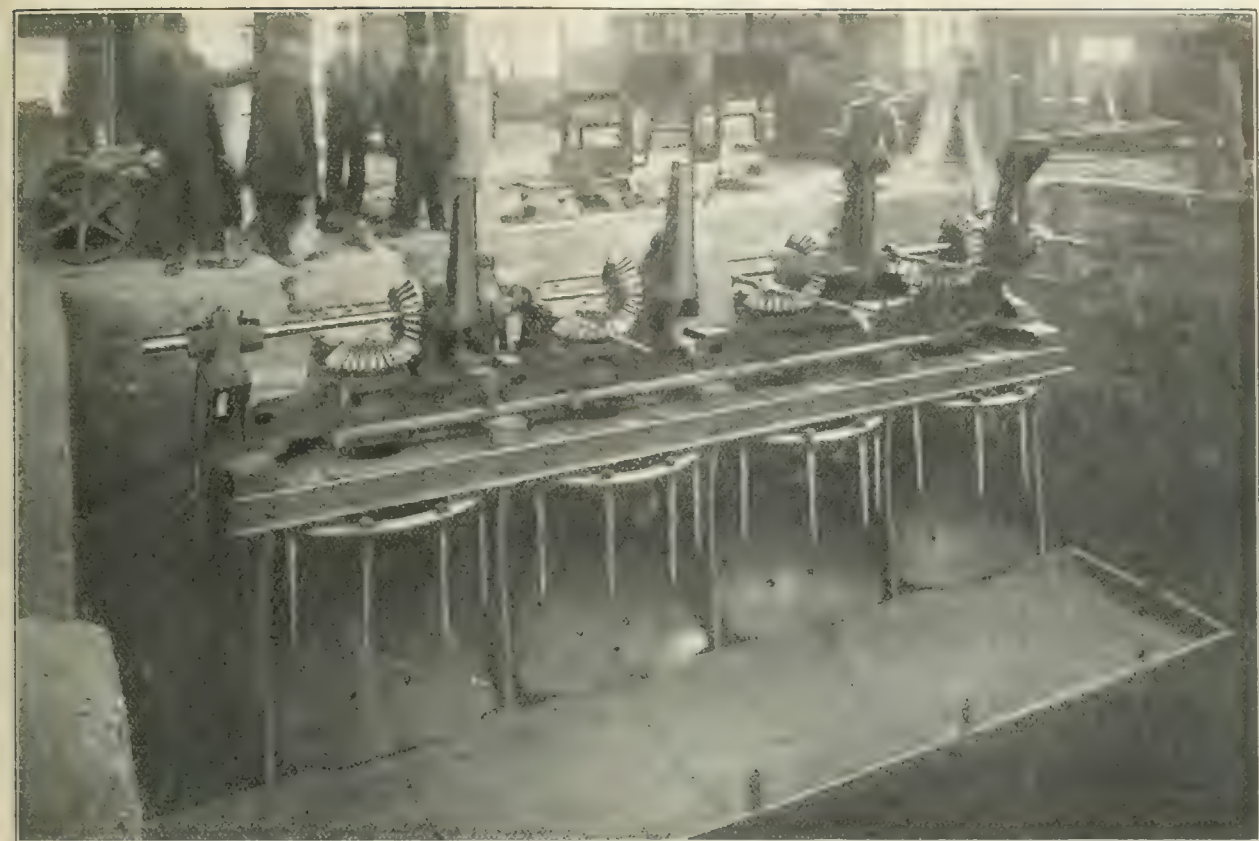


Fig. 5.—The Rod Reels Before the Erection of Platforms.

The galvanizing room will be equipped with three strings, each consisting of the usual cleaning and spelter baths, and having a full equipment of reeling frames made by Humphrey & Sons, Joliet, Ill. Two of these frames will have a capacity of 30 wires each of the coarser grades, and the third 24 wires of the finer grades.

The wire nail plant will contain 82 wire nail machines, furnished by the National Machinery Company, Tiffin, Ohio, and five machines for making special roofing nails. It is the intention of the company to manufacture all sizes, from 12-in. spikes down to brads $\frac{1}{4}$ in. long, and it will also make a specialty of large head roof-

ing nails. The wire nail plant will further be equipped to furnish cement coated, blued and galvanized nails.

In the barb wire department will be placed 22 machines of the most modern design. Among the different kinds of wire to be made will be Cambria Perfect, Cambria Special, Conemaugh Two-Point, Conemaugh Four-Point, Conemaugh Special, Glidden Two-Point, Glidden Four-Point and Glidden Special.

The field fence department will manufacture square and hexagonal mesh field fence and poultry netting of all widths and sizes, staples for both fence and poultry netting and other allied products. The company is now

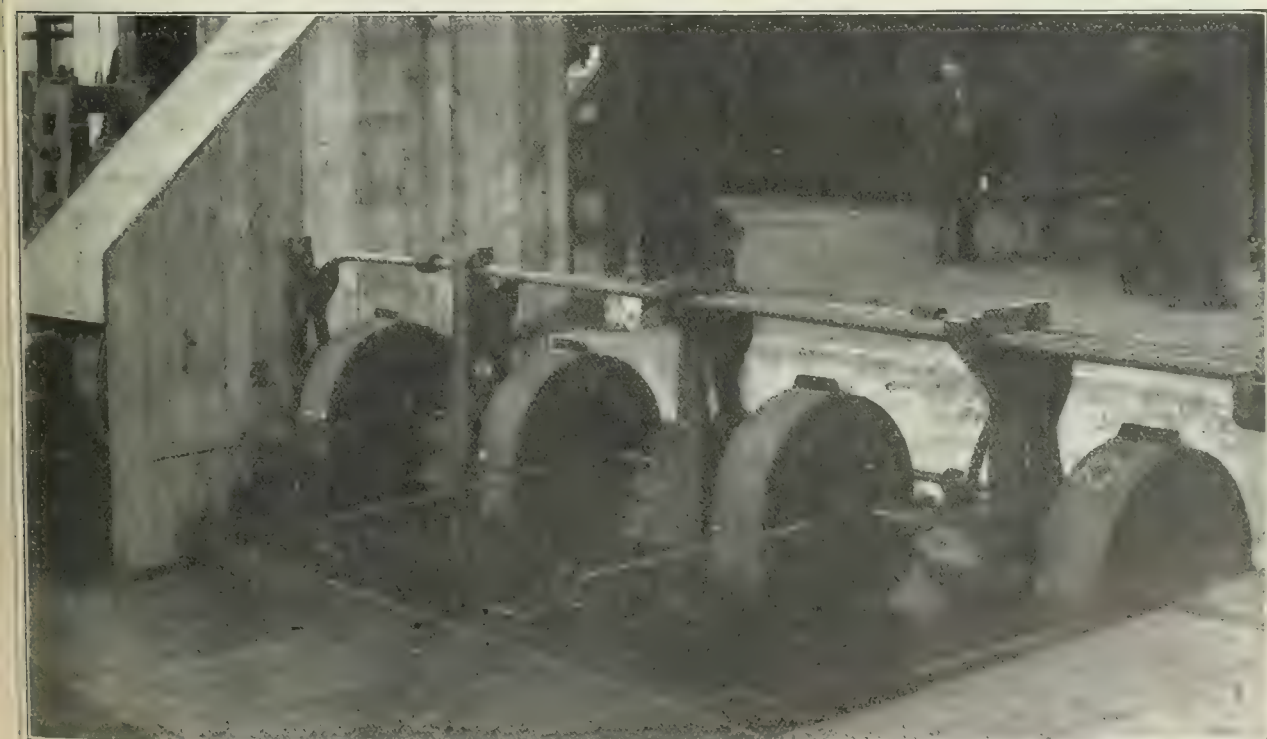


Fig. 6.—The Rod Reels After the Erection of Platforms.

building in its own shops, under the supervision of the inventor, two machines for the manufacture of the Holmquist improved poultry netting.

The Copperas Plant

To avoid polluting the Conemaugh River, the company has arranged to take the spent acid from the rod clean-

wire department of the Colorado Fuel & Iron Company at Pueblo, Col., has been appointed superintendent of this plant of the Cambria Steel Company, and it was largely under his supervision that it has been erected.

The Coke Producers' Association

At a well attended meeting of the Coke Producers' Association of the Connellsville Region, held at Uniontown, Pa., March 15, the following officers and committees were unanimously elected: President, Harry Whyel, Whyel Coke Company; vice-president, James R. Cray, Puritan Coke Company; treasurer, G. S. Harrah, Puritan Coke Company; secretary, Ernest H. Rowe, Executive Committee, chairman, Harry Whyel (president) ex-officio; C. E. Lenhart, Fayette Coke Company; J. P. Brennan, Thompson Connellsville Coke Company; L. W. Fogg, Tower Hill Connellsville Coke Company; W. A. Stone, Waltersburg Coke Company, and J. R. Cray, Membership Committee, chairman, W. A. Stone; J. B. Topham, Sunshine Coal & Coke Company; J. W. Abraham, South Fayette Coke Company. Mining Committee, chairman, O. W. Kennedy, Orient Coke Company; Geo. Whyel, Consolidated Connellsville Coke Company, J. P. Brennan, L. W. Fogg and W. A. Stone. Social Committee, chairman, D. B. Stauff, Taylor Coal & Coke Company; I. W. Semans, Hustead-Semans Coal & Coke Company, and G. S. Harrah.

The Empire Iron & Steel Company has completed five new single puddling furnaces in its mills at Niles, Ohio, to bring its manufacturing facilities to a point where the increasing demand for Empire Old-Fashion Iron can be supplied promptly at all times. Exclusive use of special analysis pig iron and Beaver ore fix in all of the company's puddling furnaces insures the desired uniform high standard of the output from the standpoint of material used, while the solution of the all-important human factor has been arrived at by employing only veteran puddlers.



Fig. 4. The Roughing Train of the Morgan Rod Mill of the Cambria Steel Company, Showing the Edwards Flying Shear.

ing room through acid proof conduits to a copperas plant to be contained in a building, 80x200 ft., equipped with modern machinery for the manufacture of copperas. This plant is to have a capacity of about 300 tons per month and the output will be sold to paint manufacturers and also used for fertilizing and disinfecting purposes.

Until the wire drawing and wire nail departments are in operation, the output of the rod mill, which is expected to be 350 tons per day, will be sold in the open market. It is expected to have the wire drawing plant ready in April, followed closely by the galvanizing, nail and fence departments, the entire works to be operative by early summer.

J. E. Lonngren, for some years superintendent of the

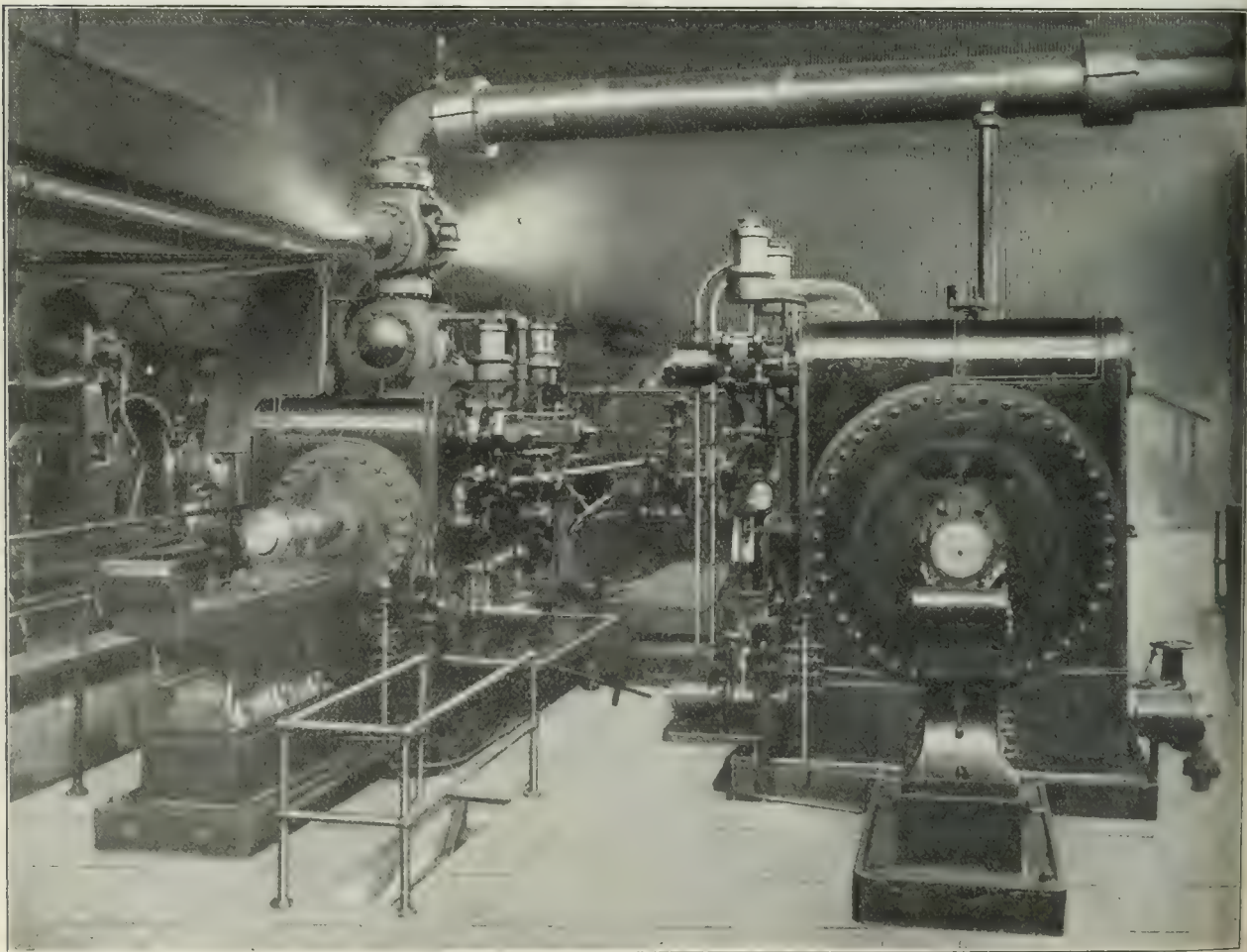


Fig. 7. The Southwark Engine in the New Cambria Rod Mill.

The Autogenous Welding Company's High Duty Polishing Machine

A special design of buffing and polishing machine has been brought out by the Autogenous Welding Company, 73 Union Street, Worcester, Mass. The principal features of this machine, which is known as the No. 4 heavy duty polisher, are the use of ball bearings, economy of lubrication and freedom from repairs to journals and replacement of shafts. Fig. 1 is a view of the machine.

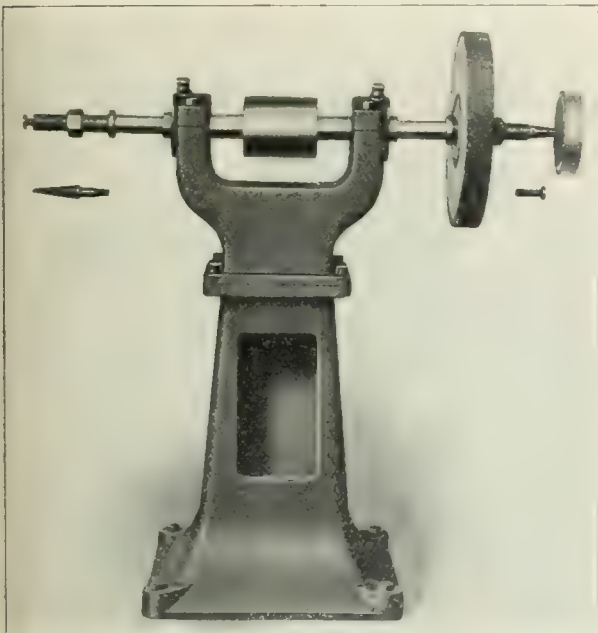


Fig. 1 A Special Design of Buffing and Polishing Machine Built by the Autogenous Welding Company, Worcester, Mass.

while Fig 2 shows the details of the annular ball bearings used on the spindle.

The spindle, as will be noticed in Fig. 2, is mounted in annular ball bearings of the Hess-Bright type in place of the babbitt bearings, which are commonly supplied with this class of machinery. The special advantages of this type of bearing, as compared with the ordinary one, are freedom from wear, ample space for lubrication and a design of housing that prevents the entrance of abra-sive material from the wheel. In an ordinary babbitt bearing it is difficult to prevent particles of abrasive material worn from the wheel from working their way into the bearing. These find their way into the lubri-

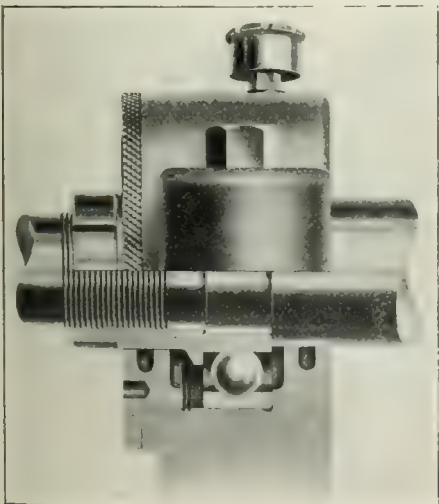


Fig. 2 Detail of the Spindle Bearing

cating oil, and before long the bearing metal is cut and the shaft badly scored. Another advantage of the ball bearings is that they always run true, as the heaviest load that can put upon them in grinding is such a small fraction of their normal capacity that the matter of

wear is negligible. The annular ball bearings on which the spindle of this machine is mounted are of the radial type, and their capacity for taking thrust is 25 per cent. of the radial load capacity. The wheel will run exactly true, and in the same plane, whether the grinding is being done against the edge or the side.

The bearings are packed with grease and fed from compression cups to keep them full. A slight overflow of this grease from the housing prevents any abrasive from getting into the bearing, as it is carried away by the grease. The amount of lubricant required to keep an annular ball bearing in good condition is very small.

The following table gives the principal specifications and dimensions of the machine:

Length of spindle, inches.....	39 1/4
Diameter of spindle in bearings, inches.....	1 1/2
Diameter of spindle between flanges, inches.....	1 1/2
Face width of spindle pulley, inches.....	5 1/2
Diameter of spindle pulley, inches.....	5
Height from floor to spindle center, inches.....	37
Speed of countershaft, revolutions per minute.....	600
Diameter of countershaft, inches.....	1 15/16
Length of countershaft, inches.....	36
Diameter of tight and loose pulleys, inches.....	10
Face width of tight and loose pulleys, inches.....	5
Diameter of drive pulleys, inches.....	18
Face width of drive pulleys, inches.....	5
Complete weight, pounds.....	550

This machine can be driven from an overhead counter-shaft or from one underneath the floor, as the pedestal is hollow, and enables the belt to pass through it.

Rateau Steam Regenerator Installations

The Rateau Steam Regenerator Company, New York City is installing five Rateau regenerators at the Ensley, Ala., plant of the Tennessee Coal, Iron & Railroad Company. The regenerators will deliver a constant flow of low pressure steam to three mixed flow steam tur-bines of 3000 kw. each. The exhaust steam supplied to the regenerators is provided by two reversing mill en-gines and one finishing mill engine. The company has also been awarded a contract by the Illinois Steel Com-pany for five Rateau regenerators for its South Works, South Chicago, Ill. This equipment will handle the ex-haust steam of the mill engines at this plant.

A complete plant at the works of the Lukens Iron & Steel Company, Coatesville, Pa., including a Rateau-Smoot turbine directly connected to a 900-kw. 250-volt direct current generator, running at 1500 rev. per min., complete condensing equipment and a steam regenera-tor, has been in continuous operation for the last five months with excellent results. There is now being in-stalled at the French Worsted Company's plant, Woon-socket, R. I., an alternator of 800-kw. capacity driven by a mixed-flow Rateau-Smoot turbine, and all the con-densing auxiliaries, and a Rateau regenerator.

The General Electric Company has received a non-exclusive right to equip the mixed flow turbines manu-factured by it with the Rateau mixed flow regulator. The Rateau device allows a steam turbine to run on low pressure, high pressure or both simultaneously. The selection of the steam supply is automatic and does not affect the speed regulation of the turbine.

Railroad Equipment Orders.—The Pittsburgh & Lake Erie is reported in the market for 1,000 hopper and 1,000 steel gondola cars. The Rock Island, contrary to recent report, says it is not in the market for 1,450 freight cars. A Chicago dispatch announces contracts for 700 cars let by the Monon Railroad. The San Diego & Arizona is in the market for 120 freight cars and the Kansas City Southern for 125 ballast cars. The San Antonio & Aransas Pass is expected to buy box cars and stock cars and the St. Louis & San Francisco 11 postal cars.

The Charter Gas Engine Company, Sterling, Ill., had a narrow escape March 15, its plant having been in imminent danger from the burning of an adjacent keg factory. The location of this factory so near the engine works had been a menace for 40 years.

Bath Duplex Internal Grinders

Two Recently Developed Types Embodying Several Improvements

The double and single head duplex internal grinding machines of the Bath Grinder Company, Fitchburg, Mass., have recently had a number of improvements made in their construction. Complete descriptions of both of these machines have already appeared in *The*

pneumatic hammers and long bearings. The various headstocks and chucks and the different types of internal manufacturing spindles furnished as a part of the equipment, are shown in Figs. 3 and 4, respectively. Fig. 5 is a view of the No. 2½, or single-head, grinder. Ex-

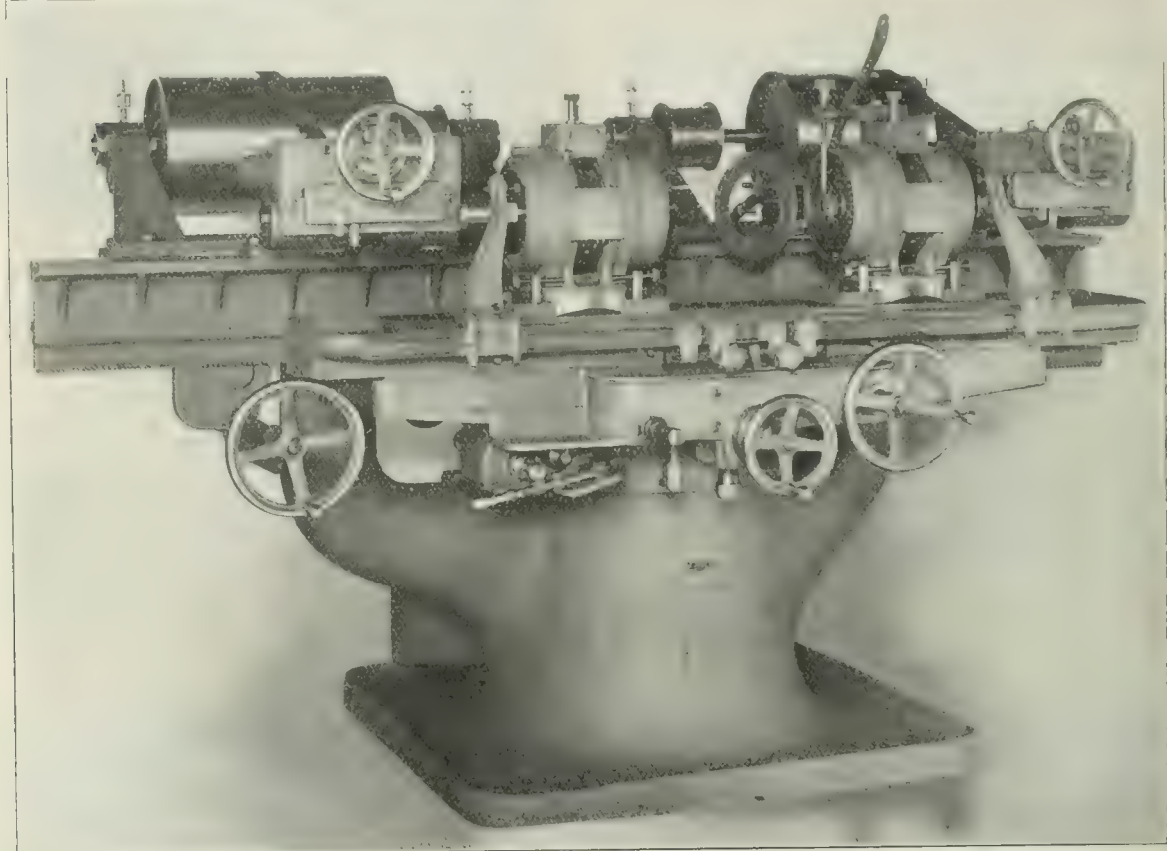


Fig. 1.—The Improved No. 5 Duplex Internal Grinder Built by the Bath Grinder Company, Fitchburg, Mass.

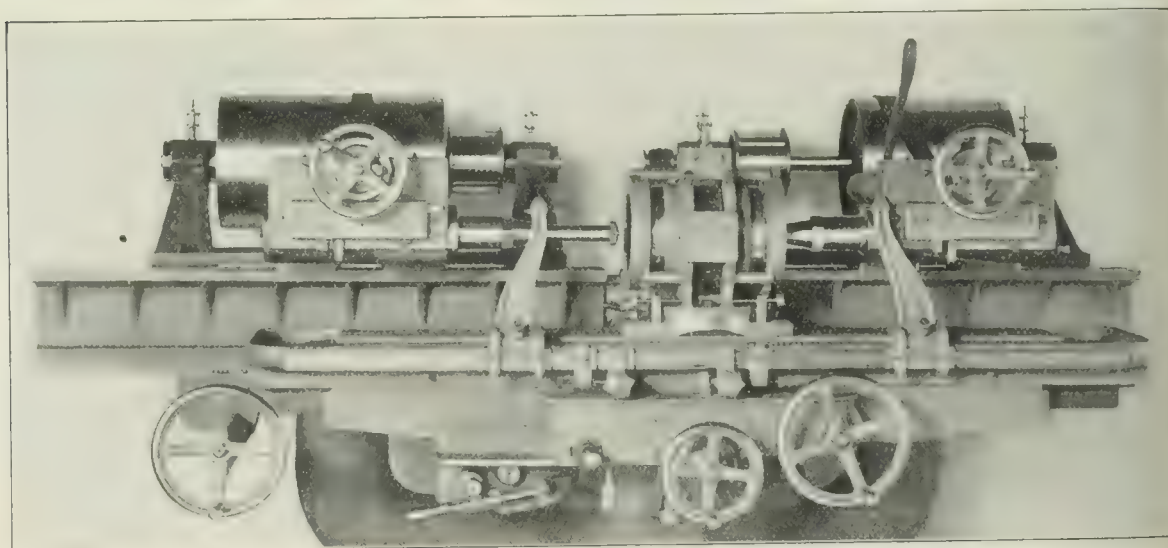


Fig. 2.—The Grinder Using Both Ends of a Special Headstock.

Iron Age, so that no extended description of their construction is necessary. The No. 2½, or single head, grinder was illustrated in *The Iron Age* May 30, 1907, and the double-head grinder was the subject of an illustrated description which appeared in the issue of September 30, 1909.

Fig. 1 shows the two-head machine, and Fig. 2 illustrates it with a special headstock furnished for grinding

angles of work being done by these machines are given in Figs. 6, 7 and 8. The first shows a divided gear being ground on a gear hobber, while Figs. 7 and 8 are two views of the No. 2½ machine with face plate and universal chuck mounted on the headstock, and showing grinding being done from the front and the rear end, respectively.

The construction of these two machines is practically



Fig. 3.—The Various Headstocks and Chucks Furnished

the same, except that the one shown in Fig. 5 has only one spindle head instead of two, and the headstock construction is the same as that shown in Fig. 1, except that in the single-head machine a cross slide supports it. The special improvements made are in the construction of

grinding spindle enters the hole from the rear end, as shown in Fig. 8. For truing the wheel or mounting or removing the work from the headstock, the water shield cover is removed, as in the headstock at the right of Fig. 1. The single movement of swinging back the cover

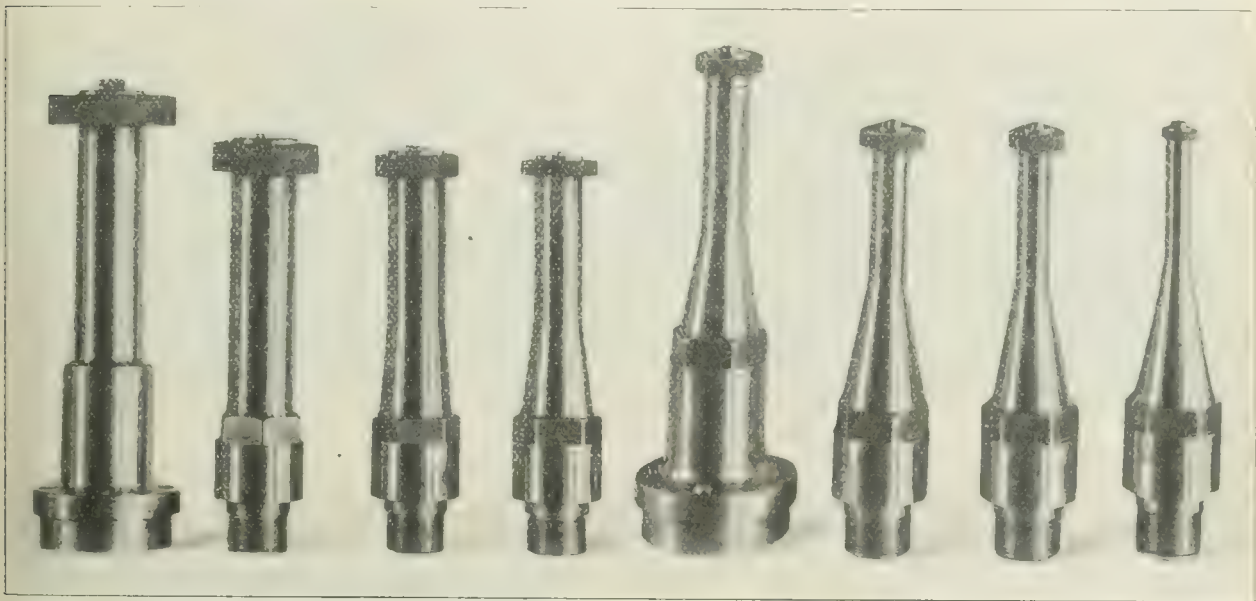


Fig. 4.—The Different Types of Internal Manufacturing Spindles

headstock, the widening of the long reciprocating slide, making provision for carrying off the water used, and the furnishing of a three-fingered dog as part of the regular equipment. The headstocks swivel and are now arranged to grind taper as well as straight work. The

is sufficient to cut off the water, as the supply pipe is connected with the cover and is thrown out of position when it is moved. It is claimed that using water with the swivel plate and mounting the headstock on the reciprocating slide, which has been widened, does away with vibration between the swivel plate and the joint. The three-fingered dog which is furnished, has a long, a medium and a short-faced tooth. The first serves to keep the wheel in the hole, the second allows it to pass

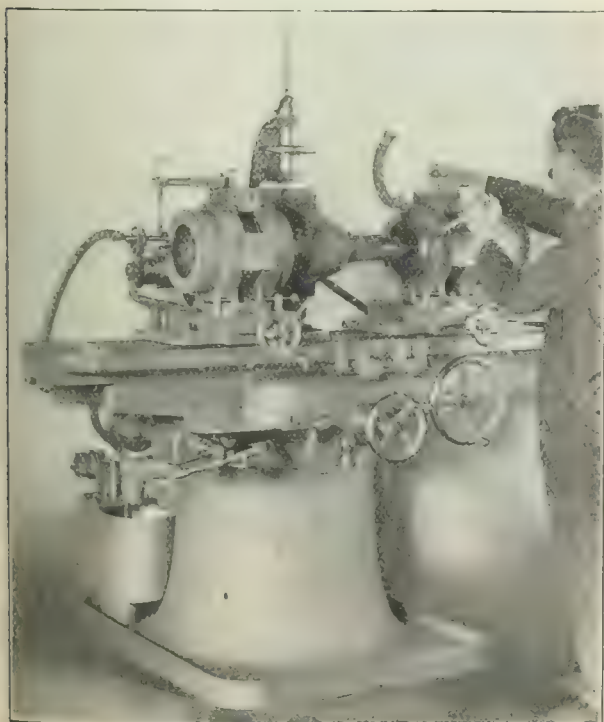


Fig. 5.—The No. 2 1/2 Grinder.

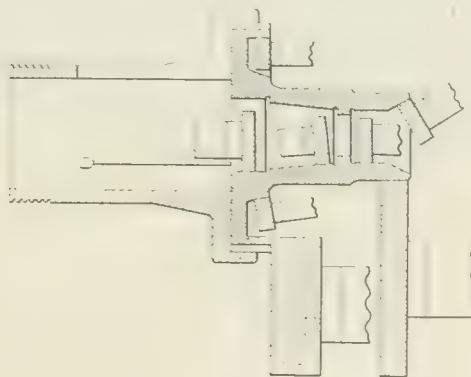


Fig. 6.—Grinding a Divided Gear on a Gear Hobber.

half-way out, and the last lets it entirely out, an arrangement which keeps the wheel grinding at all times and does away with the grinding of a bell mouth hole.

The advantage of the special headstock shown in Fig. 2, which is furnished for grinding pneumatic hammers and long bushings, is that two bearings can be ground at the same time concentrically with each other, or a coarse wheel can be used to rough the hole and a fine one to finish it. The various headstocks and the assort-

ment of work holding fixtures furnished with both machines are illustrated in Fig. 6. A is an end view of the headstock shown in Fig. 2 which is furnished for grinding pneumatic hammers and long bushings. B is a $4\frac{1}{2}$ -in. steel spring collet, while C is one of eight sets of reducing bushings furnished with the collet for reducing the hole to size. These reducing bushings can also be furnished with the stop spring chuck. D, which has jaws for holding work that cannot be held inside of the

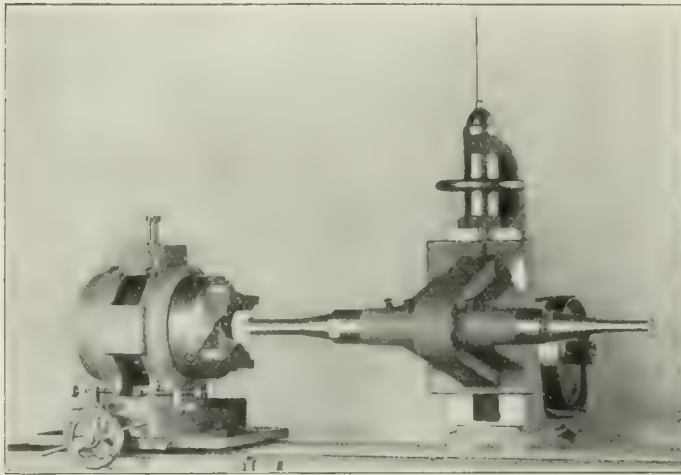


Fig. 7. Grinding from the Front End.
Two Views of the No. 2 $\frac{1}{2}$ Machine with Face Plate and Universal Chuck Mounted in the Headstock.

Rapid Construction of a Mesta Blowing Engine

A record for rapid engine construction has been recently established by the Mesta Machine Company, Pittsburgh, Pa., at its works in West Homestead. The engine on which this rapid time was made is a special type of blowing unit and will be used by the Algoma Steel Company, Sault Ste. Marie, Canada, to furnish the blast for

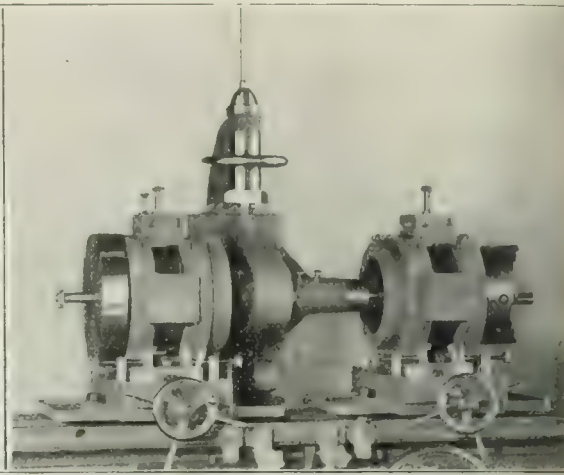


Fig. 8.—Grinding from the Rear End

spring chuck. E is a four-jaw independent chuck which is mounted on a quill and held in the spindle head in the same way as B or D. F is a face plate and H and I are the spindle heads with which the machines illustrated in Figs. 1 and 5 are equipped. In addition to these headstocks and chucks, eight sets of internal manufacturing spindles, as shown in Fig. 4, can be supplied for either machine. The large spindle A is made from one solid piece of steel. The spindle B can be mounted in a base plate like the one shown at E. Sixteen different diameters of spindles are made from 3-in. stock, and the ends are reduced to the diameter to be ground. This form of grinding spindle provides a large body of metal at the rear end, which absorbs the vibration of the spindle due to its high speed of operation and also the heat generated at the smaller end. These spindles are hardened, ground and lapped, and the bearings are made from Tobin bronze. There are no oil holes in the body of the spindles, but they are lubricated from the rear end and the machine does not have to be moved out of position to oil them.

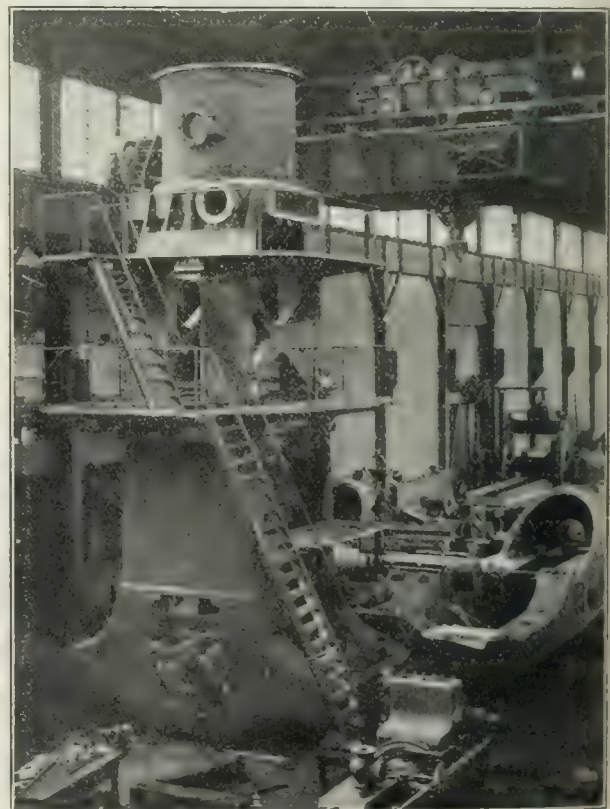
The No. 2 $\frac{1}{2}$ duplex internal grinder shown in Fig. 5 differs somewhat from the other machine, as it has only one spindle head with two spindles projecting from it, one on either side, and driven by one belt. The construction of the headstock is the same as in the other machine, except that it is mounted on the cross slides and operated by the cross screw pilot hand wheels. The dials on the cross screw indicate the work from size to size with the dial matching zero at zero. In this way it is possible to adjust the dials so that the zero points coincide, and it is simply necessary to read the desired size directly instead of subtracting one reading from another, which tends to admit error.

The use of eight grinding wheels to grind a divided gear on a hobber and the manner of holding the piece is illustrated in Fig. 6. In doing this work the gear is ground internally from the front and the rear ends simultaneously, the other parts being ground subsequently in separate operations. In Fig 7, the No. 2 $\frac{1}{2}$ machine with face plate and universal chuck mounted in the headstock, is shown with the grinding spindles entering the work from the front end. In Fig 8 the headstock is reversed and the grinding is done from the rear end of the hole instead of the front.

The Bridgeport Malleable Iron Company, Bridgeport, Conn., emphatically denies the report of its proposed amalgamation with certain other companies manufacturing malleable castings.

a Bessemer converter at a pressure of 32 lb. per square inch. It is of the long cross head heavy duty type, and the diameter of the steam cylinder is 46 in. The air cylinder has a diameter of 84 in. and a stroke of 60 in. The normal speed is approximately 40 rev. per min., but if desired a maximum of 60 rev. per min. can be secured.

In the engraving the engine is shown in the process of



A Large Blowing Engine Which Was Built in 16 Days by the Mesta Machine Company, Pittsburgh, Pa.

being unassembled for shipment from the builder's erecting floor. The order for this engine was placed on February 8 and the shipment was to be made in 30 days from the receipt of the order. Twenty-six days were, however, all that was required from the date the order was entered in the shop to build, assemble, take down and ship the engine.

The Improved Berg Cinder Car

A New Type for Handling Blast Furnace Slag

The increasing use of mechanically dumped cinder cars for handling blast furnace slag has resulted in the further development of the P. T. Berg car, manufactured by the William B. Pollock Company, Youngstown, Ohio.

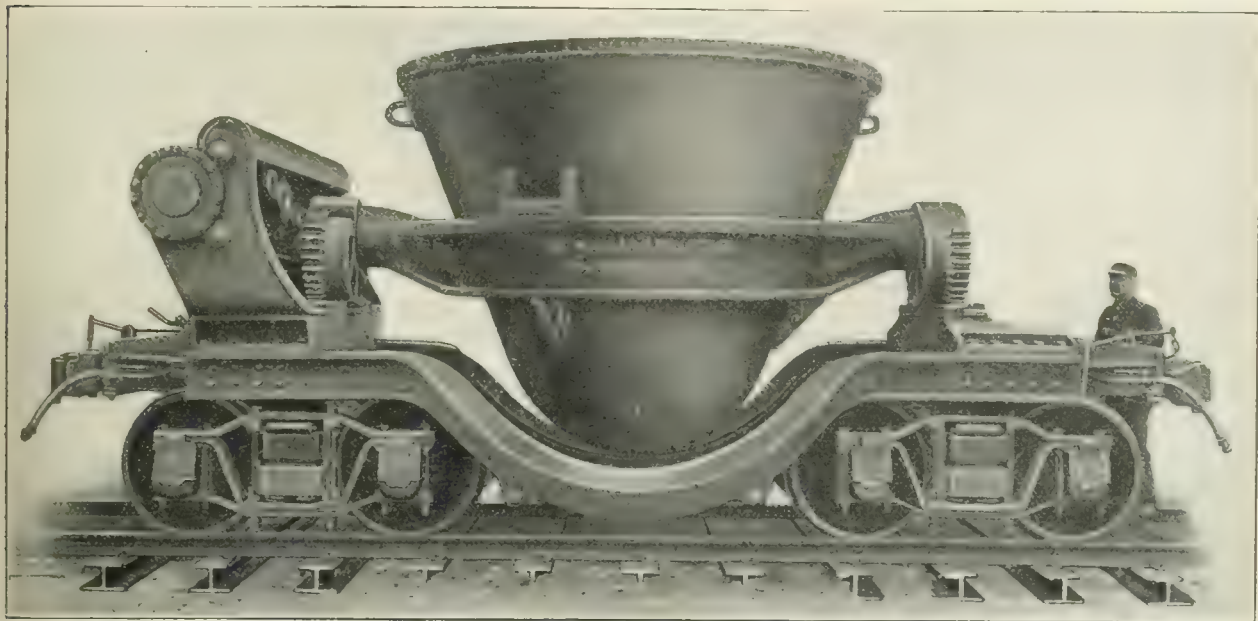


Fig. 1.—An Improved Berg Cinder Car Having a Capacity of 260 Cu. Ft. Built by the William B. Pollock Company, Youngstown, Ohio.

This car, which is of all steel construction and has a capacity of 260 cu. ft., was adopted for use at the Edgar Thompson furnaces as the result of a series of tests, and at the present time 70 of them are in service there. Fig. 1 is a general view of the car, Fig. 2 is a three-quarter view showing the mechanism for dumping the pot and Fig. 3 shows the pot completely tilted.

The car was designed with full appreciation of the severe use to which it would be subjected in service, and the construction embodies all the requirements which years of usage have suggested. The pot is made from a special analysis iron, and instead of being rigidly fixed to the trunnion ring, is secured by a lock which allows

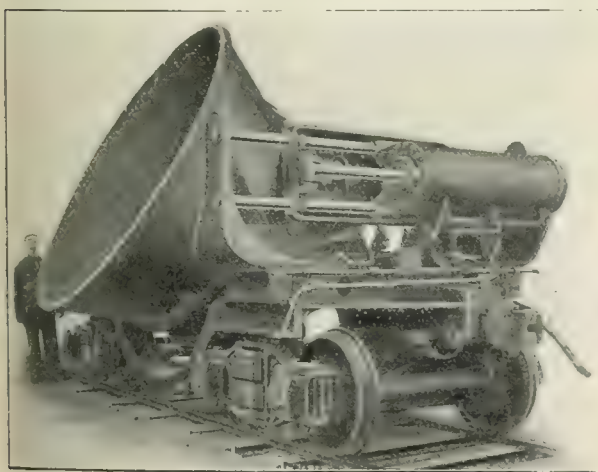


Fig. 2. Three-Quarter View of the Car, Showing the Dumping Mechanism.

free expansion and contraction. In operation the pot is self-cleaning and the scull is ejected clear of the rail and the ties. The cars are equipped with M. C. B. trucks having a capacity of 100,000 lb., Schoen solid rolled steel wheels, Simplex bolsters, cast steel spring seats having a special design of cap to protect the springs, Westinghouse friction draft gear and automatic

couplers with levers extending beyond the edge of the car body. Extra heavy steel castings which interlock so that no shearing strain is imposed on the bolts or rivets are used for the end and the side sections forming the car body.

Air or steam is used to dump the pot through a 16-in. cylinder, which has an eight-ring piston rigidly bolted to the front end frame. A long steel crosshead, which is shown in Fig. 2 together with the rest of the dumping

mechanism, engages the front gear segment and rotates the steel trunnion ring and pot by a heavy steel connecting link. These gears travel to either side of the car on treads and racks which are bolted to the end frame. The entire dumping movement is automatically con-

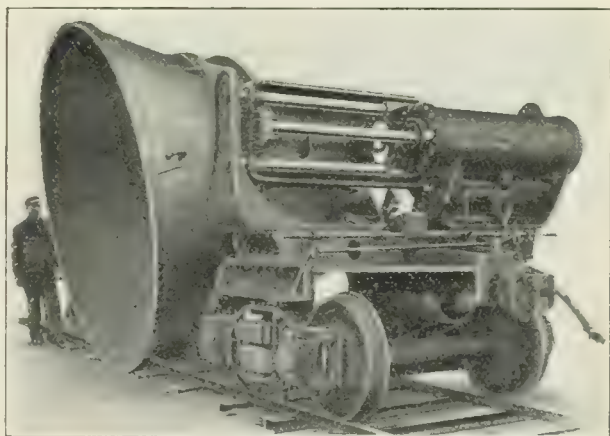


Fig. 3.—The Pot Completely Tilted.

trolled, and the speed at which the pot is tilted can be made as fast or as slow as may be desired.

The design of the cut-out cock on the train air or steam line, the operating valve and the lock is such that the rear end of the cylinder must be charged with air or steam to dump the receptacle. This air or steam forms a cushion and retards the speed of the piston in proportion to the rate at which this cushion exhausts through a regulating valve that is set and locked for a certain predetermined speed. An additional precaution against the tendency of a topheavy full cylinder pot to pull itself over rapidly is the use of elliptical gears. These maintain the center of gravity behind the vertical line of thrust on the treads and require the application of some force to push the pot over during the first half of the dumping operation, or until it is about half emptied and assumes the position shown in Fig. 2. This control of the

speed of dumping removes all danger resulting from a too rapid movement, and the return of the empty pot is also controlled in the same way, no shock being sustained by the car at the end of the stroke. An ordinary laborer or member of the train crew can dump and right the pot in less than a minute. The locking arrangement cannot be tampered with, and is so designed that it cannot be opened until power is applied from the locomotive, and it is also impossible to shut off the power after dumping until the lock is engaged and the pot securely locked in position for the next trip.

This car can also be used for handling open hearth furnace slag. When used for this purpose it is necessary to slightly modify the construction of the pot as well as add a lifting bail. A receptacle alongside the steel ladles contains the empty pots, and as these are filled they are lifted and placed in the car for transportation.

Data for Blast Furnace Piping

BY PAUL T. LESHIER, HARRISBURG, PA.

The accompanying table has been computed to be used as a time saver both in actual design and in estimating. Its chief value will be in estimating, for when

that since the committee of bondholders bought the plant it has been operated at such a satisfactory profit that the conditions seem favorable for making arrangements to put it on a proper basis. It is understood that the committee proposes to issue \$500,000 in stock and \$300,000 in bonds.

The Chicago Metal Trades Annual Meeting

The Chicago Branch of the National Metal Trades Association held its thirteenth annual dinner and meeting at the Mid-day Club on the evening of March 4. About 125 members, representing Chicago's industries, were present when dinner was served. President O'Leary called the session to order at eight o'clock and in a brief address reviewed the work of the year and extended his appreciation to co-workers who had helped to make it so beneficial.

Interesting reports were submitted from Secretary Paul Blatchford, Treasurer L. C. Walker, and Manager of Employment Bureau R. W. Closter. The Chicago Branch has gained slightly in membership during the past year and its finances are healthier than a year ago. Among other interesting items in the report of the Bureau of Employment was the statement that 6,663

CHARACTER OF PIPING	MEAN DIAMETER OF PIPE	THICKNESS OF FLANGE	THICKNESS OF LINING	WEIGHT OF PIPE PER LIN. FT. INCLUDING 2" GFLAP AND RIVETS			WEIGHT & CU. FT. OF LINING PER LIN. FT.		BRICK COUNT PER LIN. FT.		WEIGHT OF PIPING PER LIN. FT. PL. AK & LINING			SECTION MODULUS OF PIPE (IN FEET) NOT DEDUCTING FOR RIVETS			MAX. DISTANCE BETWEEN SUPPORTS (IN FEET) FOR RIVETS			RIVETS					
				PL.	PL.	PL.	LB. CU. FT.	HIGH	LOW	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PITCH	TOE	FLANGE
				PL.	PL.	PL.	LB. CU. FT.	HIGH	LOW	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PL.	PITCH	TOE	FLANGE
HOT BLAST	18"	3"	9"	170.0	1149	7.66	63	81	130	1319	47.4	38	38	24	24	1 1/2"	1 1/2"	1 1/2"							
	24"	3"	9"	180.6	1216.7	8.25	48	108	140	1418	53.5	64.5	39	43	24	24	1 1/2"	1 1/2"	1 1/2"						
	30"	3"	9"	191.2	1229.4	8.84	35	132	150	1516	60.0	72.1	40	44	24	24	1 1/2"	1 1/2"	1 1/2"						
	36"	3"	9"	201.8	1242.2	9.43	21	156	160	1615	66.9	80.5	41	45	24	24	1 1/2"	1 1/2"	1 1/2"						
	42"	3"	9"	212.4	1254.9	10.02	14	168	170	1713	74.0	89.0	42	46	24	24	1 1/2"	1 1/2"	1 1/2"						
	48"	3"	9"	223.0	1267.6	10.61	7	180	180	1812	81.7	98.1	43	47	24	24	1 1/2"	1 1/2"	1 1/2"						
54"	3"	9"	233.7	1280.4	11.19		192	190	1912	89.5	107.5	44	48	24	24	1 1/2"	1 1/2"	1 1/2"							
COLD BLAST	30"	3"	9"	81.9	106.2					85	106	14.8	18.6	35	35	24	24	1 1/2"	1 1/2"	1 1/2"					
	36"	3"	9"	93.4	116.9					93	117	17.9	22.5	38	38	24	24	1 1/2"	1 1/2"	1 1/2"					
	42"	3"	9"	127.5	152.9					128	153	26.7	32.1	40	40	24	24	1 1/2"	1 1/2"	1 1/2"					
	48"	3"	9"	138.1	165.7					138	166	31.4	37.7	45	45	24	24	1 1/2"	1 1/2"	1 1/2"					
	54"	3"	9"	148.7	178.4					149	178	36.3	43.7	50	50	24	24	1 1/2"	1 1/2"	1 1/2"					
	60"	3"	9"																						
GAS MAIN	36"	1 1/2"	1 1/2"	101.9	127.5		164	3.99	48	12	33	21.3	26.7	34	37	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	42"	1 1/2"	1 1/2"	110.1	138.1		508	3.39	42	24	38	23.1	31.1	37	38	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	48"	1 1/2"	1 1/2"	118.9	148.7		552	3.68	35	36	60	29.0	36.3	38	38	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	54"	1 1/2"	1 1/2"	129.0			596	3.38	28	48	68	31.8		40		24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	60"	1 1/2"	1 1/2"	170.0			640	4.58	22	60	75	47.1		41		24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	66"	1 1/2"	1 1/2"	180.6			684	4.77	14	72	78	53.5		42		24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	72"	1 1/2"	1 1/2"	191.2			728	4.96	7	84	82	60.0		43		24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	78"	1 1/2"	1 1/2"	201.8	242.2		772	5.16	36	88	85	66.9		44		24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	84"	1 1/2"	1 1/2"	212.4	254.9		817	5.44	20	96	90	74.0		45		24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	90"	1 1/2"	1 1/2"	223.0	267.6		861	5.74	96	100	98	81.7	98.1	50	52	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	96"	1 1/2"	1 1/2"	233.7	280.4		906	6.04	96	104	103	89.5	107.5	55	58	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	102"	1 1/2"	1 1/2"	244.3	293.2		950	6.35	96	108	108	97.4	116.0	60	63	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	108"	1 1/2"	1 1/2"	254.9	306.0		994	6.65	96	112	112	105.3	125.0	65	68	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	114"	1 1/2"	1 1/2"	265.5	318.8		1038	6.95	96	116	116	113.2	133.0	70	73	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				
	120"	1 1/2"	1 1/2"	276.1	331.6		1082	7.25	96	120	120	121.1	141.0	75	78	24	3"	3"	1 1/2"	1 1/2"	1 1/2"				

General Data for Blast Furnace Piping.

the required diameter of the piping is decided upon, then the weight of the steel work and brick lining, and the distance apart of the supports can be obtained at once from the table. The brick count gives the standard shapes contained in one linear foot and also their equivalent in 9-in. straights. The reason for giving the number of 9-in. straights is that the price of brick is usually given in terms of one thousand of this shape.

In calculating the maximum distance between supports, a fibre stress of 12,000 lb. per square inch has been used, and a rivet efficiency assumed of 50 per cent.

The figures given under the heading "Maximum Distance Between Supports" are not the maximum distance between supports obtained when figured in regard to the section modulus of the pipe, as they are somewhat shorter, but are spans that for practical purposes should not be exceeded, as piping around steel works is sometimes subjected to strains that were not taken account of, such as arise, for example, from riggers hitching a rope around the pipe.

The section stipulated for gas mains can also be used for piping which conveys gas from gas producers.

The Passaic Steel Works, Paterson, N. J., will shortly be organized and refinanced. The statement is made

men had registered and 6,271 had been assigned positions in the various shops of the members. This report, taking into consideration the somewhat stagnant condition of the past year, shows wonderful activity and the value of this department. Even during the somewhat quiet year just passed, as much difficulty was experienced in securing skilled mechanics as in most prosperous times. Mr. Closter believes this is due to the seeming unsettled conditions in the machinery industry which have forced many of the more intelligent and efficient mechanics into other lines where they have qualified for more lucrative positions. Secretary Blatchford closed his report with a strong recommendation that the members lend their hearty support and co-operation to the men in charge of the Lewis Institute where apprentices are being educated.

H. B. Shieve, president of the Superintendents' and Foremen's Club, brought greetings from that body and expressed the hope that closer relations be cultivated between it and the Chicago Branch, at the same time extending a hearty invitation to the members of the Chicago Metal Trades Association to visit his club at some of its regular meetings.

The following officers and committeemen were elected for the ensuing year: President, N. W. Ding-

wall. Chicago Drop Forge Company; vice-president. W. L. Kroeschell, Kroeschell Bros. Company; treasurer, O. A. Olson, Simonds Mfg. Company. Executive Committee, N. W. Dingwall, Chicago Drop Forge Company; W. L. Kroeschell, O. A. Olson, H. H. Latham, Latham Machinery Company; John W. O'Leary, A. J. O'Leary & Son Company; L. C. Walker, Aeromotor Company; Francis S. North, Union Special Machine Company; Staunton B. Peck, Link-Belt Company; Louis E. Burr, Woods Motor Vehicle Company.

Harry L. Wheeler, president of the Chicago Association of Commerce, was introduced as the speaker of the evening and his subject "Chicago, the Great Central Market, and the Metal Trades Industry" could hardly have been handled in a more able or interesting manner. Reviewing the history of Chicago from the time 80 years ago, when it was but an uninhabited marsh, up to the present day with its two and a quarter million population, Mr. Wheeler brought vividly before his hearers some of the many phases of this rapid development, which was traced directly to individual effort. The members of the metal trades industry were earnestly solicited to put their shoulders to the wheel that will make the Chicago of to-morrow a better market and a better town than it is to-day. The advantages of competition as an attraction to buyers were dwelt upon at some length and it was held as one of the principal reasons for Chicago's rapid strides. Jesse Holdom, for many years a judge of the Superior Court of Cook County, was the next speaker, and his subject, "Injunctions," was handled in a most pleasing and instructive manner by this dry humorist. He advocates the judicious use of an injunction and stated that its abuse generally came from haste in its use. Practical examples familiar to every one present were used to show the advantages of going slowly with injunctions. Frank C. Caldwell, first vice-president of the National Metal Trades Association, and former president of the Chicago Branch, spoke on "Our Associations." He has recently visited a number of the Eastern branches and his address was of a most practical nature. The Chicago Branch will probably meet more often the coming year than in the past.

Hoists for Foundry and Shop*

BY H. PRAKKEN.[†]

The hoist has been perfected to such a degree that its use is not confined to lifting loads of iron, but for hoisting the finest and most carefully made molds satisfactorily. Previous to the era of the electric motor, eliminating the hydraulic hoist, the old windlass was the machine in most common use for lifting purposes followed by the block and pulley, the triplex block or planetary gears with a hand hoisting device and the motor attached to the triplex block to eliminate the hand hoisting. In the designing and manufacturing of the modern hoists manufacturers had to overcome many difficulties both electrical and mechanical.

One of the essential features in a hoist for its satisfactory operation is the certainty with which the cable can be wound and unwound on and off the drum at low and high speeds. Many a hoist upon the market to-day has a low efficiency due to the design of its parts. The efficiency of the worm geared hoist varies from 45 to 80 per cent., depending upon the pitch of the worm screw and its length of service.

As the hoist while operating is often exposed to the weather, it should be weatherproofed. This is accomplished by making machined joints between the bearing and the end bracket of the motor, by treating the magnetic brake coils with weatherproof compounds and by copper plating the plungers of magnetic brakes when the last are used. All openings in the motor frame or controller through which water might penetrate should be closed up. This method of construction and treatment

will prevent the elements from corroding the exposed parts.

A hoist for foundry work should have incorporated within its mechanism an upper and lower limit device, and either a mechanical or magnetic brake for cutting off the power. When the load reaches either of the extreme points the limit device will throw off these contacts under which it has just been operating and arrange the contact for making an operation opposite to the previous one. As the controller is shut off, the brake is applied by a spring to the pulley on the shaft of the motor. The armature, therefore, can only be turned to either the hoisting or the lowering point.

The average power required by four 5-ton air hoists having a hoisting speed of 15 ft. per minute was 39.7 hp., as compared with 9 hp. for an electric hoist of the same capacity and speed. The power for the air hoists represents the amount which has to be generated at the compressor to compensate for the line loss and leakage, while the electrical horsepower is that required at the hoist.

In an air installation where many tools and hoists are in operation the pressure varies at different parts of the line much more than it would when using an electrical supply. This variation results at times in a sudden raising of the load where the latter is balanced on a cylinder hoist, causing damage to the load where it is a mold in a foundry. As holding the load at any point by the electric hoist is not accomplished by a balance of pressure, or by a stroke, the advantage of the latter is obvious where delicate molds or hot metal are handled.

The selection and control of hoists in foundries is a subject offering almost as many diversities as there are different shops. The variety of hoists for this work has finally narrowed down to the air and the electric types except where the hydraulic hoist may be installed for very heavy work. The air hoist when in proper working order is ideal for foundry use as far as speed control is concerned, with a range from a hardly perceptible speed to one as rapid as desired. The prime result to be attained in a foundry control is slow speed at all loads, high speed being only of secondary importance except in special cases where the class of work may demand a very high ultimate speed, as well as a very slow initial one, and, generally speaking, the former should decrease as the capacity of the hoist increases. For instance, a 1-ton hoist might have an ultimate speed at full load of 20 ft. per minute, while a 1½-ton hoist need not exceed 15 ft. per minute, and a 2-ton hoist might be as slow as 10 ft. per minute, without in any way affecting the output of the gang working under it, as the higher capacity hoist usually indicates larger and more difficult work. Very good control can be obtained from one-quarter to full load, which will eliminate the necessity of the molder trying for a notch on the controller, which will lift at a slow speed any load that he may have on the hook. The proper foundry control should permit the lifting of any load up to and including full load at a desirably slow speed on the first notch of the controller.

The General Fireproofing Company, Youngstown, Ohio, announces that owing to the remarkable growth in its all steel furniture and Herringbone metal lath business, it has sold its entire bar and fabricated beam reinforcement business to the General Reinforcement Company, Youngstown, Ohio. This move has been made to gain necessary additional manufacturing facilities which will permit specializing along the metal lath and furniture lines in which the General Fireproofing Company is a pioneer.

Waddill Catchings, receiver of the Central Foundry Company, 90 West street, New York, announces that the published adjudication in bankruptcy of that company and the proposed meeting of creditors do not interrupt the continuance of the business, simply being steps toward the carrying out of the reorganization, now rapidly progressing, under which the business and property are to be freed from the bankruptcy court. It is expected that the reorganization will shortly be completed. Meanwhile orders will be received and filled as heretofore.

* Abstracted from a paper presented at the meeting of the Chicago Foundry Foremen's Association, March 16, 1911.

† Sprague Electric Company, Chicago, Ill.

The Almond Tool Holder

A Universal Tool Set for Lathes, Planers and Shapers

In a set consisting of a single holder and 13 or 15 tools, the T. R. Almond Mfg. Company, Ashburnham, Mass., is offering a new tool equipment covering practi-

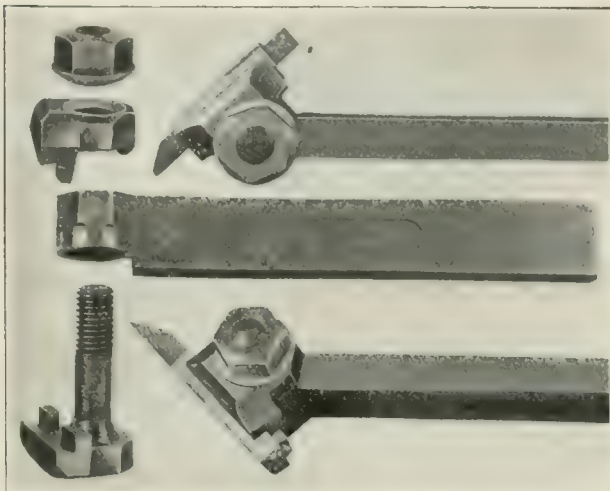


Fig. 1.—The Tool Holder Made by the T. R. Almond Mfg. Company, Ashburnham, Mass., Showing the Unassembled Parts and the Holder Made Up as a Right-Hand Offset Side Tool and a Left-Hand Offset Turning Tool Using a Bushing.

cally all the requirements for lathes, planers and shapers of moderate size. Compared with single purpose holders it has a much greater range of application, and the shapes required for the tools are more readily ob-

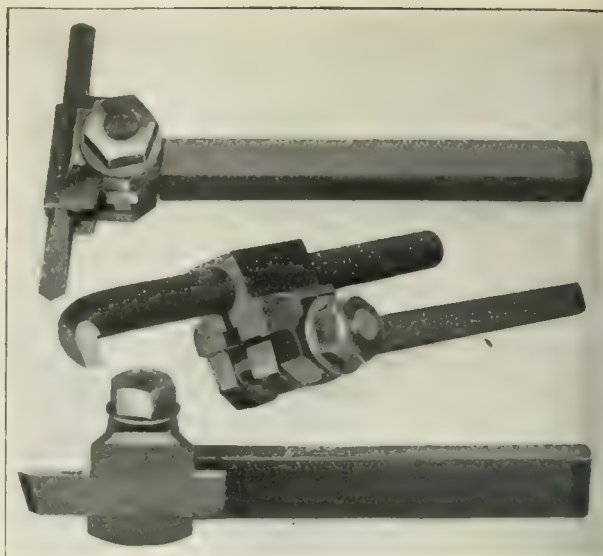


Fig. 3.—The Spotting or Centering Tool in the Straight-Across-the-Front Position, the Large Boring Bar in Left-Hand Side Position, and a Threading Tool in the Right-Hand Side Position.

the holder in one case is set up with a side tool in the right-hand off-set position, and in the other with a turning tool in the left-hand off-set position. In this view are also shown the unassembled parts of the holder. It will be seen to consist of but four parts, the shank, bolt, clamp and nut. The end of the shank is formed with octagonal faces against five of which the five different positions are obtained. Between the beveled or dove-tailed faces on the head of the bolt and the clamp, the different tools are secured and the clamping action causes the side of the tool to bind against one of the octagonal faces of the shank to hold it rigidly. The octagonal faces on the head of the bolt, fitting against the shoulder

of the shank, further add to the rigidity. One of the principal advantages of the holder is that it leaves the tool exposed on the cutting side, giving an open face that allows working up into shoulders and in corners of irregular work without interference of the tool or holder.

The tools, or the bushings in which they are held, as the case may be, have beveled faces to correspond with the dove-tail recess formed between the bolt-head and the clamp. The bushings just referred to are such as are used to secure square or round tools in the holder, and may be seen in Fig. 2, which shows the tools furnished with the holder. These will be seen to consist of right-hand, left-hand and round nose square



Fig. 2.—The Tools and Bushings Furnished with the Almond Tool Holder.

tainable than those for most multi-purpose holders. The holder is not only capable of holding a variety of tools but will hold them in any one of five different positions. Two of these positions are shown in Fig. 1, where

turning cutters, which, according to the side of the holder on which they are used, are clamped in either bushing C or D; right and left hand side tools, narrow and wide cutting-off tools, rough and finish threading tools, all

of which are held directly in the holder without the use of bushings; a small boring bar, a spotting or centering tool and an inside threading tool, all of which are held in a split bushing B, and a larger bar for which a larger bushing, A, is furnished. The bushings are of such a nature that the tools, when placed in them and assembled in the holder, are clamped on all sides. All of the tools above referred to are made from merchant bar stock, but it is recommended that for high speed rough turning two additional high speed steel cutters, Nos. 14 and 15, Fig. 2, be included in the equipment. These are right and left

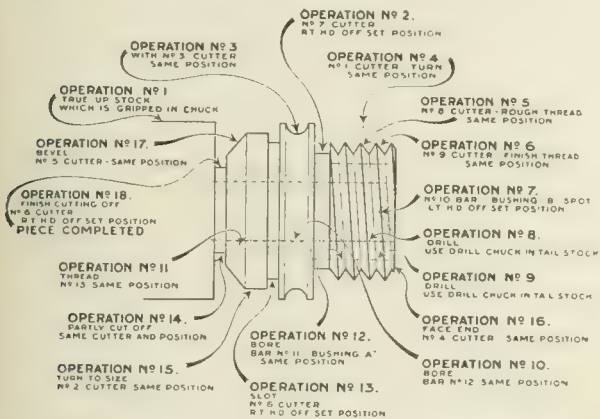


Fig. 4. A Job Completed with the Almond Tool Holder, Using Practically Every Cutter in the Set.

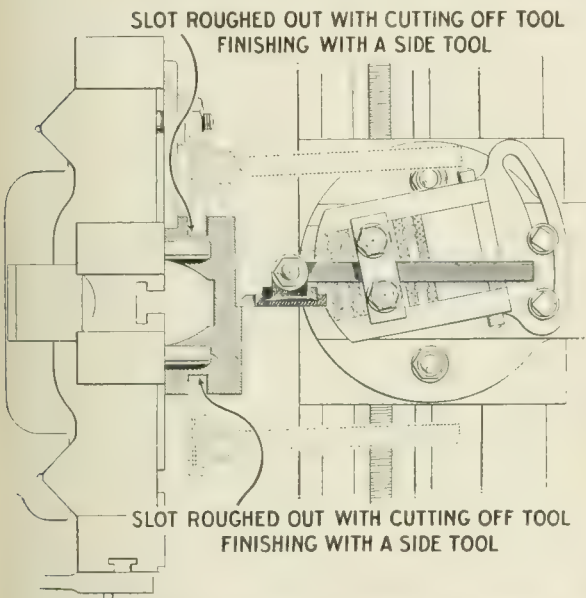


Fig. 5.—A Planer Job Involving Two Positions and Three Cutters of the Almond Tool Holder.

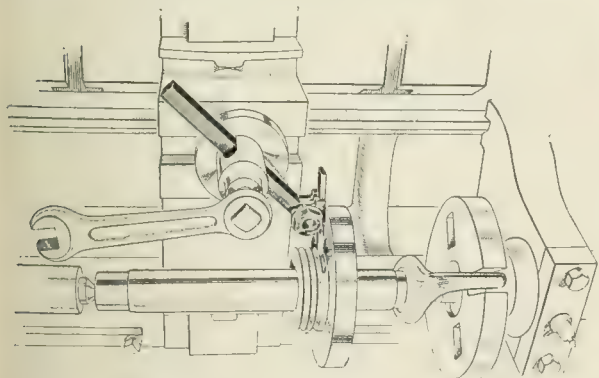


Fig. 6.—Threading Close to a Shoulder with the Almond Tool Holder.

hand turning cutters, and are made similar to the right and left hand side tools, but with the cutting points ground curved and with top rake. This design of cutter gives $\frac{3}{4}$ in. of metal to back up the cutting point and take away the excessive heat due to high speed work.

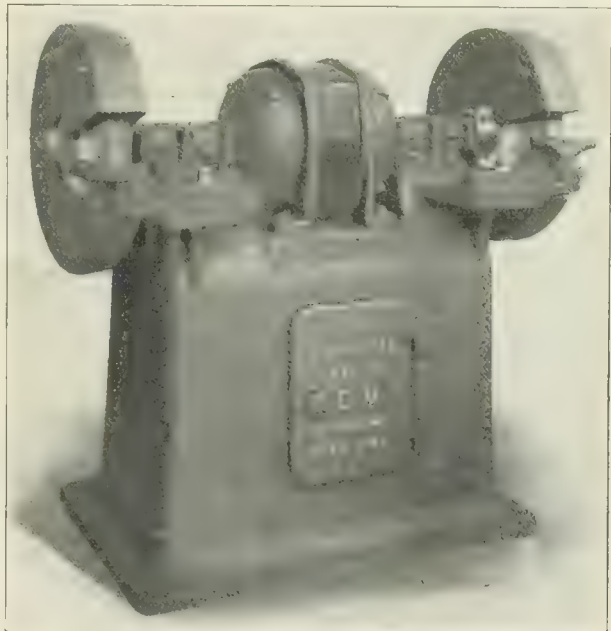
The use of the bushings is indicated in the instance of the left-hand off-set turning tool assembly as shown in Fig. 1 and the spotting tool and large boring bar as-

semblies in Fig. 3. Between Figs. 1 and 3 may be seen all of the five adjustments of the holder, namely, right and left hand side positions, right and left hand off-set positions, and the straight-across-the-front position. It is preferred that the last named position be used only where the cut is to be a light one, as in that position the cutting thrust exerts a torsional moment on the shank and the hold in the tool post depends entirely on the set screw. Any style or shape of cutter may be held in the holder and if necessary special cutters may be filed quickly into shape so that they may be used directly, or commercial sizes of rounds or squares are available fitting the bushings.

Fig. 4 shows a piece of work upon which practically every cutter in the complete set is required. The operations are explained by the inscriptions on the engraving. Figs. 5 and 6 are typical jobs indicating the advantages of the holder. Fig. 5 shows a planer job where the holder is being used with a turning tool to plane across the top and with the same setting of the work the slots in the side have been previously cut when the tools were held as indicated by the dotted line positions, the roughing being done with cutting-off tools and the finishing with side tools. Fig. 6 shows an example of threading up close to a shoulder indicating the advantage of the open face at the cutting point of the tool. The same advantages are obtained when working the side or cutting-off tools.

The New Springfield Dry Grinder

A new direct connected motor driven dry grinder is being built by the Springfield Mfg. Company, Bridgeport,



A New Direct Connected Motor Driven Grinder Built by the Springfield Mfg. Company, Bridgeport, Conn.

Conn., in three sizes. The motor is practically entirely inclosed and is mounted on a very heavy and substantial base to absorb all the vibration possible. The bearings are both large and long and run in self-oiling boxes.

The following table gives the principal dimensions and specifications of the three sizes:

	BM	CM	DM
Diameter of grinding wheels, inches	12	18	24
Thickness of grinding wheels, inches	2	2	3
Distance between wheels, inches	35 $\frac{1}{2}$	38 $\frac{1}{2}$	43 $\frac{1}{2}$
Height of spindle center from floor, inches	36	36	36
Length of spindle, inches	45	48 $\frac{1}{2}$	57
Length of bearing, inches	10	11	12
Diameter of spindle in bearings, inches	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2 $\frac{1}{4}$
Diameter of spindle between flanges, inches	1 $\frac{1}{4}$	1 $\frac{3}{4}$	2
Size of motor, horsepower	2	3	5
Floor space, inches	21 x 45	24 x 48 $\frac{1}{2}$	26 x 57
Weight of complete machine, pounds	1,050	1,400	2,060

The grinders can be furnished with or without safety hoods, as may be desired, and wheels having a greater face width can also be accommodated when the hoods are not used.

White Irons and the Prevention of Growth in Castings

Prof. H. C. H. Carpenter delivered an address on "The Growth of Cast Iron" at a meeting of the Birmingham Metallurgical Society and the Birmingham branch of the British Foundrymen's Association, held at Birmingham, Eng., February 24. His discussion of the subject was in part on the lines followed in the paper prepared by Prof. H. F. Rugan and Professor Carpenter for the autumn meeting of the Iron and Steel Institute in London in 1909. A synopsis of this paper was given in *The Iron Age* of October 7, 1909, page 1086. In connection with it was printed a comment from A. E. Outerbridge, Jr., Philadelphia, who was the first to call attention publicly to the increase in the volume of cast iron after repeated heatings. Mr. Outerbridge advanced the explanation that this change in volume is a molecular and not a chemical one. Professors Rugan and Carpenter took issue with him on this point; also with his statement there was no increase in weight through the repeated heatings of gray cast iron.

Professor Carpenter's recent address at Birmingham, in which he gave the results of his further experiments with cast iron, shows that he agrees in part with Mr. Outerbridge on one point on which issue was taken with the latter in the Rugan-Carpenter paper. In that paper the authors said:

The author's experimental results with these two alloys (A. and M. white irons) are in disagreement with his (Mr. Outerbridge's) opinion that "white iron in which nearly all of the carbon is in the combined form does not expand sufficiently to overcome the original shrinkage, even after all of the combined carbon has been changed to graphite"; and conclusively show that it does.

In the report of Professor Carpenter's Birmingham address, given in the *London Ironmonger* of March 4, 1911, the following appears:

Manganese exerts an important influence on iron, as is shown in the white irons; it keeps the carbon in the combined state, it makes it stable and prevents the deposition of temper carbon. It also makes carbon irons tougher and less brittle. He (the speaker) had been able to prepare white irons containing a considerable amount of manganese which, while not as fusible as ordinary gray iron, are very much more fusible than mild steel, and which possess a further valuable property in that they do not deteriorate by repeated heating but rather improve in their mechanical qualities, particularly as regards their tenacity. Irons made according to his specification after being heated for four hours at 900 degrees C. 150 times had not only not grown, but had contracted—from $\frac{1}{2}$ to 1 per cent.

It would seem, therefore, that Professor Carpenter's experiments with white iron have brought him to the same conclusion originally reached by Mr. Outerbridge, though Professor Carpenter confines it to white iron containing a considerable percentage of manganese. In fact, Mr. Outerbridge, in commenting upon the Rugan-Carpenter paper, showed that the authors' own tables of expansion of the white iron series A and M proved that the bars did not expand sufficiently to overcome the original shrinkage.

In discussing the subject at Birmingham, Professor Carpenter called attention to the practical value of some means of preventing the growth of cast iron. One remedy he suggested for the difficulty was the employment of white iron. On a former occasion he had suggested the use of iron containing about 3 per cent. carbon, low silicon and small quantities of other elements, but it had been held that that material was still unsuitable for ingot molds for steel works. He did not think it possible so to treat a gray iron that it would not grow. Mild steel, on the other hand, is too expensive. An iron must be used with sufficient carbon to be fusible, yet not high enough in carbon to deposit temper carbon on heating. It must not be brittle. After working on the problem for 18 months he believed he had solved it. He was not in position, he said, to explain the details, but would give these in a paper to be prepared for the May meeting of the Iron and Steel Institute. He was willing to say that the solution of the problem turned on the quantity of manganese present in the alloy.

Advantages of Long Stroke Motors for Commercial Vehicles *

Opinions differ as to the proper length of stroke for automobile and motor truck engines. An engine having a cylinder 11 in. in diameter and a stroke of 15 in., built 15 years ago, was recently superseded by one in which the dimensions were 10 and 18 in., respectively. This engine weighed about 1500 lb. less than the former one and was built for 25 hp. at a speed of 265 rev. per min. or a piston speed of 795 ft. per minute. A thorough test showed that this engine would develop 40 hp. on a smaller fuel consumption than the earlier one would develop 22 hp. and that the efficiency of the newer engine continued to increase until the piston speed reached 850 ft. per minute.

The advantages of the long stroke over a short one in an engine are less weight for a given horsepower, longer life, greater fuel economy, need of less radiating surface, smoother running and less noise. A 4×4 in. motor of modern construction if made $4 \times 5\frac{1}{2}$ in. will have as long life and an increase in power of from 25 to 35 per cent. at the same speed with an increase of only 5 to 10 per cent. in weight. Increasing the piston speed of a short stroke motor to that of a long stroke motor will not have the same effect for more power will be required to drive the motor itself. A long stroke motor of a given horsepower has a smaller cylinder diameter and as the initial pressure per square inch on the piston head is practically the same in either type of construction, the total pressure on the head and the shock caused by the quick expansion of the gases at the beginning of the stroke will be less in the smaller diameter motor.

Practically all the parts in the short stroke motor except the piston must move faster and this together with the greater number of reversals of direction of reciprocating parts per unit of time gives more wear.

The heat units from the fuel are expended in frictional losses, radiation losses, exhaust losses and useful power. In a short stroke engine the friction loss is greater on account of the greater number of strokes for the same piston speed and the radiation losses are greater due to the larger amount of exposed wall surface in the compression chamber. With the longer stroke motor the compression can be increased over that of the short stroke type without any of the bad effects or disadvantages of too high compression. The more gases are expanded the less the heat which will be carried off through the exhaust and in a long stroke motor the pressure of the exhaust gases will be lower. Smoother running and less noise are secured in a long stroke motor as the number of revolutions for the same piston speed is less than in a short stroke motor and the noise must necessarily be increased when the motor is running at a greater number of revolutions on account of the increased speed of opening and closing valves and the movement of the other parts of the motor.

The proper ratio of stroke to bore depends upon the work for which the motor is to be used, and the best practice is to use the longest stroke possible consistent with a smooth running engine for stationary work and where the speed varies to have the stroke such that the piston speed will be at a point showing the greatest efficiency at the number of revolutions per minute at which the motor is most commonly used.

The Empire Iron & Steel Company, manufacturer of black and galvanized sheets, Niles, Ohio, has been authorized by the stockholders, at a meeting held March 9, to increase its capital stock from \$200,000 to \$1,000,000. Statements which have appeared in the press referring to this company as an auxiliary to the Garry Iron & Steel Company are wholly incorrect, the Empire Company being an independent corporation. The officers are as follows: President, George D. Wick; vice-president, Samuel Siddall; treasurer, J. D. Waddell; secretary, P. H. Hubbard, and assistant secretary, D. W. Kerr.

* Abstract of a paper read at the January meeting of the Society of Automobile Engineers, New York City, by Edward A. Myers of the Model Gas Engine Works, Auburn, Ind.

New Tools and Appliances

This is essentially a news department for which information is invited.

Duplex Vertical Miller.—The Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa., has recently designed and built a large duplex type of vertical milling machine for use in milling the faces of the gates for the Panama Canal, although it can also be employed for handling large structural work. The two columns are independently driven by 20-hp. motors having a speed range of from 450 to 1350 rev. per min. and the motion is transmitted from the motor through a pinion and intermediate gear to the large driving gear which is mounted on a horizontal shaft at the side of the upright near the base. This horizontal shaft connects through bevel gearing with a vertical spline shaft which drives the spindle by worm gearing. As is customary in all machines of this type built by this company, the worm wheel has a bronze ring and the driving worm is of hardened steel and both are incased for continuous lubrication. The spindle saddle has square locked gibbed bearings on the uprights and the adjustments for the alignment are made on one shear of the column face. The saddle is counterweighted and a fast vertical adjustment actuated by power and controlled by a conveniently located lever is provided. Power for this traverse is obtained from the vertical spline shaft which extends to the top of the column through a horizontal shaft with a lead screw located in the center of the column. A double train of bevel gears connecting the vertical spline shaft with the intermediate horizontal shaft on top of the column enables the rapid traverse to be reversed. The drive for the feed motion is taken directly from the cutter spindle through spur gears, a worm wheel and two horizontal shafts. One rate of feed only is available at a time, but it is possible by employing a sufficient number of change gears to secure feeds ranging from 0.035 to 0.321 in.

Variable Speed Transmission.—A novel type of gearless variable speed transmission has been brought out by the Fellows Direct Power Transmission Company, Los Angeles, Cal. The driving shaft is directly connected to the engine and has a crank transmitting power through a connecting rod and lever to the gripping device. The grip device which is keyed on the driven shaft consists of a grooved steel disk with a pair of grip ring rocker plates mounted on either side and free to oscillate on the bosses. Eight pins spaced at equal intervals around the rim of these rocker plates have dogs or wedge blocks mounted upon them. The inner ends of these blocks are turned to an arc of a circle whose radius is slightly greater than the distance between the edge of the blocks and the holding pin. These dogs fit into a V in the grooved steel disk keyed on the driven shaft, and in their normal position are radial and just touch the groove. As the radius of the turned ends is greater than the point on which they are swung, these dogs will grip the disks if they are swung slightly in either direction. In this way the driven shaft can be revolved in either direction by swinging the wedge blocks in the proper direction without shutting down the machine. In operation it is customary to use at least three of these transmissions mounted in a set to secure absolute continuity of rotation and it is claimed that from 97 to 98 per cent. of the power imparted to the transmission will be delivered by it.

A 15-In. Double Back Geared Lathe.—The Carroll Jamieson Machine Tool Company, Batavia, Ohio, is building a 15-in. lathe with double back gears and an improved quick change gear arrangement. This tool is designed for handling an extensive range of work without loss of time in making changes, adjustments, &c. The arrangement of the feed gear box mechanism is such that 30 changes are available for either turning or screw cutting in both directions without the removal of a gear by simply operating one knob and one handle. All the feeds are friction controlled, and the finest is 0.0045 in. The cross slide has ample bearing surfaces, and is fitted

with a taper gib. Power cross feed is provided, and the cross feed screw and that for the compound rest have graduated collars. A three-step cone pulley and a 2½-in. belt are employed for driving. The ratios of the double back gears are 8 to 1 and 3 to 1. In designing this tool all the details have received attention, and all the gears are well guarded.

Hydro-pneumatic Pressure Blowers and Vacuum Pumps.—The Nash Engineering Company, 248 Gates avenue, Brooklyn, N. Y., has brought out a hydro-pneumatic pressure blower and vacuum pump, in which all the displacing and joint forming functions are performed by a liquid. The blower consists of the rotor, which is a simple casting having blades cast integral with it, an elliptical casing and an end plate. The casing is filled with water, and as the water and the wheel revolve together, the former follows the casing walls and at first recedes from the rotor, leaving spaces between the blades into which air is drawn. During the next step in the operation, the water is forced back into the wheel spaces, and the air which has entered through ports in the casing is compressed and driven out through the outlet ports.

Double Geared Traction Engine.—The Woods Brothers Thresher Company, Des Moines, Iowa, has developed a double geared type of traction engine. This engine is built with a center crank and two gear trains, one on each side. The special advantages claimed for this construction are the elimination of all side strain and the development of the maximum tractive effort.

Automobile Transmission.—The Coventry noiseless gear box for use on motor trucks and commercial vehicles, shown at the recent Automobile Show in New York, is handled in this country by S. Hoffnung & Co., Ltd., 116 Broad street, New York City. The gear box is capable of transmitting 30 hp. at 1000 rev. per min. The top speed is a direct drive from the engine, the second speed has a reduction of 1 to 1.56 with relation to the engine, the low speed a reduction of 1 to 3.16 and the reverse which is driven by spur gears has a reduction of 1 to 3.37. Three Coventry noiseless chains are involved, each having a pitch of ½ in., and the distance between shaft centers is 5.678 in. The gear box is claimed to be of very high efficiency (91 per cent. on full load is guaranteed), and to be absolutely silent running except on the reverse, which is driven by spur gears. It is also declared to have a much longer life than an ordinary spur gear transmission. This type of box has been extensively used by the London Omnibus Company, and all of its latest buses are equipped with it. It is patented in England, and patents have been applied for in this country.

A Portable Grinder With Swing Frame.—The Safety Emery Wheel Company, Springfield, Ohio, has developed an electrically-driven grinder which can be mounted on a pair of steel wheels, equipped so as to be handled by a traveling crane or mounted on a trolley suspended from an I-beam. A 5-hp. motor drives the grinder spindle through a 5-in. belt. Although the machine weighs 1800 lb., it is perfectly balanced so that one man can handle it easily. The motor and the wheel head are supported at opposite sides of a shaft which is free to swing in its bearing in the supporting member but is kept in balance by an adjusting screw which takes care of any variation due to the wear of the wheel. The wheel used is 24 in. in diameter and 3 in. thick. The diameter of the spindle is 2¼ in. in the wheel and ¼ in. less in the bearings which are 5¼ in. long. If safety collars are employed for the grinding wheel, its thickness is reduced 1 in.

Pipe Cutting Tool.—The Taylor-Wilson Mfg. Company, McKees Rocks, Pa., has developed a new tool for cutting pipe in the lathe in which the cutting blade is fastened to the body by two screws and a steel disk located at a suitable angle above the cutting line is adjustably mounted on the frame to accommodate the various sizes handled. This disk nicks the pipe and also prevents the tool from entering the cut too rapidly. Pipe or tubing ranging from ¾ to 12 in. in diameter can be cut at almost any distance from the chuck, thus doing away with the necessity for a steady rest or work support.

The Machinery Markets

Railroads are becoming more active in their machinery demands in some sections. The Illinois Central has a \$50,000 list out in the Chicago market, and the Wheeling & Lake Erie Railroad is asking for bids against a small list. New England machinery men are interested in plans of the Boston & Maine Railroad, which has purchased a large tract of land near Lowell, Mass., as a site for a \$3,000,000 repair shop system. The automobile interests are buying in Chicago, and the International Harvester Company has placed some orders against its extensive requirements. Business in Cleveland is hardly holding its own. Some manufacturers there are making tools for stock. The sales outlook for heavy machinery and mining equipment is encouraging in that market. Better reports come from St. Louis where business is improving noticeably. Shop extension plans are bringing out inquiries for large requirements and an excellent single tool business is being done. In Cincinnati the general situation is unchanged, but boilermakers are receiving as much business as in any corresponding season since 1907. Quarry developments are attracting attention in the South and good prospective trade is in sight. Government requirements and mining developments are contributing to the machinery demand on the Pacific Coast. In Texas attention is directed toward the cotton industry, and, judging from the extensions planned and the repair work contemplated, the cotton machinery business promises to be particularly good. Buying is irregular in New York and Philadelphia.

New York

NEW YORK, March 20, 1911.

New inquiries are not plentiful in the New York machinery market, and business was more dull during the last six days than it has been in several weeks. The market seems lacking in snap. Buyers are cautious about placing orders and show a disposition to reconsider their needs. People who have received bids from the trade on machinery requirements are shopping about a great deal and haggling over terms in a manner that indicates they feel they can obtain concessions. This marked hesitancy on the part of prospective buyers has unsettled the market. On the other hand, many machinery houses are busy enough in filling orders placed early in the month and consequently the slight lull now apparent is not bothering them much. The Ontario & Western Railroad has placed a few orders against the list it has out, and a machine shop in Jersey City has been buying lathes and planers. While the machine tool demand on the whole is good, dealers are having no difficulty in getting deliveries from the factories. As a matter of fact, makers of some lines of machine tools, especially milling machines and planers, who were somewhat behind in their orders eight weeks ago, now announce that they have machines in stock for immediate delivery. The export demand is unusually active and promises to continue good. Charles A. Schieren, Jr., of the Charles A. Schieren Company, manufacturer of leather belting, who recently returned from Europe, says in this connection that the outlook there for future business, in Great Britain and Germany especially, is excellent. The demand for leather belting and machinery is steadily and conservatively growing in those markets, and industrial developments now under way in Germany promise to bring out an increased call for mechanical equipment. New York houses dealing in mining equipment report that they are forwarding shipments to Mexico regardless of the disturbances there, and from all accounts mining operations in that country have not been greatly interfered with. There are some good Japanese inquiries out, principally for power machinery, and orders for nearly \$20,000 worth of machine tools were placed for a German account through the New York branch of a foreign house this week.

The American Bank Note Company has inquiries out for a large amount of machine tools to be delivered to its new plant at Hunters Point, N. Y. The list consists principally of metal working machinery, and the requirements include a general assortment of machine tools. The company is also buying a line of special machinery, most of which is being built to order.

The De Laval Steam Turbine Company, 165 Broadway, New York, is planning to erect extensive additions to its plant at Trenton, N. J., which will entail an expenditure of \$25,000. The addition includes a brick and steel machine shop, 51 x 120 ft.; a storeroom, 60 x 80 ft., and a testing room, 51 x 80 ft., all one-story structures. The list of machinery requirements is now in preparation.

W. S. Rockwell of the W. S. Rockwell Company, 50 Church street, New York, and Martin M. Kalman, are arranging for the location of a plant in the Pittsburgh district for the manufacture of steel car wheels by a new casting process. The W. S. Rockwell Company controls the necessary patents and Mr. Rockwell will superintend the construction and equipment of the plant.

The Public Service Corporation of New Jersey, whose

main offices are in Newark, has been authorized to issue \$50,000,000 5 per cent. general mortgage bonds, of which \$13,850,000 has been subscribed. Of the money raised so far \$10,000,000 will be spent in extensions and improvements. Plans are now being made for additions to the company's power stations and extensions to its lines throughout northern New Jersey, which will entail heavy purchases of mechanical equipment.

The Radio Reflector Company, 352-362 West Thirteenth street, New York, has established a department in designing and building special machinery, including die making and tool making to order.

The D. A. Alexander Company, 37-39 Andrews street and 92-94 Mill street, Rochester, N. Y., mechanical engineer and contractor for automatic sprinkling systems, steam power plants and heating and sanitary engineering, is in the market for two pipe machines, 8 and 2 in.; one 3-hp. and one 5-hp. motor and one upright drill. It is putting in new stock. Mr. Alexander was formerly of the Wright & Alexander Company, Inc. Mr. Wright will continue the business of the old company.

The laboratory building of the Cyphers Incubator Company at Fourth and Court streets, Buffalo, N. Y., was damaged by fire March 18 to the extent of \$50,000. It will be rebuilt and equipped.

The Rome Wire Company, Rome, N. Y., is completing an addition to its plant of steel brick and concrete, which will be used for the manufacture of Romeoid electric wires, bare and insulated. Considerable new machinery will be installed.

Chicago

CHICAGO, ILL., March 21, 1911.

Business is still below normal though some encouragement is found in this week's market. No large transactions are reported, but an improvement is felt in both inquiries and sales. Purchases for the new plant of the Peerless-V-Belt Company, at Cedar Rapids, Iowa, are reported to have been made. The Moline Pressed Steel Company, Moline, Ill., has bought \$2200 worth of machinery, and the Four Wheel Auto Drive Company, Clintonville, Wis., was also a buyer in this market. The International Harvester Company has purchased about \$4000 worth of machinery for the Deering and McCormick plants, and its outstanding lists still approximate about \$70,000. No large railroad transactions have been closed in the machinery market. The Illinois Central Railroad is out with a list approximating \$30,000.

The Osborne High Pressure Joint & Valve Company, Chicago, has increased its capital stock from \$200,000 to \$300,000.

The Art Metal Fire Proof Door & Trim Company has been incorporated at Chicago with \$20,000 capital stock to manufacture metal goods. The incorporators are Thomas P. Shean and Joseph O'Reilly.

Schlick & Johnson, Chicago, have plans prepared for a four-story addition, 100 x 125 ft., to its factory building at 1737 North Paulina street.

The Regal Music Instrument Company, Chicago, has plans prepared for a two-story factory building, 75 x 152 ft., to be erected at Grand and Sawyer avenues. Postle & Mahler are the architects.

Jenney, Mundie & Jensen, architects, Chicago, have plans completed for a five-story factory building, to be erected by

THE MACHINERY MARKETS

A. H. Loeb, at the southeast corner of Twenty-second and La Salle streets, which will be occupied by the Troy Laundry Machinery Company. It will be erected at a cost of \$115,000.

Bids will be received by the Water Department of the city of Rockford, Ill., March 27, for deep well pumping machinery, electric motors and appurtenances, and pump vaults.

The Freeport Gas Machine Company, Freeport, Ill., maker of gas machines, has purchased additional property upon which it will erect a new four-story factory building of fireproof construction.

The Perfect Stove & Mfg. Company, Belleville, Ill., recently incorporated with \$10,000 capital stock, will manufacture a complete line of steel ranges and do a general foundry jobbing business. The company will erect a foundry building in about 30 days, which will be equipped with a cupola, cleaning mills and other foundry equipment. The company desires to hear from parties wanting stoves or castings of any kind manufactured.

The Union Iron Works, Decatur, Ill., manufacturer of elevating, conveying and transmitting machinery, is having plans prepared for a new foundry, 60 x 154 ft.; machine shop, 50 x 135 ft., two stories, and a two-story warehouse and woodworking machinery department, 80 x 80 ft.

The Russell Automatic Gas Machine Company has been incorporated at Rockford, Ill., with \$150,000 capital stock by Nelson J. Russell, R. B. Russell and A. G. Parmele.

Sun Prairie, Wis., has voted to issue bonds in the sum of \$8000 for the installation of an electric lighting system.

Wausau, Wis., is considering the installation of a municipal lighting plant.

Mishicot, Wis., is planning to establish a municipal lighting plant.

The citizens of Waseca, Minn., will vote at the April election on the question of issuing bonds in the sum of \$15,000 for improvements to the electric light plant and water works system.

Perry W. Hearn, Webster City, Iowa, together with the local Commercial League, is interested in the establishment in that city of a large sewer pipe and drain tile plant. The plant will be what is known as a two-press shop, and will require a building, 100 x 400 ft., for drying sheds; a machinery room, 80 x 90 ft.; engine and boiler room, 70 x 80 ft., and a clay storage shed, 90 x 300 ft. Besides these buildings, the proposed plant will require 20 large dry kilns for burning pipe, equipped for using oil or coal, as circumstances may require. The following equipment will be required: Two sewer pipe presses, together with necessary fittings for making pipe from 4 to 36 in.; three sets of wet pans, two dry pans, two piano-wire clay screens, elevators for dry clay and mud, two power elevators, six gravity elevators, trucks and wagons, belting, shafting, pulleys, steam heating system requiring five or six miles of 1½-in. steam pipe, two blowers with engines, steel for kiln bands for 20 kilns, kiln lugs, six 150-hp. high pressure boilers, one 400-hp. Corliss engine, &c.

Palmer & Co., Sioux City, Iowa, will erect two large fruit warehouses, together occupying a space 100 x 150 ft., in which elevators will be installed.

The Jacob Kirschner mill at Fort Dodge, Iowa, was destroyed by fire March 10, causing a loss of \$10,000.

The Rock Island Railroad Company's elevator at Council Bluffs, Iowa, was destroyed by fire March 8, together with seven freight cars, causing a loss of \$15,000. The insurance is about \$7,500.

New England

BOSTON, MASS., March 21, 1911.

The market changes little from week to week. The dealers are doing a steady though not an especially brisk business. Rumor has it that the United Shoe Machine Company is planning further extensions to its great works at Beverly, Mass. A large amount of second-hand machinery is going on the market as a result of this company's purchase of the Wonder Worker Shoe Machinery Company's several works, which contained much that would not be selected for installation in shops such as those at Beverly. The Watertown Arsenal is making preparations for the manufacture of the disappearing gun carriages for the fortifications in the Panama Canal zone, but it is not supposed that new equipment will be required; in fact, the present buildings have room for additional machinery. The navy yards at Charlestown and Portsmouth have felt the effect of the consolidation of manufacturing departments, not on all of the equipment is the various shops being required, which precludes the possibility of any material lists from these sources for some time to come. The most important news of the week is the announcement by the Boston & Maine

Railroad of the purchase of a large tract of land at North Billerica, Mass., near Lowell, which will be the site of the great repair shops. They will be built immediately and will cost equipped \$3,000,000. This is in addition to appropriations of \$150,000 for improvements of the repair shops at Lyndonville, Vt., and \$250,000 for the shops at Concord, N. H. In the machinery market prices are being well maintained. The second-hand dealers are not anxious to make sacrifices. In fact, the demand for used machinery is pretty good, everything considered.

The site which the Boston & Maine has acquired at North Billerica, Mass., is on the Southern division, a little less than 22 miles from Boston, and within a few miles of Lowell. The tract contains 550 acres, admirably adapted in grade, soil and geographical location to the purposes to which it will be put. The work of clearing the land will begin immediately, and the erection of the shops will start in the spring, so that the company should be in the market for very long lists of machine tools, cranes and general equipment during the year. Originally it was understood that the appropriation of \$3,000,000 for repair shops included other expenditures, especially the \$400,000, which will be needed for the enlargements and re-equipments of the Lyndonville and Concord repair shops. But such is not the case. North Billerica will get the entire \$3,000,000, with which a group of great buildings will be constructed, having every facility for taking care of locomotive and shop repair. The new building at East Somerville, Mass., which was planned as the original unit of the new works, will be continued as a running repair shop.

The announcement is made that the Orson Automobile Company, New York, with works at Springfield, Mass., will largely increase the capacity of its works. The company consists of 100 stockholders, men prominent in New York business life, and the first cars were taken by these gentlemen for their own use. The purpose is to enter the market in a commercial way, which will mean large extensions of the present shops.

The Whitin Machine Works, Whitinsville, Mass., manufacturer of textile machinery, will build an addition to its foundry, 100 x 500 ft. The present foundry, erected three years ago, is 200 x 500 ft. The new building will be between it and Mumford River. It will be of brick with steel frame and roof.

The machine shop of John W. Burns, Claremont, N. H., was burned March 14 with a loss of \$10,000.

The Meriden Fire Arms Company, Meriden, Conn., manufacturer of fire arms, is building a brick addition, 40 x 125 ft., which will be used for the manufacture of tools, the purpose being to have a complete plant independent of local shops.

The Stewart Boiler Works, Worcester, Mass., will build a battery of seven boilers of a new design for the Ann and Hope Mill, Lonsdale, R. I. They will replace seven boilers of the Corliss type, which is a vertical tubular design, with enough tubes missing to permit of the entrance of a man from the top, where there is a dome, which serves for the manhole and for the facing made necessary by the absence of tubes. The boilers will be of the same general design, but much heavier and of higher capacity, the weight of each being 28 tons and its horse power 300. The dome is done away with, a manhole in the top head being substituted. The design permits of some additional tubes.

The Worcester Welding Company, Worcester, Mass., has incorporated under Massachusetts laws, to do autogenous welding, with the purpose of specializing on a portable equipment with which it will do work in the plants of manufacturers. H. G. Wollison, Pittsfield, Mass., is the president and treasurer; F. D. Campbell, Worcester, clerk, and A. P. Lamothe, Worcester, is the third director.

Additions to general manufacturing works include the following: Royal Worcester Corset Company, Worcester, Mass., addition 55 x 165 ft., five stories; Canfield Rubber Company, Bridgeport, Conn., office and factory building, 40 x 150 ft., two stories; Doane-Williams Company, Wilimansett, Mass., three-story brick building, 50 x 300 ft.

The General Fire Extinguisher Company, Providence, R. I., will build an addition to its works at Warren, Ohio, consisting of a brick building 150 x 350 ft., to be used for a pipe shop. Considerable pipe cutting machinery will be installed. W. A. Nuracker, second vice-president of the company, is chairman of the committee having the matter in charge.

Cincinnati

CINCINNATI, OHIO, March 21, 1911.

There has been no appreciable change in the manufacturing situation here during the past week. In the machine tool line lathes seem to hold their own, but the demand for other tools is light. Manufacturers of the smaller sizes of generators and motors are enjoying an excellent business,

THE MACHINERY MARKETS

but the larger units of electrical machinery are moving slowly.

Boiler makers have experienced a let-up in repair work, but orders for new equipment are coming in fully as frequently as during any previous similar time of the year since March of 1907. Second-hand machinery shows a slight improvement. A few foundries are working at over 65 per cent. of capacity, but the majority are operating below this average about 15 per cent.

Secretary J. M. Manley of the Cincinnati Branch, National Metal Trades Association, has issued a report for three months ended March 15, showing manufacturing plants that are members of the association as operating up to 90 per cent. of capacity. The standard of 100 per cent. is taken for the quarter ended June 15, 1907. The March report is 1 per cent. below that issued December 15 of last year, but this slight decrease is attributed to the very dull holiday season. The lowest average shown since these reports were inaugurated was for the quarter ended September 15, 1908, which was 53 per cent. of the standard given above.

Under the guidance of Profs. A. M. Wilson and L. K. Frankel, the junior class of the Kentucky State University, Lexington, inspected a number of factories in Dayton and Hamilton, Ohio. The plants visited in Cincinnati and Oakley included those of the American Tool Works Company, Cincinnati Milling Machine Company, Cincinnati Bickford Tool Company, Cincinnati Planer Company, Triumph Electric Company, Bullock Electric Mfg. Company and the Cincinnati Gas & Electric Company.

The last meeting, until next fall, of the Foremen's Club, Cincinnati Continuation School, was held the evening of March 17. Prof. J. H. Renshaw, dean of the Continuation School, urged those present to keep up the enthusiasm started, and stated that he hoped and believed the attendance next fall would be even greater than it had been during the past season.

The large additions to the plant of the American Can Company, Hamilton, Ohio, are well under way and are expected to be completed by the beginning of the summer season.

Contract for the additions to the plant of the Superior Gas Engine Company, Springfield, Ohio, recently mentioned, has been awarded to C. Wise, 315 Dearborn street, Chicago, Ill.

The Otto Gas Engine Works of Philadelphia, Pa., has opened an office in the Carew Building, Cincinnati. C. A. Albrecht is in charge and will have as territory the entire Central West.

The Wetterer Brewing Company, Cincinnati, is contemplating making additions to its plant that will require some ice and cold storage equipment.

The Arctic Ice Machine Company has commenced the construction of a 35-ton ice plant for the Avondale Ice Company, Cincinnati.

The Charles Boldt Glass Company, Cincinnati, will spend about \$200,000 this year in doubling the size of its present plant in East End. Work on the additions, which will cover about two acres, has already been commenced. All building material and equipment have been contracted for.

New Lexington, Ohio, opened bids for a new water works system last week, but the name of the successful bidder has not yet been announced.

The Miami Power Company is a new Ohio incorporation, with the announced intention of erecting a large hydroelectric plant near Hamilton, Ohio. The incorporators are H. L. Handley and J. W. Durfue of Chicago, W. D. James, Detroit, Mich., and William Berger and John Reif, Overpeck, Ohio. It is stated that S. C. Landis of Hamilton can furnish all particulars.

The Putnam-Hooker Company, Covington, Ky., cotton goods manufacturer, will make some additions to its plant, including a large warehouse.

The Gebhart-Wuichet Lumber Company, Dayton, Ohio, is remodeling its plant. Kirk & Blum, Cincinnati, have contract for installing a large dust collecting system in this factory.

To mine coal and manufacture coke, the Harry B. Clark Coal Company has been incorporated at Fairmont, W. Va., with \$25,000 capital stock. The principal incorporators are Harry B. Clark, John A. Clark, Charles H. Waggener and F. E. Roby, all of Fairmont.

The O. O. Poorman Company, New Bremen, Ohio, machinery manufacturer and dealer, has increased its capital stock from \$30,000 to \$50,000, to take care of some proposed extensions in its business.

The Cincinnati Bronze & Aluminum Casting Company is a newly organized Cincinnati firm, and its foundry has been located in the western section of the city. Martin Burns, formerly foundry foreman for the Lunkenheimer Company, is the leading member of the new company.

It is reported that the National Cash Register Com-

pany, Dayton, Ohio, is in the market for a large lot of equipment for proposed additions, included in which are water tube boilers aggregating about 12,000 hp.

The American Sewer Pipe Company, Akron, Ohio, has commenced work on its new plant at Brazil, Ind., which it hopes to have ready for occupancy by July 1.

The City Council of Kenton, Ohio, is planning to establish a \$40,000 water works system.

Cleveland

CLEVELAND, OHIO, March 21, 1911.

Reports from the dealers indicate little activity in the local machine tool market. In fact, the volume of business in standard tools is scarcely holding up to that of a month ago. Orders are practically all for single tools, and few inquiries for lots of more than two or three tools are pending. Inquiries are better with some manufacturers outside of the standard line of machine tools, but a number are still engaged in making tools for stock. Inquiries for pneumatic tools and air compressors are very light. In handling machinery the outlook is more favorable. There is a fair and steady demand for small equipment, and some good business is in prospect in equipment for coal handling plants. There is good inquiry for water wheels, and the demand from the West for mining machinery has become quite active. The second-hand machine tool market is quiet.

The Wheeling & Lake Erie Railroad, through its general offices in Cleveland, has an inquiry out for the following machine tools: One 36-in. double back geared screw cutting engine lathe, 8-ft. bed, motor driven; one 24-in. heavy duty back geared crank shaper, with hand operated 16-in. swing cone arbor; one Acme 2-in. single head bolt cutter, with countershaft to cut $\frac{3}{8}$ to 2 in.; one 50-in. vertical drill, feeds positively geared, height about 9 ft., distance spindle to base 62 in., diameter of spindle $2\frac{7}{8}$ in., diameter of table 42 in.

The Beard-Stephan Company, Columbiana, Ohio, recently incorporated with a capital stock of \$10,000, will manufacture safety devices and an automatic weighing device. A site for a plant has been secured. W. G. Stephan of Cleveland is president of the company and C. E. Beard is secretary and treasurer.

It is announced that the American Can Company of New York will build a large plant in Toledo, Ohio, to replace its present quarters in that city, which have been outgrown. The company has acquired a large site at the head of City Park avenue, near the Lake Shore Railroad.

Plans for the new plant for the Warner Mfg. Company, Toledo, Ohio, are being prepared, and contracts will be awarded about April 1. The company has acquired a site, 532 x 600 ft., on Central avenue and along the Lake Shore Michigan Central Railroad tracks. Two large buildings, one two stories and the other one story, will be erected and will cover nearly the entire site. Both will be of reinforced steel and concrete. The company manufactures axles, motors, gear clutches and other automobile parts.

The Thatcher-Rueter Mfg. Company, which was recently organized and secured quarters in the Bradley Power Building, 112 Hamilton avenue, Cleveland, has opened a plant for the manufacture of dies, light metal stamping and sheet metal work. Some other lines will be added later.

The Ohio Electric Car Company, Toledo, Ohio, has prepared plans for a new plant, the erection of which it is expected will be started shortly. The new building will be 60 x 240 ft., with a wing 40 x 60 ft. It will be three stories, of mill construction.

With a capital of \$15,000 the Kenyon Searchlight Company, Bedford, Ohio, has been incorporated by P. Metzgar, R. H. McKay, P. C. Stoller, E. L. Kichley and Ralph B. Skeels.

It is reported from Sandusky, Ohio, that the Sandusky Foundry & Machine Company is about to close a deal for the purchase of the plant of the Warren Electric Mfg. Company in that city.

The Corux Company, Cleveland, has been formed by Christian F. Heinkel and others to manufacture special tools and appliances.

The American Tire & Rubber Company, Akron, Ohio, which was recently incorporated for \$200,000, has about completed a new plant for the manufacture of tires of all kinds. A reclaiming plant is also being built.

The Right o' Way Horn Company, Cleveland, has been incorporated with a capital stock of \$25,000 to manufacture automobile accessories. The incorporators are Ira E. Stump, Hugh Pease, W. H. Enyon, F. B. Kavanaugh and C. J. Benkowski.

The Osborn Mfg. Company, Cleveland, has increased its capital stock from \$100,000 to \$200,000.

THE MACHINERY MARKETS

Indianapolis

INDIANAPOLIS, IND., March 21, 1911.

The Motor & Mfg. Company, Indianapolis, has been incorporated with \$300,000 capital stock, to manufacture gasoline engines and motors. The directors are W. S. McDonald, J. Olias Vanier and G. R. Brown.

The Fairmount Glass Works, Indianapolis, has authorized an issue of \$100,000 preferred stock.

The Easy Trowel & Tool Company, Indianapolis, has been incorporated with \$5000 capital stock, to manufacture trowels and other tools. The directors are Chas. W. Fryburger, Samuel J. Rice and J. B. Runner.

The Indiana Electrotpe Company, Indianapolis, has been incorporated with \$15,000 capital stock; directors, C. A. Patterson, Joseph B. Fleck and John B. Fleck.

The Sheridan Brick Company, Brazil, Ind., has been sold to a new company that will spend \$25,000 in improvements. T. C. Hornaday is manager.

The Anderson Trust Company has been appointed receiver of the American Steel Wheel Company, Alexandria, Ind. The plant has been shut down nearly three years.

The Vigo County Clay Company, Terre Haute, Ind., has increased its capital stock from \$100,000 to \$180,000.

The German-American Stone Company, New Albany, Ind., has been incorporated with \$5000 capital stock, to quarry lithographic stone in Harrison County, Ind. The principal stockholders are R. W. Morris, postmaster, New Albany; William Mitchell, Chas. Dorsey, Edward Doherty, J. B. James, W. V. and P. C. Bulliet, all of New Albany, and Dennis J. Lincoln and William Ashbrath of Louisville, Ky.

The Haynes Auto Company, whose plant was recently destroyed by fire, at Kokomo, Ind., has increased its capital stock from \$600,000 to \$800,000.

The Globe Stove & Range Company, Kokomo, Ind., has increased its capital stock from \$250,000 to \$500,000.

The East Side Carriage Company, Indianapolis, has been incorporated with \$5000 capital stock, to manufacture vehicles. The directors are Marion O'Harra, J. W. Potter and C. A. Johnson.

The Superior Fluorspar & Lead Mining Company, Evansville, Ind., has been incorporated with \$50,000 capital stock, to develop the fluorspar field of Hardin County, Ill. Dr. P. H. McCoy, Evansville, is president of the company.

The H. G. Christmas Construction Company of South Bend, Ind., has the contract for the erection of one of the principal buildings of the Oliver Chilled Plow Company's new plant at Hamilton, Ont., the contract price being \$235,000.

The Northern Indiana Gas & Electric Company has been incorporated with \$5,000,000 capital stock. It is a consolidation of the South Shore & Electric Company, Indiana Harbor & East Chicago Electric Company, Plymouth Lighting Company and Whiting Electric Light Company. Clarence G. Geist, Philadelphia, is president; Samuel T. Bodine, vice-president, and Lewis Lillie, secretary.

The Remy Electric Company, Anderson, Ind., has redeemed the small amount of former preferred stock, has made a new issue of \$500,000 preferred and has increased its common stock to \$500,000.

The Portland Cement Tile & Block Company has been incorporated at Portland, Ind., with \$15,000 capital stock, to manufacture cement products. The directors are Joseph M. Minch, C. J. Beard and L. P. Beard.

The Sneath Glass Company, Hartfort City, Ind., has increased its capital stock to \$200,000.

The Ballard Cement Fence Post Company, Newcastle, Ind., has been incorporated with \$10,000 capital stock by George and G. M. Ballard and Edward Smith.

The Wabash Power Company of Logansport, Ind., plans to build a dam and power plant at Georgetown, Ind. Among the stockholders are Judge Quincy A. Adams of the Indiana Supreme Court, Logansport; Walter Osmar, former city engineer, and O. H. Binns, secretary of the Casparis Stone Company.

The Bedford Stone & Construction Company, one of the large contracting companies of Indianapolis, has increased its capital stock from \$100,000 to \$200,000.

The Waring Glove Company, Decatur, Ind., which also has plants at Huntington and Rochester, Ind., is to have a fourth at Wabash, Ind., which will erect for the company a stone building of two stories, 50 x 100 ft.

The National Boat Company has purchased the Western Launch & Engine Works of Michigan City, Ind. The plant is to be improved and may be equipped for shipbuilding.

Herbert Epperson, son of James Epperson, Indiana State Mine Inspector, has been appointed to superintendent the electrical mining machine and drill display of the Linton, Ind., Mining Company at St. Petersburg, Russia.

The Cleveland Construction Company has the contract

for the erection of the new factories of the Haynes Auto Company, which suffered a loss of its plant at Kokomo. It will be of concrete and steel. The insurance companies decided to pay the full face of the policies, amounting in all to \$240,000. The Apperson Automobile Company of Kokomo gave temporary employment to 125 of the Haynes Company's workmen.

The C. J. Olsen Mfg. Company has been organized at Pittsboro, Ind., to manufacture combined insulators and lightning arresters and sanitary window sash; incorporators, C. J. Olsen, W. F. Hiatt and C. A. Weaver.

Pendleton, Ind., has sold \$6000 of bonds for the purpose of installing a municipal electric lighting plant.

The Southern Indiana Power Company, a merger of the Bedford Power Company, Bedford, Ind., and the Shoals Power Company, Shoals, Ind., has marketed \$800,000 in bonds to pay for a dam and power plant now being built at Williams, Ind., and another to be erected at Shoals.

The Jasper Novelty Works, Jasper, Ind., is building a \$10,000 addition to the plant, four stories, 40 x 150 ft. It will be used for the manufacture of desks.

The Western Indiana Mining Company has been organized at Terre Haute, Ind., with \$15,000 capital stock to mine coal. The directors are H. B. Talley, W. E. Eppert, G. E. Talley, James Johnson and J. A. Templeton.

The Louisville & Northern Railway & Lighting Company will improve its plant at Charlestown, Ind., by the installation of a new engine and other equipment.

The Lindenschmidt Company, Evansville, Ind., ornamental and builders' iron work and iron fencing, is erecting a new building, 30 x 55 ft., to be used as a blacksmith shop, which it will equip with a 250-lb. steam hammer, already purchased. Alterations are also being made in the company's present shop, which will be equipped with additional machinery as soon as the blacksmith shop is moved into the new building. The company is not in the market at the present time, but expects to purchase a planer later on.

The Evansville Marine Motor & Foundry Company has been incorporated at Evansville, Ind., and is planning the erection of a plant which when completed will cover one-half a block. The plans include an office building, assembling department and machine shop, which will be equipped with machinery for the manufacture of marine and stationary gasoline engines. B. F. Drury is president of the company.

St. Louis

ST. LOUIS, MO., March 20, 1911.

Business the past week has been productive of some pretty fair orders. One of the dealers furnished several tools to a plant in Quincy, Ill., and disposed of some heavy second-hand machines taken in trade. Other good business in heavy tools pending for some time has been placed.

The Government is in the market for an open side planer for the arsenal shop here.

A number of the large plants have important improvements under way involving large expenditures, which promises inquiries for fair lots of equipment in due time.

New manufacturing concerns continue to incorporate and get ready for business, and a number of those announced during the past week will require extensive machine shop outfits. The railroads are not buying anything of any consequence as yet. Business in the Southeast is looking up, and that section is expected to improve as a tool consumer rapidly from now on.

The Hansen Continuous Chemical Fire Apparatus Company, St. Louis, has been incorporated with a capital stock of \$50,000. Dr. F. William Runde is president; Edward M. E. Hansen, vice-president, and L. A. Ragan, secretary. The company will manufacture a chemical fire engine invented by E. M. E. Hansen.

The J. W. Boyd Grain Company, Joplin, Mo., will erect a combined elevator, warehouse and corn meal plant in East Joplin, at Railroad and Hill streets. The estimated cost will be \$12,000.

The city of Granby, Mo., will soon place bonds, the proceeds of which will be used for the construction of a new water works system.

Bids will shortly be received at Rolla, Mo., for the construction of a steel bridge across the Piney River, at Newburg, Mo. The engineer is at work on the plans and specifications for the bridge.

The city of Independence, Mo., has arranged with the Missouri Pacific Railroad with reference to the construction of a bridge across the railroad tracks on the South Side boulevard. Construction will begin at an early date.

The County Commissioners of Fayette, Mo., have approved the report for a new bridge at the foot of Moore's Hill.

The Little Rock Railway & Electric Company, Little

THE MACHINERY MARKETS

Rock, Ark., has plans prepared for the installation of new pumps and condensers for the intake system of its plant. A new 2500-kw. steam turbine was recently installed by the company.

Mound City, Kan., is having estimates prepared for a water works system.

The Electric Light & Power Company, Alliance, Neb., has been purchased by the city, which will make a number of improvements to the plant.

Armour & Co., Omaha, Neb., have contracted for the installation of a sprinkling system in their plant at South Omaha. They are also erecting a new machine shop building, which they will equip with the machinery transferred from their present shop. No additional equipment will be required.

The Waurika Ice & Electric Company, Waurika, Okla., has increased its capital stock from \$50,000 to \$75,000, and will make a number of improvements to its plant.

The Oklahoma Rubber Company, Oklahoma City, Okla., has been incorporated, with \$400,000 capital stock, and will immediately commence the construction of a plant for the manufacture of rubber goods, to be ready for operation by May 1. The plant will be erected on an eight-acre tract and will consist of a one-story concrete building, 100 x 200 ft. and a two-story office building, 25 x 50 ft. All the necessary rubber manufacturing machinery has been purchased, but the company is in the market for a 150-hp. oil engine, a 100-hp. steam engine and a 6 ft. by 18 ft. 100-lb. pressure steam boiler.

The Salt Lake Auditorium Association, Salt Lake City, Utah, is receiving figures on equipment to be installed in the Salt Lake Auditorium, a building 102 x 190 ft. The floor of the building will be covered with about 90,000 of 1-in. pipe, laid 1 in. apart, with double head supply for the artificial ice skating rink. The plant will also have a capacity of 50 tons commercial ice daily.

Alamosa, Colo., is having plans prepared for a \$25,000 water works system.

The McIntosh Car Seal & Mfg. Company, Denver, Colo., will be moved to Greeley, Colo., and its output greatly increased. F. E. Stockover of Greeley is interested in the company.

The Jacout grain elevator at Anselmo, Neb., was destroyed by fire March 11, causing a loss of \$10,000.

The foundations for the new oil mill, light and ice plant at Hollis, Okla., are being laid. The three plants are to be completed within four months.

Philadelphia

PHILADELPHIA, PA., March 20, 1911.

Buyers continue to place orders in a conservative manner and the volume of business closed recently does not show any material gain. Machine tool dealers report orders small individually and negotiations under way proceed slowly. Second-hand machinery merchants note but little change in recent conditions; sales continue light, although an occasional better demand for certain classes of equipment is to be noted. Locomotive builders are taking on a somewhat better run of orders, and several fair contracts are under negotiation, but the bulk of the demand of late has been for small lots. From present indications a better run of locomotive business is expected in the not distant future. Builders of the usual standard types of machine tools are not taking orders very freely, and make but meager gains in the productive rate. Special tools and machinery, particularly the latter, have developed irregularity, builders in several instances reporting fewer orders. Conditions in the general foundry trade are practically unchanged, although in instances steel casting plants note an increasing demand for certain classes of work. The movement in boilers, engines and general power equipment, both new and second-hand, continues quiet.

The contract for the erection of the warehouse and coal storage yard for the Curtis Publishing Company, at Eleventh and Washington avenues, reference to which has been previously made, has been given to the Wells Brothers Company, New York. The warehouse will have a storage capacity of 20,000 rolls of paper and the coal storage yard a capacity of 10,000 tons. Frank C. Roberts & Co. are the engineers, and will also have the placing of the contracts, it is said, for the power equipment and other engineering propositions, which, however, they are not yet prepared to consider.

The Williamson Brothers Company has let a contract for the erection of a six-story pattern storage building, to be built at Edgemont and Boston streets. The structure will be of mill construction, 62 x 100 ft., and the only equipment required will be an elevator. This concern has under consideration the erection of an addition, 70 x 250 ft., to its

machine shop and an addition to its power house. Additional power equipment of 300 kw. capacity has already been provided for. It will be in the market for some equipment in the way of tools for its machine shop, but states that it is too early to consider the nature of its requirements at this time.

M. A. Metz & Brother, manufacturers of knitted goods, are considering the erection of a five-story brick factory building, 42 x 66 ft., at the corner of Sixth and Spring Garden streets. Bids for the work are now being taken. It has not yet been decided whether a power plant will be installed or whether electric power will be purchased.

The Link Belt Company, Nicetown, is considering extensive alterations to its offices, and also portions of its plant, made necessary by the change in grade, due to the elevation of the tracks of the Philadelphia & Reading Railway, adjoining its plant. This company is estimating on a large amount of work of all kinds and considers the business outlook very favorable.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for two second-hand, standard gauge, six-driving wheel switching engines, with a wheel base not to exceed 11 ft. 6 in. Tenders may be either square or sloping. The engines should weigh 50 to 75 tons on drivers, the heavier preferred.

The Darby School Board, Darby, Pa., is considering the advisability of introducing a system of manual training in its higher schools, and it is said that the property committee has been instructed to secure the probable cost of the necessary apparatus and equipment.

A bill has been passed by the Senate of the State of Delaware authorizing the city of Clayton, Del., to borrow up to \$40,000 for the construction of a municipal lighting plant, after having first submitted the proposition to its voters, for which a special election is to be held.

A charter has been granted the United Railway Company, under the laws of the State of Pennsylvania, to operate an electric line between Humbert and Barronsville, Somerset County, Pa., a distance of seven miles. The capital is \$70,000 and the following incorporators are named: I. W. Seamans, Uniontown, Pa.; T. B. Palmer, B. A. Smith, L. W. Fogg, J. H. Palmer, D. D. Johnson and Harold W. Seamans, all of Uniontown, Pa.

Engineers received bids last week for a one-story pumping station for the borough of Spring Lake, N. J. The building will be 62 x 94 ft. The Joseph L. Swiegard Company, this city, is the engineer.

The Carbon Iron Works, Leighton, Pa., has been incorporated, with a capital stock of \$30,000, and will engage particularly in the manufacture of sadirons. The officers of the company are: President, William S. Koch; secretary and treasurer, George E. Gray; directors, Henry Kresge, U. G. Smith, Oscar J. Saeger, Charles G. Moll and Howard L. Arner. The company states that it has a building which will answer for its manufacturing purposes, but makes no reference to its requirements in the way of equipment.

Detroit

DETROIT, MICH., March 21, 1911.

Manufacturers are unable to complain of any lull in the continued prosperity. March has been a remarkable month for the amount of new business it has brought to firms of this city, and if conditions do not take any noticeable slump, it bids fair to make a record month. The fact that the auto accessories market has taken such a brace since the first of the year is a source of much gratification to many concerns. Building, in matter of new factories, has not been as active as last year, but all space is being utilized.

One of the most important companies to incorporate the past week is the Detroit Wheel Company. This company is incorporated with a capital stock of \$1,000,000, to manufacture a patent spring wheel for motor cars. The company will also make vehicles of all kinds. The bulk of the stock is held by Charles R. Chisholm.

The Detroit Range & Boiler Company is planning several improvements to its present plant. One item is the erection of a one-story factory building.

The Canfield Mfg. Company has incorporated with a capital stock of \$5000. The company will make plumbers', builders' and molders' supplies, also leather goods. Edmund B. Tompkins is the principal stockholder.

The D. & S. Specialty Company, principally controlled by James F. Draper, has filed articles of incorporation. The company has a capital stock of \$10,000, and will manufacture stove pipes and stove accessories.

The Pilgrim Scale Company has organized with a capital stock of \$25,000. It will manufacture a patent scale. The organization is in the hands of Robert Mearns, the principal stockholder.

THE MACHINERY MARKETS

The Ottawa Leather Company, Grand Rapids, Mich., maker of leather products, has increased its capital stock from \$100,000 to \$200,000.

The Lake Superior Iron & Chemical Company is planning to erect at its plant at Newberry, Mich., new chemical and retort factories. Both buildings will be constructed of steel and brick. The chemical plant will be contained in a building 60 x 160 ft., and the retort plant in a building 72 x 300 ft.

The American Handle Company, Grand Rapids, Mich., is negotiating with the city of Houghton for the erection of a plant there.

Anson E. Wolcott and associates have acquired the old Mount Clemens Health Food Building and incorporated a new company, to be known as the Wolcott Milling Company.

Manistee, Mich., will vote on the proposition to bond the city for \$90,000 for the erection of a complete municipal electric lighting and water works plant.

Escanaba will vote on the question of bonding the city for \$30,000, to be used in the construction of a gas plant.

Hiram Smith, the inventor of the Interlocker silo machine, expects to locate a factory for the production of his invention at Paw Paw, Mich., if satisfactory arrangements can be made.

The Cleveland Cliffs Iron Company will construct a \$100,000 power plant near Eagle Mills, Mich., on the Carp River. The power developed will be used for its mining properties and the Pioneer furnace.

The Menominee River Brewing Company, Menominee, Mich., is to construct a large addition to its bottling department. The new building will be 40 x 130 ft. in size and will be equipped with new machinery.

The National Chicory Company awarded last week contracts to the Bay City Stone Company for the erection of two plants, one at Kawkawlin and one at Piconning, Mich., the approximate cost of which will be \$60,000. The plants will be finished by September 1, to allow the installation of machinery in time for the fall campaign.

L. L. Conkey, Grand Rapids, Mich., will erect a two-story factory for the manufacture of operating tables for veterinary purposes. The factory will be of cement and will be equipped with modern machinery.

Brown & Schler, Grand Rapids, Mich., will begin operations in May for the erection of a brick two-story factory, 50 x 75 ft. Modern machinery for the dressing of all kinds of hides will be installed.

The Light & Power Commission of Marquette, Mich., has decided to ask for the submitting to vote the proposition of bonding the city for \$100,000, to cover the cost of construction of two new power dams and improvements to the lighting plant.

The Cadillac Cabinet & Construction Company, Cadillac, Mich., will build a new carpenter shop, 35 x 60 ft. in size, and one story. The shop will be equipped with a band saw, shaper, two turning lathes, a combination rip and cut-off saw, boring machines and emery grinders. Details are in the hands of Gilbert Sluiter.

The Mills Mfg. Company, at present located at Hudson, Mich., will move its plant to Adrian.

The Village Council of Pewamo, Mich., is in the market for a chemical engine of 90 gal. capacity.

The Elliott Machine Company, Grand Rapids, Mich., is contemplating the construction of a new plant, and is looking for a suitable site. It plans to bring its three scattering shops under one roof, and will greatly enlarge the plant's capacity.

Saginaw, Mich., will submit at the April election the question of bonding the city for \$85,000, for the construction of a new bridge.

The Colonial Furniture Company, Grand Rapids, Mich., is the name of a new company incorporated last week for the purpose of manufacturing furniture and carvings. The company has a capital stock of \$10,000. Among the incorporators is James Van Keulen.

At the April election Benton Harbor, Mich., will vote on the proposition of issuing bonds to the amount of \$100,000, for the erection of a suitable water plant.

The Sun Oil Company, Grand Rapids, Mich., has presented a petition to the City Council asking for permission to construct a new oil plant. It is planned to increase the capacity of the plant, as well as secure a more favorable location.

The David Stott Milling Company suffered the loss of its Adrian, Mich., plant through a disastrous fire March 18. The mill is a complete loss, amounting to about \$60,000. Mr. Stott states that the plant will be rebuilt immediately.

The citizens of Marquette, Mich., will vote at the April election on the question of issuing \$1,000,000 in bonds for

increasing the water power and electric generating capacity of the city's municipal plants.

The citizens of Hastings, Mich., will vote at the April election on the proposition of bonding the city for \$120,000 to establish a water power plant, which will operate a municipal electric plant and pumping station.

The City Council of Harrison, Mich., is planning the construction of a water works system.

The City Council of Kalamazoo, Mich., has under consideration the following questions: The disposals of its lighting plant and the purchase of electricity for its street lights and municipal buildings, re-equipping its present municipal lighting plant, or the construction of an entirely new plant.

Extensive improvements will be made by the Pere Marquette Railroad at Saginaw, Mich., including remodeling of the machine shops and the erection of an extension to the roundhouse, which will more than double its capacity.

The Olds Motor Works, Lansing, Mich., will commence work in the near future on an addition to its plant, 74 x 75 ft., which will increase its present manufacturing facilities by about 50 per cent. The building will be three stories and basement, and will be used for assembling purposes. The company will also build large docks at the railroad lines connected with its plant, which will greatly benefit its shipping facilities.

The T. C. Beach Company, St. Johns, Mich., recently incorporated with \$10,000 capital stock to manufacture furniture specialties, states that it will use electric power for the present, and that it has all the machinery it needs to start with, but later on it will be in the market for a large equipment of woodworking machinery.

Toronto

TORONTO, March 18, 1911.

While the Canadian market for equipment has been growing greatly under every head, there has been notable expansion in the demand for hydroelectric power plant equipment, for mining outfit and for pulp and paper making machinery. It is not by any means to be said that business is more active or in greater volume in these than in other classes, but that in them it has quite rapidly swollen out from very small to very large dimensions, and gives every promise of steadily increasing in importance. In these reports reference has been made from time to time to the installation of large power plants at various points, and to heavy expenditure on mine equipment. More recently the application of capital to new pulp and paper mills has received some notice in these columns. Toward the end of the last century and early in this one there was quite an outburst of enterprise in the pulp and paper making industries of Quebec, and several large works came into existence. This was followed by a long halt, but the advance movement has now begun again, and there are expectations of a very great growth in the country's pulp and paper making capacity. It is chiefly in Quebec and Ontario that the new mills are to go up, though projects of magnitude are announced for New Brunswick and British Columbia. In all these provinces the local governments have indicated a determination to reserve the Crown lands pulp wood for the use of domestic manufacturers, and three of them now impose restrictions on the exportation of timber from these lands. The Laurentide Paper Company, Grand Mère, Que., is making financial arrangements for a large increase in manufacturing capacity. A new paper mill is to be built at Sault Ste. Marie, Ont. The Spanish River Pulp & Paper Company has obtained the money for the construction of a big paper mill in connection with its pulp mill at Espanola, Ont. Price Brothers & Co., Quebec, Que., will begin at once to spend the \$5,000,000 recently raised for the building of new paper mills. Great paper mills to cost \$10,000,000 are to be erected at Grand Falls, N. B. Several Quebec pulp and paper companies are preparing to extend their works.

The directors of the Laurentide Paper Company, whose mills are at Grand Mère, Que., have decided to increase the capital stock, probably to \$10,000,000. It is now not quite half that amount.

The Lake Superior Paper Company has been organized, with \$8,000,000 capital stock, to build and operate a paper mill at Sault Ste. Marie, Ont. A bond issue has already been underwritten in England. The ground pulp mill and the sulphite fiber mill of the Lake Superior Corporation have been acquired by the company.

At the annual meeting of the Bank of British North America the chairman referred to the large number of branch factories established by United States companies in Canada, and said that if the widening market here was

THE MACHINERY MARKETS

enough to tempt American enterprise to start factories on this side of the line, the same policy ought to be good for British manufacturers. As the bank is owned in Great Britain, and as the remarks were addressed to British hearers and readers, there may be some response to the suggestion.

The City Council of Hamilton and the Board of Trade of Brantford, important manufacturing cities in Ontario, have passed resolutions against the reciprocity pact. In both resolutions it was affirmed that one effect would be to stop the coming of American branch factories.

The Northern Ontario Light & Power Company has been incorporated, with a capital of \$7,500,000, to take over the light and power systems of Cobalt and Harleyville and the hydroelectric plant now supplying power to the mines in that district.

In the House of Commons this week the Minister of Railways and Canals stated that the Government will proceed at once to construct 170 miles of the Hudson Bay railway.

Contracts will shortly be let for additions to the plant of the Page-Hersey Iron Tube & Lead Company at Welland, Ont. The additions are to cost \$200,000. In the same town the Canada Steel Foundry Company's plant will be expanded at an outlay of \$100,000. The business belonged to the Ontario Iron & Steel Company until it was recently taken into the Steel Foundry Company's system. Quality Beds, Ltd., is arranging to build a 60 x 80-ft. addition to its factory in Welland. The Canada Forge Company there is preparing to increase its output by 20 per cent. Plans are being worked out for the laying of an 8-in. pipe line from Welland to Selkirk as a natural gas conduit.

The Canadian Board of Railway Commissioners has approved railway terminal improvements at Halifax, N. S., to cost about \$2,000,000.

Sir William Mackenzie, president of the Canadian Northern Railway Company, says that the company's plans this year call for the construction of 600 miles of new line.

It is announced that the Grand Trunk Pacific Railway Company will build 140 new stations in the West this summer, and that the Canadian Pacific Railway Company will open 50 new towns on its Western lines before the end of the year.

The Ontario Hydroelectric Power Commission is about to call for tenders for the material for 8 or 10 miles of transmission line from a point on the Severn River to the towns of Midland and Penetanguishene, on Georgian Bay. Material and equipment for necessary transformer stations will be included.

The capital stock of the British Columbia Steel Corporation, recently incorporated under Dominion laws, is \$10,000,000. The chief place of business is to be at the city of Toronto. It is stated that a rail mill and a plant for rolling ship plates will be built. Port Mann, the Pacific terminus of the Canadian Northern Railway, continues to be mentioned as the point at which the works will be located. It is stated that the United Engineering & Foundry Company, Pittsburgh, Pa., has prepared plans and estimates for the plant. According to accounts given for publication, there are to be seven open hearth steel furnaces, of a total output of 850 tons per day.

The London Foundry Company, London, Ont., will increase the capacity of its plant this summer.

The St. Lawrence Flour Mills Company is building a mill of 2500 bbl. output per day on the Lachine Canal, Montreal. There will also be an elevator built to hold 400,000 bu. of wheat.

The City Council of Sherbrooke, Que., has decided to construct a municipal power plant at Rock Forest, to cost \$100,000.

The Canadian Pacific Railway Company is beginning the construction of a 16-story office building at the principal corner in Toronto.

The city of Regina will make extensions, costing \$100,000, to its municipal power plant.

Freight sheds to cost \$100,000 are to be built by the Canadian Pacific Railway Company at its Place Viger station, Montreal.

The rate-payers of Calgary will vote on bylaws to raise \$380,000 to be applied to electric light extensions and \$60,000 to be expended on conduits.

The Gillette Razor Company is to build a \$100,000 factory this year. A site has been got in Montreal.

The Cobalt Lake Mining Company, Cobalt, Ont., has decided to erect a concentrator of 20 stamps, capable of treating 100 tons of ore.

Sir Thomas Shaughnessy, president of the Canadian Pacific Railway Company, has announced that his company will spend \$14,000,000 on the construction of Western branch lines this year, the total to be added being 500 or 600 miles.

A mill, a tramway and air compressors are to be built

at the Standard Mine, Silverton, B. C., by the American interests that have acquired that silver-lead property.

The Western Wire & Nail Company, London, Ont., has decided to enlarge its plant. A new factory that, with the equipment, will cost \$250,000, is to be built.

The Hobbs Mfg. Company, maker of glass goods, London, Ont., is making extensive improvements in its plant.

The total outlay for the new plant, wharves, buildings, mains, &c., the Vancouver Gas Company is about to make is estimated at \$1,500,000, of which \$600,000 is to be laid out this year.

The Government of British Columbia has granted to Point Grey, Vancouver, \$130,000, and to Richmond, another suburb, \$135,000, for roadway improvement.

The contract to build 84 miles of the Alberta Central Railway from Stettler, Alberta, to the Brazeau coal fields has been awarded to J. D. McArthur, Winnipeg. The work is expected to be finished by the autumn.

The Independent Tire Company, Toronto, which has been recently incorporated, is negotiating with the City Council of Peterborough, Ont., for terms to erect and operate a factory in that city. It is prepared to increase its paid up capital to \$350,000, to build a factory, and install \$75,000 worth of machinery therein if the municipality will lend it \$40,000. The matter is under consideration. Automobile tires are to be made.

The Albert Mfg. Company's plaster mill at Hillsboro, N. B., was destroyed by fire. It employed from 100 to 120 hands when in full operation.

The Hudson Bay Company will begin the construction of its million dollar store in Calgary, Alberta, in a few weeks.

San Francisco

SAN FRANCISCO, CAL., March 15, 1911.

A few orders are coming in for single tools of fairly large size, principally from shops in San Francisco and Alameda County, but this class of business is still rather closely limited. The outside trade is still confined for the most part to small tools, the total volume showing little change. Plans are under way for extensive additions to a few shops in the interior, but little definite inquiry is coming out as yet. It is announced that the Mare Island Navy Yard will shortly start work on a coaling steamer for the Navy, which would probably necessitate the installation of a few large tools, though in a general way the plant is already well equipped.

The market for general equipment has been somewhat hampered by bad weather, but in the last few days there has been considerable activity, and orders are about to be closed on several large inquiries for mining and quarry machinery. A fair demand is noted from the lumber industry in northern California, incident to the reopening of numerous logging camps, though the lumber trade so far has been below expectations. All lines of road building machinery find an exceptionally active demand, which is expected to continue for the next six months. At present work is being rushed to repair the roads and bridges damaged by the recent storm, and quick delivery is desired on much of the equipment ordered. There has been some expectation of a demand for contractors' equipment in San Francisco, but so far the local market has been quiet, as the machinery purchased during the rush a few years ago is still in good condition, and is sufficient to take care of any work immediately in prospect. Municipal inquiries are very numerous, especially for water works and power machinery.

The gas-operated electric power plant, the gas for which is generated from crude oil within the unit, installed by the Allis-Chalmers Company for the Holton Power Company, Holton, Cal., is receiving considerable attention, as it appears to embody the most economical method of using crude petroleum which has been introduced.

W. T. Garratt & Co. will move their offices, brass foundry and finishing shop into their new building at Fremont and Folsom streets about the end of the week.

Charles P. Bannon, formerly with the American Steel Casting Company and previously assistant superintendent of the Joshua Hendy Iron Works, has opened offices in the Sheldon Building under the name of the Bannon Engineering & Machinery Company. He is acting as general sales manager for the steel casting department of the C. L. Best Gas Traction Company, and represents the Gardner line of grinding machinery.

E. P. Jamison & Co., Seattle, Wash., have opened a San Francisco office at 741 Monadnock Building, under the management of Fred B. Wright, formerly of Chicago. The company handles a general line of railroad equipment and contractors' machinery, carrying stock at Seattle, Tacoma, Portland and Spokane. A warehouse will probably be opened in San Francisco later in the year.

THE MACHINERY MARKETS

H. M. Byllesby, president of H. M. Byllesby & Co., Chicago, is inspecting his lighting and power properties on the coast, with a view to general improvements to be carried out during the year.

The Western Machine & Foundry Company, Santa Barbara, Cal., is planning to erect new buildings for its plant, with additions to the foundry department.

J. M. Frink, president of the Washington Iron Works, Seattle, Wash., was a recent visitor in San Francisco.

Adams & Holloper, manufacturers of lighting fixtures, &c., have leased a two-story building on Natoma street, between Fourth and Fifth, for foundry purposes.

The first application for space at the Panama-Pacific Exposition in 1915 was received from the Joshua Hendy Iron Works, which proposes to occupy 20,000 sq. ft., with a complete mining plant in operation. An application has also been received from the Standard Gas Engine Company of this city.

Work is now under way on the new plant of the Warman Steel Casting Company at Redondo, Cal.

H. H. Severin has opened a small machine shop at Modesto, Cal.

Preliminary plans are being made for the power plant for the Geary street municipal railroad in San Francisco, and funds have been set aside for a power plant in the Hall of Justice Building.

The Vulcan Iron Works, San Francisco, recently shipped to Osaka, Japan, a complete 25-ton Vulcan ice-making plant, including ammonia compressor, with direct connected Corliss engine, open air ammonia condenser, ice-making tanks, crane, distilling and purifying apparatus, boiler system, &c. This company is installing a 35-ton refrigerating machine at the Alexandria Hotel, Los Angeles, and has received an order for a 45-ton motor driven refrigerating plant from the John B. Agen Company, Seattle, Wash.

The Honolulu Consolidated Oil Company has placed an order with the Bessemer Gas Engine Company of Pennsylvania for six 80-hp. gas compressors, to be installed at its wells near Maricopa, Cal. The company proposes to manufacture gasoline from natural gas.

New projects for the installation of alfalfa meal mills are being started in many parts of California.

The supervisors of Solano County, Cal., have purchased a 12-ton Austin road roller, and propose to spend about \$7000 for additional road equipment.

The Temescal Clay Products Company, Los Angeles, Cal., is planning to establish a large pottery plant near Corona.

The city of Los Angeles, Cal., will be in the market shortly for a steam shovel for aqueduct work.

It is reported that Oakland interests are preparing to establish a cotton mill at San Diego, Cal.

It is reported that the Salt River Valley Water Users' Association, Phoenix, Ariz., is in the market for two hydraulic turbines of 2500 hp. each, direct connected to electric generators.

The Covina Irrigating Company, Covina, Cal., has let a contract for a lot of pumping machinery to the H. N. Tracy Company, Los Angeles.

The Truckee Lumber Company is preparing to add a box factory and sash and door mill to its new lumber mill near Oroville, Cal.

Benj. Cunha and others are planning to install an electric lighting plant at Halfmoon Bay, Cal.

The San Diego Planing Mill, San Diego, Cal., is preparing to replace a lot of equipment which was recently destroyed by fire.

The Bullion Hill Mining Company, operating near Merced, Cal., has let a contract to the Jardine Machine Company, San Francisco, for the installation of a Krogh tube mill, a Huntington mill, machine and blacksmith shops, and three Union gas engines of 74-hp. aggregate capacity.

The San Francisco city engineer is making plans for several fresh water pumping stations for the city.

The city of Los Angeles, Cal., will open bids April 3 for engine generator sets to be installed in the Hall of Records.

The town of Lodi, Cal., is in the market for a gas engine of about 75 hp.

The Risdon Iron & Locomotive Works, San Francisco, has levied an assessment of \$5 per share.

Orland, Cal., is having estimates prepared for a \$50,000 water works and power plant.

Active preparations are being made by the Blume Construction Company, San Francisco, for the early completion of the Western Pacific Railroad shops, which are being erected here. Concrete foundations for the buildings are already completed, and it is expected that the entire group of buildings will be completed and ready for occupancy by the first of June.

The Curtis Power Boat Company, Portland, Ore., has increased its capital stock from \$10,000 to \$100,000, and will erect a new plant for the manufacture of boats of all kinds and sizes. A complete line of wood working machin-

ery will be installed, together with air compressor, air drills, drift bolt drivers, hammers, &c. Electric hand drills, seamers, &c., will also be installed.

The South

LOUISVILLE, Ky., March 21, 1911.

Although there is a good deal of prospective business in the market, machinery manufacturers and dealers report the situation just now rather quiet. Quarry developments continue to supply a considerable volume of trade, while reports of probable automobile manufacturing projects indicate a demand for machine tools in that direction a little later on.

A company is being formed in Louisville with \$100,000 capital stock for the manufacture of an electric automobile. Several models have been built in a local plant, and when experiments with these are completed the company will be organized and a plant erected. Those connected with the enterprise have declined to make details public, but it is promised that additional facts will be forthcoming in a few weeks.

Longest Bros. & Co., this city, have placed the Longest motor truck on the market. It is built in the 3 and 5 ton models. Members of the company state that while the plant is equipped fully at present, the probable increase in the number of cars turned out will require additional machinery later on.

Veeder B. Paine, manager of the Mengel Mahogany Logging Company at Axim, Africa, has been in Louisville for the purpose of looking at some improved logging equipment which may be purchased for use in connection with the company's operations on the West Coast of Africa. The company is controlled by C. C. Mengel & Brother Company, Louisville.

The elevating and conveying machinery contract for the new concrete cement bins just completed at Speed's Station Ind., for the Louisville Cement Company has been let to the Webster Mfg. Company, Chicago. The order was placed through E. D. Morton & Co., Louisville.

A 10-ton electric elevator is to be installed in the new warehouse of the J. I. Case Threshing Machine Company, which is to be erected in this city in the near future.

The city of Louisville is considering the erection of a plant for the disposal of garbage. David R. Lyman is chief engineer and M. W. Neal is chairman of the Board of Public Works.

Work has been begun on the viaducts of the Big Four and Chesapeake & Ohio railroads in this city, which will relieve the congestion of freight in the East Louisville yards. The contract for the structural iron work, involving a considerable tonnage, was let to Grainger & Co., Louisville, while B. C. Milner & Son received the contract for the piers, which will be built of reinforced concrete. The cost of the viaducts will reach \$600,000. The contracts for the work were awarded from the office of the chief engineer of the Big Four at Cincinnati.

Harry B. Driver will head a new laundry company, which will erect a modern plant near Sixth street and Broadway, Louisville. Mr. Driver is president of the Elite Laundry, and will install a lot of new equipment, including power and laundry machines.

It is probable that the plant of the Southern Wall Plaster Company, Louisville, which was destroyed by fire, will be rebuilt. E. J. Kollross is general manager of the concern.

Changes are to be made in the building of the Norton Company, at Fourth avenue and Market street, Louisville, including the installation of an electric elevator. George W. Norton is president of the company.

The transfer of the securities of the Lexington & Interurban Railways Company, Lexington, Ky., from the Guarantee Trust & Safe Deposit Company of Philadelphia to the newly organized Kentucky Securities Company, which is controlled by Philadelphia interests, will open the way for the financing of improvements of the street railway and other public service properties at Lexington, including the building of a \$500,000 power house.

Wingo, Ky., has developed plans for a water works system and is constructing a 90,000-gal. reservoir. Power machinery of limited capacity will be required.

According to a statement of R. B. Hutchcraft, Lexington, Ky., who has been engaged as engineer by the Freeborn Construction Company, Kansas City, Mo., that company is beginning the erection of a cement mill at Pine Hill, Ky.,

THE MACHINERY MARKETS

which is to have a daily capacity of 1600 barrels a day. A tract of 2200 acres of limestone lands has been purchased from Col. J. A. August of Washington, D. C.

The Paintsville Water & Light Company, Paintsville, Ky., has filed articles of incorporation with \$20,000 capital stock. H. M. Stafford and John E. Buckingham are the incorporators. Details regarding the company's plans have not been announced.

The Louisville & Nashville Railroad is preparing to spend \$50,000 in improving its facilities at Russellville, Ky. New shops will be built and equipped.

A cut stone plant is being equipped at Bowling Green, Ky., by the Bowling Green Quarries Company, of which Samuel Pickles is manager.

A steam roller for street work may be purchased by Madisonville, Ky. Councilman Cooke is chairman of the street committee.

The Rublesco Mfg. Company, Seattle, Wash., is to remove its plant to Memphis, Tenn., arrangements having been made by R. M. Austin, manager of the company, with the Business Men's Club of Memphis. The concern manufactures household specialties.

City officials of Memphis, Tenn., who are investigating the question of establishing an electric light plant, are also considering the installation of a garbage incinerator.

A. B. Lamb, Paris, Tenn., is organizing a company for the establishment of water works and an electric plant at Lexington, Tenn. A franchise is to be awarded him in the near future.

Clarksville, Tenn., is now preparing specifications for the water works plant to be built there. Bids will be open about May 1, plans having been drawn by Hazlehurst & Anderson, Atlanta. Two turbine centrifugal pumps will be purchased, among other items.

Petersburg, Tenn., is arranging to have electric lights, a local flour mill having made plans to install a dynamo and furnish the service.

The Synder Airbrake Indicator Company, Knoxville, Tenn., has been organized, with \$50,000 capital stock, by O. A. Synder, J. B. Jones, R. J. Yearwood and T. G. McConnell. A plant will be built for the manufacture of the indicator, which is a patented safety device, and has been tried out on engines of the Southern Railway.

Work has been begun at Memphis, Tenn., by the Nashville, Chattanooga & St. Louis Railway, which has purchased a site for a considerable extension of its facilities, including the enlargement of its roundhouse.

The Appalachian Knitting Mills, Knoxville, Tenn., will move into the buildings formerly occupied by the Knoxville Woolen Mills Company, and will increase its capacity by the installation of new machinery.

Electric elevators will be installed in a five-story building to be erected in Chattanooga, Tenn., for the DeRossett Hat Company. J. G. Barnwell and Clarence T. Jones are the architects.

England & Bryant, Newport, Tenn., are planning the erection of a power plant on Pigeon River, near Newport, for the purpose of producing electric power with which to operate a tannery which they now control and another which is to be erected this summer.

John Adams, Newport, Tenn., is organizing a company for the development of manganese deposits at Yellow Springs, Tenn. George F. Young, Zanesville, Ohio, and John L. Doan, Marietta, Ohio, are interested in the enterprise. A contract for the equipment has been awarded to John P. Duncan & Co., Knoxville, Tenn.

Arrangements having been made whereby the Knoxville Water Commission will extend its mains to Lonsdale, Tenn., the company which was to have been formed there for the purpose of establishing a plant will not be organized.

A contract has been let to W. J. Oliver, Knoxville, Tenn., for the construction of a railroad from Charlotte, N. C., to Greenville, S. C. It is stated that water power will be developed along the route and electricity produced for the operation of the line, electric locomotives of a new type being employed. The Duke interests are understood to control the new railroad.

A water works system to cost \$5000 will be established at Marks, Miss.

It is reported that a \$50,000 company is being organized at Gadsden, Ala., for the manufacture of soil pipe and radiators. The Business Men's Club of Gadsden has offered a bonus of \$5000 for the establishment of a plant by the company.

The plant of the Gadsden Pipe & Fittings Company, Gadsden, Ala., which was destroyed by fire, will be rebuilt.

The Gulfport & Mississippi Coast Traction Company will build an electric light and power plant at Handsboro, Miss., the city having granted a franchise for that purpose.

An electric light system will be built at Newton, Miss., at a cost of \$11,000, a bond issue of that amount having been authorized.

The Arkansas Kerosolar Light, Gas & Fuel Company has been incorporated at Little Rock, Ark., with \$40,000 capital stock. A. Danville is president of the company.

Notice has been received here that the spring manufacturing plant of the Independent Steel Company of America at Kenova, W. Va., may be continued until it is shown that it is not a paying proposition. The order regarding this was entered by Federal Judge Dayton at Charleston, W. Va. The company is in the hands of receivers.

The Central Foundry Company, Anniston, Ala., is making an addition to its molding department, 45 x 125 ft. Contract has been awarded to Wolsoncroft & Powell. Details as to equipment are not as yet completed.

The City Council of McDonough, Ga., is making plans for an electric light plant. J. B. McCrary & Co. will make surveys of the city and submit plans.

The Huntsville Gas Light Company, Huntsville, Ala., has been taken over by the Huntsville Gas Light & Fuel Company, a corporation composed of Philadelphia capitalists with \$300,000 capital stock. It is understood that the new owners will make extensive improvements.

A saw mill to cost \$150,000 and a box factory to cost the same amount will be erected about two miles east of Morgan City, La. A company with a capital stock of \$300,000 has been organized, most of the stock of which has been taken by local citizens. The mill is to be built on a lot of 20 acres and construction will begin at once, the plans having been drawn and the contract let.

The Memphis Artesian Water Department, Memphis, Tenn., will immediately begin the construction of a handsome warehouse building adjoining the Auction avenue pumping station, the cost of which will be approximately \$30,000. The construction will be of brick and reinforced concrete. The building will be equipped with conveying trolleys and with a large revolving crane for unloading from cars. A railroad track will run along one side of the warehouse. Jones & Furbringer are the architects.

Texas

AUSTIN, TEXAS, March 18, 1911.

An unusually large number of cotton gins will be erected in Texas between now and the opening of the next cotton harvest. Machinery for many new gins has already been ordered, and a general rehabilitation and renewal of old gins are in progress. In south Texas the increase of the cotton acreage is causing new gins to be erected in many localities.

An election will soon be held at Eagle Lake, Texas, to vote on the proposition of issuing \$30,000 of bonds for constructing a water works plant and a sewer system for the town.

Kolar & Kristek will install new machinery in the old cotton gin at Flatonia, Texas, which they recently purchased.

The town of Marquez, Texas, is developing a large water supply for its water works system by drilling wells.

The Farmers' Union Warehouse Company, Taylor, Texas, is making good progress with its plans for erecting a cotton ginning plant to cost \$25,000 and a 500-ton seed house at that place. J. R. Hargis is president.

W. J. Meininger will install a new cotton gin at Rosenberg, Texas.

The Rosenberg Mill and Elevator Company, Rosenberg, Texas, recently increased its capital stock from \$10,000 to \$20,000. It will make improvements to its mill.

G. H. Mohle is remodeling and rebuilding his cotton gin at Lockhart, Texas. The plant will be enlarged and new machinery installed.

The City Council of La Grange, Texas, has leased the municipal water works system of that place to John H. Killough. He will install improvements. The lease is for a period of 10 years.

The City Council of Temple, Texas, has taken preliminary steps to install a garbage crematory at that place.

The interurban railway system that is being constructed out of San Benito, Texas, to various points in the lower valley of the Rio Grande will be extended to Santa Maria and Mission, about 75 miles. S. A. Robertson of San Benito is largely interested in the road and is doing the construction work. It is reported that a syndicate of St. Louis, Mo., men are financing the project.

Alonso Gerard is preparing to erect a plant at Houston for the manufacture of incubators.

A. W. Dibrell has installed an irrigation pumping plant

THE MACHINERY MARKETS

and constructed a large water storage reservoir near Seguin, Texas, and is prepared to irrigate a large tract of land.

The recent election at Caldwell, Texas, on the proposition to have the city construct a water works plant, stand-pipe and distributing system carried and the contract for the work will soon be let. An artesian water supply will be developed for the proposed system.

T. S. Blake will install a new cotton ginning plant at Plantersville, Texas.

Plans have been adopted for the erection of a 1000-ton sugar mill at San Benito, Texas. It will cost about \$1,000,000. Alba Heywood of San Benito can give information.

The Kerrville Electric Light & Power Company will extend its lighting system at Kerrville, Texas.

Plans are on foot by a syndicate of Pittsburgh, St. Louis and Beaumont men to lay a natural gas pipe line from the Caddo field, near Shreveport, La., to Orange, Texas, Beaumont and Port Arthur. The line may be extended to Houston later on. The secretary of the Commercial Club at Orange, Texas, can give information in regard to the project.

The Northern Texas Traction Company, Fort Worth, Texas, is securing right of way for its proposed interurban electric railway that is to be constructed from Fort Worth to Cleburne. This company has merged the Dallas-Sherman interurban railway with its Fort Worth-Dallas line.

G. C. Mountcastle of Fort Worth and associates are establishing an extensive system of irrigation near Pecos, Texas. Pumping plants will be installed.

The Consolidated Reservoir & Irrigation Company of Grand Falls, Texas, which recently took over the holdings of the Big Valley Irrigation Company, the Grand Falls Lake & Reservoir Company and the Grand Falls Mutual Irrigation Company will, it is announced, spend about \$600,000 in enlarging the merged irrigation system. Large storage reservoirs and canals will be constructed and pumping plants installed.

C. S. Hoffman, representing a boat building company of Kingsboro, Mass., has been investigating the situation at Tampico, Mexico, with the view of establishing at that place a large motor boat manufacturing plant.

The Pachuca Foundry & Machine Company, Pachuca, Mexico, will install new machinery and make other improvements. This company has the contract for the construction of the aerial tramway, $3\frac{1}{2}$ miles long, of the Pachuca & Real del Monte Company at Pachuca. The towers are being built of structural steel. The tramway will have a capacity of 400 tons of ore per day of 10 hours.

The Mexican Eagle Petroleum Company of the City of Mexico will construct an oil pipe line and pumping stations along the route, from the Potrero del Llano oil field, in the State of Vera Cruz, Mexico, to Tampico, about 110 miles. This company is also said to have in contemplation the erection of an oil refinery at Tampico to cost about \$2,000,000 gold. It has placed orders for an enormous amount of steel tankage material.

The Mexican Petroleum Company, which has general offices at Los Angeles, Cal., has obtained a concession from the Mexican Government for the construction of an extensive system of irrigation near Valles, State of San Luis Potosi, Mexico. It will install pumping plants, build canals and make other improvements.

An election will be held at Las Cruces, N. M., on May 9, for the purpose of voting on the proposition of issuing \$40,000 of bonds for the construction of a water works plant and distributing system and \$35,000 for the construction of a sewage disposal plant.

The American Beet Sugar Company is still at work on its plans for the establishment of a beet sugar factory at Portales, N. M., to cost about \$1,500,000.

Hearne, Texas, has plans completed for a water works system.

Clarksville, Texas, will expend \$60,000 for enlarging its water works system.

The Weisenborn Mfg. Company, Port Houston, Texas, is erecting the initial building of its new plant, and it will be ready for the machinery to be installed in a short time. A foundry for the making of all castings used by the company will also be built, together with a galvanizing plant. The company expects to employ about 500 men when the entire plant is completed.

The Eroo Bed Mfg. Company, Port, Houston, Texas, is erecting two buildings. They will be 75×390 ft., and will provide ample room for the installation of a large complement of modern metal bed making machinery. The capital stock of the company is \$200,000. One hundred men will be employed.

The Dardinelle Handle Company is negotiating for a location at Houston, Texas, with a view to erecting a factory there. The Timpson Handle Company of Timpson, Texas, is financing the company.

Bids are being advertised for the new bridge across

Shoal Creek on the Rankin Lake road, southwest of Greenville, Texas. Bids will be received by the highway commissioners for both concrete and iron bridges.

Government Purchases

WASHINGTON, D. C., March 20, 1911.

The Paymaster General, Navy Department, Washington, will open bids April 4, under schedule 3396, class 82, for 150 back geared screw cutting engine lathes.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids April 11 for one radial drill, schedule 3436; two electric hoists, schedule 3435, and one band saw, schedule 3437.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 2 for one electric traveling crane for Mare Island, Cal.

The Construction Quartermaster, Honolulu, T. H., will open bids April 1 for construction of pump house and installing pumping machinery at Fort Ruger.

The Constructing Quartermaster of Fort Mason, Cal., will open bids April 4 for reconstructing pump house, installing machinery and erecting a water tank.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids March 14, schedule 3373 and class 94, for four blowers and one set of spare parts as follows: Bidder 41, Diehl Mfg. Company, Elizabethport, N. J., \$1750 and \$1770.50; 54, Griscom Spencer Company, New York, \$1580; 66, General Electric Company, Schenectady, N. Y., \$1210; 128, B. F. Sturtevant Company, Hyde Park, Mass., \$1473, and 143, Vermilye & Power, New York, \$1560.

The American Rolling Mill Company, Middletown, Ohio, in a pamphlet just issued entitled "The Proof—American Ingot Iron Rust-Resisting," presents testimony from a number of authorities tending to substantiate the claims made for the rust-resisting properties of this company's products. A list of "articles giving best service when made from American ingot iron" includes 38 classes, alphabetically arranged, beginning with auto body sheets and ending with wire fences. Illustrations are given of roofing and siding, spiral lath, conductors, culverts and fence wire in which ingot iron is used, also a comparison of the sizes of steel and ingot iron articles, after immersion for the same time in an acid bath. In every case the steel articles showed the greater loss in volume.

The Brightman Mfg. Company, Shelby, Ohio, manufacturer of shafting and shafting machinery, has awarded the contract for the construction of its new plant at Columbus, Ohio, to the McClintic-Marshall Construction Company, Pittsburgh, Pa. The plant will be located on Marion road, on the Toledo & Ohio Central Railroad, and will consist of a building 132×400 ft., with an ell 60×100 ft., of steel and brick construction. The contract for all equipment has also been let to the construction company. The office of the Brightman Company has been moved to Columbus, where all mail should be addressed.

S. Wolberg & Co., dealers in white metal, solder and tin stock, Front and Queen streets, Philadelphia, Pa., have incorporated their business under the laws of Pennsylvania with capital stock of \$10,000, as the Wolberg-Robinson Metal Company. Samuel Wolberg is president; I. Brod treasurer, and L. C. Robinson secretary. The company is preparing to move from the old location to a new plant at 805 Washington avenue, in the same city.

The S. Obermayer Company, foundry supplies and equipment, Cincinnati, Chicago and Pittsburgh, announces that its New England branch is now located at 44 Stonehurst Street, Dorchester, Boston, Mass., with William Fitzpatrick, Jr., in charge. Any inquiries or orders for foundry facings, supplies and equipment forwarded to that branch will have immediate attention.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from store—		Galvanized.		Tin—	
Redfin Iron:		No. 22 and 24.....@ 1.5750		Straits Pig.....@ 46 1/2 @ 47 c	
1 to 1 1/2 in. round and square.....@ 1.750		No. 26.....@ 1.5250		Copper—	
1 1/2 to 2 in. X 3/4 to 1 in.....@ 1.850		No. 28.....@ 1.5500		Lake Ingot.....@ 143 1/2 @ 15 c	
Rods— 3/4 in. and 1 1/2 in. round and square.....@ 1.850		Corrugated Roofing—		Lumber Hydraulic.....@ 112 1/2 @ 113 1/2 c	
Angles:		2 1/2 in. corrugated.....@ 100 sq. ft. \$3.85		Castings.....@ 11 1/2 @ 11 3/4 c	
3 in. X 3 in. and larger.....@ 2.000		No. 24.....@ 100 sq. ft. 4.30		Spelter—	
3 in. X 3 in. and 4 in.....@ 2.250		No. 26.....@ 100 sq. ft. 4.90		Western.....@ 6 1/2 @ 6 3/4 c	
3 in. X 3 in. and 4 in. and 5 in.....@ 2.400		No. 28.....@ 100 sq. ft. 5.30		Zinc.	
1 to 2 1/2 in. X 3/4 in. and thicker.....@ 2.000		Tin Plates—		No. 9, base, casks.....@ 10 1/2 c | Open.....@ 10 1/2 c	
1 to 2 1/2 in. X 3/4 in. and thicker.....@ 2.000		American Charcoal Plates (per box.)		Lead.	
1 to 2 1/2 in. X 3/4 in.....@ 2.000		"A.A.A." Charcoal:		American Pig.....@ 5 1/2 @ 5 1/4 c	
2 1/2 X 3 in.....@ 2.400		1C, 14 X 20.....@ 5.00		Bar.....@ 6 1/2 @ 6 3/4 c	
2 1/2 X 3 in.....@ 2.400		1X, 14 X 20.....@ 5.50		Solder.	
2 1/2 X 3 in.....@ 2.400		A. Charcoal:		1/2 & 3/4, guaranteed.....@ 28 @ 28 1/2 c	
2 1/2 X 3 in.....@ 2.400		1C, 14 X 20.....@ 5.00		No. 1.....@ 26 @ 26 1/2 c	
2 1/2 X 3 in.....@ 2.400		1X, 14 X 20.....@ 5.50		Reamed.....@ 25 1/2 @ 26 c	
2 1/2 X 3 in.....@ 2.400		American Coke Plates—Bessemer—		Prices of Solder indicated by private brand vary according to composition.	
2 1/2 X 3 in.....@ 2.400		1C, 14 X 20.....@ 5.00		Antimony—	
2 1/2 X 3 in.....@ 2.400		1X, 14 X 20.....@ 5.50		Cookson.....@ 10 1/2 @ 10 3/4 c	
2 1/2 X 3 in.....@ 2.400		American Terne Plates—		Harris.....@ 10 1/2 @ 10 3/4 c	
2 1/2 X 3 in.....@ 2.400		1C, 20 X 28 with an 8 lb. coating.....@ 8.70		Other Brands.....@ 10 1/2 @ 10 3/4 c	
2 1/2 X 3 in.....@ 2.400		1X, 20 X 28 with an 8 lb. coating.....@ 10.00		Bismuth—	
2 1/2 X 3 in.....@ 2.400		Seamless Brass Tubes—		Per. lb.....\$2.00 @ \$2.25	
2 1/2 X 3 in.....@ 2.400		List November 15, 1908.....Base price 10c		Aluminum—	
2 1/2 X 3 in.....@ 2.400		Brass Tubes, Iron Pipe Sizes—		No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting.....@ 24 c	
2 1/2 X 3 in.....@ 2.400		List November 13, 1908.....Base price 10c		Rods & Wire.....Base Price 31c	
2 1/2 X 3 in.....@ 2.400		Copper Tubes—		Sheets.....Base Price 33c	
2 1/2 X 3 in.....@ 2.400		List November 13, 1908.....Base price 21c		Old Metals.	
2 1/2 X 3 in.....@ 2.400		Braze Brass Tubes—		Dealers Purchasing Prices Paid in New York	
2 1/2 X 3 in.....@ 2.400		List August 1, 1908.....193c @ lb		Copper, Heavy cut and crucible.....@ 10.75 @ 11.00	
2 1/2 X 3 in.....@ 2.400		High Brass Rods—		Copper, Heavy and Wire.....@ 10.75 @ 11.00	
2 1/2 X 3 in.....@ 2.400		List August 1, 1908.....14 1/2 @ lb		Copper, Light and Bottoms.....@ 9.50 @ 9.75	
2 1/2 X 3 in.....@ 2.400		Roll and Sheet Brass—		Brass, Heavy.....@ 7.00 @ 7.25	
2 1/2 X 3 in.....@ 2.400		List August 1, 1908.....14 1/2 @ lb		Brass, Light.....@ 5.50 @ 5.75	
2 1/2 X 3 in.....@ 2.400		Brass Wire—		Heavy Machine Composition.....@ 9.25 @ 9.50	
2 1/2 X 3 in.....@ 2.400		List August 1, 1908.....14 1/2 @ lb		Clean Brass Turnings.....@ 7.00 @ 7.25	
2 1/2 X 3 in.....@ 2.400		Copper Wire—		Composition Turnings.....@ 8.25 @ 8.50	
2 1/2 X 3 in.....@ 2.400		Base Price.....Carload lots mill 13 1/2 c		Lead, Heavy.....@ 6 @ 6 1/2 c	
2 1/2 X 3 in.....@ 2.400		Copper Sheets—		Lead, Tea.....@ 6 @ 6 1/2 c	
2 1/2 X 3 in.....@ 2.400		Sheet Copper Hot Rolled, 16 oz. (quantity lots) @ lb 18 c		Zinc Scrap.....@ 10 @ 10.00	
2 1/2 X 3 in.....@ 2.400		Sheet Copper Cold Rolled, 12 @ lb advance over Hot Rolled			
2 1/2 X 3 in.....@ 2.400		Sheet Copper Polished 20 in. wide and under, 12 @ square foot			
2 1/2 X 3 in.....@ 2.400		Sheet Copper Polished over 20 in. wide, 2c @ square foot			
2 1/2 X 3 in.....@ 2.400		Polished Copper, 1c @ square foot more than Polished.			



NICHOLSON

Granted that just ONE mechanic in your shop can save from ten to twenty minutes time per 'day through the use of NICHOLSON FILES—how great will be the saving when from fifty to one hundred or more men "get busy" with the fast cutting

NICHOLSON?



Nicholson File Company
Providence, R. I.



THE IRON AGE

Established
1855

New York, March 30, 1911

VOL. 87: No. 13

Published every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEO. W. COPE,	-	-	-	-	} EDITORS
A. L. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	
					MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Quebec Bridge Steel.....	757
Our Approaching Removal.....	758
The Perennial Rail Problem.....	758
The New York Workmen's Compensation Decision.....	759
Underground Shops in South African Mines.....	759
Correspondence.....	760
Italy's Greatest Steel Plant.....	761
The Iron and Metal Market Reports.....	762 to 770
Notes on Prices.....	770
The Des Moines Rapids Hydroelectric Plant.....	771
Judicial Decisions of Interest to Manufacturers.....	771
New Tools and Appliances.....	773
Personal.....	774
Customs Decisions.....	774
Obituary. Portrait.....	775
The Western Electric Company's Earnings.....	776
Railroad Equipment Orders.....	776
The Maintenance of Way Convention.....	776
A Large Surplus of Idle Cars.....	776
An Important Commercial Automobile Consolidation.....	777
The Baldwin Locomotive Works' Earnings.....	777
An Iron Roof Still Good After 40 Years.....	777
Labor Notes.....	777
Steel Foundry Practice.....	778
February Iron and Steel Exports and Imports.....	779
Steel Rail Failures.....	780
Union Steel Casting Company Equipment.....	781
The Production of Steel in 1910.....	782
The Battleship Delaware Boiler Accident.....	783
The United States Metal Products Company.....	783
The Duplex Process at the Bethlehem Steel Company's Plant. Illustrated.....	784
The Triple Supply and Machinery Convention.....	788
The Congress of Technology at Boston.....	788
The McConway Car Wheel. Illustrated.....	789
The No. 3 Universal Boring Machine. Illustrated.....	790
The Wallace Hand Power Bar Bender. Illustrated.....	792
Gas Producer Experiments.....	792
A New Rockford 14-in. Drill. Illustrated.....	793
The New York Compensation Law Void.....	794
The Foundrymen's Convention at Pittsburgh.....	794
The Keystone Bronze Company Expanding.....	795
The New Newton Cold Saw. Illustrated.....	795
The Rockford Shaper Down Feed. Illustrated.....	796
Cincinnati's Industrial Development.....	797
New Publications.....	798
Paper Rope.....	799
The Pennsylvania Railroad's New Ore Unloading Plant at Cleveland.....	799
The Production of Fluorspar in 1909.....	799
A Huge Ajax Forging Machine. Illustrated.....	800
The Davis 26-in. Turret Lathe. Illustrated.....	800
The Remington Bench Lathe. Illustrated.....	802
The No. ½ Bridgeport Motor Driven Grinder. Illustrated.....	803
Safety Collars for Emery Wheels.....	804
Port Mann, the New Canadian City.....	804
Trade Publications.....	805
The Machinery Market Reports.....	806 to 815
The American Electrochemical Society's Meeting.....	815
Current Metal Prices.....	816

Quebec Bridge Steel

The Contract Taken by the Carnegie Steel Company

Proposed Consolidation of Virginia Furnaces— Structural Steel Prices Unstable

The pig iron market has grown quieter, while finished steel products are moving rather under the momentum of February than from any fresh impulse. The slackening of business in other industries is not promising, yet there is no definite note of complaint thus far in iron and steel.

While pig iron buyers are not actively in the market, some little business has been done quietly. A large sale of Southern pipe iron is reported somewhat below the \$11, Birmingham, basis for No. 2, and some further sales of Southern foundry iron are reported at \$11 for delivery through, and in a few cases beyond, the third quarter. In the Buffalo district the prices recently prevailing for early shipment have been shaded under new pressure to sell.

Eastern furnaces are interested in an inquiry for 6000 tons of basic iron for a Canadian steel plant. With water shipment, Southern furnaces have a fair chance for this order.

The Steel Corporation's pig iron operations are practically unchanged, 72 per cent. of its blast furnaces being active this week. Three furnaces of independent steel companies have gone in in March, and the merchant furnace output is increasing slightly.

The effort made a few years ago to consolidate the Virginia blast furnaces located on the Chesapeake & Ohio Railroad has been renewed lately. Only preliminaries have been considered, and the outcome is still uncertain.

Among late rail orders are 4000 tons for the Lehigh & New England and 6550 tons for the George's Creek & Cumberland, placed with the Bethlehem Steel Company, and 4000 tons for the Western Maryland, which went to the Maryland Steel Company.

The \$20,000,000 bridge to connect the New Haven road with the Pennsylvania Railroad's Long Island lines, via Hell Gate and Randall's Island, has become a live project recently, and the steel requirements, which may exceed 60,000 tons, are under consideration. The Lehigh & New England bridge at Bethlehem, Pa., 1600 tons, has been let, and 4000 tons of railroad bridgework is pending, including 1700 tons for the Rock Island. The aggressiveness of some fabri-

cating companies has been so marked in recent competitions as to threaten the maintenance of the co-operative price of 1.40c. at Pittsburgh on structural shapes.

The newly organized St. Lawrence Bridge Company, in which Canadian bridge companies are interested, has been awarded the contract for the Quebec Bridge, and the 60,000 tons of steel will be furnished by the Carnegie Steel Company. The design originally figured on called for 84,000 tons.

Plate mills are running at a slower pace—now about 55 to 60 per cent. of capacity. For the three oil barges the American Shipbuilding Company is to build, 5000 tons of plates and shapes will be rolled at Pittsburgh.

The spring trade in wire products has gone beyond expectations. Some of the mills will be kept busy to the middle of the year on present bookings.

The implement companies are showing some interest in new bar contracts and the time honored arguments have come forward again for a preferential price to this class of buyers.

Railroad equipment orders continue to be given out in a grudging way. The Pittsburgh & Lake Erie contract for 1000 freight cars and 1000 gondolas will probably be placed this week. At Pittsburgh quite a little steel tie business is pending.

The tin plate mills are very busy. Those of the American Sheet & Tin Plate Company are running to 90 per cent. of capacity. Some orders are being placed for the third quarter, but the intimations that another advance may be made are not taken seriously.

The scale of sheet mill operations is somewhat disappointing.

Our Approaching Removal

The David Williams Company, publisher of *The Iron Age*, *Iron Age-Hardware*, *Metal Worker*, *Plumber and Steam Fitter* and *Building Age*, will remove its entire business from 14 Park place to 239 West Thirty-ninth street, between Seventh and Eighth avenues, New York City, and expects to be established in its new quarters in the week beginning April 10.

Several reasons have influenced the company when making this selection of a new habitation so far from the district in which it has so long conducted its operations. During the history of these various publications, the office has been frequently removed, but it has always been within a short distance of the central post-office. Convenience to the post-office was the prime consideration. This motive no longer applies, arrangements with the New York post-office now being in effect whereby our publications are sent directly to the Pennsylvania and New York Central trains without passing through the post-office. For some time many of the business interests of New York have found it advisable to seek locations further north in the city. The trend has been steadily in the direction of the district extending from Twenty-third street to Forty-second street. In this locality are found most of the important hotels, great retail stores and leading places of amusement. The out-of-town visitor finds himself in that locality more frequently than in any other part of the city. The recent opening of the great Pennsylvania Railroad station at Thirty-third street and Seventh avenue has emphasized this movement.

The new location of our office is almost midway between the Pennsylvania Railroad and New York Central stations and is within walking distance from either. It will therefore be easy of access to out-of-town visitors traveling on lines using these terminals. It will also be within easy reach of the great new post-office which will occupy a portion of the Pennsylvania Railroad Company's ground on Eighth avenue. An important advantage which will be gained will consist in having the printing office under the same roof with the business and editorial offices. Much inconvenience has been suffered for a long time in the separation of the mechanical and editorial departments, the printing office being at some distance. The new quarters will also afford much more room for the present working force, as well as provide ample space for growth, which, we are pleased to say, seems assured.

Visitors will be welcomed in the new quarters, as they always have been in the old ones. Ample provision will be made for them, including writing facilities for those living out of the city and who sometimes may find it difficult to secure conveniences of this kind while temporarily in the city. The files of our various publications and our extensive collection of trade catalogues will also be at their service for reference.

The Perennial Rail Problem

Another voluminous contribution to the discussion of rail failures and their causes was made last week at the Chicago convention of the Maintenance of Way Association. A mass of information gained from tests and from the investigation of rails was presented, some of it definite, much of it indefinite, but little of it conclusive. Such conclusions as were drawn pointed to the ingot as the source of nearly all defects, though the Rail Committee granted that the investigations should go further before any definite recommendations are made. Tests were carried out under the committee's direction to throw light on the claim commonly made on behalf of the rail mills that the head of a rail is broken down because of the excessive equipment loads of to-day, even though there be no physical defect in the interior of the rail head. The results are by no means as informing as might be hoped for and further experiments will be made to determine the maximum loads the various thicknesses of head will carry.

One thing appears plain from the vast array of statistics and test data at Chicago, and that is that some of the stringent requirements imposed upon the manufacturers in recent years did more to add to the difficulties of producing rails than to the wearing properties of the steel. It will be recalled that the minutiae of rail mill practice were laid down in some specifications with great particularity. The size of the ingots was restricted, and the distance from the finishing rolls to the nearest hot saw and the time elapsing between the last pass and the arrival of the rail at the first saw were written into the specification as matters of high importance. We are now told that it is found on investigation that such things as speed and temperature of rolling, and the number of passes in reducing from the ingot to the rail, are of relatively little consequence.

It is quite evident from the recent investigations of railroad engineers and the lines on which they are now working for rail betterment, that the contests over

sections will be far less spirited in the future. The emphasis heretofore put on rolling practice and sections bids fair to be concentrated on the ingot, which is more and more being held primarily responsible for all the failures of rails in service. The Chicago report considers that it has been fairly well established that the making of safe rails of uniform structure and wearing properties "is almost entirely a matter of making a good ingot, free from excessive segregation, or of cropping off sufficient from the top to remove such excessive segregation."

Without desiring to enter upon the devious and interminable ramifications of the rail discussion, it may be fairly said that as it stands to-day the question of rail quality is as much a commercial one as a technical one. The diseases of steel ingots are quite well known. The railroad engineers have their minds pretty well made up as to the means they would take to keep out of track rails into which ingot weaknesses have been carried. They want rails rolled from a smaller portion of the ingot than has been used heretofore, but they have not thus far been willing to pay the steel makers for the additional discard. They are willing to accept only a part of the rails rolled from the selected portion of the ingot, not conceding as yet the point that first and last they must pay for all the rails that are rolled subject to their selection under the practice developed in years of rail mill improvement. Rails are a constantly decreasing percentage of the steel production of the country—only about 12 per cent. of the ingots produced in the United States in 1910 went into rails, against more than 90 per cent. in 1880, 40 per cent. in 1890 and 25 per cent. in 1900. It would seem highly important, therefore, from the railroad standpoint, that rail rolling be made a desirable business. If special quality steel is to be required for rails, it will naturally carry with it the payment of a special quality price. Other demands for steel are being constantly met in a satisfactory way, while railroad traffic imposes conditions which are peculiar to itself. There is no question as to the safety, soundness and wearing quality of far the greater part of the rails now furnished. The percentage of risk in the use of the remainder could be reduced by putting more metal into the rail—by the more common employment of 100-lb. or 110-lb., or even 125-lb. rails where traffic is heavy. Undeniably another step toward absolute safety would be the making of larger discards in rail blooming mills. Thus far apparently the railroads have not been satisfied that they were warranted in paying for such extra discards. In these two important particulars, therefore, the question at issue remains in large part a commercial one.

The New York Workmen's Compensation Decision

The decision of the New York Court of Appeals, declaring unconstitutional the workmen's compensation act of the State, deals no fatal blow to the principle, but has an extremely important significance in defining the conditions under which it may be constitutional. The decision, according to lawyers who are specializing on the subject, determines that workmen's compensation cannot lawfully exist, under our Constitution, in concurrent operation with present remedies, except where the right to elect between the remedies remains with the employer. Otherwise the property rights of

owners are imperiled. Therefore, it is unconstitutional to give the injured workman the choice between two remedies: one being workmen's compensation, where the employer must pay predetermined damages in all cases of injury, and the other being employers' liability, existing as a basis of the Constitution under common law, where the employer is liable under certain conditions of negligence, and must pay damages, usually much larger, according to the finding of judge and jury.

Under the elective system, however, workmen's compensation, as it exists in New York and elsewhere, would be constitutional, because the employer would elect at the time of the employment of a workman which system should be resorted to in case the man were hurt or killed. A person applying for work would be informed that employers' liability was the rule of the works, or workmen's compensation, as the case might be. The applicant would either agree or he would have to seek work elsewhere. No choice would remain to him. He would have either all the advantages of workmen's compensation, with no alternative at common law, or he would be compelled to accept employers' liability, with no rights to compensation. This would preserve the property rights of the owner. It must either be this system or straight workmen's compensation all the way through, in which case it would be necessary to amend the Constitution. Until this constitutional idea has been embodied in compensation statutes they will doubtless be annulled when attacked in the courts. A different condition exists in Great Britain, that country having no constitution, its Parliament being all powerful in creating laws. A constitution is an instrument of government which even lawmakers are obliged to respect.

Underground Shops in South African Mines

Experiments that are expected to create a new demand for mechanical equipment are being conducted in several of the South African gold mines with a view to establishing underground shops for sharpening drilling tools. Many of the mine shafts in South Africa are nearly 4000 ft. deep, and at present it is necessary to carry drill rods to the surface for repairs or sharpening. When it is considered that many of the pneumatic drilling machines used in the mines require five and six sets of drill rods, numbering sometimes as many as 60 rods to a machine, it can be realized that the haulage up and down is considerable of an item. The work of conveying this equipment to the surface is, in fact, so expensive that in many mines it has been cheaper to hire native hammer boys than to use pneumatic drills.

Labor has steadily become more expensive, however, so that hand drilling is now approaching the cost of operating and maintaining pneumatic tools. Prominent mining engineers in South Africa believe that electric furnaces and electrically operated sharpening tools can be utilized in shops established underground. This would do away with the expensive hoisting of material. Experiments so far conducted in that direction are stated to have proved successful. Attempts have been made to install oil burning furnaces and gasoline operated sharpening equipment, but the Government has put a stop to this practice. No objection

has been raised, however, to the use of electrical equipment.

In many sections of the South African mining country adequate electrical power will shortly be available and at a cost much lower than at present. It will also be possible to increase the efficiency of the compressor plants. With the completion of these power developments and the introduction of underground shops for drill sharpening, it is expected that the Kafir hammer boys will cease to be an important factor in mining operations, as these improvements will tip the balance in favor of the pneumatic drill. Accordingly, American manufacturers of rock drilling equipment, as well as makers of electric furnaces, are watching South African developments closely, as the demand for such equipment is expected to increase materially.

Correspondence

The Work of the Efficiency Specialist

To the Editor: The statement has been made that many of the articles by efficiency engineers are disappointing to the business man because they do not contain specific information as to details which he can transplant bodily to his own organization. That the business man is so disappointed is because he persists in taking a restricted view of a rich and wide subject. He wants to buy the knowledge which some have acquired by large expenditures of time and money, for the price of a few magazine articles. This he can never do. He must either buy the books which specialists have bought, and which are for sale in the open market, must devote to their study hours on hours of the time when his mind is most active (and hence most valuable in the conduct of his own affairs), must develop and stimulate his imaginative faculties (for in these are the real source of creative power), or he must do what he does in every other line—pay for the work which he is either unable or unwilling to do for himself.

No business man can delegate to others the actual decision as to the line of work he will engage in or the steps which he should take to carry out his desires. Each decision, however, should be based on the composite chosen advice of those who have made the individual investigations and performed the individual acts for which they were especially qualified.

The physician or the lawyer is not concerned with the selection of the line of business in which a client is engaged. Their interest is in putting him in the proper physical or mental condition in which he can conduct this business to the best advantage. The same thing is true of the efficiency engineer. The client may fill his office to the ceiling with books on medicine, law or efficiency, but until he has acquired mental possession of the information it is an absolute impossibility for him to diagnose correctly his own case, to select the proper remedy or advantageously to direct its application.

This is the function which the professional man is qualified to perform. The business man, by the exercise of his proper function, can earn the amount of the requisite fees with far less effort than that which would be necessary in order to qualify himself to perform the same service. This is the cold blooded business view of the situation. The object, therefore, of the articles written by efficiency engineers is to convince the business man of the necessity for such services, rather than to educate him to perform them himself. Until business men quit dosing themselves with patent medicine "systems" and are ready to take and pay for the advice of competent specialists, they cannot expect materially to improve their conditions. The competent physician will never intrust the application of his carefully devised remedies to the untrained judgment of a novice, still less to the subordinate of a novice.

The average business man actually wastes every year

more than \$10 which the specialist could save him at a cost of \$1. There are none so blind as those who will not see. The consumer pays the bill at present; he will not do so much longer.

H. F. STIMPSON.

NEW YORK, March 23, 1911.

Industrial Accident Inspection and Prevention

To the Editor: I have read with much interest your recent editorial on "Anti-Accident Inspection Service," also communications in your columns on the same subject.

I spent several months last summer in Europe investigating the operation of the workmen's compensation acts of the various countries and also in studying the problem of accident prevention. I was most impressed with what has been accomplished in Germany. The Germans have outstripped all nations in their devices for the prevention of accidents. Every safety device in a German factory is painted a bright red, which calls particular attention to it and which insures its being kept in place and in use, as either the foreman or fellow workman can quickly detect whether it is in its place or not.

I most thoroughly believe in an additional inspection service. In Minnesota our factory inspection is entirely inadequate. The inspection given by the liability insurance companies is very much better. For some years I have thought the solution of these matters lay in a moderate workman's compensation law; or rather, an industrial insurance scheme to which both the employer and employee contributed, the insurance being carried in mutual organizations of employers, or employers and employees. I believe this would operate as it does in Germany, to make both employers and employees exercise the greatest degree of care in the prevention of accidents.

State factory inspection in most States is a farce. Appointees are named to pay political debts. In Germany, both employers and employees are interested in reducing the number of accidents. Both are interested in using every precaution against accident, and in the mutual employers' organizations the premiums are based on not only the hazard of the occupation, but the care exercised in the particular factory to prevent accident. I am satisfied that one-half the industrial accidents which now occur are preventable. Rotten State inspection is responsible for a good many of them; the indifference of employers, resulting from a lack of discrimination by insurance companies between careless and careful employees, is in part responsible, and the polyglot character of workmen employed is in a lesser degree responsible for our existing number of accidents. Where the nationalities are mixed they do not think alike or act alike. I am heartily with you in any attempt to better State inspection, inspection by the employers themselves, inspection by the insurance companies, and independent inspection by an anti-accident inspection bureau.

Our company (the Minneapolis Steel & Machinery Company) has the following notice posted conspicuously throughout its shops:

"This company desires the safety of its employees and is anxious to provide every safeguard to prevent accidents. Workmen are instructed to call attention to any dangerous appliance or method, and are requested to offer any suggestions they may have as to safeguards or safety appliances. Such suggestions will be gladly received."

GEORGE M. GILLETTE.

MINNEAPOLIS, MINN.

The new ore boat of the Jones & Laughlin Steel Company, to be known as the Thomas Walters, and to take the place of the W. C. Moreland, was launched last week at the shipyard of the American Shipbuilding Company, at Lorain, Ohio. The boat is 600 ft. long, 58-ft. beam and 32-ft. draft. This and its companion vessels, the Willis L. King, the B. F. Jones and the J. M. Laughlin, make up the four ships of the company's fleet.

The Continental Can Company, Canonsburg, Pa., will erect a storage and shipping building, 85 x 130 ft., and a machine shop, 50 x 100 ft.

Italy's Greatest Steel Plant

BY A SPECIAL CORRESPONDENT.

The principal factor which contributed to the establishment of this steel plant, which is the largest in Italy and one of the most modern on the continent, was the act passed by the Italian Parliament July 8, 1904, for the uplifting and betterment of the people of the south of Italy and especially of Naples. This act permitted the entry in Italy free of customs duty and taxes for 10 years of all the machinery and material necessary to build a large plant. It also permitted the lessee of the Government iron ore deposits, situated in the historic island of Elba, to mine a much larger quantity of ore per annum.

The Società Anonima Ilva, which gets its name from the ancient name of Elba, was incorporated in Genoa in 1905 with a capital of 30,000,000 Italian liras (about \$6,000,000). The corporation possesses 1,200,000 square metres (675 acres) of land in Bagnoli, five kilometres (3.1 miles) from Naples, with a good area on the sea front. The plant is divided into four principal units: By-product coke ovens, blast furnaces, open hearth steel furnaces and rolling mills.

Awaiting the completion of the new railroad between Rome and Naples, which will pass within a few yards of the works, the plant is able to receive material and ship its product by sea. For this purpose the company has built a reinforced concrete wharf, 320 metres (1050 ft.) long and 30 metres (98 ft.) wide, on which are in service eight electric cranes and four steam cranes. The land on which the plant was built does not afford a good foundation for such heavy structures as the blast furnaces, so it was found necessary to drive long reinforced concrete piles on which to build. The lava of Mount Vesuvius was found very useful in the concrete foundations.

The coal, which arrives by sea, is stored in dumps, which can hold 50,000 tons. These run parallel to the coke ovens. They are served by four 5-ton electric cranes. The by-product coke ovens, 120 in number, are of the regenerator type and are divided into two groups. The coke, gas mixed with the blast furnace gas, is sent into two 30,000 c. m. (700,000 cu. ft.) gasometers, which in turn distribute the gas to the boilers to the power house and to the open hearth department. The ovens consume daily 800 tons of coal and produce 650 tons of coke, 14 tons of tar and 8 tons of ammonium sulphate.

The ore dumps, which are immense, are parallel to the blast furnaces and have five 5-ton electric cranes which take the ore from the dumps to 10 500-ton ore bunkers, under which pass two tunnels. In the tunnels are two electric cars which carry on them large hooked buckets called kubels, the bottoms of which are conical so as to allow the material to fall into the furnace. The kubels are raised to the tops of the furnaces by inclined elevators. The coke is also carried directly from the coke ovens on electric cars in kubels. The ore of the island of Elba is high in iron and only contains traces of sulphur and phosphorus. The limestone comes from the picturesque peninsular of Sorrento where the company operates a quarry.

The first blast furnace was blown in December 1, 1909, the second was blown in May 8, 1910, and a third is in process of construction. When the plant is completed it will consist of six blast furnaces with a daily capacity of 250 tons each.

The power house contains two gas and two steam blowing engines of 1500 hp. each, one 4-cycle gas engine direct connected to a 1200-kw. generator, two 2-cycle gas engines direct connected to two 600-kw. generators, and one steam engine direct connected to a 1250-kw. generator.

The open hearth department will comprise when completed 10 55-ton American type furnaces and two 300-ton Wellman-Seaver-Morgan metal mixers. There are three Poëtter gas-producers for each furnace, and in case of need room has been left for a fourth. There are two 90-

ton electric ladle cranes and two 40-ton ladle cranes for the hot metal. There are also three 20-ton service cranes and two Wellman-Seaver-Morgan electric ingot strippers. The ingots can be cast up to 5 tons. Two gas ingot pits and two coal ingot pits heat the ingots for the blooming mill. There are also such auxiliaries of the open hearth department as the dolomite calcining and fire brick factory.

The blooming mill, with rolls of 1150 millimetres (45.27 in.) diameter, is driven by an 8000 hp. reversible steam engine, while the rail mill is driven by a 10,000-hp. and a 7000-hp. engine. Other mills, such as plate mills and merchant mills, will be erected shortly.

There is also a 62 metre (203.4 ft.) water tower reservoir for the sea water for cooling the blast furnaces.

The corporation is managed by an Executive Committee which is composed of the following: Marquis Durazzo Pallavicini of Genoa, chairman; Comm. Cesaro Fera, M.E., of Genoa; Cav. George Falck of Milan, Hon. Arthur Luzzatto, M.E., of Rome. The last named, who is a member of the Italian Parliament, was in the United States in March, 1910, when he visited some of the most important American plants, such as Gary, South Chicago, Homestead, &c.

The Standard Scale & Supply Company, Pittsburgh, recently took an unusual method to insure quick shipment of one of its Eclipse concrete mixers from its Chicago warehouse, to Gary, Ind., a distance of 30 miles. A mixer in use there had broken down and it was necessary to have another machine by the morning of the following day. The railroads could not guarantee delivery by freight, and the mixer, which was mounted on a truck equipped with a gasoline engine, was too large to be loaded in an express car. An automobile moving van was secured and the complete mounted outfit was loaded upon it at 6 o'clock in the evening. By 8 o'clock the next morning the journey by country road was completed and the machine was delivered at Gary.

The New York Fire Department has received from the Nott Fire Engine Company, Minneapolis, Minn., an auto fire engine. This engine propels itself with a gasoline motor guaranteed to give a speed of 30 miles an hour, while the pump is operated by the usual steam engine. All parts of this engine are specially made and represent experimental work of nearly four years. The test of the engine is stated to have been completely successful.

The Carnegie Steel Company has under consideration the erection of an open hearth steel plant at its Edgar Thomson Works to comprise probably 12 50-ton furnaces. For some time the company has been taking open hearth ingots from its Homestead Works to the Edgar Thomson Works and reheating them for rolling into rails. Bids have been asked on the erection of 15 gas producers for the proposed improvement, but an actual decision in regard to building the plant has not yet been reached.

Dynamiters wrecked the Erie Railroad ore bridge at Randall, Ohio, near Cleveland, March 25, causing a loss of \$90,000. The bridge was recently completed, having been erected by Heyl & Patterson, Pittsburgh. It was equipped with a 10-ton bucket. The outrage is attributed to labor troubles. The bridge was a part of a new ore handling plant, which was operated by Pickands, Mather & Co. The bridge will probably be rebuilt as soon as possible.

The Colonial Supply Company has been organized to deal in mill supplies and has opened offices and a warehouse at 414 First avenue, Pittsburgh. Most of its members were formerly connected with the C. A. Turner Incorporation. Willis Barson is president; Carl T. Haller, vice-president; H. W. Dinker, treasurer, and H. B. Lacey, secretary.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Mar. 19, Mar. 22, Feb. 21, Mar. 30,
1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton:

Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$18.00
Foundry No. 2, Valley furnace	13.75	13.75	13.75	16.00
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	15.75
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	12.50
Foundry No. 2, local, Chicago	15.50	15.50	15.50	18.00
Basic, delivered, eastern Pa.	15.25	15.25	14.50	17.75
Basic, Valley furnace	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh	15.90	15.90	15.90	18.40
Gray forge, Pittsburgh	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00

COKE, CONNELLSVILLE,

Per Net Ton, at oven:

Furnace coke, prompt shipment	1.60	1.55	1.45	2.00
Furnace coke, future delivery	1.75	1.75	1.60	2.25
Foundry coke, prompt shipment	2.00	2.00	2.00	2.50
Foundry coke, future delivery	2.25	2.25	2.25	2.75

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	20.00	20.00	20.00	33.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.50	14.50	15.50	19.00
Iron rails, Philadelphia	18.50	18.50	18.00	20.50
Car wheels, Chicago	13.25	13.25	13.00	17.00
Car wheels, Philadelphia	14.00	14.00	14.00	16.75
Heavy steel scrap, Pittsburgh	14.00	14.00	14.75	17.00
Heavy steel scrap, Chicago	11.50	12.00	12.50	15.00
Heavy steel scrap, Philadelphia	13.75	14.00	14.50	16.50

FINISHED IRON AND STEEL,

Per Pound:

Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.37½	1.37½	1.37½	1.55
Common iron bars, Chicago	1.27½	1.27½	1.30	1.55
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.65
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:

Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	1.80	1.80	1.75	1.85
Cut nails, Pittsburgh	1.70	1.70	1.60	1.85
Barb wire, galv., Pittsburgh*	2.10	2.10	2.05	2.15

METALS, Per Pound:

Lake copper, New York	12.50	12.50	12.75	13.75
Electrolytic copper, New York	12.25	12.25	12.37½	13.25
Spelter, New York	5.60	5.65	5.60	5.65
Spelter, St. Louis	5.45	5.50	5.45	5.50
Lead, New York	4.45	4.40	4.42½	4.40
Lead, St. Louis	4.30	4.25	4.27½	4.25
Tin, New York	41.25	40.50	44.75	33.25
Antimony, Hallett, New York	9.12½	9.12½	8.00	8.25
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter, 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8-in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net;

angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1;

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
1 to 1½ in.	49	43	49	43
1½ in.	75	63	71	59
1½ to 1¾ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	68	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weights.				
½, ¾, 1 in.	69	59	65	55
1½ in.	74	68	70	64
¾ to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	64	58	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld (Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.

2, 2½ to 4 in. Lap Weld (Will be sold at two (2) points lower basing (higher price) than the above discounts. The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2 in.	61	43
2½ in.	63	48
2½ to 5 in.	69	55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29 to \$30 per gross ton. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12	13	14	15	16
Annealed.	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized.	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser.	80
10 to 18.	80 and 10
19 to 26.	80 and 10 and 2½
27 to 36.	80 and 5
Galvanized:	
9 and coarser.	75 and 10
10 to 18.	75 and 10
17 to 26.	72½ and 10
27 to 36.	72½
Coppered or Liquor Finished:	
9 and coarser.	75 and 10
10 to 26.	75 and 10
27 to 36.	70 and 10 and 5
Tinned:	
6 to 18.	75 and 10 and 10

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, March 29, 1911.—(By Telegraph.)

Pig Iron.—A moderate tonnage of foundry and malleable Bessemer iron is being sold, but standard Bessemer and basic continue neglected. The Westinghouse Electric & Mfg. Company has bought 1500 tons of No. 2 foundry for delivery at Trafford City at a price that figures out less than \$14, Valley furnace, the iron coming from a nearby furnace that has a lower freight than 90c., the Valley rate. The Union Switch & Signal Company, another Westinghouse interest, has bought about 750 tons more of No. 2 foundry for third quarter at about \$13.85, Valley furnace. The McClintic-Marshall Construction Company is in the market for 1400 tons of low grade iron which, it is understood, is to be used for ballast in boats for transporting material to the Panama Canal, where the company is doing a large amount of work. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Makers of billets and sheet and tin bars are now quoting present prices for delivery through the third quarter. Specifications against contracts for steel are coming in freely, but the new demand is light, as consumers are covered by sliding scale and other forms of contracts. A sale is reported of 1000 tons of 4 x 4 in. open hearth billets for second quarter delivery at \$23, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24 and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Consumers are still pursuing the policy of buying only what they absolutely need. Current orders are fairly active but are only for small lots. The railroads are practically out of the market, and this of course is severely felt. Little new inquiry is coming up for steel cars or rails, and some inquiries for cars that were pending three or four weeks ago have been withdrawn. In the pig iron the only activity is in foundry grades, some fair sized sales having been made in the past week. There is not much new inquiry for steel, consumers of billets and sheet and tin bars being covered by contracts. The Carnegie Steel Company and other makers of billets and bars are now taking contracts for delivery up to July 1 at present prices. The situation in finished iron and steel is quiet, and on a general average the mills are not running to more than 65 to 70 per cent. of capacity. The wire trade is active, one leading maker stating that it is sold up for the next three months, and not actively seeking new business. The coke market is slightly stronger, but there is not much new inquiry. The scrap trade is neglected, consumers not being interested in the market, except at low figures that the dealers will not consider.

Ferromanganese.—Sales of about 100 tons of foreign 50 per cent. for second quarter delivery have been made at about \$37.25, Baltimore, and sales of 200 to 300 tons in small lots are reported for April delivery. An inquiry is in the market for 300 tons for second half. We quote 50 per cent. foreign at \$37 to \$37.25 for spot shipment, and about \$37.25 to \$37.50 for second half of the year, f.o.b. Baltimore, the freight rate to Pittsburgh being \$1.95 a ton.

Ferrosilicon.—Prices are reported to be a shade firmer, but new inquiries are light and only for small lots. Most large consumers are covered and are out of the market. We quote 50 per cent. at \$53.50 to \$54, f.o.b. Pittsburgh, for delivery up to July; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—It is reported that 500 tons of standard grade muck bar were sold last week to a local consumer at a price equal to about \$29, delivered. We quote best grades of muck bar, made from all pig iron, at \$29 to \$29.50, Pittsburgh.

Skepl.—A sale of 600 tons of grooved steel skepl for April and May delivery is reported on the basis of 1.30c., delivered buyer's mill, Pittsburgh. New demand is quiet, as the pipe mills that buy skepl in the open market are pretty well covered for some time ahead. We quote grooved steel skepl at 1.30c.; sheared steel skepl, 1.35c.; grooved iron skepl, 1.60c. to 1.65c., and sheared iron skepl, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The market is quiet, new inquiry being light and only for small lots. Specifications against contracts are not coming in very well. The new rod mill of the Cambria Steel Company is making good records in output. We quote Bessemer, open hearth and chain rods at \$29 to \$30, Pittsburgh, most sellers asking the higher price.

Steel Rails.—No orders for standard sections of any moment were received by the Carnegie Steel Company last week, aside from two or three fairly large orders for export. This company reports quite an active demand for light rails, and in the past week received new orders and specifications against contracts for about 4000 tons. It is also receiving good inquiries for splice bars, and has just about closed an important contract with a Southern road for a large tonnage. The demand for steel ties is fairly active. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—Two of the leading car builders report that in the past week they have not taken a single order for steel cars. The only new inquiry in the market, aside from those noted in this report last week, is one from the Chicago, Burlington & Quincy for 500 60,000-lb. refrigerator cars. The Pittsburgh & Lake Erie Railroad is expected to place contracts for 2000 steel cars within the next week or 10 days. It is also said that the Western Maryland Railroad will soon buy 500 steel hoppers, and the Buffalo Creek Railroad is inquiring for 100 hopper cars. The American Shipbuilding Company, Lorain, Ohio, has received contracts for several steel barges for the Standard Oil Company, each of which will require 1600 to 1800 tons of plates, that will be rolled by the Carnegie Steel Company. All the leading plate mills are badly in need of work, and none of them is operating to more than 50 to 60 per cent. of capacity. We quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

Structural Material.—The American Bridge Company

THE IRON AND METAL MARKETS

has been 700 to 800 tons of bridge work for the Pere Marquette Railroad. Very little local work is being placed, but east and west of Pittsburgh conditions are quite active. Bookings of that company this month will show a heavy increase over February. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—Conditions in this trade continue active. The American Sheet & Tin Plate Company is now operating close to 90 per cent. of its hot mill capacity. Specifications against contracts are coming in very freely. The leading tin plate mills are entering orders for shipment up to July 1 at present prices, and it is also stated that some business has been entered for third quarter delivery on the same basis. Prices are firm and we quote 100-lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Sheets.—Slight betterment in the new demand for sheets from some sections is reported, but the general condition of the trade is unsatisfactory, both from the standpoint of new orders and specifications against contracts. It is estimated that not over 65 per cent. of sheet mill capacity is active at present. While prices are fairly well maintained, they are sometimes slightly shaded in exceptional cases, particularly in the Southwest. Prices in effect on the different grades of sheets are printed on a previous page.

Bars.—A fair current demand is being received for steel bars, and specifications from large consumers are quite good. The implement makers are finally commencing to show some interest in the market; while no contracts have yet been placed for the year commencing July 1, it is believed there will be something done in the near future. In the preliminary negotiations, the implement makers have again raised the point that large consumers are entitled to a lower price on their steel bars than the smaller buyers. Prices on iron bars are slightly firmer, and the rate of operations among the mills is a little heavier. We quote steel bars at 1.40c. and common iron bars at 1.35c. to 1.40c., Pittsburgh.

Shafting.—The new demand is reported to be a little better, and specifications on contracts are coming in more freely. Regular discounts on cold rolled steel shafting, which are 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory, are sometimes slightly shaded.

Spelter.—Prices continue weak, and the demand is light. We quote prime grades of Western at 5.37½c. to 5.40c., East St. Louis, equal to 5.50c. and 5.52½c., Pittsburgh.

Merchant Steel.—The new demand is reported slightly better, and specifications against contracts this month have been about as heavy as in February, which was regarded as a fairly good month. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Regular prices on rivets have been reaffirmed. The new demand is reported as fairly active, but mostly for small lots, while specifications against orders are moderate. Prices of 1.90c. on structural rivets and 2c. on boiler rivets are sometimes shaded on desirable business.

Wire Products.—The wire trade is probably the most active of any of the finished lines, the new demand for wire nails and wire being quite heavy, while specifications against contracts are coming in at a very satisfactory rate. One leading wire mill reports that it is practically sold up to July 1 and is not actively seeking new business. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.70, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—Two of the Southern railroads are in the market for spikes, one for 5000 and the other for 3000 kegs. The general demand is quiet and mostly for small lots. All new contracts for spikes for shipment after April 1 are said to be based on \$1.60 per keg. Commencing April 1 prices on spikes will be as follows:

Railroad Spikes.

4½, 5 and 5½ x 4	Extra	\$1.60
3, 3½, 4, 4½ and 5 x ½	Extra	.10
3, 3½, 4 and 4½ x ¾	Extra	.20
3, 3½, 4 and 4½ x 1	Extra	.30
3½ x ¾	Extra	.40
3½ x 1	Extra	.60
2 x 3 and 3½ x ¾	Extra	.80

Boat Spikes.

¾ in. square, 12 to 24 in. long	Extra	.15
¾ in. square, 8 to 16 in. long	Extra	.15
¾ in. square, 6 to 16 in. long	Extra	.15
¾ in. square, 6 to 12 in. long	Extra	.20
¾ in. square, 4 to 12 in. long	Extra	.30
¾ in. square, 4 to 8 in. long	Extra	.45
¾ in. square, 4 to 8 in. long	Extra	.75
¾ in. square, 3 to 3½ in. long	Extra	1.00
¾ and ¾ shorter than 4 in., ¼ cent extra.		

Merchant Pipe. A gas interest at Los Angeles, Cal., is in the market for 68 miles of 8 to 10 in. steel line pipe. One of the Canadian pipe mills has taken an order for about 10 miles of 6-in. and 3 miles of 6 to 8 in., for delivery in Canada. The current new demand for merchant pipe is fairly active, but is still confined to small lots to cover actual needs. On a general average, the pipe mills are operating to about 60 to 65 per cent. of capacity. Discounts on both iron and steel pipe, printed on a previous page, are reported as well maintained.

Boiler Tubes.—Most of the leading consumers of boiler and locomotive tubes have contracted for their supply for the remainder of this year, but specifications are not coming in as well as desired. New buying is dull and is only for small lots. A new discount list on tubes, carrying a readjustment on certain sizes, has recently been adopted by several makers.

Hoops and Bands.—The new demand continues light and is mostly for small lots to cover actual needs. Specifications against contracts are not coming in well, and in some cases have been held up entirely. We quote steel hoops at 1.50c., and bands at 1.40c., extras on the latter as per the present steel card.

Iron and Steel Scrap.—The scrap market is about at a standstill, consumers being pretty well covered and only willing to consider offers at very low prices, which in most cases the dealers are turning down. It is said that there is quite a large short interest in the market, and this is helping to sustain prices to some extent. A sale of about 500 tons of heavy steel scrap for delivery at Monessen, Pa., is reported on the basis of \$14 per gross ton. Prices on borings and turnings continue weak, the two leading consumers in the Pittsburgh district being covered for some time ahead and refusing to take in more material than specified in their contracts. Dealers quote as follows, f.o.b. Pittsburgh, or elsewhere as noted, per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	\$14.00
No. 1 foundry cast	\$14.00 to 14.25
No. 2 foundry cast	13.25 to 13.50
Bundled sheet scrap, at point of shipment	10.50 to 10.75
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.00
Grate bars	11.00
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.25 to 24.50
Steel car axles	20.00 to 20.25
Locomotive axles	24.00
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.50 to 15.75
Cast iron borings	9.00 to 9.25
* Machine shop turnings	10.00 to 10.25
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.25
Stove plate	11.00 to 11.25

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Coke.—There is a little more active inquiry for foundry coke, but not much doing in furnace coke, either in the way of prompt shipments or on contracts. A Valley furnace that has been shut down for about six months and is expected to start up next week is said not to have covered for its supply of coke. One leading maker of furnace and foundry coke is now quoting 72-hour high grade foundry coke for delivery over the remainder of the year, commencing April 1, on the basis of \$2.40 per net ton, at oven. The output in the Upper and Lower Connellsville regions last week was about 360,000 net tons, a slight increase over the previous week. We quote standard makes of 72-hour foundry coke at about \$2 for prompt shipment and \$2.25 to \$2.40 per net ton, at oven, for delivery over the remainder of the year. We quote standard makes of furnace coke for prompt shipment at \$1.60 to \$1.65, and for delivery over the next six months from \$1.80 to \$2 per net ton, at oven.

The Producers' Coke Company, Uniontown, Pa., reports that furnace coke contracts recently closed by it for prompt shipment totaled 85 cars, at \$1.65 per net ton, at oven.

Chicago

FISHER BUILDING, March 29, 1911.—(By Telegraph.)

A dullness prevails in the entire market. Particularly noticeable is this inactivity in the pig iron market where there have been practically no new developments and specifications on contracts have been backward. There are rumors of price concessions on pig iron for third quarter delivery, but these are not borne out by actual trading nor can they be verified. The sale of light rails is slightly improved, and wire products are holding their own with the good record of recent weeks. Business has fallen off on bars, although prices are being well maintained. The scrap market seems

THE IRON AND METAL MARKETS

to be without support, and has continued to weaken through the entire week, with more scrap constantly coming into sight.

Pig Iron.—The week under review has been one of extreme quiet. There are no inquiries of note, and specifications have been coming forward slowly. The only sales worthy of mention have culminated in and about Peoria, Ill., where about 2500 tons of Southern iron has been sold to agricultural industries for deliveries extending through the last half on the basis of \$11.50, Birmingham. The following quotations are for April, May and June shipment, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—No sales of note are reported this week. The leading interest is still maintaining the price of \$30.60, base, Chicago. The price on open hearth rerolling billets continues at \$25.60, base, Chicago.

Rails and Track Supplies.—The volume of light rail business has increased. Contracts averaging about 1500 tons weekly are being received by the leading interest. Railroad buying is quiet, and seems to be for immediate needs rather than in anticipation of future wants. There is an active demand for all kinds of lighter track supplies. Prices are firm, as follows: We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—New business has not been heavy this week, although specifications on contracts are coming in freely. The Rock Island Railroad has taken bids on 1700 tons of bridge material. Contracts let last week include the following: Wisconsin River Power Company, hydroelectric development near Prairie du Sac, Wis., 550 tons, let to Modern Steel Structural Company; roof construction for new cell house at State Penitentiary, Fort Madison, Iowa, 140 tons, to Fremont Turner, Des Moines, Iowa; Chicago, Terre Haute & Southwestern Railway Company, 207-ft. viaduct, Donovan, Ill., 186 tons, to American Bridge Company; Great Falls Iron Works, Great Falls, Mont., foundry building, crane runway, &c., 123 tons; Southwestern Telephone & Telegraph Company, building at Houston, Texas, 525 tons, to Noelke-Richards Iron Works, Indianapolis, Ind.; Chicago, Milwaukee & St. Paul Railway Company, Black River bridge in State of Washington, 145 tons, to Milwaukee Bridge Company. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Plate mills are not running to their full capacity and business is a little slow. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices 1.80c. to 1.90c., Chicago.

Sheets.—Mills are running at about three-fifths capacity, and there is no great volume of business in sight. From present indications sheet business this year promises to be below normal. Prices are being well maintained. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Bar iron prices in this market are being better maintained than for several months. This is not taken as an indication of any great increase in business. It shows that former prices were based on the desire to get business rather than a careful figuring of costs. Steel bars are not as active as last week. Prices are being well maintained and are as follows: Soft steel bars, 1.58c.; bar iron, 1.27½c. to 1.32½c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The activity usually expected with the opening of spring work prevails in the wire market. Liberal buying is reported from every direction. Jobbers' carload prices, which are quoted to manufacturing buyers,

are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—The principal contracts closed in this market by the leading interest have been 1000 tons, Columbus, Ohio; 500 tons, Dayton, Ohio; 500 tons, Muscatine, Iowa, and 400 tons, Kansas City, Kan. In addition about 1000 tons of new business has been booked from numerous smaller sources. Inquiries are fairly free and prices remain firm, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—Mills seem to be pretty well supplied and are naming their own prices. Evidence of large stocks continues to come to light, and this week the Rock Island is out with a list totaling 2900 tons, which closes March 28. The principal item on this list is 700 tons of No. 1 wrought. The Chicago, Burlington & Quincy's list of last week was sold, and a price of \$11.35, f.o.b. seller's tracks, was paid for the railroad malleable. The entire scrap market seems to be without support. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.25 to 13.75
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.75 to 12.25
Shoveling steel.....	11.25 to 11.75

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	11.00 to 11.50
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.25 to 8.75
Boiler punchings.....	12.50 to 13.00
No. 1 cast scrap.....	11.75 to 12.25
Stove plate and light cast scrap.....	9.75 to 10.25
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00

Philadelphia

PHILADELPHIA, PA., March 28, 1911.

The general undertone of the market is strong. Transactions in pig iron have generally been small, and little forward business is moving, but prices are being fully maintained. The demand for finished materials appears to be well sustained, the mills in some cases showing a larger output than for many months. Few very large orders have been placed, although the number of smaller propositions has slightly increased. Structural material shows the most pronounced gain. The demand for billets drags, and forward business shows little indication of early favorable development. A slightly better demand for sheets is reported. Coke is dull. The old material market is inactive and prices in the leading grades again show a decline.

Iron Ore.—Sales are reported of several cargoes of Swedish ore, for early delivery, at 8½c. a unit, to furnaces in this district, with negotiations pending for larger quantities for extended shipment. Importations at this port during the week ending March 25 included one cargo each of Cuban, Swedish and Spanish ore, aggregating 14,318 tons, valued at \$32,893.

Pig Iron.—Consumers and producers are both closely watching the market and await further developments before entering into negotiations for any large supplies for third quarter or more extended deliveries. The matter of prices is the important factor. Consumers would no doubt place business at the present range if sellers would accept such orders, but as the latter are now pretty well sold up for early delivery, at the present rate of production, they are, for the most part, disposed to hold out for a higher level for third quarter, but have not reached the point where they will openly quote for such delivery. The indecision regarding lake ore prices has, it is said, considerable to do with the present situation. Under prevailing circumstances, producers are pretty generally satisfied to dispose of their current make, which they have been largely able to do, as the volume of small lot business is good and deliveries are being fully taken by consumers. The bulk of the business has

THE IRON AND METAL MARKETS

been in lots ranging from carloads for prompt shipment to a few hundred tons for delivery up to the end of the second quarter. Probably the largest proportion of such sales has been made at \$15.75 to \$16 for No. 2 X foundry iron, delivered in this vicinity. A few sellers, however, are still willing to do business at the old basis of \$15.50. There is still considerable business under negotiation in low grade iron. One Delaware River pipe foundry has closed for several thousand tons for early delivery, the purchases being made in various sized lots, upward of 500 tons as a rule, from different sellers. The scarcity of the supply of low grade iron for early delivery in this district is becoming more apparent and the bulk of the large business pending is in Southern iron. A slightly better movement in Virginia foundry iron is reported, although little of the business is for delivery in this immediate vicinity. Prices are firm at \$13, furnace, for either No. 2 X or No. 2 plain grades, for delivery over the next three months. The leading producer, however, still holds at an advance over that price for second quarter shipment. There has been some moderate buying of forge iron for rolling mill purposes. This grade is becoming scarce, as several producers have sold their near future supplies, while another will shortly blow out one of its furnaces for needed repairs. While \$14.75 may still be done for this grade, sales have been made at \$15 and in exceptional cases at \$15.25, delivered. The movement in the steel making grades of iron is practically at a standstill. No inquiry for basic from consumers in this district is reported, and prices are nominally held at the level at which business was recently done. Transactions in low phosphorus iron have been confined to odd lot buying by the smaller consumers at recent quotations. For delivery in buyers' yards in the eastern Pennsylvania district, the following range of prices for standard brands, shipment during the second quarter, range as follows:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.25
Basic.....	15.25 to 15.50
Standard low phosphorus.....	21.50 to 22.00

Ferromanganese.—Notwithstanding the low price made recently for a large block for extended delivery, sellers in this district maintain quotations for moderate and small lots for second quarter and last half of the year shipment at \$37.25 to \$37.50, Baltimore. The demand from consumers in this vicinity, however, is still of an unimportant character.

Billets.—Eastern makers report a trifle better demand, although still mainly for small, prompt lots, and orders extend aggregate a somewhat better total. In forging billets a few moderate orders for delivery over the next three months have been placed. As there is no apparent scarcity in sight, consumers still show no interest in closing business for extended delivery. Prices are well maintained, open hearth rolling billets being quoted at \$25.40, and ordinary forging billets, \$30.40, delivered in this vicinity.

Plates.—Mills continue to receive a very fair amount of new business and specifications against contracts come out freely. March rollings have been heavier than for some months, and it is believed from the present outlook that they will continue to hold recent gains in the productive rate. Orders have not been confined to any particular class of material, but cover locomotive, bridge, tank, boiler and structural plates. Prices are being firmly maintained, 1.55c., minimum, being quoted for early deliveries in this territory.

Structural Material.—The volume of business placed and in prospect is more favorable. Several good propositions, including an addition, which had previously been considered, to the Bellevue-Stratford Hotel, requiring about 2700 tons. The Baltimore Bargain House is expected to be placed this week by the general contractor. Some little bridge work is pending, as are also a number of smaller buildings. While low prices are still reported for fabricated material, plain shapes are firmly held at 1.55c., minimum, delivered in buyers' yards in this territory.

Sheets.—Mills have taken on a better volume of business and are operating for the most part at full capacity. Orders are mostly confined to prompt lots, consumers not being inclined to anticipate their wants. Prices are unchanged, recent quotations being fully maintained by Eastern makers, who quote the following range for early shipments: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The demand has been less active, although a fair inquiry for moderate lots is reported. The recent upward tendency of prices of iron bars appears to have been somewhat checked by the decreasing demand. The minimum price for refined iron bars is 1.30c., Eastern mill, although some makers still adhere to 1.35c., mill, the quotations being equal to a range of 1.37½c. to 1.45c., delivered in this vicinity.

ity. Steel bars are in moderate demand at unchanged prices, 1.55c., delivered, being named.

Coke.—The demand appears to be less urgent, consumers again largely confining themselves to prompt lot buying rather than placing extensive contracts. Negotiations are pending for at least one large block of furnace coke. Spot furnace coke is quoted at \$1.65 per net ton, at oven, while for extended forward delivery quotations range from \$1.90 to \$2. Foundry coke, which has been moving quietly in small and moderate lots, is quoted at \$2.20 to \$2.40, at oven. For deliveries in this district the following prices, per net ton, are named:

Connellsville furnace coke.....	\$3.80 to \$4.15
Foundry coke.....	4.35 to 4.55
Mountain furnace coke.....	3.40 to 3.75
Foundry coke.....	3.95 to 4.15

Old Material.—A further weakness in prices of some grades is reported, due to the lack of interest shown by consumers and the fact that some small sellers have been compelled to move holdings. Consumers are now pretty well supplied and offering prices have in a number of instances receded. No. 1 heavy melting steel has been sold in small lots at \$13.75, delivered, although mills have paid \$14 for choice stock in lots upward of 1000 tons. A few hundred ton lots of turnings have been moved at lower prices. Railroad wrought has also sold at 50c. under recent quotations. The Alan Wood Iron & Steel Company was awarded the lot of 1800 tons of Panama scrap sold last week, the purchase price being \$12.86 per ton, on cars, Port Richmond docks. The following range of prices is named for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.75 to \$14.00
Old steel rails, rerolling.....	15.00 to 15.50
Low phosphorus heavy melting steel scrap.....	18.00 to 18.50
Old steel axles.....	20.00 to 20.50
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	18.50 to 19.00
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	16.50 to 17.00
Wrought iron pipe.....	13.75 to 14.25
No. 1 forge fire.....	12.00 to 12.50
No. 2 light iron.....	8.00 to 8.50*
Wrought turnings.....	9.50 to 10.00
Cast borings.....	9.25 to 9.75
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	12.50 to 13.00*
Grate bars.....	12.00 to 12.50
Stove plate.....	11.00 to 11.50

* Nominal.

Birmingham

BIRMINGHAM, ALA., March 27, 1911.

Pig Iron.—The demand has been comparatively light, with the majority of transactions involving prompt or nearby deliveries. Report is made of the sale of 6000 tons for shipment over the remainder of this year, but without specific information as to the price. The small lots that were sold for prompt shipment brought \$11, Birmingham, for No. 2 foundry, except for the grades below No. 3, which carried premiums of 25c. to 50c. per ton. A very attractive tonnage of charcoal iron and special coke iron for the manufacture of car wheels was sold, as well as a round lot of basic iron. This last is understood to have brought a price equivalent to \$11, Birmingham, and was for prompt shipment. The quotations that are being made on foundry grades for delivery during the last half name an advance of 50c. per ton over the \$11 schedule, with \$11.25 considered a compromise price for strictly third quarter deliveries. The tonnage that has been sold at those figures is very small. Within the week there has been a persistent rumor to the effect that a certain large interest would accept deliveries over the remainder of the year at \$11. In view of the tonnage that was offered the producing interests at such figures as these just mentioned, and was not accepted, there is some disposition to discredit the rumor referred to; however, the preference for certain grades now being produced in this district gradually becomes more pronounced, and concessions from the asking price in some quarters of the market would not necessarily affect all quotations. The tonnage actually sold for delivery prior to July 1 is quite equal to expectations at the time quotations on forward deliveries were advanced, and the movement so far this month is even larger than had been anticipated. It is not believed that any additions will be made to the active producing capacity within at least 60 days.

Cast Iron Pipe.—The order book entries of local producers were not increased during the week by the addition of any large contracts, but the volume of small orders placed was quite satisfactory. Higher asking prices than those last quoted have been named for the small sizes of water pipe, and in view of the continued shortage in the produc-

THE IRON AND METAL MARKETS

tion an advance in all quotations is not considered unwarranted. There has been no announcement of municipal lettings of importance other than has been mentioned in these columns. The requirement for the city of Los Angeles, Cal., is still being held in abeyance. We quote revised quotations on water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$23; 8 to 12 in., \$22; over 12-in., average \$21, with \$1 per ton extra for gas pipe. These quotations are believed to correctly represent the market for small orders, but on large municipal contracts are probably subject to shading.

Old Material.—There is a stronger demand for old car wheels, and all wrought grades have been moving at a larger rate. A small lot of light cast and stove plate was recently sold at a slight concession, but with this exception no report has been made of any dealer's attempt to force a market at the expense of quotations. The reports from the consuming interests recently received indicate a fairly satisfactory rate of consumption, and the reduction of the tonnage in the hands of such concerns is being awaited with interest. The additions that are being made to dealers' stocks are of little consequence comparatively. We continue to quote asking prices as follows, per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axles.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, March 29, 1911.—(By Telegraph.)

Pig Iron.—Inquiries and sales are lighter than for some time. Reports from St. Louis branches show there has been some buying of basic in that territory, but orders closed by local agencies are for carload to 100-ton lots. The inquiries from Michigan consumers for Southern foundry, previously mentioned, are still open, and there is a new one from that district for 500 tons of foundry iron, prompt shipment required, that will probably be placed with a Northern furnace. A nearby melter is asking for 300 tons of Southern No. 2 foundry, 100 tons of malleable and 100 tons of high manganese, all for second quarter delivery. Indiana continues to furnish a few requests for prices on small lots of foundry iron, principally for movement before July 1. In the face of a limited demand prices have not weakened and for spot shipment \$11, Birmingham, and \$14, Iron-ton, on No. 2 foundry, are strictly maintained. However, deliveries have been extended and at these figures third quarter contracts can be made, and in a few instances Southern No. 2 foundry has been bought at \$11, with shipments running throughout the entire year. Malleable is listless and is quoted at \$14 to \$14.25, at furnace. It is reported that the melt of foundry iron is gradually increasing, and as yard stocks are not very heavy an improvement in the buying situation may develop sooner than is now anticipated. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—A few foundry coke contracts have expired, and there are quite a number that will be completed next month, but there has been very little contracting, and foundry coke buying has been confined mostly to a limited number of cars to fill nearby requirements. Prices for foundry coke are the same in all three fields and range from \$1.95 to \$2 per net ton, at oven, for spot shipment, to \$2.25 on contracts, and in some cases the last named figures are advanced for special brands. Furnace coke appears to be lagging a little, and while there has been no change in prices it is understood that a firm offer would shade quotable prices at least 5c. per ton. For domestic users a small lot of Pocahontas coke was bought at \$1.75, at oven, with shipment extended through the first half. For prompt

shipment in the Pocahontas, Wise County and Connellsville districts, furnace coke is obtainable around \$1.55 to \$1.65 per net ton, at oven, with the usual advances on contracts.

Finished Material.—Last week was reported as being reasonably good, but the present one opens with a smaller number of inquiries, and mill agencies generally anticipate a rather dull period until after the Supreme Court decisions are rendered in the trust cases. In direct opposition to this theory is the fact that structural material is being contracted for more freely than is any other line of finished material—an indication that building operations are not on the wane. Mill prices remain at 1.40c., Pittsburgh basis, and local warehouse quotations are from 1.85c. to 1.95c.

Old Material.—Business is very quiet, and no change is looked for by local dealers for several weeks. Sellers of scrap have acquired the same indifference that buyers have lately been exhibiting, and the tonnage being moved is very light. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$12.50
Cast borings, net ton.....	5.00 to 5.50
Steel turnings, net ton.....	6.00 to 6.50
No. 1 cast scrap, net ton.....	11.00 to 11.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.00 to 17.50
Bundled sheet scrap, gross ton.....	8.50 to 9.00
Old iron rails, gross ton.....	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton.....	21.50 to 22.50
Old car wheels, gross ton.....	12.00 to 12.50
Heavy melting steel scrap, gross ton.....	11.00 to 11.50

The Globe Iron Company, manufacturer of high silicon softeners, Jackson, Ohio, has given the Dombhoff & Joyce Company, with offices in Cincinnati, Chicago, Cleveland, Indianapolis and St. Louis, the exclusive sales agency for Globe pig iron in the Western territory outside of Cleveland, Ohio.

St. Louis

St. Louis, March 27, 1911.

Transactions in pig iron have included no large tonnage, but merchant sellers report a continued demand from small consumers. Business in coke has been of considerable volume. The leading car works is increasing its force of employees, and railroad buying of track material is better. The demand for finished iron and steel is improving, and the call for finished metals is normal for the season. Scrap iron and steel continue dull.

Pig Iron.—While the leading sales agencies report the past week quite dull, merchant sellers state that business with small consumers has been keeping up well, and one house claims that March will prove to be the best month in the past six. The representative of a leading Southern producer states that his business for the present month is proving satisfactory. Among the inquiries noted are 500 to 1000 tons of low phosphorus iron for shipment over the last half; 200 tons of Lake Superior charcoal for prompt delivery; 1000 tons of No. 2 Southern analysis iron, for shipment over the last half. Among the sales reported are 360 tons of ferromanganese, for shipment over the last half, and about 600 tons of Southern No. 2 foundry to various parties for prompt and deferred delivery. In so far as it is claimed that No. 2 Southern foundry cannot be bought at less than \$11, Birmingham, even for cash and spot shipment, the market is stronger, but it has changed front from a seller's to a buyer's market, owing to a slacking up in the demand from large consumers. While some agencies are holding No. 2 Southern at \$11.50, Birmingham, for shipment over the last half, it is reported that it can be bought for that delivery at \$11. With large intending purchasers, no other delivery is of interest, as they are pretty well stocked or covered for their wants to July 1. We quote No. 2 Northern foundry at \$14, Iron-ton, Ohio, for shipment prior to July 1, and \$14.50 for last half.

Coke.—There was pretty free buying of coke reported for the week. Among the sales mentioned are 4000 tons of Connellsville foundry for shipment over the remainder of the year; 5000 tons of Stonega foundry for shipment over the last half; 4500 tons of furnace coke for prompt shipment. An inquiry for 10 cars of Connellsville foundry for immediate shipment is mentioned.

Finished Iron and Steel.—Some inquiry is reported for light rails from coal mines. Structural material is in improved demand. Business in steel bars is moderate, owing to lower prices for iron. There is more doing in track material, and the sale of 24,000 tie plates to the Terminal Railroad is mentioned.

Old Material.—The market for scrap iron and steel shows no improvement. Owing to dealers carrying pretty large stocks very little is doing even in that direction, and con-

THE IRON AND METAL MARKETS

sumers will not purchase except at considerable concessions. For light sections of relaying rails, there is a demand from lumber interests. There is considerable inquiry for scrap iron and steel, but it is believed that it is mainly for inventory purposes. There were no railroad offerings the past week. We continue our quotations, but the market is easier. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, re-rolling.....	13.00 to 13.50
Old steel rails, less than 2 ft.....	12.00 to 12.50
Relaying rails, standard sections, subject to inspection.....	23.50 to 24.00
Old cast iron.....	12.50 to 13.00
Heavy, standard steel, scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.00 to 11.50

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive ties, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	9.50 to 10.00
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	9.00 to 9.50
Agricultural malleable.....	8.50 to 9.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	8.00 to 8.50
Railroad grate bars.....	8.50 to 9.00
Machine shop turnings.....	7.00 to 7.50

F. C. Pullen, who for several years has been superintendent of the business department of the Evansville Gas & Electric Light Company, has become connected with the St. Louis office of the Dornhoff-Joyce Company, as salesman for pig iron and coal.

The Corrugated Bar Company, St. Louis, has increased its capital stock from \$500,000 to \$600,000.

The contract for the new Young Women's Christian Association Building has been awarded to the Selden-Brick Construction Company. It is to be a five-story structure and will cost \$250,000.

Buffalo

BUFFALO, March 28, 1911.

Pig Iron.—Orders aggregating about 10,000 tons of foundry and malleable grades for New England and New York State points are reported placed, principally for first half delivery, and some orders for basic, chiefly of small tonnage, have been taken. New inquiry is confined almost entirely to last half delivery, and furnaces are still reluctant to bid on extended forward deliveries. Shipments on contracts have been heavy. Some furnaces are seeking current delivery business a little more aggressively, and the rigid adherence to the advanced schedule of prices quoted recently seems to have relaxed to some extent, with a consequent easing off equivalent to about 25c. per ton on most grades. Other furnaces report that what business is being taken is at the recently established higher schedule level. Some off grade malleable has been sold at \$14, but the regular grade is held at \$14.25 to \$14.50, some furnaces asking \$15. We quote as follows, f.o.b. Buffalo, for first half:

No. 1 X foundry.....	\$14.50 to \$15.00
No. 2 X foundry.....	14.25 to 14.75
No. 2 plain.....	14.00 to 14.50
No. 3 foundry.....	13.75 to 14.25
Gray malleable.....	13.50 to 14.00
Malleable.....	14.25 to 15.00
Basic.....	14.50 to 15.00
Charcoal.....	17.00 to 17.50

Finished Iron and Steel.—Current orders in steel bars, small shapes, plates and plain structural material are coming forward in fairly good volume, both as regards number and tonnage, and specifications on existing contracts keep up well. Some business is being done in plates and in squares for axles with automobile manufacturers; also in cold rolled steel with the same trade. Considerable new work for traction and steam lines in Canada is being estimated on, in addition to that mentioned last week. Fresh inquiries are coming out for fabricated structural material and the outlook is good for a large amount of spring and summer work in this line. Figures will soon be taken for a loft and light manufacturing building for the Niagara Garment Company, Buffalo, requiring about 200 tons; for the steel superstructure for the new water works tunnel intake, Buffalo, 100 tons, and for the International Hotel convention hall and theater and the remodeling of the Cataract House, Niagara Falls, requiring several hundred tons. Bids will also be received the first week in April for steel for a six-story warehouse for the Syracuse Chilled

Plow Company, Syracuse. The Buffalo Structural Steel Company has received contract for the steel, 125 tons, for the addition to the Brunner Baking Company's plant, Buffalo. The Lackawanna Bridge Company will fabricate and erect the steel for the Niagara Radiator & Boiler Company's plant addition at North Tonawanda, 100 tons; also the steel for power house and wheel pit addition for the Niagara Falls Power Company, Niagara Falls. The Wurtz & Son Iron Works, Buffalo, has the contract for the steel for the addition to the Buffalo Bolt Company's plant, North Tonawanda, N. Y., 100 tons, and the Syracuse Bridge Company for the steel work for the church of St. Anthony de Padua, Syracuse.

Old Material.—There has been a general weakening in the price of scrap, amounting to 50c. to 75c. per ton in practically all lines, due largely to the fact that current contracts are nearing completion and mills are suspending shipments temporarily. New buying is very limited, consumers purchasing only for current needs. We therefore revise prices as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$13.00 to \$13.25
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	15.50 to 15.75
No. 1 railroad and machinery cast scrap.....	14.50 to 14.75
Old steel axles.....	19.00 to 19.50
Old iron axles.....	23.00 to 24.00
Old car wheels.....	14.50 to 14.75
Railroad malleable.....	13.75 to 14.00
Boiler plate.....	11.50 to 11.75
Locomotive grate bars.....	11.75 to 12.25
Pipe.....	10.00 to 10.25
Wrought iron and soft steel turnings.....	7.25 to 7.75
Clean cast borings.....	6.75 to 7.00

The Buffalo Bolt Company, North Tonawanda, N. Y., has let contract for a new building, 50 x 250 ft., to be added to its plant. This building will be equipped with the latest machinery for wire drawing. Contracts are also soon to be let for other new buildings.

Cleveland

CLEVELAND, OHIO, March 28, 1911.

Iron Ore.—A few more reservations of 1911 ore have been made, the seller declining to name prices, which will be at the market that will be established later. It is doubtful if anything will be done regarding prices for several weeks, or until consumers appear ready to place contracts for a fair tonnage. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Fewer inquiries are coming out than in the previous few weeks, and sales of only a small tonnage are reported. Shipments are slightly better, but the general foundry situation shows little change, and few consumers of foundry iron are taking any interest in the matter of covering for the last half. The largest sale reported is 1000 tons of foundry iron for the second and third quarter. A consumer in northern Ohio is in the market for 1000 tons of No. 2 foundry for second quarter delivery. Local furnaces are holding firmly to \$14 for No. 2 foundry for the second quarter and \$14.50 for the last half. Valley furnaces quote No. 2 foundry at \$13.75 to \$14 for the second quarter, and \$14.25 to \$14.50 for the last half. The \$14.25 quotation, however, appears to be becoming more general. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.50
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—There is no inquiry for furnace grades. A few contracts for foundry coke for the last half have been closed, but consumers generally do not appear ready to cover for their last half requirements. We quote standard Connellsville furnace coke at \$1.60 to \$1.65 per net ton, at oven, for prompt shipment, and \$1.75 to \$2 for the last half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for the remainder of the year.

Finished Iron and Steel.—Mill agencies continue to get a good volume of small current orders and specifications on contracts. The ore handling plant to be erected by the Wellman-Seaver-Morgan Company for the Pennsylvania Railroad in Cleveland will require 2500 to 2700 tons of structural shapes, orders for which will be placed by the builder in lots as required. The Forest City Steel & Iron Company, Cleveland, has taken the contract for the technical high school in Cleveland, requiring 330 tons. The Pere Marquette Railroad has let contracts for bridges aggregating 1200 tons. Of this, 700 tons went to the American Bridge

THE IRON AND METAL MARKETS

Company, the remainder being divided between the King Bridge Company, the Lackawanna Bridge Company and the Wisconsin Bridge Company. The county commissioners of Cuyahoga County, Cleveland, will receive bids April 29 for the Dunham road grade elimination of the Pennsylvania & Wheeling and Lake Erie railroads, near Cleveland, requiring 400 tons. The city of Cleveland has decided to repair the Central viaduct in Cleveland and will receive bids for this work, requiring 400 tons, late in the summer. In addition to similar work already pending, considerable grade crossing elimination work is in prospect in Cleveland. Some of the mill agencies are taking steel bar contracts for the entire last half at current prices. Others are limiting these contracts to the third quarter and have opened their books for structural and plate contracts for the same delivery. Steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for sheets continues moderate and prices are being firmly maintained. The demand for light rails in carload lots has become quite active. Somewhat better inquiry is coming out for forging billets. The demand for iron bars is not active. Prices are firm, the minimum quotation being 1.30c., Cleveland.

Old Material.—The market is very quiet, and the absence of activity has resulted in a further weakening of prices. The Upson Nut Company, Cleveland, which is a new buyer of scrap, has purchased 1500 tons of heavy melting steel at about \$13, delivered, and is in the market for 2000 to 3000 tons more, for which it is offering the same price. Some of the local consumers are holding back on shipments, being well filled up. Yard dealers are buying very little for stock at present. We have reduced quotations 25c. to 50c. a ton on borings, turnings and busbeling. Prices on some other grades are largely nominal, and inquiries would probably bring out prices slightly lower than quotations. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	17.00 to 17.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.75 to 13.00
Old car wheels.....	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 7.00
Iron and steel turnings and drillings.....	7.25 to 7.75
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	11.00 to 11.50
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	11.75 to 12.00
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

Metal Market

NEW YORK, March 29, 1911.

THE WEEK'S PRICES

		Copper, New York.		Lead.		Spelter.	
		Electro.	Tin.	New York.	St. Louis.	New York.	St. Louis.
March.	Lake.	lytic.					
23.....	12.50	12.25	40.10	4.45	4.30	5.60	5.45
24.....	12.50	12.25	{40.50}	4.45	4.30	5.60	5.45
			{40.75}				
25.....	12.50	12.25		4.45	4.30	5.60	5.45
27.....	12.50	12.25	41.20	4.45	4.30	5.60	5.45
28.....	12.50	12.25	41.25	4.45	4.30	5.60	5.45
29.....	12.50	12.25	41.25	4.45	4.30	5.60	5.45

For the first time in several weeks the price of spot tin is close to the importation cost. Good sales of copper have been made but prices are unsteady. Lead has advanced sharply on the strength of a good buying movement. Buyers are neglecting spelter, and reports of price cutting are current.

Copper.—While good sales of copper have been made to consumers in need of stocks, the general attitude of buyers seems to indicate that they are waiting for lower prices. It is believed that if sellers would reduce their quotations to 12.12½c. for electrolytic there would be heavy buying, as intimation has been given to that effect by a number of large consumers. Manufacturers of copper wire have come into the market with inquiries for good round lots and some of them have been obliged to place orders at the prevailing quotation. Street railway developments in New Jersey and Pennsylvania are bringing out a good call for copper, and the promised buying movement seems to be only delayed by a test of endurance between the sellers and buyers. The forthcoming report of the Copper Producers' Association, covering the March statistics, is not much of a factor in the present situation, as all concerned admit that consumption during the month has not been large while the March exports to date have only amounted to 17,996 tons, with but two days' shipments to be heard from. Lake copper is

freely offered at 12.50c. and electrolytic at 12.25c. for spot delivery. During the week the price of lake has been shaded in the case of a few sales of outside lots. The London market to-day closed steady with spot quoted at £54 11s. 3d. and futures £55 2s. 6d. The sales were 200 tons of spot and 150 tons of futures.

Pig Tin.—The pig tin market is in a more satisfactory condition, from the consumers' standpoint, than it has been in several months. For the first time in many weeks spot tin could be bought within a few points of the cost of importation, and on Friday and Monday the sales were made at prices corresponding to the London quotation. The situation was relieved greatly on Monday when the steamer Minneapolis arrived with 715 tons, as arrangements were made to discharge the cargo in unusually quick time, with the result that the tin thus received was available for delivery yesterday, and the entire cargo will be included in the March deliveries. It is known that the March deliveries of tin were exceedingly heavy and perhaps record-breaking, being about 4500 tons. The stock on hand March 1 was 1227 tons, and this added to the arrivals of 5535 tons makes the total available tin for the month 6762 tons. The dealers did not do much business during the week, as most of the tin delivered had been contracted for weeks ago. There was some good trading on Friday when about 250 tons changed hands, and the sales were mostly to consumers. Tin is still offered at above 40c., but the consumption is also so unusually good that the price does not seem to be greatly inflated. In London to-day the market closed steady, with spot quoted at £187 15s. and futures £186 10s. Sales of spot were 100 tons and futures 550 tons. Tin sold this afternoon at 41.25c. in New York.

Tin Plates.—The mills are busy on can makers' specifications, but the demand from other sources is not very large. The railroads were expected to be good customers for tin plates at this time, but no demand has developed from that source. Quotations on 100-lb. coke plates continue at \$3.94.

Lead.—Outside sellers of lead are doing a good business, and the buying movement extends all over the East. Consumers came into the market on Thursday, and the price was run up to 4.45c., New York. Even that price was considered attractive, as an excellent business was done both here and in St. Louis. Contractors who use a great deal of lead in conduit work have been taking large quantities of lead and sellers are steadily stiffening their terms. The leading interest continues to keep its price firm at 4.50c., New York, although its quotations are relatively closer to outside sellers' prices in other markets. It is believed by many that the general market will shortly advance to the figure asked by the American Smelting & Refining Company. To-day lead could be had in St. Louis for 4.30c. and in New York, 4.45c.

Spelter.—The spelter market is ragged, and, while many leading sellers continue to demand 5.65c., New York, it is certain that this price is being cut from three to five points in order to induce sales. Buyers are indifferent, and knowing that concessions are being made they are shopping about a great deal before placing orders for what little they need. The St. Louis market is very uncertain, and while 5.45c. is generally quoted there, some large sellers are offering inducements under that price.

Antimony.—The market is dull. Consumers are taking no interest in the situation and are placing only small orders. Cookson's is nominal at 9.50c.; Hallett's, 9.12½c.; Hungarian and Chinese grades, 8.60c. Hallett's and Hungarian grades can be bought at 5 to 15 points under the above quotations for delivery during June and July.

Old Metals.—The market is dull but steady. Selling quotations are as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, March 28.—Prices for metals are without change this week. These prices are being maintained at the expense of any brisk trading. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12¼c. in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 41½c.; small lots, 43½c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper

THE IRON AND METAL MARKETS

wire, crucible shapes, 12 $\frac{1}{4}$ c.; copper bottoms, 10 $\frac{1}{4}$ c.; copper clips, 12c.; red brass, 10 $\frac{1}{2}$ c.; yellow brass, 9c.; lead pipe, 4 $\frac{1}{2}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter, No. 1, 29c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, March 27.—Lead is strong at 4.30c. to 4.32 $\frac{1}{2}$ c.; spelter quiet at 5.40c., both at East St. Louis. Zinc ore is quiet, quoted at \$37 to \$40 per ton, Joplin base. Tin is stronger, at 40.85c.; antimony (Cookson's) unchanged at 9.55c.; lake copper, 12.85c.; electrolytic, 12.60c., all at St. Louis. The demand for finished metals is normal for the season.

New York

NEW YORK, March 29, 1911.

Pig Iron.—Conditions have changed little in the past week, either as to prices or volume of business. The foundry industry is feeling its way along, and the average melter of iron, having a supply contracted for that will last well into the second quarter and in some cases into midsummer, is not interested in deliveries in the latter part of the year. While the volume of inquiry is not large, a number of transactions have been put through on the initiative of furnace companies, and what is done in this way does not get much publicity. The furnaces seem to be maintaining their attitude as to prices for the third and fourth quarter, and are not accepting the offers commonly made which are on the basis of early delivery prices. Some business has been done with New York State foundries, largely by furnaces in the Buffalo district. On Eastern business from Buffalo the canal rate is now a factor, where deliveries are to begin in April. Whereas one year ago furnaces were quoting an Eastern delivery price and assuming responsibility for fluctuations in canal freights, they are now quoting f.o.b. boat at Buffalo, so that the buyer assumes the risks of the freight market. Last year's freights were as a rule higher than the basis used by the furnaces in early season sales. A large inquiry for foundry iron has come from the American Locomotive Company, and a Connecticut valve company is in the market for 1000 tons. Buying by New Jersey foundries has been light. Local sellers have received the inquiry of the Dominion Iron & Steel Company, Sydney, Nova Scotia, for 6000 tons of basic iron. The negotiations involve some arrangement for shipment by vessels bringing Newfoundland ore to the Delaware River. A moderate lot of basic from an eastern Pennsylvania furnace has been taken by a New Jersey steel foundry. We quote tidewater deliveries as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15.25 to \$15.50.

Finished Iron and Steel.—March will close about on a par with February, and no marked increase in activity is in sight. However, present conditions are fairly satisfactory and are expected to continue. Plates and bars, both iron and steel, are not in very good demand, but orders are being received in sufficient volume to keep the mills at about three-quarters capacity, and all prices are firm. The week has seen fewer structural contracts closed than its two predecessors, but some good tonnages were taken and more are developing. The Quebec Bridge has come to the fore again, and it is now reported that the St. Lawrence Bridge Company, organized with a view to building this bridge, has had its design approved and will fabricate the structure and that the Carnegie Steel Company will supply the 60,000 tons of material required. The American Building Company's project is taking more definite shape, and if it goes through the George A. Fuller Company will doubtless have the contract and the American Bridge Company the steel. The purpose is to build 10 unit warehouses with light manufacturing facilities, in Boston, somewhat similar to those at the Bush Terminal in Brooklyn, and if these are successful more will be built. It is uncertain what tonnage will be involved in the initial 10 buildings, but possibly as high as 15,000 tons. No award has been made on the Trinity Corporation's printing building, which will take 2800 tons, nor on the 1500 tons of bridge material for the Western division of the Grand Trunk Railway. The Lehigh & New England's bridge at Bethlehem, Pa., 1600 tons, has been given to the American Bridge Company. The Boston & Albany is inquiring for several small bridges aggregating about 1000 tons; the Buffalo, Rochester & Pittsburgh, two bridges near Rochester, requiring together about 500 tons; the Boston & Maine, a truss span near Bellows Falls, Vt., of 300 tons, and the Pennsylvania, a bridge over Oil Creek, of 400 tons. The steel for the Epstein Building, or Baltimore Bargain Store, 2400 tons, has been awarded by the general contractor, the Noel Construction Company, to Dietrich Brothers. The McClintic-Marshall Construction Company has the 700 tons for the grand stand at the Fair Grounds in Allentown, Pa., through the Ochs Construction

Company, general contractor, and the Leh building in the same city, requiring about the same tonnage of steel, has been awarded the Guerber Engineering Company. Bids are in and the contract is expected to be closed this week for the 1000 tons for the Jarmulowski bank building at Canal and Orchard streets, New York City. Prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron 1.40c. to 1.45c., all New York. Store prices for plain material and plates, New York, are 1.85c. to 1.95c.

Ferroalloys.—Although good sales of ferromanganese have been made, the market is weak. It is estimated that 8000 tons has been sold so far in March, and there are some fair inquiries to be heard from. Ferromanganese is freely offered at \$36.50 to \$37, Baltimore. Ferrosilicon is quiet. European 50 per cent. cannot be imported for less than \$57, New York and Baltimore. European ferrosilicon now in this country can be had at \$55, Pittsburgh, and the domestic product is offered at the same price.

Cast Iron Pipe.—The Charles Millar & Son Company, Utica, N. Y., was the successful bidder for the 3800 tons of water pipe on which proposals were opened March 27 by the city of Pittsfield, Mass. Bids are being received by the Board of Contract and Supply, Syracuse, N. Y., for 600 tons of water pipe. Rather more activity is reported in purchases by private companies, but no important public lettings are announced. Prices continue at about the level recently prevailing, carload lots of 6-in. being available at \$21 to \$22 per net ton, tidewater.

Steel Rails.—The Lehigh & New England has placed 4000 tons with the Bethlehem Steel Company, and the George's Creek & Cumberland has given an order for 6550 tons to the same company. The Western Maryland, which bought some of its 1911 rails in Pittsburgh, has bought 4000 tons from the Maryland Steel Company. Pittsburgh reports but a few hundred tons of rails closed in the past week, while in the Chicago district new orders amounted to about 1700 tons.

Old Material.—Dullness prevails in all branches of the old material market. Sales of heavy melting steel scrap appear to be confined to small quantities and even these transactions are few. Consumers of wrought scrap seem to be completely uninterested. A little movement is observed in heavy cast scrap and other ordinary foundry stock. Old car wheels are in no demand whatever; offers of small lots have been made in various directions without eliciting any bids. Prices are weak, and the tendency appears to be decidedly downward. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Re-rolling rails.....	\$12.00 to \$12.50
Old girder and T rails for melting.....	11.00 to 11.50
Heavy melting steel scrap.....	11.00 to 11.50
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles.....	22.50 to 23.00
Old steel car axles.....	16.50 to 17.00
No. 1 railroad wrought.....	13.50 to 14.00
Wrought iron track scrap.....	13.00 to 13.50
No. 1 yard wrought, long.....	12.50 to 13.00
No. 1 yard wrought, short.....	11.50 to 12.00
Light iron.....	5.00 to 5.50
Cast borings.....	6.50 to 7.00
Wrought turnings.....	7.00 to 7.50
Wrought pipe.....	11.00 to 11.50
Old car wheels.....	12.00 to 12.50
No. 1 heavy cast, broken up.....	12.00 to 12.50
Stove plate.....	9.00 to 9.50
Locomotive grate bars.....	9.50 to 10.00
Malleable cast.....	11.00 to 11.50

Notes on Prices

Rope.—Business with manufacturers is not showing the improvement that was expected to be in evidence by this time, as spring demand is still an expectation. When Manila rope is ordered, the best quality has the largest call. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8 $\frac{1}{2}$ c. to 9c. per pound; second grade Manila, 7 $\frac{1}{2}$ c. to 8c. per pound; hardware grade 7c. to 7 $\frac{1}{2}$ c. per pound; pure sisal of the highest grade, 6 $\frac{1}{2}$ c. per pound; second grade, 6c. per pound; rove jute rope, $\frac{1}{4}$ -in. and up, No. 1, 6 $\frac{1}{2}$ c. to 7c. per pound; No. 2, 6c. to 6 $\frac{1}{2}$ c. per pound.

White Lead in Oil.—During the past month there has been a moderate demand for white lead in oil, which is probably all that could be expected, in view of the high prices ruling for linseed oil and turpentine. For the best brands New York quotations are as follows: Lots of 500 lb. and over, 7 $\frac{1}{4}$ c. in 100, 250 and 500 lb. kegs; 7 $\frac{1}{2}$ c. in 25 and 50 lb. kegs. In lots of less than 500 lb. the usual advance of $\frac{1}{4}$ c. is charged.

Linseed Oil.—Last week the Eastern and foreign markets were weak, resulting from light demand and the lower price of seed. Some of the Northwestern crushers fear their limited stocks of oil will not be sufficient to fill

THE IRON AND METAL MARKETS

orders this summer. This view of the situation is taken regardless of the number of linseed oil substitutes on the market on account of the high price of linseed oil. Lower card prices have been announced as follows, New York, in 5-barrel lots or more:

	Cents.
State, raw.....	91
City, raw.....	91
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Bolled oil, 1 cent advance per gallon over raw.	

Naval Stores.—There has been another sharp advance in turpentine, the price now overtopping that of linseed oil. It is said that this is the first time since the Civil War that the price of turpentine has gone beyond a dollar per gallon. How long the unusually high price will continue is difficult to predict, but advices from the centers where turpentine is produced are to the effect that indications point to a larger crop than last season. Demand at this point is for actual requirements only. New York turpentine quotations in 5-barrel lots are as follows:

In oil barrels.....	\$1.10½
In machine barrels.....	1.11
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins are in limited demand and prices are firm. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$8.25 and grade D at \$8.55 in the New York market.

The Forter-Miller Electric Company, engineer and contractor, will remove its offices April 1 from Rooms 801-802 to rooms 1001-1003 Hartje Building, Pittsburgh, Pa.

No. 2 furnace of the Warwick Iron & Steel Company, Pottstown, Pa., will be blown out at the close of the week. Extensive repairs are needed, which may require several months.

The Morse Chain Company, Ithaca, N. Y., has opened a branch sales office in Cleveland at 421 Engineers Building, with H. C. Minier in charge as sales manager.

The Continental Bridge Company, Peotone, Ill., secured the contract for the coal handling crane for the Albert Lea Light & Power Company, Albert Lea, Minn.

The Pennsylvania Steel Company is blowing in another furnace at its Steelton, Pa., group.

The Des Moines Rapids Hydroelectric Plant

The Keokuk & Hamilton Motor Power Company, Keokuk, Iowa, has under construction a dam for the development of the power of the Des Moines rapids of the Mississippi River at Keokuk, Iowa, and Hamilton, Ill. The dam will be built across the river at the foot of the rapids, and a power house immediately below the dam and parallel with the stream. Including abutments, it will be 4700 ft. long, or seven-eighths of a mile. It will be built of concrete, without reinforcement of any kind, will be locked firmly into the rock bed of the river and will be practically a monolith. The power house will be 1400 ft. long and 123 ft. wide. There will be 38 generating units, each consisting of a vertical shaft, on the lower part of which will be two turbines, or water wheels; on the upper part will be the revolving parts of the generators. The weight of all these moving parts will be carried on a suitable truss bearing located in a chamber just below the generator. Each unit will have its own speed governor and auxiliary apparatus.

The construction of the dam will destroy the Des Moines rapids canal, with its three locks, in place of which there will be built a large lock on the site of the present lower lock, which will be both wider and longer than the present structure, and a lake of deep water over a mile wide and 40 miles long will be substituted in place of the present canal. In connection with the lock there will be built a large floating drydock for the construction and repair of floating crafts. There will be required in this work approximately 500,000 cu. yd. of masonry, 500,000 barrels of cement and 7000 tons of steel. The operating head will vary from 39 to 21 ft.,

Iron and Industrial Stocks

NEW YORK, March 29, 1911.

The stock market has simply been drifting for some time, awaiting trade or political developments. Transactions have been exceedingly light, some stocks having been completely neglected. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref..	31½-32½	Pressed St., pref..	97½-98
Beth. Steel, com..	32½-32½	Railway Spr., com.	33½-34
Beth. Steel, pref..	61½-63½	Railway Spr., pref..	98
Can, com.....	9½	Republic, com.....	33½
Can, pref.....	80½-81½	Republic, pref.....	97½-97½
Car & Fdry, com..	53½-54	Sloss, com.....	53
Car & Fdry, pref..	116½	Pipe, com.....	17½
Steel Foundries...	47½-48	Pipe, pref.....	58-58½
Colorado Fuel...	32½-32½	U. S. Steel, com...	78½-79½
General Electric...	148½	U. S. Steel, pref..	118½-119½
Gr. N. ore cert...	61½-63½	Westinghouse Elec.	66½-67
Int. Harv., com...	116½-117½	Va. I. C. & C.....	60
Int. Harv., pref..	124	Am. Ship, com...	73-75
Int. Pump, com...	40½-41½	Chl. Pneu. Tool...	50½-53
Int. Pump, pref..	89	Cambria Steel...	47½-48½
Locomotive, com...	38½	Lake Sup. Corp...	29½-30
Locomotive, pref.	106½-107	Pa. Steel, pref.....	107½
Nat. En. & St., com.	17½-18½	Warwick.....	109
Pitts. St., pref..	101½-102	Crucible St., com.	13-13½
Pressed St., com..	33-33½	Crucible St., pref.	79½-80½
		Harb.-W. Ref., pref.	95½-96

Final approval has been given the proposed reorganization of the finances of the Westinghouse Machine Company, Pittsburgh, by the creditors' committee, which has worked out the details of the proposition. A plan has been adopted to place a \$10,000,000 first and refunding mortgage on the properties of the Westinghouse Machine Company and the Westinghouse Foundries Company, which will secure the outstanding indebtedness, furnish a security that can be marketed and provide ample working capital. A Finance Committee has been named, consisting of E. M. Brackenridge, W. H. Rea and T. L. Brown, which will assist President George Westinghouse and the Board of Directors.

The Crucible Steel Company of America, Oliver Building, Pittsburgh, Pa., reports profits for February at \$318,880.60. The profits for the six months ended February were \$1,995,079.40. Deducting charges and appropriations for depreciation, repairs and contingencies, amounting to \$671,928.22, leaves the net profits for the six months at \$1,323,151.18.

Dividends.—The Westinghouse Electric & Mfg. Company has declared a quarterly dividend of 1¼ per cent., and in addition thereto 1¼ per cent. on account of dividends accumulated since September 30, which will be paid April 15 on the preferred stock of the company.

The Chicago Pneumatic Tool Company has declared the regular quarterly dividend of 1 per cent. on the capital stock, payable April 25.

developing 200,000 hp. The first long distance transmission line will be run to St. Louis, and later other transmission lines will be developed running from Keokuk and Hamilton. It is expected that the initial installation of 120,000 hp. will be completed in two and one-half years.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Defective Condition of Appliances.—As affecting liability for injury to a workman, the unexplained fact that a hook broke while suspending a weight much less than a sound hook of the same character should hold is evidence that the hook was defective.—Massachusetts Supreme Judicial Court, *Sullivan vs. Reed Foundry Company*, 93 North-eastern Reporter 576.

Risks Assumed by Employee.—An employee assumes not only the ordinary risks incident to the employment but, as well, all risks arising and becoming known to him during his service. Yet the employer by promising to repair a defect complained of as an inducement to the employee to continue, takes from the workman the risk, and, thereafter, until the time fixed for the repair, assumes it, unless the danger from it is so great or so imminent that a person of ordinary prudence would not continue in the employment after discovering the condition. Where the promise to repair is general and indefinite the employer's undertaking runs for a reasonable time.—New Jersey Supreme Court, *Pavan vs. Worthen & Aldrich Company*, 78 Atlantic Reporter 658.

Buyer's Right on Breach of Warranty.—On breach of warranty as to the quality of articles sold, the buyer can retain them and recover his damages by counterclaim in

a suit by the seller to recover the price. As a general rule, as to articles having a market value, the measure of the buyer's damage for such breach is the difference in the market value at the time and place of delivery between the articles as they were and as they would have been had the warranty been complied with.—North Carolina Supreme Court, *Cable Company vs. Macon*, 69 Southeastern Reporter 14.

Damages Recoverable for Breach of Contract of Sale.—A buyer of iron in a building, on being wrongfully prevented by the seller from removing all of it within the time fixed by the contract, can recover the difference between the market value of the part not removed and the agreed price thereof, less the cost of removal, and not what he would have realized on a resale to third persons.—New York Supreme Court, *Hirsh vs. Press Publishing Company*, 126 New York Supplement 238.

Mutuality of Assent Necessary to Valid Contract of Sale.—Since no contract can be complete without the mutual assent of the parties thereto, an offer to sell or to purchase imposes no obligation until it is accepted according to the terms of the offer. An acceptance upon terms varying from those contained in the offer is, in legal effect, a rejection and terminates the negotiations, unless the party making the original offer acquiesces in the modifications proposed by the acceptance.—Minnesota Supreme Court, *Bastian Brothers Company vs. Wemott-Howard Company*, 129 Northwestern Reporter 369.

Buyer's Remedy on Breach of Warranty.—Where a contract for a sale requires the goods to be of good, merchantable quality, and before their arrival the buyer accepts the seller's draft for the price, the buyer can, as against the seller, refuse to receive the goods on discovering on their arrival that they are of inferior quality, and successfully defend suit by the seller on the draft.—New York Supreme Court, *Ferguson vs. Netter*, 126 New York Supplement 107.

Measure of Damages for Breach of Warranty of Machinery.—The measure of damages for breach of warranty of machinery sold is the excess of the value which the machinery would have had at the time of the sale, if it had complied with the warranty, over its actual value at that time.—South Dakota Supreme Court, *Christianson vs. Hendrie & Bolthoff Mfg. & Supply Company*, 128 Northwestern Reporter 603.

Waiver of Shortage in Delivery Under Contract of Sale.—The seller of articles is entitled to recover the price of those actually delivered, if the buyer, with ample opportunity to know of the existence of a shortage, accepts delivery and invoice.—United States Circuit Court of Appeals, Southern District of New York, *Lorraine Mfg. Company vs. Oshinsky*, 182 Federal Reporter 407.

Reliance on Misrepresentation Essential to Right to Rescind Contract.—One cannot rescind his contract to buy personal property on the theory that the seller made certain misrepresentations in the negotiations for the sale, unless the buyer relied on such representations.—West Virginia Supreme Court of Appeals, *Stalnaker vs. Janes*, 69 Southeastern Reporter 651.

Liability for Goods Destroyed Pending Premature Delivery.—A buyer of goods having arranged for delivery not before September 1, and having refused to receive them before that time on account of lack of storeroom, cannot be deemed to have accepted them where they arrived August 11 and were burned in the railroad company's freight shed August 17, as affecting liability for their loss.—Maine Supreme Judicial Court, *Aarons vs. Cummings*, 78 Atlantic Reporter 98.

Employees' Assumption of Risk of Obvious Dangers.—An employer need not warn an employee against dangers pertaining to matters of common experience and observation, generally known to persons of his age and experience. An experienced boiler fireman assumed the risk of injury through explosion of the boiler furnace while using sawdust and shavings for fuel, though he had never used that kind of fuel before, his employer not being bound to warn him of the dangers attending use of such fuel.—Washington Supreme Court, *Props vs. Washington Pulley & Mfg. Company*, 111 Pacific Reporter 888.

Liability for Injury to Structural Iron Workers.—An employer's duty to furnish his workmen safe places in which to work does not extend to the construction of a building where the place is rendered unsafe by the work and the manner in which it is performed. Neither need he make rules that will protect the workmen against negligence of fellow employees in every situation that may arise, nor foresee mistakes of fellow employees. A foreman, a pusher, an engineer and a structural iron worker, employed in constructing a building, are fellow employees in the legal sense that they assume the risk of injury resulting from the negligence of each other in performing their respective duties, other than those of inspecting and repairing machinery and appliances.—New York Supreme Court, *Stewart vs. Hinkle Iron Company*, 125 New York Supplement 1073.

Risk Assumed as Incident of Employment.—If the place to which a sheet iron worker's helper was ordered to work was as safe as any other place in which he could have performed his duties, the dangers resulting from his position were incident to his employment, and he assumed the risk of injury arising therefrom.—Springfield, Mo., Court of Appeals, *Henry vs. John O'Brien Boiler Works Company*, 132 Southwestern Reporter 310.

Risks Arising from Latent Dangers Not Assumed by Employee.—An employee does not assume the risk of injury resulting from latent conditions unknown to him. An employer must use reasonable care to maintain his premises in a safe condition, and cause them to be properly inspected at intervals to ascertain their condition as to safety.—New Jersey Court of Errors and Appeals, *Zellers vs. Delaney*, 78 Atlantic Reporter 212.

Employers' Duty to Employees Sent on Premises of Another.—An employer who contracts to do work on the premises of another must use the same degree of care respecting the safety of his employees there as is required of him on his own premises. An employer cannot avoid liability to a workman for injury by intrusting to another performance of the employer's duty to furnish reasonably safe appliances. A machine company is liable for injury to a laborer caused by a falling of coils from which the supporting bolts had been removed, if the foreman knowing of the unsafe condition directed the laborer to work on them, the latter being ignorant of the danger.—Kentucky Court of Appeals, *American Machine Company vs. Ferry*, 132 Southwestern Reporter 546.

Duty of Employer as to Safety of Freight Elevators.—An employer owes a duty to the operator of a freight elevator to use ordinary care to keep the equipment in a reasonably safe condition, but need not furnish the best known appliances, it being sufficient to provide those ordinarily used in like circumstances.—New York Supreme Court, *Scott vs. Nauss Brothers Company*, 126 New York Supplement 17.

Risk of Injury Assumed by Employee.—An employee assumed the risk of being injured by slipping on a greasy floor or by losing his balance and falling into an open pit in the floor in which a wheel revolved, where the surrounding conditions had existed for several years during which he had been employed.—New York Supreme Court, *Bauman vs. Schrupp*, 126 New York Supplement 482.

Scope of Rule Requiring Employer to Provide a Safe Place for Work.—The rule requiring an employer to provide a safe place for his employees to work does not apply where an employee is sent across railroad tracks on an errand, performance of which did not prevent him from looking out for his own safety.—New York Supreme Court, *Matruciello vs. Milliken Brothers*, 126 New York Supplement 739.

Liability of Employer for Injury Resulting from Employees' Violation of Rules.—A manufacturer is not liable for the death of a foundry employee caused by being struck by pig iron through negligence of the operators of a pig breaker in bringing a bed of pigs over a platform when there was no ear in position to receive them, where such method was a violation of the manufacturer's rules, and but for the violation the accident would not have happened.—Michigan Supreme Court, *Barto vs. Detroit Iron & Steel Company*, 129 Northwestern Reporter 15.

Liability of Employer Respecting Safety of Place of Work.—An employee cannot make a valid contract releasing his employer from liability for future injury caused by the latter's negligence. An owner of premises, on furnishing a contractor the place and appliances with which the contract is to be performed and retaining control over the appliances, is bound to the contractor and his employees to maintain the premises in a reasonably safe condition. A workman who remains at work in a dangerous place because of fear of discharge if he complains, does not assume any risk of injury other than those ordinarily incident to the employment. A manufacturer is liable for injury to an employee caused by negligent construction of piles of iron, or failure to trim the ends of iron bars handled by employees in a rolling mill, when such failure is apt to cause injury. He is not liable, however, for injury to a workman employed by an independent contractor in a mill under the contractor's control, caused by use of defective iron and failure to trim the ends of bars.—Missouri Supreme Court, *Jewell vs. Kansas City Bolt & Nut Company*, 132 Southwestern Reporter 703.

Employer's Duty to Workmen.—An employer need not furnish the best tools obtainable, it being sufficient to furnish reasonably safe ones. A manufacturer need not instruct an experienced workman how to use a tool employed in handling steel bars. A steel company was not negligent in not covering or protecting by railing a pit into which hot bars were dumped after being sheared, where such precaution was impracticable. In accepting employment involving dangers of which he knows, a workman assumes the risks ordinarily incident thereto.—Kentucky Court of Appeals, *Flaig vs. Andrews Steel Company*, 132 Southwestern Reporter 1015.

New Tools and Appliances

This is essentially a news department for which information is invited.

Special Engraving Machines.—For engraving names in automobile tire molds the George Gorton Machine Company, Racine, Wis., has built a new design of engraving machine, the special features of which are the frame and the work table. The cast iron mold ring used with this machine is mounted on a large circular work table and the revolving graver or cutting tool which is guided by a copy or master pattern cuts out the letters. The copy is clamped in a holder in the rear of the head and the outline of its enlarged letters is followed by a small pin in the arm of the pantograph reproducing mechanism which is controlled by the hand of the operator. As the letters of the copy are traced in this way they are reproduced in the mold ring on a smaller scale, the ratio of the reproduction being controlled by the setting of the pantograph arms. As the surface of the mold ring upon which the engraving is done is concave to conform to the shape of the tire, the cutter must be given a vertical movement in addition to its regular one in order that all parts of a letter shall be cut to the same depth. The spindle is held in contact by a spring with a small templet mounted above it which has the same radius as the curved part of the mold. This guides the spindle up and down as the cutter is moved across its convex surface and accomplishes the desired result.

Combination Press, Punch and Shear.—A combination trimming press, splitting shear and punch for either belt or motor drive is being manufactured by the Danville Foundry & Machine Company, Danville, Pa. This machine has been especially designed for establishments such as drop forge works where shearing, punching and pressing machinery is required. When the machine is motor driven the motor is mounted on a bracket attached to the rear of the frame. All the driving gears have cut teeth to insure quiet operation. A right and left hand screw enables the main crosshead to be adjusted to suit different classes of work and provision is also made for taking up wear by using adjustable V-shaped guides. When the knife holder is removed, a punch holder can be inserted for punching operations. The stroke of the press is $3\frac{1}{4}$ in. and the knives, which are 10 in. long, have four cutting edges. In order that long narrow bars can be sheared the main housing is left open in the back. The space between the housing is 12 in. and the depth is 8 in. The floor space required by the press is 4 ft. x 3 ft. 6 in.

Universal Grinder.—A universal grinding machine has been designed by the Morse Twist Drill & Machine Company, New Bedford, Mass., in which an effort was made to secure a durable and conveniently operated machine that would produce accurate results. Automatic reciprocating movement is provided for the table, and the point of reversal is controlled in the usual way by dogs. A lever in the front of the machine enables the table to be stopped at any point and moved by a hand wheel. A feed box attached to the rear of the machine and operated by a lever enables the rate of the table traverse to be changed quickly. Tapers as large as $1\frac{1}{4}$ in. per foot can be ground, as the table has a swiveling platen clamped at both ends and turning on a hardened and ground central stud. A scale is provided to indicate the taper and the adjustment is made by a screw at one end. The wheel has the customary swiveling base graduated in degrees and is adjusted by a hand wheel and a dial graduated to indicate thousandths of an inch on the diameter of the work. The wheel and the slide are held back by a weight which prevents any lost motion and gives an even and equal feeding movement. The automatic cross feed for the wheel will size work to within 0.0025 in. The wheel spindle is hardened, ground and lapped and runs in phosphor bronze bearings. Wheels 12 in. in diameter and from $\frac{3}{8}$ to $\frac{3}{4}$ in. thick and 7 in. in diameter with a thickness of $\frac{3}{8}$ in. can be accommodated. The head and the tailstock are clamped to the table ways by levers and the base of the former is grad-

nated in degrees. Two shifter levers connect with the overhead shafting. One of these controls the drive for the wheel and the feed and the other the work and the pump. The work speeds may be varied from 50 to 480 in. and the wheel speeds range from 1025 to 3333 rev. per min. Both of these feeds have six changes and the traverse of the platen has ten changes, varying from 12 to 100 in. per minute.

Index Milling Machine.—An index milling machine which is particularly adapted for cutting spur gears or sprockets, notching operations, grooving shafts and gashing bevel gears and pinions preparatory to planing has been placed on the market by the Garvin Machine Company Spring and Varick streets, New York City. The operation of the machine is entirely automatic and it will cut steel at the rate of 9 in. per minute with the cutter operating at a speed of 100 rev. per min. A special feature of the machine is the safety index device which automatically disengages the feed if the completion and the locking of the indexing are prevented by accident. The indexing is positive and together with the return of the table takes place at a constant speed. The proportions of the table are ample and a large chip basin is cast integral with the table. Index centers and fixtures having from 2 to 8 spindles, all of which index automatically and simultaneously, can be mounted interchangeably on the table. Multiple centers can be furnished to compensate for the variations in the diameters of gear and form cutters and as the spindles have individual micrometer adjustment very accurate work can be done. A large screw running in a trough of oil in which the nut also travels feeds the table, and the feeding and the indexing mechanisms are combined in one large gear box located in the front of the machine. All the gears run in oil and the box can be inspected by swinging down the front cover, while by removing four bolts it can be entirely taken out. Change gears located inside the front cover provide the necessary feed changes and the indexing change gears are mounted on the right side of the bed. The spindle is driven by a gear 20 in. in diameter. The spindle block has a vertical micrometer adjustment and is clamped in V-grooves by four bolts which bind the headstock and the block together rigidly. A large arm carries an intermediate arbor yoke and the outer end of the arm as well as the outboard bearing of the arbor is supported by a frame base bolted to the bed. The oil used on the work in operation passes through an overflow nozzle and an intermediate strainer into the reservoir in the base, from which it is fed to the work by a pump.

Twisted Steel Gaggers.—The Franklin Core Rod & Gagger Company, Franklin, Pa., has brought out a twisted steel gagger which is said to prevent the sand from dropping out of the molds. These gaggers are made from square steel rods twisted into a Z-shape. The special advantages of this form are that the twist in the rod holds the sand securely, while the distinctive shape of the gagger prevents it from being thrown out as scrap. Four sizes of device are made from $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ in. square stock.

Pipe Die Stock.—The Hart Mfg. Company, Cleveland, Ohio, is placing on the market a new stock in which a single set of double end chasers are employed. One end is threaded 18 per inch and can be used for $\frac{1}{4}$ and $\frac{3}{8}$ in. pipe, while the other is threaded 14 to the inch and is suitable for $\frac{1}{2}$ and $\frac{3}{4}$ in. pipe. A cam and stop are employed to secure this variation in size.

Tool Post.—A new tool post consisting of five parts has been brought out by the O. K. Tool Holder Company, Shelton, Conn. Forged steel is used in the construction of the post which is very compact and solid. The base has two serrated tongues fitting in slots in the second member. This member slides diagonally upon the base and teeth in the bottom of the slots engage with those in the tongues of the base. This sliding member has a shelf upon which the tool rests, a cap clamping the latter when the nut is tightened. By loosening the nut and sliding the upper member diagonally on the base, the tool can be adjusted to any desired height, the teeth in the two parts holding them firmly in position.

Personal

Joseph F. H. Dixon, formerly secretary and general manager of the Federal Steel Foundry Company, has been appointed general manager of the Keystone Steel Casting Company, Chester, Pa., succeeding R. B. Farquhar, Jr.

Edward S. Kendrick, of Edward S. Kendrick & Co., Cincinnati, Ohio, has accepted the appointment of Northwestern sales agent of the Berwind Fuel Company, at Minneapolis, Minn., effective April 1. The Berwind-White Coal Mining Company, People's Gas Building, Chicago, is thereafter to receive communications pertaining to Berwind coal and coke formerly handled in Cincinnati territory by Edward S. Kendrick & Co.

The Bureau of Manufactures, Department of Commerce and Labor, Washington, D. C., announces that Durand C. Alexander, Jr., of New York, has been appointed commercial agent to investigate the export trade in machinery, machine tools, and other similar products in foreign countries. His first investigations will be made in the Orient, and his itinerary will probably include Japan, Philippines, China, India, and the Straits Settlements and Australia. Manufacturers who desire special matters investigated in these lines should communicate with the Bureau, which will welcome any suggestions which may be made with respect to subjects which might be covered by Mr. Alexander's investigations.

James M. Motley has resigned as president of Motley, Green & Co., Inc. His address in the future will be at 71 Broadway, New York, where he will continue to carry on personally the business of contracting for the supply of railroad and mining equipment and material.

John H. Baird, for over 25 years in the employ of the Joseph Dixon Crucible Company, has become treasurer and general manager of the New York & New Jersey Graphite Products, with headquarters at 253 Broadway, New York. Among the products marketed are crucibles, graphite, graphite paint, pencils, school and lumber crayons, Never Slip pulley preparation, foundry facing, &c.

E. Ronceray of the Société Anonyme des Etablissements Ph. Bonvillain & E. Ronceray, 9 and 11 Rue des Envierges, Paris, France, has been elected vice-president of the Committee of Admission and Installation, Group IV., of the Turin Exposition, including Class 23, various machine tools; 24, heating process and forging tools; 25, machine tools and small tools; 26, machines for various works; 27, machines for building materials. The company has a branch in Turin, with a select and relatively numerous staff, and is at the disposal of the exhibitors desirous to be represented during the time of the exposition.

J. E. Shull and associates have disposed of the controlling interest in the Shull Steel Castings & Mfg. Company, Canton, Ohio, and Mr. Shull has retired as treasurer of the company.

Henry D. Watson, formerly assistant manager of the New York branch of the Westinghouse Machine Company, has been made general Eastern sales manager of the Saurer Motor Company, 30 Church street, New York, manufacturer of industrial automobiles.

W. S. Chase, sales manager, and Paul Ryan, advertising manager, of the National-Acme Mfg. Company, Cleveland, Ohio, returned March 27 from a three months' sojourn in Europe on business.

Robert S. Alter, secretary of the American Tool Works Company, Cincinnati, O., sailed from New York this week for a two months' pleasure trip through Europe.

David E. Jackman, of the firm of E. S. Jackman & Co., Chicago, Cleveland and Pittsburgh, has withdrawn to accept the position of treasurer of the Firth-Sterling Steel Company, McKeesport, Pa., and will assume his new responsibilities April 1.

Cornelius T. Myers, sales manager of the Wisconsin Engine Company, Corliss, Wis., has resigned with the

intention of engaging in business in Racine, Wis., as consulting engineer.

E. T. Hendee, assistant to the president of Joseph T. Ryerson & Son, Chicago, has returned from Europe.

I. L. Hughes has been appointed district superintendent of the Carnegie Steel Company's upper and lower Union mills, Youngstown, and the mills at Greenville, Pa., succeeding the late F. B. Baugh. A. W. Griffith has been made assistant superintendent.

William S. Pilling of Pilling & Crane, Philadelphia, has returned from a month's trip to the Pacific Coast.

F. W. Hudson of Chicago has been made superintendent of the Sharon, Pa., plant of the American Steel Foundries, succeeding C. W. Lytle, resigned.

Robert Bosch, Bosch Magneto Company, Stuttgart, Germany, arrived in New York March 21, and will spend several weeks here.

C. H. Todd, president of the Petroleum Iron Works Company, Sharon, Pa., has gone to Mexico on a business trip.

F. Mandon of the firm of Feunwick Frères et Cie, machinery dealers, Paris, France, is spending six weeks in the United States visiting machine tool manufacturers.

The Goldschmidt Thermit Company, 90 West street, New York, has enlarged its force of metallurgists by acquiring the services of Dr. E. A. Beck, who brings to his new position a varied experience. The company will give technical advice on all matters pertaining to the use of its metals and alloys in the production of special steels, brass and bronze.

Customs Decisions

Cast Iron Statues

In overruling a protest filed by Benziger Bros., New York, the Board of United States General Appraisers has fixed the classification under the tariff act of 1909 of cast iron statues. The statues, which are used principally for decorative purposes in Catholic churches, are imported with the marks of the mold removed. They are decorated by means of paint or coloring material, and are in all respects finished and ornamented figures. The samples submitted were finished to represent bronze. Collector Loeb classified them as "manufactures of iron not specially provided for," with duty at the rate of 45 per cent. ad valorem. Benziger & Co. alleged that a rate of eight-tenths of 1 cent a pound should be granted under the provision in the tariff for iron castings. It happens, however, that the second part of the castings provision imposes an additional tax of two-tenths of a cent a pound on castings which have been advanced in condition subsequent to the casting process.

The statues in controversy have, in the opinion of General Appraiser Fischer, been so advanced. Hence the claim for a rate of eight-tenths of 1 cent a pound is deemed by the board not well founded. The decision upholding the collector's assessment says that the board does not think it was the intention of Congress to cover, in the first clause of paragraph 147, articles which have been finished and decorated in the way these metal statues have been. Furthermore, the decision holds that the care and finish bestowed on the articles remove them altogether from the provisions of paragraph 147. Classification as "manufactures of iron" is affirmed.

In Monterey, Mexico, a magnificent hotel is being erected which will cost about \$1,000,000, and will doubtless be the finest hotel in the republic. The owner is Don Fernando Aneira and the engineer and architect is Don Gustavo Trevino. An isolated electric plant will provide lighting for the building and power for motors for running elevators, pumps, and numerous other devices. The source of power will be two Westinghouse 100 kw. steam turbine outfits, with Babcock & Wilcox boilers. The turbines, which are being made by the Westinghouse Machine Company, Pittsburgh, Pa., are being supplied by the Cia. Ingeniera, Importadora y Contratista, S. A., successors of G. & O. Braniff & Co.

Obituary

LORD AIREDALE (SIR JAMES KITSON)

Lord Airedale of Gledhow, better known in the United States as Sir James Kitson, died at Paris, March 16, aged 76 years. He was prominent in the manufacture of iron and steel in Great Britain and was senior past president of the Iron and Steel Institute. For many years he had been active in the affairs of the Institute, taking a leading part at most of its meetings. He presided at the Paris meeting in 1889; also at the meetings in New York and Pittsburgh on the visit of the Institute to the United States in 1890. He was a member of the Institute party which visited the United States in October, 1904, for the second American meeting of the Institute, which was held in New York, October 25 and 26, and at the opening session he presented the Bessemer gold medal to Andrew



LORD AIREDALE.

Carnegie. Lord Airedale was chairman of Kitson & Co., Ltd., operating locomotive works founded by his father and known as the Airedale Foundry, Hunslet, Leeds; also chairman of the Monk Bridge Iron & Steel Company, Ltd., Leeds, and a director of the Northeastern Railway Company. The Monk Bridge Iron & Steel Company manufactures Yorkshire iron and crucible and open hearth steel. Lord Airedale and his brother, F. W. Kitson, were patentees of the method for manufacturing solid weldless tires, which were produced in large quantities until superseded by steel tires. In 1862 the manufacture of steel tires was begun at the Monk Bridge Works, and the business has been carried on continuously, being now one of the foremost of its class in the United Kingdom.

CHARLES W. HUNT

Charles Wallace Hunt, an eminent engineer, died March 27 at his home on Staten Island, N. Y., aged 70 years. He was born in Candor, Tioga County, N. Y., in 1841, and took a scientific course at Cortland Academy, Homer, N. Y. Engaging in the coal business in West New Brighton, Staten Island, shortly after the Civil War, he was impressed with the high cost of handling coal. He worked out a scheme for an automatic railway for coal buckets or cars whereby coal could be dumped at any point on a trestle, the only motive power being that of gravity. He invented this system in 1871, and later built a factory in West New Brighton for making hoists and conveying machinery. This factory has for years been conducted by the C. W. Hunt Company, of which he was president. The business of the company has become very extensive, covering all parts of the United States as well as foreign countries. Branch factories have been established in Germany and England. Mr. Hunt was a prolific inventor of apparatus for use in hoisting and conveying, having taken out over 150 patents. He was a member of the American Society of Mechanical Engineers, filling the office of president for one term. He was also a member of the American Institute of Mining Engineers, American Institute of Elec-

trical Engineers, American Association for the Advancement of Science, Municipal Arts and Science Association, New York Electrical Society, United Engineering Society, Franklin Institute, New York Chamber of Commerce, Staten Island Chamber of Commerce and of the Engineers', Hardware, Machinery, and Staten Island clubs, and vice-president of the Richmond County Savings Banks. He was married twice and leaves a widow, two sons and two daughters.

GEORGE A. BARNES, secretary of the Whitman & Barnes Mfg. Company, wrench manufacturer, Akron, Ohio, and manager of the Akron plant of that company, died March 22, aged 54 years.

The Erie City Iron Works, Erie, Pa., has sold to the Jones & Laughlin Steel Company, Woodlawn Works, twelve 400-hp. vertical water tube boilers; W. J. Rainey coke interests, Uniontown, Pa., eleven 300-hp. vertical water tube boilers and 3250-kw. Erie City Lentz 4-valve engines; Allegheny Steel Company, Brackenridge, Pa., a 200-kw. Erie City 4-valve engine.

The Asbestos Covered Metal Company, Boston, Mass., has recently purchased a building from the Keystone Driller Company, Beaver Falls, Pa., which will be remodeled and equipped with machinery for the manufacture of sheet iron roofing and siding to be covered with asbestos, for the purpose of making it an absolutely fireproof building material.

The Miller-Owen Electric Company will remove on April 1 from 107 Market street to 217-19 First avenue, Pittsburgh, where it will be better able to conduct its increasing business. The company specializes in new and second-hand electrical equipment for mills and factories and carries a variety of machinery in stock.

The Frick Company, Pittsburgh, will move its offices April 1 from the Fulton Building to the Jenkins Arcade Building. The refrigerating and ice-making machinery department is in charge of Otto C. Arens, while the lighter lines of machinery, including thresher and saw mills, are in charge of Walter Martin.

The Upson Steel Company, Cleveland, Ohio, expects to place its new steel plant in operation early in April. The 34-in. blooming mill and one of the four open hearth furnaces will be operated at the start. The bar mill will not be completed until about July 1.

The Grey Iron Foundry Company, Reading, Pa., has purchased from the receiver of the National Brass & Iron Works, of that city, all the patterns and molds for the latter's extensive line of art metal work, which it will be prepared to place on the market in the near future.

The Crosby Company, sheet metal stamping, Buffalo, N. Y., has opened a sales office at 717 Ford Building, Detroit, Mich., with Fred W. Coxe in charge, for the purpose of caring better for its growing Western business.

No. 1 Crane Furnace of the Empire Steel & Iron Company at Catsauqua, Pa., is being blown in this week after considerable repairs. For several months only one furnace of the Crane group has been in operation.

The Wadsworth Core Machine & Equipment Company, recently organized at Akron, Ohio, will be located at 10 West Buchtel avenue in that city. It expects to have its new plant in operation about April 10.

Tod Furnace of the Youngstown Steel Company at Youngstown, Ohio, which has been shut down for about six months, will probably be put in blast next week.

The Great Lakes Engineering Works, Detroit, Mich., has received an order from Boland & Cornelius, Buffalo, N. Y., for a 524-ft. freight boat.

The Western Electric Company's Earnings

The Western Electric Company's annual report makes the following showing for the last two fiscal periods:

	13 mos. ended December 31, 1910	12 mos. ended November 30, 1909
Gross sales	\$68,375,150	\$45,575,000
Cost of product.....	63,442,286	43,206,000
Net earnings.....	\$4,932,864	\$2,359,000
Other income.....	486,305	.....
Total income.....	\$5,419,169	\$2,369,000
Interest	894,893	280,000
Balance	\$4,524,276	\$2,089,000
Reserves	1,150,000	.....
Earned on stock.....	\$3,384,276	\$2,089,000
Dividends	1,700,000	1,200,000
Surplus for year.....	\$1,684,276	\$889,000

The balance sheet as of December 31, 1910, shows \$739,541 reserved for pensions, \$2,846,506 reserved for general purposes and \$19,121,062 surplus.

In his accompanying remarks report to the stockholders, President H. B. Thayer states that for the 13 months to December 31, 1910, the number of orders received by the American offices of the company was \$96,000, as compared with 695,000 in the preceding 12 months, and the average value an order was \$72, as compared with \$62.

During the year the work of concentrating at the Hawthorne plant the manufacturing work formerly carried on at the New York City and Clinton street, Chicago, plants has been continued. The manufacturing plants were worked to their full capacity during the year. For 1911 additions at Hawthorne have been authorized amounting to about \$1,000,000 to provide for further concentration and additional facilities for the business. During the year the company sold its Clinton and Polk streets properties for \$3,247,201. These properties were carried on the books at \$2,759,971. The profit, \$487,232, has been carried to reserves.

On January 1, 1911, the number of employees was 23,464, as compared with 17,835 at December 1, 1909. There are now 45 ex-employees on the pension roll, and the average pension paid is \$713.64 per annum.

The total current assets, including sundry investments, less all liabilities except first mortgage 5 per cent. bonds, were \$42,695,123 January 1, 1911. This is more than two and four-fifths times the total bond issue authorized and outstanding.

Railroad Equipment Orders.—The Louisville & Nashville has ordered 500 steel underframes for gondola cars. Of the order of the Atlantic Coast Line, 1400 box cars went to the American Car & Foundry Company and 50 steel underframe phosphate cars to the Standard Steel Car Company. The Western Maryland has placed orders for 23 passenger, baggage and mail cars. The Pere Marquette has placed its order for 50 locomotives with the American Locomotive Company. The New York, Chicago & St. Louis has ordered 15 locomotives, and the New York, Ontario & Western four locomotives of the American Locomotive Company. The Western Maryland has placed five with the Baldwin Locomotive Works.

"The Strength of Oxyacetylene Welds in Steel," by Herbert L. Whittemore, has just been issued as Bulletin No. 45 of the Engineering Experiment Station of the University of Illinois, Urbana, Ill. This bulletin gives the results of an extensive series of tests to determine the strength which may be developed in welded joints made by fusing thin steel plates together by means of the flame of an oxyacetylene blowpipe. It was found that with careful manipulation, such a welded joint may be expected to have about 85 per cent. of the strength of the plate material. Considerable information as to methods of manipulation of the oxyacetylene blowpipe and the proper regulation of the gases is also given in the bulletin, which may be obtained gratis upon application to W. F. M. Goss, Director.

The Maintenance of Way Convention

An exhibition under the auspices of the Railway Appliances Association was held in the Coliseum, Chicago, March 20 to 25, inclusive, showing one of the largest collections of railroad appliances ever brought together. It was made in connection with the annual meeting of the Railway Signal Association, which met March 20 at the Congress Hotel, and the twelfth annual convention of the American Railway Engineering and Maintenance of Way Association, in the same place, beginning March 21.

Practically every device used in the construction, maintenance and operation of a modern railroad, including safety appliances and many new devices of interest to the railroad engineer, was included in the display. Every available foot of space at the Coliseum, including balcony and annex, was occupied by the exhibits of nearly 200 manufacturers. Railroad engineer experts from all parts of this and many other countries were in attendance, and technical problems connected with the engineering department of railroads were beneficially discussed at the various meetings.

A feature of unusual interest at the Coliseum was a model of the gyroscope monoplane car, which was exhibited by the Central Scientific Company, Chicago. This little model, perfectly balanced by two heavy grostats or flywheels, mounted side by side on the car and spinning in opposite directions, was a feature that never lost its attraction to the crowds who watched it on its single wire rail. The model was 14 in. in length, weighing about 140 lb., and its power of being able to right itself under any load, however unevenly distributed, was keenly studied.

Marked progress continues to be made by the manufacturers of railroad equipment. Signal apparatus has been improved probably as much as any other one branch of railroad appliances, and the fact that railroad officials continue to install such up-to-date apparatus in the face of conservative buying campaigns demonstrates this year the power of signals in decreasing the cost of operation. The American Railway Engineering and Maintenance of Way Association and the Railway Signal Association have both made remarkable showings in the past year and, directly as a result of their efforts, the railroads have outstripped splendid records of the past which have marked their yearly improvement.

A Large Surplus of Idle Cars.—The American Railway Association bulletin shows that on March 15 the net surplus of idle cars on the railroads of the United States and Canada was 207,527, an increase of 17,419, or 9 per cent. over March 1. The present surplus is four times that of one year ago. With allowance for the additional equipment in service, the number of idle cars is probably twice what it was in March, 1910.

Among literature representing the manufacturers' view of accident compensation, now being circulated in Ohio in connection with the bill now pending in the Legislature, is the paper on "The Personal Equation in Accidents" prepared by Thomas D. West for the Detroit meeting of the American Foundrymen's Association. It was published in *The Iron Age* of June 16, 1910, page 1440. The substitute compensation bill recently reported by the Judiciary Committee of the Ohio house has made several changes in the one originally introduced. One of these is the elimination of the provision by which the courts be directed to impose a double penalty in case of a judgment against an employer not insuring under the act.

The Canton Sheet Steel Company, Canton, Ohio, has purchased the plant of the American Sheet & Tin Plate Company in that city that was wrecked by a boiler explosion several months ago and which has since been practically dismantled. The site was acquired for use in future developments of the purchaser.

An Important Commercial Automobile Consolidation

The consolidation is announced of the American Motor Truck Company, Lockport, N. Y.; Lockport Stamping Company, Lockport, N. Y., and Findlay Motor Company, Findlay, Ohio. The plants of the first two named are now being moved to the Findlay plant, which is a large and modern one. Up to the time of this consolidation the Findlay Motor Company had been engaged in the manufacture of the lighter type of motor delivery wagons, consisting of a 500 to 750 lb. two-cylinder car and a 1000 to 1500 lb. four-cylinder car. The American Motor Truck Company's product has consisted of three standard classes—a five ton, a three and a half ton and a two ton, all four-cylinder type—and it will now add to its line a one ton carrying capacity truck. The Lockport Stamping Company has been engaged in the manufacture of automobile radiators, both for pleasure and commercial cars, the Findlay Motor Company taking a large portion of its output. The merger will give the Findlay Company facilities for making its own radiators as well as supplying several other prominent automobile concerns.

The executive offices of the consolidated concerns will be at the Findlay plant, but the business of the American Motor Truck Company will be run under the same name and management as heretofore. L. E. Ewing, president of the Findlay Motor Company, has been elected president of the American Motor Truck Company to succeed Charles R. Bishop, resigned. E. B. Olmsted remains the vice-president and general manager of the company. The other officers are unchanged.

The Findlay Motor Company is possessed of a large tract adjoining its present large up-to-date plant. Negotiations are already on foot looking toward the erection of extensive additions to take care of the incoming factories, and to provide for the rapidly increasing business of all of them. With the line of commercial trucks from 750 lb. capacity up to five tons, made in one plant, a line which has been thoroughly tried out in actual service for years, there will be a great increase in the business of Findlay. The combination of the three companies brings together not only three large manufacturing plants, but represents the concentration of the combined capitals of the three companies, and it is safe to predict that the Findlay alliance is destined to make itself felt in the trade.

The Baldwin Locomotive Works' Earnings

The Baldwin Locomotive Works reports to the New York Stock Exchange for the year ended December 31, 1910, as follows:

Sales	\$29,057,998
Cost	25,697,273
Manufacturing profit.....	\$3,360,725
Dividend, Standard Steel Works.....	600,000
Receipts from other sources.....	407,778
Gross profit.....	\$4,368,503
Charges, taxes, &c.....	856,929
Balance.....	\$3,511,574
Maintenance of plant and depreciation.....	994,894
Net profit.....	\$2,516,680
Dividends	1,026,000
Surplus.....	\$1,490,680

The general balance sheet as of December 31, 1910, shows cash on hand \$1,861,194 and other quick assets \$17,185,723, with current liabilities \$6,278,858. The capital surplus is \$4,020,112 and other surplus \$1,645,036. The common stock outstanding is \$9,200,000; preferred, \$10,800,000; bonds, \$10,000,000.

The Sandusky Foundry & Machine Company, Sandusky, Ohio, has closed a deal for the purchase of the plant of the Warren Electric Mfg. Company in that city and will move to its new quarters about April 1. The new plant will provide the company with much greater capacity than is afforded by its present quarters. Its

principal products are paper mill machinery and power pumps. Some additional lines may be added. W. H. Millsbaugh is president.

An Iron Roof Still Good After 40 Years

The Empire Iron & Steel Company, Niles, Ohio, manufacturer of black and galvanized sheets, is sending out photographs showing a sheet iron roof which has given perfect satisfaction for 40 years. When such a roof actually outwears the building upon which it was placed so many years ago, the circumstances connected with the case should indeed be of general interest to sheet metal men. The roof is on a warehouse belonging to the Globe Foundry & Machine Company, Niles, Ohio, of which W. B. Carter is general manager. The roof was placed at the time the building was erected in 1871. It is of the old-fashioned iron made before the open hearth and Bessemer processes were commercially known in the manufacture of steel for sheets in this country. The last coat of paint was applied between 20 and 25 years ago and during all these intervening years the roof has been practically devoid of surface protection. The photograph shows ragged edges on the eaves caused by the roof at those points being loosened and fragments blown off during a series of violent storms some months ago. This slight damage, of course, does not affect the protection still afforded the building by the roof proper. Deepest interest lies in the peculiar fact that the warehouse itself is a near wreck while the roof, which has undergone the same bombardments of nature, is still intact and giving service. This case seems to reverse the accepted order of things and change the phrase "several roofs during the life of the building" to "several buildings during the life of the roof." It appears to prove convincingly the superior wearing qualities of good old-fashioned iron roofing.

Labor Notes

The National Founders' Association publishes a list of firms involved in union molders' strikes in the United States and Canada in the past three years, designating them as strikes in which the Molders' Union has given financial support to its members in the year 1910 and thus far in 1911. The list is made up without reference to the membership of the firms affected in the National Founders' Association. No condensed statement is made of the number of men involved in strikes which were unsuccessful, nor is the total given of those in which the union carried its point. However, a general strike summary is given for the period from March, 1904, to March, 1911. For these seven years the figures are as follows:

Foundries affected.....	540
Union members involved.....	16,378
Foundries involved in compromises.....	45
Union members involved in compromises.....	1,342
Foundries involved where strikes have been lost to union.....	436
Union members involved where strikes have been lost to union.....	13,471
Foundries involved where union has been successful.....	66
Union members involved where union has been successful.....	1,718
Foundries involved where strike benefits are still being paid.....	86
Union members involved where benefits are still being paid.....	2,252

The differences between the Goulds Mfg. Company, Seneca Falls, N. Y., and its molders relative to the operation of molding machines have been adjusted, the 100 molders and coremakers who went on a strike returning to work last week.

A public conference will be held in the United Engineering Building, 29 West Thirty-ninth street, New York City, April 8, to consider the important subject of the relation of the national and State governments to the conservation and utilization of water powers. Two sessions will be held, afternoon and evening, and papers and addresses will be delivered by several well-known men. The National Electric Light Association has issued a partial list of topics, which will be discussed at this meeting.

Steel Foundry Practice

Notes on Open Hearth Furnace Work, Covering Both Metallurgy and Molding

BY EDWARD HERMS, WILKINSBURG, PA.

The following notes are based on an experience in steel foundry practice in the St. Louis and Pittsburgh districts as chemist, furnaceman and superintendent:

Acid and Basic Steels

Acid steel is not as desirable as basic steel where shrinkage is an important factor in causing cracks, as in the casting of bolsters for cars, charging machine boxes, cast steel ladles, annealing boxes, and the like; for the general run of acid steel is more liable to crack than a low phosphorus basic steel. The reason for this is not so clear, as the slightly larger percentage of sulphur in acid steel—which sulphur content tends to red shortness—can hardly account for this tendency to crack; for in reality in basic castings it is found that cracks are related to the phosphorus content, and that castings that will crack with 0.040 phosphorus will cease to crack or show much smaller cracks at 0.015 phosphorus content, without any variation in the sulphur content. These cracks are not cold cracks, but hot cracks. It is always aimed to get the phosphorus content low in plants that make a specialty of railroad castings in order to avoid the cracks. Two foundries in the St. Louis district tried acid steel for making bolsters, but were compelled to give up the practice. The fact that acid steel is more prone to crack may be due to its greater density and consequent greater shrinkage.

To make low phosphorus basic steel, it is necessary to have as little silica as possible in the charge. The pig iron must be low in silicon—the lower the better, and 1 per cent. is the limit generally allowed; the scrap should be low in silicon; also the limestone should be low in silica—better under 1 per cent. Magnesia does not make a good slag, and should be low in the limestone. Of course, the phosphorus and sulphur should be low. The more impure the limestone the more will be needed, and the excess is only a barrier to the working of the heat as it is a poor conductor, preventing the heat from entering and endangering the furnace. As much as 18 per cent. limestone to the charge is used where the charge runs high in phosphorus, as with Southern pig, which runs close to 1 per cent., and in this case it is not uncommon to get under 0.010 phosphorus in the finished steel. With 0.40 per cent. phosphorus in the pig iron, 14 to 15 per cent. of limestone to the charge is sufficient. It is customary to make a preliminary phosphorus before tapping a basic heat, and if the phosphorus is found too high, it is reduced by adding unslacked lime in small lumps after the bath is first given some action by adding pig iron or spar. It is found that iron ore, pig iron and spar added together to a very low carbon will reduce the phosphorus. By working the heat with an oxidizing flame, the phosphorus is readily removed and often absent when the heat is thoroughly melted.

Additions to the Bath

The limestone is charged on the bottom or the bottom is first covered with scrap to prevent the limestone from adhering. When the charge is melted there will be a violent boiling on the bottom until all the lime is up and floating on the charge in large chunks. The heat is then worked by giving it lumps of iron ore in suitable quantities so as not to cause foaming or unnecessarily cooling of the heat by large disengagement of gases. The chunks of lime floating on the surface, under this influence, are gradually converted into slag. Fluorspar will hasten this process of dissolving the lime, but it must not be added until the carbon in the bath is under 0.40. For otherwise the bath will foam and delay the heat. This foaming of the heat has some relation to the

iron ore used, for it appears that with a high carbon the iron ore does not reduce the carbon as rapidly as with a lower carbon, and thus that the gases generated must be held in solution. True it is that the activity of the bath is greater, the lower the carbon until a lower limit is reached. This gas the fluorspar seems to loose, which, with the viscid slag, causes foaming. With a foaming heat there is nothing to do but to wait until the foam subsides. Fluorspar can be added slowly to a high carbon bath to which no ore has been added, which is the practice in making high carbon basic heats. Pig iron also causes foaming when added to a high carbon basic heat to which ore has been added. Any cold metal added to the bath at any time causes disengagement of gas, but not always any considerable foaming. Thus it is a good practice to add cold metal, as pig iron, at the close of the heat to disengage the gas and thus help kill the bath, making more solid castings. Ferrosilicon, 10 to 12 per cent., is also good for this purpose, and it is a common practice to add 500 to 800 lb. to a bath of 20 tons just before tapping. Much more can be used with good effect in making high carbon basic steel come solid, and it is well to preheat the ferrosilicon in a little furnace for that purpose. In this way 1500 to 1800 lb. can be used in a 20-ton bath in making high carbon rolls, and will bring solid castings. The increase in phosphorus from the ferrosilicon, when using good materials, is insignificant.

In making nickel steel castings it is well to add the nickel to the bath when the carbon is low, a little before the final additions of manganese and silicon. If nickel scrap steel is used, it is well to make a preliminary nickel test just before tapping, so that the final nickel content can be safely assured. There is no loss of nickel to the slag, and an acid or basic hearth is equally applicable.

Care must be taken in making additions to the ladle that they are all dissolved before the slag enters the ladle, for if added too late the last few castings may be very high in silicon or manganese, or both, causing the castings to be brittle. The last 1000 lb. of steel from the ladle of a basic heat is rather inferior, being high in phosphorus. The basic ladle should not contain too much slag over the metal, as this hot slag is apt to cut the sleeves off the stopper rod if the heat is long in pouring. This can be partly adjusted by adding or removing brick from the ladle lipspout. The nozzle should be well preheated to prevent the sticking of the stopper.

To Prevent Piping and Shrink Holes

A good plan to prevent piping and shrink holes is to cover the heads just as soon as filled with blacklead or plumbago. This will prevent a crust from forming and keep the metal liquid, so that it will sink down to feed any shrinkage of the castings. Charcoal will also keep a head open if stirred with an iron rod; but anthracite will not do, as it is absorbed more freely and is apt to raise the carbon so as to make it difficult to cut-off the heads unless this is done with an oxygen blast. In making rolls of acid and basic steel, it is found that acid steel gives the largest pipe. With care basic high carbon castings, including rolls, can be made to come solid up to 1.10 and 1.25 carbon.

The analysis of castings varies somewhat with their purpose. Where high physical properties are required and the steel must withstand shock to a high degree, the carbon and phosphorus must be low. For bolsters 0.18 to 0.23 carbon is good with phosphorus as low as possible, preferably under 0.025. The manganese is desired

above 0.70 and under 0.85, although 0.90 is not bad with a low carbon. Silicon ranges from 0.25 to 0.35, and even 0.40. When castings must be machined, soft steel includes anything, roughly speaking, up to 0.30 carbon, and it is well to have the manganese and silicon well up to insure solidity. A little aluminum added to the metal as it enters the pouring cup will help much to insure solidity.

Molding Conditions

The condition of the liquid steel is not alone responsible for solid castings, for the condition of the mold is equally important. There must be plenty of vent in the mold, for if the vent is poor the steel will come with blowholes. This vent is interrupted by a dense mold or dampness. Dampness seems to be the worst enemy. Acid steel will not come solid in green sand much more than basic steel, yet by adding sufficient aluminum to the metal as it enters a well-vented mold, a degree of solidity can be attained that is satisfactory for much work. Dampness seems to be the principal cause of the facing burning into the mold or the steel hardness of certain cores, which makes it all but impossible to remove them. Yet an excess of fireclay will cause this trouble as well as a low class of core materials. Scabbing is often caused by dampness. All cracks are not due to the condition of the metal, but the manner of gating, the design of the pattern and the hardness of the facing are important. By distributing the flow of metal into the mold more uniformly, thus preventing a hot streak or line of weakness, while most of the metal has chilled, will often obviate a crack.

The sand for molding should be silica sand of high silica content, the higher the better. Sharp sand is not so desirable for green sand work. The silica should run above 97 per cent. Various degrees of fineness have been used with success, although it is understood the sand should be rather coarse. The fireclay to mix with this sand should be refractory and of high tensile strength, especially in green sand work. There are three kinds of bond in fireclay; the stickiness in the wet condition, that of the air dried condition, and finally that developed by firing. The first kind is essential to green sand work, the first two are right for dry sand work. The St. Louis district possesses the finest clays of the first class, and this together with the pure silica sands of this district is largely responsible for the degree of success which green sand work has attained there. If a natural sand of sufficient tensile strength could be found of a coarse texture and about 3 to 4 per cent. alumina and 93 per cent. silica, with 3 per cent. combined water and little other impurities, we would have an ideal molding sand. If the alumina runs high in the sand, the silica and alumina will flux from the high heat of the steel and burn into the surface of the casting. Dry sand molding mixture requires less clay than green sand, for here the molasses water or glutrin furnishes the bond by drying and baking. There is much foundry flour on the market that contains large quantities of carbonate or sulphate of lime, even up to 50 per cent. of the impurity, and this is objectionable as a steel foundry material because of its fluxing and fusible properties. The sand mixtures are preferably mixed dry, as only thus will the clay penetrate the mass the more thoroughly. Steel castings can be made to peel clean, so that very little grinding and chipping are necessary, and this is attainable when good facing is used.

The Buffalo Forge Company, Buffalo, N. Y., has closed a contract with the Anheuser-Busch Brewing Association, St. Louis, for an equipment of Buffalo down-draft forges with the necessary fans and motors. Among other recent purchasers of similar equipment are the Weyher Wagon Works, Wausau, Wis.; Bradley Polytechnic Institute, Peoria, Ill.; Shaw University, Raleigh, N. C.; Palmer & Singer Mfg. Company, New York City, and Fiat Automobile Company, Poughkeepsie, N. Y.

The Morgan Engineering Company, Alliance, Ohio, has purchased an interest in the Shull Steel Castings & Mfg. Company, Canton, Ohio.

February Iron and Steel Exports and Imports

A decrease both outward and inward in our foreign trade in iron and steel and manufactures thereof is shown by the February report of the Bureau of Statistics, Department of Commerce and Labor. The total values of these commodities, not including ore, exported in February was \$18,690,792, against \$18,739,961 in January. The value of similar imports in February was \$2,145,803, against \$2,874,740 in January.

The exports of commodities for which quantities are given aggregated 150,702 gross tons in February, against 152,140 tons in January. Details of the exports of such commodities in February and for the eight months of the current fiscal year ending with February, compared with corresponding periods of the previous year, are as follows:

Exports of Iron and Steel.

Commodities.	February.		Eight months ending February.	
	1911.	1910.	1911.	1910.
Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	14,939	3,033	111,463	45,402
Scrap	3,761	275	22,813	7,267
Bar iron.....	831	767	10,557	8,602
Wire rods.....	1,186	1,019	10,929	13,217
Steel bars.....	11,841	6,874	79,119	56,791
Billets, blooms and plates	23,453	1,596	85,883	48,699
Steel rails.....	19,880	34,486	225,555	255,431
Iron sheets and plates.	6,332	8,586	63,906	59,058
Steel sheets and plates.	15,950	14,105	119,535	85,680
Tin and terne plates..	2,213	828	10,830	6,677
Structural iron and steel	18,222	9,476	102,081	63,009
Barb wire.....	5,128	4,830	53,815	47,428
Wire	7,582	4,929	63,424	48,531
Cut nails.....	570	409	6,372	6,455
Wire nails.....	3,838	4,188	30,348	22,502
All other nails, including tacks.....	1,108	552	7,595	5,014
Pipe and fittings....	13,568	13,819	109,544	114,676
Totals.....	150,702	109,772	1,113,769	894,437

The imports of commodities for which quantities are given aggregated 20,454 gross tons in February, against 32,795 tons in January. Details of the imports of such commodities in February and for the eight months of the current fiscal year ending with February, compared with corresponding periods of the previous year, are as follows:

Imports of Iron and Steel.

Commodities.	February.		Eight months ending February.	
	1911.	1910.	1911.	1910.
Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	11,157	16,468	147,514	156,805
Scrap	2,370	14,092	18,081	94,393
Bar iron.....	2,572	3,208	21,116	17,446
Billets, bars and steel forms n.e.s.....	2,341	2,135	27,473	20,217
Sheets and plates...	134	384	2,846	4,074
Tin and terne plates.	873	5,661	36,970	43,752
Wire rods.....	1,007	1,665	12,676	7,623
Totals.....	20,454	43,613	266,676	344,310

The imports of iron ore in February were 94,820 gross tons, against 102,600 tons in January and 170,427 tons in February, 1910. The imports of ore in the eight months of the fiscal year ending with February were 1,529,185 gross tons, against 1,577,660 tons in the corresponding period of the previous fiscal year. Of the imports in February, 80,100 tons came from Cuba, 8826 tons from Spain, 5729 tons from Sweden and 165 tons from Canada.

The total value of the exports of iron and steel and manufactures thereof, not including ore, in the eight months of the current fiscal year ending with February, was \$142,289,601, against \$111,184,177 in the corresponding period of the previous year. The total value of similar imports was, respectively, \$23,298,159 and \$24,157,500.

The Carroll-Forster Boiler & Tank Company, Pittsburgh, has started up its plant at Wellsville, Ohio, which was shut down for four weeks, on a contract for 600 tons of riveted steel pipe to be sent to Portland, Ore., for use in the construction of a water power system.

Steel Rail Failures

The Report of the Maintenance of Way Association's Committee—Troubles Traceable to the Ingot

An important feature of the proceedings of the American Railway Engineering and Maintenance of Way Association at the Chicago convention session of Wednesday, March 22, was the voluminous report of the Committee on Rail. The statistics of rail failures submitted by the committee, were for the six months ending October 31, 1909, and are referred to as the most complete information on the subject ever published. The committee says that an important deduction from these statistics is that differences in the production of ingots and the finished rail made from them may annihilate all advantages derived from any particular rail section: "The design of rail section," the committee says, "is not, therefore, the main cure for poor material." A summary of present practice in the rail mills of the United States

the interior of the rail head." In an accompanying report, Mr. Wickhorst tells of his tests to determine the strength of rail head, but the results are inconclusive, though he says it is hoped to determine in future tests the maximum load which each thickness of head will carry. After planing pieces of rail down to thicknesses of head at the side, ranging from $\frac{3}{4}$ in. to 1 in., loads were applied and the sag measured. A load of 30,000 lb. seemed to cause a permanent sag with a $\frac{3}{4}$ -in. head, but not much, if any, with heads of greater thickness. It was noted that the web seemed to stand the load of 200,000 lb. successfully.

The committee says that it desires to make a closer study of ingot making, "as the principal defects connected with rail manufacture seem to have their origin

A Summary of American Steel Rail Practice. Compiled by Robert W. Hunt & Co., December 12, 1910.

MILL	LOCATION	KIND OF STEEL	NO OF CONN. OR JOINTS	SIZE OF INGOTS AT BOTTOMS	NOM. NO. OF INGOTS PER HEAT	NOM. NO. 90% RAILS PER VEST	BLOOM. MILL ROLL HIGH	NOM. NO. PASSES BLOOM. MILL	BLOOM. RE-HEATED	NO OF PASSES RAIL MILL TRAIN	TOTAL PASSES INGOT TO RAIL	NO OF HOT SAWED	NO OF EXTRA HOT SAWED	CS FROM FINISHED TO HEADS OF ONE COMBINED	SEL. TIME BETWEEN SETTING AND LEAVING FINISHED	DIAM. ON TOP OR BOTTOM	BRAND OR RAIL READ FROM TOP OF INGOTS
ALGOMA STEEL CO.	STONEMARE CANADA	BESS OH	3	8 x 9 $\frac{1}{2}$	2 15	4-5	2	17	YES	11	28	1	1	113'	25-30	BOTTOM	TOP BOT
BETHLEHEM STEEL CO.	BETH'N PA	OH	10	19 x 23	25	6	2	15	NO	11	26	1	1	270'	35-40	-	BOT TOP
CAMBRIA STEEL CO.	JOHNSTOWN PA	BESS OH	4	19 $\frac{3}{4}$ x 22 $\frac{3}{4}$	4	5	2	15	YES	12	27	4	0	77'	15-20	-	-
CARNEGIE STEEL CO.	BRADDOCK PA	BESS	4	18 $\frac{1}{2}$ x 19 $\frac{1}{2}$	7-8	4-5	3	7	YES	13	20	4	0	43'	12-16	-	BOT TOP
COLORADO FUEL & IRON CO.	PUEBLO COL	OH	12	18 x 20	30	4	2	15	NO	10	25	1	0	105'	25-30	TOP	TOP BOT
DOMINION IRON & STEEL CO.	SYDNEY NS CAN	OH	10	18 $\frac{1}{2}$ x 21 $\frac{1}{2}$	18	6	2	17	NO	11	28	1	0	107'	10-15	BOTTOM	TOP BOT
ILLINOIS STEEL CO.	GARY IND	OH	28+	20 x 24	24	7	3-2	9	NO	9	18	5	0	158'	12-18	-	BOT TOP
ILLINOIS STEEL CO.	SO CHICAGO ILL	BESS	3	18 $\frac{1}{2}$ x 19	6-7	4	3	5	NO	9	18	5	0	96'	10-15	-	BOT TOP
LADAWANNA STEEL CO.	BUFFALO NY	BESS OH	4	19 x 19	6 34	4	2	6	NO	9	15	1	1	232'	12-18	-	TOP BOT
LORAIN STEEL CO.	LORAIN O	OH	6	22 x 26	20	-	2	-	YES	-	-	-	-	-	-	-	-
MARYLAND STEEL CO.	SPARRINS PT MD	BESS OH	3	19 x 21	6 16	5-6	2	13	NO	11	24	1	1	-	28-32	-	BOT TOP
MONTEREY IRON & STEEL CO.	MONTEREY MEX	OH	4	17 x 22	16	4	2	15	YES	10	25	1	0	205'	40-50	TOP	-
PENNSYLVANIA STEEL CO.	STEELTON PA	BESS OH	3 5+	18 $\frac{1}{2}$ x 18 $\frac{1}{2}$	30	4	3	9	YES	11	20	2	1	8'	10-14	TOP	-
TENN. COAL IRON & RR CO.	ENSLEY ALA	OH	8	19 x 23	30	6	2	11	NO	10	21	4	0	113'	15-20	BOTTOM	TOP BOT

Figures above represent nominal practice.

* Refers to time consumed from rolls until first rail is cut.

Lorain rolls chiefly girder and high tee rails. In two-high above. For Pennsylvania Steel Company, above is for standard steel. Maryland steel may be by duplex process. Carnegie

blooming mills, rails may be given more than number of passes sections only. Tennessee and Dominion make duplex process Steel Company may roll open hearth steel from Homestead.

was presented, as given in a chart prepared by Robert W. Hunt & Co. It is reproduced herewith.

No New Rail Sections

It is admitted by the committee that to determine upon a set of specifications that will bring about the manufacture of "good steel rails," is an intricate matter, involving the making of many tests. While no rails have been purchased as yet under the committee's tentative specifications, the differences between them and the specifications used by some of the large railroad systems are not very great and are being constantly reduced. No new sections will be recommended for the present, as the results of service with the type A and type B rails of the American Railway Association are awaited. The former is the high stiff design with thin head and the latter, the lower and more flexible design, with heavy head. It is stated that the study on strength of rail head made in the past year by Max H. Wickhorst, engineer of tests for the committee, was intended to throw some light on the controversy over the thin head and thick head. It was also expected to give some information "relative to the claim that the head of a rail is broken down by the excessive equipment loads of the present day, even though there be no physical defect in

in the making of the ingot. It is true that the temperature of the bar during manufacture and the amount of work done upon it have a strong effect on the subsequent quality of the finished rail, but the studies of the committee lead it at present back to the ingot as the source of our most serious defects, viz.: brittleness, unsoundness and segregation." A study will also be made of the relationship of the chemistry to the deflection under the drop, also to take up elongation as related to permanent set, so as to take account of ductility in accepting or rejecting rails, as is now being done by Dr. P. H. Dudley for the New York Central Lines.

Six Months' Statistics of Rail Failures

One appendix to the committee's report gives the following summation of rail failure statistics for the six months ending October 31, 1909. The statistics are for the greater number of the large railroad systems and the number of tons reported is 7,445,825:

Taking all the reports, the failures are divided into: Broken, head failures, web failures and base failures, according to the following percentages: Broken, 19 per cent.; head, 66 $\frac{1}{2}$ per cent.; web, 8 $\frac{1}{2}$ per cent.; base, 6 per cent.

The figures do not show that the breakages of the heavy sections are fewer than the lighter sections, except in the case of 75-lb. rail. The head failures, however, of the 100-

lb. rail seem to be materially less than those of 90 lb. and 85-lb. rail. With the Bessemer steel the head failures are the most numerous, those for the 90-lb. being slightly more numerous than for the others. Those for 85-lb. and 100-lb. rails come next, and are nearly the same. The number of breakages is closely the same in all cases, while the web and base failures are quite insignificant. With the open hearth steel the head failures of the 80-lb. rail are the most noted. In drawing comparisons between different sections of Bessemer rail, the head failures of P. S. 85-lb. rail are the most noticeable, amounting to 35.8 per 10,000 tons laid, but the explanation given is that they are principally from a lot of 2045 tons on the Northwest system of the Pennsylvania Lines west of Pittsburgh of Carnegie 1909 rails. During the month these rails were rolled many defective heats were found, indicating that the failures were caused by the quality of the material and not the rail section. Broken rails are comparatively few, the most noticeable being the C. S. 75-lb. and then the P. R. R. 100-lb.

In comparing the sections of open hearth rail, the head failures are the most numerous in the A. S. C. E. 90-lb., G. N. 85-lb., C. S. 90-lb. and A. R. A. B. 90-lb. There is considerable difference between the A. R. A. B. and the A. R. A. B. 90-lb., but it will be found that the greater number of failures come from Bethlehem, which simply happens to be in this case the A. R. A. B. section. The failures of the same section of rails from the Gary mills are much less in number. This last statement gives the clue to the real cause of the failures, and further studying into these statistics will bring out this fact more strongly, viz.: That the cause of failures is in the quality of the material and not the design of the rail section.

In making a comparison of failures for different lengths of time, it is pretty generally known that most of the failures of any lot of rails occur in the first four years.

The marking of the rails to distinguish the position in the ingot has become very general, but, of course, the position of most of them is still unknown. In general the failures of A rails are the most numerous, but it is noteworthy that there are many failures down to D and E, and occasional ones in F. In some cases they are very numerous in D rails.

A Study of Forty Failed Rails

In another appendix the committee presents a report made by W. C. Cushing, covering a study of 40 rails which failed in the main tracks on the Southwest system of the Pennsylvania lines west of Pittsburgh in the year 1909. Sixteen broken rails were examined and 13 out of the 16 were broken in or at the splices. A study of 24 rails which failed from crushed or split heads showed that all of the failures were caused by hard, brittle, unsound or segregated metal or a combination of two or more of them. "In three cases investigation showed that foreign material was rolled in the rail section. In one case it was very apparent that this foreign material was an old tie plate. The trouble appears to have occurred from the practice at the Gary mill of throwing pieces of scrap on the stool to prevent its cutting during the casting of the ingot. Mr. Cushing concludes that these 40 cases of rail failure point out very clearly that the prime cause of rail failures is the poor quality of the material, as indicated by hardness, brittleness, segregation and unsoundness, all of which must be corrected in the ingot. Only two cases of faulty rolling were found in this lot."

Concerning a report made by Mr. Cushing on 68 additional rails which failed on the Southwest system of the Pennsylvania lines west of Pittsburgh, except a few which failed on the Rock Island system, the committee says:

From this study Mr. Cushing concludes that it is quite clear that of the new rail sections neither the P. S. section with the heavy head, nor the A. R. A. A. section with the thinner head, has yet brought about and improvement in the quality of the metal by reason of better proportionate distribution of the material in the head, web and base, respectively, in the hope that the conditions of rolling will be so improved as to produce sound material. The defects must be remedied at the blast furnace [sic], and the changes of improvement must bring about less segregation of the elements and smaller inclusion of gas bubbles and slag in whatever way the results are to be accomplished, whether it be by more time for the mixing of the elements and the escape of the gas or in some other way not yet discovered.

Rolling Conditions Relatively Unimportant

Extended reports were made to the committee by Mr. Wickhorst, covering 11 subjects investigated. Six of these reports deal with tests of rails at various

works—Bessemer rails of the Maryland Steel Company, Illinois Steel Company and the Carnegie Steel Company, titanium Bessemer rails of the Lackawanna Steel Company, and open hearth rails of the Gary works of the Indiana Steel Company. From Mr. Wickhorst's comments the following are taken:

Segregation.—When molten steel is poured into the ingot the different constituents that compose the liquid mass do not stay together when solidifying, but the carbon, phosphorus and sulphur tend to collect or "segregate" toward the interior and upper part of the ingot. The region of maximum segregation seems to correspond in location with the brittle zone developed by the drop test. The tests indicate that a small amount of segregation is not harmful, but the allowable limit has not been determined. The problem of ingot making apparently consists in controlling segregation as to maximum allowable limit, and as to location in the ingot, so a small discard will always remove it It would be desirable to make a somewhat comprehensive study of such matters as size and shape of ingot and other conditions influencing segregation.

Rolling.—Our work so far does not show very definitely the influences of such matters as speed of rolling, number of passes in reducing from ingot to rail, temperature of rolling, distribution of rail sections, &c., but they indicate that such matters are of relatively small importance.

Conclusion.—In conclusion, our work of the last nine months has shown fairly definitely that the matter of making safe rails, and in which the different rails of the lot will wear uniformly, is almost entirely a matter of making a good ingot free from excessive segregation, or of cropping off sufficient from the top to remove such excessive segregation.

Breaks Chiefly on Left-Hand Rails

In the discussion of the committee's report it was stated by C. E. Lindsay that a very large percentage of the breaks reported on the New York Central occur on the left-hand rail—as high as 90 per cent. in some months. Mr. Wickhorst referred in this connection to a report he had presented several years ago on the cause of breakages on the left-hand side. The reason he gave was that the locomotive is so built that when the counterbalance is down, giving the heaviest vertical load, the engine noses to the left at the same time. Mr. Wickhorst added that the preponderance of broken rails on the left-hand side applies to cross-sectional breaks or base breaks, and not to longitudinal breaks, such as split heads.

W. H. Elliott of the New York Central said that it had been shown some years ago in a discussion by the Master Mechanics' Association that the left forward driver of American locomotives is the heaviest of the four driving wheels, but there did not appear to be a difference in the blow delivered on the rail to account for such a great difference in the breakages between the left and right hand rails. R. N. Begie of the Baltimore & Ohio said that on the Chicago Division of that road practically 90 per cent. of breakages in the rail occur on the left-hand side. He suggested the use of a heavier rail on that side.

Union Steel Casting Company Equipment.—The Union Steel Casting Company, Pittsburgh, which proposes to build large additions, is asking for estimates on some of the equipment, including the following list of cranes: One 25-ton finishing crane, with 5-ton auxiliary lift, 68-ft. span; one 10-ton finishing crane, 68-ft. span; two 35-ton casting cranes, 10-ton auxiliary lift, 60-ft. span; one 10-ton casting crane, 60-ft. span; one 10-ton core crane, 34-ft. span; one 25-ton molding crane, with 5-ton auxiliary lift, 55-ft. span; three 10-ton molding cranes, 55-ft. span; one 10-ton dog crane, 32-ft. span; one 10-ft. yard crane, 30-ft. lift, 80-ft. span; one 20-ft. yard crane, 17-ft. span, 16-ft. lift, and one charging crane for the open hearth department. Deliveries are to be made during July.

Heavy snowstorms in Sweden have interfered with the usually regular shipments of iron ore from that country. Our recent importations have, therefore, been comparatively light, but one cargo having been received at Philadelphia the past month. Four cargoes, however, are now afloat, with 33,575 tons of ore consigned to eastern Pennsylvania furnaces.

The Production of Steel in 1910

The Largest Output Ever Attained

In last week's issue of *The Iron Age*, through the courtesy of James M. Swank, vice-president and general manager of the American Iron and Steel Association, Philadelphia, we were enabled to give the figures of the total production in 1910 of steel ingots and direct steel castings in the United States. These figures showed that the achievements of all previous years had been far surpassed. From the same source have come the details of the year's production, which are presented below:

The Total Production of Steel

The production of all kinds of steel ingots and castings in 1910 amounted to 26,094,919 tons, against 23,955,021 tons in 1909, an increase of 2,139,898 tons, or almost 9 per cent. Of the production in 1910 25,154,087 tons were ingots and 940,832 tons were castings, as compared with 23,298,779 tons of ingots and 656,242 tons of castings in 1909. The following table gives the production of all kinds of steel ingots and castings by processes in the last five years in gross tons:

Years.	Bessemer.	Open hearth.	Crucible and all other.	Total.
1910.....	9,412,772	16,504,509	177,638	26,094,919
1909.....	9,330,783	14,493,936	130,302	23,955,021
1908.....	6,116,755	7,836,729	69,763	14,023,247
1907.....	11,667,549	11,549,736	145,309	23,362,594
1906.....	12,275,830	10,980,413	141,893	23,398,136

The following table gives the production of all kinds of steel ingots and castings since 1906:

Years.—Gross tons.	Ingots.	Castings.	Total.
1910.....	25,154,087	940,832	26,094,919
1909.....	23,298,779	656,242	23,955,021
1908.....	13,677,927	346,220	14,023,247
1907.....	22,559,477	803,117	23,362,594
1906.....	22,624,431	773,705	23,398,136

Bessemer Steel Ingots and Castings

The production of Bessemer steel ingots and castings in 1910, all made by the acid process, was 9,412,772 tons, against 9,330,783 tons in 1909, an increase of 81,989 tons, or less than 1 per cent. The production in 1910 was 2,863,058 tons less than in 1906, when the maximum production of 12,275,830 tons was reached. Of the total production in 1910 9,355,350 tons were made by the standard Bessemer process, against 9,297,781 tons in 1909; 26,733 tons by the Tropenas process, against 15,506 tons in 1909; and 30,689 tons by other modifications of the Bessemer process, against 17,496 tons in 1909. The following table gives the production by States of Bessemer steel ingots and castings in the last four years:

States.	1907.	1908.	1909.	1910.
Ohio.....	3,636,679	1,955,446	3,466,077	3,314,053
Pennsylvania.....	4,351,841	2,106,382	2,845,602	2,975,750
Illinois.....	1,723,073	1,237,747	1,632,444	1,693,053
Other States.....	1,955,956	817,180	1,386,660	1,429,916
Totals.....	11,667,549	6,116,755	9,330,783	9,412,772

The following table gives separately by States the production of Bessemer steel ingots and castings in 1910. Of the total production only 923 tons were made by the standard process. By the Tropenas process the production of castings in 1910 was 26,723 tons and by the Book-walter and other modified Bessemer processes it was 30,689 tons:

States.—Gross tons.	Ingots.	Castings.	Total.
Ohio.....	3,307,715	6,338	3,314,053
Pennsylvania.....	2,965,076	10,674	2,975,750
Illinois.....	1,684,263	8,790	1,693,053
Other States.....	1,397,383	32,533	1,429,916
Totals for 1910.....	9,354,437	58,335	9,412,772
Totals for 1909.....	9,296,969	33,814	9,330,783
Totals for 1908.....	6,096,196	20,539	6,116,755
Totals for 1907.....	11,634,276	33,273	11,667,549
Totals for 1906.....	12,243,229	32,601	12,275,830

Open Hearth Steel Ingots and Castings

The total production of open hearth steel ingots and direct castings in 1910 was 16,504,509 gross tons, against 14,493,936 tons in 1909, an increase of 2,010,573 tons, or over 13.8 per cent. Of the total production in 1910 15,-

641,158 tons were ingots and 863,351 tons were castings, as compared with 13,892,896 tons of ingots and 601,040 tons of castings in 1909 and 7,524,952 tons of ingots and 311,777 tons of castings in 1908. The following table gives the production of open hearth steel ingots and castings by States since 1907 in gross tons:

States.	1907.	1908.	1909.	1910.
New England....	239,797	158,417	257,392	223,158
New York and New Jersey.....	706,019	350,348	618,117	713,245
Pennsylvania....	7,868,353	5,322,229	9,400,287	10,153,816
Ohio.....	819,642	525,171	1,424,452	1,733,409
Indiana.....	181,662	167,299	783,957	1,307,129
Illinois.....	1,013,251	483,104	1,052,572	995,011
Other States.....	721,012	830,161	957,159	1,378,741
Totals.....	11,549,736	7,836,729	14,493,936	16,504,509

In 1910 there were 15,292,329 tons of open hearth steel made by the basic process and 1,212,180 tons by the acid process, while in 1909 the production by the basic process amounted to 13,417,472 tons and by the acid process to 1,076,464 tons. Of the total production of basic open hearth steel in 1910 14,858,353 tons were ingots and 433,976 tons were castings, while of the total production of acid open hearth steel in the same year 782,805 tons were ingots and 429,375 tons were castings. The following table gives the production of both basic and acid open hearth steel ingots and castings since 1907 in gross tons:

Years.	Basic open hearth steel.	Acid open hearth steel.	Total.
1910.....	15,292,329	1,212,180	16,504,509
1909.....	13,417,472	1,076,464	14,493,936
1908.....	7,140,425	696,304	7,836,729
1907.....	10,279,315	1,270,421	11,549,736
1906.....	9,658,760	1,321,653	10,980,413

The following table gives separately the production by States of open hearth steel ingots and castings in 1910. The increase in the production of ingots in 1910 as compared with 1909 amounted to 1,748,262 tons and the increase in the production of castings to 262,311 tons:

States.—Gross tons.	Ingots.	Castings.	Total.
New England, New York and New Jersey.....	825,595	110,808	936,403
Pennsylvania.....	9,825,920	327,896	10,153,816
Ohio.....	1,591,976	141,433	1,733,409
Indiana.....	1,278,571	28,558	1,307,129
Illinois.....	849,627	145,384	995,011
Other States.....	1,269,469	109,272	1,378,741

Totals for 1910.....	15,641,158	863,351	16,504,509
Totals for 1909.....	13,892,896	601,040	14,493,936
Totals for 1908.....	7,524,952	311,777	7,836,729
Totals for 1907.....	10,803,211	746,525	11,549,736
Totals for 1906.....	10,260,522	719,891	10,980,413

Crucible Steel Ingots and Castings

The production of crucible steel in 1910 amounted to 122,303 tons, against 107,355 tons in 1909, an increase of 14,948 tons, or over 13.9 per cent. The maximum production was reached in 1907, when 131,234 tons were made. The following table gives separately by States the production of crucible steel ingots and castings in 1910:

States.—Gross tons.	Ingots.	Castings.	Total.
Pennsylvania.....	69,656	2,158	71,814
Other States.....	38,015	12,474	50,489
Totals for 1910.....	107,671	14,632	122,303
Totals for 1909.....	94,672	12,683	107,355
Totals for 1908.....	55,360	8,271	63,631
Totals for 1907.....	121,001	10,233	131,234
Totals for 1906.....	117,170	10,343	127,513

Electric and Miscellaneous Steel Ingots and Castings

The production of steel in 1910 by various minor processes, including the electric process, amounted to 55,335 tons, against 22,947 tons in 1909, an increase of 32,388 tons. In 1908 the production amounted to 6132 tons, in 1907 to 14,075 tons, and in 1906 to 14,380 tons. Of the production in 1910 50,821 tons were ingots and 4514 tons were castings.

Included in the 55,335 tons of steel reported for 1910 are 52,141 tons of ingots and castings which were made with electricity by 7 plants in Massachusetts, New York, Pennsylvania, Indiana and Illinois, against 13,762 tons made by 4 plants in 1909 in New York, Pennsylvania and Illinois. In 1910 about 50,821 tons were ingots and about 1320 tons were castings, and in 1909 about 13,456 tons were ingots and about 306 tons were castings.

The Battleship Delaware Boiler Accident

The Finding of the Court of Inquiry

Through the courtesy of the Babcock & Wilcox Company, 85 Liberty street, New York, we are enabled to publish the subjoined summary of the finding of the Court of Inquiry which investigated the accident January 17, about 9:15 a.m., to one of the boilers of the battleship Delaware.

The accident occurred while the Delaware was bound for Norfolk, Va. The ship was proceeding under easy steam, but on account of poor draft the fire-rooms were closed and working under an air pressure of $\frac{1}{4}$ in. This, under the circumstances, was not more than good natural draft, so that the rate of combustion was about 18 lb. of coal per sq. ft. of grate. The boiler is one of the well-known Babcock & Wilcox marine type, with 4425 sq. ft. of heating surface and 103 sq. ft. of grate surface, there being 14 boilers in all. On trial, the Delaware developed nearly 30,000 hp., so that this boiler, when worked under forced draft, has a capacity of over 2000 hp.

It is interesting to note in this connection the statement of the commanding officer, made to the correspondents of the newspapers who boarded the ship upon her arrival at Hampton Roads. It appears that, although the captain was on deck at the time of the accident, he did not know that one had occurred until it was reported to him some minutes later. In other words, the explosion did not make sufficient noise to attract attention on the upper deck. The damage was confined to boiler O, and its extent and nature are set down in the findings in considerable detail. It is also to be noted that the structure of the vessel was not injured at all, thus emphasizing again the fact that an accident to a water tube boiler involves the minimum of damage. The boiler was repaired while at Norfolk with some new headers and new tubes, most of the work being done by the engineer department of the ship.

Following is the official statement made to the Babcock & Wilcox Company by R. S. Griffin, acting chief of the Bureau of Steam Engineering, Navy Department, Washington, D. C., under date of March 11:

In compliance with the request contained in your letter of February 24, and with the approval of the department, the bureau submits for your information the following general statement of the finding and opinion of the Court of Inquiry appointed to inquire into the accident to boiler O of the Delaware:

(a) An explosion occurred in boiler O January 17, 1911, by which three rear headers, Nos. 8, 9 and 10, were blown bodily out of the boiler.

(b) These headers were found severely bowed, their tube faces were bulged, and the metal showed signs of overheating. All the back headers of the outboard half of the boiler, 13 in number, were more or less bowed, the degree of distortion diminishing toward the outboard side of the boiler.

(c) The inboard half of the boiler was uninjured, and subsequent comment refers only to the outboard half.

(d) The 4-in. tubes next the fire were all more or less bowed near the back ends, and showed signs of having been burned; and the majority of the 2-in. tubes were more or less distorted, while a number showed signs of having been white hot.

(e) The front headers were in good condition.

(f) The superheater tubes and manifolds showed a red color, and the 4-in. tubes through the first and second passes showed the blue color characteristic of overheating.

(g) On two of the headers blown out were found scores and dents made by the headers striking obstructions. The character of the scores and dents and the blue color of the metal in the scores indicated that the metal of the blown-out headers was in a softened condition, due to heat, when they struck.

(h) The three headers showed unmistakable signs of having been very hot. They showed the characteristic blue color following overheating, and the tube face of each had been bulged out by internal pressure, possible only when the metal is heated to a condition approaching redness.

(i) The greatest heat appeared to have existed at about the width of the height of the header, but the effects of overheating were manifest in all the back headers of the outboard half of the boiler, diminishing either way from the zone of greatest intensity of heat, which appeared to exist opposite the headers that were blown out.

(j) A number of 2-in. tubes of the blown-out headers gave evidence of having been white hot. The surface of these tubes,

near the back ends, appeared burned, and was covered with a coating of black oxide of iron. Signs of overheating were also in the outboard half of the drum, from which much of the soot had been burned off.

(k) From a consideration of the preceding facts, the court concluded that the explosion was due to the lack of a sufficient quantity of water in the boiler, and that the water-tender on watch at the time was responsible for this condition. This opinion was strengthened by the fact that it was possible to enter the fire room with safety a very short time after the explosion occurred, which would not have been possible had the boiler contained the normal quantity of water.

(l) All testimony showed that the boiler was in good condition prior to the accident, and that the regulations regarding the care and preservation of boilers had been carried out; that other boilers which had been subjected to the same use were in good condition; and that the overheating noted in the injured boiler would have produced the results observed by the court after the accident, no matter how perfect the boiler.

(m) From some testimony before the court, the conclusion was reached that the reading of the water gauges was misleading, although the gauge glass fittings are recognized as simple and reliable; other testimony, however, led to the opinion that the opening of the feed check valve had been increased shortly before the accident occurred.

The Babcock & Wilcox Company adds: "There is one point in the finding which needs a few words of explanation to make it perfectly clear. The court finds that only the outboard half of the boiler was damaged. It might seem at first glance as though it would be impossible for one-half of the boiler to be injured and the other escape. The explanation, however, is very simple. The feed water enters the boiler in the steam and water drum, which is above the front headers and connected to them by nipples, and is discharged through an internal feed pipe perforated with holes on its lower side. This pipe extends from the check valve at the inboard end of the drum to a short distance past the center of its length. As long as the water in the drum was above the tops of the nipples mentioned, it would not of course make any difference where the feed water was introduced, as it would naturally find its level. In case of low water, however, due to inadequate feed, there might be, under moderate combustion, just enough water to save the inboard half of the boiler, where the water would go directly down the nipples, while only a few headers and associated tubes on the other side would get any. This appears to be the explanation of the salvation of the inboard side of the boiler. With this general statement of the surrounding conditions, we believe the finding of the court will be entirely clear, and it seems to us that the court is to be congratulated on the very careful analysis which it has made of all the circumstances of the case, so that the reasons for its conclusion that the accident was due to low water are perfectly evident and convincing."

The United States Metal Products Company

The John W. Rapp Company and the J. F. Blanchard Company, manufacturers of hollow metal and metal-covered doors, windows and trim, have combined under the name of the United States Metal Products Company and have established general offices and show room at 203-205 West Fortieth street, New York. The officers of the new company are John W. Rapp, president; C. F. Hale, A. C. Randall and A. J. Connell, vice-presidents; E. B. Wire, treasurer, and C. A. Leonardi, secretary. The factory of the John W. Rapp Company, College Point, Long Island, covering 7 acres, and that of the J. F. Blanchard Company, Long Island City, covering 5 acres, will be continued under the combined management. The main office on West Fortieth street will be devoted to sales offices and show room. It is a four-story structure, 37 x 72 ft. The ground floor is to be devoted to storage purposes and will house the company's delivery motor truck. The second floor will be used for show room purposes and for the executive offices. The third floor will be devoted to the sales, estimating and advertising departments, and the fourth floor to the engineering and drafting departments. The building is a fireproof structure and is equipped with a vacuum cleaning apparatus.

The Duplex Process at the Bethlehem Steel Company's Plant

A New Bessemer Department with Two 20-Ton Converters and a 400-Ton Mixer—Improvements at the Saucon Works

For the first time in some years Bessemer converters are now being operated at the works of the Bethlehem Steel Company, South Bethlehem, Pa. In the old days

\$6,000,000, while new construction still under way will represent \$1,500,000 additional. The completion of this great programme of improvement will give the company

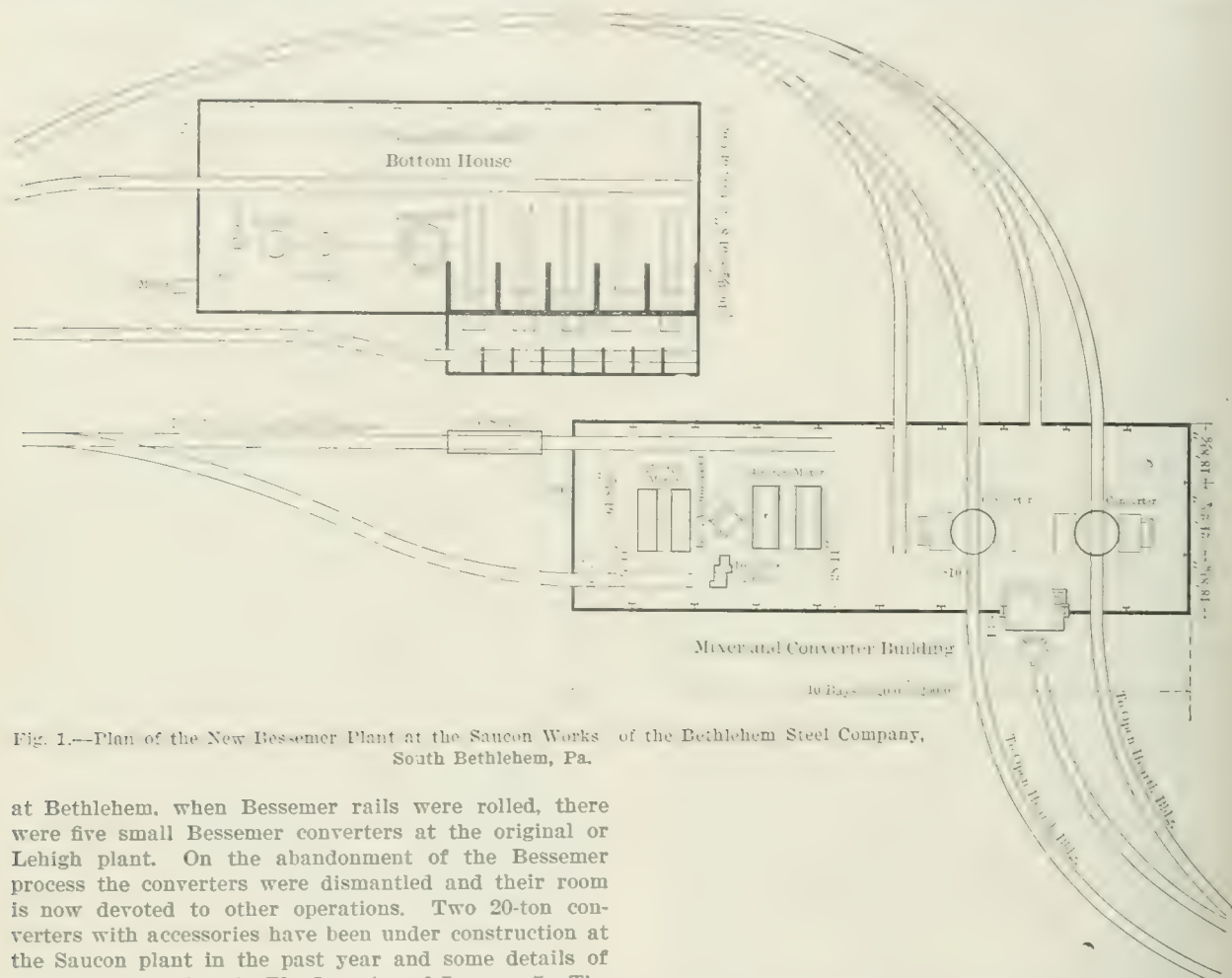


Fig. 1.—Plan of the New Bessemer Plant at the Saucon Works of the Bethlehem Steel Company, South Bethlehem, Pa.

at Bethlehem, when Bessemer rails were rolled, there were five small Bessemer converters at the original or Lehigh plant. On the abandonment of the Bessemer process the converters were dismantled and their room is now devoted to other operations. Two 20-ton converters with accessories have been under construction at the Saucon plant in the past year and some details of this plant were given in *The Iron Age* of January 5. The new work at Saucon, together with the new construction at the Lehigh plant and the rearrangement required by the improvements, has involved an expenditure of about

an output of 75,000 tons of steel per month, of which 60,000 tons will come from the Saucon plant and 15,000 tons from the Lehigh plant.

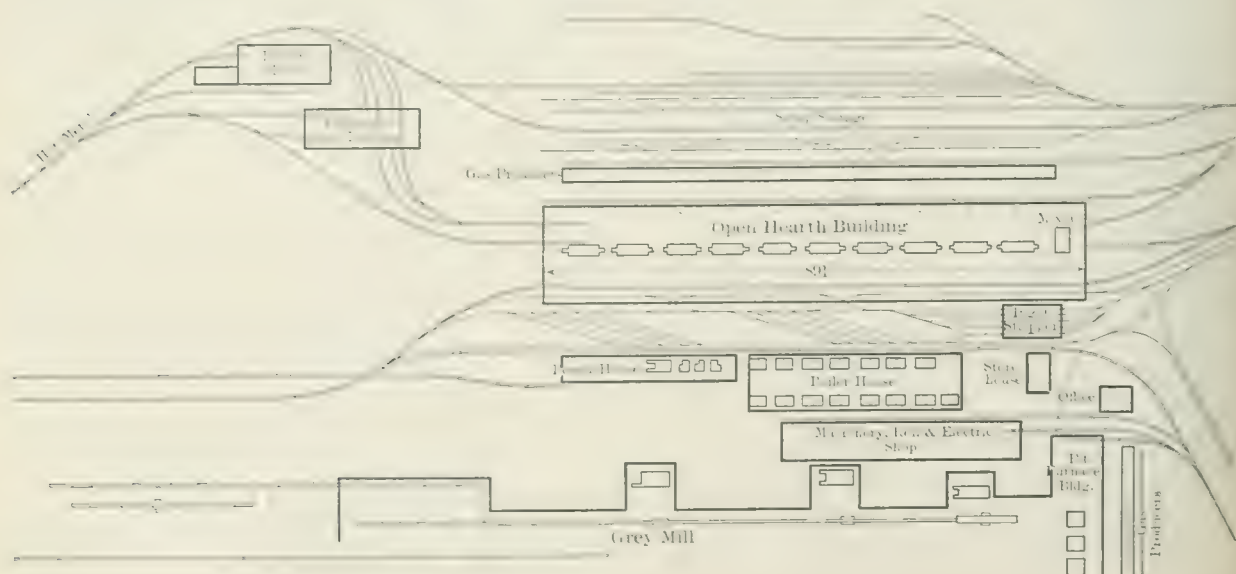


Fig. 2.—Sketch Plan Showing the Relation of the New Bessemer Plant to the Open Hearth and to the Saucon Rolling Mills.

New Blast Furnaces and Other Construction

Reference has already been made in these columns to the new blast furnace construction at South Bethlehem. Of the original furnaces B and C are still operated. A modern stack known as furnace E was built four years ago. Then came the replacement of furnace D with a modern stack which was blown in last year. The new furnace I¹ was blown in two weeks ago. The new furnace G will be completed within the next two months. The next of the new large furnaces, all of which are 22 x 90 ft. capacity, with five stoves each, will take the place of old furnace A, which has been razed. The provisions for gas washing in connection with the new furnaces are unusually elaborate in view of the plan to install gas driven blowing engines, which will be supplied with furnace gas. Each furnace has two large dry dust catchers and three Steinbart gas washing towers. In addition to this individual gas cleaning equipment there will be a complete gas washing plant to further clean the gas for the engines. This consists of five spraying towers and five Theisen rotary scrubbers each of 7500-hp. capacity with three pressure blowers. Nine gas blowing engines of the West design are now under construction in the company's own shops, and two gas engines of the same type are in operation, furnishing electric power, while two more gas power engines are now building.

The construction of Bessemer works at the Saucon plant, as shown in Fig. 1, for the operation of the duplex process, while the most important new work under way there, is only a part of what has been carried out in the past year. A new mold yard and a new scrap reclaiming plant were provided to take care of both open hearth and Bessemer work. The ingot stripper was relocated and now bears the relation to the open hearth plant, indicated in Fig. 2. A thoroughly equipped repair machine shop, 60 x 400 ft., was built to take care of both mechanical and electrical repairs, as well as the turning of rolls for the rail, structural and billet mills. The structural shop was considerably enlarged, and a new template shop and a shop office were built. The new general office building for the Saucon plant was also erected, its location being indicated in Fig. 2.

Much has been done in improving the appearance of the yards at the Saucon plant. A portion of the ground was considerably above the general yard level and much blasting of rock was required to make room for some of the buildings. The ragged banks left in the extensive excavations required when the open hearth works and finishing mills were built three or four years ago have been changed into easy slopes, and the surroundings of the new office building have been made sightly by grass plots. The aim has been to build for permanence, and brick structures have been erected where in many cases a steel frame work with corrugated covering would be considered adequate.

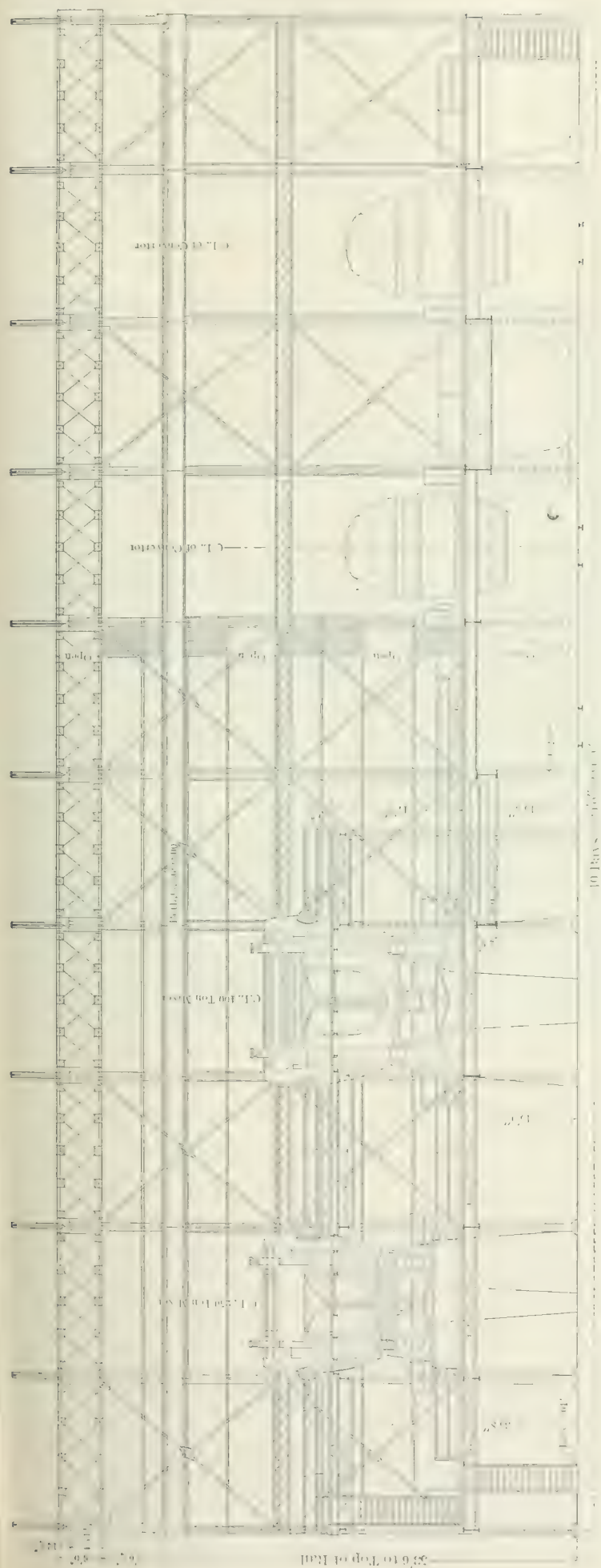


Fig. 3. Sectional Elevation of Mixer and Converter Building.

No small part of the engineering work at the Saucon plant and at the ore end of the Lehigh plant in the past few years has been the extension and rearrangement of the track system. Including the tracks which will be built to connect the blast furnaces with the new coke plant of the Didier-March Company now under construction about one mile southeast of the Saucon works, or two miles from the blast furnaces, the Bethlehem Steel Company's track system will represent more than 80 miles.

Mixer and Converter Building

The new Bessemer plant is contained in the main in two buildings, one the mixer and converter building and

ters a vertical plunger is provided which actuates a rack in the usual way. Large margins of power have been provided in the cylinders for both mixer and converters. A four-girder crane of 60 tons capacity with a 20-ton auxiliary commands the mixer building. It was furnished by the Alliance Machine Company, Alliance, Ohio.

Hot metal from the blast furnaces at the Lehigh plant travels about $1\frac{1}{2}$ miles over the route laid out to reach the mixer building. The incoming hot metal ladle cars pass over a 100-ton track scale furnished by the Standard Scale Company, Pittsburgh. The hot metal track in the mixer building is 301 ft. above the datum, this being also the level of the open hearth charging floor. The open hearth pouring floor level is 284 ft., while the general

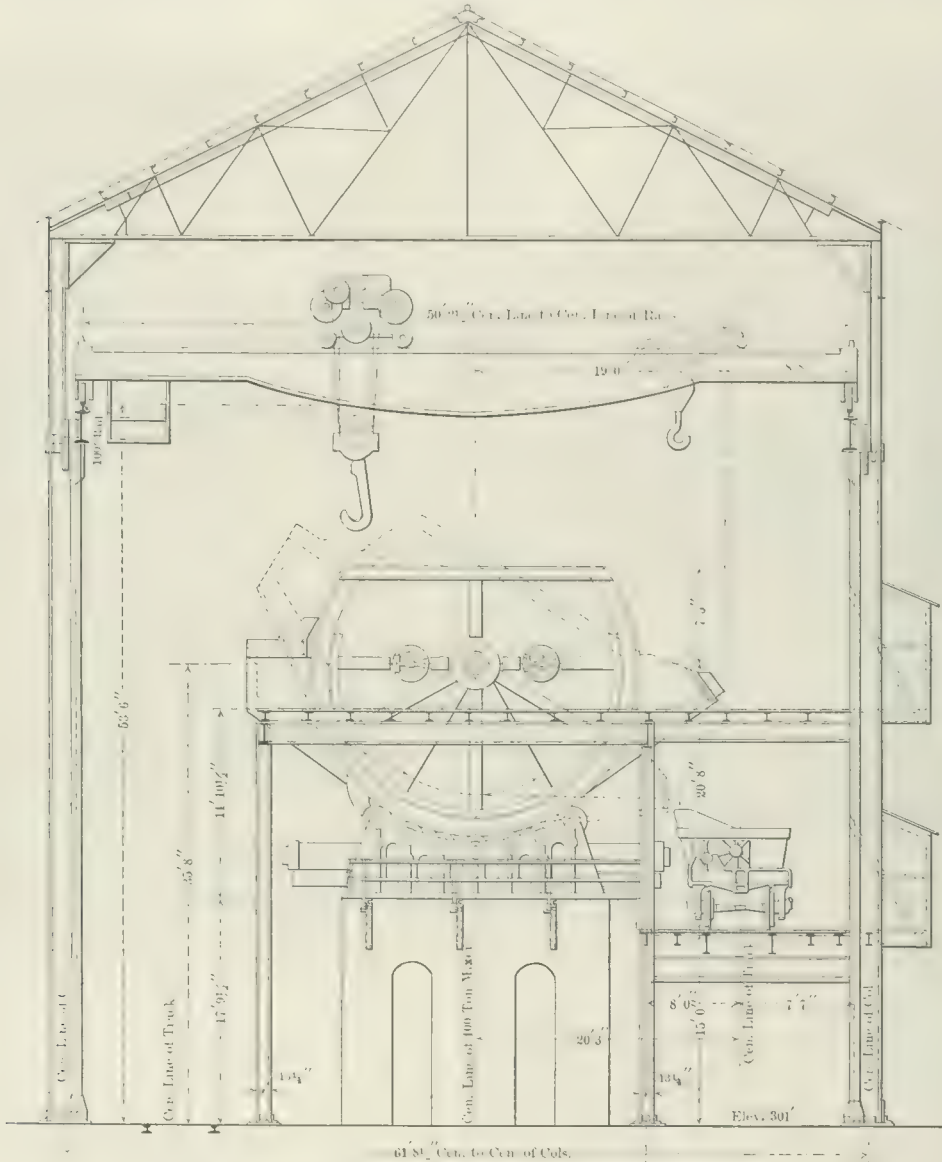


Fig. 4.—Section of Mixer Building Through the 400-Ton Mixer.

the other the bottom house. The arrangements and dimensions are indicated in Fig. 1. The converter building is 200 ft. by 61 ft. 8½ in. It contains two 20-ton converters and a 400-ton mixer. Alongside the latter will be located later the 250-ton mixer now at one end of the open hearth building, as shown in Fig. 2.

The converters and 400-ton mixer were built by the Pennsylvania Engineering Works, New Castle, Pa. They are of the usual construction, with the exception that the mixer has a skin lining of chrome brick. Their relative positions are indicated in the sectional elevation in Fig. 3. The 400-ton mixer, of which details are given in Fig. 4, stands on concrete foundations. It is actuated by a hydraulic cylinder, as in Fig. 5. The line pressure in the building is 550 lb., and a tank accumulator is provided to balance the pressure. Double X piping is used throughout. Aiken standard valves are provided for operating the converters and mixer. For the tilting of the conver-

mill and yard level at the Saucon plant is 276 ft. The hot metal which comes in double trunnion ladle cars of 25, 35 and 40 tons capacity, is lifted by the 60-ton crane and the ladles are tipped from the rear by means of the hook on the 20-ton crane auxiliary. Fuel oil is used for heating the mixer. From the floor line of the mixer house to the mixer spout is 35 ft. 8 in., while the distance to the mixer floor level is 32 ft. 8 in. The top of the crane rail is 53 ft. 6 in. above the floor level.

For the transfer of mixer metal to the converter a wire rope haulage system is provided, and a 25-ton ladle car is used in this service. The driving mechanism consists of a 5-ft. drum and a 25-hp. Crocker-Wheeler motor, and the wire rope passes over a vertical sheave at either end of the building. The operator who controls the drag-out by means of levers is stationed on the mixer platform in front of the 400-ton mixer. The travel of the ladle car to the farther converter is 140 ft. A hydraulic

jib crane serves the converter, a rack and pinion being utilized for the operation of turning. Some idea of the large section of the converter is afforded by the fact that with a charge of 20 tons or more of metal the depth of bath is only about 18 in.

The converters are blown by a Southwark horizontal cross compound engine, with steam cylinders 46 and 84 x 60 in. and air cylinders 84 x 60 in. The engine is equipped with improved gridiron air valves, and is designed to furnish 45,000 cu. ft. of free air per minute at 30 lb. pressure. It is located in the power house adjacent to the open hearth plant, and the blast pipe to the converters is about 750 ft. in length.

All skulls from the Bessemer converters, as well as those from the open hearth department, are sent to a skull cracker convenient to both buildings. All slag from the Bessemer converter, being rich in manganese, is

pumping station at the Lehigh River, and the exhaust water from the condenser equipment is therefore utilized in a return system, supplying in part the power for driving the centrifugal pumps.

Owing to the character of the formation underlying the new Bessemer buildings—limestone with clay pockets for the most part—the footings for the foundations of the mixers and converters were made unusually large and extended. Special provision had to be made also for the carrying off of all surface water in sewers.

Duplex Practice

Thus far the new Bessemer converters have been operated in connection with 5 of the 10 stationary open hearth furnaces, the remaining five making open hearth steel as heretofore from pig and scrap. Time will be required to develop a settled practice which will yield the

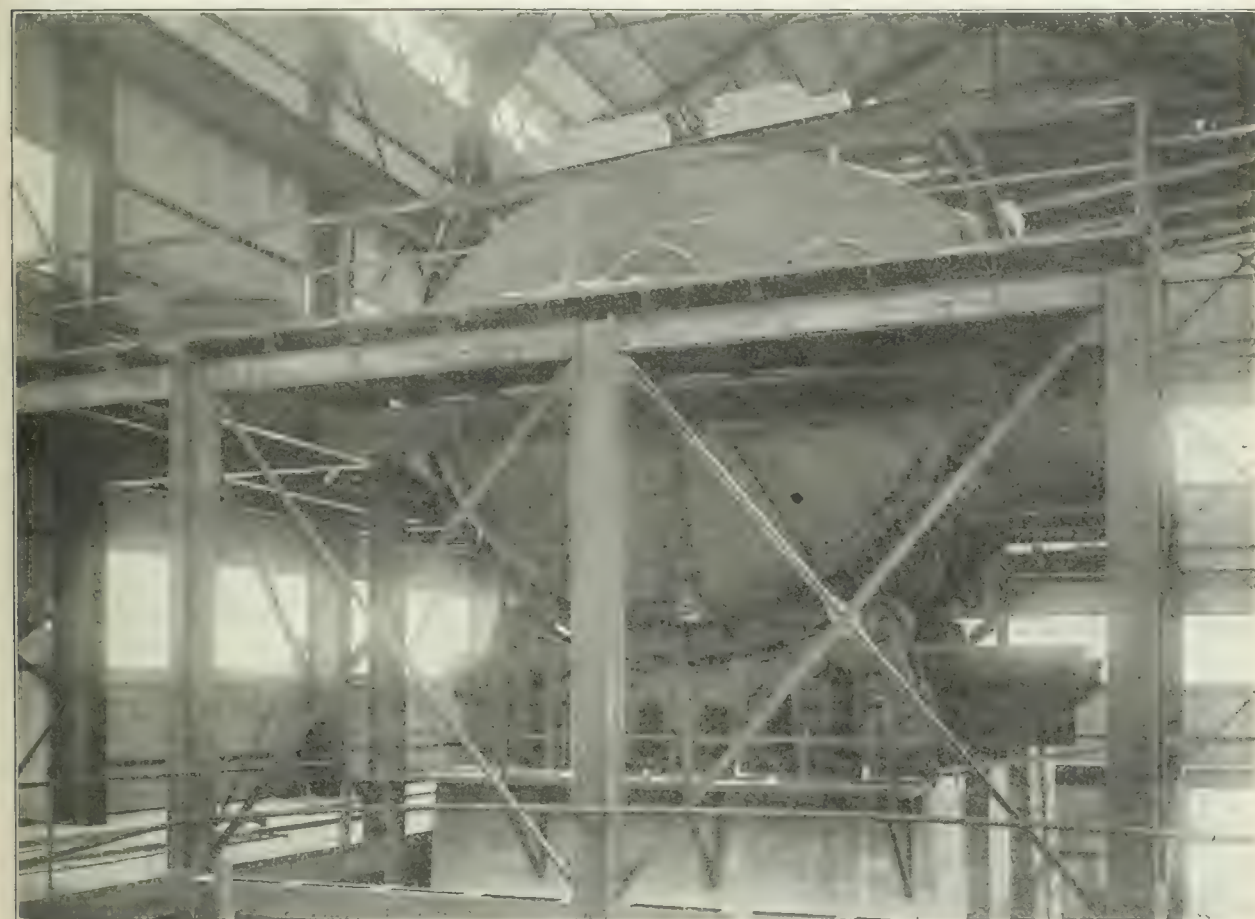


Fig. 5.—The 400-Ton Mixer.

charged again into the blast furnace. As the converter bottom is dropped the slag is deposited in boxes. These are transferred to the skull cracker, where the Bessemer slag is kept separate from the open hearth.

The Bottom House

The converter bottom house is 160 ft. by 51 ft. 8 in., with a lean-to, 16 ft. 3½ in., alongside the bottom ovens. There are five ovens, fired with small anthracite. A steam driven Eynon-Evans blower furnishes stack draft, steam being supplied by a 2-in. line front the open hearth boiler house. The ovens are equipped with Kinneair roller curtain doors. For handling the bottoms from the railroad track to the bottom pit and on and off the cars on which they are dried, a 20-ton crane is provided, furnished by the Northern Engineering Works, Detroit. The bottom house contains a Blake crusher for crushing stone for linings, and an 8-ft. wet pan and a 9-ft. dry pan of the Thos. Carlin's Sons Company type. The machinery is driven by a 100-hp. motor. There is also a compressor which supplies air for atomizing the fuel oil burned in the mixer. An adjacent storage house contains brick for ladle linings and converter bottoms.

The elevation of the Bessemer plant is 80 ft. above the

largest economies, but at present there is no special departure from that followed at duplex plants which have been in successful operation for several years. The open hearth furnaces are of 60 tons capacity. Ordinarily three ladles of converter metal will be charged for an open hearth heat, though at times the contents of four ladles may be used. The metal in the first two ladles is blown "dead soft" in the converter; the third ladle is given a shorter blow, retaining a portion of its carbon to facilitate the early reaction in the open hearth. Thus far the shortest heat in the open hearth, using blown metal, was one of 3½ hours. It is expected that ordinary practice will give five to six heats in 24 hours.

The basic pig iron made in the usual practice at South Bethlehem is nearer the ordinary merchant basic specification than that at the two plants which have made the most important contribution to duplex practice—those at Ensley, Ala., and Sydney, Nova Scotia. The pig iron from the Sydney blast furnaces runs not less than 1.50 per cent. in phosphorus and under the triplex process installed there in the past year, all metal passes through two open hearth furnaces with an intermediate blow in a basic Bessemer converter. At Ensley the silicon in the pig iron often runs considerably beyond 1

per cent., and the acid Bessemer converter is used for silicon and carbon elimination. The Cuban ores used at Bethlehem from the company's own mines are low in phosphorus, and are used in part in making Bessemer pig iron for the company's ingot mold foundry and its acid open hearth department. The Adirondack and other Eastern ores which enter into the mixtures at the Lehigh plant are higher in phosphorus, and the resultant pig iron will often contain as high as 0.8 per cent. phosphorus.

The character of the ores was a minor consideration in determining the installation of the duplex system at the Saucon plant. The chief deciding factor was the independence thus to be secured from the scrap market. Operating five or more of its Saucon open hearth furnaces in connection with Bessemer converters, the Bethlehem Steel Company will make nearly sufficient scrap for its own needs. Considering that melting steel scrap has often gone as high as \$5 a ton above the cost of making pig iron at South Bethlehem, the advantage of freedom from scrap market fluctuations can be appreciated. There are also to be considered the benefits of the increase in output and the larger leeway possible in blast furnace operation.

While details are not generally available as to the exact balance between the benefits of "duplexing" in the experience of the companies practicing it, and the interest and depreciation on Bessemer plant, together with loss of metal in converting, it is evident that it is sufficient to indicate the extension of the system. Where Bessemer plant is in existence, with the alternative of continually lessening employment and final abandonment, the economics of the duplex practice are naturally most pronounced.

The Triple Supply and Machinery Convention

A programme replete with interest to machinery and supply men has been arranged for the triple convention of the Southern Supply and Machinery Dealers' Association, the National Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association at Louisville, Ky., April 3, 4 and 5. The convention headquarters will be at the Seelbach Hotel.

On the first morning the associations named will hold joint opening exercises, when addresses of welcome will be made by Augustus E. Wilson, Governor of Kentucky; W. O. Head, Mayor of Louisville, and William Heyburn of Louisville. Responses will be made by Edward C. Hinman, ex-president of the Manufacturers' Association; H. C. Clark, president of the Southern Dealers' Association, and W. M. Pattison, president of the National Dealers' Association. The session will close with a general discussion on the "Business Outlook." In the afternoon of the same day the Southern dealers will organize their convention, and the following morning will listen to an address by E. Howard Smith, Superior Supply Company, on the "Proper Method of Compensating Traveling Salesmen," and a talk on the "Cost of Doing Business and the Proper Methods of Handling Expense Items," by W. P. Simpson, C. C. Pattison Company, Ltd., New Orleans, La. On Tuesday afternoon the members will have a "Question Box" discussion and will complete their separate sessions Wednesday morning.

The National Dealers will also organize their separate convention on Monday afternoon and will discuss "Resale Prices." On Tuesday there will be discussions on the "Cost of Doing Business" and "Manufacturers' Competitions." George T. McIntosh, Cleveland, who is secretary-treasurer of the One-Cent Letter Postage Association, will talk on "One-Cent Postage." In the afternoon the subjects of discussion will be "What Can Be Done with Illegitimate Competition?" and "Rebates for Decline in Price on Stock on Hand at Time of Decline." On Wednesday morning the association will discuss "Unintelligent Competition" and will elect its officers.

The Executive Committee of the Manufacturers' Association will meet on Monday afternoon and on Tuesday and Wednesday morning the members of the organi-

zation will discuss their side of the questions which are to come up before the two dealers' associations.

The three associations will hold a joint meeting on Wednesday afternoon. An excellent entertainment programme has also been arranged.

The Congress of Technology at Boston

The Congress of Technology with which the Massachusetts Institute of Technology will celebrate on April 10 and 11 the fiftieth anniversary of the granting of its charter, promises to be of unusual interest, not only as marking a period in the development of one of the world's greatest technical schools, but because it marks also the rise and high development of all that is now included under the names of "engineering" and "applied science." The sessions of the congress, all of which will be held in the buildings of the Institute of Technology, will open on Monday afternoon, April 10, with an address by President MacLaurin of the Institute in Huntington Hall; following this there will be read a few papers of special interest. On the second day both the morning and afternoon sessions will be devoted to the presentation of papers in the various buildings of the Institute. These sessions of the second day will be open to the public, as will also the laboratories and other departments of the institution. The evenings of both days will be devoted in large part to alumni functions. Monday evening there will be an alumni smoke in Symphony Hall; and on Tuesday evening, also at Symphony Hall, a banquet open to alumni and invited guests.

From the long list of papers which will be presented before the congress by distinguished alumni and members of the faculty of the Institute, the following are of special interest to our readers:

"An Object Lesson in Efficiency," by Wilfred Lewis, Tabor Mfg. Company, Philadelphia, Pa.

"Scientific Industrial Operation," by Tracy Lyon, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

"Scientific Management," by David Van Alstyne, Allis-Chalmers Company, Milwaukee, Wis.

"Training of Industrial Foremen," by Charles F. Park, Associate Professor of Mechanical Engineering, Massachusetts Institute of Technology.

"The Responsibility of Manufacturers for the Training of Skilled Mechanics and Shop Foremen," by Arthur W. Williston, Wentworth Institute, Boston, Mass.

"Thirty Years' Work in Boiler Testing," by George H. Barus, consulting engineer, Boston, Mass.

"Analysis of Some Losses of Efficiency in a Large Producer Gas Engine Plant," by John G. Callan, electrical engineer, Arthur D. Little, Inc., Boston, Mass.

"Mechanical Handling of Materials," by Richard Devens, Brown Hoisting Machinery Company, New York City.

"Power Plant Betterment," by H. H. Hunt, Stone & Webster Management Association, Boston, Mass.

"Some Causes of Failures in Metals," by Henry Fay, Professor of Analytical Chemistry, Massachusetts Institute of Technology.

"The Conservation of Our Metal Resources," by Albert E. Greene, American Electric Smelting & Engineering Company, Chicago, Ill.

"The Technics of Iron and Steel," by Theodore W. Robinson, Illinois Steel Company, Chicago, Ill.

"Metallography and Its Industrial Importance," by Albert Sauveur, Professor of Metallurgy, Harvard University.

The American Manufacturers' Export Association, of which Henry T. Wills, 200 Fifth avenue, New York, is secretary, has issued a strong appeal for the support of manufacturers interested in export trade. This association already includes in its membership among the largest and most progressive manufacturers in this country. Mr. Wills states that some subjects are now being taken up, which will undoubtedly be beneficial to many members and to exporting manufacturers generally.

The Pittsburgh Gage & Supply Company, Pittsburgh, has received contracts for the installation of continuous oiling systems from the Republic Iron & Steel Company, Youngstown, Ohio, and the Johnette Foundry & Machine Company, Marianna, Pa. It has also secured a contract for installing a high pressure steam piping system at the blast furnaces of the Andrews & Hitchcock Iron Company, Youngstown, Ohio.

The McConway Car Wheel

The McConway & Torley Company, Pittsburgh, Pa., is manufacturing a new steel tired built-up type of wheel under patents granted to William McConway. This wheel is especially intended for railroad service and is designed to afford a simple and easily manufactured composite structure which will prevent any turning movement of the tire on the wheel center and resist the shocks and pounding incident to service without developing any looseness of parts.

The wheel consists of three parts—the wheel center,

completed wheel, while Fig. 2 gives details of its construction.

Referring to Fig. 2, *a* is the tire, *b* the wheel center and *c* the hub. Cast iron is employed for the hub, upon which the center plate is shrunk as a maximum of security and fit is obtained with the minimum pressure for application. Between the periphery of the wheel center and the inner circumference of the tire is an annular space, which is clearly shown at the extreme left of Fig. 1, where the parts are assembled. This space is divided into eight segments by the spacing wedges used for the temporary union of the tire to the center in assembling the wheel preparatory to casting the permanent locking

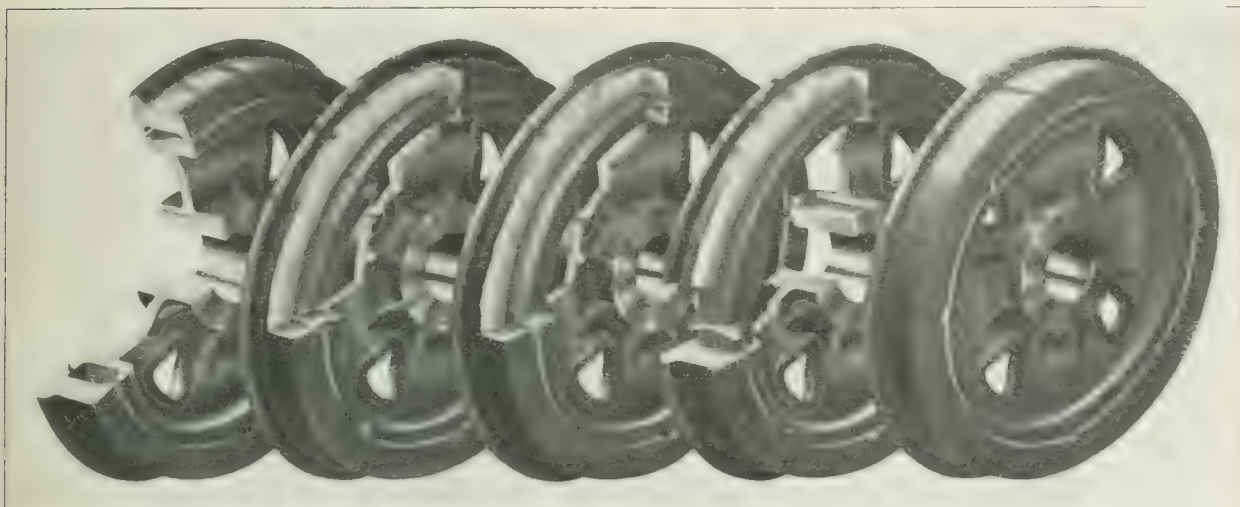


Fig. 1.—Views Showing the Successive Stages in Assembling the McConway Wheel Made by the McConway & Torley Company, Pittsburgh, Pa.

which is a steel casting; the cast iron hub and a rolled steel tire. No machine work is required on the tire except enough rough turning to make it true, and only a small amount of grinding and rough turning is necessary for the wheel centers. No bolts are used, and as the tire is neither fused nor shrunk on it cannot come off by reason of expansion and will not turn on the center. When it becomes necessary to separate the two members

wedges *d*, Fig. 2. The wedges are in pairs with the points opposed, and when the metal has cooled the shrinkage gives a clearance as in the pair shown at *e*. The view next to the left end of Fig. 1 shows the locking wedges in the first position and the temporary spacing wedges still in place. These are next removed and the locking wedges driven home. A view of the wheel after these two operations have been performed is shown at the middle of Fig. 1. This operation practically closes the space between the points of each pair of permanent locking wedges, as shown at *f*, Fig. 2. At these enlarged spaces are the sprag notches *g*, in the inner flanges of the tire, into which steel sprags, *h*, are fitted and the final closers *i* are cast in place. The wheel at this stage of its manufacture is shown in the fourth view in Fig. 1. The casting of the final closers completes the circle of locking wedges, which are under practically the same compression as if the tire was shrunk on. The sprags are imbedded in the circle of the cast iron wedges, and by engaging the tire through the notches in the flanges prevent the latter from turning. A view of the completed wheel is given at the right of Fig. 1.

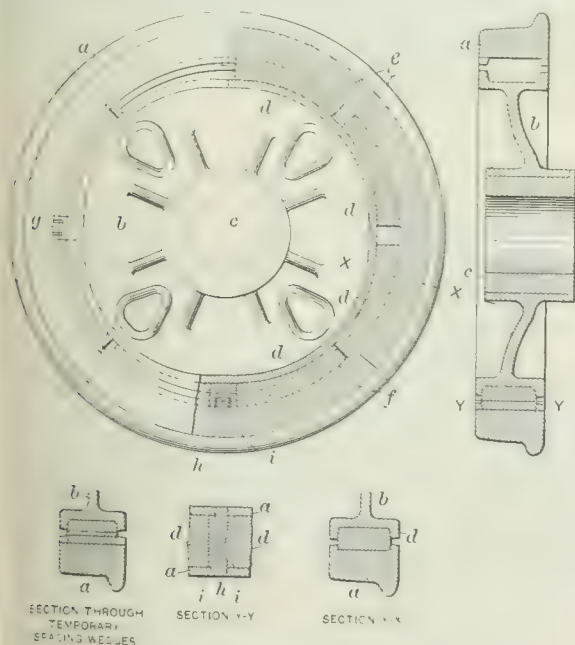


Fig. 2. Details of the Wheel.

for renewing the tire, the tire is cut in two places, diametrically opposite, and falls apart, leaving the center ready for a new tire, which can be applied by unskilled labor and requires no special machinery. All that is needed in the way of machinery is a foundry cupola and lifting appliances of sufficient capacity to handle the car wheel. Fig. 1 illustrates the various stages in assembling the wheel from the centering of the tire to the

The American Society of Mechanical Engineers will hold its monthly meeting on the evening of April 11 in the Engineering Societies Building, 29 West Thirty-ninth street, New York, when a paper will be presented on "The Economic Importance of the Farm Tractor," by L. W. Ellis, traction plow specialist for the M. Rumely Company, La Porte, Ind. It will be followed by a talk on "The Mechanical Equipment of Farm Tractors," by Dr. Charles E. Lucke, Professor of Mechanical Engineering of Columbia University, which will be illustrated by views taken at the Canadian Industrial Exhibition, held last summer in Winnipeg, Man.

The Duplex Metals Company, Chester, Pa., has made a reduction in the price of its copper-clad steel wire to 13 cents per pound base of 100 lb. or less, f.o.b. Chester, subject to discounts for cash and for quantity, making the net cash price 11.95 cents on 15,000 lb. and over. The cash discount is 3 per cent., 15 days. This is the lowest price the company has ever quoted.

The No. 3 Universal Boring Machine

A Larger Size with Several New Features

A new size of horizontal boring machine has been placed on the market by the Universal Boring Machine Company, Hudson, Mass. It is especially adapted for jig and crank case work and cylinder boring and is known as the No. 3 machine. While in many respects similar to the machine illustrated in *The Iron Age* Sep-

which dips into the oil reservoir. For shifting the driving belt from the loose to the tight pulley, a handle is conveniently located at B. The speed gear box transmits the drive to the spindle through the vertical shaft E to the head, exterior and interior details of which are shown in Figs. 2 and 4, respectively. The head casting

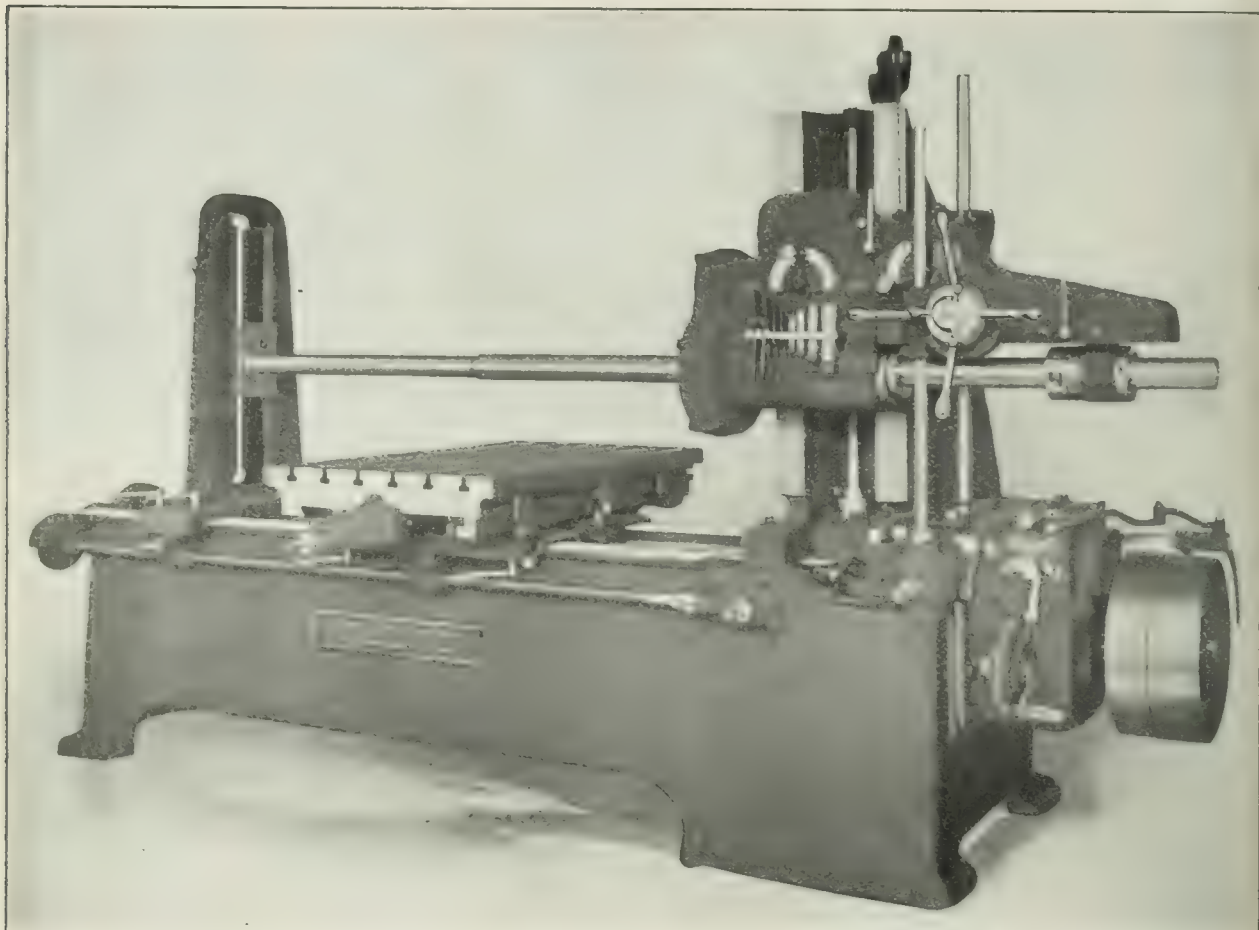


Fig. 1.—Front View of the No. 3 Horizontal Boring Machine Built by the Universal Boring Machine Company, Hudson, Mass.

tember 2, 1909, it has a number of new features, among which are the location of the driving gear and the method of feeding the boring bar. It is of the constant speed drive type and may be either belt or motor driven. Its construction is very rigid; the upright supporting the spindle head is of box form, while the bed and the saddle are designed to provide abundant support for the table, which is an essential feature in a machine of its character often required to take heavy cuts. The bearing surfaces of the saddle on the bed are large. The operating levers and the hand wheel for the rapid adjustment of the boring bar and the facilities for changing the speeds and feeds are also noteworthy features. Fig. 1 is a front view of the machine, Fig. 2 shows the exterior of the head and Fig. 3 is an end view showing details of the drive. Fig. 4 gives details of the head construction, while Fig. 5 shows the method of transmitting the automatic feed to the table.

The Spindle Drive

As the drive is from a single step pulley and a loose pulley is provided on the machine itself, the machine can be driven directly from the main line shaft. A powerful drive is secured by using a driving pulley 18 in. in diameter and $3\frac{1}{2}$ in. wide, running at a speed of 250 rev. per min. The loose pulley A, Fig. 3, is in one piece and has an oil reservoir for supplying the bearing cast in the hub. In a groove in the bearing proper is a wick,

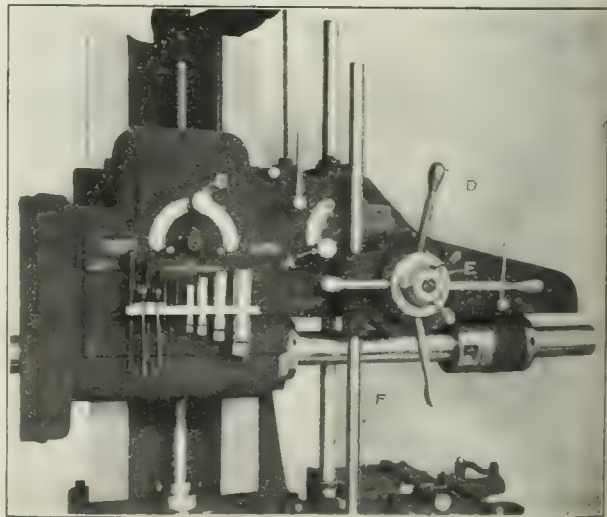


Fig. 2. Exterior View of the Head.

is in one piece, with oil pockets and half of the gear casing formed in the casting itself to retain the supply of lubricant, an arrangement radically different from that in the No. 2 $\frac{1}{2}$ machine.

The various operating handles are shown in Fig. 2.

W carries the lat which operates the table feed. When the lever at the right of the saddle is pulled out, as shown in the engraving, the teeth of the sliding jaw clutch engage corresponding teeth on the hub of the spiral gear underneath the saddle and the feed is put in action. For throwing out the cross feed automatically the stop Z is provided. A nut, Y, secured to the saddle enables the saddle and the table to travel either by hand or power longitudinally along the bed of the machine. In addition to the automatic feed, hand crank feed with micrometer adjustment is furnished for the cross and the longitudinal movements of the table.

The boring bar which is 3 in. in diameter has a vertical feed of 30 in. and a horizontal travel of the same length. These feeds and a vertical milling feed and quick raising and lowering feed for the head and the cross and longitudinal feeds for the table are all automatic and reversible. The bearing for the outboard

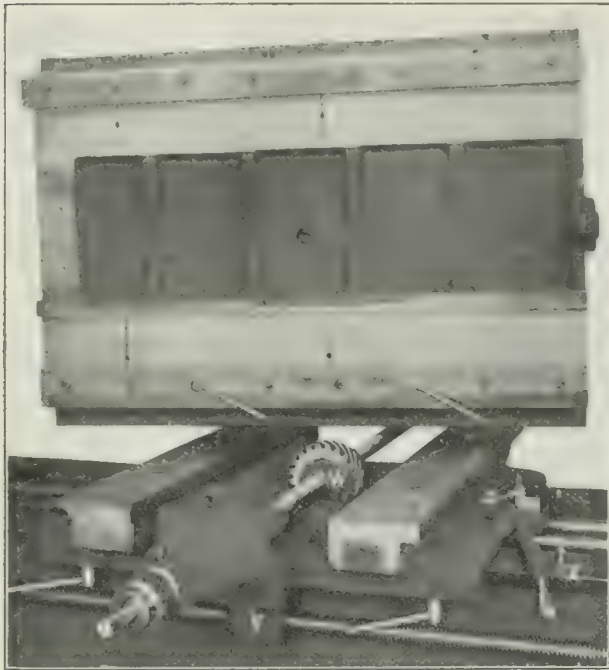


Fig. 5.—Method of Transmitting the Automatic Power Feed to the Table.

boring bar support is gibbed to the internal guiding surface of the support and the raising and lowering of the bearing is accomplished by a screw connected through spiral gearing and splined shafts to the spindle head elevating screw so that both move simultaneously. The outboard support, which can be moved longitudinally on the bed by a hand crank, is accurately fitted to the head of the machine, and provision has been made for realigning the bearings to compensate for wear.

The Wallace Hand Power Bar Bender

For bending large reinforcing bars for concrete work a powerful machine operable by one man is being offered by the Wallace Supply Company, 108-128 North Jefferson street, Chicago, Ill. It is designed particularly to handle heavy stock and will bend $1\frac{1}{4}$ -in. bars, cold, without any difficulty. Rounds and flats can also be bent on this machine and by substituting higher dies flat stock 4 in. wide or even wider can be handled successfully. The jaws or dies can easily be set to suit various sizes of bars.

The power is obtained by a ratchet lever 36 in. long which operates a small pinion engaging a stationary segment gear that forms part of the machine. Thus the radial member carrying the bending jaws is turned through a sufficient angle to produce the required bend. Fig. 1 shows the machine set up complete on a cast iron stand ready for operation, and Fig. 2, the working parts removed from the stand and stood up against it, giving an idea of how it may be compacted for transporting and

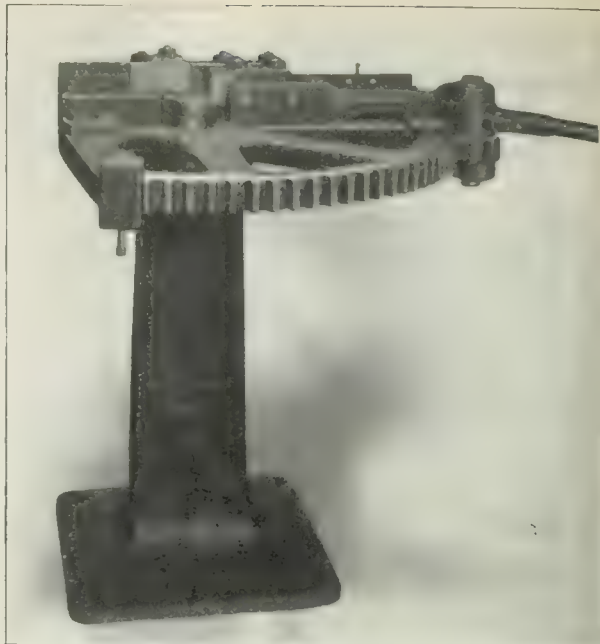


Fig. 1.—The No. 5 Angle Bender Made by the Wallace Supply Company, Chicago, Ill.

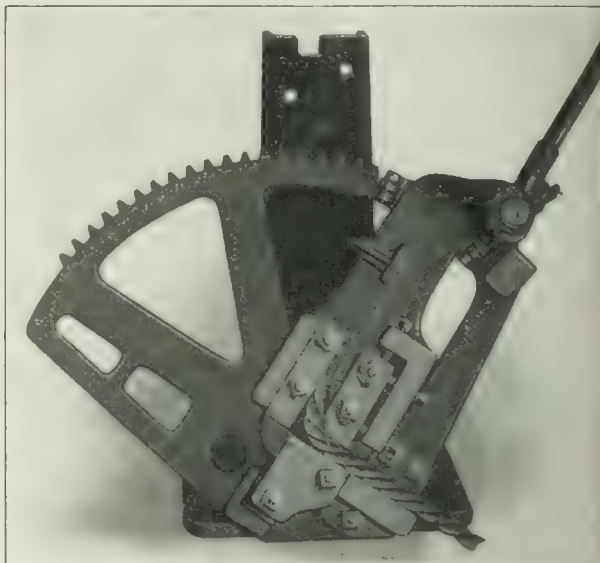


Fig. 2.—The Machine Removed from Its Pedestal, Showing a Top View of the Working Parts.

also showing a top view of the bending members. In Fig. 1 the machine is ready to receive a bar, and in Fig. 2 the lever has been brought around to a position for bending a right angle, and a piece of twisted reinforcing bar is shown between the dies as it appears after being bent.

This machine will be known as the No. 5 angle bender and is a development from long experience in the manufacture of bending tools of all kinds. In addition to this machine the company builds an extensive line of bar benders for forming bars into various angles, hooks, U shapes, rings, &c. All parts of the new bender are made very strong. The lever is fitted with anti-friction rollers and all dies have tool steel face plates at the corners. The machine is furnished with or without the stand. Its approximate weight without the stand is 268 lb. The stand weighs about 100 lb.

Gas Producer Experiments.—At the experiment station of the United States Bureau of Mines, Pittsburgh, Pa., several trial runs have been made with an experimental gas producer, using coke as fuel, with which limestone has been mixed in varying proportions, the purpose being to flux the ash and form a liquid slag, thus avoiding clinker and ash troubles and consequent shutdowns. Liquid slag has been readily made which runs freely from the producer. The high temperatures necessary are very efficient in the generation of gas.

A New Rockford 14-In. Drill

Equipped with a Special Feed, Combining Lever, Hand Worm and Belt Feeds

The Rockford Drilling Machine Company, Rockford, Ill., has developed a new 14-in. drill equipped with a special type of feed. Convenience and simplicity in handling the feed on a sensitive drill are two special features of the design. A view of the drill is given in Fig. 1, while Fig. 2 shows the details of the feed mechanism.

This feed consists of a three-step cone pulley on the upper shaft and a lower feed cone pulley placed on the same level as the worm shaft. In this way it is possible to secure three different feeds from the cone pulley on the upper shaft, and by placing the lower cone pulley on the same level as the worm shaft, the necessity of using bevel gears to change the direction of the feed is avoided and a steel spur pinion and gear protected by a guard can be used instead. The lower feed cone pulley is placed in the lowest possible position, so as to employ a very long feed belt, thus increasing the frictional pull. The feed frame is in one piece and swings on a long hinged pin, *l*, Fig. 2, which is held by a lug cast solid to the main frame of the machine. For stopping and starting the feed, the lever *h* is lifted or depressed.

Referring to Fig. 2 the two boxes *a* and *b* are cast on the main frame, the former being the bearing on which the feed frame swings, and the latter the rear bearing for the cone pulley shaft. In this way the feed frame acts as the front bearing for the cone pulley shaft, and has an arm, *c*, extending through to the left side of the machine, which engages a forked casting when the feed is engaged. The coiled spring *d*, Fig. 2, pulls this frame down and also pulls up on the forked casting *e* and throws the step *n* under the arm *c* when the feed is engaged. There is a link, *f*, which is pinned to the feed frame and hangs under the starting lever *h*. This link is simply used for pulling in the feed. On the top of the rear end of the starting lever is a bent dog, *g*, which is used in connection with the former when it becomes necessary to disengage the feed quickly. A cast iron collar on the left of the cross spindle is threaded and carries the loosely fitting nut *i*, having a short radially projecting arm. This nut revolves with the cross spindle and travels out until it strikes the adjusting screw *m*, which can be set to trip the feed at any desired point. The nut then locks and turns with the cross spindle, whereupon its arm swings the forked casting and disengages the step *n*, which holds the arm *c* of the feed frame. The coiled spring then pulls the worm *j* and the worm wheel

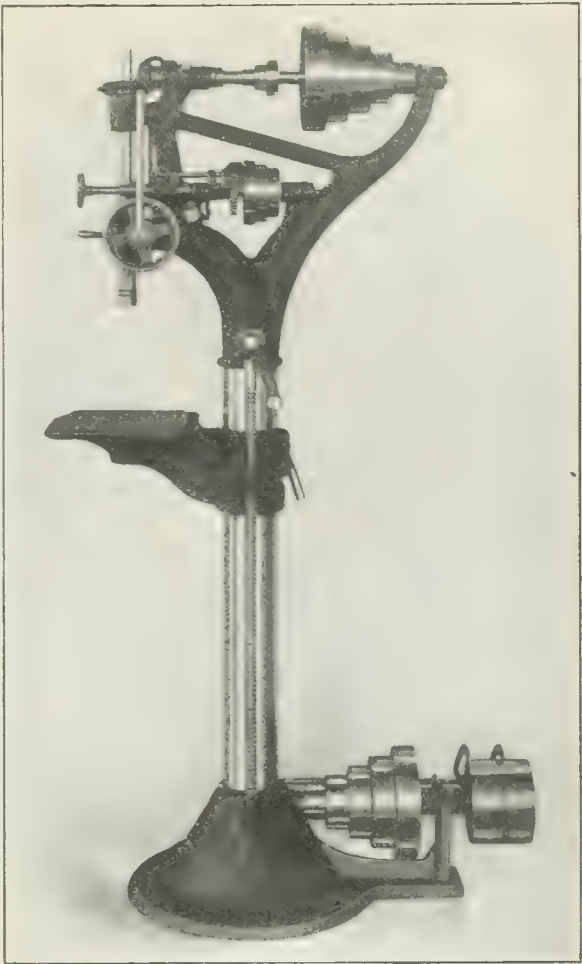


Fig. 1.—The New 14-In. Drill Built by the Rockford Drilling Machine Company, Rockford, Ill.

k apart, by rocking the feed frame on the pin *l*. The starting lever fits loosely on the back pin. To secure hand worm feed the handle *p* is shifted to move the large spur gear out of engagement with the pinion, whereupon the hand wheel *o* can be used to turn the worm, and feed the spindle through the worm wheel.

An automatic stop enables the full travel of the spindle sleeve to be secured. This is not shown in Fig. 1, as it is on the opposite side of the machine. In place of the former hand lever feed, a lever on the right side of the machine held by a suitable spring is used. This

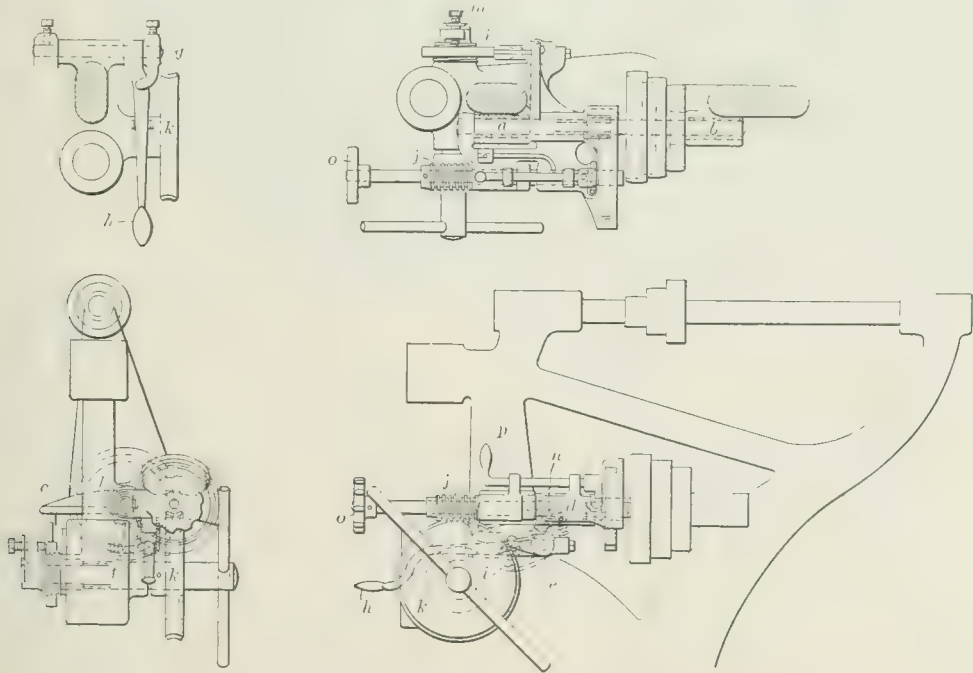


Fig. 2.—Details of the Feed Mechanism.

lever can be adjusted longitudinally, which makes it very convenient for small drilling. For facing the small hand wheel *c*, shown at the end of the shaft bearing of the worm in Fig. 2, is used. This wheel is attached to the worm shaft, and when the operator wishes to use the machine for facing, the conveniently located push lever *p* enables him to disconnect the spur pinion operating the feed, and engage the worm with the worm wheel and use the small hand wheel for the facing operations.

The New York Compensation Law Void

The Wainwright Act Declared Unconstitutional

The New York Court of Appeals, March 24, declared the workmen's compulsory compensation law, which was enacted last year, to be unconstitutional. The whole bench concurred in this decision. It is held that the act takes an employer's property without due process of law. According to lawyers who have studied the opinion, the decision in no way affects the employers' liability law, which was amended at the same time the Wainwright act was passed, and which vastly increases the liability of the employer by striking out the ordinary defenses in negligence suits under the old common law. The New York *Evening Sun* presents the following excellent article on this subject:

"The workmen's compulsory compensation law which the Court of Appeals has by a unanimous vote held to be unconstitutional sought to do much more than correct specific hardships of the common law rules of employers' liability. It was a frank attempt to make certain employers insure their employees against injury in the course of their labor.

"The employments thus singled out as dangerous were the following: 1. The erection or demolition of any bridge or building in which iron or steel framework is involved; 2. The operation of elevators, derricks, or hoisting apparatus used in or on such bridge or building; 3. Work on scaffolds; 4. Construction of tunnels and subways; 5. All work carried on under compressed air; 6. Construction or operation and repair of electrical wires or apparatus; 7. All work necessitating proximity to gunpowder, blasting powder or dynamite; 8. The operation of locomotives, motors or cars propelled by steam, electricity or gravity and the construction or repair of railroad tracks. Employers in these lines of work were rendered liable to compensate their employees for all accidents due to "the negligence of employers, agents or employees, or by the necessary risk or danger of the employment or one inherent in the nature thereof." Death compensation was fixed at four years' wages, but not to exceed \$3000; and the compensation for total or partial disability was fixed at 50 per cent. of the average weekly wage, but not to exceed \$10 a week, for a period of not more than eight years.

"It will be seen that these provisions sought practically to eliminate all question of negligence either on the part of the employer or of the employee. Under them, a plaintiff need not prove that his injuries were the result of any fault of the employer; and the employer could not set up as a defense the fact that the plaintiff had been grossly negligent. Thus in the important case now determined, the plaintiff, Ives, a switchman in the employ of the South Buffalo Crosstown Railroad Company, merely set up his complaint that he had been injured through a necessary risk or danger of his employment and asked for recovery under the statute therefor. In short, a revolutionary overturning of the theory of liability in such cases was attempted; liability was henceforth to attach regardless of sins of omission or commission and by a purely arbitrary fiat of the State.

"It was this change wrought by the Wainwright act which came before the Court of Appeals in the present case and has now been declared unconstitutional for reasons which were well summed up by Judge Werner in this sentence of his opinion:

"If such economic and sociological arguments as are here advanced in support of this statute can be allowed to subvert the fundamental idea of property, then there is no private right entirely safe, because there is no limitation upon the absolute discussion of legislatures and the guarantees of the Constitution are a mere waste of words.

"As to the so-called employers' liability law, however, the court intimates a more favorable attitude. To be sure, the views expressed thereon are all *obiter dicta*, but as an indication of the standpoint of the court they are of much interest. These other new provisions are applicable to all employments and are designed to modify certain rules of liability which often work hardship upon plaintiffs. The 'assumption of risk' rule is materially modified, the burden of proving contributing negligence is placed upon the employer, and the scope of the 'fellow servant' rule is considerably narrowed. As we understand the opinion of the Court of Appeals, these modifications of the existing law are likely to be viewed with favor. Certainly there is every ground in reason for distinguishing them from the revolutionary change proposed by the Wainwright act."

The Foundrymen's Convention at Pittsburgh

Preliminary announcement is made of the outline programme for the convention of the allied foundrymen's associations at the Exhibition Building, Duquesne Way, Pittsburgh, May 22 to 26, 1911. The following is the general arrangement of sessions with a tentative indication of the papers that will be discussed:

TUESDAY, MAY 23.

- 9 a.m.—Registration.
- 10 a.m.—Joint Session. Addresses of welcome. Papers on "Production Cost," "Economic Foundry Insurance," "Uniform Contracts."
- 2 p.m.—Separate Sessions. A. F. A.: Papers on "Unloading Methods," "Use of Borings in Cupolas," "Effect of Alloys in Cast Iron," "Permanent Molds." A. B. F. A.: Papers on "Vanadium in Nonferrous Alloys," "Determination of Nickel in Bronzes," "Pouring High Grade Bronzes."
- 7 p.m.—Foundry & Machine Exhibition Company. Exhibit. Open throughout the week during the day, and Saturday evening, May 27.

WEDNESDAY, MAY 24.

- 9.30 a.m.—Joint Session. Papers on "Rotary Blowers," "Foundry Construction," "Heating and Lighting Systems," "Patternmaking," "Molding Machines."
- 2 p.m.—A. F. A. Session. Papers on "Acid and Basic Open Hearth Processes," "Electric and Converter Furnaces for Steel Castings," "Effect of Vanadium and Titanium on Steel." A. B. F. A. Session. Papers on "Corrosion of Brass Foundry Products," "Pyrometer and the Aluminum Foundry," "Nonferrous Foundry Economies," "Equilibrium Diagrams."
- 2 p.m.—Individual plant visitation.
- 6.30 p.m.—Dinner. Pittsburgh and Associated Foundry Foremen.

THURSDAY, MAY 25.

- 9.30 a.m.—Joint Session. Papers on "Molding Sand," "Use of Alloys," "Shot in Castings."
- 1 p.m.—Train excursion to foundries and steel works. (Pennsylvania-Union Station.)
- 8 p.m.—Entertainment by Foundry & Machine Exhibition Company to members of all associations and their guests attending the conventions.

FRIDAY, MAY 26.

- 9.30 a.m.—Separate Sessions. Election of officers and reading of papers.
- 3.30 p.m.—Pittsburgh and Cincinnati ball game at the Forbes Field.
- 6.30 p.m.—Subscription dinner open to all who attend the convention or exhibition.

SATURDAY, MAY 27.

The exhibition of the Foundry & Machine Exhibition Company will be open throughout the day and evening.

The Pittsburgh Foundrymen's Association has appointed an Executive Committee to handle convention affairs, as follows: Joseph T. Speer, chairman; F. H. Zimmers, secretary; J. S. Seaman, finance; H. E. Field, convention; W. A. Bole, plant visitation; Eliot A. Kebler, reception; G. P. Bassett, Jr., ladies' entertainment; E. D. Frohman, ball game; W. B. Robinson, press.

The Natural Gas Engineering Company, Pittsburgh, has been organized and has opened offices at 801 Macheney Building, for the purpose of selling gas burners, compressors, fittings, &c., and will represent the Reinforced Brazing & Machine Company, Pittsburgh.

The Keystone Bronze Company Expanding

John S. Craig, secretary and treasurer of the above named company, whose general offices are on Thirty-ninth street, near the Allegheny Valley Railroad, Pittsburgh, states that it has taken over the brass, bronze and copper business of the Brighton Brass & Bronze Company, New Brighton, Pa., and the bronze and copper

The New Newton Cold Saw

An Annular Disk Blade with Internal Teeth

A new design of sawing machine has been placed on the market by the Newton Machine Tool Works, Inc.,

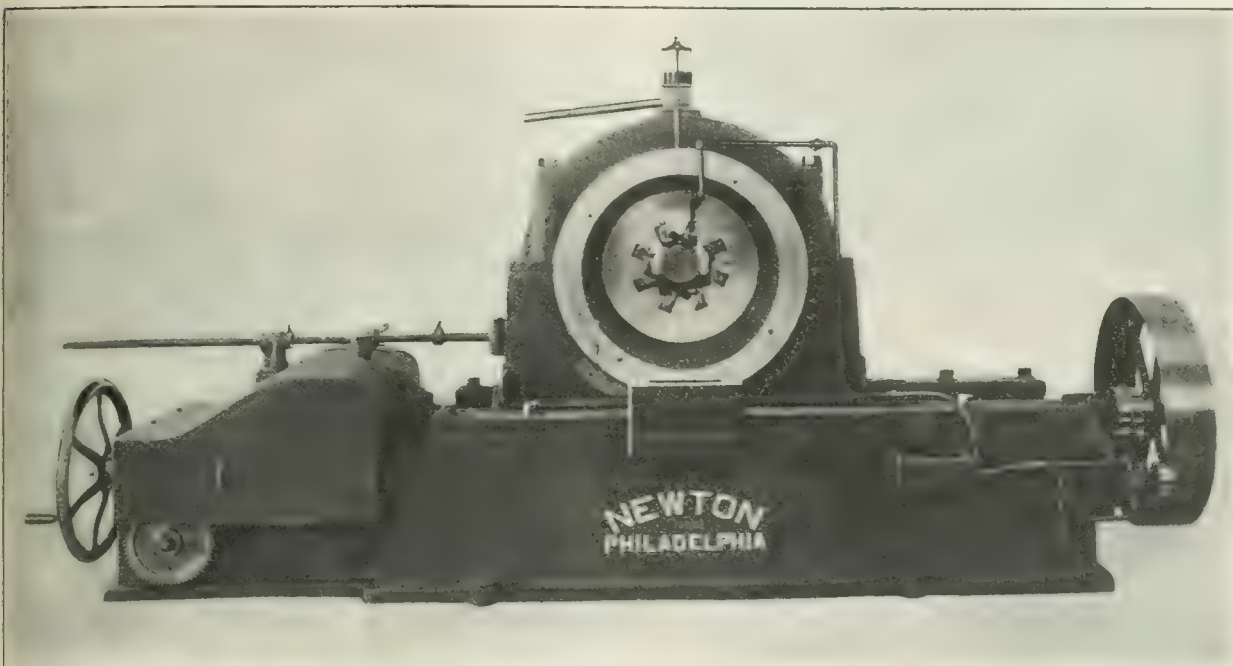


Fig. 1.—The Driving Side of a Cold Saw with Concave Blade Built by the Newton Machine Tool Works, Inc., Philadelphia, Pa.

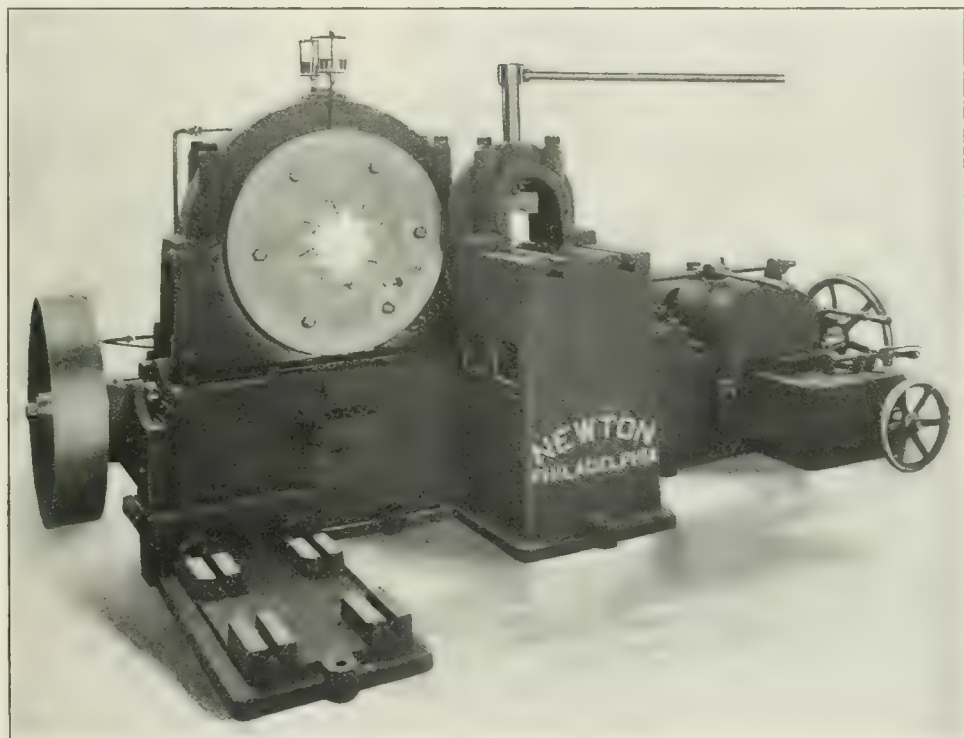


Fig. 2.—The Operating Side of the Saw.

department formerly operated by the Best Mfg. Company, Pittsburgh, and will continue to operate its own plant at Thirty-eighth and Thirty-ninth streets. The company is therefore in a good position to produce in large quantities copper, bronze and aluminum castings, babbitt metals, blast furnace tuyeres, coolers, bosh plates, locomotive driving boxes, roller mill bearings and any other specialties made in these metals. It is also the sole manufacturer of Keystone valves, acid proof metal, Knox patent copper water-cooled open hearth furnace doors, frames, rims, ports, &c., of which many have been installed in different plants of the United States Steel Corporation and of independent companies. Copper jackets for copper smelters and machinery builders' castings will also be produced. The president of the company is Mont. Murray; vice-presidents, George Best and W. H. Schoen.

The bi-monthly adjustment of the puddling and finishing scale recently made at Pittsburgh, based on the average price on shipments of iron bars for January and February at about 1.30 cents, fixes the puddling rate for March and April at \$5.75 a ton, against \$5.87½ in January and February. Wages for finishing mills for March and April will be reduced 1 per cent. as compared with the two previous months.

Twenty-fourth and Vine streets, Philadelphia, Pa. Its special features are the locating of the teeth of the saw blade on the inner periphery of an annular disk as contrasted with the ordinary type of blade having the teeth on the outside, giving a concave instead of a convex cutting track, and the use of a positive direct gear drive. Figs. 1 and 2 show the driving and the operating sides of the saw, respectively, while Fig. 3 is a specimen cut illustrating the even motion of the saw blade.

The machine consists of a very heavy cylindrical barrel about 28 in. in diameter in the bearings. A bronze worm ring with teeth of steep lead is located on the periphery of this barrel and is driven by a hardened

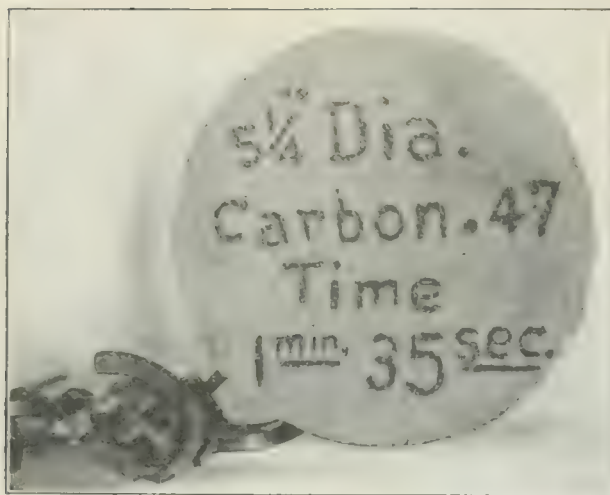


Fig. 3.—A Specimen Cut, Showing the Steady Motion of the Blade.

steel worm fitted with roller thrust bearings. The driving hub and worm wheel have a common bearing in the saddle which absorbs the opposed stresses due to the drive. This saddle is heavily constructed and the base and the cap are bolted together securely with ample provision for lubrication. Square locked gibbed bearings on the base with adjusting screws provide for wear. Nine changes of feed are secured through a gear box, and a reversing fast power traverse is also available. The feed screw of the large diameter and bearings at each end preserve the proper alignment.

The saw is driven by a 20-hp. General Electric motor. While it is not the first machine embodying the internal cutting principle, it is claimed to be the first on the market of a simple design having positive direct gear drive. The steady, even motion of the blade, even when working under very severe conditions and heavy feeds, is indicated in Fig. 3. It is possible to secure even greater feeds, but these are not recommended for commercial work.

Although this saw is rated as a 5-in. machine, it will clear 7 in. and has eight internal teeth in the saw blade. These machines are especially adapted for cutting locomotive axles and are also peculiarly suitable for cutting automobile gear blanks from bar stock, as 12 and 15 in. sizes are also made.

The Pennsylvania Railroad has installed at West Brownsville Junction, Pa., a scale for weighing cars while in motion. The new "52-ft. track scale with mechanical hump," as it is called, has great advantages over other existing scales. Probably the most ingenious feature of this new scale is what is called a relieving gear, an arrangement of jacks operated by power which permits the scale mechanism to be completely disconnected from the track. By reason of this invention the heaviest engines can pass over the scale without registering a pound's weight; the disconnection is made without the least effect on the balance of the scale. The "mechanical hump" makes it possible to regulate the velocity at which the cars go on the scale. By raising or lowering the apex of the hump, the grade down which the cars run is increased or diminished at will. This is important because on different styles of cars the distance between the front and rear wheels varies, and as the weight can only be registered during the interval between the times when the rear wheels pass on the scale and the front wheels pass off, the velocity must vary inversely with the length of the wheel base.

The Sullivan Machinery Company, Chicago, has established a branch office at 35 Federal street, Boston, Mass., to permit more adequate service of its patrons in New England, eastern Canada and the Maritime Provinces. George E. Wolcott, for several years manager of New England sales at the company's Claremont, N. H., office, is in charge of the Boston headquarters.

The Rockford Shaper Down Feed

A new type of power down feed for shapers has been developed by the Rockford Machine Tool Company, Rockford, Ill. Fig. 1 shows the automatic variable feed to the head, as applied to one of the maker's shapers, while Fig. 2 gives the constructional details. The feed is simple in design and without complicated parts, so

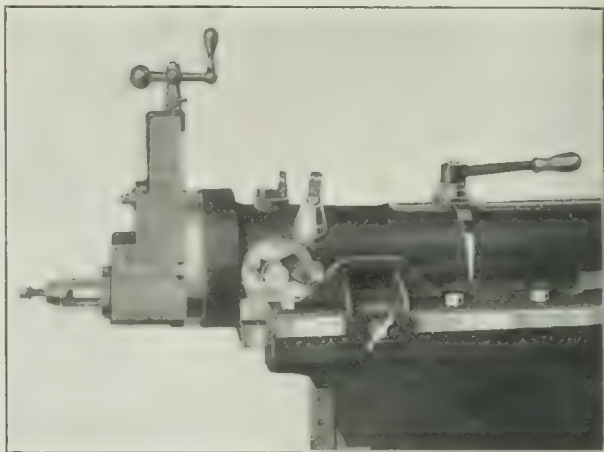


Fig. 1.—The New Power Down Feed for Shapers Made by the Rockford Machine Tool Company, Rockford, Ill.

that it is not readily subject to derangement. These give a feeding mechanism which is very serviceable. The tool can be fed up or down and the feed will operate at any angle. The cam piece, with the incline, on which the roller rides that actuates the feed, can be adjusted readily to suit the position of the ram or can be moved out of the way when not in use. The amount of

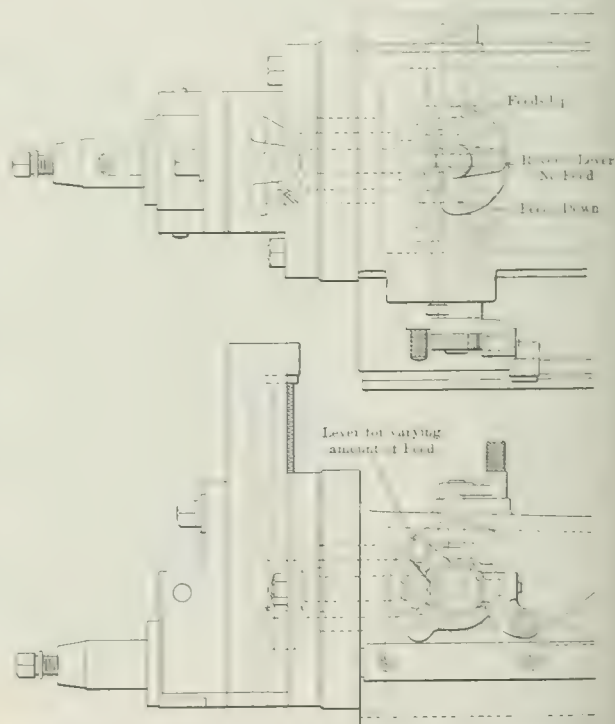


Fig. 2.—Plan View and Elevation Giving Constructional Details of the Mechanism.

the feed is regulated by the lever and the spring pin on the side of the ram, while the lever on the top reverses the direction. Six feed changes ranging from 0.008 to 0.048 in. are available, the difference between each of the changes being 0.008 in. The lever on top of the ram, which reverses the direction of the feed, has three positions, and when it is in the central one and the feed is not in use, the gears are thrown out of mesh.

Cincinnati's Industrial Development*

One hundred and sixteen years ago Cincinnati's 500 inhabitants dwelt in 94 log cabins and 10 frame houses. History tells us that in those early days her men were mechanics, blacksmiths, lock and gun smiths, shoemakers, &c. William McFarland was the father of our first manufacturing industry. He manufactured earthenware one year before the beginning of the past century (1799). Shortly after this Lyons and Maginnis were advertising desks and dining tables in our first publication, and these gentlemen are doubtless entitled to the honor of being called our first furniture manufacturers, although their work was that of cabinet makers and was all done by hand.

A Few Pioneers in Various Industries

In 1812 William Green built the first steam buhr mill; the machinery was put in by Oliver Evans, the inventor of the high pressure steam engine. This first steam engine, of 70 hp., sent here from the East, was at that time considered a wonderful piece of machinery, and so it was, for it put Cincinnati in closer commercial touch with New Orleans, where most of the flour produced was sold. The surplus output of these four 6-ft. buhrs was loaded on flat boats and floated down the Ohio to the Mississippi, thence to New Orleans. Many of the men who piloted the barges down these great rivers used to walk back through the wilderness.

Plows were first made here about the time the steam mill was put in operation. A blacksmith by the name of Miller was responsible for our first agricultural implements. In 1815, on the bank of Deer Creek, which is the present approximate location of Eggleston avenue, a white and red lead works was in operation, with a capacity of 6 tons of lead per week. This was one of the first three lead factories started between the Alleghenies and the Mississippi. The product of this works was noted by Dr. Drake, a public spirited man of that time, as being of excellent quality.

A steam saw mill was next started, with a capacity of 7000 ft. per day; and six tanneries were in operation by 1816, also a factory or blacksmith shop making a specialty of wrought nails. An English traveler (Mr. Palmer) visited our city about that time, and commented favorably upon our manufactured products and industrious citizens.

In 1817 the steamboat completed by Captain Shreve started steam navigation on the Ohio and Mississippi, and this gave great impetus to our metal working industries. We had no iron foundry in 1820—all of our castings were brought on barges from Pittsburgh, but by 1830, 10 years later, we were building steam engines, making castings of iron and brass, cabinet furniture, guns, locks, chairs, &c. There were nine foundries and machine shops, employing almost 200 men and producing about \$200,000 worth of product. At this time 18 per cent. of our population was engaged in manufacturing industries.

Cincinnati's centralness of location served her in those days as in these, by enabling her manufacturers to get prompt supplies of raw material and to readily find a market for the finished product. The great waterways connecting us with the South gave us unsurpassed transportation facilities, and by 1835 our city manufactured annually more than 100 steam engines, 240 cotton gins, 20 sugar mills and 22 steamboats. In 1841 the total value of our manufactured product was a little above \$18,000,000; and at the beginning of the Civil War it had increased more than sixfold.

The Beginning of the Machine Tool Industry

In 1838 an English machinist by the name of John Steptoe began the manufacture of machine tools, an industry which seems peculiarly adapted to our location, and which has developed so substantially and so well that we are to-day the largest machine tool manufac-

turing city in the world. An examination of the books of the old John Steptoe Company will reveal the names of many of our present prominent men who worked as journeymen at ordinary wages, and whose names to-day are household words in the great machinery centers of the world. Some of these men are to-day proprietors of our largest establishments and are respected for their worth as public spirited citizens, as well as for their enterprising and progressive spirit. This progressiveness has not been confined to our day. Horace Greeley, in the New York *Tribune* 61 years ago, said: "Cincinnati is a focus and market for the grandest circle of manufacturing thrift on the Continent." He also spoke of our enterprising and energetic population. It is gratifying to know that Cincinnati appealed to this great man 61 years ago, as it does to visitors to-day.

What article of importance can be named that has not at some time been manufactured in Cincinnati? It is difficult to think of a single thing which our industrious citizens have not undertaken. The site of McFarland's earthen ware industry of 112 years ago can now be viewed from our famous Rookwood Pottery, whose product is recognized as the acme of art, and is treasured for art's sake all over the world. Our present vast manufacturing industries leading the world in many lines, and driven by automatic engines aggregating hundreds of thousands of horsepower, could not have grown from the lowly 70-hp. slide valve engine of 100 years ago to their present state without untiring effort and devotion to duty of our manufacturers.

Cincinnati's Industrial Rank

Cincinnati leads the world in the production of machine tools, woodworking machinery and engineering specialties. Cincinnati ranks first in the United States in the manufacture of acids, bookcases, office furniture, field musical instruments, harness and saddlery, laundry machinery, playing cards, printing ink, soap and vehicles. Cincinnati ranks first in the United States in the value of manufactured products in proportion to her population. She also ranks first in the United States in the value of goods originated for export, as a hardwood lumber market, as a lithographic center, as a whisky center. Cincinnati has one of the largest tanneries, also one of the largest cast iron pipe foundries in the United States. Cincinnati has the only railroad using steam operated locomotives owned by any city, the Cincinnati Southern. We have 2600 factories, employing over 82,000 workers. Our invested capital in industrial lines is close to \$200,000,000, and we pay out annually in wages and salaries almost \$45,000,000. Cincinnati ranks third in the United States in the manufacture of clothing, jewelry, shoes and electrical machinery.

I could go on quoting figures giving the enormous amount of materials used, our entire factory output, our leading products annually, freight shipped annually, &c., but these can all be obtained by consulting our last industrial census. Our metal industry alone gives employment to over 15,000 men and pays out in wages almost \$4,000,000 per year. These concerns pay in taxes each year about \$500,000. Broadly speaking, our artisans are skilled in over 250 different kinds of industries. A great number of our most useful citizens are engaged in some kind of manufacturing industry. The majority of these men have developed from the lathe or vise; men who learned how to work with their hands as well as their heads.

The Wetzel Mechanical Stoker Company, Trenton, N. J., has completed the installation of 13 of its mechanical stokers in the boiler room of the Peters Paper Company, Latrobe, Pa. H. W. Hendrickson, 1402 Park Building, Pittsburgh, is the stoker company's sales representative in Pittsburgh and vicinity.

The Employers, Builders and Material Men's Association of Gary, Ind., is amending its constitution so as to take in all employers in the county. The object is an alliance to enforce the open shop system in all the large factories in that district.

* Extracts from an address before the manual training department of the Hughes High School, Cincinnati, by W. L. Schellenbach, chief engineer Lodge & Shipley Machine Tool Company.

New Publications.

The Steel Workers. By John A. Fitch. Cloth bound, 8vo; pages, 380. Illustrated. Published by the Charities Publication Committee, New York. Price, \$1.50; postage, 21 cents extra.

This book is one of the Russell Sage Foundation publications and is a part of the Pittsburgh Survey findings, the series consisting of six books. Like the Sage Foundation publications which have preceded it, such as "Work Accidents and the Law," it is excellent in typography and illustration and in all respects a high type of book making. The author was a fellow of the University of Wisconsin in 1908 and 1909 and was attached to the New York State Department of Labor in 1909 and 1910. It is stated in the preface by the editor, Paul U. Kellogg, director of the Pittsburgh Survey, that "Mr. Fitch entered upon his commission without any promptings other than the general instincts toward an independent resourceful citizenship inbred by the spirit of the northwestern prairies and that quickening sense of economic justice which stirs the University of Wisconsin." Much of the information with which Mr. Fitch deals was obtained from steel workers in Pittsburgh and the neighboring towns of Braddock, Duquesne, Homestead and McKeesport. Ten months were spent in the investigation and in that time the author went into every steel mill in Allegheny County. Like other investigators of his class Mr. Fitch evidently favors collective bargaining. He makes much of the fact that employers in the steel industry exclude the men from any voice in the conditions of their employment and emphasizes this fact repeatedly as an offset to whatever he describes in the way of betterment features or any increase in compensation or benefits made on the initiative of the employers. He makes much also of the "repressive measures" introduced by employers to enable the companies to retain the advantages which they gained for themselves when they eliminated the union. These, he says, have resulted in "a thoroughgoing and far-reaching censorship that curtails free speech and the free activity of citizens. The effect of these measures is seen in every department of community life wherever in Allegheny County steel is made."

In the six chapters grouped under the general title "The Men and the Tools" Mr. Fitch presents interesting descriptions, generally accurate, of the processes of steel works and rolling mills, the design being to portray minutely and adequately the conditions under which labor of the various classes is performed. Emphasis is put upon its exhausting character and its risks. Another group of chapters deals with "The Struggle for Control." Here unionism and the union movement are considered historically, the policies of the Amalgamated Association are described and the story is told again of the great strikes in the iron and steel industry, particularly the Homestead strike of 1892. It is shown how unionism was gradually eliminated, leading up to the régime which the author describes in the third part of his book under the title "The Employers in the Saddle." Wages and the cost of living are discussed, the working day and the working week and the speeding up and bonus methods with their effect upon the earnings and the physical condition of the men. The concluding portion of the discussion deals with "The Steel Workers and Democracy," the first of the two chapters in this section treating of "Citizenship in the Mill Towns," and the second of "The Spirit of the Workers."

One of Mr. Fitch's conclusions is thus stated: "No reasonable person will deny that, to speak mildly, unfortunate conditions prevail in the steel mills. These are the result of a growth or evolution through a period of years and the important thing to be considered now is the direction that this growth is to take in the future. It would seem that if these conditions remain as they are at present, or grow worse, some kind of determined and effective opposition must eventually be encountered by the employers." The author considers that the Pittsburgh steel workers are very nearly ready for a political movement. "They are inwardly seething with discontent and the time is not far distant, if indeed it has not

already arrived, when, with a leader who understands how to gain their confidence, they will flock from the standards of the old parties in a way that will be a severe shock to the machine politician."

One thing which writers of Mr. Fitch's type minimize is that many of the conditions they describe are a part of our industrial and economic system, and are not created by the industry or the particular corporation under investigation. The inference they would have the reader draw is that the corporation could change it all by a decree shortening hours and advancing wages; whereas hours and wages in one industry and in the works of one company are related to conditions in other industries and at the works of other companies. There is no line of testimony in "The Steel Workers" to the existence of a better standard of living or better mill conditions in the days of the union régime; yet the impression left with the reader is that with the "employers in the saddle," the worker fares worse than in the old days. No doubt the most significant facts in the evolution the industry has undergone in the past 15 years are the large introduction of the Slav and other European types to the displacement of the races dominant in the days of the union's power, and concurrently the mechanical revolution that has so greatly reduced the amount of skilled labor required in steel works processes.

Homestead: the Households of a Mill Town. By Margaret F. Byington. Cloth bound, 8vo; pages 292; illustrated. Published by the Charities Publication Committee, New York. Price, \$1.50; postage, 20 cents extra.

The book is a companion volume to "The Steel Workers." In the foreword, by Paul E. Kellogg, it is said to be a partial answer to the question: "Shall the day's work afford an adequate basis for American livelihood?" It is explained that those who carried on the field work of the Pittsburgh Survey took up the factors affecting the welfare of the wage earning population—sanitation, housing and public education—while Miss Byington's commission was to analyze these and other factors in the life of Homestead as they bear on the well-being of the family. The book is divided into four parts, dealing respectively with "The Mill and the Town," "The English-Speaking Household," "The Slav as a Homesteader" and "The Mill and the Household." A somewhat intimate study was made of the life of 90 Homestead families. What is scheduled in the book in the tables relating to prices of commodities and the family outlay for all purposes over a period of several months deals with what is commonly spoken of as the cost of living. This is at a level, leaving small possibilities of savings in the case of an ordinary workman's family.

Miss Byington goes into other questions, and dwells on mill town life in its capacity to satisfy the desires of the average mill man's family. Allowance must be made in the comments of an educated woman of sensitiveness and sympathy, for a certain amount of aspiration and ambition which is attributed to the workers, and which is really in large part the author's. There is apt to be in such writing, too, a large element of theory and idealizing. Much of the work of the steel mill is exhausting, it is true, but it is much more so in the minds of persons physically unfitted for it who go to study it than to those who actually do it. Many industries make large demands upon those who work in them; from many, trying conditions are inseparable and cannot be changed.

The author refers to her study, which covered the late months of 1907 and the early months of 1908, as coming at the close of the longest period of prosperity known in this generation. She attempts to state, from her observations at Homestead, what that prosperity has brought to the rank and file of the people whose waking hours are put into the work of the steel mill. Her general impression can be gained from her epitome of the life of the men who are described as "turning daily from 12 hours in the din of the huge mills to home and supper, a smoke and bed." No question need be raised of the correctness of the statements made as to wages, hours, cost of living and the conditions found in the homes of Homestead workers. Such data are matters

of record, or may be obtained, as in this instance, by systematic inquiry. There is no doubt, moreover, that life in a one-industry town is full of monotony, particularly in a town in which the sights and sounds of the mill are making their unvarying impressions day in and day out upon the minds of the dwellers. But Homestead is not exceptional in this respect; in fact, certain features of its life are in advance of what is found in some steel works towns. Moreover, nothing is said of the great improvement over the conditions from which these workers and their families escaped when they came to the United States.

The author has brought out much concerning the régime of the 12-hour day, seven days in a week, as it has affected a certain proportion of steel works employees. It is stated that in the year covered by the study detailed in the book, one man in five worked on seven days in the seven in the steel mills of Allegheny County. In this connection this opinion of William B. Dickson is quoted from his paper before the American Iron and Steel Institute in May, 1910:

It is my own deliberate judgment, after a period of almost 30 years' continuous connection with the industry, the early part of which was passed in manual labor in the mill, that the present conditions, which necessitate the employment of the same individual workmen 12 hours a day for seven days a week are a reproach to our great industry and should not in this enlightened age be longer tolerated.

There is no doubt, it may be said in passing, that the Pittsburgh Survey has contributed its share to the growing effort on the part of steel manufacturers to abolish as far as possible the seven-day week of 12 hours a day. Something may be due also to the Government inquiry into labor conditions at steel works.

Miss Byington's book is an intensely interesting human document. She has succeeded in transferring the atmosphere of Homestead to its pages and in giving the reader a vivid picture of mill town life as a product of the steel industry on latter day lines. With all allowances for the standpoint of the ideal from which the book has been written, there is a residual impression that something remains to be done for the steel works employee. It is quite certain, however, that the employing company is only one of a number of agencies through which betterment must come. The note of encouragement is not strong in this book; but it is not altogether lacking from the developments of the past year. These point definitely to a disposition on the part of American steel manufacturers, not only to improve working conditions, but in bonus, pension, benefit and accident compensation systems to add to the amounts distributed to workmen.

Scientific Management and Railroads. By Louis D. Brandeis. Cloth bound, 8vo; pages, 92. Published by the *Engineering Magazine*, New York. Price, \$1.

Extracts are made in this volume from the brief submitted by Mr. Brandeis on behalf of shippers at the hearings on freight rates before the Interstate Commerce Commission. The grounds of Mr. Brandeis' contention that the railroads had great unutilized possibilities of economy are quite familiar. He introduced testimony from other industries, differing to be sure from the railroad, but contended that there was no difference between the railroads and these industries in the principles essential to the application of scientific management. Mr. Brandeis gives extracts from the testimony of a number of experts whom he introduced to the commission and develops the argument for the introduction of efficiency methods in railroad operations. His conclusion is thus stated:

This investigation has developed clearly that the railroads to meet any existing needs should look not without, but within. If their net income is insufficient, the proper remedy is not higher rates, resulting in higher costs and lessened business, but scientific management, resulting in lower costs, in higher wages and increased business. If their credit is impaired, the proper remedy is not to apply the delusive stimulant of higher rates, but to strengthen their organizations by introducing advanced methods and eliminating questionable practices. Thus they will maintain credit by deserving it.

Paper Rope.—Another use for paper, new in this country, is a product of the Papyrus Artificial Paper

Mfg. Company, now erecting a plant for the manufacture of paper and paper novelties at Kenilworth, N. J. The company has patents covering a rope made of several strands of paper covered galvanized steel wire. The rope thus produced is strong, tough and flexible, suitable for clothes lines and such uses. It is claimed that a rope of this kind will withstand the action of the weather 50 per cent. longer than cotton.

The Pennsylvania Railroad's New Ore Unloading Plant at Cleveland

The new ore handling plant to be erected in Cleveland, Ohio, for the Pennsylvania Railroad will be larger than any similar plant now in operation at Lake Erie ports. Brief mention of the award of this contract to the Wellman-Seaver-Morgan Company, Cleveland, was made in *The Iron Age* March 16.

The plant will consist of four Hulett unloaders, equipped with 17-ton buckets. At present the largest buckets have a capacity of 15 tons. In addition to larger buckets the plant will have heavier motor equipment and a somewhat higher speed of operation than previously built ore unloading machines. The weighing larry will have a capacity of 50 tons, as compared with 35 tons on previously built machines. The unloaders will be constructed to handle the cargoes of not only the largest ore carriers now on the lakes, but also of sufficient size to unload the ore from vessels of greater width and depth that may be built in the future. In the present season a new record has also been established in vessel construction in the placing of contracts for two larger lake boats than any now in commission. These are to be 617 ft. long and 64 ft. beam, being 12 ft. longer and 4 ft. wider than any of the present ore boats.

The new unloaders will have a center span of 71 ft., with cantilevers sufficient to cover the pit, which will be 35 ft. wide. One ore bridge will be used in connection with the four unloaders. This will have a center span of 266 ft. and an over-all length of 612 ft. The bridge will be equipped with a 15-ton bucket. The ore bridge will also be equipped with weighing hoppers for loading out. The equipment will all be electrically driven, direct current, 220 volts. The ore on being taken out of the boats can be weighed by machines for shipment and loaded directly on cars, or dumped into the pit in the rear of the machines for placing into storage. It is expected that the plant will readily handle two of the largest ore carriers, or from 25,000 to 30,000 tons of ore between daybreak and dark.

The new plant will be located on the lake front in Cleveland, a short distance west of the mouth of the Cuyahoga River. Preparatory to its erection and the establishment of large ore storage yards, the Pennsylvania Railroad has been engaged for a number of months in filling in an extensive tract of water front. The plant will be carried on concrete docks and piers. The contract calls for its completion in time for the opening of navigation in 1912. This gigantic plant will be located but a short distance from the main tracks of the Lake Shore & Michigan Southern Railroad, and the unobstructed view of it that it will be possible to obtain from the car windows is expected to attract much interest.

The Production of Fluorspar in 1909.—The quantity of fluorspar mined in the United States in 1909, according to a report just published by the United States Geological Survey, was 46,198 net tons. At the close of 1908 there remained unsold 16,864 tons of fluorspar, so that the sales in 1909, which amounted to 50,742 net tons, valued at \$291,747, were supplied partly from stocks on hand. The principal fluorspar producing district in the United States is in western Kentucky and southern Illinois, and these two States shipped, respectively, 7800 tons and 41,852 tons in 1909. In 1909 Colorado, New Mexico and Arizona together produced 1090 tons, which was practically all taken by the open hearth plant at Pueblo, Colo., but this quantity was not sufficient to supply the demand.

A Huge Ajax Forging Machine

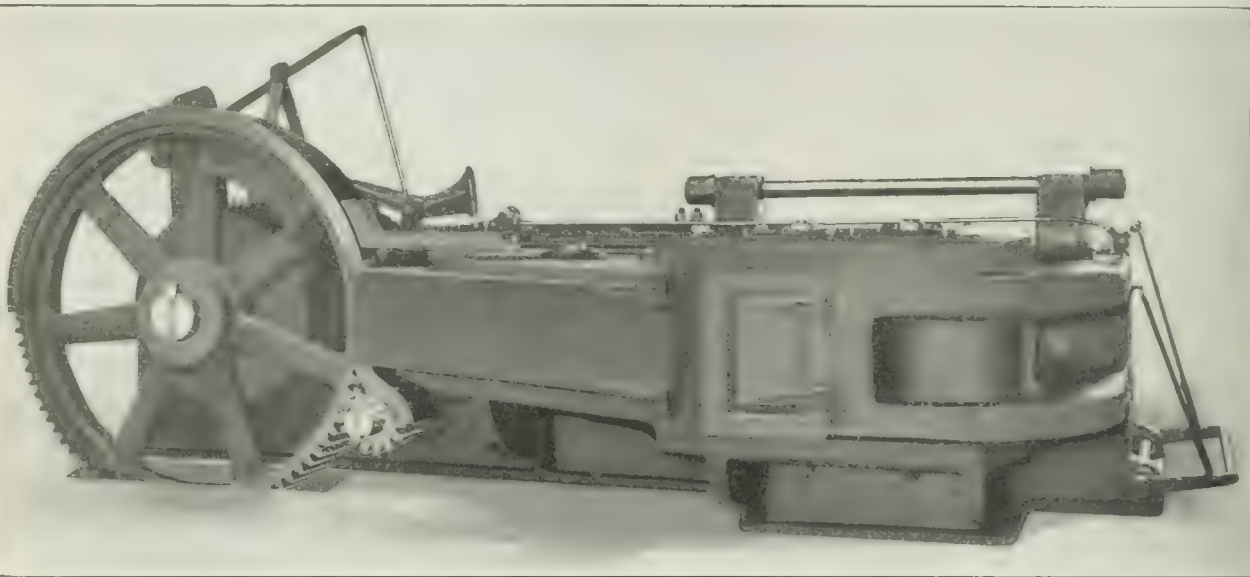
A 7-in. upsetting and forging machine, believed to be the largest ever built, was recently completed by the Ajax Mfg. Company, Cleveland, Ohio. This new machine is 2 in. larger than the biggest machine previously built and was shipped to the St. Louis plant of the Railway Steel Spring Company. The shipment was made on a special all-steel heavy trussed car, having four trucks, to sufficiently distribute the weight on the wheels, as the machine weighed 210,000 lb.

The construction of this machine is practically the same as that of the company's standard line of bolt

The Davis 26-In. Turret Lathe

Recent Improvements in This Boring, Forming and Threading Machine

The W. P. Davis Machine Company, Rochester, N. Y., has recently made a number of improvements in its 26-in. turret boring, forming and threading lathe. These include a rearrangement of the driving mechanism, the addition of a gear box drive similar to that used on engine lathes, and increasing the size of the hole through the spindle. The foot lever on the front of the machine



A 7 In. Forging and Upsetting Machine Built by the Ajax Mfg. Company, Cleveland, Ohio.

heading, upsetting and forging machines, which are made in sizes ranging from $\frac{3}{4}$ to 5 in. for upsetting and forging, and with 3 in. as the maximum size for bolt heading. The smaller machines are geared at about 6 to 1, but this new one is geared 10 to 1, the slower speed, about 35 rev. per min., being provided to secure more power. The bed plate is a one-piece steel casting, and

enables the feed to be reversed while the operator is using both hands. Automatic stops have also been provided for each face of the turret and for the carriage, and a number of other changes have been made in the interior construction, such as supplying steel gears and increasing the strength of the tool throughout. Fig. 1 is a general view of the lathe, while Fig. 2 shows front and

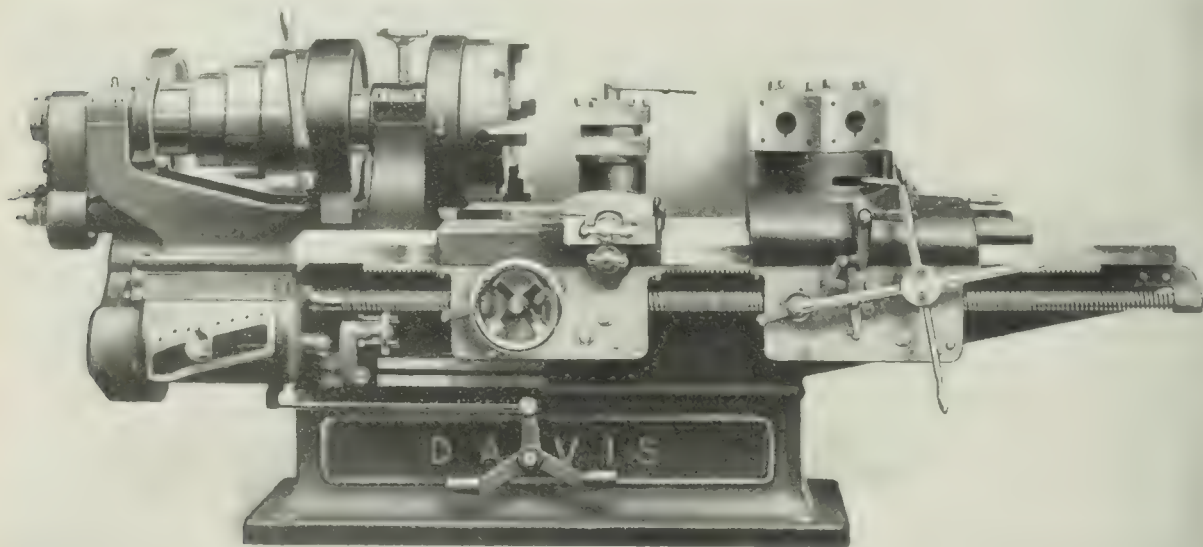


Fig. 1.—A 26-In. Turret Boring, Forming and Turning Lathe Built by the W. P. Davis Machine Company, Rochester, N. Y.

weighs about 90,000 lb., and the whole machine is 65,000 lb. heavier than the largest previously built by this company, which was of the 5-in. size and weighed approximately 145,000 lb. The flywheel of this machine is 80 in. in diameter. The power required to drive the machine is from 40 to 50 hp., and is transmitted to it by a belt. The floor space occupied is 20 ft. 6 in. x 15 ft.

end elevations, and gives an idea of some of the constructional details.

The machine has a geared friction head and a positive drive with the back gears, and the triple gear can be brought into mesh with the face plate when desired. High grade compressed babbitt metal is used for the bearings, and the holes for the shafts are bored. Ample

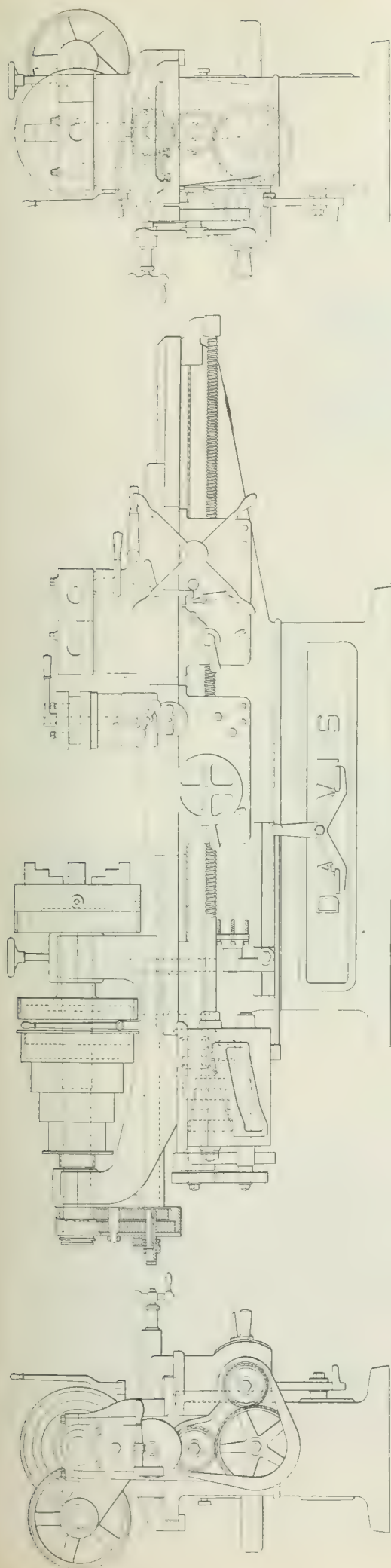


Fig. 2.—Front and End Elevations of the Lathe.

facilities for lubrication are also furnished. The spindle is made of a special grade of steel, and is equipped with a heavy 18-in., four-jaw, independent chuck of special design, which is clearly shown in Fig. 1. The cone pulley has four steps, and in connection with a two-speed countershaft and the back gears an extensive speed and feed range is possible.

The hexagonal turret is 6 in. high and measures 15 in. from face to face. Each of these faces is $8\frac{1}{2}$ in. wide and has holes $2\frac{1}{2}$ in. in diameter, made with a key seat and a key to prevent boring bars from turning in the turret when they are used. The center is open, so that a mandrel can be passed entirely through. A locking device holds the different faces in alignment with the spindle, and automatic stops for each face of the turret give independent tripping points in the longitudinal movement of the saddle. For attaching forming tools each turret face has four tapped holes.

The saddle supporting the turret is 25 in. wide, has a bearing of 30 in. on the bed, and its longitudinal travel is 40 in. Both hand and power feed are supplied for the saddle, the latter having 16 feed changes, which can also be used for thread cutting. A pilot wheel controls the hand feed, and the foot lever at the front of the machine enables the power feed to be reversed quickly. The change gear box allows changes from one feed or one thread to another to be made instantly. A very simple index plate is used, which indicates the changes, so that they may be secured without waste of time, and at the same time avoids the likelihood of making mistakes. With this gear box, 32 changes, ranging from 2 to 32 threads per inch, are possible, and, by changing the end gears, special or fractional threads can be cut.

Hand and power feed are furnished for the carriage which has an automatic stop for the longitudinal feed and a cross slide with power cross feed upon which a four-sided tool post is mounted. Revolving the tool post brings into use any one of the four different tools, doing away with a great deal of tool changing. In common with the turret saddle the carriage is driven by a lead screw, so that either one can be used for thread cutting. Dustproof, self-oiling friction pulleys with a bushing containing a recess for the lubricant are supplied with the countershaft as well as self-oiling hangers.

The following table gives the principal dimensions and specifications of the lathe:

Swing over carriage, inches.....	18
Swing over ways, inches.....	26
Diameter of hole through spindle, inches.....	$3\frac{1}{8}$
Front spindle bearings, inches.....	$4\frac{1}{8} \times 7$
Rear spindle bearing, inches.....	$4\frac{1}{4} \times 5\frac{1}{4}$
Minimum number of threads per inch.....	2
Maximum number of threads per inch.....	32
Maximum distance between chuck and turret, inches.....	$50\frac{1}{4}$
Diameter of smallest cone pulley step, inches.....	8
Diameter of largest cone pulley step, inches.....	16
Face width of cone pulley steps, inches.....	4
Diameter of countershaft pulleys, inches.....	18
Face width of countershaft pulleys, inches.....	$5\frac{1}{2}$
Number of countershaft speeds.....	2
Minimum speed of countershaft, revolutions per minute..	140
Maximum speed of countershaft, revolutions per minute..	160
Floor space, inches.....	48×144
Net weight, pounds.....	7,000
Export shipping weight, pounds.....	8,900
Size of case for export, inches.....	$48 \times 72 \times 144$

The equipment furnished with the lathes includes all the accessories ordinarily supplied with a tool of this character, except the oil pan and pump, which if desired can be supplied at a slight extra cost.

The Vanadium Mines Company, whose general offices are in the Frick Annex Building, Pittsburgh, produced March 22 its first lot of ferrovanadium at its plant in Rankin, Pa. It will be in position to ship ferrovanadium to consumers after April 10. W. A. Boritz, vice-president and general manager, is making a trip of inspection to the company's oxide plant at Cutter, New Mexico.

The Hazleton Commercial Club has been organized at Hazleton, Ind. The president is E. C. Shute; vice-president, C. J. Snyder; secretary, F. L. Steelman; treasurer, H. P. Phillips. The club will seek to attract new industries to the city.

The Remington Bench Lathe

Attachments Adapting It to a Wide Range of Uses

Several new features have been embodied in the bench lathe and its attachments built by the Remington Tool & Machine Company, 50 Congress street, Boston.

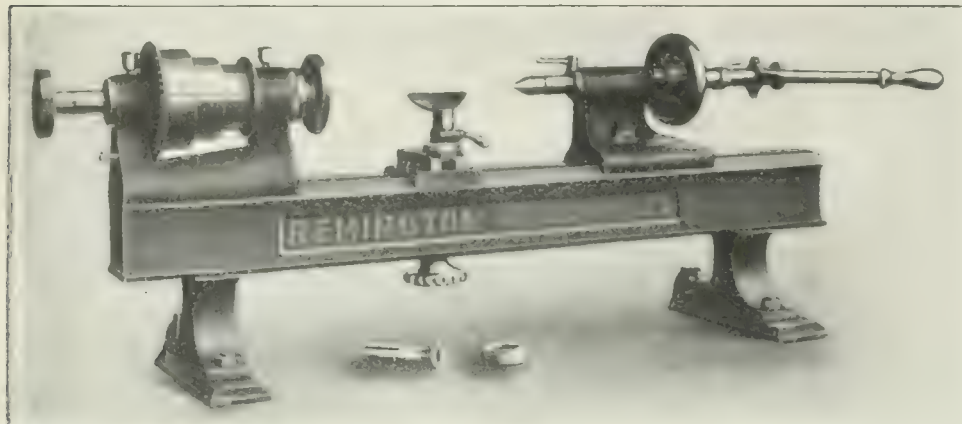


Fig. 1.—Bench Lathe with Combination Screw Feed and Lever Feed Tailstock Made by the Remington Tool & Machine Company, Boston, Mass.

Mass. These include a combination screw feed and lever feed tailstock, the use of sliding feet to secure the requisite belt tension, independent turret slide stops, a graduated swiveling tool post on the forming slide and lever and screw feed for the milling attachment. In Fig. 1 a lathe equipped with a tailstock having the combination screw and lever feeds is shown. Fig. 2 illustrates the tool with the belt tension device and the two types of feed for the milling attachment, and Fig. 3 gives a view of the lathe equipped with the independent stops on the turret slides.

The bed is heavier than that ordinarily employed, and is further reinforced by internal ribs to prevent springing under heavy cuts and secure extreme rigidity. A crucible tool steel spindle hardened and ground both internally and externally is used with a 3-degree taper in one bearing and a 45-degree taper in the other. A hole extends through the live spindle, which will pass $\frac{3}{4}$ -in. stock when a universal chuck is employed. The draw-in spindle engages self-centering spring collet chucks, and enables round stock having a maximum diameter of $\frac{3}{4}$ in. to be fed through. The spindle nose is threaded to take face plates, jaw

chucks, &c. For the spring collets a 15-degree taper was adopted as furnishing the maximum grip on the stock with a minimum pull on the threads of the spindle and the chucks. The tool steel used for the bearings is hardened, ground and lapped to a fit, and ample provision is made for lubrication. The adjustment for the end thrust of the spindle is accomplished by advancing a serrated filer collar until it comes in contact with the shoulder on the front of the spindle. This relieves the strain and the thrust on the angles of the spindle and enables $\frac{1}{2}$ -in. holes to be drilled continuously without having the spindle stick or stop, with the attendant excessive wear on the two angles.

All vibration is resisted by the design of the headstock, which has a reversed three-step cone pulley for a $1\frac{1}{4}$ -in. belt. The large range of the cone pul-

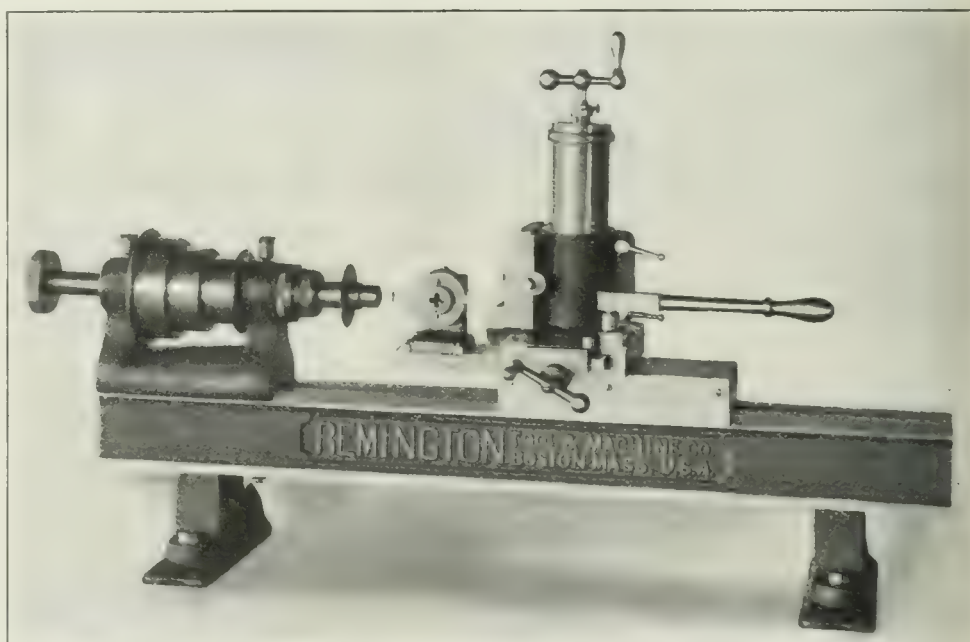


Fig. 2.—The Lathe Equipped with Lever and Screw Milling Attachment Feeds.

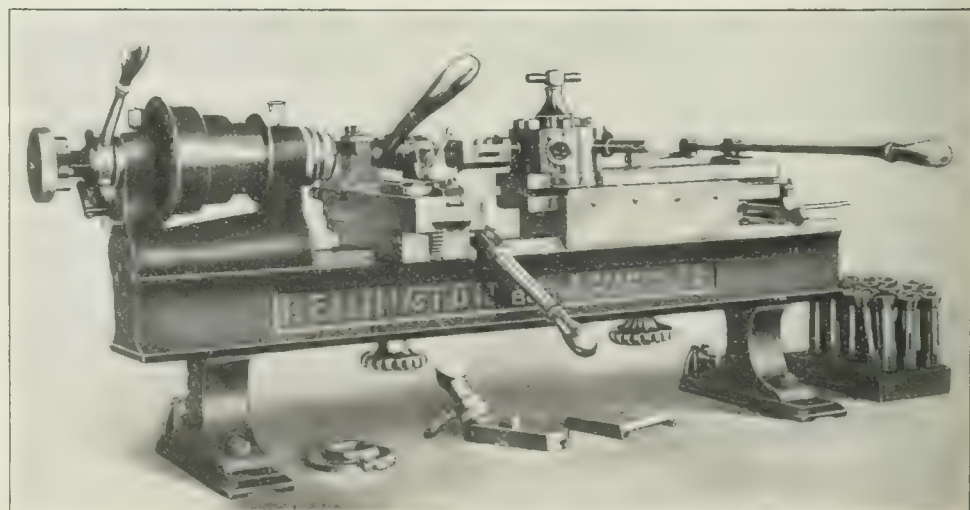


Fig. 3.—The Tool with Independent Stops on the Turret Slide.

ley is drilled with 60 holes for engaging a tension stop pin when indexing and spacing work is held in the spindle. The tailstock is also of heavy construction, and provides

for adjustment for wear on the eccentric binding bolt. It has a combination screw feed and lever feed for the spindle, as shown in Fig. 1, which has a horizontal movement of 3 in. A tipover T-rest, which is also shown in Fig. 1, enables the operator to remove the upright portion of the rest temporarily to secure greater access to the work without losing the original setting of the rest. Its design is the reverse from that ordinarily used, and the binder handle is at the base of the rest where it does not interfere with the tools or the hand. A locking ring is used to hold the rest rigid in place of a binder.

New belts cause waste of time until they are stretched, and even then the breaking of the lacing and the wearing out of the holes are a source of annoyance. The legs of this tool rest on shoes, as illustrated in Fig. 2, and can be adjusted through a range of 2 in. by an adjusting screw. In this way it is possible to use lapped and continuous belts, and at the same time secure the proper tension between the countershaft and the machine. The countershaft bearings are of babbitt, and are lubricated by wicking, which takes its supply from drip cups that also collect the surplus oil for reuse. Three speeds are provided: a fast forward, a slow forward and a reverse speed. The loose pulleys are slightly smaller in diameter than the tight ones to relieve the belt tension when the machine is not in use. For controlling the speed three treadles are furnished which can be secured to the floor.

The following table gives the principal dimensions and specifications of the lathe:

Length of bed, inches.....	36
Swing over ways, inches.....	8 1/2
Distance between centers, inches.....	18
Hole through spindle, inches.....	3/4
Diameter of countershaft pulleys, inches.....	5
Face width of countershaft pulleys, inches.....	1 1/2
Maximum capacity of chuck, inches.....	3 1/2
Angle of chuck head, degrees.....	15
Number of cone pulley steps.....	3
Face width of cone pulley steps, inches.....	1 1/4
Diameter of smallest cone pulley step, inches.....	3 3/4
Diameter of largest cone pulley step, inches.....	5
Maximum countershaft speed, revolutions per minute.....	1,000
Minimum countershaft speed, revolutions per minute.....	500
Net weight, pounds.....	156
Shipping weight, pounds.....	175

The attachments which can be supplied with the lathe include a milling attachment, which can be used with the lever shown in Fig. 2 as a hand milling attachment, or with the ball crank handle for screw feed, a six-hole turret having independent stops for each tool as illustrated in Fig. 3, and a forming and cutting-off slide having a swivel tool post graduated in degrees, so that straight forming cutters may be used in turning any degree of angle, and internal and external grinding attachments.

The Rowe Calk Company has purchased the entire capital stock of the H Calk Company of New York and has removed to Hartford, Conn., all the merchandise of that company and its books and offices. The H Calk Company is about seven years old and has the exclusive agency in North America for the H calks made in Germany and extensively used in Europe. The absorption of this company is one of the first steps following the enlarged organization and increased capital of the Rowe Calk Company.

The Foos Gas Engine Company, Springfield, Ohio, shipped, March 22, to the United States Government two Foos engines for use in operating one of the dams in the Ohio River improvement work near Wheeling. These engines are designed along the lines of the company's heavy duty vertical multiple cylinder type, consisting of three cylinders, each of 100-hp. capacity. They are part of an order recently received and will be installed at dam No. 8.

The Pennsylvania Railroad Company has added \$200,000 to its annual appropriation for employees' pensions. With increases to be made this year by its affiliated lines, the amount set aside annually for the employees of the Pennsylvania Railroad system east of Pittsburgh and Erie is more than \$850,000.

The No. 1-2 Bridgeport Motor Driven Grinder

A motor driven machine that can be used as a grinder, buffer or polisher is offered by the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn. Fig. 1 shows the machine with one grinding and one buffing wheel. Fig. 2 shows it with two grinding wheels and a water pot, and the door in the base opened so that the starting switch may be seen.

The machine has a wheel at each end so arranged that either one or both can be removed from the spindle and extra heads screwed on. These fasten on the outside of the spindle and are used for running cotton buffs, felt wheels, wire cleaning brushes and various other attachments of a similar character. This arrangement is shown at the right of Fig. 1 as well as the use of a grinding wheel on the other end. The grinding of small pieces such as drills, lathe and planer tools, cold chisels and

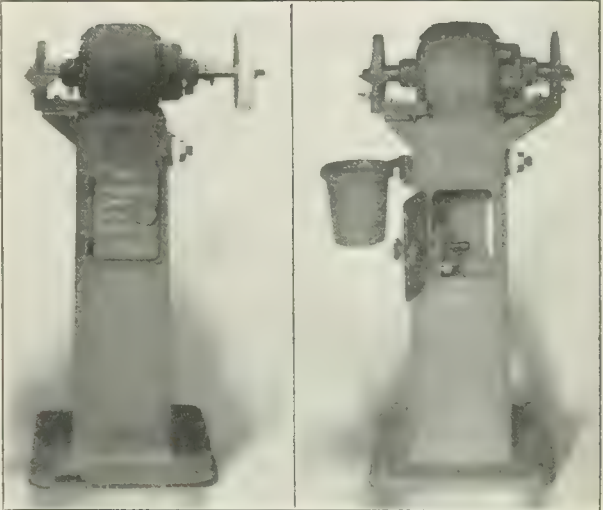


Fig. 1.—The Machine Arranged for Buffing. Fig. 2.—View Showing Starting Mechanism. Two Views of the No. 1/2 Emery Grinder Built by the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn.

general grinding on small castings and wrought iron pieces can be done on this machine. If there is danger of drawing the temper of work ground, a water pot can be arranged on the side of the base as shown in Fig. 2.

The motor used with this machine can be wound for any of the standard direct current voltages and any of the customary frequencies and voltages of alternating current. The motor starter is mounted inside of the column and is readily accessible by opening the door in the base as shown in Fig. 2. A snap switch on the outside of the machine stops the motor.

The following table gives the principal dimensions and specifications of the machine:

Maximum diameter of the wheel, inches.....	8
Height from floor to spindle center, inches.....	40
Diameter of spindle in bearings, inches.....	3/4
Diameter of spindle between flanges, inches.....	5 1/4
Distance between wheels, inches.....	17
Length of spindle, inches.....	22
Complete weight of machine, pounds.....	350

If desired an attachment for grinding twist drills can be furnished.

The Westinghouse Machine Company has recently received an order from the Solvay Process Company, Syracuse, N. Y., for a 750-kva., three-phase, 60-cycle, 480-volt, 3600 rev. per min. turbo-generator. The generator will be furnished by the Westinghouse Electric & Mfg. Company.

The annual meeting of the United Metal Trades Association of the Pacific Coast will be held at Tacoma, Wash., April 14 and 15. Annual conventions have hitherto been held by this association either at Portland, Ore., or Seattle, Wash.

Safety Collars for Emery Wheels

Charles G. Smith, president of the Pittsburgh Emery Wheel Company, Park Building, Pittsburgh, Pa., makes the following reply to an article by R. G. Williams, department of tests, Norton Company, Worcester, Mass., which appeared in the *Iron Trade Review* of March 9, taking exceptions to some points stated by Mr. Smith in a paper on "The Practical Use of Abrasive Wheels in Foundries," read before the Pittsburgh Foundrymen's Association: *

"The paper referred to was written by me at the solicitation of the Pittsburgh Foundrymen's Association, and in it I mentioned only such points as I positively knew from many years' practical experience to be proved facts, regardless of any commercial or advertising motive, and will say that all points mentioned therein will prove out in foundry practice. The writer has spent many years in trying to force into conspicuous recognition the factor of safety along with that of efficiency, and in these efforts to bring the factor of safety to as near a 'fool-proof' condition as possible, it has been necessary to bring the safety collars through a series of changes in development to accomplish this end, as there are many places wherein it is impossible to use a hood. In my paper you will notice the advisability of using the hoods in addition to the safety collars where possible, but the safety collar has proved perfectly safe, and I know of no instance in the past eight years where these collars of sufficient thickness and the proper taper were used where an operator has been even injured, and there are thousands of sets of them in use.

"Regarding the inference that I intimate that the safety collars add to the inherent strength of the wheel, it is hardly possible that anyone who would be considered a practical man would even think this to be a fact, but any practical man will recognize the fact that a 24-in. wheel, 2 in. at the face and $3\frac{1}{4}$ in. at the spindle, being tapered on both sides, has a great deal more inherent strength in the resistance of the centrifugal strains of a 2-in. face even without the safety collar than a wheel that is 2 in. at the face and also 2 in. at the spindle. This, in addition to the outside protection that the safety collars give when these are made of steel castings $\frac{3}{4}$ in. thick finished, not only enables the running at a speed that gives a much higher degree of efficiency, but should a wheel either by accident or by carelessness become broken will positively hold the parts together and prevent them from flying. The possibility of a small piece breaking outside the rim of a collar is a great deal less than where a hood is used and no safety collar, permitting the piece to hit the rest and glance off, striking the operator; in the latter case the operator has no warning whatever, but in the former possibility the piece will invariably break in a cross section at some point beneath the rim of the collar, and even should the rest be sufficiently strong to break the wheel in this shape (this being the only way in which a well made wheel can be broken in cross sections), the collar will hold it sufficiently long, even should it get away, to enable the operator to get from in front of the wheel. This fact has been proved in the few instances where such condition existed.

"I have always tried to refrain from using ambiguous terms, and cannot see wherein it is possible to get any impression that grinding wheel accidents are caused by inherent deficiencies in the wheels. While I do not know what Prof. Benjamin's experiences have been I do know, according to my experience (and I know of no one who has been in closer touch with grinding conditions for many years than myself), that there is a very small percentage of breakage from this cause, and would consider that more wheels are broken on account of the heating in the spindle caused by overheated bearings, thereby expanding sufficiently to crack the wheel, and such a condition as the operator allowing the piece to catch between the rest and the wheel is on the face of it carelessness and not an accident, as the rest should at all

times be kept sufficiently close to the wheel to prevent all such possibility.

"There are also other cases, especially on such machines as large boring mills, lathes, and planers where emery wheels are used, necessitating such continuous contact without intermission for a sufficient length of time to cause the wheel to become so hot by virtue of the work it has to perform that it will break of its own expansion or contraction. Then, of course, there are other abuses whereby the operator in performing heavy work will hit the wheel beyond its resisting strength; this is also carelessness, but all of these points whether accidents or carelessness must be guarded in the safest possible manner, and my experiences have led me in to the most severe conditions of practice, and the safety collars have always proved sufficient, except in places where it is necessary to have more than 3 in. of the wheel exposed beyond the rim of the collar, in which case a hood should always be used in addition to the collar.

"The adoption of these safety collars has been antagonized by many of the abrasive wheel manufacturers from the fact that it requires considerably more material to make a wheel safety shape than straight. As stated in my paper, it is admitted to be a difficult operation to finish these wheels sufficiently accurate to fit the collars, but we find no difficulty whatever in doing so, but as it is impossible to secure any more money for these wheels with the additional cost of manufacture the proposition touches on the percentage of profits that may be secured from the output. We, however, find that it is possible for us to meet competition in price of the straight side wheels and make a reasonable margin of profit for ourselves, realizing, however, we could make more profit by supplying straight side wheels. The writer has been deeply impressed for many years with the importance of safety in practice, so I have devoted most of my time developing along these lines, and in developing these features found that a much higher degree of efficiency went hand in hand with safety."

Port Mann, the New Canadian City

Port Mann, which is to be the Pacific Ocean terminal point of the Canadian Northern Railway, is being carved out of a wilderness. The forest has disappeared, logging has been completed, and the time is at hand when building will commence. The town site is at the mouth of the Fraser River, almost exactly opposite New Westminster. It is there or near there that the British Columbia Steel Corporation's plant is to be built. This company is supposed to be a Mackenzie & Mann enterprise in part, and, if it is, it is more or less identified with the fortunes of the Canadian Northern Railway, of which the members of that firm are the controlling spirits. The names of the provisional directors are those of clerks in a Toronto law office, so that nothing as to the steel company's auspices is hinted in the notice of the granting of the charter. In some of the items that have been published, the enterprise has been connected with the Western Steel Corporation. It may be that two undertakings have become confused in the minds of news service associations. Last week a cargo of 5821 tons of rails from Sydney, N. S., arrived at the newly constructed pier at Port Mann. They are for the Canadian Northern Railway line across British Columbia, and were shipped via Cape Horn.

The Jeffreys-Spaulding Mfg. Company, Chase City, Va., has the following officers: R. M. Jeffreys, president; S. B. Jeffreys, vice-president; A. L. Jeffreys, secretary and treasurer; S. E. Spaulding, general manager. Its plant, which is an entirely new one, has been in operation about six months, having begun about October 1, 1910. The company manufactures box shooks for the soap, oil and meat trades, crating of all kinds and general mill work. The plant is equipped with the latest improved machinery and labor saving devices, including up-to-date dry kilns and a very complete filing room. It manufactures North Carolina and Virginia pine lumber exclusively.

* This paper was printed in *The Iron Age* of October 20, 1910.

Trade Publications

Universal Double Sawing Machine.—The Tannewitz Works, Grand Rapids, Mich. Circular. Deals with a universal double sawing machine which is said to embody in its construction a large number of improvements.

Valves.—Nelson Valve Company, Philadelphia, Pa. Circular. Illustrates and describes a few of the bronze, iron and steel valves which this company manufactures. The various styles covered include bronze gate, combination globe and angle and swing check valves and iron gate valves. The salient features of each class of valves are given, and the illustrations show the different styles which can be supplied.

Logging Machinery.—Soule Steam Feed Works, Meridian, Miss. Catalogue. Size, 6 x 9 in.; pages, 61. Treats of a number of sawmill specialties and especially a steam feeding device and lumber stackers. Both of these machines are illustrated and described at length, together with their various accessories.

Voltage Regulators, Drum Controllers and Generators.—General Electric Company, Schenectady, N. Y. Three bulletins. No. 4791, superseding Nos. 4218, 4219, 4346 and 4459, describes the company's induction and switch types of feeder voltage regulators for both hand and automatic operation. It contains connection and dimension diagrams as well as weights of the different regulators described. No. 4811, superseding No. 4600, contains a considerable amount of descriptive matter and data on drum controllers for industrial service. No. 4812 relates to small direct current generators ranging in capacity from 1½ to 20 kw., which are suitable for lighting small plants, hotels, residences, factories or mills where the average length of the feeder circuits is 400 yd. or less. The generators are provided with sliding bases, which facilitate adjusting the belt, and can be installed on the floor, wall or ceiling. With the exception of the smallest size, all of the generators are provided with commutating poles, which render a change in the position of the brushes unnecessary when the load changes. The bulletin also contains a table of ratings, weights and dimensions.

Toolroom Furnace.—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin R. Points out the advantages of a combination toolroom gas furnace which embodies in one eight distinct types of furnaces. The illustrations show the furnace in use in three different ways and a number of other furnaces which this company manufactures.

Wires and Cables.—General Electric Company, Schenectady, N. Y. Bulletin No. 4787. Devoted to the subject of wires and cables. Contains data on all types of wires and cables and a discussion of the factors to be considered in choosing cables for various classes of work. Space is given to fuse and junction boxes, and a complete index renders the finding of any subject an easy matter.

Sand Blasts.—J. M. Betton, 178 Washington street, New York City. Folder. Calls attention to the Druckleib injector sand blast apparatus, and contains directions for connecting and operating it. Two views of the apparatus and a table of the sizes in which it is made are included, as well as a table of the cubic feet of free air required per minute for varying diameters of nozzles. An illustrated description of this apparatus appeared in *The Iron Age* January 5, 1911.

Hose Nozzles.—Andrew J. Morse & Son, Boston, Mass. Catalogue. Size, 5½ x 9 in.; pages, 27. Lists the various types of the Invincible nozzle for use on hose wagons, aerial ladders, water towers, tug and fire boats, mills, docks and lumber yards. The dimensions of the various nozzles are given and a number of tables complete the catalogue.

Milling Machines and Thread Milling Attachment.—The Garvin Machine Company, Spring and Varick streets, New York City. Three circulars. In No. 153, illustrations and descriptive matter explain the operation of the No. 21 plain milling machine, an illustrated description of which appeared in *The Iron Age* May 16, 1907. No. 154 deals with three sizes of hand millers, which are designed for work requiring light quick cuts. No. 155 describes and illustrates a thread milling attachment for operating on worms, the threaded nose ends of spindles, &c. In all three circulars the machines and attachments are illustrated with brief tables of dimensions.

Traction Engine.—The Holt Mfg. Company, Stockton, Cal. Bulletin No. TE 40. Pertains to the Caterpillar line of traction engines, the special features of which are a special type of traction wheel consisting of a row of carbon steel plates 3½ in. wide, that enables it to be used on all classes of soil and a high efficiency. These series of steel plates operate around four cast steel truck wheels and are so shaped as to give a firm grip on the road surface. There are numerous illustrations showing these engines in use under various conditions, and a partial list of users completes the bulletin.

Fuel Economizer.—Cornell Economizer Company, 55 De Long Building, Philadelphia, Pa. Pamphlet and chart. The former describes the Cornell fuel economizer and smoke consumer and tells how it operates. The chart consists of two concentric circles, the outer having gauge pressures in pounds per square inch, and the inner the temperature of the feed

water in degrees Fahrenheit printed on them. In use the temperature and the pressure circles are set in accordance with the conditions existing, and the decimal given on the inner circle is subtracted from that on the outer one, the result being the factor of equivalent evaporation at an atmospheric pressure of 14.7 lb.

Pneumatic Drills.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 2007. Shows the various types of Imperial piston drills which are used for drilling, tapping, reaming and flue rolling. The motor used in this tool is of the three-cylinder reciprocating type, and the cylinders and the pistons revolve around a strong main bearing, which serves as a valve seat for the rotating valve carried by the cylinders. Two special features of the drill are that no vibration is perceptible at any speed, which is due to having all the parts perfectly balanced and revolving around fixed centers, and that the main pin forms a Corliss valve for both the admission and the exhaust air. There are a number of illustrations showing the drill in use, and an illustrated list of repair parts completes the bulletin.

Melting Furnaces.—Hawley Down Draft Furnace Company, 736 West Monroe street, Chicago, Ill. Bulletin No. 33. Contains data on foundry practice, and shows the advantages of using the Hawley-Schwartz melting furnace instead of crucibles. An illustrated description of a portable furnace of this type appeared in *The Iron Age* October 13, 1910.

Presses and Emery Wheel Machinery.—Joseph T. Ryerson & Son, Chicago, Ill. Circular. Concerned with the line of presses and emery wheel machinery which this firm handles.

Shop Trucks.—Spicer Mfg. Company, South Broadway, New Philadelphia, Ohio. Pamphlet. Lists a line of trucks for use in industrial plants of various kinds. These range from a tin plate truck having a capacity of 2 tons up to a 10-ton bar mill ingot truck. Space is also given to a small hand truck, an adjustable wire reel, nail cleaning barrels and emery grinders.

Friction Transmission.—The Rockwood Mfg. Company, Indianapolis, Ind. Pamphlet. Size, 6 x 9 in.; pages, 91. This is the third edition of a book which was originally published in 1902. To bring the matter contained in the pamphlet up to date the revision has been very thorough, and it now presents the more general uses of friction transmissions as met with in daily practice and gives notes and formulae readily adaptable by the layman to the design of drives. The various types of frictions are illustrated and described, and there are extensive tables of dimensions and prices.

Fuel Oil Burner.—Tate, Jones & Co., Inc., Empire Building, Pittsburgh, Pa. Circular No. 134. Relates to the Kirkwood portable fuel oil burner of the compressed air type. The special feature of this burner is that one hose connects the tank and the nozzle, thus making it more convenient and easy to handle than portable burners of the two-hose type. The mixing of the oil and the air is accomplished by the burner, which is located on top of the tank, and the movement of one handle on the burner regulates the oil supply, the ratio between the air and the oil always being maintained at a constant point.

Concrete Reinforcement.—C. A. P. Turner, 816 Phenix Building, Minneapolis, Minn. Pamphlet. Deals with the Turner mushroom system of concrete reinforcement, which is so called from the peculiar formation around the column head and from the rapidity with which it may be erected. The special advantages claimed for this system are that the floor slabs transmit the load directly to the columns without the use of beams and girders and the centering is simplified while at the same time the reinforcement is arranged so as to secure the maximum efficiency of the material. There are a number of illustrations showing buildings where this system has been employed, and at the present time it is being used in the construction of the Milwaukee warehouse of the International Harvester Company, as was announced in *The Iron Age* February 9, 1911.

Valves.—Nelson Valve Company, Chestnut Hill Station, Philadelphia, Pa. Set of stickers. These embody the changes which have been made since the last number of the company's catalogue was issued and are intended to be pasted in the catalogue on the different pages. In each case the page upon which the sticker is to be pasted, the number of the table it replaces and its own number are given, which makes it a very easy matter to revise the catalogue and bring it up to date quickly.

Friction Clutches.—The Carlyle Johnson Machine Company, Manchester, Conn. Catalogue E. Size, 4½ x 7 in.; pages, 35. Deals almost exclusively with the driving of machinery through friction clutches, although some attention is paid to driving from line shafts. Complete tables and lists of repair parts for all of the different clutches described are included.

Electric Lighting.—Cooper Hewitt Electric Company, Eighth and Grand streets, Hoboken, N. J. Two bulletins. No. 36, superseding No. 23, is concerned with the type P indoor direct current lamp. The construction of the lamp is described at length, brief specifications given and instructions for starting the lamps included. No. 37 points out the advantages of the Cooper Hewitt lamps for industrial lighting.

The Machinery Markets

A noticeable improvement is shown in the machinery market in the Middle West, but in other sections trade is rather dull. The Railway Appliance Show held in Chicago last week in connection with the convention of the American Railway Engineering and Maintenance of Way Association stimulated trade there, and the International Harvester Company is buying liberally. The Northwestern Railroad has a list out in Chicago calling for \$12,000 worth of machinery, and the Rock Island Railroad has a large list out. The Illinois Central Railroad is inquiring for a large line of machine tools, and the Western Steel Company, a subsidiary of the International Harvester Company, has bought \$100,000 worth of power equipment. The second-hand tool demand in Chicago is in excess of the supply. An equally good demand exists in Detroit, where automobile manufacturers are buying liberally. In Cleveland a single tool business is being done, but inquiries give promise of a better business. Proposed additions to existing plants are occupying the attention of New England machinery men, but trade there seems to be holding back. The bulk of recent orders in Philadelphia has been for small equipment, and in that market, as well as in New York, conditions are somewhat unsettled, and buyers are demanding price concessions. Mexican troubles are causing some difficulties in transacting business in Texas, especially in the border cities. Export trade continues excellent. In Detroit machine tool makers have booked large orders for Australia and some good European trade has been placed in New York.

New York

NEW YORK, March 29, 1911.

The machinery outlook is more promising than it was a week ago, although buyers continue slow in closing orders for equipment on which they have inquiries out. A number of new propositions that will call for heavy expenditures for machine tools came up during the week and some very good business is in sight. The railroads are slow in purchasing, although the Long Island Railroad has been asking for bids for a few single tools. The company has no list out, and its inquiries are largely for special machinery. While people who deal in a general line of machinery are complaining, many who specialize on automatics or certain lines of metal working machinery, such as presses of special types or forging machinery, are doing a good business. Manufacturers of power equipment and transmission machinery are also getting good inquiries, and the mill supply business is especially good. Something of a lull exists in the foundry trade, and those who make a specialty of machinery castings are complaining. They state that machinery manufacturers show a reluctance to order for stock, and machine tool people, who are ordinarily good customers in this line, show a desire to wait until that market becomes more settled before placing orders.

The Saurer Motor Company, which has been organized with an authorized capital of \$1,600,000 to build Saurer industrial trucks, now made in Switzerland and England, has taken over the plant of the Quincy-Manchester-Sargent Company at Plainfield, N. J., and will shortly buy a large line of machinery to install in extensive additions now under way. The company is building a machine shop, 75 x 125 ft.; an assembling department, 75 x 100 ft., and other structures. The company has sent out inquiries for some of the required machine tools. It is understood that further additions to the plant will be made later on, and it is probable that a manufacturing plant will be established in the West. Salesrooms have been opened at 30 Church street, New York.

The Cameron Engineering Company, 156 Berriman street, Brooklyn, has purchased a good sized tract of land at Washington, N. J., along the line of the Lackawanna Railroad, and the company's plant will be moved from Brooklyn to Washington as soon as buildings are erected. The company is moving to Washington because of the growth of its business, and two steel construction buildings erected will be 40 x 80 ft. and 40 x 96 ft. The company's property admits of further enlargement as the business grows. It will be several months before the new structures are erected, and the matter of arranging for additional manufacturing equipment will not be taken up for some time.

The Papyrus Artificial Paper Company, 118 Madison street, Hoboken, N. J., with New York offices at 123 Liberty street, is building a plant, 50 x 150 ft., at Kenilworth, N. J. The structure will be two stories, and at the completion of the building its present manufacturing equipment in Hoboken will be moved there and other machinery will be added. More buildings will be erected as they are needed. The company will purchase its power from the Public Service Corporation of New Jersey. In addition to making crepe paper, the concern makes a rope composed of wire and paper, which serves the same purpose as ordinary cordage.

The United States Metal Products Company, which was recently formed through a combination of the John W. Rapp Company and the J. F. Blanchard Company, manufacturers of metal doors and window frames, has plans under way for the erection of an addition to the Rapp plant at College Point, L. I. The plans include the erection of a shop 250 x 650 ft., of steel construction, with saw-tooth roof; a dock 75 x 5000 ft., and an employees' bathhouse 60 x 70 ft.

Franklin B. Ware, State Architect, will receive bids at Albany, N. Y., April 20, for equipment for the Capitol power house. Separate propositions will be received on the necessary steam power and electrical equipment. Specifications can be obtained at the office of Nygren, Tenney & Ohmes, 87 Nassau street, or C. E. Knox, 76 William street, New York, who are the consulting engineers.

The Craig Engineering Company, manufacturer of marine engines, has recently erected a large plant at Jersey City, near Arlington station, and is now buying machinery. The plant includes a machine shop 80 x 180 ft., and it will be devoted to the manufacture of modern marine engines, pumping apparatus, &c.

C. S. Myers, manufacturer of drill presses, bench grinders, &c., at Columbia, Pa., has been placing orders in this market for equipment to be installed in a new addition to his plant which will be 50 x 100 ft.; the building will be used for machine shop purposes.

A number of New York machinery houses have booked large orders from the Nova Scotia Car Company, Ltd., of Halifax, N. S., which is placing large orders for car equipment to be installed in its recently enlarged plant.

The Long Island Railroad Company will shortly buy against a fair sized list of machinery which is to be installed in existing shops. The requirements include machine tools and blacksmith shop equipment.

J. J. Flynn, Jr., who is well known in the East as a machinery salesman, has entered the steel, machinery and supply business with an office and warehouse at 25 Bridge street, Brooklyn. In addition to handling tool steel, structural steel and forgings, Mr. Flynn has the Brooklyn agency for the O. K. tool holders and a line of high speed drills, grinders and buffing machinery. He will also handle a general line of mill supplies.

The Frontier Meter Works has been incorporated at Buffalo to take over and continue the business heretofore conducted under the same trade name by Chas. J. Smith. The manufacturing plant will remain at 44 Henry street, and the company's principal specialty will be the manufacture of improved gas meters under patents which it controls. The incorporators are Charles J. Smith, president and manager; Clinton K. De Groat and Omer E. McNamara.

The Commissioner of Public Works, Buffalo, Francis G. Ward, Municipal Building, will receive sealed proposals until 11 a.m., April 7, for furnishing and erecting a completed feed water heating and purifying system for the water works pumping station, foot of Massachusetts avenue.

The plant of the Vacuum Oil Works of the Standard Oil Company, at Olean, N. Y., was damaged by fire to the amount of \$200,000 on March 25.

The American Railway Supply Company, Tracy Fox, president, Westfield, N. Y., has completed arrangements to remove its plant for the manufacture of locomotive parts

THE MACHINERY MARKETS

and supplies from Westfield to Conneaut, Ohio, where it will erect a brick building, 60 x 100 ft., on a site offered by the city.

The New Process Stone Company, Syracuse, N. Y., will erect and equip a manufacturing building, 70 x 118 ft., concrete block construction.

The Syracuse Chilled Plow Company, Syracuse, N. Y., will add a six-story and basement brick and steel warehouse, 41 x 92 x 213 ft., to its plant on Marcellus street. It will be connected with the main factory by an overhead bridge.

The capital stock of the Pneumatic Machine Company, Syracuse, has been increased from \$500,000 to \$650,000, the increase in capital to be used for the expansion of the company's business and to provide a new factory building and equipment.

Contract has been let by the Rome Brass & Copper Company, Rome, N. Y., for construction of the new tube mill, 115 x 450 ft., it is to erect at East Rome at a cost of \$160,000; also for its new office building at Dominick and Bouck streets, Rome, to cost \$20,000.

The New York State Casting Company has recently been incorporated at Syracuse, N. Y., to manufacture aluminum, brass and high grade gray iron castings. The new company will occupy a large part of the plant of the Syracuse Stove Works, which will be enlarged to provide the space required. Francis Kernan, president of the Syracuse Stove Works; Edward Joy of Syracuse, and J. D. Rhodes of Pittsburgh, president of the National Car Wheel Company, compose the executive committee of the new company.

Commissioner of Public Works Francis G. Ward, Buffalo, N. Y., is receiving bids for the furnishing and erection of a 40-ton, 3-grate refuse destructor, with accessories, to be installed at the city refuse incineration plant at Hamburg and Scott streets.

Catalogues Wanted

The Union Iron Works, Hill and Burnett streets, Houston, Texas, desires catalogues of field boilers and engines with a view to making agency connections, and not feed boilers as was stated in *The Iron Age* of March 16.

Chicago

CHICAGO, ILL., March 28, 1911.

Conditions are somewhat improved in the local machinery market. Actuated by the attendance at the Railway Appliance Show which was held last week in the Coliseum, and further improved by liberal purchases from the leading farm machinery interest, machine tool business is better. The Northwestern Railway is out with a list approximating \$12,000 and the Rock Island with one amounting to nearly the same. The Illinois Central is asking estimates on a quantity of machine tools that will probably total \$10,000. The International Harvester Company has been a liberal purchaser throughout the week, the aggregate of its machine tool investment being \$50,000. These tools went to the McCormick, Deering and Auburn plants. The Wisconsin Steel Company, a subsidiary of the International Harvester Company, has purchased about \$100,000 worth of boilers, engines, generators and locomotives for its coal operations at Yowell, Ky., and a liberal purchase of boilers, engines and generators has also been made for the Harvester Company's plant at Auburn, N. Y. Floor sales in local machinery houses have slightly improved, emanating largely from city repair shops. A greater activity is also noted in purchases from country machine shops. The improvement in this week's market has been very welcome as business had not been up to normal for some weeks. The demand for good second-hand tools continues to be considerably in excess of supply.

The Osborn High Pressure Joint & Valve Company, Chicago, states that the recent increase in its capital stock from \$200,000 to \$300,000 is for the general extension of its business and that it does not contemplate at the present time any new construction or the installation of new equipment. The question of enlarging its plant will be taken up at the next meeting of the directors of the Steger & Sons' Piano Mfg. Company, Chicago. The various sites offered by different cities will be given full consideration at that time.

The Great Lakes Mfg. Company, North Chicago, Ill., manufacturer of hardware specialties, is rebuilding its plant which was destroyed by fire some time ago and expects to have it ready for occupancy within a short time.

The citizens of Rockford, Ill., will soon vote on \$200,000 bond issue for installation of water works system.

Anna, Ill., has plans completed for a water works system to be constructed at an estimated cost of \$6500.

The Farmington Light & Power Company, Farmington, Ill., has been incorporated with a capital stock of \$30,000. The incorporators are Theo. Bass, M. M. Anderson, H. E. Worden and A. L. Thompson.

The Superior Foundry & Mfg. Company, Belleville, Ill., has been incorporated with a capital stock of \$5000. The incorporators are Oscar Welker, John Hanwar and William M. Hoppe.

The Alton Gas & Electric Company, Alton, Ill., has increased its capital stock from \$500,000 to \$600,000.

J. A. Meyer, former president and manager of the Galva Gas Company, Galva, Ill., is seeking to obtain a gas franchise at Edwardsville, Ill., and will submit a proposition to the City Council April 4.

The Russell Automatic Gas Machine Company, Rockford, Ill., recently incorporated with \$150,000 capital stock, will manufacture gas machines, vacuum systems and cistern pumps. The company will erect a two-story factory building, 50 x 100 ft., which will be equipped with the necessary machinery for manufacture.

The Board of Public Works of Wauwatosa, Wis., will receive bids until April 1 for one duplex compound steam driven air compressor of 500 gal. per minute capacity and one air receiver or tank for use in its water works plant.

The City Council of Superior, Wis., is planning the installation of a municipal water works system.

Arlington, Minn., is planning the installation of a water works system.

Culbertson, Mont., has plans prepared for a municipal water works system.

The Denver Gas & Electric Company, Denver, Colo., through its Board of Directors, has authorized an issue of \$2,500,000 in three years. Improvements and extensions amounting to about \$500,000 will be made by the company.

Colorado Springs, Colo., is planning extensive improvements for its water works system.

The Ottumwa-Moline Engine & Pump Company, Ottumwa, Iowa, has its new plant at that place ready for occupancy. The plant is located on a 5-acre site in South Ottumwa, and additional buildings, including office building, engine testing department and tin shop, are in course of erection. A foundry building, 80 x 120 ft., will be erected during the coming summer.

The Kinser Mfg. Company, Sioux City, Iowa, is contemplating the erection of a new factory building. The company has recently increased its capital stock from \$25,000 to \$50,000, owing to the need of enlarging its facilities for the manufacture of churns.

Reidell & Jensen, Waterloo, Iowa, are planning to largely increase the capacity of their creamery plant, and will shortly commence the work of building a substantial addition.

Philadelphia

PHILADELPHIA, PA., March 27, 1911.

There is still an absence of any pronounced inquiry for either machinery or tools. Manufacturers and merchants are competing sharply for the little business offering and in some few instances price concessions are reported to have been made. Even under such conditions there has not been business to go around. The bulk of the recent orders has been for small equipment, although an occasional heavy tool is moved. Few propositions embracing any extensive equipment of tools are before the trade; negotiations are pending in one or more instances, but prospective buyers appear to be in no haste to place orders. This market is still bare of any demand for tools from the local railroads, although a few orders from railroads in other territories have been booked by some of our builders. Until the general business situation shows an actual improvement the demand for machinery and tools is expected to continue of an unimportant nature.

The Philadelphia Iron Works has purchased additional property at Eighteenth street and Pennsylvania avenue, and will erect a new office building and other additions, and will lengthen its boiler shop by 100 ft.: the latter improvement will, however, not be completed for several months. This company's plant was recently damaged by fire and the proposed additions are in the nature of replacements and extensions to its previous plant. Additional machinery equipment will be required for the boiler shop extension, but the purchase will not be considered for several months.

On application of its own stockholders the Keller Mfg. Company, manufacturer of vacuum cleaning apparatus, Judge Holland, in the United States Circuit Court, last week appointed Howard Small, H. H. Light and Charles A. Duven receivers. The company is a Delaware corporation,

THE MACHINERY MARKETS

and the petition for receivers alleges that the lack of working capital has impaired the company's credit. The plant is to be operated by the receivers, and it is stated that its assets are more than sufficient to meet all its liabilities. The receivers' bond was fixed at \$50,000.

Horace E. Campbell will sell at receiver's sale the property of Yeager & Hunter, Spring City Stove Works, Spring City, Pa. The patterns, flasks and all other equipment are to be included in the sale. The plant has a capacity of 25 tons a day and floor space for 62 molders.

The Baldwin Locomotive Works has received orders for 40 engines from the Illinois Central Railroad and six freight engines from the Georgia Central. The company denies the report that it will erect an additional boiler shop at Eddystone, Pa.

It is stated that the plant of the Union Saw Mfg. Company, Frackville, Pa., now idle, will be started at an early date. George W. Hoffman is president and William Teeter secretary.

The Belmont Iron Works has the contract to erect the buildings for the new plant of the Herr Automatic Press Company at Ambler, Pa. It also has contracts for the erection of several buildings for the American Agricultural Chemical Company at Point Breeze, as well as a number of small buildings in this city. Other orders secured are for a warehouse, 150 x 280 ft., for the American Sugar Refining Company at Long Island City, N. Y.; an addition for the Gandy Belting Company, Baltimore, Md., and a power house for the Edison Company near Los Angeles, Cal. It is also fabricating several car sheds for export to Cuba.

Revised plans for the widening of Chestnut Street Bridge, in this city, have been practically completed and the Bureau of Surveys will shortly ask for new bids under the revised plans. Under the original plans the bids exceeded the sum available.

Bids will be received until April 4 by the Navy Department for a quantity of supplies to be furnished the League Island Navy Yard, in this city. These include, under schedule 3395, a sand mixer and grinder; schedule 3397, furnishing and installing brick mold drying and core oven, also crucible steel fuel oil furnace; schedule 3426, stud bolts, sheet brass and copper, brass pipe; schedule 3427, wrought iron and steel pipe. Specifications may be obtained from the Navy Pay Office, Philadelphia, or on application to the bureau.

The Pennsylvania Railroad will erect at Dover, Del., a large railroad station, the contract for which has just been awarded to Irwin & Leighton, Philadelphia. The train platforms will be 500 ft. long and will be connected by a concrete passenger subway. The building will be two stories, the upper floor being used as offices for the officials and directors of the Delaware Railroad Company.

The American Die & Tool Company, Reading, Pa., is busy in all its various departments and considers the prospects for continued activity exceedingly good. This company has recently completed alterations whereby 10,000 sq. ft. of floor space has been added to its plant. Additional equipment for the manufacture of dies, reamers and gears has been installed and the former capacity of the plant doubled. This company makes a specialty of hardened steel spur gears up to 36 in. diameter.

J. G. Speidel, Reading, Pa., reports an increased demand for elevators, cranes and hoists. The plant is being operated at full capacity and the outlook for business is considered favorable. Among recent orders booked may be mentioned one from the Foundries Company, Orrville, Ohio, for a 3-ton double I-beam hand power crane, 36 ft. 5 in. span. The Tampa Foundry & Machine Company, Tampa, Fla., has ordered a 6-ton 49-ft. span double I-beam hand power crane. A 15-ton double geared I-beam hand power traveling crane, 31-ft. span, will be furnished the National Electrolytic Company, Niagara Falls, N. Y., while one of the same capacity, but 32 ft. 6 in. span, will be furnished A. Gonsoulins, Loreauville, La. Other orders include cranes for the Star Granite Company, St. Johnsbury, Vt.; Maurice L. Knight, Baltimore, Md.; E. P. Anderson, Circleville, Ohio, and the Goding Mfg. Company, Franklin, Mass. Three belt power elevator machines have also been ordered by the L. V. Roberts Machine Company, San Francisco, Cal.

Cincinnati

CINCINNATI, OHIO, March 28, 1911.

In comparison with February, March has proved to be a rather unsatisfactory month with a number of manufacturers in this territory. In the first named month there was quite a spurt of activity in the machine tool line, and it was expected that March would bring out a still larger volume of orders. While inquiries are numerous the trade is holding off placing orders, and this is attributed to the uncertainty as

to the court decisions on the anti-trust question. In the privately expressed opinion of a local manufacturer there is probably a little too much optimism in some circles, and as a consequence large additions to plants are being made, or are contemplated, which means the accumulating of an abnormal overhead expense that must be taken care of. This does not imply that the outlook is not encouraging, but, on the contrary, if one-half the machinery was bought that is now being inquired for it would mean something like the boom period of 1907.

Power plant equipment is moving slowly, although there are several municipal water work plants planned for the Central West this summer.

The Lodge & Shipley Machine Tool Company, Cincinnati, has decided to extend its main shop, and plans are now in the hands of an architect for a building that will be 70 x 100 ft., one story, and of mill construction. Work is expected to commence before the beginning of summer.

As was announced several weeks since, work on the new plant for the United States Electrical Tool Company, Cincinnati, has been resumed, and progress now being made would indicate that the company will be able to occupy the new factory at a date earlier than was anticipated.

The new plant of the Incandescent Light & Stove Company at Oakley, Cincinnati, is nearing completion, and the company expects to have it in full operation before the middle of the summer season.

The William Powell Company, Cincinnati, manufacturer of valves and other engineering specialties, sustained a fire loss to its foundry March 23 estimated around \$15,000. Repairs were immediately begun and no delay in shipments will result. The loss was fully covered by insurance.

The Queen City Punch & Shear Company, Cincinnati, now has all of its machinery installed in the old Bickford Tool Company plant. The new quarters will enable the company to considerably increase its output.

Work on the addition to the piano factory of the Baldwin Company, Cincinnati, will be commenced at an early date. The new structure will be 80 x 144 ft., four stories, and of mill construction. This project was mentioned some time ago as having been temporarily abandoned.

It is reported that the Riverside Glass Company's factory at Willsburg, W. Va., which has been idle since 1907, has been leased by a company that will operate it as a brass foundry, under the name of the Forest City Brass Company.

The Rebhun Last Company, Evanston, Cincinnati suburb, has let contract to Bert L. Baldwin & Co., Perin Building, Cincinnati, for two extensions to its main factory building and for an enlargement of its power plant. Some new power plant equipment will be installed, as well as special machinery for the manufacture of shoe lasts.

Architect Martin Fisher, 2156 Central avenue, Cincinnati, is working on plans for an addition to the boiler house of the Lawrenceburg Roller Mill Company, Lawrenceburg, Ind.

Bert L. Baldwin & Co., Cincinnati contractors, have contract for building a large plant at Chatham, Ont., for the American Pad & Textile Company, Greenfield, Ohio.

It is reported that the Morgantown & Kingwood Railway Company, Morgantown, W. Va., has let contract for rebuilding its large repair shops at that point that were recently destroyed by fire.

The Foos Gas Engine Company, Springfield, Ohio, which is considering the erection of extensive additions to its present plant, states that plans regarding the buildings to be erected or the equipment to be installed have not been definitely decided upon.

The Water Works Department, Cincinnati, Ohio, will soon ask for bids for the construction of a sterilization plant at the California filtration works, at a cost not to exceed \$6500; two water turbines with electric generators, approximate cost \$5500, and two wash water pumps at \$6000.

New England

BOSTON, MASS., March 27, 1911.

While the machine tool and supply dealers are doing a fair business there is still a drag on the situation which is holding back general buying. Business is not so good as was hoped for with the approach of April, but at the same time it is by no means a really dull condition, and the March footings on the dealers' books should show a comfortable amount of profit. Apparently the New England railroads are confining their threatened curtailments to their working forces. Men have been laid off in some of the New York, New Haven & Hartford and New York Central shops, but nothing has been heard to indicate that planned improvements have been abandoned or postponed. The hardware manufacturers are doing a very good business; probably their condition is fully normal. The record of new

THE MACHINERY MARKETS

manufacturing building construction continues to grow. Naturally the expansion of the cotton mills is slow, as compared to last year, when building operations ran into many millions of dollars. But in the metal trades the expansion appears to be healthful and satisfactory.

George O. Gridley, manager of the Windsor Machine Company, Windsor, Vt., manufacturer of the Gridley automatics, sailed March 22 from New York, for a short business trip in Europe.

Charles F. Underwood has been made New England sales agent for the department of power transmission of William Sellers & Co., Inc., Philadelphia, with offices at 79 Milk street. Mr. Underwood has been with the Dodge Mfg. Company for 15 years.

The recent incorporation of the Dairy Machinery & Construction Company, Derby, Conn., under Connecticut laws, is merely a transfer of the charter from New Jersey to the home State. The business has been established for some years. J. Willmann is the president.

The Farnham Cam Jack Company, Rumford, Maine, is organizing, and will immediately establish a shop for the manufacture of a new jack for lifting heavy bodies, such as railroad cars, and for other mechanisms having adaptations of the same principle. The device is the invention of Fred E. Farnham, Rumford. By the use of a combination of gearing with the cam principle a very powerful lifting force is obtained with the application of a small amount of energy. The shop will also be used for general machine work.

A large addition to the capital stock of the Clark Bros. Bolt Company, Milldale, Conn., was simply authority obtained, which may or may not be used in the future, the company states.

C. L. Barker, Norwalk, Conn., who will erect an addition to his shop, 30 x 130 ft., manufactures the Barker gas engine, the Murray motor truck, together with launches, valves and fittings.

The business of the Lester & Wasley Company, Norwich, Conn., manufacturer of envelope machinery, has been incorporated as a result of the death of the owners, D. M. Lester and F. R. Wasley. The business will be known as the Lester & Wasley Company, Inc., and will commence business with \$17,000 capital. F. W. Lester is the president; H. L. Stanton, vice-president; F. H. Allen, secretary; Percival W. Chapman, treasurer and manager, and George W. Armstrong, superintendent. These officers constitute the Board of Directors. No extension of the business is planned for the immediate future, but the company hopes to take on the manufacture of other light machinery in addition to the Leader envelope machine.

The Meriden Fire Arms Company, Meriden, Conn., which is building a large addition to its works, states that while its new toolroom is already equipped the company is still purchasing machinery and tools, and will probably continue to be in the market, though not to so great an extent as recently.

The factory of the Cohannet Silver Company, Taunton, Mass., manufacturer of silver plated ware, was burned with its contents March 22, with an estimated loss of \$20,000.

The Philadelphia & Reading Coal Company will build a modern coal pocket at its dock, Salem, Mass., with a capacity of 1000 tons.

The Spencer Wire Company, Worcester, Mass., will erect an addition to its works at Worcester, 80 x 400 ft., three stories. It will be located on Webster street, and will be of brick, mill construction, with concrete foundation. The purpose is to increase the general manufacturing capacity of the plant. Probably the flat wire department will be moved into the new building, releasing space in another part of the plant. The company states that it will probably purchase the electric power for operating the machinery of the building from the local power company, instead of increasing the power plant.

The Water Commissioners of Middletown, Conn., will erect a building in which a small repair shop will be located.

The Wyman & Gordon Company, Worcester, Mass., manufacturer of drop forgings, has purchased several lots of land adjacent to the present property, in preparation for future enlargements of the works.

The Gilbert & Bennett Mfg. Company, Georgetown, Conn., manufacturer of wire, has started work on two new manufacturing buildings.

The General Electric Company will erect a large office building for its works at Pittsfield, Mass.

The L. W. Pond Foundry & Machine Company, Worcester, Mass., manufacturer of gray iron castings, has let the contract for its new foundry, which has already been mentioned in this column. The structure will be 66 x 261 ft., and will have the most modern foundry equipment.

Additions to general manufacturing plants of New England include the following: Wachusett Thread Company,

Worcester, Mass., mill building; Farr Alpaca Company, Holyoke, Mass., two-story mill to cost \$150,000; Sanitary Cement Company, Everett, Mass., proposed addition on land just acquired.

Cleveland

CLEVELAND, OHIO, March 28, 1911.

Very few new inquiries are reported and the limited amount of new business that is coming out is mostly in single tool orders. Taken altogether March has been rather a disappointing month. Some of the dealers report that their total sales will run a little below those in February. New orders are of a scattering nature, coming mostly from small concerns. Considerable prospective business from larger concerns is being held up until general business shows further improvement. For the first time in a number of weeks there is an improvement in the demand for labor from manufacturing plants. Quite a few additional men have been put on during the past few days, mostly in plants engaged in the automobile industry. Makers of automobile parts are getting a fair volume of orders but these are mostly for small lots for quick shipment.

The Cleveland Wire Goods Company, Cleveland, has increased its capital stock from \$25,000 to \$50,000.

Cleveland crane builders are striving for an important government contract for an installation in Panama, for which bids will be received shortly. This will be for eight motor-driven traveling wharf cranes for loading and unloading vessels and freight cars. It was recently announced that this contract had been awarded to a northern Ohio builder. Later the War Department gave the matter further consideration and decided to reject all proposals and to receive new bids.

The Standard Oil Company will erect a large can factory in Cleveland. The new plant will consist of two two-story concrete buildings 70 x 300 ft. and a boiler house. A large amount of special machinery will be installed. Some power plant equipment will also be required. The contract for the building has been awarded to the Crowell & Sherman Company, Cleveland.

The Architectural Iron Company, Cleveland, has been incorporated with a capital stock of \$25,000 to do light structural work and manufacture ornamental iron, bronze and brass work. The new company will take over the plant of the H. & H. Art Metal & Mfg. Company at 827 Champlain avenue but will secure a new location providing more room. R. A. Barrett will be the manager.

The Ohio Electric Car Company, Toledo, Ohio, has increased its capital stock from \$150,000 to \$250,000 to provide for its expansion. Contracts for its new plant have been let to the A. Bentley & Sons Company of Toledo. It is expected that the plant will be ready for occupancy May 15.

The Bowling Green Motor Car Company recently incorporated at Bowling Green, Ohio, with \$100,000 capital stock, has purchased an existing plant and is not contemplating the erection of any additional buildings. All necessary machinery has been purchased.

The M. Brown Company, Wapakoneta, Ohio, has increased its capital stock from \$40,000 to \$60,000 and has taken over the business of the Snyder Mfg. Company of that city, manufacturer of mill work and furniture. The company will erect a first-class saw mill and furniture factory and enlarge its capacity, for the purpose of manufacturing sash, doors and builders' hardware.

The Acklin Stamping Company, Toledo, Ohio, has been organized with a capital stock of \$50,000 and has acquired a site on Dorr street on which a plant will be erected for the manufacture of metal stampings. Graff M. Acklin, formerly secretary-treasurer of the Toledo Machine & Tool Company, will be the president, having disposed of his interest in the company with which he has been connected. The new plant will be in charge of Mr. Acklin's two sons, James M. and Collard Acklin, and Jeremiah Bingham.

The Wooliever Wrench Company has secured a site in Alliance, Ohio, and expects shortly to begin the erection of a plant for the manufacture of a new wrench designed for various purposes. The plant will be 50 x 100 ft. and one story. The company has its main office at 417 Engineers Building, Cleveland. The officers are W. A. Wooliever, president; John D. Ackerman, vice-president; and W. H. Burnett, secretary.

The Dyer Company, Cleveland, engineer and contractor, has recently received contracts for three beet-sugar making plants, one at Findley, Ohio, with a daily capacity of 700 tons of beets, one at Monte Vista, Colo., with a daily capacity of 700 tons, and one at Elsinore, Utah, with a capacity of 500 tons. The Dyer Company is completing ship-

THE MACHINERY MARKETS

ments on a cane sugar plant with 500 tons capacity on the island of Formosa.

The Beard-Stephan Company, Columbiana, Ohio, recently incorporated with a capital stock of \$10,000, expects to equip a small plant for the manufacture of a patent crane hook, the invention of W. G. Stephan of Cleveland, and other safety devices.

Elyria, Ohio, will expend \$50,000 for improvements to its water works system.

Indianapolis

INDIANAPOLIS, IND., March 28, 1911.

Harry Moore, superintendent of the National Motor Vehicle Company, Indianapolis, Ind., and G. Shaw of the same city are promoting the Star Automobile Company, Logansport, Ind. It is reported that enough stock has been sold to assure the establishment of a plant, probably in the buildings formerly occupied by the Western Motor Works.

The Elevator Safeguards Company, Indianapolis, has been incorporated, with \$50,000 capital stock, to manufacture safety appliances for elevators. The directors are George Harvey, E. S. Padelford and C. W. Habig.

The Link-Belt Company, Indianapolis, has just completed a new building, 96 x 155 ft., an addition to its large plant. It has three floors and 39,000 sq. ft. of space. The building is fireproof.

The Berger Mfg. Company, Canton, Ohio, secured the contract for the metal furniture for the new City Hall at Indianapolis, its bid being \$14,463.

A. D. Toner's handle factory, Kewanna, Ind., has been sold to Henry Howe and Hugh Cook and will be operated after an idleness of several years.

The Southern Equipment Supply Company, Bedford, Ind., has been incorporated, with \$10,000 capital stock, to manufacture equipment for quarries. The directors are H. P. Stillwell, C. B. Fletcher and F. Riebel, Jr.

The Blackford Paper Mills has been incorporated at Hartford City, Ind., with \$265,000 capital stock, to manufacture paper products. The directors are Henry C. Paul, H. J. Miller, Louis Fox, M. B. Fisher and P. F. Griffin.

The Brazil Face Brick Company, Brazil, Ind., has been incorporated, with \$60,000 capital stock, to manufacture brick and clay products. The directors are George Seidensticker, F. Gompf and F. M. Thompson.

The Logansport Radiator Works, Logansport, Ind., has plans drawn for a steel frame fireproof addition, 100 x 110 ft., to its plant. This will double the capacity of the plant.

The City Council of Richmond, Ind., has appropriated \$10,000 for a new engine for the municipal electric light plant.

The plant of the Westerfield Motor Company, Anderson, Ind., was sold by the receiver to Mrs. J. L. Kilgore and Mrs. Maud Norton, both of whom had a judgment against the company.

The Cement Products Company has been organized at Worthington, Ind., to manufacture cement products. The directors are F. M. Dugger, James Hodges and Fred Slinkard.

F. L. Kleckner, representing the Aurora Electrical Company, Aurora, Ill., has secured a franchise from the Town Trustees of Francesville, Ind., for an electric light plant. It is proposed to build a gas generating plant to operate the dynamos.

The Service Motor Company, Chicago, Ill., has sold \$40,000 of stock in Wabash, Ind., and will establish a plant in the buildings formerly occupied by the iron and bridge works. The company will operate under \$100,000 capital stock. It makes trucks and various kinds of commercial wagons.

The Sefton Mfg. Company, Anderson, Ind., will build a factory at Brooklyn, N. Y., to handle the Eastern trade. It will be under the management of William J. Sharp, from the home office. The chief product of the company is paper boxes.

The City Council of Brazil, Ind., will hold an election to decide whether a municipal electric light plant shall be installed.

The American Insulating Company, Alexandria, Ind., has been incorporated, with \$600,000 capital stock. It will take over the interest of the American Insulating Material Mfg. Company. The directors are F. K., F. O. and J. L. Sawyer, C. L. Bayne, G. B. Slaymaker, F. M. White and J. H. Boogher.

The Underhill Brick & Tile Company, Rockport, Ind., has been incorporated, with \$24,000 capital stock, to manufacture brick and tile. The directors are M. F. and C. B. Underhill, J. G. Rimstidt, C. C. Mason and G. J. Bence.

The Southern Equipment & Supply Company, Bedford, Ind., recently incorporated, states it was organized for the purpose of assisting in the development of the Bedford Stone

district. The company will handle general construction work, with particular attention to electrical construction and maintenance and the application of electrical drive to quarrying and mill machinery. A full line of mill supplies, both electrical and mechanical, will be carried in stock.

The City Carriage Works, Fort Wayne, Ind., incorporated with \$20,000 capital stock, has taken over the plant of the old City Carriage Works, established in 1875.

The Globe Stove & Range Company, Kokomo, Ind., states that the recent increase in its capital stock from \$250,000 to \$500,000 is for extensions to its plant. The plans of the company embrace a new factory building, 180 x 260 ft., and a storage building, 80 x 400 ft., both to be of concrete and steel fireproof construction. The company will be in the market for roofing, grinding, drilling and polishing machinery, shafting, hangers, belting, elevators, cupola blower, &c.

St. Louis

ST. LOUIS, MO., March 27, 1911.

Business during the past week in machine tool lines has been rather quiet, though some fair orders have been picked up. The usual spring buying has not yet put in an appearance in this market, though visitors from out of town can be expected soon now, as new shop projects, especially the smaller ones, usually take definite shape about this time.

The Bowman-Blackman Machine Tool Company mentions the sale of a heavy Cleveland open side planer to the Government for use in the local shops.

Shops here are much interested in the completion of the extensive new freight yards of the Illinois Electric Traction System in North St. Louis. These yards comprise an area of 24 acres and will much facilitate the quick handling of carload freight over this large and progressive electric system. St. Louis now enjoys overnight deliveries of freight to the numerous points in Illinois on this company's 600 miles of lines.

The Ludlow-Saylor Wire Company, St. Louis, has increased its capital stock from \$500,000 to \$600,000.

The Spring Pipe Threader Mfg. Company, St. Louis, has been incorporated, with a capital stock of \$50,000. The incorporators are A. Gibbard, A. Brandherst and M. Whittinghoff.

The Hempstead Structural Steel Company, St. Louis, has been incorporated, with a capital stock, fully paid, of \$15,000. The incorporators are Edward A. Beinke, Ernest J. Moser and F. L. Beinke.

The Kalamazoo Corset Company, Kalamazoo, Mich., will establish at St. Louis a branch factory in the West End. The buildings will be two five-story structures and the company will employ about 500 people.

R. A. Boyle will build a girder bridge for a switch to cross Duncan street, St. Louis.

The Board of Public Improvements has plans prepared for the abolition of the Sarah street grade crossing of the Wabash Railroad, which call for a viaduct over the railroad tracks.

An explosion of unknown origin wrecked the Herkert & Meisel Trunk Company's factory on North Market street and the plant was destroyed by fire, causing a loss of \$62,000.

The Robinson Fire Apparatus Company has purchased the corner of Twentieth and Ferry streets for \$30,000. The company manufactures automobile fire engines, and it is understood will enlarge its present quarters on the site.

The Bemis Bros. Bag Company has taken out a permit for an eight-story warehouse at 601-605 South Fourth street, to cost \$55,000.

The factory of the Brown, Engel & Olean Paper Box Company was partially destroyed by fire March 25. The machinery in the place was worth \$10,000. On this the loss will be only partial.

A company has been organized at Chaffee, Mo., for the purpose of carrying on the ice business and a plant will be installed at once. The officers of the company are as follows: President, J. S. Wahl; vice-president, Wm. Pfefferkorn; secretary and treasurer, W. H. Brooks; manager, D. C. Shoptaugh.

The County Court, Rolla, Mo., has ordered the Highway Engineer to advertise for bids for the construction of a bridge to span Little Piney just south of Newburg, Mo.

The Home Lumber & Shingle Mfg. Company, Caruthersville, Mo., has been incorporated, with a capital stock of \$5,000. The incorporators are J. S. N. Farquer, C. S. Reynolds and D. A. Hitchcock.

The Kansas City Scales Company, Kansas City, Mo., has been incorporated, with a capital stock of \$10,000. The incorporators are F. M. Cockrell, R. I. Merrill, E. J. Spencer and others.

The city of Elvins, Mo., will shortly receive bids for the erection of a steel bridge across Flat River.

THE MACHINERY MARKETS

The saw and shingle mill plant of the Freeman Lumber Company at Gleason, Ark., was destroyed by fire March 15, causing a loss of \$50,000. The plant was one of the largest in central Arkansas and probably will be rebuilt, as the company holds timber rights on a large tract of land.

A. P. Kincaid, Paris, Ark., will erect at Scranton, Ark., a cotton gin, to cost upward of \$10,000. The Pratt automatic system will be used.

A company headed by J. J. Russell will erect near Forrest City, Ark., a large stove factory at the junction of the Rock Island and Iron Mountain railroads.

The Brown Shoe Company, St. Louis, Mo., which is erecting a new factory building, 49 x 150 ft., seven stories and basement, to be connected with its present factory by a 60-ft. ell, states that the building will be equipped with automatic sprinklers and two 350-hp. boilers. A new reinforced concrete stock, 146 ft. high, is also being erected.

The United States Steel Doubletree Company, Rolla, Mo., incorporated with \$20,000 capital stock, states that it owns a plant at Sullivan, Mo., and expects to continue the operation of its plant there for the present.

The City Council of Siloam Springs, Ark., has voted to expend \$5000 for new machinery to be installed in the electric light plant for the establishment of a 24-hour service.

The Roswell Gas & Electric Company, Roswell, N. M., is rebuilding its electric power plant, in order to supply power to the different pumping irrigation projects in the Pecos Valley.

Mulberry, Kan., will expend \$8000 for improvements to its water works system.

The Hollis Cotton Oil, Light & Ice Company, Hollis, Okla., recently incorporated with \$75,000 capital stock, states that it has already contracted for building and machinery for the plant which it is installing at Hollis.

The Eagle Mfg. Company, Kansas City, Mo., is planning the erection of a plant at Muskogee, Okla. The company will move its machinery from its present plant about July 1. Considerable additional equipment will be required. A. C. Trumbo is president of the company.

Detroit

DETROIT, MICH., March 27, 1911.

March on the whole has been a remarkable month in point of shipments and orders. The spring trade would naturally be very good, but March has been exceptionally so. More orders for motor cars have been received than for any other month of the past year. The General Motors Company is authority for the statement that all its output for this year has been contracted for already. A great deal of foreign trade has been opened up and Australia has been an excellent market this spring for Detroit manufacturers. Some apprehension has been voiced by outsiders as to overproduction. The head of the Paige-Detroit Motor Car Company, however, states that there is no cause for such a feeling, as he believes the demand is in excess of the production.

The Clyde Construction Company has increased its capital stock from \$52,000 to \$130,000. The company will make use of the capital for increasing its capacity.

The Dispatch Laundry Company has increased its capital stock from \$5000 to \$20,000 with the view of more than doubling the size of the plant.

Nearly every week finds a new motor car concern entering the city's automobile ranks. This week the Wayne Motor Company incorporated with a capital stock of \$30,000. Walter H. Woods of Ann Arbor is the principal stockholder.

A new auto accessory company is the Michigan Steering Wheel Company of this city. It has a capital stock of \$7000. Eugene A. Bresler is one of the principals.

The Northway Motor Company is starting the construction of a large addition to the plant in the way of a new foundry.

W. M. Eaton of New York and J. B. Foot of Jackson, both officials of the Au Sable Power Company, made a trip this week to Milwaukee, Mich., where they inspected a site for the sub-station of the Au Sable Company. This transformer station will be operated as an auxiliary to the present power house. The building will be about 70 x 90 ft. and of solid concrete. The heavy machinery will be installed on the ground floor.

The Marshall Furnace Company, Marshall, Mich., has started construction on a new factory.

The Michigan Limestone & Chemical Company, Calcite, Mich., will build a large stone crushing plant this spring. Work will commence this week on the excavations.

Pittman & Dean of this city have let the contract for the erection of a new steel artificial ice plant. The plant will far exceed the capacity of the present factory.

The Hensley Trolley & Mfg. Company has plans completed for the erection of a brick factory addition. The new factory will take care of the crowded quarters.

Montrose Township, Genesee County, will vote this spring on a bonding proposition to cover the cost of construction of two new iron bridges over the Flint River.

St. Charles, Mich., will spend \$4000 for a small water works system if the question passes at the spring election.

The Plymouth Motor Car Company is the name of a new automobile concern incorporated in this city. The new company will start business with a capital stock of \$20,000.

The Menominee River Sugar Company is making plans for the erection of a new drying plant to cost in the neighborhood of \$125,000.

The Continental Motor Company, Muskegon, Mich., has plans laid for a large addition to its present plant. The factory will cost approximately \$60,000.

The Kalamazoo Suspender Company, Kalamazoo, Mich., will build a three-story factory this spring to care for its increasing business.

Port Huron, Mich., is to have an aeroplane factory. Business men have become interested with Charles J. Stroebel of Toledo, Ohio, and have organized the Stroebel Aviating Company of Port Huron.

A company has been organized at Grand Rapids, Mich., to make an improved pipe covering. The principals are Glendon A. Richards and I. H. Wilson.

The Combination Brick Company of this city has increased its capital stock from \$50,000 to \$200,000.

With the idea of increasing the capacity of the plant, the Frost Gear & Machine Company, Jackson, Mich., has increased its capital stock from \$100,000 to \$150,000.

The John Johnson Company of this city has been organized to deal in and manufacture steam-pipe covers, tents and awnings. The company has a capital stock of \$20,000.

A new steel castings company is the Peerless Crucible Steel Castings Company of this city, which has a capital stock of \$20,000.

The Gies-Hoyt Mfg. Company with a capital stock of \$10,000 has incorporated under the new name of Standard Gear Company.

The Detroit Foundry & Supply Company has made a considerable increase in its capital stock. The amount was raised it from \$25,000 to \$40,000.

The Creissel Bread Company, Flint, Mich., has incorporated with a capital stock of \$75,000. Machinery of the most modern type will be used for the manufacture of all bread products.

Of material importance to Bay City, Mich., is the large increase in the capital stock of the Michigan Turpentine Company. The increase from \$120,000 to \$500,000 is to allow the construction of a plant nearly three times the size of the present structure.

Two large chemical plants are in process of construction at Luther and Filer City, Mich. Promoters have secured 10,000 acres of stump land and propose to erect plants of considerable importance to the two towns. H. W. Marsh of Manistee is prominently identified with the organization.

The Hanselman Candy Company, Kalamazoo, Mich., is planning a considerable enlargement to its present factory. This spring the company will erect a three-story brick plant adjoining the main structure, intending to enable it to handle its increasing business. The company recently installed a \$5000 chocolate coater.

The large plant of the Ideal Motor Company at Lansing, Mich., was completely destroyed by fire March 20. The loss will reach \$200,000. The company will rebuild.

The Stebbins & Wilhelm Company, Sturgis, Mich., maker of furniture, will build a four-story factory addition to its Sturgis plant. The building will be of brick and modern mill construction.

The Barnes-Baker Company with a capital stock of \$40,000 filed articles of incorporation with the Secretary of State this week. The company will locate its plant at St. Joseph, Mich., and will make a patented folding umbrella.

A new company has been organized at Battle Creek, Mich., under the style of the Battle Creek Box Company, to manufacture boxes. The concern has a capital stock of \$10,000.

The W. R. Roach & Co., who have several canning factories about the state, will erect a plant consisting of eight buildings at Scottville, Mich. The buildings will cover 2½ acres of cement foundations.

The Eclipse Motor Company, Cadillac, Mich., will remove its plant to Traverse City. The Board of Trade there has made sufficient inducements to warrant the change which will be accompanied by an enlargement of the plant's capacity.

The Duplex Motor Car Company, Charlotte, Mich., which at first planned to remain at the latter place and make its improvements there, has decided to move to Muskegon. Chicago parties have bought out the Charlotte stockholders,

THE MACHINERY MARKETS

and with the added capital it is planned to make considerable improvements.

A bond issue of \$125,000 to cover the cost of a new Leonard street bridge, will be voted upon by Grand Rapids, Mich., at the April election. The proposition was favorably acted upon by the council last week.

The Imperial Furniture Company, Grand Rapids, Mich., has commenced construction on a new factory addition to its present plant. Work will be rushed to completion.

The Board of Trade of Grand Rapids, Mich., is planning to establish a \$300,000 fund to assist new industries and bring new industries to the city.

W. J. Turner of the Vulcan Brick Works, near Norway, Mich., is planning to install some new labor saving machinery this season. The force of 50 men will be cut to about 40, it is planned, with the new machinery.

The Cadillac Motor Car Company, Cadillac, Mich., has taken over the Monroe Body Company of Monroe for the purpose of giving as much detail to the construction of the body as it is able to give to the parts made under its own supervision.

The E. N. Pudrith Company, manufacturing jeweler, has increased its capital from \$50,000 to \$75,000.

The John P. Berry Company, sheet metal manufacturer and machinist, has let the contract for a two-story brick factory. The structure will be more than twice the size of the present plant.

The Elliot Machine Company, Grand Rapids, Mich., manufacturer of automatic button attaching machines, stapling and riveting machines and shoe finders' hardware, is seeking a suitable site in that city for the erection of a large factory building. The company is at present operating three different branches in Grand Rapids, all of which will be assembled in the new building when completed. Details regarding engines, boilers, machinery or tools to be installed have not been decided upon as yet.

The City Council of Elsie, Mich., will expend \$5000 for the installation of an electric light plant.

The Pere Marquette Railroad Company will construct a 43-stall roundhouse at Grand Rapids, Mich., to be equipped with all modern improvements.

The Continental Motor Mfg. Company, Muskegon, Mich., states that the erection of the addition to its plant for which plans have been prepared has been indefinitely postponed. Detroit is offering strong inducements to the company and it is possible that the plant may be moved to that city.

The South

LOUISVILLE, Ky., March 27, 1911.

Little change is noted in the condition of the local machinery market, manufacturers reporting conditions generally quiet. Indicating a peculiarity of the situation, a local boiler plant is working overtime this week on rush orders, although the officers of the company report that little business has been put on the books of late and reduced hours may be put into effect in the next few weeks.

An interesting feature of the industrial outlook in this section is the large number of interurban traction projects which are under consideration. In Kentucky and Tennessee numerous companies are being formed for this purpose, and they are looked to as heavy purchasers of power equipment a little later on.

In addition to improvements of the traction system at Lexington, Ky., recently reported in *The Iron Age*, the Henderson Interurban Company has completed its organization and will build lines from Henderson to Dixon, Ky. The Business Men's Club of Shelbyville, Ky., has taken hold of a plan to build a line to Frankfort, the State capitol, while numerous lines are under consideration at Nashville, Tenn., for construction into nearby territory. Henderson, Tenn., is now discussing a line from that point to Savannah, Tenn., the estimated cost of which is \$850,000. William Lea, of Henderson, is the engineer in charge of the preliminary work.

Henry H. Martin, vice-president and general manager of Grainger & Co., structural iron manufacturers, Louisville, has resigned his position, his stock in the company being purchased by W. C. Brohm, who has succeeded to the positions made vacant by Mr. Martin. The latter has not yet decided on his plans for his future work, but will engage in business in Louisville.

The Lincoln Institute, which has secured a large tract of land near Simpsonville, Ky., has let contracts for the erection of eight buildings to the George H. Rommel Company, Louisville. A power house will be built and equipped, as the institute will have its own water works and electric light plant. Equipment for these will be purchased in the near future. In addition some machinery will be required for the manual training department of the school. The institute is

to be used for the training of negroes along industrial lines, and has a fund of over \$400,000 to draw from, Andrew Carnegie having given \$300,000 to the work. W. H. Frost, president of Berea College, at Berea, Ky., is closely in touch with the new institution.

The Lindley Mfg. Company, Louisville, has been incorporated with a capital stock of \$50,000. E. O. Lindley is president and F. T. Kincaid, secretary of the company, which will engage in the manufacture of furniture. Officers of the company state that negotiations are under way for the purchase of a plant already equipped, but that these have not been concluded. In the event that a new plant is erected it will be equipped with entirely new machinery.

Charles F. Grainger, of Grainger & Co., Louisville, who is president of the Board of Water Works, has been reappointed a member of the board by Mayor W. O. Head.

The Iles Contracting Company, Louisville, has been incorporated with \$3000 capital stock by Charles Stilger and others. A steam roller is about the most important item of equipment to be purchased.

The National Smoke Preventer Company, which was organized in Louisville recently, has incorporated at Knoxville, Tenn., with \$50,000 capital stock, the incorporators of the company being T. I. Stephenson, W. P. Davis, C. A. Brown and others. The company will operate a factory in Louisville for the manufacture of automatic smoke consumers.

The O'Neil Coal Company, Island, Ky., is preparing to purchase machinery for the operation of a 75-ton mine which is just being opened. Secretary W. C. Ferguson is in charge of the mechanical work.

The Marrowbone Coal & Coke Company, which operates mines at Lookout, Ky., and has its main offices at Uniontown, Pa., has announced plans for the construction of 60 additional beehive coke ovens at Lookout. Edward Holle, of Pikeville, Ky., is the engineer in charge.

LaCenter, Ky., is planning the establishment of a water works system but definite details are lacking.

W. A. Dodds is establishing a plant for the manufacture of pressed brick at Hickman, Ky., most of the machinery having been contracted for.

The machine shops and tippie of the Bell Union Coal Company, at Curlew, Ky., were destroyed by fire March 22. They will be rebuilt.

Fire destroyed the machine shop of A. C. Burry, at Campbellsville, Ky., March 18, the loss being \$2500.

Dawson Springs, Ky., is having plans drawn for a water works system by the engineering department of Paducah, Ky. J. W. Holmes, superintendent of the Paducah water works, is consulting engineer. Pumps will be installed and water will be drawn from three artesian wells and 10,000 ft. of mains will be laid.

The company formed to develop the manganese property near Newport, Tenn., has been incorporated under the name of the Tennessee Manganese Company, with \$50,000 capital stock. John M. Doan is president, John Sant vice-president and general manager, Thomas H. Sant secretary and George F. Young treasurer. The offices of the company are at East Liverpool, Ohio. Forty tons of washed ore will be handled daily, and trade with steel mills is now being established. John N. Adams is the engineer in charge at Newport. The equipment has been bought.

N. B. Underwood is reported to be planning the development of manganese deposits near Sivierville, Tenn. He has taken options on a large tract.

The Kentucky-Tennessee Phosphate Company has been incorporated at Nashville, Tenn., with \$500,000 capital stock, for the development of phosphate lands in the States mentioned. S. Strudwick, K. H. Carpenter, E. Robin Jones and James C. Bradford are among the incorporators.

Polishing machines, air compressors and other equipment are wanted by the Lexington Monument Works, Lexington, Tenn., which has been organized with Joseph W. Fuller as general manager. C. P. Wilson is president of the company, which will establish a large monument works.

The West Tennessee Investment Company is establishing a laundry at Dyersburg, Tenn., and is asking for prices on equipment, including a 25-hp. engine.

The plant of Keenan, Wade & Wade will be purchased by the city of Trenton, Tenn., for electric light purposes if a bond issue of \$22,000 now pending is authorized. Most of the proceeds will be used for remodeling and equipping the plant.

Three miles of pipe line will be laid by the city of Newport, Tenn., to bring water to the city from springs. A bond issue for the work will be voted on April 29.

The Gray & Dudley Hardware Company, Nashville, Tenn., has increased its capital stock from \$850,000 to \$1,000,000. It is understood that the increase is for the purpose of providing funds for improvements in the plants operated by the company, which include those for the manufacture of harness, saddlery, stoves and ranges.

Work is progressing rapidly on the power plant of the

THE MACHINERY MARKETS

Tallulah Falls Power Company, Tallulah Falls, Ga. The general contractor is the Northern Construction Company, and the contract for the concrete work has just been let to Condon & Milner, Knoxville, Tenn. It amounts to \$400,000. The plant is to produce 50,000 h.p., and it will provide light and power for consumption in Atlanta.

The Anderson Resilient Auto Wheel Company, recently incorporated in Nashville, Tenn., has been organized by electing O. H. Anderson president, J. T. Timberlake vice-president and G. I. Frazier secretary and treasurer. It has not yet been decided where the wheels are to be manufactured. The company has a capital stock of \$500,000.

W. H. Thompson, Brookhaven, Miss., is in the market for machinery for the manufacture of wooden buckets.

The J. B. McCrary Company, Atlanta, Ga., has been given the contract for the erection of the electric light plant at Albertville, Ala. The equipment, consisting of an 80 h.p. engine and dynamo has been ordered.

Power and woodworking equipment, including planers, matchers, edgers, &c., is wanted by the Beckwith & Pepple, Foley, Ala., who are establishing a planing mill.

Surveys are being made in connection with the proposed plant of the Little River Falls Power Company, which is planned for Little River Falls, in Alabama. It is intended to furnish power for manufacturing plants in Gadsden. R. A. Mitchell is interested.

The Memphis, Bridge Company, Memphis, Tenn., has been awarded the contract for a steel bridge to be erected at DeWitt, Ark.

The Spring River Power Company, Jonesboro, Ark., has been formed with \$100,000 capital stock. A plant will be erected which will furnish power and light to towns located in that general district.

J. P. Saddler is planning the erection of a factory for the manufacture of buggies at Bowling Green, Ky. He was formerly in this business at Owensboro, Ky.

The sawmill of the McLean Lumber Company, Chattanooga, Tenn., was burned March 22, the loss being \$60,000. In rebuilding practically all of the machinery, including the power plant, will have to be replaced.

The Furnace Equipment Company, Maryville, Tenn., recently incorporated, has taken over the business of the Maryville Foundry. The company will manufacture the McNaughton grate bar, of which V. J. Adams, Chandler Building, Atlanta, Ga., is sales agent.

The citizens of Tarboro, N. C., will vote on \$25,000 bonds for proposed water works at a special election, May 1.

Texas

AUSTIN, TEXAS, March 25, 1911.

The agricultural and much of the ranch portions of the State have been visited by good rains the past week. The present prospects for a good crop season are unusually favorable. Satisfactory business conditions are reported from all parts of Texas and the Southwest. In Mexico the revolutionary situation is causing serious damage to nearly every line of industry. An enormous falling off in the machinery trade in that country is noted. This is particularly true as to mine and milling machinery. Many orders that were placed with United States concerns before the beginning of the revolutionary disturbances have been canceled temporarily. The tying up of railroads leading into the mining districts of Northwestern Mexico has made it impossible to ship in machinery.

The Board of Commissioners of Milam County is erecting two new steel bridges, in addition to the one that was recently finished, over Walker's Creek.

The City Council of Brenham has under consideration an application that has been made to it for the installation of a gas plant and distributing system. The proposed franchise is for 50 years, and the sum that is to be spent in the establishment of the plant shall not be less than \$40,000. The Council has also ordered improvements to be made to the water works plant. A new brick building for the pumping station will be built and 100 additional water meters installed. Henry E. Booker is superintendent.

An election will be held at Hearne on April 18 to vote on the proposition of issuing bonds for the installation of a water works plant and distributing system.

The laying of a natural gas pipe line from the Caddo field, near Shreveport, La., to Houston, and the installation of a distributing system in the latter city is a project that is being considered by Louis Denning, president of the Bush-Everett Company of St. Louis, Mo., and G. L. Craig of Pittsburgh, Pa. They recently made a thorough investigation of the situation at Houston with the view of making formal application in due time for a franchise over the

streets of the city for the proposed distributing system. The proposed pipe line will be about 200 miles long, and along its route are a number of thriving towns and several large lumber mills and other industries.

The construction of a new 1000-ton sugar mill at San Benito will soon be started. The contract was recently let for the burning of 500,000 brick that are to be used in the construction of the necessary building. Alba Heywood of San Benito is interested in the enterprise.

The recent sale of \$2,000,000 of 5 per cent. bonds by the city of Fort Worth has provided the money necessary for the construction of a large surface reservoir for the water works system of that city and for the carrying out of other municipal improvements.

The La Donna Sugar Company is erecting a sugar mill, to cost more than \$1,000,000, at Donna. A. M. Snider of Cleveland, Ohio, is largely interested in the enterprise.

Dr. F. S. Pearson of New York and a number of British associates have taken preliminary steps toward the establishment of a large hydroelectric and irrigation enterprise in southwest Texas. It is announced that representatives of the syndicate have obtained options on several hundred thousand acres of land in the valleys of the Medina and Nueces rivers, and that surveys have been made for a series of dams and reservoirs and hydroelectric plants. This syndicate is composed of the same men who own the Mexico Light & Power Company and its subsidiary concerns in Mexico, including the great hydroelectric plant at Necaxa. It is announced that the initial plans call for the expenditure of more than \$5,000,000 in construction and development work. C. H. Carney, manager and chief engineer of the Mexico Light & Power Company, with headquarters in the City of Mexico, is actively in charge of the Texas project of the syndicate.

D. B. Chapin of Chapin has been investigating the situation along Devil's River, in western Texas, with the view of constructing one or more large dams across the canyon of that stream and reclaiming many thousands of acres of land by means of irrigation. His plans contemplate the construction of large canal systems and the installation of pumping plants.

W. D. Faus will install a plant at Gonzales for the manufacture of concrete blocks and other building material.

A syndicate of Houston men, consisting of Carey Shaw, C. L. Bradley, K. H. Cawthon, Edward Kennedy and others, will install a water works system and other public utilities on a subdivision of 830 acres of land situated adjacent to Houston.

The Luling Electric Light & Power Company has been granted a franchise by the City Council of Luling to install, maintain and operate an electric light and power plant.

Hamilton Bros., Chicago, Ill., will install a system of sewers at Cameron, Texas.

The United States & Mexican Trust Company is preparing to colonize and place under irrigation 22,000 acres of land in the Imperial Valley, 50 miles from Fort Stockton, on the line of the Kansas City, Mexico & Orient Railroad. Irrigating pumping machinery will be installed and other improvements made. The company's headquarters are at Kansas City, Mo.

H. A. Waddell and associates will install a box factory and sawmill near Morgan City, La., at a cost of about \$300,000.

The bottling works of Stephens & Schade at Clifton, Ariz., that were recently destroyed by fire, entailing a loss of about \$30,000, will be rebuilt.

The City Council of Las Cruces, N. M., has granted a franchise to the Las Cruces Electric Light & Ice Company to install an electric light and power plant.

The Mexican Government has just granted a concession to Ingwald C. Thoresen, William Thompson and Adolfo Fenochio, all of Tampico, Mexico, for the erection and operation of a beet sugar factory at that place. It is stated that the proposed factory will cost upward of \$1,000,000. It will be the first beet sugar factory to be erected in Mexico. The region around Tampico is said to be well adapted to the growing of sugar beets.

Miguel Naranjo of Lampasos, State of Nuevo Leon, Mexico, and associates have completed preliminary arrangements for the construction of a large system of irrigation near that place. A dam will be constructed across the Arroyo Blanco, at a cost of about \$215,000, and form a large water storage reservoir. From this reservoir there will be constructed a large canal that will lead over the adjacent lands. Pumping plants will be installed and the land reclamation system established on a large scale, it is stated.

Harry E. Blake of Los Angeles, Cal., recently investigated the irrigation possibilities of the San Pedro and Sulphur Springs valleys in Arizona. He estimates that an abundant supply of water for irrigation can be obtained in wells and brought to the surface by means of pumping plants.

The Standard Oil Burner Company, San Antonio, will

THE MACHINERY MARKETS

install a plant in that city for the manufacture of crude oil burners.

The city of New Braunfels is having plans prepared by the W. K. Palmer Company, 717 Dwight Building, Kansas City, Mo., for the installation of a municipal hydroelectric plant.

The Wichita Falls Motor Company, Wichita Falls, has been incorporated, with a capital stock of \$160,000. The incorporators are J. A. Kemp, J. W. Culbertson, J. C. Ward and others.

Capt. A. B. Wolvin of Duluth, Minn., president of the Texas City Allied Companies, has been arranging for the expenditure of over \$1,000,000 in terminal and harbor improvements at Texas City.

The Crouch Grain & Elevator Company, Fort Worth, announces that as soon as the fire insurance can be adjusted the company will rebuild the elevator recently destroyed by fire at Temple.

The Saner-Whiteman Lumber Company, Cairo, whose mill was burned March 6, will rebuild as soon as possible. The company has bought a small mill to cut the timbers to be put into the large one.

Central and Western Canada

WINNIPEG, MAN., March 21, 1911.

Business prospects in central and western Canada this spring are very favorable. Predictions are general that 1911 will be a year of great industrial expansion. Preparations are being made to erect new plants of different kinds and to add to others increased capacity. The prosperity of this part of the country is apparent on every hand, and if seeding conditions will be favorable business men should have nothing to fear for another year at least.

The Asbestos Mfg. Company, Vancouver, B. C., has decided to add three more machines to its plant.

Balbraith & Son, sash and door manufacturers, New Westminster, B. C., contemplate taking over the Page & Bremner sawmill on Lulu Island and making extensive additions if granted a 25-year lease by the city.

The Winnipeg Street Railway Company has let the contract for the plant of the new power station which will be built this summer. It will be installed in four units of 3000 kw. each.

During the coming summer the Canadian Pacific Railway will erect a pumping station on the Souris River, about eight miles from North Portal, Sask., to convey the water by pipes to North Portal. The undertaking will cost about \$50,000.

A tool factory is to be established across the river from New Westminster, B. C. The name of the concern is the Drop Forge Mfg. Company.

The Central Electric & Gas Company, Portage la Prairie, Man., will enlarge its plant this year.

It is announced that the Barnett-McQueen Company, contractor, will establish a bolt factory at Fort William.

The city commissioners of Saskatoon, Sask., are considering the advisability of doubling the capacity of the city's power plant.

Tenders will be received up to and including April 4 by W. H. Stewart, treasurer of the town of Rondeau, Sask., for electrical machinery, pumping machinery, producer gas plant, 14,000 ft. water mains, 22 hydrants, 47 6-in. left-handed gate valves and 47 6-in. valve boxes.

It is announced that G. Gale & Sons, manufacturers of brass and iron bedsteads, headquarters at Waterville, Quebec; branches at Montreal, Toronto and Winnipeg, will erect a factory in Winnipeg to cost about \$50,000.

The Winnipeg branch of the Dominion Bridge Company, Ltd., is now in operation. Extensive alterations and improvements have been made. It is fitted with modern machinery, and has a capacity of 15,000 tons per annum.

George Anderson & Co., engineers and iron founders, of Carnoustie, Scotland, have opened an office at 504 Builders' Exchange, Winnipeg.

The contract for 100 miles of grading and ballasting on the Alberta Central Railway has been awarded to James McDonald & Co., Winnipeg. The price is \$25,000 a mile, the total being \$2,500,000. The road leads to the Brazilian coal fields.

Sir Donald Mann, vice-president of the Canadian Northern Railway Company, states that the company's new terminal station at Winnipeg will cost \$5,000,000.

Harrod's Stores, London, England, will build a store at Calgary, Alberta, to cost \$1,500,000. The assistant and general manager, Winnipeg, are in Toronto this week to make arrangements with the architects.

Only two tenders were received in response to the call for boiler installation at the municipal power plant, Ed-

monton, Alberta. New specifications will, therefore, be issued and tenders again called for. Two 400-hp. boilers, or one unit of 800 hp., and one 500-hp. boiler for the pumping plant are wanted.

Four hundred and fifty tons of machinery have arrived at Vancouver for the Ocean Falls Company's pulp plant at the Bella Coola Inlet, B. C. The vessel came round the Horn from Eastern Canada and New York. Part of its cargo consisted of electrical apparatus from an Ontario company. More machinery is being taken in at Vancouver. To the equipment of the new plant many countries contribute. Several small machines come from Manchester, England; the wet machines come from Christiania, Norway; the turbines are partly from Kristineham, Sweden, and partly from Winterthur, Switzerland. Both eastern and western Canada, as well as the United States, have a hand in furnishing the plant.

Patrick Burns, the Calgary meat packer, is credited with the intention of building a large packing plant at Edmonton, Alberta.

The Winnipeg Steel Granary & Culvert Company, St. Boniface, Man., recently incorporated with \$100,000 capital stock, advises that it has completed the erection of a factory, and has all the equipment installed.

Eastern Canada

TORONTO, ONT., March 25, 1911.

Contracts have been entered into by the three trans-continental railway companies for the construction of a large mileage in the West this summer. The contracts aggregate \$42,000,000. They do not cover all the construction plans of the companies for the season. In the Province of Ontario both the Canadian Pacific and the Canadian Northern will add considerably to their lines. The Grand Trunk will also spend liberally on the double-tracking of various portions of its system in Ontario. On the Government Division of the National Transcontinental much ground will be covered in the course of the campaign opening with the spring, the trans-Ontario section being the portion on which the contractors have most to do. The Ontario Government is pushing construction on the Porcupine branch of its Temiskaming & Northern Ontario Railway. Active though it is, railway building lags behind other departments of enterprise. Most of the roads to be built this summer are urgently called for, for the carrying in of supplies and equipment to farmers, miners, lumbermen and primary industries that have ventured beyond the railway zone. In all fields of productive and commercial business the outlook is excellent. The crops are expected to get an early start, and that means much for wealth production in Canadian latitudes. That the banks have confidence in the situation is indicated by the expansion of commercial loans. At this season the banks are usually cautious in the making of loans or advances, but the prospects in the present spring are evidently considered attractive. In these days of railway-making, of departures into new branches of industry, of increasing immigration and of swelling imports of capital, the products of iron and steel are in especial demand. In the making of a great country, as distinct from the providing of a fully developed country, the consumption of iron and steel materials and instrumentalities dwarfs consumption in many other lines. The iron and steel industries drawn upon get the benefit of much of the capital expenditure as well as of that on current account, whereas most other industries have to depend largely on the latter.

The Northern Navigation Company, Collingwood, Ont., is about to call tenders for the building of a fast steamship for the Upper Lakes. The cost is to be about \$600,000.

The Associated Portland Cement Company, London, England, is said to be contemplating the establishment of a number of plants in Canada at points scattered from the Atlantic to the Pacific. This would involve the expenditure of millions of dollars in construction.

The Public Works Department of Canada is about to call tenders for the construction of a new block at Ottawa, the estimated cost to be \$3,500,000.

The office building the Canadian Pacific Railway Company is starting to build at the principal street intersection in Toronto is to be the tallest in the city. It will be 16 stories.

Polson Iron Works, Ltd., Toronto, will begin at once the construction of a floating dock in connection with its plant here. It will be of two sections, each 150 ft. long and 165 ft. over the outriggers. The sections will be built of steel throughout. They will be electrically driven by four

THE MACHINERY MARKETS

centrifugal pumps with a capacity of 5000 gal. per minute. The motors will have a capacity of 50 hp. each.

The Campbell Milling Company, Toronto, announces that it will build a 3000-bbl. flour mill at Midland, Ont., at an estimated cost of \$400,000. Plans have been decided upon and contracts will shortly be let.

Gunns, Ltd., is erecting a refinery for cotton seed oil near its abattoir in Toronto, capacity two carloads per day. This will be the first industry of the kind in Canada. Cotton seed, now dutiable at 17½ per cent. ad valorem would come in free under the reciprocity agreement.

The contract for building the bridge over the River Chaudière at St. George, Beauce County, Quebec, has been awarded to O'Neil & Loney, Quebec City.

Moffatt & Irving, Toronto, have applied to the Board of Control here for a site of 5 acres in Ashbridge's Marsh. They propose to erect a large iron and steel plant.

The Town Council of Galt, Ont., has decided to spend \$12,000 in the purchase of a 120-acre farm in the town limits, the property to be used for factory sites.

David Dick & Sons, Ltd., Welland, Ont., have the contract to build the Page-Hersey Iron Tube & Lead Company's plant at Welland for \$150,000.

The Standard Steel Works, Ltd., capital stock \$1,000,000, head office Montreal, has been incorporated under Dominion laws.

In its agreement with the City Council of Peterborough, Ont., the Independent Tire Company undertakes to put in \$75,000 of new machinery. The agreement has yet to receive the sanction of the ratepayers.

A bridge is to be erected at Indiantown, N. B., this summer. It is to have three spans, each 220 ft. long. The substructure will be of concrete and the superstructure of steel. It is to take the place of a ferry.

The New Dominion Motors Company has been incorporated under Ontario laws. Capital stock \$100,000 and principal place of business Walkerville, Ont.

Numerous tenders have been received for the installation of a natural gas plant and for the construction of a street railway system in Moncton, N. B. The undertakings are being carried out by the municipality. The tenders have been forwarded to the city's consulting engineer in London, England.

The Hoover Suction Sweeper Company, Ltd., Windsor, Ont., recently incorporated, is an offspring of the Hoover Suction Sweeper Company, New Berlin, Ohio, from which place the business of the Canadian company will be conducted.

Pacific Coast

H. J. Burns, Spokane, Wash., has under construction a one-story brick factory building, 50 x 80 ft., which will be equipped for the construction of blower systems for planing mills and large storage tanks for irrigation purposes and other heavy sheet metal work.

Bellingham, Wash., is having plans prepared for enlargement of its pumping station. N. A. Whitney is city engineer.

The Agutter-Griswold Company, Seattle, Wash., manufacturer of switchboards and other electrical goods, is erecting a new factory building, 60 x 120 ft., three stories and basement. The first floor will be used for offices and store-room purposes, and the second for the manufacture and assembling of switches, panelboards and switchboards. The entire third floor will be occupied by the sheet metal department. Besides the machinery required for punching and forming, there will be separate rooms equipped for the various finishing processes. The building will be equipped with a heating plant and a freight elevator, and all machinery will be driven by electric motors.

The Diamond Carriage Company, Spokane, Wash., is erecting a factory building, 50 x 142 ft., two stories and basement, of brick construction with cement floors. The basement will be used as a garage for motor trucks for which the company is agent. The company manufactures delivery wagons, trucks, auto bodies and does a general repairing business. Additional woodworking and ironworking machinery will be installed in the near future.

Government Purchases

WASHINGTON, D. C., March 26, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids April 18, schedule 3451, for one gasoline engine; schedule 3452, for seven engine lathes, and schedule 3453, for one file sharpening apparatus, one portable electric grinder, three lathes, one milling machine, one pipe threading and cutting-off machine, one drill press and one shaft straightener.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids April 29 for turbo-alternators and electrical equipment for the United States Naval Station, Pearl Harbor, Hawaii.

Bids were opened March 21 by the Bureau of Supplies and Accounts, Navy Department, Washington, as follows:

Class 1.—Two turbo-generating sets, one motor generating set and one switchboard—Bidder 1. Atwood-Rearick Company, New York, \$14,286; 35. General Electric Company, Schenectady, N. Y., \$11,801; 97. Terry Steam Turbine Company, New York, \$12,540.

Class 11.—One vertical hollow chisel mortising machine—Bidder 9. Bentel & Margendant Company, Hamilton, Ohio, \$1540; 28. Defiance Machine Works, Defiance, Ohio, \$1100; 32. J. A. Fay & Egan Company, Cincinnati, Ohio, \$1195; 36. Greenlee Bros. & Co., Chicago, Ill., \$1310; 40. Griscorn-Spencer Company, New York, \$1035; 71. Manning, Maxwell & Moore, New York, \$1305; 105. S. A. Woods Machine Company, Boston, Mass., \$1670.38.

Class 21.—Two motor driven lathes—Bidder 4. American Tool Works, Cincinnati, Ohio, \$1557; 33. Fairbanks Company, Washington, D. C., \$2080; 34. Frevert Machinery Company, New York, \$1446 and \$1358; 37. Garvin Machine Company, New York, \$1410 and \$1345; 40. Griscorn-Spencer Company, New York, \$1243.13; 46. Hendey Machine Company, Torrington, Conn., \$2394, \$2379 and \$2404; 53. J. H. Johnson, Jr., Company, Philadelphia, Pa., \$1479 and \$1619; 57. J. P. Kemp, Baltimore, Md., \$1755.25 and \$1559.25; 71. Manning, Maxwell & Moore, New York, \$2394, \$2379, \$2405, \$1830 and \$1580; 73. Niles-Bement-Pond Company, New York, \$1713; 76. Prentiss Tool & Supply Company, New York, \$1505 and \$1521.

The American Electrochemical Society's Meeting

The nineteenth general meeting of the American Electrochemical Society will be held in the new Chemists' Club Building, 50 East Forty-first street, New York, April 6, 7 and 8. A copy of the programme of this meeting has been received from the secretary, Prof. Joseph W. Richards, Lehigh University, South Bethlehem, Pa. It provides for the reading and discussion of a large number of papers, and for excursions and entertainments, including the entertainment of ladies. Among the papers are the following:

"A New Electric Resistance Furnace," by F. A. J. FitzGerald.

"Reliability of Electric Furnaces for Commercial Work," by F. T. Snyder.

"An Electric Furnace for Heating Bars and Billets," by Thaddeus F. Bailly.

"Electrolytic Refining as a Step in the Preparation of Steel," by C. F. Burgess.

"Some Problems of the Electroplater," by G. B. Hogaboom.

"Electric Furnaces for the Manufacture of Steel," by James Lyman.

"Some Experiences with the Electric Furnace at South Chicago," by C. G. Osborne.

"Electric Steel Processes as Competitors of the Bessemer and Open Hearth," by A. E. Greene.

"Design of a 50-Ton Induction Electric Steel Furnace," by A. Hirth.

"A New Type of Electric Furnace," by Carl Hering.

The excursions comprise one on the afternoon of April 6 to the Laurel Hill Works of the Nichols Copper Company, Brooklyn; on the afternoon of April 7 to the electroplating plant of the Hanson & Vanwinkle Company, manufacturer of electroplating material, Newark, N. J.; on the afternoon of April 8 to the plant of the American Smelting & Refining Company, Perth Amboy, N. J. On the evening of April 6 a subscription dinner will be held in the dining room of the Chemists' Club, and on the evening of April 8 the New York Section of the society tenders an invitation smoker to the visiting members and guests of the society and to the Chemists' Club.

The world's copper production in 1910 is placed at 870,356 metric tons, against 848,299 tons in 1909, by Aron Hirsch & Co., of Halberstadt, Germany, whose position is well recognized among statisticians. They report the world's consumption in 1910 at 947,320 tons, against 847,079 tons in 1909. These statistics are more encouraging for the copper trade than any others which have recently appeared.

The Vulcan Iron Works, Wilkes-Barre, Pa., has awarded the Westinghouse Electric & Mfg. Company the contract for furnishing one 200-kw. direct-current type ET. compound wound, 250-volt, 120 rev. per min. generator, also the switchboard that is to be used in connection with the generator.

THE IRON AGE

Established
1855

New York, April 6, 1911

VOL. 87: NO. 14

Published for the Proprietors by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.00 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. L. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE
Pig Iron Stocks Less.....	817
Our Approaching Removal.....	818
Works Accident Insurance.....	818
The Geared Turbine and Its Lessons.....	819
Metal Frames for Aerial Craft.....	819
Correspondence.....	820
Dr. R. W. Raymond Resigns.....	821
The Dille & McGuire Mfg. Company's Expansion.....	821
The Pittsburgh Foundrymen's Association.....	821
Pig Iron Production. Illustrated.....	822
Alaska Copper Coming.....	823
Pig Iron Output in Two Panics. Illustrated.....	824
Southern Companies to Merge.....	825
The Union Steel Casting Company's Extensions.....	825
The Traffic Club of Pittsburgh.....	825
Compensation Legislation in New Jersey and Ohio.....	825
The Iron and Metal Market Reports.....	826 to 835
Iron and Industrial Stocks.....	835
Notes on Prices.....	835
New Publications.....	836
New Republic Iron & Steel Company Plant.....	836
Personal.....	837
A Firth-Stirling Steel Poster.....	837
The New Lozier Plant at Detroit.....	837
The Wheeling-La Belle Steel Merger Off.....	837
New Tools and Appliances.....	838
New Coke Rates.....	838
Elongation and Ductility Rail Tests.....	839
The Triple Supply Convention.....	840
The Yale & Towne Mfg. Company Will Establish a Canadian Plant.....	841
The Cambria Paint & Color Company's Improvements.....	841
Workmen's Accident Compensation.....	842
The Bethlehem Steel Corporation in 1910.....	845
The Midvale Steel Company's Report.....	845
Obituary. Portrait.....	846
Magnetic Switch Motor Starters. Illustrated.....	847
The Westinghouse Apprenticeship System. Illustrated.....	848
Navy Yard Apprentices.....	850
Pennsylvania Railroad Apprentices.....	851
Deere & Co.'s Reorganization.....	851
Customs Decisions.....	851
Features of a Modern Steel Foundry. Illustrated.....	852
The New Moline Multiple Spindle Drill. Illustrated.....	855
National Metal Trades Association.....	855
The New York Metal Exchange Election.....	855
The Schatz Combination Punch and Shear. Illustrated.....	856
A New Steel Rolling Mill for St. Louis.....	857
Standardization by the Automobile Engineers.....	857
The Enlarged Bettendorf Steel Car Plant. Illustrated.....	858
The Climax Spur Geared Chain Hoist. Illustrated.....	860
A Large Aetna Multiple Punch. Illustrated.....	860
New Brown Ore Unloading Plant. Illustrated.....	861
Steel Mill Lighting. Illustrated. (With Supplement.).....	862
Unloading Pig Iron with Lifting Magnets. Illustrated.....	865
The Lamb Portable Electric Radial Drill. Illustrated.....	866
The Handy Slitting Shear. Illustrated.....	866
The Corvel Automatic Circular Metal Saw Sharpener. Illus.....	866
The Paramount Indestructible Steel Clamp. Illustrated.....	867
The Detroit Kerosene Engine. Illustrated.....	867
The Machinery Market Reports.....	868 to 879
Trade Publications.....	879
Current Metal Prices.....	880

Pig Iron Stocks Less

Reductions Chiefly in Alabama and the Central West

Finished Material Specifications Fall Off—A March Record in Wire Output

Our March pig iron statistics show another sharp increase in production, due entirely, as in February, to the larger activity of steel works. Merchant furnaces last month fell slightly behind their February rate. The output of coke and anthracite iron last month was 2,188,161 gross tons, or 70,586 tons a day against 64,090 tons a day in February. There was a net gain of nine in furnaces active, all contributed, as in February, by the steel companies, the number of merchant furnaces in blast remaining the same. The steel works furnaces produced 48,970 tons a day last month, a gain of 6621 tons over the February rate, while the merchant furnaces produced 21,616 tons a day, a loss of 125 tons.

The daily capacity of the 231 furnaces in blast April 1 was 70,752 tons, against 66,562 tons a day for 222 furnaces on March 1. Production is now at the rate of 25,950,000 tons a year, including charcoal iron. This is a gain of 1,500,000 tons a year over the rate on March 1, and of 6,250,000 tons over the rate at the low point January 1.

Significant in connection with this large increase in production is the fact that since February 1 pig iron stocks at furnaces in the Ohio, western Pennsylvania and Wheeling districts have been reduced 57,000 tons, 45,000 tons of this being since March 1. More than 50,000 tons of the reduction was in merchant stocks, which from August, 1910, to February had shown a steady and heavy increase. Alabama stocks, including those at steel works, were reduced about 40,000 tons last month.

Most pig iron markets have been dull. An exception is Cincinnati, where new orders and shipments of foundry iron show improvement, though prices are not quite so firm. At Philadelphia a sale of 18,000 tons of mixed grades of Southern iron was made for the pipe trade, deliveries over six months.

In steel making iron the chief sale reported is 10,000 tons of Southern basic for Western shipment, deliveries through the remainder of the year. A Pittsburgh transaction in Bessemer iron is 10,000 tons for ingot molds, deliveries over five months, settlements to be at market prices established by not less than 1000-ton sales.

Finished material specifications show some falling off in most lines. Wire is an exception. The leading interest made a new record on wire shipments last month, and bookings continue good, particularly for fencing.

The Steel Corporation's new bookings in March were at the rate of 35,000 tons a day, against 40,775 tons a day in February. Shipments increased at the same time, as is well indicated by blast furnace opera-

tions. The Corporation's active furnace capacity is now 72 per cent., one Edgar Thomson and one Mingo having been blown out since April 1, while a fifth Gary furnace started up. Indications are that high point in production has been reached for the present.

The Harriman rail order is expected this week. Not more than 50,000 tons will be placed now, though the year's requirements have been put at 150,000 tons. The Sandy Valley & Elkhorn has bought 5350 tons, and the St. Paul 6000 tons, and an order has been taken for 3900 tons for Japan. The Grand Trunk inquiry for 18,000 tons is up, but the order is delayed by some questions over specifications. The Seaboard Air Line's order for 15,000 tons will probably go to the seaboard mill.

The Steel Corporation is low bidder on the latest Panama Canal letting, calling for 12,000 tons of steel for a large drawbridge and six lock gates. The Great Northern has placed 4000 tons of bridges. The chief structural contract is 11,000 tons for the Rothchild Building, Chicago, taken by the American Bridge Company.

Some improvement is noticed in the sheet trade, but tin plate operations are not quite as satisfactory as in recent weeks. The talk of advance of 10c, a box on fourth quarter business is not materializing.

Scrap markets are uniformly weaker, with no indications of any early improvement. Consumers are little tempted by the concessions thus far offered and stocks are heavy.

Lake Superior ore prices for 1911 are likely to be decided in the next fortnight. Late estimates of this year's movement are around 30,000,000 tons, or about 70 per cent. of that for 1910. The ore on Lake Erie docks April 1, about 7,745,000 tons, was more than in any year on that date.

Our Approaching Removal

The David Williams Company, publisher of *The Iron Age*, *Iron Age-Hardware*, *Metal Worker*, *Plumber and Steam Fitter* and *Building Age*, will remove its entire business from 14 Park place to 239 West Thirty-ninth street, between Seventh and Eighth avenues, New York City, and expects to be established in its new quarters in the week beginning April 10.

Several reasons have influenced the company when making this selection of a new habitation so far from the district in which it has so long conducted its operations. During the history of these various publications the office has been frequently removed, but it has always been within a short distance of the central post-office. Convenience to the post-office was the prime consideration. This motive no longer applies, arrangements with the New York post-office now being in effect whereby our publications are sent directly to the Pennsylvania and New York Central trains without passing through the post-office. For some time many of the business interests of New York have found it advisable to seek locations further north in the city. The trend has been steadily in the direction of the district extending from Twenty-third street to Forty-second street. In this locality are found most of the important hotels, great retail stores and leading places of amusement. The out-of-town visitor finds himself in that locality more frequently than in any other part of the city. The recent opening of the great Pennsylvania Railroad station at Thirty-third street

and Seventh avenue has emphasized this movement.

The new location of our office is almost midway between the Pennsylvania Railroad and New York Central stations and is within walking distance from either. It will therefore be easy of access to out-of-town visitors traveling on lines using these terminals. It will also be within easy reach of the great new post-office which will occupy a portion of the Pennsylvania Railroad Company's ground on Eighth avenue. An important advantage which will be gained will consist in having the printing-office under the same roof with the business and editorial offices. Much inconvenience has been suffered for a long time in the separation of the mechanical and editorial departments, the printing office being at some distance. The new quarters will also afford much more room for the present working force, as well as provide ample space for growth, which, we are pleased to say, seems assured.

Visitors will be welcomed in the new quarters, as they always have been in the old ones. Ample provision will be made for them, including writing facilities for those living out of the city and who sometimes may find it difficult to secure conveniences of this kind while temporarily in the city. The files of our various publications and our extensive collection of trade catalogues will also be at their service for reference.

Works Accident Insurance

It is significant of the widespread interest among employers in the question of workmen's compensation for accident that the National Metal Trades Association has set apart one of the sessions of the New York convention next week for the discussion of employers' liability insurance. It has been accepted as an inevitable result of the passing of accident compensation laws in various States that the rates of the employers' indemnity companies would be sharply advanced. This view is based, no doubt, largely on the experience of these companies in England under the régime of pro-labor legislation which has prevailed there in recent years. It overlooks two important facts, however. One is that the expense of litigation, which the indemnity companies have to bear under the present condition, will largely be saved under compensation legislation if it works out as its friends have predicted. The other is that under compensation legislation the mutual interest of employer and employee in the prevention of accidents should work a marked diminution in their number.

Two propositions which have been foremost in all the agitation of this question are: First, that a large percentage of works accidents is preventable and must be prevented; second, that where accidents do occur in spite of increased precautions the employee or his dependents should receive the largest possible percentage of the employer's outlay on account of the accident, to the elimination of lawyers' fees and costs of litigation. It would seem like a hopeless view of the effort to put this whole question on a better basis to say that the new situation is simply to be handed over to the indemnity companies to be dealt with by advancing the cost of insurance to the employer. No such outcome will satisfy employers who have gone into a study of the problem of works accidents with a serious purpose to make works employment safer and to deal justly with the victims of accidents. If it does not result in closer co-operation between employers and

employees to prevent accidents, the movement will have come far short of success.

In so far as they choose to insure with existing indemnity companies, we shall look to see those employers who spend money freely to reduce the liability to accident in their works to a minimum insisting on a preferential rate determined under an adequate system of inspection such as does not now exist in connection with accident insurance, except that against losses by fire or boiler explosions. Whether a gradation of rates can be devised which will satisfy the employers who have taken an advanced stand in safeguarding against accident is a question. It is certain that at present such employers bear an inequitable share of the losses paid by companies insuring against accident damages.

It would seem that one result of the régime which the new legislation is hastening will be to bring together in insurance associations many of the employing companies which may be regarded as choice risks. In the case of some of the best of the mutual fire insurance organizations among manufacturers the standard of preventive measures is so high that a certain discredit attaches to a fire involving any considerable loss. In a similar way there will ultimately come organizations of manufacturers in which co-operative study of the best methods of safeguarding workmen will result in the minimizing of accidents to a degree now considered out of the question.

Accident relief and compensation are praiseworthy, but the present agitation will come far short of the real end if it puts the chief emphasis on plans of insurance and schemes of compensation. Prevention and conservation must be the keystones of the whole campaign.

The Geared Turbine and Its Lessons

C. A. Parsons, the inventor and developer of the steam turbine that bears his name, spoke very interestingly of the geared turbine in the course of a recent lecture delivered at the Royal Institution. The subject is of great importance, not only in turbine practice, but in other applications of power, such as fans, where it is economical and otherwise desirable to operate the motor at high speeds. The following is taken from an editorial on the lecture, published in London *Engineering*:

In this matter the pioneer was Dr. de Laval. The largest of his geared units was of but moderate output compared with the 900 horsepower of the *Vespaian*. At his lecture Mr. Parsons showed the pinion removed from the latter vessel after having served to drive the ship over 12,000 miles. The total wear did not exceed 2 mils, and apparently the gear would outlast the ship. As compared with the original machinery, the geared turbine has shown an economy of 22 per cent. The boilers and propeller are the same. The latter is run at 70 revolutions a minute, the turbine speed being 1400. The great saving in weight by the use of a high speed turbine is obvious. The efficiency of the gearing is so high that it is very difficult to measure the frictional loss, a transmission dynamometer of the usual type not being sufficiently sensitive to afford reliable results. A measurement of the rate at which heat generated in the gears leads, however, to the conclusions that the efficiency is over 98½ per cent.

One great advantage of the geared turbine at sea lies in the fact that racing is impossible. Many years ago single cylinder marine engines, fitted with a flywheel, were in use on the Holt Line, and it was found that the inertia of the flywheel greatly diminished the tendency for the engine to race in a seaway. With the geared turbine the flywheel effect of the high speed rotor is such that even if the propeller completely emerges the speed does not increase by more than 15 per cent. before the propeller returns again to its element.

Perhaps a still more noteworthy example of the effectiveness of modern gearing is afforded by the example Mr. Parsons quoted of an exhaust steam turbine of 750 horsepower, which he has supplied to drive a plate mill in Scotland. Here a double reduction gear is used, the turbine running at 2000 revolutions per minute and the mill at 70. There is also a 100-ton flywheel running at the same speed as the rolls. The energy stored in the rotating system is such that work can be given out for a short time at the rate of 4000 horsepower and the maximum deceleration at the end of each roll is only 7 per cent. It is now seven years since Mr. Parsons's experiments with geared turbines began, and he states that the results so far have been so uniformly satisfactory that he believes the system may be applied successfully to turbines generating many thousands horsepower. These deductions are quite in accord with the experiments carried out on this side of the water, not alone with turbines but with electric motors, where high speeds are desirable in order to reduce the size and initial cost of the installation.

Metal Frames for Aerial Craft

If the statistics could be collected, many would doubtless be surprised to learn of the extent of the profitable business that has been secured by certain gas engine builders resulting from the growth of the aeroplane industry, while the gradual standardizing of air machine parts is creating a wider demand for all kinds of material used in their construction. One branch of aeroplane manufacture that might prove a profitable field of endeavor is the making of metal frames for the machines. Many of the fatalities which have been reported through breakage of air crafts were the direct result of weak frames, which were principally constructed of bamboo or other light wood.

While metal tubing has to some extent been adapted to air craft construction, it is generally conceded by metal tubing experts that there is much room for profitable effort along these lines. Makers of light metal tubing have been amazed at the crudity of the construction of the framework of air machines, even of those used by the most expert aviators. As with the first bicycles, most of the heavier-than-air machines now in use bear unmistakable evidence of being "home made," and the repairs executed on some of them have borne the earmarks of work done by an amateur rather than by an expert machinist.

The average aviator is an adventurous mortal, who has graduated from the automobile racing class, with enough knowledge of machinery to "tinker up" a break, and invariably the patchwork of an indifferent mechanic satisfies his ideas of good workmanship. Most of the metal frames put into use so far have not displayed the niceties of construction known to practical metal tube makers, although an alloy of aluminum and steel has been found well adapted for this work. Just two days before his death through the breakage of his air machine at New Orleans last December, John B. Moisant announced that he would shortly introduce a monoplane of all metal construction, except that the propeller was to be of wood. It would appear that the proper standardizing of metal tubing for the bodies of air craft would do away with the necessity of much of the bungling repair work now

done on such machines, and if a standardized method of testing the tubing were developed there would be less need of repairs and naturally fewer accidents due to breakage of frames.

Correspondence

Ferromanganese in Chilled Cast Iron Wheels

To the Editor: Referring to the communication from A. J. Outerbridge, Jr., in your issue of March 13, and to your notice in *The Iron Age* of March 9, of the pamphlet issued by us respecting our manufacture of high grade charcoal iron for chilled car wheels, we beg to say that Mr. Outerbridge's statements seem to concern the results of tests made by him between 1880 and 1888, at which time the load carried by individual car wheels did not exceed four to five tons per wheel.

The problem now is to produce wheels that will meet service conditions under loads of nine to ten tons per wheel. A proper appreciation of the point at issue will be gained if the results of Mr. Outerbridge's experiments as stated by him are considered under two heads. First, concerning the strength of the unchilled body of wheel with respect to its ability to carry the increased load; second, concerning the character and quality of the chilled part of tread and flange with respect to its ability to withstand increased shock and strain and especially very severe heating by brake friction due to heavier loads carried.

In the extract from the paper read by Mr. Outerbridge before the Franklin Institute, in March, 1888, as quoted in your issue of March 16, the following statement concerning the effect of manganese is given:

It undoubtedly produces a marked effect upon the character of the white crystalline structure. You may readily recognize "a manganese chill" by its coarse lamellar or foliated filaments and by the tendency which it produces to form white iron or "hard spots" in isolated places throughout the gray portion of a casting. Manganiferous pig iron has been used to produce chilled castings, but it does not make a durable wearing surface, the chilled tread of a car wheel, for example, produced by this method, presents to the eye, when broken through the section, a handsome appearance, but the white metal is comparatively soft; it may be easily bored, and, what is more serious, it crumbles readily under the impact of rapid shocks on the rail. A remarkable effect is produced upon the character of hard iron by adding to the molten metal, a moment before pouring it into the mold, a very small quantity of powdered ferromanganese, say 1 lb. of ferromanganese in 600 lb. of iron, and thoroughly diffusing it through the molten mass by stirring with an iron rod. The result of several hundred carefully conducted experiments which I have made enables me to say that the transverse strength of the metal is increased from 30 to 40 per cent., the shrinkage is decreased from 20 to 30 per cent., and the depth of chill is decreased about 25 per cent.

Mr. Outerbridge plainly states that the effect of manganese upon the chilled structure is to produce "coarse crystallization" and a chilled structure that will not give good service. Our pamphlet advocated the use of high grade charcoal pig iron for the manufacture of wheels that will stand the drop and thermal tests and at the same time possess a chilled structure in tread and flange better calculated to resist present service conditions under heavy freight equipment.

If our plea in this respect is what Mr. Outerbridge refers to as "special pleading which is altogether wrong," we are at a loss to follow his argument. We fail to see the advantage of practice that will make wheels stand the drop and thermal tests and yet fail to withstand the extreme service conditions imposed on tread and flange under present maximum loads. We realize the difficulty, not to say delicacy, of the situation as between the makers and users of chilled wheels and it is our desire to aid in the establishment of better conditions if possible. It appears to us to be a case where a proper knowledge and appreciation of the real facts is of the first importance and that if for any reason the present practice of wheel making should be changed to meet the present conditions of service, correct information on that point should be welcomed by all concerned.

At present prices paid for chilled wheels no one can question the impracticability of making wheels much different from present quality. The M. C. B. rules establish

the price for new 33 in. wheels used for repairs regardless of weight at \$9 each, and the credit to be given for one 33 in. scrap wheel removed at \$4.75, leaving \$4.25 for the company supplying the wheels, out of which all expenses, including making of inspections and tests, must be provided.

We are informed that the net result is that the chilled wheel makers receive less than $\frac{1}{2}$ cent per lb. and an equal weight of scrap car wheels free as the maximum price paid for wheels even by the leading railroads, and in many cases the price is considerably less. It is manifest that about all that the wheel makers can do is to recast the old wheels into new ones and no doubt depend on the addition of ferromanganese to make wheels that will stand the drop and thermal tests.

Railroad officials have been investigating this matter for a number of years and particularly in the past four or five years. Whether their claim that the chilled wheel does not give satisfactory service under heavy equipment is warranted or not, it appears to be made more widely from year to year. The extensive trials of rolled steel wheels under heavy equipment also bear out the fact that railroads are seeking better wheels if they can be found. Certainly railroad officials cannot claim their unwillingness to pay better prices for better chilled wheels, considering the departure made in the case of steel wheels.

The time seems to have arrived for the manufacture and use of better chilled wheels, if the use of this type of wheels is to be continued under heavy equipment; and we as makers of charcoal chilling irons are trying to do our part in meeting the need of proper material for a demand which we believe will come, if indeed it has not already arrived.

Mr. Outerbridge's article will probably be quoted by those who approve present conditions in the manufacture and use of chilled wheels but it seems to us to contain in itself the fatal admission that under the practice he recommends the quality of chilled metal in tread and flange will be inferior, although the quality of the unchilled metal may be satisfactory. This is precisely the condition that exists to-day and for which the makers of chilled wheels must find the remedy if it can be found.

SUPERIOR CHARCOAL IRON COMPANY.

J. C. HOLT, Vice-President.

GRAND RAPIDS, MICH.

A Skeptic on Some Efficiency Figures

To the Editor: In the *American Magazine* for March, Ray Stannard Baker introduces to a section of the public "Frederick W. Taylor, Scientist in Business Management." Immediately following this article is a long paper by Mr. Taylor on "Scientific Management." Mr. Baker's account of Mr. Taylor is so eulogistic and so well supported by eminent authority that one turns to Mr. Taylor's article predisposed to accept what he says as the latest and most scientific statement on the very important subject of how to conduct great business enterprises in the most efficient and economic manner. Greatly to my surprise, however, I found the particular example cited by Mr. Taylor actually impossible of accomplishment, as I think what follows will demonstrate. In order to do full justice to Mr. Taylor, I quote what he says:

One of the first pieces of work undertaken by us, when the writer started to introduce scientific management into the Bethlehem Steel Company, was to handle pig iron. The opening of the Spanish war found some 80,000 tons of pig iron piled in small piles in an open field adjoining the works. . . . A railroad switch was run into the field right along the edge of the piles of pig iron. An inclined plank was placed against the side of a car and each man picked up from his pile a pig of iron weighing about 92 lb., walked up the inclined plank, and dropped it on the end of the car.

This gang was loading on the average about 12½ long tons per man per day. We were surprised to find, after a scientific study of the men at work, that a first-class pig iron handler ought to handle between 47 and 48 long tons per day, instead of 12½ tons.

A man named Schmidt was, after examination, selected to test the theory that with intervals of rest (time

not given the handler of the pigs could do about four times more work than by the old method of continuous labor. Mr. Taylor describes what happened as follows:

Scam started in to work, and all day long, and at regular intervals, was told by the man who stood over him with a watch, "Now pick up a pig and walk. Now sit down and rest. Now walk. Now rest," &c. He worked when he was told to work and rested when he was told to rest, and at half-past five in the afternoon had his 47½ tons loaded on the car. And he practically never failed to work at this pace and to do the task that was set him during the three years that the writer was at Bethlehem.

To test the accuracy of these statements, it is only necessary to restate the problem in hours and minutes of work. Is it possible for one man to handle, in the manner stated, about 1050 pigs of iron (equaling 96,600 lbs.) per working day?

The length of the work day is not stated in Mr. Taylor's article, but, as he says the job was finished at half past five, it was probably 9½ hours. This, however, does not allow for the rest periods. Assuming that these were not less than 1½ hours for the whole day (and this is probably less than Mr. Taylor required), this would leave 8 full hours, or 480 minutes, of working time. To handle the necessary number of pigs of 92 lbs. each to make up the 47½ tons that were loaded daily would require the handler to carry up the plank and deposit on the car very nearly 2¼ pigs per minute. It would be physically impossible for any man to continuously work at this rate, even with Mr. Taylor's rest periods.

ROCHESTER, N. Y.

ROBERT MATHEWS.

Explanation by Mr. Taylor

The following statement will appear in the book on "The Principles of Scientific Management," which will be published by Harper & Brothers, New York, April 20:

"Many people have questioned the accuracy of the statement that first-class workmen can load 47½ tons of pig iron from the ground on a car in a day. For those who are skeptical, therefore, the following data relating to this work are given:

"1. That our experiments indicated the existence of the following law: A first-class laborer, suited to such work as handling pig iron, could be under load only 42 per cent. of the day and must be free from load 58 per cent. of the day.

"2. That a man in loading pig iron, from piles placed on the ground in an open field on a car which stood on a track adjoining these piles, ought to handle (and that they did handle regularly) 47½ long tons (2240 lb. per ton) per day.

"That the price paid for loading this pig iron was \$9.10 cents per ton, and that the men working at it averaged \$1.85 per day, whereas in the past they had been paid only \$1.15 per day.

"In addition to these facts the following are given:

47½ long tons = 106,400 lb. of pig iron per day
At 92 lb. per pig, = 1156 pigs per day
42 per cent. of a day under load = 600 min. = 0.42 = 252 min. under load
252 min. = 1150 pigs = 0.22 min. per pig under load.
A pig iron handler walks on the level at the rate of 1 ft. in 0.006 min.

"The average of distance of the piles of pig iron from the car was 36 ft. It is a fact, however, that many of the pig iron handlers ran with their pig as soon as they reached the inclined plank. Many of them also would run down the plank after loading the car. So that when the actual loading went on, many of them moved at a faster rate than is indicated by the above figures. Practically the men were made to take a rest, generally by sitting down, after loading 10 to 20 pigs. This rest was in addition to the time which it took them to walk back from the car to the pile. It is likely that many of those who are skeptical about the possibility of loading this amount of pig iron do not realize that while these men were walking back they were entirely free from load, and that therefore their muscles had, during that time, the opportunity for recuperation. It will be noted that, with an average distance of 36 ft. of the pig iron from the car, these men walked about 8 miles under load each day and 8 miles free from load."

Dr. R. W. Raymond Resigns

At a joint meeting of the Board of Directors and of the Council of the American Institute of Mining Engineers Dr. R. W. Raymond tendered his resignation as secretary. He has been relieved from the many executive and administrative duties, which have been increasing steadily, and which with the suggested extensions of the activity of the Institute must further multiply. Dr. Raymond has been appointed secretary emeritus of the Council, the Institute retaining his services for special editorial and other duties for which he is so well qualified by training and experience. Dr. Raymond, one of the founders of the Institute in 1871, was elected vice-president and became president in that year, following David Thomas, who resigned because his advanced age did not enable him to perform the duties of his office to his own satisfaction. He was annually re-elected a president in 1872, 1873 and 1874. In 1883 he was appointed secretary to succeed Dr. T. M. Drown, who had resigned. He was elected secretary in February, 1884, and has been annually re-elected since then.

Dr. Joseph Struthers, who has been connected with the Institute as assistant secretary for eight years, and as editor for five of these years, has been elected secretary of the Board of Directors and has been appointed secretary of the Council. Dr. Struthers was editor of the *Mineral Industry* for the years 1900-1903 (Vols. 8, 9, 10 and 11), and prior to that time was for 15 years on the teaching staff of the department of metallurgy of the School of Mines, Columbia University. He has been field assistant of the United States Geological Survey, in charge of the preparation of numerous reports for the *Mineral Resources*, and special agent of the United States Census in a like capacity. In connection with the work of the Institute, he is a member and treasurer of the Board of the United Engineering Society, chairman of its House Committee and secretary of the Library Conference Committee, which has general supervision of the libraries of the engineering societies in the United Engineering Society Building, 29 West Thirty-ninth street, New York City.

The Dille & McGuire Mfg. Company's Expansion.—

This company, whose factory for the production of lawn mowers is at Richmond, Ind., has under construction a new plant which will occupy an entire city block. The new buildings are being erected on ground adjoining the old plant, which in the future will be used for warehouse and storage purposes. The building of the new plant will in no way interfere with the present one, which will be operated to the end of the season in order to complete the orders now in hand. Six new and separate buildings will be erected, connecting where necessary by metal runways or bridges, all being under cover. The new buildings will be numbered, as follows: No. 1, machine shop; No. 2, office; No. 3, paint and handle department; No. 4, oil and paint vault; No. 5, blacksmith shop and forming department; No. 6, grinding department.

The Pittsburgh Foundrymen's Association.—

The monthly meeting of this society was held at Fort Pitt Hotel, on the evening of April 3. Professor Crabtree of the Carnegie Technical Schools of Pittsburgh delivered an address on "Experiments in Testings to Make a New Style of Iron Casting." The members of the association are busy making plans to entertain the American Foundrymen's Association on the occasion of its convention to be held in Pittsburgh, May 23 to 26.

The Steel Products Company, Columbus, Ohio, recently incorporated, has leased the plant of the Taylor Steel Company, Plain City, Ohio, which it is now operating. It will make a specialty of alloy steel castings. Among other products will be vanadium, titanium, manganese, chromium, nickel and carbon steel castings. F. L. Sessions is president, and A. V. Taylor is vice-president and secretary.

Pig Iron Production

Another Sharp Increase in March

Active Capacity April 1 About 1,500,000 Tons a Year More Than on March 1

As in February, the March output of the blast furnaces of the country reflects the enlarged operations of the steel works as the result of the buying movement that started in mid-January. The production of coke and anthracite iron last month was 2,188,161 gross tons, or 70,586 tons a day, against 64,090 tons a day in February. The net gain in blast furnaces active was 9 for the month, 14 having blown in and 5 having gone out. As in February, the gain was wholly due to the increased pig iron production of the steel companies. The number of merchant furnaces active remained the same, four blowing in and four blowing out. The steel works furnaces produced 1,518,063 tons last month, or 48,970 tons a day, a gain of 6621 tons a day over the February rate. The merchant furnaces produced 21,616 tons a day, against 21,741 tons a day in February, a loss of 125 tons.

The daily capacity of the 231 furnaces in blast April 1 was 70,752 tons, against 66,562 tons a day for 222 furnaces on March 1. Production is now at the rate of 25,950,000 tons a year, allowing for charcoal iron. This represents a gain of 1,500,000 tons a year in the past month, the rate on March 1 being 24,450,000 tons. Production is now at substantially the rate of the early summer of 1909 and of the same period in 1910.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with March, 1910, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.

	Steel Works.	Merchant.	Total.
March, 1910.....	56,113	28,346	84,459
April	55,663	27,129	82,792
May	52,235	24,867	77,102
June	51,637	23,879	75,516
July	47,183	22,122	69,305
August	46,534	21,429	67,963
September	47,007	21,536	68,542
October	45,794	21,726	67,520
November	41,427	22,232	63,659
December	35,909	21,440	57,349
January, 1911.....	36,401	20,351	56,752
February	42,349	21,741	64,090
March	48,970	21,616	70,586

March Output by Districts

The table below gives the production of all coke and anthracite furnaces in March and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.

	November. (30 days)	December. (31 days)	January. (31 days)	February. (28 days)	March. (31 days)
New York....	142,810	142,674	136,519	131,238	157,624
New Jersey....	18,284	15,437	12,627	6,006	5,869
Lehigh Valley..	62,161	68,531	68,324	56,367	69,263
Schuylkill Val..	54,642	51,466	60,592	57,321	67,634
Lower Susquehanna and Lebanon Val.	50,370	51,888	43,942	42,729	46,980
Pittsburgh dis..	445,083	397,379	409,698	424,517	531,521
Shenango Val..	82,904	82,706	82,922	86,908	109,799
West. Penn....	87,568	81,957	94,118	96,616	120,464
Md., Va. and Kentucky....	58,772	59,945	56,424	57,759	61,628
Wheeling dis..	84,390	74,225	77,715	95,571	135,775
Mahoning Val..	180,717	162,349	174,318	201,624	203,006
Central and North. Ohio..	108,599	112,662	127,579	144,806	170,914
Hocking Valley, Hanging Rock and S.W. Ohio.	25,008	29,959	33,253	32,396	35,173
Mich., Minn., Mo., Wis., Col., Wash.	78,927	68,313	60,941	61,406	86,791
Chicago dis....	239,469	197,340	165,826	155,498	213,638
Alabama	165,512	154,025	128,188	118,594	143,751
Tenn., Georgia and Texas....	24,764	26,961	26,340	25,153	28,331
Total.....	1,909,780	1,777,817	1,759,326	1,794,509	2,188,161

The list of furnaces blown in in March includes one Bethlehem (new) and one Crane in the Lehigh Valley, one Clairton in the Pittsburgh district, one New Castle in the Shenango Valley, two Cambria in western Pennsylvania, Princess in Virginia, one Ohio in the Mahoning Valley, one Joliet, one South Chicago and one Gary in the Chicago district, one Detroit in Michigan, and one

Pioneer and one Ensley in Alabama. Furnaces blown out in the month preceding April 1 were one Lackawanna and Genesee in New York, McKeefrey in the Mahoning Valley, Ironton in the Hanging Rock district and one Rockwood in Tennessee.

Capacity in Blast April 1 and March 1

The following table shows the daily capacity of furnaces in blast April 1 and March 1. These figures are based largely on the performance of the furnaces in the past two months:

Coke and Anthracite Furnaces in Blast, and Capacity in Gross Tons.

Location of furnaces.	Total number of stacks.	April 1. Number in blast.	Capacity per day.	March 1. Number in blast.	Capacity per day.
New York:					
Buffalo	17	13	4,375	14	4,665
Other New York....	7	2	314	3	529
New Jersey.....	7	1	190	1	156
Spiegel	2	..	....	..	....
Pennsylvania:					
Lehigh Valley.....	24	13	2,625	11	1,929
Spiegel	3	1	88	1	85
Schuylkill Valley..	16	8	2,182	8	2,178
Low. Susquehanna..	7	4	726	4	716
Lebanon Valley.....	10	5	789	5	810
Pittsburgh dis....	50	39	16,725	38	15,620
Spiegel	3	2	295	2	373
Shenango Valley....	20	11	3,638	10	3,250
Western Penn.....	27	13	4,095	11	3,375
Maryland	4	3	806	3	820
Wheeling district....	14	12	4,380	12	4,350
Ohio:					
Mahoning Valley....	23	17	6,590	17	6,425
Central and North..	22	14	5,484	14	5,232
Hocking Val., Hanging Rock and S. W. Ohio.....	15	7	898	8	1,157
Illinois and Indiana..	34	19	7,365	16	6,275
Michigan, Wisconsin and Minnesota.....	10	6	1,380	5	1,093
Colorado, Missouri and Washington	7	4	1,042	4	1,104
The South:					
Virginia	23	9	965	8	937
Kentucky	5	2	285	2	344
Alabama	46	19	4,710	17	4,235
Tenn. and Georgia....	20	7	805	8	905
Totals.....	416	231	70,752	222	66,562

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel making iron is included in these figures, together with ferromanganese, spiegeleisen and ferro-silicon. These last, while stated separately, are also included in the columns of "total production":

Production of Steel Companies—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1909.	1910.	1911.	1910.	1911.
January	1,117,823	1,773,201	1,128,448	19,538	8,360
February	1,073,363	1,620,539	1,185,782	21,396	12,821
March	1,140,553	1,739,212	1,518,063	25,591	11,784
April	1,093,092	1,669,898	.....	22,304	.....
May	1,256,418	1,619,283	.....	26,529	.....
June	1,365,527	1,549,112	.....	27,680	.....
July	1,508,762	1,462,689	.....	22,924	.....
August	1,591,991	1,442,572	.....	25,756	.....
September	1,660,839	1,410,221	.....	15,151	.....
October	1,769,094	1,419,624	.....	8,500	.....
November	1,689,994	1,242,804	.....	9,032	.....
December	1,768,799	1,113,174	.....	12,178	.....

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.	1911.
January	71,149	37,718	57,975	84,148	56,752
February	73,038	37,163	60,976	85,616	64,090
March	71,821	39,619	59,232	84,459	70,586
April	73,885	38,289	57,962	82,792	.....
May	74,048	37,603	60,753	77,102	.....
June	74,486	36,444	64,656	75,516	.....
July	72,763	39,287	67,793	69,305	.....
August	72,594	43,851	72,546	67,963	.....
September	72,783	47,300	79,507	68,476	.....
October	75,386	50,554	83,858	67,520	.....
November	60,937	52,595	84,917	63,659	.....
December	39,815	56,158	85,022	57,349	.....

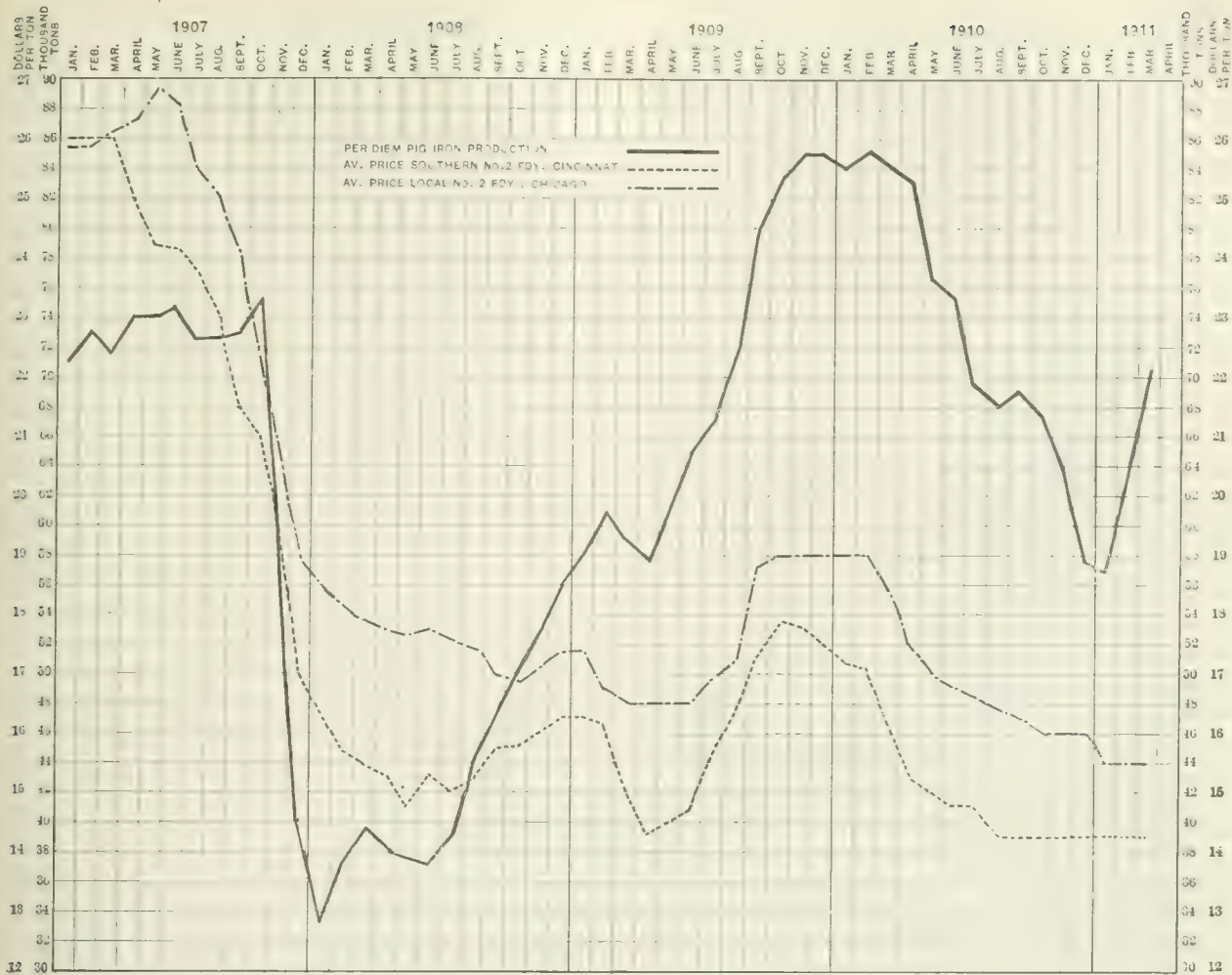


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to April 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron Delivered at Chicago.

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou. No. 2 Cln.	Loc. No. 2 Chl.	Sou. No. 2 Cln.	Loc. No. 2 Chl.	Sou. No. 2 Cln.	Loc. No. 2 Chl.	Sou. No. 2 Cln.	Loc. No. 2 Chl.
Jan.	26.00	25.85	16.15	18.45	16.25	17.35	17.25	19.00
Feb.	26.00	25.85	15.75	18.16	16.13	16.75	17.06	19.00
March	26.00	26.10	15.50	17.85	15.05	16.50	16.30	18.30
April	25.06	26.35	15.20	17.73	14.25	16.50	15.37	17.50
May	24.25	26.85	14.75	17.63	14.50	16.50	15.00	17.06
June	24.10	26.60	15.25	17.73	14.70	16.50	14.85	16.75
July	23.85	25.55	15.00	17.55	15.75	17.00	14.75	16.56
Aug.	23.00	24.85	15.25	17.35	16.38	17.13	14.31	16.50
Sept.	21.50	24.10	15.65	17.05	17.35	18.70	14.25	16.40
Oct.	20.95	22.45	15.75	16.85	17.88	19.00	14.25	16.06
Nov.	19.50	20.66	16.00	17.10	17.75	19.00	14.25	16.00
Dec.	17.00	18.80	16.25	17.35	17.45	19.00	14.25	16.00
Jan., 1911, 14-25,	15.50;		Feb., 14.25,	15.50;	Mch., 14.25,	15.50.		

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.
January	2,205,607	1,045,250	1,797,560	2,608,605
February	2,045,068	1,077,740	1,707,340	2,397,254
March	2,226,457	1,228,204	1,832,194	2,617,949
April	2,216,558	1,149,602	1,738,877	2,483,763
May	2,295,505	1,165,688	1,833,330	2,390,180
June	2,234,575	1,092,131	1,930,866	2,265,478
July	2,255,660	1,218,129	2,103,431	2,148,442
August	2,250,410	1,359,831	2,248,930	2,106,847
September	2,183,487	1,418,998	2,385,206	2,056,275
October	2,336,972	1,567,198	2,599,541	2,093,121
November	1,828,125	1,577,854	2,547,508	1,909,780
December	1,234,279	1,740,912	2,635,680	1,777,817
January, 1911, 1-15,	1,759,326;		February, 1911, 1-15,	1,794,509;
1911, 1-15,	1,188,161.			

The Buffalo Forge Company, Buffalo, N. Y., reports the receipt of a contract from the Hazel-Atlas Glass Company, Wheeling, W. Va., for the installation of one of its natural gas heating systems. This system consists of a motor driven fan with air distributing ducts and a natural gas heater with specially designed heating and mixing chamber in which the products of combustion are consumed. A moderate temperature is maintained in the heating chamber, with a resulting increase in durability. This system, which uses the gas fuel direct without an

intermediary boiler, has proved very efficient. A number of installation have been made in the natural gas section of Pennsylvania and West Virginia, including some repeat orders.

Alaska Copper Coming.—The last spike completing the Copper River & Northwestern Railroad between Cordova on tidewater and Kennicott, Alaska, where the Bonanza copper mine is situated, was driven March 30. The first ore will be shipped from Kennicott for the Tacoma smelter this week. Work on the railroad, which is 197 miles long and cost \$20,000,000, was begun November 15, 1907. Its construction is one of the most remarkable engineering feats of modern times. Beginning May 1, two cargo steamships will be operated between Tacoma and Cordova, bringing Bonanza ores to the smelter.

The Continental Radiator & Foundry Company, whose general office is at 1409-1411 Olive street, St. Louis, Mo., and present foundry at South St. Louis, is planning the erection of a new foundry at a location which has not yet been definitely decided. It is proposed to build a foundry for the manufacture of cast iron radiators with a capacity of 3,000,000 to 4,000,000 ft. per year. The building and equipment will cost about \$175,000, and it is proposed to make it the most complete of the kind in the West. The president of this company is Hamilton A. Forman; vice-president and general manager, Lewis F. Ostrander; secretary and treasurer, John J. Ostrander.

The number of active blast furnaces in the Pittsburgh district shows a net increase of one between March 1 and April 1, the total April 1 being 41 out of 53. One Clairton furnace was blown in in March. Of the Edgar Thomson group nine furnaces are now in blast, the same number as on March 1. One furnace was blown in March, but another was blown out April 1.

Pig Iron Output in Two Panics

A Parallel Between the Period Following 1893 and That Following 1907

The accompanying reproduction of a chart prepared by Noah H. Swayne, 2nd, resident manager of Rogers, Brown & Co., Philadelphia, Pa., makes a most interesting comparison of the production of pig iron in the years 1893 to 1899 and 1907 to 1911—the last two panic periods. The curves represent the average daily production for each month in the respective years and are based on the monthly statistics of *The Iron Age*. It is interesting to note the parallelism of the different changes in the two periods. While the panic of 1893 began about five months earlier in the calendar year than that of 1907, the dips and peaks in the upper curve follow with a certain regularity those in the lower one about three months later. It is to be noted that in 1893 (lower curve) from a record rate of about 26,000 tons in May, it required five months to reach the low level of that initial decline, which was

an upward movement would be seen in the next few months, to be followed by about six months of irregularity, but with a declining tendency and then succeeded by an upward movement to a new high record.

Another interesting feature of the chart is that the advances and declines, although represented by very different totals, have followed approximately the same percentage basis and thus give some support to the cycle view, which there has been so much of a disposition to ignore in connection with the recovery from the panic of 1907. In spite of the differences in the causes of the panics of 1893 and 1907 and in after-panic influences in the respective periods, there is much in the pig iron production curves suggesting that recovery from one panic has certain phases which may with reason be looked for in the recovery from another.

The Lakeside Forge & Wrench Company's property at Erie, Pa., will be offered for public sale April 18, at 2 o'clock p.m., on the premises, by M. L. Davis, receiver. The property to be sold comprises all the land and plant, including the personal belongings, bills and accounts re-

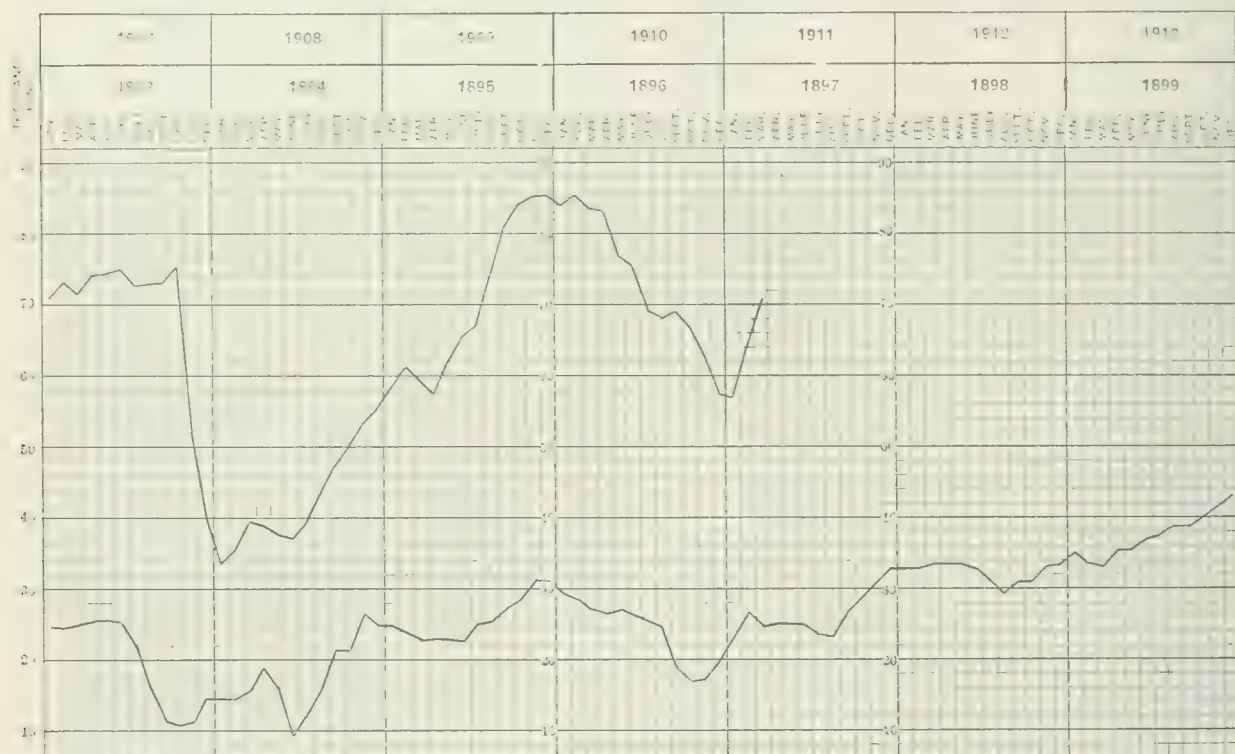


Chart Showing the Course of Pig Iron Production in the United States in the Years Following the Panic of 1893 (Lower Curve) and in the Years Following the Panic of 1907 (Upper Curve).

in October, with an approximate rate of 11,000 tons. In 1907, shown in the upper curve, the output in October was the high water mark, about 75,000 tons daily, but the decline was more precipitate, three months being sufficient to reach the low rate of that decline, approximately 34,000 tons in January, 1908. Recovery was gradual, both during 1894 and 1908, but the movement in both instances reached another peak within 12 months. November was the high point in 1894 at over 26,000 tons, while the peak in the later period was reached early in 1909, three calendar months later. Short periods of decline ensued in each case, after which there was again a steady upward climb until November, 1895, in the first instance, when a new high record of approximately 31,000 tons was made. From the upper curve it will be noted that the after-panic high point was again reached three months later than in the earlier depression, or in February, 1910, when we were operating at a rate of 86,000 tons a day. Declines followed, as is shown by both curves, the low ebb in the first being in October, 1896, with a rate of 16,500 tons. In the second curve, again three months later than in that for the nineties, the low point is observed in January, 1911, with a rate of about 56,500 tons. Should the parallelism continue with the same degree of regularity as indicated above,

receivable, &c. The land comprises about 2 acres, on which are erected a 50 x 180 ft. factory building, a 70 x 176 ft. factory building, a 76 x 76 ft. forge shop, together with boiler, oil and store houses. Among the equipment to be sold are two steam hammers, four drop hammers, four trimming presses and the usual machinery for finishing forgings.

The Newport Rolling Mill Company, Newport, Ky., is greatly pleased with the interest shown in its exhibit at the Railway Appliance Show, held in the Coliseum, Chicago, March 20 to 25. A full line of the sheets rolled by this company was displayed and, in addition, a comparative test was made between its genuine open hearth iron and other sheet metals. This test was conducted to demonstrate how genuine open hearth iron sheets will stand up under corrosive influences. The rust resisting qualities of the company's open hearth iron is causing it to be used for boiler tubes, corrugated culverts, tanks, stacks, stoves and ranges, cornices, skylights, eaves troughs, conductor pipe, &c., for which purposes it is said to give excellent results.

Corrigan, McKinney & Co. blew out their Genesee Furnace at Charlotte, N. Y., last month for relining.

Southern Companies May Merge

Southern Iron & Steel Company and Alabama Consolidated Coal & Iron Company

As has been well known, negotiations for the consolidation of two important Southern iron producing companies—the Southern Iron & Steel Company and the Alabama Consolidated Coal & Iron Company—have been in progress for some weeks. It is now stated that the controlling interests have decided that such a merger is advisable, and that bankers have given assurance that funds will be provided to carry present plans into effect and to provide working capital. What remains, in order to make the plans effective, is the consent of certain bondholders of the Southern Iron & Steel Company to accept in lieu of their bonds preferred stock in the consolidation. The company announced on April 1 that in view of the impending readjustment in its affairs the interest on its bonds due April 1 and amounting to \$143,000 would not be paid. It is understood, however, that no steps will be taken by the bondholders in view of this default, pending the arrangements for the merger. The Alabama Consolidated Coal, Iron & Steel Company, with a nominal capital of \$2000, was incorporated in New Jersey, March 10, to be the holding company for the merger. Its capital will be increased later to \$10,000,000 preferred and \$20,000,000 common stock.

The Southern Iron & Steel Company was formed in March, 1909, as a reorganization of the Southern Steel Company, which went into a receiver's hands in 1907. Its capitalization consists of \$10,000,000 first and refunding mortgage 20-year gold bonds (of which \$8,000,000 was issued, \$2,000,000 of these replacing underlying first mortgage bonds); \$7,000,000 noncumulative 6 per cent. preferred stock and \$10,000,000 common stock. The controlling interest is in the hands of English capitalists represented by Cecil Grenfell, who came to New York some months ago to act as chairman of the company following the resignation of the president, W. H. Hassinger of Birmingham, Ala. The company's properties are those formerly owned by the Southern Steel Company, the Chattanooga Iron & Coal Company and the Lacey-Buek Iron Company, as well as the entire capital stock of the Georgia Steel Company, owning a blast furnace at Rising Fawn, Ga., and ore and other mineral properties. The other three blast furnaces of the company are at Alabama City, Ala.; Trussville, Ala., and Chattanooga, Tenn. It has six open hearth furnaces at Alabama City, and is now operating at the same plant the wire, rod and fencing mills completed in 1910. It has 918 coke ovens, three brown ore mines, five red ore mines and three limestone quarries. Its four blast furnaces have an annual capacity of about 250,000 tons. Its wire plant at Alabama City is credited with a capacity of 100,000 tons a year of wire rods, 130,000 tons of wire and 1,000,000 kegs of wire nails.

The Alabama Consolidated Coal & Iron Company was organized by Joseph H. Hoadley and others July 19, 1899. Its capital consists of \$1,250,000 of preferred and \$2,500,000 of common stock. It has four blast furnaces—two Clifton furnaces at Ironaton, Ala., with 100,000 tons capacity a year, and two Etowah furnaces at Gadsden, Ala., with 150,000 tons capacity a year. It owns red ore mines at Hammond, Ala., 5 miles east of Birmingham; also red ore properties near Attalla and Gadsden, Ala. It has coal properties in Tuscaloosa County, Ala., on which there are 915 coke ovens. At Lewisburg, Ala., near Birmingham, are two coal openings and 350 coke ovens. The company also has considerable acreage of brown ore and coal lands and 300 acres of limestone property between its Clifton and Etowah furnaces, on which it operates a quarry.

The Union Steel Casting Company's Extensions.—

This company, whose plant is at Sixty-first and Butler streets, Pittsburgh, will erect a modern steel casting plant on the land it recently purchased, adjoining its present property. Bids are now being taken on several steel buildings. The main building aggregating 80,000 sq. ft.

is to contain two 35-ton, two 25-ton, one 20-ton, six 10-ton and two 5-ton Morgan electric traveling cranes; two acid lined 25-ton furnaces to be built by William Swindell & Brothers, Pittsburgh; one charging machine, not selected, besides a full line of other equipment for the manufacture of steel castings for rolling mills, machinery, vanadium steel and steel locomotive frames, driving wheel centers, Union all steel truss roof, annealing boxes, &c. Patterns will be stored in a separate building, and there will be a power plant of 600 h.p. electrical equipment. Ground has been broken and the new addition is expected to be ready for operation in September. On April 18, the stockholders will vote on an increase in the capital stock from \$1,500,000 to \$2,500,000, part of which will be used to finance these improvements, the balance to be held in the treasury.

The Traffic Club of Pittsburgh

The ninth annual dinner of the above named organization was held in the Fort Pitt Hotel, Pittsburgh, on the evening of March 30 and was in every way the most successful in its history. About 600 guests partook of the banquet, Willis L. King, vice-president of the Jones & Laughlin Steel Company, serving as toastmaster. Mr. King stated that, when serving in a similar capacity several years ago, he took occasion to criticize the railroads for some of their actions and felt called upon at this time to do the same. He stated that if the railroads would get together and pass a vote of confidence in the American people it would be better for all concerned. Mr. King's remarks were listened to with very close attention and he was frequently applauded. Other interesting speakers were George F. Baer, president of the Philadelphia & Reading Railroad Company; James T. McCleary, secretary of the American Iron and Steel Institute, and Ex-Governor Frank S. Black of New York. Robert Mather, chairman of the Westinghouse Electric & Mfg. Company; J. A. Hatfield, president of the American Bridge Company; O. C. Gayley, vice-president of the Pressed Steel Car Company, and A. C. Dinkey, president of the Carnegie Steel Company, were present as guests of the club.

Compensation Legislation in New Jersey and Ohio

The Edge workmen's compensation bill passed the House of the New Jersey Legislature by unanimous vote April 3, and became a law. Its main provisions are explained elsewhere in this issue. It makes the employer's liability for accident compensation a matter of contract between employer and employee.

The special House committee of the Ohio General Assembly, which has been considering the Green-Thomas and Black bills for workmen's compensation, has adopted a compromise on the feature relating to payments by employers and employees into the State insurance fund. The Black bill, endorsed by manufacturers, provides that the employees pay 25 per cent., while the Thomas bill, representing organized labor, puts the entire assessment on employers. The compromise provides that the employers pay 90 per cent. and employees 10 per cent. Another compromise amendment permits waiving the right to compensation from the insurance fund in favor of a suit in court only where it is shown that the employer was grossly negligent.

The Foundrymen's Club of Cincinnati held its quarterly meeting at the Havlin Hotel the evening of March 30. Over 30 members enjoyed a banquet, with Paul A. Gosiger acting as toastmaster. Afterward the election of officers for the ensuing year occurred, and the following were chosen: President, William Goodman, Laidlaw-Dunn-Gordon Company; vice-president, A. W. Williamson, Peck, Williamson Company, and secretary and treasurer, A. G. Wessling, Wessling Bros. Foundry Company. George Elliott, Lunkenheimer Company, delivered a lecture on the "Composition and Structure of Iron Alloys," illustrating his talk with stereopticon views.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Apr. 5, Mar. 29, Mar. 1, Apr. 6,
1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton:

Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$18.00
Foundry No. 2, Valley furnace..	13.75	13.75	13.75	15.75
Foundry No. 2, Southern, Cincinnati.....	11.25	11.25	11.25	15.75
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	12.50
Foundry No. 2, local, Chicago..	15.50	15.50	15.50	18.00
Basic, delivered, eastern Pa....	15.25	15.25	15.00	17.75
Basic, Valley furnace.....	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	18.40
Gray forge, Pittsburgh.....	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00

COKE, CONNELLSVILLE.

Per Net Ton, at oven:

Furnace coke, prompt shipment.	1.60	1.60	1.45	1.95
Furnace coke, future delivery...	1.75	1.75	1.60	2.15
Foundry coke, prompt shipment	2.00	2.00	2.10	2.50
Foundry coke, future delivery...	2.25	2.25	2.25	2.75

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	23.00	23.00	23.00	27.00
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh.....	29.00	29.00	29.00	33.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.50	14.50	15.50	18.50
Iron rails, Philadelphia.....	18.00	18.50	18.50	20.50
Car wheels, Chicago.....	13.25	13.25	13.25	17.00
Car wheels, Philadelphia.....	13.25	14.00	14.00	16.75
Heavy steel scrap, Pittsburgh..	13.75	14.00	14.75	17.00
Heavy steel scrap, Chicago.....	11.50	11.50	12.00	14.75
Heavy steel scrap, Philadelphia.	13.50	13.75	14.50	16.50

FINISHED IRON AND STEEL,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.37½	1.37½	1.37½	1.55
Common iron bars, Chicago....	1.25	1.27½	1.27½	1.55
Common iron bars, Pittsburgh..	1.35	1.35	1.35	1.65
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York...	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York...	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE.

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*.....	1.80	1.80	1.75	1.85
Cut nails, Pittsburgh.....	1.70	1.70	1.60	1.85
Barb wire, galv., Pittsburgh*...	2.10	2.10	2.05	2.15

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.50	12.50	12.75	13.75
Electrolytic copper, New York..	12.25	12.25	12.37½	13.25
Spelter, New York.....	5.55	5.60	5.70	5.60
Spelter, St. Louis.....	5.35	5.45	5.55	5.45
Lead, New York.....	4.45	4.45	4.40	4.40
Lead, St. Louis.....	4.30	4.30	4.25	4.25
Tin, New York.....	41.75	41.25	42.25	32.90
Antimony, Hallett, New York...	9.12½	9.12½	9.25	8.25
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter, 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¾ in. and up, 1.40c. to 1.45c., net;

angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zeos, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel.	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	63	63	49	43	
1½ in.....	75	63	71	59	
¾ to 1½ in.....	79	69	75	65	
2 to 3 in.....	80	70	76	66	
	Lap Weld.				
2 in.....	76	66	72	62	
2½ to 4 in.....	78	68	74	64	
4½ to 6 in.....	77	67	73	63	
7 to 12 in.....	75	59	71	55	
13 to 15 in.....	51½				
	Butt Weld, extra strong, plain ends, card weight.				
1½ in.....	69	59	65	55	
1½ in.....	74	68	70	64	
¾ to 1½ in.....	78	72	74	68	
2 to 3 in.....	79	73	75	69	
	Lap Weld, extra strong, plain ends, card weight.				
2 in.....	75	69	71	65	
2½ to 4 in.....	77	71	73	67	
4½ to 6 in.....	76	70	72	66	
7 to 8 in.....	69	59	65	55	
9 to 12 in.....	64	54	60	50	
	Butt Weld, double extra strong, plain ends, card weight.				
1½ in.....	64	58	60	54	
¾ to 1½ in.....	67	61	63	57	
2 to 3 in.....	69	63	65	59	

THE IRON AND METAL MARKETS

Lap Weld, double extra strong, plain ends, card weight.			
2 in.	65	59	61 55
2½ to 4 in.	67	61	63 57
4½ to 6 in.	66	60	62 56
7 to 8 in.	59	49	55 45

Plugged and Reamed.

1 to 1½, 2 to 3 in.	Butt Weld	Will be sold at two (2) points lower than merchant or card weight pipe, Butt or Lap Weld as specified.	
---------------------	-----------	--	--

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	45
1½ to 2½ in.	51	43
2½ in.	53	48
2½ to 5 in.	69	55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29 to \$30 per gross ton. Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.							
Nos.	0 to 9	10	11	12	12½	13	14 15 16
Annealed	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20 2.30
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.80 2.90

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2½
27 to 36	80 and 5
Galvanized:	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72½ and 10
27 to 36	72½
Coppered or Lluor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; 5/8 in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, April 5, 1911.—(By Telegraph.)

Pig Iron.—Inquiries for pig iron in the past week have been very light. There does not seem to be any inquiry whatever for Bessemer iron. The agreement of the Valley furnaces, which also embraces several of the prominent dealers, to hold Bessemer iron at \$15, minimum, at furnace, seems to be working out very well, as far as maintaining prices is concerned, but we do not hear of actual sales, except that mentioned in our report sent by mail. A fair amount of foundry iron is changing hands, most of it at \$14, Valley furnace, but \$13.75 can still be done with several producers for prompt shipment. One of the prominent ingot mold makers has recently sold 4500 tons of ingot molds for delivery in second and third quarters, but covered on the Bessemer iron needed for them some time ago and will not be in the market for any more iron at present. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—New inquiry for steel is only for small lots, but consumers are specifying at a fairly liberal rate against their contracts. Regular prices are reported as being firmly held. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24, and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Generally speaking, March was a disappointment in the iron trade. New business has shown a falling off in the

last two or three weeks. An exception to this is found in the fact that the rail and billet sales department of the Carnegie Steel Company passed orders in March for the mills for 350,000 tons, an increase over February of about 50,000 tons. There is more pessimism to be found in the trade to-day than a month ago. The pig iron market is quiet, the only important transaction during the week being a reported contract made by the Valley Mold & Foundry Company with the Shenango Furnace Company at Sharpsville, Pa., by which the former will take upward of 10,000 tons of Bessemer iron per month over the next five months. The contract is to go into force July 1. The iron will be delivered in a molten state in ladles, and taken direct to the foundry of the Thomas D. West Foundry Company, where it will be made into ingot molds. The contract is on a sliding scale basis, the average price Bessemer iron per month, as determined by actual sales of 1000 tons or more, to rule. The Shenango Furnace Company has been furnishing basic iron to the Valley Mold & Foundry Company on a similar arrangement for some years. The average price of Bessemer iron for March has been given out as \$15, although there have hardly been enough sales to fix a price, and the average price of basic for the same month was \$13.75, Valley furnace. There is a fair amount of new inquiry for furnace and foundry coke, with prices ruling a little stronger, but the scrap trade is about dead. Consumers overbought a month or six weeks ago, and are now said to be rejecting scrap which ordinarily they would take in without any complaint. The yards of most consumers are filled up to the limit and prices of scrap are weak.

Ferromanganese.—There is little new inquiry. This material is now said to have reached the lowest prices ever touched. It is said that foreign 80 per cent. has sold in some cases below \$37, Baltimore. We quote \$37 to \$37.25, Baltimore, either for prompt shipment or for delivery over the remainder of this year. The freight rate from Baltimore to Pittsburgh is now \$1.95 a ton.

Ferrosilicon.—No important inquiries are in the market. We quote 50 per cent. at \$53, to \$53.50, f.o.b. Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—The market is dull with prices weak. We quote nominally best grades of muck bar made from all pig iron at \$29 to \$29.50, delivered at buyer's mill in Pittsburgh district.

Skelp.—No sales of moment have been made. We quote grooved steel skelp at 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—New inquiry is light and only for small lots. The supply at present seems heavier than the open market can absorb. We quote Bessemer, open hearth and chain rods at \$29 to \$30, Pittsburgh, but it is understood that very little business has been placed at the higher figure.

Steel Rails.—In the past week the Carnegie Steel Company received an order from a coal railroad for 5000 tons of standard sections and new orders and specifications for upward of 4000 tons of light rails. Its Edgar Thomson rail mills are now operating at about 50 per cent. of capacity, or slightly less, this having been the rate of operation of these mills for some months past. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The largest local car inquiry is still that of the Pittsburgh & Lake Erie, for 2000 steel cars. The Chicago, Burlington & Quincy is in the market for 1000 steel gondolas. The Pressed Steel Car Company has sold 120 ore cars of 60 tons capacity each to the Bingham & Garfield Railroad, Salt Lake City, Utah. The American Car & Foundry Company will build 1400 box cars, with steel underframes, for the Atlantic Coast Line, and 50 phosphate cars. The Seaboard Air Line has an inquiry out for 1000 box cars, with steel underframes, 200 phosphate cars, 30 cabooses and 9 passenger cars. The Pressed Steel Car Company has an order for 25 tanks, which will be shipped, knocked down to the National Railways of Mexico, and then built on cars after arrival at destination. The general demand for plates from boiler shops and other consumers is dull, and not more than 50 per cent. of plate mill capacity is active at present. We quote ¼ in. and heavier plates at 1.40c., Pittsburgh, and this price is said to be very well held.

Structural Material.—It now develops that the actual amount of material needed for the Quebec Bridge will be about 50,000 tons, made up of plates, shapes and steel bars, but there are very few eye bars. This material will be

THE IRON AND METAL MARKETS

Cast Iron.—Specifications for the specifications will not come forward for some months. The structural trade is very quiet. Local fabricating interests report that the present period is the dulllest for some months, only small orders, ranging from 100 up to 300 tons or less, having been received in the past week. Bids will be asked in a few days for the steel, probably 500 to 600 tons, for new buildings, for the United States Casting Company in this city. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—Conditions in this trade are not quite as satisfactory as they have been. New orders for tin plate are light. New specifications against contracts are not as heavy, although those for June shipment are not due until April 15. Recently several of the tin plate mills are said to have entered some contracts for delivery through fourth quarter of the year on the basis of \$3.70 per base box, while there was a verbal understanding some time ago that on business for fourth quarter all the mills were to ask 10c. advance, or \$3.80. What effect this breaking over by two or three of the mills will have on the general situation remains to be seen. The leading interest is operating this week to about 78 per cent. of its hot tin mill capacity. We quote 100-lb. coke plates at \$3.70 per base box, Pittsburgh.

Sheets.—New orders and specifications against contracts for sheets are showing some improvement, but March business was not up to expectations, by any means. There is also more disposition on the part of a few mills to grant slight concessions in prices to secure orders than existed in the trade about a month ago. This shading in prices is not general, by any means, but is closely confined to three or four points of delivery where competition for the business coming out is usually very keen. Regular prices on the different grades of sheets are given on a previous page.

Bars.—The new demand for steel bars is dull and specifications against contracts are not coming in as freely as they did a month or six weeks ago. As yet there have been no active negotiations with implement makers for their season requirements for the year beginning July 1. Prices on iron bars, which have been more or less demoralized for some time, are now reported to be a little firmer. We quote steel bars at 1.40c., and common iron bars at 1.35c. to 1.40c., Pittsburgh.

Shafting.—Fresh orders are only for small lots, while specifications against contracts are not active. When any attractive business comes up discounts are usually shaded. Regular discounts on cold rolled steel shafting are 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory.

Spelter.—New business is slack, while prices are weak. Prime grades of Western are quoted nominally at 5.30c., East St. Louis, equal to 5.42½c., Pittsburgh.

Hoops and Bands.—The demand is light. Specifications against contracts are coming in well from some sections, but not so freely from other points. Makers of hoops and bands are not operating to more than about 60 per cent. of capacity at present. We quote steel hoops at 1.45c. to 1.50c. and bands at 1.40c. extras on the latter as per the present steel bar card.

Merchant Steel.—New orders are only for such quantities as consumers actually require. Specifications against contracts in March, on the whole, showed a falling off as compared with February. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Like all other lines of finished material, the new demand is confined to small lots. Specifications against contracts are not satisfactory. Regular prices on structural rivets are 1.90c., and on boiler rivets 2c., but are shaded on desirable business.

Wire Products.—New orders and specifications against contracts continue heavy. This is, no doubt, the most active line in point of new business and shipment by the mills on the whole list of finished material. Leading mills are from two weeks to a month or more behind in shipments, especially on fencing wire, the demand for which is abnormally heavy. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.70, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—The price of the \$1.55 price on spikes, which held good only until March 31, railroads rushed in specifications against their contracts at a larger rate in the latter part of March, one leading spike maker reporting that it received specifications for railroad spikes in the last two weeks in March at the rate of 1200 to 1500 kegs per

day. No large inquiries are now in the market. Prices are now as follows:

Railroad Spikes.	
1 1/2 in. square, 4 to 8 in. long	Extra 1.60
1 1/2 in. square, 8 to 12 in. long	Extra 1.40
1 1/2 in. square, 12 to 16 in. long	Extra 1.20
1 1/2 in. square, 16 to 20 in. long	Extra 1.30
1 1/2 in. square, 20 to 24 in. long	Extra 1.40
1 1/2 in. square, 24 to 30 in. long	Extra 1.60
2 x 3/16 in. square, 4 to 8 in. long	Extra 1.80

Boat Spikes.	
1 1/2 in. square, 4 to 8 in. long	Extra 1.15
1 1/2 in. square, 8 to 12 in. long	Extra 1.15
1 1/2 in. square, 12 to 16 in. long	Extra 1.15
1 1/2 in. square, 16 to 20 in. long	Extra 1.20
1 1/2 in. square, 20 to 24 in. long	Extra 1.30
1 1/2 in. square, 24 to 30 in. long	Extra 1.45
1 1/2 in. square, 30 to 36 in. long	Extra 1.75
1 1/2 in. square, shorter than 4 in., 1/4 cent extra.	1.00

Merchant Pipe.—The inquiry of the Guaranty Pipe Line Company, Los Angeles, Cal., for 50 to 60 miles of 3 and 10 in. steel pipe for a gas line has not yet been closed. No other large lines are actively in the market, but a good many projects that will take a large tonnage of pipe are talked of. The demand for merchant pipe was not as active in the latter part of March as it had been, and orders entered by the mills that month were about the same as in February. Discounts on iron and steel pipe given on a previous page are said to be quite well maintained.

Boiler Tubes.—There is nothing of interest to report. Large consumers are covered and are specifying against contracts in a fairly satisfactory way. Prices are said to be more or less open, one mill selling at whatever discounts it desires.

Coke.—Prices on both furnace and foundry coke are a little stronger, although new inquiry is rather light. A Mahoning Valley blast furnace interest is reported in the market for about 10,000 tons a month for the remainder of this year, deliveries to start about April 15. The output in the Upper and Lower Connellsville regions last week was 361,000 tons, a slight increase over the previous week. We quote standard makes of 72-hour foundry coke at about \$2 for prompt shipment and \$2.25 to \$2.40 per net ton, at oven, for delivery over the remainder of the year. We quote standard makes of furnace coke for prompt shipment at \$1.60 to \$1.65, and for delivery over the next six months from \$1.80 to \$2 per net ton, at oven.

Iron and Steel Scrap.—The scrap market is about as dull as it could be, and it is evident that consumers overbought some time ago, rejections of scrap now being made that under other conditions would not take place. Dealers are not trying to force sales under these conditions. The Baltimore & Ohio scrap list came out on April 3 and is to close on April 15. It offers more material than usual. The greatest declines have taken place in prices of heavy steel scrap, bundled sheet scrap, borings and turnings, and we have reduced our quotations on these grades. Dealers are now quoting as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere, as noted:

Heavy steel scrap, Steubenville, Pa.	813.75 to \$14.00
lanshee, Sharon, Monessen and Pitts-	
burgh delivery	13.00
No. 1 foundry cast	14.00 to 14.25
No. 2 foundry cast	13.25 to 13.50
Bundled sheet scrap, at point of shipment	9.50
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	14.50
No. 1 railroad malleable stock	13.00
Grate bars	11.00
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.25 to 24.50
Steel car axles	20.00 to 20.25
Locomotive axles	24.00
No. 1 bushing scrap	12.50 to 12.75
No. 2 bushing scrap	9.00 to 9.25
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.50 to 15.75
*Cast iron borings	8.75 to 9.00
*Machine shop turnings	9.75 to 10.00
Old iron rails	14.00 to 14.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.25
Stove plate	11.00 to 11.25

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, April 5, 1911.—(By Telegraph.)

Railroad buying has not yet assumed any great activity. Though there has been improvement in the tonnage of truck fastenings, an inclination to hold purchases down to actual needs of the day seems to prevail. The extreme quiet in the pig iron market has resulted in a weakening in prices of Southern iron, although no volume of new business has come forward as a result. Wire products are active and show good healthy country conditions. This wholesome situation is further demonstrated by cast iron pipe activity,

THE IRON AND METAL MARKETS

caused by numerous small municipalities installing water works systems. Structural shapes are among the most active items in the market, though they are not up to normal, and fabricators generally could easily care for more work. In scrap hardly enough trading has been done to establish prices, though the general tendency is weakening.

Pig Iron.—The perfect calm that seems to have settled on the surface of the pig iron market has not been ruffled by sales or inquiries of note this week. The only apparently healthful inquiries that have been afloat have either sunk or drifted out of sight, and to-day not even ripples of activity are current. Recent price weakening rumors in Southern iron have become open, and \$11, Birmingham, is now being quoted for both second and third quarters. Rumor is strong that this price has been named for the remainder of the year without obtaining results. Some furnaces are still adhering to their early determination to avoid sales at current prices for last half delivery, though the general consensus of opinion is that prices will be unchanged during the second and third quarters. The following quotations are for April, May and June shipment, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—Billets in this district find an active market in practically no place outside the manufacture of car axles, and with business quiet in that field no sales of note have been made. The leading interest is maintaining its price of \$30.60, base, Chicago, and the price on open hearth reolling billets remains at \$25.60, base, Chicago.

Rails and Track Supplies.—A very good volume of business has come in on track fastenings. Spikes and bolts have been particularly active for the past 10 days, and specifications on contracts have also been liberal. Light rails have sold freely, and about 10,000 tons of standard sections have been booked from various sources. Prices are firm, as follows: We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb. 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—New business on structural material has been somewhat active this week, the principal item being 11,000 tons, which will go into the Rothchild's Building in Chicago. This contract was let to the American Bridge Company. Half of the structure will be completed this year and the remainder in 1912. The Great Northern Railway is reported to have purchased 4000 tons of bridge work. The Toledo Furnace Company has bought 700 tons of material for its ore bins and testles. The Chicago, Burlington & Quincy Railroad is out with an inquiry for 600 tons of bridge material. Complaints are still heard that prices are not being firmly maintained by fabricators. We quote plain material from mill 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Plate mills are running at but little better than half capacity and business is quiet. Building activities are a long way from normal in ship and car building yards. We quote mill prices, 1.58c. to 1.63c.; mill prices, 1.80c. to 1.90c., Chicago.

Sheets.—There is little change in the situation from that of a week ago. Mills are still running at about 60 per cent. capacity, with but a small volume of business in sight. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The continued depression in the scrap market and the slack demand have put bar iron back in the rut from which it had such a hard time emerging a few weeks ago. There is only a fair demand for steel bars, and mills are running at less than 60 per cent. of their capacity with no great volume of business in sight. Prices are as follows: Soft steel bars, 1.58c.; bar iron, 1.25c. to 1.30c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago; from store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—This corner of the market is unaffected by rumors of Supreme Court decisions or by the disinclination of railroads to buy. The small community and the American farmer are going straight ahead with the spring work, and the consumption of wire products continues to be enormous in the face of quietness in other branches of business. With the opening of navigation on the Great Lakes many Western buyers will begin their usual lake and rail shipments, and specifications are expected to be still more free from the great Northwest. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—Inquiries have been very free, although large specifications have not been numerous. The leading industry has closed with the city of Milwaukee, Wis., for 3200 tons of 6 to 16 in. water pipe. Kalamazoo, Mich., has purchased between 600 and 700 tons for spring work on the city water mains. The larger gas companies seem to be pretty well bought up, and the numerous orders for this material are coming forward from the smaller concerns in lots of from 100 to 400 tons. With the business already closed and numerous inquiries on their books, the leading pipe people seem justified in their opinion that this year's business will total above normal. Healthy country conditions and ease in money have helped many small municipalities in their decision to build water works this season. A bright outlook is naturally the result. Prices remain firm, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—There have been practically no changes in the prices of scrap in this market, due largely to the fact that there has not been enough trading to establish a price. There have been no sales worthy of mention outside the selling of the Rock Island list which closed March 28. No. 1 springs on this list brought \$10.70; No. 1 busheling sold at \$9.93; locomotive tires for \$17.40, and No. 3 cast at \$9.35, all at seller's tracks. The Chicago, Milwaukee & St. Paul sold 500 tons of car wheels at \$13. The Chicago, St. Paul, Minneapolis & Omaha is out with a list totaling 2500 tons, the principal item of which is 1500 tons of reolling rails. The Great Northern has issued a new list amounting to 3000 tons of steel, malleable and cast scrap. There seems to be no bottom to the market, and buyers are not much in evidence. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, reolling.....	13.25 to 13.75
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.75 to 12.25
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	10.50 to 11.00
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.25 to 8.75
Boiler punchings.....	12.50 to 13.00
No. 1 cast scrap.....	11.75 to 12.25
Stove plate and light cast scrap.....	9.75 to 10.25
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00

Cleveland

CLEVELAND, OHIO, April 4, 1911.

Iron Ore.—It is very probable that definite action regarding ore prices for 1911 will be taken in the next two weeks. The leading ore firms have as yet given the matter no formal consideration, but there is a feeling among them now that the fixing of prices should not be delayed much longer. With the opening of navigation near at hand, shippers want to get some of their tonnage moving from their mines and down the lakes, and they feel that some buying activity can be stirred up by disposing of the price question. There is already some demand for small lots of certain ores for shipment as soon as boats begin to move. With prices fixed, however, the sale of only a limited tonnage is expected

THE IRON AND METAL MARKETS

in the next few weeks. As yet there is an absolute uncertainty whether last season's prices will be maintained or whether a reduction will be decided upon. Some time ago it seemed almost a foregone conclusion that prices would be cut 50c. a ton. Strong opposition to lowering the price, however, has come from furnace interests having large stocks of ore on hand. Various estimates of the movement during 1911 are being made, but a fairly liberal prediction places it at 30,900,000 tons, as compared with 42,000,000 tons last year. Ore on docks April 1 is estimated at 7,745,000 tons. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Sales the past week were limited to a few small lots. Some small new inquiries came out, none being for over 500 tons. Larger buyers continue to hold off. Several who have been feeling the market on prices for foundry iron for last half delivery in the past few weeks have deferred their purchases. Some sellers look for an improvement in the demand as soon as ore prices are fixed for the year. We note the sale of 500 tons of Southern iron for the last half to a northern Ohio consumer. Prices remain stationary. We quote No. 2 foundry at \$13.75 to \$14, Cleveland and Valley furnace, for the second quarter, and \$14.25 to \$14.50 for the last half. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Northern foundry, No. 3	14.00
Gray forge	13.50
Southern foundry, No. 2	13.35
Jackson, Co. silvery, 8 pct. to 11 pct. on	18.00

Coke.—A local furnace interest has just contracted for its last half requirements, aggregating about 11,000 tons a month. The foundry coke market is very quiet. There is some demand for small lots for prompt shipment, but little inquiry for contracts for the last half. We quote standard Connellsville furnace coke at \$1.60 to \$1.65 per net ton, at oven, for prompt shipment, and \$1.75 to \$2 for the last half. Connellsville furnace coke is held at \$2 for prompt shipment, and \$2.25 to \$2.50 for the second half.

Finished Iron and Steel.—Business continues fairly good in finished lines, but most selling agencies report a slight falling off in tonnage as compared with the previous few weeks. There is a good volume of orders, but they are for small tonnages, buyers specifying for only their early requirements. Some good steel bar specifications have come from rivet manufacturers. No new structural orders or inquiries for round tonnages have developed, but it is announced that specifications will be out in a few days for the Statler Hotel and the Y. M. C. A. Building in Cleveland. A few of the agricultural implement makers in this territory have been feeling the market on prices for new steel bar contracts, but it is expected that these interests will buy somewhat later than usual this season. The building outlook is very satisfactory in Cleveland, and a good demand is expected for concrete reinforcing bars, as well as small lots of structural material. Little business is coming from the railroads at present. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. There is a fair demand for sheets and regular prices appear to be maintained. The demand for iron bars continues light. Prices are unchanged, 1.30c., at mill, being the minimum quotation.

Old Material.—The market continues quiet, but prices are steady and fairly firm. Dealers do not expect the present lull to be of long duration, and are generally declining to offer scrap at any concession from recent price quotations. Heavy steel scrap is usually held by dealers at \$13.25, which is about 25c. a ton more than local mills seem willing to pay. The Pennsylvania Lines West closed April 4 on its usual list. Other railroad lists out are the Erie Railroad to close April 5 and the New York Central to close April 7. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	\$14.00 to \$14.50
Old iron rails	17.00 to 17.50
Steel car axles	19.50 to 20.00
Heavy melting steel	13.00 to 13.25
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.50 to 7.00
Iron and steel turnings and drillings	7.25 to 7.75
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.00 to 11.50
No. 1 railroad wrought	13.00 to 13.25
No. 1 cast	11.75 to 12.00
Stove plate	11.00 to 11.25
Bundled tin scrap	11.00 to 11.50

Philadelphia

PHILADELPHIA, PA., April 4, 1911.

Outside of a continued inquiry for structural material, the local market drags. The movement in pig iron has been less active. Practically no change in billets, sheets or bars is reported, although prices for iron bars are not quite so strong. Coke is quiet. Little demand for old material is reported, and prices show a further decline.

Iron Ore.—Negotiations are still pending for considerable quantities of Swedish ore, but close slowly. Importations at this port for the week ending April 1 include 20,235 tons of Swedish ore, valued at \$92,816, and 16,400 tons of Cuban, valued at \$45,100.

Pig Iron.—Transactions have been of an unimportant character, although negotiations are under way for a round block of low grade iron, and bids have gone in against an inquiry for 1200 to 2400 tons of charcoal iron and 2000 to 4000 tons of coke foundry iron for the Pennsylvania Railroad's requirements at Altoona in April, May and June. In foundry grades sales have been confined to small and moderate lots, for prompt and second quarter delivery, at prices ranging from \$15.50 to \$16 for the usual eastern Pennsylvania brands of No. 2 X foundry. Efforts are still being quietly made to effect purchases for third quarter, and even later delivery, but outside of taking care of some of their regular customers, sellers refuse to consider such inquiries, and will not openly name a price for shipment beyond the second quarter, although it is believed that business has been quietly done at the top range of present quotations. In Virginia foundry iron the movement being confined to odd lots for either prompt or near future delivery, for which producers name \$13, furnace, for either No. 2 X or No. 2 plain grades. The leading interest is not holding out as strongly for an advance of 50c. a ton for second quarter delivery, and it is reported that \$13, furnace, has been accepted by it for April shipment. One of the leading cast iron pipe iron makers in this district is still negotiating for a large block of low grade Southern iron, but orders have not yet been placed. There is still some demand for forge iron for rolling mill purposes, but no fresh sales are reported. Northern forge iron is steadily becoming less plentiful, and prices are being very firmly held at \$14.75 to \$15.25, delivered. In a few instances sales have been made at the top of the market. No inquiry for basic iron is reported and quotations are nominal. Low phosphorus iron has been sold in small lots at prices within the present range of the market, but there is little inquiry worth mentioning. No weakness in prices in this district is to be observed. Consumers are taking deliveries freely, and the statistical position in this territory promises, from preliminary reports, to be more favorable. Quotations are unchanged, the following range being named for deliveries in buyers' yards in this vicinity, during the second quarter:

Eastern Pennsylvania, No. 2 X foundry	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain	15.25 to 15.50
Virginia No. 2 X foundry	15.80 to 16.00
Virginia No. 2 plain	15.80 to 16.00
Gray forge	14.75 to 15.25
Basic	15.25 to 15.50
Standard low phosphorus	21.50 to 22.00

Ferromanganese.—There has been little fresh demand in this district, and sellers are quoting \$37.25, Baltimore, for small lots for second quarter, and \$37.50 for second half deliveries. This price would no doubt be materially shaded on any sizable business.

Billets.—Small orders make up the bulk of the business, and consumers show no indication of coming into the market for large lots for extended delivery. Aggregate business coming to the mills shows little variation and the rate of production is unchanged. Open hearth rolling billets are quoted at \$25.40, with ordinary forging billets at \$30.40, for early delivery in buyers' yards in this vicinity.

Plates.—Operations in the finishing departments at some of the Eastern mills show a decline from the recent high rate. This has been due more to the smaller size of orders than to any decrease in their number. The demand still covers very fully the general range of consumption. There is a very good volume of business in sight, particularly in plates for structural work. The prospect of an increasing demand for boat plates is also considered favorable. Quotations are being firmly maintained at 1.55c. minimum for ordinary plates, delivered in buyers' yards in this district.

Structural Material.—A very encouraging volume of inquiry is noted. Fabricators report an increased demand for material for buildings requiring from 50 to a few hundred tons, with an occasional larger specification. The structural work for Alexander Brothers' new building in this city, 350 tons, is up, and bids have gone in against 1000 tons for a new building for the Reading Iron Company, Reading, Pa. A very good demand for miscellaneous plain shapes for building

THE IRON AND METAL MARKETS

purposes is also to be noted. Eastern shape mills continue to operate around 65 to 70 per cent. of capacity. While prices of plain shapes are being maintained at 1.55c., minimum, delivered in this district, fabricated material is still reported as being very low and competition for business keen.

Sheets.—Mills continue to take sufficient day to day business to enable them to operate for the most part at full capacity, but there is still an absence of any demand for extended delivery, current orders being small and for prompt shipment. The following range of prices is named for early delivery by Eastern mills: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The demand for refined iron bars is less pronounced, and, while quotations are unchanged, there is an apparent tendency toward price shading on the part of some mills for business of a desirable character. A slightly better inquiry for steel bars is reported. For business of an ordinary character 1.37½c. to 1.45c. is named for refined iron bars, and 1.55c. for steel bars, delivered in this territory.

Coke.—Transactions have been confined closely to prompt lots, both in furnace and foundry grades. Consumers are holding back on contracts, as they can usually pick up spot lots at price concessions. Producers are not forcing business at present prices for forward delivery. Prompt foundry coke has sold at \$2, at oven, while for forward delivery \$2.20 to \$2.40 is named. Moderate sales of spot furnace coke are reported at \$1.60, at oven; for extended deliveries \$1.70 to \$1.90 represents the range of the market. For delivery in this territory the full range of quotations, per net ton, is about as follows:

Connellsville furnace coke.....	\$3.75 to \$4.05
Foundry coke.....	4.15 to 4.35
Mountain furnace coke.....	3.35 to 3.65
Foundry coke.....	3.75 to 4.15

Old Material.—The market is extremely dull and prices continue to move downward. Consumers are, for the most part, pretty well supplied and place orders only when bargains are available. Railroad lists are about of the usual character, and until they are cleaned up the buying in the general market is expected to be light. The top of the market for No. 1 heavy melting steel is about \$13.75, delivered, and odd lots may be picked up at 25c. less, but sellers are not offering material at that level. Both borings and turnings show a decline on light trading. In fact, the whole list is weak. The following range of prices, while to some extent nominal, about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No 1 heavy melting steel scrap.....	\$13.50 to \$13.75
Old steel rails, rerolling.....	14.50 to 15.00
Low phosphorus heavy melting steel scrap	17.75 to 18.25
Old steel axles.....	20.00 to 20.50
Old iron axles.....	..... to
Old iron rails.....	18.00 to 18.50*
Old car wheels.....	13.25 to 13.75
No. 1 railroad wrought.....	16.25 to 16.75
Wrought iron pipe.....	13.75 to 14.25
No. 1 forge fire.....	11.75 to 12.25
No. 2 light iron.....	7.50 to 8.00*
Wrought turnings.....	9.00 to 9.50
Cast borings.....	8.50 to 9.00
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	12.00 to 12.50
Grate bars.....	12.00 to 12.50
Stove plate.....	10.50 to 11.00

* Nominal.

Birmingham

BIRMINGHAM, ALA., April 3, 1911.

Pig Iron.—Without doubt there has been some slowing down in the pig iron market, as far as sales in this immediate vicinity are concerned. When it was found that a price of \$11, Birmingham, could be made effective, the purchasers felt apparently that there was no great reason to show undue anxiety about covering requirements ahead. The result has been a lessened demand, though shipments on old orders continue to move out at a most satisfactory rate. There does not, however, appear to be any disposition to make a concession below the established figure of \$11, even for prompt shipment. And where reports to that effect are heard it generally means that the iron was bought by analysis or else was not fully up by analysis to the generally accepted standard for the grade. Some of the larger buyers still have inquiries before this market, but for the most part these are only "feelers," and it is believed that at any concession contracting might be made for large tonnages running through the year. The market for Southern charcoal iron shows decided strength; some good contracts have been entered. Prices for this iron remain very firm indeed. The month of March will have shown but little change in the

producing rate over that of February. Those furnaces now operating have for some months had the best of picked material and all the stacks in blast seem to be, according to best reports, holding to steady records. Stocks are expected to show a still further decrease.

Cast Iron Pipe.—Several contracts for small filling in orders were booked by Alabama pipe producers the week past, mostly from the Central West. No reports are made of any lettings of consequence. Prices remain about as for the week previous. Production is still less than for the same period last year. It is felt that at present figures there is really no incentive to increase production, though this could be done to a fair degree on short notice should the demand justify. Prices quoted are as follows, per net ton, on board cars here: 4 to 6 in., \$23; 8 to 12 in., \$22; over 12-in., average \$21, with \$1 higher for gas pipe. These figures really represent quite an advance in the asking prices over those prevailing for December and are indicative of the very much stronger feeling that cast iron pipe should not be sold on a basis devoid of any profit.

Old Material.—There is considerable inquiry for certain grades of scrap, with the hope expressed that a better feeling will soon pervade the entire list. As a matter of fact, some buyers are quietly picking up all lots to be had on a bargain figure basis. Dealers report prices approximately as follows, per gross ton, on cars Birmingham:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axles.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

The Blast Furnace Committee of the United States Steel Corporation spent several days in this district last week, and very thoroughly investigated conditions pertaining to the iron and steel industry of the South, and particularly furnace practice here. Much interest was manifested in the raw material and its better preparation in this particular district.

L. E. Patton has been made resident manager of Hickman, Williams & Co. here, succeeding T. L. Powell, resigned to go in other business for himself in Chicago.

St. Louis

ST. LOUIS, April 3, 1911.

Building permits for March increased over the previous month, and the business of local fabricators is better. Jobbers of iron and heavy hardware are feeling the improvement usual in the spring. Pig iron is quiet, and there is not much demand for coke. Railroads are buying some track fastenings, but rails are quiet. The commercial demand for finished metals was good the past week.

Pig Iron.—The leading sales agencies are unanimous regarding the dullness of the market, both with respect to inquiries and sales. The consensus of opinion, with both commission houses and merchant sellers, is that, owing to the activity of the past three months, a let up in the demand, temporarily, is normal, and to be expected. There being no signs of an advance in prices buyers see no reason to anticipate their wants materially at this time, and it is likely some are waiting to close contracts for their finished products before adding to their purchases for future delivery. Buyers of finished products in turn are to some extent awaiting developments at Washington. Prices are unchanged. We quote No. 2 Southern foundry at \$11, Birmingham, for shipment over the second and third quarter, and \$11.50 for fourth quarter; No. 2 Northern foundry, \$14, Ironton, Ohio, for shipment over the second quarter, and \$14.50 for last half delivery.

Coke.—Beyond a jobbing demand, no transactions are reported. An inquiry for a large tonnage for shipment over the last half is mentioned. Specifications on contracts are coming in freely, and the situation is regarded as fairly satisfactory, in view of the quite large volume of business during the first quarter of the year. Prices are unchanged. We quote for selected Connellsville 72-hour foundry, for shipment over the remainder of the year, \$2.25 per net ton, at oven; carload lots 25c. per ton higher.

Finished Iron and Steel.—The demand for structural material is improving. Specifications in steel bars are holding up well, and there is more inquiry from jobbers. There is a heavy demand for track fasteners. A new structure at Memphis, Tenn., will require 400 tons of steel bars.

Old Material.—The market is at a standstill. Business is only possible at prices that holders will not accept, and

THE IRON AND METAL MARKETS

St. Louis market is quiet. Stocks are quite large and accumulating, but holders believe that an advance may come about in the near future. The Missouri Pacific is out with a list of 1500 tons of miscellaneous scrap, and the St. Louis & San Francisco with one of 900 tons. Prices are weaker and in some items lower. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, less than 3 ft.....	11.75 to 12.25
Subject to inspection.....	23.50 to 24.00
Frogs, switches and guards, cut apart..	11.00 to 11.50

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	9.50 to 10.00
No. 1 boilers, cut to sheets and rings..	8.00 to 8.50
No. 1 cast scrap.....	11.00 to 11.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	9.00 to 9.50
Agricultural malleable.....	8.50 to 9.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	8.00 to 8.50
Railroad grate bars.....	8.50 to 9.00
Machine shop turnings.....	7.00 to 7.50

The Sligo Iron Store Company will build an addition to its warehouse at Sixth and O'Fallen streets, to accommodate its increasing business.

Cincinnati

CINCINNATI, OHIO, APRIL 5, 1911. (By Telegraph.)

Pig Iron.—Following its erratic course developed lately, the Southern market shows considerable improvement over the previous week, both in the matter of tonnage shipped and booked. It is estimated that the depletion in furnace stocks in the Birmingham district proper in March was over 40,000 tons, as compared with the amount on hand at the end of February, which is an indication that iron on contracts is moving freely. New contracts for No. 2 Southern foundry include one for 2100 tons at \$11, furnace, shipments to run through the next four months. For prompt shipment and at the same price a nearby consumer bought 1000 tons of No. 2 soft, and for July to December delivery a Michigan manufacturer took 1200 tons of a well-known brand of Southern No. 2 foundry and at no advance in price. This same figure was inserted in a number of contracts for 100 to 300 tons, with deliveries ranging from April to September. For May shipment an eastern Pennsylvania firm purchased 1000 tons of Southern gray forge at \$10, Birmingham. Northern iron continues quiet, but there has been no weakening in prices. Inquiries before the trade include one from northern Ohio for 1300 tons of either Northern or Southern No. 2 foundry for second quarter movement. Others from the same district call for 300 tons and 700 tons for prompt and last half shipment, respectively. There is no shading in prices in this market, and for prompt and second quarter shipment we quote No. 2 foundry at \$11, Birmingham, and \$14, Ironton, although several producers are extending deliveries through the third quarter, and there are a few Southern furnaces willing to take on contracts for the entire year at the present spot shipment quotation. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—There does not appear to be any rush among foundry coke consumers to make any long-time contracts, though a few have signed up for a future supply. There is the usual amount of buying to fill immediate requirements. Furnace coke is also moving slowly, and while contracts are reported from other districts none has been closed here. Furnace coke for prompt shipment is quotable at \$1.55 to \$1.65 per net ton, at oven, in the Wise County, Pocahontas and Connellsville districts, and the uniform spot shipment

price for foundry coke is \$2, with the usual premium of 15c. to 25c. per ton asked for future shipment.

Finished Material.—Structural material is still in the lead, and the past week ended with a number of mill agencies showing a fair tonnage booked, and the inquiries this week coming in are encouraging. Steel bars are slow sellers, and hoops and bands are barely holding their own. On the other hand, railroad track material has recently been a good salable commodity. Mill prices are unchanged at 1.40c., Pittsburgh, and local warehouse quotations are around 1.87c. to 1.95c.

Old Material.—Prices have slumped on all grades of scrap. Consumers are stocked up, and one large local user has its side track full of cars loaded with scrap iron. Local buyers' yards are also stocked up, and there is no indication that the situation will improve very soon. Prices for delivery in buyers' yards southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.75 to 5.25
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	10.50 to 11.00
Burnt scrap, net ton.....	7.50 to 8.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	8.00 to 9.00
Old iron rails, gross ton.....	14.00 to 15.00
Relaying rails, 50 lb. and up, gross ton..	21.00 to 22.00
Old car wheels, gross ton.....	11.50 to 12.50
Heavy melting steel scrap, gross ton..	10.50 to 11.00

San Francisco

SAN FRANCISCO, March 29, 1911.

In some departments a slightly stronger buying movement has been noted the last few weeks, but the improvement has been neither as great nor as general as conditions through the State would seem to warrant. Merchants are buying in a very conservative way, and the small jobbing trade, which is usually active in March, has just commenced to revive. A few large orders are coming out, however, and there are a number of rather indefinite inquiries in the market which may materially increase the April tonnage. Considerable business is expected within the next few weeks from the mountain mines, and the approach of the fruit season may also bring out more demand in some lines. Public service corporations and municipalities are among the principal buyers at present. Money is tight in San Francisco, and the disbursement of the exposition funds has not commenced, but the leading industries of the State appear to be in good condition.

Bars.—The market still appears to be somewhat unsettled, owing to competition between Eastern, foreign and Pacific Coast materials. Foreign bars can be placed in the harbor at about 1.65c.; and, while merchants are buying in only a limited way for future delivery, their stocks have been materially increased by recent arrivals. A considerable tonnage of bars from Irondale, Wash., has also been delivered within the last few weeks, and supplies held here are considerably in excess of current requirements. Orders booked by Eastern interests are mostly of a sorting-up nature. The demand for reinforcing bars is increasing all along the coast. The city of Los Angeles placed an order last week, and will receive bids on another lot March 31. New figures will be taken shortly on reinforced concrete barrack buildings for the navy yards at Bremerton, Wash., and Pearl Harbor, T. H. Locally, a lot of bars will be required for a concrete viaduct in Mission street. Plans are under way for a large amount of concrete bridge work in California. So far the jobbing price of soft steel has not advanced, but there is a rather firm feeling in the market. Bars from store, San Francisco, are quoted at 2c. for both iron and steel.

Structural Material.—The movement is fairly active, but more work of a notable nature having been let in Los Angeles and the northern cities than in San Francisco. There are several good inquiries in the market here, most of which have been mentioned before, but there is considerable delay in the actual letting of contracts. A good volume of small work, however, is coming out all the time, being for the most part taken by local fabricators. The outlook for San Francisco and vicinity is considered good. Bridge work has been a more important item than usual on the coast, and several large jobs of this nature are still in prospect. The inquiry for the Mt. St. Joseph's Orphanage is now in the market, and specifications for the Oakland City Hall will be out about the first of the month. Figures are being taken on the Security Bank Building, Oakland, about 450 tons. The Bankers' Investment Company is planning a large building on Market street, near Geary. Competitive plans are being solicited for the United States Subtreasury Building. The Los Angeles Investment Company has applied for a permit to erect a 14-story building, but the permit was refused. Plans are being prepared for the new Clunie Theater at Sacramento. Bids have been taken on a small bridge at San Luis

THE IRON AND METAL MARKETS

Oilsco, and there is an inquiry amounting to some 350 tons for two bridges in Ventura county. Bids on the American River bridge, at Auburn, Cal., will be opened April 4. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.65c.

Rails.—The movement of standard sections this month has been satisfactory in comparison with the same period last year, though business has failed to materialize on a good many inquiries. More activity is expected in April. Numerous orders for light rails have been placed recently, and as some of the largest prospective consumers are still to be heard from, the outlook is decidedly favorable. Specifications have been completed for tubular steel trolley poles, spikes and track plates for the Geary street line, on which bids will be received next week. The town of Long Beach, Cal., is planning a double-track belt harbor road. It is reported that the Southern Pacific will shortly lay two additional tracks on its line between San Francisco and Redwood City. The Oakland, Antioch & Eastern Railway has been reorganized with increased capital, with the intention of adding a 50-mile extension to the 30-mile line now being laid. The extension, if built, will end at Stockton, Cal. The Oakland Traction Company has ordered 1000 tons of rails from the Pennsylvania Steel Company.

Sheets.—The jobbing trade in black and galvanized sheets is improving slowly. Several of the leading consuming industries are in good shape, but riveted pipe is rather quiet. Some large inquiries are coming up, and an active movement is expected.

Plates.—Prospective improvements to gas works will require a considerable tonnage of tank plates, but the market at present is quiet. The use of concrete for oil storage tanks is apparently increasing, and the demand for steel for the larger storage projects is accordingly curtailed.

Merchant Pipe.—Conditions in this department are highly unsatisfactory, without any apparent reason. While building is generally active throughout the State, the usual improvement in the distributive trade in March has failed to appear, and merchants are accordingly buying only on a very small scale. Bookings by representatives of the most important manufacturers have been even smaller than in February. There has been no important business in the oil fields, though inquiries from that quarter are increasing, and some good orders may develop within the next few weeks. The tonnage taken by water companies has been fairly large, but not sufficient to compensate for the dullness in other lines.

Cast Iron Pipe.—The demand continues active in all the coast states, and a few fairly large orders have been booked recently, though most of the business is in small lots. The Los Angeles Gas & Electric Company and the town of Porterville, Cal., have placed their orders with the United States Pipe Company. A number of large projects are under way, for which the pipe has not yet been provided. Considerable pipe will be required shortly at Portland and Albany, Ore., and a gas company at Eugene, Ore., is in the market for a lot of pipe. Bids will be taken shortly for several Government water plants, including those at Fort Ruger, at Honolulu; Fort McDowell, San Francisco; Fort Baker, in Marin county, Cal., and a 42-in. circulator pipe for the Mare Island Navy Yard.

Pig Iron.—There is no animation to the market for foundry iron, most of the local foundries working on a very limited scale, though some slight indications of improvement are noted. Prices show no quotable change, the figures on foreign iron depending largely on conditions of sale. Importers are asking \$23 for English, Continental and Chinese foundry iron, and No. 2 Southern foundry iron is quoted at \$21 to \$22.

Old Material.—The demand for all descriptions of scrap has fallen below expectations, and the local market is very dull. Owing to an accumulation of steel scrap here, a shipment of 1000 tons is being sent to Philadelphia and 2500 tons has been sold for shipment to Genoa, Italy. Cast scrap is still scarce, but no large lots are wanted, and there is not enough demand to cause any advance. There is no movement of any consequence in either wrought scrap or old rails. Prices are quoted as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$11 to \$12; wrought scrap, per net ton, \$12 to \$15; rerolling rails, per net ton, \$15.

The German Iron Market

BERLIN, March 23, 1911.

The position of the iron market has certainly not grown clearer in the past two weeks. It seems rather to have grown more involved and uncertain. To say that prices have weakened, yet that there is also talk of raising pig iron prices, is to give some measure of the contrary tendencies in the market. The last trading day on the Düsseldorf Exchange saw a drop of steel bar quotations, which are now

105 to 110 marks, as compared with 112 to 115 marks at the last previous quotation January 20. Hoops and bands also dropped to 135 to 140 marks, as against 140 to 145 marks. English No. 3 foundry was quoted at 68 to 70 marks, delivered at Ruhrort, as compared with 69 to 71 marks, and Luxemburg basic iron at 52 to 53 marks, against 52 to 54 marks. On the other hand, a proposal will be made at a meeting of the Pig Iron Syndicate to-morrow to raise the prices of pig iron, there being a strong favorable sentiment in the syndicate. The report given out by the Düsseldorf Exchange said that the calls for delivery of pig iron remain very brisk, and that an active business is also doing in other products at existing prices. Thus there are evidently contrary tendencies in the market. Similar news also comes from Belgium, where advancing prices had been announced for several weeks; but last week reductions of 6d. in the export price of bars, rivet stock, and ship angles, and 1s. in wire rods were reported from Antwerp.

The failure of the efforts to continue the bar convention has, upon the whole, not had so great an effect as had been looked for. Some of the smaller concerns, indeed, are selling at heavily cut prices but the great producers of the West are refusing to make any substantial reduction, for the home trade at least. The lower prices quoted above for the Düsseldorf Exchange are merely a reflection of the prices already existing in the open market. However, it is asserted that some of the smaller producers are taking orders for bars at as low as 100 marks, and in some cases even lower. Of course such prices are made only by mills short of work; but the great establishments of the Steel Works Union are mostly well supplied with bar orders and feel no necessity to join in the price cutting. The export business in bars even shows a certain firmness, but prices for export have long been at a very low level. It is now asserted that many of the big works took foreign orders at 92 to 94 marks some weeks ago, before the fate of the convention was settled; but it is added that they are insisting upon better prices now, and that some foreign selling is at even so high a price as 105 marks. The great mixed works have bar orders ahead for a month or two.

The mills of the Steel Works Union are reported as doing a somewhat better business. Work on semimanufactured material is abundant, and the mills are even exceeding their allotments; much of the product, however, is for export at comparatively unsatisfactory prices. A slight improvement in the demand for rails is mentioned, and some good foreign orders have again been taken. New orders for structural shapes have not come in during the past fortnight—since the opening of business at unchanged prices—as had been expected. As is usually the case in March, however, shipments of semifinished material, rails, and structural shapes are unusually heavy this month in anticipation of the close of the business year next week. In thin plates business is very quiet, and prices have been depressed to 137 to 138 marks; the mills are rather irregularly employed, and orders are slow in coming in. Conditions are also less satisfactory in heavy plates. Work on wire rods is at the normal rate, but export prices are very low. In drawn wire and wire nails many of the mills are short of work.

The excess of iron and steel exports over imports in February was 358,600 tons, comparing with 307,600 tons in February, 1910, and 354,000 tons in January, 1911.

Buffalo

BUFFALO, N. Y., April 4, 1911.

Pig Iron.—The market continues quiet, particularly as regards foundry and malleable irons, with a lessening volume of new inquiry, although some business has developed in charcoal iron and in specialties. The majority of sales made were for small lots for current consumption. One furnace interest, however, reports a number of orders totaling about 7000 tons for third quarter and second half delivery, from eastern New York and New England points, consisting chiefly of medium silicon foundry grades. Some life is shown in business with agricultural implement makers, but trade with car wheel foundries and those making railroad supplies is dull. Producers are finding it difficult to keep prices up to the higher level which they endeavored to establish a few weeks ago, and some furnaces have dropped off on quotations equivalent to an additional 25c. per ton from last week's schedule for current quarter delivery. The quotations given below represent prices for current quarter delivery, f.o.b. Buffalo, with an average of 50c. per ton higher asked for last half, most furnaces holding for prices for forward delivery that buyers consider prohibitive:

No. 1 X foundry	\$14.25 to \$14.75
No. 2 X foundry	14.00 to 14.50
No. 2 plain	13.75 to 14.00
No. 3 foundry	13.50 to 13.75
Gray forge	13.25 to 13.50
Malleable	14.00 to 14.50
Basic	14.25 to 15.00
Charcoal	16.75 to 17.50

THE IRON AND METAL MARKETS

Finished Iron and Steel.—New business in shapes and bars shows slight improvement for the week, the demand for structural shapes being better than for some months. Specifications on contracts distributed over most classes of finished products are also coming forward in somewhat heavier volume. The Jones & Laughlin Steel Company has received an order, through general contractor C. A. Alexander, Rochester, for the concrete reinforcing bars required for the extensive additions to be made to the plant of the Johnston Harvester Company, Batavia, N. Y., about 500 tons. A number of small orders for rails for traction lines, aggregating about 2200 tons, have been taken by the Lackawanna Steel Company. Canadian export trade keeps up in good volume with an increasing demand from week to week. Figures are to be taken the coming week for the Main Street Realty Company's store and office building, 250 tons, and for the Buffalo General Electric Company's 17-story office building and the Hutchinson High School, Buffalo, requiring large steel tonnage. The Buffalo Structural Company has taken the contract for the steel for the A. L. Weber department store, 150 tons. The Lackawanna Bridge Company was low bidder for steel for the three buildings of the Atlas Steel Castings Company's plant, Buffalo, 200 tons, and also for the city fire station, Utica, N. Y., 175 tons. Wm. F. Felton, Buffalo, was low bidder for the intake pier superstructure for the new water works tunnel, Buffalo, 100 tons, and the Pittsburgh Bridge & Iron Company, Rochester, Pa., took the contract for the 600 tons of steel for the addition to the plant of the Hammermill Paper Company, Erie, Pa.

Old Material.—The market continues weak. Transactions have been very small and insufficient to test prices. There has also been only a moderate movement on contracts, most mills being well supplied for current needs. We quote as follows, per gross ton, f.o.b. Buffalo, prices being largely nominal:

Heavy melting steel.....	\$13.00 to \$13.25
Low phosphorus steel.....	17.25 to 17.50
No. 1 railroad wrought.....	15.50 to 15.75
No. 1 railroad and machinery cast scrap	14.50 to 14.75
Old steel axles.....	to
Old iron axles.....	to
Old car wheels.....	to
Railroad malleable.....	13.75 to 14.00
Boiler plate.....	11.50 to 11.75
Locomotive grate bars.....	11.75 to 12.25
Pipe.....	10.00 to 10.25
Wrought iron and soft steel turnings..	7.25 to 7.75
Clean cast borings.....	6.75 to 7.00

New York

NEW YORK, April 5, 1911.

Pig Iron.—Some of the business pending last week has been closed. The American Locomotive Company's total purchases thus far for Eastern and Central Western plants amount to about 10,000 tons. Several foundry iron sales in this market were each for 1000 tons or upward, but average buyers seem inclined to do little for the latter part of the year unless attracted by the extension of present prices farther forward than furnaces generally will consider. Sellers are rather more active in seeking business; on the other hand, most of them are pretty well sold for the second quarter, and have been making full shipments on contracts. A sale of 1000 tons is reported to an electric interest, and some business has been done with foundries in the Hudson Valley. Prices are unchanged, and production in Eastern districts continues at about the same rate, one eastern Pennsylvania furnace has gone out of blast in the past week, while another was blown in. Rather sharper competition in the Buffalo district is indicated by recent transactions. We quote tidewater deliveries as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15.25 to \$15.50.

Steel Rails.—The Harriman order will probably be placed this week and will be for 50,000 tons or somewhat less. Whether later orders will bring the total for these lines up to the expected 150,000 tons remains to be seen. The Carnegie Steel Company has sold 5350 tons to the Sandy Valley & Elkhorn, a coal road, and 3900 tons for Japan will also be rolled at the Edgar Thomson mills. The Illinois Steel Company has booked 10,100 tons in the past week, including 6000 tons for the St. Paul and 2000 tons for an Indiana line. The Cambria Steel Company has booked an order for 1000 tons for a traction line. The Grand Trunk is inquiring for 18,000 tons, which will probably be placed in this country, though some question as to specifications is delaying the contract. The Seaboard Air Line is considering the purchase of 15,000 tons, which will probably go to the seaboard mill.

Ferroalloys.—There has been very little trading in this market in ferromanganese during the week, although inquiries for several lots that would total upward of 2000

tons are reported for the last half. The price is nominal, at \$36.50 to \$37, Baltimore. New York houses quote foreign ferrosilicon at \$54, Pittsburgh, for stocks on hand, which is considerably below the cost of importation. The demand for the domestic product is light.

Finished Iron and Steel.—The Eastern demand for plates is very light, but enough business is being received from the West to keep the mills at between 70 and 75 per cent. capacity. Steel bars are quiet and still waiting for definite inquiries from the implement makers for their year's requirements from July 1. There is less activity in bar iron than a month ago, but a good volume of orders is still being placed. The last of the large structural contracts pending in New York City has been placed—the 7900 tons for the McAlpin Hotel, which has been awarded the American Bridge Company by the general contractor, the Thompson-Starrett Company. The revised plans for the Woolworth Building are yet to come out. The American Bridge Company also has 500 tons for the Avery Building at Columbia University. The Boston & Maine has awarded its bridge at Bellows Falls, 1200 tons, to the Boston Bridge Company. The Hinkle Iron Works has 400 tons for the Hotel Woodstock, West Forty-third street, New York; Eastern Steel Company, 350 tons for the New York Dock Company's pier 22 in Brooklyn; Lewison & Co., 900 tons for a loft on Union Square, at West Fifteenth street; Lewis F. Shoemaker & Co., 250 tons from Stone & Webster, Boston, for a power house at Jacksonville, Fla., and G. W. Neff Smith 300 tons for an addition to the Henry Siegel store in New York. Bids closed March 30 on 900 tons for two viaducts in the New York Central's suburban area, and also on 600 tons for a telephone exchange building in Portland, Me., on which the American Bridge Company is reported to be low bidder. April 15 bids will close on 1000 tons for a terminal building in Norfolk, Va., for the Norfolk & Western, the Virginian, and one or two other Southern roads. The Central Railroad of New Jersey is in the market for 1000 tons for car shops at Elizabethport. The lowest bid for the Panama Canal emergency lock gates, which will require 12,000 tons of plates, was submitted by the United States Steel Products Company, \$2,238,987, and the McClintic-Marshall Construction Company was \$40,000 higher. Prices are firm and without change: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Store prices for plain material and plates, New York, are 1.85c. to 1.95c.

Old Material.—Conditions in this branch of trade are extremely unsatisfactory. Transactions have fallen to an exceedingly low point, and dealers are having increased difficulty with consumers in regard to rejections. It is more difficult than ever to make sales stick that were effected some time ago. One of the largest eastern Pennsylvania steel mills is embargoed, as material has been delivered to it too rapidly. No consumers of heavy steel melting scrap appear to be in the market, the only transactions effected in this line being with dealers having contracts to fill. Old car wheels are offered in considerable quantities without eliciting any bids, and no market can be found for re-rollers. Some transactions have occurred in relaying rails, but the demand in this line is spasmodic, and it is understood that a considerable quantity which had been lying in store here for some years was recently sold for scrap. The conditions have long been exceptionally favorable for the accumulation of scrap, so that supplies are heavy, while it is understood that the railroad lists to come out next week will again be large. About 250 tons of Panama scrap, at Hoboken, N. J., was sold on Tuesday, the bids ranging from \$7.17 to \$9.52 per gross ton, on lighter. The highest bid represents a decline of about \$2 per ton since the sale of Panama scrap was made two weeks ago in Philadelphia. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles....	21.50 to 22.00
Old steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.50 to 13.00
No. 1 yard wrought, long.....	12.00 to 12.50
No. 1 yard wrought, short.....	11.00 to 11.50
Light iron.....	5.00 to 5.50
Cast borings.....	6.00 to 6.50
Wrought turnings.....	6.50 to 7.00
Wrought pipe.....	10.50 to 11.00
Old car wheels.....	11.50 to 12.00
No. 1 heavy cast, broken up.....	11.50 to 12.00
Store plate.....	9.00 to 9.50
Locomotive grate bars.....	9.50 to 10.00
Malleable cast.....	10.50 to 11.00

Cast Iron Pipe.—The New York Department of Water Supply, Gas and Electricity opens bids to-day on 1025 tons of 6 to 12 in. pipe and 155 tons of special castings. New Bedford, Mass., will open bids April 17 on 1170 tons of 36-in. and 2200 tons of 30-in. pipe and 200 tons of specials. Fulton, N. Y., will open bids on the same day

THE IRON AND METAL MARKETS

on 370 tons of pipe. Manchester, N. H., is in the market for 545 tons. The Quartermaster's Department of the United States Army, New York, it is announced, will re-advertise for bids for 2000 tons. The Brooklyn Union Gas Company is in the market for 600 tons of 30-in. The demand from private companies has been moderately active. Competition continues keen for all orders coming up. Prices on carload lots of 6-in. range from \$21 to \$22 per net ton, tidewater.

Metal Market

NEW YORK, April 6, 1911.

THE WEEK'S PRICES

Copper, New York.		Tin.		Lead.		Spelter.	
March.	Lake.	Electro-lytic.	New York.	New York.	St. Louis.	New York.	St. Louis.
30.....	12.50	12.25	41.35	4.45	4.30	5.60	5.40
31.....	12.50	12.25	41.37½	4.45	4.30	5.60	5.40
April.....							
1.....	12.50	12.25	41.60	4.45	4.30	5.60	5.40
2.....	12.50	12.25	41.60	4.45	4.30	5.60	5.40
3.....	12.50	12.25	42.12½	4.45	4.30	5.55	5.35
5.....	12.50	12.25	41.75	4.45	4.30	5.55	5.35

Tin is firmer and sold during the week at advancing prices. Copper is softer and continues rather weak. Lead is strong and in increased demand. Spelter is weak. Antimony is dull.

Copper.—The Copper Producers' report showing the March statistics will be out April 7, but that fact is not having much effect on the market, as it will not show large export sales, according to the copper sellers' own admission. Large consumers seem determined to hold out for lower prices, and are offering to buy large lots at 12.12½c. for electrolytic and 12.37½c. for lake, and there is an unconfirmed report that sales have been made at these figures. There are some offers of lake at 12.40c. and a few outside carload lots were sold on Thursday within a few points of that figure. The exports of copper so far this month were 1749 tons. In London to-day the market closed dull, with spot selling at £54 7s. 6d. and futures £54 18s. 9d. The sales amounted to 350 tons of spot and 700 tons of futures.

Pig Tin.—The special feature of the week was the remarkable showing of the statistics for the month of March. The statistics show the American consumption during the month to be 5100 tons, and the total for three months shows an increase of 1000 tons as compared with the same period last year. It is a remarkable fact that with this statistical showing, which is a record, the visible supply shows a decrease of 500 to 600 tons. The 2500 tons sold at the Banca auction March 29 went at a figure equal to 40.87½c., delivered in New York. In New York to-day pig tin was sold for 41.75c. The London market closed weak with spot tin selling at £191 and futures £187 10s. The sales amounted to 350 tons of spot and 450 tons of futures.

Tin Plates.—There is not much demand for tin plates in this market as the call from the general manufacturing field is very light. The mills are busy on orders in hand placed a few weeks ago, and the can manufacturers are the principal buyers just now. The price remains unchanged at \$3.94 for 100-lb. coke plates. Foreign tin plates at Swansea, Wales, were quoted to-day at 14s. 6d.

Lead.—Lead was easier in St. Louis early in the week, but it continued strong in New York and good sales were made. While sales were reported in the West at a few points under 4.30c., they were outside lots offered by people who were anxious to convert their holdings into collateral. The New York market remained unchanged during the week at 4.45c., but was very strong. The leading interest continues to hold out for 4.50c., but is said to be meeting outside sellers in the Western market. To-day lead can be had in St. Louis for 4.30c. and in New York for 4.45c.

Spelter.—Spelter weakened in St. Louis last Wednesday and sales were made in that market at varying prices. Spot supplies are bringing relatively more in New York than in St. Louis, because of the scarcity of stocks here. For more than a year New York has ceased to be an important distributing point for spelter, the sellers preferring to hold their supplies at East St. Louis, and most of the sales made here of late were for prompt shipment from that point, consequently the spot market in New York is now 20 points higher than in East St. Louis, instead of 15 points, as formerly quoted. The St. Louis market is uncertain and 4.35c. is generally quoted there and 4.55c. New York.

Antimony.—Consumers are still uninterested, but some sales have been made by the dealers, many of whom are loaded with stocks purchased before the formation of the syndicate. The market in futures is weak, but the nominal prices for spot are unchanged with Cookson's selling at 9.50c. and Hallett's at 9.12½c.

Old Metals.—The market continues dull. Dealers' selling quotations are unchanged as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, April 4.—A number of good sized orders were placed in this market last week for lake copper at the prevailing price of 12¾c. These orders had been expected for some time, and now that they have been purchased it is believed there will be a decline in the price. There was also a good amount of business done in other metals in small lots. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12¾c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 42¼c.; small lots, 44¼c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.40c. to 5.45c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 29c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, April 3.—Lead is higher, quoted at 4.30c. to 4.32½c.; spelter is lower and quoted at 5.32½c., both at East St. Louis. Zinc ore is unchanged at \$37 to \$40 per ton, Joplin base. Tin is quoted at 42.10c.; antimony (Cookson's), 9.85c.; lake copper, 12.85c.; electrolytic, 12.60c., all at St. Louis. The demand for finished metals the past week shows considerable improvement.

Iron and Industrial Stocks

NEW YORK, April 5, 1911.

Another week of comparative stagnation has been experienced in the stock market. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref.....	31	Railway Spr., com.....	34
Beth. Steel, com.....	32 - 32½	Railway Spr., pref. 99 - 100	
Beth. Steel, pref. 61½ - 62½		Republic, com.....	32½ - 33½
Can. com.....	90½ - 98½	Republic, pref.....	97½ - 97½
Can. pref.....	80 - 81	Sloss, com.....	52½ - 53
Car & Fdry, com.....	53½ - 54½	Pipe, com.....	56 - 58½
Car & Fdry, pref.....	115	Pipe, pref.....	58 - 58½
Steel Foundries.....	46½ - 47½	U. S. Steel, com.....	77½ - 79½
Colorado Fuel.....	31½ - 31½	U. S. Steel, pref.....	118½ - 119½
General Electric.....	148 - 149½	Westinghouse Elec. 66½ - 67	
Gr. N. ore cert.....	60½ - 63½	Am. Ship, com.....	71½ - 72½
Int. Harv., com.....	116½ - 119	Am. Ship, pref.....	111½
Int. Harv., pref.....	124½	Chi. Pneu. Tool.....	51½ - 52½
Int. Pump, com.....	40½ - 41	Cambria Steel.....	47½ - 47½
Int. Pump, pref.....	88½	Lake Sup. Corp.....	27½ - 29½
Locomotive, com.....	37½ - 38½	Pa. Steel, pref.....	107½ - 108
Locomotive, pref.....	107½ - 108	Warwick.....	11
Pressed St., com.....	33 - 33½	Crucible St., com.....	12½ - 13
Pressed St., pref.....	98	Crucible St., pref.....	79½ - 79½

* Ex dividend.

Dividends.—The International Steam Pump Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable May 1.

H. R. Worthington, Inc., has declared the regular semi-annual dividend of 3½ per cent. on the preferred stock, payable May 1.

The Vulcan Detinning Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable April 20.

The Thompson-Starrett Company, New York, has declared the regular 4 per cent. semi-annual dividend on its preferred stock. The Board of Directors has recommended to the stockholders an increase in the common stock from \$1,000,000 to \$1,500,000.

Notes on Prices

Rope.—Business with manufacturers is keeping up in volume about as for past months without any special indications of a spring revival. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per pound; second grade manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ½-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—The holding off of consuming manufac-

turers in placing large orders for oil has more than offset the diminished receipts of flaxseed, so that card quotations for jobbing lots in the Eastern market are only a cent higher than at the beginning of the year. The decline in the price of foreign oil, of which considerable has been imported to this country, has also had some effect in keeping prices of domestic oil lower than perhaps they would have been except for this influence. A general quotation for carloads of raw oil is 89c. for immediate delivery, while close buyers could get lower figures. Lower card prices have been announced as follows, New York, in 5-barrel lots or more:

State, raw.....	Cents. 91
City, raw.....	91
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Bolled oil, 1 cent advance per gallon over raw.	

Naval Stores.—Prices of turpentine in the local market have declined 5c. per gallon in sympathy with freer receipts of the crops at primary points in the South. The demand here has been for immediate requirements which are small. New York turpentine quotations in 5-barrel lots are as follows:

In oil barrels.....	\$1.04½
In machine barrels.....	1.05
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins have been advanced in price, with moderate buying in New York. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$8.50 and grade D at \$8.60 in the New York market.

The new plant of the Omaha Structural Steel Works, Omaha, Neb., is practically completed and will be in operation in about three weeks. The building is of steel construction and all equipment will be operated by individual motors. The company will fabricate structural steel for buildings and bridges.

The Miller-Owen Electric Company, 217-219 First avenue, Pittsburgh, Pa., dealer in electrical machinery and general repairing, is agent in the Pittsburgh district for the Kimble alternating current motors for Gordon and Universal presses, made by the Kimble Electric Company, Chicago.

The furnace of the Lawrence Iron Company, Iron-ton, Ohio, is making a remarkable record. It is running on basic, cast in chills, and for more than 600 casts not a ton has gone over one per cent. in silicon or 0.05 in sulphur. The greater part of the iron has been below 0.50 in silicon and 0.025 in sulphur.

The plant of the Western Stove Works, Peoria, Ill., has been sold at auction to F. E. & F. H. Avery, of that city, who desire to sell or lease the plant after the sale has been confirmed by the court. The plant is fully equipped for the manufacture of stoves and repairs.

The McClintic-Marshall Construction Company, Pittsburgh, Pa., with works in that city, also at Carnegie, Pa., and Pottstown, Pa., has opened a branch office in the Trussed Concrete Building, Detroit, Mich., in charge of R. B. Titsworth.

The Earlston Furnace of Joseph E. Thropp, at Everett, Bedford County, Pa., made 8456 tons of foundry iron in the month of March. This is a new high record for the furnace. It also made a record for low fuel consumption and low cost of labor.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, has received a large contract for special machinery from the Inland Steel Company, Chicago.

No. 2 furnace of the Warwick Iron & Steel Company, Pottstown, Pa., which was expected to go out April 2, will not be blown out until late in the present week.

The Northern Iron Company, Port Henry, N. Y., blew out its Standish Furnace April 4, for relining and general repairs.

The Ironton Iron Company blew out its furnace at Ironton, Ohio, April 2, for relining.

New Publications

Textbook of the Principles of Machine Work.—By Robert H. Smith. Bound in cloth. Size, 5 x 8 in.; 388 pages; 434 illustrations. Price, \$3 net. Published by the Industrial Education Book Company, Boston, Mass.

Textbook of the Elements of Machine Work.—By Robert H. Smith. Bound in cloth. Size, 5 x 8 in.; 192 pages; 204 illustrations. Price, \$2 net. Published by the Industrial Education Book Company, Boston, Mass.

These two books have been brought out in an effort to supply textbooks covering the field of machine work, and the aim has been to give the beginner in these subjects the advantages of textbooks similar to those used in studying other older subjects, so that the fundamental as well as the advanced principles may be quickly acquired in a logical, systematic and progressive manner. In both books the student is told how to do things and the theory connects principles and practice. Machines, mechanisms and tools are graphically illustrated by original mechanical and prospective drawings and condensed tables describe them briefly and systematically. Condensed schedules which name the materials, the operations, the machines, the jigs, the fixtures and the tools give operations in machining and standard and typical problems in machine construction.

In both books numbered sections are used, which make it a simple matter to locate cross references. In the former book speed and engine lathes, with their various attachments and the operations performed by them, are described in the first half. This is followed by chapters on grinding and drilling machines, a special chapter being devoted to multiple spindle and radial drilling machines. Bolts and nuts, machine screws, counterboring and countersinking and calipering and thread testing are covered in two chapters, while the final chapter contains tables and other data used in machine work.

The other book gives the history and the origin of machine tools and the materials used in machine construction. This is followed by instructions for reading drawings and the use of measuring, laying out and operating tools. The next chapters, III. to V., inclusive, are devoted to chipping and tool grinding and machine filing and scraping and polishing. Instruction on the treatment of the various types of steel is given in Chapter VI., and the next chapter tells of the hand and machine methods of cutting off stock. Pipe and pipe fittings and scraping and bending occupy the next two chapters. Brazing, soldering and babbitting are discussed in Chapter X., while the next chapter is given over to the various forms of power transmission and instructions for aligning and leveling shafting and installing machines. The final chapter contains tables and data.

Inventors and Inventions.—By Henry Robinson. Published by the author, 41 West Thirty-third street, New York City. Paper covers; pages, 96. Price, 25 cents.

The author has here given a great deal of practical advice to inventors. He covers the whole field, from the conception of an invention through its design and financing to manufacturing and marketing. Pointers are given on successful manufacturing. A number of chapters treat of the methods by which inventors are robbed of the fruit of their brains. Caustic strictures are made on the lack of protection given by the Government to owners of patents. The book is profusely illustrated.

New Republic Iron & Steel Company Plant.—The Republic Iron & Steel Company will blow in its new blast furnace at Youngstown, Ohio, the fourth of the Hazelton group, about May 1. The open hearth plant at Hazelton will probably be started up in May. Four of the eight 60-ton furnaces will be operated to begin with.

The Detroit Iron & Steel Company has both its furnaces on Zug Island in operation, Furnace B having blown in on March 25.

Personal

Clyde M. Carr, president of Joseph T. Ryerson & Son, Chicago, is spending a few weeks in California.

W. A. Wilbur, president of the Bethlehem Foundry & Machine Company, South Bethlehem, Pa., announces that W. V. Knauss, treasurer, has resigned, to take effect April 1. Mr. Knauss retires after an honorable business career of over 45 years. Miss Iva E. Krause succeeds him as treasurer of the company.

Harry M. Lane, president of the Lane & Bodley Company, Cincinnati, met with a serious accident March 30. A large casting, being lifted in the shop, fell on his feet, mashing one foot off at the ankle and painfully injuring the other.

George K. Leet becomes secretary to Chairman E. H. Gary of the United States Steel Corporation, succeeding the late W. K. Fleming. Mr. Leet has been secretary to Assistant Secretary of the Treasury Andrew.

Wm. B. Cowles, for a number of years vice-president and treasurer of the Long Arm System Company, Cleveland, Ohio, has opened a consulting engineering office in Detroit.

Lyle W. Orr, formerly with the Reznor Mfg. Company, Mercer, Pa., has become manager of the Modern Tool Company, Erie, Pa., filling the vacancy caused by the death of Frank L. Gallagher.

J. B. Henry, who on April 1 withdrew from the sales department of the United Engineering & Foundry Company, Pittsburgh, is now superintending the construction of the large additions which the Union Steel Casting Company is making. Mr. Henry has been in the steel casting business all his adult life, having been employed in official capacities at the Alliance and Sharon plants of the American Steel Foundries, previously with the Union Steel Casting Company, and latterly with the United Engineering & Foundry Company.

F. R. Sites, formerly with the sales engineering department of the Riter-Conley Mfg. Company, Pittsburgh, Pa., has resigned, and commencing April 10 will be connected with the operating department of the American Steel & Wire Company, at Cleveland, Ohio.

The report that F. W. Hudson of Chicago had been appointed superintendent of the plant of the American Steel Foundries, at Sharon, Pa., is officially denied.

W. C. Du Comb, assistant engineer for the Standard Roller Bearing Company, has resigned to become connected with the Royerford Foundry & Machine Company of Philadelphia and Royerford, Pa., manufacturer of Sells roller bearings. Mr. Du Comb was engineer of the Riehlé Brothers Testing Machine Company for several years.

F. Charles Scribner, for the past three and one-half years general foreman of the gauge and tool departments of the Wells Bros. Company, Greenfield, Mass., has severed that connection and has accepted the position of inspector of gauges with the Colt's Patent Firearms Mfg. Company, Hartford, Conn.

Alexander E. Brown, president and general manager of the Brown Hoisting Machinery Company, Cleveland, who has been in ill health since last July, suffered a second stroke of paralysis March 31, but his condition is not regarded as critical.

A Firth-Sterling Steel Poster.—E. S. Jackman & Co., Chicago, sales agents for the Firth-Sterling Steel Company, McKeesport, Pa., have issued a dissertation on steel in novel form. It is a blue print, the letters appearing in white. The title is "Firth-Sterlingism." The gist of the dissertation is that credit for a good tool must be given to all connected with its preparation from the maker of the steel to the man who finishes it. It concludes: "The mission of a bar of steel has only begun when it is delivered to the buyer. At that point the seller's responsibility ceases and the buyer's responsibility begins. The outcome is beyond the control and responsibility of the maker of the steel. Superiority in steel is a fact. All steel is not alike. There is more in steel than chemists can find. Good steel came before

laboratories. Good bread came before cook books. Good blacksmiths and good mechanics came before printing presses."

The New Lozier Plant at Detroit

The Lozier Motor Company formally opened its new plant at Detroit, Mich., April 3. The factory, which has been under construction since last May, commenced operations with a force of 450 men, which will be increased as rapidly as possible until all departments are in full operation. It is located on the Detroit Terminal Railroad on a site comprising 65 acres. It was built to enlarge the manufacturing facilities of the company, whose cars have heretofore all been built in the plant at Plattsburgh, N. Y. This factory will continue to operate as heretofore, but will build units for use in the Detroit works, the latter plant being the only one in which the completed cars will be turned out. The two factories at Detroit and Plattsburgh will have a combined output of 1000 cars for the coming season, all parts of which will be made in these factories from raw materials. The buildings, comprising the new Detroit factory, are fire-proof, constructed of steel and concrete, the flat slab type of construction being here employed for the first time in an automobile factory. They were designed, and work was carried on under the personal supervision of Albert Kahn, architect and designer of many of the best known automobile plants.

The main building, two stories, covers the entire frontage of 800 ft. on Mack avenue, with side wings extending back approximately 200 ft. In this building are located the factory offices, restaurant, final assembling, physical and chemical laboratories and experimental departments, together with the body construction and finishing department. Building No. 2 is of one story saw tooth construction, covering 68,000 sq. ft., and contains the machine shop, chassis assembling, finished stock and chassis testing departments. Other buildings are devoted to power generation, heat treating, rough stock, garage and other purposes of this nature. The power building is equipped with two 350-hp. water tube boilers and Detroit stokers, one Hamilton-Corliss engine direct connected to a 625 K. V. A. Allis-Chalmers generator and one Laidlaw-Dunn-Gordon air compressor. All departments of the factory are operated by electric power. Ninety per cent. of the machinery throughout this plant is entirely new and of the latest type, installed entirely with the view to producing high-class motor cars.

The Wheeling-La Belle Steel Merger Off.—Negotiations which have been under way for some time looking to a merger of the interests of the La Belle Iron Works, Steubenville, Ohio, and the Wheeling Steel & Iron Company, Wheeling, W. Va., have been called off. At a meeting of the Board of Directors of the La Belle Iron Works, held at Steubenville last week, it was decided not to do anything in the matter for the present at least.

The Shenango Furnace Company, Pittsburgh, W. P. Snyder president, is circulating a booklet dealing chiefly with the iron ores of its Mesaba and Menominee range mines. The company's Bessemer ores are the Shenango, Tyrone, Webb and Whiteside, while the non-Bessemer group is composed of Wilpen, Webb and Whiteside for the Mesaba range, and Clifford and Antoine of the Menominee range. Of all of the above, analyses are given. The company's standard Bessemer and basic pig irons and the malleable pig iron of the Mabel Furnace are also described by analyses. Illustrations are given of the company's mining, coke, blast furnace and vessel properties.

The Sims Company, Erie, Pa., maker of steam specialties, has received an order from the John B. Stetson Company, Philadelphia, for an 8000-hp. feed water heater weighing 24,000 lb. This will be the largest feed water heater ever turned out by the company. Among other orders recently received was one for a carload of 18 feed water heaters for shipment to Sherman, Texas.

New Tools and Appliances

This is essentially a news department for which information is invited.

Commutating Pole Motor.—The General Electric Company, Schenectady, N. Y., has just brought out a new type of commutating pole motor which is especially designed for the severe service required in many industrial power applications. The special feature of these motors is that the commutating poles are connected in series with one another and with the armature, an arrangement which enables sparkless commutation to be secured over wide ranges of load and under adverse operating conditions, since the magnetizing force of the poles is in proportion to the armature current and may be employed to compensate for armature reaction. In addition a wider range of speed control is secured than is possible with motors of the non-commutating pole design. A fan mounted on the armature shaft within the pulley and bearing head secures internal ventilation and insures cool operation. The main field coils are wound on horn fiber spools and are well insulated, the winding being rendered moisture proof by a thorough impregnation with a special insulating compound. Before the coils are finally assembled they are armor wound with a single layer of enamel covered wire which serves the double purpose of protecting the windings from mechanical injury and assisting in heat radiation. The poles are wound with rectangular copper wire on horn fiber spools. Special care has been taken in the design to secure a commutator that would be entirely free from loose or high bars. The outer corners of the segments are rounded to prevent the mica insulation from chipping and the inner edges are notched to prevent short circuiting between the bars. There are also small grooves in both sides of the segments which serve to anchor the mica segments firmly, thus avoiding the possibility of high pieces of mica.

Induction Motor Starter.—An improved type of hand operated starting compensator for an induction motor has been recently placed on the market by the General Electric Company, Schenectady, N. Y. This compensator consists of an inductive winding with sub-voltage taps and a switch for connecting the taps to the motor. In use the motor is thrown directly from the starting tap to the line, the proper sub-voltage tap being permanently connected with the switch. This enables a reduced voltage to be applied to the motor to start it and bring it up to speed. The proper voltage to be used for starting is determined by trying all of the several taps with which the compensator is provided, and the one that is most suitable is secured by permanently connecting the corresponding tap to the switch. In designing the compensator care has been taken to insure the proper and effective protection of the motor. To prevent the motor from being thrown on the line by accident, the off position of the switch is located between the starting and the running positions, and an automatic latch holds the handle in this position. In this way it is impossible for the operator to throw the handle into the running position without first throwing it into the starting one. A system of spring actuated release levers attached to the switch shaft and an equipment of no-voltage and overload relays, which operate in conjunction with each other and with the hand operated mechanism, comprise the automatic protection. The motion of the operating handle toward either the starting or the running position is always opposed to the tension of the spring actuating the release levers, and if the handle is accidentally left on the starting position, the contractile action of the spring returns it to the off position immediately. The relays operate to produce a similar result. The no-voltage relay frees the release levers, and the spring immediately returns the switch to the off position, thus disconnecting both the motor and the compensator from the supply circuit and protecting them from the returning full line voltage. The overload relays which are inserted in the running circuit are designed to remain unaffected by the usual rush of current at starting, but can be adjusted to operate at a

slight rise above the normal current and open the no-voltage relay circuit, the action of the spring returning the switch to the off position.

Speed Box.—The American Tool Works Company, Cincinnati, Ohio, has recently brought out a new eight-change speed box which is intended to be applied to its 4, 5, 6, and 7 ft. plain and full universal triple geared radial drills. The box is of the cone and tumbler construction and provides eight speeds, each of which is instantly obtained by shifting the tumbler lever. The speeds are secured through four change gears on the lower shaft and three on the tumbler which is of the compound type. All the driving gears are of special steel and are of the Brown & Sharpe 20-deg. involute pointed tooth type. The tumbler lever is located in its various positions by a notched plate which prevents the gears from being improperly engaged and when the tumbler is located, it is securely locked in position by a latch pin. The speeds can be easily changed without shock, as the cone gears rotate while the speeds are changed. An auxiliary drive between the pulley and the cone shaft which is automatically engaged or disengaged by the raising and the lowering of the tumbler lever while changing speeds enables this to be done. The drive is positive in its action and operates through a friction clutch. A shock absorber in the line of drive absorbs all shocks and strains, thus insuring long life to the driving mechanism. This style of speed box is interchangeable with the four-step cone pulley regularly furnished and also with the four-speed friction type of speed box and will transmit enough power to enable a 6-ft. radial drill to pull an 8-in. pipe tap.

Heavy Double Crank Press.—The Max Ams Machine Company, Mount Vernon, N. Y., has placed on the market a new line of presses which is especially designed for stamping operations of the heaviest character, such as blanking and forming automobile parts, stair risers and metal ceilings and shingles. The frame is of the builder's standard built-up type, reinforced by four steel rods to take the entire working strain. The slide is gibbed and has parallel adjustments for raising and lowering. The striking surfaces of the clutch, which is of the sliding block type, are lined with hardened steel faces, and to prevent their edges from tearing off the block is pushed a sufficient distance from the wheel to give clearance. A new safety trimming device, which compels the operator to have both his hands on the levers to start the press, forms a part of its equipment. In this way it is impossible for the operator to have his hands between the die and the punch at any time while the press is in operation, and if the weight of the pieces necessitates the employment of two men, the machine can be supplied with an extra set of levers placed in a convenient location. The new press measures 60 in. between the uprights, has a slide stroke of 3 in. and in complete working order weighs approximately 40,000 lb.

Combination Drill.—The Standard Tool Works, Standish, Maine, has recently developed a combination drill, which is made by using two sizes of specially shaped steel, the shank of the smaller one being turned taper and fitting into the larger drill as if the latter were a socket. The object of the smaller drill is to relieve the center in the same way that small holes are often drilled to make it easier for the large drills to enter the work.

New Coke Rates.—Effective May 15, rates of freight on coke from the Connellsville region to Chicago will be \$2.50 per net ton on furnace and commercial coke, the rate to Toledo will be \$1.95 a ton and to Detroit will be \$2.10 on both furnace and commercial coke, instead of \$2 a ton on furnace coke and \$2.25 a ton on commercial coke, as at present. There will be no change in the freight of coke to Cleveland, which will remain at \$1.65 a ton as at present.

The Cambria Steel Company had all its eight furnaces at Johnstown, Pa., in blast April 1, Nos. 1 and 7 having blown in in March.

The Mackle-Crawford Construction Company has removed its office to room 221 Grant Building, Atlanta, Ga.

Elongation and Ductility Rail Tests*

Requirements of the New York Central Lines

BY P. H. DUDLEY.

The acceptance of rails under a single drop test of 2000 lb., falling a given height, rejects only those of less ductility than is required to take up the energy of the drop before rupture. This range of rejections varies from a small percentage of 1 to 3 per cent. of the output, and all in manufacture should be avoided.

Experience has shown that there are likely to be a number of heats of Bessemer and occasionally a melt of open hearth rails in which the ductility is just sufficient to absorb the energy of a single blow of the drop and pass the rails. The butts, however, will break from a second blow without giving any increased elongation, while a number of the rails are so severely strained by gaging in the straightening presses that the strains develop into checks and detailed fractures from service in the tracks.

The percentage in plain Bessemer ranges from 2 to as high as 15 per cent. in some rollings, and is yearly increasing in this class of rails. Eighty to 90 per cent. of the heats of Bessemer or of the melts of open hearth require two or more blows under the drop to break them, giving a desired range of 12 to 18 per cent. of ductility in the rails for service as girders, which experience shows has rendered excellent service in New York Central lines, where the temperatures often fall to 30 and 40 degrees F. below zero. It is only natural that railroad officers should try to secure as good material as was possible from 1890 to 1900, or better, in rails for their constantly increasing wheel loads and speeds.

The 1890 specifications of the Boston and Albany and New York Central & Hudson River for the low 0.06 phosphorus and 0.60 to 0.65 carbon Bessemer rails, required a drop test from each heat and that 90 per cent. should stand a test of 2000 lb. falling 20 ft. without breaking for either the 80, 95 and 100 lb. sections. To this requirement was soon added the proviso that where a butt broke, yet gave 4 per cent. maximum elongation per inch, the rails of the heat would be accepted. It is but proper to say that while a few of the rails had a minimum range of 4 per cent. ductility, the majority had from 8 to 16 per cent., and comparatively few breakages occurred. The surface wear and flange abrasion were of slow rates, the rails lasting two and three times as long as more recent Bessemer rails.

To carry the present high speed wheel loads, the former minimum elongation of 4 per cent. per inch has been raised to 6 per cent., for the maximum inch or two consecutive inches must each give 5 per cent. The ductility of the metal must be exhausted in the test butt from Bessemer heats in which the equivalent of one-tenth of 1 per cent. of metallic titanium has been used in the bath of steel. The range of ductility secured in this steel is the minimum specified to 18 per cent per inch, though the range of the majority of the heats is from 11 to 16 per cent. Of the Bessemer heats each, according to weight of section, makes from 18 to 30 rails accepted or rejected by one ductility test.

The basic open hearth melts of 60 to 80 tons each, making from 100 to 150 rails, according to section, are accepted or rejected upon the results of three ductility tests, one from the second ingot, one from the middle ingot of the melt, and a third from the next to the last ingot teemed. To accept the rails of the melt each test must show 6 per cent. maximum elongation for 1 in., or 5 per cent. each for 2 consecutive in. The ductility of the metal is exhausted in rotation from each of the different tests of the melt, and we thus ascertain the general uniformity of the steel of the first to the last teemed. This has tested, but not confirmed, a published statement that the first steel teemed is liable to have so high a temperature that it will be brittle; while the middle ingot will have a proper temperature and be tough, the

last ingot will be teemed of steel so cold that it will be brittle. This does not seem to apply to these large melts of rail steel, as shown by the ductility tests. Basic open hearth rails have been rolled under these specifications at Bethlehem, Buffalo and Gary.

The three tests per melt on the open hearth rails call attention definitely to several conditions of mill practice which in hot metal must proceed at the right temperature in a logical and orderly manner. A melt or two at first did not pass; but the causes for failure could be quickly ascertained and remedied in the following melts, the making and rolling of the steel proceeding in a more satisfactory manner to both the manufacturer and customer. The specifications provide that a distinction must be made between a chilled butt and one that is brittle, before acceptance or rejection of rails, while the full ductility tests give the low as well as the high range—facts not before available for the manufacturers to study, to guide their efforts to secure the desired range.

The specifications are intended as an aid to good commercial work in manufacture for the necessary quality for present service as well as output. Attention is called to good mill practice after the ingots are teemed and set on top; they should be promptly stripped, weighed and charged into reheating furnaces. This is to avoid unnecessary cooling of the metal, developing large shrinkage cavities in the ingots from the inexorable law that molten or hot steel has a greater volume than when cold.

The management of one rail mill has organized a railroad service for uniformly prompt delivering and charging into the reheating furnaces of its large ingots, with the result of nearly entire elimination of piped rails, under the commercial discard.

The consolidation of the Bucyrus Steel Castings Company and the Carroll Foundry & Machine Company, Bucyrus, Ohio, which has been under consideration for several weeks, was effected April 1. The former company took over the latter, but the consolidated company will bear the name of the Carroll Foundry & Machine Company. The capital stock will be increased from \$200,000 to \$500,000. The former officers of the Bucyrus Company will hold the same positions in the new company, as follows: President and manager, P. J. Carroll; vice-president, Frank P. Donnenwirth; secretary and treasurer, W. A. Blicke.

The Bessemer gold medal of the Iron and Steel Institute will this year be awarded to Prof. Henri Le Chatelier, the eminent French metallurgist, in recognition of his great services in the advancement of metallurgical science. The presentation will be made by the Duke of Devonshire, president of the Institute, at the annual general meeting to be held in London in May, 1911. The Andrew Carnegie gold medal for 1910 will also be awarded at the same meeting, the recipient being Felix Robin, Paris.

The borough of South River, N. J., has placed an order for pumps for its new water works with the Buffalo Steam Pump Company, Buffalo, N. Y. This equipment consists of two 5-in. two-stage centrifugal pumps, each having a capacity of 800,000 gal. of water per day against a total head of 135 lb. The pumps will be driven by 75-hp., 1700 rev. per min., Fort Wayne motors.

Canadian advices state that a syndicate which aims to bring the independent nail works of the country into a common ownership has made an offer for the property of the Maritime Nail Company, at St. John, New Brunswick.

The Lackawanna Steel Company, Lackawanna, N. Y., now has four of its blast furnaces active. No. 2 Furnace was blown out April 1.

Three of the six Ensley furnaces of the Tennessee Coal, Iron & Railroad Company were in blast April 1, No. 4 having blown in on March 4.

* Submitted to the convention of the American Railway Engineering and Maintenance of Way Association, Chicago, March 22, 1911, as an appendix to the report of the Committee on Rail.

The Triple Supply Convention

LOUISVILLE, Ky., April 3, 1911.—The triple convention of the American Supply and Machinery Manufacturers' Association, the Southern Supply and Machinery Dealers' Association and the National Supply and Machinery Dealers' Association opened here this morning with an interesting session, which brought out some decided opinions on legislation affecting business. The meeting was formally opened with prayer, and there followed an address of welcome by Augustus E. Willson, Governor of Kentucky, whose happy manner of welcoming the delegates brought out considerable applause. A representative of the Mayor of the city also made an address of welcome, which was responded to by William Heyburn of the Belknap Hardware & Mfg. Company, Louisville. Mr. Heyburn spoke in decided terms, criticizing the laws curtailing the privileges of manufacturers' associations. He said:

The laws of the country are such that there are limited opportunities for associations of the kind you represent. Germany has definite laws, and business organizations are licensed. Their purposes are definitely outlined and they are given definite privileges. I have never been able to see why our own lawgivers are so blunt in their legislation against trade associations.

Mr. Heyburn went on to say that the laws governing manufacturers' associations were not only crude but unfair. He gave it as his opinion that the discriminations against manufacturers by legislators made it necessary for the formation of trusts by manufacturers for self-protection. The present laws, he stated, do not apply to all classes of business, and they might at least have the recommendation of being uniform. Referring to the formation of monopolies again, the speaker stated that he did not wish to assert that such combinations were bad institutions, but rather indicated the trend of business, coming about because agreements necessary to manufacturing interests are not permitted. The speaker concluded by asking the members to use all their power to bring about legislation as regards business associations that will be fair.

Edward C. Hinman, American Steam Pump Company, Battle Creek, Mich., remarked that there are men in Washington having power in legislative affairs who never manufactured anything, never employed men and who never signed a payroll. He added that he was glad the time had come in business when there was no North and no South.

W. M. Pattison, president of the National Dealers' Association, and H. C. Clark, president of the Southern Dealers' Association, also spoke in response to the addresses of welcome.

John Trix, American Injector Company, Detroit, Mich., who recently returned from a trip to Panama and South America, spoke in praise of the manner in which the canal construction operations are being conducted. He said that men are too prone to make accusations of graft, when the public's money is being spent on public utilities. His investigations taught him that the expenditures for the canal work are being carefully handled. The speaker added that he had been 31 days at sea and had not seen the American flag on a vessel. He hoped that the associations would advocate that the American Congress have the good sense to pass necessary laws subsidizing the merchant marine. He said that every piece of German freight that goes into the hold of a German vessel is carried at a reduced freight rate.

George Puchta, Queen City Supply Company, Cincinnati, in talking of the business outlook, asserted himself to be an optimist in the fullest sense. Said he: "We have seen a good year's business and good crops. The Canadian reciprocity question will soon be solved satisfactorily, I hope. The currency situation, I think, is about to be solved, so that when we need money most we can have it, and nothing should stand in the way of a good and growing business in the near future."

This afternoon the dealers' associations held separate meetings and organized. The Executive Committee of the Manufacturers' Association held a session which lasted all the afternoon.

The principal event of the afternoon session of the

Southern Dealers' Association was the report of Secretary-Treasurer Alvin M. Smith, Smith-Courtney Company, Richmond, Va., which was in part as follows:

Report of the Secretary of the Southern Dealers

We have had a healthy growth in our membership, having received 11 new members in the past year.

While business does not appear to be by any means normal, yet from reports received last year was a much better one than most of us had experienced in the previous three years. We suffered fewer losses and received some advances which, with larger profits secured and fewer bad debts charged off, made us more optimistic for the future. The consensus of opinion is that 1911 will be better than 1910, despite the weighty cases before the Supreme Court and the adverse railroad rate decision, which many think is holding back capital and stagnating business in new enterprises.

Our relations with other jobbers' associations are very harmonious and we are assisting them, as they are us, in all matters of common interest.

CASH DISCOUNTS.

We have succeeded in securing cash discounts from a number of manufacturers who were not allowing same at this time last year, and some who had withdrawn same have at our request reinstated it on condition that our members live up to the terms of payment.

The principal trouble in the securing of cash discounts seems to be that the jobber does not live up to the terms imposed by the manufacturer, who becomes disgusted and withdraws it. It is therefore incumbent upon us to fulfill our part of the contract if we expect to receive the concession. Considering the fact that our own customers impose upon us to such an extent in the case of cash discounts, it seems to me we should get together and not only pay our own bills in the required time, but also make our customers do so.

We have been called in on several occasions to arbitrate claims of our members against public service corporations and have been successful in arranging such grievances satisfactorily. We have urged conservative legislation based on fairness to such companies. The prosperity of the South has been largely promoted by our public service corporations, and we should not join in the universal howl against them but treat them fairly and urge our legislatures and Congress to do so.

Machinery profits, with few exceptions, remain small. We have used every power of persuasion on the manufacturers and they seem to think we should be able to receive as a personal favor the small profits they give us. I would recommend that all of us who stock machinery insist on getting a just margin of profit as a premium for being able to make quick deliveries.

While we of the South were considerably disappointed at New Orleans not receiving the Government's support for a World's Panama Exposition in 1915, we have every reason to believe that the opening of the Panama Canal will mean an era of new and greater prosperity for the South, particularly the Gulf States. The fact that New Orleans is 2000 miles nearer the center of the population than San Francisco and is also 2000 miles nearer the Panama Canal than her Pacific Coast competitor is pretty good evidence that the great bulk of our South and Central American freight passing through the canal will go through the Gulf ports of Florida, Alabama, Louisiana and Texas, and the South should dominate this trade and she undoubtedly will.

The Sixty-first Congress failed to pass the necessary legislation to enable the Post-office Department to start an experimental parcel post, and it is to be hoped the Sixty-second, now convening, will also refuse to sanction this outrage. Our association will continue its efforts in conjunction with other associations to prevent any parcel post extension. Such a calamity would mean a largely increased postal deficit and further delay 1-cent letter postage.

It is certainly to be hoped that during the next year we will try to get better profits on staple goods, such as shafting, spikes, bolts, nuts, nails, &c. It is ridiculous to hear of a jobber selling shafting out of stock at 50 per cent. off, when it cost him 57 per cent. in carloads, and yet we are doing it every day. This same foolish margin of profit is being got on all the above lines. Let us reform and begin with the staples.

The National Dealers' Association

This association spent most of the afternoon in organizing its separate convention.

The annual reports of the officers were received, and some little time was occupied in discussing resale prices. The meetings of both of the dealers' organizations were executive sessions.

The Manufacturers' Association

LOUISVILLE, Ky., April 4, 1911.—(By Telegraph.)—The Manufacturers' Association formally organized this morning. The session was given over largely to the discussion of employers' liability for accidents.

Secretary F. D. Mitchell, in his annual report, showed that the organization had increased 25 per cent. in membership, and eight manufacturing companies were admitted to the association at the meeting. President S.

P. Browning, Ohio Valley Pulley Works, Maysville, Ky., announced the convention committees, after which the meeting was opened for general discussion.

The question of reimbursing dealers for depreciation in stocks of machinery in the event of a decline in price was brought up by several manufacturers, all of whom declared themselves unfavorable to any such plan. It was argued by one speaker that such action would only be warranted providing the dealers agreed to divide their profits with manufacturers on stocks on hand when prices advanced. Another suggested that even though the dealers acquiesced to such a proposal, it would be hard to make adjustments in the event of price changes.

The question of employers' liability in cases of accident was brought up by John Trix, who declared that most of the State laws covering workmen's compensation are unjust, and commended the workmen's compensation laws of Germany.

Edward C. Hinman, American Steam Pump Works, Battle Creek, Mich., said that his company maintained a humane policy in treating with its injured workmen, and had never had a lawsuit with one of its employees. He explained as follows: "If one of them is ill, we see that he gets proper care and pay for it. If he dies, we bury him, and let his fellow workmen attend the funeral. We pay the damages if we maim them, and we are always fair. If all manufacturers were humane there would be no need for legislation."

S. K. Broderick, Broderick & Bascom Rope Company, St. Louis, said that manufacturers had more to fear from unjust legislation than from ambulance chasing lawyers. He believed that the best way to solve the problem was to encourage industrial training and get closer to the needs of the workmen, adding that manufacturers pay more attention to the whole machine and neglect the needs of the individual.

Melville W. Mix, Dodge Mfg. Company, Mishawaka, Ind., said that a prominent law maker had declared to him that the manufacturers would only charge their compensation taxes in their business and the ultimate consumer would eventually pay the bill. Mr. Mix was inclined to take the same view, as it would be only natural for the manufacturers to apportion the tax to their overhead expenses. The only difficulty would be that different laws in different States might create unequal competition.

During the meeting President Browning stated that in the past the association had given most of its attention toward recruiting new members and he added that the time had come for the organization to make itself useful to the members in a business way. A resolution of regret was passed on the death of A. S. Upson, president Upson Nut Company, Cleveland, Ohio.

The National Dealers' Association

This organization at its meeting talked at length on manufacturers selling in competition with accredited dealers. Wallace M. Pattison, W. M. Pattison Supply Company, Cleveland, Ohio, stated that he believed the association ought to take a firm stand in influencing the manufacturers to recognize the dealers and refrain from entering into competition with their agencies. He mentioned means that had been taken by dealers in meeting manufacturers' competition by quoting prices from catalogues of mail order houses, and said that dealers were often obliged to take such methods of protecting themselves when the manufacturers were protected by price agreements and the tariff.

The president called attention to the increasing expenses of the machinery selling business and said that a two per cent. profit is all that can be made on many sales.

There followed a general discussion on the expense of doing business and then the question of manufacturers' competition came up. It was pointed out that following a price decline the machinery and supply dealer was at the mercy of the buyer, as the manufacturer was ready to dispose of stocks at the reduced quotations. The consensus of opinion seemed to be that the dealers should decline to do business with a manufacturer unless the latter agreed to share losses in case of a decline or give the

dealer a chance to recoup by refraining from underselling in the dealer's territory.

The Southern Dealers' Association

This association at its morning meeting listened to an address on "The Cost of Doing Business and the Proper Method of Handling Expense Items," by W. P. Simpson, C. T. Patterson Company, Ltd., New Orleans, and a paper on "The Proper Method of Compensating the Traveling Salesmen," by E. Howard Smith, Superior Supply Company, Bluefield, W. Va.

The afternoon was given over to a question box discussion during which the one cent letter postage question was talked over to some extent.

To-morrow the three associations will elect officers and hold a joint session.

P. A. W.

The Yale & Towne Mfg. Company Will Establish a Canadian Plant

The Yale & Towne Mfg. Company, Stamford, Conn., of which Henry R. Towne is president, has had under consideration for some years the question of establishing a plant in Canada, and has recently decided to do so. This plant will be located at St. Catharines, Ont., and will be designed to conduct the Canadian business of the company, which is already considerable and is steadily growing. The chief products of the company comprise locks of all kinds, builders' hardware and chain pulley blocks, facilities for the production of all of which will be provided in the St. Catharines plant, where the methods of production and standards of quality so long established in the parent plant will be maintained and continued. The ground for the plant has already been acquired, arrangements for construction are under way, and it is hoped to have the plant in effective operation early in 1912. When this point is reached, due announcement will be made to the Canadian customers of the company, who in the meantime will continue to be served from the parent plant through its general offices, 9 Murray street, New York.

The Cambria Paint & Color Company's Improvements

The Cambria Paint & Color Company, Johnstown, Pa., having recently disposed of its site to the Baltimore & Ohio Railroad, which desired the ground for the purpose of enlarging freight yards, has secured another location, to which it has moved part of its buildings and equipment. The old buildings thus removed comprise two, one of which is 38 x 90 ft. and the other approximately 38 x 200 ft. A new brick building, 50 x 150 ft., to be used for grinding and mixing paints and colors, and another, 32 x 100 ft., will shortly be erected, the contract for their construction having been placed with a local builder. New lead mills and some other equipment will be required. New motors will also be ordered for the mixing department, while the grinding of colors will be done by steam power. It is expected that the new plant will be completed and ready for operation about the middle of the year.

The Central Foundry Company's affairs are now likely to be adjusted shortly. Judge Hough, in the United States Circuit Court, signed an order Tuesday authorizing the receiver, Waddill Catchings, to accept the offer of Frederick H. Buss and Daniel A. Homan to buy the property of the bankrupt corporation in its entirety. The amount named as the purchase price is \$1,659,500, this covering all the assets except the stock of the Standard Radiator Company. This will be followed by the reorganization of the company.

The Morgan Engineering Company, Alliance, Ohio, states that it has not purchased any stock in the Shull Steel Castings Mfg. Company, Canton, Ohio, and never had any interest in it.

Workmen's Accident Compensation

A Review of Bills Proposed by Commissions in Seven States

P. Tecumseh Sherman, formerly New York State Labor Commissioner, prepared for a recent issue of the *Survey*, New York, a review of the reports of the various State commissions on employers' liability for accident, or rather employees' compensation for works accidents. Mr. Sherman goes at length into an analysis of the various bills, commenting on their resemblances and differences and pointing out the causes for the latter. We have referred from time to time to the progress of the work of the commissions in the various States and to features of the bills as they were reported, but Mr. Sherman's summary is of special value in bringing the details of the seven bills together for ready comparison, and we reprint below that portion of it which presents the main features of each. The New York law, applying to certain dangerous trades, which was recently declared unconstitutional, is summarized at the beginning for purposes of comparison:

New York

The New York law applies only to a few exceptionally hazardous occupations and industries, and only to those injuries therein due to the fault of the employer or of "fellow servants," or to "trade risks." The "compensation" liability which it imposes is additional to the older liability for damages, and the option is given the injured employee, after the accident, to choose between them. It provides for compensation as follows:

In case of death. If there are total dependents, a lump sum equal to three years' wages, but not to exceed \$2000. If only partial dependents, a proportion of the foregoing. And if no dependents, medical and funeral expenses not to exceed \$100.

In case of disablement: Weekly payments of 50 per cent. of wages if the disablement is complete, or of 50 per cent. of impairment of earnings if it is partial, but of not more than \$10, beginning at the end of the second week and continuing during disablement, but not longer than eight years.

Disputes are to be settled by arbitration or by action at law. A judgment in an action is to be for a lump sum only, equal to the sum of the payments prospectively due.

Illinois

The report of the Illinois Employers' Liability Commission presents a bill which applies to all employments in the course of trade or business; to all employees not "casual," and to all accidental injuries and deaths caused in the course of the employment, except those due to the serious and willful misconduct of the injured employee, and those not causing disablement for more than one week.

It is a mixed "negligence" and "elective compensation" law. It abolishes the defenses of "assumption of risks" and "fellow servant" in the law of negligence, and then gives the employer the option to elect liability for compensation alone, upon condition that he manifest such election in a prescribed public manner. In default of such election the employer is made liable under both laws. If he elects the compensation liability, a contract is presumed between him and each of his employees (except such employee as by written notice expresses a contrary election on his part) to substitute that liability for all others, except where the injury is caused by the willful failure of the employer to comply with "statutory safety regulations," in which case the employer is to be liable for full damages. The compensation payable is as follows:

In case of death: To a widow, parents and descendants, if any, toward whose support the deceased has contributed within five years, three years' wages but not less than \$1500 nor more than \$3000. Otherwise, to other collateral dependents, a proportion of the foregoing. And if no such dependents, not more than \$150 to the personal representative of deceased. The sum above provided for as compensation to dependents is payable for the first six months in installments, like wages, and thereafter in a lump sum or in installments, at the option of the person entitled thereto.

In case of disablement: Periodical payments from the date of and continuing during disablement, or until the sum of the payments equals the amount which would have been due in case of death,¹ as follows: If disablement is complete a weekly payment of 50 per cent. of wages, but not less than \$5 nor more than \$10, for eight years; and thereafter, if complete disability continues, 8 per cent. of the amount which would have been due in case of death, payable in monthly payments during life. The loss of both eyes, or of both hands, &c., is always to be deemed complete disablement. If disablement is only partial, a weekly payment of 50 per cent. of the impairment of earnings, not to continue longer than six years; but other definite proportions of wages in weekly payments for fixed periods are prescribed for certain specified injuries (i.e., the loss of a hand, of an eye, &c.). Where weekly payments have continued six months and the disablement is determined to be permanent, an option is given the injured employee to demand in settlement a lump sum equal to four years' compensation, less the amount of payment received.

Also, for the first 90 days, the employer is to furnish necessary medical care, appliances, &c.

Compensation may be determined by agreement. Disputes must be settled by arbitration.

This bill did not receive the approval of a majority of the commission, which therefore does not recommend it for enactment. The employers on the commission objected to that provision which would leave an employer liable for damages for an accident due to his willful failure to comply with "statutory safety regulations." The labor representatives on the commission filed two sets of objections to the bill. Two of them endorsed the demands of the Chicago Federation of Labor, that an advanced "employers' liability law" should precede a "compensation law." Four of them, on the contrary, objected that the "compensation" liability should be made compulsory instead of elective, and that the compensation provided ("three years' wages" for death and "four years' wages" for complete disability) would be inadequate.

Wisconsin

The report of the Special Committee on Industrial Insurance of the Wisconsin Legislature recommends a bill which applies to all employments; to all employees except those whose employment is but casual or not in the usual course of the trade, business, profession or occupation of the employer, and to all injuries and deaths proximately due to accidents incurred where the employee is performing service growing out of and incidental to his employment, unless caused by willful misconduct (whether of the injured employee, of a fellow servant, of the employer, or of a stranger).

It is a mixed "negligence," "elective compensation," and "compulsory compensation" law. It abolishes the defenses of "assumption of risks" and "fellow servant" in the law of negligence (except as to railroads, as to which those defenses have already been modified); then imposes instead the compensation liability alone upon the State, and each county, city, town, village and school district therein, and then gives every private employer the option to elect liability for compensation alone, upon condition that he manifest such election by filing notice with the Industrial Accident Board, which notice binds him until withdrawn in the manner in the bill prescribed. And unless an employee, at the time of hiring, notifies the employer in writing of his election not to be subject to the compensation law, the liability thereunder is to be the exclusive remedy against the employer for accidental injuries and deaths. It is to be noticed that this leaves the employer liable for damages under the law of negligence, as amended, for accidents due to his "willful misconduct." The compensation prescribed is as follows:

In case of death: If there are total dependents, a sum (less the amount of any payments for disablement previously made)

¹ The effect of this provision upon the following provisions is uncertain.

² A careful study has failed to reveal any such provision in the bill. But what the bill does provide is a conundrum, and this may be the correct answer.

equal to four times the deceased's average annual earnings (to be taken at not less than \$375 nor more than \$750), payable in weekly installments, unless the Industrial Accident Board shall direct payment in gross. Wife, husband and children, under certain conditions, are to be conclusively presumed to be total dependents. If there are only partial dependents, the foregoing compensation is to be proportionately reduced; and if there are no dependents, the expenses of burial, not to exceed \$100.

In case of disability: Nothing for the first week. Thereafter weekly payments as follows: If the disablement is complete, of 65 per cent. of average weekly earnings, or if it be so complete as to render the injured person so helpless as to require a nurse, of 100 per cent. of such earnings; if the disablement is only partial, the foregoing payments to be proportionately reduced: such payments to continue during disablement, but not longer than 15 years, nor to exceed in the aggregate four years' average earnings. (Average yearly earnings are to be taken at not less than \$375 nor more than \$750; and average weekly earnings, at one fifty-second thereof.) Payments may be withheld for 29 days after disablement, and if the injured employee recovers in the interval no payment is to be due.

In addition, the employer must furnish necessary medical and surgical treatment, medicines, appliances, &c., for 90 days; and in case of his failure to do so he is to be liable to others for the cost thereof.

If, after permanent disablement, death results from an independent cause, the employer is nevertheless to be liable for compensation as for death, less the amount of compensation for disablement already paid.

A State Industrial Accident Board is established, to consist of three members. Every compromise (settlement?) of a claim for compensation is subject to review by this board within one year. And every dispute concerning compensation is to be determined by it, subject to review by the courts upon certain questions of law only. Voluntary mutual insurance schemes are permitted, but not as a substitute for the legal liability.

New Jersey

The report of the New Jersey Commission on Employers' Liability recommends a bill which applies to all employments, to all employees except "casual," and to all injuries or deaths in the course of the employment, unless intentionally self-inflicted. Like the Illinois bill, it is a mixed "negligence" and "elective compensation" law. It abolishes the defenses of "assumption of risks" and "fellow servant" and restricts the rule of "contributory negligence" in the negligence law, and then provides that employer and employee may contract for the "elective compensation" liability alone, and that such a contract shall be presumed in every case, unless a contract to the contrary is made in writing. The compensation payable under this bill is as follows:

In case of death: If there are total dependents, weekly payments of varying proportions (from 25 to 60 per cent.) of wages, depending upon the number and relationship of the dependents, but of not less than \$5 nor more than \$10, and not to continue longer than 300 weeks. If there are only partial dependents, such weekly payments are to be proportionately reduced. And if there are no dependents, not more than \$200 for expenses of last illness and burial. Children over 16 and non-resident alien dependents are not to be deemed dependents.

In case of disablement: Weekly payments, beginning at the end of the second week, of 50 per cent. of wages if the disablement is complete, but of not less than \$5 nor more than \$10, and to continue during disablement but not longer than 300 weeks, if the disablement is temporary, or 400 weeks, if it is permanent. If the disablement is only partial, the foregoing rates are to be proportionately reduced;—but in certain cases (*i.e.*, the loss of a hand, a foot, or an eye, &c.) 50 per cent. of wages for definite numbers of weeks is specified.

In addition the employer must furnish necessary medical and hospital services during the first two weeks, not to exceed \$100 in cost.

Payments may be commuted for a lump sum only where, upon application, the court decides it to be "in the interest of justice."

Compensation may be determined by agreement. Disputes are to be settled by the courts "in a summary manner."

The representatives of labor on the New Jersey commission objected to that provision in the bill which fixes the maximum compensation in case of death at \$10 per week for 300 weeks, or \$3000, and contended for a maximum of 400 weeks, or \$4000.

Minnesota

The report of the Minnesota Employees' Compensation Commission recommends a bill which applies to all employments in industries conducted for gain or profit

(nominally only to those which are dangerous, but every industrial employment in which an accident shall occur is naively declared to be dangerous); to those employees only who are commonly known as laborers and workmen, or technically as "servants," and to all personal injuries arising out of and in the course of the employment, unless occasioned by drunkenness or purposely self-inflicted (both with some qualifications).

It is a strict "compulsory compensation law," and, where it applies, is exclusive of all other liabilities. The compensation payable is as follows:

In case of death: Funeral expenses, not to exceed \$100, and: If there are total dependents, periodical payments (not less frequently than monthly) of 50 per cent. of wages, continuing during the condition of dependence, but not longer than five years nor to aggregate more than \$3000. If there are only partial dependents the foregoing payments are to be proportionately reduced. And if there are no dependents, medical and hospital expenses, not to exceed \$100.

In case of disablement: Medical and hospital expenses, not to exceed \$100, and: If the disablement is complete, periodical payments (as above) of 50 per cent. of wages (but the annual amount of compensation never to exceed 50 per cent. of \$2000), commencing at the end of the second week and continuing during disability but not longer than five years. If the disablement is only partial, the payments are to be 50 per cent. of the decrease in wages (or if wages exceed \$2000, 50 per cent. of the decrease below \$2000). But the percentage of wages is to be increased in certain specified cases of maiming.

Payments may be commuted for a lump sum or by the purchase of an annuity, but only with the approval of the Board of Arbitration.

A system of boards of arbitration is established, with one board composed of three officials in each county, and a code of procedure therefor is provided. Settlements and agreements as to compensation are subject to the approval of the proper board, and all disputes are to be determined in first instance by that board, with the right of appeal to the courts.

Detailed provisions governing the insurance of the liability for compensation are laid down. Voluntary mutual insurance schemes are permitted upon conditions, but not as a substitute for the legal liability.

One of the three members of the Minnesota commission objected to the bill on the following grounds: 1. That some adaptation of the German system of compulsory insurance is preferable. 2. That industrial chaos is to be feared if the bill should be enacted and the law subsequently declared unconstitutional. 3. That the question of cost has not yet been adequately considered.

Massachusetts

The Report of the Massachusetts Commission on Compensation for Industrial Accidents presents no bill. The commission expresses itself as greatly impressed by the pronounced opposition of both employers and employees to the tentative draft of a compensation bill which it published some weeks before its report, and recommends that further investigation and study should be undertaken before a measure is submitted for enactment.

The tentative draft bill referred to applies to every employment in which the employer has more than five persons continuously in his employ for at least three days; to all employees except those who by reason of advanced age, &c., are more liable to accidents or to more serious consequences from accidents, and who have, with the approval of the Accident Board, agreed with their employers not to claim the benefits of the act; and to all injuries arising out of and in the course of the employment, except those due to the injured employee's deliberate intention, his deliberate breach of statutory regulations, or his intoxication.

It is a "compulsory compensation" law; and the liability imposed is exclusive of all others, except where the circumstances are such that the employer would be liable at "common law," in which event an option is given the injured employee either to sue for damages at common law or to claim compensation.

The compensation payable is as follows:

In case of death: If there are total dependents, weekly payments of 50 per cent. of wages, but of not less than \$4 nor more than \$10, for 300 weeks. Wife, husband and children are to be deemed total dependents. If there are only partial dependents, such weekly payments are to be proportionately reduced. And

of 50 per cent. of impairment of earnings if it is only partial; to continue during disablement, but not longer than 300 weeks from the date of accident, i.e., for 298 weeks.

In unusual cases a weekly payment, after it has continued for six months, may be commuted for a lump sum, subject to the approval of the Accident Board.

All insurance policies, which cover an liability of employers under this proposed law, must make the insurance company liable directly to the injured employee.

A State Accident Board of three members is established. Settlements and agreements as to compensation are subject to the approval of that board. All disputes are to be determined in first instance by a board of arbitration, two members of which are to be selected by the employer and the injured employee, respectively, and the third is to be a member of the State Accident Board. From the decision of that board an appeal is allowed to the courts on all questions except the amount of compensation.

Voluntary mutual insurance schemes, in lieu of the legal liability for compensation, are permitted upon conditions, provided that they be approved by the Accident Board and be not obligatory upon employees.

Washington

The bill recommended by the Washington Commission on Industrial Accidents and Employees' Compensation is what is known as a "compulsory insurance law," and is essentially different in method from the preceding.

It applies only to employment in "extra-hazardous works" (which are enumerated and defined to include practically all machine-factory, mining, quarrying, lumbering, transportation, engineering and electrical work, besides many specific occupations, and to which are to be added, by administrative determination, such other occupations as may prove in fact to be extra-hazardous) or where the employer elects to come under the law; to all classes of employees; and to all injuries received unless due to the deliberate intention of the injured.

Every employer to whom the proposed act applies is to pay annually to the State a fixed percentage of his annual payroll (varying from 0.015 in some industries to 0.1 in others), no part of which he may deduct from wages, for an Accident Fund; and four cents a working day for each employee, two cents of which he may deduct from wages, for a First Aid Fund; and upon paying such premiums he is to be relieved from all further liability, except for intentional wrong or for violation of safety regulations—for which latter he is liable to the State substantially in damages for the accidents caused thereby. Default in paying the required premiums subjects an employer to double liability—both for "damages" and for "compensation."

Out of the First Aid Fund injured workmen are to be paid compensation of \$5 per week for not to exceed three weeks; and employers are to be reimbursed for the expenses of necessary medical and surgical care, which they are obligated to provide immediately after accidents. Out of the Accident Fund compensation is payable as follows:

In case of death: Funeral expenses not to exceed \$75, and to dependents, if any, monthly payments varying from \$10 to \$35, depending upon the number and degree of relationship and dependence of the dependents, with appropriate limitations as to duration, but under some circumstances to continue for life.

In case of disablement: Monthly payments, beginning from the end of the third week, of varying sums, depending upon the degree of disablement and the number of dependents, but of not more than \$35 in any case and of not less than \$20 in case of complete disablement, such payments to continue during disablement or for life;—except that for permanent partial disablement the payment is to be a lump sum, "equal to the extent of the injury" but not more than \$1500. Certain specified injuries (loss of limbs, loss of sight, paralysis, &c.) are always to be deemed to constitute permanent complete disablement, and certain others, permanent partial disablement. Payments may be commuted for a lump sum, upon the request of the beneficiary.

A State Industrial Insurance Department is created to administer the funds. The Accident Fund is intended to be exactly self-supporting, and provision is made for

segregating special funds to meet liabilities as they are incurred and for the payment of surplus premiums and for assessing further premiums to make good deficiencies. If the fund is insufficient to meet a liability the employer must pay it, but a right is given him to reimbursement from the State. If any establishment, on account of poor or careless management, is unduly dangerous in comparison with other like establishments, the department may raise its premium rates. From the decision of the department in any matter affecting premiums, compensation, &c., an appeal lies to the courts.

It is the idea of the bill that the proposed department shall exercise wide discretion, and that the Legislature shall frequently amend the rates of premiums prescribed in and other minor provisions of the proposed act, as experience may dictate to be proper to carry out its purpose.

Ohio

The report of the Ohio Commission on Employers' Liability recommends a bill which applies to all employments under the State or any of its counties, towns, school districts, &c., in any establishment wherein five or more persons are regularly employed or for any employer who complies with the provision of the proposed act: to all employees in such employments; and to all accidental injuries and deaths, not self-inflicted, from accidents arising in the course of the employment.

It is a "compulsory insurance" law, with provisions for voluntary election by those employers upon whom it is not made compulsory. It requires every employer to whom it applies to pay into the State Insurance Fund annual premiums based on his payrolls according to rates of risks to be fixed annually by the State actuary. The employer may deduct one-quarter of those premiums from wages. Upon making such payments the employer is relieved from all other liability. If an employer, who is obligated under the bill to make such payments, fails to do so, he is made liable for damages both to the State and to the injured employee, under the law of negligence amended by the abolition of the defenses of "contributory negligence," "assumption of risks" and "fellow servant." The compensation, payable out of the Insurance Fund, is as follows:

In all cases: Necessary medical and hospital services and medicines not to exceed \$150 in cost.

In case of death within one year after the injury: Funeral expenses, and: If there are dependents residing in the United States, monthly payments of 60 per cent. of wages, for 300 weeks from the date of the injury, but not to amount to more than \$3400 or less than \$1500. Husband, wife, children, father, mother, sisters and brothers only are to be classed as dependents. Dependents residing outside the United States are to be entitled to one-half the above compensation.

In case of disablement: Nothing for the first week. Thereafter monthly payments beginning at the end of the first week as follows: If it is complete but only temporary, of 60 per cent. of wages, continuing during total disablement, but not longer than 300 weeks, nor to amount to more than \$3400 or less than \$1500. If it is complete and permanent, such payments to continue for life. If it is only partial, payments of 60 per cent. of impairment of earnings, but not more than \$12 nor less than \$5 per week, to continue during disablement, but not longer than 300 weeks.

Periodical payments may be commuted for lump sum payments by the State Board of Compensation Awards.

A State Insurance Fund is established and a State actuary and a State Board of Compensation Awards are created; the latter board to consist of five members, with power to appoint an examining physician to represent it in each county. That board is charged with the disbursement of the Insurance Fund and the determination of all claims for compensation. From its determination on certain questions an appeal lies to the courts.

In addition to the provisions hereinbefore summarized, all the measures reviewed provide for prompt notice to the employer of an accident and of a claim for compensation, and for medical examinations of injured employees, at reasonable intervals, by the employers' (in Washington and Ohio the State's) physicians. They also all provide for the modification of the rate or the discontinuance of compensation when the conditions upon which compensation depends vary or cease to exist.

The Bethlehem Steel Corporation in 1910

The report of the Bethlehem Steel Corporation for the year ending December 31, 1910, makes the following financial statement, which is compared with that for 1909:

	1910.	1909.
Net manufacturing profit.....	\$4,216,160	\$2,654,457
Other income.....	127,702	182,136
Total income.....	\$4,343,862	\$2,836,593
Deductions:		
Interest on notes and advances.....	\$185,294	\$149,518
Interest on funded debt.....	1,486,956	1,386,263
Depreciation	670,000	500,000
Total deductions.....	\$2,342,250	\$2,035,781
Net income for year.....	*\$2,001,612	\$800,812
Previous surplus.....	3,268,076	2,467,264
Total surplus.....	\$5,269,688	\$3,268,076

* Equal to 7 per cent. earned on \$14,908,000 preferred stock and in addition 6.45 per cent. on \$14,862,000 common stock, compared with 5.37 per cent. earned on \$14,908,000 preferred stock in 1909.

The balance sheet of the Bethlehem Steel Corporation as of December 31, 1910, compares as follows with that of December 31, 1909:

<i>Assets.</i>		1910.	1909.
Property account.....	\$54,305,936	\$48,946,018	
Funds with trustees.....	281,868	4,951,495	
Inventories	7,598,386	6,522,378	
Notes and accounts receivable.....	4,954,647	5,150,452	
Miscellaneous investments.....	20,950	103,878	
Cash	3,298,807	1,304,193	
Deferred charges.....	1,799,202	1,909,953	
Totals.....	\$72,259,796	\$68,888,368	
<i>Liabilities.</i>		1910.	1909.
Preferred stock.....	\$14,908,000	\$14,908,000	
Common stock.....	14,862,000	14,862,000	
Funded debt.....	25,993,000	26,660,000	
Union Iron Works.....	1,365,533	1,410,267	
Notes and accounts payable.....	7,773,864	6,327,987	
Bond interest.....	472,182	471,037	
Reserved for depreciation, &c.....	1,260,163	727,727	
Reserved for relining furnaces, &c....	355,365	253,275	
Surplus	5,269,688	3,268,075	
Totals.....	\$72,259,796	\$68,888,368	

President Schwab's Statement

From the statement to stockholders by President C. M. Schwab, the following is taken:

A comparative statement of the total estimated amount of the orders booked by the corporation for the past three years and the uncompleted orders on the books at the close of these years, shows as follows:

	Uncompleted
	Orders booked during year.
Year ended December 31, 1908.....	\$14,458,997
Year ended December 31, 1909.....	28,696,516
Year ended Decembtr 31, 1910.....	29,580,562

Notwithstanding the fact that the general market conditions in the iron and steel trade for the year were most unsatisfactory, the figures above reported show a steady advance in earnings, orders booked and unfilled orders on hand. The diversity of the products manufactured by your corporation is undoubtedly an element that makes for stability in earnings. Its output consists of tonnage products, such as pig iron, blooms, structural shapes and rails; more highly finished commercial products, such as machined forgings, large special machine tools, gas engines and the like; and armor and ordnance material for our own and foreign governments. In a period of depression the business in tonnage products is the first to fall off, while contracts for finished forgings, engines, special machinery, &c., require in some cases many months for completion, and work consequently continues during the earlier stages of a depression on contracts previously placed. Further, it is only rarely that a falling off in requirements of our own and foreign governments for armor and ordnance is coincident with an unfavorable commercial market. As a result of this condition, the plants of your corporation have during this year been running at a better proportion of their capacity than most of the other mills of the country.

Even the rails and structural shapes produced at Bethlehem are in the nature of a specialty, in that the rails are rolled of open hearth steel and the structural shapes are of a patented, special, economical section not produced elsewhere in the United States, so that in dull times we receive a most satisfactory share of such contracts as are placed. This is evidenced by the fact that during the year 1910 our rail and structural mills have been operated to the fullest extent of their steel-making capacity.

The production of steel for these mills has been the factor which heretofore has limited their output, but this will be at least doubled by the new Bessemer plant now in operation.

The additions and improvements to the Bethlehem plant for the purpose of increasing its steel making capacity, referred to in the last report, have been practically completed. One of the blast furnaces was blown in April 10, 1910, the second in March, 1911. This plant will then have four large, modern blast furnaces and two smaller ones, with a productive capacity of about 750,000 tons of pig iron per annum, sufficient to supply its entire Bessemer and open hearth requirements.

The increase in steel making capacity necessary to supply the full demands of the rolling mills has been provided by the addition of a Bessemer plant, which was put into operation February 8, 1911. With the completion of the blast furnaces this now gives a capacity of about 600,000 tons of rolled material per annum and places the Bethlehem plant in a position to realize the maximum return from the investment in the extension known as the Saucon plant. A great economy still remains to be effected by the electrification of our smaller mills to be driven by current produced by the utilization, in gas engines, of the waste gases from the blast furnaces, and this will be proceeded with as soon as deemed expedient.

The Bethlehem plant has grown to such magnitude that a further extension of its railroad facilities is deemed advisable, and a charter has therefore been taken out for a railroad, to be known as the Philadelphia, Bethlehem & New England Railroad. Survey of the main line has been made and construction plans begun, with the ultimate purpose of providing connections with other trunk lines than those which at present reach the plant. The plan for financing this road contemplates only a moderate direct investment by your corporation.

The number of employees in your various plants in the United States, and the salaries and wages paid therein, compared with last year, are as follows, exclusive of Cuban mines:

	Average number employees during year.	Salaries and wages paid.
1909.....	8,783	\$6,678,790
1910.....	11,034	\$8,211,838

In view of the large expenditures necessary to extend the business, it is stated that it has been thought unwise to distribute any of the earnings. The increasing business has required that a large part of the net earnings be used for working capital. The last dividends paid were a total of \$111,810 on the preferred stock in 1907.

The Midvale Steel Company's Report

The report of earnings of the Midvale Steel Company, Philadelphia, for the fiscal year ending October 31, 1910, is as follows, with comparison with the preceding year:

	1909-10.	1908-09.
Profits over all costs, charges and expenses, including depreciation.....	\$1,411,181	\$555,347
Deduct dividends.....	*367,500	150,000
Fire insurance fund.....	100,000	.....
Balance, surplus for year.....	\$943,681	\$405,347

* As to 1200 per cent stock dividend see below.

The balance sheets of October 31, 1910, and October 31, 1909, compare as below:

<i>Assets.</i>		1910.	1909.
Property and equipment.....	\$10,488,534	\$9,621,375	
Patterns	200,000	200,000	
Worked materials.....	1,551,825	1,983,072	
Raw material.....	822,474	527,910	
Merchandise, coal, &c.....	444,115	369,398	
Bills and accounts receivable.....	1,151,278	1,101,009	
Investments in bonds.....	200,000	100,000	
Cash	383,893	109,412	
Totals.....	\$15,242,119	\$14,012,178	
<i>Liabilities.</i>		1910.	1909.
Capital stock.....	\$9,750,000	\$750,000	
Bills payable.....	1,250,000	1,125,000	
Accounts payable.....	432,626	371,202	
Miscellaneous	4,372	164	
Fire insurance fund.....	200,000	100,000	
Surplus	†3,605,120	11,665,812	
Totals.....	\$15,242,119	\$14,012,178	

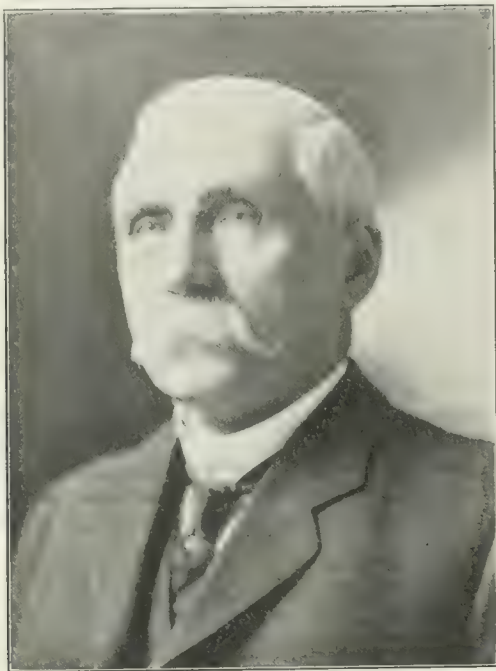
† After deducting stock dividend of 1200 per cent. paid to stockholders of record February 23, 1910, calling for \$9,000,000.

The National Tube Company, Pittsburgh, Pa., is making some improvements and additions to its plant at Lorain, Ohio, consisting of one six-hole soaking pit furnace for No. 1 blooming mill, new crane runway spans and an extension to the south end of the building, the total cost of all the work being about \$58,300.

Obituary

ANDREW S. UPSON

Andrew Seth Upson, president of the Upson Nut Company and the Union Rolling Mill Company, Cleveland, Ohio, died suddenly April 2, being stricken with heart failure while reading at home. He was 75 years of age, having been born in Burlington, Conn., in 1835. At the age of 18 he secured a horse and wagon and made his first start in business by selling bolts and nuts in his native State, securing his stock from his brother-in-law, Dwight Langdon, a manufacturer in Unionville, Conn. He was so successful that two years later he was employed by the Langdon Company as a regular salesman. In 1860 Mr. Langdon died, and Mr. Upson organized a partnership, and continued the business under the firm



ANDREW S. UPSON.

name of Upson & Dunham. This was succeeded by the Union Nut Company, the name of which in 1866 was changed to the Upson Nut Company. In 1872 a branch was established in Cleveland, which later became the main plant of the company.

Mr. Upson had made Cleveland his permanent home since 1889. He retained the active management of the Upson Nut Company until his death. In the past few years he had traveled extensively, but while at home he continued to attend closely to business. In addition to manufacturing nuts and bolts, the company operates a blast furnace, and has about completed the erection of a new open hearth steel plant in Cleveland, of which the blooming mill and one open hearth furnace it is planned to place in operation this month. The taking up of the additional burden of building a steel plant, in connection with his other responsibilities at his advanced age, caused considerable comment among Mr. Upson's associates and showed that his energy was not impaired by years. He was in other ways prominently identified with business affairs in Cleveland, being vice-president of the State Banking & Trust Company and a director of other Cleveland banks and other corporations. He was a member of the Cleveland Chamber of Commerce and the Union, Colonial and Euclid clubs in that city. He leaves two sons, Dennis A. and William J. Upson, and one daughter, Mrs. F. H. Rose, wife of the assistant treasurer of the Upson Nut Company.

MORTIMER H. BICKLEY, president of the Penn Steel Casting Company, Chester, Pa., died April 1, aged 80 years. He was one of the founders of the company and has been its president since 1892. He was also prom-

inently identified with other Chester industrial interests. He leaves a widow, a daughter and two sons.

E. W. VANDUZEN, president and treasurer of the E. W. Vanduzen Company, one of the oldest foundrymen in the Central West, died at his home in Cincinnati, March 30, aged 86 years. He leaves two sons and four daughters. It is announced that the foundry business will continue to be conducted under the same name.

GEORGE A. BARNES, secretary of the Whitman & Barnes Mfg. Co., Akron, Ohio, died March 22, aged 54 years. He was born in Cincinnati and began his long service with the company at its Syracuse factory in 1876. In 1879 he was transferred to the Canton, Ohio, plant, remaining there as manager until 1895, when he removed to Akron, at which place he resided until his death, with the exception of the years 1902 and 1904, when he was located at the Chicago offices of the company. At the time of his death, in addition to being secretary, he was a director and a member of the Executive Board. He leaves a widow and one son, H. L. Barnes, who is superintendent of the company's Chicago works.

OWEN LEIBERT, Bethlehem, Pa., died March 25, aged 75 years. He was connected with the Bethlehem Steel Works for nearly 40 years, and was chief engineer when he retired from active work nearly 19 years ago.

THOMAS RICKARD, vice-president of Harron, Rickard & McCone, San Francisco, Cal., agents for the Niles-Bement-Pond Company and other machinery lines, died March 25, at his home in Berkeley, Cal., from heart failure. He was a young man in apparently good health.

THOMAS M. GALVIN, vice-president of the Eby Machinery Company, San Francisco, Cal., died March 25, at St. Mary's Hospital in that City, after an illness of three weeks, aged 48 years. He was a native of Michigan, and had been in the machinery business in San Francisco since 1884.

JONAS COE HEARTT TUPPER, New York, who had been engaged in the foundry business for 50 years, died April 1, aged 73 years. He was born at Troy, N. Y. He was a son of Capt. W. W. Tupper, who had charge of one of the first passenger packets operated on the Hudson River. For 63 years he had lived in New York, conducting business under the firm name of W. W. Tupper & Co. He leaves a widow and one son, W. F. H. Tupper.

The Gandy Belting Company, 726-740 West Pratt street, Baltimore, Md., has adopted the new uniform belting price-list, effective March 1, and has issued a circular giving the full list of prices which now apply on the Gandy belt. The circular indicates the sizes carried in stock, which range in all widths and plies from 1-in., four-ply, to 30-in., 10-ply. It also gives a telegraphic code. The very comprehensive stock carried enables the company to fill orders on the day received with thoroughly seasoned belting. Besides the stock at Baltimore the company has its distributors scattered throughout the country.

The United States Geological Survey, Washington, D. C., has issued its large table giving the production and value of the mineral products of the United States for the calendar years 1900 to 1909. The value of the production of metals in 1909 is placed at \$753,427,290; non-metals, \$1,132,197,897, and unspecified, \$300,000; total, \$1,885,925,187, against a total of \$1,595,048,849 in 1908. The maximum value was reached in 1907, when it was placed at \$2,071,607,964.

The boring of the 9¼-mile tunnel through the Alps, under the Loetschberg, in the canton of Oberland, Switzerland, which will shorten the railroad journey from Italy to London from two to three hours when all the work has been completed in 1913, was finished March 31. The French contractors who undertook the work have been engaged in it four years and a half.

The stockholders of the Nova Scotia Steel & Coal Company on March 29 authorized an increase in the common stock from \$6,000,000 to \$7,500,000. None of the new stock will be issued at present.

Magnetic Switch Motor Starters

A New Type Developed by the Electric Controller & Mfg. Company

A magnetic switch motor starter for accelerating electric motors automatically cuts out the starting resistance step by step through the operation of magnetically operated switches. While it is more complicated and expensive than a hand operated starter, it is widely used in connection with large motors and for automatic control because of its advantages, not the least of which is the thorough protection afforded to the motor and to the driven machinery. The Electric Controller & Mfg. Company, Cleveland, Ohio, has developed a commercial magnetic switch, known as the type A, that is said to be radically new in principle, theory and operation. The operating coil of this switch is composed of a few turns of heavy wire covered with fireproof insulation and is connected in series with the motor. One of the special features of this starter is that it will close its contacts only when the current flowing through it is below a certain predetermined amount, thus combining in one a magnet switch and a current limiting relay. As long

can also be equipped with an overload, which gives all the features of a circuit breaker.

A complete line of accessories has been developed for maintaining the water level in tanks and regulating the

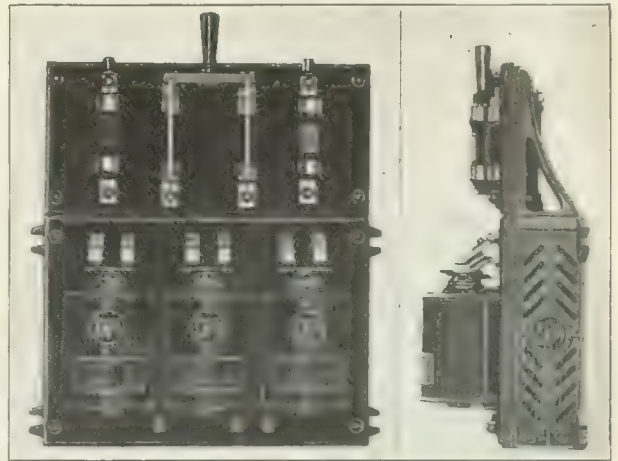


Fig. 2.—Front and Side Elevations of a Three-Unit Starter with Knife Switch on Panel.

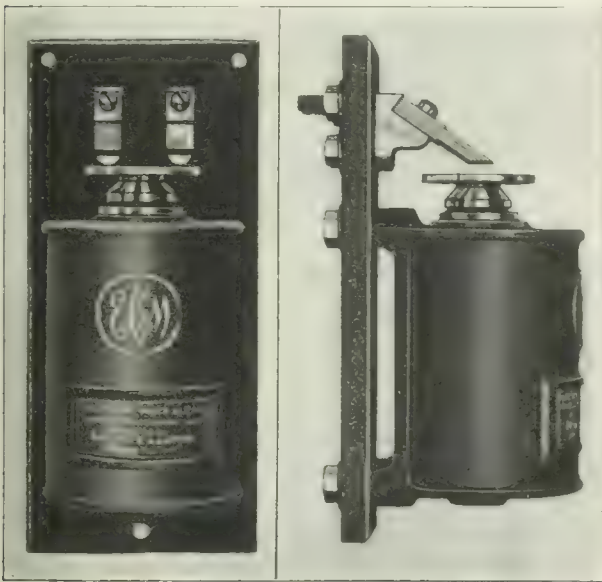


Fig. 1.—A Single Magnetic Switch Motor Starter Made by the Electric Controller & Mfg. Company, Cleveland, Ohio.

as the current flowing through this switch exceeds this predetermined value, the switch will not close until the current has been reduced by increasing the speed of the motor. Fig. 1 gives front and side views of one of these switches, while a three-unit type with a knife switch is illustrated in Fig. 2. For automatic control the starter is equipped with a magnetic switch, as shown in Fig. 3.

A cylindrical iron shell mounted on a slate panel incloses and protects the operating coil, as shown in Fig. 1. The two laminated copper brushes at the top of the switch are short circuited when it operates and cut out a section of resistance. A plug at the bottom of the coil shell can be screwed out or in to adjust the amount by which the current must fall before the switch operates.

These switches are well adapted for use as motor starters and the maker has standardized them for 110, 220 and 500 volts direct current and a wide range of different horsepowers. Six different types of starter can be supplied, with various numbers of accelerating switches. In their simplest form these switches consist of a number of type A switches, mounted in connection with a resistance. These can be used in connection with a knife switch, either on the panel, as shown in Fig. 2, or mounted at some distance from it. A shunt-wound magnetically operated switch is provided, where the starter is to be used for push button or automatic control and also for the knife switch control of large motors. If desired a starter of this type, which is shown in Fig. 3,

pressure in compressed air systems automatically. The number of points of acceleration developed by any particular starter is one more than the number of switches used. One or at most two switches will be sufficient for small motors where a light load has to be accelerated, but for large motors and especially those having large inertia the use of five or six switches is recommended. No-voltage protection is afforded by all forms of these starters as if the supply of electricity is interrupted the switches drop out, thus inserting all of the starting resistance in series with the motor, and when the current begins to flow through the circuit again the motor is accelerated automatically as if it were being started for the first time.

In operation it is simply necessary to close the knife switch or push a button to start the motor, while opening the switch stops it. The motor will be accelerated automatically and brought up to speed in the shortest possible time consistent with safety. The amount of time required depends upon the character of the load; if the load is light the switches will close rapidly and bring the motor up to full speed is a short space of time, while if

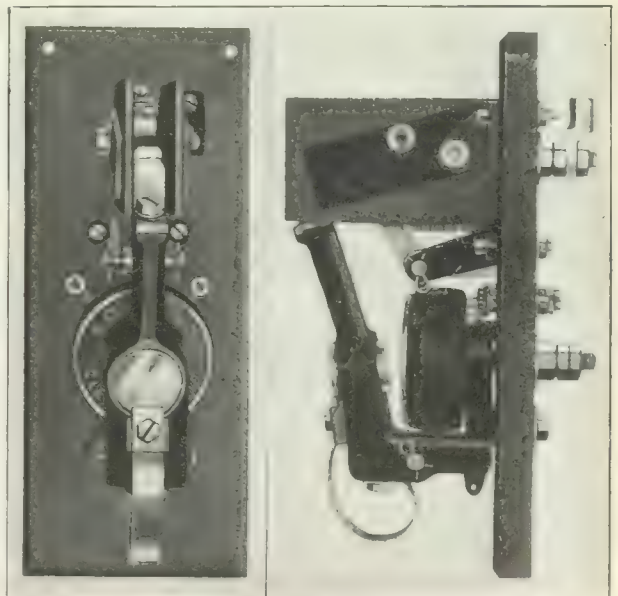


Fig. 3.—The Starter Equipped with a Type S Magnetic Switch for Automatic Control.

the load to be accelerated is large, such as a punch press having a large flywheel, the switches will close more slowly, and the time required to bring the motor up to full speed will be proportionately lengthened.

The Westinghouse Apprenticeship System

How These Companies Train College Graduates for Their Engineering Departments

The value to a college graduate of an apprenticeship course as a supplement to his college work can hardly be overestimated. When a young man leaves college his mind is alert and impressionable, and he adapts himself

course make him far better qualified to enter pure engineering, sales engineering or executive work.

The importance of an apprenticeship system to the development of a highly organized engineering depart-

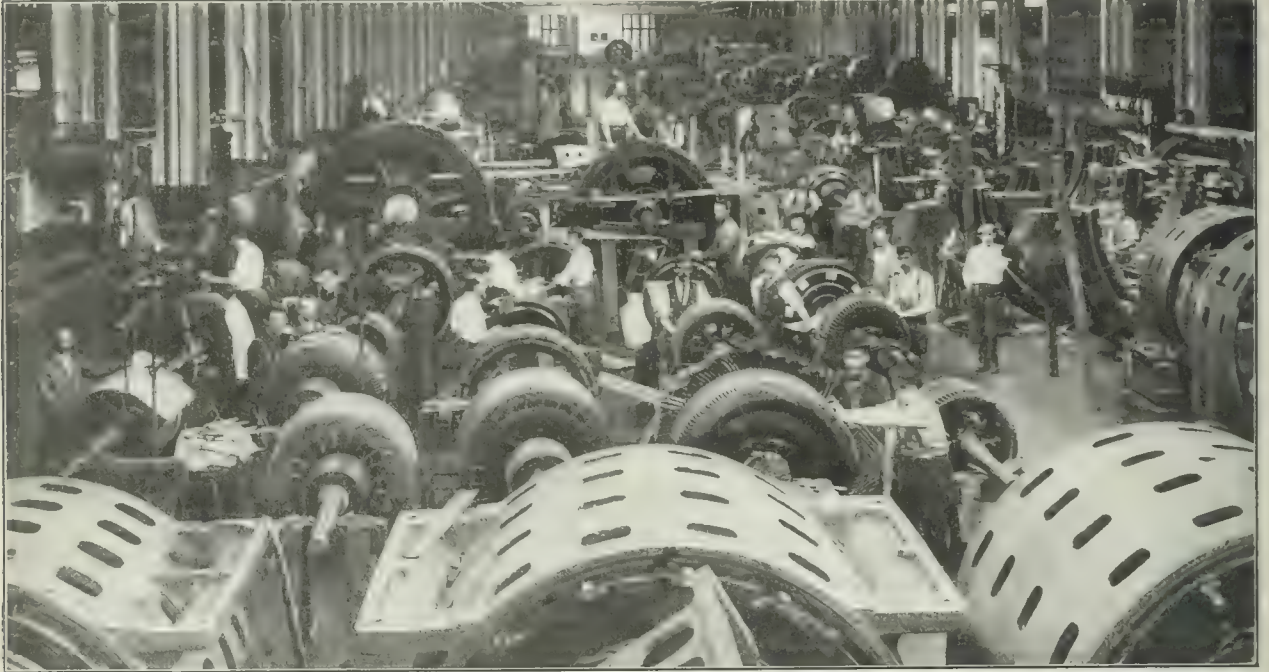


Fig. 1.—The Engineering Apprentices at Work in the Assembling Shop of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

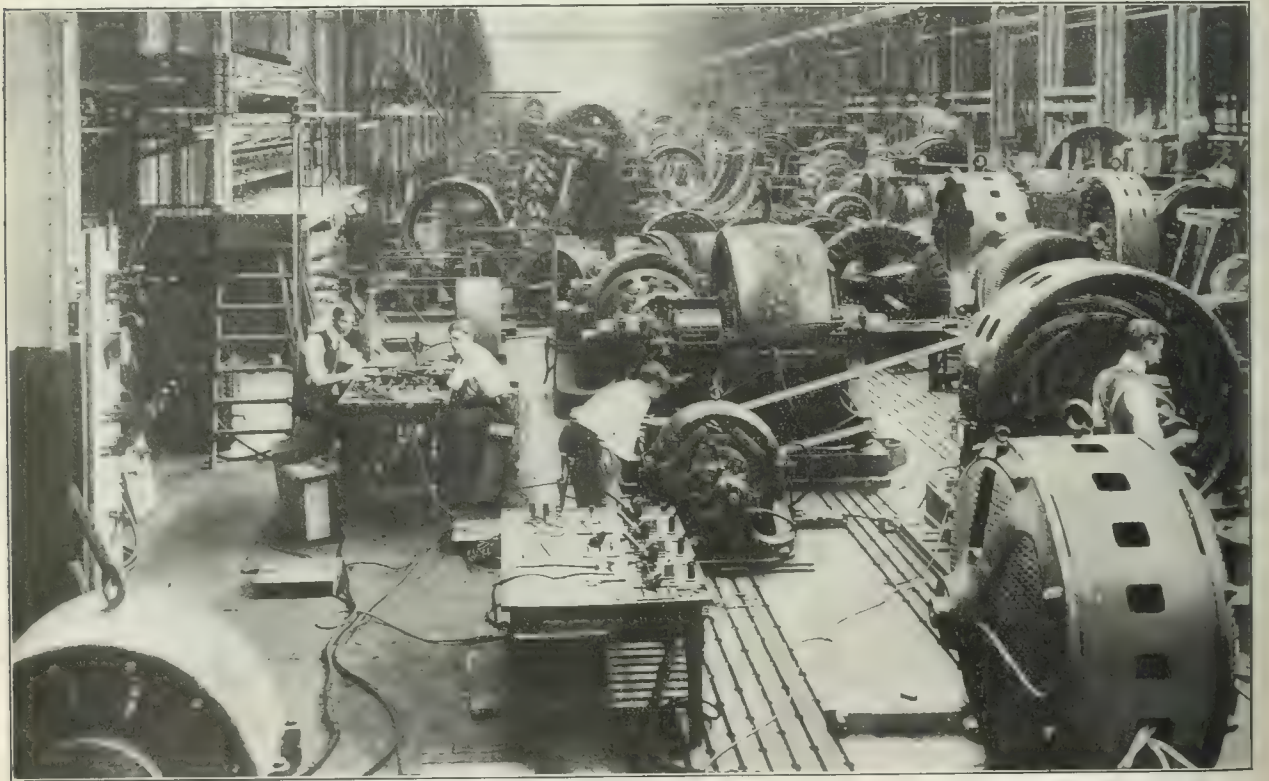


Fig. 2. Testing the Completed Machines.

readily to the conditions that prevail in a large manufacturing institution. His senses are keen, and by changing, at short intervals, from one department to another of a large works he is able to familiarize himself quickly with the underlying principles of manufacturing methods. The knowledge and training in methods of practice that he gets during his service in the apprenticeship

ment was recognized by the Westinghouse Electric & Mfg. Company very shortly after the establishment of its works at East Pittsburgh, Pa. The apprenticeship course was regularly organized there in 1896, and at first was established to keep track of the young men who presented no specific qualifications along electrical lines and who entered the organization with only the assurance that as



Fig. 3.—An Interior View at the Westinghouse Club,
Wilksburg, Pa.

opportunities afforded they would be advanced. Technical graduates and others were treated alike as far as the course of shop training was concerned. This arrangement was, of course, rather desultory in its applications and was unsatisfactory to the company and to the men.

In 1902, as the works had grown rapidly and the apprentices had increased, it was decided to put the apprenticeship course on a more systematic basis. It is now known as the engineering apprenticeship course, and admits graduates of technical schools and universities. This course is of two years duration, or 5480 hours, 18 cents per hour being paid the first year, 20 cents for the next six months and 22 cents for the remainder of the second year. The man is put on trial for 685 hours before he is admitted fully to the course. Application for admittance into the engineering apprenticeship course must be made by letter in the handwriting of the applicant, and he must state date of birth, course pursued, degrees received, refer to professors or others, give a statement of any practical experience which he may have had, and the name and address of father, or mother if father is deceased, or guardian in case both parents are deceased. A recent photograph of the applicant must accompany his application.

The apprentice is given an opportunity of becoming familiar with the manufacturing operations and the general construction and working of the apparatus produced. He is afforded, in the various departments of the works, as shown in Figs. 1 and 2, actual shop and engineering experience to supplement the work he has done in college. At times apprentices are taken from the course to fill regular positions in the company's engineering or sales organization before the expiration of the full apprenticeship service; in this case the compensation is increased in accordance with the position that the apprentice has been called upon to fill.

The apprentice devotes somewhat over one-half of his time to the shops and the rest of the time to the engineering, construction, testing and correspondence departments. The large scope of the work in which he is permitted to engage gives him an excellent opportunity


ENGINEERING APPRENTICE		1ST YEAR		2ND YEAR	
		2ND HOUR AT	PER HOUR	1ST HOUR AT	PER HOUR
		MO DAY YR. HRS. CLASS OF WORK		MO DAY YR. HRS. CLASS OF WORK	
					
		NAME		IN CASE OF ACCIDENT NOTIFY		COLLEGE
ADDRESS				LOCATION	
AGE				DEGREE	
				YEAR	

Fig. 4.—Front View of the Card on Which the Work of Each Apprentice Is Recorded.

to become familiar with up-to-date engineering practice and to decide what branch of the work he would prefer to pursue. The time is divided between the different departments, depending upon the relative values of the experience to be gained in these departments. The testing department, illustrated in Fig. 2, comes last, since it is desired that the apprentice should have a thorough understanding of the apparatus and its parts before he is permitted to operate it.

The engineering apprentices can avail themselves of the advantages of the Westinghouse Club, an interior view of which is given in Fig. 3. This club effects among its members a spirit that is closely akin to the feeling that exists among the undergraduates of a college. The club affords its members an opportunity of becoming acquainted with other young men whom he should know in his future career, as well as older and more experienced men in his field of work. The club provides for educational, social and athletic activity among its members. It is governed by a board of thirteen directors, chosen, for the most part, from the younger men, who are thus responsible for the direction and success of the club. Incidentally an important advantage of club membership to these younger men is the experience gained in conducting such an organization. The various activities supported by the club are as follows: Athletics, including baseball, basketball, tennis, &c.; entertainments, such as dancing, smokers, &c.; excursions to notable industrial plants and other points of interest around the famous Pittsburgh district; music, such as a band, glee and mandolin clubs, &c. The predominant feature of the club is the educational work. Sections of technical or engineering

[illegible]

Fig. 5.—Back of the Apprentice's Record Card.

ing classes are organized to deal with the application and construction of various types of apparatus or to consider other subjects of importance in industrial organization and management. These classes supplement the daily engineering work of the apprentice in the factory.

The Machine Company's System

The apprenticeship courses at the Westinghouse Machine Company are conducted along the same general lines and the requirements for admission are practically the same. There are at present 35 graduates taking the course with the machine company. These men hail from universities and colleges all over the country.

The record that is kept of each engineering apprentice is shown in Figs 4 and 5. A detailed account of the work the apprentice has done in each department is summarized on the back of the card, Fig. 5. The two years' course for the engineering apprentices is divided as follows: Eight months, turbine department; two months, condenser department; four months, gas and steam department; two months, producer department; three months, field erecting; three months, drafting, and two months, miscellaneous work.

The wages paid are the same in both companies and give an average monthly pay of \$40 to \$45 the first year and from \$45 to \$55 the second year. An apprentice's expenses average about \$35 a month, the most important items of which are about \$10 per month for

room rent, about \$4 a week for board, and railroad fare about \$3.50 a month. Although the remuneration does not provide for the indulgence of any of the expensive habits that the apprentice may have formed during his college career, still it is ample to provide him with all the essentials and to keep him well fed.

With few exceptions all of the men who graduate in the machine company's course are taken into the company's sales or engineering organizations. Some of these exceptions are men who are sent by the company's customers to take the course. Sometimes a company that is operating a great many Westinghouse machines desires to have some man in its organization familiarize himself thoroughly with their design and operation by taking the apprenticeship course.

The apprentices with the machine company also are eligible to membership in the Westinghouse Club. This affords them social, physical and educational advantages. They are able to mix with men engaged in other lines of work and thus broaden their scope.

Navy Yard Apprentices

The System in Vogue in U. S. Navy Yards

BY HENRY WILLIAMS, NAVAL CONSTRUCTOR.

Any discussion of the general question of training mechanics and of apprentice systems is incomplete without a description of the system of training apprentices to the skilled trades in navy yards. While the system there in vogue has many undoubted shortcomings and defects, it has trained many highly skilled mechanics and may be considered as showing the attitude of the Government toward the apprentice question and the training of skilled labor.

The Navy Department maintains an elaborate apprentice system in its navy yards, which in its general character has changed little in many years, and is a direct survival of the old custom of apprenticing boys to some particular trade. The system has been in vogue since the earliest days of navy yards and wooden ship building, when the ship carpenters represented the majority of the employees. Many distinguished naval architects and at least one chief constructor of the navy began life as apprentice shipwrights in a navy yard.

Large Number of Trades Represented

With the change of steam propulsion and steel construction, the number of trades represented increased greatly. The apprentice system was extended to include them all, so that at the present time in a yard such as the Brooklyn Navy Yard there are no less than 16 trades in which apprentices are employed. They are paid liberally, and have an excellent chance of learning their trades under most favorable conditions. Furthermore, when they have passed out of their apprenticeship they are rated journeymen mechanics if qualified and if efficient are assured of fairly steady employment and an excellent chance to become leadingman and ultimately foreman. Having this in mind, it is not difficult to understand that the places are greatly desired, and, when examinations to fill the vacancies are held, a large number of desirable boys present themselves to compete.

The regulations governing the employment of these apprentices require the registration of applicants with the Board of Labor Employment at the navy yard in which they wish employment, designating the specific trade desired. certificates of character and habits of industry must be furnished, and applicants must be between 15 and 18 years of age. Competitive examinations to fill vacancies are held every six months, and a number of names equal to four times the number of vacancies in each trade is taken from those highest on the register.

Applicants Are Examined

The examining board consists of three or more naval officers, one of whom must be a naval constructor and one a surgeon. The candidates are examined as to their physique and each is assigned a mark. Those not found to possess the required physical qualifications are not

examined further. The mental examination consists of a written examination in spelling, simple arithmetic, including decimals and the rule of three, and an oral examination to determine fitness for trade, general intelligence, &c.

The applicants are given appointments in the order of standing, as determined by the examinations, and those who pass a satisfactory examination, but for whom there are no vacancies, constitute an eligible list for future vacancies in the succeeding six months. Those who fail to pass are dropped from the register and cannot re-register for one year.

Apprentices are assigned to employment under the various foremen and mechanics, and learn their trade in the good old-fashioned way by seeing the work and helping with it, and later by being given work within their capabilities to perform. They are marked quarterly by their foremen as to their progress and general conduct. It is contemplated, as a part of the training of apprentices, to give them each day an hour or two of instruction in elementary school subjects. Due to press of work, however, this has not been done at all of the navy yards, the boys being encouraged to attend night schools or take correspondence courses to supply the deficiencies in their general education.

Semiannually, all apprentices are examined by the board of officers referred to above, and the quarterly reports of foremen are considered in connection with the results of the examination. This board determines and recommends as to the fitness of apprentices for advancement or for promotion to fourth class mechanic. If satisfactory improvement has not been shown, or if the conduct has not been good, the board recommends such disciplinary action as may be desirable, or the discharge of the apprentice.

Classification of Apprentices

Apprentices are classified under four classes: fourth class apprentices receive 20 per cent., third class 30 per cent., second class 40 per cent. and first class 50 per cent. of the pay of a first class journeyman workman of the trade at the yard in which he serves. Before being eligible for promotion, apprentices must serve at least six months in each of the fourth and third class and one year in each of the second and first class. When an apprentice has served three years and is 20 years of age, he is eligible for promotion to the lowest rating in the trade in which he works. He must serve one year in this grade, and at the end of this time, if his services have proved satisfactory, he receives a certificate of apprenticeship signed by various officials. Ex-apprentices are continued in employment rated in accordance with their merits and placed on the same footing as other mechanics employed.

In order that the importance of the apprentice system in navy yards and its contribution to the skilled labor market may be realized, the following list is given, showing the number of apprentices in each trade at the Brooklyn Navy Yard:

Boatbuilder	1	Patternmaker	3
Rollermaker	2	Plumber	16
Coppersmith	2	Sheet metal worker.....	11
Die sinker.....	1	Shipfitter	18
Electrician	15	Ship joiner.....	9
Machinist	18	Shipsmith	2
Molder	2	Shipwright.....	5
Painter	1	Wire worker.....	5

At the Washington Navy Yard, where is located the naval gun factory, the machinist trade is practically the only one employing apprentices, but, as the main work of the yard is machine work of the very highest class and the opportunities for employment in mechanical trades in Washington are very limited, it will be seen that this gives an opportunity to many boys of learning a most excellent trade while providing the navy yard with a supply of mechanics for the future.

The number of apprentices employed is as follows:

Blacksmiths	6	Machinists	250
Coppersmiths	3	Molders	12
Joiners	7	Patternmakers	5

The boys applying to take the examinations are of surprisingly high class, many of them often earning more money than they could expect for some years, in their new positions.

Office boys, errand boys, news boys and the like abandon readily their comparatively lucrative employment for a chance to learn a trade in the navy yard. The reasons given by many of them for doing so are extremely original. One bright youngster "didn't want to be a street car conductor all his life"; another one said his father was afraid he would learn bad habits as office boy in a broker's office. Many of them are attracted by the prospect of working on "Uncle Sam's warships."

There appears to be every reason to suppose that navy yard apprentices will be found as a general rule to be highly skilled workmen in their trades, and that the system as a whole, while having numerous shortcomings, undoubtedly is an important factor in training mechanics and in recruiting for the mechanical trades many boys for whom the ordinary shop has no attraction and who would, under other circumstances, become clerks or street car conductors.

It should be remarked that the above is limited to the apprentices at navy yards and does not apply in any way to the question of training the enlisted force on naval vessels, which also contributes largely, but in a different manner, to the skilled labor market.

Pennsylvania Railroad Apprentices

Unique among railroad schools in America is one for apprentices which has been established at Altoona, Pa., by the Pennsylvania Railroad, co-operating with the Engineering School of the Pennsylvania State College. This school is for the benefit of regular apprentices in the railroad shops at Altoona. The object of the school is to give to apprentices a knowledge of the fundamentals of mathematics, mechanics and drawing, thereby making them better artisans—men more useful in their specific trades. The large attendance shows that the apprentices are eager to make the most of the opportunities open to them, and the company is more than repaid by the actual increase in the efficiency of its workmen, and by the assurance of unswerving loyalty from the men who have received all their training in its service.

Departing from the general practice in institutions of this nature, which is to teach only technical subjects, systematic work in English is carried on with special reference to writing business letters, filling out order blanks, time cards, and other details. The work is arranged to cover three scholastic years of 42 weeks. Each apprentice receives four hours of instruction a week, or a total of 504 hours for the three years. The subjects given include essential elements of many of those in the mechanical engineering course of the best universities—mathematics, physics, mechanical drawing, mechanics, mechanism, strength of materials, machine design, experimental tests and shop management. A monthly report of grades is made out by the head instructor and submitted to the general office of the company and to the Pennsylvania State College. These monthly reports, with the annual reports concerning each member of the classes, when taken in connection with the regular records of the shop foremen, form an accurate basis on which to select and use the men to the best advantage.

Deere & Co.'s Reorganization

Deere & Co., Moline, Ill., implement manufacturers, have been reorganized and reincorporated under a 99-year charter, with an authorized capital stock of \$50,000,000. The company hereafter will embrace the various Deere factories and branch houses, which up to this time have been separately incorporated, but owned or controlled by Deere & Co. Nineteen subsidiary companies are represented in the merger, in addition to which the reorganized company has acquired the Dain Mfg. Company, Ottumwa, Iowa, and Welland, Ont., and certain interests in the Marseilles Company, whose plant recently was removed from Marseilles, Ill., to East Moline, Ill. As all the stock in the 19 subsidiary companies was owned by the stockholders of Deere & Co., the change

represents a merger only as far as the Dain and Marseilles companies are concerned.

The new corporation embraces the following factories: Deere & Co., Moline, Ill.; Deere & Mansur Company, Moline, Ill.; Moline Wagon Company, Moline, Ill.; Marseilles Company, East Moline, Ill.; Kemp & Burpee Company, Syracuse, N. Y.; Fort Smith Wagon Company, Fort Smith, Ark.; Dain Mfg. Company, Ottumwa, Iowa, and Welland, Ont. It also includes the 13 branch houses of the John Deere Plow Company located at Kansas City, Mo.; St. Louis, Mo.; Indianapolis, Ind.; Dallas, Texas; New Orleans, La.; Omaha, Neb.; Portland, Ore.; Spokane, Wash.; Denver, Colo.; Oklahoma City, Okla.; Baltimore, Md.; Winnipeg, Man.; San Francisco, Cal.; Syracuse, N. Y., and the branch house of the Deere & Webber Company, Minneapolis, Minn.

Stockholders in each of the 22 concerns have surrendered their stock certificates to the First Trust and Savings Bank, Chicago. In return they will receive stock in the new corporation as soon as the new charter is secured. Details of a plan whereby employees of the company will be given an opportunity to acquire stock on favorable terms are under consideration, and an announcement will be made in the near future. A large factory site adjoining the Dain plant in Welland, Ont., has been purchased, on which an extensive addition will probably be erected, to be used for the manufacture of harvesters for the Canadian trade.

Customs Decisions

Barbers' Hair Clippers

The Board of United States General Appraisers has decided that hair clipping instruments used by barbers are not machine tools within the meaning of the tariff act of 1909. The merchandise in controversy was entered by Sears, Roebuck & Co. The custom house authorities classified the articles as manufactures of metal and imposed a duty of 45 per cent. Under the claim made by the importers, the duty would be 30 per cent. General Appraiser Fischer, who writes the decision, says that the articles are not machine tools. The hair clipper is an instrument of manual operation, and would answer in that respect to the definition of a tool. At the same time the board takes the view that the article in no way partakes of the character of power tools, and is not within any of the definitions of the term "machine tools" as given by lexicographers. The importers' claims are accordingly overruled.

Rolls for Rolling Mills

Another claim involving the tariff's paragraph for machine tools was filed by the American Steel & Wire Company. The collector of customs at Cleveland assessed a 45 per cent. duty on cast steel rolls for rolling mills on the ground that the rolls are manufactures of metal. The decision for the board states that, while the articles may be parts of machine tools, they are not entitled to classification under the provision for machine tools. On this point, the decision says: "The cold rolling mills of which these rolls are to form a part would, if imported, be subject to classification at the rate claimed, but the steel rolls considered separately would no more be entitled to such consideration than would the gear wheels if imported alone. The protest is overruled, and the decision of the collector affirmed."

Vegetable Cutters

A decision has been handed down favorable to the claim of Downing, Judae & Co. regarding the classification under the present tariff of vegetable cutters made of tin. The articles are known as parers and corers. They were returned for duty as "kitchen knives," at the rate of 1 cent each and 15 per cent. ad valorem. The importers' claim was that the articles should be allowed to enter at 45 per cent. as manufactures in chief value of metal. The decision holds that as the cutters are used in grating, slicing and peeling vegetables and are made of tin, they are not "knives," within the meaning of the cutlery provisions of the law. The collector's assessment is reversed.

Features of a Modern Steel Foundry

Some Interesting Points of the Bayonne Steel Casting Company's Plant

In the construction of a modern steel foundry many problems are encountered. In the new foundry of the Bayonne Steel Casting Company, Bayonne, N. J., planned by the general manager, A. E. Williamson, the raw materials enter at the back and travel forward continuously until they leave the shipping room as the finished product. Machinery is used wherever possible to avoid the laborious and expensive hand methods.

Handling the Raw Materials

The raw materials, ore, coke, scrap, pig iron, &c., are brought into the foundry yard on a branch track from the railroad and unloaded directly from the cars into their respective storage spaces. Above the latter is an overhead track, carrying a small electric trolley hoist arrangement, so that sheet steel buckets loaded with the raw materials can be picked up, carried into the foundry and dumped on the charging floor, or into a chute which discharges them into the cupola. Fig. 1 shows the railroad track curving around the corner of the foundry, part of the stock yard, the mono rail track and its supports and the trolley hoist lifting a dump bucket.

Beyond the turn the railroad track flanks the foundry building its entire length, leaving enough space for the stockyard with the mono rail above it. The car shown in Fig. 1 has been switched from the main line and is on its way into the foundry building and over the charging floor, through a door hidden by a jog in the building.

To throw the switch the car is run back until the operator can reach and turn a crank handle at A, the car at that time not being on the movable part, E, of the rail. The crank A revolves the rod B, which is supported by the small I-beam C. The rod D is revolved simultaneously with the rod B, through a universal joint connec-



Fig. 1.—The Mono Rail Tramway and the Car for Handling the Raw Material.

tion. On the end of the rod D is a worm meshing with a gear rack fastened to the end of this switch rail.

Inexpensive sheet metal buckets are used, and are kept filled at the various material piles, so that the trolley hoist is not delayed for loading.

The foundry building was first erected at Delawanna,

N. J., some 25 miles from Bayonne for a steel foundry, and was purchased, dismantled and re-erected by the present owners at Bayonne, and castings were being made in three months and four days.

The Charging Floor

Fig. 2 is a view of the charging floor, with raw materials for a complete cupola charge piled upon it and

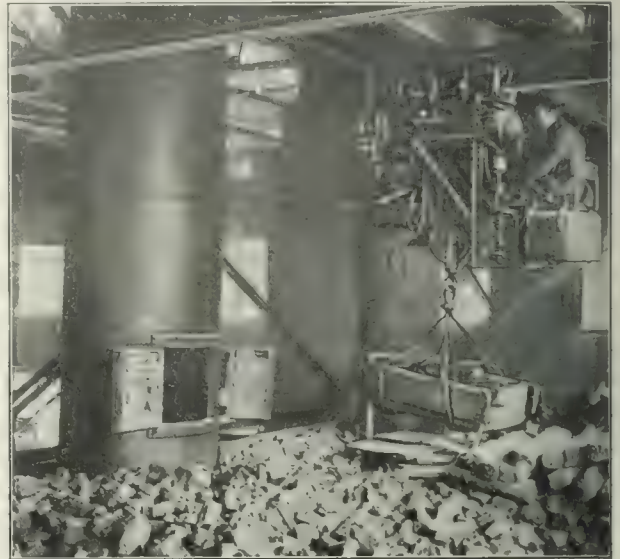


Fig. 2.—View of the Charging Floor, Showing the Cupola Being Charged from the Car.

shows more plainly the trolley hoist. The rail is directly in line with the center of the cupola, and the wooden tray, hanging from the hoist, is open at one end, so that it can be discharged by tilting it until the load slides into a chute (not shown), and thence into the cupola.

The melted metal is drawn from the cupola spout F, Fig. 3, into large steel plate ladles handled by the overhead traveling crane and poured into the Tropenas converters shown on either side of the cupola. The converters discharge into ladles placed in the pits in front of them. The metal is transferred into smaller ladles and from these to the molds. At the extreme right of Fig. 3 is a small cupola, H, that is used for melting down the alloys. The cupola and the converters are in a corner of the main foundry just back of the columns supporting the roof trusses and the traveling crane track. The ladles of molten metal can thus be easily handled by the overhead cranes and the hot metal is readily accessible for the molders.

Features of the Building

As the main foundry building is constructed with a structural steel frame and corrugated sheet steel roof and siding and only steel flasks are used, the fire hazard is nil. The foundry is of liberal height, so that smoke, fumes and gases can rise and escape through numerous windows near the roof, keeping the air clear.

At one end of the main building are the sand bins and sand mixing machinery. At the right of Fig. 4 is shown the molding sand crusher or grinding pan I, with the rollers JJ. The machine at the left mixes the sand in any desired combination, either for core making or molding. The sand is shoveled into the hopper of K, where the coarsest foreign substances are removed and is then picked up by the buckets L, and carried to the top where it is dumped on a vibrating screen or riddle and passes through several other operations. It can be mixed with water to give it the proper degree of moisture or with oil to be used where oil sands are desired or with



Fig. 3.—The Cupolas and the Converters from the Foundry Floor.

molasses to give it the proper binding qualities. Behind this machine and occupying this entire corner of the foundry are the large sand bins which are filled directly from railroad cars run in on the siding just outside the building. When the machine has prepared the sand it is put into huge buckets and transferred to the molding floor by the overhead crane.

Jib Cranes

Numerous jib cranes like the one in Fig. 5 are used throughout the foundry. These are detachable and portable and are secured to the building columns by hinges that allow them to be lifted and transferred from one

column to another by the overhead traveling crane. A jib crane is provided for every three or four columns, and no more are required than can be kept busy.

Each jib crane has an air hoist mounted on four wheels and traveling on the I-beam forming the radial arm of the crane. This arm swings through a semi-circle and the crane can thus cover a large amount of floor space. In the bay in the background, Fig. 5, the molding machines and the bench molders are located, while to the left, the small floor work is being molded.

Drying Ovens

While the drying ovens are of the ordinary type with roll top doors, the mold cars as shown in Fig. 6 have



Fig. 4.—The Crusher and the Mixer for the Molding and the Core Sand

some points of special interest. The platform of the car is built of I beams and channel irons, and on the center line are securely fastened two uprights, M M, each containing two rows of staggered holes, in any of which the arms N N, can be placed. On these arms shelves similar to the one partly shown at O are placed, and to receive the molds to be dried. Loose arms may be seen at P.

These shelves are distributed among the molders making dry sand molds and the finished molds are placed on them on the molders' floor. When a shelf is filled the crane picks it up and carries it to the drying oven car. As soon as the floor of the car is filled arms are placed in holes in the uprights so they will just clear the molds beneath and the first shelf is put in position, and so on until the top is reached. This arrangement allows molds to be stacked up on the cars to the full height of the oven and without waste space, due to various heights of molds. It also allows the hot air to circulate freely over the top of the molds as well as on all sides and thus dry them quickly. The ease with which the molds can be handled is also conspicuous. When a carload of dried molds has been rolled out of the oven the traveling crane successively removes the shelves and distributes them about the floor.

Considerable manual labor is also saved in running the cars into and out of the ovens. Two drying ovens are now in use with two tracks and two doors to each oven, and in front of each track a loop of wire rope is anchored in the floor to take the hook of a pulley such as that shown at R, Fig. 6. One end of the wire rope is run through this pulley and fastened to the car and the other end is given a turn around the hook of the traveling crane as shown at S. A man on the floor then retains the free end of the rope while the crane hoists and pulls the car out of the oven. Similarly with loops and pulleys at the inner ends of the oven tracks, the cars can be pulled into the oven.

The Finished Castings

After the castings are shaken out of the molds, they are picked up by overhead traveling cranes and carried



Fig. 5.—One of the Jib Cranes Equipped with an Air Hoist.

to the end of the foundry near the converters and loaded on narrow gauge flat cars. These take them through a sand blast room where they can be sand blasted if necessary and then into the cleaning room. Here the smaller ones are put into tumbling barrels after having the sprues, gates, &c., broken off. The larger castings have their sprues and risers cut off by cold saws. After this the fins, &c. are clipped or ground off, bad spots are repaired by electric welding and the castings are



Fig. 6.—The Drying Ovens and the Special Car for Handling Molds.

weighed and loaded on cars, or the company's automobile truck for delivery.

In no part of the plant do the castings or the raw materials travel backward. The plant has been so designed that the sand is brought into one corner of the building where it is ground and mixed and then delivered to the molders and core makers; the pig iron, ore, coke, scrap, &c., are brought into the diagonally opposite corner where they are charged into the cupolas and converters and made into steel; the molten metal is distributed over the molding floor and poured into the molds, the castings are shaken out, taken to the annealing ovens and from there to the cleaning room, through which they pass and are halted for various operations before being loaded for shipment. By continuously traveling forward through all of these operations no confusion is apparent in the foundry and the work is handled as quickly and economically as is consistent with good workmanship.

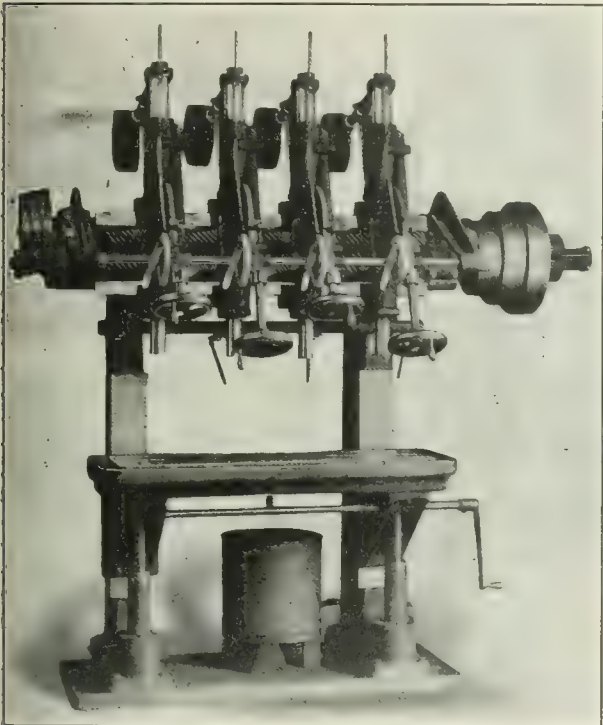
The Merchants Steel & Supply Company, Marquette, Building, Chicago, has opened an equipment and machinery department, which is in charge of Loren Bugbee, to buy, sell and repair the general line of contractors' equipment and machinery, such as steam shovels, locomotive cranes, dinkies, dump cars, standard gauge cars and locomotives, boilers, engines, pumps, generators and miscellaneous machinery, as well as new and relaying rails and accessories of every description. The company is now erecting at its yard a shop for the overhauling and repairing of all kinds of machinery.

The Farris Bridge Company, Diamond Bank Building, Pittsburgh, Pa., has completed and is now distributing its 1911-1912 year book to county commissioners, borough engineers and a selected class of manufacturers. The book is leather bound, and its pages are arranged in weekly order, 3½ x 8 in., ruled in cross section for the purpose of making memoranda. The company constructs viaducts, coal tipples, mill buildings, light and heavy foundation work, reinforced concrete, &c.

The New Moline Multiple Spindle Drill

For heavy jig and forging work, drilling and reaming links, connecting rod work and various other jobs of a heavy character, a new multiple spindle drill, known as No. 23, is built by the Moline Tool Company, Moline, Ill. All of the spindles are fed independently. While the tool illustrated has four, other numbers of heads can be provided.

The maker's standard double spiral type of drive is employed, steel being used for the main spiral gears in the rail and phosphor bronze for those in the spindle. Ball thrust bearings are provided for the spindles and the spiral gears. A bronze spiral gear meshing with a rack cut from the solid in the bronze bushed steel quills provides the feed for the different spindles. The bronze spindle spiral gears are mounted on the inclined shaft, which is driven by bronze and hardened steel worm gearing. This shaft also carries a quick traverse hand wheel and is pivoted so that the worm wheels can be dis-



The No. 23 Multiple Spindle Drill Built by the Moline Tool Company, Moline, Ill.

engaged from the worms either by the hand latch or the automatic stop. Three-step cone pulleys drive the shaft extending across the front of the machine, that in turn drives the worms, each of which is connected to the shaft by a clutch controlled by a hand lever. Each worm has a hand wheel mounted upon it, thus giving hand worm feed when the worms are disconnected from the worm shaft. The spindles run in revolving sleeves on which the spindle spiral gears are mounted, instead of in the heads themselves, and provision is made in the lower bearings of these sleeves to compensate for wear. The spindles are counterbalanced and six changes of speed in approximately geometrical progression are rendered available by a three-step cone pulley and the back gear.

The columns, the rail and the table are of box section and the latter has a working surface which measures 14 x 62 in. It is provided with T-slots and can be adjusted vertically. A wide groove for oil or water surrounds the table.

The following table gives the principal dimensions and specifications of the tool:

Maximum distance between spindle centers, inches.....	60
Minimum distance between spindle centers, inches.....	6
Diameter of spindles, inches.....	2 7/16
Morse taper of spindles.....	No. 5
Travel of spindles, inches.....	10
Size of drill used, inches.....	2
Distance face of column to spindle center, inches.....	11
Maximum distance table to spindles, inches.....	28

Size of table, inches.....	14 x 62
Adjustment of table, inches.....	18
Weight of machine, pounds.....	6,500

The equipment regularly furnished with the tool includes a countershaft and wrenches, but does not include the pump, tank or piping for the cooling system, these being furnished at a slight additional cost.

National Metal Trades Association

The programme for the thirteenth annual convention of the National Metal Trades' Association at the Hotel Astor, New York, Wednesday and Thursday, April 12 and 13, is announced as follows:

- Wednesday Morning Session.
Appointment of Convention Committees.
Reports of Officers.—(a) J. H. Schwacke, president; (b) Howard P. Eells, treasurer; (c) Robert Wuest, commissioner.
Reports of Standing Committees.—(a) Finance, J. H. Schwacke, chairman; (b) Joint Committee of the National Metal Trades' Association and National Founders' Association, J. H. Schwacke; (c) Industrial Education, F. A. Geier, chairman; (d) Apprenticeship, E. P. Bullard, Jr., chairman.
Report of Marshall Cushing, special representative at Washington.
Unfinished business.
New business.

- Afternoon Session.
“Labor Efficiency Betterment.”—Papers by John Calder, manager Remington Typewriter Works, Iilon, N. Y.; H. F. J. Porter, industrial engineer, New York; W. A. Grieves, employment superintendent Jeffrey Mfg. Company, Columbus, Ohio.
Participants in discussion: W. W. Coleman, vice-president Bucyrus Company, South Milwaukee, Wis.; H. N. Covell, Lidgerwood Mfg. Company, Brooklyn, N. Y.; William J. Manning, M.D., medical and sanitary officer, Government Printing Office, Washington, D. C.; F. C. Blanchard, works manager Ashcroft Mfg. Company, Bridgeport, Conn.; A. N. Dutton, vice-president Peerless Motor Car Company of New York, New York; W. F. Helmond, Underwood Typewriter Company, Hartford, Conn.; Frank Burgess, Boston Gear Works, Boston; M. W. Alexander, General Electric Company, West Lynn, Mass.; Geo. Gilmour, chief engineer engineering and inspection division of the Travelers' Insurance Company, New York.

- Evening Session
Convention banquet, Hotel Astor.
Thursday Morning Session.
Report of Committee on Employers' Liability Insurance, Wm. Butterworth, chairman.

- Participants in discussion: Raynal C. Bolling, assistant general solicitor, United States Steel Corporation, New York; Miles M. Dawson, New York, expert in technical insurance, who was secured by the Russell Sage Foundation to make a study of insurance in Europe; J. A. Macdonell, liability insurance expert, New York; H. V. Mercer, chairman Commission on Compensation for Industrial Accidents, Minneapolis, Minn.

- Afternoon Session.
“Impressions of American Mechanical Engineers on Foreign Shop Methods.”—Papers by H. L. Gantt, New York, and Oberlin Smith, president Ferracute Machine Company, Bridgeton, N. J.
Participants in discussion: Henry D. Sharpe, treasurer Brown & Sharpe Mfg. Company, Providence, R. I.; George Mesta, president Mesta Machine Company, Pittsburgh; Wm. Lodge, president Lodge & Shipley Machine Tool Company, Cincinnati.
“The St. Louis Method of Technical Education,” Lewis Gustafson, superintendent the John Ranken, Jr., School of Mechanical Trades, St. Louis.
Report of Resolution Committee, Henry D. Sharpe, chairman.
Report of Nominating Committee, M. H. Barker, chairman.
Election of Officers.
Adjournment.

The New York Metal Exchange Election.—James E. Pope of the Pope Metals Company was elected president of the New York Metal Exchange at the annual meeting, held April 3. A. B. Hall was chosen vice-president and Robert L. Crooke treasurer. The Board of Managers is as follows: B. Hochschild, H. W. Hendricks, G. E. Behr, E. Baerwald, Edwin Groves, Charles J. Marsh, W. Parsons Todd and A. Gardiner Cooper. The Arbitration Committee is composed of E. A. Caswell, E. J. Keane, P. R. Jennings, C. S. Trench and J. Langeloth.

The Alan Wood Iron & Steel Company, Philadelphia, Pa., on March 27 ran its first train of molten pig metal from its Swede furnaces over its new bridge across the Schuylkill River, connecting with its steel plant at Ivy Rock, Pa.

The Schatz Combination Punch and Shear

The Addition of a Bar Cropper Makes it Possible to Handle Rails, Bars and Structural Shapes

A type CP shearing machine combined with sectional bar cropper and punch has been installed by the Schatz Mfg. Company, Poughkeepsie, N. Y., for the Pittsburgh-Buffalo Company, at Marianna, Pa. This machine has a full equipment for cutting rails, angles, tees, rounds and

requiring less floor space and having proportionately greater strength. The punch slides are of great width and are housed in bearings of ample proportions, thus securing perfect alignment at all times. The driving gears have cut teeth, and those connecting with the different parts of the machine are of the hydraulically molded type, which insures noiseless running. All the gears of the machine are protected by ample guards.

The capacity of the punch is $1\frac{1}{4} \times 1\frac{1}{4}$ in. stock. A universal table consisting of a die holder and a horizontal jaw forms a part of the equipment. This table is especially suitable for punching plates, bars and all forms of structural shapes, both in the web and also in the flange close to the corner. For all ordinary punchings the vertical die holder is used, the horizontal one being employed for punching bent plates and punching, notching and coping I-beams. The dies employed for punching channels and I-beams have a bevel to conform to the slope of the inner flange surfaces. In addition to punching channels and I-beams of standard dimensions, it is also possible to punch Bethlehem girder beams having wide flanges. A stripping off device also forms part of the equipment of the punch. It is circular in shape with an opening exposing the punch and is fastened on the housing of the punch slide in a circular bearing. This arrangement enables the operator to rotate the stripper so as to bring the opening in any desired position and make the punch visible from any angle. The material is held down and stripped off horizontally, thus preventing breakage of the punch when stripping material. A key is employed to hold the punches in position instead of a set screw.

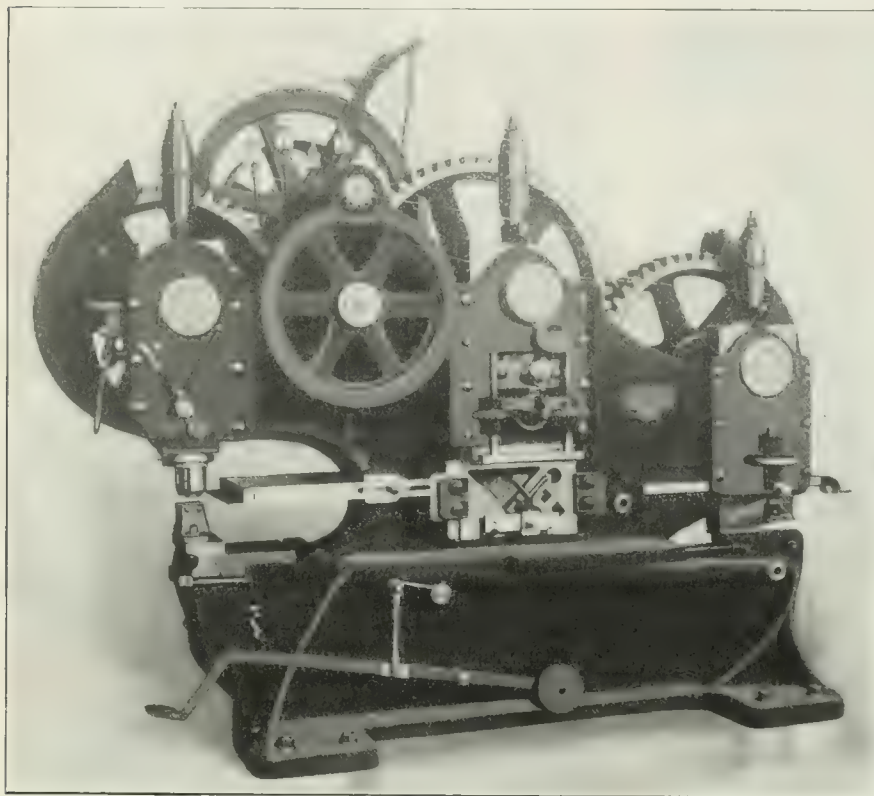


Fig. 1.—A Combined Punch, Shear and Sectional Bar Cropper Made by the Schatz Mfg. Company, Poughkeepsie, N. Y.

squares at right angles or at a bevel of 45 degrees, as well as splitting plates of any of the ordinary lengths or widths. It will be used by the purchaser in the manufacture of mine equipment and more especially steel cars and tipples. Fig. 1 is a general view of the machine, and Fig. 2 gives some specimens of the work done by it.

The frames are made from Siemens-Martin steel and are positively guaranteed by the builder against break-

The blades of the sectional bar cropper will cut angles, rounds, squares and tees at right angles, and it also can be furnished for cutting angles and I-beams at right angles without waste and without deforming the section. The ability to cut channels and beams without waste is an important feature especially where these shapes enter into the manufacture of other articles, since they are generally furnished in lengths from which a certain number of pieces can be cut. With this machine

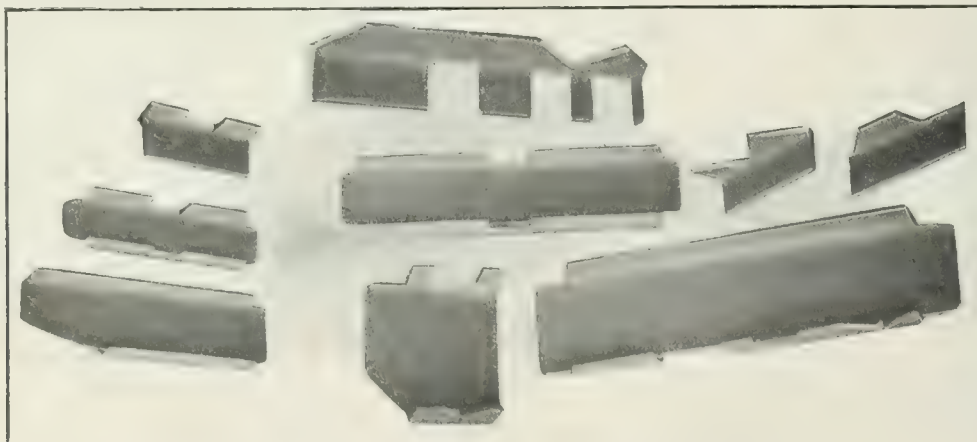


Fig. 2.—Some Specimens of Coping Done by This Machine.

age. The use of this material makes the machines weigh about one-third as much as those of the same type built with cast iron frames. This results in securing machines

it is possible to trim $\frac{1}{4}$ in. from the end of a beam or channel instead of sawing it, which is the customary way. A miter attachment is also furnished with the

cropper, which enables angle irons to be cut at a bevel of 45 degrees, either right or left. No filing is said to be needed to make pieces cut by this machine fit properly.

The capacity of the plate shear for splitting and shearing is 1 1-16-in. plates, and cutting flat bars 1½ in. thick. The shear blades are 14 in. long, and this part of the machine is equipped with an automatic separating device which prevents the cut portions of the plate from binding against the frame of the machine while the cuts are being made.

The plate shear and the cropper are operated by a disengaging gear consisting of a screw release with a weight and wide bearing surfaces. This gear is absolutely reliable and operates instantaneously in any position of the slide. The device is thrown into engagement automatically. The bar cropper and the large size of plate shear has a strong and novel hold-down. This consists of two screw spindles connected at the bottom by a cross member and is easily and quickly adjusted to any desired thickness of stock by a crank handle and worm gear.

The universal coping fixture, which is attached to the punch end of the machine, is especially suitable for coping and punching miters in the flanges of I-beams, channels and tees at one stroke. This fixture makes cuts with smooth edges and can be used to advantage in manufacturing parts from structural shapes.

The machines are made in seven different sizes, the smallest cutting plates ¾ in. thick and 4-in. I-beams and channels, while the largest handles 15-in. I-beams and channels and 1 9-16-in. plates. The punch, shear and bar cropper can be operated either independently or in unison as may be desired by the operator.

A New Steel Rolling Mill for St. Louis

A steel rolling mill company is being organized in St. Louis, Mo., by William E. Guy. The capital stock, which already is oversubscribed, will be \$350,000, and the company, which is not yet named, will soon be incorporated. Building operations will begin as soon as the site is determined upon. It is not yet decided whether the mill will be built in St. Louis or East St. Louis. The plant will require at least 10 acres, with railroad and water facilities.

The company will manufacture hard steel bars, angles and channels, and the plant will have a capacity of 48,000 tons a year. As there is but one plant in or around St. Louis in this line, it is believed that the field for supplying builders, agricultural implement makers, &c., is sufficiently large to warrant the building of a new steel rolling mill. A feature of the business, it is expected, will be the rolling of special reinforcing bars for use in concrete structures. Many builders have special or patented forms of reinforcing bars, which are made according to specifications. St. Louis is a large center for the production and distribution of railroad and other kinds of scrap, comparatively little of which is worked up into new forms there, and the new plant will furnish an outlet for much of that material. The company plans the installation of open hearth furnaces later on.

Thomas R. Akin of Chicago has resigned as general superintendent of the Western division of the Republic Iron & Steel Company to become the president of the new company. Mr. Akin is a former resident of St. Louis. The directors will be William E. Guy, Thomas R. Akin, George O. Carpenter, L. R. Carter, J. H. Smith, George D. Markham, and one other. Mr. Guy was the head of the old Tudor Iron Works, which, with other companies, was merged into the Republic Iron & Steel Company. He has since been engaged in building railroads.

The New York Shipbuilding Company, Camden, N. J., launched March 27 the steamship Somerset, which it is building for the Merchants & Miners' Transportation Company. The vessel is a sister ship to the Suwanee, launched about a month ago, is 333 ft. long, 30 ft. deep, of 3500 tons capacity, and will be used in the coastwise service carrying freight and passengers.

Standardization by the Automobile Engineers

The Society of Automobile Engineers, 1451 Broadway, New York, with a membership of nearly 800 of the ablest engineers and experts having to do with the automobile industry, has within the year accomplished results that will be found to have made engineering history of a definite nature. Its work is of interest not merely to the technician, but to the layman who demands efficiency, safety and comfort in the use of his motor car, but who has little idea how largely these desired qualities are the fruit of vast research and labor.

Standardization is a keynote of the work of the society, that being the vital and imperative need of the producing end of any great industry. That standardization is a good thing is realized by many, but the necessity of it would be realized by many more if the situation were fully understood. For example, it is not clear to many of the business men associated with the automobile industry that there is any unnecessary complication of design. They do not realize that there are 300 or 400 more dimensions and designs for lock washers between the sizes of 3-16 and ½ in. than there ought to be. It is hard for the business man to see why any such situation should arise unless there existed some necessity for it. The explanation is clear.

A draftsman, for example, is called upon to make a drawing of an automobile axle. His instructions are to draw an axle capable of carrying a car of some given weight, and that, in a general way, it should be an I-beam axle of certain length and style. Entering into this axle are very many details as to size of hole for spring clips, pins for steering joints, &c., to accommodate the rest of the steering mechanism and permit the whole thing to slip into a car properly. The draftsman exercised his own judgment as to these details, not having before him any standard for the various details. He may choose a tubing for the steering cross rod that does not exist in stock. If he has no table of tubing sizes before him he makes it to suit his own fancy, as long as it will do the work. He will do the same thing for the shape of the heads of the screws and bolts, and for the size of the holes for the spring clips and for many other details. Every one of these things he may thus select may not exist in stock, may not even be of standard design.

The drawing will go to the checker and, if the figures correspond and the design be a good-looking one, it goes to the purchasing department and the parts are ordered. The next thing that may happen is that the screws ordered are found to be special, and the screw company furnishing them so states and says: "Can you not use this size, which differs only a very little from what you have ordered?" The purchasing department says, "Yes; but all the other parts are already in the machine shop and partially machined and we are sorry, but we must have these special screws even at the high price you are obliged to ask for them." So the special parts are ordered and incorporated. The worst of it is that the next time a new model is designed, it may be desired to incorporate this axle or parts of it to save tools and fixtures; so again the special parts are ordered, and it may be several years before the extra expense of obtaining special parts is got rid of.

To guide the ideas of such draftsman is one of the principal functions of the Society of Automobile Engineers. The aim will be to put into the hands of every designing draftsman an engineer's pocketbook or a series of sheets, which shall show him what is available in the way of screws, tubing, lock washers, rod ends, grease cups and the many fittings that are standard. There will be no attempt to throttle original research as to changes in engines, changes in transmissions, or changes in any portion of an automobile. This does not alter the fact, however, that it is better to have a novel engine or a novel transmission made up of component parts which are standard and well tried out than one which is not only novel in design as a whole, but one in which every element is novel and untried.

The Enlarged Bettendorf Steel Car Plant

A Recent Addition Which More Than Doubles Its Capacity

The plant of the Bettendorf Axle Company, Bettendorf, Iowa, built in 1902, consisted of a brick building, 240 x 700 ft., on a 40-acre tract of land. During the past two years the plant has been enlarged until at present the factory grounds cover an area of 100 acres, and a number of new buildings have been erected. Fig. 1 shows the arrangement of the plant and gives some idea

net. The pig iron and the scrap storage bins, which have a capacity of about 5000 tons, are of reinforced concrete and are located in the furnace bay adjacent to the furnaces. A 500-ton hydraulic scrap shear is located in the furnace bay for shearing rails and heavy scrap, which is taken to the bins after it has been cut. Gates, risers and defective castings are loaded on the charging

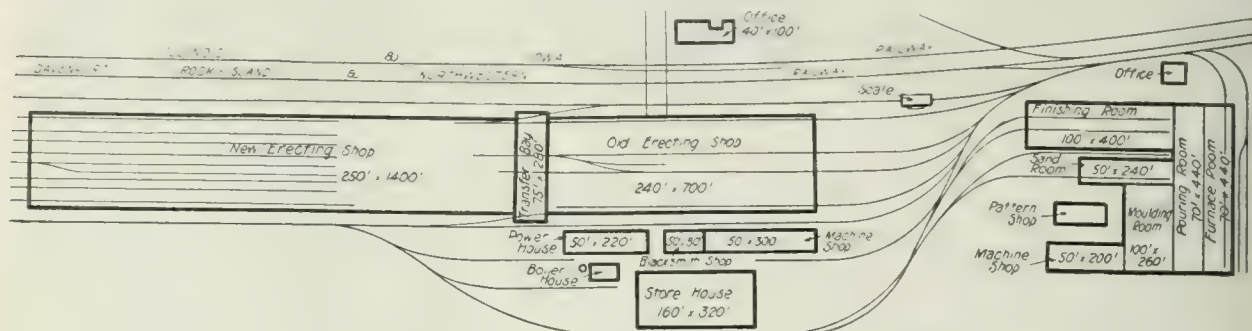


Fig. 1.—Plan of the Plant of the Bettendorf Axle Company, Bettendorf, Iowa.

of its present arrangement and size, while Figs. 2, 3 and 4 show a portion of the foundry equipment. Fig. 2 is a view of the sand mixer and the conveyor for delivering sand at the various molding machines in the foundry. Fig. 3 is a view in the pouring room and Fig. 4 shows the annealing furnaces.

The steel foundry, which is located east of the main shop, like the rest of the buildings, is brick and structural steel, divided into wings or bays, and space is provided for future growth. The furnace bay, which is at the end, is 70 x 440 ft., and is equipped with two 5-ton electric traveling cranes for handling molds and castings and a ladle crane having a 35-ton main hoist and a 5-ton

cars in the pouring bay and taken directly to the furnace bay for charging.

A continuous sand mixer runs through the foundry department handling the sand and conveying it to the sand mixer shown in Fig. 2. This room is 240 ft. long and 50 ft. wide, and its equipment includes one 5-ton 48-ft. span electric crane, with a $\frac{1}{2}$ -yd. grab bucket, two 25-ton continuous heavy sand mixers, two 15-ton facing sand machines and a number of concrete bins for storing the sand. These bins can store enough sand to last through the winter, and are heated with steam coils to dry the sand.

The melting rooms are two in number and measure

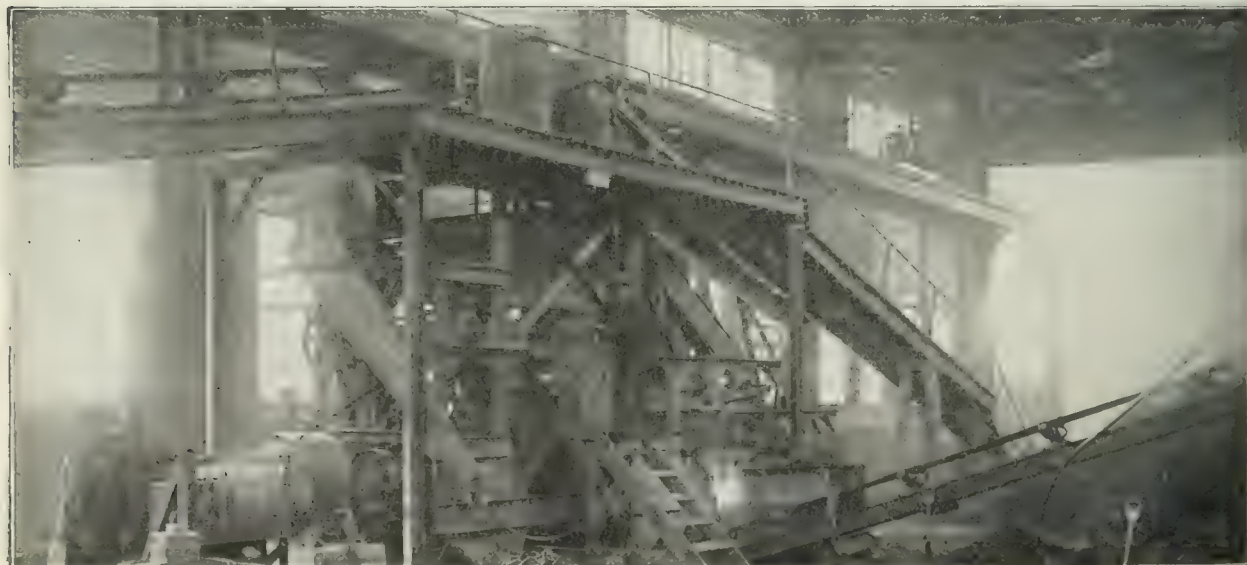


Fig. 2.—The Sand Mixer and the Conveyor in the Foundry.

auxiliary hoist. Both of these cranes span the entire width of the bay, and in addition there are an electric traveling wall crane and two jib cranes for handling the furnace spouts, each of 5 tons capacity. The present equipment of the foundry is two 25-ton open hearth furnaces, which are designed to use either oil or gas as fuel. The burners and the doors and the door frames are all water cooled. The furnaces are served by a Morgan charging machine and the entire floor, which is of concrete, is flush with the tops of the charging car rails. Ample raw material storage room is provided and all the handling is done by a crane and lifting mag-

50 x 260 ft. each. Their equipment includes electric traveling cranes, having a capacity of 5 tons, miscellaneous jib cranes, pneumatic ramming tools, Bettendorf core and molding machines and a continuous sand conveyor delivering the sand at the various machines from the mixer. The annealing and chipping rooms, which are arranged in two bays, each 400 ft. long and 50 ft. wide, contain two continuous annealing furnaces of the type shown in Fig. 4.

The new erecting shop is 250 x 1400 ft., and 60 ft. high. In connection with the old shop, which it adjoins, a single building, 2100 ft. long, is formed. This shop con-



Fig. 3.—A View in the Pouring Room.

tains 15 electric traveling cranes, ranging in capacity from 3 to 10 tons. Underframes and cars are made here, and the original shop is divided into five bays. The two on the south are devoted to the manufacture of bolsters, small car parts and truck springs are made at the opposite side, and the center bay is used for storage and assembling the underframes. A transfer bay equipped with cranes and magnets for distributing material from the old shop to the four bays of the new addition connects the two parts. In the new part the two north bays are used for fabricating and erecting underframes and cars, the south central bay for securing floors and sides

The bay of the foundry building adjoining the molding room is used as a metal pattern and machine shop and contains tools for building and repairing metal patterns, molding machines and other machinery used in the foundry. The wood pattern shop, 50 x 140 ft., is on the upper floor of a separate building. A motor driven automatic stop-and-start planer, a jointer, a pattern grinder, saw tables, a band saw, a lathe and a revolving oil stone form part of its equipment.

The power plant is in two buildings, a boiler house, 50 x 80 ft., and an engine and pump house, 50 x 220 ft., adjoining it, both at the end of the blacksmith shop.

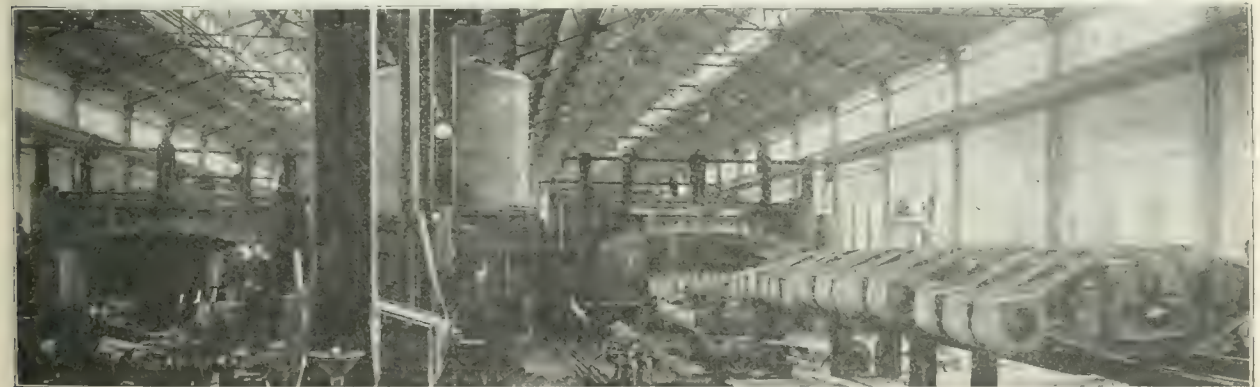


Fig. 4.—The Furnaces in the Annealing Department.

to the frames, and the other bay for storing small car parts and specialties.

The main machine shop is utilized exclusively for building and repairing the machinery used throughout the plant. All of the tools, which include planers, engine and turret lathes, radial drills, crank shapers, saws, bolt cutting machines and drill presses, are motor driven. Tools are made and dressed in a blacksmith shop, 50 x 80 ft., at the end of the machine shop. Included in its equipment are forges, hammers, presses, hardening furnaces with electric pyrometers and a bolt and rivet heading machine. Facilities for repairing the large number of motors used in the plant are afforded by the electrical department, which is located in the main shop.

In the boiler house are four vertical water tube boilers with automatic chain grate stokers and a fuel economizer. Coal and ashes are handled by a conveyor with automatic weighing hoppers. Space remains in this building for installing two additional boilers. The engine and pump house contains two duplex fire pumps, each having a capacity of 1000 gal. per minute, and six hydraulic pumps capable of supplying 1230 gal. per minute at a pressure of from 350 to 3000 lb. per square inch. These pumps supply the hydraulic presses throughout the plant and three weighted and two actuated accumulators govern them. Three compressors having an aggregate capacity of 3400 cu. ft. per minute furnish the compressed air required. An exhaust steam turbine directly con-

ected to a 500-kw. direct current generator, which was illustrated in *The Iron Age* February 23, 1911, and two tandem compound engines directly connected to 100-kw. direct current generators supply light and power. In a system of concrete tunnels are laid the hydraulic and compressed air piping and the electrical conductors to the various buildings.

The Climax Spur Geared Chain Hoist

A new spur geared chain hoist is being manufactured by the Climax Hoist Company, 1753 North Howard street, Philadelphia, Pa. Simplicity and efficiency, without excessive cost, was the aim in its design. Fig. 1 is

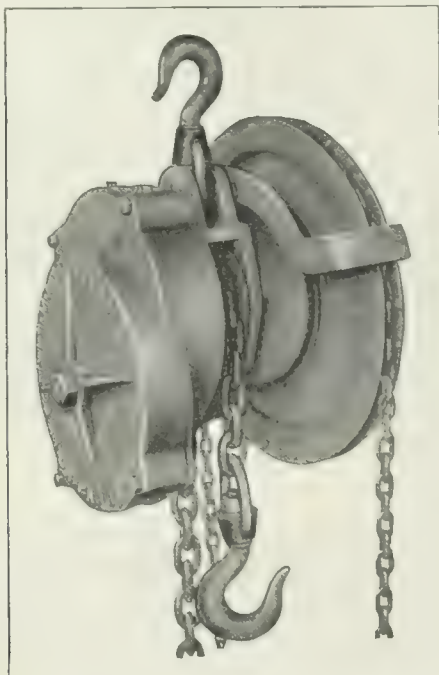


Fig. 1.—A New Spur Geared Chain Hoist Manufactured by the Climax Hoist Company, Philadelphia, Pa.

a general view of the hoist, while Fig. 2 gives an end view and an axial section.

This hoist has but two spur gears and two pinions to obtain the necessary reduction from the hand chain wheel to the load sprocket. The load is carried on steel rollers, and the gears are inclosed in a dustproof case and run in a bath of oil, minimizing friction and enabling quick and easy operation. A friction retaining brake automatically sustains the load at any point, and is secure, smooth and noiseless.

The load chain runs in a sprocket wheel, *b*, Fig. 2, which is keyed to a long hub or sleeve, *c*, cast in one

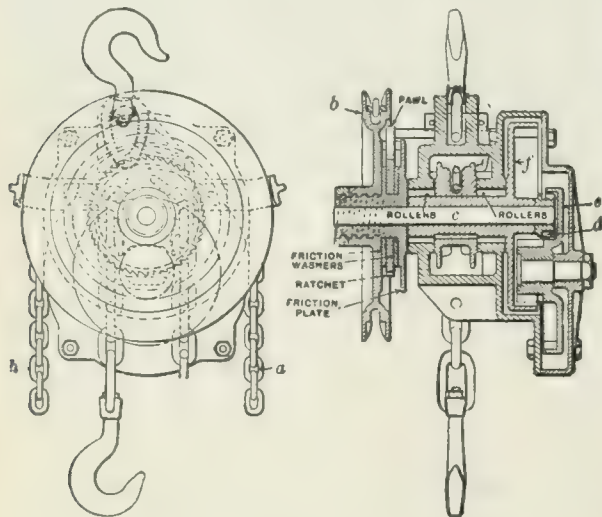


Fig. 2.—End View and Axial Section of the Climax Spur Geared Hoist.

piece with the internal load gear *g* and carried on roller bearings in a suitable housing. This internal gear is driven by a spur pinion cast in one piece with an internal intermediate gear carried on a steel stud attached to the hoist cover. This gear is driven by the spur pinion located on the chain wheel shaft, which passes through the hub of the load gear to the opposite end of the hoist. The automatic friction brake is located between the hand wheel and the body of the hoist, and hoisting is accomplished by pulling the right hand side of the chain which rotates the mechanism. Lowering is accomplished by operating the left hand chain. The rotation of the hand wheel, through a pawl actuates the friction brake and permits the load to descend only as fast and as long as the chain is pulled.

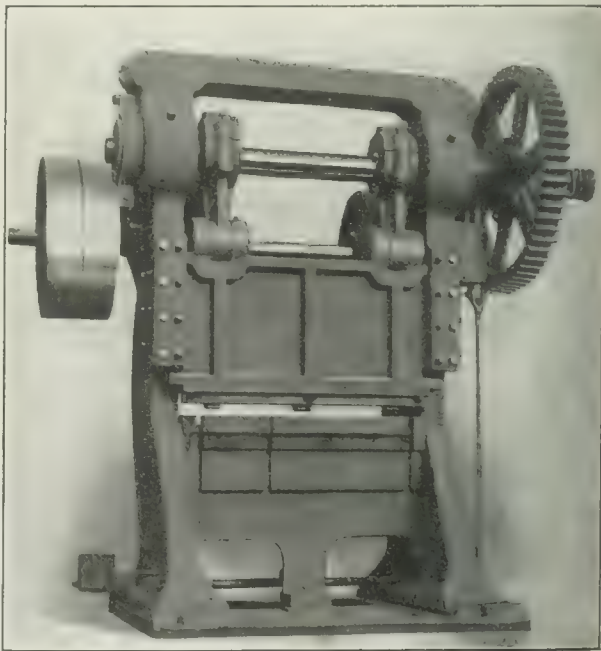
The new hoist has very few parts, and all are made to standard size, so that any one may be easily replaced. Seven sizes are made, having rated capacities of $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, 3, 4 and 5 tons.

A Large Aetna Multiple Punch

A new multiple punch of especially rigid construction has been brought out by the Aetna Foundry & Machine Company, Warren, Ohio. It is built in sizes ranging from 30 to 54 in. between the housings and for either belt or motor drive.

The housings are one-piece castings, connected at the top by a fitted cap. The bearings are solid eyes fitted with renewable cast iron bushings, having bronze linings. Set screws provide for adjustment to compensate for end and side wear of the sliding heads. Bronze shoes which are not shown are placed under the pitman to take up lost motion, the adjustment being secured by wedges driven in by a tap bolt.

The gear is equipped with the builder's standard automatic steel clutch, which is thrown in by a heavy spiral



A Large Multiple Punch Built by the Aetna Foundry & Machine Company, Warren, Ohio.

spring when the foot lever controlling it is depressed and is automatically released when the pressure is removed. The die table has a direct bearing at the center upon the bed plate to insure rigidity and in addition is tongued and grooved to the housings, to which it is attached by fitted bolts. The machine rests upon a heavy bed plate bolted to the foundations. The power is transmitted to a solid forged eccentric shaft, and when the punch is motor driven, the motor is placed either on the side of or between the housings.

The dimensions of the 36-in. machine, which will serve to give some idea of the proportions of the entire line, are overall height, 6 ft. 7 in.; height between bed plate and center of eccentric shaft, 5 ft. 4 in. and size of base plate, 4 ft. 6½ in. by 4 ft. 1½ in.

New Brown Ore Unloading Plant

A Recent Installation for the Maryland Steel Company

A new fast plant for unloading Cuban iron ore for the Maryland Steel Company having some new features has recently been placed in operation by that company at Sparrows Point, Md. The plant consisting of two electric fast unloaders, each equipped with a man trolley and patent two-rope ore grab bucket, was built by the Brown Hoisting Machinery Company, Cleveland, Ohio. The buckets have a capacity of $7\frac{1}{2}$ tons each, and each unloader has a capacity of 500 tons per hour. The plant is designed for unloading directly from the boats to the cars. As the storage capacity is limited to a small pit in the rear, no bridge is required.

The unloaders consist of a portal pier cantilever structure spanning three standard gauge railroad tracks, with a distance of 46 ft. between legs, arranged with a lift-

The moving gear is operated by power from the motor house, being controlled by an electric brake. The entire operation of the plant is under the control of the operator in the trolley at any position along the runway. Power is transmitted from the motor by a line of shafting down each side of the pier, and this, together with the necessary train of gears, is connected to the track wheels, so that the unloader can be propelled along the tracks, on which it is mounted, in either direction. The trolley is so designed that the operator can turn the bucket by a turntable through an angle of 90 degrees. Each unloader has a movable guide hopper arranged to travel on flanges of the channels comprising the lower chord of the trusses in the pier. The hopper is placed in the desired position over a car, and the bucket is discharged into the hopper.

The weighing hopper has been dispensed with and an entirely new weighing mechanism is provided to meet the requirements of this plant. The scale is located in the end of the runway in the cantilever and weighs both the trolley and the bucket. The scale is shown on the rear



The New Ore Unloading Plant Installed for the Maryland Steel Company by the Brown Hoisting Machinery Company, Cleveland, Ohio.

able apron or cantilever projection at the front, or water end and with a cantilever projection at the rear. The loaded trolley hoists its load at the rate of 185 ft. per minute, and travels along the runway at the rate of 600 to 800 ft. per minute. The travel of the unloader along its tracks with a full load is 75 to 100 ft. per minute. The cantilever projection in the rear extends 50 ft. from the rear legs, and provides a trolley travel of 35 ft. from the rear legs. The total length is 150 ft., and the total trolley travel 123 ft.

The apron extension on the front or vessel side of the pier is operated by power. A latch is provided at the top of the mast to lock the apron when it is in a raised position, relieving the strain on the raising and lowering rope. The mechanism for raising and lowering the apron is connected to the pier traveling motor by a jaw clutch. The apron is attached to the fixed portion of the track in the pier by hinged connections, so designed as to prevent any abrupt break in the track at this point and to provide a smooth continuous runway for the trolley. The cantilever in the rear is similar in general construction to that of the trolley track within the pier and the apron.

unloader in the engraving, the one in the foreground not being provided with a scale. The weighing is done by an operator in the scale house near the scale. The plant is designed to weigh only the ore that is placed on the storage pile. However, should it be desired to weigh the ore before it is dumped into the cars this can be done by running the trolley back to the scale and then, after weighing, moving it forward to a position over the hopper.

The power for moving each unloader along the dock and raising and lowering the apron is furnished by a 75-hp. direct current 220-volt motor. Each trolley is equipped with a 250-hp. motor for hoisting, a 75-hp. motor for racking the trolley and a 5-hp. motor for operating the turntable. The hoist motor is controlled through master operated magnetic control equipment.

In Vol. III. of the Revised American Statesmen Series of the Carborundum Company, Niagara Falls, N. Y., a pocket leaflet, the biography of Capt. John Smith is given in lighter vein. The text is by the president of the company, F. W. Haskell, and is entertaining. There is no mention of carborundum until the last page.



Fig. 8. View Showing Light Emitted by Incandescent Rods in a Rod Mill.



Fig. 9. A Boiler Shop Illuminated by 500-Watt Mazda Lamps.

IRON AND STEEL MILL LIGHTING



Fig. 2.—An Example of Bad Lighting.

while the latest incandescents, the Mazdas, give in the larger sizes as much as 645 candlepower per horsepower (1.15 w.p.c.). Moreover, the range of sizes has been widened and the quality of the light improved.

During recent years so many new illuminants have appeared that were it not for the science of illuminating engineering that has sprung up to meet the exigency, many an electrical engineer would be like a boy with a chest of sharp but unfamiliar tools. In 1906 the Illuminating Engineering Society was formed in New York City, the objects of the society, as stated in its constitution, being "the advancement of the theory and practice of illuminating engineering, and the dissemination of knowledge relating thereto." The parent body is flourishing, with a membership of over 1600, and has sections in various cities. Several prominent illuminating engineers are specializing entirely in industrial lighting, while tests and investigations of mill illumination are frequently reported in the *Transactions* of the society and of its sections.

Besides invention and illuminating engineering, the merging of iron and steel interests has contributed toward the movement for higher efficiency in lighting. Still another factor has been the creation of industrial lighting departments by progressive lamp manufacturers. The engineers of these departments place themselves at the disposal of the technical staffs of iron and steel concerns, furnish such data as they possess on lamp performance and suggest how the lighting units should be installed and used to give the most satisfaction.

Characteristics of Iron and Steel Mill Lighting Service

Striking differences distinguish the conditions affecting illumination in the iron and steel and related industries from the conditions found in most other classes of

lighting. In the first place, the work done is of an absolutely practical nature; fine art and sentiment play little or no part in it. Therefore attempts at decoration, which increase the cost of fixtures, reflectors or lamps without having any utilitarian value, are absurd. Especially is this true in the case of large units or clusters which are hung so high that the details of the apparatus are never noticed.



Fig. 3.—A Comparison of the Illumination Given by a Bessmer Converter at Full Heat and an Inclosed Arc Lamp.

The prevalence of dirt is another characteristic of this class of service. Flying particles of slag, sand and coke dust in furnaces and foundries and oily dirt in blacksmith and machine shops are serious, though unavoidable, hindrances to the illumination of these places. Dense clouds of steam from exhaust pipes have much the same effect as floating dust in counteracting the illuminating effect of the lamps. In shops where dirt and dust are produced in very large quantities it is often uneconomical to use lamps with any interior mechanism, as the deposit on these parts clogs them and makes it necessary to overhaul the lamps at frequent intervals, take out the moving parts and either scrape them with



Fig. 4—Improper Lighting.



Fig. 5—Proper Light.

Two Examples of Lathe Lighting, Showing How the Use of the Right Type of Reflector Obviates Glare.

emery cloth or clean them in acid. Even with lamps having no mechanism such as incandescents, dirt and dust, if allowed to accumulate, will greatly reduce the light, so that it is advisable to establish a regular cleaning schedule to secure permanent good service.

There is probably no other class of buildings in which the illumination, due to the character of the work itself, varies so much from minute to minute as in iron and steel mills, on account of the large masses of metal handled in an incandescent state. The extreme of variation is found near Bessemer converters. During the blow the central part of the mill is filled with such a flood of light that artificial illuminants appear puny by contrast. This difference is clearly shown in Fig. 3. Consequently the artificial lighting system needs to be exceptionally powerful to give satisfactory illumination when the metal has ceased to furnish much light, and the after effect of the blow or pour is still hindering the workmen's ability to see.

It is not generally realized what a large and disturbing factor glowing metal forms. For example, in a rod mill where there are 900 ft. of incandescent steel rod, with an average diameter of $\frac{1}{2}$ in., exposed, the incandescent area is 150 sq. ft., or 21,000 sq. in. Assuming an intrinsic brilliancy of only 0.01 cp. per square inch, the rods emit a total spherical candlepower of 216, or more than as much as an ordinary inclosed arc lamp. An example of the amount of light emitted is given in Fig. 8.

Two of the most important requirements for good artificial illumination in iron and steel mills and shops are steadiness and uniformity. The first may be defined as absence of flicker. Some lamps, when they get out of adjustment or when the voltage supply is low, chatter noisily, apparently in frantic effort to regulate themselves. Under such conditions the workmen are not only subjected to the annoyance of flicker, but their attention is likely to be transferred from the work to the misbehaving lamp.

Absolutely steady light is impossible in foundries, furnace plants and steel mills, owing to the variations in the light emitted by the incandescent metal, but even in such places plenty of artificial light should be provided so that the changes from noontime brightness to semidarkness may be less pronounced and glare effect may thereby be reduced. Obviously, the stronger the artificial light the smaller is the percentage of the total light received from the metal and the less is the percentage of variation. In machine shops and in all mills where large masses of intermittently flaming or glowing material are not used a close approach to absolute steadiness may be secured by the proper choice of illuminants.

If electricity be supplied at constant voltage to an incandescent lamp the light remains practically steady.

With arc lamps, even with steady voltage, there is a continual variation in candlepower, due to the continually changing physical conditions at the arc. Whenever the supply voltage falls below normal—as it will at times in all mills and shops—the candlepower also drops, the amount depending upon the type of lamp. Certain types of electric arc lamps vary in candlepower as much as 7.5 per cent. for a 1 per cent. change in voltage, while other types vary as little as 2.65 per cent. The common carbon incandescent under a 1 per cent. change in voltage varies about 5.55 per cent. in candlepower, and the Mazda incandescent about 3.68 per cent.

The following table shows the voltage at which some commercial lamps recently tested by the writer failed to operate when the pressure was gradually reduced. The lamps were all in good operating condition when tested and were set for normal operation at 110 volts:

Type of lamp.	Voltage of extinction.
4-amp. direct current luminous arc	55
3.5-amp. mercury arc	97
6-amp. alternating current carbon inclosed arc	87
60-watt carbon incandescent	Still glowing at 50 volts. In a dark room glow can be seen below 30 volts.
40-watt Mazda incandescent	Still glowing at 20 volts. In a dark room glow can be seen below 10 volts.

No lamp can be expected to give good results on a system where the voltage fluctuates violently. Reasonably constant voltage should be secured by providing self-regulating generating machinery, switchboard regulating apparatus and conductors of large carrying capacity.

The second important requirement for good artificial illumination in iron and steel mills and shops is uniformity. Assuming that there are perfectly steady lights, if these are not properly installed they will not produce uniform illumination and the effect in extreme cases will be intolerable. It takes a certain time after passing from a brightly lighted to a dimly lighted room for the eyes to accommodate themselves to the change so as to distinguish objects readily. Just so, when a mill or shop is brightly lighted in some portions and is dark in others, the eyes of any workman who has to walk from one part of the building to another are continually accommodating and reaccommodating themselves, and only so long as he stays in one place and keeps from looking at the dark and bright spots in other parts of the room can he see to the best advantage.

Methods of Securing Uniform Illumination

In most cases the desired end will be accomplished by providing a sufficient number of lights, well distributed above the working area, so that there will be a minimum

of dark corners and shadows. Instead of using a single 1000-cp. unit to light a shop of a given size, two units of 500 cp. each, or better yet, 10 distributed 100-cp. units should be used. Each subdivision in the size of the unit makes for uniformity and eye comfort. Where units of extremely high candlepower are already installed it may, for reasons of convenience and economy, be desirable to retain the existing arrangement of outlets, and when changing the kind of lamp used to substitute high candlepower lamps or cluster units of an improved variety; but from an illumination standpoint it is better to subdivide the units and thus obtain a greater degree of uniformity. The artificial illumination of a large room in an iron or steel mill may be considered fairly uniform if tests show that it does not vary more than 100 per cent. from the average in different parts of the working area.

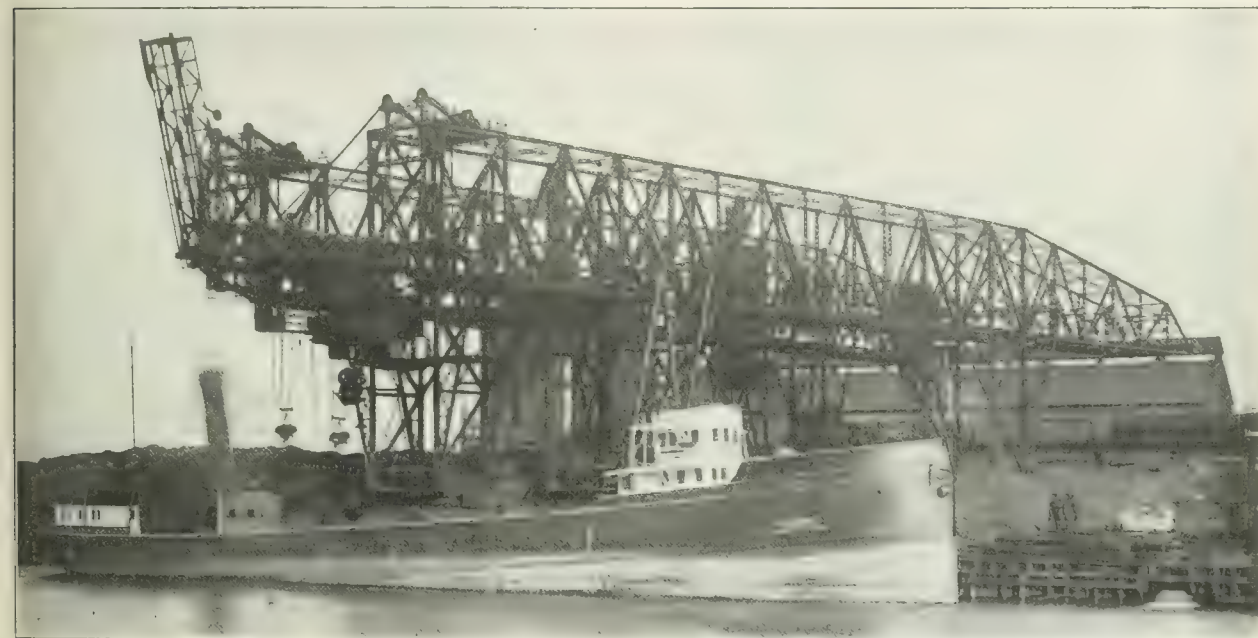
Glare

All the benefits of uniform illumination may be counteracted if the lamps are so installed as to cause a glare effect. They should either be so high as to be quite out-

obtained by the ratio given for such size in the tables. The company's tin plate business has been increasing, and as announced recently its tin plate capacity will be nearly doubled by additions now under way.

Unloading Pig Iron with Lifting Magnets

At the Indiana Harbor plant of the Inland Steel Company, two 62-in. lifting magnets made by the Cutler-Hammer Mfg. Company, Milwaukee, Wis., recently unloaded 4,000,000 lb. of pig iron in 10½ hr., from the Erwin L. Fisher, a sister ship to the one shown in the engraving. The vessel docked at 7:15 a.m., and work was commenced 20 minutes later, continuing with only a half-hour interruption at noon for oiling and inspection until 6:35 p.m. At 7:20 p.m. the boat cleared, the total time at the dock being 12 hr. and 5 min. During the 10½ hr. that the work of unloading was carried on the maximum number of lifts made in any one hour was 73 and the minimum



Unloading 4,000,000 Lb. of Pig Iron with Two 62 In. Lifting Magnets Made by the Cutler Hammer Mfg. Company, Milwaukee, Wis.

side the ordinary range of vision, or should be provided with suitable globes, shades or reflectors. Particularly is this true in mills and shops where accidents are likely to occur. Pointing machines in wire mills, for example, should not be lighted by unshaded incandescents hung directly in front of the worker's eyes. The local lamp should be provided with a reflector or else a sufficient number of lamps should be installed up above so that the local lamp may be removed altogether.

In machine shops one sees the most glaring violations of that cardinal principle of good local illumination, "light on the work, not in the eye." Fig. 4 shows a typical case of bad lathe lighting, where the workman, to shield his eyes, had hung a piece of paper over the lamp. The next view, Fig. 5, taken with the same exposure (1 min. 10 sec.), shows the same lathe lighted by a lamp in a steel reflector, which greatly increases the illumination on the work and at the same time removes the glaring light source from the workman's range of vision.

45. In all 1281 lifts were made by the two magnets used, the average lift per magnet being 3427 lb.

Aside from the speed which is secured by the use of these magnets fewer men are required. Speed is of course very desirable, especially in the busy season and quick unloading enables more trips to be made. With the lifting magnets only two or three men are needed in the hold of the vessel, and no time is lost in filling buckets, as a load can be picked up as soon as the crane operator closes the magnet circuit. The work of unloading the vessel can be carried on regardless of the weather, since the men in the cabs of the bridges and the hold of the vessel are sheltered.

As a forerunner of the annual Master Car Builders' convention at Atlantic City in June information has been received from the Royersford Foundry & Machine Company of Royersford and Philadelphia, Pa., that it has engaged double space this year, in which an even more comprehensive exhibit than ever will be made of Sells roller bearings; Rollerine, the new roller and ball bearing lubricant, and punching and shearing machines, all products of the Royersford Company. Manager John D. Sells will be in charge as usual.

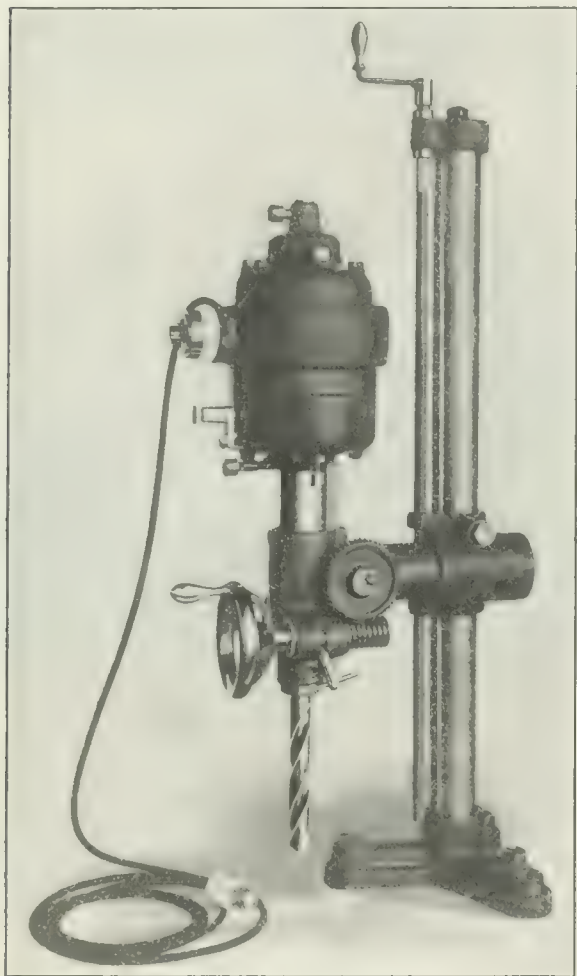
The Jones & Laughlin Steel Company, Pittsburgh, has issued a leather bound booklet for its tin plate department, devoted to ratios of odd sizes of tin plate. These ratios represent the relation between a box of tin plate of a given size, and the base box of 112 sheets, 14 x 20 in. The price on any given size of tin plate is obtained by adding to the base price of the weight and quality desired, such extras as may be required by the length or width of the size ordered; also such quantity and odd size extras as may apply, and multiplying the sum thus

The Des Moines Bridge & Iron Works, Des Moines, Iowa, has been awarded the contract to furnish and erect the structural steel, 750 tons, for the Dakota Portland Cement Company's plant at Chamberlain, S. D. The Freeborn Engineering & Construction Company, Kansas City, Mo., is the engineer.

The Lamb Portable Electric Radial Drill

The Lamb Electric Company, 20 Horton street, Grand Rapids, Mich., has recently brought out a new portable electrically driven radial drill. This new tool is built of aluminum, phosphor bronze and drop forgings and will drill 1-in. holes in any position. It is driven by an electric motor, which can be supplied with current from a lamp socket. With two motors, one for alternating and the other for direct current, it can be used practically everywhere. The motor is integral with the spindle and the latter can be operated in any position. This tool can be furnished for either one or two speeds. In the latter type a two-speed gear change controlled by a small shifting knob is employed and speeds of 135 and 230 rev. per min. are instantly available.

The spindle is fitted with a No. 3 Morse taper and has a feed of 5 in. The main column is made of steel tubing



A New Portable Electric Radial Drill Made by the Lamb Electric Company, Grand Rapids, Mich.

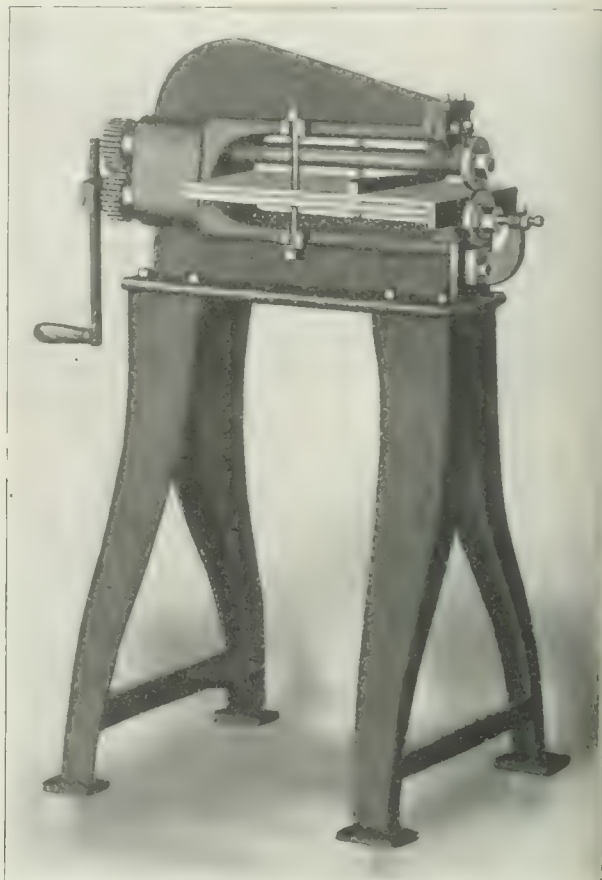
and if desired can be lengthened at a slight additional cost. The net weight of this tool is 130 lb.

The Handy Slitting Shear

For handling all sorts of sheet metal work, the Indianapolis Elbow Company, 806 Fort Wayne avenue, Indianapolis, Ind., has brought out a new type of slitting shear. This tool will cut straight work of any length, will split a 30-in. sheet through the middle and cuts curved work, such as elbows, tees and other odd pieces to line. One of the special features of the shear is the steel bar crank, which can be readily adjusted to different lengths for light or heavy work.

The cutters used are of a special grade of steel, carefully tempered and ground after hardening. The cutters can be adjusted easily as well as the height of the table in relation to them, and double scales on the table

enable the gauge to be readily adjusted. The gears used have their teeth cut from the solid, which insures smooth running. Stay bolts are furnished for heavy work, and when these are used sheets as heavy as No. 16 gauge can be cut. Without the bolts the capacity is No. 20 gauge sheets. The throat depth of the shear is 16 in., which allows pieces 15 in. wide to be cut easily. The machine



The Handy Slitting Shear Made by the Indianapolis Elbow Company, Indianapolis, Ind.

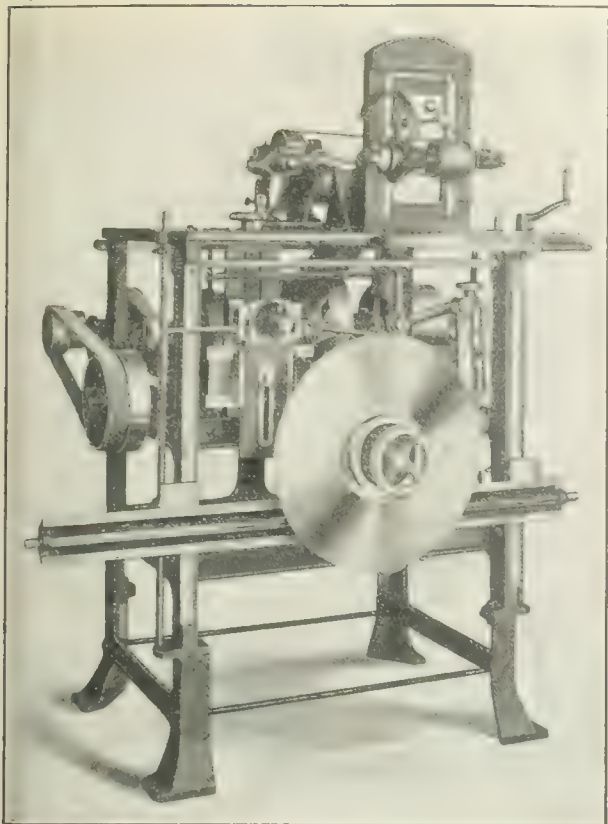
can be furnished with back gears for either hand or power operation, when very heavy work is to be handled at a slight additional cost.

The Covel Automatic Circular Metal Saw Sharpener

A new automatic machine for sharpening circular metal saws has been developed by the Covel Mfg. Company, Benton Harbor, Mich., and is being sold by E. C. Atkins & Co., Indianapolis, Ind., the general agents for this company's line of automatic filing room machinery. The sharpener has a number of improvements, among which are an angle shaped slide on the head, an improved adjusting crank to the gate screw, cut gears and a patented crosshead which enables the center of the saw to be adjusted to coincide with the grinding wheel center at all times. The special advantage of the machine is that it can retoothe or punch heavy circular saws without retempering, which has heretofore been almost impossible.

This machine can be used to grind new teeth into saws where the old ones have been broken out and the work can be fed to the emery wheel with which the sharpener is equipped by an index plate. These plates are made with any number of teeth according to the saw which is to be sharpened or ground and gives a great advantage, as under the methods previously employed it has been well nigh impossible to retoothe or punch heavy circular saws without retempering them.

All movements or adjustments of rods or connections are controlled by hand wheels and screws and can be adjusted while the machine is running. The maker's

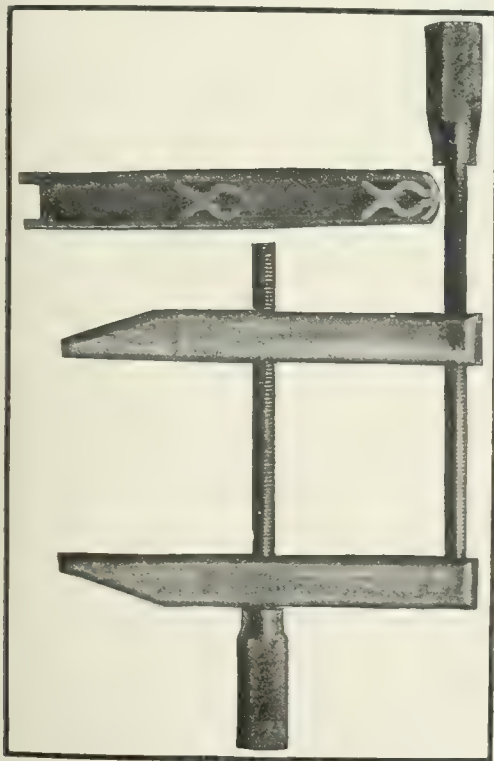


A New Automatic Sharpener for Circular Metal Saws Built by the Covel Mfg. Company, Benton Harbor, Mich.

new standard automatic belt tightening bracket also forms a part of the sharpener's equipment.

The Paramount Indestructible Steel Clamp

The Adell Bros. Mfg. Company, Orange, Mass., has recently brought out a new pressed steel clamp, known as the Paramount Indestructible clamp. It is made from sheet steel with a special inner strengthening nut to secure the greatest strength with the least metal. The clamps are designed for the use of machinists, tool-



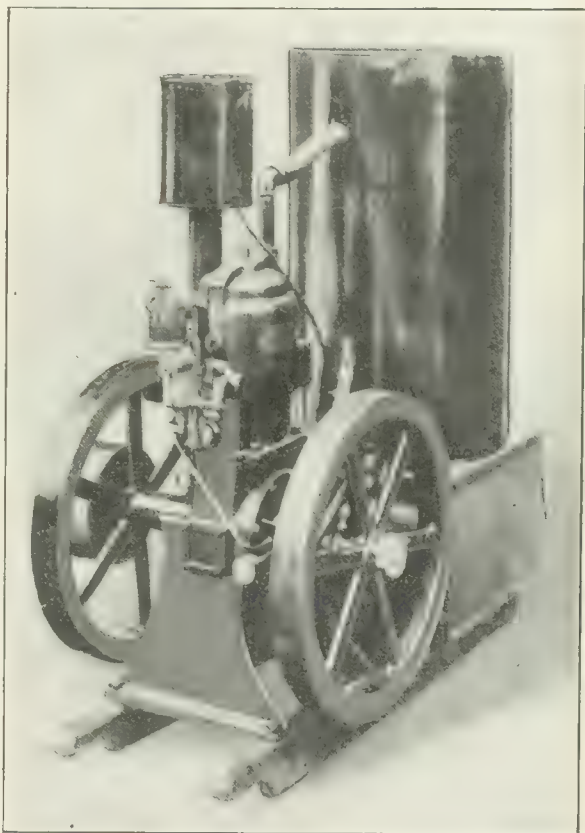
The Paramount Indestructible Pressed Steel Clamp Made by the Adell Bros. Mfg. Company, Orange, Mass.

makers, car and boat builders, electricians and others having occasion to clamp together temporarily pieces of wood or parts of any kind.

The screws are long, and are said to give a durability which cannot be found in other clamps. A special modified type of United States standard thread is employed, which is fine enough to insure a powerful clamping action and at the same time gives a very smooth thread which is not apt to catch waste, dirt, &c. The nature of the material used insures exact duplication and uniform strength, while the method of construction eliminates sharp edges. Another special feature of the clamp is that glue when hard falls away from the smooth steel surface readily, thus eliminating the trouble frequently experienced. The standard sizes have 6-in. jaws with $4\frac{1}{2}$ -in. opening; $7\frac{3}{4}$ -in. jaws with $5\frac{1}{2}$ -in. opening, and $8\frac{3}{4}$ -in. jaws with $6\frac{1}{2}$ -in. opening.

The Detroit Kerosene Engine

Kerosene as fuel in internal combustion engines has the advantages, as compared with gasoline, of costing 25 per cent. less and being capable of developing 25 per



A Stationary Kerosene Engine Built by the Detroit Engine Works, Detroit, Mich.

cent. more power per gallon. To enable users of stationary engines to secure the advantages of this form of liquid fuel, the Detroit Engine Works, Detroit, Mich., has placed on the market a stationary engine which will operate on gasoline, distillate, naphtha, alcohol, kerosene or mixtures of any of them, although the most satisfactory operation is secured with kerosene as fuel.

The construction of the Detroit engine is very simple, no cams, gears or sprockets being employed. There are only three moving parts and but one adjustment is required. The engine is of the two-cycle type and can be started easily as it does not require cranking. The speed can be varied from 100 to 1000 rev. per min. and reversed if desired. The engine is mounted on skids and can be carried from place to place wherever work has to be done, often saving considerable time. On account of its simple construction the engine is unusually free from repairs. Six sizes of the engine are built, ranging from 2 to 8 hp.

The Machinery Markets

Railroads are taking more interest in their machinery requirements in Chicago, where two more small lists are out. Reports are received of renewed activity in the automobile industry in the West. The machinery trade in New York is figuring on two good lists of tools for Japanese consumption, and New England is getting considerable business from abroad. The demand in Philadelphia and Baltimore is irregular for standard equipment, although a good business is being done in special machinery. Electrical machinery and equipment for traction enterprises have the call in Cleveland just now, where considerable new construction work and power plants are being undertaken. The indications of good crops and the prospects of the settlement of the Mexican disturbances are having a good influence on the machinery trade in Texas and the Southwest. In other sections of the country business is rather quiet, with little of marked importance to report except on the north Pacific Coast, where the movement of mining machinery and supplies to Alaska is unusually heavy and numerous orders are coming out for stamp mills, &c.

New York

NEW YORK, April 5, 1911.

Inquiries and orders are coming into the New York machinery market in better volume than at any time in the last three weeks. Several good deals have been closed, and some large inquiries, particularly for machine tools, came out. The American Bank Note Company, which is buying for its large new plant at Hunter's Point, N. Y., was an excellent customer, and its inquiries indicate that there is more business to come from that source. Two fine lists of machine tools for export to Japan have made their appearance. These lists are sent out by two different Japanese engineering firms, and one of them calls for about \$10,000 worth of equipment, while the other is somewhat smaller. The larger list, it is understood, is not to be closed for two months. Houses that make a specialty of buying machinery for the European trade are also inquiring for machine tools, and the general export business is better than it has been at any time within the last 12 months. It is believed that the Baltimore & Ohio Railroad will shortly issue a list, as machinery men who are familiar with the affairs of that company state that data are being collected by its mechanical force with a view to making heavy purchases of machine tools and blacksmithing equipment. For the last two years the company has been contemplating the erection of machine shops at Cumberland, and plans prepared for this improvement call for an expenditure of \$500,000. It is probable that the company has decided to go ahead with the enterprise, and it is expected that a list will be out before many days. Second-hand machine tools are bringing unusually good prices, and some large sales of rebuilt machinery were made during the week. The demand for used mechanical equipment increased noticeably within the last few days, and the pleasing feature is that the inquiries are new and the sales are not the result of people asking for bids on new tools and compromising on second-hand machinery.

The Drum Elevator Company, 103 Walker street, New York, will require considerable equipment for a new plant it proposes to erect on Sand street, Brooklyn. The building will be six stories and basement, 20 x 100 ft. It will be of brick and mill construction and will cost about \$25,000. When the plant is completed the equipment in the New York factory will be moved there and more will be added. The machinery details have not been perfected as yet, and the company has not decided whether it will use electric or steam power.

The Rector Gas Lamp Company, 131 West Thirty-first street, New York, has purchased a building at Scranton, Pa., formerly used by the Lackawanna Iron & Steel Company as a storage building. The lot is 80 x 160 ft., and a two-story brick building now on it will be improved and used for manufacturing brass parts for gas lamps. The company's manufacturing equipment in the New York building will be moved to Scranton in time to commence manufacturing operations May 1. George A. Updyke is president.

The Hatfield Mfg. Company, maker of auto trucks, has moved its plant from Cornwall, N. Y., to Elmira. W. N. Taylor, who was formerly connected with the Pope-Toledo Company, is general manager of the Hatfield Company, and will have charge of the manufacturing details. The company will install some new equipment, including power apparatus, and may use some electric motors. Inquiries have been made in the New York market for a line of machine tools. Mr. Taylor has charge of the purchasing details.

The Department of Water Supply, Gas and Electricity, New York, Henry S. Thompson, Commissioner, will receive bids until April 12 for furnishing and installing a boiler plant complete and a pumping plant complete in the pumping station, to be erected at Whitestone, N. Y., and for furnish-

ing and erecting a pumping station near the existing driven well plant at Whitestone. Bids are to include the furnishing of all labor and material required to complete the contract abandoned by the Robertson, Gearhart Construction Company.

The Destructor Company, 111 Broadway, New York, was low bidder for the three-grate, 40-ton refuse destructor, to be installed at the city utilization plant, Hamburg and Scott streets, Buffalo.

The International Time Recording Company will build a 50 x 200 ft., three-story reinforced concrete factory addition to its plant at Endicott, N. Y.

The Newburgh Light, Heat & Power Company will build and equip a power plant at Balmville, near Newburgh, N. Y. Plans have been prepared by Frank E. Estabrook, engineer.

It is understood that the Ontario Button Company will move from Amsterdam, N. Y., to Utica, where it will establish its manufacturing plant at Third and Utica streets. Chas. A. Byington is president, and E. G. Dennison secretary and manager.

The Rochester Railway & Light Company, Rochester, N. Y., has given the contract for the construction of its power plant No. 6, and work has been commenced.

The Hemmingsway Canning Company, Lyons, N. Y., has purchased and will refit and equip the former plant of the Lyons Beet Sugar Refining Company at that place for use as a canning factory.

The H. N. Thayer Company, manufacturer of baby carriages, is adding a three-story, 84 x 108 ft., building to its factory.

The Lake Erie Foundry Company, Erie, Pa., has let contract for a two-story addition, 50 x 100 ft., to be made to its plant, and work has been commenced.

Contracts have been let for the construction of a one-story factory building, which the Loetz-Tuscher Company, Utica, N. Y., will erect.

The Hammermill Paper Company has awarded the contract for the erection of the extensive addition it will make to its plant at Erie, Pa., to the Pittsburgh Bridge & Iron Company; about 1500 tons of structural steel will be required.

The Allied Safety Devices Company has been incorporated at Buffalo for the manufacture of various safety devices for woodworking and ironworking machinery, and will take over and continue the business of the George B. Nye Company, manufacturer of woodworking machinery and safety devices. The plant and office of the company will be located at 45 Henry street. George B. Nye is manager.

Chicago

CHICAGO, ILL., April 4, 1911.

The local machinery market is somewhat quieter than last week, although sufficient business has been turned in most machinery houses to bring the total for March business well above that of February. There are several lists of second-hand machine tools being offered in this market by automobile concerns from various parts of the country. The largest offer of this kind totaling \$20,000 comes from a factory in the Detroit district. Although the automobile business is improving in some quarters, lists of this kind in many instances including some new tools are not encouraging, and show slow recovery from the recent set back given this industry. Following last week's list, which was for Butler, Wis., shops, the Chicago & Northwestern Railroad is out with new requirements for the Boone, Iowa, shops which total \$6000. It is reported that this railroad company will follow shortly with a third list, and that purchases of the material mentioned in the three inquiries will be made at the same time. Further activity in railroad

THE MACHINERY MARKETS

buying is evidenced by the new Santa Fe list approximating \$10,000. The fact that railroads are buying more freely has lent a better tone to this market and a general impression prevails that as the season advances this buying movement will strengthen. Floor sales from city shops and small manufacturers in this immediate vicinity are increasing, and in many instances distributors report that branch of business up to normal. Trade emanating from heavier sources has, however, been somewhat inclined to drag since the first of the year.

The Chicago Pump Company, Chicago, manufacturer of electrical pumping machinery, has increased its capital stock from \$10,000 to \$25,000, additional capital being necessary to take care of its rapidly growing business.

John C. Kristan, 1027 Milwaukee avenue, Chicago, has purchased the property at the northwest corner of Elston avenue and Augusta street and will erect a building, three stories and basement, to be equipped with improved baking machinery. All equipment with the exception of conveyors and boiler has been purchased. P. M. Hyde, 226 LaSalle street, is the architect.

The Alton Gas & Electric Company, Alton, Ill., has increased its capital stock from \$500,000 to \$600,000, but states that it is not contemplating any improvements at the present time.

The Farmington Light & Power Company, Farmington, Ill., recently incorporated with \$30,000 capital stock, will take over the property of the Farmington Electric Light Company and extend its service to London Mills, Rapatee and Middle Grove, Ill.

The business of the Miller Safety Lock Company, Peoria, Ill., has been incorporated with \$2400 capital stock. The company manufactures automatic car and door safety locks for the prevention of accidents on passenger elevators.

A special election will be held by Roland, Iowa, April 18, to vote upon the issuance of bonds in the sum of \$8000 for the construction of a light plant and \$10,000 for a water works system.

The Marshalltown Motor Material Mfg. Company, Marshalltown, Iowa, recently incorporated with \$10,000 capital stock, states that it has rented a factory which it will use for the present.

The Fort Dodge Culvert Company, Fort Dodge, Iowa, manufacturer of corrugated metal culverts, arches, well curbing, &c., will increase its capital stock from \$10,000 to \$50,000. The company has recently expanded its plant facilities by the installation of several presses, special riveting machines and rolls. A squaring shear and a set of rolls and dies for making galvanized fence posts will probably be purchased in the near future.

Dodge Bros., formerly of Joliet, Ill., have purchased a site in Keokuk, Iowa, and removed their machinery for the manufacture of indestructible automobile tires to that city.

The farmers in the vicinity of Carroll, Iowa, have organized a company to be known as the Farmers' Grain & Lumber Company, with a capital stock of \$20,000, and will erect an elevator.

Headford Brothers, Waterloo, Iowa, foundrymen, are contemplating erecting an addition, owing to the rapid increase in their business, notwithstanding their facilities have only recently been greatly enlarged.

The Peoria Washed Sand & Gravel Company, Peoria, Ill., has increased its capital stock from \$5000 to \$25,000.

The Harrison Machine Works, Belleville, Ill., has issued orders for the resumption of a nine-hour day in all departments of the plant. An increase of business has rendered it necessary to run on longer hours. The Belleville foundry interests employ upward of 2000 men, and are now working full time, with plenty of orders ahead.

The Automatic Safety Appliance Company, La Salle, Ill., has been incorporated with a capital stock of \$100,000. The incorporators are A. G. Huling, Thomas Baird and W. H. Fraser.

A new corporation, known as the Hollow Brick & Tile Company, has been chartered and will operate in West Salem, Ill., with a capital stock of \$50,000. The president is Wm. Harrison; vice-president, W. O. Mallinson; secretary and treasurer, Paul Grace.

The Woodhull Grain Elevator Company, Woodhull, Ill., has been incorporated with a capital stock of \$7000. The incorporators are Jay L. Carnes, A. D. Richards and A. N. Johnson.

Philadelphia

PHILADELPHIA, PA., April 3, 1911.

While the closing week of March has shown a slight improvement in the demand for machinery, tools and equipment, the volume of the month's business has been rather disappointing to the trade. Little business of individual magnitude has been transacted, the general run of sales be-

ing small. Railroad business has been particularly light; inquiries have been few and those that have come out close up very slowly. Competition for business of almost every character has been growing sharper, merchants being particularly anxious for orders, and in a number of instances prices have suffered. The past week a few orders for heavy tools have been placed, and at least one fair sized prospect for a moderate shop equipment has developed. As a rule, however, the demand is confined to single tools for prompt shipment, and as stocks on hand cover a pretty fair range, the requirements can be pretty generally met. Special tool builders have booked a few orders, and in several instances it has been this class of business that has enabled builders to keep plants in operation at recent capacities. In second-hand tools conditions follow largely those of the general market. There is a moderate inquiry for various equipments, but sales are irregular. Foundries are a trifle better engaged, particularly steel casting plants, but gray iron foundries, depending to some extent on the machine tool trade for work, note little betterment in the demand for that class of castings. The market for boilers and engines is somewhat broader, as is usually the case at this season when spring building opens up. Several moderate power propositions are in sight and a betterment in this line is anticipated.

Alexander Brothers, manufacturers of leather belting, are going ahead with proposed plans for the increasing of their plant facilities. A contract has been placed with G. F. Pawling & Co. for a structural steel, brick and concrete building, for general manufacturing purposes, 71 ft. 9 in. x 178 ft. 5 in., extending from 414-416 North Fourth street through to Orianna street. Plans are being considered for the enlarging of the power plant, the equipment required for which will probably be such as will double the present capacity.

The A. F. Bornot & Brother Company is considering the erection of a garage on North street, above Sixteenth street, from plans by Werner Trumbower. The structure is to be brick and concrete, 50 x 90 ft., two stories.

The Hohlfeld Mfg. Company, Eighth and Dauphin streets, has broken ground for a large manufacturing plant to be located at Tenth street and Sedgley avenue, to which it will remove on completion. There will be a group of three buildings. The main manufacturing building, which at present is to be three stories, will have provisions for two additional stories. This building will be 62 x 250 ft. The power house will be of the one-story type, 24 x 104 ft. A one-story storage building, 21 x 116 ft., will also be erected. Both steam and electric power plants are under consideration, but have not yet been decided upon.

The Pennsylvania Equipment Company, West End Building, is in the market for a number of new body 60,000-lb. box cars, 8 ft. 6 in. x 36 ft. and 8 ft. high, equipped with Tower M. C. B. couplers, Westinghouse air brakes and hand brakes, diamond frame, arch bar, rigid trucks; several modern vestibule passenger cars, not less than 70 ft. long; several new body cabooses, 36 ft. long, and a number of 80,000-lb. capacity gondola cars, with bottom dump.

The Lehigh Valley Railroad Company has been receiving bids for the erection of a brick and steel car repair shop, one and two stories, to be erected at Coxton, Pa. The proposed structures are understood to embrace a roundhouse and general shop buildings.

Fretz, Gross & Co., manufacturers of umbrella hardware, 1015 Diamond street, have acquired property at Twenty-sixth street and Sedgley avenue and will erect a manufacturing plant, which they will occupy on completion. Plans have been completed for a one-story concrete factory, which will give them 70,000 sq. ft. of floor space. The plant will be equipped with the necessary machinery for the manufacture of umbrella tubing and hardware. Much of the machinery, being of special nature, will be built in their own shop. A complete machine shop is to be installed in the new plant, but the exact nature of the equipment has not yet been decided upon.

The borough of Chambersburg, Pa., will take bids until April 7 for work in connection with its water works, consisting of a diversion of a dam, a reservoir of 2,200,000-gal. capacity and a stand pipe, 10 ft. in diameter and 40 ft. high. John Birkinbine, Parkway Building, Philadelphia, is the engineer, from whom plans and specifications may be secured. The borough will also receive bids until April 10 for a sewage disposal plant and sewer system. This work consists of a filtering plant, including pumping plant and filter beds and 85,000 ft. of terra cotta pipe. Albright & Mebus, Land Title Building, Philadelphia, are the engineers in connection with the latter work, and from whom plans may be obtained. C. O. Wood, Chambersburg, is chairman of the Water Works Committee, and S. K. Syrock, Chambersburg, is chairman of the Sewage Plant Committee.

It is stated that a company, to be known as the Ephrata & Lebanon Railroad Company, was decided upon at a meet-

THE MACHINERY MARKETS

ing held at Schaefferstown, Pa., which will build and operate an electric railway between Ephrata, Pa., and Lebanon, passing through Clay, Hopeland, Klinefeldersville, Schaefferstown and Riestville, Pa., a distance of 23 miles. The right of way has been secured, and it is understood that the company will formally organize and begin the work of building the road at a very early date.

The York Bridge Company reports business in the highway bridge line as very encouraging. It is rushed in its estimating department and constantly receiving inquiries for bridge and structural work. This company has recently opened an office in the Milwain Building, Albany, N. Y. Among recent orders taken may be mentioned two bridges from the Hershey Improvement Company, Hershey, Pa.; steel floor beams and joists for two 90-ft. spans at Clarksburg, W. Va., and a 16 x 62 ft. heavy highway bridge for the town of Croghan, N. Y. Work will also be shortly started on a new bridge to span the Susquehanna River at Sunbury, known as the Packers Island Bridge, and consisting of six spans, 22 x 154 ft., of heavy highway construction. The company also has the contract for an eight span bridge to be shipped to Brazil. Considerable work for the Pennsylvania Water & Power Company at McCalls Ferry is also in course of erection, while orders for several new buildings for Otto Eisenlohr, Lancaster, Pa., have also been booked.

New England

BOSTON, MASS., April 4, 1911.

Some of the important houses manufacturing sensitive drilling machines have advanced their prices 5 per cent. The movement is understood not to be universal, but probably a very large per cent. of spindles manufactured in this country are affected. This branch of the trade has felt for some time that its prices were too low, considering the great improvements which have been effected, by which customers receive a greater value than formerly.

The machine tool business in general is responding but slowly to the spring influence, according to the dealers. The builders are experiencing some improvement through the better business in the Middle West and through orders from abroad.

The great group of New England industries, of which the typewriter is entirely typical, are very busy. This is an excellent gauge of the general prosperity of the country. In Connecticut the typewriter people are rushed with orders. Some factories are not producing up to current orders, and will be compelled to increase their manufacturing facilities, and, in fact, are already doing so by the purchase of new equipment. The Royal Typewriter Company, Hartford, proposes to increase its plant and double its capacity.

The silverware industry is another striking proof of this general condition. As a whole the plants of Connecticut and Rhode Island enjoyed an unusually prosperous year in 1910, and the condition has not changed for the worse since the New Year. The International Silver Company, Meriden, Conn., did the largest business in its history, with the exception of 1909, the net earnings being equivalent to 24 per cent. on the capital stock of \$6,000,000.

The brass manufacturers of the Naugatuck Valley are normally busy. The demand has increased somewhat since the first of the year. Recently large orders for rods and tubes have been booked. The mills could produce more, but still they are comfortably active, taking the situation as a whole. The manufacturers who cut up brass in their factories are fairly busy, and some of them are rushed to the limits of their manufacturing resources. The builders of machinery which goes into the brass mills and factories are doing a normal business. One of the largest concerns of the kind in the world found last year nearly equal to all previous records. Foreign business in this branch of the machinery trade is fairly good. In New Britain the hardware manufacturers are doing a good business, without being rushed with orders.

The widespread agitation following the disastrous factory fire in New York will stimulate business to some extent. Everywhere the authorities are finding factory buildings which are inadequately guarded against risk to employees in case of fire or panic, and a much more rigid insistence upon the carrying out of the provisions of existing laws, and widespread movements for better codes of regulations, are working toward improvements which will cost in the aggregate millions of dollars. Manufacturers and dealers in everything that will be required in remedying present conditions are alert to the situation, and should do a large business before the movement breaks down through the inevitable lack of interest which will follow after a time.

The labor situation could not well be quieter. A few insignificant strikes are on, chiefly outside of the metal lines, and little of the threatening talk usually heard at this sea-

son is reported. The great branches of the metal working fraternity appear to have no special grievances against their employers. There is nothing to indicate that the machinists will give trouble in any of the machinery centers, nor is there unrest in the foundries or boiler shops, excepting that the Boston & Albany Railroad is feeling the effects of sympathetic action on the part of its boiler makers.

The Veeder Mfg. Company, Hartford, Conn., manufacturer of cyclometers, odometers, tachometers, tachidometers and speed counters, will erect a three-story addition to its plant, 40 x 72 ft., three stories and basement.

The Gilbert & Bennett Mfg. Company, Georgetown, Conn., wire manufacturer, is erecting two galvanizing buildings, one 41 x 114 ft., the other 14 x 26 ft.

The Yale Iron & Stair Company has been organized to establish works at West Haven, Conn., and carry on a business similar to that of the Yale Safe & Iron Company, which recently went into bankruptcy. William Grossley, formerly connected with the old company, is the president and treasurer of the new corporation. A new factory will be erected, equipped with modern machinery. The business of the Yale Safe & Iron Company has been wound up by the receiver, Frederick Farnsworth, head of the McLagon Foundry, New Haven.

The Rhode Island Branch, National Metal Trades Association, has organized for the year with the election of these officers: President E. A. Beaman, Beaman & Smith Company, Providence; vice-president, A. J. Thornley, Narragansett Machine Company, Pawtucket; treasurer, John G. Aldrich, New England Butt Company, Providence; secretary, Joseph A. Holland; Executive Committee: James Morpeth, Brown & Sharpe Mfg. Company, Providence; William Tether, Maxwell-Briscoe Motor Company, Providence; H. L. Scott, H. L. Scott & Co., Providence; J. E. Osgood, J. M. Carpenter Tap & Die Company, Pawtucket.

The Standard Brass & Copper Tube Company, New London, Conn., has increased its capital stock from \$50,000 to \$75,000, the purpose being to increase the plant.

Terrill & Rogers, Boston, Mass., has moved its headquarters from 153 Milk street to 12 Pearl street. The firm represents manufacturers of twisted steel bars, soft steel and iron bars, hammered forgings, filled columns, tubes, plates, sheets, kerosene torches oil furnaces, &c. The firm consists of B. B. Terrill and P. C. Rogers.

The machinery division of the Blake & Johnson Company, Waterbury, Conn., is busily engaged in redesigning its whole line, and has already brought out an improved cold rolling mill designed to meet the increased demand of manufacturers of cold rolled steel, flat wire, copper, brass and other metals. The mill is in two sizes, 8 and 10 in. The company has also added to its line a redesigned thread rolling machine, having a capacity of 7-16 in. diameter, with threads up to 4-in. length. The machine is designed to take dies having and face up to 4 in., the standard size furnished being 2 in. The process of redesigning the line is going on through the wire mills, rivet machines, presses and subpresses, gang slitters and grinders. L. P. Clark is the manager of the machinery department.

The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., has brought out a new double acting cam pillar press, known as the Special No. 8, which is designed for heavy cutting, forming and drawing. It has a capacity of drawing or cupping steel shells 4 in. in diameter, 1/8 in. thick and 2 in. deep.

Additions to general manufacturing plants of New England just announced include the following: Bradford Dyers' Association, Bradford, England, mill building at Niantic, R. I., 290 x 380 ft., one story, of heavy mill construction, Richard P. Jenks, 735 Banigan Building, Providence, R. I., engineer in charge; H. E. Bartlett, Leominster, Mass., toys, factory, 60 x 100 ft., two stories, to replace factory recently destroyed by fire; Westerly Jewelry Company, West Mystic, Conn., one-story brick factory; W. A. White, Hartford, Conn., factory building to be occupied by the Eastern Chemical Company; Wachusett Thread Company, Worcester, Mass., factory, 124 x 313 ft., four stories; J. D. Bergen Company, Meriden, Conn., cut glass, branch plant at St. Louis, Mo.; Providence Braid Company, Providence, R. I., three-story mill, 50 x 180 ft., and three stories, 25 ft., addition to present mill.

Cleveland

CLEVELAND, OHIO, April 4, 1911.

Business with machine tool dealers has improved slightly. Both orders and inquiries are somewhat more plentiful. While no large inquiries are coming out, there is a better demand for lots of three or four tools. During the previous few weeks there was very little demand for more than single tools. Practically all of the business is still coming from

THE MACHINERY MARKETS

small concerns. The demand for second-hand tools is more active.

There is a decided improvement in the demand for electrical equipment, particularly from traction companies for extensions to their power plants. These companies have bought very little new equipment during the past year or more. Specifications for the new \$2,000,000 plant to be built at Cuyahoga Falls, Ohio, by the Northern Ohio Traction & Light Company are expected to be out shortly, and considerable other business from traction companies is in prospect. Considerable new construction work in power plants for industrial companies is also in prospect, indicating an early increase in the demand for engines and boilers.

Cleveland interests will build a large lighting and power plant in Fort Worth, Texas, the equipment for which will be purchased shortly. This will include eight 500-hp. boilers, two 4000-kw. turbine generating units with accompanying equipment. Plans have been prepared by the Cleveland Construction Company, 606 Citizens Building, engineer in charge, which will place the orders for the equipment.

The Erie City Iron Works, Erie, Pa., will enlarge its plant by the erection of an up-to-date foundry, 250 x 600 ft., and a pattern storage house. Plans for the plant have been prepared, but it has not been decided when to start the construction, which may be delayed for a time. The plant has been enlarged by the recent completion of a brick stack and tank shop, 100 x 200 ft., equipped with the necessary cranes for handling material. The company reports a very good volume of orders for both engines and boilers, and its shops are well filled with work for some time ahead.

The Williams Edwards Company, wholesale grocer, Cleveland, will shortly place orders for power equipment for its new building now under construction. The specifications include two 200-hp. water tube boilers, two generating units and complete electric and elevator equipment.

The Cleveland Worsted Mills Company is building an addition to its power plant at its Odsonia mills at Falconer, N. Y. Orders have been placed for two 400-hp. Sterling water tube boilers and two Detroit automatic stokers.

The Detroit Stoker Company, Detroit, Mich., through its Cleveland office, has received an order from the American Locomotive Company for three Detroit automatic stokers to be installed at its Allegheny plant in connection with three 300-hp. Wickes vertical boilers.

The Cleveland, Painesville & Eastern Railroad will enlarge its power plant at Willoughby, Ohio. Two 400-hp. boilers and electrical equipment will be purchased.

The Burke Electric Company, Erie, Pa., builder of motors, has just completed an addition to its plant, 50 x 338 ft., of brick, one story. This addition will be used for the storage of finished parts, and the assembling, testing and finishing departments. This addition with other extensions made by the company during the past year provides more than double the former capacity.

The W. H. Mullins Company, Salem, Ohio, has commenced the erection of a large four-story addition to its plant, having a street frontage of 150 ft. The building will be of steel construction. The first two floors will be occupied by offices, and the remainder of the building will be used for the assembling of automobile parts.

The city of Toledo, Ohio, will shortly place a contract for a bascule lift to be erected in connection with the new Cherry street bridge in that city. Plans submitted by the Strobel Steel Bridge Construction Company, Chicago, have been accepted. The estimated cost of the lift is about \$140,000.

The Ohio Valley Brass & Iron Company, in which several Cleveland men are interested, has been organized to establish a plant at Wellsburg, W. Va., for the manufacture of plumbing goods and steam specialties. The company has a capital stock of \$75,000.

The Stewart Tank & Mfg. Company, Cleveland, Ohio, has been organized with a capital stock of \$25,000 to manufacture water closet seats and tanks.

The Enamel Vitrified Brick Company, Toledo, Ohio, has been incorporated with a capital stock of \$200,000 to place on the market a brick made by a new process. It is stated that several plants will be erected in various sections of the country. William Urschel is president and J. J. Urschel, manager.

The Electric Furnace Company, Alliance, Ohio, has been incorporated with a capital stock of \$20,000 by T. F. Bailey and others.

The Bieder Mfg. Company has reopened its plant in Ashtabula, Ohio, where washing machines, vacuum cleaners and other products will be made. The plant was recently closed when the company removed the manufacture of its gas engines to Erie, Pa.

The Dayton Auto Top Mfg. Company, Dayton, Ohio, has been incorporated by L. B. Kline and others to manufacture automobile tops. The company will be located at First and St. Clair streets.

The Union Clay Products Company, Akron, Ohio, has under consideration the erection of a plant at St. Joseph, Mo., for the manufacture of building and paving brick and sewer pipe. All matters regarding the proposition are in the hands of Matthew Lang, Akron, Ohio.

Cincinnati

CINCINNATI, OHIO, April 4, 1911.

It is reported from a source that is considered reliable that the automobile manufacturers in the West are preparing for a more active period. Several of them are understood to be making quiet inquiries for skilled labor. If this report is correct, it will undoubtedly tend to improve the machine tool business. The railroads continue their policy of only purchasing such tools as they are in urgent need of, and the absence of any extensive lists indicates that this policy will probably be continued for some time yet.

Business with the jobbing foundries shows signs of slackening up, but there is no appreciable diminution in the melt so far. Second-hand machinery is only moving moderately well.

The Split Fiber Keg Mfg. Company is a new incorporation at Cincinnati, with \$30,000 capital stock. The company intends to manufacture a patented split-fiber keg for holding paint and white lead, but quarters for the new factory have not yet been selected. Otway Yeazell is president and treasurer, and Max J. Schumann is secretary. Other incorporators are Raymond A. Yeazell, Basel Autal, Peter Fabian and Dennis J. Ryan.

The Thomas Mfg. Company, Springfield, Ohio, maker of farm implements, &c., has plans under way for enlarging its foundry.

The Foos Gas Engine Company, Springfield, Ohio, has shipped two 300-hp., 3-cylinder gas engines to Kenilworth, W. Va., to be used in operating the gates of the large dam recently constructed at that point by the Government.

There is a freely circulated report to the effect that the Baltimore & Ohio Railroad Company's repair shops, now located in Sandusky, Ohio, will be removed to Toledo some time in the present year.

The Carborundum Company, Niagara Falls, N. Y., will soon open a branch salesroom at 308-310 Main street, Cincinnati. This will be used for handling more expeditiously the Ohio and Kentucky territory.

The Knabe Brothers Company, Cincinnati, is a new incorporation with \$450,000 capital stock, and has acquired the piano factory of the Smith & Nixon Piano Company in Norwood suburb. Among improvements contemplated is the installation of a sprinkler system. E. J. Knabe, Jr., and William Knabe are among the principal incorporators.

The Blair Motor Company has been incorporated at Cincinnati, with \$25,000 capital stock, by John A. Deasy, P. F. Habercorn, John H. Monahan, J. W. Creaman and Edward H. Bourk. It is the announced intention of the company's officials to make a patented chainless motor truck, but no manufacturing arrangements have yet been decided on. John A. Deasy's office is in the Fourth National Bank Building.

The Ohio, Indiana & Kentucky Heater Company is a new Cincinnati incorporation, with \$10,000 capital stock. Manufacturing quarters have been leased in the rear of the building at 209 to 215 East Sixth street, and operations will commence so soon as the necessary equipment can be installed. Practically all machinery, which is of a special character, has been contracted for. The new company will manufacture a patented gas furnace. Officers have not yet been selected, but A. J. English, of Cincinnati, is named as one of the principal promoters.

Littleford Brothers, Cincinnati, manufacturers of boilers and tanks, have acquired an additional site adjoining their plant, but have no plans for any immediate additions to their factory.

The Laidlaw-Dunn-Gordon Company's Cincinnati plant is shipping two 8,000,000-gal. cross compound Corliss pumping engines to the Coronet Phosphate Company, Lockland, Fla.

A supplementary report made last week by J. M. Manley, secretary of the Cincinnati Branch, National Metal Trades Association, raises the average of operating activity of plants in this vicinity from 90 per cent., as given in the report of March 15, to 91 per cent., which is the same shown for the quarter ending December 15.

The Samuel C. Tatum Company, Cincinnati, manufacturer of office and hardware specialties, has discontinued the operation of its foundry at John and Water streets, and hereafter all its manufacturing will be done at the Colerain avenue plant. However, some of its foundry business will be let out under special contracts with outside firms.

It is rumored that several new lumber and woodworking plants will be established in Cincinnati at an early date.

THE MACHINERY MARKETS

Among them, it is stated, is the Hugh McLean Lumber Company, Buffalo, N. Y., which will either move its Buffalo plant or establish a large branch yard and factory here. Confirmation of this report cannot now be made.

The Miami Cycle & Mfg. Company, Middletown, Ohio, is receiving bids for the construction of two buildings to be of reinforced concrete construction. One will be two stories and the other three stories, and both will be approximately 120 ft. long. The two-story building will be equipped with a small traveling crane, and the three-story building will be used for automatic machinery.

St. Louis

St. Louis, Mo., April 3, 1911.

Hemp & Co., manufacturers of tinware, have moved into their large new plant at Vandeventer and Shaw avenues.

The Stupp Brothers Bridge & Iron Company is making some additions to its buildings, though no new equipment will be required.

The Quickmeal Stove & Range Company and the Charter Oak Stove Company are both occupying their new plants. Both of these are large propositions.

It is reported that the Wrought Iron Range Company will erect a large new plant in the near future.

The St. Louis Malleable Iron Company is keeping its plant in the northern part of the city quite well filled with work, though new business does not seem to be coming in as rapidly as might be.

The Webb Motor Fire Apparatus Company is extremely busy filling orders for its specialty of powerful automobile fire engines and is much behind on orders. The popularity of this type of fire apparatus has grown so that it is now almost impossible to sell the smaller cities the old style steam fire engines. The same motor propels the vehicle to the fire and pumps the water after arrival.

The East St. Louis Cotton Oil Company has been making some additions to its plant in East St. Louis, Ill.

The Kettle River Quarries Company, operating a large creosoting plant at Venice, Ill., for treating street paving blocks, railroad ties, &c., finds business very good at this time.

The Brozelle Motor Company, St. Louis, has been incorporated with capital stock of \$10,000. The incorporators are Benj. Brozelle, D. M. Houser, Charles H. McKee and others. The company will engage in the manufacture of motors and engines.

The D. & T. Mfg. Company, St. Louis, has been incorporated with a capital stock of \$30,000. The incorporators are John M. Dougherty, Harry C. Tabler, George E. Miller and others. The company will engage in the manufacture of heating apparatus.

The Van Cleave Motor Car Company, St. Louis, has increased its capital stock from \$6000 to \$12,000.

The Near Air Tire Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are E. A. Hankey, William J. Wesley and C. H. Bothwell.

The Tire Filler Company, St. Louis, has been incorporated with a capital stock of \$4500. The incorporators are E. A. Hankey, Henry A. Koch, George B. Ogan and others.

The Board of Public Improvements, St. Louis, is advertising for bids, returnable April 28, for the construction and installation of a municipal asphalt plant.

The Boss Mfg. Company, Kewanee, Ill., will establish at Kansas City, Mo., branch factory for the manufacture of gloves and mittens. The parent company has a capital stock of \$1,000,000.

The Lexington Auto Bridge Company, Lexington, Mo., has been incorporated with a capital stock of \$25,000. The incorporators are J. A. Brownell, J. J. Brownell and A. Brownell. The company will build bridges across the South Canadian River for the accommodation of automobiles.

The Keystone Driller Company, Carthage, Mo., intends to remove from its present location on Limestone street to North Main street and occupy the old woolen mill property. This change of location to more spacious quarters will enable the company to double its capacity. Eventually it is the intention to establish a factory at Carthage. The main plant of the company is situated at Beaver Falls, Pa.

The Standard Spring Wheel Company, Kansas City, Mo., has been incorporated with a capital stock of \$100,000. The incorporators are C. F. Underhill, T. J. Blackendorf and Harry W. McNutt.

The Cedar Milling Company, Cedar Mills, Mo., has been incorporated with a capital stock of \$12,000. The incorporators are J. P. Utt, S. N. Kennett and W. H. Rance.

The Gund Brewing Company, La Crosse, Wis., has purchased a site at Prescott, Ark., and will erect a stave factory.

Town Council of Scranton, Ark., for a franchise for an electric light plant, and states that if it is granted they will purchase a complete electric equipment, consisting of generator, wires, switchboard and other equipment. A cotton gin will also be erected at Scranton by the same parties.

Bridgeport, Neb., will hold an election to decide the question of issuing bonds for the construction of a water works system.

The Spring Pipe Threader Mfg. Company, St. Louis, Mo., recently incorporated with \$50,000 capital stock, will establish a plant to manufacture spring pipe threaders, cutters and vises. The company will be in the market about May 1 for milling machines, lathes, grinders, shaftings, engines, &c.

Indianapolis

INDIANAPOLIS, IND., April 3, 1911.

The Warner Motor Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture automobiles and parts. The directors are Thomas W. Warner, Indianapolis; E. S. Janney, Toledo, Ohio.; W. M. Sample, Muncie, Ind.

The Citizens Gas Company, Indianapolis, has increased its capital stock from \$1,000,000 to \$2,000,000, to provide for new construction and improvements as they become necessary. J. D. Forrest is secretary of the company.

The Hendricks Novelty Company, Indianapolis, has increased its capital stock from \$10,000 to \$40,000. A. A. Ayres is president of the company.

The Dailey Construction Company, Evansville, Ind., has been incorporated with \$12,000 capital stock, as general contractors. The directors are T. J. Dailey, H. E. Myers and T. J. Galley.

The Northern Indiana Gas & Electric Company has begun work on its power house at East Chicago, Ind., the cost of which will be \$650,000. It will supply power for the cities of East Chicago, Hammond, Whiting and Indiana Harbor.

The Vincennes & Southeastern Interurban Railway Company has been incorporated at Vincennes, Ind., with \$50,000 capital stock to build and operate an interurban electric railway. The directors are George B. Hazelton, Ray Eubank and Roger G. M. Lewis.

The Altermatt-Wahl Mfg. Company, South Bend, Ind., has increased its capital stock from \$25,000 to \$50,000. J. F. Altermatt is president of the company.

The Forse Mfg. Company, Anderson, Ind., has increased its capital stock from \$20,000 to \$50,000. W. H. Forse, Jr., is president of the company.

The Hood Canning Company, Portland, Ind., has been incorporated, with \$25,000 capital stock, to manufacture canned goods. The directors are W. H. Hood, M. F. Briston and J. A. Hood.

The Wabash Pearl Button Company, Delphi, Ind., will open a branch factory at Lafayette.

The Smith Agricultural Chemical Company, Columbus, Ohio, has bought a site at Indianapolis, Ind., for steel and concrete buildings to cover 7 acres. The company owns phosphate mines in Sumner, Tenn.

Citizens of Kokomo, Ind., have subscribed more than the \$140,000 required in order to obtain the Haynes Automobile Company, which will build a new plant to take the place of the one burned February 28.

W. H. Hoppenrath has been granted a 25-year franchise by the City Council of Elwood, Ind., for an artificial gas plant. It must be completed by September 15.

The Warsaw Furniture Company, Warsaw, Ind., has been incorporated, with \$15,000 capital stock to manufacture furniture. The directors are Thomas Pearlman, Joseph Spiegel and S. O. Penrod.

Arbuckle & Co. have been incorporated at Rushville, Ind., with \$50,000 capital stock, to do a foundry and machine business. The directors are Nathan Arbuckle, James W. Arbuckle and W. Morgan.

The Kendallville Furniture Company, Peru, Ind., has increased its capital stock \$50,000. R. H. Bouslog is president of the company.

The Feeney Mfg. Company, Muncie, Ind., has been incorporated, with \$6000 capital stock, to manufacture vacuum cleaning machinery. The directors are Edmund J. Feeney, F. M. Johnson and J. A. Meeks.

Robert Tompkins and A. L. Stewart of Rushville, Ind., are organizing a company and will erect a furniture factory at a cost of \$50,000, including building and machinery.

The Citizens Mutual Heating Company, Terre Haute, Ind., will erect during the coming summer a new heating system. The initial installation will consist of a brick power house, 60 x 75 ft., with ultimate length of 100 ft., and two 400-hp. boilers and other appurtenances, such as circulating pumps, hydrovacuum reheater, air compressor, feed water

THE MACHINERY MARKETS

heater, boiler feed pumps, &c. There will be between 600 and 700 ft. of underground heating mains laid during the year, ranging in size from 4 to 12 in. Over 1000 ft. of 8-in. hot water mains will be laid from the auxiliary plant, feeding directly into the ends of the lines of the present mains. The W. H. Schott Company, 39 Jackson boulevard, Chicago, will install the plant.

The Commercial Club of Terre Haute, Ind., has signed a conditional contract with W. H. Glover, representing a new company which is being organized in Sebring, Ohio. The company will manufacture porcelains, incandescents and later a general line of pottery ware. A site has been secured and by the terms of the contract the company is to erect a one-story factory building, 50 x 130 ft., and a dry kiln.

The Trebert Gas Engine Company, Butler, Ind., manufacturer of auto and marine gas engines, has signed a contract with the Commercial Club of Terre Haute, Ind., for the erection of a factory in that city. A site has been secured and a building 50 x 140 ft. will be erected in the near future.

The Dille & McGuire Mfg. Company, Richmond, Ind., lawn mowers, has under construction a large plant and desires prices and catalogues on the following equipment: Electric motors and appliances, automatic and multiple drilling machines, automatic grinding machinery, lathes and milling machinery, pulleys, hangers, small hand tools and several elevators.

Baltimore

BALTIMORE, MD., April 1, 1911.

The demand for machinery tools and equipment incident to the iron and steel trade is irregular. While some few merchants and manufacturers are a trifle more active, the majority report a rather quiet market. In some cases machine tool merchants report a slightly better aggregate business, but individual orders are still usually confined to small and unimportant transactions. A better demand for equipment of a special nature has enabled some manufacturers to keep plants operating at comparatively full capacity. Inquiries for machine tools have not been very plentiful, particularly for those of the usual standard types. Nevertheless, the trade feels that a period of more active buying is not far distant. New building work is opening up fairly well, both in this immediate vicinity as well as in the South. Fabricators are busy on estimates, but the bulk of the work in immediate prospect is small in individual size, although a few moderate sized undertakings are pending. The contract for the Baltimore Bargain House, placed last week with the Noel Construction Company, is the largest proposition of that character which has been before the trade in this city for some time, about 2400 tons of structural material being involved. Several buildings of good size are under consideration in Portsmouth and Norfolk, Va., including a union railroad station in the latter city. Low prices offered for fabricated structural work continue to be made, both for work in this city as well as the South. In some cases it is apparently not a question of profit, but rather that of keeping working organizations intact. There has been a greater volume of business in local municipal contracts, some few of which have been of interest to the trade. Outdoor work is opening up fairly well and general contractors anticipate a good season. Projected plans for municipal betterments in connection with harbor and dock facilities are of particular interest. In the heating and ventilating engineering field work of large magnitude has been less pronounced, although some good business is in sight. The demand for boilers and engines has been moderate, and while manufacturers of the former are in instances quite active, it has been largely due to the demand for equipment of a special rather than regular class.

Plans are under way for the formation of a company to erect a plant in this city for the manufacture of gasoline launches, yachts and small vessels. Herbert B. Stinson, attorney, is understood to be interested in the project, but information regarding it is not yet available.

The Simpson-Doeller Company, manufacturer of labels, has taken bids for a complete power, engine, heating and electric plant to be installed in its new warehouse, but the contracts have not yet been awarded.

The packing plant of Chr. F. Kurrle was damaged by fire on March 24. The loss cannot be definitely stated at this time, but the plant will be rebuilt and equipped as soon as possible.

The Knickerbocker Ice Company will, it is stated, erect a large ice plant at York and William streets. From plans prepared the building will be of stone and brick and of fire-proof construction.

Plans are being figured on for the erection of an office

building for Henry Kern, Portsmouth, Va., to be known as the Kern Building. It is to be five stories, 68 x 110 ft., and constructed of steel and brick.

It is reported that the D. B. Martin Company, fertilizer manufacturer, has had tentative plans prepared for a group of buildings to be erected at its Union abattoir. Competitive bids for the erection of the new addition will shortly be asked for.

The Ellicott Machine Company notes an absence of any material demand for dredging machinery, but is fairly busy in its various departments from orders already on its books.

The Gandy Belting Company will erect a five-story steel and concrete addition, 50 x 87 ft., for general manufacturing purposes, to its plant. McLaughlin Brothers have the contract and have begun work. This company reports a very fair run of business and anticipates a busy season.

Bartlett, Hayward & Co. report a moderate volume of general business, of which small individual orders contribute the larger share. No additional equipment is being taken on by this concern and they state that the proposed plans for extensive additions to their machine shop, under consideration some months ago, are still held in abeyance.

The Aumen Machinery & Supply Company reports business rather quiet and confined to small individual transactions, covering wood and metal working machinery. The month's aggregate volume of business will slightly exceed that for the month of February.

The Crook-Horner Company, 7 and 9 Balderston street, is making alterations in its building to give it more display space. The office has been removed from the second to the first floor, and facilities increased for carrying a larger stock of machinery and mill supplies. Its general business during the past month has been quite satisfactory.

Wallace Stebbins & Sons have recently taken orders for three 150-hp. Fitzgibbons boilers for installation in the Mercy Hospital, and three of the same capacity and type for the St. Mary's Industrial School. Their machine shop is busy on a general line of work, but the demand for machine shop supplies and fittings is reported as being dull.

It is announced that the Baltimore & Ohio Railroad Company has awarded a contract to Edward Brady & Son for the erection of a cold storage plant on Sharp street, between Lee and Hill streets. The building, 54 x 350 ft., is to be of brick and concrete. It is also stated that the work of rebuilding and enlarging the roundhouse and shops at Cumberland, Md., will be begun at an early date.

Suchting & Son have awarded the contract for a three-story addition, 46 x 131 ft., to be built to their box factory at 613-615 West Pratt street to F. C. Carstens. The building will be used as a factory and warehouse. They are not yet prepared to figure on equipment for the new factory, but state that in the near future they will consider additional power equipment for the present plant.

The Crook-Kries Company has taken a number of moderate orders for general heating and ventilating work, both in this city and Washington, D. C., and is estimating on considerable new business. A contract was recently taken to equip the residence of George Blackiston, Sherwood, Md., with a steam heating plant, pumping apparatus and a vacuum cleaning system, under the direction of J. P. Burnett, engineer. Extensive alterations to the power plant of the Belvidere Hotel are also being made by this company.

The Cumberland Valley Railroad is reported to be preparing plans for extensive improvements in Chambersburg, Pa. The plan includes, it is said, the construction of a roundhouse, freight yards and passenger station, new terminals and the elevation of its railroad tracks in that city, the streets of which are to be crossed on bridges. G. C. Koons, Chambersburg, Pa., is the company's engineer.

The Chesapeake Iron Works is quite busy estimating on new work, but is not very actively engaged in its operating department. Recent inquiry has been largely confined to small work, although bids have just gone in on an 800-ton job for the new Hamilton Hotel, Washington, D. C. Among orders taken was one for the ornamental and structural material for the new Western High School Building, Washington, D. C. From present indications it is believed that the demand for structural and ornamental iron will improve in the near future.

As an outcome of a hearing of prominent shippers of commodities in this city before the Public Service Commission recently, regarding the alleged excessive switching charges by the railroads, which were fixed at a rate of 5 cents per 100 lb., it is stated that the officials of the Pennsylvania and the Baltimore & Ohio railroads have tentatively agreed upon a charge of 1 cent per 100 lb. as their rate for this service. Producers located on either road will have a more equitable freight rate under this basis.

Work has begun on the first section of the new Baltimore Bargain House, for which the Noel Construction Company has the general contract. Plans were prepared by Joseph Evans Sperry, architect, and call for a 12-story structure,

THE MACHINERY MARKETS

94 x 167 ft., of steel frame, brick and stone construction. The structural steel work, embracing 2400 tons, will be furnished and erected by Dietrich Brothers. The building will be equipped with a number of freight and passenger elevators and modern mechanical means for conveying merchandise from one portion to another. The work of demolishing present buildings on the site of the new one has already begun.

Plans have been prepared by the harbor engineer of Baltimore for the extension and completion of a system of docks and water front streets to meet the growing needs of the port. In addition to providing additional facilities for water transportation, the development of certain sections of the harbor front is included in the proposed plan; \$10,000,000 would be required for the work contemplated. The Harbor Board is now preparing to construct one municipal dock in South Baltimore, the funds coming out of a loan authorized last year.

John D. Adt is very busy on various types of machinery, largely, however, of a special nature. Orders for elevators have also been booked, including one for the Pearl Hominy Company of this city. There has been an improvement in the demand the past month for machinery and shop supplies. Tobacco working machinery has been in exceptionally good demand. All departments of the plant are operating full time and in some overtime is being made.

The members of the committee having in charge the preparation of plans for the contemplated industrial building for light manufacturing purposes are enthusiastic in their expressions as to the success of the plan. The first unit to be erected will occupy about 16,000 sq. ft. of ground space and represents about half the ultimate capacity of the proposed plant. The building, which is to be seven stories, of steel frame and concrete construction, will be located, if present plans are successful, at Preston street and Clifton place. P. O. Keilholtz is the engineer and Theodore W. Pietch consulting architect. The building is to be heated with steam and furnished with electric light and power and gas for industrial purposes, while live steam will be furnished tenants at a reasonable cost.

Bids are being asked by the Board of Estimate, city of Baltimore, covering extensive paving and sewer work, as well as for a considerable quantity of general supplies for various departments. The board will receive bids until April 12 for a 5-ton tandem steam road roller for the Department of Public Improvement, specifications for which are to be obtained from the city engineer. In connection with sanitary contract No. 65, bids will be received by the board for furnishing, building and installing sewage screens for the sewage disposal works, specifications against which may be had from the Sewage Commission, 904 American Building, on payment of a nominal sum. Bids will also be received April 12 for proposals for supplying ornamental lamp posts for the Department of Lamps and Lighting, specifications for which may be had from the superintendent.

Dietrich Brothers, who have been awarded the contract for the structural steel work for the new Baltimore Bargain House, state that Bethlehem shapes will figure largely in the work. Several small contracts for buildings and additions, ranging from 50 to 75 tons of structural material, have also been recently booked by the firm. Dietrich Brothers now occupy their new office building at Davis and Pleasant streets, and their new structural shop, now under erection, is about 90 per cent. completed. The necessary equipment is being installed and the plant is expected to be ready for operation in the next 30 days. A few small tools remain to be purchased to complete the equipment.

The Baltimore Bridge Company has taken a moderate volume of new business the past month, which together with the contracts already on its books keeps the plant comparatively busy. Recent orders include a small bridge for the Chesapeake & Ohio Railroad and several buildings for the Republic Finance Company for its new Portland cement plant at Union Bridge, Md., one of which is a packing house requiring about 300 tons of material. The structural work for the Holt Building, Newark, N. J., will be fabricated and erected, while orders for several small bridges for the Gaute-malian Railway, in South America, have also been taken.

The T. C. Bashor Company is exceedingly busy in its boiler and tank department. It is also building a quantity of special machinery for fertilizer work, particularly in connection with the manufacture of fish products. The heating and ventilating engineering department is busy figuring on plans for several good sized propositions. Among orders received in the past few weeks was one for 500 ft. of 96-in. diameter ½-in. thick steel pipe from a concern in Newark, N. J. Orders for a number of boilers and tanks have also been booked, while special equipment in the way of bins and supports is being made for the Republic Finance Company for installation in the new cement plant of the Tidewater Portland Cement Company, Union Bridge, Md.

The Northwest

The Milwaukee Steel Foundry Company, Milwaukee, Wis., expects to break ground within the next 10 days for the erection of a concrete and steel building, 80 x 250 ft., to be used for a foundry and office purposes. Orders for electrical equipment have been placed.

The Commercial Club of Merrill, Wis., is endeavoring to secure the establishment of a shoe factory for that city.

The Superior Water, Light & Power Company, Superior, Wis., is having plans prepared by Hazen & Whipple, New York City, for an addition to its pumping station to accommodate a new 5,000,000-gal. pump which is being built by the Epping Carpenter Company, Pittsburgh, Pa. The company also expects to build a pure water storage reservoir this summer.

The Lakeside Paper Company, recently incorporated with \$125,000 capital stock, will build its plant at Menasha, Wis. Work on the construction of the plant is now going forward, but orders for only part of the necessary equipment have been placed.

Contracts have been let for the erection of a school building at Racine, Wis., to cost \$50,000, and which will be known as the Gilbert Knapp School.

The Twin City Rapid Transit Company, Minneapolis, Minn., states that its plans for improvements during the current year include the construction of a combined lumber shed and store house for the use of its mechanical department, 88 x 130 ft., two stories, and a combined store house and forge shop for the use of its maintenance of way department, two stories, 30 x 60 ft., of brick and steel construction. These buildings will be located on the company's general shop grounds at Snelling and University avenues.

C. Gotzian & Co., St. Paul, Minn., shoe manufacturers, have under consideration the erection of a new factory building, plans for which have not been prepared.

The City Council of Kadoka, S. D., is planning the construction of a \$60,000 water works system.

Detroit

DETROIT, MICH., April 3, 1911.

The activity of the most of March was not so apparent the past week, although there was no great slump in orders and in general business; automobile manufacturers were not deluged with rush orders, as has been the case most of the month. A prominent motor car company received one especially large order from a single agent, the order amounting in round figures to \$100,000. The accessory lines both in this city and throughout the State are running to full capacity, this industry having improved greatly since the first of the year.

The Gordon Pagel Bread Company of this city is undertaking the enlargement, on an important scale, of its local plant. An increase of \$375,000 in its capital, followed by the placing of a \$100,000 loan with a trust company of this city, paves the way for the improvements. A great deal of modern bread machinery will be purchased.

Schmied & Sismans Company's lumber mill of this city suffered a \$60,000 fire loss March 26. The planing mill was completely destroyed, as well as a great quantity of lumber.

The Detroit United Railway, as a partial settlement to the street car controversy, will spend considerable money on extensions and new equipment. About 20 miles of new track will be laid and 75 new cars of the pay-as-you-enter type purchased.

This city has secured the Wetmore Adding Machine Company, at present located, in a development way, at Milwaukee, Wis. The company has been considering the qualifications of cities all the way from Buffalo to Denver, and has now decided on Detroit as the logical location. Its product is a springless adding machine.

Johnson & Waterstraut, Sturgis, Mich., manufacturers of combination coat and trouser hangers, suffered the total loss of their plant April 1. The loss is partially covered by insurance.

Douglas & Lomason, manufacturers of automobile accessories, have let the contract for the erection of a two-story concrete factory building. The firm has outgrown its present quarters and is moving to an entirely different quarter of the city.

Baldwin, Tuthill & Bolton, Grand Rapids, furniture manufacturers, have secured building permits for the construction of a three-story brick addition to their present plant. The building will cost about \$10,000.

The flooring mill of Mitchell Bros., Jennings, Mich., has resumed operations after improvements, including four new flooring machines. The company's business has steadily in-

THE MACHINERY MARKETS

creased and more machines will be added as business warrants it.

The Herriman Mfg. Company, Chicago, is seeking a suitable location in South Haven, Mich., for its machine shop. The principal members have been agitating the move for some time, desiring to locate in western Michigan.

The Cleveland Cliffs Iron Company is projecting water power development on the Carp River, near Marquette, that is of considerable importance. The company is adopting electricity for the operations of its mines wherever possible. A new steel and concrete dam on the Carp River, with the generating plant at Marquette, is one project. It is expected to generate about 7000 hp. The plans will involve large expenditures.

The Ottawa Leather Company, Grand Haven, has increased its capital stock from \$100,000 to \$200,000. It is understood that the increase is for the purpose of enlarging the plant. The action has been contemplated for some time.

The Cadillac Handle Company, Cadillac, Mich., announces that work will begin this month on the \$80,000 worth of improvements now under contemplation. The improvements include a new chemical plant.

The Scofield Carriage Company, Ovid, Mich., is in financial straits. The affairs of the company have been placed in the hands of J. H. Marshall and F. A. Robson, who will act as trustees. The company's liabilities amount to about \$20,000.

The Dobbins Furnace Company, Marshall, Mich., has changed hands. The interests of the company have been transferred to W. R. Simons of Battle Creek and G. W. Leedle of the former city. The new firm intends to make considerable improvements as a first step.

The Farmers Co-operative Elevator Company and the Saginaw Milling Company both suffered a complete loss by fire of their plants March 26, at Sandusky, Mich. The latter company will rebuild immediately.

The Menominee Machinery Company, Menominee, Mich., has purchased all of the holdings of the F. G. Hood Company of Pentage. The purchase includes the sawmill, cooerage factory and the planing mills. The property will be dismantled and moved to Menominee.

The Veitengruber Mill, Frankenmuth, Mich., was destroyed by fire last week, with a loss of \$35,000. It is not known whether the company will rebuild.

The plant of the W. R. Roach Company, recently organized at Scottville, Mich., will be equipped with five engines, each of 40 hp., with six pumps in connection. The buildings and machinery will cost in the neighborhood of \$155,000.

The Muskegon Steel Castings Company is a new industry for the city of Muskegon, Mich. The company has purchased a site on the lake front.

L. Kiper & Sons, Muskegon, will engage in the manufacture of leather products.

The Central Closet Mfg. Company, Holland, Mich., will move its plant to Kokomo, Ind.

The Non-Explosive Tank Company is the name of a new company incorporated with the Secretary of State. The company has a capital stock of \$20,000 and will locate its plant in this city.

A new automobile accessory concern for this city is the Detroit Body Company, incorporated to manufacture automobile bodies.

The Ayres Engine & Motor Company, Trenton, Mich., has filed articles of incorporation with the Secretary of State under a new name, to be known as the Trenton Engine Company. The capital stock is given as \$100,000.

With a capital stock of \$50,000, the American Hydrostat Company of this city has filed articles of association. The new company will manufacture a patent hydrostat. Robert Kerby of Windsor, Ont., is president.

The Empire Cream Separator Company, Bloomfield, N. J., has filed articles of incorporation with the Secretary of State, for the purpose of establishing a branch plant at Port Huron, Mich.

Allied to the motor industry is the new Michigan Motorcycle Company, organized in this city, with a capital stock of \$100,000. The company's product will be a low priced motorcycle.

The American Axe Handle Company of Tower and Grand Rapids, Mich., has been inspecting a factory site at Houghton, with a view of moving its plant at Tower to the latter city. If the move is made the company will be able to run the year round, owing to the proximity of plenty of hardwood, and will enlarge its plant accordingly.

The Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., on account of the increased demand for its product, is planning to enlarge its plant by the erection of a finishing factory. The new building will be a two-story and basement structure, 60 x 100 ft.

Work soon will be started on a large addition to the plant of the Battle Creek Paper Company, Battle Creek, Mich.

The new structure will be a two-story building, 100 x 130 ft.

Flint has a new industry in the line of auto accessories. The new company will be known as the Auto Body & Specialty Company, having incorporated this week with a capital stock of \$15,000.

The Michigan Carton Company, Battle Creek, Mich., has increased its capital stock from \$200,000 to \$400,000, for the purpose of expansion.

Marquette, Mich., is planning to bond the city for lighting plant improvements. The programme includes the rebuilding of the Silver Lake dam and the main dam near the power house. The installation of more powerful machinery will be necessary to care for the added water power. The proposed bond issue is for \$100,000.

The Crystal Sand & Gravel Company was organized this week at Battle Creek, Mich., with a capital stock of \$125,000. The company will erect a large cement block plant at Level Park, near the city. Willis B. Ballou is the principal stockholder.

Capitalists are completing the organization of an electric railroad to run between Pentwater and Walkerville, Mich. Pentwater has raised \$20,000 as a bonus fund. Particulars are in the hands of the Pentwater Business Men's Association.

The Valley City Milling Company, Grand Rapids, Mich., is planning the erection of a five-story building, to care for the increase in business.

The Portland Mfg. Company, Portland, Mich., has broken ground for the construction of an addition to its plant, to enable the company to make its own brass castings used in the manufacture of washing machines.

The Duplex Power Car Company, Charlotte, Mich., is considering the erection of a new factory building, but is undecided whether it remain in Charlotte or seek a new location. The company manufactures a four-wheel drive commercial truck, operated by gasoline power.

The South

LOUISVILLE, KY., April 4, 1911.

There has been a noticeable improvement in the machinery market. Orders for ice machinery, boilers and quarrying equipment have been received in larger volume, and a good deal of new work is being figured on by the manufacturers. A decision of local courts, requiring distilleries to dispose of their waste in some more sanitary way than by allowing it to run into near-by streams, is expected to result in considerable purchases of drying machinery of various kinds by many plants.

The Louisville & Nashville Railroad, which has its general offices in this city, has announced that considerable improvements are to be made in its facilities at Anniston, Ala. Besides enlarging its roundhouse, the road will install a large stationary boiler.

The Louisville Point Lumber Company is completing the installation of a considerable amount of conveying machinery made by the Jeffery Mfg. Company, Columbus, Ohio. The sale was made by Fred Wehle of Louisville.

E. T. Slider of New Albany, Ind., has purchased the plant of the Eclipse Coal Company, Louisville, and will install elevating machinery for handling coal, sand and gravel. The plant is located at Campbell and Fulton streets.

The Louisville Board of Trade has appointed a Manufacturers' Committee, which is to make an effort to induce new manufacturing enterprises to come to Louisville.

A block of \$600,000 of bonds of the Kentucky Electric Company of Louisville is being sold in the Boston market. The proceeds will be used in connection with the construction of the company's new plant.

The Brinly-Hardy Company, manufacturer of plows and other farm implements, will make extensive improvements in its plant at Preston and Main streets, Louisville. It is now in the market for a considerable amount of blacksmithing machinery, as well as drop hammers, shears, &c.

The Electric Vehicle Company has been incorporated in Louisville with a capital stock of \$10,000 by Lee Miles, Edward Drummond of the Drummond Mfg. Company, foundrymen; Philip Allison and H. B. Hewett of the Cooper-Hewett Company, agents for a number of electrical machinery manufacturers. The project, which is now in the experimental stage, has in view the manufacture of electric passenger and commercial automobiles. Several have been designed, and if the cars prove as practical as it is believed they will, the company will increase its capital stock to \$100,000 and erect a large plant in Louisville.

The Bray Clothing Company, Louisville, has purchased the buildings of the old Kentucky Woolen Mills at Frankfort and Story avenues, and will occupy them in the next few months. The company intends greatly to enlarge its capacity, not only in connection with the special machinery

THE MACHINERY MARKETS

required for clothing manufacture but also by the installation of considerable power equipment, including boilers and engines.

The C. E. Ziegler Tobacco Company, Louisville, has been incorporated with \$150,000 capital stock. The business has been operated heretofore without incorporation. It is planned to erect a new plant to cost \$35,000. W. D. Collins of Louisville, W. A. Bradford of Ft. Thomas, Ky., and D. C. Collins of Cincinnati are among those connected with the company.

The Southern Veneer Mfg. Company, Louisville, has increased its capital stock from \$25,000 to \$50,000. No new equipment will be required, as the company is now operating a plant which was rebuilt and enlarged following a fire last fall.

The University of Louisville is equipping a department of electrical engineering. Most of the equipment for the department, which will begin operations next fall, has been ordered.

Corbin, Ky., is considering the establishment of a system of water works. W. M. Steele, secretary of the Board of Trustees of the town, is now inspecting the plants of other cities.

The Empire Coal Company has been incorporated at Hopkinsville, Ky., by W. T. A. V. and N. M. Rutland, and mines at Empire have been leased for a period of 10 years. Extensive improvements will be made in the equipment of the mines. W. T. Rutland is president of the company.

The Kentucky-Panama Coal Company has been organized with \$1,000,000 capital stock by Inkerman Bailey, Sr., of 66 Broadway, New York, for the purpose of developing coal land in Hopkins and Muhlenburg counties in western Kentucky. The purchase of electrically operated mining machinery, involving an expenditure of \$150,000, is contemplated. Those connected with the company assert that the opening of the Panama Canal will enable Kentucky coal to be transported to that part of the hemisphere at little expense.

The Kentucky Barytes Company, Nicholasville, Ky., has filed amended articles of incorporation, increasing its capital stock from \$6000 to \$1,000,000.

Formal transfer of the properties of the Somerset Water, Light & Traction Company, Somerset, Ky., has been made to the United Water, Light & Traction Company, which purchased them at a sale held to wind up a receivership. Extensive improvements, including the addition of much new equipment in the power house, are to be made. O. H. Waddle is president, and J. L. Waddle manager of the new company.

The Nortonville Traction Company, Nortonville, Ky., has been chartered with \$100,000 capital stock. The incorporators are Frank E. Mohr of Columbus, Ohio; Frank G. Hoge, Nortonville, and T. F. Callard, Hopkinsville, Pa.

The Eagle Casting Company, Winchester, Ky., has filed amended articles of incorporation increasing its capital stock from \$30,000 to \$60,000. The company has a plant for the manufacture of gas engines.

The Southern Onyx Company of Delaware is reported to have closed a deal for a large tract of onyx land in Barren County, near Glasgow, Ky., and is planning operations on a large scale.

Commissioners of the city of Memphis, Tenn., have adopted a resolution asking the State Legislature to authorize a bond issue of sufficient amount to enable a municipal lighting plant to be constructed. The amount is not definitely stated. Officials of the city have been inspecting municipal lighting plants in other towns through the North and West.

Electrical equipment is wanted by Jackson, Tenn., bids now being received for a 250-hp. engine, a generator and a switchboard. T. H. Hartmus is secretary of the Municipal Board.

N. A. Morelock of Limestone, Tenn., is asking for prices on machinery for the manufacture of cement. Crushers, grinders, burners, &c., are wanted.

The John G. Duncan Company, 308 West Jackson avenue, Knoxville, Tenn., is in the market for a 40-hp. center crank stationary engine, and a 50-hp. locomotive boiler, new or second-hand.

J. A. Wilson has taken over the control of the Sparta Water Company, Sparta, Tenn., and is planning improvements.

A bill has been introduced in the Tennessee Legislature providing for a bond issue for water works purposes by Arlington.

A bill introduced in the Tennessee Legislature authorizes Bristol to issue water works bonds.

Jonesboro, Tenn., will construct a street railway system if bonds for that purpose are authorized by the State Legislature.

The Nashville Industrial Bureau, Nashville, Tenn., is raising a fund of \$200,000 for the purpose of bringing new enterprises to that city.

The improvements to be made by the Augusta Railway & Electric Company and the Augusta-Aiken Railway Company, Augusta, Ga., involve the installation of two 2500-kw. steam turbines, a 7½-mile transmission system to Clearwater, S. C., where a 500-kw. motor generator set will be installed, and the installation of a 300-kw. generator set near Aiken.

The Waddell-Williams Company, Rhoda, La., will establish a sawmill and box factory. The details of the plants have not been completed.

The Mobile Stove & Pulley Works, Mobile, Ala., will rebuild and enlarge its main foundry building, recently burned.

The International Harvester Company, Chicago, it is reported, will erect an implement plant at Bessemer, Ala., at a cost of \$100,000. It is stated that a 10-acre site has also been secured.

The Franchise of the Decatur Light, Power & Fuel Company, Decatur, Ala., recently expired and has not been renewed. It is reported that the City Council is contemplating the construction of a municipal plant.

A lighting plant may be installed in the capitol building at Jackson, Miss. Address Governor Noel.

The members of the Board of Control of the State Penitentiary have returned from Angola, La., where they went to locate the new \$350,000 sugar refinery, and it has been decided to locate the plant near the lake.

The success which attended the recent test at a New Orleans dock of an unloading machine or conveyor, built for the Success Pressed Steel Slat Conveyor Company, has induced the company to take steps toward establishing a factory at New Orleans to manufacture the machines for general use.

The plant of the Tremont Lumber Company at Eros, La., was destroyed by fire March 27, causing a loss of \$500,000. It is expected that the mill will be rebuilt.

Q. D. Sauls, formerly of Norfield, Miss., has located at Tylertown, and will soon begin the erection of a lumber manufacturing plant.

A petition has been made to the State Legislature by the city of Pulaski, Tenn., for authority to issue \$20,000 bonds for lighting purposes. It is understood that Commissioner Henry Grigsby and his associates have in view the building of a modern electric light plant, as the present plant is overloaded and somewhat out of date.

Texas

AUSTIN, TEXAS, April 1, 1911.

Reports of bountiful rains continue to come from different parts of the State, still further brightening the crop prospects. Wonderful activity is noted in all lines of industry and machinery men are in good spirits over the general situation. The prospects for the establishment of peace in Mexico are more encouraging than at any time since the revolutionary troubles in that country began, and it is expected that with the bringing about of the settlement of the disturbed conditions there will be a resumption of activity in the mines and industries generally. Tentative plans for many important municipal improvements are being held in abeyance pending the restoration of order in that republic.

The Hygeia Mineral Water Company will install a bottling works at Southerland Springs. It was recently organized with a capital stock of \$30,000, the incorporators being W. E. Nelson and H. P. Nelson of San Antonio, and Judson Hume of Southerland Springs.

P. L. Downs of Temple, who is the principal owner of the old gas plant at that place, which was closed down several years, has advised the City Council that he has about concluded negotiations for the construction of a new plant and distributing system to cost \$100,000.

The municipal lighting system of Llano is to be extended, and other improvements will be made to the plant.

The Business Men's Club of Waco, through President H. H. Shear and other members, is negotiating with a syndicate of men with the view of constructing an interurban electric railway between Waco and Cleburne, a distance of about 50 miles.

The Barstow Irrigation Company, Barstow, will construct a large water storage reservoir and make other improvements to its system of irrigation at a cost of several hundred thousand dollars.

The Beaumont Water Works Company, Beaumont, has under consideration the installation of improvements that will serve to eliminate the salt water that enters the distributing system from the river from which the supply is obtained during periods of drought. J. E. Gibson, a water works expert of Philadelphia, is making an investigation with that end in view.

THE MACHINERY MARKETS

W. C. Hunt of Alvin and associates have been granted a franchise for the construction of water works system for that town. The distributing system will extend all through the business and residence portions of the town. The proposed improvement will cost about \$25,000.

An electrically operated cotton gin will be installed at Brenham by William Seidel.

The Uvalde Electric Light Company will install a gasoline engine and will furnish a day power current for its patrons in Uvalde.

S. M. Swenson & Sons will install a large irrigation pumping plant on the Clear Fork of the Brazos River, three miles below Leuders. If this plant proves the success that is expected the firm will install several other pumping plants at points on the Brazos River to irrigate its lands.

G. A. Morris and T. S. Jackson will rebuild their ice plant at Roswell, N. M., that was recently destroyed by fire.

The Guanajuato Light & Power Company is constructing about 9 miles of transmission line west from Silao, Mexico, to Juarichos, for the purpose of installing a large electric pumping plant to irrigate lands in that section. The company is also building another line three miles long from Silao to Charcos for the same purpose. The company recently installed four pumps at the Nopales hacienda. The company's general offices are at Guanajuato, Mexico.

The capacity of the Denison Ice Company's ice plant at Denison, has been increased to 100 tons daily. It recently added two 150-hp. boilers to its plant.

An electric light and ice plant will be installed at Alto by L. S. Atkins of Center. The ice plant will have a daily capacity of 10 tons.

An electric light plant will be installed at Francis, Okla., by the City Council.

A cement brick plant will be erected at Roswell, N. M., by C. M. Allison.

A creamery will be installed at Decatur by a company that is being organized there under the auspices of the Board of Trade.

A gas lighting system will be installed at Sunset by the Lone Star Gas Company.

The installation of a new ice plant by Wilkins & Goodlow, at Mount Vernon, will soon be finished.

An electric light plant and water works system will be installed at Boswell, Okla., \$35,000 of bonds having been voted recently for the purpose.

A factory for the manufacture of various articles out of hardwood timber will be erected at Longview by the Longview Hardwood Specialty Company. About \$100,000 will be invested in the plant.

A water works plant and distributing system will be installed at Dawson by J. F. Williams.

The capital stock of the Tips Foundry & Machine Company, Austin, has been increased from \$20,000 to \$40,000 to provide for enlargements and improvements to the plant.

The Board of Trade of Hillsboro is promoting the construction of an interurban electric railway between Dallas and that place.

A large factory for the manufacture of wax from the candleilla weed that grows wild in the upper border region of Texas, is to be established at McKinney Springs, Brewster county, by Oscar Pacius of Monterey, Mexico, and associates.

The City Council of Brownsville has under consideration the application made by the Brownsville & Gulf Railway Company for a franchise to extend its line through that place and to operate motor cars over it. The existing road is to be rehabilitated and place in first class condition.

The Wisconsin Sugar Company, Milwaukee, Wis., has under consideration the establishment of a beet sugar factory at Brownsville or some other point in the lower valley of the Rio Grande. R. G. Wagner, president of the company, recently made a personal investigation of the situation with this object in view.

The Weisenborn Mfg. Company, which is to establish a factory near Houston for the manufacture of woven wire, will soon begin the erection of its foundry and machine shop buildings.

An interurban electric railway will be constructed by the San Leon Terminal Railway Company, Houston, from San Leon to Dickinson, about eight miles.

The Puebla Light & Power Company, Puebla, Mexico, will install a large hydro-electric plant at Tuxpango, and construct electric power transmission lines to Puebla and other towns of that section. It is stated that about \$6,000,000 will be invested in the enterprise. Lord Crowdry, London, Eng., is largely interested in the company.

Allen & Price, Washington, Ind., have bought a site at Gonzales, Texas, and will erect a plant for the manufacture of bridge material and road machinery. Work will begin at once.

The Rock Drill Machinery Company, El Paso, has been incorporated with a capital stock of \$50,000. The incorporators are W. H. Leonard and D. B. Turner.

The Walter Box Company, Georgetown, has increased its capital stock from \$10,000 to \$25,000.

The Farmers' Union Gin & Warehouse Company, Olney, has been incorporated with a capital stock of \$14,000. The incorporators are C. W. Junker, W. H. Rothwell and others.

Pacific Coast

PORTLAND, ORE., March 29, 1911.

Local merchants are receiving a very satisfactory volume of business in general machine shop equipment, but orders for tools of large size are the exception. Foundry business is only moderately active. The market for general machinery throughout Oregon and Washington is in very satisfactory condition, with numerous inquiries for power and water works equipment, electrical machinery, &c. The movement of mining machinery and supplies to Alaska is unusually heavy this season, and numerous orders are coming out for stamp mills, &c., for mines in that district. The movement of woodworking machinery in Oregon and Washington is about normal for this season, but the demand for logging equipment is hardly up to expectations, as operations in this district are being resumed on a smaller scale than last spring. The general opening of the logging camps is considerably later than usual.

B. F. Yates, of the Berlin Machine Works, Beloit, Wis., has been visiting the cities of the north Pacific Coast, and it is believed that the establishment of a branch factory is contemplated by this house.

Bell, Williams & Co. have purchased a site at Thirty-third and Halsey streets on which they propose to erect a machine shop.

The Washington Iron Works is erecting a concrete foundry building, to be occupied by the Puget Sound Bridge & Dredging Company, at Eighth avenue, South and Connecticut streets, Seattle, Wash.

The Washington Steel & Iron Company, recently organized at Spokane, Wash., is promoting a project for the development of an iron ore deposit near Wenatchee, Wash.

H. V. Gates & Son are planning to install a shop at Hillsboro, Ore., for the manufacture of riveted pipe and water works supplies.

The town of Medford, Ore., has ordered two rock crushers of 12 tons per hour capacity from the Beach Mfg. Company, Portland.

The city of Spokane, Wash., is in the market for a number of laundry machines.

A lively inquiry is now coming out for road machinery in preparation for improvements to be carried out this summer by many counties and towns of Oregon and Washington. Washington County, Ore., has ordered a steam roller, and the town of Dallas, Ore., is taking figures on a scraper.

The Hood River Apple Growers' Union has placed an order for refrigerating machinery with Bell & Wildman of this city.

The Jones Market, this city, is installing a 15-ton motor-driven refrigerating plant made by the Vulcan Iron Works, San Francisco. A 5-ton marine type refrigerating machine of the same make is being installed in the steamer Northland of the Northland Steamship Company, Seattle, Wash.

An order has been issued by the Oregon Labor Commissioner to compel the installation of blower sawdust collecting systems in planing mills all over the State.

The North Bend Lumber Company, North Bend, Ore., is planning to install a new band saw and log carriage.

The Husum Lumber Company, Husum, Wash., is preparing to increase the capacity of its mill by the addition of new machinery.

The Morrison Mill Company has taken an option on a site at Bellingham, Wash., where it proposes to erect a large box shook mill.

John Snyder of the Tacoma Fir Door Company has secured a large tract on the Bay Island channel, near Tacoma, Wash., on which he intends to erect a saw and planing mill and lighting plant.

The Hawley Pulp & Paper Company, Oregon City, Ore., has installed a new water wheel.

The Pacific Power & Light Company of this city has bought out the Hood River Power & Light Company and the Husum Power Company, with plants at Hood River, Ore., and White Salmon, Wash., and announces that a material increase will be made in the equipment of both plants, as well as in the transmission system.

W. D. Collins, who is operating the Venicia mine near Lewiston, Cal., is preparing to install a gasoline hoist.

The Golden Rod Milling Company has taken over the business of the Acme Mills Company of this city, and will rebuild and enlarge the flour mill which has been operated by the latter.

THE MACHINERY MARKETS

The town of Wenatchee, Wash., is considering the installation of a large pumping plant on the Columbia River. Bids will be taken April 7 for machinery for the manual training department of the Broadway High School, Seattle, Wash.

The Twin Falls Mill & Elevator Company, Twin Falls, Idaho, announces its intention to erect a flour mill adjoining its grain elevator.

The Byron Jackson Iron Works, San Francisco, Cal., has taken a Government contract for six large centrifugal pumps for the Salt River Irrigation Project.

The Salt River Valley Water Users' Association, Phoenix, Ariz., has let a contract for two turbine water wheels to the Morgan Smith Company, York, Pa., at \$16,590, and for generators and transformers to the General Electric Company at \$30,000.

The Broadview Dairy Company, Spokane, Wash., is erecting a new dairy and ice cream plant in which machinery will be installed at a cost of about \$15,000.

Contracts have been let for three large generators for the Rogue River Electric Company at Prospect, Ore.

The Joshua Hendy Iron Works, San Francisco, Cal., has taken over the plant of the Johnson Tractor Company's plant, with the intention of manufacturing traction engines. The machine work will be done at the large plant of the Joshua Hendy Iron Works at Sunnyvale, Cal., the Johnson shop being used as an assembling plant. F. D. Calkins will have charge of the traction engine department.

Canada

TORONTO, ONT., April 1, 1911.

Trade has been affected by the backwardness of the weather, which at the end of March contrasted strongly with the promising condition of the weather at the beginning of the month. In one way this backwardness has been of some advantage. While it causes delay in the beginning of construction operations, and in the opening of navigation, it gives manufacturers working on orders for plant and equipment a chance to catch up. It is expected that buyers will become impatient for delivery on spring account as soon as fine weather sets in. The idea is getting into the minds of business men that political conditions may play a larger part in the state of trade than they have been doing up to the present. The possibility that a general election may be sprung on the country is not absent from the thoughts of men in commercial life. If the Opposition should endeavor to block the reciprocity agreement by obstructing in supply, as was thought probable, the Government would be forced to go to the country. There is some uncertainty in business because of the reciprocity question, but on the whole, trade is flourishing.

At the annual meeting of the Canadian Westinghouse Company, Hamilton, Ont., it was stated that the increase of business would call for extensive additions to plant.

Building operations will be begun on the works of Steel & Radiation, Ltd., at St. Catharines, Ont., as soon as the structural steel can be got on the ground. The cost of the plant is to be \$100,000.

The Moncton Tramways, Electricity & Gas Company, Moncton, N. B., has taken over the municipal lighting plant of that city.

The Ontario Government loan of \$5,000,000 for the extension of the Temiskaming & Northern Ontario Railway and for further hydro-electric science, will be floated in England.

The Canadian General Electric Company, Peterborough, Ont., has taken over the plant of the Canadian Shipbuilding Company, Bridgeburg, Ont.

The Kootenay Jam Company will build a factory to cost \$50,000 at New Westminster, B. C. Chowdate machinery, made in Germany, will also be installed.

This summer the city of Ottawa will spend about \$200,000 on sewer construction. Twice that sum is at the disposal of the Municipal Council for the purpose, but the remainder will not be used till next year.

The Canadian Pacific Railway Company, Montreal, will call for tenders for the construction of a reinforced concrete bridge, 500 ft. long, at Graham station.

Ottawa's plans for commercial building this year are the largest in the history of the city.

A charter has been issued to the Winnipeg Steel Granary & Culvert Company, Winnipeg, Man., with a capital stock of \$100,000. It will manufacture corrugated steel products of all kinds.

The Winnipeg plant of the Dominion Bridge Company is now in operation.

Contracts in connection with the extension of plant at Kakebeka Falls have been awarded by the Kaministiquia

Power Company, Fort William, to the John Inglis Company, Toronto, for the penstock; to J. M. Voith, for the water-wheels; to the Canadian General Electric Company, Peterborough, Ont., for the electrical equipment; to the Steel Company of Canada, for the wire. Estimated cost \$200,000.

The Canadian Westinghouse Company, Hamilton, Ont., has the contract to install a municipal lighting plant at Sherbrooke, Que.

The Spanish River Pulp & Paper Company, Espanola, Ont., has awarded contracts for two 164-in. paper machines to Pusey & Jones, Wilmington, Del. The machines will have a capacity of 35 tons per day each. To the Watrous Engine Works Company, Brantford, Ont., it gave a contract for eight beaters. The Canadian Westinghouse Company, Hamilton, Ont., gets the contract for the generator, and the Robb Engineering Company, Amherst, N. S., gets the contract for the boilers.

J. M. Winters is negotiating with the municipality of Tilbury, Ont., for terms for the opening of an industry in the town to manufacture gasoline engines.

The National Manufacturing Company, Brockville, Ont., which makes cream separators, scales, stoves and ranges, is arranging for a large addition to its plant.

The American Concentration Company, Joplin, Mo., is building a \$75,000 concentration plant for the Canada Iron Corporation, in connection with the latter's Tarbrook mines.

The Harbor Commissioners of Montreal have approved plans for the construction of grain elevators, railroad sidings, and other improvements at the port of Montreal, to cost \$2,500,000. The work is to be done as far as possible this season.

Proposals for the construction of a large plant to manufacture asbestos products are being made to the city of London, Ont. A plant employing 300 hands is under consideration.

The Canadian Pacific Railway Company is credited with plans at Fort William that will call for an outlay there of \$6,000,000 this year. The improvements will include a new coal dock, wharf, coal handling plant, a landing dock for steel, a cleaning elevator, and other works.

From the M. Rumley Company, La Porte, Ind., a shipment of 35 carloads of oil-pull tractor engines was received at Regina, Sask., this week. This is the third shipment the company has made to the Canadian West this season. Regina is its headquarters in the Canadian West.

Nearly \$4,000,000 was transferred from London, Eng., some days ago to the head office of the Bank of Montreal, to meet payments in connection with the organization of the Canadian Steel Foundries, Ltd., for the taking over by that new corporation of the Montreal Steel Works, Ltd., and the Ontario Iron & Steel Company, Welland, Ont.

Three hundred gasoline plowing outfits have been booked by one implement company in Battleford, Sask., this season. The high prices of horses are given as the reason for this development.

The Acme Electrical Appliance Company, capital stock \$300,000, has been incorporated under Ontario laws. The head office is to be in Brantford.

The Page-Hersey Iron, Tube & Lead Company, Welland, Ont., has awarded the contract to David Dick & Sons, Ltd., of that city, for the construction of its new plant there at a cost of \$150,000. The Canadian Automatic Transportation Company, Welland, has also placed the contract with the same construction company for the erection of its plant to cost \$25,000.

The Welland Machine & Foundries Company, Ltd., Welland, Ont., has been granted a charter and will build a manufacturing plant at once. The capital stock is \$40,000. Among the directors are David Ross, John M. Crow and Ernest L. Garner, of Welland.

Government Purchases

WASHINGTON, D. C., April 3, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids April 25 for furnishing and erecting two traveling cranes, schedule 3458, and one radial drill, two engine lathes, one boring and drilling machine, one boring and turning mill, schedule 3459.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids April 29 for furnishing and installing in the power plant at the United States naval station, Pearl Harbor, Hawaii, six 450-hp. water tube boilers, equipped with oil burning apparatus, super heaters, flue and stack.

The Commissioners of the District of Columbia will open bids April 7 for the installation of boilers and connections complete at the Industrial Home School, Washington, and for the installation of two 100-hp. Economic boilers at the workhouse site, Occoquan, Va.

The purchasing officer of the Isthmian Canal Commission, Washington, will open bids May 27, under Canal cir-

cular 627, for furnishing miter gate moving machines, miter forcing machines and electric motors for the lock gates.

The Department of the Interior, United States Reclamation Service, Washington, will open bids April 13 for furnishing electrical apparatus and hydraulic turbines for Truckee-Carson project, Nev. Particulars can be had from the United States Reclamation Service, 605 Federal Building, Los Angeles, Cal.

The United States Engineers' office, Oswego, N. Y., will open bids April 24 for dredging machinery for dipper dredge.

The Isthmian Canal Commission, Washington, opened bids March 22, for furnishing one medium steel cutter complete, cast steel, as follows: Baldt Steel Company, New Castle, Del., \$575; Detroit Steel Casting Company, Detroit, Mich., \$245.25; Penn Steel Casting & Machine Company, Chester, Pa., \$830; J. F. Pennell, New York, 16.5 cents per pound; Rosedale Foundry & Machine Company, Pittsburgh, Pa., 15.9 cents per pound; Union Foundry & Machine Company, \$560.

Trade Publications

Valves and Fittings.—The Ohio Brass Company, Mansfield, Ohio. Catalogue H. Size, 6 x 9 in.; pages, 56. Calls attention to an extensive line of valves and steam specialties. Included in the former are radiator valves, pressure regulating valves and globe, angle and check valves. All of the lines covered are illustrated and numerous sectional views are included to show the construction.

Grinding Machines.—Landis Tool Company, Waynesboro, Pa. Catalogue. Illustrates and describes the various grinding machines built by this company. These include universal and plain grinders, self-contained plain grinders, internal grinders and a machine for grinding cranks. The special features of the Landis line are first discussed, followed by a statement of the various classes of work for which the different machines are adapted. Next in order comes the description of the different machines, including the No. 3 universal grinder, illustrated in *The Iron Age* July 21, 1910, and the 16 x 72 in. plain self-contained machine, an illustrated description of which appeared in *The Iron Age* April 21, 1910. Instructions on the care and the use of the machines are given, followed by a table of allowances for grinding and views of the different shapes of wheels furnished.

Electric Lighting.—Holophane Company, Newark, Ohio. Loose leaf catalogue sheets. Call attention to a number of new globes which have been brought out. Data on the derivation of illumination curves from printed tables and from the foot-candle curve are given, as well as information on various illumination calculations.

Mining Locomotives.—Milwaukee Locomotive Mfg. Company, Milwaukee, Wis. Bulletin No. 101. Treats of gas driven locomotives for mines, tunnels, contractors' service, lumber yards, industrial plants and railroads and brick and cement works. The various styles of locomotives are illustrated and there are a number of views showing the different parts and installations.

Punch and Shear.—Little Giant Punch & Shear Company, Sparta, Ill. Folder. Relates to the Little Giant combined punch and shear for hand operation. The machine is illustrated, and the description of the various parts is placed around the engraving with arrows showing the location of the part referred to.

Refillable Cartridge Fuse Shell.—A. F. Daum Company, Pittsburgh, Pa. Booklet No. 14. Shows several types of the Daum refillable inclosed fuse shells, gives prices and contains instructions for ordering.

Multiple Strainers.—The Lagonda Mfg. Company, Springfield, Ohio. Bulletin R. Concerned with the Lagonda-Enterprise multiple strainers for removing suspended matter from boiler feed and condenser circulating water. The special features of these strainers, which are built in sizes ranging from 2 to 48 in., are that the effective straining area is from two and a half to six times larger than that of the pipe, and that it is possible to clean separate compartments of the strainer without interrupting the flow through the others.

Polyphase Induction Motors.—Crocker-Wheeler Company, Ampere, N. J. Bulletin No. 126, superseding No. 115. Discusses the design of a line of polyphase induction constant speed motors which are built in sizes ranging from 1/4 to 250 hp. The special advantages of these motors are extreme simplicity of construction, the possibility of using them in connection with a high tension transmission system, thus reducing the cost of power and the absence of sliding contacts, which eliminates sparking and enables them to be used in textile mills, wood-working plants and other places where a small spark might cause an explosion or conflagration. Illustrations show the details of the construction of the motors, as well as a number of interesting applications of them.

Engines.—Murray Iron Works Company, Burlington, Iowa. Catalogue No. 65. Size, 3 1/4 x 5 1/2 in.; pages, 84. Contains illustrations and descriptive matter concerning the Corliss engines

built by this company and their various parts. Space is also given to other products, such as air compressors, pumping engines; tubular, water tube and internal furnace boilers and feed water heaters. An illustrated description of a cross compound Corliss engine built by this company for the mechanical laboratory at the University of Nebraska appeared in *The Iron Age* December 23, 1909.

Arc Lamps.—Radio Reflector Company, 352 West Thirtieth street, New York City. Folder. Calls attention to the Radio high efficiency electric arc lamp which is especially designed for lighting industrial plants. The special features of the lamp are a large amount of light on a small current consumption and long life.

Pneumatic Tools.—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Circular N. Describes the Thor air tools and appliances, contains tables of capacities and shows several in use. The various tools illustrated include piston air drills, a reversible wood boring machine, breast and screw feed drills, pneumatic hammers for chipping, caulking and riveting; yoke riveters, a grinding machine and a close-quarter drill which was illustrated in *The Iron Age* May 28, 1908.

Motor Drive for Metal Working Machinery.—General Electric Company, Schenectady, N. Y. Bulletin No. 4815, superseding No. 4548. Shows a few of the numerous methods of applying either alternating or direct current motor drive to metal working machinery. The special features of this drive include increased production, economical power consumption, easy control and a logical arrangement of the tools. The illustrations show the various types of motors used together with the controllers and rheostats employed and a number of motor-driven tools. The last includes drills, cold saws, shapers, millers, lathes, grinding machines, boring mills, planers and punches and shears.

Grinders.—Gardner Machine Company, Beloit, Wis. Catalogue. Size, 6 x 9 in.; pages, 127. Gives general description and specifications for a complete line of disk grinders and accessories. Among the tools shown is the company's patternmakers' grinder, which was illustrated in *The Iron Age* April 28, 1910.

Rolled Steel Windows.—United States Metal Products Company, Metropolitan Building, New York City. Catalogue No. 101. Devoted to Rapp rolled steel window for all types of industrial buildings. These windows are made in two standard sizes for lights of glass measuring 10 x 16 and 12 x 18 in., respectively. The window frames are made of cold rolled steel and the glazing bars are joined together by interlocking. The joints and the intersections are welded, which adds greatly to the strength of the sash and the frames. In addition to these standard units several special types are shown. There are a number of diagrams giving the dimensions for various combinations of the two standard units.

Electric Signs.—Electric Motor & Equipment Company, Newark, N. J. Bulletin No. 127, superseding No. 112. Gives general description and specifications for an electric monogram sign which can be used for transmitting signals where letters or characters have to be flashed. These letters are flashed out distinctly and remain in sight until the message is received, thus lessening the possibility of a mistake.

Pumps and Hydraulic Machinery.—The Goulds Mfg. Company, Seneca Falls, N. Y. Catalogue F. Size, 7 x 8 in.; pages, 326. Calls attention to the various styles of pumps and hydraulic machinery for all purposes which this company is prepared to furnish. These include suction pumps, antifreezing lift and force pumps, deep well force pump standards, pumps for pneumatic water systems, house force pumps, hydraulic rams, suction pumps, double acting pumps, single acting triplex pumps and rotary force pumps. Space is given to accessories and fittings and a number of useful tables giving the friction of water in pipes, the barometric pressure at different altitudes and the capacities of various sizes of pumps are included. *The Iron Age*, October 6, 1910, contained a description of the Pyramid double action piston pump.

Valves and Gauges.—Crosby Steam Gauge & Valve Company, Boston, Mass. Circular. Refers to the safety valves and pressure gauges made by this firm and shows typical examples of each.

Horizontal Boring, Drilling and Milling Machine.—Lucas Machine Tool Company East Ninety-ninth street and L. S. & M. S. Railway, Cleveland, Ohio. Circular F-5. Illustrates and describes the new No. 32 Precision horizontal boring, drilling and milling machine. The principal feature of this machine is that it has constant speed quick power movements for all parts having feeds, and no matter what one is being employed, the quick return is obtained by manipulating the feed and quick return lever in conjunction with the feed distributing interlocking levers. These levers prevent the power movement from being operated when any feed is engaged, or vice versa, and the throwing of the feed and quick return lever to the left gives a quick vertical movement to the head, a quick cross movement to the platen or a quick longitudinal movement to the saddle or to the spindle, depending upon the position of the interlocking levers. When the quick return lever is in the right hand position the corresponding feeds are engaged.

CURRENT METAL PRICES.

The following quotations are for small lots. New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—

Refined Iron:	
1 to 1½ in. round and square	¢ 11.75
1½ to 4 in. x ½ to 1 in.	¢ 11.50
1½ to 4 in. x ½ to 5-1	¢ 11.85
Rods—¾ and 1-16 round and square	¢ 11.85
Angles:	
3 in. x ½ in. and larger	¢ 11.75
3 in. x ½ in. and ¾ in.	¢ 11.50
1½ to 2½ in. x ½ in.	¢ 11.50
1½ to 2½ in. x ¾ in. and thicker	¢ 11.75
1 to 1½ in. x ¾ in.	¢ 11.50
1 to 1½ in. x ¾ in.	¢ 11.50
2½ x ¾ in.	¢ 11.50
4 x ¾ in.	¢ 11.50
4 x ¾ in.	¢ 11.50
4 x ¾ in.	¢ 11.50
4 x ¾ in.	¢ 11.50
Tees:	
1 in.	¢ 11.50
1½ in.	¢ 11.50
1½ to 2½ x 3-16 in.	¢ 11.50
3 in. and larger	¢ 11.50
Beams:	
Channels, 3 in. and larger	¢ 11.50
I-Beams, 1½ to 6 x 3-16 to No. 8	¢ 11.50
"Barden's Best" Iron, base price	¢ 11.50
Burden's "H. B. & S." Iron, base price	¢ 11.50
Norway Bars	¢ 11.50

Merchant Steel from Store—

Bessemer Machinery	per lb. 1.90
Toe Calk, Tire and Sleigh Shoe	2.50 @ 3.00
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black	One Pass, C.R.	R.G.
	Soft Steel.	Cleaned.
No. 16	¢ 11.50	2.80
No. 18 to 20	¢ 11.50	2.90
No. 22 and 24	¢ 11.50	3.00
No. 26	¢ 11.50	3.10
No. 28	¢ 11.50	3.30

Russia, Planished, &c.

Genuine Russia, according to assortment	¢ 11.50 @ 14¢
Patent Planished, W. Dewees Wood	¢ 11.50 @ 10¢; B. 9¢ net.

Galvanized.

Nos. 12 and 14	¢ 11.50
Nos. 22 to 24	¢ 11.50
No. 26	¢ 11.50
No. 28	¢ 11.50
No. 20 and lighter 36 inches wide, 25¢ higher	

Genuine Iron Sheets— Galvanized.

No. 22 and 24	¢ 11.50
No. 26	¢ 11.50
No. 28	¢ 11.50

Corrugated Roofing—

2½ in. corrugated	Painted	Galv.
No. 24	¢ 11.50	4.50
No. 26	¢ 11.50	4.50
No. 28	¢ 11.50	4.50

Tin Plates—

American Charcoal Plates (per box.)

"A. A. A." Charcoal	¢ 11.50
IX, 14 x 20	¢ 11.50
A. Charcoal	¢ 11.50
IX, 14 x 20	¢ 11.50

American Coke Plates—Bessemer—

IX, 14 x 20	¢ 11.50
IX, 14 x 20	¢ 11.50

American Terne Plates—

IX, 20 x 28 with an 8 lb. coating	¢ 11.50
IX, 20 x 28 with an 8 lb. coating	¢ 11.50

Seamless Brass Tubes—

List November 15, 1908	Base price 15¢
------------------------	----------------

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908	Base price 15¢
------------------------	----------------

Copper Tubes—

List November 13, 1908	Base price 21¢
------------------------	----------------

Brazed Brass Tubes—

List February 1, 1911	19¢
-----------------------	-----

High Brass Rods—

List February 1, 1911	14¢
-----------------------	-----

Roll and Sheet Brass—

List February 1, 1911	14¢
-----------------------	-----

Brass Wire—

List February 1, 1911	14¢
-----------------------	-----

Copper Wire—

Base Price.	Carload lots mill 13¢
-------------	-----------------------

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. (quantity lots)	¢ 11.50
Sheet Copper Cold Rolled, 1¢ advance over Hot Rolled	
Sheet Copper Polished 20 in. wide and under, 1¢ square foot	
Sheet Copper Polished over 20 in. wide, 2¢ square foot	
Planished Copper, 1¢ square foot more than Polished	

METALS— Tin—

Straite Pig.	¢ 11.50 @ 45
--------------	--------------

Copper—

Lake Ingot	¢ 11.50 @ 14½
Electrolytic	¢ 11.50 @ 14½
Casting	¢ 11.50 @ 14½

Spelter—

Western	¢ 11.50 @ 6½
---------	--------------

Zinc.

No. 9, base, casks	¢ 11.50 @ 8
--------------------	-------------

Lead.

American Pig	¢ 11.50 @ 5
--------------	-------------

Solder.

½ & ¾, guaranteed	¢ 11.50 @ 28
No. 1	¢ 11.50 @ 26

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	¢ 11.50 @ 10½
Halletts	¢ 11.50 @ 10½

Bismuth—

Per lb.	\$2.00 @ \$2.25
---------	-----------------

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting	¢ 11.50 @ 23
Rods & Wire	Base Price 31¢
Sheets	Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	10.75 @ 11.00
Copper, Heavy and Wire	10.50 @ 10.75
Copper, Light and Bottoms	9.50 @ 9.75
Brass, Heavy	7.00 @ 7.25
Brass, Light	5.50 @ 5.75
Heavy Machine Composition	9.25 @ 9.50
Clean Brass Turnings	7.00 @ 7.25
Composition Turnings	8.25 @ 8.50
Lead, Heavy	3.75 @ 3.50
Lead, Tea	3.50 @ 3.25
Zinc Scrap	4.00 @ 3.75

NICHOLSON

We have had over forty years' experience in making Files and Rasps; we not only know what KIND of steel to use, but HOW to use it.

If NICHOLSON FILES did not hold their CUTTING edge—our order books would not hold so many CUSTOMERS.

We make over 3,000 different styles and sizes. Send for Catalog.

NICHOLSON FILE COMPANY

PROVIDENCE, R. I., U. S. A.

THE IRON AGE

Established
1855

New York, April 13, 1911

VOL. 87: No. 15

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second Class Mail Matter

Subscription Price, United States and Mexico, \$5.00 per Annum, to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT, - - - - - PRESIDENT
W. H. TAYLOR, - - - - - TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM, - - - - - SECRETARY

GEO. W. COPE, - - - - - } EDITORS
A. J. FINDLEY, - - - - - }
H. R. COBLEIGH, - - - - - MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building
Pittsburgh, Park Building
Boston, Compton Building
Chicago, Fisher Building
Cleveland, American Trust Building
Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.

CONTENTS.

Editorial:	PAGE
Quietness in All Markets.....	881
Our New Location.....	882
The Readers of <i>The Iron Age</i>	882
Accident Compensation and Conciliation.....	883
Awakening to the Danger of Fire.....	883
A Notable Anniversary.....	883
Workmen Appreciate Technical Publications.....	884
Correspondence.....	884
The Newark Foundrymen's Association.....	884
The Machine Tool Builders' Convention.....	884
March Copper Production and Stocks.....	884
Philadelphia Pig Iron Prices for 10 Years.....	885
The Iron and Metal Market Reports.....	886 to 894
Iron and Industrial Stocks.....	895
Notes on Prices.....	895
New Tools and Appliances.....	896
Obituary.....	897
Personal.....	897
Recent Immigration.....	898
The Osborn Mfg. Company Buys the American Wire Brush Company.....	900
The National Metal Trades Association.....	901
Buffalo Coke Rates Hearing.....	901
The Quebec Bridge Contract.....	901
British Trade Conditions Less Favorable.....	901
Efficiency Methods of the Tabor Mfg. Company.....	902
Papers for the Foundrymen's Convention.....	903
The Triple Supply Convention.....	904
Modern Business Methods.....	905
Unfilled Orders of the Steel Corporation.....	906
The Hart-Parr Company's New Foundry.....	906
Lake Superior Iron Ore Analyses.....	906
The Pittsburgh-Westmoreland Coal Company.....	907
The Proposed Southern Merger.....	907
The New York and New Jersey Branch Metal Trades Elec- tion.....	907
Mutuality.....	908
Germany's Steel Production in 1910.....	911
Employers' Liability Insurance.....	912
The Influence of Manganese on Soft Steel.....	913
The Exploration of Cuban Iron Ores. Illustrated.....	914
The Philadelphia Foundrymen's Association.....	918
The Wyoming Automatic Eliminator. Illustrated.....	918
The De Laval Turbine Reducing Gear. Illustrated.....	919
German Steel Trade Problems.....	920
Canada's Iron and Steel Bounties.....	921
Scientific Industrial Operation.....	922
The Denckhoff Multiple Inlet or Sand Blast. Illustrated.....	923
A New Pennsylvania Railroad Track Scale. Illustrated.....	924
The Gardner Crusher. Illustrated.....	927
Gas and Gasoline Engine Trades Convention.....	927
The Doherty Gas Calorimeter. Illustrated.....	928
A New Vessel for the Cuban Coal Trade.....	929
Detroit-Fenestra Steel Sash Orders.....	929
Employers' Responsibilities.....	930
The Southwark Reversing Convertible Simple or Compound Engine. Illustrated.....	930
Acheson Lubricants.....	931
The Badge Oilstone Holder. Illustrated.....	931
Special Massachusetts Fan Drives. Illustrated.....	932
The Aetna Boller and Scrap Hauls. Illustrated.....	933
Turbine Driven Gas Blowers.....	933
The Kirk & Blum Adjustable Emery Wheel Hood. Illus- trated.....	933
The Machinery Market Reports.....	934 to 942
Trade Publications.....	942
Current Metal Prices.....	944

Quietness in All Markets

Some Weakness in Sheets and Bars—Export Trade Falling Off

In point of new business both pig iron and finished material markets have been quieter in the past week than in any other since January. While there is little change in the scale of mill operations, it is evident that if it is to be long maintained the stream of new orders must increase. A feeling of disappointment is appearing, but against it is the fact that even the bare hand-to-mouth buying, which is now the rule, has some favorable surprises week by week. Moreover, the unfilled orders in the hands of the steel companies now represent actual business, much of it for early rolling, and therefore make a better comparison with the larger totals of other years than appears on the face of the statistics.

The railroads in particular give little promise of larger buying, and those who speak for them are discouraging anything but modest expectations on the part of the steel trade for the entire year.

Publications abroad concerning exports of sheet bars from the United States to England and Wales refer to such shipments as growing, whereas they have been smaller than at the same period last year. In January and February our total iron and steel exports averaged 150,000 tons, or 50 per cent. more than the monthly average for 1910, but foreign inquiry and orders have been falling off for several weeks.

The Harriman lines have placed 72,000 tons of rails which presumably cover only a part of the year's requirements. The Illinois Steel Company will furnish 21,225 tons of Bessemer rails, the Tennessee Company 18,000 tons of open hearth rails and the Colorado Company 33,000 tons of open hearth rails. The Brooklyn Rapid Transit Company has bought 2000 tons, the Boston Elevated 1800 tons and one of the Chicago terminal roads 2500 tons.

Structural contracts of the week include 2500 tons for the Gunther Building, Chicago; 3000 tons for the Trinity Corporation's printing building in New York, 1500 tons for an International Harvester Company machine shop in Milwaukee and 2000 tons of bridge work for a Western road. Bids have been taken on 7500 tons for the Insurance Exchange Building in New York, and bids close this week on 4000 tons for the Pennsylvania Hotel, Pittsburgh, and 2500 tons for the Gary Screw & Bolt Company's new plant at Gary, Ind. The extensive grade crossing work of the Pennsylvania Railroad in Cleveland will come upon the market in June.

A co-operative movement, only tentative as yet, is on foot in the fabricating trade, which has suffered severely from the extremely low prices, not only on large contracts, but on much of the ordinary steelwork let in recent months.

Weakness in iron bars is more pronounced in Eastern and Western markets. Refined iron bars have sold

at 1.35 cents, delivered in eastern Pennsylvania. There is some indication in the West that the steel bar market is not so firm.

Sheet manufacturers will meet this week to consider trade conditions. Prices on sheets have been less generally maintained of late.

Recent cutting on rivets has precipitated an open market. Boiler rivets have sold at 1.75 cents, Pittsburgh, or \$5 a ton below what has been considered the regular basis.

For the Chilean warship contract three bids are reported from the United States, and the tonnage in armor and hull plates is put at 8000 tons.

A Toledo, Ohio, shipyard has taken a car ferry contract calling for 2500 tons of plates and shapes.

Low prices on ferromanganese for the second half of the year have brought out a good deal of business, some of which was done at \$36.50, Baltimore.

The pig iron market goes on in the same rut, with buyers and sellers looking for light on the situation for the last half of the year, and finding little. Furnaces are getting less of an advance for that delivery than in early March. Southern iron has sold in a few cases below \$11 for early delivery. The chief inquiry pending is from pipe works. The market for steel-making iron is at a standstill.

Lake Superior ore prices may be announced in the coming week. Furnace interests are by no means a unit in the view that last year's prices must be held as a prop to pig iron, and a reduction of 25 cents is now discussed as being not so radical as to shake the general market, while it takes some account of the change in conditions.

Our New Location

This week the David Williams Company, publisher of *The Iron Age*, the *Iron Age-Hardware*, the *Metal Worker*, *Plumber and Steam Fitter* and the *Building Age*, has effected the removal of its offices from 14 Park place to 239 West Thirty-ninth street, between Seventh and Eighth avenues, New York City. As might be expected, the removal of the extensive business of this company has not been accomplished without some confusion, and it is possible that a number of our friends may find their correspondence delayed during the course of the rearrangement of the various departments in the new quarters. The delay will simply be temporary, and it may be expected that in a very few days all the business of the company will be proceeding as smoothly as usual. We shall be glad to welcome visitors in our new location, which we trust will prove convenient to a larger number than the old quarters in the downtown section of the city.

The Readers of "The Iron Age"

Within the past few months W. H. Taylor, general manager of the David Williams publications, has addressed a letter to 5000 subscribers to *The Iron Age*, asking each to state specifically who reads the copy of the paper thus received. The replies have been most gratifying, and we here express our appreciation and thanks to the more than 3200 persons who took the pains to write us.

The fact that 64 per cent. of those addressed replied to this letter is a splendid evidence of the good

will of our readers. The inquiry was not sent to selected firms or companies, but the first 5000 names on our subscription list were taken as being fairly representative of the whole circulation. But we will still welcome from any reader a letter offering suggestions for the improvement of *The Iron Age* and telling who reads his copy of the paper.

The letter of inquiry said that the information was sought with a view to making the paper more valuable, and many of our correspondents volunteered friendly criticism and suggestion. But the feature of the replies which is of most striking interest is the statistical exhibit they make possible, classifying the readers of *The Iron Age*. We find that the 3209 replies represent 10,386 readers, divided as follows:

Officers and managers.....	3,401
Purchasing agents.....	963
Superintendents and engineers.....	1,483
Foremen	604
Unlisted*	3,935

* Readers for whom no specific position was given in the reply. It is possible that a large number of such readers would properly be placed in the other classifications if complete information was available.

Assuming that the same proportion holds for the entire circulation of 12,000 copies, and no reason can be seen why it should not, the total readers of each issue of *The Iron Age* are found to be over 38,000, of whom nearly 13,000 are officers and managers, nearly 4000 purchasing agents, over 5000 superintendents and engineers and over 2000 foremen.

From this exhibit it is evident that, in the effort to make *The Iron Age* more valuable, weight must be given to the things of special interest to the officers and superintendents of the manufacturing plants in iron and steel and metal working lines. Readers among mechanics and other workmen are relatively few, and therefore negligible, in determining the character of reading matter. Even among the foremen, the readers as compared with superintendents and engineers are only in the ratio of about 1 to 2½, while the ratio of actual foremen to superintendents is, perhaps, more nearly 2½ to 1; that is, many of those reported as foremen who read *The Iron Age* are men fairly ranking as superintendents—the foremen in more responsible positions.

An important phase of this information, and one which will be put to good use, is its value to advertisers. For an advertiser to know exactly the class of buyers reading his announcements is to enable him to frame his argument to the best effect. To appeal to the general manager of an industrial plant calls for a very different advertisement from that used to attract the attention of a mechanic. We shall therefore give the widest publicity to the data our subscribers have furnished us, and the subscriber first and last will reap the benefit.

For more than half a century *The Iron Age* has enjoyed a unique reputation. Its present publishers came to the direction of its affairs 18 months ago with an appreciation of its prestige, but with no such realization of its great scope and power as the 3209 letters from our subscribers have brought. The character of the firms or companies, the positions occupied by the men signing the letters, and the interest so generally expressed in the publication are telling proof of the influence of *The Iron Age* in the metal industries of the country.

The publishers of this paper realize the responsibil-

ity of living up to such a reputation and of meeting such expectations. But with the continued co-operation of their readers, they dare to believe that the future holds even better things than have yet been attained.

Accident Compensation and Conciliation

It is to be deplored that the spirit of antagonism to employers, which some leaders of organized labor show on every occasion, should have entered into the discussion of the question of accident compensation. The hearings before the various State Commissions have developed no little feeling. In one or two cases members of these commissions who were regarded as representing organized labor have been bitterly assailed by the unions because they have been willing to accept certain compromises where the issue was sharply drawn between the interests of employers and employees.

The whole purpose of the movement in which employers have taken so active a part in the past few years is to get this question on a higher plane. As long as accident claims are contested on the strict basis of the law, the spirit of the pound of flesh may be expected on both sides. In the effort to introduce conciliation and to substitute humane and equitable settlements for the technicalities of legal conflicts, it would seem that both sides should approach the question without animosity. The history of litigated accident cases is well known. Whether employer or employee has lost in any particular case—and both have been heavy losers in the long catalogue of accident suits—there has always been one successful class—those whom employers and workmen have employed to fight for them. Not only does the present movement aim at conservation of life and limb, but at the saving of the large sums of money now expended in accident litigation with so grotesquely small result to the injured employee and his dependents. If a better way is to be found it must not be sought in antagonism, but in conciliation and mutual interest.

It is no time to attempt to recast the lines on which modern industry is conducted, nor to reverse at a stroke all the precedents and practice of centuries relating to accident liability. There will be abundant opportunity for amending the legislation that will result from the present agitation in the various States. And it must not be forgotten that the courts are still here and that nothing can come of attempts to wrest away common law or statute rights. The whole strength of the new plans that are taking shape in some of the States lies in the willingness of employers and employees to adopt them. They must find reasons in their mutual interest for electing them, and all the legislatures and all the labor unions cannot take away this power of choice.

Awakening to the Danger of Fire

The recent appalling fire in a New York City shirt-waist factory, involving the loss of 144 lives, is causing manufacturers throughout the country to examine more carefully the precautions against fire in their own establishments. Many of them find that subordinates intrusted with the duty of looking after such details have permitted the apparatus to get out of order. Fire pails have been discovered empty, their contents

having evaporated; extinguishers have been permitted to become so old that their efficiency may well be doubted; fire doors intended to be closed except when actually in use are found open, even at night, and inflammable rubbish has been permitted to accumulate in dangerous places. Long immunity from fire in any establishment is apt to make everybody in authority somewhat lax in guarding against it and in enforcing even the most ordinary precautions. It is deplorable that something really serious is required to awaken responsibility or vigilance. A neighborhood fire involving great destruction of property may do it to some extent, but one which is accompanied by the loss of many human lives is a much greater stimulant to the energetic overhauling of precautionary arrangements. It is to be hoped that the recollection of this great catastrophe may be influential for more than a brief season.

A Notable Anniversary

The celebration at Boston this week of the semi-centennial of the charter of the Massachusetts Institute of Technology signalizes the large contribution of this school to the country's industrial advance. Iron and steel manufacture and the working of metals are fields in which a vast amount of good work has been done by the alumni of this excellent institution, and representatives of these industries have done much for the programme of the week's congress. The half century has brought a development in industry, not only in the United States but throughout the world, well nigh equaling that of all the centuries preceding. It has been a period in which "applied science" has come to be vastly significant in industrial operations, and the technically trained man has become a commanding factor in commerce and manufacture. It is true that the view is now and then expressed that the supply of engineers is increasing more rapidly than the ability of mining, metallurgical and mechanical industries to absorb such talent. But the conditions which have been emphasized in the familiar discussion of that question only mean that the standards are rising and that what was an extraordinary equipment 25 years ago is much nearer the average to-day.

It is of particular significance that the celebration at Boston comes at a time when the field of applied science, once regarded as limited to the drafting room or the laboratory, is being extended to industrial management. The direction of productive forces, formerly treated as a natural gift, depending little on training, is now recognized as a thing to be acquired, as other equipment for an industrial career is acquired. It is more than a coincidence that so much prominence is given in the papers read at the congress of the Massachusetts Institute to works administration and scientific management. It indicates that while many of the alumni of the institution have won distinction in developing mines, in building and operating railroads, in producing and distributing power, and in the practical applications of chemistry and metallurgy, others have made good contributions to the standardizing of modern factory practice. In the development of higher efficiency in production, the value of scientific investigation has been emphasized recently as never before, and the trained man has taken a new place of prominence in shop management. The papers prepared for the Boston congress, some of which are reproduced in

this issue, while others will follow, are in themselves an impressive exhibit of the equipment the technically trained mind brings to the solution of modern shop problems.

Workmen Appreciate Technical Publications

Those manufacturing establishments which maintain libraries of technical publications for the use of their employees have found the expenditure a profitable one. The men use the libraries for the most part during the noon hour, but frequently, where the closing time permits, remain to take advantage of the opportunity offered. The technical journals are chiefly sought. The public libraries are regularly visited for the same purpose by many workmen and foremen, and men higher in authority are occasionally found there. The librarians state that the use of this class of current literature is much greater than a decade ago, men realizing to a higher degree the value to their future of keeping in touch with current engineering conditions and improvements.

Correspondence

Labor Speeding Under Scientific Management

To the Editor: The figures quoted by Frederick W. Taylor from his new book on "The Principles of Scientific Management" indicate the theoretic possibility of one man loading from the ground 47½ long tons of pig iron, in 92-lb. pigs, in a working day of 10 hours. Yet I doubt the physical possibility that any man or set of men could continue to work for three years, at the pace rendered necessary by the figures quoted.

According to them, it takes a man only 13.25 sec. of time to pick up a pig, carry it up an inclined plank, and deposit it on a car—the average length of such walk being 36 ft. Allowing half of this time for the return, would make the total about 20 sec. for each pig, or 3 pigs per minute. At this rate the 1156 pigs would be loaded in 386 min. In the example given by Mr. Taylor, in his article from which I quoted in my letter published in your issue of April 6, the job was finished in 9½ hours, or 570 min. Subtracting 386 from above would leave for rest periods 184 min. Mr. Taylor has not yet given the length of these periods, but states that they were generally taken sitting down after loading 10 to 20 pigs. Taking 15 pigs as the average, there would be 77 such periods during the loading, and 2½ min. to each period does not seem to be an extravagant estimate for such rests, or 192 min. for all. Of course, I may have overestimated the rest periods, but, considering what the loader has to do, my estimate does not seem out of the way, and I have been assured by doctors to whom I have submitted this matter that they do not think it physically possible for any man to continue working at this pace for any length of time without heart failure.

This brings up the humanitarian side of the question, as well as the economic. Does it pay employers to require their men to walk 16 miles per day ("these men walked about 8 miles under the load each day and 8 miles free from load"), carrying for 8 miles, partly up hill, "106,400 lb. of pig iron," in order to earn \$1.85 per day, rather than one quarter of the amount at \$1.15 per day? Does it pay the men to do 400 per cent. more work for 60 per cent. more pay? Does not such "speeding" as this make the objection which the labor unions have to such methods both plausible and necessary? To ask these questions seems to me to answer them, and, while they may not enter into the calculations of the "scientific manager," yet from what I know of the manufacturers of this country, as a body, they are not so inhuman as to require that their workmen shall risk their health and their lives in doing such "stunts" as Mr. Taylor mentions.

ROBERT MATHEWS.

ROCHESTER, N. Y.

The Newark Foundrymen's Association

The April meeting of the Newark Foundrymen's Association, Newark, N. J., was held at the Washington, on the evening of April 5. After dinner the election of officers took place, returning the old officers to another term as follows: Franklin Phillips, president; James Flockhart, vice-president; Arthur E. Barlow, secretary, and G. Hannay, treasurer. An interesting talk on the "Government Method of Testing Government Metal" was given by W. S. Prince, of Henry R. Worthington, Inc. Figures showing a variation of 20,000 lb. tensile strength and 9 per cent. of the elongation in tests on bars poured from the same melt were given. He believes that the method now pursued by the Government inspectors, requiring a test bar to be attached to the casting, is faulty, inasmuch as it does not show the quality of the metal in the cast as the figures given proved. The next meeting of the association will be held May 4, and a lecture illustrated by stereopticon views on "Core Binders and Core Sands" will be given by H. M. Lane, editor of *Castings*. The association has invited nearby foundrymen and supply dealers, not now connected with the association, to this meeting.

The Machine Tool Builders' Convention

The programme of the spring meeting of the National Machine Tool Builders' Association, at the Marlborough-Blenheim, Atlantic City, May 18 and 19, is practically completed. The opening session, Thursday morning, will be given up to committee reports, and the afternoon to the meetings of the various committees representing the different divisions of the industry. On Friday the papers and topics of discussion will be as follows:

"Department Plan of Machine Tool Arrangement on the Basis of Equipment," by F. C. Kent, superintendent Pierce-Great Arrow Company, Buffalo, N. Y.

"Department Plan of Machine Tool Arrangement on the Basis of Product," by a speaker to be announced.

Open discussion period of 20 minutes.

"The Scientific Development of Shop Efficiency," by F. W. Taylor, general manager Tabor Mfg. Company, Philadelphia.

"The Proper Distribution of Expense Burden," by A. Hamilton Church, certified accountant, Boston.

Open discussion period of 15 minutes.

"Employers' Liability and Workmen's Compensation," by F. C. Schwedtmann, chairman Industrial Association of St. Louis, and James A. Emery, counsel National Association of Manufacturers, Washington, D. C.

Reports of convention committees.

March Copper Production and Stocks

The Copper Producers' Association has issued its monthly statement for March as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States March 1.....	156,637,770
Production of marketable copper in the United States from all domestic and foreign sources during March	130,532,080
Deliveries of marketable copper during March:	
For domestic consumption.....	66,080,789
For export.....	59,081,127
Total.....	125,161,916
Stock of marketable copper of all kinds on hand at all points in the United States April 1.....	162,007,934

These figures show an increase in stocks from March 1 to April 1 of 5,370,164 lb., which is a considerably smaller increase than had been expected. This is the more striking in view of the fact that for the first time the refinery production for any one month exceeded 130,000,000 lb. In 1910 there were two months when the output exceeded 127,000,000 lb., while the high mark in 1909 was 124,000,000 lb.

Vol. I, No. 1, of the *Steel and Metal Digest*, being the April number of a new publication by the American Metal Market Company, New York, is in pamphlet form, and contains 36 pages, 6 x 9 in. The purpose of the journal is to give a summary of events in the metal, iron and steel markets month by month, with tables of prices and other statistics relating to these trades.

Philadelphia Pig Iron Prices for 10 Years

So many requests have been received for pig iron prices for a series of years at Philadelphia, Pa., and vicinity that August A. Miller, editorial representative of *The Iron Age* in that city, has compiled the subjoined 10-year tables, which are averaged from the weekly quotations published in our market reports, and has also plotted from these tables the diagram given herewith:

Average Prices Standard Brands Eastern Pennsylvania No. 2 X Foundry Iron

	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January...	\$15.50	\$16.75	\$22.45	\$14.60	\$17.50	\$18.50	\$24.80	\$18.25	\$17.25	\$19.00
February...	15.31	17.19	22.25	14.50	17.50	18.50	25.87	18.25	17.00	18.60
March.....	15.12	18.81	22.25	14.80	17.50	18.75	25.00	18.12	16.47	18.00
April.....	15.46	19.62	21.87	15.00	17.75	18.44	24.81	17.65	16.20	17.75
May.....	15.19	19.75	20.06	14.75	17.81	18.50	25.55	16.94	16.06	17.00
June.....	15.06	20.94	19.19	14.50	16.75	18.44	24.62	16.62	16.42	16.55
July.....	15.00	22.30	18.10	14.31	16.12	18.25	23.06	16.50	16.50	16.25
August....	14.97	22.00	16.87	14.25	16.25	19.00	21.90	16.50	17.00	16.00
September..	14.80	22.00	16.12	14.25	16.43	20.44	20.50	16.62	18.05	16.00
October....	15.25	22.12	15.20	14.43	17.25	21.12	19.85	16.75	18.69	15.81
November..	15.37	23.37	15.00	15.75	18.05	23.30	18.94	17.00	19.00	15.68
December..	15.75	23.00	15.00	16.90	18.25	24.00	18.84	17.25	19.00	15.50

Average Prices Standard Brands Basic Iron.

	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January...	\$11.00	\$15.87	.....	\$13.75	\$16.50	\$17.85	\$23.87	\$17.04	\$16.75	\$18.75
February...	13.94	17.25	\$20.00	13.70	16.50	17.97	24.37	17.25	16.56	18.50
March.....	14.00	18.25	26.00	13.78	16.69	17.82	24.44	17.25	15.50	17.88
April.....	14.50	19.00	19.81	14.00	16.75	17.86	24.00	17.25	15.00	17.50
May.....	14.29	19.00	19.25	13.81	16.53	17.59	24.65	16.25	15.00	16.70
June.....	14.19	19.50	18.75	13.53	16.00	17.75	23.94	15.50	15.50	16.10
July.....	14.00	20.70	17.75	13.04	15.00	17.82	22.33	15.10	15.80	15.70
August....	14.00	20.50	16.00	12.81	15.25	17.90	20.65	15.00	16.87	15.20
September..	14.00	20.50	15.12	12.73	15.81	21.15	19.08	15.25	18.00	15.05
October....	14.00	20.50	14.50	13.18	17.08	18.78	18.40	15.50	18.83	15.00
November..	14.19	20.50	14.06	15.75	17.55	19.56	17.81	16.25	18.02	14.95
December..	14.62	20.50	13.79	14.56	17.81	22.75	17.33	16.70	18.75	15.00

Average Prices Standard Brands Gray Forge Iron.

	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January...	\$14.50	\$15.87	\$20.50	\$13.50	\$16.00	\$17.00	\$22.37	\$16.45	\$16.06	\$17.75
February...	14.19	16.62	20.00	13.50	15.62	16.62	22.50	16.50	16.00	17.50
March.....	14.00	17.62	19.50	13.50	16.00	16.50	23.00	16.50	15.44	16.90
April.....	14.37	18.19	19.12	13.75	16.00	16.50	22.62	16.15	14.95	16.62
May.....	14.30	18.35	18.62	13.56	15.75	16.50	22.70	15.44	14.81	15.94
June.....	14.06	18.94	17.87	13.35	15.20	16.16	22.56	15.12	15.18	15.65
July.....	13.50	20.30	17.50	13.12	14.62	16.19	21.69	15.00	15.35	15.37
August....	13.75	20.50	15.81	13.00	14.75	17.15	19.20	15.00	15.94	15.00
September..	13.75	20.00	14.94	12.90	14.81	17.75	18.50	15.37	16.85	14.75
October....	13.75	19.75	14.05	13.19	15.69	18.42	17.85	15.50	17.50	14.69
November..	13.94	21.00	13.75	14.56	16.25	20.70	16.75	15.62	17.75	14.69
December..	14.44	21.00	13.75	15.90	16.25	21.75	16.50	15.85	17.75	14.65

Average Prices Standard Brands Low Phosphorus Iron.

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January...	.....	.....	.....	\$20.00	\$24.33	\$27.19	\$24.60	\$21.50	\$22.81
February...	.....	\$11.37	.....	20.00	24.50	26.62	24.00	21.50	22.94
March.....	.....	21.31	.....	20.06	25.00	27.00	23.62	21.37	23.00
April.....	.....	21.25	.....	20.56	24.75	27.00	23.40	20.70	23.00
May.....	.....	20.99	.....	20.56	24.70	27.45	21.50	19.56	24.00
June.....	\$22.50	20.85	.....	20.56	24.50	27.69	21.00	19.50	22.90
July.....	23.00	.....	\$17.75	20.25	24.50	27.69	21.00	19.50	21.56
August....	23.00	.....	17.50	20.45	24.50	27.60	20.87	20.25	22.50
September..	23.37	21.33	17.50	20.56	24.69	27.50	20.25	21.00	22.50
October....	22.70	21.00	18.06	21.75	25.44	27.05	20.00	22.25	22.50
November..	.....	.....	19.56	23.50	26.45	27.75	20.62	22.75	22.50
December..	21.50	20.00	19.90	24.00	27.25	25.00	21.40	22.75	22.50

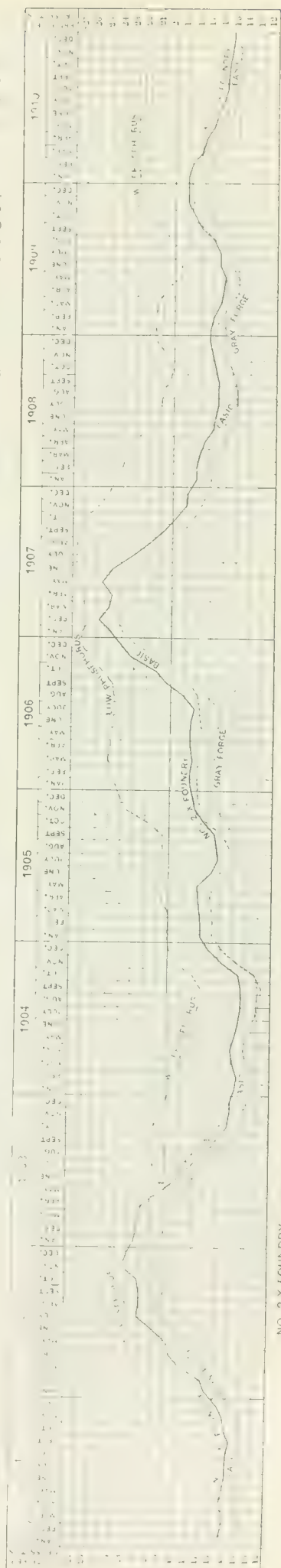
The Scottsdale Foundry & Machine Company, Scottsdale, Pa., manufacturer of rolling mill machinery, recently furnished a large mill table embodying some special features to the Superior Steel Company, Carnegie, Pa.

The Andrews & Hitchcock Iron Company contemplated blowing in one of its furnaces this week, but has decided to allow it to remain out of blast for the present at least.

The Joliette Steel & Iron Foundry Company, Joliette, Quebec, Canada, recently installed a 2500-lb. Baillet converter. Steel castings were first made on March 1.

The Orton & Steinbrenner Company, Chicago, has appointed W. Van R. Whitall, Inc., 30 Church street, New York City, as New York and New England representative for its locomotive cranes and grab buckets.

The fortieth annual convention of the National Association of Stove Manufacturers will be held at the Hotel Astor, New York, Thursday and Friday, May 11 and 12.



Illustrations in Standard Brands of Eastern Pennsylvania No. 2 X Foundry, Basic, Low Phosphorus and Gray Forge Pig Iron, Per Gross Ton, at Philadelphia, Pa., Compiled by August A. Miller.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

FIG IRON, Per Gross Ton:	Apr. 12, 1911.	Apr. 5, 1911.	Mar. 8, 1911.	Apr. 13, 1910.
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$17.75
Foundry No. 2, Valley furnace.....	13.75	13.75	13.75	15.75
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00	12.00
Foundry No. 2, local, Chicago.....	15.50	15.50	15.50	17.50
Basic, delivered, eastern Pa.....	15.25	15.25	15.25	17.50
Basic, Valley furnace.....	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	18.40
Gray forge, Pittsburgh.....	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago.....	17.50	17.50	17.50	19.00

COKE, CONNELLSVILLE,

Per Net Ton, at oven:				
Furnace coke, prompt shipment.....	1.60	1.60	1.55	1.75
Furnace coke, future delivery.....	1.75	1.75	1.75	1.95
Foundry coke, prompt shipment.....	2.00	2.00	2.00	2.55
Foundry coke, future delivery.....	2.25	2.25	2.25	2.75

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh.....	23.00	23.00	23.00	27.00
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia.....	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh.....	29.00	29.00	29.00	33.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.50	14.50	15.50	18.50
Iron rails, Philadelphia.....	17.50	18.00	18.50	20.50
Car wheels, Chicago.....	13.25	13.25	13.25	16.50
Car wheels, Philadelphia.....	13.25	13.25	14.00	16.00
Heavy steel scrap, Pittsburgh.....	13.25	13.75	14.75	17.00
Heavy steel scrap, Chicago.....	11.50	11.50	12.00	14.50
Heavy steel scrap, Philadelphia.....	13.50	13.50	14.00	16.25

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.....	1.37½	1.37½	1.37½	1.50
Common iron bars, Chicago.....	1.25	1.25	1.27½	1.55
Common iron bars, Pittsburgh.....	1.35	1.35	1.35	1.60
Steel bars, tidewater, New York.....	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York.....	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York.....	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York.....	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.....	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.....	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*.....	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh.....	1.70	1.70	1.60	1.85
Barb wire, galv., Pittsburgh*.....	2.10	2.10	2.10	2.15

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.37½	12.50	12.62½	13.00
Electrolytic copper, New York.....	12.12½	12.25	12.25	12.87½
Spelter, New York.....	5.50	5.55	5.65	5.60
Spelter, St. Louis.....	5.30	5.35	5.50	5.45
Lead, New York.....	4.45	4.45	4.40	4.40
Lead, St. Louis.....	4.30	4.30	4.25	4.25
Tin, New York.....	42.25	41.75	41.75	32.45
Antimony, Hallett, New York.....	9.00	9.12½	9.25	8.25
Tin plate, 100-lb. box, New York.....	\$3.94	\$3.94	\$3.94	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in.

and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		
	Steel.	Iron.	
	Black. Galv.	Black. Galv.	
1 to 1½ in.....	75	49	43
1½ in.....	63	71	59
3 to 1½ in.....	79	69	75
2 to 3 in.....	80	70	76
	Lap Weld.		
2 in.....	76	66	72
2½ to 4 in.....	78	68	74
4½ to 6 in.....	77	67	73
7 to 12 in.....	75	59	71
13 to 15 in.....	51½		
	Butt Weld, extra strong, plain ends, card weight.		
¼, ½, ¾ in.....	69	59	65
1 in.....	74	68	70
¾ to 1½ in.....	78	72	74
2 to 3 in.....	79	73	75
	Lap Weld, extra strong, plain ends, card weight.		
2 in.....	75	69	71
2½ to 4 in.....	77	71	73
4½ to 6 in.....	76	70	72
7 to 8 in.....	69	59	65
9 to 12 in.....	64	54	60
	Butt Weld, double extra strong, plain ends, card weight.		
¾, 1 in.....	64	58	60
1 to 1½ in.....	67	61	63
¾ to 3 in.....	69	63	65
	Lap Weld, double extra strong, plain ends, card weight.		
2 in.....	65	59	61
2½ to 4 in.....	67	61	63
4½ to 6 in.....	66	60	62
7 to 8 in.....	59	49	55

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld { Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.

2, 2½ to 4 in. Lap Weld { The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel. Iron.

1 to 1½ in. 49 43
1½ to 2½ in. 61 43
2½ in. 63 48
2½ to 5 in. 69 55
2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29 to \$30 per gross ton. Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos. 0 to 9 10 11 12 & 12½ 13 14 15 16
Annealed. . . . \$1.75 1.80 1.85 1.90 2.00 2.10 2.20 2.30
Galvanized. . . . 2.05 2.10 2.15 2.20 2.30 2.40 2.50 2.60

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:

9 and coarser. 80
10 to 18. 80 and 10
19 to 26. 80 and 10 and 2½
27 to 36. 80 and 5

Galvanized:

9 and coarser. 75 and 10
10 to 16. 75 and 10
17 to 26. 72½ and 10
27 to 36. 72½

Coppered or Liquor Finished:

9 and coarser. 75 and 10
10 to 26. 75 and 10
27 to 36. 70 and 10 and 5

Tinned:

6 to 18. 75 and 10 and 10

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ½ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, April 12, 1911.—(By Telegraph.)

Pig Iron.—There is some small buying of foundry and malleable Bessemer iron, but standard Bessemer, basic and gray forge are very dull, with practically no new inquiry. The Valley furnaces continue to hold the price of Bessemer at \$15, at furnace, but have not made a sale in some weeks. Two blast furnaces which were scheduled to go in this week will remain out on account of the poor demand for pig iron. No large inquiries of any kind are in the market. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—A little cutting in the prices of billets and sheet bars has appeared, some of the smaller open hearth plants offering both billets and sheet bars at 50c. to \$1 a ton under the regular price. The new demand from consumers is quiet, but specifications against contracts are coming in at a moderately good rate, although not as heavy as some time ago. The larger steel mills, that make both Bessemer and open hearth, are stated to be holding firmly to regular prices, which are as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at \$24, and forging billets at \$28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

The iron trade continues in an uncertain and halting condition. The railroads seem to have retired from the market altogether. The Pennsylvania Lines West issued in-

structions last week canceling all orders on which shipments have not been made, or which have not been rolled. The pig iron market is practically lifeless. Cutting is being done in prices of open hearth steel by some of the smaller mills, and in the last few days both Bessemer and open hearth billets have been offered by dealers in small lots somewhat under the market. The demand for finished iron and steel is quiet, but prices are fairly strong. The coke trade is dull and scrap has declined materially in the past week. There is now a disposition by producers of both raw and finished materials to sell ahead for the entire year at present prices, but so far very little business has been offered by consumers. Some tin plate has been sold for fourth quarter delivery at to-day's market, and it is likely more sales will be made before the week is out.

Ferromanganese.—The very low prices ruling on foreign ferromanganese have stirred up consumers, and a good deal of material has been sold in the past week. One local consumer has bought 1000 tons, deliveries 250 tons a month commencing June, at \$36.50, Baltimore; another interest has bought 200 tons at about \$36.75, Baltimore, and a Kentucky steel interest is reported to have bought 500 tons for forward delivery at about \$37, Baltimore. We quote 80 per cent. foreign at \$36.50 to \$36.75 in large lots and \$37, Baltimore, in small lots, the rate for delivery to the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—In spite of the low prices ruling on this material, there is very little new inquiry, most consumers being covered for some time ahead. We quote 50 per cent. at \$53 to \$53.50, f.o.b. Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—In the absence of sales, we continue to quote best grades of muck bar made from all pig iron at about \$29, delivered at buyer's mill in the Pittsburgh district.

Skelp.—New inquiry is light, and in some cases consumers that have contracts with the mills are holding up shipments. Prices are fairly strong and we quote grooved steel skelp at 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—While most consumers are covered for some time ahead, they are not freely specifying against their contracts. New inquiry is dull. We quote Bessemer open hearth and chain rods at \$29, Pittsburgh.

Steel Rails.—In the past week the Carnegie Steel Company has received orders for upward of 10,000 tons of standard sections for export, about half of which is to go to Japan. Two or three large inquiries for standard rails are in the market, but even if these are placed it is not likely that much of the business will come to the local interest. New orders and specifications for light rails in the past week were fairly good, the Carnegie Steel Company having taken about 3500 tons. The Edgar Thomson rail mills are operating to about 50 per cent. of capacity or less. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—New inquiries are not very heavy and reports are that fabricated work is going at the lowest prices reached in some months, in spite of the fact that the mills claim to be holding firmly for beams and channels on the basis of 1.40c., Pittsburgh. The McClintic-Marshall Construction Company has taken about 1500 tons for the new Milwaukee machine shops for the International Harvester Company, and also about 2000 tons of bridge work for one of the Western roads. The American Bridge Company has taken 400 tons for a new smelting plant in Nevada.

Plates.—The Pennsylvania Railroad has divided about 6000 tons of plates and shapes for new cars that it will build at its Altoona shops between the Cambria Steel Company and the Carnegie Steel Company. All the plate mills are badly in need of orders, and none is operating to more than 60 to 75 per cent. of capacity, if that much. The Allegheny Steel Company, however, is running its plate mill at Brackenridge, Pa., to nearly full time this week, with a fair amount of work ahead. We quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

Tin Plate.—Specifications against contracts are not so heavy as they were, but it is believed that in the latter half of the month they will be better, as already several large consumers have ordered the tin plate they will want for June shipment. The fact that several mills have made sales on the \$3.70 basis for fourth quarter delivery has

THE IRON AND METAL MARKETS

Sheet Pile.—The American Sheet & Tin Plate Company, containing 25 hot mills, will run only four days this week, and probably at the same rate next week. The leading interest is operating this week to about 80 per cent. of capacity, a slight falling off. The independent mills, especially those that make roofing plate, are running to nearly full capacity. The new demand is much under what it has been. We quote 100-lb. coke plates at \$3.70 per base box, Pittsburgh.

Sheets.—It is likely that a meeting of the leading sheet mills will be held in Pittsburgh this week for the purpose of considering trade conditions. More disposition has been shown by some makers to go after new business aggressively, allowing slight concessions in prices to get it. This cutting in prices has not yet been severely felt, and after the situation has been gone over it is hoped that it will largely disappear. New orders for sheets have shown slight betterment, and specifications against contracts are reported as coming in a little more freely. Regular prices on the different grades of sheets are printed on a previous page.

Bars.—The demand for both iron and steel bars is reported to be quieter than at any previous time this year. Specifications against contracts are not coming in freely, and the whole situation is rather unsatisfactory. The decline in prices of scrap is reflected in iron bars, which are not as firm as they were, and there are also reports that prices of steel bars have been shaded in some cases, but these have not been verified. We quote steel bars at 1.40c. and common iron bars at 1.35c., Pittsburgh.

Shafting.—Specifications against contracts from the automobile builders and the implement makers are reported as coming in a little better, but new demand is quiet. Regular discounts of 57 per cent. off in carloads and 52 per cent. in less than carload delivered in base territory are sometimes shaded on desirable orders.

Spelter.—Prices are slightly firmer than they were last week, although new demand is very dull. We quote prime grades of Western at 5.35c., East St. Louis, equal to 5.42½c., Pittsburgh.

Hoops and Bands.—From some sections of the country specifications against contracts are coming in quite freely, but in some other sections are light or held up entirely. The new demand is only for small lots. We quote steel hoops at 1.45c. and bands at 1.40c., extras applying on the latter as in the present steel bar card.

Merchant Steel.—So far this month the new demand has been lagging and specifications against contracts have shown a falling off as compared with the same period in March. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Specifications against contracts have not been coming in at a satisfactory rate for some time, and the new demand is confined to small lots. Regular prices of 1.90c. on structural rivets and 2c. on boiler rivets continue to be shaded on desirable orders.

Wire Products.—This branch of business does not seem to be affected by the adverse conditions generally existing in the iron trade. The consumption is enormously heavy, the wire mills operating to practically full capacity. The output of wire for fencing and other purposes this year promises to break all former records. Jobbers are specifying very freely against their contracts, and the retail trade is placing new orders actively. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.70, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—New orders so far this month have shown a falling off as compared with the latter part of March, but this is largely due to the fact that specifications were then rushed in to avoid the advance April 1. There are no large inquiries. Prices are now as follows:

Railroad Spikes

4½, 5 and 5½ x 4	.....	\$1.60
3, 3½, 4, 4½ and 5 x 4	.....	Extra 10
3½, 4 and 4½ x 5	.....	Extra 10
3, 3½, 4 and 4½ x 5½	.....	Extra 30
2½ x 8	.....	Extra 40
2½, 3 and 3½ x 8	.....	Extra 60
2 x 16	.....	Extra 80

Boat Spikes

¾ in. square, 12 to 24 in. long	.....	Extra 15
¾ in. square, 8 to 16 in. long	.....	Extra 15
1 in. square, 6 to 16 in. long	.....	Extra 15
7⁄8 in. square, 6 to 12 in. long	.....	Extra 20
¾ in. square, 4 to 12 in. long	.....	Extra 30
¾ in. square, 4 to 8 in. long	.....	Extra 45
1 in. square, 4 to 8 in. long	.....	Extra 75
1 in. square, 3 to 3½ in. long	.....	Extra 1.00
¾ and 7⁄8 shorter than 4 in.	.....	cent extra.

Merchant Pipe.—It is reported that a Kansas City gas interest has placed an order for 10 miles of 6 to 8 in. line pipe, but as yet nothing has been done with the Los Angeles inquiry reported last week. The current demand for merchant pipe is fairly satisfactory. It is stated that regular discounts on both iron and steel pipe are being firmly held.

Boiler Tubes.—The new demand for boiler tubes is quiet, as most large consumers placed their contracts some time ago, specifications against which are coming in reasonably well. Prices on boiler tubes are more or less flexible, makers not adhering closely to the schedule.

Coke.—Inquiry for both furnace and foundry coke is light. Most of the blast furnace interests that buy their coke in the open market are covered for their supply for some time on sliding scale contracts, based on either Bessemer or basic iron. An inquiry from a Mahoning Valley blast furnace interest for 10,000 tons of coke per month that came in the market about a month ago has been withdrawn, the decision having been made not to blow in the furnace at present on account of the unsatisfactory condition of the pig iron trade. The output of coke in the Upper and Lower Connellsville regions last week was 368,029 net tons, a decrease over the previous week of a little more than 3000 tons. We quote standard makes of 72-hour foundry coke at about \$2 for prompt shipment and \$2.25 to \$2.40 per net ton, at oven, for delivery over the remainder of the year. We quote standard makes of furnace coke for prompt shipment at \$1.60 to \$1.65, and for delivery over the next six months from \$1.80 to \$2 per net ton, at oven.

Iron and Steel Scrap.—The scrap market has shown a further decline in prices which have now about reached the low point that prevailed prior to February 15, when the upward turn took place. The local market on steel scrap is adversely affected by an embargo for scrap destined to Monessen, Pa., which was put on last week. The scrap list of the Pennsylvania Railroad closed Tuesday and the rail list, with 15,000 to 18,000 tons, closes Wednesday. The Baltimore & Ohio scrap list also closes Wednesday. The list of the Southern Railway closed Tuesday at Washington, D. C., containing about 3000 tons of scrap and 3000 tons of old car wheels. The new demand is dull, as most consumers are covered ahead. We note sales of 1000 tons of borings at about \$9.10, delivered at consumer's mill, and 1000 tons of No. 2 heavy cast iron scrap at \$13.25, delivered. Dealers are now quoting as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere, as noted:

Heavy steel scrap, Steubenville, Folsbee, Sharon, Monessen and Pittsburgh delivery	.....	\$13.25 to \$13.50
No. 1 foundry cast	.....	13.75 to 14.00
No. 2 foundry cast	.....	12.75 to 13.00
Bundled sheet scrap, at point of shipment	.....	9.25 to 9.50
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	.....	14.50
No. 1 railroad malleable stock	.....	12.50 to 12.75
Grate bars	.....	10.50 to 10.75
Low phosphorus melting stock	.....	16.75 to 17.00
Iron car axles	.....	24.25 to 24.50
Steel car axles	.....	18.50 to 18.75
Locomotive axles	.....	23.00
No. 1 busheling scrap	.....	12.50 to 12.75
No. 2 busheling scrap	.....	9.00 to 9.25
Old car wheels	.....	13.50 to 13.75
Sheet bar crop ends	.....	15.50 to 15.75
*Cast iron borings	.....	8.75 to 9.00
*Machine shop turnings	.....	9.50 to 9.75
Old iron rails	.....	16.00 to 16.25
No. 1 wrought scrap	.....	14.25 to 14.50
Heavy steel axle turnings	.....	10.25
Stove plate	.....	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Vivian, Bond & Co. have closed their offices here and retired from the Pittsburgh field. A. C. Daft, formerly connected with that firm, has opened an office in room 2502, Oliver Building, Pittsburgh, and will handle ferroalloys, pig iron and other products.

George C. Mills, formerly with Naylor & Co., has opened an office in room 1625, Farmers' Bank Building, Pittsburgh, and will handle pig iron, ferromanganese and ferrosilicon. He will also look after the interests of Naylor & Co. in the Pittsburgh district, that firm having abandoned its offices in the Frick Building March 15.

The offices of the Ohio Iron & Metal Company, iron and steel scrap, H. D. Stalnaker, resident manager, have been removed from rooms 2124-2125 to rooms 1123-1125, Farmers' Bank Building, Pittsburgh.

The Reinforced Brazing & Machine Company, Pittsburgh, has installed in its plant a new 55-hp. Miller engine, purchased from Wickes Brothers, Pittsburgh.

THE IRON AND METAL MARKETS

Chicago

FISHER BUILDING, April 12, 1911. (By Telephone.)

The dullness of the past few weeks has extended into April, and the week under review has not even kept up to the sluggish activity of the first week in the month. In the pig iron market offers of Southern iron at \$11, Birmingham, for the remainder of the year are reported to have called forward nothing more than scattering small orders. It is known that a considerable quantity of railroad equipment business is pending. The bar market has been very quiet, and some shading is reported. The price of scrap has been weak, and the tendency appears to be decidedly downward. The Atchison, Topeka & Santa Fe Railroad has issued one of the very largest scrap lists ever offered, but doubt is expressed as to the sale of this material on the present low market. Wire products and cast iron pipe continue active. General business conditions are somewhat below normal with no indication of immediate brightening.

Pig Iron.—The extreme dullness that dominated the pig iron market at the time of our last report has extended into this week, making it by far the most inactive period of the year. The only sales reported are small lots here and there which are too unimportant to mention. Foundries in this city report business a trifle better than for a few weeks past, but this is mostly work of a repair nature and there is no great volume in sight. Most foundries in this district have sufficient pig iron on hand to see them through the first half, and buyers are very evidently awaiting development of the present uncertain market before making known their future wants. An enormous accumulation of iron is known to exist at the furnaces, and this stock is not moving with any rapidity even under the stimulus of recent price concessions. The price of \$11, Birmingham, for No. 2 Southern foundry, prevails in this market, and this figure is being freely quoted for the second and third quarters. It is felt that no great amount of pressure would be necessary to obtain the same price for business for the last half, although such a quotation it is felt would not bring forward many buyers in the present dull market. Northern furnaces are asking \$1 advance on sales through the last half, but practically no deals are being closed. The general opinion is that this is not because prices are too high, but because of the lack of foundry business. The only encouraging feature of this week's market is that specifications against contracts have been somewhat freer. The following quotations are for April, May and June shipments, Chicago delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	16.00 to 16.50
Northern coke foundry, No. 2.....	15.50 to 16.00
Northern coke foundry, No. 3.....	15.25 to 15.75
Northern Scotch, No. 1.....	16.50 to 17.00
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.50 to 16.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—Little of interest has happened in the billet market. The quiet that seems to have settled over Western car industries is naturally reflecting a quietness in billets, the demand for which is almost absolutely dependent upon manufacturers of this nature. The leading interest continues to maintain its price of \$30.60, base, Chicago, on open hearth billets and \$25.60, base, Chicago, on rerolling billets.

Rails and Track Supplies.—Specifications for rails and track supplies have somewhat fallen off, but increased activity is noted in inquiries that are coming into this market. Mills are running full on track supplies and the retrenchment policy in vogue does not seem to affect this branch of business. New construction may be avoided, and improvements of every kind curtailed, but the trackage now in use must be kept in good repair, and a certain amount of the lighter track supplies is constantly being used. Light rail business continues to be very active. Prices are firm, as follows: We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—The only sale of importance made in this section during the week was 2500 tons for the Gunther Building, which went to the Morava Construction

Company. There was a time in this market when sales of this size caused considerable flurry among fabricators, but with the enormous increase in the capacity of fabricating plants that has come in the last few years jobs of this size are swallowed up with but passing comment. It is reported that plans for the Federal Life Building are about completed by the architects, Marshall & Fox. It is estimated that this building will require about 2000 tons of structural material. Railroad building is extremely quiet, and the lack of business is acting as a stimulant to those who rumor price concessions. We quote plain material from mill 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—There is considerable inquiry in this market for new cars and considerable railroad activity is expected to develop in the construction of rolling stock in the near future. No new business of note has been closed this week, and mills continue to run at about 60 per cent. capacity. We quote mill prices 1.58c. to 1.63c.; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Mills are running at about two-thirds capacity with but a comparatively small tonnage in sight. The sheet business so far this year has been below normal, and there is nothing in sight that would indicate a decided improvement. There is no change in Chicago prices, which are being well maintained as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Car building has been so extremely quiet for the last few months that comparatively little bar iron has gone into that channel. Wagon and implement manufacturers have, however, enjoyed a very fair business, and are to-day using a good share of the output. There is a moderate demand for steel bars, although mills could take on more work without being at all crowded. Prices are as follows: Soft steel bars, 1.58c.; bar iron, 1.25c. to 1.30c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago; from store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Planting and harvest time mark two busy periods in the sale of wire products. In the spring crops must be protected as they are planted, and in the fall harvest funds permit improvements long contemplated. Such a vast quantity of wire products goes into these channels that mill activity can be very correctly gauged by farmers' movements. The spring fencing period is now at its height, and retail stocks are very rapidly finding their way to farms. Small orders to fill in depleted stocks are appearing in every quarter from which nails, wire, fencing, &c., are being sold. Fabricators are reporting one of the very best seasons in their history. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—The only sale of note that has been closed in this market the past week was made by the leading interest to the city of Elyria, Ohio, where a new water works system is being installed and 1500 tons of pipe will be used. The larger gas pipe specifications are believed to be pretty well in. The Pacific Coast cities have been particularly active purchasers of gas pipe this year, Portland, Seattle and Tacoma heading the list. The Portland Gas & Coke Company has purchased 12,000 tons of gas pipe this spring from the United States Cast Iron Pipe & Foundry Company, which made shipments from its Chattanooga plant. It is interesting to note one of the advertising opportunities accepted by this gas company, which directed the shipment of a complete trainload of its pipe at one time. Thirty cars of 30,000 lb. capacity were loaded and shipped intact to the Minnesota Transfer, from which point they were hauled to Portland, Ore., by daylight. Arrangements were made with the newspapers in the principal cities along the route and the exceptional shipment was given much publicity. Everything seems to indicate that this will be a satisfactory business year in the pipe industry. Prices remain firm, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—Consumers are well taken care of, and prices are being held up only because brokers are still busy filling purchases made some time ago. It is expected that this week will see these contracts fairly well filled and price changes may follow. The Milwaukee Railroad is out with a list of 500 tons of car wheels which closes April 11. This item is in fair demand and it is expected that a ready sale will be made. The time honored list of the Atchison, Topeka & Santa Fe has again appeared, but it has been swelled to the great total of 27,000 tons. This list closes April 10 and is one of the largest accumulations of material since

THE IRON AND METAL MARKETS

ever listed. There is little trading in this market and nothing that would indicate activity in the near future. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows, per gross ton:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.25 to 13.75
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections.....	
Jacked to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy looking steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.75 to 12.25
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and tie beams.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	10.50 to 11.00
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.25 to 5.75
No. 1 bushing.....	9.50 to 10.00
No. 2 bushing.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.25 to 8.75
Boiler punchings.....	12.50 to 13.00
No. 1 cast scrap.....	11.75 to 12.25
Stove plate and light cast scrap.....	9.75 to 10.25
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00

Philadelphia

PHILADELPHIA, Pa., April 11, 1911.

The market in practically all lines has taken on a waiting attitude. Several propositions of good size, both in crude and finished products, which have been under negotiation for some time, have developed into orders, but there is a decided lack of snap when it comes to considering new business.

Iron Ore.—Some inquiry for foreign low phosphorus ore is reported and negotiations for further supplies of Swedish ore are pending. Importations at this port during the week aggregated 18,784 tons, all Swedish ore, valued at \$108,031. The largest individual cargo of ore ever received at this port, 11,600 tons, on the steamship Tellus, is included in the week's arrivals.

Pig Iron.—While several of the important negotiations pending last week have been closed, and an occasional inquiry for a fair sized lot is reported, the market generally has a quieter appearance. The Pennsylvania Railroad placed its order for 5300 tons of coke and charcoal foundry iron late in the week, this being for second quarter delivery. A transaction covering 18,000 tons of Southern iron, mixed grades, on a sliding scale, briefly reported last week, was also closed. This was virtually the renewal of an expiring contract with one of the local cast iron pipe foundries, and deliveries will be taken at the rate of 3000 tons a month. Inquiries are out for two lots of low grade iron for Delaware River pipe foundries, one of 4000 and the other 5000 tons, for second quarter delivery. Malleable iron consumers are testing the market for last half delivery, but no transactions are reported. In the higher grades of foundry iron the movement has been light. Inquiries are mostly for small prompt lots, although one for 500 tons of No. 2 X and another for 1800 tons, equally divided between Nos. 1, 2 and 3, for second quarter shipment, are reported. Prices are being well maintained, \$15.50 to \$16, delivered, representing the market for the usual standard brands of eastern Pennsylvania No. 2 X foundry for second quarter shipment. The volume of inquiry for forward delivery is not so large, and it is stated that producers are not so insistent on advances for third quarter iron as they were several weeks ago. No open quotations for extended delivery have, however, been announced. There has been a moderate small lot movement in Virginia foundry grades, and prices of No. 2 X and No. 2 plain iron are generally quoted at \$13, furnace, for second quarter, the leading interest having receded from its position of holding for an advance of 50c. a ton for such delivery. The movement in forge iron has not been active, although some unclosed inquiries are reported. The supply of the better grades is limited and \$15, delivered, about represents the minimum for the best known brands, although \$14.75 could probably still be done for other makes. Basic iron is at a standstill and \$15.25, delivered, is a nominal quotation. Sales of low phosphorus iron have been confined to small lots at recent quotations. Meetings of the Eastern Pig Iron Association and the Virginia Pig Iron Association, held in this city last week, were not productive of any important details, both reported stocks showing a slight decrease. Shipments continue somewhat in excess of the current make and deliveries are being freely taken by consumers. The

following range of quotations represents the market for standard brands, delivered in buyers' yards in this district, in the second quarter:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.25
Basic.....	15.25 to 15.50
Standard low phosphorus.....	21.50 to 22.00

Ferromanganese.—While there has been no demand of importance from consumers in this district, prices are weak on sales in other markets and a nominal quotation of \$37 to \$37.25, Baltimore, is named by sellers for small lots for either prompt or forward shipment.

Billets.—Business is still confined to small, prompt lots, consumers being disinterested in supplies for extended delivery. Day to day orders are of sufficient size, however, to enable mills to maintain a fairly even productive rate. Quotations are unchanged, \$25.40 being named for open hearth rolling billets and \$30.40 for ordinary forging billets, delivered in this vicinity.

Plates.—A very good run of orders for business of a miscellaneous character is reported, but they are gradually decreasing in size and the aggregate volume coming to the mills has diminished; hence finishing departments are a little less actively engaged. Specifications for bridge work are coming out freely and some business for car work has been definitely placed, particularly one lot of some 2000 to 3000 tons for cars to be built by the Pennsylvania Railroad at its Altoona shops. While there is a fair volume of boat business ahead, it develops slowly. Prices are being fully maintained at the recent level, 1.55c. minimum for ordinary plates, delivered in this district.

Shapes.—Both mills and fabricators are figuring on a good amount of business, but no contracts of importance have been closed. The new Reading Hotel, Reading, Pa., is again under consideration, the original requirements having been considerably reduced. A sizable tonnage for car work, which has been under negotiation for the Pennsylvania Railroad, is said to have been definitely placed. Very low prices for fabricated work are still reported, but thus far have not affected plain shapes, which continue to be maintained at 1.55c. minimum, delivered in this vicinity.

Sheets.—There is a continued day to day demand, which in the aggregate is sufficient to enable mills to about maintain a regular output, but the situation is unfavorable from a mill standpoint, as there is little business ahead, consumers showing no interest in placing orders for extended delivery. Eastern mill quotations for prompt shipment are as follows: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Consumers of refined iron bars are placing business sparingly in view of possible price recessions. Small orders are being taken at the recent minimum, 1.37½c., delivered in this vicinity, although it is believed that on desirable specifications 1.35c. could be done. A moderate movement in steel bars is reported at 1.55c., delivered in this territory, being maintained.

Old Material.—The market continues quiet. Consumers show little interest in the situation and when offers are made they are usually below prices recently paid. The demand for heavy melting steel is light, and the bulk of the transactions have been between dealers. Mills take on occasional bargain lots but are pretty well supplied. Rejections owing to grade have, in at least in one instance, been particularly heavy, especially when shipments are against high priced orders, on which consumers insist on getting strictly prime material. Rolling mills have not been very active buyers. The market throughout has a rather weak appearance. The following range of prices, while to some extent nominal, about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.50 to \$13.75
Old steel rails, rerolling.....	14.50 to 15.00
Low phosphorus heavy melting steel scrap.....	17.75 to 18.25
Old steel axles.....	20.00 to 20.50
Old iron axles.....	25.00 to 26.00*
Old iron rails.....	17.50 to 18.00*
Old car wheels.....	13.25 to 13.75
No. 1 railroad wrought.....	16.00 to 16.50
Wrought iron pipe.....	13.50 to 14.00
No. 1 forge fire.....	11.75 to 12.25
No. 2 light iron.....	7.50 to 8.00*
Wrought turnings.....	9.00 to 9.50
Cast borings.....	8.25 to 8.75
Machinery cast.....	13.75 to 14.25
Railroad malleable.....	12.00 to 12.50
Gate bars.....	11.50 to 12.00
Stove plate.....	10.50 to 11.00

* Nominal.

Coke.—Spot coke appears to be accumulating and ef-

THE IRON AND METAL MARKETS

forts to move it are reported to have resulted in lower quotations, particularly for furnace coke. The demand for foundry coke is not urgent. The whole market, in fact, has an easier appearance. For the better grades prices are well maintained. Spot foundry coke is in instances quoted at \$2 per net ton, at oven, with forward coke at \$2.20 to \$2.40. Spot furnace coke has been reported sold at \$1.55, with forward deliveries quoted at \$1.70 to \$1.90, ovens. The following range per net ton represents the market for delivery in this territory:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke.....	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke.....	3.75 to 4.15

Cleveland

CLEVELAND, OHIO, April 11, 1911.

Iron Ore.—No meeting to consider ore prices has yet been held, but action may be taken any day. Representatives of the leading ore firms decline to express their individual opinions as to what will or should be done. Furnacemen generally feel, however, that there will be a reduction in prices of 25c. and possibly 50c. a ton. Dock shipments have improved somewhat. The total shipments from the docks in April were nearly 1,000,000 tons. No chartering of vessel tonnage for ore has been done as yet, and carrying rates have not been fixed, but it is expected that they will be the same as last year. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Inquiries are light. The only sale of any size reported is 1500 tons of No. 2 Southern to a Barberton Ohio, plant, for delivery through the second, third and fourth quarters, the buyer paying \$11, Birmingham, for the second quarter and \$11.25 for the last half. A Cleveland foundry that recently had an inquiry out for 1000 tons of Southern but deferred purchasing is again feeling the market on prices. Prices are firm at \$13.75 to \$14, Cleveland and Valley furnaces, for the second quarter, and \$14.25 to \$14.50 for the last half. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer.....	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.50
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—Little demand is coming out for foundry coke for the last half, and foundries generally are expected to defer placing contracts until June. There is some demand for small lots for spot shipment. No inquiry is reported for furnace grades. We quote standard Connellsville furnace coke at \$1.60 to \$1.65, per net ton, at oven, for spot shipment, and \$1.75 to \$2 for the last half. Connellsville foundry coke is held at \$2 for prompt shipment and \$2.25 to \$2.50 for the second half.

Finished Iron and Steel.—Some of the mill agencies report a slight improvement in orders, which fell off somewhat late in March. A fair volume of specifications is coming out, but new business is nearly all in very small lots. New inquiries are light. Another contract for a lake boat was placed this week, the Toledo Shipbuilding Company receiving an order from the Mackinac Transportation Company for a steel car ferry boat, to be built in time to be placed in commission next October. The builder is now negotiating for the steel required, namely, 2500 tons of plates and shapes. No inquiries for round lots of structural material have developed. The legal formalities in connection with the extensive grade crossing elimination planned by the Pennsylvania Railroad in Cleveland have been completed, and unless unforeseen obstacles arise bids will probably be advertised for early in June. The City Council has just authorized the elimination of a number of Nickel Plate grade crossings on the west side in Cleveland, and it is expected that this work will be started during the year. Several new building projects in the city have also developed during the past week, which, if carried out, will require considerable tonnage. Prices on steel bars, plates and shapes are firm at 1.40c., Pittsburgh. The demand for sheets is moderate, but prices seem to be quite well maintained. Rivets are weaker than they have been recently, and there is at present virtually an open market. Some business in boiler rivets is being taken at 1.80c., but a price of 1.75c., Pittsburgh, is being quoted by some of the mills, which is \$5 a ton lower than the regular price. Forging billets are moving fairly well in carload lots. There is a good inquiry for small lots of light rails. The demand for iron bars is moderate, with prices stationary at 1.30c. to 1.35c., at mill.

Old Material.—Practically nothing is doing in the scrap market. The continued inactivity has resulted in a weakening of prices. Quotations on several grades have been reduced about 50c. a ton. For heavy melting steel scrap local mills are declining to pay the present minimum quotation of \$12.75. Very little scrap is being offered at present. Dealers cannot afford to sell their stock at ruling prices, and to save themselves from losses will wait for a firmer market. The Michigan Central Railroad closed April 11 on its usual list. The Pennsylvania Railroad has a large list out, on which it will close April 13. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.50 to \$14.00
Old iron rails.....	16.00 to 16.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.75 to 13.00
Old car wheels.....	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.50 to 12.00
Railroad malleable.....	12.75 to 13.00
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 6.75
Iron and steel turnings and drillings.....	7.25 to 7.75
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	10.50 to 11.00
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	11.75 to 12.00
Stove plate.....	11.00 to 11.25
Bundled tin scrap.....	11.00 to 11.50

The Balkwill Pattern Company, 1444 East Forty-ninth street, Cleveland, Ohio, has changed its name to the Wellman Pattern Supply Company. This company will take over the business of the Cleveland Fillet Company, a closely allied corporation. The company is now operating a department for general machine work and will make a specialty of high grade screw machine products. Its other products include wood and metal patterns, wood turnings, white metal and brass pattern letters, wood and leather fillet, brass dowel pins and plates, wood dowel pins, foundry chaplets and patternmakers and foundry supplies.

Cincinnati

CINCINNATI, OHIO, April 12, 1911.—(By Telegraph.)

Pig Iron.—So far as activity is concerned, the market has eased back into the same old rut. Sales and inquiries have dwindled to a very limited number and both buyers and sellers are apathetic. Shipments on contracts continue to move freely, and, due to a curtailment in production in the Ironton district, there is said to be a steady decrease in the total of blast furnace stocks. An Illinois melter is asking for 500 tons of high silicon, to be delivered within the next three months, and there are a few inquiries for foundry iron from Michigan and Indiana that are still hanging fire. Basic and malleable are both dull. There is no confirmation of outside reports that Southern No. 2 foundry is being shaded here below \$11, Birmingham, for spot shipment, but it is admitted that several producers are quoting present prices on contracts running through the third quarter, and in a few instances throughout the entire year. Northern iron remains at \$14, Ironton, for shipment until July 1, but deliveries are also being extended, and no doubt third quarter contracts can be signed up at the price named. A small lot of Southern gray forge was sold last week to an Ohio manufacturer at \$10, Birmingham, for future delivery, but \$9.75 represents the prompt shipment quotation. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—The market for both furnace and foundry coke is dragging. Consumers are holding back on making contracts, following the same policy as that of several weeks ago. It is stated that there is considerable furnace coke in all three fields, that producers are anxious to get moved, and in some cases there is room for believing that prices have been shaded a few cents. This same condition applies to foundry grades, but for the regular standard market brands we quote 48-hour coke at \$1.55 to \$1.60 and 72-hour coke around \$2 per net ton at oven for prompt shipment,

THE IRON AND METAL MARKETS

with the usual premium of 15c. to 25c. per ton, asked on time contracts. These prices rule in all three districts.

Finished Material.—The past week was reported as being fairly satisfactory. The movement of plates and boiler tubes shows that boiler manufacturers are getting busier. Reinforcing concrete bars are also in demand. The mill price is 1.40c., Pittsburgh, and the local warehouse price will average about 1.30c.

Old Material. The market is very sluggish, and while yard stocks are not so heavy as they have been it is understood that dealers have a large amount of scrap bought that has not yet been shipped in. Prices are weak, and another cut is expected to take place soon. Prices for scrap at buyers' yards, Southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	12.75 to 13.25
Steel castings, net ton.....	12.75 to 13.25
No. 1 cast scrap, net ton.....	10.50 to 11.00
Burnt scrap, net ton.....	7.50 to 8.00
Old iron axles, net ton.....	16.50 to 17.00
Old iron shafts, gross ton.....	8.00 to 8.50
Old iron rails, gross ton.....	10.00 to 10.50
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old iron wheels, gross ton.....	12.50 to 13.00
Heavy melting steel scrap, gross ton.....	10.50 to 11.00

St. Louis

St. Louis, Mo., April 10, 1911.

While the demand for pig iron and coke is dull, encouraging indications of growth in business are offered by the steps being taken by some local steel and iron foundries to enlarge their plants, and the formation of new corporations identified with the steel and iron industry in and near St. Louis. Moderate purchases of finished material and tools are being made by the railroads. The demand for finished metals is satisfactory.

Pig Iron.—The demand for pig iron is very limited, probably not over 1500 tons having been sold the past week in the aggregate in this market. Inquiries, too, were few in number and small in tonnage. The leading sellers are not so much surprised with respect to small sales, in view of the activity of the past three months, as with the utter lack of interest in the market. Even merchant sellers complain of dullness, and this makes it more pronounced, in view of the fact they deal with foundries which buy little and often, and cover a wide range of territory. We continue our quotations for No. 2 Southern foundry at \$11, Birmingham, for shipment over the second and third quarters, and \$11.50 for fourth quarter; No. 2 Northern foundry, \$14, Iron-ton, Ohio, for shipment over the second quarter, and \$14.50 for last half delivery.

Coke.—One house reports inquiries for foundry coke aggregating 1600 tons, but the rest have had none of consequence during the past week. No sales beyond carload lots were mentioned. There is no change in prices.

Old Material.—The market is stagnant. An east side steel foundry is willing to take on considerable tonnage, but at prices that holders will not accept. With this exception there is no demand of consequence from consumers, and there is very little business passing between dealers. Considerable movement is going on in filling previous contracts. The following railroad offerings for the week were reported: Vandalia Line, 200 tons; Southern Railway, 200 tons; Kansas City Southern Railroad, 200 tons. The market is weaker and prices on a part of the list are lower. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, reolling.....	12.25 to 12.75
Old steel rails, less than 3 ft.....	11.00 to 11.50
Relaying rails, standard sections, sub- ject to inspection.....	23.00 to 23.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.00 to 11.50
Frogs, switches and guards, cut apart.....	11.00 to 11.50

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Railway springs.....	9.50 to 10.00
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' force.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	9.50 to 10.00
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
No. 1 cast scrap.....	11.00 to 11.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	7.50 to 8.00
Agricultural malleable.....	8.50 to 9.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	7.50 to 8.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00

Finished Iron and Steel.—The Missouri, Kansas & Texas Railroad is in the market for 100 miles of 55-lb. stand-

ard and rails, and another Western trunk line has an inquiry out involving about the same tonnage. There is also some inquiry from interurban electric lines. The demand for structural material is slow. For bars there is some inquiry from jobbers. The demand for track material is fairly active.

The State Supervisor of Statistics reports that Missouri's foundry and machine shop output increased from a value of \$14,692,000 in 1904 to \$22,023,000 in 1909, and the number of producing establishments from 256 to 331. In the same five years the capital invested grew from \$14,067,000 to \$23,046,000.

Birmingham

BIRMINGHAM, ALA., APRIL 10, 1911.

Pig Iron.—A lot of 1000 tons of No. 2 soft, for shipment commencing immediately and extending through the third quarter, was sold in this market the past week at \$11, Birmingham. Another lot of 1000 tons of No. 2 foundry for shipment over the last half brought the same price. With the exception of these transactions the buying was confined to small lots for prompt shipment, in which the \$11, Birmingham, basis was fully maintained. The current quotation for strictly last quarter deliveries is \$11.50, Birmingham, for No. 2 foundry. As is indicated above, certain of the producing interests would not refuse tonnage for the entire last half at \$11, but that price is not being quoted other than for the third quarter. Two of the producing concerns are disposed to sell only against such tonnage as is now actually on their furnace yards, while a third adheres strictly to \$11.50 for deliveries after July 1. The inquiry being received is of fair volume, but with the prospective buyers apparently disposed to await further developments. There has certainly been no inducement offered in the shape of a concession from the \$11 schedule, and as warrant yard holdings were increased during the month of March, rather than make concessions in order to move the surplus production, it hardly seems probable that a decline will be suffered. Reports for April 1 show a decrease in the aggregate stock in this State of only some 3000 tons. The total production for the month of March was considerably larger than for the month previous, however, and the month of April started with two more stacks in operation than were being operated March 1. The total of coke furnace operations in this State at present is 19 stacks, three of which are running on basic iron. It is not probable that the production will change this month, and there are reasons to anticipate a larger rate of consumption. Only two stacks in this district are now producing charcoal iron and the order books of such producers are understood to represent a larger tonnage when compared with the output than for a long time. The price for chilling grades of charcoal iron is firm, at \$22 to \$23, at furnace, for delivery during the remainder of the first half.

Cast Iron Pipe.—An aggregate of 2000 to 3000 tons of water pipe was placed with Southern manufacturers the past week. The tonnage reported consisted of comparatively small lots and the prices received were very satisfactory. It is announced that two contracts for 1000 tons of water pipe each will be placed the coming week, and an aggregate of some 5 miles of smaller sizes than 10-in. is now pending. The stock of "seconds" and other grades suitable for culvert and similar work has been practically depleted as a result of the buying by railroad interests and class A pipe in all sizes is very scarce. We quote water pipe firm at the following prices per net ton, f.o.b. cars here: 4 to 6 in., \$23; 8 to 12 in., \$22; over 12-in., average \$21, with \$1 per ton extra for gas pipe.

Old Material.—The available stock has been increased by the offerings of railroad companies and receipts from the rural districts. The demand from the consuming interests continues very light, but the tonnage involved in the shape of bargain transactions is fairly attractive. It is believed that dealers generally are making more effort to increase their holdings than for some months, which is within itself an encouraging feature in the market situation. By reason of the nature of recent transactions the status of prices cannot be determined with accuracy. We quote dealers' asking prices nominally as follows, per gross ton, f.o.b. cars here:

Old iron axles.....	\$14.00 to \$14.50
Old iron rails.....	12.50 to 13.00
Old steel axles.....	12.50 to 13.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.00 to 10.50
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

THE IRON AND METAL MARKETS

New York

NEW YORK, April 12, 1911.

Pig Iron.—While the pig iron market is uninteresting, and from the producer's standpoint quite unsatisfactory, a fair amount of business is done each week. About half the foundries have taken on some pig iron for the third quarter or second half, and comparatively little buying remains to be done for the second quarter. Some producers have maintained fairly well the higher price asked for the second half, but there is no uniformity in this regard and a number of buyers have been able to get iron for the third quarter at close to the figures asked for early delivery. A manufacturer of sanitary pipe is in the market for 5000 tons for a New Jersey plant and for 1500 to 3000 tons for a New York State plant. A New Jersey manufacturer of furnace castings has bought 1000 tons the last week and a boiler manufacturer is in the market for a like amount. In some cases Buffalo furnaces are basing quotations on Eastern delivery on a canal freight of \$1.25, while other furnaces are still quoting f.o.b. boat at Buffalo. The statistics of the Virginia and Eastern Pennsylvania furnaces show that stocks were reduced in March, while orders on hand April 1 were about the same as one month previous. We quote for tidewater delivery as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15.25 to \$15.50.

Finished Iron and Steel.—The steel bar, plate and structural mills are running at about the same capacity, between 60 and 70 per cent. Since the last of February there has been little change in any of these lines. Bar iron temporarily improved but later fell back to the former level and continues about the same. Steel bars have yet to hear anything very definite from the implement makers, and at present the mills are not receiving very satisfactory specifications. Plate contracts generally are not as large as usual at this season, and seldom go much beyond immediate demands. The same is true in orders for stock of structural material. The latter trade has some improvement in sight from the several new inquiries in the market, most of which, however, are for relatively small lots. Milliken Brothers, Inc., have the 3000 tons for the Trinity Corporation's printing building and will use Bethlehem shapes. The Phoenix Iron Company has 1000 tons for the Elizabethport shops of the Central Railroad of New Jersey; the Pennsylvania Steel Company, 500 tons for freight sheds at Harrisburg, Pa., for the Pennsylvania; the American Bridge Company, 600 tons for elevated structure reinforcing for the Interborough Rapid Transit Company, New York; 450 tons for the New England Telegraph & Telephone Company's building at Portland, Me., and 300 tons for the Merchants' Real Estate Trust building in Boston; Levering & Garrigues, 425 tons for the Turnbull Estate loft at Grand and Centre streets, New York; the McLintie-Marshall Construction Company, 360 tons for the Alexander Brothers store in Philadelphia; the Lackawanna Bridge Company, 200 tons for the Utica Central Fire station, Utica, N. Y., and the New England Structural Company, 130 tons for a small bridge for the Boston & Maine at Somerville, Mass. Bids have closed on the following, but no awards have been made: 500 tons for the A. T. Ordway building, Newark, N. J.; 1600 to 1700 tons of steel car center sills for the Chesapeake & Ohio; 500 tons for a steel and concrete bridge over the Central Railroad of New Jersey tracks for the Hudson County Boulevard Commission; 7500 to 8000 tons for the Insurance Exchange Building, 80 Maiden Lane, New York; 300 tons of bridge material for the Atlantic Coast Line; 150 tons for spans and extensions to the present trestle on the Boston & Albany over the Charles River near Cottage Farm; over 200 tons for two bridges for the New York Central, one at Watertown and the other at Oriskany, N. Y. Bids also closed last week on 1200 tons of boiler supports for the Lehigh Coal & Iron Company. Bids will close April 15 on 1000 tons for the Reither Building, Waterbury, Conn. Other inquiries in the market are for 4000 tons for the 14-story Pennsylvania Hotel, Pittsburgh, Pa.; 200 tons for a three-track highway bridge for the Erie; 200 tons for foundation grillage of 18 and 24 in. beams for the barge office and two bridges for the Boston & Maine, one of 75 tons at Thayer, Mass., and one of 60 tons at St. Johnsbury, Vt. Prices are firm and without change: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Store prices for plates and plain material, New York, are 1.85c. to 1.95c.

Ferroalloys.—Very little interest is being shown in ferrosilicon, and the market is about \$53 to \$54, Pittsburgh. Outside of one large inquiry from the Pittsburgh district, the ferromanganese demand is light. Buyers seem to run along the line of very cheap prices. The usual quotation in New York is \$37.50 to \$38, seaboard.

Cast Iron Pipe.—John Fox & Co. were the lowest bidders for the 1025 tons of pipe and 155 tons of special castings for which bids were opened by the New York Department of Water Supply, Gas and Electricity April 5. The bid on the pipe was \$21.85 per ton; on special castings, \$43, and on valve boxes, \$40. The most important public lettings now in sight are those of New Bedford, Mass., for 3370 tons; Attleboro, Mass., 1500 tons; Fulton, N. Y., 370 tons, and Bloomfield, N. J., 100 tons, on all of which bids will be opened April 17. Public lettings are much below the average for the season, but private buying is about normal. Pipe manufacturers in this part of the country are apparently facing a scarcity of the grades of pig iron which they favor. The number of Eastern blast furnaces in operation has been greatly reduced, and the Southern supply of low grades is light. One of the buildings of the Camden Iron Works of R. D. Wood & Co., at Camden, N. J., was burned last week, with a loss of \$15,000. Prices on carload lots of 6-in. continue to range from \$21 to \$22 per net ton, tidewater.

Steel Rails.—The Harriman rail order was about the expected amount, so far as the Steel Corporation mills are concerned—a total of 39,225 tons, of which 21,225 tons of Bessemer rails will be rolled by the Illinois Steel Company and 18,000 tons of open hearth rails by the Tennessee Company. In addition, the Colorado Fuel & Iron Company was given an order for about 33,000 tons, making a total of 72,000. It is expected that the Harriman lines will make further purchases later in the year. Other rail buying in the past week has been relatively small. The Seaboard Air Line is understood to have placed an order with the Maryland Steel Company. Its original inquiry was for 7000 to 12,000 tons. The Richmond, Frederick & Potomac has bought 1000 tons from the Maryland Steel Company and the Boston Elevated 600 tons of Bessemer rails from the Pennsylvania Steel Company. The Boston Elevated has ordered 1200 tons of open hearth rails from the Bethlehem Steel Company. The Brooklyn Rapid Transit has ordered 2000 tons. In the past week the Illinois Steel Company has booked 3300 tons, of which 2500 tons were for an Illinois line. The Tennessee Company booked 735 tons for the Galveston, Houston & Henderson, and 700 tons in scattering orders.

Old Material.—The most interesting local transaction of the week was the sale of a lot of 500 tons of old horse-shoes. It seldom happens in these days that such a quantity of this class of old material is offered for sale and it represents a long accumulation. It was moved at about \$12.50 per ton, New York. Transactions in other classes of old material have been quite light. Small quantities of heavy melting steel scrap have been bought by dealers who still have contracts to fill, but consumers are making new purchases sparingly, doing so only when choice material is offered at attractive prices. Rejections continue to be made for comparatively unimportant reasons, thus forcing dealers to accept lower than contract prices. The general situation is thus very unsatisfactory. All grades of foundry scrap are in exceedingly light demand. Rolling mills are almost completely out of the market. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	\$10.50 to \$11.00
Heavy melting steel scrap	10.50 to 11.00
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track scrap	12.50 to 13.00
No. 1 yard wrought, long	12.00 to 12.50
No. 1 yard wrought, short	10.50 to 11.00
Light iron	5.00 to 5.50
Cast borings	5.50 to 6.00
Wrought turnings	6.00 to 6.50
Wrought pipe	10.50 to 11.00
Old car wheels	11.50 to 12.00
No. 1 heavy cast, broken up	11.50 to 12.00
Stove plate	9.00 to 9.50
Locomotive grate bars	9.50 to 10.00
Malleable cast	10.50 to 11.00

Buffalo

BUFFALO, N. Y., April 11, 1911.

Pig Iron.—Inquiry has been extremely light the past week and sales were correspondingly slow. Such inquiries as have been received were largely for third quarter and last half delivery, and principally from stove, agricultural implement and pipe makers. There has been some little buying in malleable, aggregating about 3000 tons, for second quarter delivery. A little inquiry for basic has been received from Canada; also for one small lot for export from the Atlantic Coast. Shipments on contracts are being specified in fairly good volume. Prices are unchanged, as follows, for first half delivery, f.o.b. Buffalo:

THE IRON AND METAL MARKETS

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	11.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 3 foundry.....	13.50 to 13.75
Gray forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Bessemer.....	14.25 to 15.00
Charcoal.....	16.75 to 17.50

Finished Iron and Steel.—Most sales agencies report current specifications on contracts and mill bookings keeping up well, although one or two state that the week has shown a slight falling off in new business. One of the leading interests reports a good sized contract for steel bars, also further activity in the demand for track materials from both traction and steam lines in Canada. Continued activity is also noted in fabricated structural lines, most of the local shops being pretty well supplied with work, made up principally of small orders. The Eastman Kodak Company, Rochester, is calling for preliminary estimates for another building to be added to its plant requiring 275 tons. Figures will soon be asked for an extensive addition to the Hamot Hospital, Erie, Pa., and for a nurses' home for the same institution, requiring a considerable tonnage. The contract for steel for the Fire Proof Film Company's factory building at Rochester, about 200 tons, was taken by the F. L. Hughes Company of that city.

Old Material.—The market continues very dull, with no new buying, and very moderate deliveries on contracts, owing to present contracts being completed in the majority of instances. In consequence of these conditions prices show a marked falling off. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.00 to \$12.50
Low phosphorus steel.....	16.25 to 17.00
No. 1 railroad wrought.....	15.00 to 15.25
No. 1 railroad and machinery cast scrap..	14.25 to 14.50
Old steel axles.....	19.50 to 20.50
Old iron axles.....	23.00 to 24.00
Old car wheels.....	13.75 to 14.25
Railroad malleable.....	13.50 to 13.75
Boiler plate.....	10.50 to 10.75
Locomotive grate bars.....	10.75 to 11.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings..	6.50 to 7.00
Clean cast borings.....	6.00 to 6.25

Metal Market

NEW YORK, April 12, 1911.

THE WEEK'S PRICES

Copper, New York.		Tin.		Lead.		Spelter.	
April	Lake.	Electro-lytic.	New York.	New York.	St. Louis.	New York.	St. Louis.
6.....	12.45	12.22	(41.45)	4.45	4.30	5.55	5.35
			(41.50)				
7.....	12.45	12.22	42.45	4.45	4.30	5.55	5.35
8.....	12.43	12.20	42.45	4.45	4.30	5.53	5.32
10.....	12.40	12.15	42.25	4.45	4.30	5.50	5.30
11.....	12.37½	12.12½	41.75	4.45	4.30	5.50	5.30
12.....	12.37½	12.12½	42.25	4.45	4.30	5.50	5.30

For the first time in over six months pig tin sold this week below the cost of importation. Copper has declined ¼c. Lead is dull but firm. Spelter has a downward tendency. Antimony is cheaper.

Copper.—The Copper Producers' statistics showing the March production to have been the largest on record has had a depressing effect on the market, although the large deliveries recorded offset this sufficiently to prevent a sharp reduction. The price has gradually receded until both lake and electrolytic are ¼c. cheaper than a week ago. Sales have been good but not large. Inquiries are heavy, but the tone adopted by those asking for quotations indicates that they are looking for cheap copper. Most of the consumers are asking for electrolytic at 12c., and if it gets down to that price it seems likely that a heavy buying movement will ensue. One large selling interest has made offers of lake at 12.40c., delivered in the Naugatuck Valley, 30 days cash, which would bring the spot price in New York under 12.30c. Invariably the asking price for lake, however, is 12.37½c., while electrolytic can be had at 12.12½c. The market in copper wire is moving directly opposite to the general copper market, and bare copper wire has been advanced to 13.75c. per pound. Recently there was some heavy price cutting in copper wire, and large sales were made at 13c. or under. In London to-day the market closed steady, with spot selling at £53 12s. 6d. and futures £54 5s. The sales amounted to 600 tons of spot and 400 tons of futures.

Pig Tin.—A fair business was done in pig tin last Thursday afternoon and again on Friday, but buyers were frightened off on the second day by a sharp advance in the London market, which resulted in a 1c. raise in the price here. The advance, it is said, was caused by heavy buying on the part of agents for the London syndicate. This show of strength on their part is a clear demonstration that the syndicate continues to hold the whip hand. The arrival of the steamer Mesaba with 1025 tons on Monday relieved the

situation here, and yesterday for the first time in more than six months pig tin was sold in New York below the cost of importation. It is now ½c. under the corresponding London price. This is only because consumers seem to have filled their wants and there are some anxious sellers. The Mesaba cargo must carry this country for two weeks, as fully that time will elapse before the next steamer arrives, which will bring 1000 tons. Many April contracts will have to be liquidated with the Mesaba tin, and it is improbable that this market will remain under the London market for many days. In New York to-day pig tin was sold for 42.25c. The London market closed firm, with spot tin selling at £194 and futures £189. The sales amounted to 270 tons of spot and 220 tons of futures.

Tin Plates.—Tin plates are quieter, new inquiries being less plentiful. Quotations are unchanged at \$3.94 for 100-lb. coke plates.

Lead.—Lead is dull, but firm. The buying is confined to small lots, but inquiries are good. The American Smelting & Refining Company continues to quote 4.50c., so that outside sellers are in control of the situation as they are taking 4.45c. The St. Louis market is steady at 4.30c.

Spelter.—Spelter is easier, with a declining tendency. Consumers are moving cautiously, buying from hand to mouth. Their indifference has induced a number of large sellers to make concessions, as there are some important inquiries out, and intimation has been given that a good reduction in spelter prices would bring about some buying. As the matter stands now, the sellers are reducing quotations a few points at a time and offering slight concessions in order to induce business actually in sight, and the buyers take this as an indication that any heavy purchasing would bring about an advance again. This market is relatively higher than the St. Louis market, because of the absence of spot spelter in New York. In St. Louis plenty of spelter can be bought for 5.30c., while the price of spot here is 5.50c. As the result of the reduction of spelter quotations the manufacturers of sheet zinc have reduced their quotations ¼c. lb.

Antimony.—The United States Government is inquiring for 30,674 lb. of antimony, Cookson's or equal, bids to be opened at the Frankford Arsenal, Philadelphia, April 14, but outside of this business there is little in sight to encourage the dealers who are loaded with stocks. The market has weakened slightly, and Cookson's is now 9.50c.; Hallett's, 9c., and Chinese and Hungarian grades, 8.40c. The latter brands can be had at 10 points less than the spot price for May delivery, but no reduction is made on quotations for Cookson's and Hallett's for future delivery.

Old Metals.—Profound dullness prevails. Dealers' selling quotations are nominally unchanged as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	8.75 to 9.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, St. Louis, April 10.—The market on lead is quiet and unchanged at 4.30c. to 4.32½c.; spelter is lower at 5.27½c. to 5.32c., both at East St. Louis. Zinc ore is lower, owing to a heavy surplus, and a general shut-down is being mooted; we quote \$35 to \$38 per ton, Joplin base. Tin is higher, quoted at 43.10c.; antimony (Cookson's), 9.85c.; lake copper, 12.85c.; electrolytic, 12.60c., all at St. Louis. The demand for finished metals for the past week was from commercial sources and proved to be a good average.

Metals, Chicago, April 11.—Buying of copper continues on a fair basis, with prices unchanged, but on the whole the market is disappointing. Pig tin is somewhat higher, due rather to speculative influences than any increase in sales. Sheet zinc is ¼c. per pound lower, and is now quoted at \$7.50 per cask, f.o.b. La Salle. The market for old metals is still heavy, but with prices practically unchanged. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12½c.; in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 43c.; small lots, 45c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.40c. to 5.45c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 32c.; block tin pipe, 35c.

Iron and Industrial Stocks

NEW YORK, April 12, 1911.

Another exceedingly dull week has been experienced in stocks, waiting for the decision of the United States Supreme Court in the Standard Oil and American Tobacco cases. Fluctuations in prices were not important, except in the cases of Steel Foundries, in which a sharp decline occurred, and Can preferred and General Electric, in which there was a pronounced upward movement. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..... 8	Pressed St., com... 32½- 33
Allis-Chalm., pref.. 30½- 30½	Pressed St., pref.. 98½- 98½
Beth. Steel, com... 32½- 34½	Railway Spr., com. 32 - 33½
Beth. Steel, pref.. 62½- 64½	Railway Spr., pref. 99 - 100
Can, com..... 9½- 10½	Republic, com.... 32½- 34
Can, pref..... 80½- 84½	Sloss, com..... 52 - 52½
Car & Fdry, com... 52 - 53½	Pipe, pref..... 56½- 57
Car & Fdry, pref.. 115½- 115½	U. S. Steel, com... 76½- 78½
Steel Foundries... 39½- 46½	U. S. Steel, pref.. 118½- 119½
Colorado Fuel... 30½- 32½	Westinghouse Elec. 66 - 67
General Electric... 148½- 152½	Va. I. C. & C..... 60
Gr. N. ore cert... 61¼- 62¾	Am. Ship, com.... 73
Int. Harv., com... 117 - 118½	Chl. Pneu. Tool... 51½- 53½
Int. Harv., pref.. 123½- 124½	Cambria Steel.... 45 - 47½
Int. Pump, com... 39½- 40	Lake Sup. Corp... 28½- 29½
Int. Pump, pref..... 89	Warwick..... 11
Locomotive, com... 37 - 37½	Crucible St., com. 12½- 13
Locomotive, pref.. 104½- 107	Crucible St., pref.. 79 - 79½

Dividends.—The Harbison Walker Refractories Company has declared the regular quarterly dividend of 1½ per cent. on its preferred stock, payable April 20.

The Chicago Pneumatic Tool Company has declared the regular quarterly dividend of 1 per cent., payable April 25.

The Rhode Island Perkins Horseshoe Company has declared the regular quarterly dividend of 1 per cent. on its preferred stock, payable April 15.

The Pittsburgh Coal Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable April 25.

The Standard Underground Cable Company, Pittsburgh, has declared a quarterly dividend of 3 per cent.

Notes on Prices

Rope.—A slight improvement in demand is noticed. Prices on manila and the lower grades of sisal rope are somewhat irregular. The following quotations represent general prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per pound; second grade manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—The market continues dull. Domestic ray is quoted in carloads from 87 to 88 cents per gallon, according to the seller. Foreign oil for immediate delivery is quoted at about 4 cents less per gallon. One reason given for the indifference manifested by manufacturing consumers is that such oils as fish and cotton seed oil, among others, which are known as nondrying oils, can by the discovery of processes of treating them be used successfully in replacing linseed oil. The following are New York prices in 5-barrel lots or more:

State, raw.....	Cents. 91
City, raw.....	91
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—There has been a readjustment in prices of turpentine at Savannah, where receipts of the new crop are heavier. Prices have declined in New York and a further reduction is expected. Buying, as usual on a falling market, has been restricted to immediate requirements. New York turpentine quotations in 5-barrel lots are as follows:

In oil barrels.....	Cents. 93½
In machine barrels.....	94
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins are lower in sympathy with the reduction at Southern points, which, however, has not increased demand in New York. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$8.15 and grade D at \$8.30 in the New York market.

The writer of the communication on "Reciprocity" will please send his name to the editor of *The Iron Age*. It will be kept in confidence, but under our rule the communication cannot be printed unless we have the name of the author.

Frank Samuel, Philadelphia, Pa., was the highest bidder for the blast furnace plant of the Union Iron & Steel

Company, Big Stone Gap, Va., at the receiver's sale April 6. If the sale is confirmed by the court the buyer will dismantle the plant.

Revised bids were taken Wednesday on about 2500 tons of steel for the new buildings of the Gary Screw & Bolt Company, Gary, Ind. This company has adopted steel for one or two large buildings which it had originally intended to build of concrete. The amount of steel to be used in the plant will therefore be much larger than called for in the original plans.

The Standard Gauge Steel Company, Beaver Falls, Pa., manufacturer of crank shafts, connecting rods, machine keys, machine racks and other finished steel specialties, has opened a branch office in the Old Colony Building, Chicago, in charge of John Gillen, and a branch office in the Pennsylvania Building, Philadelphia, in charge of W. A. Mellon.

Arthur R. Cruse, who severed his connection with the Cruse-Kemper Company on October 1, 1910, announces that he has established the Cruse Engineering Company, 1420 Chestnut street, Philadelphia. He will give attention to designing and contracting in gas holders, shell and tank work and general plate metal work; also structural steel for all uses.

Secretary of the Navy Meyer has retained H. L. Gantt, Harrington Emerson and Charles Day, experts in scientific management, to visit the principal Eastern navy yards, with a view to improving the methods in the manufacturing and repair shops. Some steps along these lines have already been taken, but it is found advisable to instruct the officers at the yards in the details.

The Charles Greiner Company, manufacturer of high speed elastic-blow riveting and spinning machines, wire straightening and cutting and special forming machines, New Haven, Conn., suffered the loss of its entire plant by fire April 8. It is arranging to resume operations speedily and believes that it will be able to do so within a week or two.

A creditors' committee has been appointed to take charge of the affairs of George W. Jackson, Inc., Chicago, to avoid bankruptcy proceedings if possible. The assets are estimated at \$5,500,000 and the liabilities at \$5,000,000. The cause of the company's financial difficulties is insufficient working capital.

The Flannery Bolt Company, Bridgeville, Pa., has placed an order with the Nazel Engineering & Machine Works, through its Pittsburgh representative, J. A. Smitmans, for two 770-lb. Beche pneumatic forge hammers, to be driven individually by 35-hp. Crocker-Wheeler motors.

The Ohio Iron & Steel Company, which has been considering the blowing in of its Mary Furnace, at Lowellville, Ohio, has decided to allow the stack to remain out of blast, owing to the unsatisfactory condition of the pig iron trade.

John E. Williams has been appointed receiver for the Scott Iron & Steel Company, Carnegie, Pa. The assets of the concern are given as \$300,000, with current liabilities of \$100,000 and bonded debts of \$150,000.

The National Iron & Steel Company, 330 Chronicle Building, Houston, Texas, is distributing a photographic view of that portion of its old material yards showing the large quantity of relaying steel rails which it carries in stock.

The plant of the Hollidaysburg Iron & Nail Company, at Hollidaysburg, Pa., was sold March 11 to Gustave Benjamin, Buffalo, N. Y. The works are to be improved and enlarged and operations are to be resumed shortly.

New Tools and Appliances

This is essentially a news department for which information is invited.

A Variable Speed Countershaft for Ceilings.—The G. A. Gray Company, Cincinnati, Ohio, has brought out a new variable speed countershaft which gives four different cutting speeds with a constant high return speed. The essential part of the drive is two inversely placed cones, one mounted on the constant speed shaft carrying the return pulley, and the other on the variable speed shaft which carries the cutting pulley. The line shaft drives the constant speed shaft through a pair of tight and loose pulleys, and this shaft in turn drives the variable speed shaft through an endless belt. In changing speeds it is necessary to pull two cords. The first of these raises the swinging idler with which the countershaft is provided and slackens the belt, while the next movement increases or decreases the speed. The weight of the swinging idler keeps the endless belt under the required driving tension, and the momentum of the two cone pulleys supplementing that of the heavy flywheel pulley reduces the strain on the line shaft belt when the speed is reversed.

Engine and Turret Lathe Chucking Mechanism.—A novel chucking mechanism for use wherever work has to be chucked in reasonably large quantities in either the rough or the partly finished state has been developed by Adolph Muehlmann, Cincinnati, Ohio. It can also be employed for handling castings and forgings or pieces cut from the bar and in use the work is placed in the chuck, gripped and machined and afterward removed without stopping the spindle. Cast iron split chucks hold the work and are actuated by a closing tube in the interior of the spindle, the tube itself deriving its movement from a lever conveniently located at the front or the rear end of the head, according to the type of machine to which the apparatus is applied. These chucks can be employed for either external or internal gripping and in both cases are operated through three rocker fingers, with wedge-shaped heels that act like a set of toggles against an adjustable collar at the rear end of the chucking tube. The operating fingers themselves are actuated by a sliding ring enveloping the rear end of the apparatus and provided with a helical cam slot which gives it an endwise movement when it is rotated upon its bearing shell. This ring is operated by a toothed sector that receives its motion from the operating handle. When this handle is pulled forward the chuck is closed upon the work and pushing it to the rear releases the piece after machining. When the chuck is gripped tight on the work the thrust of the closing tube is straight against the square ends of the chuck locking fingers, and the latter are locked in position and relieved of any tendency to open and put excessive friction upon the operating sleeve and other parts.

A 5-In. Self-Contained Motor Driven Cutting-Off Machine.—The Hurlbut-Rogers Machine Company, South Sudbury, Mass., has placed on the market a motor driven cutting-off and centering machine of the accelerated speed type. A short shaft under the main spindle, having a sliding gear at one end which meshes with one of the driving gears of the machine and a pulley that is belt connected to the shaft on top of the standards, drives the centering attachment which is mounted on a sliding base and pushes back out of the way when not in use. The spindle of this attachment is hollow and the work end has a standard taper fit with a chuck for holding drills and countersinks. A constant speed motor of any standard type can be used to drive the machine by having its armature shaft extended sufficiently to mount a pulley at each end for the belts running to the side pulleys of the machine.

Circular Milling Attachment.—The Hendey Machine Company, Torrington, Conn., has developed a new circular milling attachment, which is applicable to the maker's No. 2 or No. 4 machine. The attachment consists of a

bracket carrying a universal shaft and driving a horizontal shaft for moving the table through a worm and worm wheel. The circular table worm shaft is driven from this horizontal shaft through bevel gearing, and the drive in either direction is controlled by a lever which also has a neutral position for use in turning the table by hand. The diameter of the table, which is provided with four T-slots, is 20 in. It is also graduated in degrees and has an additional T-slot for the trip dog, which can be set to stop the table at any point with the feed in either direction. The regular feed box of the machine is used and 21 circular feeds may be obtained. The attachment can be easily removed in a few minutes when not in use.

A Quick Return Boring Machine Feed.—A quick return for the cutter bar of its horizontal boring machine has been developed by the Cleveland Machine Tool Works, Cleveland, Ohio. This rapid rate of return is secured by pulling out the knob in the center of the feeding head and operating the capstan by hand. The clutch used also differs from those ordinarily employed, as the teeth are beveled to an angle just below the slipping point. This makes it a simple matter to engage or disengage the clutch, while at the same time it is not apt to unlock itself.

Double Action Drawing Press.—For deep sheet metal shells, such as automobile gas tanks, rapid fire cartridge shells, phonograph horns, deep and narrow seamless buckets and other work where the depth is great as compared with the diameter and the metal from which the shells are drawn is of light or medium weight, the Ferracute Machine Company, Bridgeton, N. J., has recently placed on the market a line of six double action drawing presses. The frame is of the straight line type and is cast solid and the columns are set close together to secure a minimum of spring when doing heavy work. Cams bearing on steel rollers running in bronze boxes drive down the outer ram, the cam shape being of the proper form to produce a dwell, while the plunger which has a crank motion derived from an eccentric in the middle of the cam shaft descends to the bottom of the stroke. The press has double gears and to equalize the torsional stress there are twin gears on the cam shaft. A spring bolster is furnished for the bed of the press by which certain portions of the bolster can be sprung up with wedge bolts, thus obviating the use of paper or sheet metal for blocking dies that do not draw evenly. The press is controlled by a friction clutch of large diameter, which enables the operator to start or stop the press at any portion of its stroke. The largest press of the six has a ram stroke of 10 in. and a plunger stroke of twice that length. The overall height of the machine is 160 in., and the total weight, approximately, 21,000 lb.

New Rockford Miller.—A new milling machine which can be used for both vertical and horizontal milling and slotting is being built by the Rockford Milling Machine Company, Rockford, Ill. The vertical milling and the slotting attachments are driven by a sleeve or quill connected to the main spindle by spur gearing. Both of these attachments have large bases which are bolted to the column and when the machine is to be used for regular milling work the quill can be removed quickly and replaced by the overhanging arm. Sixteen spindle speed changes are available through a four-step cone pulley and double back gears, and 14 feed changes ranging from 0.005 to 0.21 in. per revolution of the spindle can also be secured. Handles located on the side of the column provide seven variations through a tumbler gear mechanism and the back gears double this number. The maximum longitudinal feed for the table is 24 in., the traverse travel is 7½ in. and the vertical movement below the center is 19 in.

Grinding and Polishing Machines.—The Webster & Perks Tool Company, Springfield, Ohio, has recently brought out a number of new tools and is completing its line of grinding and polishing machinery from the very smallest bench to the largest floor sizes. The new machines are now practically ready for the market and catalogues and other literature descriptive of them are in preparation.

Obituary

HENRY CRIBBEN

Henry Cribben, Chicago, for many years one of the most prominent men in the stove trade, died April 6, aged 77 years. He was born on the Isle of Man, and was brought to this country when a child, his parents locating at Rochester, N. Y., but both died when he was nine years old. Living with friends, he attended school until he was 16 years old, when he entered the foundry of Row, Bennett & Co., Rochester, and learned the trade of molder. At the breaking out of the Civil War he enlisted in the army, serving until discharged in 1865. Returning to Rochester he organized the Co-operative Foundry Company, for the manufacture of stoves, and became its manager, later opening a branch in Chicago. Purchasing the Chicago business from the company he started the firm of Cribben & Sexton. This firm developed a very large stove manufacturing business, and incorporated as the Cribben & Sexton Company, the presidency of which he held up to his decease. Mr. Cribben was deeply interested in organization movements for the promotion of the stove business. For 10 years he was president of the Stove Founders' National Defense Association, and also served for a term as president of the National Association of Stove Manufacturers. He leaves a widow, a daughter and two sons, William H. and Edward W. Cribben.

A tribute to Mr. Cribben was paid in shutting down the Pittston Stove Works, Pittston, Pa., by the present president, George Mitchell, of the Stove Founders' National Defense Association, on Monday afternoon, at the time of the funeral in Chicago. President Mitchell made an address covering the beneficent influence Mr. Cribben had exerted in the interest of the stove founder and stove molder.

TOM L. JOHNSON, who was Mayor of Cleveland, Ohio, from 1901 to 1909, died in that city April 10, aged 56 years. He had been a national figure for 10 years, chiefly by reason of his persistent campaign for 3-cent street railroad fares in Cleveland. In 1888, as a free trader and an advocate of Henry George's single tax, he ran for Congress in the Cleveland district and was defeated. In 1890 he was elected, and two years later he was re-elected by a large plurality in a Republican district. His first employment as a young man was with a street railroad company at Louisville, Ky. He later acquired an interest in an Indianapolis street railroad and at 22 years of age had a controlling interest in its stock. With his brother, Albert L. Johnson, he acquired interests in various street railroad systems, their largest operations being in Cleveland and in Brooklyn, N. Y. With A. J. Moxham he established the Johnson Company at Johnstown, Pa., in 1888, building a mill for rolling girder rails manufactured under patents of the company. The mills were removed to Lorain, Ohio, in 1895 and the Lorain Steel Company was organized, which later built blast furnaces in connection with the Bessemer steel plant at Lorain. Mr. Johnson was vice-president of the Johnson Company and of the Lorain Steel Company. The latter company was absorbed by the Federal Steel Company.

The Carnegie Steel Company has leased the fifth and sixth floors of the Frick Building, Pittsburgh, containing about 50 offices, and will connect the Carnegie Building, all of which it occupies, with the Frick Building by two bridges across Relief alley, which separates these two structures. Most of the former tenants on the fifth and sixth floors of the Frick Building have been transferred to other offices in the same building.

The Bessemer Gas Engine Company, Grove City, Pa., has received a contract from the Honolulu Consolidated Oil Company of California for eight 80-hp. gas engine driven compressors, together with lighting and pumping plant for the Pacific Coast Works. The same concern has recently received other heavy orders for its Bessemer gas engines and is running its shops practically full time.

Personal

Reuben Hill has been made factory manager of the Detroit Lubricator Company, Detroit, Mich.

R. W. Anderson, superintendent of the open hearth department of the Colorado Fuel & Iron Company, Pueblo, Colo., has resigned to take the position of superintendent of the open hearth department of the Pittsburgh Steel Company, Monessen, Pa., May 1.

C. A. Haney, president of the Sloan & Chace Mfg. Company, Newark, N. J., has returned from a trip to Cuba.

Henry J. Gosiger has severed his connection with the Eureka Foundry Company, and has entered the pig iron and coke business, having offices in the Gerke Building, Cincinnati.

George M. Houston has severed his connection with the Houston, Stanwood & Gamble Company, boiler and engine builder, Covington, Ky., to accept a position with the Root & Vandervort Engine Company, Moline, Ill.

C. H. Pearson, formerly with the Noera Mfg. Company, Waterbury, Conn., has accepted a position in the hoist department of the Yale & Towne Mfg. Company. His field of operations will be in the West.

W. L. Louis has been appointed traffic manager of the Elgin, Joliet & Eastern Railway Company, Chicago, succeeding F. E. Learned, who has resigned to engage in other business.

John G. Wright, New York manager for the Hooven-Owens-Rentschler Company, manufacturer of Corliss engines, Hamilton, Ohio, is on a business trip to Porto Rico.

W. H. Tew has acquired an interest in the Carpenter-Kerlin Gear & Machine Company, 77 White street, New York.

At a meeting of stockholders of the Riverside Bridge Company, Martins Ferry, Ohio, Albert Whitaker was elected a director to fill the vacancy caused by the death of his father, and Alexander Glass was elected to succeed Harrison Hibbis. The directors who were re-elected are O. R. Wood, F. J. Park, Henry Schmulbach and J. B. Summerville.

W. McLain of the sales department of the Cambria Steel Company, Oliver Building, Pittsburgh, Pa., has returned from a five weeks' trip to California.

W. L. Rodgers, president of the Pittsburgh Gage & Supply Company, Pittsburgh, and who last week was elected president of the National Supply and Machinery Dealers' Association, has gone to Bermuda.

M. H. March, formerly in charge of pig iron and coke sales for Frank Samuel, is now associated with J. K. Dimmick & Co., Philadelphia, Pa., in charge of pig iron sales.

Carlisle Mason, vice-president and general manager of the Nelson Valve Company, Wyndmoor, Pa., returned April 6, from an extended business trip abroad.

Howard Warner, who has for several years been connected with the office of Frank Samuel, Philadelphia, Pa., has been placed in charge of the pig iron and coke sales, succeeding H. S. March, resigned.

James Taylor has resigned as manager of the Belting & Machinery Company, Rochester, N. Y., to become sales manager for Charles M. Ghiskey's Sons, 508 Commerce street, Philadelphia, importers and jobbers of hardware and supplies.

D. P. Chase, superintendent of the New York Car Wheel Company, Buffalo, N. Y., has resigned his position with that company to accept the appointment of secretary with the Albany Car Wheel Company, resident in Albany, N. Y.

The J. W. Paxson Company, Philadelphia, Pa., announces that it is now ready to ship all grades of Albany and Lumberton molding sand, core sands, clay, &c., direct from the banks, opening the 1911 season, or can ship seasoned sands from its store sheds, in almost any desired quantity.

Recent Immigration

Its Significant Aspects to the Iron and Steel Industry

BY W. J. LAUCK.

One of the most interesting results of the remarkable expansion of the American iron and steel industry has been the constantly increasing demand for labor to operate the new blast furnaces and steel mills. An indication of the steady increase in the operating forces may be realized from the fact that the average number of iron and steel workers in the United States in 1880 was only 140,798, as compared with 171,181 in 1890 and 242,740 in 1905. The original employees of the industry were native Americans or representatives of immigrant races from Great Britain and northern Europe. A development similar to that in the iron and steel industry, however, was characteristic of the other basic industries of the country in the period under discussion, and with the general and constantly increasing demand for iron and steel workers, the original sources of labor supply were found inadequate. Recourse was therefore had by manufacturers to the immigrant labor supply from southern and eastern Europe, and the members of immigrant races from this geographical area soon found employment in considerable numbers in the furnaces and steel mills.

After 1895 the immigration of English, Irish, Scotch and German laborers practically ceased, and during the past 15 years the additional labor forces required by the iron and steel industry have been principally recruited from recent immigrant races. At the present time 57 per cent. of the entire operating force of the blast furnaces and steel mills is of foreign birth, principally English, Irish, Welsh, German, and such races of southern and eastern Europe as Croatian, north and south Italian, Lithuanian, Magyar, Polish, Russian, Roumanian, Servian, and Slovak. The recent immigrants preponderate among the foreign born employees.

The extensive employment of such large numbers of immigrant workmen of many races was obviously followed by many important results, both from the standpoint of the industry itself, its processes and method of organization, and from the point of view also of the original operating forces. Before these results may be fully realized, however, it is necessary to review briefly the personal and industrial characteristics of the southern and eastern Europeans, who were employed in such large numbers.

Characteristics of Southern and Eastern Europeans

From a strictly industrial standpoint, one of the facts of greatest import relative to the new arrivals has been that an exceedingly small proportion have had any training or experience while abroad for the occupations in which they have found employment in iron and steel plants in this country. The bulk of recent immigration has been drawn from the agricultural classes. In this respect they afford a striking contrast to the steel workers of past years from Great Britain and northern Europe, who were usually skilled industrial workers before coming to the United States and who sought positions in this country similar to those which they had occupied abroad.

In addition to lack of industrial training and experience, the new immigrant labor supply has been found to possess but small resources from which to develop industrial efficiency and advancement. The southern and eastern Europeans have, as a rule, given evidence of industry and energy, but, unlike the races of older immigration, they have been unable to use the English language, and a large proportion have been illiterate.

The standards of living of the iron and steel workers from the south and east of Europe have also been low. The recent immigrant males being usually single, or, if married, having left their wives abroad, have been able to adopt in large measure a group instead of a family

living arrangement, and thereby to reduce their cost of living to a point far below that of the American or older immigrant in the same industry or the same level of occupations.

Their Method of Living

The method of living usually followed is that commonly known as the "boarding-boss" system. Under this arrangement a married immigrant or his wife or a single man constitutes the head of the household, which, in addition to the family of the head, will usually be made up of from 2 to 16 boarders or lodgers. Each lodger pays the boarding boss a fixed sum, ordinarily from \$2 to \$3 each month, for lodging, cooking and washing, the food being usually bought by the boarding boss and its cost shared equally by each individual member of the group. Another frequent arrangement is for each member of the household to purchase his own food and have it cooked separately. Under this general method of living, however, which prevails among the greater proportion of the immigrant households, the entire outlay for necessary living expenses of each adult member ranges from \$9 to \$15 each month. The additional expenditures of the recent immigrant wage earners are small. Every effort is made to save as much as possible. The entire life interest and activity of the average wage earner from southern and eastern Europe seem to revolve about three points: (1) to earn the largest possible amount under the existing conditions of work; (2) to live upon the basis of minimum cheapness, and (3) to save as much as possible. Domestic economy, as well as all living arrangements, has been subordinated to the desire to reduce the cost of living to its lowest level.

Another salient quality of recent immigrants who have sought work in the steel industry has been that as a whole they have manifested but a small degree of permanent interest in their employment or in the industry. They have constituted a mobile, migratory class, constrained mainly by their economic interest. They move readily from place to place, according to changes in working conditions or fluctuations in the demand for labor. The recent immigrant has no property or other restraining interests which attach him to a community.

Usually Tractable

To the above described characteristics of immigrant iron and steel workers of recent arrival should be added one other. The members of the larger number of races of recent entrance to the mills have usually been tractable and easily managed. This quality seems to be a temperamental one, acquired through present or past conditions of life in their native lands. When aroused by strikes or other industrial dissensions, the Slavic races have displayed an inclination to follow their leaders to any length, often to the point of extreme violence and disorder, but in the normal life of the mills the southern and eastern Europeans have exhibited a pronounced tendency toward being easily managed by employers. This characteristic, while strong, is confined, however, to the immigrant wage earners of comparatively short residence, and results from their lack of training and experience abroad and to the difference between their standards and aspirations and those of the native American and older immigrant industrial workers.

When the foregoing characteristics are considered it is somewhat surprising that the iron and steel manufacturer found it possible to utilize the recent immigrant labor force in any effective way. As a matter of fact, the extensive employment of the southern and eastern European was made possible only by the use of improved processes and methods, which have cut down the neces-

sary working forces of the industry as a whole and eliminated to a large extent the elements of mechanical skill and training formerly required. As a result it is possible to operate the mines, furnaces and steel plants with a much smaller proportion of skilled and specialized employees.

Another effect discernible from the extensive employment of recent immigrants has been the increase in the number of petty foremen. This situation might naturally be expected, because the immigrant wage earners from the south and east of Europe cannot speak English and require a greater amount of supervision than the native Americans and the older immigrants from Great Britain. As a matter of fact, such foremen in most instances are straw bosses and their main function is that of an interpreter. The body of non-English speaking employees are subdivided into small groups and placed under their direction in order to secure more ease in handling and a greater degree of efficiency.

Greater Liability to Accidents and Disease

From what has already been stated relative to the lack of industrial experience of the larger proportion of recent immigrant iron and steel workers, it is also clear that their employment has increased the liability to accidents and to disease. This situation is due to ignorance on the part of southern and eastern European wage earners, to their tendency to accept blindly dangerous working conditions, and to their lack of knowledge of safety devices and proper methods of precaution. Their ignorance also leads them to neglect the sanitary rules which have been formulated for the protection of themselves and their fellow workmen. In other words, when the lack of training of the recent immigrant while abroad is considered in connection with the fact that he becomes an iron and steel worker immediately upon his arrival in this country, and when it is recalled that a large proportion of the new arrivals are not only illiterate and unable to read any precautionary notices posted around the furnaces and steel mills, but also unable to understand English and consequently without ability to comprehend verbal instructions intelligently, the inference is plain that a direct casual relation exists between the employment of recent immigrants and the occurrence of fatalities and accidents.

Racial Displacements

As regards the effect of the employment of recent immigrants upon the native American and older immigrant employees from Great Britain, Germany and northern Europe, three distinct tendencies in the way of racial displacements and substitutions are plainly observable. In the first place, a large proportion of the native Americans, Welsh, English, Irish and Germans, who were exclusively employed before the advent of the southern and eastern Europeans, have voluntarily or involuntarily left the iron and steel industry.

In the second place, the older employees who remained in the industry were, as a rule, advanced to the skilled and responsible positions which require experience and training. Although improvements in methods of production caused a decline in the demand for skilled men, this situation was more than counterbalanced by the demand for trained steel workers growing out of the remarkable development of the industry. As a consequence, at the present time there is a sharp segregation into occupations according to races. The rough and unskilled work is done by the southern and eastern European immigrant. The skilled occupations and the executive positions are occupied by native Americans and by Welsh, English, Irish, Scotch, Germans and Scandinavians of the first or second generation.

In the third place, probably the most significant aspect in the present situation is found in the fact that the sons of native Americans and older immigrant employees from Great Britain and northern Europe are not in any considerable numbers seeking employment in the iron and steel manufacturing establishments. The superintendents of furnaces and mills in all sections of the country make complaint of this condition of affairs. It is ascribed by them to the tendency among native born

persons to adopt a more or less superficial attitude and to seek after occupations of more conventional respectability. Whatever may be the cause of the reluctance of the native American to enter the steel mills, it is true that, for some time to come, efficiency must be sought by the manufacturers in mechanical inventions and in other economics rather than in a highly developed labor force.

Views of Employers

The United States Immigration Commission, in the course of its study of the iron and steel industry, endeavored to secure opinions from representative employers relative to the efficiency of the immigrant labor supply and a statement of their preferences for the different races of foreign born wage earners. The statements could only be obtained in a general way, since in the cases of particular kinds of work their opinions of the relative efficiency of the races employed had not been narrowed down to the point of differentiation. As a whole, however, they agreed on practically all comparisons given, which may be summarized thus:

1. Natives are considered superior to all races for executive positions, from the labor bosses up.

2. In all skilled occupations the preferences are stated to be for native labor first, and English, Welsh, Scotch, Swedes, Germans and Irish in the order named. No preferences as to the other races are stated, since the number in skilled work is too small to admit of comparison.

3. In unskilled work the native Americans, English, Irish, Welsh, Scotch, Germans and Swedes are employed at present to such a slight extent that relative preference cannot be stated. In all instances these races are the preferences over all others in unskilled labor. With regard to the southern and eastern European races themselves, the preferences of the employers are given in about the following order: Slovaks, Poles, Magyars, Croatians, Italians. The first three races named are regarded as nearly equal from the standpoint of preference, the Croatians as unsatisfactory, and the south Italians as the very last resort for any kind of labor except railroad construction.

The statements of employers regarding the efficiency of the second generation, including immigrants who had come to the United States during childhood, were that it was invariably greater than that of the first generation except when the latter had been experienced workers in their occupations before immigration, as in the case of Welsh. Chief among the reasons assigned for this opinion was the belief that the second generation is more ambitious and alert and, with the high degree of assimilation attained, a greater capacity for progress and efficiency is shown. In every case the second generation is regarded by employers with high approbation, and it is stated that there will gradually be afforded as the new generation grew up a supply of labor for the semi-skilled and skilled occupations, which will greatly aid in solving the conditions of scarcity.

Effect on Labor Organizations

The extensive employment of the recent immigrant is also largely responsible for the weakening and demoralization of the labor organizations of the original employees. It is not, of course, true that the recent immigrant caused the downfall of the unions of the early operatives in the industry. The significant fact, however, has been that the influx of recent immigrants has been too rapid and has occurred within too short a period of time to permit of their absorption by the labor organizations. As a consequence, they practically inundated the unions and hastened their disintegration.

There are no direct data available relative to the effect of the employment of recent immigrants upon wages and hours of work. It is true that wages have increased within recent years and, on the other hand, that there has been no decrease in the hours of labor. There cannot be much doubt, however, that the remarkable expansion in the iron and steel industry would have been marked by higher rates of wages and shorter hours had it not been for the availability of the labor supply from the south and east of Europe.

From a more general standpoint, the rapid increase of southern and eastern European iron and steel workers within recent years has been the cause of serious municipal and social problems. In the older steel manufacturing centers the extensive employment of recent immigrants has led to the development of isolated foreign colonies, which have been characterized by low standards of living, bad sanitary conditions, and which, because of the maintenance of old world customs and institutions and the indifference of the American population, have retarded progress toward industrial efficiency and general assimilation. Steelton, an industrial suburb of Harrisburg; Cambria City and Conemaugh, the foreign sections of Johnstown, Pa., and the immigrant colonies of Pittsburgh and its environs, Youngstown, South Chicago, Cleveland and Milwaukee, are all illustrations of the affixing, by a gradual process of industrial expansion, of immigrant sections to the original native American and older immigrant populations of steel manufacturing cities and towns. In other cases, such as Gary, Ind.; Lackawanna City, N. Y., and Granite City and Madison, Ill., the development of the iron and steel industry within recent years has created entirely new industrial communities composed almost wholly of southern and eastern European wage earners. Both classes of colonies present many difficulties in the way of absorbing and Americanizing the alien peoples who have sought work in the iron and steel industry.

Railroad Equipment Orders.—The Bethlehem Steel Company has ordered 100 steel coke cars from the American Car & Foundry Company; the Rock Island, 41 combination and postal cars from the Pullman Company; the Canadian Northern, 200 steel underframe cars from the Canadian Car & Foundry Company; the Birmingham & Southern, 100 freight cars from the Pressed Steel Car Company; the Inter-Colonial, 91 freight cars from the Canadian Car & Foundry Company; the Great Northern, 35 baggage and combination cars from the Barney & Smith Car Company; the Minnesota, Dakota & Western, 50 flat cars from the Haskell & Barker Car Company; the Bingham & Garfield, 120 dump cars from the Pressed Steel Car Company. The Chicago, Burlington & Quincy is still in the market for 1000 gondola cars and the Pittsburgh & Lake Erie for 1000 gondola cars and 1000 hopper cars. The Charlotte Harbor & Northern is in the market for 50 cars. The Seaboard Air Line is inquiring for 1000 steel underframe box cars and 200 phosphate cars. The Chino Copper Company is reported in the market for 50 hopper cars. The Missouri, Kansas & Texas is in the market for 16 locomotives. The Georgia Railroad has ordered 6 locomotives from the Baldwin Locomotive Works; the Lackawanna, 35 locomotives, and the Illinois Central, 5 locomotives from the American Locomotive Company. The Pere Marquette and the Western Maryland are reported in the market for a considerable number of locomotives.

M. J. Butler, vice-president and general manager of the Dominion Steel Corporation, gives this summary of recently completed and pending improvements at the plant at Sydney, Nova Scotia: During the past year 120 by-product coke ovens of the latest and most approved type, with a capacity of 720 tons per day, at an expenditure of \$1,300,000, have been completed. Under construction and nearing completion are two 50-ton open hearth furnaces, one Bessemer converter and No. 8 blast furnace. A contract has been let for the superstructure of No. 7 blast furnace, and the work of excavation is now under way. A merchant mill for the manufacturing of bars, rods, &c., is being erected. There is on hand, ready to erect, as soon as the buildings are ready, a 22-in. mill for the manufacture of shapes, angle bars, &c.; also a plate mill.

The Foremen's Club of the Park Drop Forge Company, Cleveland, Ohio, held its quarterly banquet at the Gillsy Hotel on the evening of April 8. Thirty-one covers were laid. After the tables were cleared the guest of the evening, R. R. Abbott, metallurgist and chief engineer Peerless Motor Car Company, gave an illustrated ad-

dress on "The Heat Treatment of Steel," which was greatly enjoyed. The Park Drop Forge Company is one of the largest drop forgers of alloy steel, crank shaft, axle and gear work in the country, and the quarterly banquets provide a pleasant way of securing scientific information.

The Osborn Mfg. Company Buys the American Wire Brush Company.—The Osborn Mfg. Company, Cleveland, Ohio, has purchased the business and patents of the American Wire Brush Company, 277 Greenwich street, New York, and will hereafter manufacture the products formerly made by that company in a new plant, which will also be Eastern district sales office for the products of the Cleveland plant, and will be located at 202 and 204 Center street, opposite Howard street, New York. The products taken over by the purchase by the Osborn Company include the Minerva line of wire brushes and the Mez wire wheel brushes. The New York plant and district sales office of the Osborn Company will be in charge of F. D. Jacobs, second vice-president, who will look after the sales in New York City and vicinity and New England, having been in close personal touch with the trade in that territory for the past 15 years. To provide additional capital for taking over the New York plant, the Osborn Mfg. Company has increased its capital stock from \$100,000 to \$200,000.

The Famous Danbury Hat Boycott Suit to Be Retried.—The United States Circuit Court of Appeals has ordered a new trial of the suit which was brought several years ago in the United States Court of Connecticut by D. E. Loewe & Co. against the United Hatters of North America. In the lower court the trial judge directed a verdict for the plaintiff and multiplied by three the amount of damages awarded by the jury. The trebling of the verdict was done under the provisions of the Sherman anti-trust law and this made a total judgment of \$232,240.12. The Court of Appeals declares that the judge erred in directing a verdict and also states that hearsay evidence was improperly admitted.

The Cornell Economizer Company, 55 De Long Building, Philadelphia, Pa., has brought out a chart for determining the flow of steam through an orifice. The chart consists of two circular pieces of cardboard which are mounted concentrically and are free to move with respect to each other. The circumference of the outer piece is graduated to indicate the amount of steam discharged in pounds per hour, while the inner one has graduations corresponding to different diameters of orifice from $\frac{1}{2}$ to 2 in. A portion of the circumference of the smaller piece is cut away so as to expose a series of graduations corresponding to the gauge pressure in pounds per square inch on the larger circle. There is a line marked G on the smaller circle which when set opposite the gauge pressure causes the graduation corresponding to the diameter of the orifice in inches to coincide with that indicating the amount of steam discharged in pounds per hour. This chart will be found accurate for the flow of steam through an orifice from a higher into a lower pressure when the ratio between the two sides does not exceed 58 per cent.

The American Blower Company, Detroit, Mich., has appointed the American Trading Company, Johannesburg, South Africa, as selling agent for its products in South Africa, and will conduct a more active campaign for business in that territory than heretofore. A good demand comes from South Africa for equipment for mine ventilation, this business being largely divided among American, German and English manufacturers of ventilating machinery.

The Atlanta & Carolina Railway Company, Atlanta, Ga., has awarded contracts to John T. Adams and L. E. Strum, Columbus, Ohio, for the construction of a standard gauge main line railroad and branches between Atlanta and Augusta, Ga., approximating 208 miles of construction.

The National Metal Trades Association

The thirteenth annual convention of the National Metal Trades Association opened at Hotel Astor, New York, Wednesday morning, April 12. The attendance was large at the first session, with a promise of even a greater gathering for the second day. The reports of President J. H. Schwacke and Commissioner Robert Wuest demonstrated that the association has had a very successful year, and is in a most prosperous condition. Fred A. Geier, chairman of the Committee on Industrial Education, presented a very able report, containing important data, and recommending an organized effort to further this most important branch of education, which would mean the employment of an "evangelist," to use the expression applied in the paper and the discussion which followed it. The idea received enthusiastic indorsement.

The usual convention committees were appointed. The Committee on Resolutions is as follows:

H. D. Sharpe, chairman, Brown & Sharpe Mfg. Company, Providence, R. I.
H. W. Hoyt, Great Lakes Engineering Works, Detroit, Mich.
B. Briscoe, United States Motor Company, Tarrytown, N. Y.
H. N. Covell, Lidgerwood Mfg. Company, Brooklyn, N. Y.
Harry B. Kennedy, Hoggson & Pettis Mfg. Company, New Haven, Conn.

The annual dinner of the Alumni, consisting of past and present officers, was held at the Hotel Astor on Monday evening.

Buffalo Coke Rates Hearing.—An adjourned hearing on the coke freight rate advance from the Connellsville district to Buffalo was held before Special Examiner J. Edgar Smith of the Interstate Commerce Commission staff at Buffalo, April 10. Additional arguments against the advance were presented by the complainants. Briefs of these arguments will be forwarded to the commission at Washington for decision. The complainants are the Wickwire Steel Company, Buffalo Union Furnace Company, Tonawanda Iron & Steel Company, New York State Steel Company and Lackawanna Steel Company. The railroads involved as defendants are the New York Central, the Buffalo, Rochester & Pittsburgh; the New York, Chicago & St. Louis; the Lake Shore & Michigan Southern, the Pittsburgh & Lake Erie, the Baltimore & Ohio, and the Pennsylvania.

The Quebec Bridge Contract.—The Canadian Government has contracted with the St. Lawrence Bridge Company to build the Quebec bridge, the cost to be \$8,650,000. It will be a railroad bridge with two 4-ft. side-walks. The original design providing for roadways and street railroad lines has been abandoned.

Fire seriously damaged the south pipe foundry of the Camden Iron Works, R. D. Wood & Co., Camden, N. J., April 6. The roof was burned through but did not fall, thereby saving what might have been a heavy loss from damaged machinery and equipment. This department will be idle several weeks for repairs, but a good share of the work will be taken care of in other departments of the plant. The loss is estimated at \$15,000.

Fred F. Fischer, manufacturers' representative, has removed his office from the Park Building to 703 Oliver Building, Pittsburgh. Mr. Fischer represents the following in the Pittsburgh district: Providence Engineering Works, Providence, R. I.; De LaVergne Machine Company, New York; Trenton Engine Company, Trenton, N. J.; Hawkes Boiler Works, Chicago. Mr. Fischer's specialty is installing gas engines and gas producers, using hard or soft coal for fuel.

The Titusville Iron Company has removed its offices in the West Street Building, 90 West street, New York, to room 1307. Barnard Abel, who for many years has been general manager at the works, will have personal charge of this office.

British Trade Conditions Less Favorable

A less hopeful view is taken by iron trade journals in London of the outlook both in pig iron and finished material. The *Iron and Coal Trades Review* says that the pig iron position is discouraging. Production exceeds demand, especially in the Cleveland district, and the prospect for exports to the Continent is not so bright. Cleveland warrants have declined to 47 shillings 1½ pence. Iron in Connal's stores March 30 amounted to 626,521 tons, against 451,448 tons March 31, 1910. The finished iron and steel trades have grown quieter. In the Midlands the market was adversely affected by the financial difficulties of a large firm of bar manufacturers. The galvanized sheet trade is less active, exports being considerably less than at the same time last year. Steel shipbuilding material shows a fair demand, and in the north of England ship plates are still at £6 15s.

The *Ironmonger* says that the chief event of the last week of March was the prolongation of the Rail Trade Association, the difficulties recently encountered being surmounted. It is stated that the negotiations for putting the Tube Manufacturers' Association on a better basis have been broken off for the time being. This journal says concerning exports from the United States:

There is still a continual outflow of half-finished steel from the United States to Europe, among the latest shipments being 500 tons of billets by the Manchester Importer from New York to Manchester, which steamer also carries 700 tons of pig iron and 144 tons of steel bars, while the Quernmore, from Baltimore to Liverpool, carries 2020 tons of billets. The large increase noted lately in the imports of semifinished steel into South Wales is affecting the local steel manufacturers, the Downlows Works lately having been making only four days a week, while there are complaints that a somewhat similar state of affairs prevails at some of the other establishments in the district. The imports of sheet bars are increasing, too, just at a time when the galvanized sheet trade is in anything but a prosperous condition, and when for the time being at all events the tin plate manufacturers are not quite so well off for specifications as they would like to be. Some makers seem to have been rather saving up plates of oil sizes, apparently hoping that the Standard Oil Company would come into the market here and take up any material available. Unfortunately, however, as it happens, the Standard Oil requirements are being executed on the other side of the Atlantic, and the reflex action set up tends temporarily to weaken the situation in Wales.

The Jones & Laughlin Steel Company, Pittsburgh, has placed an order with the Alliance Machine Company, Alliance, Ohio, for three three-motor electric traveling cranes—one 5-ton, with a 77-ft. span; one 10-ton, with a 77-ft. span, and one 15-ton, with a 122-ft. span—for installation in the new billet mill at its Aliquippa, Pa., plant. The Carnegie Steel Company has placed an order with the same company for a three-motor 10-ton crane with a 54-ft. span, to be installed at Homestead, Pa.

The Detroit Seamless Steel Tubes Company, Detroit, Mich., established for itself a new production record in the month of March, its output having been 24 per cent. larger than in any previous month in its history. A large percentage of the production of this company is used by the railroads for locomotive flues. The product for the month of March, if placed end to end, would represent a tube about 175 miles long.

The Pittsburgh Machine Tool Company, which is building a new plant at Braddock, Pa., expects to occupy it about May 1. The new building is brick and covers an area of about 100 x 217 ft. Some equipment has been installed, including a 10-ton crane purchased from the Cleveland Crane & Engineering Company. The new plant is expected to double the company's present capacity.

The offices of William Swindell & Brothers, engineers and contractors, have been removed from the German National Bank Building to suite 5034-5037 in the new Jenkins Arcade Building, Fifth avenue and Liberty street, Pittsburgh, Pa.

The Vanadium-Alloys Steel Company, Latrobe, Pa., has increased its capital stock from \$200,000 to \$300,000.

Efficiency Methods of the Tabor Mfg. Company

Results of the Introduction of the Taylor System of Scientific Management

An important paper, presented before the Congress of Technology in Boston, April 11, at the fiftieth anniversary of the granting of the charter of the Massachusetts Institute of Technology, was that of Wilfred Lewis, president of the Tabor Mfg. Company, Philadelphia, entitled "An Object Lesson in Efficiency." In the introductory pages of the paper Mr. Lewis reviews conditions existing before the Taylor system of scientific management was introduced. The author, after a long career as a mechanical engineer with William Sellers & Co., became an officer of the Tabor Mfg. Company 11 years ago, the business being the manufacture and sale of foundry molding machines. At first the machines were built on contract. Later the company established its own plant in Philadelphia. Mr. Lewis tells of the advice given by his friends to maintain an open shop and to keep down the number of clerks or nonproducers. The need of better shop management was not appreciated until the growing business began to show increasing losses. Within a year came a general strike for higher wages and shorter hours. This was compromised by the concession of shorter hours at the same pay. The company sold more of its stock and borrowed more money until it seemed unreasonable to expect further financial aid.

At this juncture Fred. W. Taylor offered to loan the company more money if it would install his system of management. This arrangement was made and the initiation of the new system was put in charge of Carl G. Barth. There was much criticism at the start, and this was not confined to the shop. Mr. Barth was obliged to call for more and more assistance in the planning department, and for a year or two it seemed as though ground was being lost. At length, however, the work begun by Mr. Barth and continued by Mr. Hathaway, now vice-president of the company, began to bear fruit. Instead of losses there was an even break, and then profits. A better spirit prevailed, better wages were earned and production increased rapidly. Mr. Lewis, after giving in detail the history summarized above, asks the question, "How comes it that a large increase in the force of nonproducers can be made to effect such an enormous increase in output?" In answering it he gives the following details of the operation of the Taylor system in the Tabor plant:

"In 1910 the Tabor Mfg. Company turned out two and one-half times as much value in finished product as it ever did under the old régime with the same force. Formerly for every 10 men engaged as producers, or 'chip-makers,' as Mr. Dodge defines them, we had not more than one man connected with the shop as a nonproducer. Now we have fewer men at machines, with three times as many nonproducers turning out practically three times as much work, because prices are lower to-day than they were five or six years ago, and two and one-half times the value means about three times the product.

"To explain in detail these anomalous results would carry me far beyond the limits of my paper and call for the elucidation of a system which had better be studied at first hands."

It is not an easy matter to start any innovation in an open shop full of union men, and, as might be anticipated, the appearance of a man with a stop watch and tally sheet was at first strenuously opposed by the workmen. So also was the suggestion of a bonus for the successful performance of an allotted task. But the kickers were gradually converted or discouraged, better discipline was established, and a few of the men were soon earning 30 per cent. more wages than they could command elsewhere.

Rates Not Changed and Men Are Not Driven

In the beginning the men were suspicious and disinclined to believe that a good performance was not to be the signal for a cut in price; but they have since learned

by experience that prices are fixed by the management upon definite knowledge of all the time elements involved in any piece of work, and that the time allowed will not be changed so long as the method employed remains the same. In this way the management demonstrates its loyalty to the workmen and they in turn are glad of an opportunity to demonstrate their loyalty to the management, as they did last year.

We pay better wages for fuller and better results performed in a definite way, and yet there is no driving in the ordinary sense of the word. The tasks assigned to the workmen are easily within their ability to perform, and when new work is given out, as occasionally happens, at day rates, before the time on the job has been set, nobody wants to take it because there is no bonus attached for its quick and accurate performance.

Functional Foremen Important Factors

But our wonderful increase in production is not due entirely to rapidity of performance, for in some instances very little gain in that direction has been made. A great deal is due to the functional foremen, whose duty it is to prepare and guide the way of every piece of work going through the shop. The old notion that a man cannot serve two masters or take orders from more than one superior is denied by the new philosophy, which makes it possible for a workman to have as many bosses as there are functions to be performed. There is no conflict of authority unless the functions overlap, and even there such conflict as may arise is salutary and to the interest of the company. A gang boss, for instance, covers one class of machines or work, and it is his business to see that every man is provided with at least one new job, with all the tools and fixtures, ready for its immediate performance as soon as the job upon which he is engaged has been completed. He also gives the necessary instructions about setting the work, explains the drawings and teaches the workman how to set his work when necessary. This man has nothing to do with the running of machines and does not interfere at all with the speed boss, who also has supervision in his function over the same men as the gang boss and sees that each machine is run at its proper speed, with feed and cut as per written instructions. He also teaches the workman and gives him such practical assistance as may be needed.

An inspector also helps the same set of men and sees that the work done is of the right quality, and that the first piece made is up to the standard in all dimensions, fit and finish. He also makes further inspection from time to time to see that the standard is maintained. An overzealous speed boss in his desire for a large output may impair the quality of the work done by exceeding the speed limit, and there is, therefore, the possibility of a conflict between the speed boss and the inspector, but the inspector's requirements must be fulfilled, and such a conflict cannot fail to be salutary, because rapidity of production when accompanied by inferior results is never to be desired, and in almost all cases some method is found by which high speed can be maintained and the best quality preserved. It rarely happens that the superintendent or manager is called upon to adjust a difficulty between the two functional foremen.

The Stockkeeper's Contribution

In assembling the various parts required to make a complete machine the stockkeeper sees that all the parts for a group of machines are in hand ready to go together before work is begun upon any one of them, and the whole group is finished at the same time.

To avoid delays incident to materials which should be ordered in advance, the storeroom must carry a sufficient amount of stock to cover the time required for replacements, and this is cared for by a storekeeper and his clerical assistants in an automatic, mechanical way. For-

merly it was necessary for the superintendent to bear in mind or to look ahead and see what was wanted in advance; but with many thousand parts going through the shop at once, important details, sometimes few and sometimes many, were invariably overlooked, which meant delay and disappointment to the customer and very often cancellation of orders. Now a balance of stores is kept in the planning department by which new orders are placed as soon as the stock on hand falls below a certain established minimum, kept plainly in view against every detail. This minimum may vary as conditions change, and it is fixed by the discretion of the manager of the planning department in consultation with the sales department.

Planning the Work

In the planning department, which is to the shop what the drawing room has been for many years to the superintendent, every new machine is charted to show the progress of the work through the shop, and every piece is provided with an instruction card for its proper manipulation, showing the machine upon which it is to be done, the tools and fixtures required, the feeds and speeds to be used, the sequence of operations and the time allowed in detail for each and every elementary movement. As these operations are performed they are checked off in a route file, from which can be seen at any time the exact condition of the work and the time remaining for its completion.

An order of work clerk directs the progress of the orders to be filled in accordance with a schedule prepared by the manager in consultation with the sales department, and he has before him in miniature a view of the whole shop, showing every machine or vise, the work being done on each, the work ready to be done and the work ahead in the shop which has not yet arrived at the machine. This is a large board or wall plate, which shows also what machines are manned and where a man can be conveniently shifted when there is no work ahead at his particular machine. By this means all of the work in the shop is kept moving in proper balance at a normal rate of speed, men are taken on or laid off as the exigencies of business may require, and no loss is sustained by the usual tendency of workmen to relax when, in times like these, orders are falling off and work ahead is hard to find. At such times we are, of course, obliged to curtail production, and the situation being apparent to all, no complaint is made against a reduction in time, which we always prefer to a loss of well trained men.

A well equipped toolroom in charge of a competent man is a *sine qua non* in any machine shop, and here also one of our greatest improvements has been made. Formerly each workman was inclined to accumulate his own assortment of tools and fixtures, which were stowed away in dark corners and kept in disorder and confusion. Now everything comes in perfect order (and the best of its kind) from the toolroom as required and goes back again when the job for which it was taken out is finished. Tools are ground to standard forms and not to suit the whims of individual workmen, and the toolroom is responsible for the condition of all tools sent out.

No Time Study in Designing

The drawing room is, perhaps, of all departments less affected by the new order of things than any other, and yet there is an indirect effect due to the atmosphere of activity which pervades the whole plant. Here the work is by its very nature more or less original and, of course, no time can be set for the completion of that which is not definitely known, and which grows into shape by a process of trial and error, until something satisfactory is attained. Designing is not therefore amenable to time study, and depending largely, as it does, upon inspiration, there is no superior intelligence to direct its progress. It is the nature of original research which flourishes and bears its best fruit under adverse criticism. A good designer is like a good composer. His work is creative and full of harmonies, and, being an artist in his line, he cannot be held to a time schedule. In original work the incentive therefore must come from within rather than from without, and this is

generally inborn with the ability to create. Copyists, on the other hand, who always need direction, might be brought under the domination of time study, and in many clerical operations this has been done, but we have not yet attempted to fix tasks in tracing or bookkeeping and we do not pretend to say that our development is by any means complete. We have progressed, however, to a point which makes further progress comparatively easy, and in the face of stubborn opposition we have firmly established a successful business upon the principles of scientific management as laid down by Dr. Taylor.

The scientific habit of thought as applied by Dr. Taylor to the production of high speed steel has resulted in speeding up machine shops about three to one, and I think it is not unreasonable to expect that the same habit of thought as applied by him to the every day hand work of men will eventually result in doubling the average output of labor with comparatively little increase in the physical effort required.

Papers for the Foundrymen's Convention

The secretary, Dr. Richard Moldenke, Watchung, N. J., announces the following provisional list of papers to be read at the convention of the American Foundrymen's Association at Pittsburgh in the week beginning May 22:

- "Economical Insurance for Foundry Properties," by S. G. Walker, Providence, R. I.
- "Foundry Construction," by Geo. K. Hooper, New York City.
- "Vanadium Iron and Steel Castings," by G. L. Norris, Pittsburgh, Pa.
- "The Foundry at Close Range," by Benj. D. Fuller, Cleveland, Ohio.
- "The Permanent Mold," by Edgar A. Custer, Philadelphia, Pa.
- "Titanium in Iron and Steel Castings," by Chas. V. Slocum, Pittsburgh, Pa.
- "Production Costs," by Ellsworth M. Taylor, New York City.
- "The Manufacture and Annealing of Converter Steel Castings," by Bradley Stoughton, New York City.
- "The Electric Steel Furnace for Steel Castings," by Dr. P. Heroult, New York.
- "Titanium in Malleable," by C. N. Gale, Pittsburgh.
- "The Practicability of the Induction Furnace for the Making of Steel Castings," by C. H. Von Baur, New York City.
- "The Rotary Blower for Cupola Use," by R. H. Rice, Schenectady, N. Y.
- "Open Hearth Steel Foundry Practice," by R. E. Bull, Granite City, Ill.
- "Pattern Shop Apprentices," by Jabez Nall, Cleveland, Ohio.
- "The Application of Lifting Magnets to Foundry Work," by A. C. Eastwood, Cleveland, Ohio.
- "Electric Motor Drive for Foundries," by Brent Wiley, Pittsburgh, Pa.
- "The Small Open Hearth Furnace for Steel Castings," by Walter MacGreggor, Chicago.
- "Microscopic Structure of Iron and Steel," by Prof. William Campbell, New York City.
- "Manganese and Silicon in the Foundry," by A. E. Outerbridge, Jr., Philadelphia, Pa.
- "Gas Cavities, Shot and Chilled Iron in Iron Castings," by Thos. D. West, Cleveland, Ohio.
- "Core Making and Core Machines," by Arch. M. Loudon, Elmira, N. Y.
- "Molding Machine Practice," by E. H. Mumford, New York City.
- "Machine versus Hand Molding," by John Alexander, Philadelphia, Pa.
- "Defective Castings and How to Handle Them," by John M. Perkins, Detroit, Mich.
- "Core Room Practice," by F. A. Coleman, Cleveland, Ohio.
- "Cupola Melting Practice," by P. Munnoch, New York City.
- "Malleable Castings," by W. P. Putnam, Detroit, Mich.
- "The Equipment of Air Furnaces Using Oil as Fuel," by N. W. Best, New York City.
- "Instruction Paper on Phosphorus in Cast Iron," by H. E. Field, Pittsburgh, Pa.
- "Mechanical Charging of Cupolas," by G. R. Brandon, Harvey, Ill.
- "Pattern Equipment," by W. S. Giele, Philadelphia, Pa.
- "Recovery of Foundry Waste," by S. A. Capron, Westfield, Mass.
- "Cupola Practice," by R. H. Palmer, Salem, Ohio.
- "The Foundry Foremen's Educational Movement," by D. O. Wilson, Newark, N. J.
- "The Briquetting of Metal Borings and Turnings," by Dr. R. Moldenke, Watchung, N. J.
- Presentation of data on the molding sand tests of the A. F. A. Memorandum on the standard test bar for cast iron.

Other papers have been promised, but titles are not yet available. Details of the programme, both as to entertainment and sessions for the reading of papers, will be furnished later.

The Triple Supply Convention

The closing sessions of the triple convention of the American Supply and Manufacturers' Association, the National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association, at Louisville, Ky.,* on Wednesday, April 5, brought out some interesting opinions on the subject of resale prices. The general sentiment expressed was to the effect that manufacturers should set a minimum price with a clear margin of profit at which their goods should be sold.

The three associations held separate meetings on Wednesday morning and elected their officers.

The manufacturers at their morning meeting discussed apprenticeship systems. In that connection Willard Parker, Pennsylvania Shafting Company, Spring City, Pa., declared that the increased cost of living is creating a scarcity of apprentices. He pointed out that the best interests of boys who would ordinarily become apprentices are sacrificed for the benefit of the family, as they are put at work which is more remunerative because the money is needed at home.

R. K. Hodgkins, Yale & Towne Mfg. Company, New York, described the industrial school maintained by his company, but he added that very often missionary work is necessary to get the boys to enlist in the school.

Another speaker stated that under modern methods the apprentice will soon be a thing of the past. He declared that the developments of the college trained men along mechanical lines is doing away with the need for mechanics. "The knowledge in mechanical lines to-day," said he "is in the drawing room, where the designing is done and not in the shop. Where we need our apprentices more than anywhere else is in the toolroom. The tendency is to educate operators instead of general mechanics. It seems to me that the development of specialists is more important than the development of all-round mechanics."

Edward C. Henman, American Steam Pump Company, Battle Creek, Mich., spoke along the same lines. He said that the machinist trade is not taught in these days, adding: "We can buy the best machinery designed by clever people, and all we need to do is to make machine hands. Even the makers of the most intricate machinery are training operators whose knowledge is confined to the work done by one particular machine. In many lines of manufacture the day of the apprenticeship system is over."

The Manufacturers' New Officers

The manufacturers made short work of electing their officers, as the report of the Nominating Committee that had been appointed was accepted and passed unanimously. The following officers were elected:

President, Willard Parker, Pennsylvania Shafting Company, Spring City, Pa.; first vice-president, N. A. Gladding, E. C. Atkins & Co., Inc., Indianapolis, Ind.; second vice-president, D. K. Swartwout, Ohio Blower Company, Cleveland, Ohio; third vice-president, C. H. Jenkins, Moran Flexible Steam Joint Company, Louisville, Ky. Executive Committee: W. H. Fisher, T. B. Wood's Sons Company, Chambersburg, Pa.; E. A. Ludden, Detroit Oak Belting Company, Detroit, Mich.; J. E. Osgood, J. M. Carpenter Trap & Die Company, Pawtucket, R. I.; R. H. Hodgkins, Yale & Towne Mfg. Company, New York; J. W. Malcomb, New York Belting & Packing Company, New York. F. D. Mitchell was re-elected secretary-treasurer.

The National Dealers' Officers

The National Supply and Machinery Dealers' Association, at its morning meeting, devoted a great deal of time to discussing resale prices, after which the following officers were elected:

President, W. L. Rodgers, Pittsburgh Gage & Supply Company, Pittsburgh, Pa.; first vice-president, Henry Prentiss, Prentiss Tool & Supply Company, New York;

second vice-president, J. O. Harron, Rickard & McCone Company, San Francisco, Cal.; advisory secretary-treasurer, T. James Fernley, Philadelphia, Pa.; secretary-treasurer, Thomas A. Fernley, Philadelphia, Pa. Advisory Board: Edgar E. Strong, Strong, Carlisle & Hammond Company, Cleveland, Ohio; George Puchta, Queen City Supply Company, Cincinnati, Ohio, and Wallace Pattison, W. M. Pattison Supply Company, Cleveland, Ohio. Executive Committee: W. T. Todd, Somers, Fitler & Todd Company, Pittsburgh, Pa.; M. B. Barkley, Cameron & Barkley Company, Charleston, S. C.; Charles Farquhar, Chanler & Farquhar Company, Boston, Mass.; George Vonnegut, Vonnegut Hardware Company, Indianapolis, Ind.

The Southern Dealers' Officers

The Southern Supply and Machinery Dealers' Association elected the following officers:

President, W. P. Simpson, C. F. Patterson Company, Ltd., New Orleans, La.; first vice-president, S. M. Price, S. M. Price Machinery Company, Norfolk, Va.; second vice-president, I. F. Young, Young & Vann Supply Company, Birmingham, Ala.; secretary-treasurer, Alvin M. Smith, Smith-Courtney Company, Richmond, Va.; chairman Executive Committee, H. C. Clark, Charlotte Supply Company, Charlotte, N. C.; chairman Manufacturers' and Conference committees, W. H. Banks, Banks Supply Company, Huntington, W. Va.; chairman Textile Committee, D. G. Morton, Carolina Supply Company, Greenville, S. C.; chairman Membership Committee, George P. Dougherty, Fox-Harris Machinery & Supply Company, Pine Bluff, Ark.

During the morning meetings several booms were launched to obtain the 1912 convention for different cities. The members from Norfolk, Va.; Asheville, N. C., and Dallas, Texas, put in bids for the next joint meeting, but, being undecided as to meeting together again, the three associations took no action.

The Closing Joint Meeting

The three separate conventions were adjourned and a joint meeting of the associations was held at noon. President Parker of the Manufacturers' Association presided, and addresses were made by Mr. Simpson, the new president of the Southern Dealers' Association, and Wallace M. Pattison, who spoke in the place of Mr. Rodgers, president of the National Dealers' Association, who was detained at home by illness.

Speaking of the place for the next convention, President Parker said that the manufacturers would be willing to join the dealers at any place of meeting they might elect, and he suggested that before adjourning the very important matter of resale prices be discussed. Mr. Hodgkins, Yale & Towne Mfg. Company, said that he thought that it would be wise to let the manufacturers manufacture and let the machinery and supply dealers distribute. He said that his firm endeavored to maintain resale prices, and they found that each year more and more of the supply men were supporting them. Another manufacturer said that he made no attempt to distribute his products except through the local agents, and he always protected them in resale prices. A representative of the Detroit Lubricating Company declared that his company made a practice of establishing a minimum rather than a maximum price, but there was nothing on its goods indicating the price they were to be sold at. A Texas dealer called attention to the fact that under the stringent laws of that State the distributor there cannot enter into any price agreement, and so it was found hard to get to an understanding. He said that the dealers there are perfectly willing to accept manufacturers' resale prices, but would have to insist on a fair margin of profit. Another dealer argued that it would not be policy to establish a resale price on all goods, and said that the dealers only want resale prices on material where the margin of profit is too small.

This last remark brought out the interesting fact that at one of the dealers' sessions a ballot was taken as to the cost of doing business, and it developed that 16.15 per cent must be added to the price paid for goods; in other

* The proceedings of the previous sessions of the convention, were reported in THE IRON AGE of April 6.

words, the speaker stated the dealers must add that much to the regular profit percentage.

A manufacturer advised that the manufacturers arrange to quote three prices for their products, one to the jobber, one to the distributor and one to the consumer. No decided action was taken, but several manufacturers pledged themselves to protect the dealer with a proper resale price.

The entertainment features of the convention reflected credit on the committee in charge. A reception to the officers, followed by dancing and cards, took place on Monday, and on Tuesday night there was a supper, followed by a vaudeville performance. The majority of the members attended an excursion to the Mammoth Cave on Thursday. A special programme of outings, including an automobile ride and river excursions, was arranged for the entertainment of the ladies attending the meetings.

Modern Business Methods *

BY WALLACE M. PATTISON.†

Early history treats of those great leaders who lived in an age of conquest, whose reputations were made on the field of battle, such as Alexander the Great, Hannibal and Julius Caesar. Later we pass into that age where science and the arts first made their influence felt. This was followed by the age of discovery which opened up this continent to civilization. This is the age of business, the greatest business age in the history of the world. And especially is this true of America. Never were there greater business opportunities or greater facilities for building up business than exist in our age and this country. And it is the man who has grasped the opportunities that these greater facilities open up to us who is the greatest business genius of his time.

Organization the Greatest Factor in Building a Business

Without doubt the greatest factor in building a large business is organization. Organization is defined as the process of disposing or arranging constituent and interdependent parts into an organic whole. That definition may be a little complicated, but we can say, in a broad way, that organizing is systematizing. The object of organization is to bring men together for work and action, and in order that the work may be efficiently and well done and the action strong and forcible, the organization must move forward as one united whole.

And herein lies the genius of the organizer. It is easier to talk about than it is to carry out. When a man's business, or his work for that matter, becomes larger than he can take care of himself, he seeks for assistance, and from that moment he becomes an organizer, and his success as an organizer will depend upon his ability to select his assistants and transfer his own work to them and to inspire those assistants with his own ideas, his own energy and his own ability. Emerson says: "Every great business is but the lengthened shadow of one man," and I think he is about right. It is organization that helps us to lengthen our shadows. There is but little than any of us can do individually. There are only 24 hours in a day, and all we can hope to do is to give a third of that time continuously; but if we have this ability of organization and for executive work, we can go on multiplying ourselves by thousands and hundreds of thousands, and it is this that makes business to the ambitious man so attractive. No concern has yet reached the limitations of organization, not even the great and powerful Standard Oil Company or the great United States Steel Corporation. There are still limitations for the ambitious man who is willing to work and reach for them.

The first factor in organization that I would refer to is co-operation. That great steel master and successful business man, Andrew Carnegie, in giving a business address some years ago, which I read, likened business to

a three-legged stool, and he called the three legs, capital, labor and management. But I have often thought that a three-legged stool is not the securest kind of a seat, and if I might be so presumptuous as to make a suggestion to that distinguished man, I would say add another leg to your stool. And I would call that fourth co-operation. Capital, labor, management, and the co-operation of these three are what tend to the greatest success in modern business.

And now a word in regard to system. I said organizing was systematizing. But my experience has been this, that the man who employs system must be sure to be the master of system and not the slave of system. I have seen many businesses choked and bound and tied with the red tape system. I think there is more danger of system being overworked than underworked. I wouldn't have you believe that I am not a believer in system, because no man can accomplish much without system.

A Business Man Must Be a Manager of Men

I have said that the greatest factor in building a large business is organization. I would like to say now that the greatest factor in organization, in my estimation, is the human factor. It is not things that make life, it is people. It is not things that makes business, it is people—people with red blood in their veins—men and women with hearts and feelings and aims and wishes, men and women susceptible to encouragement and sympathy and training and discipline. This is the great and important raw material that any modern business man aiming to do a large business must deal with.

Too many of us are paying too much attention to the things of business and too little to the people who make and handle the things. To the modern business man it makes very little difference what kind of business he is in, it makes very little difference whether he is handling hardware or groceries or dry goods, or running a bank or a railroad or a school. These are but the things of business, the medium in which he exercises his business ability. I venture to say that our great and distinguished fellow citizen, Mr. Rockefeller, would have made as great a success out of the steel business as he has made out of the oil business, and that Mr. Carnegie would have made just as big a success of the paint business as he did of the steel business. And think of the tremendous success that the mighty Roosevelt would have made out of the advertising business.

But what I want to make clear is that the modern business man is a manager of men and not a manager of things. This human factor that I have referred to touches our business on all sides. First, it touches us on the side of the people who make our products; and next on the side of the consumer who uses our products. The staff must be made efficient, loyal and enthusiastic. We must have their whole-hearted co-operation and good-will; and the consumer must be satisfied.

In dealing with the staff it has been my experience that the problem of handling the staff is how to get the best out of them, not how to get the most out of them. The standard of the staff makes the standard of the house, and the standard of the house makes the standard of the service. If we have got the right kind of staff, well trained, well handled, all the rest will be easy.

Organizing an Efficient Staff

How are we going to organize, train and develop an efficient staff? First in importance I would say is the selection. It is astonishing how careful we are when we come to buy some new equipment or to put up a new building—the care that we take to investigate all sides of that proposition; but when it comes to the living machinery, we wait until we need an extra hand and then we take the first one that comes along. You will never secure an efficient staff in that way. Every organization should have some systematic method of securing applicants, looking into their history, making sure that they are in every way suitable for the work, and beginning with the office boy, right through, too much care cannot be taken in making your selections.

And next I would say, in building up a strong organ-

* Paper presented before the National Supply and Machinery Dealers' Association at Louisville, Ky., April 14.

† The W. M. Pattison Supply Company, Cleveland, Ohio

ization, is the necessity for providing a good place for the staff to work in. The modern business building to-day provides ought to in all cases good light and heat and ventilation, good washrooms and lockers, and a clubroom and a reading room and luncheon rooms. These are things that make your store a good place to work in, and they are not rare in business to-day. These things that are provided should always be provided in the spirit that the staff are entitled to them, and not in the spirit of charity, but in the spirit that it is a good thing for the concern as well as a good thing for the staff. In any other kind of spirit the results will be not what we expect.

And third in importance, in building up an efficient staff, I would put training. How many concerns have a systematic method of training the people of their organization? And yet it is of the very highest importance, if we are to develop the right kind of staff. We send our boys and girls to school and they are thoroughly grounded in the different grades, with great patience and care. But when they have finished school we send them into business and they usually have to make their way with no systematic training. So that every modern business house ought to have some systematic method of training its staff.

I might state that the employees of my company have an organization known as the Pattison Progress Club. Practically every employee that has to do with the selling end is a member. They formulate their own rules and regulations and take entire charge of their meetings, which are held monthly. They are addressed by representatives of the manufacturers whose lines we handle, or at times they assign to some employee a topic on which he lectures, followed by a general discussion. Question boxes are provided, and the answers to these questions are fruitful in good results. At other times they are asked to criticize whatever may be objectionable to them in the general management of our business, and I beg to assure you that some of the suggestions offered are quickly adopted, owing to their merit. We are glad to encourage these meetings, and furnish them a suitable clubroom where they can meet. We find these meetings most beneficial in developing a higher standard of efficiency and a spirit of co-operation far-reaching in its effects.

The Spirit of the Employees Builds a Business

Building a business has always appealed to me as very much the same thing as building a nation. What is it that makes a nation great? It is the spirit of the people, is it not? And what is it that creates that spirit? It seems to me it is the constitution under which they live; it is the institutions under which they are governed; it is the customs and habits and the achievements of the people. These are the things that create national spirit in a people. Now, if we can get that same thing into our business, we will get the same kind of a result—whole-hearted, loyal, enthusiastic service.

It is, therefore, of the highest importance that every man that comes into your business should know what the principles and policies of the concern are. He should be told that you expect to win on merit; that you are broad and liberal as well as aggressive in your policy and methods; that he should be loyal to your house and to all the employees, and that he should strive constantly for the improvement and advancement of the business and himself. He should be polite, courteous and truthful in all his dealings within and without the house. The keynote of these principles is efficiency. They should make the most of the business by making the most of themselves.

If you but encourage the young men starting with you to strive to make the most of themselves, and give them the opportunity to make the most of themselves, I have but little doubt that your business will grow and develop to meet your fondest expectations. Set your standard high. Impress upon your men that it is quite as much to their interest as your own that this goal should be reached. The reason we sometimes do not accomplish more is because we do not attempt more. The successful man to-day has something of daring in his make-

up, and must be willing to back his judgment, and take some chances.

And in closing I would just like to say this, that the man who is in business merely for the dollars and cents that are in it, who sees nothing more than the profits, will never make, in my estimation, a high success of his business. Unless he sees the opportunity for a useful career not only for himself but for others, he cannot reach the highest success.

Unfilled Orders of the Steel Corporation

The statement of the United States Steel Corporation published April 10 shows that unfilled orders on the books of subsidiary companies increased 46,758 tons in March, the total on March 31 being 3,447,301 tons, against 3,400,543 tons on February 28. A comparison is made below of the figures for March 31 with those issued monthly beginning with July 31, 1910, and with the quarterly statements beginning with December 31, 1908.

March 31, 1911....	3,447,301	July 31, 1910.....	3,970,931
February 28, 1911...	3,400,543	June 30, 1910.....	4,257,794
January 31, 1911...	3,110,919	March 31, 1910.....	5,402,514
December 31, 1910...	2,674,757	December 31, 1909...	5,927,031
November 30, 1910...	2,760,413	September 30, 1909...	4,796,833
October 31, 1910...	2,871,949	June 30, 1909.....	4,057,939
September 30, 1910...	3,158,106	March 31, 1909.....	3,542,595
August 31, 1910....	3,537,128	December 31, 1908...	3,603,527

The unfilled orders at the close of the years preceding 1908 were as follows: 1907, 4,624,552 tons; 1906, 8,489,718 tons; 1905, 7,605,086 tons; 1904, 4,696,203 tons; 1903, 3,215,123 tons; 1902, 5,347,523 tons.

It is understood that new orders entered in March were upward of 950,000 tons, or somewhat more than 35,000 tons a day for 27 business days, while shipments were above 900,000 tons, or at a rate considerably in excess of those for February..

The Hart-Parr Company's New Foundry.—The Hart-Parr Company, Charles City, Iowa, manufacturer of oil cooled gas tractors, has under construction a new gray iron foundry, 248 x 270 ft. The main bay of the building is 50 ft. wide, and is to have two electric traveling cranes to handle the large flask work. There are bays on each side of the 50-ft. bay 33 ft. wide, and on the south side of the building are three sections of saw tooth construction, each 30 ft. wide, running the entire length of the building. These sections are to be divided off into offices, and locker, pattern storage, pattern repair, casting and cleaning rooms, making the entire foundry work under one roof. The equipment from the old foundry will be utilized as far as possible, and as soon as it is installed in the new foundry the old building will be used for a forge shop. Nearly all the new equipment for the new building has been contracted for. This includes a No. 9 Whiting cupola, two 10-ton Shepard electric cranes, one extra heavy large molding machine built by the Taber Mfg. Company, and other smaller equipment. The company will have about 7½ acres of floor space under cover upon completion of the new building.

Lake Superior Iron Ore Analyses.—The Lake Superior Iron Ore Association, Rockefeller Building, Cleveland, has published its pamphlet for 1911, giving the analyses of Lake ores, as shown by complete cargo averages for the season of 1910. The list is fuller than that of any previous booklet, the distribution of the ores of which analyses are given being as follows: Gogebic range, 49; Marquette range, 66; Mayville range, 2 (Iron Ridge and Mayville); Menominee range, 54; Mesaba range, 101; Vermilion range, 7; Michipicoten district, 3; Sudbury district, 1 (Moose Mountain). In the cases of new ores the expected analyses for 1911 are given.

Contracts for installing a heating and ventilating system in the new New York City post-office were let April 6 to Baker, Smith & Co., New York, at their bid of \$165,000. The Otis Elevator Company got the contract for installing electric elevators at a bid of \$139,000.

The Pittsburgh-Westmoreland Coal Company

Developments in the New Washington County Field

The old Connellsville coal basin, extending from Latrobe to Fairchance, Pa., has only from 30,000 to 35,000 acres of unmined coal. Owing to the very heavy consumption of coke the average exhaustion of this basin is now at the rate of 2400 to 2600 acres per year. As a definite limit thus appears to be established for the supply of coke from that region, it is fortunate that good coking coal with low sulphur, the equal of that from the old Connellsville basin, was discovered a few years ago lying in Washington County, southwest of Monongahela City. The Jones & Laughlin Steel Company and the Lackawanna Steel Company secure their coke from this field. The land not owned by the steel companies is owned by the Pittsburgh-Westmoreland Coal Company and the Pittsburgh-Buffalo Company, the Pittsburgh-Westmoreland Coal Company owning about 17,000 acres, or an acreage equal to about one-half the unmined coal in the old Connellsville basin to-day. The land values in this particular coal field have risen remarkably the past six or seven years. Land that could have been purchased in 1904 for \$500 to \$600 per acre could not be purchased now for \$1200 to \$1500 per acre.

Extent of the Company's Operations

In 1907 the Pittsburgh-Westmoreland Coal Company, whose general offices are in the Fulton Building, Pittsburgh, Pa., with branch offices in Cleveland, Detroit and Buffalo, started to develop new mines and coke ovens, the mines to have a capacity of 15,000 tons a day with a plant of 2000 mechanical coke ovens, which would produce 6000 tons of coke a day. During the panic this work was suspended, but last year a large mine was opened near Bentleyville, Pa., and there were erected and completed 300 of the new ovens. These ovens have a total capacity of 1000 tons a day, and the operation of the plant is wholly mechanical. In the next year and a half the company will complete three new coal mining plants and 1500 new ovens, increasing its coal production to 6,000,000 tons a year, and as a third of it will be manufactured into coke its coke production will be 1,500,000 tons per year.

The coal is uniformly under 1 per cent. in sulphur, and runs only $4\frac{1}{2}$ to 5 per cent. in ash, while it is almost free from phosphorus. On account of the low sulphur and low ash, it is possible to take the slack and manufacture it into coke, shipping the lump coal to market for gas making, malleable iron purposes and steel melting. The coal of this particular field is claimed to be the only coal known in the country where the slack is low in sulphur and can be turned into coke; other plants, even in the Connellsville district, using run of mine coal where coke is made.

Everything Done Mechanically

The plant of the Pittsburgh-Westmoreland Coal Company is unique in the fact that everything is done mechanically. The coal is dumped on a tippie, the lump coal going into railroad cars, and thence to market, and the slack coal running by gravity on a belt, which takes it to a large concrete bin, holding 2500 tons. From this bin it runs by gravity into six jigs, where the small particles of slate and dirt are removed from the slack coal, which is then again elevated to a large bin. From the bin the slack coal drops into a larry by gravity and is hauled to the different ovens and dropped in. When run of mine coal is used, no slate is removed, this coal being sent directly to the ovens as it comes from the mine. A mechanical leveler, which operates on a track on one side of the ovens, quickly levels the coal, the doors are closed, and the coking process is completed without further labor. At the end of 48 hours, when the coke is fully burned, the doors are opened, and a pusher, which runs on the same track as the leveler, pushes the coke on a

conveyor which carries it into a coke car in large lumps and screens the coke during the conveying process.

On account of having the ovens operated by doors, the ovens are not open more than 20 or 30 minutes and the high heat is maintained in these ovens at all times, making the coke very hard, with good cell structure and the highest burden bearing qualities.

The team work noticed at this plant among the machines and the men who operate them is very interesting. The doors of the ovens are opened ahead of the pusher and conveyor and five or six ovens are kept watered ahead of the machinery. The conveyor is a large and very heavy machine with a cab on it at a height greater than the ovens. It not only conveys the coke and screens it but it also shifts the railroad cars. The height of the cab on the conveyor enables the operator to look across over the ovens and signal to the man who operates the pusher machinery, so that there is perfect team work in the removal of the coke from the ovens. The larryman then immediately fills the oven full of raw coal. The man who operates the leveling machine is waiting for the larryman to drop the coal into the oven, and levels the coal within two minutes after the coal is dropped into them. The doors are then closed, and this finishes the entire labor in the manufacture and removal of the coke into railroad cars.

Through the almost automatic operation the cost of the manufacture of coke at this plant has been reduced to approximately 15 cents a ton, which is to be compared with 35 to 40 cents in the ordinary bee-hive ovens in the Connellsville field.

This new field of coking coal promises in a few years to be the center of the coke making industry of western Pennsylvania. The discovery of this field and its successful development will add great wealth to the Pittsburgh district. The best coke in the world has for many years been that made in the old Connellsville basin, but it has been proved that this field of coal makes coke of equally high quality and thus prolongs the period in which such coke will be available in western Pennsylvania.

The Proposed Southern Merger

At the request of various classes of security holders of the Southern Iron & Steel Company and of the Alabama Consolidated Coal & Iron Company, Cecil A. Grenfell, of London; Alexander J. Hemphill, president of the Guaranty Trust Company; Charles Hayden, of Hayden, Stone & Co.; Benjamin Strong, Jr., of the Bankers' Trust Company, and Henry H. Melville, of Montreal, have consented to act as a committee to carry out a plan for the merger of the two companies. A plan and deposit agreement embodying the basis of the proposed merger and reorganization will be filed with the Bankers' Trust Company of New York as depositary, under which security holders will be invited to deposit their securities. Holders of the Southern Iron & Steel Company first and refunding mortgage 20-year gold bonds, 6 per cent. gold debentures, 1-year, 6 per cent. gold notes, preferred stock and common stock are notified that default having been made in the payment of interest on the bonds and debentures, Edwin G. Merrill, John W. Platten and Harry Bronner have consented to act as a committee for the protection of their interests. Holders of securities are requested to deposit them with the Union Trust Company of New York.

The New York and New Jersey Branch Metal Trades Election.—The New York and New Jersey Branch of the National Metal Trades' Association held its annual meeting April 10, and after a luncheon at the Machinery Club of New York elected the following officers: President, Michael Fogarty, New York; vice-president, M. K. Bowman, Bowman-Edson Company, New York; treasurer, L. A. Bevin, Rider-Ericsson Engine Company, New York. Executive Committee: A. B. See, A. B. See Electric Elevator Company, New York, and Peter Weber, Edison Phonograph Works, West Orange, N. J.

MUTUALITY*

The Betterment of Industrial Conditions Good Business Policy

BY W. A. GRIEVES, COLUMBUS, OHIO.†

Cooperation has become the dominant consideration in present day business. Its power is being emphasized in every movement toward social and industrial progress. Manufacturers realize that only through this medium can their mutual interests as manufacturers be best conserved. As successful business men you know the necessity of co-operation, one with the other, in obtaining the results for which you are striving. You are here to-day with this one dominating thought: "What can we do that will bring greater harmony and consequently larger gains to our business?"

Now, it has always seemed to me that in this effort toward co-operation we have been working from effect to cause when we should have been working in the reverse order—from cause to effect. We have been directing our efforts in combating undesirable influences and conditions, for the making of which we have been at least to some degree responsible. But we are learning and there are encouraging signs for the future, as I notice, in glancing over the report of the last annual meeting of your association, a statement in the report of your commissioner, which reads:

The past year has been rather uneventful in labor incidents, your officers having devoted more of their time to preventing rather than combating labor difficulties.

That sounds good. It is getting at the nerve of the whole matter. It is fast becoming the spirit of the hour. We are beginning to see that the differences between employer and employee are not, after all, so much of a problem. We are thinking of them in terms of a condition, and the efforts of your officers to improve that condition point to a new era of more amicable relationship.

A New Idea Among Employers

To the thoughtful employer and business man has come a new idea. He is beginning to regard any movement for the betterment of industrial conditions as not only humanitarian but as good business policy.

Frequently we hear it said that any effort toward labor efficiency betterment has its origin, not in the desire for public good, but in selfishness, and some employers are inclined to regard it with a degree of suspicion. They have seen some failures, some evidence of ingratitude on the part of employees, and because of this have said there is nothing in it. But with this view we have very little sympathy. Our years of experience in associating and working with men compel us to regard any such conception as wrong. And this is the line along which progressive and farsighted employers are thinking and working; and judging from your commissioner's report of last year, it has been effective.

To my way of thinking there is no other solution, and the fact that your association has honored me by inviting a discussion of the subject of labor efficiency betterment among employees is evidence that the desire is strong on your part to improve the condition.

Labor efficiency betterment, as generally conceived, is not a new factor in industrial life. For years many attempts have been made along this line with varying degrees of success. Like every other phase of industrial progress, experiments had to be made, and in doing so many mistakes have resulted. But these are to be expected in every line of activity having as its aim the improvement of the condition.

The honest and aggressive employer is asking the question: "What elements can I bring into my business that will increase the output, reduce the cost of

production, and at the same time raise the wages and earning capacity of my employees?"

Workmen Must Have Inviting Environment

In the consideration of these questions many employers have not observed the fundamental element essential in obtaining the results he is seeking. If the output of his business is to be increased, he must employ the best workmen, for the burden or overhead is no greater for a good man than a poor one; and if his shop is run on modern plans, he can reduce the cost of production, at the same time raise the wages and earning efficiency of his men, as well as greatly increase production.

But the problem does not end here. If the employer is to have the most competent and intelligent men in his service he must provide the most inviting environment, for intelligent and thrifty men seek the most intelligent and wholesome places to work. Now, the difficulty in the way of greater progress in the field of industrial betterment seems to lie in the fact of the employer not knowing just how far he can go and at the same time avoid the criticism that he is paternalistic. To strike the middle ground between these extremes is the question. To do so, the employer must know his men; and if his business is such that a personal contact with his employees is impossible, he should secure the services of some one qualified by training or natural ability to do it for him.

The Social Engineer

This condition has led to the creating of a new field in present day industry—namely, that of the social engineer. I don't know that the title is a good one, but it seems to be the best to designate the calling that has yet been found.

Mutuality, or labor efficiency betterment, if it is to mean anything, must not be hurried. All permanent things are of slow growth, and this feature of modern industry cannot be made an exception. As in many other lines of moral and physical uplift, the progress of labor efficiency betterment has been greatly retarded because of the mistakes of those who, eager in their desire for personal gain, have made it a matter for commercial exploitation.

The average workman is at once suspicious of anything suddenly thrust upon him, even though it may be for his wellbeing. To be successful, therefore, any attempt at industrial betterment must be approached from the standpoint of a thorough understanding on the part of the employer and employee that it is to be for their mutual interests.

I recall very distinctly an incident in my early experience in this work of an ill fated attempt to hurry a project that was designed to help promote mutuality, but which was turned down by the employees for no other reason than that they did not understand it. The lesson was somewhat dearly learned, but it was far-reaching. It taught me that if the work in which I was engaged was to succeed it must be brought about slowly, step by step, here a little and there a little, until the entire confidence of the men has been secured.

To obtain this some person must have the work constantly in mind, and while it is necessary that the start should come from the employer himself or some one delegated by him, the greatest results will not be found until the employees themselves have been enthused to the degree that they will make suggestions direct. Get an employee to feel that the responsibility for carrying into effect his own suggestion devolves upon him, and in

Address before the National Metal Trades Association, New York, April 12.

† Employment Superintendent Jeffrey Mfg. Company.

nine cases out of ten he will work hard to see that it is done.

How to Win the Support of Workmen

Allow me to illustrate this point by a specific incident which occurred in our own plant about two years ago. We had a mutual aid association that had been in existence for about 18 years. It had been through all the vicissitudes and trials incident to associations organized along similar lines. It had done much good, but had not elicited the support of the employees to the degree that was possible under different organization.

It fell to the lot of the writer to attempt a reorganization. A plan was submitted which, if carried out, we believed would increase the membership at least 200 per cent., this conclusion being reached after a careful study of the situation. The evening upon which the vote was to take place arrived, but it was discovered that two or three men who had not been consulted about the plan, and who consequently misunderstood it, were doing all in their power to defeat it. These men were influential among their fellows to the degree that defeat of the plan was inevitable. Seeing the situation was hopeless, I moved that a committee composed of these men and myself be appointed to reconsider the plan, claiming that nothing could be lost by the delay. After much argument the motion was carried.

The committee met and, instead of taking the initiative in the discussion, I asked for a suggestion as to how the plan might be improved. The member who had been the principal cause of opposition made a suggestion of change, the adoption of which did not in reality affect the original plan, but the insertion of which seemed to win him wholly for it. He was made chairman of the committee and made the report to the association at its next meeting. The plan was unanimously carried and inside of one year the membership had increased nearly 300 per cent.

I cite this merely to show that if results are to be obtained the interest of the men must be secured. They must be educated to realize that everything that helps to make more desirable the working conditions is an advance toward the goal of harmonious relationship and better understanding.

When the Jeffrey Company Began Systematic Industrial Betterment

While the company which I represent has always been interested in seeing that good physical conditions existed about the plant, it was only about two years ago that steps were taken for a definite policy of industrial betterment. And in this connection let me say that the work was not conceived through any spirit of sentiment, but rather as a business proposition. Our company has always acted upon the belief that that which is good for the employee must be good for the employer, and this idea has constantly been emphasized to the employee as each phase of our labor efficiency betterment has been developed. That this plan has worked satisfactorily and produced results is not due, we believe, so much to anything we ourselves have done as it is to the fact that it is right and human. We believe that there is no danger in sympathetic co-operative fellowship of employer with employee, a fellowship of purpose and interest, established not upon the plane of paternalism, but upon the plane of justice to both. The greatest strength and largest hope for the great industrial forms, which all fair-minded men are seeking, depend upon our finding this meeting ground of common interest and purpose.

Partnership with our workmen and the desire to realize it with all its benefits is fast becoming the dominant consideration. Gradually we have reached this point and are finding the call of duty, with regard to the question of protection of health and limb of our workmen and many kindred questions, lengthening out straight and clear before us, and have found opportunity for accomplishing the needful things waiting at our doors. This is not said from the standpoint of those who have attained, but rather from that of those just beginning to do and who are finding a sense of satisfaction in work-

ing out these problems which have as their supreme aim the workman's right to all that is due him.

Some Details of the Jeffrey Company's Methods

Now, as this discussion was to contain practical suggestions, I shall briefly enumerate some of the phases of industrial betterment being successfully carried on by our company. After the reorganization of our Mutual Aid Association two years ago, we adopted the plan of strongly requesting each new employee upon entering the employ of the company to take membership in the association. This method of securing members, of course, has proved tremendously prolific. While membership is not compulsory, the benefits are so attractive that more than 93 per cent. of all employees who did not already have all the protection they could afford to carry have been secured for membership. This has been an excellent protection for our men, as an employee can secure for the small sum of \$1 per month as high as \$200 in benefits in one year.

Before making self-protection a part of the employee's obligation upon entering our employ, the Mutual Aid Association was continually calling upon the members for special assessments, and frequently appealing to the company for contributions. Under the new plan we have had each year, after paying all claims, \$2000 in the treasury, all at a cost of one-third to two-thirds less than under the old plan.

Our experience shows that as a rule the average employee will not protect himself unless urged to do so; and while some employers contribute as much as 50 per cent. of the premium to these associations, it does not act as an inducement for the men to join. Given the proper organization, together with due emphasis upon a man's duty to protect himself, and the responsibility of the success of the organization placed entirely upon the men, you can count upon a reasonably prosperous association. Men appreciate most that which costs something, whether it be in money or effort in social service.

Plan of Caring for Injured Men

Next in importance to our system of accident prevention by the constant installation of the latest safety devices is our plan for caring for our injured men. About three years ago we made a careful study of the number of men who were off work owing to slight injuries, which in themselves were not serious, but through the lack of proper antiseptic treatment had become infected. Our records showed that on an average as high as a half dozen men were away from work daily for this reason. As it had always been our policy to pay wages for a portion of the time lost by our employees through injuries, this investigation revealed a condition that represented a twofold loss. We reasoned that under proper antiseptic treatment these infections could be reduced to a minimum, and not only would we save the amount of the employee's wages, but also the greater loss occasioned by a decreased production.

It was not unusual to find some of our most skilled and highest paid mechanics off work for several days because of infection caused by a slight cut or bruise, and when you count what that may mean in decreased production, not only of the injured man himself, but also the possible holdup of an order all along the line, it is not easy to determine the loss.

From the standpoint of cold business this condition demanded a remedy. We at once set to work and thoroughly equipped an emergency hospital, and placed a regularly graduated physician and trained nurse in charge. The doctor's entire time is given to the hospital work, and he is assisted in the mornings with the redressings by the nurse. The nurse's time in the afternoon is given up entirely to visiting sick or injured employees or their families. Out of some 4000 cuts, bruises, sprains, &c., together with redressings to the number of over 4000 last year in our plant, the infections resulting did not average more than four per month.

At the close of this report will be found a summary of the surgical and medical cases taken care of in our hospital for the year ending October 31, 1910.

These figures might suggest to you that there was an abnormal number of accidents in our shops. Such is not the case, however, as we have been told by inspectors that our plant is among the best in the use of safety devices and ways of accident prevention. We believe there are no more accidents in our shops than may be found in any modern and well equipped factory employing the same number of men.

You may ask of what direct benefit to us is it to have the doctor treat such ailments as colds, indigestion, headache, cramps, sore throat, boils, and all the other ailments noted in the list. We answer for the very same reason that it pays us to prevent infection resulting from injury; for the reason that if a man is valuable to have in our employ, he is more valuable if he is in a good physical condition. If an employee has a headache or cramps, it is more profitable to have him treated at our own plant, relieved of his suffering, and sent back to work within an hour, than it is to have him lose a whole day. Then, too, the work our doctor does in the way of preventing illness among our employees, by prescribing when the first symptoms are evident, cannot be over-emphasised. Dozens of cases of this kind have been brought to our attention. The men are more and more taking the doctor into their confidence, and he is teaching them, in many ways, how to live better physically.

The Work of the Nurse

During the past year our nurse made 989 personal calls in the homes of our employees, all of which were made on account of illness or accident to employees or their families. It would be impossible to enumerate at this time the far-reaching results of a work of this kind. From the mission of helping to soothe the pains of a sick baby or consoling the sorrow of a mother discouraged, to that of the work of a truant officer in finding whether the employee reported ill is really sick or away on a fishing or hunting excursion, the diversity of this nurse's duties may be realized.

We have many calls from the homes of our employees on account of illness of the wife and children. It was quite common for some of our most valuable men to be away from work on this account. Now, instead of the men going home, the nurse is sent. Nine times out of ten she can be of far more assistance than could the father, and this not only saves the time the men would otherwise lose, but is also a great advantage to the company in having the men at work.

Then, too, the nurse's work among our women employees is valuable. What the doctor is to our men, the nurse is to our women. They have learned to confide in her their troubles, and she is constantly being called upon for advice and service.

Another place where the nurse's services have proved to be of financial value is when an employee is injured and is away from work; she is then a medium of goodwill and interest. Her assurance that the company will deal fairly and squarely with the injured man has many times made the ambulance chaser's prospects look slim, and out in Ohio, where our liability laws are so much one sided, employers from that State will realize the force of this.

Just at this point in the dictating of this paper, the writer's attention has been called to the absence of an employee who has been reported sick for two days. He was one of two men in our employ who could do a certain work better than any one else. There was a rush order of rather unusual size to be completed on a certain date subject to penalty. The foreman had some question as to the reality of this man's illness, and the nurse was sent to investigate and do what she might in helping him recover. The result of her visit revealed his absence to be not due to illness, but rather to his enthusiasm and interest in a bowling contest that was being pulled off in a certain alley in the neighborhood. It may not be necessary to mention that he reported for work that afternoon.

And so we might speak of many other ways in which this nurse is a valuable factor in our plant, but time will not permit.

Provisions for Employees' Comfort

Another example of labor efficiency betterment being a good investment from the standpoint of business is illustrated in a portion of our electrical department where some 50 girls are employed. When we first began to employ girls we did not have a desirable rest room where they might eat their lunch and rest during the noon hour, and although the work was not hard and such that they could make good wages—above the average for women—we experienced great difficulty in keeping them. It occurred to us that if an attractive and well-furnished room was provided in which they could spend the noon hour in reading, resting and social intercourse, it might help solve the question of why the girls were so often leaving our employ. We did this and in less than one month a 50 per cent. increase in permanency resulted, until now it is only a rare case in which girls can be induced to leave us. In fact, so attractive is the environment in which they work that we constantly have applicants waiting for a vacancy to occur in order that they may have a chance of filling it.

Until about two years ago there was no place in our factory to which the male employees could go to smoke or read during the noon hour. As smoking was prohibited within our factory gates, owing to the danger from fire, employees who wished to smoke were compelled to go into the street, or, in disagreeable weather, to the corner saloon with all its undesirable surroundings. We reasoned that if a man wanted to go to the saloon it was perhaps his own business; but if one of our employees wanted to smoke he ought not to be driven to the unwholesome atmosphere of the saloon to do so.

The writer suggested the need of a clubhouse, and did not have any difficulty in getting a meeting of the employees to talk the matter over. A committee was appointed to take the matter up with the company. The result was that the management secured an adjoining residence to our plant and fitted it up as a clubhouse for the employees. All the latest magazines, both popular and technical, are provided, together with reading and writing facilities, card tables, &c. These rooms are filled every noon hour, and are now patronized to the extent that they are not nearly adequate to accommodate the members who go there each day. One especially encouraging result of the establishing of these clubrooms was that shortly after they were opened one of the saloons in the immediate vicinity went out of business, and, although several attempts have been made to re-establish it, none of them has been to any degree successful.

A Restaurant and Dining Room Provided

A recent and exceptionally successful feature of our industrial betterment work has been the introduction of a thoroughly equipped restaurant and dining room. About six months ago we found in one of our buildings, rather well adapted for this purpose, about 2000 sq. ft. of floor space that could be inexpensively fitted up for such use. A committee of employees was chosen to manage it, the purpose being to give the very best service for the lowest possible cost; and, although failure was predicted by many, we have gone right ahead for six months giving excellent service at a most reasonable cost. Everything to eat is of the home cooking variety, and for a cost of from 10 to 20 cents a good warm meal, served in the most wholesome surroundings, can be secured. Between 300 and 400 are served each day, and our capacity is being strained to the point where we will soon be compelled to provide larger quarters.

The company does not contribute anything to this except to furnish the room and light and heat. All help is paid for out of the receipts, and we are laying away a few dollars each week for improvement and depreciation of equipment. We installed one of the best phonographs we could buy, together with a variety of records ranging from Caruso and Melba, to a few of ragtime sentiment. The latter, we are glad to say, have not met with approval, and we find there is greater demand for the very best selections of vocal and instrumental music by the great artists.

It is interesting to see how the men will wait and listen to the strains of uplifting music until the last minute before the whistle blows; and we cannot help but feel that they return to their machines with a much better mind and heart attitude than if they had spent that time in the contaminating surroundings of the neighborhood saloon.

Helping Employees to Save Their Earnings

Acting on the theory that a community is the most prosperous whose working people have the most and best home life, and that the most and best home life conduces to the highest wages, the best education and training and the greatest prosperity of a community, we have recently started a movement toward the establishing of a Building and Loan and Savings Association among the employees.

We believe that we should assist in every way that we can, without touching the border line of paternalism, to help our employees learn to save their earnings. We are convinced that it is not so much the intense desire to squander, as it is perhaps the lack of an immediate opportunity to save, that men do not save more. Saving money is largely a matter of realizing its importance, and if we can help foster any agency that will encourage this sentiment among our employees, we believe it is our duty to do so.

This is a point for financial consideration on the part of employers. While there is perhaps no exact method of determining the loss in dollars and cents due to the constant changing of employees, we are convinced that it is of such magnitude as to add a considerable increase to the cost of production. And not only is this expensive to the manufacturer, but we believe in most cases it is unprofitable to the employee. No matter how competent or skilled the workman, there is always a loss to the employer when, a new employee begins work. Adjustment to the new methods of working takes time, and this is bound to mean loss. We could cite many instances where employees have been induced to leave our employ for the small sum of 2½ cents per hour increase in rate to go to a distant city with their families at a great expense, only to find the job to be temporary. In most cases these moves have meant loss not only to the employees themselves, but also to the company. If the workmen owned their own homes or were endeavoring to, it would not be so easy for them to leave, and hence the gain to all concerned.

While it is too early to prophecy to what extent an institution of this nature can be made successful; yet, judging from the interest and enthusiasm manifested on the part of employees, the outlook is most encouraging. We believe the plan can be made a potent factor in not only helping the employee save his earnings through which he may get a home of his own, but that it will be most profitable to the company in establishing a more permanent constituency of desirable employees.

Labor Efficiency Betterment Pays

Now, I have enumerated some phases of labor efficiency betterment which have seemed to us sufficiently important to take up as a permanent feature of our business. As we said at the beginning of this discussion, we have done so step by step, believing that it is good business, and never once allowing our employees to have any other impression. That we have been reasonably successful is not due to the fact that we have attempted anything unusual or extraordinary. We have taken up those things which have seemed to us could be made better, and in a quiet and unassuming manner have succeeded in getting results.

Now the question is asked, "After all, does it pay?" Our own experience answers emphatically in the affirmative. Mutuality is far-reaching. It includes something more than merely business success, for it affects the moral and material welfare of any community.

We may rightly emphasize the good business of any such policy; but after all there is an element of sentiment interwoven through all the industrial fabric, the absence of which would be seriously felt. A business policy that absolutely ignores all feeling of sentiment is

not desirable. There are contributory causes for business success, and they are fostered by a system of management which recognizes in every one of us a closer tie than that which can be measured by any pecuniary relationship. The dollar does purchase perfunctory service, but it cannot and never will secure of itself loyalty and good-will.

Summary of surgical and medical cases taken care of at the factory hospital of the Jeffrey Mfg. Company, Columbus, Ohio, for the year ending October 31, 1910:

Surgical:	
Original cases.....	4,266
Redressings.....	4,291
Intention.....	47
Medicinal:	
Coryza (colds, la grippe, &c.).....	620
Indigestion.....	418
Headache.....	370
Cramps (of stomach, dysmenorrhea, &c.).....	305
Sore throat (tonsillitis, pharyngitis).....	251
Inflamed eyes (conjunctivitis).....	143
Constipation.....	123
Toothache.....	90
Diarrhea.....	87
Boils.....	62
Rheumatism.....	54
Special advice.....	36
Diseases of skin (eczema, ivy poisoning).....	29
Neuralgia.....	25
Nausea.....	20
Biliousness.....	19
Hoarseness.....	16
Lumbago.....	15
Bronchitis.....	12
Congested kidney.....	12
Hemorrhoids.....	8
Earache.....	8
Ill effect from heat.....	6
Nervousness.....	6
Heartburn.....	6
Backache.....	6
Felon.....	5
Congested liver.....	4
Asthma.....	4
Jauddie.....	3
Carbuncle.....	3
Dizziness.....	3
Hives.....	3
Ulcerated teeth.....	3
Pleurisy.....	2
Heart trouble.....	2
Epilepsy.....	2
Sick headache.....	2
Nasal catarrh.....	2
Measles.....	2
Nose bleed.....	2
Cystitis.....	2
Total.....	11,394

Germany's Steel Production in 1910

The statistics of steel production in Germany and Luxemburg in 1910 are as follows, in metric tons, with comparison with 1909:

	Number of works pro- ducing. 1910.—Tons.	Number of works pro- ducing. 1909.—Tons.
Acid Bessemer ingots.....	3 171,108	3 151,148
Basic Bessemer ingots.....	24 8,030,571	27 7,517,451
Acid open hearth ingots.....	13 140,189	14 228,798
Basic open hearth ingots.....	64 4,973,569	60 3,844,139
Acid castings.....	45 111,959	42 83,014
Basic castings.....	41 151,852	36 123,442
Crucible steel.....	21 83,202	24 84,069
Electric steel.....	13 36,188	8 17,773
Totals.....	119 13,698,638	115 12,049,934

The doubling of the 1909 output of electric steel last year is an interesting feature of the statistics. This result was apparently somewhat at the expense of crucible steel. Acid open hearth steel fell off considerably. The significant feature of the table, however, is the very large increase in basic open hearth, amounting to nearly 30 per cent.

The Colonial Iron Company, Riddlesburg, Pa., will install in connection with its new blast furnace stack a complete new stock handling equipment, including skip hoist and bins. Frank C. Roberts & Co., Philadelphia, Pa., are the engineers.

Employers' Liability Insurance

The Report of the National Metal Trades Association Committee

A valuable report presented at the convention of the National Metal Trades Association, Hotel Astor, New York, this week, was that of the committee on Employers' Liability Insurance. The chairman is William Butterworth, of Deere & Co., Moline, Ill., and his associates are George F. Steedman, Curtis & Co. Mfg. Company, St. Louis and Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I. The report covers 94 printed pages of a pamphlet $5\frac{1}{2} \times 8\frac{1}{2}$ in., and is not only a comprehensive but an able document. It traces the progress made in dealing with industrial accidents and in compensating employees and their dependents. Legislation in Great Britain and Germany is reviewed, as well as the practice of industrial companies in both countries. Coming to the United States the report takes up the legal aspects of the subject and describes the modifications made by the State laws recently adopted and those proposed by the commissions in other States. The plans for relief adopted by the United States Steel Corporation, the International Harvester Company, Deere & Co., and the ideas advanced by labor organizations and associations of employers as to the best methods of dealing with the question are discussed.

The Rate of Compensation

Considerable space is given to the compensation rate and quotations are made from the reports of the various State commissions. The New York Commission made an extended investigation into this branch of the subject. Data were secured from 52 firms employing about 29,000 persons and a study was made showing the actual cost of accidents in the year 1907 and the cost under a compensation scheme which allowed three years' earnings in case of death and half earnings during disability, making up the loss of wages where partial disability reduced the earning capacity. The New York report concludes that the figures afford strong evidence that large manufacturing concerns could pay compensation on such a scale as that used in the New York report, which is fully equal to the present English system, at no greater cost than many of them are now actually incurring for accidents, and probably in some cases for less. It is assumed that this conclusion should not be made to apply to small employers.

The committee says concerning contributions by employees to the compensation fund that no way has been found of bringing this about by legislation. While the example of Germany and Austria in obliging a workman to devote a fraction of his earnings to an accident fund cannot be followed in the United States, the committee suggests that this may be left as a matter of contract between the employer and the employee. The committee favors a contribution by the employee, not so much to relieve the employer of a part of the cost, as to increase the compensation, and give the employee more independence and a greater interest in the plan.

Employers and Employees Should Have a Choice

The question of the classification of industries according to risk is one which, the committee thinks, merits great consideration. A mandatory statute made applicable to all employers might be held unreasonable by the courts since a large number of small industries involve no particular hazard. Any safe legislation, though compulsory in form, must be elective in fact, and should embrace all industries, though it might be that a limitation of the act to industries employing more than a specified number of men would be approved by the courts. The report adds that any bill drafted should reserve to both employer and employee their rights at common law, but providing as to the employer that if he pursues his common law remedies and refuses to make settlement of compensation under the act, his common law defenses shall be limited (the limitation to be fixed by the act), and with the further proviso as to the employee that he

shall be presumed to have accepted the compensation plan unless he expressly contracts to the contrary; and that any acceptance by him of compensation at common law shall bar him from all benefits in the compensation provided in the act. Or it might be made elective in form, with the same penalties to follow an election not to pay the compensation provided.

Voluntary Associations of Manufacturers

The conclusion of the committee is that while it might seem desirable to compile a bill which would meet the approval of the association it would be very difficult to do this in a way that would be acceptable to the various States in which the membership is found. The committee, therefore, contents itself with referring to the proposed bills in the States now having the subject under consideration by commissions or legislative committees. The suggestion is made, however, that voluntary associations be organized in the different National Metal Trades' Association districts, each member to contribute his fair proportion to a compensation fund of such a size as properly to take care of all accidents and sickness among the employees.

Manufacturers' Experience with Accident Insurance

In connection with the report several pages of statistics are given gathered from a list of 200 manufacturers. Out of 176 replying 20 per cent. reported that they depend on some form of accident or liability insurance for protection; 43 per cent. said that they employ the usual precautions, such as protecting exposed gears, saws, belts and other dangerous parts; 7 per cent. claimed to employ some forms of insurance and also to adopt the usual safety appliances. To the question "Do you carry liability insurance?" 87 of the replies were in the affirmative. Out of 197 manufacturers replying to an inquiry concerning employees' aid associations 51 companies, or 26 per cent., reported such associations, but only 15 per cent. of those having associations said that membership is compulsory. Out of the 51 companies 29 do not contribute to the support of the association. The remaining 22 contribute in divers ways and varying amounts. Concerning insurance benefit systems, 192 replies were received. Of this number 26 companies, or 14 per cent., claimed to have adopted some insurance system. Out of the 26, 62 per cent. cover sick benefits, 80 per cent. pay death benefits, and 80 per cent. require employees to contribute. Only 5 companies out of 190 replying to the question on pension systems reported such systems in use.

Out of 162 firms reporting as to records of accidents, 62 per cent. said that they keep such records. Thirty-eight per cent. do not keep such records except of notices sent to insurance companies. Reports from 34 manufacturers show their combined cost for accidents in one year to be \$22,333, at an average cost to the company of \$656.86. Another group of 192 accidents cost seven companies \$3256. One company paid in one year for 271 accidents and one accidental death \$3258. An inquiry was sent as to membership in local mutual insurance associations organized by the manufacturers. Of 176 companies replying only 6 belonged to such mutual insurance associations.

Judge Holt in the United States Court has rejected the bid for the assets of the J. B. & J. M. Cornell Company on several grounds, among which are that it did not offer to pay the receivers, A. Gordon Murray and Michael Blake, anything for their services or expenses, left them without means to carry out contracts not included in the bid, and that the court had no power to compel non-assenting creditors to accept the terms offered to them. If no other bid is made an order will be entered directing the receivers to turn over the property to the trustee, that he may proceed in the liquidation of the estate.

William E. Hill & Co., Kalamazoo, Mich., manufacturers of saw mill machinery, are now making steel castings with a 3-ton Fischer converter.

The Influence of Manganese on Soft Steel

In *Metallurgic* for January 8 and 22 is an important paper on "The Influence of Manganese on the Properties of Low Carbon Steel" by George Lang. The author briefly reviews the literature of the subject, dealing with percentages of maganese up to 3 per cent, and finds little agreement in the results of various workers.

The manganese used in the preparation of the samples was made by the Goldschmidt process and contained only 0.2 per cent. carbon; the manganese content was 95.17 per cent. The requisite amount was melted in a small crucible and metal from an electric furnace, with about 0.1 per cent. carbon, poured in; the whole was thoroughly mixed. The metal, weighing about 100 lb., was poured in a sand mold 3.93 in. square, the casting being upright. As soon as possible it was removed and cooled in the air. To get away from the influence of segregation, the upper 50 per cent. was cut off, leaving about 50 lb. of metal. The manganese loss was about 10 per cent. The ingots were carefully heated and rolled to round bars 1.18 in. diameter, and part of this was drawn into wire of 0.236 in. diameter for electrical and magnetic tests. Drillings were taken from both ends of the rolled bar, and gave the following average results:

Table 1.—Analyses.

No.	C.	Mn.	S.	P.	Si.	Cu.
1.....	0.109	0.285	0.046	0.063	0.319	0.131
2.....	0.125	0.440	0.050	0.067	0.286	0.164
3.....	0.126	0.675	0.046	0.067	0.303	0.167
4.....	0.099	0.785	0.052	0.040	0.311	0.123
5.....	0.098	1.020	0.049	0.041	0.316	0.140
6.....	0.100	1.270	0.045	0.099	0.313	0.146
7.....	0.101	1.315	0.047	0.102	0.303	0.141
8.....	0.102	1.765	0.056	0.103	0.309	0.152
9.....	0.099	1.835	0.059	0.108	0.324	0.126
10.....	0.090	2.230	0.058	0.102	0.301	0.129
11.....	0.092	2.470	0.051	0.110	0.294	0.125

The silicon is high, but practically constant. It is present because the original metal was intended for steel castings. The results of testing the rolled bars are shown in the following table:

Table 2.—Untreated Material.

No.	Elastic limit. Pounds.	Ultimate stress. Pounds.	Elongation. Per cent.	Reduction area. Per cent.	Nick test.	Brinell hardness.
1.....	46,082	62,581	27.8	53.5	23.2	119.0
2.....	47,647	64,999	29.2	62.5	29.4	115.4
3.....	49,781	66,279	29.4	63.9	28.1	115.0
4.....	49,283	64,572	27.8	65.9	33.4	118.6
5.....	51,629	68,128	28.6	64.2	31.8	123.2
6.....	54,332	71,399	27.9	68.1	26.4	132.4
7.....	54,047	71,257	28.0	67.7	34.0	133.6
8.....	57,959	82,493	25.9	54.7	25.1	156.2
9.....	58,457	84,982	26.0	46.7	23.6	162.0
10.....	61,017	92,734	21.2	43.4	9.5	198.6
11.....	63,435	102,975	18.8	39.4	2.7	211.0

The nick test was carried out on a piece planed out of the round, 10 mm. square and 100 mm. long. The nick was 10 mm. deep, its radius being 2 mm. The results are given in kilogram meters per square centimeter.

In the next table are given the results on annealed bars. The annealing consisted of heating to 900 degrees C. in a gas muffle, for one hour, and cooling very slowly under Kieselguhr. The Brinell hardness test was made at a pressure of 3000 kilograms, and with a 3/8 in. ball (9.525 mm.).

Table 3.—Annealed Steels.

No.	Elastic limit. Pounds.	Ultimate stress. Pounds.	Elongation. Per cent.	Reduction area. Per cent.	Nick test.	Brinell hardness.
1.....	43,238	56,892	31.5	70.0	30.8	113.4
2.....	43,593	57,603	30.5	66.8	30.6	115.8
3.....	44,376	59,452	30.2	70.0	31.0	115.4
4.....	45,087	59,737	30.2	70.1	32.1	117.8
5.....	45,514	61,159	30.7	71.8	37.2	123.4
6.....	46,651	64,999	30.2	72.6	43.3	131.8
7.....	47,718	65,852	29.8	70.3	44.0	134.8
8.....	48,358	73,960	27.4	72.3	41.6	158.7
9.....	49,212	78,511	26.2	66.7	37.5	164.5
10.....	49,923	92,023	18.7	60.6	24.3	198.0
11.....	52,270	108,237	15.3	53.1	13.9	218.4

In the following table are given results on quenched steels. The bars were heated as before in the muffle for one hour; then quenched in water at 15 degrees C., with constant agitation.

Table 4.—Quenched Steels.

No.	Elastic limit. Pounds.	Ultimate stress. Pounds.	Elongation. Per cent.	Reduction area. Per cent.	Nick test.	Brinell hardness.
1.....	42,953	78,795	19.6	61.0	23.6	146.5
2.....	46,936	82,493	19.2	62.0	27.0	165.0
3.....	48,643	84,200	16.0	62.2	29.4	154.2
4.....	49,638	84,485	14.1	56.1	30.0	157.4
5.....	54,261	96,859	15.5	53.0	27.2	179.0
6.....	63,008	107,810	15.2	48.2	18.4	230.2
7.....	66,137	111,224	16.3	47.8	18.1	237.0
8.....	85,694	155,031	9.0	44.6	14.8	273.6
9.....	89,178	157,164	6.7	41.7	14.5	288.8
10.....	91,027	164,560	4.9	26.6	12.3	326.0
11.....	92,307	166,551	3.1	18.9	11.7	144.42

Discussion of Results

The results show that the average effect of the manganese in raising the tenacity in low carbon steels is 2135 lb. per sq. in. for each 0.1 per cent., manganese. This applies up to 3 per cent. of manganese, but if the results are plotted it is seen that the influence is greater, the higher the manganese percentage.

The elongation in the unquenched steels is practically unchanged up to 1.8 per cent. manganese, and amounts to over 25 per cent. As the manganese increases it falls to 15 per cent. with 2.5 per cent. present. The quenching brings about an important decrease in the elongation. The contraction of area in the unquenched steels begins to fall when 1.3 per cent manganese is reached.

The tensile tests in general show an increase in tenacity and a decrease in ductility with increasing manganese. This continues up to the limit of manganese reached. It is otherwise with the nick tests, which measure the brittleness. These results increase to a maximum and then fall. In the untreated material this maximum is reached at 0.8 per cent.; it then suffers little change up to 1.8 per cent., when it begins to fall rapidly. The annealed steel shows the maximum when 1.3 per cent. is reached, then up to 1.8 per cent. the change is small, after which it falls rapidly.

The hardness as shown by the Brinell test increases very quickly in the unquenched steels with increasing manganese. The quenching brings about still greater hardness.

The steels were very thoroughly tested with regard to their magnetic electrical and microscopic properties, the results being given in full in the original paper. A bibliography is given and the paper is illustrated by many curves.

G. B. W.

The Canada Steel Company, Hamilton, Ont., will have its mill completed and in operation some time this month. It will reroll old steel rails, producing steel bars, small angles for bedsteads, &c. The statement is made that the company has enough orders booked to keep the mill at work, double turn, for several months. The raw material which it will use is scarce at present, owing to the large employment of old rails for the laying of temporary tracks on branch lines of Western railroads. The president of the company is F. W. Baillie, Toronto; vice-president, R. M. Bertram, Toronto; managing director, W. M. Currie, Hamilton.

The Steel Company of Canada, a consolidation which took over the Montreal Rolling Mills, the Hamilton Iron & Steel Company, and the Canada Bolt & Nut Company, has issued its first statement, which is for the six months ended December 31, 1910. It shows profits of \$783,664. The balance after depreciation, fixed charges and preferred dividends is \$245,918, being at the rate of over 4 per cent. for the year on the \$11,500,000 of common stock. The company wrote off \$104,071 for depreciation; fixed charges amounted to \$206,305, and preferred dividends were \$227,370.

The midsummer meeting of the Society of Automobile Engineers will be held at Dayton, Ohio, on Thursday, Friday and Saturday, June 15, 16 and 17. Aviation events and sociability, including the entertainment of the wives of attending members, will be features of the meeting.

The Exploration of Cuban Iron Ores*

Characteristics of the Moa Deposits—The Cost of Mining and Delivery in the United States

BY DWIGHT F. WOODBRIDGE, DULUTH, MINN.

During April, May and June, 1910, I was in charge of an examination of the greater part of the Moa iron ore area in Oriente Province, Cuba, on the north coast, near the east end of the island. My instructions, on arrival at the properties, were to check former estimates of tonnages and grades, and to re-examine the ore comprised in claims covering 44,727 acres. This work included the running of lines dividing the properties into co-ordinate planes, the boring of many thousand feet of holes spaced at the intersections of these co-ordinates, the taking of samples of the ore penetrated, the analysis of these samples for their various constituent minerals, and the determination of the results as to tonnages, depths and grades, both for individual properties and for the entire group. Each section of every one of the thousand holes

fields was superposed upon about 60 square miles, and that the ore beds extended directly to the Atlantic shore, forming a blanket more or less continuous from the sea to the summit of the island, the high of land between the Atlantic Ocean and the Caribbean Sea.

A precipitous range of rugged hills is practically continuous along the north coast of Oriente Province. These hills attain an altitude of from 2000 to 2500 ft., and, approaching by sea, form the distinguishing feature of the landscape. At points the slopes reach the water's edge, elsewhere they are some miles from the shore. Numerous bays break the coast; some large enough for harbors for ocean-going ships, while others are constricted in area and shallow in depth. A series of coral reefs extending for many miles along the coast protects it from the constant sweep of the Atlantic surge, which is hurled in by the steady northeast trade winds. Occasionally these reefs are cut by broad and deep entrances, easily distinguishable by the break in the otherwise uninterrupted line of white water that is like a foamy stripe, elongated on either hand until it ends, a mere ribbon upon the blue. These reefs, awash at low tide, are covered at high tide, and so perfect a protection do they form that the decrepit, poorly rigged, flat-bottomed fishing boats of the natives are safe inside, no matter how fiercely the combers may smash upon the reefs beyond.

The *ciudadcita* of Baracoa is 35 miles east of Moa, and its history extends back to the time of Columbus, for it was here that he first landed on Cuban soil. The town was founded in 1500. To the west, 50 miles, is the capacious Bay of Nipe, where are situated the works and shipping piers of the Spanish-American Iron Company, the sugar mills of the United Fruit Company and a terminus of the Cuba Railway. Between Baracoa and Nipe Bay there are no settlements worthy the name—only an occasional fisherman's hovel, where a cocoa palm grove comes down to the sea, or where there are a few roods of cultivable soil. So much of the scanty earth along this stretch of coast is iron ore that arable ground is hard to find and is in high request.

Roads scarcely deserve the name in this section of Cuba. While there is the *Camino Real*, the so-called King's Highway, it is impassable for wagons, and from Moa to Baracoa a pack mule cannot get through, even with an empty saddle. In seasons of high water the roads to Sagua and on to Nipe Bay cannot be traversed at all, and communication is almost entirely by boat. The poor transportation increased the difficulty of securing provisions and supplies, of getting and keeping competent men and of handling the mails.

No Stripping Necessary

No surface of soil exists over these ores; indeed, the ore itself is the soil, upon which grow either pine forests or a characteristic tropical jungle. On the lower elevations and in the better drained of the upland interior, pine predominates; inland, where the rainfall may be heavier, and wherever it remains more permanently after falling, the verdant jungle enters. It closely resembles the jungles of northern South America, with its tough, cordlike creepers, its strange arboreal growths, and its dense poisonous and prickly shrubbery. It is hard to penetrate unless one has in his hands that omnipresent weapon, the machete. In the belief that a thin capping of surface soil and humus might lie above the ore in these jungles, I took a number of samples in these

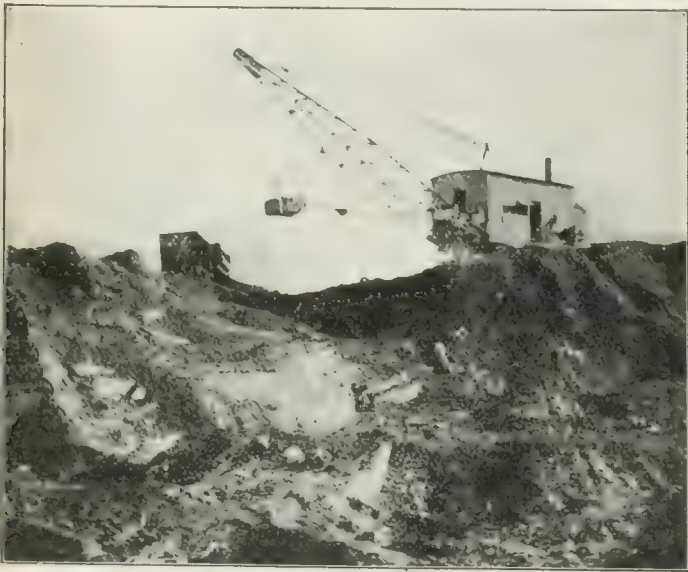


Fig. 1—A Long Line Excavator at Mayari, Showing Radius of Action.

drilled was to be compensated for depth and grade with every other, a series of simple arithmetical calculations of no slight magnitude, the mere mechanical labor of which consumed much time, but finally resulted in giving a complete average of all the essential facts for the entire area of 18,000 hectares.

Moa and Mayari Ores Compared

Articles descriptive of the discovery and development of a tonnage of 600,000,000 tons of commercial iron ore in the Mayari field by the Spanish-American Iron Company have been published from time to time. Subsequent to these discoveries and their exploitation, the red soil at Moa was recognized as an iron ore and researches were immediately instituted to determine the quantity and quality of this ore. These investigations commenced in 1906, and had been carried on almost continuously with a varying degree of vigor up to the time of my own examination in 1910. The tonnages of this new district proved to be greater than those of Mayari, while the quality was found to be quite similar. The resemblance in grade was but natural, since the origin of ore in these two fields was precisely the same and the breaking down of the ore bearing rock has proceeded at Moa in a manner analogous to that process at Mayari. More than 50,000 acres of land were examined and drilled, the district was mapped, and thousands of drill samples were analyzed. It was found that the general area of these Moa

* Reprinted from *Bulletin* No. 51 of the American Institute of Mining Engineers, March, 1911.

woods at varying depths, which showed on analysis that, when found at all, the ore extended to the surface, whether timbered or not. No stripping of these ore bodies is necessary to fit them for mining, and during the dry seasons a lighted match may be applied to the forest floor, and the fire will clean off all organic matter above the ore, leaving it free and fit for immediate mining by the steam shovel or other means of excavation.

Scattered about the surface of these deposits are boulders, flat sheets, pellets and nodules of hard iron ore, somewhat dehydrated, and varying from masses of many tons to pieces the size of minute bird shot. Natives call the pellets *tierras de perdigones*, or "shot soil," a name warranted by their appearance and by the use to which they sometimes have been put, both in peace and in war. While the upper inch or two is occasionally composed entirely of this material, it is usually carried in a matrix of soft ore, and it was the original design at the time of discovery to wash this hard ore from the surrounding red soil and ship a product of indurated iron ore. This scheme, however, was impracticable, owing to the expense of collecting the hard ore, which is spread over a great area in a comparatively thin layer or appears in isolated deposits and pockets; moreover, the matrix contains so much clay that washing was slow and difficult. During the course of experiments having in view the washing of this material, it was found that the soft ore matrix was as good ore as the hard, and it was not until this fact was fully realized that the great size and vast importance of these deposits were appreciated and their possibilities realized.

Not a Sheet Formation

It has been considered by some engineers that these shot ores cemented into masses occur in layers and bedding planes, and so form a persistent sheet covering a large continuous area. In proof of this they point to the hard boulders frequently found underground in the progress of drilling operations. Basing my opinion on the results of a drilling campaign greater than that of any concern aside from the Spanish-American Iron Company, at the Moa and Mayari properties, I cannot agree with this theory. I believe the hard ore found underground in drilling to be blocks and boulders of this cemented material, and not often of large size; also, that the horizontal outcrops of cemented nodules, at times found along the sides of erosion canyons, are not original, but have assumed their present condition since they became subject to the changes incident to surface action. And this is the case whether they are directly upon the top of the ground or near to it. Contrary to statements made in occasional reports, there are in these deposits no definite layers of ore of varying degrees of induration, color or class. The deposits are homogeneous masses, and the harder ores found so frequently are the result of heat, the action of the elements and the infiltration of iron salts as a cementing material; while the variations of color and texture are the result of a more or less hydrated condition and a more or less complete disintegration of the original rock, all due to local favoring or retarding causes. I took careful note of the depth reached by nodulized ore and found it to average a few inches, while the extreme depth was 24 ft. This latter depth for nodules was rare; in such cases their proportion of the mass was very slight.

Depth of the Ore

The deposits constitute a surface mantle varying in thickness from a mere film to 121 ft., which, I believe, is the extreme depth ever drilled in ore in Moa. This hole was bored by men in the employ of the Juragua Iron Company. The greatest depth which I attained was 81 ft., said to be the second deepest ever bored there, and the deepest ever put down by an ordinary crew of two men. There is an average thickness of from 18 to 20 ft. The results of work under my supervision, covering an

area of more than 8000 hectares of ore drilled, showed an average of 18.83 ft. Mayari ore, I understand, is a trifle thicker. The thickness of the ore mantle is affected by local causes, assisting or delaying the breaking down of the serpentine rock (which experts agree to be the mother of this ore), erosion by streams and other causes. The ore lies directly upon the serpentine, and mining will be somewhat unfavorably affected by the fact that the gradation from ore to rock is not at all regular, but very rough, so that in cleaning the bottom of an ore body with any sort of automatic machine, chunks of serpentine are liable to be broken off and lifted with the ore, unless care is constantly exercised. This irregularity is shown plainly at the mines of Mayari, and shipments from these openings to Nipe piers sometimes contain serpentine broken from the floor.

Torrential mountain streams are frequent in this area. A square of 225 hectares was measured for check work in which were no less than three large rivers with deep gorges, each one worn well into the underlying rock. In this particular area about 25 per cent. of the total was barren of ore. But while there are many streams, this special case was abnormal and cannot be duplicated in the entire district. In spite of a brief rainy season and a long dry period, waters flow with surprising volume throughout the year. But erosion at the present time is

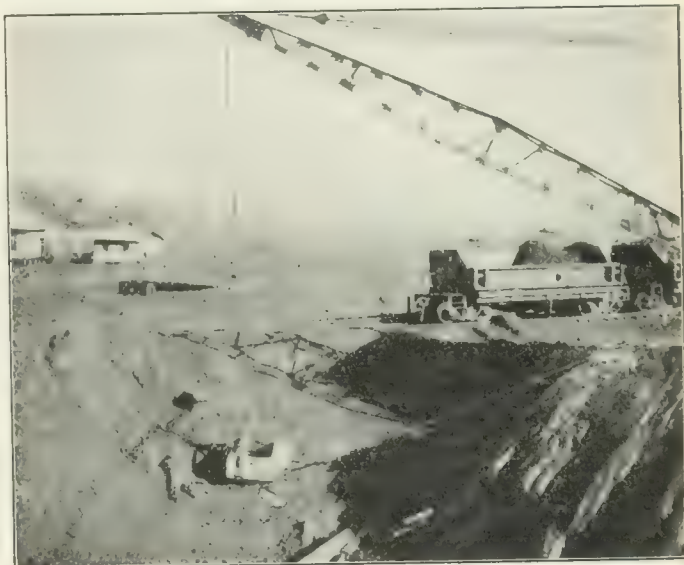


Fig. 2. The Drag Line Loading Ore Cars at Mayari. Cars Used Here Are of 50 Tons Capacity and Are Side-Dump.

exceedingly slight and entirely negligible so far as tonnage of ore is concerned, for the *arroyo* slopes are hard and smooth, and, even in flood, the rivers bear comparatively little material in suspension.

One peculiarity of this ore is that it stands indefinitely without caving. On exposed vertical faces, open to storm and sun, there is no appreciable sloughing off of the sides. I have seen pits dug years ago, that have been open to the action of the weather, the vertical walls of which still retain marks of picks and other tools of the diggers. This ore is very clayey, representative and composite assays showing Al_2O_3 , 13.34, and SiO_2 , 3.36 per cent. Derived, as it undoubtedly is, from serpentine, the proportion of alumina is naturally very high.

Method of Exploration

By reason of the character and condition of these ores exploration can be carried on by a process that is simple, accurate, rapid and cheap. Ordinary 2-in. auger bits are forged on one end of 4-ft. sectional rods, the other end being fitted to receive a sleeve nut, 5 or 6 in. long, into which another 4-ft. section may be screwed. As a hole is driven down by the auger bit additional threaded sections are screwed on the rod, making it any desired length. On each end of each rod, except where the bit is shaped, is a backing nut screwed down hard, in order to prevent the rods from working too tightly into the sleeve nuts when turned into the resisting ground, which would

render it difficult to release quickly. In most cases ore can be bored by this simple tool with comparative ease, and when hard blocks and boulders are encountered underground, they are sometimes cut by the substitution of a cutting chisel bit for the auger point; in other cases



Fig. 3.—Ore Excavated, Showing Rock Boulders on Floor.

the men will move a few feet away and drive another hole, experience having shown that a very short distance will usually be sufficient to avoid a boulder. The hole is started through the drier top soft ore or nodules on the surface, a little water is poured in, the bit lifted and driven down by the combined strength of two men, and then turned in the ore. The work is a combination of churning and boring. Every few feet the tool is lifted, the ore adhering to the bit is cleaned off by pressing a stick into the point of the bit and then revolving the tool, and saved for analysis, and all sludge that has collected above the bit is scraped off. If the hole is sampled in sections, all ore taken out of each section by the bit is saved to make a full sample; but if the hole is sampled as a whole, the ore is all piled upon a cloth and afterward mixed and quartered down with the ever-ready machete to make a suitable sample. When sampling was in sections it was found best to adopt 5-ft. lengths, both for general convenience and to ease the work of the calculator of averages. The drilling is hard work in deep or difficult holes, or where nodules are frequent—as hard as any labor that a man can comfortably endure. It is done almost entirely by Spaniards, mostly from the Province of Galicia, who become very expert and earn good pay. It is all task work, and the going rate of contract wages varies with the depth of holes as well as with the character of country rock. Each pair of boring men is accompanied by a water carrier and a sample marker, both paid by the day; the sample marker acts as the representative of the employer. He measures the holes and sees that bottom is reached before the drilling is stopped. The deeper the work the more difficult it is, and there is on the one hand a tendency on the part of drillers to shirk, and on the other to allow themselves extra measurements. They will stop in ore if it is hard drilling, marking *piedra*, or “rock,” on their last sample, if there is no one to check them. Were it not for the peculiarity of this ore of standing without caving, this system of drilling would be impossible, and it would be difficult for the engineer to follow and check the depth of holes by dropping down a measuring rod, or by inserting a bit with which to test the material at the bottom. It is not uncommon to check grades of properties previously drilled by inserting bits in the old holes and reaming out a sample from the sides of the hole. If the original hole has been protected at the surface by plugging it with a piece of sapling, it is very unusual to find the hole caved or destroyed.

Proficiency of the Borers

The price paid the borers begins with from 1.5 to 2 cents per foot for the first 10 ft. of depth, and increases by the addition of a like sum per foot for each succeeding 10 ft. of progress following. In ordinary ground each borer will earn from \$2.50 to \$3 per day; in other words, a pair of borers will complete from 10 to 13 holes, averaging 20 ft. deep, per day. Sometimes, when work is unusually difficult, or when it is desirable to get special results on check work, it is necessary to pay by the day at the rate previously earned on contract, or to give some sort of bonus for depths. Working with one of these drills, two men in my employ drove a hole 81 ft. deep, although it took them two long days to complete it. This hole was drilled at a spot where I thought that the ore was thicker than the original testing, or my own first check, had shown it. The original record was 22 ft. and was marked “rock bottom”; my own check was 20 ft. and was likewise marked “rock.” But the third attempt went down four times as far before it really bit the serpentine, though located less than 10 ft. from either of the others. Evidently both former holes had cut into an ore boulder that the men thought was bottom, or that they did not desire to penetrate. In the third effort to reach bottom 10 ft. of hard ore was cut by the use of a chisel bit between the 20-ft. and 30-ft. levels. A fact that was somewhat of a surprise to me, in connection with this hole, was that the bottom section, from 75 to 81 ft., showed ore as high in grade as that in any other part of the boring and slightly above the average. The borers acquire great facility, and work rapidly and hard. If the ground is easy of entry they complete the holes quickly, and race each other from one location to the next in order to lose as little time as possible. They regard themselves as of a type of laborers higher than the average, and feel pride in their occupation.

In no other way is it possible to explore such an area except at great expense and in a long time. No system of tunnels, pits or other openings is so well suited to this work. It is well enough to sink pits occasionally, to check by actual observation certain facts that seem patent from the drilling, or to answer questions that may arise. In this manner of drilling there have been bored on that part of the Moa area explored by my men more



Fig. 4.—A Trail Over Ore Soil in Pine Woods at Moa.

than 50,000 ft. of openings in ore, counting the work of original explorers and my own check work.

Regularity of the Ore Cheapens Mining

By this rapid and inexpensive method of boring the ore blanket it will be possible to determine in advance of any actual mine operation the precise quality of product to be expected from any given area, and thus to regu-

late grades won or to produce any quality within the chemical limits of the ore body. And it will be a simple matter to ascertain in advance the general topography of the underlying rock, and thus to bring mining work for years to come under an assured and definite plan and system. All this, of course, means a greatly reduced cost of mining.

To those accustomed to vein mines or to the great replacement deposits of the Mesaba iron range, borings varying from 100 to 300 m. apart may seem utterly inadequate to prove grades and tonnages. But a consideration of the origin of these fields and of their necessarily quite homogeneous character answers this objection in part. The answer is made definite and conclusive and the customary method proved safe by results secured in actual practice. In early examinations of the Mayari field original borings were spaced every 100 ft., but as the work proceeded the ore was found to be so regular in analysis, texture and thickness that holes were gradually spaced at intervals up to and even exceeding 1000 ft. There was some variation in the essentials, but the averages proved so closely as to be accepted as perfectly competent evidence. The results reached by these more widely separated borings have been since abundantly proved and confirmed by intermediate holes spaced as close as 50 ft. from each other, while in actual mine operation over the same ground shipments also check these distant original holes. My own intermediate lines, run between co-ordinates, were a further proof. Engineers and others accustomed to narrow veins and comparatively small tonnages may be startled at such figures as this work presents, secured, as these have been, on data that may seem absurdly insufficient, but study and examination will convince them of the reasonableness of the assumptions made.

One interesting peculiarity of this ore is that often its appearance is no guide to its analysis. Naturally one might expect the deep reddish soft ore to be of better grade than the coarser yellowish ore containing grains of quartz, &c. But this lighter yellowish ore, when dried at 212 degrees, is as high in iron as the heavier red colored ore, and its discovery in a hole is little or no guide to the probable depth of that hole, although it is a fact that this class of ore is found more frequently near the base of the beds than in the higher levels.

Analytical Work in the Field

It is very important, for this and many other reasons, that any serious attempt at the examination of these ore fields be assisted by a chemist in the field. About 2500 samples were analyzed during the course of my work on this examination, most of them in a field laboratory. It was impossible to maintain an equipment in the hills sufficient for the determination of chromium, nickel, phosphorus and the like, but all iron assays were made there, and were kept as close to the daily returns from the drillers as was practicable. With the crude equipment at hand one chemist, assisted by two Spanish grinders from the district, assayed as many as 50 samples in a day. Our laboratory was housed in a palm thatched hut, one side open to the breezes, with its foot thick roof inhabited by snakes, scorpions and rats, and with myriads of flies, fleas and gnats swarming about us as we carried on our calculations or weighed out our samples. The northeast trade winds that come into such a laboratory after sweeping over thousands of miles of sea are freighted with dampness, and it was found that a slight delay in weighing a dried sample caused it to absorb moisture so rapidly as to affect the results. So careful were my selected native assistants in their work of marking samples, both in the field and in the grinding shed, that of all the samples brought in for analysis less than half a dozen were unmarked or misplaced.

This limonitic ore carries an excessive amount of hygroscopic moisture and is light in weight, varying between 18 and 21 cu. ft. to the ton. At an average of 20 cu. ft., which has been assumed as a safe unit for computation by all explorers in that field, the ore will weigh 5382 tons per hectare-foot. When the area runs into thousands of hectares and the average depth to more than 18 ft., it may be seen readily that the estimated tonnage will give an enormous aggregate.

Chromium-Nickel Content

The presence of nickel and chromium has been noted. The former is found in quantities increasing toward the floor of the deposits. In the analyses of several hundred samples for this element the highest percentage found was 1.28 and the lowest 0.44, with an average not far from 0.80. I need not emphasize the economic importance of an iron ore averaging 43 per cent. of iron and carrying 0.80 per cent. of nickel. Several hundred tests for chromium showed an average of 1.75 per cent., a serious matter if it were not that a simple metallurgical process will eliminate this element at one stage of the reducing operation. These ores are of Bessemer grade, slightly lower in silica than the average Mesaba and not higher in kaolin than some Mesaba ores. Phosphorus exists in very slight proportion. Sulphur is negligible. At Felton, on Nipe Bay, the Spanish-American Iron Company operates a large works for the beneficiation of this ore by drying it in cylindrical, rotating, horizontal kilns heated to a high degree, which reduces by 33 per cent. the weight of raw ore charged. Against this cost of nodulization, which may be given at about \$1.25 per ton of product of the kilns, are to be placed the saving in freights and duty, and the advantage to the furnaceman of receiving a partly prepared material for treatment.

Mining and Transportation Costs

With no overburden to be removed, the deposit situated close to the sea, with stream valleys cutting through the ore beds and running directly to deep water, and with an average thickness suitable for about one shovel cut, these ores should be mined at low cost by ordinary steam shovel. The steam shovel is referred to here as though its advantage for this work were unquestionable, but this is not so certain, since some other type of machine excavator may be better. The drag line excavator has been tried and has advantages, especially if the deposit or ore is comparatively thin and the floor quite rough. Also, its radius of action is far greater than that of a steam shovel, which must be moved frequently. There is no question of the relative efficiency of the two machines if the shovel can get one or two full cuts in clean ore, but such opportunities are comparatively rare. One block of 75,000,000 tons, assaying several percentages better than the average of the district and of a thickness of about 70 ft., can be connected with deep water by a railway 4000 m. long, without excessive gradients. Ore so situated can be delivered on board ship at an actual operating cost not to exceed 20 cents per ton. The average cost of mining and rail transport to the sea for the entire tonnage in sight should be but little more than this amount.

Iron ore is transported from Cuba to American Atlantic ports at 85 cents per ton. It is carried in British and Norwegian tramp steel ships of from 3500 to 6000 tons cargo capacity, usually equipped with two cargo hatches forward and two aft. These vessels do not compare with the great lake freighters of from 10,000 to 13,000 tons capacity and with from 20 to 33 hatches. To be sure, a lake ore carrier would not live in the weather to which these boats are subjected, but there is no doubt that reasonably large staunch carriers can be so constructed as to afford rapid loading and unloading at each end of the route. With a ship of this character in this trade, more money could be made at 70 cents per ton than the lake boats make at 85 cents per ton. Adding duties at 75 per cent. of the foreign import rate, incidentals, administration expense, nodulizing and all other charges, a nodulized 54 per cent. Bessemer ore can be delivered from these mines at American Atlantic ports at a cost of about 5 cents per unit of iron, and at Pittsburgh at a cost of 8 cents per unit of iron, the additional 3 cents being due to the freight from the seaboard to Pittsburgh. The raw ore can be delivered at the same points at 3.5 and 7.2 cents, respectively. Of course Lake Superior ores have a counter and equivalent advantage at Pittsburgh.

Various important steelmaking concerns are interested in the Moa region. The United States Steel Corporation has a number of men in that field; the Pennsylvania Steel Company and the Bethlehem Steel Company

are also well represented by their subsidiary companies, the Spanish-American Iron Company and Juragua Iron Company; and other Eastern and Western interests are identified with the field. No mining has been started as yet at Moa, but it is probable that operations will not long be delayed.

The Philadelphia Foundrymen's Association

A Paper on Pyrometers by Richard P. Brown

The Philadelphia Foundrymen's Association held its regular monthly meeting at the Manufacturers' Club, Philadelphia, Pa., on the evening of April 5. President Thomas Devlin occupied the chair. The Wetherill Finished Castings Company, Erie avenue and Richmond street, manufacturer of special alloy castings, was elected to membership, and an application for membership was received from Crocker Brothers, Pennsylvania Building, Philadelphia, represented by C. H. Newcomb. Appropriate resolutions were adopted on the death of Mortimer H. Bickley, president, Penn Steel Castings & Machine Company, Chester, Pa. A committee consisting of Elmer E. Brown, chairman; August A. Miller and James S. Stirling was named by the president to make the necessary arrangements for a special car for the delegation attending the foundrymen's conventions in Pittsburgh, May 23 to 26. Henry M. Lane, editor of *Castings*, Cleveland, Ohio, urged the members to attend the conventions, which will no doubt be most instructive, both from the number and scope of the papers presented as well as the exhibition of foundry appliances, the plans for which are on a most elaborate scale.

The paper for the evening's consideration was on "The Measurement of High Temperatures in Modern Foundry Practice," by Richard P. Brown, Brown Instrument Company, Philadelphia. Mr. Brown discussed the great importance which knowledge of temperature plays in the annealing furnaces of malleable iron foundries and steel casting plants. He described various devices used for measuring furnace temperatures, such as the Siemens water pyrometer, the platinum or quick-acting pyrometer, the thermo-electric or Le Chatelier pyrometer, the Mesure & Noel optical pyrometer, the Wanner pyrometer and the new Brown radiation pyrometer, made by his own company, which was illustrated and described in *The Iron Age* of December 1, 1910. He stated that he believes the time is coming when the operations of all cupolas at foundries will be controlled largely as to temperature. Experiments have been made by some concerns to regulate the cupola temperature at the melting zone by Thermo-couples installed through the wall, the inside of the couple being in a recess in the wall so as not to be struck by the material to be melted. Several works are now conducting experiments along this line which bid fair to furnish data for controlling cupola temperatures.

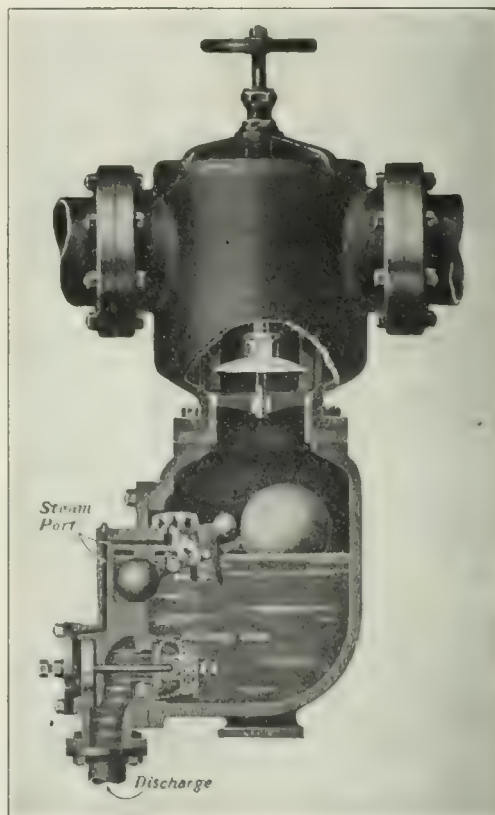
In dwelling on the importance of the recording instrument as an adjunct to a pyrometer, Mr. Brown mentioned the fact that a large steel works at Reading had received an order from an automobile manufacturer for a quantity of steel which was to be annealed at a specified temperature; when the steel was delivered to the customer it was not entirely satisfactory, and he did not wish to accept it, claiming that it was not annealed at the temperature specified. The steel manufacturers had fortunately kept the pyrometer records and produced these to prove that they had carried the desired temperature. To use the words of the metallurgist at the plant, "these records saved us thousands of dollars." Frequently, when ovens are fired with coal, the fires are choked by the fireman, and a bad drop in temperature occurs. At a Western malleable plant, at which recording pyrometers are used, the superintendent noticed such a drop and called the fireman's attention to the record of the pyrometer. He instructed him to be more careful in the future when firing up, and there was no more trouble from that score on future records. At some up-to-date plants the record chart of a perfect anneal is placed on the wall beside the pyrometer, and the fireman can see what temperature was carried at each hour of the previous anneal and duplicate it. This

does away with all guesswork. The fireman knows exactly what heat he is carrying and the recording instrument shows the manager in the main office whether the fireman was on the job and carried out his orders all night.

In referring to the Siemen's water, quick-acting platinum, thermo-electric and radiation instruments, practical demonstrations were made by Mr. Brown in connection with an electric furnace and indicating and recording instruments. He was given a unanimous vote of thanks for his paper, after which the meeting adjourned and luncheon in the club dining room followed.

The Wyoming Automatic Eliminator

A combination steam separator and trap, which is known as the Wyoming automatic eliminator, is being manufactured by W. H. Nicholson & Co., Wilkes-Barre, Pa. This device is made in two styles for both horizontal and vertical pipe lines, the former being the type illustrated, and not only separates the moisture and the con-



The Wyoming Automatic Eliminator for Separating Moisture from Steam Made by W. H. Nicholson & Co., Wilkes-Barre, Pa.

densation from the steam but automatically discharges them as well. One of its distinguishing features is the use of a large size discharge valve which makes it almost impossible to flood the separator. The valve is operated by a steam piston and the mechanism is of the instantaneous opening and closing type, thus avoiding all wire drawing through the discharge valve. It is either entirely opened or closed at all times and is always covered by at least 2 in. of water, thus providing a water seal and preventing leakage of steam.

In the horizontal type of eliminator, the upper section or separating chamber is composed of a series of serrated baffle plates which divert the flow of steam. In this way all the water of condensation and the moisture in the steam collect upon these plates and drop to the chamber below where they are automatically discharged through the discharge valve. A shut-off valve is located between the upper section and the steam trap in the lower portion. When this valve is closed the main steam line is shut off from the eliminator, an arrangement which affords a very convenient way to clean out the dirt and the sediment which collects in the trap. These eliminators are made in all sizes from 2½ to 16 in. and will operate at any pressure from 5 to 150 lb.

The De Laval Turbine Reducing Gear

A New Speed Reducing Connection for Turbo-Generator Sets

For some time experimental work has been carried on by the De Laval Steam Turbine Company, 165 Broadway, New York City, at its works in Sweden and at Trenton, N. J., to develop a helical reduction gear that could be used to reconcile the high speed of the turbine with the much slower one of the electric generator. The result of this work is shown in Fig. 1, which is a view of a 500-kw. geared turbo-generator set, and in Fig. 2, which illustrates the reducing gear and the pinion used.

Quite recently the unit illustrated in Fig. 1, which

from the base plate by two pedestals, one on each side and is bolted down on one end only, which leaves it free to expand and contract in an axial direction between steel guide bars mounted on the top of the bed plate pedestals. As a thrust bearing also determines the longitudinal position of the shaft, the results of axial expansion are largely compensated for.

The generator supplied with this set is of the standard Crocker-Wheeler type, and occupies a floor space of 7 ft. 9 in. by 7 ft. 8½ in. The field frame is 68¾ in. in diameter and has eight main and eight auxiliary or commutating poles, the latter being connected in series with the armature circuit and so proportioned as to eliminate sparking through all ranges of load within the capacity of the turbine.

The pinion and the gear which are shown in Fig. 2

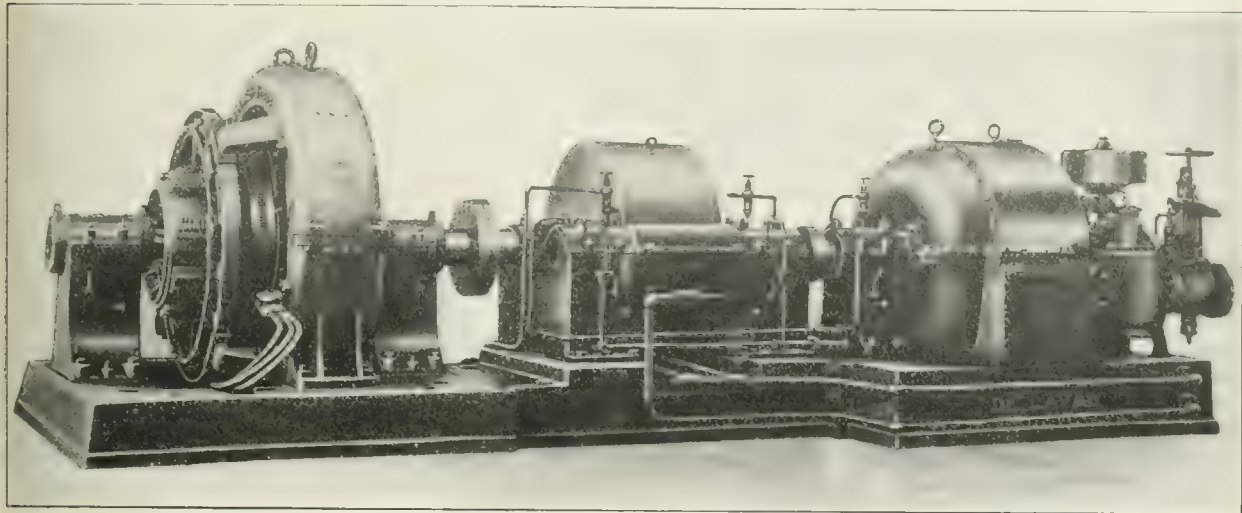


Fig. 1.—A 500-Kw. Turbo-Generator Set Equipped with a Single Reducing Gear Built by the De Laval Steam Turbine Company, New York City.

consists of a multi-stage turbine driving a standard speed direct current Crocker-Wheeler generator through a pinion and single gear was completed at the company's Trenton plant. The speed of the turbine is 3600 rev. per min. and that of the generator shaft 500 rev. per min., the ratio of the speed reduction being approximately 7 to 1. A good idea of the compact nature of the con-

sists of the most interesting part of the unit. It will be noticed that these are of the double helical or herring-bone type and differ from the standard gear supplied with the De Laval turbines but in the size of the gear and the fact that only a single gear is used for the largest sizes of turbine. The diameter of the gear is 48 in. The pinion is cut from a solid steel bar and is mounted in plain babbitted bearings supported in a rigid cast iron frame that also supports the bearings for the gear. The pinion bearings are lubricated by sight feed oilers, and the excess lubricant flows to the wells of the gear bearings which have ring oilers. The large gear consists of a solid cast iron center upon which two thick steel rings are shrunk. The gear hub is mounted on a stiff shaft which carries one-half of a flexible coupling for connection to the driven machine, while a coupling of the same type is mounted on the pinion shaft for coupling to the turbine shaft, the distance between the couplings being 6 ft. 3½ in. The lubrication of the gear and the pinion teeth is accomplished by jets of oil which are forced out under a pressure of 10 lb. per square inch through a series of pipes and nozzles at the line of contact on the entering side. The supply pipe is shown in Fig. 1 running across the gear case below the center line. After this oil has been used it passes away through the pipes coming from beneath the gear case to an oil strainer located in the base of the turbine, then through a cooling and settling chamber and finally to the oil well from which it is again pumped through the piping. The circulation of oil is maintained by an oil pump in the base of the turbine, and this pump is driven from the governor shaft of the turbine and supplies oil to the gears and to the bearings.

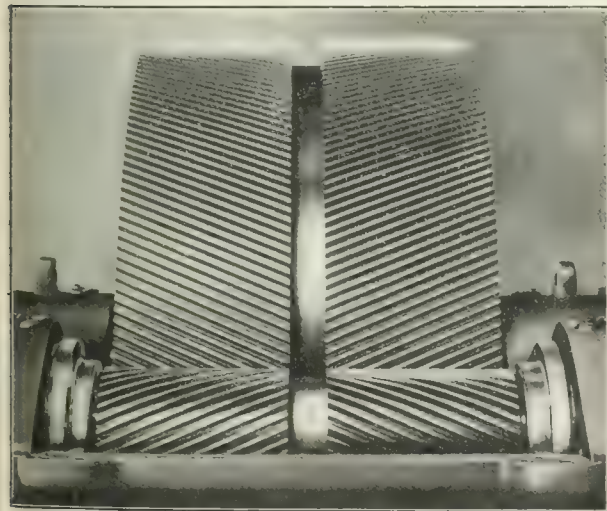


Fig. 2.—The Reducing Gear and the Pinion Used.

struction of the turbine, the maximum capacity of which is 1200 hp., can be obtained from the engraving, the total amount of floor space required being approximately 9x25 ft. The main casing of the turbine is made of cast iron and is approximately cylindrical in shape. It is split horizontally, so that the upper half can be lifted to give access to the revolving and the stationary members of the turbine. This casing is supported at the same level as the center of the shaft, 42 in. above the floor,

In the test made of this unit before shipment, the operation was found to be remarkably free from vibration and noise. The quiet running is attributed to several causes, the principal ones being the accurate cutting of the gears on a specially designed machine and an adequate supply of lubricant.

German Steel Trade Problems

Advanced Processes and Syndicates Lead to Overproduction

The most interesting question now agitating the German iron and coal trades is whether the two great organizations controlling them—the Steel Works Union and the Coal Syndicate—will be renewed upon the expiration of their present contracts. The former terminates at the middle of 1912, the latter in 1915. Negotiations looking toward the prolongation of the former will be taken up in earnest in the coming autumn, while committees are already doing preliminary work to prepare the ground. The *Frankfurter Zeitung* has recently devoted a series of articles—evidently from the pen of an expert who traveled over much of the coal and iron districts studying the situation—to reviewing all the conditions bearing on the prospects of the two organizations. In the course of these articles some extremely interesting paragraphs are given to general developments in the iron industry within the past few years and to the organization problem. A condensed translation of some of this matter is furnished by our Berlin correspondent as follows:

Reducing Costs of Production

All observers are full of praise for what has been accomplished in the German iron industry within a few years toward reducing cost of production. This has only been possible through the help of a well-trained staff of engineers, such as our technical universities turn out, and through the most intense detail work at every stage of production. The utilization of furnace slag, formerly a dead loss to the works, but now a rich source of profit, and the utilization of the gas that formerly escaped into the air from furnaces and coke ovens are the best known achievements in the direction of reducing production costs. What the saving of the blast furnace gases alone means—the power from which now penetrates to the remotest corner of the works—is shown by the case of a medium-sized establishment in the Siegen region, which in this way alone saves 180,000 tons of coal, equal to half of its dividends. If all the iron works were built to save the gases, the annual saving in coal would reach 2,000,000 tons. Supplying furnace gas to adjacent cities and towns direct from the iron works is as yet only in its beginning; but it is scarcely possible to say how much this will mean for them.

Fusions and amalgamations of works, rendering possible a better division of labor and a better specialization in production, have also tended in the direction of lowering costs. The result is that the West German iron industry to-day is really placed on a new price basis, as compared with even a few years ago. A different standard can be applied to them to-day; prices that would have formerly been regarded as miserably low are now accepted as yielding an actual profit, thanks to the reduction in production costs.

Some Disadvantages of This Progress

But this development has also its disadvantages. The application of furnace gas, which is making the furnace's chief function that of a power generator, and relegating pig iron to a secondary position, as a mere by-product of this power generation, prevented the works from curtailing their production as the market situation required in years of depression, inasmuch as they would have been under the necessity of reducing production correspondingly in all other departments. It is precisely the fear of such an overproduction of pig iron that causes the English to shrink from an extended use of the big gas motors.

What has occurred in the case of pig iron production has also been repeated in a general way with the great mixed works, developed under the pressure of technical progress. In other words, such establishments must keep in operation in order to secure low costs of production. Any restriction in operations means a heavy increase in those costs, since general expenditures—salaries of of-

ficials, wages of labor, coal, interest, &c.—run on undiminished. Hence an order at a price equal to the cost of production is much better for such an establishment than no order at all, since it will at least help to bear the general expenses. The recognition of this fact leads inevitably to a further expansion of plants, for it is a simple problem in arithmetic that 100,000 tons can be produced more cheaply by the ton than 10,000. That is the natural logic of the situation.

Effect of the Kartels or Syndicates

The worst of it is that this natural logic has been overworked to an unnatural degree under the domination of the kartels. It is very interesting to see that this fact is now recognized even in quarters in the iron trade which not long ago would have fought tooth and nail against such an admission. . . . It begins to be felt that there has been too much worshiping of big figures, that many of the well-reasoned fusions really subserved only personal or speculative interests, and that it was by no means an unmixed blessing for the iron trade when the big banks put huge amounts of capital for new establishments and enlargements into it, and then organized price-fixing syndicates in order to guarantee profits. Every kartel, even an association formed for the brief space of several years, carries in itself the germ for a heavy extension of plants. This fact is now recognized—now that it is too late. For we are actually already on the way that leads to disaster, the way to a heavy overproduction.

The clamor of the works for new orders is really due not merely to their need of full employment with a view to keeping down production costs, but to another special cause, namely, the wish to obtain, upon the renewal of the Steel Works Union, high allotment figures. It is hoped to get these by pointing to the magnificent figures of shipments actually already made. In other words, the fight for allotments is already raging, and the current heavy sales are only a maneuver in this fight.

Hand in hand with it goes another process—the enlargement and extension of the works. We are referring here not merely to the two great new establishments—the new works of the Gelsenkirchen Company at Esch (in Luxemburg), and the new works of Thyssen at Hagendingen (in Lorraine)—but also to the numerous smaller additions which are being erected everywhere at the older works; and we are referring to expansion in the means of production, to the rounding out of the works for making higher classes of products, and so on. There can be no doubt of the fact that the iron works are again in a high degree their own customers; they are creating work for themselves by means of their own new plants that they are erecting; and this is one reason why home production still seems to keep somewhat normal.

Great Overproduction in Sight

There can be just as little doubt that when the Union comes to be renewed in about a year—these new works and additions having meanwhile been finished and become producers instead of consumers—then the German iron and steel mills will have a producing capacity that will far exceed their ability to sell their products. Then we shall have an overproduction that can only be gradually overcome by the growth of consumption, notwithstanding the natural tendency of consumption to increase, and notwithstanding the outlet opened to us in the foreign market, which, of course, is capable of further development. This was precisely the case at the previous renewal of the Union in 1907, when the allotments in bars were suddenly increased; now the same process will have to be repeated on an enlarged scale.

This fight for quotas will be the first thing that will prove an obstacle to the prolongation of the Union. From the preliminary preparations of the works it is

evident that this fight for allotments will be carried on with all possible tenacity and energy. The fight in 1907 foreshadowed what is coming. There are establishments to-day which, although running at their utmost capacity, can hardly produce up to their allotments; but there are others that have blown out some of their furnaces and are stopping their rolls one day in the week for the reason that their allotments do not permit them to run more than about three-fifths of their productive capacity, and they do not feel able to pay the heavy tonnage penalties for exceeding their quotas. Works of this latter class will not be guilty of excessive modesty a second time.

Other Problems Than Allotments

But there are other problems. For example, the syndication of the B products (all other steel products than rails, structural shapes and semifinished material), especially bars. Will the works be able to find a form for accomplishing this, after having hitherto sought in vain for one? Or is the Union to be renewed again as a torso? Can this be thought of, in view of the fact that the sales of the B products already exceed those of the A products, and that this excess of the former is continually growing bigger? . . . Then we have the serious geographical differences. The Silesian mills have got themselves into a difficult position through their enlargements of plants, despite their relatively higher cost of producing goods. A more important matter is the competition between the Rhenish-Westphalian and the Luxemburg-Lorraine works. The former have their coal at their doors, while the latter have iron ore equally nearby. The more southerly group derives relatively a much greater advantage from the application of power produced from furnace gases, since they thus save coal, which is dearer there by reason of high freights. They do not yet undertake the higher processes of manufacture, owing to the lack of skilled workmen, who prefer to stay near the larger towns; but the Rhenish-Westphalian works no longer feel secure even of this advantage; it is probably only a question of time when the southwestern mills will also take to turning out the finer classes of products.

The writer finally takes up the question, How much interest have the works in renewing the Union? He finds that, while there is a strong sentiment in favor of the renewal, many mills point out that their interest in that direction has grown less since 1907, owing to the shifting of production to class B products, in which allotments indeed are made, but the works are left to sell their product at their own prices, and to hunt for their own trade. Nevertheless, an aggregate of 5,000,000 tons of class A products is still fully under the syndicate arrangement of the Union. The Union has offered great advantages to its members in marketing this big total, as well as in fixing a common freight basis. Besides this, the Union maintains a selling agency in London, and in one or more other markets, and these would have to be abandoned if the renewal is not effected. But the most practical advantage is the maintenance of prices; it is everywhere admitted that prices would drop 20 to 30 marks a ton as soon as the Union should be dissolved. In other words, a loss of something like \$60,000,000 a year would ensue for its members.

The foundry business at Franklin Park, Chicago, Ill., heretofore carried on by Forster, Waterbury & Co., will hereafter be conducted by the Franklin Park Foundry Company, which will continue the manufacture of malleable and gray iron castings and specialties, such as steam, water and gas pipe fittings, link belt chain, carriage and wagon hardware, miscellaneous hardware, &c. The main office will be located at Herrs Island, Pittsburgh, Pa., and the factory office and works at Franklin Park, Chicago. Inquiries and orders may be addressed to either office. James P. Walsh is president; J. N. Korhumel, general manager; J. Twing Brooks, secretary and treasurer. Charles F. Forster has sold his entire interest in the corporation of Forster, Waterbury & Co. and, having resigned his position as treasurer and general manager, is no longer connected with the concern in any way.

Canada's Iron and Steel Bounties

The Government Discourages Hopes of Renewals

TORONTO, April 8, 1911.—In his budget speech April 4 Mr. Fielding, the Finance Minister of Canada, made some reference to the subject of bounties, but it was not until his speech was concluded and the House was about to go into supply that, in reply to a question, he stated categorically that "There is no intention on the part of the Government to renew them." It would appear, therefore, that on iron and steel produced in Canada after the end of June there will be no bounty paid, save on such as is manufactured by electrical process before the close of 1912.

Mr. Fielding's statement puts an end to uncertainty and to some hopes that were clung to up to the moment it was made. It is true, toward the end of the last session of Parliament he spoke to the same effect in terms that were scarcely less unmistakable. The bounties on pig iron, puddled bar and steel ingots ceased at the end of last year, and the bounty on wire rods will expire at the end of next June. There is no doubt that what Mr. Fielding said last spring prepared the iron and steel manufacturers for the discontinuance of the bounties, but it is equally beyond question that they also expected compensation in the form of protective duties. Several important staples of the iron and steel industry are either on the free list or are dutiable at very low rates. Of the former are wire rods, bar wire and Nos. 9 to 13 galvanized wire. Of the latter are galvanized or otherwise coated iron or steel sheets not thicker than No. 14 gauge, &c.

The Injection of the Reciprocity Question

After the terms of the reciprocity agreement with the United States were made known, it was manifest that the steel interests of Canada were not to be compensated for loss of bounties by increase of tariff protection. That led to the belief or hope that the Finance Minister would abandon his formerly expressed purpose of discontinuing the bounty. Of late it has consequently been freely conjectured that the Government would this session introduce legislation providing for another five-year term for the bounties. Strong but unavailing pressure was brought on the Finance Minister to induce him to do this. Hence Canadian manufacturers of steel will not have the benefit of the bounties, and they will have no further tariff protection. The very probable effect will be the passing of the Canadian wire trade largely to United States manufacturers.

Of course, if the reciprocity agreement with the United States becomes law, Canadian manufacturers of wire rods will have free entrance for that product in the market of the United States. But there is little prospect of working up a profitable business in the greatest steel producing country in the world. The *Montreal Star* says that the tendency will now be for Canadian steel makers to restrict their output to products which have the benefit of protective duties. Yet Canada's demand for wire is of great present magnitude, and is rapidly enlarging with the influx of new settlers into the prairie country. If that trade is left largely to United States makers of rods and finished products it will be worth their attention.

One Chance Yet

There is still a possibility that the bounties, at least on some articles, will be revived. In his budget speech Mr. Fielding made no reference to the reciprocity agreement, nor to the British preference, and volunteered no information as to renewal or nonrenewal of bounties. If Congress and Parliament approve the agreement it will come into effect, and then there will be a new situation calling possibly for new adjustments on the part of the Government. The Government has caused it to be understood that the establishing of the agreement would be followed by an increase in the preference to Britain. The Canadian market being thus further opened to competitors from the United States and Great Britain, the Government might be constrained to revert to the bounty method of assisting industry.

C. A. C. J.

Scientific Industrial Operation*

Some of the Changes It Has Wrought in Large Manufacturing Organizations

BY TRACY LYON, PITTSBURGH, PA.†

A great deal has been said recently, in the public prints and otherwise, of scientific management, and the railroad companies of this country have been particularly, and more or less unjustly, criticised for the lack of it. I believe that the public at large has rather a vague idea as to what this "scientific" management or operation consists of from a practical point of view, and while its principles have been very thoroughly defined by various eminent authorities, an effort to indicate very briefly some of the accomplishment in this direction may be of service to those who have not given the matter particular study.

There is a new schoolmaster abroad, or perhaps he might better be called a doctor, the "efficiency engineer," who stands ready to apply his medicine in the most scientific, though sometimes unpractical, manner. On the other hand, some successful manufacturers say that they do not want college men in their service, and disdain anything that smacks of being scientific; much as a "born" salesman might smile at the suggestion of the study of logic and psychology as an aid to salesmanship, even though he was unconsciously somewhat of an adept in their laws himself, and might profit greatly if he knew more about them.

What Scientific Management Means

It is hardly necessary to say that scientific management is not a new thing in itself, although its application in a thorough manner has been thus far limited to a comparatively small field. There seems to be little doubt, however, that it can be applied to advantage to any business, large or small, the only difference being that in the case of very large industries many years may be required to accomplish the task without an undue upsetting of conditions.

Scientific methods involve a casting aside of precedent and established usage, the determination by systematic observation and analysis of conditions as they are, not as they seem to be, and the application of the information so obtained to individual tasks.

It is natural to assume that when a man has worked at one task for years, whether on a machine tool or at manual labor under ordinary competent supervision, and with the advantage of his own experience and trade traditions, he would have reached a degree of skill and speed which could be increased by expert instruction in only a small degree. But this is not so, and therein lies the keynote of scientific management. It has been demonstrated that a man can be taught to double or even quadruple his output, with no greater or even less physical exertion, by means of a use of tools and a distribution of effort which he unaided would be incapable of evolving.

What the labor cost of an individual operation should be can only be determined by analytical time studies, in which personal equation and past performances are disregarded and every move is considered. The simple application of a graphic ammeter to a motor driven machine tool may tell a surprising story of repeated delay and undeveloped capacity. It may be said on behalf of employers that such studies are sometimes discouraged, to say the least, by the workmen themselves.

Knowledge of Work Standards and of Costs

In order to bring out the best and most intelligent effort on the part of most men it is necessary to establish and recognize a reasonable measure of their efficiency. And to develop this efficiency to its highest degree

there must exist methods of compensation which will offer a comparatively large return for increased individual effort; an organization which will effectively plan in advance to bring together at the right time all information, tools and material required, and which will furnish adequate instruction and supervision and a carefully considered arrangement of appliances and machinery which will bring about an economical movement of the work. A very essential function of such an organization is to create a feeling of copartnership between employer and workman, and an understanding that the employer is not trying to get the most for the least wage but is willing to pay liberally for increased output and efficiency.

Many manufacturers do not know what the real and actual cost of their product is, particularly if it is diversified, because of a lack of adequate cost accounting and because the overhead or general charges are not properly distributed, to their own detriment as well as to that of the public. This is not an easy question to solve, but there are scientific methods of accomplishing it. I believe that railroads would purchase many articles they now manufacture if they had a truer knowledge of their shop costs. Railroad shops have no balance sheets to face and do not necessarily go out of business if they are not making money.

On one railroad, with whose operations I was familiar some years ago, allowances were established for the cost of repairs to equipment per ton mile, or mile run; for the cost of coal used by locomotives per ton mile, for roundhouse expenses per locomotive handled, for terminal expenses per car switched, for freight house expenses per ton of freight handled, as well as many other expenses. These allowances were based upon a more or less scientific study of what the cost should be, and each foreman and station master knew every day whether he was ahead or behind the game. In the same way, allowances for expenses of all kinds may be established in any business, using as a basis percentages of direct or productive labor, of cost of product, of sales, a certain amount per unit produced or order handled, or whatever other basis may be devised to appeal to the man who is directly responsible for the expense, and thus place before him a constant record of the amount by which the allowances are exceeded.

Such records and comparisons may perhaps be shown most clearly if plotted as curves. In fact, I do not believe that the financial and operating details of any large and complex business can be properly appreciated and studied without the use of graphical records. By these means a field can be covered and comparisons made which would be impossible with the use of figures alone.

Department Organization Extended

Rather an interesting development has taken place in the last few years in the organization of several of the largest manufacturing plants in this country. These plants have a highly diversified product and were originally laid out to centralize the manufacture of many parts in highly specialized "feeder" sections, such parts being delivered as required to the various assembling departments. As these plans grew in size it became increasingly difficult to bring about a uniformly prompt delivery of parts by the feeder sections, and it was finally determined that the most economical results could be obtained by breaking up the greater number of these sections and distributing their tools among the assembling departments, even though this entailed some duplication of equipment and an abandonment of the benefit of centralized specialization. This step toward the departmentalization of very large shops has brought out the advantages to be obtained in broadening the responsibility of the heads of departments and in holding them accountable for results. A further step has been to give finished materials, and the regulation of these stocks in a system of interdepartmental accounts, making each department pay for all labor, power, heat, light, supplies and materials it receives, and to give it its own engineering staff. This industrial development is parallel to the division organization of some railroads and to the organization of the great department stores.

* Read before the Congress of Technology, Boston, Mass., April 11, at the 50th anniversary of the Massachusetts Institute of Technology.

† Assistant to first vice-president of the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

Other Features of Scientific Methods

Scientific methods involve the use of the most expert advice obtainable, as to the selection and handling of material, the choice and maintenance of tools, the processes of manufacture and operation and the elimination of wastes. The possibilities of industrial chemistry are unlimited. I believe that many manufacturers fail to expend as much as they should for such services or for an efficient staff, for lack of appreciation of the very large returns which may be obtained thereby at an expense which is very small compared with the amounts involved.

The success of a manufacturing business may depend upon the amount of money tied up in stocks of raw and finished materials, and the regulation of these stocks in a more or less automatic manner is one of the large problems which requires scientific treatment.

Scientific management would not permit factories to be poorly lighted, as many are. It can be demonstrated that the cost of furnishing the very best light obtainable is inconsiderable in comparison with the benefits to be derived in an improvement in the quality of work and increased production. The same thing may be said of the cost of improving sanitary and other conditions which affect the comfort and health of the workman, and of maintaining orderliness and cleanliness.

The Drucklieb Multiple Injector Sand Blast

A sand blast having greater capacity than that ordinarily employed and capable of being subdivided is frequently needed in large foundries. To meet this requirement J. M. Betton, 178 Washington street, New York City, has placed on the market the Drucklieb multiple injector sand blast, which is designed more especially for use in foundries having a large output of pieces of a similar character.

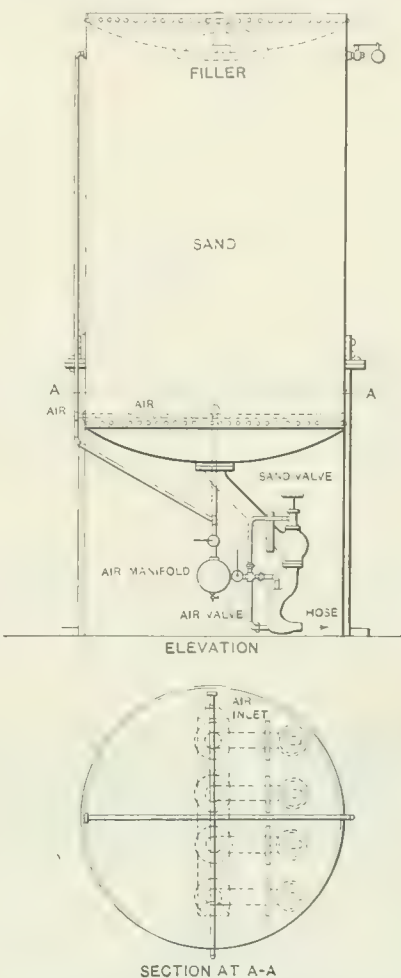
A vertical cylindrical tank made of riveted boiler steel and capable of withstanding a working pressure of 80 lb. per square inch is employed for storing the sand. Both the ends of the tanks are dished and in the upper one there is a large sand inlet closed by a manhole cover. One, two, three or four outlets, with pipes to lead the sand to a special form of the Drucklieb injector sand blast apparatus, which was illustrated in *The Iron Age* January 5, 1911, are attached to the bottom of the tank by flanged connections. The sand is thoroughly mixed with the air in the sand blast apparatus and discharged at the maximum velocity through a line of rubber hose equipped with a nozzle holder. The flow of sand is regulated by a sand valve, which is of such a design that it will not jam under the pressure of the sand. One of its special features is a central air jet that imparts a greater evenness and regularity to the flow of the sand than is obtained by gravity alone, the current of air forming a low vacuum underneath the valve and effecting this.

The supply of compressed air is piped from the air receiver near the compressor through a riveted steel manifold, which is placed horizontally under the sand tank, and also serves as an air separator. The supply for each outlet is controlled by a single lever-handle, quick-opening gate valve, the air being piped to the sand valve and the mixing and the forcing openings. The flow of sand through each outlet can thus be started, regulated and stopped independently of the others without affecting their action in any way. The necessary draining facilities are also provided for the manifold.

Air is piped from a separate connection controlled by one valve to the upper part of the tank to balance the pressure, and also to two perforated tubes placed at right angles near the bottom of the sand tank. Small jets of air delivered through these openings agitate the sand and further facilitate its flow. The mixed air and sand currents are delivered through a length of rubber hose from each main outlet to the nozzle holder in the customary way. Where required further subdivisions can be made by employing Y-fittings.

When this system is used the Drucklieb sand blast apparatus can be attached to the bottom or the sides of any closed tank from which sand will flow, the num-

ber being determined by the requirements of each particular case, since the individual outlets operate independently of all the others. In use, the sand is elevated to one central point, and the delivery hose led to separate cleaning rooms. If it is desired to carry on the sand blasting work continuously, this can be done by superposing a second tank with the necessary valves and piping upon the regular sand tank. These multiple sand blasts are made with capacities of 2000, 4000, 6000 and



Elevation and Section of the Drucklieb Multiple Injector Sand Blast Made by J. M. Betton, New York City.

16,000 lb. of sand and with one, two, three or four outlets. These outlets are generally located in the line so as to face in the one direction, but they can be turned to face any point of the compass if desired. While 80 lb. is the maximum pressure under which these sand blasts can be worked, they nevertheless will operate at lower pressures without making any changes or adjustments, and the lower air pressure is more generally used, as it produces a more economical consumption of power.

The American Association of Refrigeration, of which J. F. Nickerson, Chicago, is secretary, will hold its second annual meeting in the East Room of the La Salle Hotel, Chicago, May 9 and 10, the first session opening at 10.30 A.M. Reports will be received from the official delegates to the second International Congress of Refrigeration held in 1910 in Vienna, Austria, and from the committee appointed to investigate the claims and proposals of the several cities desirous of securing the third International Congress which is to convene in the United States in 1913.

The Alberta Rolling Mills Company, Ltd., is building a rolling mill at Medicine Hat, Alberta, Canada, and expects to have it ready for operation by May 1. Iron bars and bands will be rolled. Natural gas will be used. J. L. Pollock is president; S. C. Dunn, vice-president; A. L. Scott, treasurer; W. F. Goodison, secretary; and F. Zeigahn, manager.

A New Pennsylvania Railroad Track Scale

A Mechanical Hump and a Relieving Gear Are Two of Its Special Features

In the 52-ft. track scale recently installed at the West Brownsville Junction, Pa., of the Pennsylvania Railroad, radical departures have been made, most of which are covered by patents secured by A. W. Epright, the company's scale inspector. One of the most important fea-

per cent. by adjusting devices. Probably the most ingenious feature of the new scale is the relieving gear, which is an arrangement of power operated jacks permitting the mechanism of the scale to be disconnected entirely from the track. Operating this gear enables the

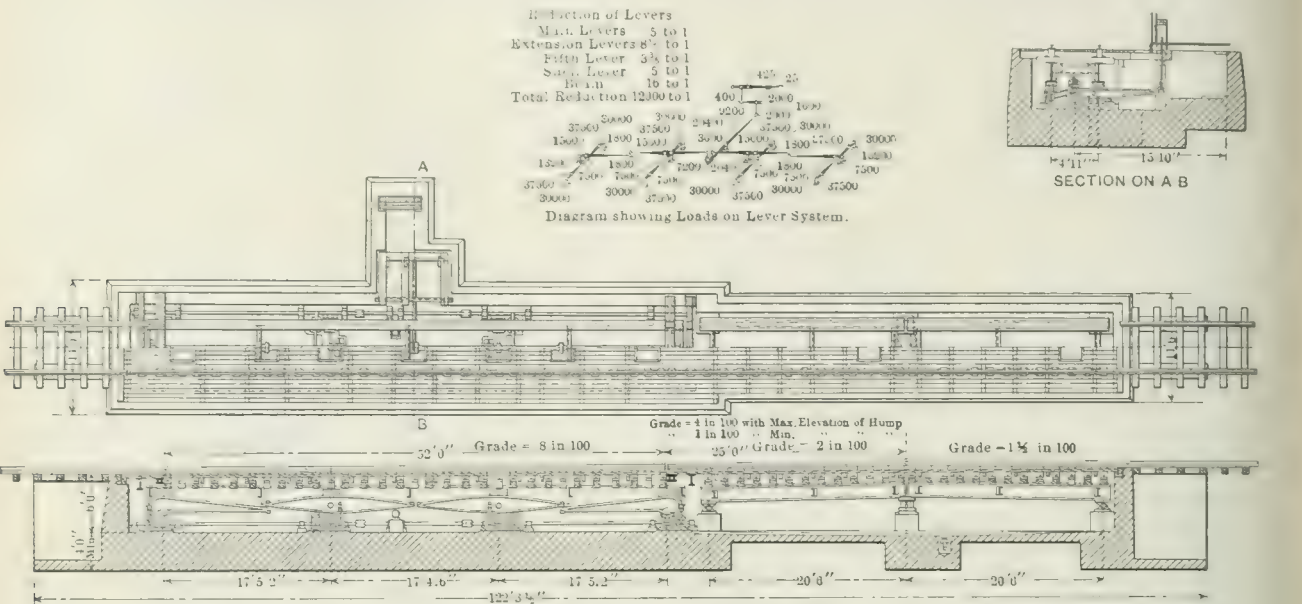


Fig. 1.—Details of the New 52-Ft. Track Scale Installed by the Pennsylvania Railroad at West Brownsville Junction, Pa.

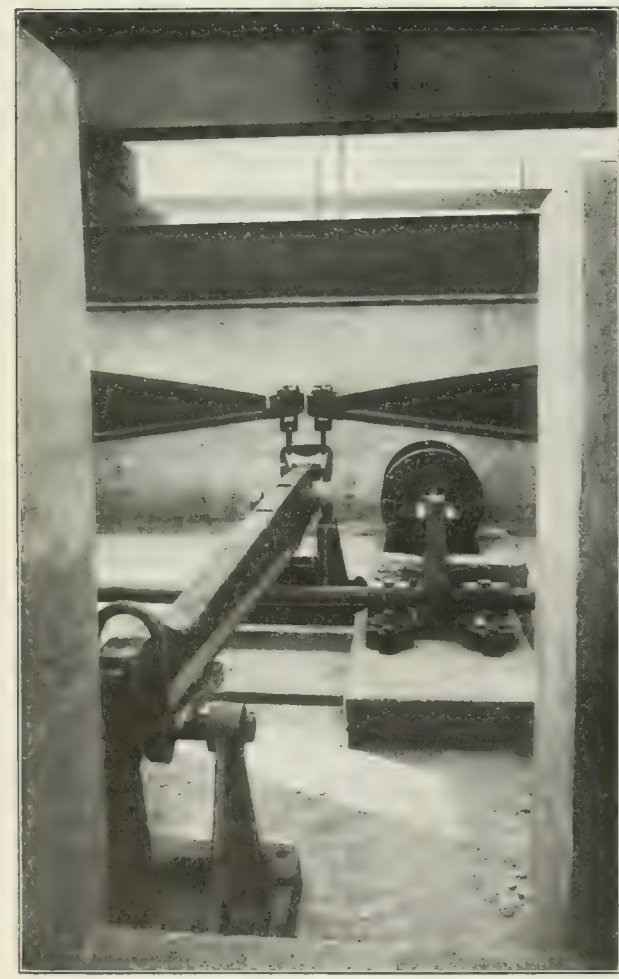


Fig. 2.—Method of Connecting the Scale Beams in the Pit

tures of the new scale is a mechanical or adjustable hump to regulate the speed of gravity switching of cars over the scale, and the grade on the hump can be varied from a minimum of 1 per cent. to a maximum of 4 per

heaviest engine to pass over the scale without registering a pound of weight, while the disconnection is made without affecting the balance of the scale in the least. As the surface platform is supported entirely independently of the scale mechanism, wind pressure or snow and ice on the platform do not destroy the accuracy of the scale's balance. Fig. 1 is a plan view and sectional elevation of the scale, together with a diagram of the loads on the various levers. Fig. 2 illustrates the method of connecting the scale beams in the pit, while a view of the



Fig. 3.—The Scale Beam Used.

type of beam employed for registering the weight is given in Fig. 3. Fig. 4 shows the end levers, the torsion shaft and the end toggle jacks of the relieving gear, while Figs. 5 and 6 are sectional views, the former being a longitudinal section at the end, and the latter a half-cross section with the floor removed. Fig. 7 illustrates the system of levers used in connection with the relieving gear. Fig. 8 gives a view of the track scale and the hump showing some of the details of the scale platform construction, while Fig. 9 shows the mechanism for adjusting the apex of the hump and Fig. 10 the beams of the scale platform.

Constructional Details

It will be noticed by referring to the longitudinal section through the scale and the hump shown in Fig. 1 that all wooden substructure has been eliminated, and

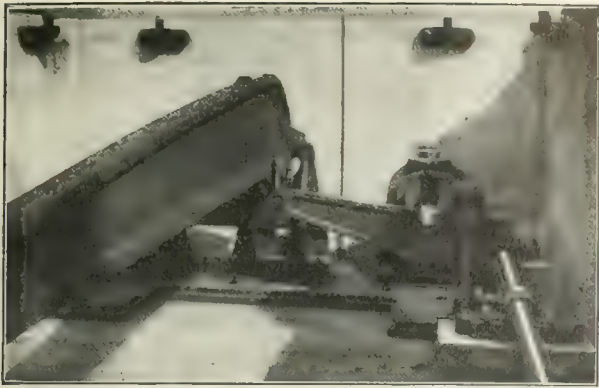


Fig. 4.—The End Levers, the Torsion Shaft and the End Toggle Jacks of the Relieving Gear.

that the main bearings are of the suspension type, thus providing greater freedom of action of the platform as they get rid of the gyration of the knife edges across the face of the hardened steels, as well as giving greater arcs of motion from the point of platform suspension to the base of the scale rail. An analysis of this bearing which is shown in the upper portion of Fig. 1 and also in Fig. 2 will reveal the fact that the main lever is rigidly supported from the bedplate castings, and that a saddle block with an inserted compensating steel engages the knife edge. Two links are suspended from this saddle block and support the yoke casting at eight different points. These yoke castings in turn are bolted to eye beams, thus forming a metal bridge from which the scale rails receive their direct support. This form of construction enables an oscillating motion in a longitudinal direction with sliding friction at the supporting ends of the links to be secured for the platform, while in a transverse direction an undisturbed pendulous motion is obtained. All of the main lever stands and the extension lever stand, supported from the four main bed plates, have self-compensating steels wherever a pivot contact is made and the independent alignment of each individual lever by adjustments at their connections.

The scale has a full capacity beam reading to 300,000 lb., which is shown in Fig. 3. This beam is equipped with a poise operating on a set of a specially designed ball bearings. This reduces the resistance from about 4 lb. to as many ounces. To insure the latch seating perfectly in the teeth of the beam at all times a mechanical spring with means for adjustment has been provided to operate it.

The Relieving Gear

The most radical departure from the older form of construction is probably the introduction of the relieving

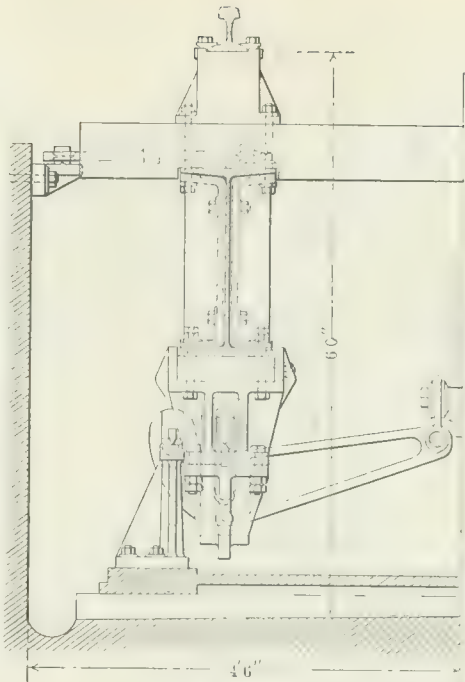


Fig. 6.—Half Cross Section with Floor Removed.

gear. It takes the place of the rigid dead rail system, with the supporting columns that filled the vault practically full of metal, thus preventing the proper inspection of the scale bearings, and also eliminates the second track over the scale, together with the approaches and switches at either end. Primarily this relieving gear consists of a series of eight toggle lever jacks, illustrated in Figs. 4 and 7, supported in pairs by the universal bedplates. The torsion shaft, with suitable link connections at each of the four sections of the scale, operates these jacks. This torsion shaft, which is shown at the right

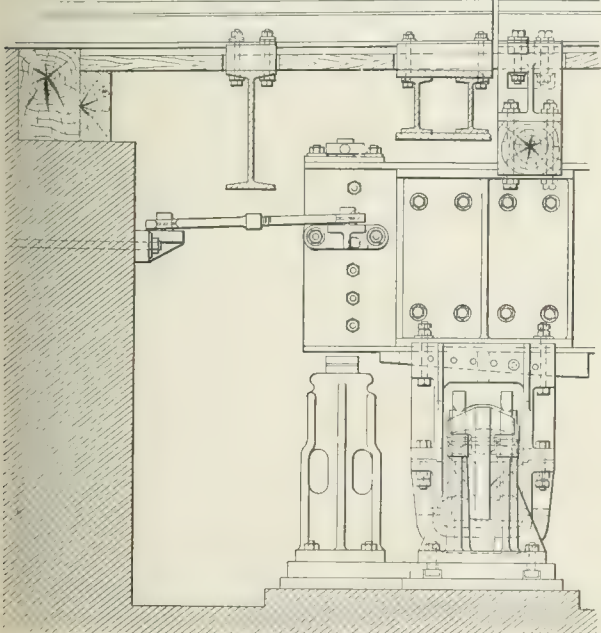


Fig. 5.—Longitudinal Section at End.

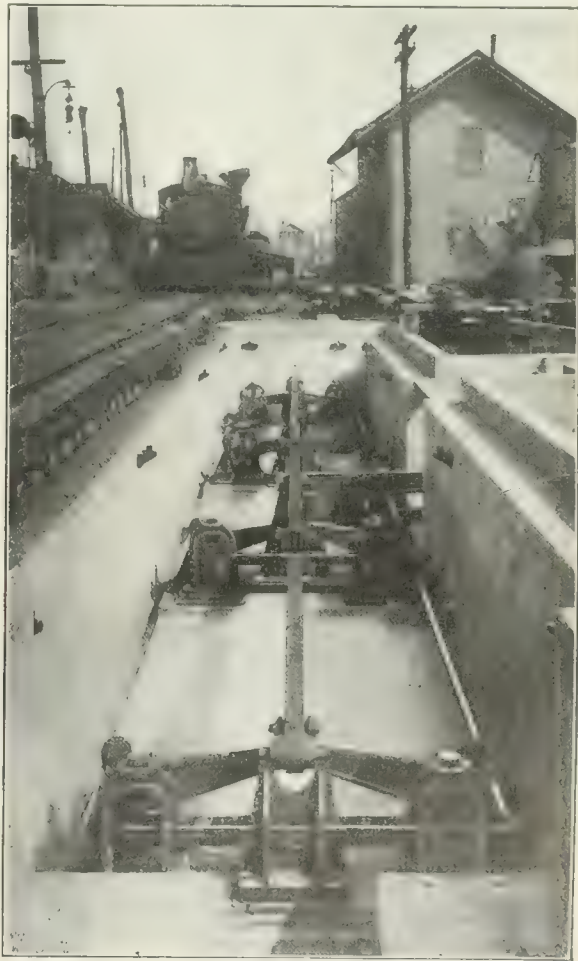


Fig. 7.—The Lever System and the Relieving Gear.



Fig. 8.—View of Track Scale and Hump, Showing Details of Scale Platform Construction.

of Fig. 4, in turn is operated by a double-ended cylinder shown at the right of Fig. 2 and just beyond the opening in the right scale pit wall, Fig. 7. This cylinder is controlled by the weighmaster in the scale office, and the power employed is either compressed air or water, the former being preferred. A hand operated mechanism that can be quickly connected in case the power gives out is also provided.

The scale track is converted into a dead track by the weighmaster operating a four-way control valve, which causes the toggle jacks to be put in operation, so that the plungers travel upward against the I-beams, supporting the metal bridge and raise the platform from its ordinary position on the suspension links by relieving the knife edges of all weight without causing the knife edge contact on the bearing steels to be disturbed. The throwing in and the releasing of the relieving gear is accomplished without changing the original alignment of any part of the scale system, and as the knife edges do not leave their seats when the platform is raised, the balance of the scale is practically maintained when the bridge is again lowered.

The total weight of the platform is about 38,000 lb., and with an approximate pressure of 80 lb. per square inch in the cylinder the bridge can be raised so that the heaviest engine will not show any weight on the beam when going over the scale. The operating gears cannot, of course, be worked under a superimposed load, but as the average interval between the cuts of the cars is 18.6 sec., and the relieving gear can be operated in about 1 sec., this is not necessary.

The Mechanical Hump

The object of the mechanical hump is to provide a simple and effective means whereby with a minimum

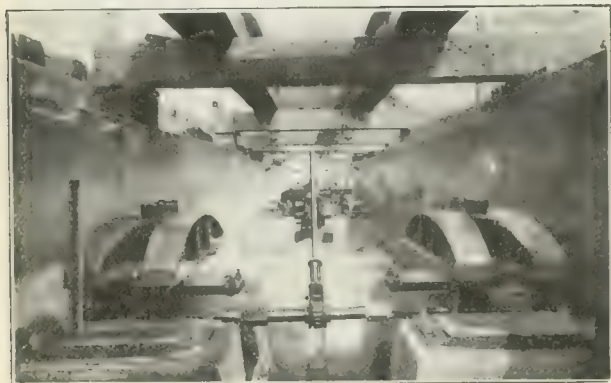


Fig. 9.—Mechanism for Adjusting the Hump Apex.

amount of attendance for manipulating the cars, the latter can be passed rapidly and without stopping over the platform of the scale with the proper velocity to permit each to be weighed as it passes over the platform regardless of variations within the usual limits in the lengths of successive cars. This is accomplished by providing the track over which the cars pass to the scale with a hump having a fixed apex at a short distance from the adjacent end of the scale platform. The proportion between the slope at the side adjacent to the scale to the distance between the apex and the scale platform and the rate at which the cars are to be weighed is such that when the cars are pushed at a uniform rate up the side of the hump away from the scale and are uncoupled, either before or while being pushed up the hump, each will run down the opposite side and on the scale platform with the proper velocity to secure accurate weighing. A view of the scale and the hump is given in Fig. 8. All the cars passing over the railway scale at the head of a classification yard are not of one pattern, and the distances between the front and the rear wheels vary. These variations in wheel base length are in a measure automatically compensated for by the mechanical hump, which is so designed that the elevation of its apex above the scale platform can be adjusted to get the desired relations

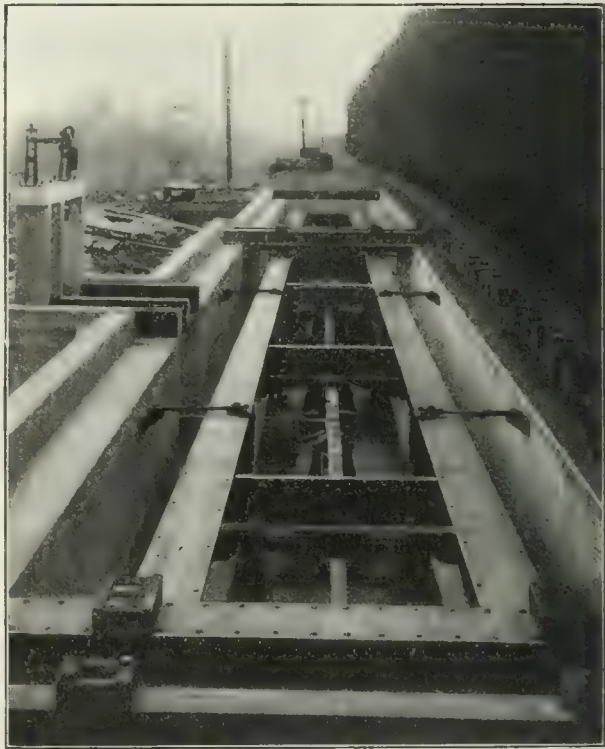


Fig. 10.—The Scale Platform Beams.

which insure the proper velocity of the cars when passing over the scale platform.

The construction of the hump provides for two sets of box chords or girders running parallel with and directly under each rail in the track overhead. These two sets of chords are supported at the center, which forms the apex of the hump, by rigid steel castings located parallel with the track. These in turn are supported by abutments on either side to which bedplates are bolted. These abutments also support two toggle lever jacks of the Sansom screw type directly under a vertical line passing through the center of the rails. These jacks are connected universally by an extension socket and are operated by a hand ratchet with a lever arm at the center, as shown at Fig. 9. At the four ends of the box chords pivotal castings are bolted which also are supported by the bedplates on the abutments. Surfaced hardwood ties are bolted to the box chord system, and to these in turn are bolted square cast iron columns projecting through the platform covering the top of the inclosure. The details of this construction are clearly shown in Fig. 8, and the rails forming the track over the hump are bolted to these columns with railslips.

The present design of hump provides for a vertical rise of 8 in. at the apex which is located about 25 ft. from the scale.

When the apex is raised to the proper height, distance pieces or liners are inserted under the center casting, after which the jacks are released. This arrangement rigidly supports the center casting at the apex at all times, as the jacks do not carry the superimposed load, but are merely employed to raise and to lower the apex. The changes in the length of rail, due to raising or lowering the apex and expansion and contraction caused by atmospheric changes, are compensated for by placing a bronze friction plate at the base of the four pivoted castings on either end. This permits a free change in a longitudinal direction of the four pivotal castings bolted to the box chord to be secured.

The Gardner Crusher

For grinding any material, either wet and dry, to any degree of fineness from 1 in. to 100 mesh, the Gardner Crusher Company, 556 West Thirty-fourth street, New York City, has placed on the market a combined crusher, disintegrator and pulverizer. The special features claimed for this machine are the small driving power required in proportion to the output, and a special type of crank construction by which, if the material being crushed offers too much resistance, the beaters will turn on their axles, thus avoiding breakage. In many cases it is claimed that for certain materials the crusher is superior to one of the jaw type. When used in this way the Gardner crusher is operated as a single-stage reduction machine, and the material is fed directly from the quarry and reduced to the desired fineness in one operation without the use of any auxiliary equipment. This, however, is not recommended by the maker, as for very fine and regular grinding this crusher should be merely used in preliminary work before the material goes to the tube mill.

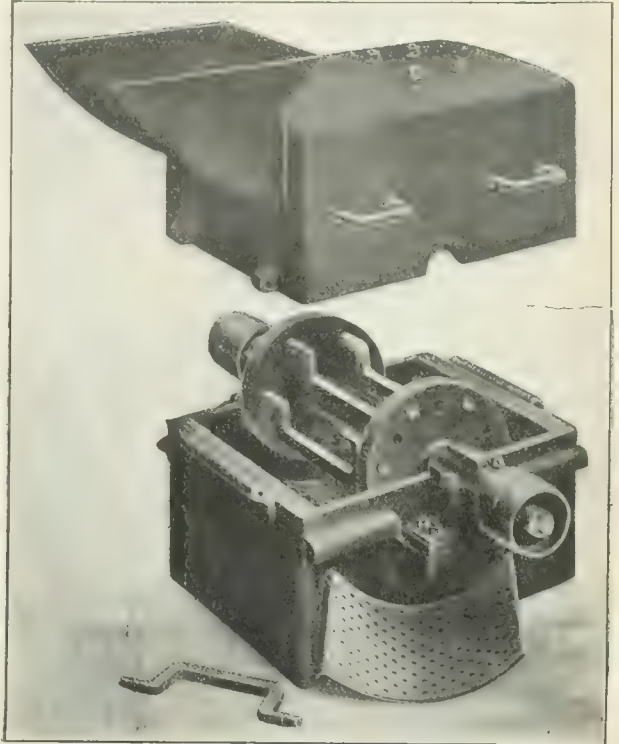
The machine consists of a very strong iron frame, cast in two parts, the lower one being the base and the upper one containing the hopper. The contact surfaces of both parts are planed to secure a perfect fit, while to prevent dust from entering, the top is fastened in place by bolts. In this way it is possible to inspect and clean the apparatus quickly by merely stopping it, removing the belt and lifting the top. The main shaft, which is located in the lower part of the frame, rests in two large bearings, that are provided with self-oiling lubricators. Mounted on this main shaft are two cheek plates, connected by articulated beaters, in the shape of brace cranks, which are clearly shown in the lower part of the engraving. These beaters are made of high grade manganese steel and are the only part of the apparatus subjected to wear. Their life depends upon the hardness of the material which they are employed to crush, and varies from one month to a year. The bottom of the crusher is a rounded, perforated iron plate, which acts as a screen for the material being discharged. Movable ribs of very hard metal are mounted on the inside of the top and can be moved down close to the cranks in case of wear, and also regulate the degree of fineness of the product. The material is fed into the crusher through the hopper placed at the left end, either by shovels or an automatic feeder, the latter not only improving the output of the mill, both as regards quality and fineness, but also lessening the amount of power required.

In operation the material passes through the hopper into the crusher, and one after another of the six cranks forming the crushing mechanism strike it rapidly in succession and break it into particles according to the degree of fineness required. The discharge is effected with great rapidity and the material is swept on the surface of the perforated grates in the lower portion, the combined action of the rotation thus imparted to it and the centrifugal force driving it out of the apparatus as quickly as the degree of fineness will permit.

The crusher can be mounted either on a bed of solid masonry or in a pit. In the latter case the bearing blocks for the main shaft rest on the side walls of the pit, which

have the necessary strength to support them. When the product of the crusher falls into the pit, it can be removed either by a bucket conveyor, the lower end of which is placed under the discharge grate, or else by an endless belt running under the machine and receiving the crushed product directly. This latter method is recommended when several crushers are in operation.

Three sizes of crusher are made for handling material, the maximum dimensions of which are for the No. 1 machine 10 x 5 in., for the No. 2 machine 13 x 9 in. and for the No. 3 machine 14 x 12 in. A test made with very hard cement clinker in the No. 1 machine equipped with a screen having $\frac{1}{8}$ -in. holes gave an output of 6000 lb. per hour, 98 per cent. of which would pass through a 16-mesh sieve and 40 per cent. through a 100-mesh sieve. The same machine when equipped with a 1-16-in. screen and producing 4000 lb. per hour gave an output, 100 per cent. of which passed through a 16-mesh sieve and 70 per cent.



The Crusher, Disintegrator and Pulverizer Built by the Gardner Crusher Company, New York City.

through a 100-mesh sieve. Changes in the size of the output can be easily secured by changing the screen, whose only office is to regulate the fineness of the discharged material, and changing the speed.

Gas and Gasoline Engine Trades Convention

The National Gas and Gasoline Engine Trades Association, which will hold its next convention June 20 to 23, inclusive, at the Hotel Pontchartrain, Detroit, Mich., has issued its preliminary programme. The first day's session arranges for the report of the Marine Engine Committee, of which G. D. Harris, Oshkosh, Wis., is chairman. This committee will provide, among others, for a paper on "The Relation of Ignition to the Sales Department," by R. H. Combs, St. Louis. On the morning of the second day a report will be made by the Agricultural Power Committee, of which Prof. P. S. Rose is chairman. The morning of the third day will be given up to miscellaneous business, while in the afternoon a paper will be presented by E. St. Elmo Lewis on "Advertising and Business Management." Excursions for entertainment have been arranged as well as visits to a number of the leading local factories. The convention exhibits will be arranged in rooms adjoining the meeting hall, with no charge for space, but reservations should be made in advance to insure accommodations. C. O. Hamilton, Elyria, Ohio, is president, and Albert Stritmatter, Cincinnati, Ohio, is secretary.

The Doherty Gas Calorimeter

A New Instrument for Determining the Heating Value of Combustible Gases

The Improved Equipment Company, 60 Wall street, New York City, is manufacturing a new type of gas calorimeter under patents granted to Henry L. Doherty. The special advantage of this calorimeter is that the calorific value of any combustible gas can be measured without requiring much time in making the test and little or no calculation on the part of the operator. The fundamental principle of the Doherty calorimeter is the direct displacement of the gas being tested by the water which is heated by the gas during the test, thus maintaining the ratio between the volumes of gas and water absolutely constant. The water displacing the gas imparts pressure to the latter which is secured from a constant static head in the regulator of the calorimeter. Every cubic inch of water passing the flame is heated by the burning of the same quantity of gas displaced by it and determining the heating value of the gas in B. t. u. becomes simply a question of measuring temperatures and making necessary corrections for the conditions of temperature and pressure existing at the time the test was made in order that the results may be reduced to a recognized standard.

The calorimeter which is shown in Fig. 1 and diagrammatically in Fig. 2 consists of two essential parts, the absorption chamber and the tank. They are both cylinders, the former being placed inside the latter with a heavy layer of non-conducting felt between to prevent the interchange of heat through the walls. The Bunsen burner is located within the absorption chamber, and thus a compact, self-contained and very simple arrangement is secured. The tank has a gauge glass for indicating the water level inside and a U-gauge shown at the right of Fig. 1 for indicating the pressure on the gas and the water in inches of water. The gauge glass is graduated in nine equal parts, the volume between the two extremes being exactly 1-3 of a cu. ft. The regulator at the rear of the central portion of Fig. 1 is simply a standpipe in which constant pressure is maintained by a supply of flowing water, part of which escapes to the drain, while

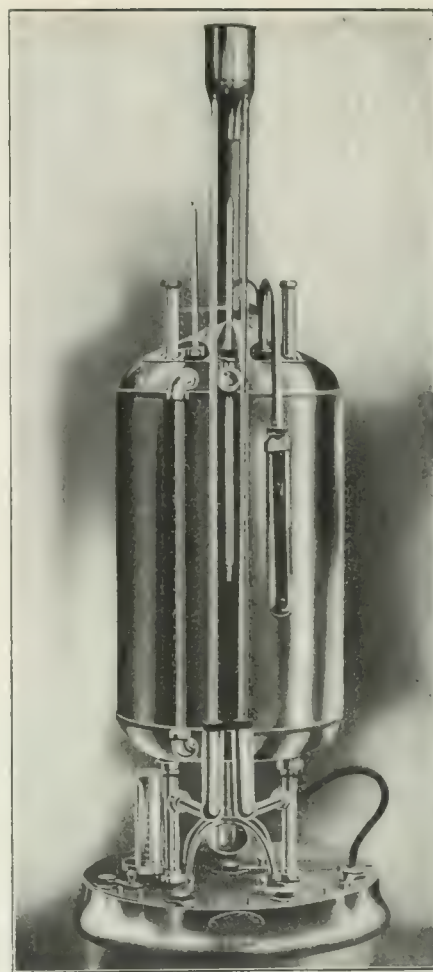


Fig. 1.—The Doherty Gas Calorimeter Made by the Improved Equipment Company, New York City.

plates within the absorption chamber control the temperature of the flue gases passing out from the calorimeter so that their temperature can be made the same as that of the room. This is done so that no heat is given

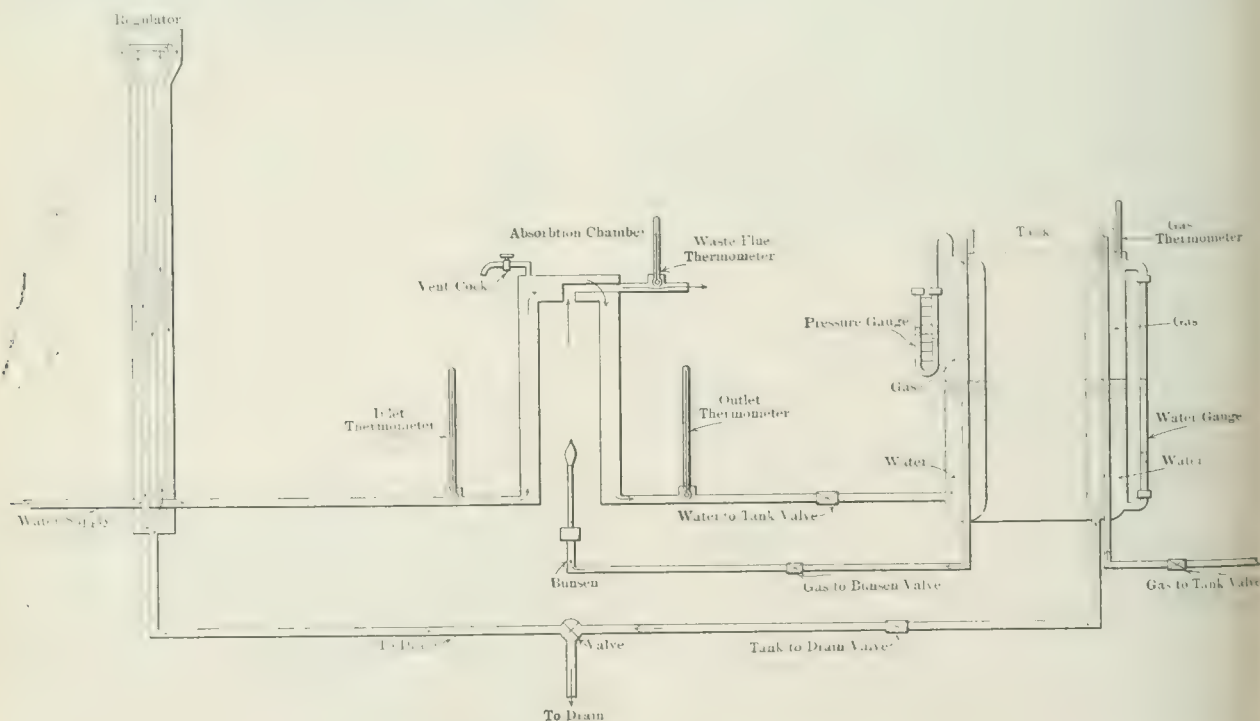


Fig. 2.—A Diagrammatic View of the Calorimeter.

the remainder keeps the standpipe full as displacement occurs in the tank.

The water passes from the standpipe through the absorption chamber and into the tank, its course being clearly indicated by arrows in Fig. 2. Adjustable baffle

to or taken from the air, and the only heat absorbed by the water in the combustion chamber is produced by the combustion of the gas. Five thermometers are used in connection with the calorimeter. These measure the following temperatures: that of the water entering the ab-

sorption chamber, that of the water leaving the absorption chamber, that of the gas in the tank, that of the products of combustion and the atmospheric or room temperature. The inlet and outlet thermometers are the two long ones extending from the base of the calorimeter to the enlarged portion of the regulator, Fig. 1, the outlet thermometer being on the left side and the inlet on the right. The instrument used for indicating the temperature of the gas in the tank is at the left of the outlet thermometer and almost directly above the gauge glass. The flue gas thermometer which measures the temperature of the products of combustion is located between the inlet and the outlet thermometers and projects from the top of the calorimeter. Directly beneath this thermometer in Fig. 1 can be seen the instrument indicating the room temperature.

With this calorimeter the sample of gas to be tested is drawn into the tank very slowly by opening the valve marked "gas to tank," Fig. 2, and opening slightly the one marked "tank to drain." The gas supply is then shut off and water is admitted from the standpipe by opening the "water to tank" valve, thus imparting the pressure of the regulator to the gas. This pressure is adjusted to 2.6 in., which is the standard for conducting tests by the adjusting valve on the U-gauge. At this point the temperatures on all the thermometers are noted and recorded. The Bunsen burner is lighted and the displacement of the gas immediately begins to take place. The area of the baffle plates in the absorption chamber exposed to the gas is adjusted until the gases of combustion emerge into the atmosphere at room temperature. The water level in the gauge glass in the meantime will have risen almost to the first graduation, and when this point is reached all temperatures are noted, and this is repeated as each mark is reached, thus giving 10 readings at equal intervals. The average of these 10 readings is taken as the basis of computation in a test.

In determining the calorific power of the gas these two formulæ are employed:

$$V = \frac{17.64 [(h - h') - a]}{460 + t}$$

$$\text{B.t.u.} = \frac{62.5 d}{V}$$

V = the volume of gas corrected to 60 degrees F. and a pressure of 30 in. of mercury.

h = the barometric pressure in inches of mercury.

h' = the U-gauge pressure in inches of mercury.

a = the vapor tension pressure in inches of mercury.

t = the temperature of the gas in the tank.

d = the difference in temperature between the water before and after passing through the absorption chamber.

All of these values except h and a are given by the calorimeter, and the former can be secured at the time the test is being made from a barometer, while the latter can be determined from tables furnished with the calorimeter, showing the vapor tension at different temperatures of the gas in the tank. The value of h' is 0.0769 times the reading of the U-gauge. It will be seen, therefore, that making a test with this instrument consists simply in reading the temperatures of the inlet and the outlet water, multiplying the difference between them by 62.5, and multiplying this result in turn by the value of $1/V$, which is secured from tables furnished by the maker. The result obtained in this way gives the gross heating effect of the gas under test, but does not take into account the latent heat represented by the water of condensation produced in burning the gas. To determine this the following method is employed: A drip at the lower end of the absorption chamber collects the water of condensation and discharges it into the glass graduate shown underneath the calorimeter at the left of Fig. 1. This graduate is marked both in c. cm. and B.t.u. When the water level reaches the lowest of the graduations of the gauge glass the amount of condensation in the graduate is noted, and when the water level has reached the top mark on the gauge glass, the increased amount of water in graduate is recorded. This shows the amount of heat represented by the water of condensation, and when multiplied by three, as $1/3$ cu. ft. of gas was burned, the B.t.u. value of water of condensation per cubic foot of gas tested is secured. This when subtract-

ed from the gross result secured by the temperature readings gives the net calorific value per cubic foot of the gas under test.

Provision is made in the construction of the calorimeter whereby the pressure in the tank cannot be increased beyond that equal to a few inches of water, while at the same time the water continues to flow through the absorption chamber and out through the drain, thus preventing any overheating of water, which might result in an explosion if the burner were left lighted and the flow of water through the absorption chamber obstructed. In addition the instrument can be completely drained and all the air expelled from the tank and the piping at the conclusion of a test.

A New Vessel for the Cuban Coal Trade

The Havana Coal Company (Berwind-White Coal Mining Company), Philadelphia, held open for inspection at Pier 28, South Wharves, Philadelphia, on April 8, the new steamship *Berwindvale*, which it will operate in the coal trade between Havana and Atlantic Coast ports. The vessel is a sister ship to the *Berwindmoor*, operated by the same company. Both were built by Sir Raylton Dixon & Co., Ltd., Middlesbrough, England, and are specially designed as coal carriers. They are of the single deck type, constructed on the Harrow-Dixon patent cantilever frame system, with cellular double bottom and side tanks for water ballast. The five holds are entirely free from obstructions and the hatchways are unusually large. The length over all is 425 ft., breadth 54 ft., molded depth 29 ft. The engines are of the triple expansion type, with cylinders 28, 46 and 77 in. in diameter, and a stroke of 48 in., developing about 4000 hp., and giving a speed of approximately $14\frac{1}{2}$ knots per hour. Three single ended boilers 15 ft. 3 in. by 11 ft. 6 in., each with three Morison suspended furnaces $45\frac{1}{2}$ in. diameter, furnish the steam. One peculiarity of these steamships is the absence of masts. Eight derrick posts, ranged in pairs convenient to the hatchways, serve for loading and discharging purposes. Light spars for signal purposes and for carrying wireless aerials are supported from cross beams connecting each pair of derrick posts. The *Berwindvale* arrived at Philadelphia recently on her maiden voyage, carrying a cargo of 7540 tons of Swedish iron ore from Narvik, making the voyage of 3650 miles in 18 days.

Detroit-Fenestra Steel Sash Orders.—The Detroit Steel Products Company, Detroit, Mich., reports a good volume of orders for Detroit-Fenestra steel window sash. Among the larger orders received recently are for steel sash for new factory buildings to be erected by the following companies: Milwaukee Steel Foundry Company, Milwaukee, Wis.; National Supply Company, Toledo, Ohio, one-story, saw-tooth roof, large factory building and machine shop; Northwestern Terra Cotta Company, Chicago, Ill., five-story building; Favorite Stove & Range Company, Piqua, Ohio, large foundry building; Mengel Box Company, Louisville, Ky., for new plant at Jersey City, N. J.; Carnegie Steel Company, for building at Youngstown, Ohio; C. W. Parker Company, Leavenworth, Kan.; Kieffer Building, Detroit, Mich.; Oklahoma Railway Company, power house and car barns; Standard Sanitary Mfg. Company, Dawes & Myler plant, New Brighton, Pa.; American Rolling Mill Company, Middleton, Ohio, new power house, A. B. Neuman, Chicago, engineer in charge, and Bush terminal warehouse, Brooklyn, N. Y.

For the first time since October, 1910, the figures of car surpluses and shortages on the railroads of the United States and Canada show a decrease in the net total of idle equipment. On March 29 the surpluses of idle freight cars of all classes amounted to 196,217 cars and the reported shortages 1,330 cars, leaving a net surplus of 194,887 cars, compared with 207,261 cars on March 15. This represents a decrease of 12,374 in idle cars, whereas, in the month ended March 15 there was an increase of 33,600 cars.

Employers' Responsibilities

Under the chairmanship of W. L. Saunders, president of the Ingersoll-Rand Company, the New York State Employers' Welfare Section of the National Civic Federation held a meeting at the rooms of the New York Board of Trade and Transportation, 203 Broadway, April 6. The programme was in charge of the Committee on Improvement of State Inspection of Factories of the Department on Compensation for Industrial Accidents and Their Prevention. The immediate purpose of the meeting was to discuss the recent deplorable fire which had brought suffering and death to many employees in the Triangle shirt waist factory in New York City. The circumstances attending this fire have brought out the necessity of paying still greater attention to welfare work, including sanitary work rooms, fire escapes, fire drills and industrial insurance. In opening the meeting Mr. Saunders said: "We employers ought to care for the health, comfort and safety of our workers. Each employer should be held responsible for his workers' life and welfare, civilly and criminally, when negligence or carelessness is proved against him."

Among those contributing to the discussion were Fire Chief Croker, of New York City; State Labor Commissioner Williams; Henry R. Towne, president of the Merchants' Association and also of the Yale & Towne Mfg. Company, and Louis B. Schram, chairman of the United States Brewers' Association. Earnest appeals were made for the more efficient inspection of factories. The statement was made that while the New York State Department of Game has 75 inspectors, the State Department of Labor is provided with only 50. There are 60,000 factories in the State of New York, and consequently the inspectors of the Labor Department can only visit them once or twice a year. Insufficient power is also a weakness of this administration of State supervision. The department is powerless, for example, to make a manu-

facturer rearrange the machinery in his factory so as to give greater space to pass between the machines. Chief Croker pointed out the fact that the responsibility for fire protection facilities in factories in New York is divided among the Health Department, the Building Department, the Tenement House Department, the Fire Department, and the Water, Gas and Electricity Department. He claimed that the responsibility should be placed in one department, which should not only inspect every factory building in the city at stated intervals, but that owners should be given only two weeks after its inspection for compliance with notices made of failure to carry out regulations, after which, if the warning is unheeded, the department should close the factory.

The Southwark Reversing Convertible Simple or Compound Engine

The First of This Type Built in America Recently Installed at the Cambria Steel Company

One of the special features in the equipment of the steel plant of the Grand Crossing Tack Company, Chicago, Ill., described in *The Iron Age*, August 4, 1904, was a reversing engine which was the first of its kind in America. It was built in Germany and had three 40 x 40 in. steam cylinders and operated at a maximum speed of 200 rev. per min. Recently a similar engine has been built by the Southwark Foundry & Machine Company, Philadelphia, Pa., and installed in the Gautier department of the Cambria Steel Company, Johnstown, Pa. The diameter of the steam cylinders and the stroke of the piston are 4 in. less in this engine than in the other, so that it is not quite so large, but it has other points of interest. It can be run either as a simple or a compound engine, is the first to be built in this country and is much

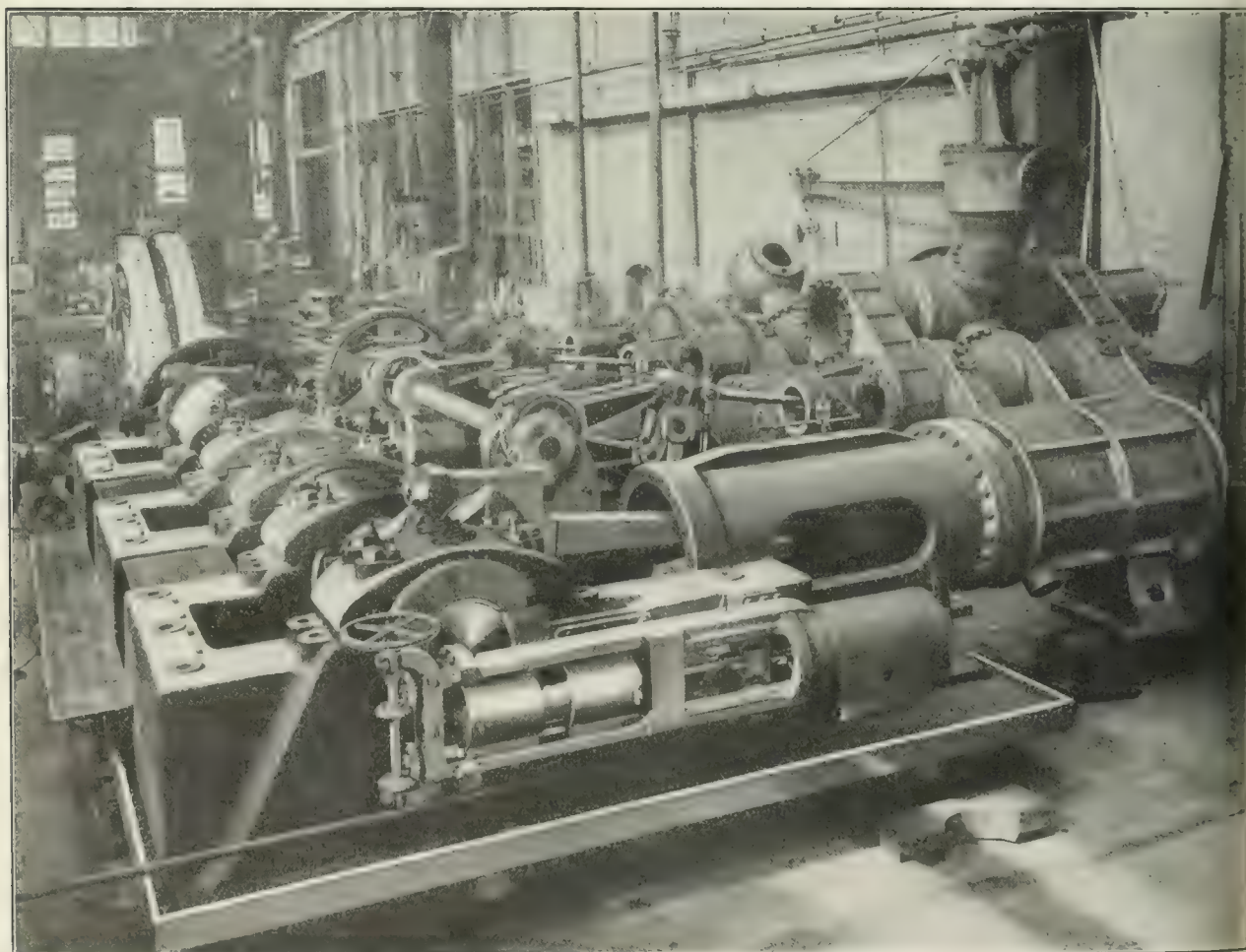


Fig. 1.—A Reversing Convertible Simple or Compound Engine in Process of Construction at the Plant of Its Builder, the Southwark Foundry & Machine Company, Philadelphia, Pa.

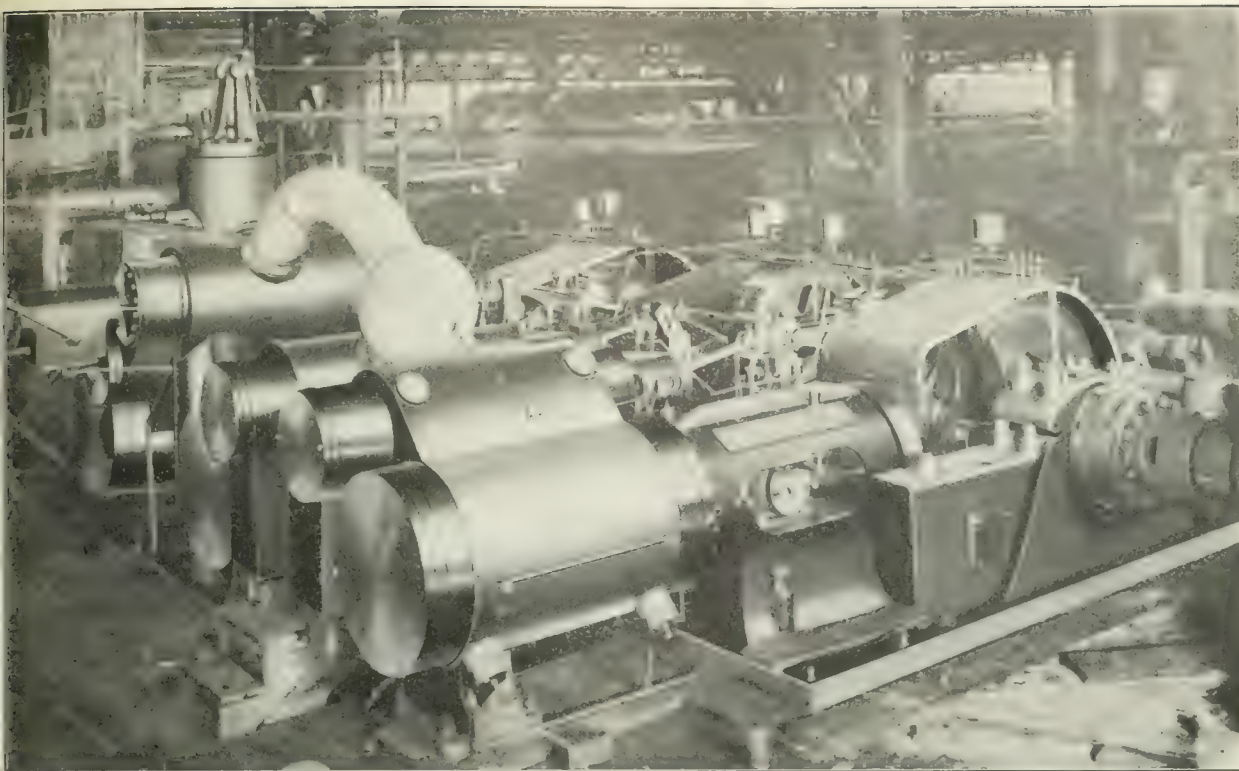


Fig. 2.—The Engine in Use for Driving a 24-In. Plate Mill in the Gautier Works of the Cambria Steel Company, Johnstown, Pa.

heavier than the other. Fig. 1 shows the engine in course of construction at the builder's plant, while Fig. 2 illustrates it in service for driving a 24-in. mill.

The engine is designed to operate at a pressure of 175 lb. per square inch and to run condensing. When used as a simple engine, steam at full boiler pressure is admitted to all three cylinders and exhausted directly into the condenser. The power developed under these conditions is in excess of 10,000 hp. When less horsepower is required this can be developed at a considerable saving in the amount of steam consumed by running the engine as a compound one. This change is accomplished by employing a converting valve located over the steam valve of one of the cylinders. The location of these two valves is clearly shown in the engravings. A small valve under the control of the engineer in the pulpit admits steam to the actuating cylinder, which moves the converting valve to a position where the high pressure steam only enters the end steam cylinder, from which it is exhausted into the other two and finally passes into the condenser. This arrangement gives a compound engine with a cylinder ratio of 2 to 1.

The point of cut-off in main cylinder can be varied from 75 per cent. to as small an amount as may be desired and the cut-off in the low pressure cylinders need not necessarily be the same as that in the high pressure one. The cut-off is adjusted by a motor which regulates the position of the stops against which the reversing gear comes to rest. A steam cylinder is used to reverse the engine.

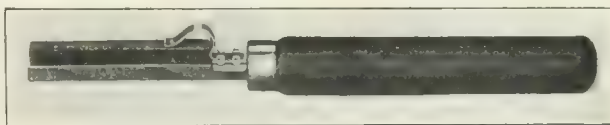
The valve gear is a Gooch link motion, driven by nine eccentrics on a lay shaft above the main shaft. Using a lay shaft enables the main shaft to be shortened and gives a more compact engine, while at the same time comparatively smaller eccentrics and lighter moving parts can be used in the valve gear, thus greatly decreasing the inertia strains at high speed. Each link is driven by two eccentrics at the top and one at the bottom, which avoids the use of offset eccentric rods, having a certain amount of spring. All the valve gear parts are made to have only a direct push or pull without any bending, and all the steam valves are of the piston type.

Acheson Lubricants.—The International Acheson Graphite Company, Niagara Falls, N. Y., has become general agent in the United States for the sale of the new lubricants Oildag and Aquadag, products of the

Acheson Oildag Company. The International Acheson Graphite Company makes Gredag, and by the new arrangement will be in touch with the sale of lubricants that meet any and all needs. Gredag contains disintegrated Acheson graphite and grease; Oildag is deflocculated Acheson graphite and oil, and Aquadag is deflocculated Acheson graphite and water. No other graphite, it is stated, is available in so many forms for the purposes of lubrication. All Acheson graphite is made in the electric furnace. Its production last year was over 13,000,000 lb., being far more than all the graphite mined in the United States in the same period.

The Badge Oilstone Holder

A new style of oilstone holder is being manufactured by F. J. Badge, 286 Taaffe Place, Brooklyn, N. Y. This tool holds triangular, square, round, or rectangular oilstones of $\frac{1}{4}$ to $\frac{3}{8}$ in. sizes and any length up to 4 in. If desired the bar holding the stone will telescope into the handle sufficiently to hold a stone as short as 2 in. Dies and punches can be lapped and the cutting edges of tools



A Telescopic Oilstone Holder Made by F. J. Badge, Brooklyn, N. Y.

stoned much more easily as the stones are conveniently and comfortably held. As more pressure can be brought to bear upon the stone it will cut faster than if held in the fingers. Stones held in this device are not so apt to break and those which have already broken and are too short to be held in the fingers can be used effectively.

The holder consists of a V-shaped bar pressed from sheet steel with a saddle fitting loosely over the V and capable of sliding the whole length of the bar. This saddle is provided with a set of tongues under which the end of the spring holding the oilstone is slipped. The pressure exerted by this spring on the stone has a tendency to cant the saddle, thus causing it to grip the V of the bar and lock itself in position. An abutment at the end of the bar prevents any end motion on the part of flat stones which do not drop entirely into the V of the bar.

Special Massachusetts Fan Drives

Two Recent Installations Embodying Novel Features

The Massachusetts Fan Company, Watertown, Mass., has recently made two motor driven installations in which special means for driving the fans were employed. In one of these, problem of how to reconcile the slow speed required by a fan with the fast speed necessitated by the economical use of the power of a steam turbine or electric motor was solved, while in the other a vertical adjustable speed motor was used. Fig. 1 shows the installation made in the works of the American Bronze Company, Berwyn, Pa., where a reducing gear was employed between the fan and the motor to permit a high-speed motor to be used with a fan running at 300 rev. per min. The other installation, a diagram of which is given in Fig. 2, was at the Haverhill High School, Haverhill, Mass., and here a vertical shaft disk fan is driven by a belt connected vertical adjustable speed alternating current motor, the speed variation being secured by raising and lowering the armature.

The practice of using a reducing gear, as illustrated in Fig. 1, is one that is being watched by engineers with much interest, especially as it enables the steam turbine to be used for driving large fans in marine work. In this particular instance the economy secured in the space required is important, as, if a motor of the same power and operating at the speed of the fan had been employed, the space required would have been three times as great. To insure smooth operation and avoid vibration on the gear a flexible coupling is located between the motor and the reducing gear, which was furnished by the Power Transmission Gear Company, 96 Broadway, New York City.

The cone type of fan which requires no housing is used and the fan is located in a plenum chamber drawing the air through an opening in the wall at *a* and discharging it through the periphery of the wheel. This type of fan is especially useful where the amount of space available is not large enough to permit the use of an ordinary housed fan, while its ability to work against pressure in a number of cases makes it useful where the disk fan could not be employed. It is also used in heating systems in conjunction with either steam coils or hot air furnaces and insures a constant supply of fresh air.

In the other installation, a diagram of which is given

bolts. Both of these parts have a bore that gives each a running fit on the outside of the bushing. Power is transmitted to the collar and the pulley by a sliding fit key,

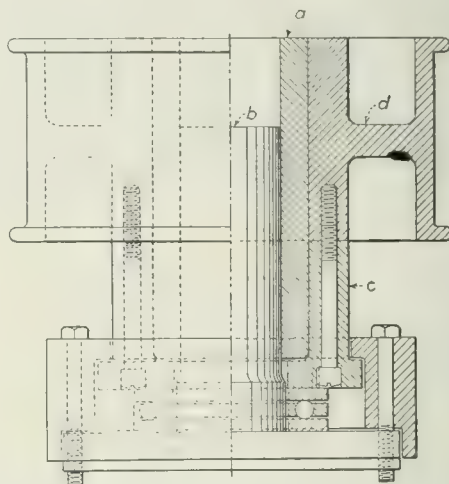


Fig. 2.—A Motor Driven Vertical Disk Fan Installed at the Haverhill High School, Haverhill, Mass.

which is screwed into a keyseat in the bushing. The weight of the collar and the pulley is carried by a ball thrust bearing located below the former and resting on the bonnet of the motor. The housing, which is bolted

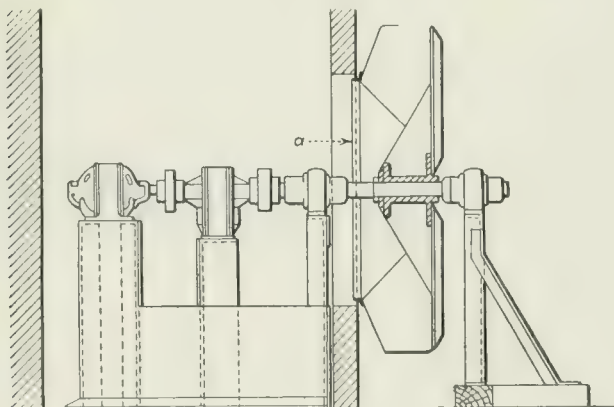
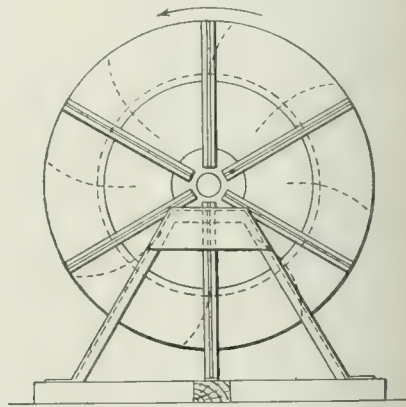


Fig. 1.—A Cone Fan with Reducing Gear Built by the Massachusetts Fan Company, Watertown, Mass.

in Fig. 2, the speed of the motor driving the fan through a belt was varied by raising and lowering the armature, and it was necessary to avoid a similar motion of the motor pulley. The drive which permits the motor shaft to be raised $3\frac{1}{2}$ in. while changing the speed from 900 rev. per min. to 450 rev. per min. by the sliding armature control consists of three main parts. The bushing *a* is the first and is firmly keyed to the motor shaft *b*. Outside of the bushing are located the collar *c* and the flange pulley *d*, the latter being connected to the former by long

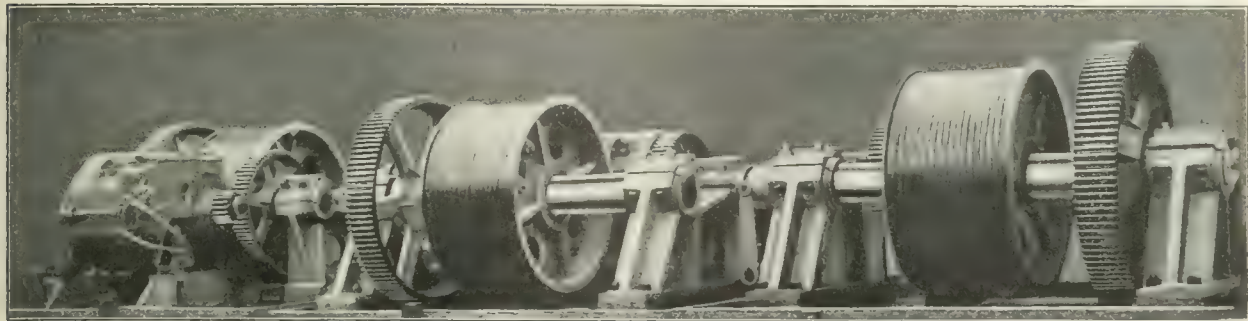
to the bonnet, serves to hold the various other parts of the drive in position.

This installation has been in operation for some time and the drive has proved entirely satisfactory. Its only wearing point is the ball thrust carrying the weight of the collar and the pulley, and here the friction is very slight, as the strain is entirely lateral. The fan used in this case is an 84-in. straight blade disk fan and is driven by a 5-hp. General Electric vertical adjustable speed alternating current motor.



The Aetna Billet and Scrap Hauls

The Aetna Foundry & Machine Company, Warren, Ohio, recently built a billet and a scrap haul for the open hearth steel department of the Jones & Laughlin Steel Company from designs furnished by the purchaser. In the engraving the single unit at the left is the scrap haul, while the double unit, both parts of which are connected by a sliding clutch, is the billet haul. The diame-



A Scrap and a Billet Haul Recently Built by the Aetna Foundry & Machine Company, Warren, Ohio.

ter of the drums is $5\frac{1}{2}$ in., and the face width $25\frac{1}{2}$ in. The gears are of steel with cut teeth, and the shaft is a steel forging. A direct motor drive from the jack shaft to the drum shaft is employed, a 75-hp. Westinghouse motor supplying the power. The diameter of the main latter is 6 in. and that of the main shaft is 9 in. The weight of each bed plate is over 10,000 lb.

Turbine Driven Gas Blowers

The trend of modern practice in gas plants, especially those devoted to the manufacture of water gas, is clearly shown by data tabulated for the Terry Steam Turbine Company, Hartford, Conn. This tabulation gives full particulars of a large number of recently installed Terry steam turbine gas blowers, of which 25 have been in operation long enough to give reliable results. The most prominent fact gleaned from this tabulation is the increase in blast pressure necessary to give the greater output of up-to-date gas apparatus. Former pressures of 12 to 16 in. of water are now usually from 17 to 24 or more inches.

Of the 25 blower sets under consideration, the average air pressure at the blower outlet is 21 in., the maximum being 28 to 30 in. Only six of these were operated at outlet pressures of less than 17 in., while nine showed 23 or more inches.

Another important fact is the increase in speeds. The gas blowers must be driven at much higher speeds of revolution, a condition which has practically eliminated the belt drive of reciprocating engines. The steam turbine which permits of direct-connection is showing surprising adaptability. The direct connection eliminates belt troubles and does away with one bearing, three bearings being sufficient to support the shaft carrying both the turbine wheel and the fan wheel.

As shown by the tabulation, the speeds vary from 1550 revolutions per min. up to 3300, the variation being due to different sizes of blowers and different pressures maintained. Other advantages of the steam turbine for this service are the absence of internal lubrication, insuring exhaust steam free from oil, and the simplicity both in design and operation.

Australia is now making steel rails. Information has been received that the Lithgow Iron Works, Lithgow, New South Wales, has turned out its first steel rails. The steel was made in open hearth furnaces. The rails are stated to have been perfectly rolled, and at the time the news was forwarded they were in the hands of experts, being tested with a view to their acceptance by the Government railroad authorities. A bounty of \$2.92 per ton is paid for all steel made from Australian pig iron.

The Kirk & Blum Adjustable Emery Wheel Hood

A new adjustable hood for emery wheels is being manufactured by Kirk & Blum, Cincinnati, Ohio, for use in connection with dust exhausting systems. The special features claimed for this hood are a trap which prevents clogging of the system, a simple adjustment affording the operator absolute protection from flying particles, and

the employment of a lower velocity of air than that used with the average hood.

The arrangement of the trap does not allow small pieces or tools dropped from the operator's hand to enter the pipe and clog the system, a feature which eliminates the time and expense required for hunting through the piping system to locate large particles which have inadvertently got into it. Frequently the fan is badly damaged by these foreign substances, and in any event the system has to shut down until they are located and



A New Adjustable Hood for Emery Wheels Made by Kirk & Blum, Cincinnati, Ohio.

removed. A single movement of the arm draws the hood back and the adjustment is secured by a conveniently located thumb screw, there being no catches or fasteners of any kind. This hood is regularly built to take care of a 16-in. wheel, but the upper lip can be adjusted to accommodate a much smaller size.

The American Society of Engineer Draftsmen will hold its regular meeting in rooms 1110 and 1111, 116 Nassau street, New York, on the evening of Wednesday, April 19. Henry L. Sloan is secretary-treasurer.

The Machinery Markets

There are indications that at least three railroads will soon become active purchasers of machinery, according to inquiries now before the trade in New York. Other railroads are buying more actively in the New York market than they have for some time, and the call from the general manufacturing trade is good. In other sections the railroad demand is not so brisk. Renewed activity in building and construction work is noted in Detroit, where the automobile companies are also very busy. Trade has increased in New England, where a larger volume of inquiries is also reported. An improvement in the automobile trade is also felt in that market. In Cleveland business is rather unsatisfactory, although there is a steady volume of small orders. The machinery demand is below normal in Chicago, although the Northwestern Railroad has been buying there and the Chicago packing plants have been purchasing for their repair shops. In Cincinnati local business is scarce, but some good trade is coming from the South, and sawmill equipment is meeting with good sales. The Philadelphia market lacks snap and the buying is irregular. Manufacturers of road machinery and bridge equipment are looking for some good business in Texas, resulting from the "good roads" agitation. An improvement in the demand for the heavier types of machine tools is helping the market in San Francisco, and there is a growing call for small shop equipment. The export business continues unusually good in all quarters.

New York

NEW YORK, April 12, 1911.

There are indications that a number of railroads will shortly become active in filling their machinery requirements, as their inquiries indicate that lists are being prepared. It is known that the Baltimore & Ohio Railroad has an extensive list in preparation, and it is reported that the mechanical departments of both the Seaboard Air Line and the Southern Railroad are collecting data with a view to making up lists of requirements. The New York, Ontario & Western Railroad has been closing orders against a large list it has had before the trade for some time. This list, it is estimated, calls for fully \$75,000 worth of equipment. Some very good orders were placed with New York houses during the week, principally for machine tools. The New York, New Haven & Hartford Railroad is also showing signs of activity. This company will shortly make extensions to its electrical zone, and some good purchasing will no doubt ensue. A fair business was done by New York dealers outside of the railroad purchasing. The Simms Magneto Company placed some additional orders for machinery for its large plant at Watsessing, N. J., and inquired for a few more tools. Good sales were also made to the automobile interests, principally for machines required for installation in repair garages. Although foundrymen are not particularly busy, they are very good purchasers of mechanical equipment, such as molding machines, air lifts and cranes, and people in the general foundry supply business are experiencing a good trade. Second-hand machinery is scarce, especially in some lines of machine tools, and good prices are being taken for used tools.

The New York trade is bidding on two extensive automobile lists. The Saurer Motor Company, which recently took possession of the plant of the Quincy-Manchester-Sargent Company, Plainfield, N. J., has sent out a list calling for fully \$50,000 worth of equipment, and the Pope-Hartford Auto Company is asking for bids on a list necessitating an expenditure of about the same amount.

Manufacturers of engines, boilers and power accessories are bidding against a large number of inquiries. Actual orders for this class of equipment have not been coming in in very good volume for the last six weeks, but inquiries have increased noticeably. It is apparent that the Public Service Corporation of New Jersey will shortly be a heavy purchaser of power equipment. The company intends making an addition to its power station at Coal street, Newark, and is also making improvements to its plant on the Hackensack meadows. Inquiries are coming in from the sugar plantations in Cuba and the British West Indies, although it is a little early for the usual annual buying movement from that source, as the sugar planters do not as a rule consider their mechanical requirements until after their crops have been harvested.

The Wrought Iron Casting Company, 126 Liberty street, New York, recently incorporated with \$50,000 capital stock, has acquired a tract of land at Forty-eighth street and the Lehigh Valley Railroad, Bayonne, N. J., and is constructing a building 75 x 100 ft. as the first unit of a plant. This is to be the main building, and other structures will be erected as needed. A. A. Buehring is president of the company and W. E. Volz vice-president.

The Le Grand Bronze Company, Plainfield, N. J., has acquired a site at the foot of Forty-seventh street, adjoining the Lehigh Valley Railroad at Bayonne, N. J., and will build a plant for the manufacture of bronze bushings, the first building of which will be a foundry, one story, 40 x 80 ft., of reinforced concrete, equipped with cranes and eight furnaces. The company's plant and offices will be moved from Plainfield as soon as the buildings are completed.

Joseph Collier & Co., manufacturers of carriages and automobile bodies, 229 Halsey street, Newark, N. J., are planning for the erection of a four-story brick and limestone building, 67 x 100 ft., which is to be erected on Central avenue, near Seventh street, Newark. Edward Dunn, who has offices in the Firemen's Insurance Building, Newark, is now receiving bids for the construction of the factory.

The Celluloid Harness Trimming Company, 54 Ferry street, Newark, N. J., will erect a five-story brick and concrete factory building, 37 x 58 ft. F. A. Phelps, Newark, is the engineer in charge.

The Lippard-Stewart Motor Truck Company, Buffalo, N. Y., recently incorporated with a capital stock of \$350,000, will establish a plant in that city for the manufacture of motor trucks exclusively. Thomas R. Lippard, president of the company, has until recently been general manager of the Franklin Automobile Company at Syracuse, and B. G. Stewart, who will be the company's chief engineer, was formerly mechanical superintendent of the Franklin Automobile Company. The company's present offices are at 851 Ellicott Square Building, Buffalo.

The United Indurated Fibre Company, Lockport, N. Y., has completed plans for extensive additions to its plant on Mill street, which will be commenced this spring.

The Upson Company, recently organized at Lockport, N. Y., to manufacture fiber specialties, will erect a new factory on the old Franklin Mills site in East Lockport at an estimated cost of \$25,000. Chas. A. Upson is president, and Ralph M. Snell is superintendent of the new company. They were formerly connected with the Niagara Paper Mills Company of Lockport in similar capacities.

Contract for the construction of a pumphouse, filters, mains and intake has been awarded by the Board of Water Commissioners of Ogdensburg, N. Y., to L. B. Cleveland, Watertown, N. Y., at \$79,850.

The Thompson Milling Company, Lockport, N. Y., which has recently been reorganized, will double the capacity of its flouring mill plant on Market street.

The L. C. Smith Bros. Typewriter Company, Syracuse, has commenced construction of an eight-story and basement addition, 54 x 201 ft., to its factory on East Washington street.

The Corning Glass Works, Corning, N. Y., Geo. B. Hollister, manager, is having plans prepared for a three and four story factory addition to its plant, the approximate cost of which will be \$100,000.

The Domestic Appliance Company has been incorporated at Rochester with a capital stock of \$60,000, and will establish a plant for the manufacture of special appliances and the conducting of a general machinery business. Among the incorporators are Louis W. G. Flynt, Wm. H. Cadwell, Harvey E. Corey and E. Schuyler Davis.

The Village Board of Trustees, East Aurora, N. Y., are receiving bids until April 18 for a sewage disposal plant and sewerage system upon plans of Frederick K. Wing, construction engineer, 910 White Building, Buffalo. D. N. Rumsey, Village Clerk.

The Universal Paint Company, Syracuse, N. Y., D. W. Rothensies, Reading, Pa., president, has plans under consideration for a large factory building at Syracuse.

The Wagstaffe Company, fruit preservers, Hamilton, Ont., will build and equip an extensive branch fruit preserving factory in the north end power district at Niagara Falls, which will employ 450 people. The directors of the United States branch company are James Wagstaffe, Herbert Wagstaffe and James W. Wagstaffe, Hamilton; E. H. Taylor, Niagara Falls, and Gordon F. Matthews, Buffalo, N. Y.

The Buffalo Machinery Company, manufacturer of jewelers' machinery, Buffalo, N. Y., has completed plans for a three-story brick addition to its plant at West and Forest

THE MACHINERY MARKETS

avenues, that city. C. A. Svenson, president of the company.

The Simonds Mfg. Company, maker of saws and edge tools, which built an extensive plant at Lockport, N. Y., last year, contemplates the erection of an additional building this summer to cost \$40,000.

The Huebner-Bleisten Patents Company, lithographer, Sidway Building, Main and Goodell streets, Buffalo, N. Y., is arranging to build an extensive lithographing plant in that city, to be equipped with special patented machinery controlled by the company.

Plans of State Architect Franklin B. Ware, Albany, are under consideration for a central heating plant for Cornell University, Ithaca, estimated cost \$50,000.

Chicago

CHICAGO, ILL., April 11, 1911.

Machine tool business is still below normal, though the market has a decidedly healthier undertone. The Northwestern Railway Company has made some purchases on the lists issued during the past two weeks, and further closings are expected to follow daily, as the amount purchased has been but a small part of the original list. Prominent Chicago packing plants have been buying supplies in this market for repair shops which are being added to Southern refineries located in Louisiana and South Carolina. Local sales are reported to be somewhat above those coming from outside points. A leading manufacturer of tinware, with plants in Chicago, has been an active machine tool purchaser during the week under review. Customers outside this immediate vicinity have been fairly liberal buyers throughout the week, purchases having been made by Kansas, Ohio and Wisconsin machine shops. The pulse of city trade seems to be a trifle stronger than that from the country, although an improved inquiry is felt in all quarters. The woodworking machinery dealers are exchanging congratulations over the month just passed, which has in many instances proved a record breaker. April business in this line of machinery is starting out well, though somewhat hampered by the large strike now affecting some of the principal furniture factories.

McDowell, Stocker & Co., prominent for many years in the machine tool business in Chicago, have gone into the hands of a receiver, Frank M. McKey, 1047 First National Bank Building, having been appointed to that responsibility by the United States District Court.

The Illinois Contracting Electrical Company, Rock Island, Ill., has been incorporated with a capital stock of \$7000. The incorporators are W. W. Wilmerton, Martin McNealy, and F. H. Kelly.

The Independent Toll Clearing Company, Springfield, Ill., has been incorporated with a capital stock of \$2500. The incorporators are M. B. Farwell, E. D. Glandon, L. A. Herrick, and C. R. Peel. The company will maintain telephone toll lines and exchanges.

The West Salem Hollow Brick & Tile Company, West Salem, Ill., has increased its capital stock from \$2400 to \$50,000.

The Union Light & Power Company, Minonk, Ill., has been incorporated with a capital stock of \$100,000. The incorporators are Frank Z. Ames, S. C. Kipp, C. R. Robinson, and J. S. Webber.

The International Harvester Company, Chicago, is reported ready to proceed with the construction of a large machine shop at its works in Milwaukee, Wis. The building will be 145 x 203 ft., six stories, and of steel construction throughout.

The Pennsylvania Railroad Company, recently purchased the property of the old Toledo Rolling Mill of the Republic Iron & Steel Company, and will probably convert the buildings into repair and car shops.

The Jungers Stove & Range Company, Grafton, Wis., will erect three buildings for the manufacture of stoves and ranges. The first building erected is to be 48 x 140 ft., two stories, of reinforced concrete. Electricity will be used for both power and lighting.

Advices have been received from Webster City, Iowa, that C. H. Richeson, president of the Commercial League, is negotiating with parties who will build a \$250,000 drain pipe and tile plant in that city. It is stated that \$50,000 will be subscribed to the stock by Webster City citizens.

The Dubuque Packing Company, Dubuque, Iowa, is building a new packing plant just west of its present site. The structure will be entirely of reinforced concrete, and upward of \$20,000 will be expended for new machinery, which will be electrically driven.

The Flick-Ziepprecht Box Company, Dubuque, Iowa, is erecting a new factory building to cost \$15,000, which will enable the company to double its capacity. New machinery and an electric lighting system will be installed.

The Independence Canning Corporation, Independence, Iowa, is making radical changes in its establishment. The

old factory has been torn down to make room for a larger one, 42 x 60 ft., and a warehouse, 80 x 100 ft., will also be built.

Des Moines men, headed by G. S. Gilbertson, have organized the Dakota Portland Cement Company, Chamberlain, S. D., which has a capital stock of \$2,500,000. Mr. Gilbertson is president; B. H. Thomas, secretary, and W. J. Sonder, superintendent, all of Des Moines. The contract for the buildings has been let to the Des Moines Bridge & Iron Works.

The Diamond Calk Horseshoe Company, Duluth, Minn., has just completed the erection of a building, 50 x 75 ft., of steel construction, in which it is installing equipment removed from its old factory, to which four extra heavy forging machines will be added. Two more forging machines are yet to be purchased. The company also has plans prepared for a new horseshoe factory.

Sully, Iowa, will hold an election on April 10 to vote on the issuance of bonds for the installation of a water works system.

The Call Switch & Frog Company, Denver, Colo., incorporated with a paid up capital stock of \$50,000, for the manufacture of the Call automatic railroad switch and other railroad supplies, has purchased a tract of four acres and will commence at once the erection of a factory. The stock of the company is owned by the Call Switch Company, an Arizona corporation formed in 1907. The factory will be modernly equipped throughout.

The citizens of Irene, S. D., will vote on the proposition of installing a water works system April 18.

Philadelphia

PHILADELPHIA, PA., April 10, 1911.

No important developments have been reported in the local market for either machinery or tools during the week. Buying in general continues irregular, and is still mostly confined to small propositions, although a fair volume of business is under negotiation, including several moderate lists, which have not come into the open market. Machine tool builders and industrial plants generally have been able to operate at an unchanged basis, but there is a lack of snap in the market, and few, except makers of special equipment, have order books in very satisfactory shape as far as forward business is concerned. The foundry trade, particularly makers of gray iron castings, report the demand as still being unsatisfactory; steel casting plants, however, find business to be slightly better. In no instance are plants being operated at a normal basis with any degree of regularity. In the second hand machinery trade an irregular demand is reported; buying is light and covers a wide range of equipment; first-class tools of recent make and in good condition are, however, always in demand. The boiler and engine trade has been without feature; a quiet business is moving with inquiries for moderate power equipment coming out from day to day.

Plans are being prepared for a four-story warehouse, 75 x 300 ft., of brick and reinforced concrete, to be erected on Tasker street between Water street and Delaware avenue, for John T. Bailey & Co., manufacturers of cordage.

The Excelsior Brass Company, Reading, Pa., held its annual meeting April 3, and the following officers were elected: President, Herbert E. Woodward; vice-president, George Wicklein; treasurer, Henry Etheridge, and secretary, Louis M. Gantert.

Plans are being prepared, it is said, for extensive improvements to the plant of the Beacon Light Company, Chester, Pa. While confirmation is lacking at this time, it is understood that the improvements proposed include the installation of a large coal conveying plant.

The Reading Crane & Hoist Company, Reading, Pa., is busy in all its various departments, and reports inquiries for cranes and hoists of different types as coming in quite freely. It is bidding on work in connection with a number of Mexican power plants. A special 84-ft. girder crane has been shipped to the Union Bag & Paper Company, Sandy Hill, N. Y., while several special cranes have been furnished the United States Government for use in the Bureau of Standards.

John L. Byrnes, Haddonfield, N. J., who is well known in the local machinery and machine tool field, has become associated with Cammell, Laird & Co., New York, representing Cammell, Laird & Co., Ltd., Sheffield, England, makers of special tool steels, and will represent the firm in this territory.

The County Commissioners of Berks County, Reading, Pa., will receive bids until April 26, for the erection of two concrete bridges, known as Bordners No. 1, to be erected over Tulpehocken Creek, at a point about seven miles from Robeson, Pa., and Bordners No. 2, to be erected over the

THE MACHINERY MARKETS

Swatara Creek, at a point about six miles from Myerstown, Pa.

Charters continue to be granted in considerable number by the State of Pennsylvania for small power plant companies, giving them the right to furnish power and light in their respective districts. These are largely underlying companies of large power producing interests. Twenty-five such companies, with a capital stock of \$5000 each, of which W. A. Lathrop, R. H. Wilbur and H. F. Baker are named as incorporators, were granted charters last week to operate in Northampton, Lehigh and Carbon counties. These are understood to be operated in connection with the proposed extensive power plant system of the Lehigh Coal & Navigation Company. Charters for five companies of the same character have been granted interests in Luzerne County; these include the Wilkes-Barre Power Company, Wilkes-Barre Township Power Company, Hanover Township Power Company, Wright Township Power Company, and Ashley Power Company. Hazleton, Pa., is understood to be the headquarters of the operating interests.

The manufacturing department of the Philadelphia Metal Stamping Company, 2213 Chestnut street, was destroyed by fire April 6. The presses and other machinery will be replaced as soon as insurance adjustments have been made.

The Philadelphia Coppersmithing Company, 119 Florist street, has purchased adjoining property on which it will build an erecting shop of brick and steel, 61 x 133 ft. The company will build most of the equipment needed, as it is largely of a special nature.

The Lanston Monotype Machine Company, 1231 Callowhill street, is having plans prepared for a new building, 190 x 260 ft., eight stories at Twenty-fourth and Locusts streets.

Plans have been about completed for the new manufacturing building, 80 x 300 ft., six stories, to be erected at Beach, Palmer and Allen streets, for the American Can Company.

New England

BOSTON, MASS., April 12, 1911.

The general experience is that collections are improving, and business on the whole is in larger volume, following the usual influence of the spring season. The Boston dealers in pig and sheet metals report a considerable increase in orders. In fact, the change with them is very marked as compared to six weeks ago. This is always a good season with them, and possibly the improvement is no better than would normally be expected under existing conditions. Builders of heavy machines report an increase in the number of promising inquiries, but with little change as yet in the volume of business booked. The wire trade states that prices of copper products are more stable than has been the case recently. The wire business as a whole is very good, though reports from representatives in the West are not so encouraging as they have been. The machine screw manufacturers are finding business somewhat better, and in some cases are running nights in certain departments. The Pope Mfg. Company, Hartford, Conn., is adding largely to its equipment, having placed some large orders for machine tools. The improvement in the automobile trade is felt in New England, in common with the rest of the country, most of the factories being much more active than they had expected to be. The same thing is true of the manufacturers of parts and accessories, as is instanced with the manufacturers of drop forgings who report a notably better business. The dealers in machine tools do not note any special change in local conditions as they affect the trade.

The Farrel Foundry & Machine Company, Ansonia, Conn., manufacturer of heavy machinery and rolls, is erecting a large building, which will be an addition to the roll department.

The Milner Mfg. Company, Chicopee, Mass., has been organized to manufacture a new sanitary drinking fountain. The authorized capital stock is \$100,000. Henry J. Milner is the president, Thomas A. McDonnell, vice-president, and Maurice Leahy, secretary. The factory will be located in Chicopee.

The National Iron Works, 61 Talcott street, Hartford, Conn., has established a business for the manufacture of ornamental and other iron work.

The New England machine tool builders will be represented in large number at the spring convention of the National Machine Tool Builders' Association at the Marlborough-Blenheim, Atlantic City, May 18-19. The programme will be an interesting one, with an excellent list of speakers. The chief topics of discussion will be shop efficiency and workmen's compensation and its allied principles.

Manning, Bowman & Co., Meriden, Conn., manufacturers of nickel and silver plate specialties, have made a large

increase in capital stock, which will be issued as a stock dividend. The company has no plans for extending its works at this time.

The Ball & Socket Mfg. Company, West Cheshire, Conn., manufacturer of metal and wire specialties, states that the building which will be erected immediately will be used as a stockroom. It will be 40 x 86 ft.

The most important announcement of industrial expansion in New England outside of the metal trades is that of the Pilgrim Mills, Fall River, Mass., which will build a cotton factory to cost \$1,000,000 in that city. The plans call for a three-story spinning mill and a two-story weave shed, covering a total area of 132 x 594 ft. The original equipment will consist of 50,000 spindles and 1200 looms. The mill will receive its power from the local electric power company, which will constitute an experiment in cotton mill practice. Other increases in manufacturing facilities in this territory follow: William Skinner & Sons, Holyoke, Mass., silk manufacturers, mill building 60 x 240 ft., four stories, to cost \$100,000; Harvard Knitting Mills, Wakefield, Mass., mill building 90 x 180 ft., three stories; Worcester Cold Storage & Warehouse Company, Worcester, Mass., addition 80 x 100 ft., two stories; Goetz Silk Mfg. Company, Holyoke, Mass., silk manufacturer, three-story brick mill, 50 x 250 ft.; Celluloid Starch Company, New Haven, Conn., three-story building, 40 x 60 ft.

The carpet plant of the Cochrane Mfg. Company, Dedham, Mass., was burned, April 4, with estimated loss of \$200,000.

New England communities were never so alive to the desirability of organized action in increasing their prosperity. Boston, Providence, Portland and other seaport cities and towns are moving toward improved terminal facilities and increased dockage. Large plans are being carried forward at Providence. New London hopes to see its splendid harbor selected as the terminal of great steamship lines which now dock in New York and its immediate vicinity. The extension of the Grand Trunk system through the Vermont Central from Palmer, Mass., to Providence, will assist in the development of a number of manufacturing centers, and now the New York, New Haven & Hartford announces that it may parallel that line, electrically, to complete its connections for the Canadian traffic. Not a few enterprises are under way with the purpose of creating industrial funds with which to assist small manufacturing concerns in their growth. The various boards of trade and chambers of commerce are getting together in combination with the idea of furthering the interests of New England.

Several names well known in the metal industry are included among the incorporators of the Meriden Board of Trade Industrial Corporation, Meriden, Conn., the charter of which permits it to lease and deal in industrial property. The authorized capital stock is \$100,000, and the incorporators are Robert W. Carter, George H. Wilcox, William H. Lyon, C. F. Rockwell, and C. H. Fredemink, all of Meriden.

The Standard Machinery Company, Providence, R. I., has brought out a new type of rolling mill having various special features. The machine will take a maximum length of roll of 22 in., and a minimum of 10 in. face and 12 in. diameter. It is specially designed for the rolling of large sections of copper moldings, automobile rims, &c., and also for the rolling of sheet steel, copper, zinc, german silver and nickel, and for the breaking down of the ingots of precious metals, reducing them to a thickness of about 1/8 in.

The general understanding is that the New York, New Haven & Hartford Railroad will electrify its system as far as New Haven on the New York end, within the next year or two, and possibly will begin a similar work in Boston. Reports differ, but this is the popular opinion of the railroad men, who base their belief upon a statement recently made by one of the company's prominent officials.

The Charles Greiner Company, New Haven, Conn., manufacturer of riveting and spinning machines, was a sufferer by a fire which destroyed the building, April 8.

Cincinnati

CINCINNATI, OHIO, April 11, 1911.

Several machine tool builders report an improvement in both orders and inquiries, but this is not general. The South continues to furnish some fairly satisfactory business, but orders from nearby territory are scarce. Transactions in second-hand machinery are not very numerous, although both new and rebuilt sawmill equipment is moving more satisfactorily. Manufacturers of valves and fittings are very busy, and it is notable that the export business in these engineering specialties has been very good lately.

A large number of Cincinnati members of the National Metal Trades Association left in special cars, over the Penn-

THE MACHINERY MARKETS

sylvania Railroad, to attend the annual convention in New York.

The new additions to the plant of the R. K. LeBlond Machine Tool Company, in East End, Cincinnati, are nearly completed, and installation of the equipment will be finished before the fall season begins.

The Cincinnati Lathe & Tool Company confirms the report as to moving its Spring Grove avenue plant to the Oakley district. Plans for the new buildings are being drawn and the company expects to occupy its new home before the beginning of the fall season.

The Imperial Motor Car Company, Cincinnati, has taken out a permit for the erection of a \$20,000 garage.

The bottling house addition to the plant of the Hudepohl Brewing Company, Cincinnati, recently mentioned, will be a two-story structure, of mill construction, and will cost about \$35,000.

C. J. McDiarmid, receiver for the Cincinnati Punch & Shear Company, announces that all the equipment in this plant will be auctioned off, in separate lots, by the Ezekiel & Barnham Company, Cincinnati auctioneers, April 19. A number of outside bidders are expected to be present at this sale.

Some power equipment will probably be required by the F. C. H. Manass Company, Cincinnati, printer and engraver, who has plans made up for a two and one-half-story concrete building that will be erected on Burnet avenue, at an estimated cost of \$45,000.

The John Grossius Furnace Company, Cincinnati, has purchased a portion of the former home of the Victor Safe & Lock Company, on East Eighth street, and it is stated, will add two stories to present building. This will give the company a manufacturing plant about 75 x 75 ft., four stories.

The H. R. Irwin Mfg. Company, whose Cincinnati plant for the manufacture of washing machines was recently destroyed by fire, has leased a building close to its old site, in which is now being installed special machinery that will double its output.

The General Electric Company, Cincinnati, entertained 25 of its outside salesmen, April 8, with a banquet at the Sinton Hotel. H. C. Houck acted as toastmaster.

The Cincinnati Steel Castings Company, Cincinnati, has acquired a new site on which will be erected a new plant. The proposed building will be about 75 x 150 ft., two stories, and of brick and steel construction.

The Scheffele Shoe Company, Cincinnati, expects to begin work shortly on a large addition to its factory.

Harry Hake, architect, Cincinnati, has charge of the plans for the new power building, recently mentioned, to be erected for A. J. Anderson.

The Pioneer Pole & Shaft Company, Piqua, Ohio., manufacturer of poles and shafts, has plans prepared for the erection of a large new plant.

Cleveland

CLEVELAND, OHIO, April 11, 1911.

While the demand for machine tools is a little more active than during the greater part of March the condition of the trade is still unsatisfactory. There is practically no business coming from the railroads and very little from the large manufacturing plants. There is a steady volume of small business, but few orders are for over two or three tools. The local manufacturing situation shows some improvement, quite a number of the shops having increased their working forces somewhat during the past two weeks. The automobile plants in Ohio and Michigan are mostly running at or near their full capacity at present, and the volume of recent orders is claimed to have been quite satisfactory. The automobile makers this year are following a conservative policy, and are not making cars in excess of the demand. Some of the makers are already preparing to get out their 1912 machines, and are placing orders for the parts for these cars. Machinery dealers, however, are looking for very little business from the automobile industry during the year. The demand for second-hand machinery is moderate and the supply not large. In the local foundry trade conditions show no change, the demand for castings being somewhat light.

At the annual meeting of the American Mine Door Company, Canton, Ohio, held April 3, it was decided to enlarge its plant to double its present capacity and to install a new power plant. An extension, 60 x 150 ft., will be built to the present plant. Officers were elected as follows: Major A. Vignos, president and treasurer; R. J. Die-

bold, vice-president; Alfred Vignos, secretary; N. K. Bowman, general manager.

The Jeffries Electric & Mfg. Company, Cleveland, has been incorporated with a capital stock of \$10,000 by S. S. Jeffries, H. W. Culbertson and others.

The Standard Galvanizing & Mfg. Company, operating a plant at 726 Canal road, Cleveland, has taken out incorporation papers with a capital stock of \$15,000. The incorporators are Samuel G. Catchpole, G. T. Bander, E. W. Cheeltham, Victoria Cheeltham and C. T. Denby.

The Biggs Boiler Works Company, Akron, Ohio, will enlarge its plant by the erection of a brick and steel addition, 120 x 225 ft. The new building will be used as an erecting shop, machine shop, flanging shop. A power plant will be installed. All of the machinery will be motor driven.

The Lorain Metal Products Company, Lorain, Ohio, has been formed to manufacture various metal products. The company will effect a consolidation of the Stander foundry, the O'Brien Brass Works and the B. R. Maddock Pattern Works. The company will operate in the Stander foundry plant. B. R. Maddock will be the manager. The plant is located at Thirty-fifth street and Elyria avenue.

The Acklin Stamping Company, Toledo, Ohio, recently incorporated to manufacture stamped metal articles, has broken ground for a new plant on Dorr street. The company will shortly be in the market for its machinery equipment.

The City Council of Canton, Ohio, has authorized Service Director Harbert to expend \$17,000 for electrical equipment for the new auxiliary pumping station in that city.

The Buckeye Iron & Brass Works, Dayton, Ohio, will erect a new foundry. The building will be of concrete, 83 x 159 ft.

A new plant is being established in Newton Falls, Ohio, by F. B. Hall for the manufacture of an iron flexible ladder, Mr. Hall having acquired the rights and equipment of the Wheeling Flexible Ladder Company.

The Rock Creek Basket & Veneer Works, Rock Creek, Ohio, will build a new plant 63 x 120 ft.

It is announced that the Wolfram Marble Company, recently organized with a capital stock of \$300,000, will build a large plant near Port Clinton, Ohio, for the manufacture of cement products. Frank Wolfram and others are interested in the company.

The American Metal Screen & Weather Strip Company, 2460 East Grand Boulevard, Detroit, Mich., is being reorganized, and is in the market for some sheet metal working machinery for stamping window screens and weather strips.

The Sandusky Portland Cement Company, Sandusky, Ohio, is spending \$125,000 in the enlargement of its plants at Bay Ridge, Ohio, and Dixon, Ill.

The Defiance Carriage Company, Defiance, Ohio, is planning the erection of an \$8000 factory building.

The Brookside Machine & Repair Company, Cleveland, has been incorporated with a capital stock of \$10,000. M. Debold, Conrad Marquart, S. N. West and others are the incorporators.

St. Louis

ST. LOUIS, MO., April 10, 1911.

The Curtis & Co., Mfg. Company will enlarge its steel plant at Hamburger and Kienleu avenues.

The St. Louis Frog & Switch Company will enlarge its plant to provide for the installation of additional forging machines.

The Emerson-Bishop Refrigerating Machine Company, St. Louis, Mo., has been incorporated with \$400,000 capital stock. The company plans the erection of buildlers to cover about one acre and will install machinery to manufacture refrigerating machines from 150 to 2000-lb. capacity. The company makes a specialty of family machines.

The Automatic Tire Company, St. Louis, has been incorporated with a capital stock of \$25,000. The incorporators are N. W. McLeod, W. E. Grayson, T. M. Dees, and E. A. Pelton. The company will engage in manufacturing all kinds of tires.

The Stephen J. Gavin Lumber Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are Stephen J. Gavin, Julius E. A. and Katharine A. Gavin. The company will engage in the lumber and mill business. Two planing mills will be built, one at Spring and Cass avenues, and the other at 6400 Easton avenue.

The Saunders Car Stopper & Equipment Company, St. Louis, has been incorporated with a capital stock of \$250,000. The incorporators are D. R. Saunders of Columbia, Miss.; S. J. Henry, Lawrence Boswell, J. F. Bartman, and S. T. Hatcher of St. Louis. The company will manufacture a corrugated car-stopper for steam railroads, to be used in place of the present bumping posts. A plant will be erected in St. Louis.

A company to be known as the Scott Gasoline Rock Drill

THE MACHINERY MARKETS

Company is being organized in St. Louis. The Capital stock is \$500,000. The incorporators are Louis L. Scott, John R. Williams, Samuel D. Martin and others. Frank Wyman, former postmaster, has assisted in the formation of the company, and the measures for perfecting the machine, which is a rock drill that is attached directly to the cylinder of a gasoline engine, obviating the use of a steam plant, air compressor and hose in drilling rock and other substances. Later on the company intends to have its own shops in St. Louis. At present the machine will be manufactured under contract.

The Hannibal Wagon Company, Hannibal, Mo., is improving its plant by the erection of new buildings for its paint department, warehouse and shipping rooms. The present buildings are also being rearranged. The capital stock of the company has been increased to \$75,000.

The Ozark Hickory & Cob Pipe Company, Cuba, Mo., is building a factory in that town. Jacob Weisbaum is the superintendent.

The Ozark Water Mills Company, Ozark, Mo., has increased its capital stock from \$25,000 to \$39,500.

The Meyers Pump & Mfg. Company, St. Joseph, Mo., has been incorporated with a capital stock of \$60,000. The incorporators are D. W. Hall, W. M. Meyers, and M. M. Garver. The company will manufacture an automatic stock pump, automatic hay forks, gasoline engines and other machinery. It has established a plant on Seventh street.

H. F. Rush and Starling White, Hillsboro, Ohio, will soon start on the construction of a building in Stuttgart, Ark., for use as a foundry. The owners propose to do a general repair and casting business, and later engage in the manufacture of cane and feed mills.

The Tulsa Portland Cement Company, Tulsa, Okla., has been incorporated with a capital stock of \$300,000. The directors are C. F. Tingley, H. R. Crews, L. F. Barnes, J. O. Mitchell, J. W. McCloud, O. H. Leonard, H. C. Ashby, J. E. Crosbie, and Chas. Huonker. The company will erect a 700-bbl. cement plant near the city.

Detroit

DETROIT, MICH., April 10, 1911.

April is witnessing renewed activities in building and construction work. March was quiet in this regard owing to the winter weather that prevailed throughout. The past week has seen the beginning of operations on several new office buildings. Factory construction work is not as active as it was last year at this time, several big automobile concerns having moved into their new plants this spring. April will see many spring orders for motor cars, but it is doubtful if it will reach the high mark set last month. Automobile companies throughout the State are running to their limit. F. S. Holmes of the Jackson Automobile Company states that the market will be bare of cars within 30 days.

The plants of the General Motors Company in this city and Pontiac have been inspected by several New York officials, and their report calls for enlargements to the Cartercar and Oakland branches at Pontiac, and to the E. M. F. plant of this city. This corporation has leased the property formerly occupied by the Ellis-Ford Pipe Company, which is opposite the main factory, with the purpose of building an additional structure.

The Detroit Clothes Pole Company has been incorporated to make a patent clothes pole attachment. The company is starting with a small capital stock, but is on a firm basis. Harvey O. Knickerbocker is the principal stockholder.

The Alden-Sampson Company, which recently moved its plant from Pittsfield, Mass., has increased its capital stock \$500,000 to \$2,500,000. This will give the plant every facility in increasing its output.

Another motor car company to increase the size and facilities of its plant is the Anderson Electric Car Company. The company has voted to increase its capital stock from \$1,200,000 to \$2,500,000. This concern makes the Detroit Electric, and has of late turned its attention to the manufacture of high powered electric trucks, using the improved Edison batteries. It is understood that the increase in capital is to allow more development in this line.

The Yeomans Body & Box Company is building a large addition to its plant in this city. The new plant will adjoin the main factory and will greatly enlarge the operations of the company.

The Reynolds Motor Boat Company, whose plant is near Grosse Pointe, Mich., a suburb of this city, has increased its capital stock from \$40,000 to \$100,000. The capital will not be used in plant addition, but for business purposes.

By the use of \$100,000, the increase to the present capital stock, the Michigan Smelting & Refining Company will begin the erection very soon of an entirely new plant. The company states that at this stage it is not in the market for any new machinery, but will be later on.

The Purvis Engineering Company has filed articles of incorporation with the Secretary of State with a capital stock of \$10,000. The company will engage in structural work of all kinds.

R. A. Carmichael & Co. of this city have incorporated to manufacture drugs, perfumes and toilet waters. The company has plenty of capital and will do a wholesale business. The capital stock is given as \$40,000.

Forrest L. Jordan, Lansing, Mich., has the organization of a company under way to manufacture a sanitary combination sink and pump frame, an invention of his own. The plant will be located at Hastings.

The Lowell Cutter Company, for the purpose of expansion in the way of larger quarters, has added \$50,000 to its present capital stock of \$75,000.

The Cadillac Creamery Company has incorporated with a capital stock of \$10,000. The company will erect a new factory, and will install modern butter making machinery. The plant will be located at Cadillac, Mich.

The Cadillac Veneer Company, Cadillac, Mich., will construct an addition to its plant in the way of a new concrete factory, 35 x 55 ft. in size. The new building will be used as a machinery shop.

The Soo Building Supply Company is the name of a new concern incorporated at Sault Ste. Marie, Mich., to manufacture building supplies. Kenneth Wright is president.

Hillsdale, Mich., voted to spend \$10,000 for electric light plant improvements at the April election.

The Trick-Bar Company has been incorporated at Lansing, Mich., with a capital stock of \$20,000. The principal stockholders are Edwin M. Smith and John D. Goldsmith, both of Allegan. The company will make gymnasium apparatus.

The Dudley Paper Company, Lansing, Mich., is planning a reorganization of the company, which has entirely outgrown its quarters. Representatives are in Cincinnati conferring as to increasing the capital and size of the plant.

The Hildreth Motor Company is another Lansing plant to plan enlargements to its plant. The firm will erect a large addition, 50 x 112 ft. to the main building, part of which will be used for a temporary stockroom.

The Michigan Carton Company, in order to allow operations on a more enlarged scale, has filed notice of an increase in capital stock from \$100,000 to \$400,000.

A project that will require a number of miles of pipe is the proposed co-operative plan of Saginaw and Bay City, Mich., to connect their water supply with Saginaw Bay or Lake Huron. The distance is 56 miles, and it is estimated the undertaking will require \$2,000,000.

The Brinkerhoff Piano Company, Brazil, Ind., is seriously considering moving its plant from the former city to Charlotte, Mich. The company formerly was located at Charlotte, but went to the Indiana city in view of a \$60,000 bonus.

Another furnace Company for Marshall, Mich., is the Simons-Ludle Furnace Company, whose capital stock is \$5000. Marshall is becoming famous for its furnace factories.

The Johnson Optical Company suffered the loss of its four-story plant in this city last week. The loss will amount to about \$75,000, with \$50,000 insurance.

Baldwin, Tuthill & Bolton have their plans complete for additions to their plant at Grand Rapids, Mich. A new building, 70 x 85 ft., will adjoin the old structure, and when the machinery is moved to the latter building, the plant occupied as a machine shop, on Sixth street, will be torn down and replaced by a building 150 x 180 ft. The Baldwin, Tuthill & Bolton saw fitting plant is the largest in the world.

Big Rapids, Mich., voted to spend \$25,000 in securing industries for the city. The city is prepared to offer some good inducements to progressive concerns.

The Bainton Electric Steel Company, which was incorporated a few weeks ago, announces that it has purchased a site of six acres in Buchanan, Mich., and will erect a plant thereon to cost \$75,000.

Business men of Cadillac, Mich., have nearly completed the organization of a company with a capital stock of \$100,000, to be known as the Cadillac Chair Company. J. N. Perkins of Otsego is to be business manager.

The Detroit Milling Company, which suffered a complete loss by fire of its plant at Adrian, is laying plans for rebuilding. The company lost all its machinery, and in case of rebuilding will be in the market for an entirely new outfit.

Bids are being received up to April 24 by the Government for the dredging of Saginaw River. The last Congress appropriated \$686,000 for this work, and the task will involve the use of some modern dredging machinery.

The Bates & Edmunds Motor Company, Lansing, Mich., will make use of the \$25,000, the recent increase in capital stock, for improvements to the plant.

The American Hydrostat Company, which was organized

THE MACHINERY MARKETS

last week with a capital stock of \$50,000, announces that it has purchased machinery sufficient to get the plant going nicely, but will require more later on. The company has patented a hydrostat to control the water supply of boilers, preventing accidents from low water. William C. Kirby of Windsor, Ont., has the organization in hand.

The Chas. H. Osborn Company, Vicksburg, Mich., maker of vacuum cleaners, will move its plant to Hastings. It recently added improvements to its machine and will increase the size of the plant upon its change of location.

A company has been perfected at Holly, Mich., supported by plenty of capital, for the manufacture of road building machinery. The new company will occupy the former plant of the Cyclone Fence Company.

The Battle Creek Paper Company, Battle Creek, Mich., will commence work at once on the construction of an addition, 100 x 130 ft., two stories and basement, which is to be occupied by several different departments.

The Eclipse Motor Works, for many years located in Mancelona, Mich., will move its plant to Traverse City, where it will be merged with the Traverse City Iron Works.

San Francisco

SAN FRANCISCO, CAL., April 5, 1911.

While the demand for machine tools of the heavier types is still limited, a material improvement has taken place within the last few weeks. One local firm reports the largest month's business in more than a year on tools of ordinary type and capacity, and inquiries for small shop equipment are increasing. The nature of recent business is regarded as an indication of favorable conditions in the metal working industries through the State, and a fairly active movement is expected this summer. The outlook for large tools is less promising, as there are few inquiries in the market at present, and many local shops continue to work considerably below their present capacity.

The manufacture of pumping machinery is one of the most active lines in this territory. The demand for irrigating pumps is increasing with the approach of summer, and there is an unusually large inquiry for water works machinery, largely in connection with municipal projects. Electric power equipment appears to be more active in the north than in California at present, but several large projects are under way in this State, which will probably result in business later in the year. Several of the northern California mines are coming into the market, and some orders from this source have already been booked.

There has been quite an active movement of sawmill and logging equipment, and some orders are still coming out, though it is thought that the largest requirements in this line have been filled. Substantial orders are coming from a number of the large wood working plants in Oakland and at outside points, which are replacing old equipment with high-speed machines in preparation for the summer rush.

Owing to changes in the plans, with the object of increased capacity, the opening of the Pacific Coast Steel Company's new plant at South San Francisco has been postponed, and will probably not take place before July.

The Doak Sheet Steel Company, controlled by the same interest as the Pacific Coast Steel Company, has sold out its sheet metal business, with a plant at Eighth and Irwin streets, to the Ames-Irvin Company.

B. F. Yates, president of the Berlin Machine Works, Beloit, Wis., was in San Francisco at the end of last week, visiting the California agents, Tenshaw, Bulkley & Co. Mr. Yates announces definitely that a branch factory, representing an investment of about \$1,000,000, will be installed by his company in Oregon or Washington, the exact location to be decided shortly.

The Pacific Gear & Tool Works is putting up a two-story brick shop building at Columbia Square and Folsom street.

The Western Boiler & Steel Company has been incorporated at Los Angeles, with a capital stock of \$50,000, by G. W. Darby, D. M. Ward, R. B. Hayes, A. W. Gordon and F. S. Hutton.

The Cyclops Iron Works, this city, has secured a large lot on Folsom street near Fourth, where it is planning to erect a concrete foundry building.

Bids will be opened May 1 at the local United States Engineer's office for a 12-ton revolving steam crane. The Government engineers will also call for bids shortly for two steel-hull suction dredges with 20-in. pumps for use on the Sacramento River near Yuba City.

Contracts have been let for the erection of a power station at the navy yard at Mare Island, Cal. Officers at the

navy yard have been instructed to be prepared for the work of installing oil burning equipment in vessels at short notice.

The Craig Shipbuilding Company, Long Beach, Cal., has just completed a large steel steamer. The company has floated a \$250,000 bond issue.

The Lee Railway Switch Device Company has been incorporated at San Diego, Cal., with a capital stock of \$500,000, by T. E. Lee, J. W. Hastain, J. C. Hocker, C. F. Mohnicke, W. A. Brown, D. S. Miller, and W. V. O'Farrell. The company intends to manufacture and market a patent switch.

The A. Jensen Company, Eureka, Cal., manufacturer of creamery machinery, expects to move its plant to Oakland, Cal., the coming summer.

The Artesia Company has been organized at Los Angeles by J. W. Jennings, M. H. Harris and E. Scott. The company intends to equip a shop for the manufacture of a patent well drill.

The town of Pleasanton, Cal., is in the market for a pump of 30,000 gal. per hour capacity.

The Machinery & Supply Company, San Francisco, has moved from 61 Fremont street to Seventh and Harrison streets.

The San Joaquin Light & Power Company has placed orders for generating equipment of over 6000 hp. capacity for the new steam plant at Bakersfield, Cal.

The town of Madera, Cal., is contemplating the installation of an electric generating plant, to furnish current for lighting and power for the water works.

The Pacific Gas & Electric Company is planning a large auxiliary steam power plant to be installed at Sacramento, Cal.

Norman B. Livermore & Co. have placed orders with the Hilles & Jones Company for an outfit of boiler tools, and now have all the equipment required for their new shops in South San Francisco. They expect to occupy the new quarters in about a month. They have recently booked an order for a large Mallet locomotive, to be delivered to Salt Lake City, and report considerable activity at the local shops on repair work for the Southern Pacific.

L. C. Bihler, traffic manager of the Carnegie Steel Company, is visiting the San Francisco office.

The Palmer Lumber & Mfg. Company, Chehalis, Wash., is erecting a new factory in that city, the equipment of which will be electrically operated by individual motors.

The Standard Brass Casting Company, Oakland, Cal., has under construction a new foundry building, 100 x 100 ft., two stories, of brick construction. Additional oil furnaces giving a total capacity of 7000 lbs. per heat, and a new five-ton traveling crane are being installed. The company expects to occupy the building by May 1, and will add special foundry equipment from time to time.

The South

LOUISVILLE, KY., April 11, 1911.

Business is reported to be satisfactory in most lines represented in this market. The demand for power equipment is unusually good, several large orders having been booked during the past week, while ice machinery is also selling at a rapid rate. The sales of electrical equipment have been fair, while quarrying machinery has been in better demand than for several weeks. A lot of inquiries for equipment of this kind have been received, and some good business is in prospect. Machinery dealers report an unusually good call for contractors' outfits.

Business with the Henry Vogt Machine Company is excellent, two orders having been received last week for 300-hp. water tube boilers, in addition to four ice machines of large capacity.

The James Clark, Jr., Electrical Company reports a fair demand for dynamos and electrical appliances.

An order has been placed with the New Albany Mfg. Company, New Albany, Ind., for the equipment of a small cut-stone plant for the Bowling Green Quarries Company, Bowling Green, Ky. The Bowling Green oolitic limestone district is undergoing rapid development, and that territory is looked upon as a large prospective consumer of power and quarrying equipment.

The Schoppenhorst Dry Cleaning & Dyeing Company, Tenth and Grayson streets, Louisville, has had plans drawn for an electric power plant to cost \$10,000. The company recently installed individual motors for the operation of its machines, the Fairbanks-Morse Company supplying them.

H. E. Mechling, Louisville, will erect a modern laundry plant on Broadway, between Sixth and Seventh streets, in the near future, and will be in the market for power and laundry machinery. He is proprietor of the Swiss Cleaners & Dyers Company, Louisville.

Bids on a steel bridge, with concrete piers, which is to

THE MACHINERY MARKETS

be erected over Salt River between Jefferson and Hardin counties, will be opened in the office of Commissioner Charles F. Taylor, Louisville Trust Building, this city, April 20. The structure will be 800 ft. long and will probably cost \$75,000.

W. J. Semonin, president of the Commercial Club of Jeffersontown, Ky., has announced that Louisville capitalists have practically completed plans for an electric light and power plant to be erected there. The plant will be exempted from taxation for 10 years.

Fred Erhart, Louisville, is drawing plans for an addition to the Capitol Hotel, of this city, which will include an electric light and ice plant. The cost of the improvements will be \$20,000.

Capt. Brinton B. Davis, Louisville, is architect for the new Henry Watterson Hotel to be erected in this city at a cost of \$650,000. It will have its own electric light, power and refrigerating plants. It will be built of reinforced concrete.

The Farmers' Home Hotel, Louisville, has been reorganized under the name of the Commercial Hotel. An ice plant is to be added to the equipment of the hotel.

It is stated that the General Council of Louisville will almost certainly adopt ordinances which have been presented providing franchises for the construction of steel viaducts on Water street by the Illinois Central Railroad.

The Merrill-Ruckgaber Company of New York has been given the contract for the construction of the foundations for the new plant of the Kentucky Electric Company, Louisville, which is to be built at a cost of approximately \$1,000,000.

The Webster Loose Leaf Filing Company, Louisville, has been incorporated with a capital stock of \$85,000 by F. A. Yates, H. W. Davis, and Bradford Davis, Webster. It will make office devices, and has equipped a factory in the Sneed Building.

C. Hegewald & Co., New Albany, Ind., are installing a small boiler in the cooperage plant of Joseph Dreidel, in Louisville. They have also secured the contract for the installation of a battery of boilers in the Newmarket Distillery on the Louisville & Nashville Railroad. The company reports that it is actively at work in connection with the installation of steelwork on locks and dams, contracts for which were let by the Government.

A party of Eastern capitalists interested in the Kentucky Securities Company, which is to take over central Kentucky traction properties, visited these last week and outlined plans for improvements which are to be made. Work on these will begin in the immediate future.

The Fiscal Court of Knox County at Barbourville, Ky., has invited bids on the construction of six steel bridges at various points in that county.

Woodworking equipment will be required by the West Kentucky Coal Company at Paducah, Ky., the barge building plant of which was recently burned. W. H. Cunningham is manager.

The Shrode Valve Company has been incorporated at Marion, Ky., by John L. Shrode, F. W. Nunn, T. H. Cochran, C. S. Nunn, and J. W. Blue, Jr., for the manufacture of a patented device. Plans for the erection of a plant have not yet been announced.

J. J. Blocher, owner of the Troy Laundry & Heating Plant, Owensboro, Ky., is in the market for some second-hand power equipment, including two 150-hp. tubular boilers.

The J. H. Hall Plow Company, Maysville, Ky., one of the largest implement concerns in Kentucky, has announced an advance of 25 cents a day in the wages of all of its employees, to take effect at once. Reports from farm implement manufacturers throughout this section indicate a healthy condition of business.

Announcement has been made of the suspension of business by the Maysville Foundry, Maysville, Ky. It has been known for some time that it would probably discontinue operations.

The Coil Coal Company, Madisonville, Ky., is preparing to develop some coal lands, and has let a contract for the sinking of a shaft. The mine will be equipped at once. W. D. Coil is general manager.

Work is being rushed on improvements of the Louisville & Nashville Railroad at Paris, Ky. New repair shops and roundhouses are being built, a steel bridge over Houston Creek is being erected, and a train shed and other buildings involving structural material are going up.

The Louisville & Nashville Railroad will build a concrete and steel bridge over the Bay Fork Creek near Scottsville, Ky. A fill is now being made there preparatory to awarding a contract for the work.

Obion, Tenn., is seeking authority from the State Legislature to issue \$40,000 of bonds for a water works plant.

The Elizabethtown, Milligan & Johnson City Electric Railroad Company has been chartered for the construction of a traction line between the points named in Tennessee. W. G. Payne and others are the incorporators.

F. D. Harvey, 11 South Second street, Memphis, Tenn., is preparing to purchase general contractors' equipment.

Machinery, including power and woodworking, will be purchased by the Champion Lumber Company, Crestmont, Tenn., which will rebuild the sawmill of the Pigeon River Lumber Company, and will increase its capacity to 175,000 ft. a day.

The Tennessee Legislature is considering the appropriation of \$20,000 for the construction of a tunnel and the installation of a large electric elevator in the State Capitol Building at Nashville.

The Knox County Court at Knoxville, Tenn., granted a franchise to the East Tennessee Power Company to serve that community with light and power. The company is now building a hydro-electric plant in Polk County, Tennessee.

A bill providing for a bond issue of \$25,000 by Dayton, Tenn., for the purpose of providing water works, will be offered in the Tennessee Legislature.

The exact amount of the bond issue which Memphis will probably be authorized to issue for the purpose of constructing an electric light plant is \$1,000,000. A bill providing for this has been introduced in the Tennessee Legislature.

The Bureau of Publicity of Memphis, Tenn., reports that during the past year 58 new factories have been established in that city. Most of them, it is stated, are the result of advertising by the community.

B. J. Robinson, Vicksburg, Tenn., is planning the erection of an iron foundry and garage combined at a cost of \$20,000. Plans have been drawn and bids for the erection of the building will be asked for shortly.

The DeLoach Mfg. Company, which has been considering several cities as its permanent location, has decided upon Atlanta, Ga. It has completed organization with \$250,000 capital stock, and has elected A. A. DeLoach president. The company will make sawmills and motor trucks. It had a plant at Bridgeport, Ala.

Several Alabama cities are considering constructing water works systems. These include Greenville, Ashville and Fayette.

Q. D. Sauls, Tylertown, Miss., will erect a saw and planing mill, and is in the market for a gang-saw, rip-saw and planing machines, as well as power equipment.

The United States Engineer Office, Wheeling, W. Va., will open bids April 10 for furnishing and delivering river wall valve jacks, gate engines, gate winches, &c., for dam No. 26, Ohio River.

The American Foundry & Mfg. Company, Frederick, Md., has absorbed the National Shutter Bar Company and leased a factory at West South street, where it will manufacture spring doors, locks and shelf hardware. It will also continue the manufacture of shutter fasteners.

W. D. Haas & Co., Bunkie, La., have begun the work of reconstructing their cotton gin plant which was destroyed by fire last September. The plant that was burned was one of the largest in the South and was valued at \$30,000. The new building will be the same size as the one destroyed, but at present not as much machinery will be installed in it.

The Board of Control has signed the contracts for the construction of the sugar mill at Angola, La. Work is to be commenced as soon as possible. The mill will be equipped with the latest types of machinery.

The directors of the Tremont Lumber Company have decided to rebuild their mill at Eros, La., on a larger and bet-

Texas

AUSTIN, TEXAS, April 8, 1911.

In connection with the good road movement that is receiving much support by the different counties of Texas, the construction of many new steel bridges is being considered. Bonds have already been voted for a number of these proposed structures. During the last week general rains have fallen, covering practically all of the State and extending far into Mexico, adding still further to the promising prospects for a good crop season and stimulating business in all lines.

O. P. Slack of Houston and associates are arranging to construct a cotton compress at Harlingen, to cost about \$25,000. It is planned to have it finished in time to handle this season's crop.

J. D. Sugg, San Angelo, who recently purchased the electric street railroad system of that city at forced sale to satisfy a mortgage of \$28,000, will make extensive improvements to the property, including the construction of new lines.

It is announced by the Trinity Valley Traction Company, Dallas, that it has finished the preliminary work looking to the construction of its proposed interurban electric railroad to run between Dallas and Palestine, about 100 miles, and

THE MACHINERY MARKETS

that the work will be started some time during the coming summer. The tie and grading contracts have been let.

The town of Eastland has issued \$15,000 of bonds for the purpose of installing a system of water works, including a pumping plant.

At a recent meeting of the Board of Commissioners of Galveston, bids for the construction of a duplicate water main across Galveston Bay via the new causeway that is being constructed were opened. The lowest bid was that of Isaac Heffron, Galveston, for \$66,389. Final action on the bids was deferred. An issue of \$100,000 of bonds for this purpose has already been voted on and authorized. The duplicate main is to be 30 in. and approximately 10,766 ft. long.

A. Stattleman, Oklahoma City, Okla., has entered into a contract with the Terminal Stock Yards Company, Houston, for the erection of a fertilizer and rendering plant in the latter city.

The creation of another drainage district in Galveston County is under consideration by the Board of County Commissioners. An election will probably be held some time in May to vote on the proposition of issuing bonds for the purpose. Dredging and ditch machinery will be required to carry out the work if the proposition is favorably acted upon.

The State government of Tamaulipas and the municipal government of Matamoros, Mexico, have granted a concession to A. B. Cole, B. B. Renfro and R. C. Cowan, all of Brownsville, Texas, and Procofo Guerra of Matamoros for the construction of a system of electric railroad from the Mexico terminus of the new international bridge across the Rio Grande to the town of Matamoros, about three miles, and over the principal streets of the latter city. The concession requires that the construction shall be started within 10 months and finished within two years. It is reported that the same men who have obtained this concession contemplate constructing a system of electric street railroad in Brownsville and to extend its track across the bridge to connect with the Mexico system.

A 5-ton ice plant will be installed at Breckenridge by the Breckenridge Mill & Gin Company.

Neils Buck, architect of Chicago, and associates, who recently purchased 1000 acres of land near Beeville, Texas, will install a system of irrigation and colonize the tract.

The San Angelo Milling Company is preparing to begin the construction of a new flour mill at San Angelo, to cost about \$30,000.

The Guatemala Coffee Company, Houston, will establish a coffee roasting plant in that city. The roasting apparatus will be of the electric-gas type, and will have a daily capacity of 200 bags of coffee.

An extension of 1½ miles of its track and other improvements will be made to the electric street railroad system of the Marshall Traction Company, Marshall, Texas.

The City Council of Wichita Falls, Texas, has granted a franchise to M. A. Marcus and T. E. Dobson for the installation of an electric light and power plant.

The City Council of Gainesville will soon take steps to extend the distributing system of the water works plant, erect a new standpipe and make other improvements. That city recently voted \$150,000 for taking over the water works plant there from the private interests that owned it.

The Gold Bond Company will construct a large system of irrigation near Pecos.

It is authoritatively announced that Stone & Webster, Boston, Mass., will begin the construction of an interurban electric railroad from Dallas to Waxahachie, 30 miles, within 30 days after the deeds to the right of way have been signed and the franchise for the use of the streets of Waxahachie has been granted. The work of constructing the line is to be finished within 12 months after it is started. The Southern Traction Company, Dallas, is also negotiating with the City Council of Waxahachie for the use of certain streets for the proposed line that it is to construct to and through that place.

A cotton gin will be installed at Atwell by the Elmen Realty Company, Houston.

The San Saba Quarry Company will install machinery at its marble quarries near San Saba, for the purpose of cutting and hoisting the stone. W. L. Sweeney of San Saba is president of the company.

I. A. Walker of Dallas has applied to the City Council of Temple for a franchise for the installation of a gas plant and distributing system. Another application for a similar franchise is pending before the City Council.

Fred Lotz and associates are erecting a lumber mill and planer at Anahuac.

The plan that was recently set on foot to organize a private company to develop and put into effect the hydro-electric feature of the Elephant Butte dam and land reclamation project at Elephant Butte, N. M., has been abandoned on the recommendation of a majority of the Board of Governors of the Elephant Butte Water Users' Association and the El Paso Valley Water Users' Association. The Federal

Government is preparing to install a temporary electric power plant at the site of the big dam. It will cost about \$500,000. O. H. Ensign, chief electrical engineer of the reclamation service, is in charge of this branch of the project.

Active steps have been taken by the Commercial Club of Belton to have an interurban electric railroad constructed between that town and Holland, 16 miles.

The Old Dominion Copper Company will install an extensive system of underground electric railroad in its mines in the Globe district of Arizona.

A committee of citizens of Wilcox, Ariz., consisting of H. A. Morgan and others, is promoting the installation of a large central electric power plant and transmission lines to various points in the Sulphur Spring Valley, the power to be operated chiefly for the operation of irrigation pumping plants.

Edward Beggs recently bonded two of his placer mining claims in the La Pax district, Arizona, to a syndicate of Eastern men, and the latter will install a large hydraulic plant for working the property.

The Elephant Head Buttes Mining Company has under consideration plans for a concentrating and separating plant for its mine, situated 35 miles south of Tucson, Ariz.

George W. Stine, Cananea, Mexico, will install a complete hoisting equipment, air compressor, drills and pumping plant at his mine in the Cananea district.

The Twin Peaks Mining Company contemplates installing an ore reduction mill at its mine near Steeple Rock, N. M.

The Economic Mining & Milling Company will install considerable new machinery at its mine in the Carrizozo district, N. M.

Propositions have been received by the Commercial Club of San Antonio from the Geo. D. Mayo Machine Company, Laconia, N. H., to establish a knit goods factory, and from H. L. Breinig to establish a furniture factory.

W. T. Watt, president of the Provident National Bank, Waco, is arranging preliminaries for the new sanitarium to be built at a cost of \$300,000. The structure will be 14 stories, of steel, brick and terra cotta.

Eastern Canada

TORONTO, ONT., April 8, 1911.

Trade conditions continue to favor larger business in all lines involving the use of plant and machinery. On all hands maintenance of the present activity at least seems assured, and the prospects for quite a marked expansion beyond the limits of last season's trade are shading into realities. In some departments the business in hand already exceeds that of last year, and the best is yet to come. The volume and economic quality of the wave of immigration now rolling in are promising in the way of additional buying power, and the influx of investment capital keeps pace with the stream of population from other countries. There is scarcely any part of Canada in which enterprise is not creating new wealth-producing or wealth-distributing works and creating new needs to be satisfied. No one who sees newspapers published at the principal centers of the several Provinces can fail to be impressed with the large number of items dealing with new projects for the establishment of industries and for the construction of great plants and important railroads. Apparently the hesitation caused by the reciprocity agreement has passed away so far as developments of this kind are concerned. In some fields, notably in lumber manufacture, it would appear that the proposed agreement has given an impulse to the movement of American capital into Canada. Assuredly the agreement has been an influence to immigration from the United States.

The chairman of the Ontario Hydro-Electric Power Commission has announced that arrangements have been made with the New York and Ontario Power Company of Wadlington, N. Y., for the delivery of 15,000 hp. within 18 months for the supplying of towns and cities in Western Ontario by the commission. A further supply of 20,000 hp. is also to be at the service of the commission from High Falls on the Madawaska for distribution in the same area. The towns and cities in that part of the Province have been for some time calling for service by the commission, and there is now a practical certainty that the commission will build an extensive transmission system there like that it has radiating from Niagara Falls among towns and cities in lower western Ontario. There will be three main stations—one at Brockville, one at Morrisburg and one at Kingston. From each of these wires will ramify 20 miles and upward.

THE MACHINERY MARKETS

F. H. Keefer, K. C., Port Arthur, Ont., passed through Toronto this week on his way home from England. He says that, as soon as the coronation is over, an English syndicate will take steps to locate at Port Arthur a pork-packing plant to cost approximately \$7,500,000.

Work has been begun upon the construction of the Wayagamack Pulp & Paper Company's plant at Baptist Island, Three Rivers, Que., by Deacon & Co., contractors, Montreal. There are to be four 50-ton paper mills. It is expected that one of the mills will be in operation this year.

The Canada Cement Company will double its extensive plant at Lakefield, Ont.

The Chaudière Machine Company, Ottawa, has offered to build an incinerator for that city. Some time ago the Board of Control recommended the acceptance of the proposal of Lamb & Laurie, Montreal, for the Heenan-Froude incinerator for \$34,650, but the City Council has since held the matter in abeyance.

McFarland & Douglas, Ottawa, announce that they will at once begin the construction of a large factory to make interlocking furniture finish, fireproof steel doors, windows, &c. Rights to manufacture these articles in Canada have been obtained from the United States holders.

The proposed extensions of the lines of the Ontario Hydro-electric Power Commission, Toronto, to Windsor and other western points in the Province will, it is estimated, cost \$2,000,000. The sub-station for the new area to be served will be at Chatham.

The McClary Mfg. Company, London, Ont., is building an office block and warehouse in Montreal.

The Montreal Aero Company, with an authorized capital stock of \$500,000, has been incorporated; head office in Montreal.

Engineers acting for the city of Ottawa have prepared plans for the entrance of the railroads into the city. These call for the taking up of sections of certain existing lines, for the closing up of a piece of canal, the cutting of another piece, and the building of a tunnel. The last named work would alone cost \$1,500,000.

The London Concrete Machinery Company, London, Ont., will soon commence the construction of a new factory in that city.

The Smart-Turner Machine Company, Hamilton, Ont., has installed a large pumping plant at the municipal water-works, Chatham, Ont.

The Crown Lumber Company, Woodstock, Ont., is about to erect a new bending factory close to its present plant. It is to be equipped with modern machinery.

The George White & Sons' Company, London, Ont., manufacturer of engines, boilers, &c., will erect an addition to its plant.

The Acme Electric Appliance Company, Ltd., Brantford, Ont., has been granted a charter of incorporation by the Dominion Government, with a capital stock of \$300,000. The directors are Alvin Sheard, Gilbert Brereton and Leslie J. Hastings.

Western Canada

WINNIPEG, MAN., April 7, 1911.

The Canadian Pacific Railway Company, head office, Montreal, will build 700 miles of wire fence in the West this year.

The shingle mill, saw mill and lumber yard of the Pitt River Lumber Mills Company at Coquitlam, B. C., were destroyed by fire, the total loss being estimated at about \$200,000. It is said that the company will rebuild. The machinery destroyed was recently installed.

Theodore A. Burrows, ex-M. P., Grand View, Man., who is called the timber king of the West, is preparing to put in two big sawmills in the country west of Edmonton, Alberta. One, which will be on the McLeod River, is to be of a capacity of 5,000,000 to 7,000,000 ft. annually. The other is to be on the Pembina River.

The Industrial Committee of the City Council, Edmonton, Alberta, has reported in favor of granting a gas franchise to the International Heating & Lighting Company, Cleveland, Ohio. The agreement will be submitted to the rate payers.

The Gordon Wire & Wire Nail Works (John J. Gordon, St. John, N. B.), is in communication with the Industrial Committee of Edmonton, Alberta, with regard to the locating of a nail plant in the latter city.

Over 200 men are at work on the Western Dry Dock Company's plant at Port Arthur, Ont. It will be ready for the first vessels of the season.

The Schaafe Machine Company, New Westminster, B.

C., has put in a night shift to clean up its order list. It is turning out a lot of lumber mill equipment.

The British-Canadian Lumber Company, Vancouver, B. C., will build a large new mill this summer on Lulu Island, near New Westminster. It will be run by electrical power. There will be a box factory as well. The cutting capacity of the mill will be 250,000 ft. per 10 hours. In the course of another year the company will build an additional lumber mill and a pulp mill.

The Rat Portage Lumber Company, Ltd., headquarters at Winnipeg, has decided to re-build the mill that was burned in the Rainy River district last fall. The company will also build a large plant in Norwood, Man. At the latter point there will be, in addition to a large saw mill, a planing mill, a sash and door factory and a box factory.

The Canadian Equipment & Supply Company, Ltd., Calgary, Alberta, has increased its capital stock to \$200,000.

A new company starting in Winnipeg, the Coast Lumber Yards Limited, is preparing to erect a large saw mill at St. Boniface, Manitoba, just across the river from Winnipeg.

A syndicate of United States and Canadian capitalists is proposing to instal a power plant near Revelstoke, B. C., to harness the Columbia River at that point, and to erect a paper and pulp mill capable of producing about 200 tons of product per day. Some of the names mentioned in connection with the project are F. C. Adams, of Portland, Ore.; C. D. Danahar, of Tacoma, Wash., and Charles A. Barnum, a well-known Western timberman.

The Vancouver Gas Company is having plans prepared for two producers and storage tanks to cost between \$400,000 and \$500,000.

The Grand Trunk Pacific Railway Company has decided to erect a million dollar hotel in Edmonton, Alberta. It will be built on most modern lines, and of course will have a first-class elevator accommodation.

R. J. McGaw, Goderich, Ontario, superintendent of the Western Canada Flour Mills Company, Ltd., has been on a trip to the Winnipeg and Brandon plants of the company. He announces that the oatmeal mill at Brandon will be enlarged this year. New machinery will be added to increase the capacity of the plant.

Cushing Brothers, Ltd., Calgary, has purchased a site for a sash and door factory at Edmonton, Alberta; and Saskatoon, Sask., is mentioned as another point at which the firm will establish a factory.

Government Purchases

WASHINGTON, D. C., April 10, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 2, schedule 3484, for one lathe, and schedule 3485, one 120-in. crank shaft lathe.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 16 for 11 forging presses, schedule 3475.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids June 3 for two electrically operated floating cranes complete, one for delivery to Boston, Mass., and one for the United States Naval station, Pearl Harbor, Hawaii.

The Isthmian Canal Commission, Washington, will open bids under file C Z 5120A, for furnishing two 4-cylinder vertical water cooled gasoline automobile motors.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids April 29 for one 3000 cu. ft. air compressor for the central power plant, United States naval station, Pearl Harbor, Hawaii.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 4 as follows:

Class 1, one 10-ton 3-motor electric jib crane—bidder 25, Butte Engineering & Electric Company, San Francisco, Cal., \$3800; 37, Cyclops Iron Works, San Francisco, Cal., \$3500; 124, Maine Electric Company, Portland, Me., \$4089; 128, Morgan Engineering Company, Alliance, Ohio, \$7535; 133, Niles-Bement-Pond Company, New York, \$4190; 182, Toledo Bridge & Crane Company, Toledo, Ohio, \$6400; 194, Whiting Foundry Equipment Company, Harvey, Ill., \$3470; 222, Northern Engineering Works, Detroit, Mich., \$3490.

Trade Publications

Engines.—American Engine Company, Bound Brook, N. J. Two bulletins. No. 16 illustrates and describes the American-Bell simple engine. Dimension diagrams and tables of these engines for belted and direct connected generator service are included. No. 17 deals with the duplex compound engine and contains a description of its special features, supplemented by illustrations, together with brief tables of dimensions.

Tachographs and Tachometers.—The Industrial Instrument Company, Foxboro, Mass. Bulletin No. 40. Lists all types of speed measuring instruments from a simple speed indicator for counting revolutions to the elaborate precision variation recorder. All of these instruments are illustrated and their special features described.

Grain Separating and Threshing Machinery.—The Aultman & Taylor Machinery Company, Mansfield, Ohio. Catalogue. Size, 8 x 11 in.; pages, 52. This is the company's 1911 catalogue describing and illustrating a complete line of separators, threshers, hullers, &c., operated by traction engines.

Paints for Structural Steel Work.—Schoellkopf, Hartford & Hanna Company, 30 Church street, New York city. Folder. Relates to the Steeltote paints for structural work, which are said to combine the qualities of decoration and protection. The paints are made in seven colors and chips show the exact shades.

Automatic Alarm.—American Safety Lamp & Mine Supply Company, Scranton, Pa. Circular. Bulletin No. 8. Deals with the American automatic trip alarm, which is designed to warn people against crossing the tracks when a trip of cars being pushed by a locomotive or pulled by a rope is approaching. The essential parts of the alarm are two in number, a light in which a special spring arrangement prevents the wick from jarring down into the oil fount, and a 10-in. bell which is operated by the vibration of the car. The device is suspended from the front end or side of the leading car, and it is claimed that the bell can be heard distinctly from 300 to 500 ft. ahead of an approaching trip of cars.

Concrete Mixer.—Svenson-Shuman Machine Company, Bessemer Building, Pittsburgh, Pa. Circular. Illustrations and descriptive matter explain the operation of the Svenson measuring batch mixer, which is designed especially for buildings, foundations, floors, sidewalks, cement blocks, mortar mixing and curb and gutter work. Among the special features of the mixer are that each batch is measured while the preceding one is being mixed, the mixing is done by plows in a stationary tub and in plain sight of the operator, the mixture is discharged from the bottom of the mixing vessel and the batch can be dumped at the end a little at a time or all at once, as may be desired.

Special Machinery and Appliances.—C. E. Sargent, Marine Building, Chicago, Ill. Pamphlet. Illustrates a large number of special machines and appliances which have been designed to solve mechanical problems, reduce the cost of manufacture and accomplish work formerly done by hand.

Raw Hide Pinions.—The New Process Raw Hide Company, Syracuse, N. Y. Mailing card. Pertains to the line of New Process noiseless pinions for direct drive. These pinions are said to have the breaking strength and wearing qualities of metal with the noise and shock incident to the use of metal to metal gearing eliminated.

Power Plant Instruments.—Louis M. Ellison, 6328 Princeton avenue, Chicago, Ill. Pamphlet. Concerned with a line of instruments for power plant work which he has designed and manufactured. These include draft gauges of the standardizing and differential types and accessories, including brackets, thermometers, portable piping, reducer sets for piping and wire goose necks. Direct pressure and draft gauges are also shown, as well as probable balanced draft gauges and a throttling-evaporating calorimeter.

Lifting Magnets.—The Browning Engineering Company, Cleveland, Ohio. Mailing card. Shows a number of uses of the Browning magnets for handling metal in connection with a locomotive crane and an overhead traveling crane.

Hoists, Trolleys and Cranes.—Climax Hoist Company, 1753 North Howard street, Philadelphia, Pa. Catalogue C. Size, 3½ x 6½ in.; pages, 32. Shows a line of spur geared hoists, plain and geared trolleys and cranes. The various appliances are illustrated and described, and there are a number of sectional views showing constructional details. A number of illustrations of installations and a complete price-list are included. An illustrated description of one of the hoists appeared in *The Iron Age* April 6, 1911.

Oxyhydric Metal Cutting and Welding.—The American Oxyhydric Company, Milwaukee, Wis. Pamphlet. Refers to the use of the Oxyhydric process for the cutting and the welding of metals, and shows some of the work that has been done, as well as the tools employed.

Grab Bucket.—Pawling & Harnischfeger Company, Milwaukee, Wis. Folder. Points out the advantages of using a single rope grab bucket for handling sand in foundries.

Copper Clad Wire.—Duplex Metals Company, Chester, Pa. Pamphlet entitled "The Copper Clad Handbook." Concerned with the copper clad wire which this company manufactures. After a brief historical introduction and a short description of the process of manufacture, the various types of wire are taken up together with some of their applications. Tables giving the weights and dimensions of the different sizes of wire made complete the pamphlet.

Recording Voltmeters.—The Bristol Company, Waterbury, Conn. Bulletin No. 131. Refers to the use of Bristol's recording voltmeters for switchboard and portable service with 12, 8 and 6 in. charts. The several types of instruments

made are illustrated, and reproductions of the various kinds of charts which can be supplied for either alternating or direct current for a wide range of voltages and different periods of time are included. Dimensions of both the alternating and the direct current instruments are given, and a partial list of users completes the bulletin.

Slide Rule.—George W. Richardson, 4212 Twenty-fourth place, Chicago, Ill. Circular. Refers to the use of a direct reading slide rule for solving a great variety of problems. The special feature of this rule is that a number of key letters are stamped on the slide and show through a hole in the body of the rule. In use after the problem to be solved has been selected, the key letter corresponding to its class is noted and the slide moved either to the right or the left until this letter appears in the key hole. When this has been done the answer to the problem will be given directly without any further manipulation of the rule. The stock of the rule is made of aluminum with reinforcing ribs and the scales are celluloid with ivory finish.

Drill Chucks.—The Jacobs Mfg. Company, Hartford, Conn. Catalogue. Size, 6 x 9 in.; pages, 34. Gives a brief description of the special features of the Jacobs improved drill chuck followed by illustrations showing the actual sizes of the chucks and a brief statement of the capacity, dimensions, &c. Sectional views of the chucks together with directions for taking them apart, an illustrated list of straight and taper shanks furnished and a price-list of repair parts are included.

Babbitt Ladle.—Wolverine Machine Works, Saginaw, Mich. Circular. Concerned with the Gondola babbitt ladle which has a sliding wooden handle for use in pouring. The shape of the lips enables either a small or a large stream to be poured, while the sides which are high just back of this point prevent the metal from backing up and running over. The parts exposed to the fire are of cast iron, and the shape gives balance to the ladle and accuracy to the pour. Three sizes, ranging in capacity from 15 to 40 lb., are made.

Ice Making and Refrigerating Machinery.—The Cleveland Ice Machine Company, Cleveland, Ohio. Catalogue. Size, 6½ x 9½ in.; pages, 40. Lists the various types of machines built by the company and describes and illustrates their special features. In addition to the machines, space is given to accessories such as electric motors and gas engines for driving them, ammonia condensers and coils, ice cans, gauges and pipe fittings.

Rotary Converters.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Circular No. 1028. Describes completely a new line of self-starting rotary converters. The combined efficiency of one of these converters and the transformers used for stepping down the voltage of the transmission line is generally higher at all loads than that of a motor-generator set of equal capacity and voltage. In addition to this increase in efficiency, the simplicity and compactness of the rotary converter has led to its use where alternating current has to be converted to direct current for railway or power service. This new line of converters is built in all sizes from small machines used in the laboratory for demonstration purposes up to units having a capacity of 3000 kw. The illustrations show the machines assembled, as well as their several parts, a number of installations and diagrams of typical rotary substations.

Duplicating Machine.—Copygraph Mfg. Company, Ambbridge, Pa. Pamphlet. Refers to the use of the Dailey American Copygraph for producing manifold fac-simile copies of a typewritten letter, postal or index card or any other form. The special advantages of the Copygraph are that the chase holding the type matter can be placed in position or removed from the machine without touching or altering the position of the ribbon, a copy is printed with every movement of the roller or about 2000 per hour, gravity paper feed, automatic removal of the printed sheets and a minimum number of moving parts.

Iron and Steel Cements.—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Booklet. Size, 3¼ x 6 in.; pages, 16. Contains extracts from the Smooth-On instruction book and shows the various products of this company for repairing breaks in pipes, remedying defects in castings and making joints in structural iron or steel work. A number of repairs made with these products are illustrated, as well as the application of the cements.

Metals and Alloys.—The Electric Smelting & Aluminum Company, Lockport, N. Y. Brochure. Lists the various alloys of aluminum, silicon, manganese and other metals which this company manufactures in ingot form in the electric furnace. Brief specifications are given for the different metals, which include pure aluminum, nickel aluminum, aluminum bronze, silicon copper, manganese copper, phosphor tin and copper and several grades of babbitt metal.

Head Trimming Press.—The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn. Circular No. 300 A. Gives general descriptions and specifications for a line of semi-automatic bolt head trimming presses for trimming hot forged bolts. Three different sizes of press are built, all of which are illustrated, together with views of the bolts before and after they have gone through the press. An illustrated description of one of these presses appeared in *The Iron Age* January 12, 1905.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

Nicholson File Company
Providence, R. I.

THE IRON AGE

Established
1855

New York, April 20, 1911

VOL. 87: No. 16

Published Every Thursday by the
DAVID WILLIAMS COMPANY
239 West 39th Street, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building
Milwaukee, 416 Engineering Building.	

CONTENTS.

Editorial:	PAGE.
Reduction in Lake Ores.....	945
Increasing Pre-eminence of the Mesaba Iron Range....	946
Government Regulation of Prices.....	947
The New Free List.....	947
The Number of Car Wheels.....	947
Correspondence	948
The Steel Corporation's Annual Meeting.....	949
The National Radiator Company's Eastern Plant.....	949
Customs Decisions.....	949
The Iron and Metal Market Reports.....	950 to 960
Iron and Industrial Stocks.....	960
The Crucible Steel Company of America.....	960
Trade Publications.....	960
Electric Furnaces of the Induction Type.....	961
Personal	964
Obituary	964
The Ratio of Burden to Labor.....	965
Metal Rolling in the United States.....	966
The Congress of Technology in Boston.....	967
Large Condenser Installations.....	967
Employers' Liability and Workmen's Compensation.....	968
Modern Shop Management.....	970
Iron Ore Docks on the Lakes.....	972
Handling Philadelphia's Ore Imports.....	973
Central Station Welfare Work.....	973
Tariff Revision Begun.....	974
The Pittsburgh Steel Company's Finances.....	974
Railroad Equipment Orders.....	974
The Clayton Motor Driven Air Compressor. Illustrated....	975
The Gore Wire Rope. Illustrated.....	975
The National Metal Trades Association.....	976
The West Penn Steel Company's Extensions.....	979
Molding Thin Castings on an Arcade Jarring Machine. Illus.	980
The Iron and Steel Institute.....	980
The Patterson Adjustable Electric Light Bracket. Illus....	981
The Rogers-Brown Iron Company.....	981
The Algoma Steel Company's Coke Plant. Illustrated....	982
The Hooper-Falkenau Engineering Company.....	986
A New Metal Studding Machine. Illustrated.....	987
Repairing Concrete Floors.....	987
Vivian Bond & Co.'s Pittsburgh Business.....	987
The National Association of Manufacturers.....	988
A New Standard Motor Driven Rolling Mill. Illustrated...	988
Petroleum Iron Works Contracts.....	989
Vermillion Iron Ore Explorations. Illustrated.....	990
Swank's New Firebrick Plant.....	992
The Rochester Iron & Metal Company's Growth.....	992
The Machinery Market Reports.....	993 to 1001
Current Metal Prices	1002

Reduction in Lake Ores

A Cut of 50 Cents a Ton Now Expected

An 80,000 Ton Structural Contract Pending in New York—Pig Iron Stocks Little Changed

The question of Lake Superior ore prices for 1911 has become of first importance in the past week. Among merchant ore producers sentiment in favor of a 50-cent reduction from the level of 1910 has been more pronounced, but the issue is complicated by the attitude of some of the steel interests. The latter are concerned about the effect of a reduction in ore upon the market for finished steel. So far as pig iron is concerned, the cut in ore has been pretty well discounted.

The transfer of the conferences on the lake ore situation from Cleveland to New York was a development of the week which kept the entire trade on the qui vive. There was no definite outcome, but the perplexities of the situation have not lessened. Offers of non-Bessemer lake ore for 1911 shipment have been made at a considerable concession from the basis of 1910, and in the East sales of foreign ores at prices midway between those of 1909 and 1910 point to a lower basis both for Eastern and lake ores. In Cleveland the prediction is made with more confidence this week that the reduction on all grades of ore will be 50c. a ton.

Pig iron and finished material markets have grown quieter. Pig iron production is receding from the high point reached at the opening of April. The United States Steel Corporation has put out two furnaces in the past week and now has less than 70 per cent. of its furnace capacity active.

In foundry pig iron, under indifferent buying, prices for deliveries late in the year are getting closer to those for early shipment. Eastern pipe works have made low offers for Northern irons, but as pipe grades are not plentiful, producers are showing no eagerness to accept.

In steel-making pig iron, the largest sale reported was of 5000 tons of Northern basic to a southern Ohio steel company, shipments over the second half of the year. At Cleveland, inquiries for 6000 tons of basic iron are pending, half of it to go to Chicago. Stocks at steel works furnaces and in the yards of merchant furnaces in the Central West were reduced 700 tons, on a total of 860,000 tons in the first half of April. This compares with a reduction of 45,000 tons in March.

The ferromanganese situation has not improved and business is still done at \$36.50, Baltimore. One sale of 1000 tons has been made to an Ohio steel company and another of 500 tons, also in the Central West.

Pittsburgh reports some cutting of prices on billets and sheet bars, the supply of available semi-finished steel both from producers and merchant firms showing some increase.

The chief development in structural steel was the call for bids for 80,000 tons of fabricated steel for the Interborough Rapid Transit Company, New York. It will be used for additional tracks and extensions for the Second, Third, Sixth and Ninth avenue elevated lines, including a double deck bridge over the Harlem River. Bids are wanted by April 24. Deliveries begin in three months and extend over two years. For the Insurance Exchange Building, New York, 8000 tons of steel will be furnished by the American Bridge Company. At Chicago, the Otis Building, 8000 tons was let last week, and pending business there includes 5000 and 2000 tons respectively for the buildings of the Northwestern Mutual Life Insurance Company and the Fidelity Insurance Company.

The Missouri, Kansas & Texas has bought 14,000 tons of rails, 6000 tons to be rolled at Chicago and 8000 tons at a seaboard plant for delivery at Gulf port. The Baltimore & Ohio is in the market for 7500 tons.

Manufacturers of sheets at the Pittsburgh meeting last week decided against reducing prices in spite of the recent shading. Specifications for tin plates have fallen off somewhat, at the same time that activity in the British tin plate industry is slackening, an indication that foreign competition may be sharper on the next contract for tin plates for the export oil trade. At the last letting Welsh mills could not guarantee deliveries, and the business came to this country.

The scrap market has gone from bad to worse. Offerings by railroads have been more of a factor, and in some districts rejections of dealers' shipments have added to the demoralization.

Tin in New York has again sold below the import level this week. In copper, sales of 500,000 lb. have been made at 12c. for electrolytic, but selling interests representing producers are generally holding for 12½c. The expectation that the February and March movement in iron and steel would help the copper situation has proved to be another forlorn hope.

Growing Pre-eminence of the Mesaba Range

The dependence of the steel industry of the United States upon the Mesaba iron range of Minnesota is brought out more strikingly than ever by the statistics of the production of Lake Superior ores in 1910. In that year, with a total of 43,442,397 gross tons from the five Lake Superior ranges and the three detached mines in southern and central Wisconsin, the Mesaba range contributed 29,201,760 tons, or more than 67 per cent. The Mesaba shipments were a new high record, being roundly 1,000,000 tons more than in 1909, while the shipments from all ranges were only about 850,000 tons more last year than in the preceding year. Thus the so-called "old ranges" shipped less than in 1909.

The following comparison of shipments from the various ranges in the past two years emphasizes the increasing disparity between the Mesaba range output and that of all the other ranges on Lake Superior:

	1909. Gross tons.	1910. Gross tons.
Marquette Range.....	4,256,172	4,392,726
Menominee Range.....	4,875,385	4,237,738
Gogebic Range.....	4,088,057	4,315,314
Vermillion Range.....	1,108,215	1,203,177
Mesaba Range.....	28,176,281	29,201,760
Miscellaneous	82,759	91,682
Totals.....	42,586,869	43,442,397

It is true that exploration and development work

has been carried on with vigor on the old ranges in recent years, and that this has resulted in a much larger addition to the known ore reserves of the lake region than was considered possible at the time the Steel Corporation was formed. Nevertheless, accepting at par the claims made by the owners of some of the new properties on the old ranges, it is plain that Marquette, Menominee and Gogebic mining companies have strained to the utmost to make the totals of the past half dozen years, and their tendency will be toward smaller rather than greater shipments.

The Menominee range, for example, produced 5,109,000 tons in 1906, whereas its total last year was but 4,237,738 tons. The Marquette range shows a more even record in the past half dozen years. Leaving out 1908, with its sharp depression, the average output in the years 1905 to 1910, inclusive, has been about 4,200,000 tons, the minimum being 4,057,000 tons in 1906, and the maximum, 4,392,000 tons in 1910. The Gogebic range, through the tremendous activity at the Newport and the well sustained output of the Norrie group, has come up well in the past two years, making an output of 4,088,000 tons in 1909 and of 4,315,000 tons in 1910, whereas the greatest previous total was 3,705,000 tons in 1905. The Vermillion range reached its highest output in 1902 at 2,084,000 tons. In 1905 and 1906 it averaged about 1,750,000, whereas in 1909 and 1910 it dropped down to an average of 1,150,000 tons.

In view of the waning of the old ranges, relatively if not actually, special interest attaches to the development work which has been in progress in the past few years on the Cuyuna range, west of Duluth, and the Baraboo range in Wisconsin. As has been indicated by articles in these columns from time to time, both these districts will give a good account of themselves. The belief of those closest to developments on the Cuyuna range is that a good many mines will be found that will rival the Mesaba in grade, and will rank well up in tonnage. As was pointed out in an article on the Baraboo range in *The Iron Age* of March 9, page 618, unexpected finds have been made there, with prospects that the total of available ore will run well up into the hundreds of millions of tons. Of particular interest in this connection is the account given elsewhere in this issue of the work that has been in progress in the past year or two on the Vermillion range. While it is early to say definitely what may be looked for as the result of this activity, it is not unreasonable to expect a very considerable addition to the available ores of that district, which thus far has been relatively unimportant in point of tonnage, though its ores are of the highest grade.

The importance of the Mesaba range is seen in a new light in a comparison of its total output with the total of iron ore shipments from the Lake Superior region. From the first shipment of ore down the lakes in 1852 to the close of navigation in 1910 the shipments from all the Lake Superior mines amounted to 493,089,000 tons. Of this total the Mesaba range, making its first shipment in 1892, contributed 224,905,000 tons. Thus in 19 years this range, well named "giant," has produced 45.6 per cent. of all the iron ore that has come from the mines of Minnesota, Wisconsin and Michigan in the past 58 years, or more than three times the life of the Mesaba range.

Government Regulation of Prices

Washington advices state that Representative Martin of South Dakota, who has lately been appointed on the Committee on Interstate and Foreign Commerce, is planning to urge legislation which will give the Federal Government the right to regulate the prices charged by corporations which have come under the ban of the Sherman anti-trust law and are monopolies or attempted monopolies under that law. He is said to be convinced that in the absence of such regulation it will be difficult to reach these corporations effectively, as they may simply change their form, and if resolved into their subsidiary companies such companies will effect a complete understanding and continue to maintain control of the market for the commodities produced, thus simply changing the form of monopoly. It is asserted that the problem now presents itself how to follow up anti-trust decisions so as to give actual relief to the public, and that Representative Martin is convinced that Government regulation of prices would go a long way toward bettering the situation. He is said to believe that the Government has the power to do what he proposes.

It will be exceedingly interesting to see whether Mr. Martin's Congressional colleagues will support his views to a sufficient extent to embody them in practical legislation. The assumption of control of freight rates by the Interstate Commerce Commission is an important step in that direction. If the price at which railroads shall sell their transportation can be fixed by a Government agency, it would seem that railroads might with some justification demand that another Government agency should be empowered to fix the prices of such commodities as they purchase, thus insuring them low costs of what they are compelled to buy. But this carries with it the further argument that those whose prices would be so controlled should in turn have their interests safeguarded by some Government agency fixing prices on what they are obliged to buy. As it would surely be inequitable to restrain any set of manufacturers or producers from charging more than a fixed price and leave those who supply them with essential materials free to demand what they may, the regulation of prices would have to be continued until every seller of any kind of material came under control. In such a regulation of costs, could the man who sells his labor escape? In the last analysis he would be the one whose emoluments would be the most important obstacle to the leveling process. Could a Government agency make him give way and assist in the cheapening process?

It is difficult to see how national legislation can thus be invoked, even against the so-called trusts, without precipitating a most confusing state of affairs. How can the price of a manufactured product be regulated, for the purpose of penalizing a corporation, unless it be conceded as one of the powers of the Government that it can fix or regulate the price of any commodity offered for sale by any person? Will the Congressional representatives of agricultural constituencies be willing to admit that a Government agency ought to be created for the purpose of fixing the price of wheat, corn, cotton, potatoes, flaxseed, hogs and other products of the field or the farm? It is but a few months since all these commodities were soaring and the entire country was wailing over the

cost of living. Was Representative Martin then straining himself to give "relief to the public" by trying to break down farmers' prices? At that time he was probably a believer in the law of supply and demand, as far as farm products were concerned. And that is the law which ultimately asserts itself, in spite of all legislation. It is that law which has so often brought about lower prices even when combinations and trusts have done everything in their power to control the market for a commodity. Congress should not attempt to interfere with the free play of this law, even to penalize a so-called monopoly.

The New Free List

The Democratic party has signalized its return to power in the House of Representatives by fathering a bill to place on the free list about a hundred articles, mainly such as are used by farmers and planters. Agricultural implements of every description, all sorts of fabric coverings for cotton bales, metal cotton ties and wire baling ties, leather and such leather goods as boots and shoes and harness, wire rods and wire fencing and fence staples, all kinds of lumber except cabinet woods, sewing machines, meats, all kinds of flour and salt are the articles thus covered. Thus the farmers who have been opposing Canadian reciprocity are to be appeased by the possibility of getting cheaper agricultural implements, wire fencing, harness, boots, shoes and salt. The Southern cotton planter, although he has taken no special interest in the reciprocity question, has always been anxious to see cotton ties on the free list, and the opportunity is seized to minister to his desires. Free meats and flour are sops to the general public. There is nothing scientific or logical about the bill as a type of tariff making. It simply wrests from their places on the dutiable list a number of articles whose transfer to the free list is likely to win political support. The country apparently demanded a further reduction of tariff duties last fall, but this bill cannot be considered a proper reply to such a demand. It demonstrates the conception of tariff revision which dominates the new House of Representatives and shows what is to be expected when the tariff as a whole is taken up for revision next winter. It will be remarkable, indeed, if such a bill as this survives the ordeal of the Senate.

The Number of Car Wheels

An inquiry having come to us recently as to the approximate number of car wheels in the country, it is interesting to observe how close an approximation can be made by data readily accessible. The latest edition of *Poor's Manual* gives the number of cars reported by the steam roads of the country as follows:

Passenger	36,245
Baggage, mail and express	13,449
Freight	2,180,324
Total	2,230,018

The above shows the number of cars at the end of the fiscal years of the railroads, June 30, 1909, for the majority, but on December 31, 1909, for quite a number. The *Railway Age Gazette* statistics of car building show the following:

1909	96,419
1910	185,357

It may be assumed that the equivalent of a year

and a half increase has occurred since *Poor's* total of 2,230,000 cars was compiled; and as few cars have been abandoned it is safe to add 200,000 to the figure, making 2,430,000 cars for the present. There are no statistics on the number of privately owned cars, but from a private estimate made some time ago by one in perhaps the best position to know, it may be estimated that at present there are about 150,000 privately owned cars running on the steam roads. We have then 2,580,000 cars running on the steam roads, the number being subject to only a small probable error. At eight wheels per car, we should have 20,640,000 wheels.

There are about 60,000 locomotives on the steam roads, some with truck wheels and all with tenders, most of which are double truck. An allowance of eight wheels per locomotive (driving wheels not being considered at all) is probably close, making 480,000 more, or a grand total of 21,120,000 wheels on the steam roads. Taking account of spare wheels, the total may be put at about 21,500,000, and it seems improbable that the actual number in existence on the steam roads of the country is as low as 21,000,000 or as high as 22,000,000.

Nothing like similar accuracy can be expected in estimating the number of wheels on electric lines, mine, logging and other industrial railroads, &c., but we may experiment by assuming for argument that there are the equivalent of 75,000 electric cars of eight wheels and 100,000 industrial cars of four wheels, which numbers would give us precisely 1,000,000 more wheels, so that the doubt in estimates as to such wheels cannot greatly affect the total, and we may therefore put the grand total of all car wheels and wheels on locomotives other than driving wheels at between 22,000,000 and 23,000,000.

The total weight of these wheels is not susceptible of such close estimation. While the standard wheels average a trifle more than three to the gross ton, there are many smaller wheels which may run four, five, and in some cases more, to the ton. If we divide our 22,500,000 wheels into three classes of 7,500,000 wheels each, and take the first class at three to the ton, we get a weight of 2,500,000 gross tons; taking the next class at $3\frac{3}{4}$ to the ton, we get 2,000,000 tons, and taking the last at five to the ton, we should get 1,500,000 tons, making a total of 6,000,000 tons. The data were taken somewhat arbitrarily, to arrive at round figures. The actual weight is perhaps in excess of 6,000,000 gross tons.

Correspondence

Safeguarding Against Fire

To the Editor: Your editorial of April 13, "Awakening to the Danger of Fire," calls attention to actual conditions amounting in some cases to almost criminal negligence. But many manufacturers, especially in the metal trades, cannot be appealed to from the loss of life standpoint, because in the spread-out single-story factory there is not the element of personal danger present in the many-storied factory buildings of a great city.

The pocketbook nerve of all factory managers is very sensitive, and all of them should be open to argument via that channel. Doubtless the reason that so many plants are inadequately safeguarded against fire is that their managers think "What's the difference? I'm fully protected by insurance." But what factory really is fully protected by insurance? Suppose the insurance is sufficient to replace all stock, shop equipment and factory

buildings. What about the future time when an old customer orders repairs and has to be told "Those obsolete patterns were destroyed in our recent fire?" What will cover the loss of shop records? What will pay for the loss of trade by interruption to business?

Fire extinguishers throughout the plant, fire companies organized among the employees, and a complete automatic sprinkler system will not only pay for themselves in reduced insurance rates, but will do much to provide stability of output, which is one of the greatest assets of a live manufacturing plant.

HENRY M. WOOD.

CINCINNATI, OHIO.

The Annealing of Malleable Castings

To the Editor: I would like to ask a few questions pertaining to the article, "Annealing Malleable Castings," by W. P. Putnam, in your issue of March 23. The very first paragraph leads me to judge that all you have to do is to put a charge in the furnace, melt it, and have a good annealer. Presto! Do different classes of malleables require different mixtures? Does one need no "skill," no "judgment" to tell "burnt iron," or hot iron, when the mixture is ready for pouring?

Let us rearrange the table showing "results of annealing bars of the same composition in different foundries," according to their tensile strengths, those omitted having no temperature given:

No.	T. S.	Temp. F.	Hrs.	Total carbon.
10.....	50,849	2,200	96	0.40
8.....	47,336	1,620	208	0.80
7.....	45,213	1,700	144	1.32
2.....	44,034	1,700	144	1.94
1.....	40,996	1,450	112	1.49
6.....	40,408	1,650	72	1.71
3.....	39,638	1,620	101	1.47

The author says: "It will be noticed that in each case under too high a temperature or a long period of annealing, the carbon was nearly all removed. Either practice is wasteful and produces *poor* malleable for *some* purposes." The first two bars show the greatest tensile strength and the lowest total carbon, one annealed at a high heat, the other for a long period. Will many consumers object to such a fault? And for what purposes are such malleable castings poor?

Will Mr. Putnam give an explanation for bars Nos. 7, 1, 6 and 3 being lower in total carbon than No. 2? No one of these bars was annealed at a greater heat or for a longer period than No. 2. If all castings to be machined are to have different treatment from that given others, then should all such be accumulated for one oven? Wouldn't this mean a delay to all in a small plant? What is the "different treatment"?

In the chart "proper finishing temperature for the annealing of white iron in relation to carbon contents," that for the sample bars sent to 11 different foundries is 1575 degrees F. And 10 of the 11 exceeded this from 45 to 625 degrees, and yet produced a malleable with tensile strength 40,000 to 50,849, with other physical properties relatively good!

If a scissor block and car coupler are the same carbon contents, do they require same temperature and time? Spade steps and hydraulic jack castings, too? Does the carbon content above fix the "critical and proper annealing temperature" and the time?

I agree that this department has often been neglected, but argue that the mixing and melting are more important factors—the pivot point in the plant—and that practical experience shows many fallacies in theory.

INQUIRER.

Lake Ore Prices and the Furnaceman's Situation

To the Editor: There can be no real bargain unless it has reciprocal advantages. The seller must make something and the buyer must make something. Should all the bargain in the iron business be one way, it would not be long until there would be serious trouble. If all the consumers were able to buy iron at less than it cost the furnaces to produce it, they might think they were driv-

ing a good bargain for themselves. But little by little they would force the furnaces into bankruptcy, leaving themselves at the mercy of a few of the stronger furnaces, and presently they would see iron prices at such a mark that they themselves would be in serious trouble.

At the present time there is no real bargain in lake ores. The ore men have managed to hold their ores at such a price that, while there is a very handsome profit indeed to the miners, the iron masters cannot make iron at a price that the market will take. The merchant furnaces depending on outside sources for their ore are literally, with the low prices for iron, between the devil and the deep blue sea. They are caught between the upper and lower millstones. They are not getting a reciprocal deal. Competition is the life of trade and reciprocity is the long life of trade. In ore there is neither competition nor reciprocity, and the situation is one that is well-nigh unbearable.

SOUTHERN OHIO FURNACEMAN.

The Steel Corporation's Annual Meeting

The annual meeting of the United States Steel Corporation was held at Hoboken, N. J., April 18, Chairman E. H. Gary presiding. The stockholders approved and ratified all purchases and contracts made by the directors and Finance Committee since the meeting a year ago. The following directors were elected for a term of three years: George F. Baker, W. E. Corey, John F. Dryden, Clement A. Griscom, Samuel Mather, D. G. Reid, Henry Walters, and Gardiner M. Lane. Mr. Lane was elected to succeed the late Nathaniel Thayer. He is a member of the firm of Lee, Higginson & Co., bankers, New York.

A total of 1,924,821 shares of preferred stock and of 2,900,671 shares of common stock was voted, or altogether 4,825,492 shares.

Charles A. Cabot of Boston introduced a resolution for a committee of five to investigate certain statements published in a magazine referring to labor conditions in the plants of the Steel Corporation. The article was entitled "Old Age at Forty." Chairman Gary, in reply to Mr. Cabot, said that while the article was unfair, unreasonable and partisan, and the motive in publishing it was not good, he favored the resolution. Representing by proxy a large majority of the stockholders, he would vote for the appointment of a committee of five stockholders to investigate and report its findings to the Finance Committee.

The directors of the Corporation will meet on the last Tuesday of April and elect officers, including the Finance Committee.

The National Radiator Company's Eastern Plant

Improvements and extensions are being made to the plant at Trenton, N. J., recently purchased by the National Radiator Company of Johnstown, Pa., where the Solace and Novus radiators for the Eastern market will be made. The property is on the main line of the Pennsylvania Railroad, and consists of 13 acres of land on which there is now a foundry building, 110 x 225 ft., equipped with two cupolas, &c. There is also a warehouse, 90 x 200 ft., and two new brick buildings recently completed, one 50 x 100 ft., to be used for a cleaning and testing department, and the other, 50 x 175 ft., to be used for core making purposes. A new power house, 60 x 75 ft., is to be built, which will contain the boiler equipment for supplying an engine of 225 hp., yet to be purchased.

It is expected that the Eastern plant will be ready for operation about the middle of June, and is to be under the management of Charles N. Tull. While the extensions to the plant are being made, and preparations pushed for its operation, the patterns, flasks and other equipment are being made at the Johnstown plant, and will be shipped to Trenton so as to be available for use as soon as the new plant is ready for operation.

Customs Decisions

Bayonets

For tariff purposes bayonets are "side arms." This is the conclusion reached by the Board of United States General Appraisers after the consideration of testimony submitted in a test case arising under the tariff acts of 1909 and 1897. The American Express Company and C. Hirsch & Sons Iron & Rail Company are the importers. Duty was assessed on all of the goods as "side arms," some at the rate of 35 per cent. under the act of 1897, and on the others at 50 per cent. under the present act. The importers alleged the bayonets are dutiable property at 25 per cent. under the tariff acts of both 1897 and 1909 as "parts of" muskets or rifles. General Appraiser Fischer, in his decision for the board, says that he thinks the evidence shows conclusively that the bayonet is worn at the side in a scabbard when not attached to a firearm.

Forged Iron Ladles

When the present tariff was framed a departure was made from the language used for "forgings" in the previous tariff. This has resulted in a protest by the Johnston-Morehouse-Dickey Company, Pittsburgh. The goods in controversy are invoiced as best iron ladles, and were assessed for duty at 45 per cent. under paragraph 199, act of 1909, as manufactured articles, not specially provided for, composed wholly of metal. The claim of the importers is that they are dutiable at only 30 per cent. of their value, under paragraph 123, as "forgings of iron." The ladles are made by a forging process from Swedish iron, and are used in the handling of molten metal. Subsequent to the process of forging they are more or less manipulated or tooled to remove the rough edges. According to the record, the ladle as forged had an elongated end somewhat like a handle, which has in part been cut off. After importation a handle is to be welded to the article to complete it. It is pointed out in the board's decision that the present act's provision for forgings is materially different from a clause in the corresponding act of 1897. The existing tariff extends the meaning of the term by the phrase "of whatever shape or whatever degree of manufacture." On this point, the decision says: "It is evident that the change in the language was for the purpose of limiting 'forgings' to such as are not processed beyond the original forging." The protest is overruled.

Nut Locks

The competition between German and American manufacturers of nut locks has resulted in a suit before the Board of United States General Appraisers, having for its object the raising of the tariff classification on this line of goods. The American manufacturers claim that German made nut locks are being put on the market here at prices below the cost of manufacture in this country. The test case now before the board stands in the name of the Motor Car Equipment Company. The Treasury Department having ordered collectors of customs to classify nut locks under paragraph 199 of the act of 1909, as "manufacturers of metal not otherwise provided for," objection is made by the importing interests and users of the goods in this country. The Motor Car Equipment Company contends that they should be returned for duty at three-quarters of 1 cent a pound under the tariff provision for "washers."

Several witnesses for the Government have testified that, although the domestic industry is of large proportions, the contention of the importers, if granted, would mean its extinction. They brought out clearly the difference between a nut lock and the article usually referred to as a washer. The nut locks in controversy are made from wire with a spring temper. The witnesses testifying in favor of the higher duty included representatives of the National Lock Washer Company and Positive Lock Washer Company, both of Newark, N. J.; Riverside Steel Spring Company, Riverside, N. J., and Hobbs Mfg. Company, Worcester. The board will render a decision shortly.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

Apr 19, Apr 12, Mar 15, Apr 20,

PIG IRON, Per Gross Ton

	1911.	1911.	1911.	1910.
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$17.75
Foundry No. 2, Valley furnace.....	13.75	13.75	13.75	15.50
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00	12.00
Foundry No. 2, local, Chicago*.....	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa.....	15.25	15.25	15.25	17.50
Basic, Valley furnace.....	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	18.40
Gray forge, Pittsburgh.....	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago.....	17.50	17.50	17.50	19.00

COKE, CONNELLSVILLE,

Per Net Ton, at oven:

	1.60	1.60	1.55	1.70
Furnace coke, prompt shipment.....	1.75	1.75	1.75	1.90
Furnace coke, future delivery.....	2.00	2.00	2.00	2.50
Foundry coke, prompt shipment.....	2.25	2.25	2.25	2.75
Foundry coke, future delivery.....				

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh.....	23.00	23.00	23.00	26.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia.....	25.40	25.40	25.40	30.00
Wire rods, Pittsburgh.....	29.00	29.00	29.00	32.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.50	14.50	15.50	18.50
Iron rails, Philadelphia.....	17.50	17.50	18.50	20.50
Car wheels, Chicago.....	13.25	13.25	13.25	16.50
Car wheels, Philadelphia.....	13.25	13.25	14.00	16.00
Heavy steel scrap, Pittsburgh.....	12.75	13.25	14.25	16.25
Heavy steel scrap, Chicago.....	11.50	11.50	12.00	14.25
Heavy steel scrap, Philadelphia.....	13.25	13.50	14.00	16.00

FINISHED IRON AND STEEL.

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.....	1.35	1.37½	1.37½	1.50
Common iron bars, Chicago.....	1.25	1.25	1.27½	1.50
Common iron bars, Pittsburgh.....	1.35	1.35	1.35	1.60
Steel bars, tidewater, New York.....	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York.....	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York.....	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York.....	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.....	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.....	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh.....	1.70	1.70	1.60	1.85
Barb wire, galv., Pittsburgh.....	2.10	2.10	2.10	2.15

METALS, Per Pound:

Lake copper, New York.....	12.37½	12.37½	12.50	13.25
Electrolytic copper, New York.....	12.12½	12.12½	12.25	12.80
Spelter, New York.....	5.50	5.50	5.65	5.60
Spelter, St. Louis.....	5.30	5.30	5.50	5.45
Lead, New York.....	4.45	4.45	4.37½	4.40
Lead, St. Louis.....	4.30	4.30	4.22½	4.25
Tin, New York.....	71.70	42.25	39.75	33.05
Antimony, Hallett, New York.....	8.75	9.00	9.25	8.25
Tin plate, 100-lb. box, New York.....	\$3.94	\$3.94	\$3.94	\$3.84

* This price is at furnace and not delivered in Chicago.

† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras

as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zeos, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16 in. on thinnest edge.....	\$0.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.	—Steel.	—Iron.
	Black. Galv.	Black. Galv.	Black. Galv.
1 to 1½ in.....	75	63	49
1½ in.....	79	69	55
¾ to 1½ in.....	79	69	55
2 to 3 in.....	80	70	56
2 in.....	76	66	52
2½ to 4 in.....	78	68	54
4½ to 6 in.....	77	67	53
7 to 12 in.....	75	59	51
13 to 15 in.....	51½		
Butt Weld, extra strong, plain ends, card weight.			
¼, ½, ¾ in.....	69	59	55
1 in.....	74	68	60
¾ to 1½ in.....	78	72	64
2 to 3 in.....	79	73	65
Lap Weld, extra strong, plain ends, card weight.			
2 in.....	75	69	51
2½ to 4 in.....	77	71	53
4½ to 6 in.....	76	70	52
7 to 8 in.....	69	59	55
9 to 12 in.....	64	54	50
Butt Weld, double extra strong, plain ends, card weight.			
¼ in.....	64	58	54
¾ to 1½ in.....	67	61	57
2 to 3 in.....	69	63	59
Lap Weld, double extra strong, plain ends, card weight.			
2 in.....	65	59	51
2½ to 4 in.....	67	61	53
4½ to 6 in.....	66	60	52
7 to 8 in.....	59	49	55

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld (Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.

2, 2½ to 4 in. Lap Weld

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

	Steel.
1½ to 2½ in.	65
2½ in.	67½
2½ to 3½ in.	70
3½ to 4½ in.	71½
5 and 6 in.	75
7 to 13 in.	62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29 to \$30 per gross ton. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12	12½	13	14	15	16
Annealed.	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30	
Galvanized.	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90	

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser.	80
10 to 18.	80 and 10
19 to 26.	80 and 10 and 2½
27 to 36.	80 and 5
Galvanized:	
9 and coarser.	75 and 10
10 to 16.	75 and 10
17 to 26.	72½ and 10
27 to 36.	72½
Coppered or Liquor Finished:	
9 and coarser.	75 and 10
10 to 26.	75 and 10
27 to 36.	70 and 10 and 5
Tinned:	
6 to 18.	75 and 10 and 10

Pittsburgh

PARK BUILDING, April 19, 1911.—(By Telegraph.)

Pig Iron.—No important inquiries are out for pig iron, and only a few small lots are being sold, of not over 300 tons. Several blast furnaces in this district and in the valleys will go out the coming week on account of the lack of demand. Prices are largely nominal, as not enough business is being offered by consumers to test the market. We quote Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Prices on both Bessemer and open hearth steel are not as firm as they were. Open hearth billets and sheet bars are being offered by dealers in small lots for prompt shipment at about \$1 per ton under regular prices. As nearly all consumers are covered by contract, there is very little new demand, but specifications are not coming in as freely against contracts, especially from the sheet mills, as they were some time ago. The larger steel mills are still quoting regular prices, which they claim they are holding firmly, as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1½-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

The quietness existing in the iron trade for some months is even more pronounced. April has been a distinct disappointment so far, new orders and specifications against contracts showing a large falling off as compared with the first half of March. There is nothing in sight that indicates early betterment, and while prices of finished products in the main are being fairly well observed, this is largely for the reason

that hardly enough new business is being offered to test them. Consumers are not inclined to make contracts, even when offered the privilege of doing so, for last quarter delivery. There is a distinct feeling that it is going to take strong efforts to maintain the present level of prices, and consumers are not running any risks of a decline. Further declines in iron and steel scrap have taken place, with practically no business offering.

Ferromanganese.—The market has been quiet the past week, the only reported sale being one of about 400 tons for third quarter delivery, at about \$36.50, Baltimore. We quote 80 per cent. foreign at \$36.50 to \$36.75 in large lots and \$37, Baltimore, in small lots, the rate for delivery to the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—No sales are reported, and prices on 50 per cent. are weak and lower. We quote 50 per cent. at \$53 to \$53.50, f.o.b. Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—We quote best grades of muck bar made from all pig iron at nominally \$29, delivered at buyer's mill in the Pittsburgh district. No sales have been reported in this market for some time.

Skelp.—Few new orders are being placed, and consumers are still holding up shipments, as they are not running their pipe and tube mills to full capacity. In spite of the light demand, prices are quite firm, and we quote grooved steel skelp at 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—A local maker reports a sale of about 800 tons of open hearth rods of special quality, at a price equal to about \$29.75, Pittsburgh, the premium of 75c. a ton having been paid for a specific guaranteed analysis. We quote Bessemer, open hearth and chain rods of ordinary carbons at \$29, Pittsburgh.

Steel Rails.—The Baltimore & Ohio Railroad will double track parts of its line to Chicago, and is said to be in the market for about 7500 tons of standard sections. The Carnegie Steel Company continues to receive some fairly large orders for standard sections and light rails for export. A good part of the product of its Edgar Thomson mills has been going abroad for some time. This interest also reports new orders and specifications for about 3200 tons of light rails in the past week. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—An eight-story hotel is to be built at Youngstown, Ohio, which will take 2000 tons or more of steel. The Atlantic Coast Line has placed 1100 tons with the McClintic-Marshall Construction Company. Other local work in sight includes a steel bridge from Woods Run to McKees Rocks, Pa., across the Ohio River. A fair amount of work is being placed, but it is said it is being taken in some cases at cost, or below, for the fabricating. We quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Plates.—The Pittsburgh & Lake Erie Railroad has at last bought 1000 steel coke cars, 80,000 lb. capacity, from the American Car & Foundry Company and 1000 composite gondola cars, 100,000 lb. capacity, from the Pressed Steel Car Company. The Texas Company has placed 200 tank cars with the American Car & Foundry Company, and the Spokane, Portland & Seattle Railroad 14 baggage and mail cars with the Pressed Steel Car Company. The Youngstown Car Mfg. Company has received an order for 50 25-ton steel cars for the United Fruit Company of Costa Rica. The general demand for plates is dull, and none of the larger mills is operating to more than 50 or 60 per cent. of capacity. We quote ¼-in. and heavier plates in the wide sizes at 1.40c., but on the narrower sizes it is stated that a few mills are slightly shading this price.

Sheets.—A fairly well attended meeting of the sheet mills was held in Pittsburgh last week, at which present conditions in the sheet trade were thoroughly discussed. Reports showed that in certain sections some mills were shading prices, but it was pointed out that to lower prices under present conditions would not stimulate the demand, but would simply make worse the existing unsatisfactory conditions. Present prices were reaffirmed, all mills represented agreeing to maintain the regular schedule. Prices in effect on black, galvanized and roofing sheets are printed on a previous page. The Hyde Park plant of the American Sheet & Tin Plate Company, containing six hot mills, was

THE IRON AND METAL MARKETS

started last week, the output of sheets being shipped to Vandergrift, Pa., for galvanizing.

Tin Plate.—The new demand is very dull, and there has been a distinct slowing up in specifications. This is hardly understood by the tin plate mills, as usually at this season specifications are very active. The American Sheet & Tin Plate Company is operating some of its larger mills only four days a week, while a number of independents are running at a lighter capacity, owing to the falling off in new demand and specifications. The American Sheet & Tin Plate Company will add 10 new tinning stacks to its tin plate mill at Ellwood, Ind. We quote 100-lb. cokes for delivery through the third quarter at \$3.70 per base box, Pittsburgh.

Bars.—Both iron and steel bars are quiet, few orders coming in from the car building interests, while the wagon and implement makers are only having a fair amount of new business, and are not specifying freely against their contracts. Prices on both iron and steel bars are weaker, but as yet there has been no distinct decline. We quote steel bars at 1.40c. and common iron bars at 1.35c., Pittsburgh.

Shafting.—There is a fair run of new orders, mostly for small lots, but specifications against contracts are not coming in well. Discounts on cold rolled shafting remain at 57 per cent. off in carloads and 52 per cent. in less than carloads, delivered in base territory, but in exceptional cases these discounts are shaded.

Spelter.—The market is weaker, and we quote prime grades nominally at 5.30c., East St. Louis, equal to 5.42½c., Pittsburgh.

Hoops and Bands.—Specifications against contracts are coming in at only fairly satisfactory rate, while the new demand is light and only for small lots. There is no disposition on the part of the consumers to carry heavy stocks. We quote steel hoops at 1.45c. and bands at 1.40c., extras on the latter being charged as per the present steel bar cards.

Merchant Steel.—New orders and specifications show a heavy falling off, as compared with the first half of March, and shipments by the mills this month will no doubt be much lighter than last month. The new demand is from hand to mouth. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—The market on both structural and boiler rivets is practically open. In a general way structural rivets are now quoted at 1.85c. to 1.90c. and boiler rivets about 1.90c., but on some recent orders these prices were very materially shaded.

Wire Products.—There has been a decided slowing up in the new demand, and specifications so far this month have been much below those received in the first half of March. The mills, however, have a good deal of business on their books for delivery over the next month or two. It appears that a very limited amount of new business in wire nails and wire has been placed with the mills since the last advance in prices was made. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.70, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—Specifications against contracts and new orders so far this month are much below those of the last half of March, but this is explained by the fact that an advance of 5c. per keg went into effect April 1. New inquiries are light and are only for small lots to cover actual needs. The base price of railroad spikes is \$1.60.

Merchant Pipe.—No large oil or gas lines are actively in the market, and the general demand for merchant pipe is only fairly active. However, it can be said that present conditions in the pipe trade are more satisfactory than are most other finished lines. It is stated that regular discounts on both iron and steel pipe are being absolutely maintained.

Boiler Tubes.—Most consumers of boiler tubes are covered by contracts up to July 1 or longer, against which specifications are coming in at a fairly satisfactory rate. The new demand is light and only for small lots. A new list of discounts and also a new classification of sizes were recently put into effect, and are printed on a previous page.

Coke.—Most consumers of blast furnace coke are covered by sliding scale contracts, but several furnaces that are not covered with a regular supply are buying from month to month. A sale of about 10,000 tons of standard blast furnace coke for May delivery is reported at \$1.65 per net ton at oven. The output of coke in the Upper and Lower Connellsville regions last week was 362,769 net tons, a decrease over the previous week of 6000 tons. We quote standard makes of 72-hour foundry coke at about \$2 for prompt shipment and \$2.25 to \$2.40 per net ton, at oven, for delivery

over the remainder of the year. We quote standard makes of furnace coke for prompt shipment at \$1.60 to \$1.65, and for delivery over the next six months from \$1.80 to \$2 per net ton, at oven.

Iron and Steel Scrap.—A heavy tonnage of iron and steel scrap was sold by the Pennsylvania and the Baltimore & Ohio railroads last week, most of it going directly to consumers. The prices obtained were much lower than on previous lists. In addition to the embargo on scrap routed for Monessen, Pa., there is also an embargo at Follansbee, W. Va., and this is helping to force down prices, especially on heavy melting scrap. There is absolutely no new buying, most consumers having all the scrap they will use in the next month or two. Heavy steel scrap is now being offered at a lower price than was in effect prior to the upward movement which took place early in February. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	\$12.75 to \$13.00
No. 1 foundry cast	13.75 to 14.00
No. 2 foundry cast	12.75 to 13.00
Bundled sheet scrap, at point of shipment	9.00 to 9.25
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	14.50
No. 1 railroad malleable stock	12.50 to 12.75
Grate bars	10.50 to 10.75
Low phosphorus melting stock	16.75 to 17.00
Iron car axles	24.25 to 24.50
Steel car axles	18.50 to 18.75
Locomotive axles	23.00
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.50 to 13.75
Short bar crop ends	18.50 to 18.75
Cast iron borings	8.75 to 9.00
Machine shop turnings	9.25 to 9.50
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.25
Stove plate	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, April 19, 1911.—(By Telegraph.)

Business conditions in almost every branch of commercial activity are at direct variance with the basic conditions that should dominate. Never in the history of North America have crop prospects been brighter. The splendid probabilities in agricultural districts were still further improved this week by generous rainfall in practically every agricultural section of the United States. Wire and cast iron pipe activity reflects this good condition in the country, yet practically every other item of this market report is, to say the least, quiet. It seems to be a battle between natural and man-made forces.

Pig Iron.—Conditions in the pig iron market are still inactive, though the week under review has brought out a few inquiries which seem to be more than feelers. A Chicago investor is reported to be in the market for between 1000 and 2000 tons of No. 2 analysis, with every prospect of purchasing what he believes to be a good investment. A prominent manufacturer of pipe fittings and plumbers' supplies is inquiring for 1500 tons, 1000 tons of which is No. 2 analysis and 500 tons high silicon. An Illinois manufacturer of agricultural implements is reported to be in the market for 800 tons, half of which is No. 2 soft and half No. 3 foundry. Some sales have been made, though none of very large tonnage has been closed. The aggregate total is, however, much better than reported in the preceding two weeks. Business is still very slack among jobbing foundries. An opinion seems to prevail among buyers that prices are low enough, but the disposition to await developments is holding back considerable business that would probably be placed under normal conditions. Southern iron is still quoted at \$11. Birmingham, for early delivery, and this price has been extended to deliveries running through the entire last half. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace, the minimum quotations being for April, May and June shipment and the maximum for third quarter delivery:

Lake Superior charcoal	\$17.50 to \$18.00
Northern coke foundry, No. 1	15.50 to 16.00
Northern coke foundry, No. 2	15.00 to 15.50
Northern coke foundry, No. 3	14.75 to 15.25
Northern Scotch, No. 1	16.00 to 16.50
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

THE IRON AND METAL MARKETS

(By Mail.)

Billets.—No sales of note have been made. The leading interest continues to maintain its established price of \$30.60, base, Chicago, on open hearth forging billets, and \$25.60, base, Chicago, on rerolling billets.

Rails and Track Supplies.—A fair tonnage of rails has come into this market in the past seven days, although mills are running far from full, and even if the inquiries now afloat should all materialize at one time they could probably be taken care of without any great delay. The Missouri, Kansas & Texas has placed its rail order, and 6000 tons were given to the leading interest. It is understood that the balance of this order, which amounted to about 8000 tons, was placed in the East and will be shipped by water to Texas points. The Burlington is in the market for considerable tonnage of standard sections, and the Pere Marquette will probably place its order for between 3000 and 4000 tons of standard sections in the near future. Light rails and track supplies continue active. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—Business has been decidedly quiet and there is a scramble every time a new letting appears in this market. The most important deal closed this week is the Otis Building in Chicago, which was let to the American Bridge Company. This structure will consume approximately 8000 tons of steel. The general contract for the new plant of the American Brake Shoe & Foundry Company was awarded to the Lackawanna Bridge Company and the construction of the buildings will be begun at once. There is no life or snap to business, and it is rumored stronger than ever that price concessions are the rule of the day. Western railroads are doing practically no buying, and their bridge work seems to be at a standstill. We quote plain material from mill 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Many rumors of price cutting on plates are afloat, but it is felt that concessions will do little toward brightening the market, and the principal producers are firmly maintaining prices. We quote mill prices 1.58c. to 1.63c.; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—With but a small amount of business in sight, mills continue to run at about two-thirds capacity. Prices are being maintained by the power of producers rather than by strength of demand, and continue for Chicago as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Both bar iron and steel are inactive. Agricultural purchases seem to have been pretty well made and railroads are furnishing but a small portion of the usual business that emanates from this source. Mills are running a little better than half capacity and the general market is weak. Prices are as follows: Soft steel bars, 1.58c.; bar iron, 1.25c. to 1.30c.; hard steel bar rolled from old rails, 1.30c. to 1.35c., all Chicago; from store, soft steel bars, 1.80c. to 1.90c., Chicago.

Wire Products.—The real rush of the spring trade in wire products is about over. As the warm weather advances northward, various sections of the country have taken up spring fencing, and smaller communities have resumed building activities that usually lie dormant in such places during the winter months. At the present time the very northernmost row of States are coming into the market, and Northwestern jobbers who have been somewhat behind those of the South are beginning to note improved trade in all kinds of wire products. Mills are still very active, and will be for some weeks, but it is now evident that the rush of spring business will be cared for without delays in shipments. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—Business has not been quite as active as for several weeks. There has been very little railroad buying, and no large municipal letting. Numerous small deals have been closed, however, the most important among these being 700 tons of water pipe to Grand View Height, Ohio, which went to the leading interest. Firmback, Ohio, has also placed its order for 400 tons of water pipe with the same company and will begin installing its water system at once. There has been little buying among the gas companies, though this is to be expected, as the season for large lettings of this nature is pretty well past. Prices remain

firm, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—Extreme quietness prevails in the scrap market. Mills have accumulated stock sufficient to supply anticipated wants for some little time and are being offered everything they need. Prices have continued to fall off here and there, though scarcely enough trading is being done to well establish values. Consumers are apparently not inclined to hammer prices down and when in need are buying at market quotations. An occasional sale gives evidence that the market still retains vitality, and between long pauses purchases of fair size have held out some little hope for the future. The Milwaukee Railroad sold its offering of 500 tons of car wheels at \$13.25. The enormous accumulation of the Santa Fe evidently failed to bring forth satisfactory offers, and we may expect to hear from this list again. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows, per gross ton:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	13.25 to 13.75
Old steel rails, less than 3 ft.....	12.75 to 13.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 24.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.75 to 12.25
Shoveling steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.50 to 11.00
Steel knuckles and couplers.....	10.50 to 11.00
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	7.75 to 8.25
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	8.25 to 8.75
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.50 to 10.00
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	9.75 to 10.25
Pipes and flues.....	8.25 to 8.75

Philadelphia

PHILADELPHIA, Pa., April 18, 1911.

Outside of negotiations pending for low grades, the pig iron market is practically at a standstill. In finished products the demand is quieter, although considerable small fabricated work in both buildings and bridges is being figured on, but prices are ragged, competition being keen. No improvement in the demand for billets or sheets is reported. Refined iron bars are dull and prices have slightly receded. Old materials are easier.

Iron Ore.—Consumers are showing little interest in the market, and a suspension of any important business in foreign ores is expected until something more definite regarding lake ore prices is learned. Importations at this port during the week ending April 15 included 6515 tons of Spanish and 5300 tons of Cuban ore, valued in the aggregate at \$27,149. Importations of Cuban ore at Baltimore in March totaled 63,300 tons. The first of the season's shipments of Wabana (Newfoundland) iron ore by the Nova Scotia Steel & Coal Company, Ltd., to Philadelphia will arrive next week. The new steamship Tellus, carrying 12,000 tons, will transport the initial cargo, consigned to several eastern Pennsylvania furnaces.

Pig Iron.—The market has been practically bare of any important development. The lack of new business is not causing producers in this district any particular anxiety, as they are shipping freely against orders already in hand, and, on the average, deliveries have been in excess of the current make. The majority of the producers report decreasing stocks. Consumption is believed to be on a somewhat better basis, evidenced by the increasing volume of instructions for urgent deliveries. Last week was one of the duller that the trade has experienced for a long time. Buyers and sellers are still inclined to await developments before entering on any important negotiations on which the delivery covers the third quarter and last half of the year. Some moderate sales of foundry grades, on which delivery extends into the third quarter, are reported at prices now prevailing for second quarter delivery. The most important negotiations under way at this time are in low grade irons. The cast iron pipe interests are still considering purchases, but there is a considerable difference of opinion regarding prices. With Northern low grade for second quarter delivery scarce, sellers do not show any disposition to meet buyers' views. The bulk of the actual business transacted in this market recently

THE IRON AND METAL MARKETS

has been in the higher foundry grades, pretty generally confined to small prompt lots, for which the recent range of prices, \$15.50 to \$16, delivered in this vicinity, still prevails. For third quarter shipment sellers still refuse to make open quotations, although they do not seem so firmly disposed to anticipate a higher range than the present top of the market. On the other hand, consumers, while not expecting any lower quotations, are in a number of cases willing to take their chances if they cannot now purchase for third quarter at the present market. There has been no pronounced buying of Virginia foundry grades, and sellers are holding firmly at \$13, furnace, for No. 2 X and No. 2 plain grades, for shipment over the remainder of the second quarter, beyond which they are not yet willing to sell. Forge iron has been quiet. There is practically an entire absence of demand for steel making grades. Eastern consumers of basic iron show no interest in the market, while the movement in low phosphorus is along very narrow lines. The following range of prices represents the market for standard brands, delivered in buyers' yards, eastern Pennsylvania and nearby points, in the second quarter:

Eastern Pennsylvania, No. 2 X foundry	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain	15.25 to 15.50
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.75 to 15.25
Basic	15.25 to 15.50
Standard low phosphorus	21.50 to 22.00

Ferromanganese.—An inquiry from an Eastern mill for 500 tons for July-December delivery is in the market. There is still some uncertainty regarding prices, and while \$37, Baltimore, has been named for small lots, it is believed that that figure could be shaded 50c. a ton. Several sellers have, however, withdrawn from the market at the present price level.

Billets.—Week after week mills have reported business as of a hand-to-mouth character, and consumers appear to be satisfied to continue to buy in small lots for prompt delivery. Prices remain unchanged, \$25.40 being named for rolling billets, and \$30.40 for ordinary forging billets, delivered in buyers' yards in this vicinity.

Plates.—Mills report about the average number of orders, including considerable business in locomotive and boiler plates, but they are of rather small size, and the aggregate volume coming in is still below that of several weeks ago. There is a fair amount of new business in sight, particularly for boat steel, and with mills operating at 70 to 75 per cent. of capacity the situation is not as bad as it might be. The demand for plates for fabricated structural work continues rather good; in fact, business is said to be pretty generally distributed. Notwithstanding reports that concessions had been made in the West, prices of plates are firmly maintained in this district at 1.55c., minimum, delivered.

Structural Material.—Continued reports of low prices for fabricated work are current, and in some instances absurdly low figures have been said to have been named, but lacking confirmation. Nevertheless, at the prevailing prices of plain material a loss is evidently being taken on a considerable portion of the smaller jobs, on which there has been any marked competition. Under such conditions negotiations close slowly, and while fabricators are figuring on considerable work, the amount placed is small. There has been a moderate demand for miscellaneous plain material, for which prices are firmly maintained, at 1.55c., minimum, delivered in this territory.

Sheets.—In a number of instances Eastern makers' mills are again operating at full capacity, the general run of orders being somewhat heavier, but there is still an absence of forward business and makers are unable, as a rule, to figure more than a week ahead. Eastern mill quotations for prompt deliveries are unchanged and named as follows: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Coke.—While a few small contracts for the best grades of foundry coke have been made at the top of the market, \$2.40, at oven, sales of what is reported as good coke have been made for prompt shipment at \$2, at oven. There is little demand for forward furnace coke, the bulk of the movement being for near future delivery, on which quotations range from \$1.55 to \$1.65, at oven. The following range of prices, per net ton, is named for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$3.70 to \$4.05
Foundry coke	4.15 to 4.55
Mountain furnace coke	3.30 to 3.65
Foundry coke	3.75 to 4.15

Bars.—The demand for refined iron bars has been lighter and mills show a greater anxiety for orders, as a result of which prices have sagged slightly. For the ordinary run of business 1.37½c. is still asked, but orders carrying desirable specifications have been taken at 1.35c., delivered in this district, and it is said that the latter figure has been shaded.

About 1.35c. to 1.42½c., delivered, represents the range of the market for general business. Steel bars are moderately active at unchanged prices, 1.55c., delivered.

Old Material.—Continued dullness, with weakening prices, represents the situation. Buyers show little interest in the market, and, while they take on occasional small lots, the business is usually done at a price concession. Choice No. 1 heavy melting steel to pass rigid inspection has been sold at \$13.75, delivered, several 1000-ton lots being reported, but under the ordinary classification this grade of material can be had at \$13.25, delivered. Rolling mill grades are quiet. In the majority of articles on the list hardly enough business has been done to establish quotations. The following range of prices, however, while to some extent nominal, about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap	\$13.25 to \$13.75
Old steel rails, rerolling	14.50 to 15.00
Low phosphorus heavy melting steel scrap	17.75 to 18.25
Old steel axles	20.00 to 20.50
Old iron axles	25.00 to 26.00*
Old iron rails	17.50 to 18.00*
Old car wheels	13.25 to 13.75
No. 1 railroad wrought	16.00 to 16.50
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire	11.75 to 12.25
No. 2 light iron	7.50 to 8.00*
Wrought turnings	8.75 to 9.25
Cast borings	8.25 to 8.75
Machinery cast	13.75 to 14.25
Railroad malleable	12.00 to 12.50
Grate bars	11.50 to 12.00
Stove plate	10.50 to 11.00

* Nominal.

Cincinnati

CINCINNATI, OHIO, April 19, 1911.—(By Telegraph.)

Pig Iron.—A local pipe foundry has ordered 1000 tons of Southern No. 3 foundry for practically prompt shipment. A southern Ohio steel company took 5000 tons of Northern basic for shipment running through the last half. A local melter bought 1000 tons of Northern No. 2 foundry for April and May. All the foregoing contracts are understood to have been taken at prices nearly corresponding to those quoted for prompt shipment. Other sales include 200 tons of Southern No. 2 foundry at \$11, Birmingham, and the same tonnage of Southern No. 1 soft at \$11.50, both for prompt shipment, to Indiana and Illinois territory, respectively. Carload orders show a marked decrease, and inquiries have dwindled to a very small number, with nothing in sight to indicate a change in the near future. It is stated that a central Western consumer, who was willing to take on a considerable tonnage of basic for future delivery, has now decided to await developments in the business situation. However, there seems to be a general undercurrent of optimism among both producers and consumers, which has doubtless tended to support spot shipment prices, and if there has been any cutting in the quotations of \$11, Birmingham, for Southern, and \$14, Ironton, for Northern No. 2 foundry, it is confined to a few limited lots, where special conditions prevailed, but contracts for the entire year can be made at present prompt delivery prices. For April-May movement 100 tons of Southern gray forge changed hands at \$10, at furnace. Malleable is dull and unchanged, at \$14 to \$14.25, Ironton. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	\$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	17.70
Lake Superior coke, No. 1	15.70
Lake Superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

(By Mail.)

Coke.—Practically all foundry coke consumers whose contracts expired April 1 have filled their requirements, and it will be at least 30 days before any new business is looked for from this source. There is also a falling off in the number of carload orders to fill immediate wants. Prices of foundry coke, however, remain the same, and \$2 per net ton, at oven, is quoted for prompt shipment and \$2.25 to \$2.40 for future delivery. One Wise County interest is asking the same price for prompt shipment, as it is willing to take on time contracts at, namely, \$2.25. Furnace coke, especially in the Connellsville field, is not quite so strong, and standard grades are obtainable for spot shipment at

THE IRON AND METAL MARKETS

\$1.50 to \$1.55 per net ton at oven, and from \$1.65 to \$1.70 on contracts. Wise County and Pocahontas furnace coke commands a few cents premium over the quotations given.

Finished Material.—Reports as to any concessions in prices cannot be confirmed here, although iron bars are reported as not being so firm. Structural material continues to move from warehouse stocks in small quantities, but there is some large local business in sight. Hoops and bands are not being contracted for freely. Railroad track material is moving a little better. We continue the mill quotation of 1.40c. and the average warehouse price of 1.90c., covering structural material, steel bars, plates, &c.

Old Material.—Dealers do not look for any early improvement in the market, and are very indifferent about making offers even on small lots of scrap. A number of them have about as much stock as they care to carry under present market conditions. No large lots of railroad scrap are being offered, and buying both on the part of the dealer and consumer is confined to small tonnages. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	10.00 to 10.50
Burnt scrap, net ton.....	7.50 to 8.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.50 to 8.50
Old iron rails, gross ton.....	14.00 to 15.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	11.50 to 12.50
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, April 18, 1911.

Iron Ore.—Prices for 1911 have not yet been named, but it is very probable that this question will be disposed of before the end of the present week. Indications are growing stronger every day that a reduction of 50c. a ton will be made on all standard ores. A meeting of the leading ore interests was held April 12, at which the situation was discussed, but definite action was deferred until another meeting. Two ore sellers that act independently of the others are making reservations, but are declining to name prices until the leading ore firms take action on the matter. Some tonnage of off grade ore has been sold at about last season's prices, but prices on these ores were quite low during 1910. The ore shipping season opened this week. The first cargo shipped from Escanaba is expected to arrive at a lower lake port late in the week. The Pittsburgh Steamship Company has notified its masters to have their boats ready to start by April 24. Some will be started this week and all will probably be in commission by May 1. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—The market shows little activity. Some foundry iron in small lots is being sold, but no inquiries of any size are coming out. Inquiries for 6000 tons of basic iron are pending. One is from southern Ohio for 3000 tons for the second quarter and the other is from Chicago for a similar tonnage for the third quarter. There is an inquiry from Sharon, Pa., for 500 tons of gray forge for the second quarter. Southern iron is held at \$11, Birmingham, for No. 2 for the second quarter, but it is believed that this price might be shaded on a round lot for spot shipment. Prices on Northern foundry iron are steady at \$14.25 to \$14.50, Cleveland, and Valley furnaces for No. 2 for the last half, and \$13.75 to \$14 for the second quarter. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.50
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—The market is very dull. Foundries are buying only in carload lots and generally are allowing their stocks to run low. Orders are mostly for quick shipment. There is no inquiry for furnace grades. We quote standard Connellsville furnace coke at \$1.60 to \$1.65 per net ton, at oven, for spot shipment, and \$1.75 to \$2 for the last half. Connellsville 72-hour foundry coke is held at \$2 for prompt shipment and \$2.25 to \$2.50 for the last half.

Finished Iron and Steel.—The demand shows a slight falling off in both new orders and specifications on contracts. Orders are nearly all for small lots. There is a fair demand for structural material, and local fabricators report an improvement in prospective work, for which bids have been asked. The Forest City Steel & Iron Company, Cleveland, has taken the contract for 350 tons of structural steel for a new building to be erected by the National Carbon

Company, Cleveland. The Toledo Bridge & Crane Company, Toledo, Ohio, has taken the contract for a new sugar plant to be erected by the Dyer Company, Cleveland, in Monte Vista, Colo. This will require 400 tons. Inquiries are out for the Commercial Building, Cleveland, that will take 400 tons of steel, and for the Free Press Building in Detroit. The demand for steel bars and plates is not active. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for sheets continues only moderate. Slight price concessions are being made by some of the independent mills. The rivet market continues weak, prices as low as 1.70c., Pittsburgh, being reported on boiler rivets. With the low prices going, the usual differential of \$2 a ton between boiler and structural rivets has practically disappeared. The demand for iron bars is very light. While the general quotation is 1.30c. to 1.35c., at mill, the lower quotation is not always being maintained. Jobbers are getting a fair volume of warehouse orders, but very little mill business. Railroad orders in this territory are very scarce.

Old Material.—The market continues very dull and prices are weaker. Consumers are offering from 50c. to 75c. a ton less for nearly all grades than a week ago. Dealers are accepting the lower prices for scrap on cars, but for shipment from yards are generally holding to recent quotations, so that at present only small lots can be bought at the prices the mills are willing to pay. Local mills refuse to offer over \$12 to \$12.25 for heavy melting steel, and we quote this grade 50c. lower than a week ago. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.50 to \$14.00
Old iron rails.....	16.00 to 16.50
Steel car axles.....	19.50 to 20.00
Heavy melting steel.....	12.00 to 12.50
Old car wheels.....	12.50 to 13.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.50 to 12.00
Railroad malleable.....	12.75 to 13.00
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are for net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 6.75
Iron and steel turnings and drillings... ..	7.25 to 7.75
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	10.50 to 11.00
No. 1 railroad wrought.....	13.00 to 13.25
No. 1 cast.....	11.75 to 12.00
Stove plate.....	10.75 to 11.00
Bundled tin scrap.....	11.00 to 11.50

Buffalo

BUFFALO, N. Y., April 18, 1911.

Pig Iron.—The market continues very dull, with light sales and limited inquiry, confined principally to last half requirements. While apathy is manifested by buyers, apparently little soliciting is being done by producers. The only sales reported run in small lots, and totalling but little over 1500 tons, foundry grades. One inquiry of about 3000 tons is pending since last week, and not placed as yet. Prices are unchanged. We quote as follows, f.o.b. Buffalo, for second quarter delivery:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 3 foundry.....	13.50 to 13.75
Gray forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Basic.....	14.25 to 15.00
Charcoal.....	16.75 to 17.50

Finished Iron and Steel.—A fair amount of trade in nearly all lines is reported by most of the sales agencies. Wire products are somewhat livelier than a week ago, and plain structural material shows an increasing demand for small and moderate sized jobs, of which there are a good number in hand. The Canadian export trade continues good, one order of 2000 tons of bar material being noted. Bids went in last week on 600 tons of steel for the McCurdy-Norvell department store, Rochester, and specifications will soon be out for bids for about 500 tons for a large manufacturing building to be erected by the Hickey-Freeman Company, also at Rochester. The Wurtz & Son Iron Works has received the contract for the fabrication and erection of the steel for the Lauber store and loft building, Broadway, Buffalo, and the Claremont apartment, Buffalo, each requiring about 100 tons, and the Lackawanna Bridge Company has taken the contract for the St. Mary's Academy building, Syracuse, 150 tons. The contract for the steel for a public school in Rochester, 100 tons, went to F. L. Hughes of that city.

Old Material.—Dull and stagnant conditions continue, and no new buying is noted, consumers apparently being out of the market for the present, notwithstanding that deliveries on a majority of contracts have been completed. Prices continue weak. The very small amount of business going is

THE IRON AND METAL MARKETS

entirely between dealers. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.00 to \$12.50
Low phosphorus steel.....	16.00 to 16.50
No. 1 railroad wrought.....	14.00 to 14.25
No. 1 railroad and machinery cast scrap..	13.50 to 14.00
Old steel axles.....	19.00 to 19.50
Old iron axles.....	22.50 to 23.50
Old car wheels.....	13.75 to 14.25
Railroad malleable.....	13.50 to 13.75
Boiler plate.....	10.50 to 10.75
Locomotive grate bars.....	10.75 to 11.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings...	6.50 to 7.00
Clean cast borings.....	6.00 to 6.25

St. Louis

St. Louis, Mo., April 17, 1911.

A little better inquiry for pig iron developed the past week and specifications on contracts are reported to be coming in satisfactorily. Some large coke buyers are in the market for considerable tonnages. The demand for finished iron, steel and metals is moderate. Bank clearings continue heavy, and there is a good degree of activity in building operations. Crop prospects in general in the Mississippi Valley and the Southwest are excellent.

Pig Iron.—Some of the leading brokers report a slight improvement in inquiry, but actual business has been no better; in fact, it is not probable that much over 1000 tons was sold in the aggregate last week, which is less than was mentioned in our last report. Nominally the market is unchanged and we quote for No. 2 Southern foundry, for shipment over the second quarter, \$11; for the last half, \$11 to \$11.50, Birmingham; for No. 2 Northern, shipment over the second quarter, \$14; for the last half, \$14.50, Ironton, Ohio.

Coke.—While the inquiry for coke is not general, there are a few large buyers in the market. One office reports an inquiry from a local steel foundry for 1500 tons, part foundry and part furnace. Another seller has an inquiry for a large tonnage of by-product coke, and a third mentions an inquiry from an outside consumer for 5000 tons of foundry for shipment over 20 months. The only sales of importance were 20 carloads to various parties. A firmer tone is noted. We quote for selected Connellsville 72-hour foundry, for shipment over the remainder of the year, \$2.25 per net ton, at oven; carload lots 25c. per ton higher.

Finished Iron and Steel.—The Missouri, Kansas & Texas Railroad has closed a contract for 100 miles of standard rails. No new inquiry is reported. The demand for light rails is moderate, coming principally from coal mining interests. The inquiry for structural material is better. For bars there is some demand from jobbers. Track material continues in fair demand.

Old Material.—There is no improvement in the demand from consumers and the market is exceedingly dull. No railroad lists were offered the past week. While the market is nominally unchanged, concessions from prices quoted would have to be made to effect sales. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.50 to \$14.00
Old steel rails, rerolling.....	12.25 to 12.75
Old steel rails, less than 3 ft.....	11.00 to 11.50
Relaying rails, standard sections, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	11.00 to 11.50
Frogs, switches and guards, cut apart..	11.00 to 11.50

The following quotations are per net ton:

Iron fish plates.....	\$11.00 to \$11.50
Iron car axles.....	17.00 to 17.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Railway springs.....	9.50 to 10.00
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushelling.....	9.50 to 10.00
No. 1 boilers, cut to sheets and rings..	8.00 to 8.50
No. 1 cast scrap.....	10.00 to 10.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad Malleable.....	8.50 to 9.00
Agricultural malleable.....	7.50 to 8.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	7.50 to 8.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00

Charles M. Day has been appointed to represent Hickman, Williams & Co.'s St. Louis office in the West and Southwest.

The Harry Benjamin Equipment Company, St. Louis, purchased at receiver's sale the entire equipment and property of the Covington & Southwestern (electric) Railway.

The Laclede Gas Light Company will erect an eight-story office building at the corner of Eleventh and Olive streets. The structure will have a frontage of 100 ft. on

Olive and 107 ft. on Eleventh street. It is the intention of the company to occupy most of the building when completed.

San Francisco

SAN FRANCISCO, CAL., April 12, 1911.

Notwithstanding a fair activity in some lines the situation in general is by no means satisfactory. Sales of most finished products since the first of the year have been below normal, and the increase which usually occurs during the spring has been much smaller than was confidently expected. Many of the larger consuming interests have failed so far to place any important orders, while the small trade is operating on a hand-to-mouth scale and there is a general reluctance to carry any stock for future requirements. In a few lines, however, there is considerable activity. Some very fair orders are being placed for water works and gas systems, and extensive development work is being carried on by the leading railroads, which are planning for still greater improvements in the future. Building is active in all coast cities, with indications of further improvement during the summer.

Bars.—The distributive trade in soft steel bars is dragging at about the same rate as last month. The small buyers through the country are taking only limited quantities and the larger consumers buy very little in excess of current needs. Stocks in local warehouses are fairly large and merchants are buying in a very limited way of domestic mills. Some foreign bars are being ordered to arrive, but this business also is of comparatively small proportions. The principal demand is for reinforcing material, for which foreign bars are used to a large extent. An increasing business in this line is expected, as a number of large concrete buildings are being figured in San Francisco and other coast cities. There is less firmness as to prices than before, owing to pressure to sell on the part of local manufacturers of iron bars. Bars from store, San Francisco, are quoted at 2c. for steel and 1.90c. for iron.

Structural Material.—Permits were issued last month for buildings at a valuation of \$2,090,703, making the best month's record since last July. The amount of class A construction, however, was very small, most of the work consisting of small brick and concrete structures. The total at Los Angeles is higher than in San Francisco, while the record of Oakland, Cal., was better than for any previous month except April last year. The situation at Portland, Ore., has been steadily improving since January, but building is rather quiet at Seattle, Wash. No local contracts of special interest have been awarded recently, but a considerable number of small orders are being taken by local shops, and figures will be taken shortly on some new municipal jobs. Eastern fabricators are showing little interest in municipal work in San Francisco, owing to the preference given to local shops. Several large steel buildings are talked of, but with a few exceptions the outlook is rather uncertain. A good demand for small work, however, is practically assured. The Southern California Edison Company, Los Angeles, is in the market for a lot of transmission towers. Reid Bros., local architects, are drawing plans for a 10-story bank building for Los Angeles. The Y. M. C. A. at Seattle, Wash., is planning an eight-story building, and the Pacific Tel. & Tel. Company is planning a large structure at Spokane, Wash. I. Gevurtz & Son, Portland, Ore., are having plans drawn for a large class A building at Fifth and Alder streets. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.65c.

Rails.—Light rail business is coming out in good shape, though some merchants are getting less inquiry than usual at this season. The movement of standard sections on small orders is about normal and there are indications of an increasing tonnage. There is some buying for interurban and street railroads, but new developments in this line are slow to materialize. The transcontinental lines, however, are securing franchises and rights of way which are believed to be the first steps in a plan for general development. The Sacramento Electric, Gas & Railway Company is planning to lay new rails on several streets this year. The Mt. Tamalpais Railway Company is preparing to extend its scenic road from West Point to Bolinas Bay. Gasoline motor cars are to be used on the new line.

Sheets.—The general distributive business is very quiet, though a number of good contracts have recently been taken by local sheet metal works. Merchants are buying in a very small way. A considerable tonnage will be required for pipe work in various parts of the coast during the summer.

Plates.—There is very little movement in the jobbing trade, but the tonnage recently booked by mill representatives is better than for some time and a number of new inquiries are coming up. Several large penstock jobs are to be let shortly, one being for the new power and water project of Tacoma, Wash. The Sacramento Electric, Gas & Railway

THE IRON AND METAL MARKETS

Company will erect a new gas holder, and a contract has been let for a gas tank at Petaluma, Cal. A new gas plant project has been started at Turlock, Cal. The Los Angeles Gas & Electric Company has let a contract to the Llewellyn Iron Works for a 65,000-barrel oil tank. The Standard Oil Company has secured a large tract of land near Los Angeles for the supposed purpose of building a new refinery. The Tacoma Gas Company will erect two tanks, with a total capacity of 1,000,000 cu. ft., and an increase in capacity is planned by the Spokane Gas Company.

Merchant Pipe.—Both merchants and mill representatives report business below normal. There is apparently some activity among the consuming trades and some improvement should appear before long, but at present there is a general tendency to keep supplies as small as possible. The movement to the oil fields continues light, the only notable inquiries having failed to produce any business. The National Tube Company has taken the municipal order for tubular trolley poles for the Geary street railroad.

Cast Iron Pipe.—The tonnage since the first of the month has been moderate, but small orders are fairly numerous and conditions are favorable for an active summer. Notable extensions are to be made to the gas systems of San Francisco and Los Angeles, as well as of several smaller towns. Many cities of the coast are making preliminary preparations for auxiliary systems for fire protection, though no business in this connection can be expected for some time. The water situation in San Francisco and Alameda County is unsettled, and competing corporations are giving more attention to sources of supply than to their distributing systems. Prices at Pacific Coast terminal points are \$34 per net ton for 6 to 12 in., \$35 for 4-in. and \$1 extra for gas pipe.

Pig Iron.—The local foundry trade remains dull, though there is considerable activity around Los Angeles and at several north coast points. Prices stand about as before, No. 2 Southern foundry iron being nominally quoted at \$21 to \$22, while importers ask \$23 for ordinary foundry grades of English, Continental and Chinese iron.

Old Material.—The demand for all classes of material is limited. The requirements of steel melting scrap on the coast have been smaller than was expected at the first of the year and the market is accordingly depressed, though a renewed demand is expected in the near future. Cast scrap receives little attention, but dealers have no large supplies on hand and the price is steadily maintained. Old rails and wrought scrap are quiet. Prices are quoted as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$11 to \$12; wrought scrap, per net ton, \$12 to \$15; re-rolling rails, per net ton, \$15.

Birmingham

BIRMINGHAM, ALA., April 16, 1911.

Pig Iron.—The trading in this market the past week was very light, and but little tonnage was added to order books by the sales made through Northern and Eastern offices. It is not believed, however, that the inactivity of the past weeks has yet been reflected in the movement from furnace yards. No mention has been made of requests that shipments against contracts now in force be withheld, and the condition now existing in the market is attributed to the uncertainty of prices rather than to the condition of the foundry trade. As far as can be ascertained, the attitude of the producing interests as to commitments for deliveries for the last quarter of this year has not changed, notwithstanding the lack of sales at the figures asked. The basis of \$11, Birmingham, is being freely quoted for third quarter shipments, with the exception of two concerns who refuse to accept any tonnage for shipment after July 1 at a lower price than \$11.50 for No. 2 foundry, but such figures, though probably acceptable by certain concerns, are not yet quoted for the last quarter. For the small lots placed last week the \$11 schedule was fully maintained, and no concessions from that basis are believed to be available except for high silicon iron, which can probably be had at a smaller premium over the No. 2 basis than had been asked. There has been no change in the asking prices for grades below No. 4 foundry, such grades being quoted at a differential of 25c. per ton on a No. 2 foundry schedule. The production of charcoal iron has been temporarily reduced by the blowing out of one furnace for repairs.

Cast Iron Pipe.—A contract for 5000 tons of water pipe for the city of Helena, Mont., is to be placed the coming week. An aggregate of some 1500 tons in comparatively small lots is also to be placed at an early date and the five miles mentioned in last report is still pending. With the placing of this tonnage it is believed that the plants now running will be well supplied with orders, and that higher prices than those now asked will be realized, notwithstanding

ing the unchanged prices of raw material. It is noted that the output in this district is still represented only by the operations of the United States and the American companies, with the dates for the resumption of operations at idle plants still undetermined. This fact alone has probably had more effect on the asking prices than any other feature connected with the market. With the volume of business in sight very satisfactory, we quote this market firm at the following prices, per net ton, f.o.b. cars here: 4 to 6 in., \$23; 8 to 12 in., \$22; over 12 in., average \$21, with \$1 per ton extra for gas pipe.

Old Material.—Considerably more interest was manifested in this market the past week than for some weeks previous, and the sales that were made were of such a nature as to afford to some extent a test of dealers' prices. The movement from the yards was confined largely to certain grades, but as the largest accumulations were affected it is believed that the market is considerably firmer as a result. We revise dealers' selling quotations as follows, per gross ton, f.o.b. cars here:

Old iron axes (light).....	\$14.50 to \$15.00
Old steel axes (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

The Hammond-Byrd Company of this city, dealer in pig iron, coal, coke and cast iron pipe, has opened an office at Chicago, Ill., with Chas. W. Badger, resident manager, which is temporarily located at 428 Ashland Block, and will after May 1 be located in the First National Bank Building. This company has also opened an office at San Francisco, Cal., in charge of C. H. Stanyan as resident manager.

The German Iron Market

BERLIN, April 6, 1911.

The iron market situation still remains involved in considerable uncertainty, but the general tendency appears to have grown somewhat better, notwithstanding evidence that points apparently to the contrary conclusion. Thus the latest reports agree in saying that the bar market has lately undergone a considerable improvement, so far as the amount of business done is concerned. For some time after the negotiations for the prolongation of the convention failed the market remained in a state of uncertainty regarding the probable effect of this event upon prices, and the tendency with consumers and dealers was to wait to see whether they might not be able to get better terms later on. Prices did break, indeed, but not so severely, at least for the home market, as had been anticipated; and now buyers are appearing in the market in considerably greater numbers.

Steel Bar Prices Lower

After the failure to renew the bar convention the mills of the southwestern district made an agreement not to sell below 105 marks; and this appears also to be about the price of the mills of the Steel Works Union in the Rhenish-Westphalian district, but it is asserted that bars can be bought at some establishments, even for the home market, at as low as 100 marks. For export the price free on board at Antwerp was as low as 94 marks, and even 92 marks, till about the end of March, but it is doubtful whether such low prices are now conceded, inasmuch as the export drawback expired with the expiration of the convention at the first of this month. This cessation of the drawback is likely to relieve outside markets of the pressure of German bars to some extent; it is supposed that this fact explains a firmer tendency in the Belgian bar market, with a slight increase in the export price. Belgian works have also just added 3 shillings to the price of beams for the English market.

The latter specialty and other structural shapes appear at length to be finding a readier market at home, the building season having at last opened up with considerable vigor. Specifications have been coming in much more briskly, and new ordering has been considerably more active since the Union adopted unchanged prices several weeks ago. A better export demand for this and some other specialties is reported. The Union continues to get foreign business in rails. Plates, both heavy and thinner qualities, are reported to be doing better. In band iron prices have been disturbed by mills outside of the trade combination and have dropped to 135 marks; the mills also have only light home orders, and have, therefore, been competing sharply for foreign or-

THE IRON AND METAL MARKETS

ders. They have beaten down prices abroad and even then find it difficult to get orders.

The Pig Iron Outlook

The pig iron trade is quiet. Buyers are in some cases trying to get in orders for 1912 delivery, but the furnaces are rejecting these, as they are disposed to await the result of the negotiations for prolonging the Essen Syndicate. It has been conferring again with the Siegen furnaces with regard to joining, but no apparent result can as yet be reported. The East German Pig Iron Syndicate has just been prolonged to the end of 1914. It seems probable that an effort will be made to effect an advance of prices along with the renewal of the Essen Syndicate, which lapses at the end of June. Whether such a rise can be carried through seems doubtful. A motion was made at a meeting of the syndicate a fortnight ago to raise prices at once, but it was voted down.

It seems probable that the production of pig iron will continue to expand. The Norddeutsche Hütte, which has been building blast furnaces near Bremen for several years, put them into blast this week. It has its own coke ovens; they were put into operation three weeks ago. Other concerns are building furnaces. It is reported that the Gutehoffnungshütte, one of the greatest establishments on the Lower Rhine, has bought an extensive site at Diedenhofen, Lorraine, with a view to erecting a large furnace and steel plant. It owns very high grade ore properties in the vicinity. It is also reported that Belgian furnaces at Longwy are about to establish a great furnace plant at the mouth of the Scheldt, below Antwerp; for the present they will build coke ovens, expecting to run them on English and German coal.

More Consolidations

An important consolidation of companies has just been announced. The Eisenwerk Kraft, situated near Stettin, is to absorb the Niederrheinische Hütte, which operates four furnaces at Duisburg, at the mouth of the Ruhr. Both are owned chiefly by Prince Henckel von Donnersmarck. The Duisburg concern has been renovating its furnaces for several years and bringing them up to modern standards, and it owns extensive ore properties in the Nassau and Rhine districts. There have been various rumors in circulation that it would also build a complete steel plant, with rolling mills, and that it was about to buy a coal mine in addition.

Another fusion of considerable importance, that of the Sieg-Rheinische Hütte with the well-known Fasson Eisen-Walzwerk Mannstaedt, was announced to-day. The Mannstaedt concern, with a present capital of 5,500,000 marks, will raise it to 10,000,000 marks, and will remove its whole plant to Friedrichs-Wilhelm-Hütte, on the Sieg River, not far from the Rhine. Mannstaedt will also build an open hearth steel plant in order to render itself independent of the Union for its steel supply. The managers hope in this way to reduce the costs of production, and thereby to push their foreign trade more successfully. The furnace company acquired owns one completed furnace and another partly finished. The latter will at once be completed and put into blast. Both furnaces will be equipped with appliances for saving the gas, which will create the power for the rolling mills. The Mannstaedt Company is well known in many foreign markets for its shaped bars of various profiles.

Negotiations for the prolongation of the German cast iron pipe syndicate have failed, and the combination has been dissolved.

The railroad authorities are asking for bids for nearly 500 locomotives, all to be delivered by the end of next March. This will bring much work to the machine shops.

New York

NEW YORK, April 19, 1911.

Pig Iron.—A fair amount of business is being placed, but most of it is in moderate lots, and there is considerably more inquiry than buying. One important interest is in the market for 4750 tons of five different kinds of analysis iron, deliveries beginning in June and extending into the last quarter. An electrical interest is still inquiring for 2200 tons, and there is further New York State business pending. In New Jersey are a number of inquiries, in the main for lots of 500 and 1000 tons, deliveries for the most part in the last half. A recent inquiry for 1000 tons for a boiler works foundry has been withdrawn. Of the tonnage recently under negotiation for a sanitary pipe interest, 2000 tons is believed to have been bought for New Jersey delivery, while a smaller amount was taken for a New York State plant. Prices have changed but little, but furnaces have not realized their expectations in the matter of advances over the current market price for deliveries in the second half of the year. Ore prices are more

of a factor than in recent weeks. Some foreign ores are now available at a concession from the basis maintained two months ago, prices lately reported being midway between those of 1909 and 1910. The maintenance of the 1910 basis on both Lake Superior ores and on Eastern ores is considered less likely as the season of navigation approaches. Shipments of some Eastern ores have kept up well, one interest's shipments in the first three months of this year being 94 per cent. of those in the first quarter of 1910. We quote pig iron for early shipment as follows, at tidewater: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15.25 to \$15.50.

Ferroalloys.—An Ohio steel interest has purchased 1000 tons of ferromanganese for delivery over the next four months at a price about \$36.50, Baltimore. Another Ohio steel interest has purchased 500 tons for early delivery. Inquiries are now few and the ferromanganese market is quite weak. It is certain that \$36.50 is the top price at seaboard at present. Ferrosilicon is neglected in the New York market, and the usual quotation is between \$53 and \$54, Pittsburgh.

Steel Rails.—The Maryland Steel Company is reported to have taken 8000 tons of the 14,000 tons placed by the Missouri, Kansas & Texas, shipment to be made by water to Gulf port. The Pennsylvania Steel Company has sold 1800 tons to the Cambria Construction Company. For the Chicago City Railways an inquiry has come out for 1250 tons of girder rails.

Finished Iron and Steel.—Present low prices for fabricating have brought out considerable business in structural material, but otherwise the finished lines are very quiet. Deliveries are so good that plates are ordered only as needed, and practically no stock is carried by the consumers. The steel bar trade expects to hear from the implement makers in about a month, but new inquiry is still very light and specifications are poor. Only a fair tonnage of bar iron orders is being received. Except for plates of the narrower sizes, however, prices are all firm. The principal event in the structural field was the asking of a pound price on 80,000 tons for the Interborough Rapid Transit Company of this city. Bids will close April 24, and deliveries are to begin in three months and extend through two years. The erecting is to be done by the purchaser. The material is wanted for general improvements on the Manhattan elevated lines, including additional tracks for express service on the Second, Third and Ninth avenue lines and extensions on these, as well as the Sixth avenue line. A double-deck bridge over the Harlem River is also included. Plans were issued April 18 on the 14-story Essex County National Bank Building, Newark, N. J., and are expected to be out this week on the Bamberger store in the same city. Those for the Woolworth Building are also expected to be out shortly, but reports that the fabricator has been decided on are premature. The general contract for the Insurance Exchange Building, on Maiden Lane, New York City, has been awarded the Thompson-Starrett Company, and the American Bridge Company will furnish the 8000 tons of steel. The McClintic-Marshall Construction Company has taken between 1500 and 1600 tons of bridge material for the Atlantic Coast Line, and the Cambria Steel Company has the award of the 1200 tons for the boiler house for the American Sugar Refinery Company in Boston. The Eastern Steel Company has 350 tons for the Keystone Theatre in Philadelphia, and the National Bridge Company 225 tons for the School of the Ascension in New York. Bids are in, but no awards have yet been made, on the following: Norfolk Terminal Railway Company's station, Norfolk, Va., 1200 tons; loft for the Haviland Company on East Thirty-sixth street, New York, 1500 tons; Barge Office, New York, 1000 tons; Henry Heide candy factory, New York, 2200 to 2300 tons; building for Black, Starr & Frost on Fifth avenue, New York, 1000 tons; 12-story loft for the Fabian Construction Company, West Twenty-sixth street, New York, 1800 tons, and 12-story loft for the Stone Construction Company on West Thirty-fifth street, New York, 800 tons. Other inquiries in the market are for 5000 tons for the Northwestern Mutual Life Insurance Company's building, Chicago, and 2000 tons for the Fidelity Insurance Company's building, and 1500 tons for the Marshall Field warehouse in the same city. Bids will close May 1 on 600 to 1200 tons of plates for four, six or eight barges for Missouri River service asked by the United States Army Engineer Office. Quotations remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—The dullness in the cast iron pipe trade is emphasized by the fact that the most important public letting now in sight in this section of the country is that of Presque Isle, Maine, 385 tons, April 25. A number of other lettings have been announced, but all are for small

THE IRON AND METAL MARKETS

quantities. The general demand from private consumers is exceedingly light. Prices continue to range from \$21 to \$22 per net ton, tidewater, for carload lots of 6 in. L. A. Thomson, city engineer, Regina, Saskatchewan, Canada, will receive bids up to noon April 26 for 900 tons of 18-in. and 150 tons of 6-in. water pipe.

Old Material.—Conditions in this branch of trade have seldom been worse. The only transactions have been purchases of small lots of heavy melting steel scrap by dealers who have contracts yet to fill. Rejections continue to be made by steel companies and rolling mills. In numerous instances the material thus rejected has been sacrificed in preference to paying freight back to the dealers' yards. Prices thus realized have been much lower than any hitherto reported. The railroad offerings closed in the past week were sold largely to dealers, but the condition of the market prevents them from giving shipping instructions, and it may be some time until the material is moved. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	\$10.00 to \$10.50
Heavy melting steel scrap	10.00 to 10.50
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	10.00 to 10.50
Light iron	5.00 to 5.50
Cast borings	5.00 to 5.50
Wrought turnings	5.50 to 6.00
Wrought pipe	10.25 to 10.75
Old car wheels	11.50 to 12.00
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.50 to 9.00
Locomotive grate bars	9.00 to 9.50
Malleable cast	10.00 to 10.50

Metal Market

NEW YORK, April 19, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

April.	Lake.	Electro-lytic.	Tin.	Lead.				Spelter.	
				New York.	St. Louis.	New York.	St. Louis.	New York.	St. Louis.
13....	12.37½	12.12½	42.15	4.45	4.30	5.50	5.30		
14....	12.37½	12.12½	42.15	4.45	4.30	5.50	5.30		
15....	12.37½	12.12½	42.15	4.45	4.30	5.50	5.30		
17....	12.37½	12.12½	42.10	4.45	4.30	5.50	5.30		
18....	12.37½	12.12½	41.95	4.45	4.30	5.50	5.30		
19....	12.37½	12.12½	41.70	4.45	4.30	5.50	5.30		

Spot pig tin is still selling below the cost of future importation and has declined below last week's price. While electrolytic copper has been sold at 12c., the market is now stronger. Lead is dull and softer. Spelter is quiet, but unchanged. Antimony has been active at lower prices.

Copper.—Consumers' inquiries indicate that some of them are in need of stock, but they are holding out for 12c. electrolytic. Their attitude in this direction has been influenced by some heavy sales of outside lots of electrolytic at that price, as within the last week fully 500,000 lb. of speculative copper was offered at resale and promptly taken. These offerings of outside lots influenced prospective purchasers, who were unable to get their orders taken at that price, and they promptly withdrew their inquiries. As the matter stands now there is a deadlock between sellers and buyers. With the speculative offerings out of the way dealers feel that they should be able to get 12.12½c., and they declare their intention of holding out for it. Lake copper is fairly firm at 12.37½c., although some sales have been made below that price. A good sized lot was sold in Buffalo at about 12.15c., but this transaction was made by a holder who was anxious to obtain some ready money. In London to-day the market closed steady, with spot selling at £53 11s. 3d. and futures at £54 3s. 9d. The sales amounted to 700 tons of spot and 300 tons of futures.

Pig Tin.—The pig tin market is dull, but all things considered the situation is better from the consumers' standpoint than it has been in many weeks. The closing of the London market last Thursday afternoon for the Easter holidays left this market to its own guidance until yesterday morning, and consequently pig tin for the first time in many months remained at one price for a period of three business days. There is a good quantity of spot tin available in this country, but consumers seem to be fairly well supplied, and they refuse to take hold, regardless of the fact that this market is at present considerably below the import parity. The reopening of the London market yesterday had little effect on the situation beyond causing a 5-point drop in the American price. In New York to-day pig tin was sold for 41.70c. The London market closed steady, with spot tin selling at £191 15s. and futures at £187. The sales amounted to 220 tons of spot and 390 tons of futures.

Tin Plates.—Tin plates are quieter, and about the only

call from consumers comes from the can manufacturing interests. Quotations are unchanged at \$3.94 for 100-lb. coke plates.

Lead.—Lead is dull and neglected. Although the nominal price is unchanged, the market is somewhat softer than it was a week ago. The usual quotations are 4.45c., New York, and 4.30c., St. Louis.

Spelter.—It is hard to tell the actual price of spelter, as there are many dealers who are anxious to dispose of their holdings and reports of price cutting are prevalent. Consumers are not inclined to make purchases at prevailing quotations, and the market is so disorganized that they have very little faith in the situation. Some sellers are very firm in their demands and are holding out for 5.50c. for spot in New York and 5.30c., St. Louis. It is pretty certain that by shopping about consumers could get better terms.

Antimony.—While the foreign syndicate of antimony producers seems to be fairly successful in maintaining the combination that has been effected, antimony is weak in this country. This is due to the fact that stocks are very plentiful, and as the agents here for European houses are very firm in their demands most consumers are filling their wants elsewhere. There has been a good deal of trading, much of it of a speculative nature among dealers, and this has brought out the fact that many people are over stocked with some of the best known brands. Hallett's can now be had for 8.75c., although some sellers are quoting 9c. Cookson's is firm at 9.50c., which is largely due to the fact that most of the available antimony of that brand is in the hands of authorized representatives of the producers here. The Chinese and Hungarian grades are freely offered at prices from 8.25c. up. Just now all grades of antimony can be bought at resale at a lower price than it would cost to import the metal into this country.

Old Metals.—Continued dullness is reported by dealers, whose selling quotations are unchanged as follows:

	—Cents.—
Copper, heavy cut and crucible	11.75 to 12.00
Copper, heavy and wire	11.50 to 11.75
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	10.50 to 10.75
Composition turnings	8.75 to 9.00
Clean brass turnings	7.75 to 8.00
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.25 to 4.30

Metals, Chicago, April 18.—There is a considerable volume of copper being sold in small spot orders. Spelter shows a decline of 5 points from last week, with the demand from consumers only moderately active. The price of tin receded ¼c. during the week. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12¾c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 42¾c.; small lots, 45c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, April 17.—Lead is quiet at 4.30c.; spelter is steadier at 5.30c., both at East St. Louis. Zinc ore is firmer and held at \$36 to \$39 per ton, Joplin base. Tin is easier at 42.30c.; antimony (Cookson's) unchanged at 9.85c.; copper is lower, lake quoted at 12.12½c. and electrolytic at 12.47½c., all at St. Louis. The demand for finished metals the past week was only fairly good.

Notes on Prices

Rope.—Some manufacturers report a slight improvement in the demand, while others say that business is about the same as for some time. The prices of the lower grades of sisal rope are somewhat irregular. The following quotations represent regular prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per pound; second grade manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—Dullness is pronounced. The market in England is higher than it is here, owing to a better demand, so that if there was even a moderate activity here prices would probably be advanced. New York prices for carload lots are about 87c. to 88c. for domestic and 83c. for foreign

oil. The following are New York prices in 5-barrel lots or more:

	Cents.
State, raw.....	91
City, raw.....	91
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—Turpentine has continued to decline, following a similar condition in the Savannah market, and buyers are holding off for still lower prices. New York turpentine quotations in 5-barrel lots are as follows:

	Cents.
In oil barrels.....	79½
In machine barrels.....	77
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins have remained steady, with a light demand. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$8.15 and grade D at \$8.30 in the New York market.

Iron and Industrial Stocks

NEW YORK, April 19, 1911.

Transactions in stocks the past week were not only light, in accordance with the continuance of dull conditions, but were further reduced by two holidays. The tendency was downward, but the declines were not serious. Steel Foundries was a notable exception, rising sharply from its recent decline. The range of active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	7½- 7¼	Pressed St., pref..	98½- 99
Allis-Chalm., pref..	28½- 29	Railway Spr., com.....	32¼
Beth. Steel, com..	32¼- 33	Railway Spr., pref.....	99½
Beth. Steel, pref..	61- 63	Republic, com.....	32
Can, com.....	9½- 10	Sloss, com.....	51¾- 52½
Can, pref.....	82- 83½	Sloss, pref.....	112
Car & Fdry, com..	51½- 52½	Pipe, com.....	16¼- 17½
Car & Fdry, pref..	114½- 116	Pipe, pref.....	55¾- 57
Steel Foundries....	41½- 45	U. S. Steel, com..	74¾- 77½
Colorado Fuel....	29- 30½	U. S. Steel, pref..	119- 120
General Electric....	150- 150½	Westinghouse Elec.	65½- 66
Gr. N. ore cert....	60¼- 62	Am. Ship, com....	72- 73
Int. Harv., com..	115½- 115¾	Chi. Pne. Tool....	51- 52½
Int. Harv., pref..	124½- 124¾	Cambria Steel....	45- 46¾
Int. Pump, com....	38½- 39½	Lake Sup. Corp....	28- 28¾
Int. Pump, pref..	89- 90	Pa. Steel, pref.....	108
Locomotive, com..	36- 37¼	Warwick.....	11
Locomotive, pref..	104- 105½	Crucible St., com..	12½- 12¾
Pitts. Steel, pref..	103- 104	Crucible St., pref..	77½- 78½
Pressed St., com..	31¾- 32	Harb.-W. Ref., com.....	42

Dividends.—The American Steel Foundries has declared the regular quarterly dividend of 1¼ per cent., payable May 15.

The Warwick Iron & Steel Company, Pottstown, Pa., has declared a semi-annual dividend of 4 per cent.

The Ellwood City Iron & Wire Company, Ellwood City, Pa., manufacturer of fire escapes, railings, iron stairs, &c., has recently erected a brick addition to its factory, doubling the floor space and enabling work to be handled to better advantage. No additional equipment will be required for the present. A. D. Pander is president and manager.

At the monthly meeting of the Engineers' Society of Western Pennsylvania held in its headquarters in the Oliver Building, Pittsburgh, on the evening of April 18, Dr. Joseph W. Richards of Lehigh University, South Bethlehem, Pa., presented a paper on "The Electrometallurgical Revolution in the Iron and Steel Industry of Norway and Sweden."

The entire plant of the Allegheny Steel Company, Brackenridge, Pa., embracing open hearth steel works, plate and sheet mills, boiler tube mill and other steel specialty departments, is in full operation, with a fair amount of work ahead. The company reports that more actual orders are being placed than for some time.

The United States Cast Iron Pipe & Foundry Company has moved its Chicago office from the Rookery Building, where it has been located for many years, to the People's Gas Building, Rooms 923-927, where much more desirable quarters have been engaged.

Federal Furnace A, at South Chicago, went out of blast April 15. Furnace No. 3 of the Illinois Steel Company's plant, at South Chicago, is temporarily out of blast as the result of an accident, but will resume operations within a week.

The Crucible Steel Company of America

Chairman Herbert Du Puy of the Crucible Steel Company of America states that at a meeting of the Board of Directors, held in Pittsburgh on Monday, April 17, the report of the treasurer was presented showing that the operating profits for the month of March, 1911, were \$335,722.47, or more than \$100,000 in excess of what had been unofficially stated in the public prints earlier in the month.

Mr. Du Puy further states that though the domestic business of the company, in sympathy with general conditions, is not holding up quite as well as it did last year, at the same time, to equalize this, efforts have been made to push for foreign trade, so that in dull periods, when there is a shrinkage in orders at home, this shortage can be made up through an increase from foreign countries. He states that the company is now considering the advisability of arranging an official connection with a house in Austria and the establishment of a branch in South Africa, so as to cover additional foreign territory to that which it already covers. The management feel it incumbent upon them to vigorously push the introduction of their products into foreign lands where the demand for the higher grades of crucible steels are constantly increasing, and where, owing to the superiority of the products of the company, the market shows encouraging conditions.

President Dougherty of the Pittsburgh Crucible Steel Company is maturing his plans for the development of the new works at Midland, Pa., and expects in a few days to submit figures covering the first installation of improvements to be made there. Within 12 months it is confidently expected that the company's coal property which was recently bought and at least the open hearth furnace improvements to be built at Midland will all be in full practical operation. Great results are confidently looked for after these installations are completed.

Trade Publications

Molding Machines.—The Union Foundry & Machine Company, Pittsburgh, Pa. Catalogue A. Concerned with the Lawlor improved jarring molding machine and also a movable combined jarring and squeezing machine. The former is capable of handling very large work and the latter can be utilized for very small work. Both machines are illustrated and a brief table of the sizes in which the jarring machine is made is included.

Telephone Material.—W. N. Matthews & Brothers, St. Louis, Mo. Loose leaf book. Size, 4 x 6½ in.; pages, 236. This is the third edition of a book on telephone line construction and contains considerable information and data on overhead and underground telephone construction work. The various specialties made by this company are all illustrated and described, and in addition there are instructions and diagrams for making the customary tests.

Vanadium Steel.—American Vanadium Company, Frick Building, Pittsburgh, Pa. Three pamphlets. Two of these deal with the various kinds of automobile and spring steels which this company is prepared to furnish and contain data on the properties of the various types. The third pamphlet contains 64 pages, and after a brief historical introduction, gives a classification of the different kinds of vanadium steel, together with the proper methods of heat treatment. A list of the various applications together with the type and the treatment recommended for each case is included, together with directions for the application of vanadium to steel and iron.

The James Lappan Mfg. Company, Pittsburgh, builder of heavy steel plate work, has received a contract for the piping work and the replacing of dust catchers and down comers at the Edith Furnace of the American Steel & Wire Company, located at Pittsburgh. This furnace is to be entirely rebuilt.

The Alan Wood Iron & Steel Company was the highest bidder for the Panama scrap sold at Philadelphia on Tuesday, its bid being \$10.11 per ton.

The Central Tube Company of Pittsburgh, works at Leatsdale, Pa., has increased its capital stock from \$350,000 to \$500,000.

Electric Furnaces of the Induction Type*

Electrical and Metallurgical Features, with a Summary of Costs

BY C. F. ELWELL, PALO ALTO, CAL.

Electrical Features

The furnaces for the refining of steel electrically, which have passed the experimental stage, may be divided into two distinct groups—namely, arc furnaces and induction furnaces. To the former belong the Heroult, Stassano, Keller and Girod furnaces, and to the latter the Kjellin and Röchling-Rodenhauser furnaces. Of the former the Heroult Furnace is perhaps the best known and most successful, and as comparison always carries more weight than a description it will be used as the representative of the arc furnaces. The electrical features may be divided up under several heads.

DISTRIBUTION OF HEATING EFFECT OF THE CURRENT.

Arc Furnaces.—In the Heroult Furnace the current passes from one electrode through an arc to the slag, through the slag to the upper metal, and thence through another arc to another electrode; and of the current which passes through the carbons only a small percentage passes through part of the metal. As the heating effect of the arc is far greater than any effect of the resistance of the charge, there must be large differences of temperature between different parts of the bath of metal, even in spite of the great activity of the bath around the electrodes. This is especially the case with a deep bath of metal. It is for this reason that Girod employs a bottom electrode, thinking thus to have these differences of temperature less by passing all the current for the arcs through the bath. From figures given in *Stahl und Eisen* for a 2-ton Girod Furnace, it was computed that the resistance of the carbon electrode was 3800 times that of the bath of metal and so 3800 times more electrical energy was converted into heat in the carbon electrode than in the bath itself. From this it is seen that if the current in the bath of metal produces any considerable part of the heat of the furnace, there must be a large loss of energy in the carbon electrode. The only correction for this is to make the electrodes larger, and the working limit has already been reached. The fact is that the bath is very little heated by the passage of the current and almost all the heating in this type of furnace is done by the very localized heating of the arc. The matter of the losses of energy in the carbons will be taken up under the heading of efficiency.

Induction Furnaces.—The principle of the induction furnace is already well known, but in order to compare the Kjellin and Röchling-Rodenhauser types it will be well to repeat briefly the principle of operation and the type of construction of the Kjellin type. The furnace consists essentially of an iron core around one leg of which is wound a primary winding inclosed in a refractory case and usually cooled by means of forced draft. The annular hearth surrounds this primary coil, and is separated from it by means of refractory material. This hearth contains the metal and acts as a secondary winding of one turn. The voltage induced in this turn is quite small, so that the energy transformed from the primary coil results in a very large current in the secondary, which heats the metal and thus nearly all the electrical energy is converted into heat in the metal to be melted. The ring being of constant cross section, the heating is about uniform over the whole bath of metal. The Röchling-Rodenhauser Furnace, which has a differently shaped hearth, is constructed either for single or three-phase current. In the former case there are two grooves, and in the latter three grooves. In both cases these grooves, which are similar to the grooves in the Kjellin Furnace, open into a distinct open hearth. The cross section of the grooves is comparatively small, and they form the secondary circuits in which the currents

which heat the metal are induced. Lateral doors are provided so that the contents of the working chamber may be watched, slag drawn off or charge put in. The chief electrical difference between the Röchling-Rodenhauser and Kjellin Furnace is that a distinct secondary winding is provided in the former, and the current induced is led by means of heavy terminals to plates embedded in the refractory material of the furnace. This refractory material becomes an electrical conductor at the higher temperatures, and this enables an additional circuit to be formed, so that the currents induced in the secondary winding pass through the bath of metal, heating the bath still further. The current also serves to neutralize the great self-induction of the secondary, and a better power factor is obtained. The point to be recognized here is that the heating is uniform and not localized as in the Heroult Furnace.

VARIATION OF LOAD ON SUPPLY MAINS.

Arc Furnace.—The instability of an arc is well known, and the load on a supply circuit, even with constant watching, varies very greatly. If the furnace has its own generator the regulation can be effected more simply, but the best furnace is one which can be connected to regular three-phase supply mains. To do so with the Heroult Furnace means motor driven electrode regulators, &c., and even then the furnace is not a very desirable load.

Induction Furnaces.—The changes in load on an induction furnace are always of the international kind and sudden changes of load are practically impossible with an induction furnace.

ADAPTABILITY TO CONNECTION TO SUPPLY MAINS.

In the question of power factor the Heroult Furnace shows some advantage over the Kjellin Furnace, for in order to build a Kjellin Furnace of 8-ton capacity and keep the power factor up to 0.6 or 0.7 it was necessary to lower the frequency to five periods per second. As a five-cycle generator costs more than twice as much as a 25-cycle generator this is a serious question. But with the Röchling-Rodenhauser Furnace the current in the second secondary winding can be used to neutralize the effect of self-induction to such an extent that a 7-ton furnace may be operated with 25 cycles with a power factor of 0.6, while a 3-ton furnace on 25 cycles has a power factor of 0.8. The smaller Röchling-Rodenhauser Furnaces are operated from 50 cycles with power factors of 0.85 and 0.8. In my opinion the most economical way to correct this evil is by using fixed condensers which cost only a small percentage of the cost of the furnace and the power factor may be made as high as desired.

ELECTRICAL EFFICIENCY.

Arc Furnaces.—The before mentioned Girod Furnace with but one electrode of 14 in. (35.5 cm.) diameter and a current of 6200 amperes at 60 volts showed a power loss of 10 per cent. in the electrode alone. In the Heroult Furnace the current is in general smaller, but there are two electrodes in series, and the result is about the same. Not only is energy lost in the electrodes by reason of their high resistance, but a large amount is also lost by means of the water cooling of the jackets, which is necessary because of their high conductivity for heat. The cost of maintenance of carbon electrodes is also considerable. Radiation loss is greater with the arc furnaces because a great deal of the heat of the arc is reflected to the roof, which must be water cooled to last, and even then has to be renewed about every 14 days.

Induction Furnaces.—Tests made on a 3.5-ton furnace at Volklingen have shown an electrical efficiency of 97 per cent., which is a contrast to the 10 per cent. lost in electrodes alone in arc furnaces. The electrode plates never wear out for they do not come in contact with the molten metal or slag, and the portion of the lining which

* Reprinted from the Proceedings of the American Institute of Electrical Engineers, April, 1911. A paper prepared for the Pacific Coast meeting of the Institute at Los Angeles, Cal., April 25-28.

acts as a conductor has been found in practice to last longer than any other portion of the lining.

SUMMARY OF ELECTRICAL FEATURES.

a. Heating of metal bath is much more uniform in induction furnace.

b. The variation of load is much less with the induction furnace.

c. The adaptability to connection to existing power networks is in favor of the induction furnace.

d. The efficiency is in favor of the induction furnace.

Metallurgical Features

The earlier induction furnaces, *i. e.*, those of the Kjellin type, did not show many metallurgical advantages except that it was possible to treat much larger charges than with crucible methods. They were quite unsuited to working with slag because of the shape of the hearth, and so only served to melt pure materials. The shape of the Röchling-Rodenhauser Furnace is such that slags can readily be handled and refining carried on. At the same time it can be used for smelting work whenever necessary, and as much larger charges can be worked, a considerable saving is made in crucible steel working. The advantages of the electric furnace are:

1. On account of the convenient regulation of the temperature attainable the phosphorus can be removed until only a trace remains.

2. It is especially suitable for the most thorough desulphurization.

3. When the refining is complete, the charge can be left in the furnace as long as may be desired without change of composition.

At Trollhattan, Sweden, the furnace is started by means of a ring of metal. The cold materials are charged gradually until all are melted. Continuous operation is possible by leaving a portion of the molten metal in the furnace after each teeming. At Volklingen, Germany, the furnaces are supplied with molten metal from basic Bessemer converters, which contains about 0.08 per cent. S and 0.08 per cent. P. The extent of the dephosphorization and desulphurization depends on what the steel is wanted for.

An oxidizing slag is formed from lime and mill scale or ore, which is removed, as far as possible, when dephosphorization is complete. The recarburization takes place and a slag free from iron is formed for desulphurization. A typical slag for desulphurization has a well-known white appearance and falls to a white powder on exposure to the air. When the slag has this property the charge may be left as long as desired in the furnace. The furnaces are entirely emptied after each charge, as the molten converter steel allows the load to be readily brought to a satisfactory figure.

When not working about one-third of the normal energy will keep the furnace hot. The 7-ton furnace at Volklingen has been 30 hours without taking any current and was heated up again with normal energy consumption. Within half an hour the metal began to glow and regained its normal temperature after 4 hours and the charge was finished up in the regular way. At the works at Volklingen no work is done on Sunday, but there is no difficulty in starting up the furnaces with unfinished charges from the previous Saturday.

The natural circulation which takes place in induction furnaces serves to thoroughly mix the charge, and the management of the Poldihütte, Austria, made a test in which seven samples were taken from six different places in the furnace and the analysis of these samples is shown in the following table:

	Carbon.	Manganese.	Silicon.	Phosphorus.	Sulphur.	Chrom.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per ct.
1.....	0.81	0.27	0.335	0.031	0.007	1.00
						1.01
2.....	0.77	0.25	0.340	0.030	0.008	1.00
						1.01
3.....	0.85	0.28	0.345	0.029	0.007	1.00
						1.01
4.....	0.82	0.27	0.335	0.030	0.009	0.98
						0.99
5.....	0.78	0.25	0.335	0.030	0.009	0.99
						0.96
6.....	0.78	0.27	0.419	0.031	0.010	0.99
7.....	0.79	0.28	0.326	0.030	0.009	0.98

The furnace was teemed 37 minutes later, and a sample cast-out of the ladle gave the following analysis:

	Per cent.
Carbon	0.77
Manganese	0.29
Silicon	0.396
Phosphorus	0.031
Sulphur	0.009
Chromium	0.99

That the Röchling-Rodenhauser Furnace is no longer an experiment is shown by the fact that the 3.5-ton furnace was worked for a whole year producing steel for rails, and more than 5000 tons have been sold. The 8-ton furnace has been running since November, 1908, an average of 14 days to a lining and 1200 tons of rails to a lining. The management contemplates the building of a 16-ton furnace as the next step. At Dommeldingen the 2-ton furnace is used to refine crude pig iron. The chemical and physical properties of the metal are given below:

	Analysis of charge.	Analysis of cast.
	Per cent.	Per cent.
Carbon	4.0	0.50
Phosphorus	1.8	0.025
Sulphur	0.2	0.03
Manganese	0.0	0.76
Silicon	1.05	0.056
Breaking strain.....	95,000 lb. per sq. in.	
Elongation	20 per cent.	
Contraction of area.....	36.33 per cent.	
Duration of conversion.....	5 hours.	

SUMMARY OF METALLURGICAL FEATURES.

1. Having no electrodes, facilities are provided for heating the bath without introducing impurities and the charge may be left indefinitely in the Röchling-Rodenhauser furnace without change.

2. Having a large open hearth (in the 1.5-ton furnace it is 60 by 26 in. or 1.52 by 0.65 m.), with doors it is possible to do any class of refining in the Röchling-Rodenhauser furnace much the same as in the open hearth furnace.

3. When the hearth doors are closed the Röchling-Rodenhauser furnace is air-tight and may be left for long periods without great loss of heat, making intermittent working possible.

4. The natural gentle movement of the charge allows of complete mixing of the ingredients of the charge, and is not sufficient to attack the lining.

Costs of Production

Royalty: The German users of the induction furnace pay \$0.65 per ton for rail steel and \$1.50 per ton for crucible quality steel. This is for small daily production. For 1000 tons daily the royalty is placed at \$0.36 per ton for rail steel and for 1200 tons daily it is \$0.50 for crucible quality steel.

Energy Required: A great many figures have been given out, most of which were for small furnaces and special runs. The plants at Trollhattan and Volklingen being in commercial operation supply the most reliable figures obtainable.

Cold Pig and Scrap: With cold materials, refining, &c., to crucible quality steel is done with 600 to 900 kw-hr. per ton according to the size of the furnace.

Hot Pig and Scrap: With hot pig iron and cold scrap crucible quality steel is obtained with 300 to 700 kw-hr. per ton according to the proportions of the two ingredients and the size of the furnace.

Hot Metal from the Converter: Converter material with an analysis of P, 0.08 per cent.; S, 0.08 per cent.; Mn, 0.5 per cent.; C, 0.1 per cent. is refined to steel for rails with an analysis of P, 0.05 per cent.; S, 0.04 per cent.; Mn, 0.85 per cent.; C, 0.5 per cent. with 100 kw-hr. per ton in a 7-ton furnace. Same material is refined to high quality steel showing only traces of P and S; Mn, 0.2 per cent.; C, 0.5 per cent., with 250 kw. hr. per ton.

Hot Metal from Open Hearth Furnace: Material from open hearth furnace, already dephosphorized and containing 1.22 per cent. C; Mn, 0.38 per cent.; Si, 0.21 per cent. to high quality steel with 200 to 250 kw-hr. per ton.

1. Cost with a 1.5-ton furnace melting scrap and refining to pour best steel for steel castings. Furnace of

the three-phase, tilting type. 50 cycles, 210 kw. and power factor 0.80.

Interest Charges: Cost with all accessories about \$9000. With 10 per cent. for interest charges gives \$900 annually. Using 290 working days in a year and six charges, 3 to 3.5 hours each, daily and 1500 lb. to a charge gives 4.2 tons daily and 1220 tons yearly. This is equivalent to about 21 hours working. Cost per ton for interest, \$0.74.

Labor: Two men can attend to this furnace with ease, as the electrical part requires no special attention. The melter adjusts the temperature and watches the metallurgical process. The helper sees to the fan and charging, &c. Allowing two shifts and \$5.50 per shift or \$11 daily gives a labor cost of \$2.62 per ton of steel.

Lining: Relining may be done every 8 or 14 days. It takes three tons of magnesite and 0.36 ton of tar to completely reline the furnace. The relining is done with half new material and half old. For getting out the old lining, mixing material and putting in the new, four men are allowed 16 hours. Cost of lining per ton of steel, on an average, \$1.50.

If lined with dolomite, which is cheaper, and every 14 days, then lining cost, allowing one-third material recovered, is \$1 per ton of steel.

Keeping Warm: When the furnace is not used for several hours during the night it must be kept warm, for which about a third of the working amount of energy is necessary. In this way if normal energy is 200 kw. then about 200 kw-hr. will be necessary to keep the furnace warm over the three-hour period of rest. For six working days this is necessary five times and 1000 kw-hr. must be charged up to heating. Cost of keeping furnace warm at \$20 per kw-yr. is \$0.09 per ton of steel.

Cooling of Transformer: The blower takes a 2.5-hp. motor or 1.8 kw. and for 24 hours=43 kw-hr. Cost of cooling transformer per ton of steel, \$0.02.

Energy Consumption: From cold materials about 850 to 900 kw-hr. are necessary, in this size furnace. Taking larger figure the cost of energy per ton is \$2.06.

Royalty: In the United States, on the basis of a plant of 50 tons daily the royalty would be about 50 cents per ton.

Summary of Cost.

Interest charges.....	\$0.74
Labor	2.62
Lining	1.50
Keeping furnace warm and cooling.....	0.11
Royalty (approx.).....	0.50
Energy for melting and refining.....	2.06
Total.....	\$7.53

The figure \$7.53 is the working cost which must be added to the cost of the materials in order to find the cost of crucible quality steel from scrap. The above figure would be more reasonable with larger furnaces.

2. Cost with a 2-ton, 300-kw., three-phase tilting furnace.—Molten converter steel to quality steel for castings.

Cost with all accessories about \$12,500. With 10 per cent. for interest charges gives \$1250 per annum. Allowing 250 working days in the year and 16 tons per day gives 4000 tons per annum, or \$0.31 per ton of steel.

Interest charges per ton of steel.....	\$0.31
Power for heating up, per ton of steel.....	0.02
Power for refining, allowing upper figure of 300 kw-hr. at \$20 per kw-yr.	0.68
Air cooling of furnace core	0.01
Cost of lining every 10 days (German figure)	0.35
Wages, allowing \$16 per day.....	1.00
Royalty on basis of 50 tons daily.....	0.50
Total cost per ton of steel.....	\$2.87

This figure would give a good idea of the cost of converting molten pig iron into steel, exclusive of the ferroalloys.

3. Cost with a 5-ton, 550-kw., three-phase tilting furnace.—Molten converter steel to crucible quality steel.

Cost with all accessories about \$22,000. With 10 per cent. for interest charges gives \$2200 per annum. Reckoning 250 working days in the year, each one with eight heats of 5 tons, the yearly production would be 10,000 tons, or \$0.22 per ton for interest charges.

Interest charges.....	\$0.22
Power, including heating up. For a monthly average of 230 to 280 kw-hr. per ton and taking the higher figure..	0.64
Cost of lining (German figure).....	0.30
Wages, allowing \$20 per day.....	0.50
Air cooling of core.....	0.01
Royalty (approx.), basis of 50 tons daily.....	0.50
Total.....	\$2.17

4. Cost with a 7-ton, 750-kw., three-phase 25-cycle, 0.6-power factor tilting type furnace.—Converting molten converter steel into high grade rails.

Cost with all accessories \$27,000. Interest charges at 10 per cent. gives \$2700 per annum. Allowing 100 tons daily (the makers claim a production of 140 tons) and 250 working days in the year gives a yearly production of 25,000 tons of rail steel and interest charges per ton of steel equals \$0.11.

Interest charges.....	\$0.11
Power for heating up.....	0.01
Power for refining. Makers claim 100 kw-hr. per ton. Allowing 150 kw-hr. per ton.....	0.34
Power for cooling.....	0.01
Cost of lining. Pneumatically tamped. Two foremen and six laborers, or \$21 daily. Per ton.....	0.02
Cost of lining material (German figure).....	0.06
Wages. Two head melters at \$3 and 10 helpers at \$2.50. \$31 per ton.....	0.31
Royalty on rail steel, one furnace in U. S.....	0.35
Total.....	\$1.21

This is the conversion cost, which added to the value of the pig and ferroalloys, &c., gives the cost of steel for rails. The Prussian railroads paid \$10 extra per ton for rails made in this furnace and were well pleased with the product.

5. Cost with a 7-ton, 750-kw., three-phase, 25-cycle, 0.6-power factor, tilting type furnace.—Molten converter steel to highest quality steel.

This furnace will produce about half the steel of this quality as when working on rail steel, or 50 tons daily. The cost per ton under these conditions is about \$2 per ton, including royalty.

SUMMARY OF COSTS OF PRODUCTION EXCLUSIVE OF MATERIALS.

1.5-ton furnace melting scrap and refining to pour high grade steel for castings. Per ton.....	\$7.53
2-ton furnace refining molten converter steel to high grade steel. Per ton.....	2.87
5-ton furnace refining molten converter steel to high grade steel. Per ton.....	2.17
7-ton furnace refining molten converter steel to high grade steel. Per ton.....	2.00
7 ton furnace refining molten converter steel to high grade rails. Per ton.....	1.21

A. M. Byers & Co., Inc., Pittsburgh, have about completed large extensions and additions to their pipe mill in that city, which is now equipped for the manufacture of pure wrought iron pipe by the most improved methods. The new plant covers nearly two city blocks, and will treble the former capacity. The new buildings are of concrete, brick and steel construction, and are largely equipped with electrical machinery. Welding furnaces have been installed; also several Morgan electric cranes for carrying material to cars or to the new warehouse.

The Allegheny Steel Company, Brackenridge, Pa., manufacturer of open hearth tank plates, Reliance boiler tubes, sheets, steel castings, &c., is building an addition to its sheet mill building, consisting of a steel structure, 80 x 120 ft. The plate mill building is also being increased by an addition 100 ft. in length. Some new cranes will be needed to serve these extensions.

The business of the Osgood Dredging Company, Albany, N. Y., including patents and patterns, has been purchased by the Marion Shovel & Dredge Company, Marion, Ohio. The headquarters of the merged company will be at Marion.

Press reports that the machine shops of the Erie Railroad are to be removed from Kent, Ohio, to Youngstown, Ohio, are officially denied.

Personal

W. A. Hitchcock, Unionville, Conn., has been elected president of the Upson Nut Company, Cleveland, Ohio, to fill the vacancy caused by the death of Andrew S. Upson. Mr. Hitchcock has been connected with the company for 35 years, and has been secretary as well as the manager of the company's plant in Unionville for about 15 years. He was succeeded as secretary by F. H. Rose of Cleveland, who has been assistant treasurer. Mr. Hitchcock will move to Cleveland.

Alexander Crawford has been appointed purchasing agent for the Hyatt Roller Bearing Company, Newark, N. J.

S. M. Rodgers, metallurgist of the American Steel & Wire Company, delivered an address before the Cleveland Engineering Society, April 11, on "The Practice of Making Steel."

H. G. Wilson, formerly manager of the Cleveland office of the Pittsburgh Shafting Company of Detroit, Mich., has been made manager of the Detroit office, with general supervision also of the Cleveland territory, succeeding in this capacity L. B. Parker, who has been made general manager of the Columbia Steel & Shafting Company, with headquarters in Pittsburgh, Pa.

Rodman Gilder, secretary of the Crocker-Wheeler Company, manufacturer of electrical machinery, Ampere, N. J., has resigned to become associated with the brokerage house of Dick Bros. & Co., 30 Broad street, New York.

F. H. Crawford, formerly office manager of the New Castle Stamping Company, New Castle, Pa., is now general manager of the Keystone Enameling Company, Sharpsville, Pa., manufacturing kitchen enameled ware.

Hamilton G. Stalnaker of the Ohio Iron & Metal Company, iron and steel scrap, Farmers' Bank Building, Pittsburgh, has gone to Europe for the benefit of his health.

George E. Miller has resigned as manager of the Cleveland sales office of the Westinghouse Electric & Mfg. Company, to accept a position with the Cleveland Electric Illuminating Company. The management of the Cleveland office of the former company will hereafter be conducted from the Pittsburgh office.

Charles E. Adams, president of the Cleveland Hardware Company, has been elected president of the Cleveland Chamber of Commerce.

A. H. Teuchter, president of the Cincinnati Bickford Tool Company, Oakley, Ohio, sailed from New York, April 17, for a several months' business and pleasure trip through Europe.

President A. C. Dinkey of the Carnegie Steel Company, Pittsburgh, Pa., denies the report which has been extensively circulated that he intends to resign from that position.

Robert A. Murray, Farmers' Bank Building, Pittsburgh, has been appointed agent in the Pittsburgh district for the Atlas Engine Works and the Chandler-Taylor Company, both of Indianapolis, Ind. He will handle their medium speed engines.

William E. Sanford has resigned as superintendent of the pipe mill of the Mark Mfg. Company, Zanesville, Ohio, to accept a similar position with the Page-Hersey Iron, Tube & Lead Company, Welland, Ont., Canada.

The New Departure Mfg. Company, Bristol, Conn., maker of New Departure ball bearings, is enlarging its already extensive corps of engineers. Victor E. Page, Pawtucket, R. I., for some years past managing editor of the *Automobile Journal*, is the latest addition to the force.

H. J. Koontz, Farmers' Bank Building, Pittsburgh, has been appointed sales agent in the Pittsburgh district for the Queen City Punch & Shear Company, Cincinnati, Ohio.

The Crucible Coal Company, a subsidiary of the Crucible Steel Company of Pittsburgh, will probably be mining coal at the rate of 60,000 tons a month before January 1. The plans for the development of the company's

coal land near Rice's Landing on the Monongahela River call for the sinking of two large concrete lined hoisting shafts and one air shaft. Steel shaft houses and tipples extending over a proposed four-track coal siding and down to the river will be built. The company will also build 150 steel coal barges and four steel towboats. The Monongahela Division of the Pennsylvania Railroad will soon be extended to the new mines. J. C. Neff is general manager of the coal company.

Obituary

WILLIAM SEARLES GORTON, secretary and general manager of the Standard Welding Company, Cleveland, Ohio, was instantly killed April 17, by being struck by a fast train while driving across the Lake Shore tracks in an automobile near the plant of his company. He was born in Waterford, Conn., February 12, 1859. He received his education in the public schools of that city and learned the machinist trade. He served for four years in the marine department of the United States Coast Survey, and later was assistant engineer on cable railroad construction in Eastern cities. For some time he was a traveling man for the Thomson Electric Welding Company, Lynn, Mass. In 1897 he became connected with the Standard Tool Company, Cleveland, and in 1899 assisted in organizing the Standard Welding Company. This company at first confined its products largely to steel tubing and electrically welded parts for bicycles, but it soon branched out into the manufacture of automobile rims. Under the able management of Mr. Gorton, and aided by the growth of the automobile industry, the company's business grew fast, and a large plant built in 1908 has since been doubled in capacity, the present plant being one of the largest in Cleveland. He leaves a widow, three daughters and one son. His brother, F. C. Gorton, is also connected with the Standard Welding Company.

LUDWIG WOLFF, president of the L. Wolff Mfg. Company, Chicago, manufacturer of plumbers' supplies, died at his home in that city April 14, after a long illness, from a complication of diseases which culminated in pneumonia. He was born in Germany, March 11, 1836, coming to this country in 1854 with his parents and eight brothers and sisters. After numerous disheartening experiences, he applied to the Chicago & Northwestern Railroad, Chicago, for employment and showed the officials how to make bent steam pipes for locomotives. He was then given a contract and established a small shop, borrowing the necessary material. His business grew, and he began to make cooking utensils, then copper range boilers and later plumbers' supplies. In 1866 he purchased the interest of his partner, Terrence Maguire, and later organized the L. Wolff Mfg. Company, which became one of the leading establishments of the country in its line. He was married three times, his third wife dying in 1907. He leaves five sons and one daughter.

JOHN P. HUGHES, vice-president of the Chicago Foundry Foremen's Association and superintendent of the foundry of the Allis-Chalmers Company, died April 7 at St. Joseph's Hospital, where he had undergone an operation for appendicitis.

GEORGE H. BISHOP, of the George H. Bishop Saw Works, Lawrenceburg, Ind., died at French Lick Springs, Ind., April 12, aged 55 years.

The Washington Tin Plate Company, Washington, Pa., has under consideration the addition of six sheet and pair furnaces, two annealing furnaces and a 15-ton electric traveling crane, with a 56-ft. span and 20-ft. lift. The plans for these additions are being prepared by S. Discher & Sons, Farmers' Bank Building, Pittsburgh, who are also taking estimates on the work.

The La Belle Iron Works, Steubenville, Ohio, is receiving estimates for the building of eight more sheet mills and two jobbing mills, but a definite decision regarding these additions has not been made. This company now has eight sheet mills, but has a surplus supply of sheet bars which it sells in the open market.

The Ratio of Burden to Labor*

Its Natural Increase in Modern Manufacturing Processes

BY JAMES E. STANWOOD,†

In all manufacturing processes in the determination of the cost of the finished article, it is usual to divide it into three elements: The cost of the material used, the cost of the labor that can be charged to the conversion of this material into the finished product, and the amount of the burden or overhead expense. This burden includes the cost of all other expenditures of labor and material necessary for carrying on the processes of production, which are general in their character, and which cannot be charged directly to any portion of the actual labor or material. In this connection the cost of selling the product should not be neglected, but should be considered a part of the burden. The ratio, then, of the burden to the direct labor or burden labor ratio may be expressed by a fraction $\frac{B}{L}$ in which B represents the total cost of the burden of a department or factory for a unit period of time, and L the total direct labor cost of the same, for the same factory or department, for the same unit of time.

Examples of Change in Burden Labor Ratio

As a result of the constant improvement in machinery and processes, or, to use a popular phrase, because of the increase in "labor saving devices," it can be stated as a law that the ratio of burden to labor naturally tends to increase from year to year or period to period as industry progresses. This can be shown by an illustration: Let the material, labor and burden in a given process be equally divided so that each has a unit value of 2, then the total cost is 2 plus 2 plus 2 equals 6. The burden labor ratio being $\frac{2}{2}$ equals 1. If, now, by an improved machine or by an improved process the labor is cut in half, then the total cost becomes 2 plus 1 plus 2 equals 5, and the burden labor ratio will be $\frac{2}{1}$ equals 2. This is on the assumption that no other change has been made than that of cutting the labor in two. Let us consider a different set of values, in which the material is assumed to be 2, labor 12 and burden 6. The total cost then becomes 2 plus 12 plus 6 equals 20, and the burden labor ratio is $\frac{6}{12}$ equals $\frac{1}{2}$. Suppose that an improved process or machine now reduces the labor from 12 to 3, a rather uncommon experience; now the total cost becomes 2 plus 3 plus 6 equals 11, and the burden labor ratio is $\frac{6}{3}$ equals 2. The saving in total cost is 45 per cent., but the burden labor ratio is increased fourfold.

In many cases in practice, the saving in labor as outlined in these examples is brought about by the introduction of some new device or machine which is sold generally to the trade, so that it is open to all manufacturers to secure the benefit of this improvement; but it also usually happens that the competition among manufacturers gives most of this benefit to the consumer, and after a short period all the manufacturers are practically on the same basis, using the same grade of materials, the same type of tools and employing labor at about the same cost.

If this law of the natural increase of burden labor ratio is not recognized, it follows that manufacturers who base their cost estimates on previously ascertained burden labor ratios find themselves in the position of

selling their goods at a low margin of profit, or no profit, or even at a loss.

Actual Burden Increase

The examples here given assume that the total burden itself does not in any way increase or decrease absolutely; on the other hand in many instances where improved machines or appliances are employed the total burden itself actually does increase. More elaborate machinery calls for greater care for upkeep and for a greater depreciation. It frequently follows that although the net cost of the product is greatly reduced by a saving in labor, yet this entire saving in labor is not realized on account of an actual increase in burden.

A prominent manufacturer recently stated to the writer that the use of "high speed" steel greatly increased his burden labor ratio over the use of the older steels. This of course is due to the reduction in labor cost which the "high speed" steel effected, but in addition the increased cost of this steel and the increased cost in the upkeep and the depreciation of machines required to use it also increase the actual burden; the net manufacturing cost, however, has been greatly reduced by the use of these improved cutting metals.

The reduction in the labor cost of an article, as shown above, cheapens it to the manufacturer and ultimately, with free competition among the manufacturers, cheapens it to the consumer.

The Problem of Increased Product

The usual advantage claimed for labor saving machines to the manufacturer lies in the fact that they increase the capacity of his plant. If, as in the last rather extreme example, the labor cost is reduced to one-fourth of what it originally was, it means that one man or one machine will produce four times more than before the improvement was adopted. The result of this is a large increase in plant capacity with the attending necessity of finding a correspondingly large market for the output. When the reduced cost of production gives one manufacturer an advantage over another, he secures his market by taking the trade from the other who may be less favorably equipped. When on the other hand all manufacturers in the same line install the same machinery at about the same time and by competition the price is reduced, then the only increase in market can come about by reason of the reduced cost to the consumer. In some cases a greater demand due to the decrease in the cost of the goods tremendously increases the volume of business; in others, where a decrease in cost does not easily produce an increase in demand, the burden is increased in the effort to make a market.

Man who in the beginning had but few implements, and these of the crudest form, has in the process of his marvelous development made his tools more and more efficient and elaborate, and thereby has greatly increased the burden labor ratio.

High Economy and High Burden Labor Ratio

A striking example of this extensive and elaborate use of tools is found in the appliances used in the numerous processes of the entire plant which the United States Steel Corporation has in operation for digging the iron ore from the ground in Minnesota, conveying it to Gary, Ind., and making it into such products as rails and structural steel. In this continued process from mother earth to the finished product very little direct labor is put on the material in the entire course of its conversion. Everything is done by a machine—the digging of the ore, its transportation by steam through the lakes, the unloading and the feeding of the ore to the furnace, the conversion of the melted metal into steel, the formation of a billet, and the rolling of the billet into finished product. In this case the actual labor falls on those who attend the machines. This includes, of course, the sailors and crews on the lakes, operators on the railroad in Minnesota, as well as the men at the mines, and in the steel plant at Gary. This extensive operation possesses a tremendous burden in relation to the direct labor ex-

* Presented before the Congress of Technology, Boston, Mass., April 11, 1911, at the 50th anniversary of the charter of the Massachusetts Institute of Technology.

† Vice-president and engineer, Houston, Stanwood & Gamble Company, Cincinnati, Ohio.

pended, and yet, as is well known, the entire process is one embodying the highest economy of production.

In conclusion it may properly be suggested that a scientific study of the cost of burden is an undertaking that promises the attainment of new economies; for great reductions are possible in the cost of administration, of operation, of buying and selling, and in the maintenance and depreciation of plant. Thus, in striving for more efficient production, burden saving methods are fully as valuable as labor saving devices.

Metal Rolling in the United States

Comments of a British Visitor

At a recent meeting of the Birmingham, England, section of the Institute of Metals, G. A. Boeddicker read a paper giving observations on practice in American metal rolling and drawing plants. The works he had seen he found quite up to date, with electric power generally in use except for rolls. The engines are all slow running.

Rolls are generally driven from a jack shaft, a convenient arrangement whereby any number of rolls can be put side by side without being coupled together. That enables the speed of the different rolls to be varied as required, while a breakdown of one or another does not interfere with a whole train. Where that arrangement is adopted the engines run from 75 to 100 revolutions.

Great care is taken everywhere in using only pure metals for the alloys made. Lake copper is generally used. The spelter is of exceptional purity, containing 0.4 to 0.1 per cent. of lead, and even if the alloy produced should contain lead, only pure spelter is used and pure lead added to the alloy. The casting is done on a larger scale, but is probably not quite so well done as in Great Britain, owing to the fact that there being no casters' lads employed, laborers without experience are sometimes put to the casting of German silver and brass. The furnaces are mostly of the round type; the fuel anthracite, and generally 160-lb pots are used, the metal being cast into ingots of 75 to 100 lb. For narrow metal the ingots are 6 in., while for sheet metal they are 12 in. wide. In pouring, a small funnel is put on the top of the mold, which is lined with fireclay and has four holes in the bottom to split the metal. All slag and charcoal remain in the funnel and cannot get down into the mold. A similar plan is used in casting rods. These are sometimes cast into split molds and sometimes into solid molds. Where the latter are used they are open at the bottom and fitted with a plunger about 6 in. long. When the rod is poured and has set, but while still red hot, the plunger is pushed up 4 or 5 in.; that pushes up the rod, and there it is left until quite cold, when it can be readily lifted out of the mold. Americans go to great trouble and expense in cleaning the surface of the ingots before rolling. Sometimes these are scraped all over on a "scalping" machine, and sometimes planed, in which case a shaving $\frac{1}{8}$ in. thick, is generally taken from each side of an ingot $1\frac{1}{4}$ in. thick, which means about 14 per cent. of scrap from one operation alone. He felt thankful that the scalping process is avoided in British practice.

Rolling and Wire Mills

The rolling mills are generally speeded up. At Waterbury they "break down" at 10, "got down" at 22 and finish at 45 revolutions, while at the Riverside Mills they break down at 20 and finish at 50 revolutions. As a result of that speeding up a pair of rolls probably goes through two or three times as much work as is the case in England. The rolls are fitted with automatic coiling arrangements for coiling the strip as rolled. That is rendered necessary by the length of the strips, which would otherwise be too long for the annealing furnace. The annealing is done in oil-fired open furnaces, sometimes at the same temperature as in British practice and sometimes at much higher temperatures. The metal is conveyed from the rolls to the muffle on a tray and lifted bodily into the furnace by a simple pulley arrange-

ment, the operation taking only a few minutes. A charge of 20 to 30 cwt. is left in the furnace for an hour or an hour and a half. Narrow strips are not put in flat, but placed on edge sideways between pegs riveted on the tray so that no two strips touch each other. When the metal is withdrawn from the furnace it is instantly quenched by a jet of water. The annealing furnaces measure about 6 ft. by 15 ft.

The gang slitters and shearing machines are fitted with automatic scrap-cutting devices. There are pickling, brushing and drying machines and overhauling machines for thin strips, where the metal passes over several rollers and where one man inspects one side and another man the other.

In the large Waterbury wire mills the wire is transported from the blocks to the annealing furnace and from them to the pickling shop and back again to the blocks by means of overhead electric trolleys. Apart from bull blocks, continuous machines of the Waterbury type are general throughout America. The English system of rolling bars, slitting them, and drawing the slittings is practically abolished and rod rolling is introduced not so much for the sake of economy, as in order to get rods of 56 to 60 lb. For pin wire, or any other wire down to 18 or 20 gauge which is not required in heavy coils, the English system is probably quite as economical as rod rolling. All the plant is electrically driven, and in one case the motors are placed beneath the floor and connected to the mills above by short belts. The annealing furnaces for rods are open cylindrical furnaces which can be conveniently charged from the electric trolley overhead.

Discussion

In the discussion of the paper, as reported by the *Ironmonger*, one member agreed with the speaker as to the inferiority of American castings. This results either from the use of bad or rough iron molds or insufficient care in scraping and dressing them. The thing that struck him most in going over some American mills was the large number of costly subsidiary machines employed. They are so numerous and so important that the rolling mills themselves are almost lost among them. The lists of sizes issued by American manufacturers to their customers are of a more definite character than those used in Great Britain and prevent customers substituting thinner and thinner gauges for the various sizes. Another member said he had seen strip taken into American mills which would be promptly rejected in England. As a rule it is put on the overhauling machine, and even after it is scraped the spills sometimes remain; nevertheless they are able to produce good brass.

Mr. Bean of Allen Everitt & Co., Ltd., said that while British manufacturers at times make something verging on a profit, American mills are making 12½ per cent. and more profit every year. It is all a question of power and speed; quick and powerful machinery is the secret of their success. The high wages paid to operators by American manufacturers has not been an unmixed evil, for it drove them to adopt powerful labor-saving machinery. He had been struck by the splendid surface on American rolled metal, and if that resulted from the use of the scalping machine he would be pleased to see such machines used in England.

The author of the paper, in summing up made the remark British iron and steel manufacturers usually make in commenting on the large tonnages from American steel works. Many of the improvements he had referred to are only advantageous, he said, where the quantities of material to be dealt with are large. They would probably be found impracticable in Europe, partly because the works are not large enough and partly because the orders received are smaller and more diverse. Where the Americans deal with four or five different qualities of German silver, European manufacturers have to deal with about 20, and where the former get one order for five tons of one size and one gauge, manufacturers in Great Britain get, perhaps, a hundred orders for a hundred different sizes. It is therefore a mistake to assume, because British manufacturers have not more generally adopted Western ideas, that they are behind.

The Congress of Technology in Boston

The Congress of Technology, which met in Boston, April 10 and 11, in celebration of the semicentennial of the signing of the charter of the Massachusetts Institute of Technology, was a pronounced success on the two main lines laid down by its projectors.

The opening session of the congress was begun with an address by President Maclaurin of the Institute, who spoke on "Some Factors in the Institute's Success," and attributed that success primarily to the method of instruction, now everywhere accepted, but not long ago a debated and somewhat scorned venture. "Apart from his appreciation of the value of all sound learning," said Dr. Maclaurin, "William Barton Rogers, the founder and first president of the Institute, saw clearly that the whole controversy as to the relative merits of science and the classics in the field of education missed the mark by placing the emphasis in the wrong place. He understood that when one gets to the root of things in education, the method rather than the subject is of supreme importance, and his insistence on the value of method in teaching was the cardinal doctrine in his creed and the one that has contributed most to the success of the Institute."

The daylight hours of the second day were given over to the presentation of papers on various aspects of applied science. These papers were grouped in six divisions, and the times of reading were so arranged that the general public, a large number of whom had received personal invitations, were enabled to hear papers in several divisions on topics in which they were particularly interested. The result of these sessions amply justified the plan. Every session was very largely attended, and as the papers dealt not with educational or technical abstractions, but were, on the contrary, striking and vital reports from the actual field of industrial work, the large audiences gained a better conception than would otherwise have been possible of the fashion in which applied science has remade the life and habits of the world within the last half century.

The congress has set clearly before the public the needs and the possibilities of what the speakers on Tuesday evening called the "New Technology." The high standard of the Massachusetts Institute of Technology and its well deserved fame as one of the very foremost technical schools in the world hardly need reiteration. But the very success of the Institute has brought it to a point where insufficient endowment and cramped quarters threaten seriously to interfere with its future usefulness unless the obstacles are very soon removed. The banquet in Symphony Hall on Tuesday evening, April 11, provided a significant sign of keen appreciation of this need both by the alumni of the Institute and by many other outside of its immediate ranks. The enthusiasm of the thousand alumni and guests who filled the floor of the hall was reflected in the words of the speakers, who included two such notable figures in Institute affairs as President Lowell of Harvard, long a member of the Corporation of Technology, and President Emeritus Eliot of Harvard, who was professor of chemistry in the original Institute faculty. The temper of this great meeting was significant in showing a sharp consciousness of a new era created by applied science; of the important part that has already been taken by graduates of the Massachusetts Institute; and of the pressing need, especially from the point of view of the interest of Massachusetts, that the Institute should be immediately equipped with the additional means for enabling it to continue in the future as it has been in the past, a leader in technical education.

The practical earnestness of the alumni in doing their full share toward making possible the "New Technology" was shown in three announcements made by President Maclaurin from the platform after the banquet. One alumnus, who wished his name withheld, has offered to the Institute a tract of 1000 acres of land in Maine, well suited to the uses of a summer school in civil engineering. Other alumni have definitely pledged themselves to give a very large part of the price necessary for buying a new site for the Institute. Edward N.

Eagar, president of the Universal Portland Cement Company, has promised as a gift all the cement needed for erecting the new buildings in reinforced concrete. Meanwhile the question of the site itself, Dr. Maclaurin said, has been narrowed to a choice between three sites, all of which are within a short distance of the present building. It is expected that this question of a new site, upon which everything else on the development of the Institute depends, will very soon be settled.

Large Condenser Installations.—The Wheeler Condenser & Engineering Company, Carteret, N. J., has recently been awarded the contract for five notable surface condensing equipments. The condensers proper will all be of the Wheeler dry tube type, described in *The Iron Age*, October 7, 1908. These equipments will differ, however, from previous condensers in the special design necessary to handle the enormous amounts of steam, at the same time securing high vacuum and high rate of heat transmission through the surface. Three of these condensing equipments will be for the Waterside No. 1 plant of the New York Edison Company, and will consist of circulating, hot well and vacuum pumps, together with specially designed base condensers to operate in connection with three 20,000-kw. turbo-alternators. These condensers will have a rated capacity of 300,000 lb. of steam per hour, and will be the largest of their kind in the world. The other two equipments will be for 10,000-kw. turbines and with pumps and other auxiliaries are for the new power station of the Minneapolis General Electric Company.

Among recent sales of the Terry Steam Turbine Company, Hartford, Conn., are the following: Marconi Wireless Telegraph Company, New York, 4-hp. direct connected generator; Boston Elevated Railway, seven pumping sets; Crocker, McElwain & Co., Holyoke, Mass., 25-hp. turbine, direct connected to a pump; Kirkman & Sons, Brooklyn, N. Y., 70-hp. condenser circulating set; Birmingham Gas Works, Birmingham, N. Y., 60-hp. blowing unit; Empire Steel & Iron Company, Mt. Hope, N. J., 30-hp. circulating set; United Electric Light Company, Springfield, Mass., 50-kw. generator set; Fisherman Cold Storage Company, Provincetown, Mass., 25-hp. pumping set; Union Railways Supply Company, Atlantic Highlands, N. J., 25-hp. forced draft set; Cleveland Electric Illuminating Company, Cleveland, Ohio, 380-hp. turbines, to drive boiler feed pumps; Consolidated Coal Company, Fairmont, W. Va., 200-hp. pumping set; Sandusky Portland Cement Company, Dixon, Ill., 60-hp. condenser circulating set.

An interesting installation of electrical machinery was recently completed at Boley, Okla. All the inhabitants of the town are colored people, the town having been started under the auspices of Wiley University, Marshall, Texas, which is an institution for the higher education of colored people controlled by the Freedmen's Aid Society of the Methodist Episcopal Church. The apparatus installed was supplied by the Gregory Electric Company, Sixteenth and Lincoln streets, Chicago, Ill., and the plant is of interest as being the first electric light and power plant in the United States installed, operated and owned by colored men. All the electrical engineering work was done by colored people.

A special meeting of the stockholders of the Firth-Sterling Steel Company, Pittsburgh, has been called for June 12 to vote on a proposition to sell the projectile plant belonging to this company near Washington, D. C., to the Washington Steel & Ordnance Company, which is being organized to operate the plant. The Firth-Sterling Steel Company will receive in payment capital stock of the Washington Company. The stockholders will also be asked to vote for a reduction of the common stock to the amount of 7500 shares, and the issue in lieu thereof of 7500 shares of preferred stock, representing \$750,000 of capital stock. There will then be \$750,000 common and \$750,000 preferred stock.

Employers' Liability and Workmen's Compensation*

A Review of the New Jersey Law and Its Elective Feature—The Question of Insurance

BY WM. B. DICKSON.†

In discussing the subject of "Employers' Liability and Workmen's Compensation" I will not attempt to review the past nor to indicate the steps by which this important subject has been brought so prominently before the American people. The evils of the old system are generally recognized and admitted by intelligent employers. That public opinion has been thoroughly aroused is evident from the fact that in 10 States commissions have been appointed by the Governors or Legislatures to study these questions and recommend legislation.

In April, 1910, Governor Fort of New Jersey, acting under a joint resolution of the Legislature, appointed a commission to inquire into and recommend legislation on the subject of employers' liability. This commission, of which I had the honor to be president, was composed of two employers, two representatives of labor and two legislators, one each from the House and the Senate. In January of this year the commission presented its report, accompanying it with a proposed bill on employers' liability and workmen's compensation. This bill passed in the Senate by a vote of 16 to 1 and on Monday of this week passed in the House by the remarkable vote of 54 to 0, and was signed by Governor Wilson on Tuesday, April 4.

New Jersey has thus given a notable lesson in non-partisan legislation. The commission was appointed by the Republican Governor Fort. The commission's bill was passed by a Republican Senate by a vote of 16 to 1 and then by a Democratic House by a vote of 54 to 0. Last, but not least, it was signed by that great representative of true Democratic principles, Governor Wilson. I am by tradition a Republican, but if the Democratic party can produce and will sustain leaders such as Governor Wilson in New Jersey and Francis Lynde Stetson in New York, I can imagine no more inspiring career for the young man, ambitious to serve his country, than to fall in behind and keep step with such men.

The bill, which is divided into three sections, may be briefly outlined as follows:

Changes in Previous Laws

SECTION I.—This section deals entirely with modifications of the present law. It retains the proviso that the negligence of the employer must be shown to have been the natural and proximate cause of the injury. This proviso was retained, not because the commission did not believe in compulsory compensation, but because the weight of legal opinion received in reply to inquiries was against the constitutionality of any plan whereby an employer would be compelled to compensate an injured workman regardless of his (the employer's) fault or negligence. The wisdom of this conclusion has since been demonstrated by the recent decision of the New York courts declaring the New York act in this respect to be unconstitutional, even in the hazardous trades.

The New Jersey elective scheme differs from that of New York in an essential feature, in that the election must be made at the time of hiring, whereas in New York it is made after the accident. As a result, I am informed that the New York law has been practically a dead letter, as the workmen have naturally elected to sue under common law rights. In New Jersey, if the workman at the time of hiring refuses to accept a compensation law which the Legislature has declared to be equitable, the employer can refuse to hire him, and in doing so will no doubt be sustained by public opinion.

Section I, however, modifies the present law of employers' liability by entirely abrogating the two old de-

fenses usually known as "fellow servant" and "assumption of risk." It also modifies the law of "contributory negligence" by providing that the employer must prove that the negligence of the employee was "willful." This term is defined in the bill as: (1) Deliberate act or deliberate failure to act, or (2) such conduct as evidences reckless indifference to safety, or (3) intoxication.

It will be observed that this section deals entirely with the liability of the employer and, standing alone, strips the employer of those defenses which in the past have been of the greatest value to him in defending suits at law.

The members of the commission were unanimous in their opinion that, regardless of any other legislation, the above modifications in the present law should be made, for the following reasons:

1. The defense of "fellow servant." In the great majority of cases the employee has no voice in the selection of his fellow servants, and the mere fact of having the same employer should not in itself release the employer from a liability which he would otherwise incur.

The injustice of this rule may be illustrated thus: An accident occurs, due to the act of an employee, which results in the injury of a fellow employee and also of an outsider in no way connected with the work. The outsider may and often does secure redress, while the employee is barred solely on account of his being a fellow servant.

2. The defense of "assumption of risk." While theoretically a workman may be presumed to have a choice in the selection of his employment and to have carefully weighed the risks naturally inherent therein before going to work, as a matter of fact in the vast majority of cases the choice is narrowed down to the acceptance of such risks or no work. In this connection the objection has been made by some employers that for extra hazardous work extra wages are paid. An instance was cited where riveters in a shop were paid \$3 per day, while men doing the same work in the erection of high steel buildings were paid \$6. The commission's view of this objection was that in the case of the workman on the high building he was placing his life and limbs in jeopardy every minute of the day, and this should be a sufficient offset to the extra wage without asking him to throw in the scale also the future welfare of those naturally dependent on him.

3. The defense of "contributory negligence." The commission recognized the fact that this defense is founded on principles of justice. As the law now stands, however, any degree of negligence on the part of the employee was sufficient to bar his action, even though the employer was also guilty of negligence. In order to prevent injustice by the nonsuiting of an injured employee on a mere technicality—*i. e.*, where his negligence is relatively trivial—the commission incorporated in its proposed bill a provision that the employer must prove "willful negligence" on the part of the employee.

In suggesting these modifications in the present law the commission intended primarily to abolish these obsolete defenses because of their inherent injustice. Incidentally, however, the removal of these defenses leaves the employer in a less tenable position in ordinary suits at law, and he will therefore naturally be more willing to assent to the provisions of Section II.

Elective Compensation for Workmen

SECTION II.—This section contains an elective system of workmen's compensation, and is made as nearly as possible automatic and universal by providing that every contract of hiring, express or implied, shall be presumed to have been made with reference to the provisions of this section, unless either party has notified the other in writing of his intention to continue under his common and statute law rights, as expressed in Section I. Then follows the schedule of compensation, which may be briefly summarized as follows:

For temporary disability, 50 per cent. of wages.

For disability total and permanent, 50 per cent. of wages for 400 weeks.

For disability partial and permanent: A schedule of

* Address delivered before the American Academy of Political and Social Science, Philadelphia, April 8, 1911.

† First vice-president of the United States Steel Corporation.

definite injuries has been prepared covering as nearly as practicable the most common and obvious forms of injury. The compensation is half wages, ranging from five weeks for the loss of one joint of a toe up to 200 weeks for an arm.

For death, the compensation is based on the number and relationship of actual dependents, but is distributed, in case of no will, in accordance with the intestate law of the State.

The maximum in all cases, including death, is \$10 per week for 300 weeks, except in case of total permanent disability, when payment is extended to 400 weeks.

This bill applies to all employments, including domestic service, the only exception being "casual employments."

Compensation and New Legal Status Go Together

SECTION III.—This section deals principally with definitions, but aside from these has one paragraph to which the commission attaches great importance—*i. e.*, a proviso that sections I and II are declared to be inseparable, and if any essential part of either section be declared unconstitutional, so that the whole of such section must fall, the other section must fall with it and not stand alone.

In framing this clause the commission had in mind the situation which exists to-day in Ohio, where a law has been passed which simply removes the employer's present defenses. Laboring under this handicap, the Ohio employers are now striving to influence pending legislation which will provide for workmen's compensation; but, of course, they cannot hope to wield as much influence as before the defenses were abrogated.

The New Jersey Commission, while unanimously of the opinion that the two defenses of "fellow servant" and "assumption of risk" should be entirely abrogated, and that of "contributory negligence" materially modified, have tried to deal with the whole subject in a practical and businesslike manner, by incorporating in the same bill the removal of these defenses and the schedule of compensation. Their aim has been, not to strip the employer of his defenses without giving him a harbor of refuge, and by the proviso mentioned these two ideas are made to stand or fall together.

The one weak point in most of the legislation proposed in the various States, including New Jersey, is the fact that, in the last analysis, the payment of the compensation, even after the amount has been agreed upon, is dependent on the continued solvency of the employer. This condition will probably be met, partly at least, by legislation permitting the transfer of the liability to the company insuring the employer, providing that such company is approved by the State Commissioner of Insurance.

Reasons for Employers' and Employees' Election

The commission confidently expects that the elective section of the act will be generally accepted by both employers and employees, for the following reasons:

By the employer:

1. Because his liability is limited and he is thus relieved of the danger of harassing lawsuits for excessive damages.

2. By reason of the abrogation of two defenses and modification of another the position of the employer who refuses to accept the elective law will be less tenable.

3. Because he can in a large measure add the expense to cost of manufacture and recover it in his selling price.

4. Because he can readily insure his liability.

By the employee:

1. The practical certainty of settlement in accordance with the schedule, as against the uncertainty of an appeal to common law rights.

2. Promptness in settlement, as against the "law's delay."

3. All the money is paid to the injured person, as against the heavy attorney's fees and court expenses of the suit at law.

Protection by Insurance

In the various hearings on the proposed bill the one feature which has impressed me most has been the evi-

dent fear on the part of the small manufacturer or employer that the bill will impose unusual burdens on him. It seems to me that the answer to this is that he can protect himself by insurance. That the cost of insurance under existing systems is excessive I believe to be true, but that is not the worst feature. Heretofore the aim of the employer has been to seek by insurance to minimize the outlay, and the welfare of the injured or his dependents has not been a factor in the problem. The present system simply shifts the fight against the injured employee from the employer to the insurance company, which throws the whole force of its trained legal organization and its financial resources against the inexperienced, ignorant or otherwise helpless injured employee. In fact, the whole aim of the insurance companies has been to use every legal device to avoid payments to victims of accidents. That they have been fairly successful in attaining this object would seem to be indicated by the report of the New York Commission, which shows from statistics of nine companies that on an average only 36.34 per cent. of that which employers pay in premiums is paid in settlements of claims and suits. This is clearly a great economic waste.

MUTUAL ACCIDENT COMPANIES.

The remedy lies in the organization of one or more mutual accident insurance companies, conducted along the lines that have been so conspicuously successful in the factory mutual fire insurance companies which have been operating for the past 60 years in New England. The first purpose of these companies has been to prevent fires. They not only advise their members just what must be done to prevent fires by methods of construction and maintenance, but they go further and refuse to admit to membership any factory which will not conform to their high standards.

The result has been a reduction in the cost of fire insurance from \$2.50 per \$100 to 7.17 cents, which latter figure is the average yearly cost for the past 13 years. The adoption of this system will fully protect the small employer, and will at the same time attack the problem at the right end by reducing the number of accidents, which, after all, is the great desideratum.

I venture the opinion, with all due respect to our friends the insurance men, that in the near future it will be repugnant to an aroused and enlightened social conscience that the insurance of injured workmen should be a source of profit to any one.

A Pennsylvania Bill Follows the New Jersey Plan

Imitation is the sincerest form of flattery. I have here a draft of an act which, within the past week, has been presented to the Pennsylvania Legislature by men affiliated with the labor interests of your State. This act is practically a duplicate of the New Jersey one, the only changes being minor ones to make it conform to the local conditions.

The New Jersey bill is probably the most advanced legislation on this subject in this country. Personally, however, I am convinced, from my study of the subject, that even this bill, while a distinct advance, does not provide a permanent solution of the problems involved. This, in my judgment, must come through a system of State insurance, which shall be compulsory both on the employer and the employee. Before such a plan can be adopted in this country the federal and State constitutions must be amended.

The Mason Engineering & Mfg. Company, recently organized, will erect a plant at West Middlesex, Pa., for the manufacture of water heaters. The building will be of brick and concrete, and the company expects to begin manufacturing about August 1. Frank Large, Sharon, is president; Joseph Metz, West Middlesex, vice-president; Charles Pierce, Sharon, treasurer; William E. Elliott, Sharon, secretary.

The offices of the Pittsburgh Supply Company have been removed from the Frick Annex Building to the Jenkins Arcade Building, Pittsburgh, Pa.

Modern Shop Management*

The Problem of Increasing the Returns of Both Employer and Employee on an Ethical Basis—Fundamentals of Efficiency

BY DAVID VAN ALSTYNE,†

However impracticable the programme of socialism may be, it seems to me that we are drifting toward community interest and government control and ownership with all its inefficiency and awkwardness, and will continue to, unless the employing class, which is the money-making class, can be made to realize that to whatever extent its moneymaking is detrimental to the community as a whole, it is simply encouraging the spread of socialistic tendencies. Sooner or later organized labor will find politics its most effective weapon and its tendency will be socialistic.

Present management of "big business" is probably not much more efficient or freer from evils than government management, but the possibilities of individual control are far greater than those of community control and must be realized if we are to escape the latter.

Among the potent factors for progress in our own social organization perhaps the most potent are the employers of labor, the managers of men. Competition forbids employers doing more for their employees than their competitors; rather inclines them to do less. So that if reforms are to be accomplished they must be accompanied by greater profits. The chief interest the employer should have in the welfare of his employees is to enable them to earn more than his competitors' employees are able to earn.

All other interests are incidental and will be largely taken care of by the employees themselves if they have the money with which to do it. Therefore the social reformer who would effect his reform through the employer is confronted with the task of increasing the employees' wages and at the same time increasing the employer's profits. It is the instinctive desire of every employer to promote the welfare of his employees to the fullest possible extent as long as it does not interfere with his profits. His philanthropy and good will do not extend much beyond this.

A small concern managed by a man of ability is likely to be fairly efficient because most of the details can be kept under his personal observation. As the business grows it becomes necessary for him to leave it more or less to his subordinates. That part of the business which he is most interested in or best acquainted with will continue fairly efficient; the rest dropping to an efficiency commensurate with the ability of those immediately in charge. When it reaches the magnitude of our large railroads and industrials, the chief executives are almost wholly out of touch with the details of the business and with the individuals of the rank and file.

System, Not Leadership, the Important Thing

In proportion as the magnitude of the business increases, the importance of the personality of the leader decreases and that of the system and organization through which he exercises his personality increases. It is through a systematic control of employees of the rank and file that he reduces waste of time and material, rather than through his personal influence over his immediate subordinates. The measure of the efficiency of an organization is the extent to which the enthusiasm of the individuals in it is maintained through the organization and not through the personality of the men at the head of it.

Few men in positions of great executive responsibility realize how little influence they exert on the business under them. It is not a serious exaggeration to say that

the difference between the results obtained by an average manager and one who is known as an exceptionally able man is not material; and whether the result is good or bad is largely accidental in so far as the man in charge is concerned, and chiefly due to conditions surrounding the business.

The conventional manager depends upon cut and dried expedients rather than scientific standards or ideals. His methods are based more on superficial observation and haphazard opinion than on the fundamental laws governing his business. Failure to accomplish the results he hopes for is not, in his opinion, a criticism of his methods but rather calls forth his regret at the passing of the good old times when men were less independent and indifferent or conditions otherwise more favorable.

Managers of the New Type Scarce

There is as much or more organizing ability now than there ever was, but through the consolidation of many small concerns into a few large ones, great responsibility is being put upon a few men who are not trained for it. The jobs have grown faster than the men.

Of promoters or "captains of industry," whose far-sightedness indicates where development is needed and where money can be made, there is no lack; but managers who will patiently standardize each detail in the operation of their business and get the maximum out of it, are exceedingly scarce.

Under detail-control management as little as possible is left to individual judgment, but the movements of every man, every piece of material and the expenditure of every dollar are guided according to a prearranged schedule.

If the objection is made that guiding every move men make makes machines of them, destroys their initiative, the answer is that there is not much initiative to destroy and that the best results are obtained for both employer and employee when men are worked like machines and treated like men. In large organizations they are more likely to be treated like machines and allowed to work as their own individual fancy dictates.

Not the least asset created by the management which has accurate record of the individual, is the impression made upon the employee that the highest officials know of him personally, that he is less subject to the whims and prejudices of his immediate superior and that he is recognized as an essential part of the organization which arouses an enthusiasm that cannot be too highly valued. The organization created by this control of details is of vastly greater importance than the facilities or equipment. The good organization will obtain good results with poor equipment, but the poor organization will obtain poor results no matter how good the equipment may be.

Conventional vs. Detail Management

Under conventional management the foreman, or man immediately in charge, has a fair technical knowledge but usually little organizing ability. The multitude of details under his jurisdiction receive his attention a few at a time, the others drifting along according to the fancy of the individuals handling them. The few details receiving the attention of the foreman are brought up to a standard proportionate to his skill and knowledge, and begin to drop again as soon as he returns his attention to some of the other details. The result is to confine attention chiefly to those details which seem of most importance and to let the rest drift along as they will. Hence, average output per dollar expended for labor and

* Extracts from a paper read before the Congress of Technology at Boston, April 11, 1911, at the fiftieth anniversary of the Massachusetts Institute of Technology.
† Vice-president Allis-Chalmers Company, Milwaukee, Wis.

material is small and must continue so as long as so much depends upon the efforts of one man.

Under detail management an investigation of the possibilities of each operation and each pound or foot of material is made and a standard set per unit of output. These investigations are made and the standard set by experts each in his own line. Records giving a continuous comparison of each detail of labor and material with its standard indicate which are satisfactory and which need attention.

The value of establishing a standard or measuring stick for every detail cannot be overestimated. It not only gives the manager a feeling of security in his knowledge as to exactly how his affairs stand and as to what needs his concentrated attention, but also gives his subordinates something definite to work for and arouses their enthusiasm, especially when extra pay is given for reaching the standard.

Fundamentals of High Efficiency

Fundamental principles in reaching high efficiency are:

1. Records. An accurate record of each detail, or group of details, of labor and material. A record should be looked upon as a working tool and its value measured by its capacity for producing lower cost and greater output.

2. Standardized conditions. This involves putting the equipment into such condition as will make maximum output and most economical operation possible.

3. Standardized quality. The determination of a standard of quality of output or efficiency of service below which it is not permissible to go, is necessary because efforts to reduce cost and increase output may result in lowering the quality unless systematically prevented.

4. To find out what is to be done and how to do it. This involves stripping the work of all unnecessary refinement, finish, material and operations, bearing in mind that what is worth doing at all is worth doing well enough for its purpose and not a bit better, and then determining the simplest and quickest method of doing it with the facilities at hand and establishing a time or cost limit.

5. Written instructions as to the standard method of reaching the required time or cost. Such instructions constitute a textbook of the business and are not to be deviated from. Employees should be constantly checked on their knowledge and close observance of instructions, otherwise the instructions are rarely fully understood and are quickly forgotten or ignored.

6. Constant comparison of actual performance with standard to see that the actual reaches the standard and continues there. It is not essential that allowances, standards or ideals should be ultimate or represent the highest state of the art; in fact such standards may appear to be so hopelessly impossible of attainment as to be undesirable for present purposes. The standard should be set as far ahead of present practice as is practicable. The ideals of to-day are the only ones we are immediately interested in reaching though they may be the practice of to-morrow, and it then becomes necessary to set up new ideals.

The essential thing is to see that whatever ideals are set are reached, and that as long as they are not changed there shall be no falling away from them. This is the principle which is most neglected by managers and at which usual management fails. It is easy to establish rules and standards, but it is not easy to have them lived up to continuously. Unless the organization provides for comparing in detail what it does with what should be done, with mathematical accuracy, a high efficiency cannot be maintained. It is a common experience for a concern to reach a good efficiency during dull business and to drop to a low efficiency during heavy business because the management has so little control over details.

These principles are a decided recognition of the capacity of the individual and may be considered antagonistic to some of the expressed principles of organized labor.

The usual form of trade agreement which binds the

employer to pay fixed rates per hour, day or week and the employee to put in his time and produce whatever the employer is able to get out of him is economically wrong, because one-sided and indefinite. Each has his opinion as to what constitutes a fair day's work, which the employer will constantly try to increase and the employee tend to decrease.

What one employer may consider a fair output may be too little for another employer and more than required by a third. It is to the interest of both employer and employee to agree upon a reasonable time for each operation, so that each may know definitely what he is to expect from the other.

An agreement which binds the employee to a definite output as well as the employer to definite working hours, rates of wages, &c., is a safeguard for both parties.

During the recent period of great commercial activity many complaints were heard of the difficulty in getting skilled men; many employers claiming that the unions were making men indifferent and independent and through various restrictions, preventing the development of a sufficient number of skilled men to supply the demand.

I am inclined to think that to a certain extent this may have been true and that it was largely the fault of the employer for permitting it. The influence of the unions, however, in this direction is limited and only indirectly the result of their efforts to better their conditions. The chief cause of the scarcity of skilled labor is the extreme fluctuations in business, creating at one time an abnormal demand and at another throwing both skilled and unskilled labor out of work.

There are more skilled men and there is skill of a higher order than ever before; but by the nature of things their number is more or less adjusted to the average demand. There is always available a nucleus of those good men who have comparatively steady work and during times of extreme activity the only men available are those who spend a considerable portion of their time in idleness. In times of great activity there is no good opportunity to train this generally unemployed increment, and in dull times idleness encourages laziness, indifference and a loss of the little skill men acquire while at work. We are inconsistent in throwing as many men as possible out of work as soon as business begins to decline and then complaining that they are not capable of the highest efficiency when they are employed.

In my opinion this is the greatest evil for which our present social system is responsible, and it is also the most difficult to regulate. Apprenticeship, trade schools and like efforts to train skilled workmen are all good to a certain degree, but their influence is insignificant as compared with the influence of long periods of enforced idleness to which the laboring class is subjected.

It is to be hoped that some day it may be found practicable for the law to require employers to take care of a certain portion of their idle employees during periods of depression, and the government to give employment to the rest on public improvements.

It is encouraging to note the number of concerns which are introducing old age pensions, profit sharing, &c. It is to the pecuniary interest of the employers to do those things themselves rather than to wait for them to be done by the government with its inevitable inefficiency.

The Value of Welfare Methods

Every large employer of labor can afford to have what might be called a "sociological department," whose duty it would be to look to the welfare of its employees, so long as it is not done in a patronizing manner. Such a department should keep a personal record of each employee, consisting of whatever information of value is obtainable, to be used in deciding as to desirability as an employee, eligibility for promotion, instead of depending on haphazard opinions which are usually superficial and biased. It would also keep as closely in touch as possible with employees to find out what secret grievances they are brooding over, due to brutal, prejudiced and partial treatment by superiors and be ready to lend a helping hand in case of misfortune, sickness or death. Apprenticeship, pensions, profit sharing, prevention of

accidents and hospital service might also properly come within the jurisdiction of this department.

Having in mind that the large employer will not attain highest efficiency which will continue indefinitely until he produces as closely as possible the personal relationship between superior and subordinate which exists in the case of small employers, it would seem that the best way to accomplish it is through a department created for the purpose. This department would, in the long run, be one of the most effective in increasing net earnings.

Financial Control May Be an Obstacle

The speculative financial influence is a serious obstacle to the progress of better management and, in consequence, to its own interests. Not only does it not understand the human element in its business, which is the important element with a large employer of labor, but being in control it usually dictates a narrow, opportunist sort of policy based on superficial opinion rather than scientific investigation. It cannot see that a moderate investment in better organization and management will, in nine cases out of ten, save a large investment in equipment, besides reducing the cost of the operation. As a result, executives, no matter how well intentioned, are afraid to depart from the narrow conventional limits prescribed, so that "big men" are not developed for the "big" positions.

Little improvement can be expected until the average board of directors takes more interest in the business it

good. It is strange but true that it should be difficult to persuade the owners of a property to accept greater profits with small investment. It is equally true that the scientific manager will find it more difficult to educate his superiors than his inferiors. A proposition to invest one dollar to save ten is frequently less attractive than a proposition to invest ten dollars to save one, because it is unconventional.

Most men seem to have a genius for seeing things as they want to see them, not as they are, and for fixing their attention on non-essentials. To make real progress, such characteristics must be overcome, and the one and only way it can be done is to show how much more profitable is a policy based on scientifically accurate knowledge.

The science of management is in a very undeveloped state, but progress is being made and another generation or two will look back upon the methods of to-day as exceedingly crude.

Iron Ore Docks on the Lakes

Details of Capacity and Construction, with Recent Additions

W. A. Clark, chief engineer of the Duluth & Iron Range Railroad, Duluth, has made a new compilation of data of the iron ore shipping docks on Lake Superior

RAILROAD	LOCATION	DOCK NO.	NUMBER OF PACKETS	STORAGE CAPACITY TONS	HEIGHT, WATER TO CENTER HINGE HOLE	HEIGHT, WATER TO DECK OF DOCK	WIDTH OF DOCK OUTSIDE TO OUTSIDE OF PART'N POSTS	LENGTH OF SPOUTS	LENGTH OF DOCK	ANGLE OF POCKETS	CU. FT. PER PACKET TO BOTTOM OF STRAINERS
CHICAGO & NORTHWESTERN RY.	ESCANABA, MICH.	1	184	21143	28'10"	48'6"	37'0"	21'0"	1104'	39° 30'	1418
" "	"	3	226	28792	31'2"	62'8"	37'0"	27'0"	1356'	45° 0'	1969
" "	"	4	250	34923	36'6"	59'2"	37'0"	30'0"	1500'	45° 0'	2191
" "	"	5	370	120158	37'9"	70'5 1/2"	52'2"	32'1 1/2"	2220'	45° 0'	4142
" "	"	6	320	69760	40'0"	70'0"	50'2"	30'0"	1920'	45° 0'	4114
" "	ASHLAND, WIS.	1	234	42120	40'0"	70'0"	50'2"	30'0"	1404'	45° 0'	3215
" "	"	2	234	42120	40'0"	70'0"	50'2"	30'0"	1404'	45° 0'	3215
	TOTAL		1818	339018							
DULUTH & IRON RANGE RAILROAD	TWO HARBORS, MINN.	1	208	56907	39'3"	74'0"	51'8"	34'0"	1376'	48° 00'	4075
" "	"	2	208	41600	33'5"	57'6"	49'0"	27'0"	1280'	38° 42'	3006
" "	"	3	170	31000	40'0"	66'0"	49'0"	27'0"	1054'	43° 32'	2090
" "	"	4	168	36960	37'0"	62'0"	49'0"	29'0"	1042'	38° 42'	3279
" "	"	5	168	35450	39'0"	66'0"	49'0"	30'0"	1050'	43° 32'	3426
" "	"	6	148	43246	40'0"	73'0"	51'3 1/2"	32'4"	920'	45° 00'	4272
	TOTAL		1070	247763							
DULUTH, MISSABE & NORTHERN RY.	DULUTH, MINN.	2	384	59120	32'0"	77'6"	49'0"	27'0"	2336'	45° 0'	2368
" "	"	3	384	80640	40'7"	67'1 1/2"	59'0"	27'0"	2204'	45° 0'	2382
" "	"	4	384	119274	41'9 1/2"	72'6"	57'0"	30'1 1/2"	2304'	45° 0'	3267
	TOTAL		1152	259034							
GREAT NORTHERN RY.	SUPERIOR, WIS.	1	374	100080	40'0"	73'0"	62'8"	32'4"	2214'	45° 0'	4972
" "	"	2	360	94500	40'0"	73'0"	62'8"	32'4"	2100'	45° 0'	4922
" "	"	3	326	88020	40'0"	73'0"	62'8"	32'4"	1956'	45° 0'	4652
" "	"	4	302	106304	40'2"	75'0"	62'6"	34'6"	1812'	47° 30'	5347
	TOTAL		1352	389004							
DULUTH SOUTH SHORE & ATLANTIC RY.	MARQUETTE, MICH.	4	200	28000	27'9"	47'3"	36'8"	21'1"	1200'	39° 45'	1800
" "	"	5	200	50000	40'0"	70'10"	51'0"	32'4"	1236'	45° 0'	3448
	TOTAL		400	78000							
LAKE SUPERIOR & ISHPEMING RY.	MARQUETTE, MICH.	1	290	35000	30'9"	54'0"	50'0"	27'4"	1232'	38° 49'	2710
MINNEAPOLIS, ST. PAUL & SAULT SAINTE MARIE RY.	ASHLAND, WIS.	1	314	48356	40'0"	66'2"	36'0"	27'0"	1908'	50° 45'	2425
" "	SUPERIOR, WIS.	1	100	30000	42'5 1/2"	78'0"	58'0"	32'1 1/2"	600'	47° 00'	1775
	TOTAL		414	78356							
CHICAGO, MILWAUKEE & ST. PAUL RY.	ESCANABA, MICH.	1	240	50400	40'2 1/2"	66'6"	52'0"	13' 2 1/2"	1500'	45° 0'	2900
" "	"	2	240	63500	40'11 1/2"	69'2"	54'0"	30'4 1/2"	1500'	45° 0'	3150
	TOTAL		480	113900							
ALGOMA CENTRAL & HUDSON BAY RY.	MICHIGICOTEN, ONT.	1	12		34'0"	43'4"	25'0"	22'6"	311'9"	44° 0'	
CANADIAN NORTHERN & ONTARIO RY.	KEY HARBOR, ONT.	1	20	2000	41'5"	61'9"	28'0"	30'0"	240'0"	37° 30'	2215

Record of Ore Docks on the Great Lakes.

directs and becomes more intimately acquainted with the details. It would seem that one way to accomplish this would be to have each department board report direct to the board instead of through the president, who as a rule is a specialist in only one department. It would also seem advisable for the board to have specialists report on the efficient operation of all departments in the same manner as chartered accountants report on the accounting department.

For those who have the courage to break away from some of the old traditions and conventional methods there is an unlimited field. The difficulties are great, but the possibilities are greater. The results are conspicuously

and Lake Michigan. It is revised to May 1, 1911, which is the nominal opening of the navigation season, and thus includes all the additions that have been made in the past year or that are now under construction. Here-with appears a reproduction of Mr. Clark's chart, which makes an impressive showing of the ore handling capacity of the upper lake docks.

The Struthers Furnace Company has authorized the construction of a gas cleaning plant at its furnace at Struthers, Ohio, for which plans are being prepared by Julian D. Page of Youngstown, formerly with the W. B. Pollock Company.

Handling Philadelphia's Ore Imports

The largest vessel built abroad for the transatlantic ore trade, the steamship *Tellus*, arrived April 7 at Philadelphia, on her maiden voyage, with a cargo of 11,600 tons of Swedish iron ore from Narvik, Norway, consigned to the Warwick Iron & Steel Company, Pottstown, Pa. The vessel left Narvik March 19, and the voyage of some 3650 miles was uneventful, the ship proving itself to be a good sea boat.

The *Tellus* was designed as a general bulk cargo carrier and was built and engined by William Doxford & Sons, Ltd., Sunderland, England. She is 445 ft. long, 60 ft. wide, has a molded depth of 31 ft. 6 in. and a draft of 28 ft. 6 in., is built of steel and has a shelter deck extending the full length of the vessel. Her carrying capacity is rated from 12,000 to 13,000 tons, the area of the holds aggregating 556,040 cu. ft. There are four holds, No. 1, forward, being 67 ft. long; No. 2, 139 ft.; No. 3, 65 ft., and No. 4, aft, 76 ft. Water tanks for ballast, with a capacity of 3370 tons, are provided, 1800 tons of which are carried in side tanks, located between the shelter and main decks and extending the full length of the vessel, the remainder being carried in bottom tanks. Large hatchways extending through the shelter and main decks provide easy access to the holds. The hatchways to the Nos. 1, 3 and 4 holds measure 36 by 30 ft., while the No. 2 hold has two hatchways, one 36 by 30 and one 32 by 30 ft. For unloading purposes, derrick hoists are located at each hatchway, the hoists being operated by steam winches, of which there are 11.

The engine, triple expansion, is located amidship. It has cylinders 27½, 44½ and 76 in. in diameter, and a stroke of 51 in., developing 3000 hp. The boiler installation includes three marine boilers, 17 ft. 6 in. by 11 ft. 3 in., with nine furnaces 4 ft 7 in. in diameter. The bunker capacity is 1257 tons of coal. The vessel is owned by Wilhelm Wilhelmsen of Tronsberg, is under command of Capt. Karl Andersen, has been chartered for a term of nine years by the Nova Scotia Steel & Coal Company, and will be used in the transportation of Wabana ore, both in the transatlantic and Atlantic Coast trade.

The New Philadelphia & Reading Ore Pier

The *Tellus* was the first to discharge a full cargo at the new ore pier of the Philadelphia & Reading Railway Company at its Port Richmond wharves, Philadelphia. This pier, which has been erected for some time, but delayed in operation by the noncompletion of the power apparatus, has two unloading units, which represent one-half of the ultimate plant. The installation was made by the Brown Hoisting Machinery Company, Cleveland, Ohio, and represents the electrically driven "fast plant" unloading machinery designed by that company. Each unit has a rated capacity of 300 tons per hour, working with 5-ton grab buckets, but as the machinery was stiff and numerous tests were made with the weighing devices and other parts of the equipment, the cargo was not discharged at much more than 50 per cent. of the rated capacity.

The unloading pier has a width of 69 ft., and the unloading device spans four railroad tracks; the length of the runway on the pier is 650 ft., which will enable two small vessels to be unloaded at one time. A suspended movable weighing hopper of 60 tons capacity, with standard weighing apparatus, serves each unit, the bottom of which is 15 ft. above the railroad tracks. Cars are handled in either direction on three of the tracks on the pier by means of a Dodge system of rope drive, a transfer table at the outer end of the track serving to transfer the cars to the different tracks as desired. One track is given over exclusively to the incoming movement of empty cars.

The arms of the unloaders are 50 ft. above the pier and extend outward, when at operation, 60 ft. from the wharf line, being raised into a perpendicular position when not in use, or when moving from one hold to another, or when a vessel is being docked. All the equipment is electrically driven, and, while handled by inexperienced men, very satisfactory results are said to have

been obtained on the first work out of the machines. In a large number of cases weights taken of single bucketfuls showed them to have run well over 20,000 lb. The unloading device will from now on be used for the regular work of unloading at this pier.

Central Station Welfare Work

Plans for Benefit of Electric Light and Power Employees

The Public Policy Committee of the National Electric Light Association, which during the past winter has been devoting considerable attention to the various aspects of welfare work as related to the central station industry, held a final meeting at the New York headquarters in the United Engineering Building, March 28, when the report, which had been prepared through a series of long conferences, was unanimously adopted for presentation to the member companies, in number nearly a thousand, at the annual convention in New York next May.

Several of the companies already have in force some of the schemes proposed, but it is not assumed that every company will wish to adopt every form of relationship outlined in the report. The plan includes accident insurance, sickness insurance and death benefits, service annuities, profit sharing, employees' savings and investment funds, and life insurance, although with regard to the last item it is suggested that the companies limit themselves to providing their employees with all possible information in connection with safe low cost life insurance, and do not put in force any plan of their own.

By unanimous vote the term "pension" has been dropped and the service annuity adopted as the recognition of an automatic recompense for continuous service, and the committee is of the opinion that member companies should provide such annuities for every male employee reaching the age of 65 and every female employee of 60 years, after continuous and satisfactory record of 10 years of service. The details of profit sharing are based upon the idea that it is better to have those engaged in the industry as partners than employees and that preferably profits of the employee based upon his wage scale should reach him in the securities of his company, and that dividends upon such securities should be paid in cash, in the manner customary with other security holders. Details are also given with regard to savings funds and investment funds, with the object of promoting thrift among employees and, where feasible, combining the plan with profit sharing, it having been found that the two work out very satisfactorily together.

The personnel of the committee is: Charles L. Edgar, chairman, president Edison Electric Illuminating Company, Boston, Mass.; Nicholas F. Brady, vice-president New York Edison Company; Charles A. Stone, Stone & Webster Corporation, Boston; H. M. Bylesby, Bylesby & Co., Chicago; Henry L. Doherty, president Denver Gas & Electric Company; W. W. Freeman, president National Electric Light Association and vice-president Brooklyn Edison Company; Samuel Insull, president Commonwealth Edison Company, Chicago; Joseph B. McCall, president Philadelphia Electric Company; Samuel Scovill, vice-president Cleveland Electric Illuminating Company; Gen. George H. Harries, vice-president Washington Railway & Electric Company; Everett W. Burdett, counsel of the association, and Arthur Williams, New York Edison Company, vice-chairman of the committee. The committee has also enjoyed the active co-operation of Thomas E. Murray, president Association of Edison Illuminating Companies; W. H. Blood, Jr., and R. S. Hale.

It is believed that it is the first time in the history of the country that an association having in its membership so many corporations, and representing over 90 per cent. of the investment and earnings in the industry for which it stands, has taken up such a subject in this comprehensive and thoroughgoing manner, and the report itself will be awaited with the utmost interest by all connected with public utilities and by economists in general.

Tariff Revision Begun

The Proposed Free List Extension

The first bill introduced in the House of Representatives by Chairman Underwood of the Ways and Means Committee was presented April 12 and is generally called the free list bill. It is an omnibus measure to meet the demands of various sections of the country where the sentiment is strong against the Canadian reciprocity bill because it omits from its provisions many articles that enter into general consumption. This free list bill, it is believed by the Democratic leaders and by the progressives, will satisfy the insurgents who refused last session to support the reciprocity bill. The enacting clause provides that it shall go in effect on the day following its passage, when the following named articles will be exempt from duty:

"Plows, tooth and disk harrows, headers, harvesters, reapers, agricultural drills and planters, mowers, horse rakes, cultivators, threshing machines and cotton gins, farm wagons and farm carts, and all other agricultural implements of any kind and description, whether specifically mentioned herein or not, whether in whole or in parts, including repair parts.

"Bagging for cotton, gunny cloth and all similar fabrics, materials, or coverings suitable for covering and baling cotton, composed in whole or in part of jute, jute butts, hemp, flax, seg, Russian seg, New Zealand tow, Norwegian tow, alooe, mill waste, cotton tares, or any other materials or fibers suitable for covering cotton and burlaps and bags or sacks composed wholly or in part of jute or burlaps or other material suitable for bagging or sacking agricultural products.

"Hoop or band iron, or hoop or band steel, cut to lengths, punched or not punched, or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation, with or without buckles or fastenings, for baling cotton or any other commodity, and wire for baling hay, straw, and other agricultural products.

"Grain, buff, split, rough and sole leather band, bend, or belting leather, boots and shoes made wholly or in chief value of leather made from cattle hides and cattle skins of whatever weight, or cattle of the bovine species, including calf skins, and harness, saddles, and saddlery, in sets or in parts, finished or unfinished, composed wholly or in chief value of leather; and leather cut into shoe uppers or vamps or other forms, suitable for conversion into manufactured articles.

"Barb fence wire, wire rods, wire strands or wire rope, wire woven or manufactured for wire fencing, and other kinds of wire suitable for fencing, including wire staples.

"Beef, veal, mutton, lamb, pork, and meats of all kinds, fresh, salted, pickled, dried, smoked, dressed or undressed, prepared or preserved in any manner; bacon, hams, shoulders, lard, lard compounds, and lard substitutes; and sausage and sausage meats.

"Buckwheat flour, corn meal, wheat flour and semolina, rye flour, bran, middlings and other offals of grain, catmeal and rolled oats, and all prepared cereal foods, and biscuits, bread, wafers, and similar articles not sweetened.

"Timber, hewn, sided or squared, round timber used for spars or in building wharves, shingles, laths, fencing posts, sawed boards, planks, deals, and other lumber, rough or dressed, except boards, planks, deals, and other lumber of lignum vitae, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all other cabinet woods.

"Sewing machines and all parts thereof.

"Salt, whether in bulk or in bags, sacks, barrels, or other packages."

The new steel plant of the Upson Nut Company, Cleveland, Ohio, was placed in partial operation April 12, two of the four open hearth furnaces and the blooming mill being started. The bar mill will not be ready for operation until about June 1.

The Pittsburgh Steel Company's Finances

The Pittsburgh Steel Company reports to the New York Stock Exchange for the year ended June 30, 1910, and six months ended December 31, 1910, as follows:

	Twelve months to June 30, 1910.	Six months to December 31, 1910.
Sales	\$11,506,005	\$5,137,817
Inventory of finished goods at end of period	\$40,090	1,200,246
Totals	\$12,346,095	\$6,338,063
Deduct:		
Inventory of finished goods at begin- ning of period	675,176	840,000
Materials used and cost of operations (including repairs and maintenance of plants)	9,311,938	4,433,864
Balance	\$2,358,979	\$1,064,108
Selling and general expenses	1,103,167	594,240
Balance	\$1,255,811	\$469,868
Miscellaneous income (net)	28,782	6,085
Total income	\$1,284,593	\$476,554
Interest charges	369,672	174,028
Net earnings	\$914,921	\$302,525
Common dividends	479,520	239,880
Surplus profits	\$435,401	\$62,645

The general balance sheet as of December 31, 1910, is as follows:

Assets.	
Real estate, buildings, plant and machinery (patent rights not valued)	\$13,251,194
Stocks of subsidiary companies	330,000
Cash	886,575
Accounts receivable (net)	1,554,483
Notes receivable	105,948
Loans and advances	843,706
Finished product, raw materials and supplies on hand	2,485,526
Prepaid charges	41,397
Total	\$19,498,531
Liabilities.	
Capital stock, preferred	\$7,000,000
Common stock	6,294,460
Chicago real estate, bond and mortgage	30,000
Time and demand loans	1,511,197
Accounts payable	1,338,524
Dividends payable January 1, 1911	119,880
Profit and loss	3,204,469
Total	\$19,498,531

The Board of Governors of the Exchange acted favorably on the application of the company to list \$7,000,000 of its preferred stock.

Railroad Equipment Orders.—The Pittsburgh & Lake Erie Railroad has ordered the 2000 freight cars for which it was recently in the market. The Virginia Railroad is reported to have placed an order for 1000 cars. The Chesapeake & Ohio is reported to be planning to build 1500 freight cars at its shops, but the report is not confirmed. The Grank Trunk is to build 30 cars at its own shop. The Texas Company has ordered 200 tank cars from the American Car & Foundry Company. Recent locomotive orders include 35 for the Western Maryland, 5 for the Florida East Coast and 2 for the Rutland. The Chicago & Northwestern is negotiating with the American Locomotive Company for 30 locomotives.

Recent orders taken by the Buffalo Forge Company, Buffalo, N. Y., for mechanical draft apparatus of considerable size include, among others, the Cambria Steel Company, Johnstown, Pa.; American Smelting & Refining Company, New York, N. Y.; Burgess Sulphite Fibre Company, Berlin, N. H.; Knickerbocker Portland Cement Company, Hudson, N. Y., and several export orders from agents in Germany, Japan and South America. The export business has been particularly active so far this year, with excellent prospects of exceeding any former season.

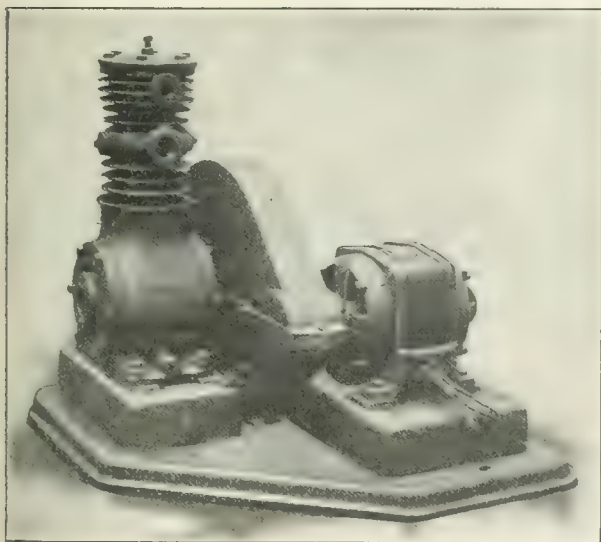
At the Midvale Steel Works, Nicetown, Philadelphia, April 15, eight workmen were killed and several others seriously hurt by the tilting of a ladle of molten steel. Among those killed was George F. Steel, superintendent of open hearth department No. 1.

The Clayton Motor Driven Air Compressor

A small size of motor driven air compressor designed especially for use in automobile garages is being built by the Clayton Air Compressor Works, 115 Broadway, New York City. The special features of this compressor are an inclosed frame, self-oiling bearings and no oil cups or stuffing boxes requiring attention on the part of the operator. The compressor is designed especially for service in garages of moderate size for inflating tires, cleaning cushions and inaccessible parts of the engines and cars, supplying the air blast for brazing or soldering operations, &c.

The machine is of the air-cooled type as water jacketing is not necessary for this class of service, and one of its special features which tends to increase the cooling effect is the fan construction of the driving pulley arms. As will be noticed from the engraving, the compressors are simple and compactly built, and all parts are readily accessible. In operation no adjustment is required, and the operator does not have to give them very much attention. The compressor is of the single-acting type, the air being compressed on the upstroke only. Belt, silent chain or direct connected drive can be used with these machines as they can be supplied with pulleys for belt drive, sprockets for silent drive or couplings for direct connection to electric motors, gasoline and steam engines and water or steam turbines.

If desired this compressor can be used in connection with an air receiver and in this case it is driven by an electric motor. When fitted up in this way an automatic motor starter and stopping device is mounted on the same base with the compressor, and the motor which gives a self-contained unit. Stopping and starting the motor automatically as the pressure in the receiver rises or falls keeps the tank continually full of air at the required pressure and ready for instant use. The compressor is lubri-



A 31 $\frac{1}{2}$ x 31 $\frac{1}{2}$ In. Vertical Single Acting Air Compressor with Geared Motor Drive Built by the Clayton Air Compressor Works, New York City.

cated from an oil reservoir in the base into which the connecting rod dips and throws oil on all the bearings.

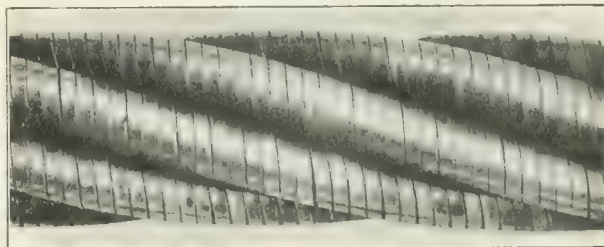
In addition to this unit the company also builds a larger compressor of either single, duplex or triplex type for more extensive and continuous service. This larger machine has water-cooled cylinders and can be fitted to any style of drive or arranged as an independent unit.

The Skinner Engine Company, Diamond Bank Building, Pittsburgh, is making installations of high-speed automatic engines, directly connected to generators, as follows: Municipal power plant, Greenfield, Ohio, two cross compound engines to drive alternating current generators of 200 k.v.a. and one simple engine to operate a 125 k.v.a. generator; Franklin Brewing Company, Columbus, engine to operate a 125-kw. generator; Coal Riv-

er Coal & Coke Company, Clothier, W. Va., engine to operate a 150-kw. generator; Pittsburgh Bridge & Iron Company, Rochester, Pa., engine to operate a 100-kw. generator; Phoenix Hotel Company, Lexington, Ky., two engines directly connected to 100-kw. generators; Troy Laundry Company, engine to operate a 125-kw. generator.

The Gore Wire Rope

The Waterbury Company, 80 South street, New York City, is manufacturing an improved form of wire rope under patents granted to Thomas Gore. This rope consists of a number of strands made in the customary way from round wire covered by a layer of flat wire. The



An Improved Form of Wire Rope Manufactured by the Waterbury Company, New York City.

strands are intended to take all the strains to which the rope is ordinarily subjected, and the cover is merely for the purpose of protecting these wires from abrasion and exposure and to assist the strands in retaining the grease supplied for internal lubrication and insure greater flexibility. In this way a wire rope has been produced which will maintain its initial factor of safety longer and assure a longer life for the sheaves and drums used in connection with it by changing the corrugated surface to a smooth one.

The rope illustrated is a 3 $\frac{1}{4}$ -in. plow steel dredge cable having an approximate breaking strain of 400 tons and weighing 15.9 lb. per foot. It is composed of six outer strands having 61 wires, 0.106 in. in diameter and served with flat wires that are 0.046 in. thick and 0.325 in. wide. The core of this rope is 1 $\frac{1}{4}$ in. in diameter and is composed of six strands, having 19 wires in each strand of various sizes to give sufficient strength to withstand the crushing effect of the outer rope. The flat wires are rolled from a cold drawn acid open hearth round bar which leaves the edges convex and prevents the wires from crowding during the flexing of the rope. These flat wires are wound over the strands at an angle of 60 degrees to have them lay transversely to the axis of the rope. In this way when the wires are worn through in the body of the rope, they will not protrude but will pack down into the interstices of the rope and increase its wearing surface.

Frederick Winslow Taylor, the well-known consulting engineer of Philadelphia, ex-president of the American Society of Mechanical Engineers and the originator of the movement known as scientific business management, will make an address on "The New Conception of Business and Industrial Efficiency," in Carnegie Hall, New York, Friday evening, April 28, under the auspices of the Civic Forum. Brief addresses will also be made by John Golden, president of the United Textile Workers of America, on the attitude of organized labor toward this movement, and by Frank B. Gilbreth, on its practical operation. This will be the first opportunity given in New York for the general public to hear a statement of the principles underlying the efficiency movement and their practical application. Details regarding tickets may be obtained at the office of the Civic Forum, 23 West Forty-fourth street.

The furnace of the Napier Iron Works, Napier, Tenn., is now producing at the rate of about 100 tons of iron a day. While it was out of blast in the three months preceding February 13, it was overhauled for repairs.

The National Metal Trades Association

Thirteenth Annual Convention, New York, April 12 and 13

The thirteenth annual convention of the National Metal Trades Association, held at Hotel Astor, New York, April 12 and 13, was the largest and most successful in the history of the organization. The topics considered are vital ones, and able speakers presented papers or entered into the discussion of the subjects in a more informal manner. Employers' liability was argued out in its various aspects as regards workmen's compensation. Industrial education received a fresh impetus by the resolve of the association to assist financially in the employment of an "evangelist," who will attack the work aggressively and in a broad way. Labor efficiency was taken up in this same connection. The new president, F. C. Caldwell, is a strong man, and will carry on the work of his predecessors with the same vigorous enthusiasm and ability.

The reports of President J. H. Schwacke and Treasurer Howard P. Eells showed that the association is in a very prosperous condition. Commissioner Robert Wuest in his annual report said in part:

The Commissioner's Report

Although appreciating the fact that the employers of this country are overorganized, I seriously advise the formation of an American National Federation of Employers, to be composed of representatives of all organizations similar to our own, of which, I understand, there are in the neighborhood of 364 in existence to-day. The maintenance cost of such an organization would be insignificant when compared with the substantial benefits to be derived. For instance, there is no question that the representatives maintained in Washington, D. C., and other fields, as well as the printed matter issued by the various associations of employers are productive of good. Yet it seems to me that the time has come when the formation of such an association as I have briefly outlined is absolutely necessary if we would make lasting progress toward real industrial freedom. For such an association, representing numerically fully as many individuals as are popularly supposed to be represented by that American labor octopus, the American Federation of Labor, would exert such undoubted influence that the employers of this country would receive immediate and positive recognition from our lawmakers, national, State and municipal, and would offer ever present and always needed aid to both employers and employees through the medium of a virilely edited weekly or monthly magazine which would carry with it the authority of a body of magnitude. And, lastly, it would check an enormous waste of money, time and energy by preventing the present duplication of effort and expense.

A matter which should be given most serious consideration, just at this moment, is the taking of proper steps to prevent dynamiting outrages, of which there have been a great number throughout the country in the past 60 days, more in number and greater in audacity than ever before in the history of the United States. It seems to me that all State legislatures should be urged strenuously to adopt stringent laws penalizing the promiscuous sale and storage of dangerous explosives and prescribing, under heavy penalties, the manner in which sellers must keep permanent records of sales of such explosives, and in which purchasers must store same in such places as will eliminate the danger of theft, thus affording the police authorities some slight aid by which they might be able to trace the perpetrators of dastardly crimes of this sort. To-day, under our loosely drawn regulations purporting to govern such sales, no aid whatever is lent to the police in either preventing or detecting projectors of these terrible crimes, now so steadily increasing in number, costliness and fearfulness.

Owing to the insufficient number of operatives reported by our Toledo Branch, the Executive Committee of that branch adopted a resolution dissolving the branch as of February 28, and recommending to its members the retention of their membership with us and the expenditure of their best efforts to secure new members. Commenting on the resolution, the secretary stated that it was his belief that a majority of the members would remain loyal to the National Association and that the future would develop additional members, so that in time they might be able to have a branch which would again be eligible under our constitution and by laws.

On March 1, 1910, the beginning of our fiscal year, we had 730 members in good standing. In the course of the year 39 applications for membership were favorably acted upon and 31 resignations accepted. There were pending, at the time of the recent meeting of the Administrative Council, which preceded this convention, 16 resignations, all of which were accepted; also 10 applications for membership which were favorably acted upon, making our total membership in good standing at this time 732. The elimination by our Administrative Council of

brass molders from our classification is an action of which time will prove the wisdom.

The total number of operatives reported on the basis of the December assessment shows a gain of 5.3 per cent. Our income shows an increase of 42.6 per cent.

The reports of various committees were made by their chairmen as follows: Finance and Joint Committee of the National Metal Trades Association and National Founders' Association, J. H. Schwacke; Industrial Education, Fred A. Geier, and Apprenticeship, E. P. Bullard, Jr.

Industrial Education

Mr. Geier's report resulted in one of the important actions of the convention, the passage of a resolution calling for the expenditure of \$5000 to go toward the employment of an "evangelist," whose work will be to further the general cause of increased efficiency of workmen. In his paper, Mr. Geier said:

"In accordance with a resolution of the 1910 convention your committee sent out the following questions:

1. State briefly to what extent industrial education is carried on in your city in
 - (a) Public schools—state courses taught.
 - (b) Trade schools—state trades taught.
2. State how many, if any, of your employees are attending the above schools either during the day or at night.
3. Do you give your apprentices or other employees instruction? If so, state number, and, briefly, what taught.
4. Does your experience with boys or men who have had industrial education prove that it is valuable, or, if you have had no experience, do you favor extending the work of industrial education in your community, and on what plan?
5. We further desire to get some statistics on the cost of giving this instruction—
 1. In public schools, per pupil per year.
 2. In trade schools, per pupil per year.
 3. Shop instruction, per apprentice per year.

"These questions were sent out to the total membership of 856, of which 454 were represented in branch associations, leaving 402 individual firms, out of which 136 firms replied, giving specific answers to one or more of the questions. Replies were received from the secretaries of 11 branch associations. It was evident from the replies received that the majority of the firms had not given the questions proposed careful consideration, nor made any investigations of the conditions as to industrial education in their respective communities.

"It was the purpose of the committee in questions 2 and 3 to ascertain how many of the present employees of the National Metal Trades Association were receiving industrial education. The best summary that could be made from the insufficient data obtained shows an approximate number of less than 1000 receiving any kind of instruction. Undoubtedly there are more employees than this, because in the majority of instances these questions were answered with the statement 'none to our knowledge.' The majority reported are to be found in such districts or cities where the subject of industrial education has been studied and to a certain extent inaugurated in some definite form. The replies indicated that there was apathy in those communities where industrial education had not been advocated and introduced. In contrast to this, replies from such communities where industrial education had been studied and inaugurated showed the keenest interest in this subject and the greatest desire to see a further development."

As evidence of this Mr. Geier quoted a large number of replies, most of which favored the half-time and continuation system. The report continues:

HIGH OPINION OF INDUSTRIAL EDUCATION.

"Of all the replies received, only four were of the opinion that industrial education was of no value.

"For the purpose of making some definite recommendations to our membership, it was thought that it would be of value to our members to know something about the

relative cost of the various plans of industrial education. From the replies received it would appear that the cost per pupil in a well-equipped high school is about \$50 per year. The cost per student in the Cincinnati Continuation School, which is a part of the public school system, is about \$15 per year. There has been recently established a continuation school in the Rankin Trade School in St. Louis, the cost of instruction in which is about \$15 per pupil per year. The cost in the trade school is necessarily very much higher, as indicated by the report from the Milwaukee Trade School, which gives the cost at \$250 per pupil per year, and the Rankin Trade School, St. Louis, \$185 per pupil per year.

In question 4 sent out, the committee desired to get an expression from the membership as to what plan of industrial education they favored; 117 reported as in favor of industrial education without a specific recommendation as to plan; 27 specifically recommended either the co-operative or continuation plan. The committee is thoroughly in accord with all plans of industrial education, but it is quite evident from the figures above quoted that, because of its cost, industrial education on the plan of the co-operative or continuation school will be adopted for economic reasons largely.

EDUCATION MUST BEGIN EARLY.

"We must bear in mind that the satisfactory solution of the problem of industrial education involves the training of all the children who go into trades and an equally thorough training for all the trades into which they go; hence the probable development along lines which will utilize commercial shop equipments, requiring on the part of the school only the theoretical instruction.

"The development of the industries of Germany during the past decade or two has been amazing, and can no doubt be largely attributed to the fact that the efficiency of her workmen during that period has been greatly increased through the development of the system of industrial education from the lowest trade up through the university.

"The cost of living is steadily advancing, and higher wages must inevitably follow. To meet this increased cost of labor and also the keener foreign competition from Germany with her highly trained workmen, an increase in the efficiency of our workmen is imperative, and in our opinion can largely be accomplished by a thoroughly developed and far-reaching scheme of industrial education. The manufacturers must not shirk their responsibilities in furthering this movement, and, in fact, should ally themselves at once with every movement looking toward this end."

The suggestions were received with unanimous indorsement, sentiment being strong that industrial education along proper lines is the secret of renewing and maintaining the supply of skilled workers. A majority of the convention favor the half time and continuation schools, as compared with the older trade school idea.

Marshall Cushing, special representative at Washington, D. C., for this association and the National Founders' Association, made his report concerning Federal legislation during the year.

Labor Efficiency Betterment

Under the head of labor efficiency betterment John Calder, manager of the Remington Typewriter Works, Ilion, N. Y., presented a very interesting exposition of the subject, following in a general way his paper presented to the American Society of Mechanical Engineers and published in *The Iron Age* of February 16 last. Papers on the same topic were read by H. F. J. Porter, industrial engineer, New York, and W. A. Grieves, employment superintendent of the Jeffrey Mfg. Company, Columbus, Ohio. In the general discussion which followed the participants were: W. W. Coleman, vice-president Bucyrus Company, South Milwaukee, Wis.; H. N. Covell, Lidgerwood Mfg. Company, Brooklyn, N. Y.; William J. Manning, M.D., medical and sanitary officer, Government Printing Office, Washington, D. C.; F. C. Blanchard, works manager, Ashcroft Mfg. Company, Bridgeport, Conn.; A. N. Dutton, vice-president Peerless

Motor Car Company, New York City; W. F. Helmond, Underwood Typewriter Company, Hartford, Conn.; Frank Burgess, Boston Gear Works, Boston, Mass.; M. W. Alexander, General Electric Company, West Lynn, Mass., and George Gilmour, chief engineer, engineering and inspection division of the Travelers Insurance Company, New York City.

Workmen's Compensation

Great interest centered on the report of the Committee on Employers' Liability Insurance, made by William Butterworth, the chairman, the chief points of which were published in *The Iron Age* of last week. The draft of a bill was presented, embodying the underlying principle that the employer should have the right to elect the method of determining compensation. In its preamble the bill lays down these principles, thus:

That any employer in this State may elect to provide and pay compensation for injuries sustained by an employee arising out of and in the course of employment, according to the provisions of this act, and thereby relieve himself from liability for the recovery of damages except as herein provided. If, however, any such employer shall elect not to provide and pay the compensation according to the provisions of this act, he shall not escape liability for injuries sustained by his employees arising out of and in the course of their employment by alleging or proving in any action brought against such employer:

1. That the employee either expressly or impliedly assumed the risk of the injury incurred; or
2. That the injury or death was caused in whole or in part by the negligence of a fellow servant

Every such employer is presumed to have elected to provide and pay compensation as provided in this act unless and until notice in writing by the employer of his election to the contrary is filed with the State Bureau of Labor Statistics. Such employer, however, shall not be entitled to any of the privileges or advantages specified herein until a notice in writing of an election by said employer to provide such compensation has been filed with the State Bureau of Labor Statistics on blanks furnished by it for such purpose.

The participants in the discussion were Raynal C. Bolling, assistant general solicitor, United States Steel Corporation, New York City; Miles M. Dawson, expert in technical insurance, who was secured by Russell Sage Foundation to make a study of insurance in Europe, New York City; J. A. Macdonell, pioneer independent liability insurance expert, New York City, and H. V. Mercer, chairman Commission on Compensation for Industrial Accidents, Minneapolis.

Much interest attached to Mr. Bolling's remarks, extracts from which follow:

Raynal C. Bolling on Workmen's Compensation

"I think there is another party to the question besides the State, the employer and the employee; in fact, I think the party most interested is the consumer, the general public, because, while this may be temporarily a question between the employer and the employee, it is eventually a question of how much addition to the cost of the product the consumer can stand to meet the additional cost of making provision for workmen who are injured and the families of workmen who are killed in the production of these goods. Whenever we set about to right any wrong, particularly when we set about doing so as swiftly as this is being done, we run a risk of falling into other wrongs.

"I want to point out what seems to me a few of the very grave dangers that we run into in this kind of legislation. I think it is absolutely unfair that the employer should be compelled to accept the provisions of the compensation act when the employee is not bound to do so. If we are going to disregard this question of fault entirely, and it is not going to be a question of who is to blame, then it is not right that when the employee is at fault the workman should have the right to go to a jury and try to get an exorbitant verdict, but that when the workman himself is at fault he should be able to turn round and claim compensation under the compensation act. What is sauce for the goose ought to be sauce for the gander. There is no reason why the workman should ask to have his fault disregarded and be allowed to recover when he himself is directly to blame for his accident, and yet, if his employer is at fault, he expects to hold him for a heavy jury verdict.

CONTRIBUTION BY WORKMEN UNDESIRABLE.

"Representing perhaps the largest employer of labor in the country, I think that the idea of a contribution by the workmen is unsound and undesirable both in principle and in practice. If you examine these acts you will find that none of them attempts to give the injured workman the full measure of his loss. If a man is injured and loses three months' time, he does not get his full wages for that three months, he gets 50 per cent. of his wages. That means that he is losing 50 per cent. and the employer is contributing the other 50 per cent. So that I cannot see on principle why the workman should be asked to pay in something toward the employer's contribution of one-half of the loss. In practice I think it is worse still, because, if the workman contributes, you are compelled to put the fund in the hands of the State for administration.

"I do not think that anybody intends that the workman should contribute the money and that his employer should disburse it. That might be very desirable, but I don't think it is likely to be done. The discussion will start every time with the idea of a substantial contribution by the workmen just as it did in Ohio, where it started with the idea that the workman was to pay 25 per cent., in which case he might have some objection to an excessive expenditure from that fund; but as the matter advanced, they kept cutting that down until before the law was brought up for final passage—I do not know whether it has been acted upon by the higher legislature—but that contribution was finally cut to 10 per cent.; and when the workman's contribution is only 10 per cent., he will only be theoretically interested in keeping down any excessive expenditure from the fund. In fact, it would be no deterrent at all. Contribution by the workman involves State administration of the fund, and that again relates to a plan of State insurance such as has been proposed in Ohio and in Washington. Now please bear in mind when I speak of State insurance that I am not referring to insurance given by organizations of employers who then fix the premiums, and who themselves endeavor to keep down disbursements.

SAFEGUARDING AGAINST ACCIDENTS.

"I am talking about State insurance in such form as has been proposed, for instance, over here in Ohio. The first objection to that—and to my mind the worst objection to it—is that I think it is bound inevitably to effect what is much more important to my mind than the relief question—namely, the prevention of accidents.

"Five years ago the United States Steel Corporation thought its mills were well protected. All of its subsidiary companies had been at work on the question at that time for from 5 to 10 years. They do not carry insurance. They carried their own risk in their own casualty department, and they had done a great deal they thought to protect their workmen; but in the last five years, by reason of a central organization, and by a system of inspection outside of the insurance company, they have cut down serious accidents among the Steel Corporation's employees to 50 per cent. of what they were five years ago. That means that while to-day 2600 men may have been injured, there are 2600 men now alive and well who would have been reported as seriously injured or killed but for these improved conditions. They have become a leader in this thing. They have proved that the prevention of accidents is much more important than the relief of accidents.

"And now if you have a State actuary, as under the Ohio plan, fixing the premiums for all employers of the same class, the man who is in a rolling mill which is carefully protected may be placed at the same premium as the man employed at a rolling mill where nothing has been done at all to protect the workmen. The total expenditures of the Steel Corporation for safety work this last year has been \$750,000; yet under this plan it would not be entitled to any more benefits than the people who have not paid a dollar for protection. If that will not discourage prevention of accidents, and the providing of safety devices I don't know what will. In the second place, the employer who has paid the premium and is relieved from the consequence of an accident, unless he is

a mighty humane employer, will say: 'I have paid my premium and I am out of it,' and he won't worry about prevention. I think the financial burden would soon become intolerable, as the actuary would fix the premium, the employer having no voice in it. The State would disburse the money, and the employer have no voice in it, and I leave it to you from practical experience whether that would not afford as fine a political opportunity as ever existed under any State government, and whether the whole effect of such a system from one end to the other will not be simply to encourage the disbursements of as much money as possible? I think the strain on the administrative machinery of the State is going to be too great to be borne. I do not think any State administration has ever yet had the opportunity to disburse such enormous sums with such a small check upon the disbursements as will exist under such a system as that. A corrupt or partisan administration with such an opportunity as that is simply an appalling prospect; and even if it were not a corrupt administration but merely inefficient, perhaps the same results are likely to occur.

SHOULD BE COMPULSORY.

"I think that the most desirable provisions for this kind of legislation are that it should be compulsory in principle or in practice, so far as possible. I believe that the way out of it is the way suggested by your committee; and if the employers come in I think they will bring their workmen in very promptly. I think that a bill should include all employers where it is possible to obtain its passage, even to farm or domestic servants; and that where such a bill is passed, as it has been in New Jersey, it will tend tremendously to steady future legislation on the subject. You will find that the dangers are very much less decreased by not arraying all the employers on one side and the workmen on the other.

"I agree thoroughly with the provisions that ten days or two weeks must elapse before any payment shall begin. I believe the bill should contain, as far as possible, provisions similar to the New Jersey bill fixing a definite amount for a certain injury, because under that plan the great majority of injuries, even though they are not fixed in the schedule, will be settled between employer and employee. For instance, if the amount is definitely fixed as to its maximum that part will not have to be the subject of court arbitration or decision.

"And now I come to the last question—namely, what is to be done about it? That is the most important question. My first answer to that is, 'Don't chase rainbows,' because I think the little boy that chased the rainbow ran into a duck pond, and that is what I think we are in some danger of doing. There is a good deal of talk, particularly since the New York decision, of a Federal law along the line of some system like the German system. In the first place, I think it is unconstitutional. In the second place, consider the Federal laws that have been proposed on some other question, for instance, on the subject of divorce; I think it is pretty nearly impossible to obtain it.

"In the meantime, I am morally certain that if something is not done about this, and done pretty quickly, the defense of fellow servant and the assumption of risk doctrine will be taken away, and if that is done the employee won't want compensation and we cannot get it in any form; it will simply be a case of liability in every case, with a jury assessing damages. I think what you want to do is to get together and have proper bills passed in the State Legislatures, and, after that is done, I believe strongly that the employers can among themselves organize mutual insurance companies similar to the factory fire mutuals of New England, which deal with their situation there admirably and effectively. Such companies could enforce prevention just as effectually as the Steel Corporation has done among its subsidiary companies, and would thus strike at the very root of all this evil in a way that no State inspection or State prevention of accidents can ever hope to reach it."

The impressions of American mechanical engineers on foreign shop methods constituted the chief topic of the closing session. The papers were by H. L. Gantt, New York, and Oberlin Smith, president Ferracute Ma-

chine Company, Bridgeton, N. J., while Henry D. Sharpe, treasurer Brown & Sharpe Mfg. Company, Providence, R. I., and George Mesta, president Mesta Machine Company, Pittsburgh, discussed the subject in its various aspects.

Lewis Gustafson, superintendent of the David Ranken, Jr., School of Mechanical Trades, St. Louis, presented to the convention a paper on "The St. Louis Method of Technical Education."

The Resolutions

Several resolutions were presented by Henry D. Sharpe for the Resolution Committee. Besides Mr. Geier's resolution already mentioned, the following were adopted:

Whereas, The idea of systematic compensation for industrial accidents is rapidly gaining favor not only with the community at large, but with employers; and

Whereas, The various industrial interests may by co-operating and finding a common principle, contribute to an earlier and a better solution than will be attained if each interest shall devise plans with sole regard to its peculiar conditions.

Resolved, That the National Metal Trades Association heartily approves the idea of systematic compensation for industrial accidents:

Resolved, That it is not expedient for this association now to commit itself to a definite plan, and we indorse the opinion of our Committee on Employers' Liability Insurance, that "it is high time that all employers of labor were co-operating in a general effort to formulate some uniform policy";

Resolved, That we approve and applaud the splendid individual systems in force in the shops of individual members of this association, and urge, while eagerly awaiting the development of a common policy, the further establishment of voluntary plans of compensation;

Resolved, That the Committee on Systematic Compensation for Industrial Accidents be continued with enlarged membership, with a view to active co-operation with other organizations and the local branches of the association in the furtherance of practical legislation which will successfully bring about systematic compensation for injured workmen; and be it further

Resolved, That the Administrative Council is authorized to appropriate funds to a reasonable amount for the employment of counsel and to enable the committee to properly fulfill its duties.

Resolved, That the committee known as the Committee on Employers' Liability Insurance shall be known as the Committee on Systematic Compensation for Industrial Accidents.

Resolved, That this convention commends the American Society for the Prevention of Industrial Accidents to the members of the association and authorizes the Administrative Council to undertake membership in behalf of the association.

Whereas, The question of systematic compensation for industrial accidents is receiving wide attention in this country; and

Whereas, The matter of the prevention of such accidents is of the first importance and demands the greatest consideration by all employers; be it

Resolved, That this convention of the National Metal Trades Association recommends to its Administrative Council the consideration of a plan for the inspection of the shops of its members, which plan will furnish to the members themselves an opportunity of judging the comparative state of their own equipment and system for the preservation of human life, and will show to the association what progress (if any) may be made from time to time in the furnishing of adequate safety devices; and be it further

Resolved, That the Administrative Council be authorized to appropriate funds to a reasonable amount to make such inspection, if upon their investigation the plan appears feasible.

Whereas, The Congress of the United States has authorized the President to invite the International Congress of Social Insurance to hold its next triennial convention in the United States; and

Whereas, Such a gathering of persons who are interested in workmen's compensation and allied subjects and especially of the great experts of other countries, with its debates and discussions, freely participated in by all of our citizens who would attend, the same being followed by the publication of its proceedings, will inevitably be of the greatest service in supplying information to guide us in framing our laws; now, therefore, be it

Resolved, That the National Metal Trades Association respectfully petitions the President duly to extend this invitation and urges the authorities in charge of the International Congress to hold the proposed convention in the year 1912, if practicable; and

Resolved, That we petition the Congress of the United States to make suitable initial appropriations for the same.

Whereas, A demand having been made on certain members of this association by labor unions for an eight-hour working day; and

Whereas, It is our belief that the existing hours of labor in vogue by the members of this association are not excessive, viewed with reference either to the physical capacity of the workman or his social, moral and intellectual welfare; and

Whereas, The actually physical exertion required from the shop workmen has been in the last few years greatly reduced by the general introduction of labor-saving appliances in every department of the shops, and this condition is rapidly increasing; and

Whereas, The greater cost of manufacture due to shorter working hours and other restrictions of production is a direct and important, though often overlooked, factor in increasing the cost of living; and

Whereas, The movement of the labor unions for a shorter workday, restriction of output and higher wage is directly responsible for higher cost of production, and consequently higher cost of living; therefore be it

Resolved, That this association in convention assembled hereby record our absolute disapproval of any decrease in the hours now worked by the members of this association.

The New Officers

The officers were elected according to the recommendation of the Nominating Committee, as published in *The Iron Age* of March 27. They are: President, F. C. Caldwell, H. W. Caldwell & Son Company, Chicago, Ill.; first vice-president, Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I.; second vice-president, W. A. Layman, Wagner Electric Mfg. Company, St. Louis, Mo.; treasurer, Howard P. Eells, Bucyrus Company, South Milwaukee, Wis. Councillors for two years, J. H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia, Pa.; C. Birmingham, Canadian Locomotive Company, Ltd., Kingston, Ont.; L. H. Kittredge, Peerless Motor Car Company, Cleveland, Ohio; W. H. Van Dervoort, Root & Van Dervoort Engineering Company, East Moline, Ill.; A. E. Newton, Prentice Bros. Company, Worcester, Mass.; P. O. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio. Councillor to serve unexpired term, Stevenson Taylor, Quintard Iron Works, New York City.

M. H. Barker, American Tool & Machine Company, Boston, was again elected an honorary member of the Executive Council.

At the alumni dinner J. H. Schwacke, the retiring president, was presented with a valuable watch as a token of appreciation of his efficient labors during his term of office.

The dinner at Hotel Astor, Wednesday evening, was largely attended and proved a very interesting occasion. The speakers were Walter George Smith, Philadelphia, president of the Conference of Commissioners of Uniform State Laws; Julius M. Mayer, former attorney general of the State of New York, and Rev. Dr. John Wesley Hill, New York.

The West Penn Steel Company's Extensions.—The West Penn Steel Company, Brackenridge, Pa., manufacturer of open hearth billets, sheet bars and steel sheets, has recently completed some extensive improvements and additions to its plant, consisting of annealing furnaces, resquaring shears, roller levelers, slitting machines, and also an extra large hydraulic stretcher leveler for leveling sheets up to 48 in. wide. Another pickling machine of the Mesta type, made by the Mesta Machine Company, Pittsburgh, has been added. With its present complete equipment the company expects to be able to dispose of nearly all its output from its seven hot sheet mills in high grade material for furniture, passenger cars and other fine work. It also makes large quantities of electrical steel sheets of very high quality, fully equal to imported material.

J. Holmes Whiteley, Stewart Building, Baltimore, Md., is the purchaser of the property of the Union Iron & Steel Company, at Big Stone Gap, Va., which was sold by the receiver April 6. Should the sale be confirmed by the court he expects to arrange to rebuild the blast furnace on modern lines and to equip it so as to be able to compete with any furnace of its size in the country. The item published in *The Iron Age* of last week intimating that Frank Samuel of Philadelphia would secure this property was evidently incorrect.

The McAuley Trap Company, Pittsburgh, has shipped 16 high-pressure steam traps to the Illinois Steel Company, Chicago. This was the eighth order received from the same customer in the past few years. Other recent shipments were to the Renova shops of the Pennsylvania Railroad, Eliza furnaces of the Jones & Laughlin Steel Company, Edgar Thomson plant of the Carnegie Steel Company and the Pittsburgh Piping & Equipment Company, Pittsburgh.

Molding Thin Castings on an Arcade Jarring Machine

The mold for an exceptionally thin casting was recently made at the foundry of the Chandler & Taylor Company, Indianapolis, Ind., on a three cylinder jarring machine

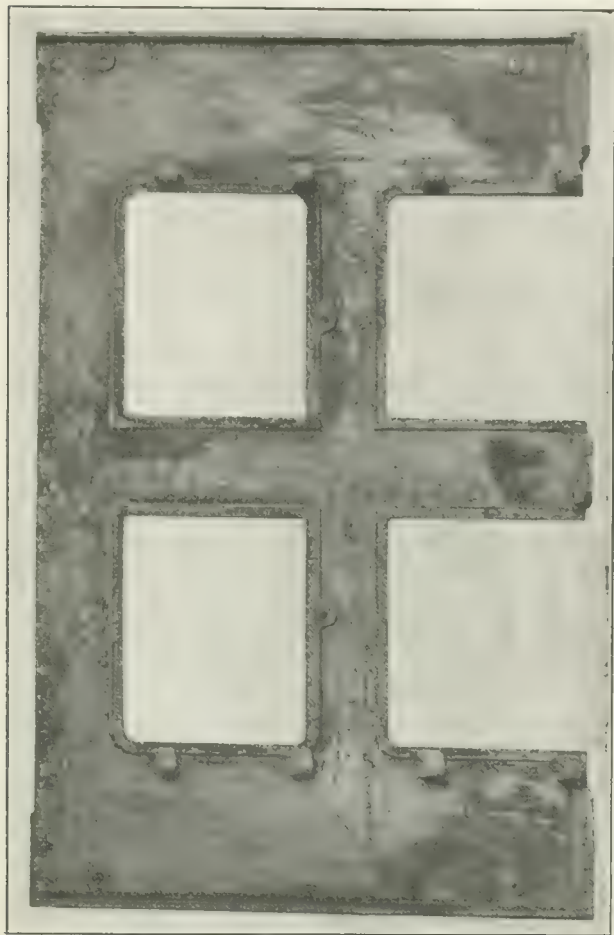


Fig. 1.—A Boiler Front Measuring 6 x 8 Ft. and $\frac{3}{8}$ In. Thick, the Mold for Which Was Made on a Jarring Machine Built by the Arcade Mfg. Company, Freeport, Ill.

machine supplied by the Arcade Mfg. Company, Freeport, Ill. This casting, a view of which is given in Fig. 1, was a boiler front and the mold in which this casting was made is illustrated in Fig. 2.

While there is nothing special about the size of the

result which is partly attributable to the use of molding machines and also to the fact that the cope and the drag are made separately, the former not being put on the mold until the drag is completed.

The Iron and Steel Institute

The annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George street, Westminster, London, May 11 and 12, commencing each day at 10.30 o'clock a.m. The following is a list of the papers that are expected to be submitted:

- "Temperature Influences on Carbon and Iron," by E. Adamson, Sheffield.
- "The Chemical and Mechanical Relations of Iron, Chromium and Carbon," by J. O. Arnold, Sheffield, and A. A. Read, Cardiff.
- "The Growth of Cast Irons After Repeated Heatings," by H. C. H. Carpenter, Manchester.
- "The Relation of Impurities to the Corrosion of Iron," by John W. Cobb, Leeds.
- "Magnetic Properties of Some Nickel Steels, with Some Notes on the Structures of Meteoric Iron," by E. Colver Glauert, Berlin-Charlottenburg, and S. Hilpert, Berlin-Grünwald.
- "Note on a Process for the Desiccation of Air by Calcium Chloride," by Felix A. Daubigné and Eugene A. Roy, Auboué, Meurthe-et-Moselle.
- "The Volumetric Estimation of Sulphur in Iron and Steel," by T. Gifford Elliott, Sheffield.
- "The Action of Aqueous Solutions of Single and Mixed Electrolytes on Iron," by J. Newton Friend and Joseph H. Brown, Darlington.
- "Iron-Silicon-Carbon Alloys," by W. Gontermann, Siegen, Westphalia.
- "The Influence of Vanadium Upon Cast Iron," by W. H. Hatfield, Sheffield.
- "The Organic Origin of the Sedimentary Ores of Iron," by W. H. Herdsman, Glasgow.
- "Some Studies on Welds," by E. F. Law, W. H. Merrett and W. Pollard Digby, London.
- "The Corrosion of Steel," by Percy Longmuir, Sheffield.
- "The Influence of 2 Per Cent. Vanadium on Steels of Varying Carbon Content," by A. McWilliam and E. J. Barnes, Sheffield.
- "Some Properties of Heat-Treated 3 Per Cent. Nickel Steels," by A. McWilliam and E. J. Barnes, Sheffield.
- "Mechanicalizing Analysis as an Aid to Accuracy and Speed for Commercial Purposes," by C. H. Ridsdale and N. D. Ridsdale, Middlesbrough.
- "Welding Up of Blowholes and Cavities in Steel Ingots," by J. E. Stead, Middlesbrough.

The autumn meeting this year will, by the kind invitation of the Associazione fra gli Industriali Metallurgici Italiani, be held at Turin, Italy, and an influential Local Reception Committee has been formed, under the presidency of G. E. Falck, president of that association, to carry out the necessary arrangements. The meeting will commence October 2, and with the subsequent tour organized in connection therewith will occupy about 15 days from the time of leaving London until the return.

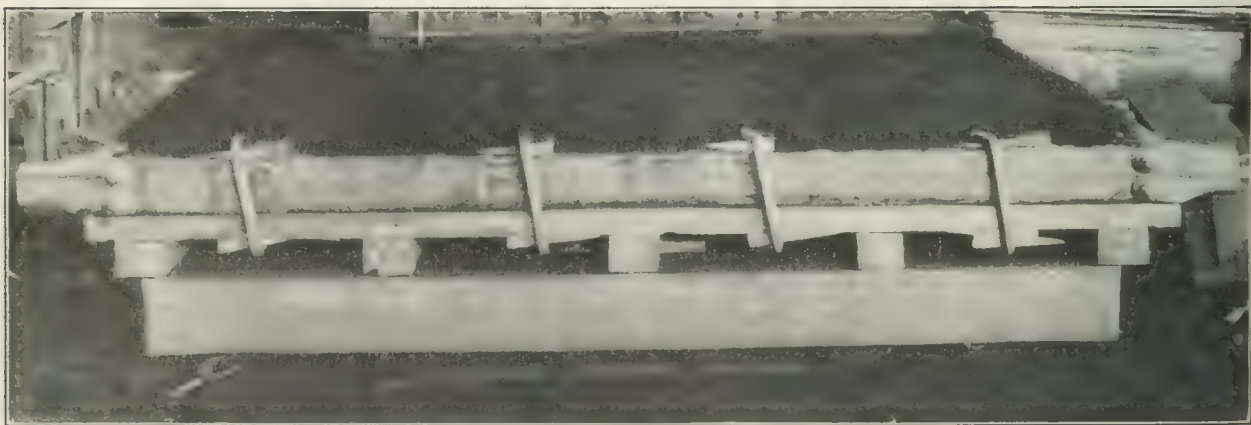


Fig. 2.—The Mold from Which the Casting Was Made.

casting which measures 6 x 8 ft., its thickness is remarkable as it is only $\frac{3}{8}$ in. Making these molds with the aid of a jarring machine has resulted in at least doubling the output of the foundry. Prior to the installation of this machine only one of these castings could be made per day. At the present time it is possible for one man to make three of these in a day, a

This tour includes Savona, Genoa, Pisa, Rome, Naples, Florence and Milan.

The Pelican Metal & Roofing Company, 333 Howard avenue, New Orleans, La., has purchased a square of ground and will erect at once a one-story factory building, 100 ft. square, to take care of its increasing business.

The Patterson Adjustable Electric Light Bracket

A new type of electric light bracket which can be adjusted for use on all classes of machines has been placed on the market by the Patterson Tool & Supply Company, Dayton, Ohio. The special advantages claimed for this bracket are that it can be operated at any point, a saving of 75 per cent. in the number of globes broken is



Fig. 1.—The Bench Type of Adjustable Electric Light Bracket Made by the Patterson Tool & Supply Company, Dayton, Ohio.

effected by its use and an increase in the output of the machines due to better light is secured. Fig. 1 shows the bench type of bracket, and Fig. 2 illustrates the machine type. These brackets are furnished with various base connections which enable them to be used in practically all locations in every branch of manufacturing.

The bench bracket shown in Fig. 1 is set forward, and the light is thrown on the work, so that the operator can

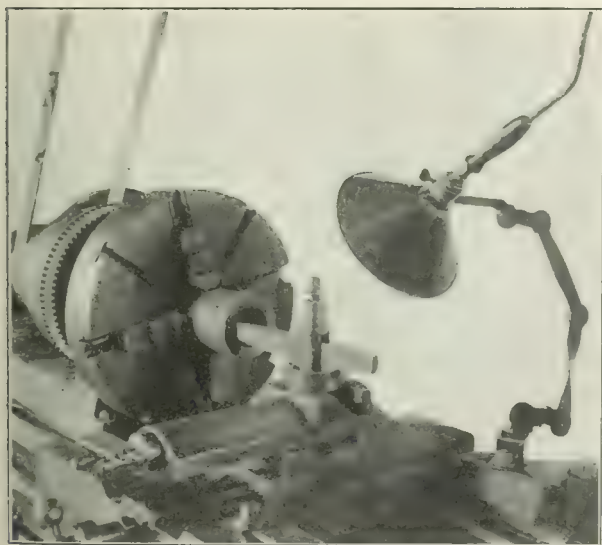


Fig. 2.—The Machine Bracket Attached to a Lathe.

see at all times the line to which he is working. If desired this bracket can be reversed so as to throw the light through the opening in the work. A universal machine bracket is illustrated in Fig. 2 attached to a lathe carriage. In this position the light is cast directly on the point of the tool, and the operator is enabled to see the tool when doing internal work just as well as if it was external work.

The construction of these brackets is strong. The brackets are made of sheet steel, and the joints operate on leather frictions between two disks and a strong rivet. The general design is such as to enable them to withstand the general hard usage met with in a factory. The base of the bench bracket is of heavy cast iron, while that of the machine bracket has a hole to take a 1/2-in. bolt, thus making it convenient for attachment to a machine having T-slots for bolts. For locating them permanently four screw holes are also furnished. A screw clamp or a spring clip is used to hold the lamp in place.

The height of the bench bracket is 23 in., and when a right angle bend is made at the first joint there is a 16-in. reach from the center of the stand to the light. At the second joint the machine bracket has a reach of 21 in. from the center of the base to the light and will cover a radius of 42 in.

The Rogers-Brown Iron Company

The report of the Rogers-Brown Iron Company, Buffalo, N. Y., for the fiscal year ending December 31, 1910, shows gross earnings of \$3,768,220. Deducting operating expenses, taxes, &c., amounting to \$3,138,658, leaves net profit of \$629,562. After paying bond interest, \$207,083, the amount for surplus is \$422,479. The balance sheet, December 31, 1910, is as follows:

ASSETS	
Property and plant.....	\$12,142,536
Investments in subsidiary companies.....	1,588,770
Stocks of ore, coke, pig iron and material.....	976,232
Accounts receivable.....	496,441
Cash.....	366,946
Accounts paid in advance.....	23,434
Discount on debenture bonds.....	56,667
Total.....	\$15,591,026
LIABILITIES	
Capital stock.....	\$5,000,000
Buffalo & Susquehanna Iron Company first mort. 5s.	2,600,000
Buffalo & Susquehanna Iron Company 5 per ct. debts.	1,500,000
First and refunding mortgage 5s.....	3,415,500
Notes and accounts payable.....	1,233,347
Dividends payable January 1, 1911.....	50,000
Accrued bond interest.....	127,546
Liabilities accrued, not due.....	55,931
Reserve for depreciation of property.....	99,586
Surplus.....	1,509,116
Total.....	\$15,591,026

The Sullivan Machinery Company, manufacturer of mining and quarrying machinery, 150 Michigan avenue, Chicago, has established an office at 814 Salisbury House, London Wall, London, E. C., England, which will, in future, have general charge of its business in England and on the continent of Europe. Howard T. Walsh, for several years the company's Pacific Coast manager at San Francisco, is in charge of the new London office, and he has associated with him Arthur F. Belding, who has been connected with the Joplin office for some time.

The Vanadium-Alloys Steel Company, Latrobe, Pa., which is about to increase its capital stock from \$200,000 to \$300,000, states that the increase is for the purpose of taking care of its growing business, the company expecting a very prosperous year. No extensions to its plant are contemplated at this time. The company manufactures high speed, alloy and carbon steels.

It is of great interest to note the excellent work of the two furnaces of the Northwestern Iron Company, at Mayville, Wis., one running on high phosphorus and the other on malleable Bessemer pig iron. The output for the second week of April was 3913 tons, or 559 tons per day. Previous to March, 1909, the best week's output was 2737 tons, or 391 tons per day.

The Deutsch-Amerikanischen Techniker-Verbandes (National Association of German-American Technologists), of which H. Bacharach, 721 Lewis Block, Pittsburgh, Pa., is secretary, has issued a pamphlet containing the constitution and by-laws of the organization and a full list of the members with their addresses.

The Algoma Steel Company's Coke Plant

Steps in an Unusual Record of Construction—Two Batteries of 55 Koppers Ovens Each, with By-Product Works, Built in Less Than a Year

BY D. M. GRIFFITH.

(With Supplement)

On March 11, 1911, the first coke was made in No. 1 battery of the 110 by-product coke ovens which were constructed by H. Koppers of Joliet, Ill., for the Algoma Steel Company, at Sault Ste. Marie, Ont. Less than a year elapsed from the time excavation was started until the ovens were producing coke; and considering the

for the coke plant, it was necessary to support all of the foundations upon piling. The total number of piles required was 6020. To divert the course of a creek which wound around through the coke plant site, two concrete retaining walls were built. One of these was made of sufficient size to support the track for the shear leg of



Fig. 1.—Part of the Piling Used for Carrying the Concrete Slab. Photograph Taken April 5, or 15 Working Days After Excavation Was Started.

extreme conditions under which this plant was built, such as severe weather, marshy ground, poor labor conditions, isolation of plant from base of supplies and working from temporary yard level, remarkable progress was made in its construction.

On account of the marshy ground at the site chosen

the traveling coal bridge. This creek as shown in the plan view on the accompanying supplement, now extends the entire length of the coke plant and empties into the slip just beyond the stack end of battery No. 1.

The slip was extended about a half mile, so that coal could be delivered direct to the coke plant by boat. This

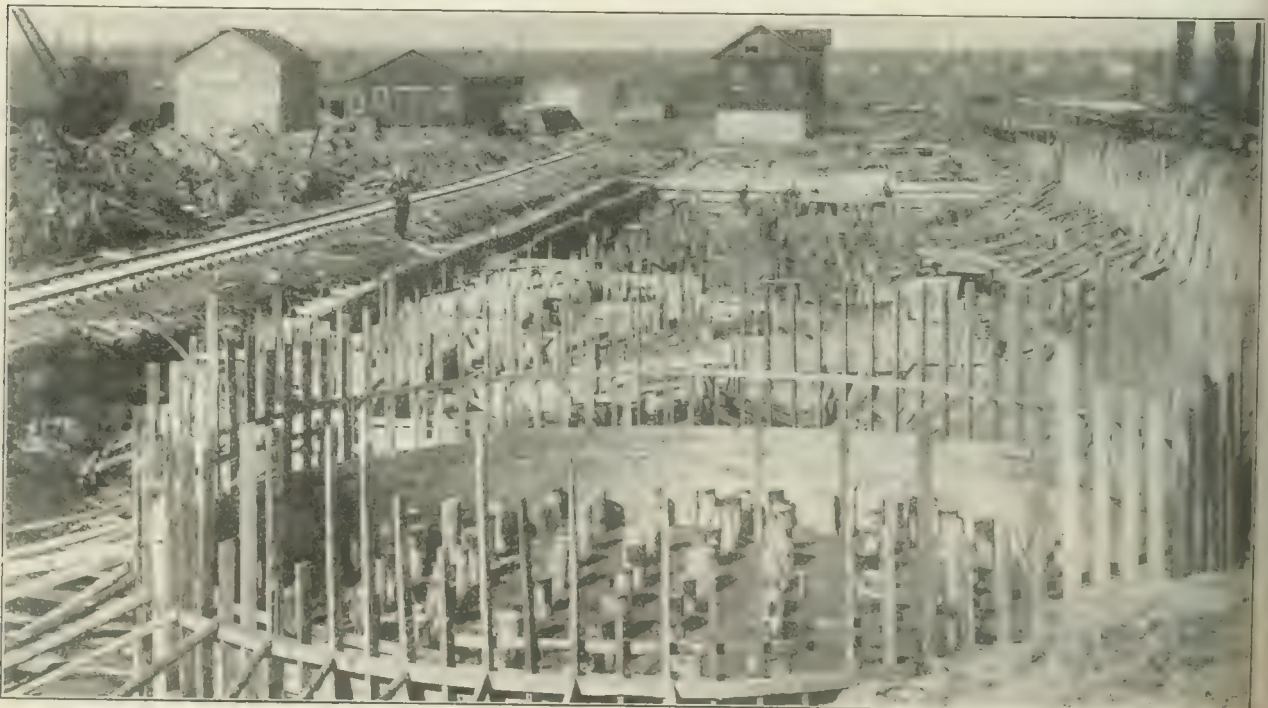
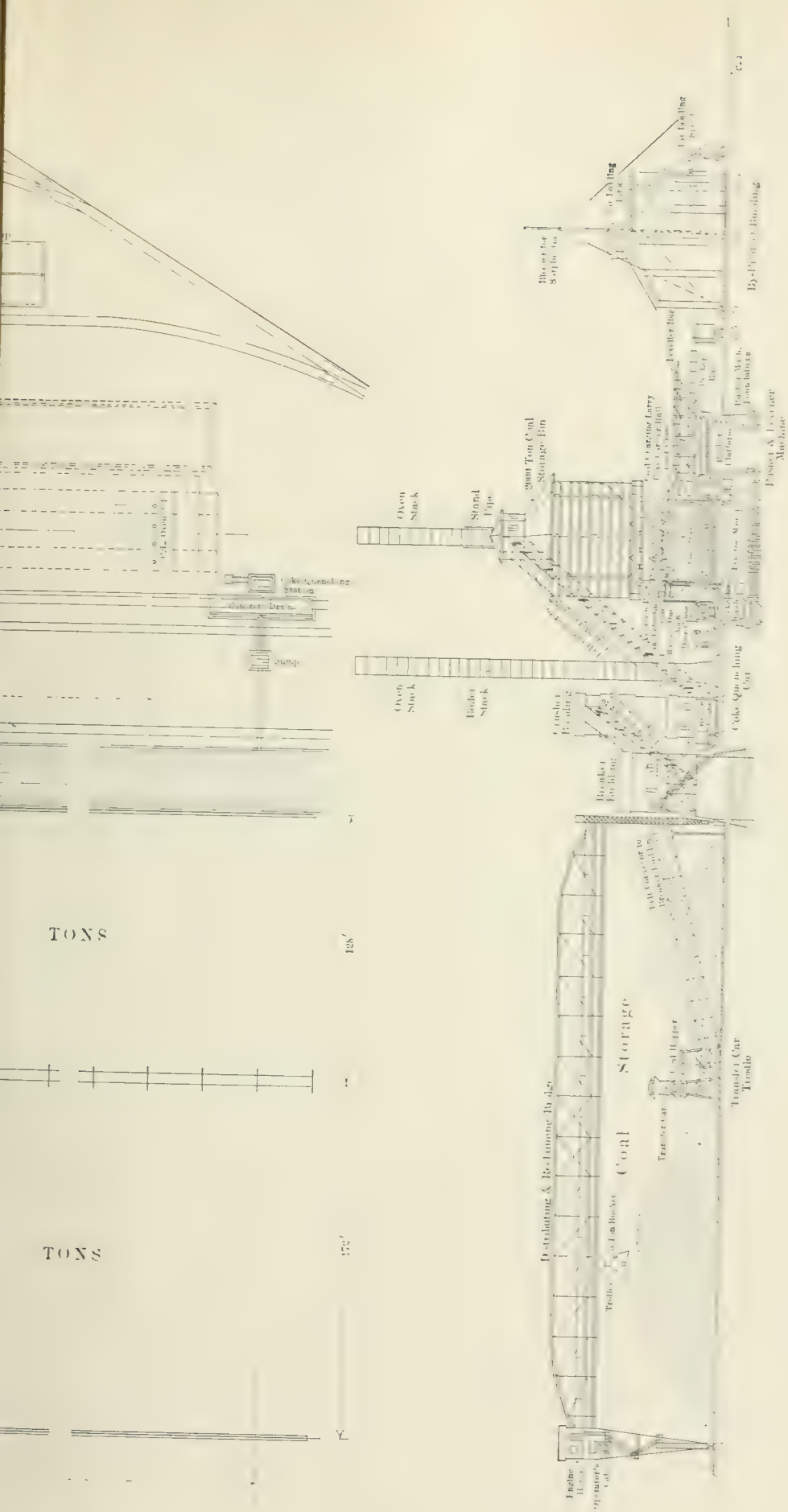
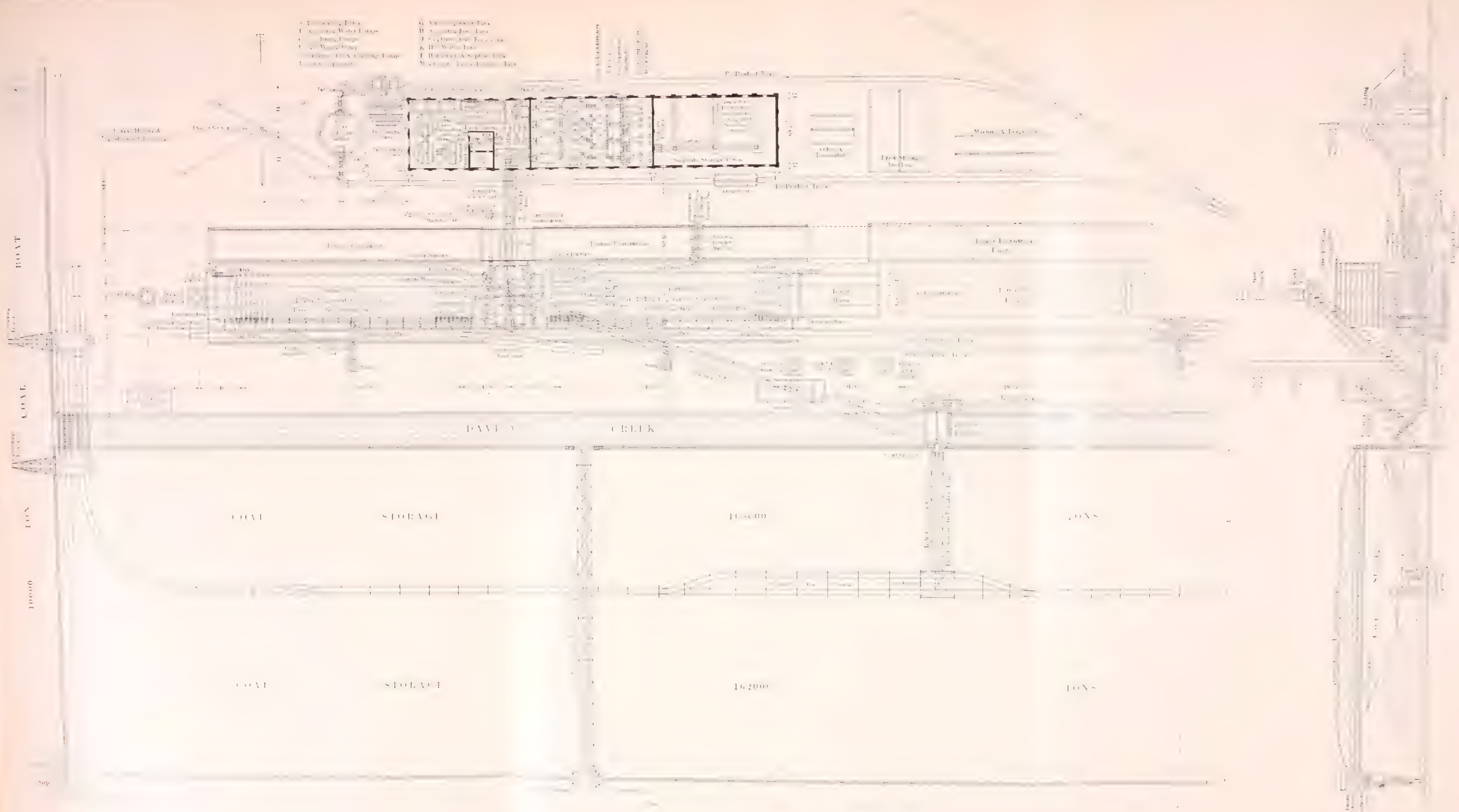


Fig. 2.—Progress in Piling and Form Work in 19 Working Days, or Up to May 19



belt and the coal ens. used and in ft. 9 own for the on tion



GENERAL ARRANGEMENT OF KOPERS BY-PRODUCT COKE OVENS AT THE PLANT OF THE ALGOMA STEEL COMPANY, SAULT STE. MARIE, ONTARIO.



Fig. 3.—Oven Foundations and Chimney Flues to Stack, with Brick Work on Regenerator Walls Under Way.

channel is 90 ft. wide and is of sufficient depth to take care of boats with a carrying capacity of 12,000 tons of coal.

Coal Unloading and Storage

In connection with this slip and extending its entire length a very substantial timber dock has been constructed. This supports the track on which the coal unloaders travel, also a coal transfer trestle by means of which the coal from the boat unloaders is conveyed in by electrically operated coal transfer cars to either the coal storage pile or to the coal hoppers.

The coal is taken from this hopper by a belt, to the coal breaker and crusher building, where it is broken up and the iron particles removed by a magnetic separator. The coal is then crushed and conveyed by a belt to mix-

ing bins, from which point it is conveyed by another belt to the 2000 ton coal storage bin. By means of hand operated gates, which are located in the bottom of the coal storage bin, the coal charging car receives the coal from the bin for charging direct into the top of the ovens.

In Fig. 1 is seen a part of the piling which is used for carrying the concrete slab, upon which the oven and stack foundations are supported. These piles vary in length from 30 ft. to 60 ft. and are spaced about 2 ft. 9 in., center to center. The steel traveling bridge shown in this view was used for distributing the concrete for the oven and by-product building foundations and the creek retaining walls. The photograph was taken on April 5, 1910, just 15 working days after the excavation work was started.



Fig. 4.—Showing the Large Amount of Concrete and Form Work Completed in 37 Working Days Following the View in Fig. 2.

Progress in Foundation and Brick Work

In 27 working days the form work for the voids and chimney flues was completed and the 3 ft. thick concrete slab, which rests on the piles, was laid. At the same time the concrete foundations for the entire first battery were up to an elevation of 11 ft. above the top of the piles. This left a height of about 5 ft. more of concrete to be put in, to bring the oven foundations up to the proper level for the starting of the brickwork.

structed and lined with brick. A good start had also been made on the brickwork of the regenerator walls. In the background can be seen the progress made on the slip up to this date. The channel had been dredged for a distance of about one-third of a mile and had reached a point a little beyond the center line of the ovens.

Fig. 4 calls attention to the status of the by-product building form work and foundations on July 2. It shows that a large amount of concrete and form work was com-

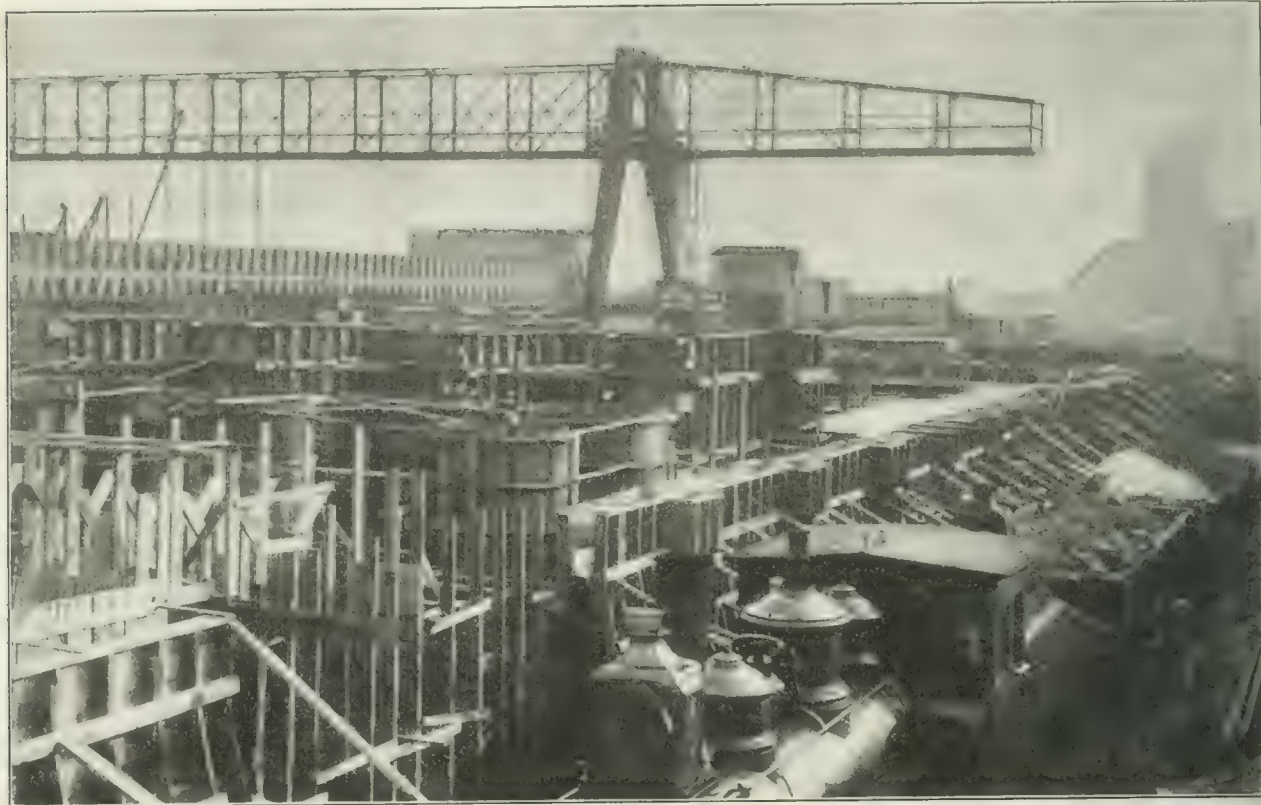


Fig. 5.—Showing by the Height of the Locomotive the Large Amount of Form Work Needed to Give a Yard Level 16 Ft. Above Top of Piles.



Fig. 6 Progress Made Up to October 6, 1910.

On April 26 excavation work was begun for the by-product building and gas holder. In Fig. 2 can be seen the progress made in piling and form work up to May 19. In 19 working days all of the excavating and piling for the foundations for the by-product apparatus, building walls and gas holder was finished, as well as considerable form work for gas holder and building walls.

Fig. 3 shows the progress made in the construction work on the ovens up to June 8. The oven foundations were then finished and the chimney flues to the stack com-

pleted in the interval of 37 working days between the taking of the views in Figs. 2 and 4.

Fig. 5 gives an idea of the amount of construction work that had been done on the ovens and by-product building up to August 13. The regenerator walls had been finished, the oven wall brickwork had reached a height of about 4 ft. above the floor of the ovens, and the concrete pinions and end buckstays had been erected at each end of the battery. In comparing the height of the form work of the by-product building with that of the

standard locomotive shown in the foreground, it is evident that a large amount of construction work was necessary at this point to bring the foundations to their proper elevation, so that the finished yard level would be 16 ft. above the tops of the piles.

Fig 6 indicates the progress made up to October 6,

house, stack for battery No. 1, coal storage bin, by-product building, battery No. 1 and gas holder. This view was taken December 7, 1910. On battery No. 2 up to December 15, 1910, the foundations for the coke pusher and leveling machine had been finished and the oven brickwork for the entire battery had reached a height of

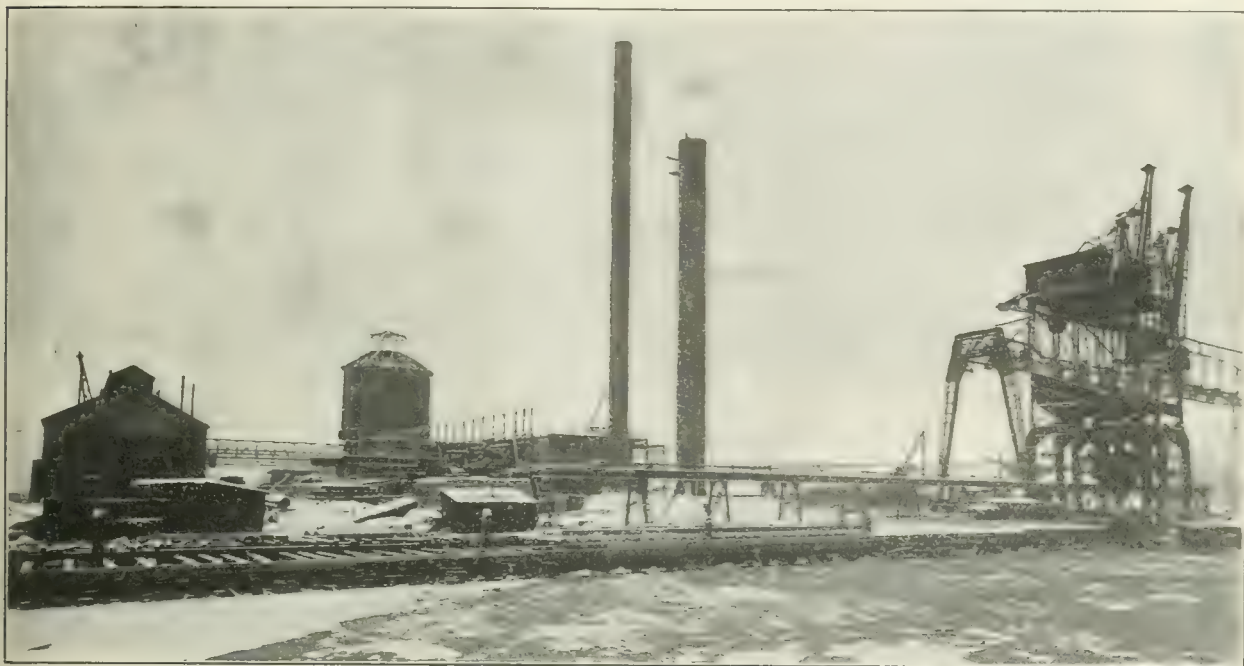


Fig. 7.—View Taken December 7, 1910, Showing Slip, Coal Unloaders, Coal Transfer Trestle and Storage Bin, By-Product Building and Battery No. 1, with Stack and Gas Holder.

1910. The brickwork has been completed for battery No. 1. In the foreground is shown a part of the form work and concrete for battery No. 2. The steel roof trusses and columns for the by-product building are erected and work has been started on the purlins and building walls.

By November 16, 1910, the buckstays, coke and pusher side steel benches, with cast iron cover plates, steel stack

8 ft. above the floor of the regenerators. A large temporary building, which was used to protect the brickwork and workmen during the severe cold weather, was practically completed.

Fig. 8 is an interior view of the temporary building over battery No. 2. The brickwork here shown is above the roof of the ovens and nearly completes the brickwork for this battery.



Fig. 8.—Temporary Building Over Battery No. 2. Brickwork for This Battery Nearly Completed.

and supports for gas collecting and suction mains had been erected. The regenerators had been filled with checker brick, the regenerator end walls bricked in, and the brick walls underneath the benches completed.

Fig. 7 shows the slip, coal unloaders, coal transfer trestle, dock, traveling coal bridge, standpipe, pump

In Fig. 9 the electrically operated four-hopper steel coal charging larry is shown on top of battery No. 1. This car receives its coal from the coal storage bin and has a capacity of 12.75 tons, which is sufficient to charge one oven. In the background can be seen the 2000-ton steel coal storage bin which is located between battery No. 1

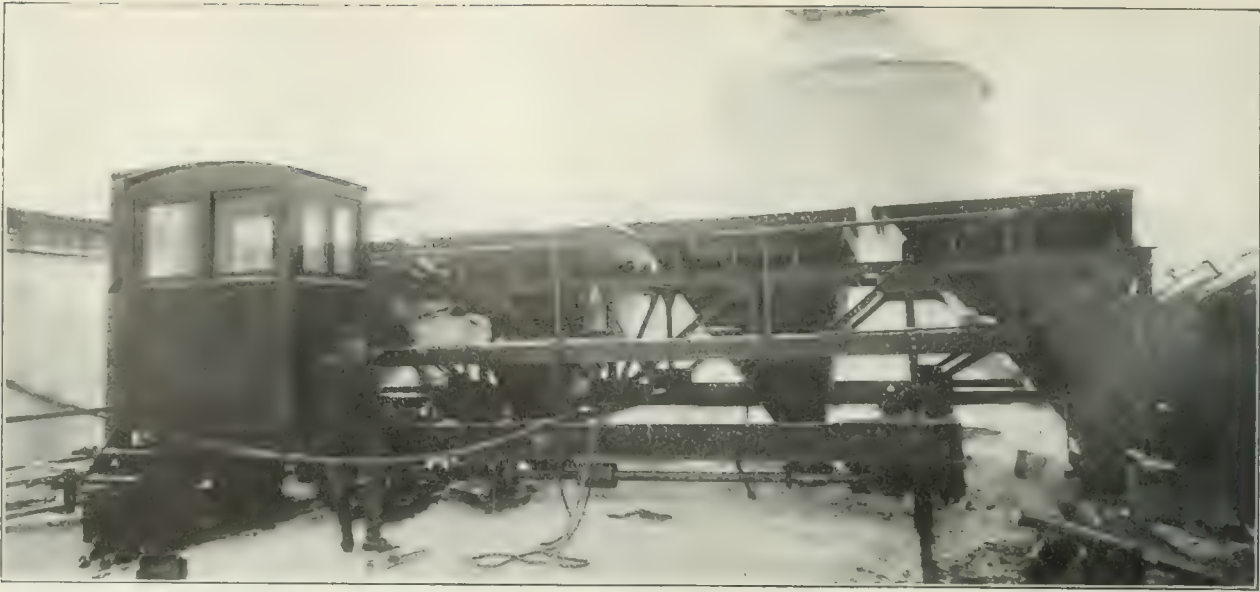


Fig. 9.—Electrically Operated Four Hopper Coal Charging Larry.

and battery No. 2. This view was taken January 10, 1911.

Fig. 10, for which the photograph was taken from the pusher side on March 1, 1911, gives a measure of the progress made on battery No. 2. The brickwork, including the regenerator end walls and the checker brick, had been finished and the buckstays and structural work on coke and pusher benches had been erected.

In the accompanying supplement, which gives the general arrangement of the entire coke plant, the present installation of two batteries of 55 ovens each is shown, and the provision made for a future installation of one battery of 55 ovens. Battery No. 2 will be ready to make coke by April 24.

The Fawcett Machine Company, Pittsburgh, has shipped a set of worm wheels and worm shaft for a vertical windlass to be installed on the United States battleship Wyoming. The shaft is 12 ft. long, 6 in. in diameter, with two worms, right and left thread. The wheels are made of manganese bronze, and have a pitched diameter of 74 in., with 8-in. face.

The Pittsburgh office of the Babcock & Wilcox Company, Farmers' Bank Building, has received an order from the Crucible Steel Company of America for 5000-hp. Stirling water tube boilers, which will be installed in its new plant at Midland, Pa.

The Hooper-Falkenau Engineering Company

The Hooper-Falkenau Engineering Company, 165 Broadway, New York, has been formed to take over the business of George K. Hooper, the well-known designer and organizer of industrial plants. Mr. Hooper's experience covers a period of 25 years, ranging in importance from that of an unskilled laborer to executive and consulting engineer. The design of new machinery for special purposes and the management of plants are among his activities. One of the most notable connections in the latter capacity has been the management of the Weir Frog Company, Cincinnati, Ohio, with which he has been connected for five years and at present is serving as vice-president and general manager. Perhaps most notable of Mr. Hooper's work has been in improving and systematizing foundry practice.

Arthur Falkenau, in joining forces with Mr. Hooper, withdraws from the Falkenau-Sinclair Machine Company, Philadelphia, of which he has been president for a number of years. In the course of 30 years' experience as a consulting engineer and owner of machine works, Mr. Falkenau has designed and perfected many successful devices, among which probably the best known is the pneumatic system for handling mail. Another well-known invention is a mine exploration suit, the first successful application of the helmet idea to mine rescue work.



Fig. 10.—Progress on Battery No. 2 Up to March 1, 1911.

A New Metal Studding Machine

A machine for manufacturing metal studding of a peculiar shape is built by the Wire Specialty Works, 549 Fulton street, Chicago, Ill. Fig. 1 is a view of the machine, and Fig. 2 shows a sample of the studding made by it.

The plain sheets of No. 21 gauge steel used for making the studding are first perforated on a power press.

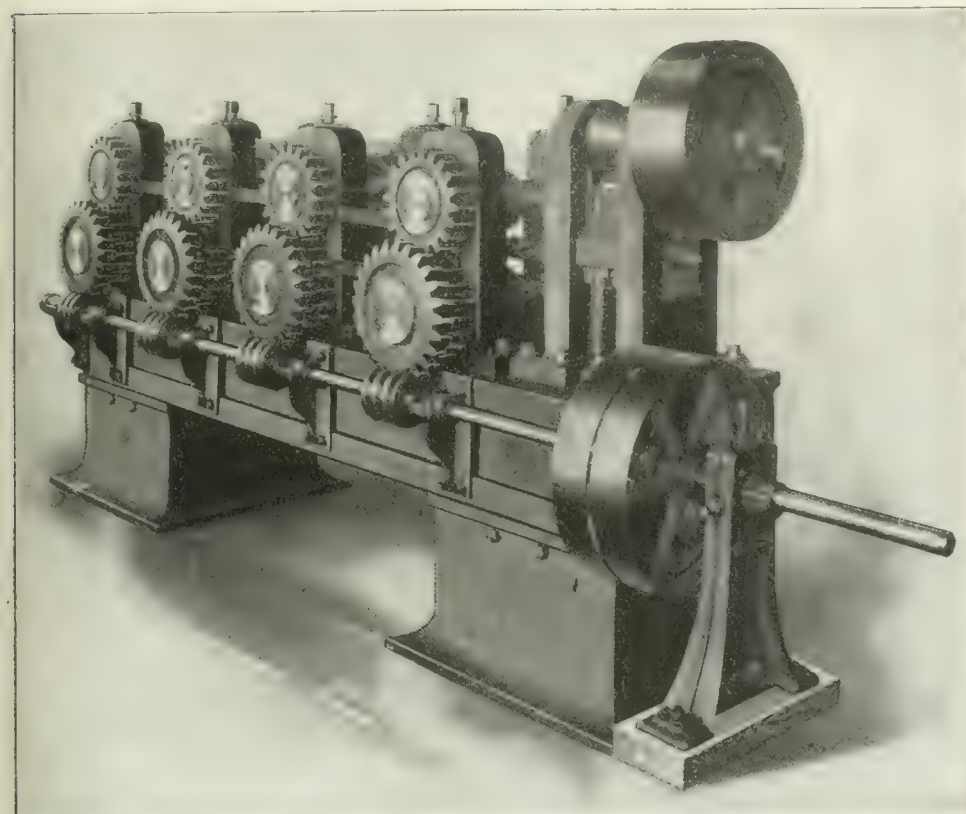


Fig. 1.—A New Machine for Making Metal Studding Built by the Wire Specialty Works, Chicago, Ill.

They are then fed from a table into the first of the four forming rolls in the machine. These bend the metal to approximate shape, and after it leaves the last of them it is fed through a swaging device which hammers the studding into the exact form and makes it perfectly straight. The machine is entirely automatic, and it is only necessary for the operator to start the sheets into the first set of rolls.

The studding shown in Fig. 2 is of a double type for making hollow partitions, in which two courses of plaster board are inserted, leaving an air space between. Its shape is secured by employing a set of guides between the

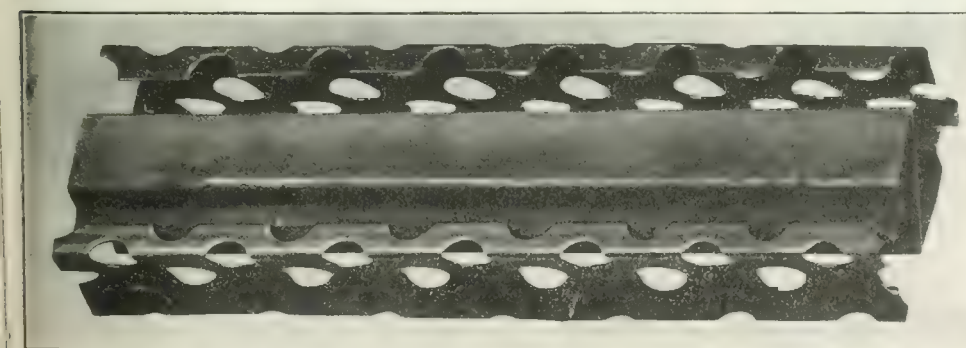


Fig. 2.—A Sample Piece of Studding Made by the Machine.

four rolls for folding the metal. If desired, studding with only one channel can be formed on the machine. This type is used where an air space is not required between the two sides of the partition.

This machine has a capacity of 25,000 ft. of studding per day, and the metal sheets pass through the rolls at a speed of 50 ft. per minute. The machine weighs 10,000 lb., and occupies a floor space of 3 ft. 6 in. by 9 ft.

Repairing Concrete Floors

There is a popular and widespread fallacy to the effect that a concrete floor once chipped or cracked is practically at the end of its usefulness. This is undoubtedly due to the unsatisfactory results of unskilled workmen attempting to repair a damaged floor. Unless proper care is taken, and the workman engaged on the job has sufficient knowledge of concrete, a repair job is most unsatisfactory.

In this connection, the practice of the Aberthaw Construction Company, Boston, Mass., is worth noting. In certain of the concrete buildings erected by this company floors have been chipped in particular places because of some phase of the industry which gave rise to dropping heavy materials in one place, as, for example, the winding rolls in a paper mill. When a floor has thus become damaged the proper method of repairing is to chip out with mallet and chisel a recess, usually square, of sufficient depth to reach to the bottom of the deepest break in the concrete surface. The rough surface resulting from this process is then treated with acid to bring out the solid aggregate, or else a stiff brush is

used to remove all the loose dust, and the recess washed out by sluicing out with a hose. When all the dust particles have been removed, the recess is grouted with cement, and before this has set the granolithic finish applied and leveled up with the rest of the floor. Repairs made in this manner are as permanent as the remainder of the floor, as the bond between the new and old concrete will be perfect if all the loose material has been carefully removed.

Vivian Bond & Co.'s Pittsburgh Business.—Vivian Bond & Co., 68 Beaver street, New York, who transact a large business in ferroalloys, have not retired from the Pittsburgh field as erroneously stated in last week's issue of *The Iron Age*. It is true that they have closed their Pittsburgh office, but this is simply because it has been found that as much business can be transacted over the long distance telephone, and by having a representative cover the

field at frequent intervals as could be done by having an office in Pittsburgh. The firm first opened its office in Pittsburgh in the fall of 1908, but it did a considerable business there before that time. The representative of the firm will as actively cover the Pittsburgh territory as when an office was retained there. It is regrettable that the notice of the closing of the Pittsburgh office should have been made so sweeping.

The National Association of Manufacturers

The sixteenth annual convention of the National Association of Manufacturers, of which John Kirby, Jr., is president, will be held at the Waldorf-Astoria Hotel, New York, May 15, 16 and 17. Advance notices of this convention indicate that it will be the most important held in the history of the association. In issuing the call for the convention President Kirby urges upon members the advisability—in fact the necessity—of their personal attendance. He adds:

There has never been a period when the country's industrial interests have been confronted with so many vital problems as in the present year of 1911. It may also be added that never before has organization been so urgently needed and discussion so important to the welfare of the nation's industries. The sixteenth annual convention, therefore, comes at a time when every manufacturer finds himself face to face with conditions strongly affecting the future safe-conduct of his business. The problems which will claim the attention of the coming meeting are many and vital, including labor in its various ramifications, also the great constructive policy interwoven in the prevention of accidents and the equitable solution of the urgent question of industrial relief.

Results of the investigations made in Europe by the association's special commissioners, F. C. Schwedtmann and James A. Emery, covering the very timely and important subjects of accident prevention and industrial relief, will be presented in the form of a voluminous report to the convention. In all probability one entire day and evening will be devoted to these subjects. An important feature connected with accident prevention and industrial insurance will be the displaying of a great number of lantern slides, illustrating not only the experiences of Germany but also conditions in the United States. The fact that fully 1,000,000 persons are injured yearly in the industries, and that under our present laws it required an expenditure of more than \$17,000,000 to administer \$9,000,000 for the benefit of injured employees in 1909, indicates the vital importance of the subject to labor, capital and the general public alike.

A special feature will also be made of banking and currency, and the attitude of our manufacturers toward the plans recently proposed to reform our inadequate banking and currency systems will be discussed. Other questions of economic importance, such as immigration, industrial education, a reform of our patent laws and the creation of an independent Tariff Commission of experts will also be considered.

The sessions will be open to the general public, and the association extends a cordial invitation to all manufacturers to attend, whether members of the association or not.

The Thomas Carlin's Sons Company, works at 1600 River avenue, N. S., Pittsburgh, has moved its office from room 1919 to room 1947 Oliver Building, Pittsburgh. The company recently shipped to Henry A. Hitner's Sons, Philadelphia, a No. 1 belted shear to cut 6 in. square, and has received an order from the Prudential Iron & Steel Company, Coburg, Ontario, Canada, for a No. 7 motor driven shear to cut material 3 in. square.

A New Standard Motor Driven Rolling Mill

Designed for Rolling Sections and Special Shapes and Sheet Metals, and Possessing Various New Features

A new type of motor driven rolling mill has been brought out by the Standard Machinery Company, 7 Beverly street, Providence, R. I., and is a continuation of the standard line which at the present time comprises 16 sizes, all following the one general type. This new machine is designed for use with specially formed rolls for rolling extra large sections of copper moldings, automobile rims and other special shapes and for rolling sheet steel, copper, zinc, German silver, nickel, platinum, gold plate and gold, its function with the precious metals being to break down ingots and reduce them to a thickness of about $\frac{1}{8}$ in. for transfer to the finishing or mirror lapped rolls. Fig. 1 shows the front of the mill with the back gears, the wabblers and the rolls, while Fig. 2 is a

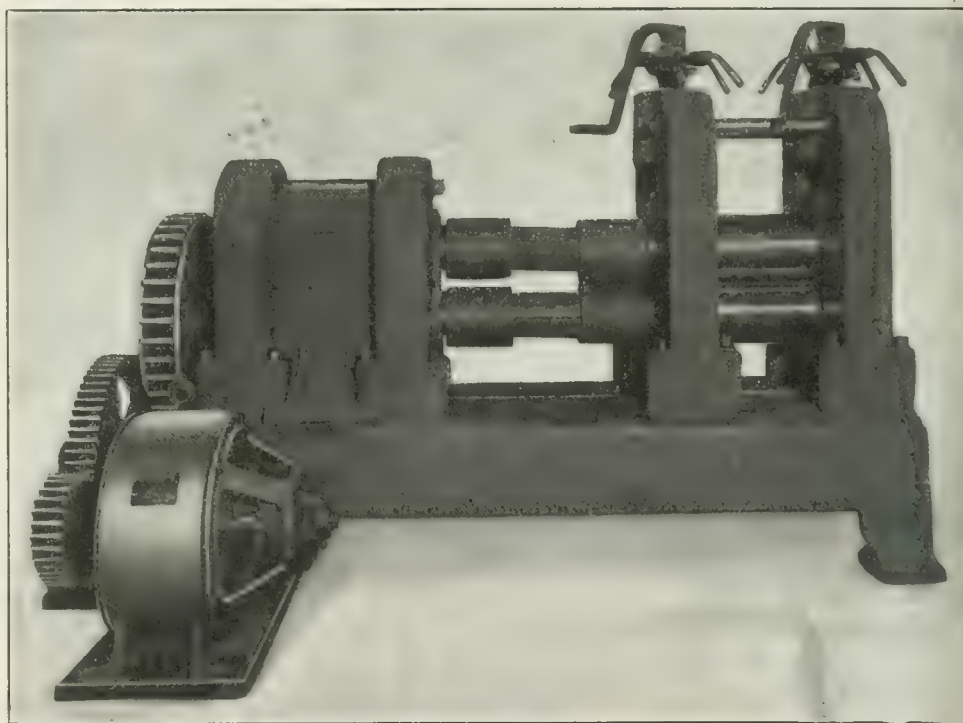


Fig. 1.—The New Motor Driven Rolling Mill Built by the Standard Mfg. Company, P

view taken from the gear end of the machine, and Fig. 3 illustrates the same type of mill equipped with a friction clutch and also shows the herringbone pinions.

The photographs show the machine with the regular square section roll housings, fitted with rolls 12 in. in diameter and 20 in. wide, having heavy phosphor bronze bearings on the roll journals with crucible steel adjusting screws. The upper boxes are supported by side yokes, which straddle the adjusting screws and are connected to the boxes by straight rods for lifting purposes. At the top of each upper box is a hardened and ground steel thrust washer, which takes the thrust of the screw. The outboard or roll housing is fastened with T bolts and T slots in the bed, permitting the use of rolls of different lengths, as the housing slides in and out. The maximum length roll that can be used is 22 in., and the minimum length is 10 in., both being 12 in. in diameter. The rolls are driven by cast steel wabblers and cast steel wobbler couplings, direct connected to the herringbone pinion shafts, mounted in the gear housings. Patented roller bearings are used.

The herringbone pinions shown in Fig. 3, constitute a special feature of the mill. They are two pitch, 13 in. pitch diameter, with a 14-in. face, each having a 7-in. face, made right and left, and are forced over a crucible

steel shaft which has its bearings in the housings. The pinions are steel forgings and all the teeth are cut, which insures an exceptionally accurate drive in the transmission of power to the rolls, securing a uniform, well polished rolling with stock free from wrinkles or waves re-

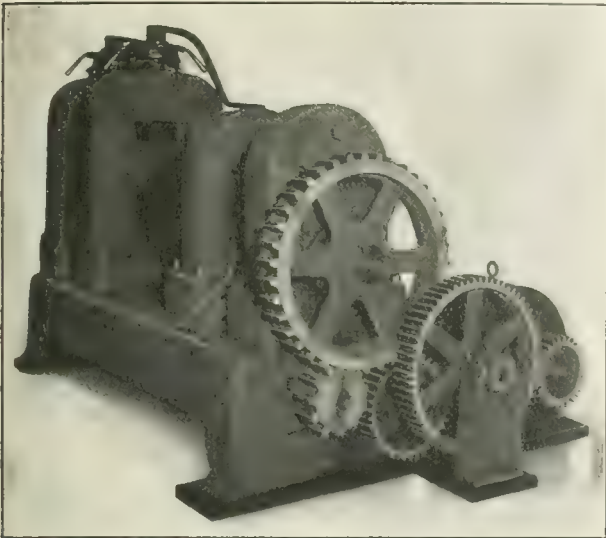


Fig. 2.—View Showing the Driving Gears.

sulting from back lash; or vibrating from strains and other imperfections.

Exclusive of the motor drive and the herringbone pinions the mill is triple trained; taking into account the motor drive, it is four trained, while the herringbone pinions brings the total up to five trains. The total ratio, including all gears, is 84 to 1; the ratio of the motor pinion to the gear is 2.4 to 1; from the driving shaft of

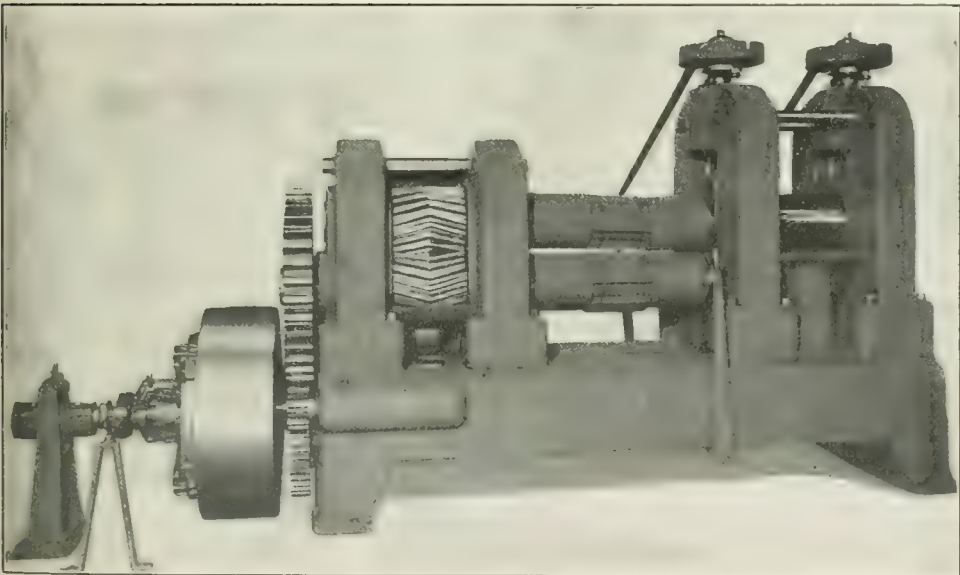


Fig. 3.—The Mill Arranged for Belt Drive with a Friction Clutch.

the mill to the rolls, 35 to 1. A 50-hp. direct current motor running at 1000 rev. per min. drives the mill. The variable speed arrangement is another new feature, the speed controller being hung in a panel which fastens on the side of the mill.

The roll journals of the mill are 9 in. diameter and 9 in. long; the length of the bed, 10 ft. 2 in.; the overall height, 8 ft. 6 in., and the floor space, 8 x 15 ft., the total weight, including bed plate, with motor, 27,500 lb.

The main driving gear on the housings and its pinion are of shrouded gun iron, while the other two trains of gear shown in Fig. 2 are of cast iron and have cut teeth. The adjustment is controlled by a spanner arrangement and for heavy strains by offset wrenches which are brought down to the height of a man's shoulder. The adjusting screws are fitted with micrometer adjustment.

The machine is threaded at the roll ends to permit it to be used with a water cooling attachment, special chambers being made on the inner side of the roll. On the chilled iron roll, which is ordinarily furnished, these chambers are cast in two parts on the inner portion of the body, which permits a continuous circulation of water. With hardened steel rolls they are made with a shell on the outside, with a special construction.

The following table gives the principal dimensions and specifications of the mill:

Maximum length of rolls used, inches.....	22
Minimum length of rolls used, inches.....	10
Diameter of rolls, inches.....	12
Pitch diameter of herringbone pinions, inches.....	13
Face width of herringbone pinions, inches.....	14
Ratio of gearing.....	84 to 1
Diameter of roll journals, inches.....	9
Length of roll journals, inches.....	9
Length of bed, inches.....	122
Overall height, inches.....	102
Floor space, feet.....	8 x 15
Size of motor required, horsepower.....	50
Speed of motor, revolutions per minute.....	1,000
Total weight of rolling mill, including bed plate and motor, pounds	27,500

In addition to the motor drive, the mill can be furnished with a friction clutch drive, as shown in Fig. 3, or with a silent chain drive.

Petroleum Iron Works Contracts.—The Petroleum Iron Works Company, Sharon, Pa., is operating its plant to nearly full capacity, and its estimating department is figuring on considerable new work, including some for export. It has recently completed the following contracts: American Sheet & Tin Plate Company, Gary, Ind., stand pipe, 20 ft. diameter by 130 ft. high; Republic Iron & Steel Company, Hazelton, Ohio, a stack, 17 ft. diameter by 250 ft. high, and a standpipe 20 ft. diameter and 120 ft. high, while another stack, a duplicate of the first, is nearing completion. A recent shipment consisted of a 30,000-gal. steel tank for oil storage, which went to Brazil. The company has under construction at Yonkers, N. Y., for the Otis Elevator Company, a steel tower, using Bethlehem shapes in the trestle, which is to support a steel tank of 200,000 gal., being 178 ft. above the ground. It recently completed for the United States Government a 12,000-barrel oil storage tank for supplying fuel to oil-burning vessels and smaller storage tanks for gasoline at Providence, R. I.; Norfolk,

Va.; Tampa, Fla.; Mobile, Ala.; Charleston, W. Va., and two stations in our island possessions. Considerable oil storage tankage is being shipped to Texas, Oklahoma and other oil fields.

Lee C. Moore & Co., Lewis Building, Pittsburgh, recently shipped fittings for six steel tubing oil derricks to Roumania. The fittings consisted of top and bottom plates, clamps, bolts and U-bolts, weighing 24,000 lb. The appliances are steel forgings for 80-ft. derricks, made extra heavy to withstand the hard usage encountered in the Roumanian oil fields. Tubing for the derricks will be cut at or near the scene of operations, and after the derricks are erected the tubing will be filled with concrete to further strengthen and stiffen them, as ordinary types of derricks have proved inefficient in that field.

Vermillion Iron Ore Explorations

Remarkable Activity Involving a Score of Companies—A Review of the Work Thus Far Done

BY DWIGHT E. WOODBRIDGE, M. E.

There is great activity and interest in iron ore exploration on the Vermillion range of northern Minnesota. This was the original mining district of Minnesota and was the cause of the building of the Duluth & Iron Range Railway in the eighteen eighties. But in spite of various campaigns of exploration, only one ore body was discovered on that range for many years subsequent to the original finds at Tower, where the shipment of ore began in 1881. It now looks as though some mines might be added to those heretofore known, though the great majority of the present active explorations are doubtless doomed to disappointment. The Vermillion range is a difficult and costly region to explore, and knowledge concerning the probable concentration of ore bodies was not as clear 10 or 15 years ago as it is now. These, with other reasons, may account for at least some of the failures of the earlier campaigns of exploration.

The Soudan Iron Bearing Formation

The one ore deposit found on this range, between 1881 and the opening of Section 30 a short time ago, was that of the Chandler and adjacent mines in 1888. From that year to 1907 no new ores were found, for the entire Ely basin may be considered an extension from the Chandler. In 1907 explorations were begun on Section 30, and ore was cut by drills. But this property passed through various vicissitudes before becoming a mine, and its first shipments were made last year to the amount of some 50,000 tons. Between Tower in T 61-15 and the Chandler in T 63-12 is a stretch of country 18 miles long, where there is a series of well defined outcroppings of the so-called "Soudan iron bearing formation" in which are situated all the mines of both Tower and Ely. It seems to be generally recognized that, to permit a concentration of commercial ore from the rocks of the formation and a deposition sufficiently large to make a minable deposit, there must be a comparatively impervious basin in which the solutions may deposit their burden of iron mineral. This fact, though repeatedly referred to in treatises concerning the region, is occasionally lost sight of by those who see in an outcropping of ore and jasper a sufficient reason for carrying out exploration work. But there are several explorations now under way that have borne this fact in mind, and at these the opportunities seem better than elsewhere.

Activity in exploration to-day is due more or less directly to the success of Section 30. When it was generally recognized that ore had been found there and later, when shipments actually began, there was more or less excitement and many companies were organized. Considering the fact that the Vermillion range has shipped more than 30,000,000 tons of high grade iron ore, mostly a Bessemer of excellent physical character, that would bring on the market to-day, say \$5 to \$6 a ton, that its mines are now in better shape and larger than at any previous period of their history, that at many points the promise of ore is as good as where it has been found, and that a strong and wide formation extends for many miles, the wonder is that exploration has not been more successful than it has in the past.

Present Explorers New to Iron Mining

Contrary to former experiences, most of the present work is in the hands of persons and companies that are not identified with the iron trade and that may be classed as amateurs in the business, so to speak. Most of the financing has been by the sale of stock to the public, largely in Minnesota, in Duluth, Minneapolis, St. Paul and smaller towns. The companies are said to be financed, generally speaking, sufficiently at least for pre-

liminary exploration and development. Some of them have found ore of commercial quality and in promising quantity, and it is reasonable to expect that a few will become successful mines in due time. It is, to be sure, utterly impossible to verify the various reports that are printed in newspapers or that pass current as to what has been found, and only time will tell which of these many properties are actually successful; but I have attempted to make here a brief résumé of operations and prospects at each of the active explorations and to present such information as has been permitted to come out. I cannot undertake, however, to vouch for every statement as to individual property development.

Most of the explorations on the range are near the main line of the Duluth & Iron Range Railway, whose road extends in a quite direct line from Tower to Ely. This road has recently surveyed a preliminary line from its station of Murray to the northwest into the center of one of the new groups of explorations, north of Vermillion lake. Toward this same center the Canadian Northern road has examined, in an informal, preliminary way, a route for a railroad from its main line at the station of Cook, which lies to the southwest of Lake Vermillion. The Canadian Northern also owns and operates a line from Port Arthur, on Lake Superior, southwesterly into northern Minnesota, reaching the easterly end of the Vermillion range, some 50 miles east of Ely, and there is a rumor that it proposes to connect this stub end with its main line from Duluth to Winnipeg, at or near the town of Cook, in which case it will follow the Vermillion range for 75 miles.

The Westerly Group of Explorations

More than 20 explorations are either active at this moment or have been working till very recently and are closed temporarily. In addition to these, whose monthly expenses cannot be far from \$100,000, are several that may begin work shortly and on which the preliminaries have been undertaken. The active explorations seem to fall into some four groups, in addition to which are a few isolated operations.

The most westerly of these groups is that on the north and west side of Vermillion lake, along the north line of T 62-15 and in the northwestern part of 62-14. Extending easterly from Pine island toward Mud lake in 62-14 is a very strong iron bearing formation, quite wide at places, and here and there showing outcroppings of good ore. Properties of this group, named from west to east, include the Pittsburgh Iron Mining Company in section 6, and the Vermillion Iron Development Company, section 5—both in T 62-15; the Chicago-Vermillion, section 34; the Rice Bay, section 35; the Scott-Bevier, section 36—all in T 63-15; and the Vermillion Steel & Iron and the Vermillion Steel & Iron Extension, sections 5 and 4, T 62-14. The Vermillion Steel & Iron shaft is 200 ft. deep. East of the Vermillion Steel & Iron Extension is the Irona, which is in its third diamond drill hole. The Pittsburgh is idle. Vermillion Iron Development covers some 380 acres. A working shaft has been sunk 165 ft. vertically; at 140 ft. it cut the steeply dipping formation, and is now bottomed in a slaty hematite that is fairly clean and is improving. This property has not been drilled by the present company, but holes were sunk some years ago by J. S. Lutes, acting for the Biwabik Mining Company, which were not successful. Mr. Lutes acted on the natural assumption that the formation dipped to the north, but this has now been found incorrect, the shaft showing the contrary. The Vermillion Iron Development is to install a generating plant and electric drills. West of the above is the Chicago-Vermillion,

Easterly from these and in what I have classed as group three, are the McCue Mining Company, section 10, 62-14; the Almar, section 15; Steward, section 14; the Armstrong Lake, section 13, all in T 62-14, and the DuLuth-Vermillion, section 7; the Phillipson & Mesaba, sections 4, 8, 17 and 18; the Campbell, section 9, and the

Southall, section 4, all in T 62-13. All but the Duluth-Vermillion and the Campbell are idle, and these two are drilling. Most of these are located on a long outcrop of hard magnetic banded jasper and iron, extending in a generally direct course for some miles along the shores of Armstrong and Robinson lakes. At the Steward there is a stockpile of some 700 or 800 tons of high grade hematite, taken from workings carried on by exploring syndicates, one of which closed operations but a short time ago after expending a large sum. There is little doubt that more ore is to be found where this was taken out, but nothing is known as to the quantity possible. Southall is a United States Steel Corporation property drilled years ago and found to have ore; its surface ore is a high grade, dense, hard magnetite. It has never been operated nor extensively drilled.

Properties in the Ely Basin

In group four are properties in and adjacent to the Ely ore bearing basin, from which the United States Steel Corporation extracts its highest grade and finest ore, and whose ore bodies are large and deep. The Vermillion & Mesaba Iron Company is in sections 32 and 33, T 63-12, and sections 4 and 5, T 62-12; the Chandler Extension, section 28, T 63-12; the Sharon, sections 2 and 3, and the White Iron Lake, section 2, both in T 62-12, and the Section 30 Development, section 30, T 63-11. The Vermillion & Mesaba has a well defined basin pitching west, and has a number of drill holes in ore, with one shaft 50 ft. deep, of which 20 ft. is ore, and another, 60 ft. deep, in contact between greenstone and ore formation. The Chandler Extension took over a part of the abandoned Chandler mine and has taken out some 25,000 tons of shipping ore from the footwall and has developed some 75,000 tons more, most of which can be shipped this year. Pickands, Mather & Co. are understood to have become interested in this operation by advances made on ore. Whether a new lens has been found, or some ore hidden by slides, &c., has been recovered, I do not know. The Sharon has not yet started work but soon will. The White Iron Lake has been drilling for some years. A shaft is 180 ft. deep, and from this a crosscut is now being driven on the 150-ft. level, in order to cut ore that was said to have been found by drills at lower levels. Section 30 Development is drilling some 300 ft. from where ore in quantity was exposed in the Section 30 company's workings, and is said to have met with encouragement.

Most of these concerns are equipped with machinery plants ample for their needs; many of them have air drills, and the most modern steam generators are not uncommon. Mention has been made of the North American's surface equipment, but the Vermillion Steel & Iron has nearly as good and others are not far in the rear, though none of them have the steel buildings and concrete shafts of the North American. Electric drills are being installed at the Vermillion Iron Development, and the diamond drill, as has been shown, is in extensive and constant use.

Unless conditions change in the course of the next few months these are but a part of the explorations that will be under way the coming summer. It is not expected that any mines will be developed sufficiently to make shipments this year with the exception of Chandler Extension, but if what the various companies say is borne out by the facts, there should be several shippers in 1912 or 1913. And, no matter what may result from this campaign of exploration, the Vermillion range will continue to be a field for prospecting from time to time for a long period. Its outcrops are promising and seductive; its ore, when found, is so good, and it is so near lines of communication, that no one or half dozen unsuccessful campaigns can dull the edge of expectation in the minds of prospectors. But it is somewhat significant that in this present period of activity there is interested no large mining company of experience.

Germany's iron ore production last year reached 28,709,654 metric tons, as compared with 25,504,464 tons in 1909. The Statistical Office places the production of pig iron at 14,227,455 metric tons, as compared with 12,512,257 tons in 1909.

Swank's New Fire Brick Plant

The firm of Hiram Swank's Sons, which established a fire brick works in 1856 in the outskirts of Johnstown, Pa., and which still operates a plant in another section of that town, manufacturing center and bottom plate runner brick, sleeves, nozzles, Bessemer tuyeres, converter bottom brick, &c., has just placed in operation at Irvona, Clearfield County, Pa., on the Pennsylvania and New York Central railroads, a new and modern plant. The capacity of the two plants makes this firm the largest producer in its line in the country. The Irvona property consists of 12 acres of land on which a main brick and steel building, 75 x 300 ft., serves as a tempering department; another building, 30 x 40 ft., contains boilers, engines, wet and dry grinding pans and other machinery for making sleeves, nozzles, &c. At the new plant five kilns are now being operated, and nine additional kilns are under construction.

The firm has an ample supply of clear water and a reserve of 700 to 800 acres of flint fire clay and about 400 acres of coal and plastic clays. Ira E. Matthews is superintendent of the plant. Besides the sales office at 216 East Robinson street, N. S., Pittsburgh, Hiram Swank's Sons contemplate establishing shortly a Philadelphia office. Their Johnstown plant is being operated to capacity on various contracts.

The Rochester Iron & Metal Company's Growth.

The Rochester Iron & Metal Company, with principal office at 325 to 345 St. Paul street, Rochester, N. Y., has filed application at Albany to increase its capital stock from \$20,000 to \$100,000. This company was incorporated in 1903 with a capital of \$10,000, increased to \$20,000 in 1906, and the further increase at the present time to \$100,000 marks its steady but rapid growth, and places it in the rank of the first dealers of the country in scrap iron and steel and metals. The Rochester Iron & Metal Company at present occupies the grounds of the Genesee Falls Field on St. Paul street and is equipped with all modern facilities for shearing and handling scrap iron of all kinds and dimensions. The equipment includes shears, cranes, drops, railroad scales and direct railroad siding in the yard. Due to the growth of its wholesale business, the company has within the past two years added to its facilities by acquiring a large tract of ground adjoining the New York Central at Portland avenue. It also occupies the Atlantic avenue grounds of the New York Central which are especially reserved for the handling of railroad scrap. Both of these auxiliary yards are equipped with direct railroad sidings and with all other modern facilities. Louis Frankel is president; Charles Frankel, vice-president; Louis Sarachan, treasurer and manager; Harry Klonick, secretary. These officers and Benjamin Rosenthal comprise the Board of Directors.

The New Jersey Wire Cloth Company, Trenton, N. J., has opened an office and store at 93-95 Pearl street, Boston, Mass., where it will keep a complete stock of its regular products, comprising all grades of cloth and netting made of all kinds of wire, in order to insure prompt delivery of material required in that vicinity. The company has perfected processes for painting, japanning, galvanizing and tinning wire netting, and can meet specifications as to wire of correct size and temper, exactness of mesh, uniformity of crimp and of required finish.

George G. Blackwell Sons & Co., Ltd., Liverpool, England, have published a 12-page pamphlet on "Titanium in Steel and Iron." It is chiefly a reprint of an article dealing with results obtained in the United States by the use of ferrotitanium in the manufacture of rail steel. Reference is made also to a special titanium alloy manufactured for iron foundries. It is stated that titanium iron castings change less in volume under heating and cooling than ordinary castings, and that ingot molds from iron treated with titanium alloy have a longer life. The quantity recommended is from $\frac{1}{4}$ to $\frac{1}{2}$ lb. of alloy to 100 lb. of iron.

The Machinery Markets

Railroad inquiries have improved, but the carrying companies are buying very cautiously. Instead of sending out comprehensive lists they are issuing inquiries for separate tools, and accordingly it is hard to determine how extensively they are buying. This is especially true in the New York market. In Philadelphia a decided betterment is felt for the first time in some weeks, but most of the business done there is of a single tool nature. The foreign demand for transmission equipment is good in Philadelphia. Railroad inquiries are better in Chicago, where the Northwestern Railroad has a list out asking for bids on \$15,000 worth of machinery. The Chicago, Burlington & Quincy will spend perhaps \$10,000 for special machinery. In Milwaukee the National Brake & Electric Company is calling for \$20,000 worth of mechanical equipment. European business is the mainstay of the trade in Cincinnati at present, although there is a good domestic demand for used machines. The call for machinery is good in some quarters in Cleveland, but most of the orders placed are for single tools. Sales of power equipment are occupying the attention of the trade in the South. In Detroit business is rather quiet, although the automobile demand is good.

New York

NEW YORK, April 19, 1911.

Although new inquiries are scarce, the trade in New York is bidding on a number of large lists, and there are good prospects that they will be closed in the very near future. It is conservatively estimated that the actual lists before the trade call for expenditures aggregating fully \$200,000, and this added to the scattered inquiries distributed among the various machinery houses brings the requirements of buyers up to a large figure. The trade is now bidding on a New York, Ontario & Western list, and orders have been closed for some of the forging and upsetting machinery. This company will spend fully \$100,000 if it closes for all the machinery on which it is asking bids. The Saurer Motor Company list, mentioned last week, and the Pope Mfg. Company list, each calling for about \$50,000 worth of machines, have not been closed yet. In addition to this business, some of the railroads are calling for small lots, but their requests for bids are widely scattered and it is hard to get a line on just how much they are doing. While the machinery houses handling a general line of metal working equipment have nothing to complain of, manufacturers' agents who handle automatics or one or two lines of special tools are not so busy, as there is a decided lack of new enterprises in the way of factory extensions and new manufacturing prospects in this territory. Power equipment people are busy, the demand for that class of material coming principally from electric railroad companies throughout New Jersey and Pennsylvania, many of which are extending their lines.

The Clark Motor Company, Buffalo, N. Y., recently organized, has secured factory premises at Elmwood avenue and the Erie Railroad and New York Central Belt Line, where it will manufacture electric motor trucks and pleasure vehicles. The company controls the Van Wagoner and Clark patents relating to motor suspension and power transmission. A. A. Landon is president and Stanley B. De Long secretary-treasurer and manager, 1738 Elmwood avenue.

Plans are being prepared for a three-story factory, 70 x 350 ft., of reinforced concrete, to be erected this summer by the Lippard-Stewart Motor Truck Company on Elmwood avenue, near Hertel avenue, Buffalo, N. Y., for the manufacture of motor trucks. Thomas R. Lippard is president, 851 Ellicott Square Building.

The plant of the Johnston Harvester Company, Batavia, N. Y., is to be enlarged this summer by the erection of two additional buildings, each approximately 70 x 500 ft., to be used for increasing the capacity of the malleable iron department, so that the company, which is now controlled by the Massey-Harris Company of Toronto, manufacturer of farming machinery, can supply to its Canadian plants at Toronto, Woodstock and Brantford from the Batavia plant all of the malleable iron parts used by them.

The American Pulp & Board Company has been incorporated at Niagara Falls, N. Y., with a capital stock of \$20,000, to manufacture pulp-board shooks and boxes of fibrous materials; also to deal in all kinds of paper and in all ingredients, products and compounds thereof. Arrangements will be made soon for a manufacturing plant.

The newly organized Upson Company, Lockport, N. Y., will, instead of erecting a new plant, build an addition to the old Franklin Mills at East Lockport, making the plant modern in all details for its purposes. Electric and water power will be used. The company will be in the market for small electric units, overhead trolley conveyors, shafting and pulleys. Necessary special machinery has already been arranged for. Charles A. Upson is president, Lockport.

The McCall Machine Works has been incorporated at Rochester, N. Y., with a capital stock of \$15,000, to manu-

facture presses, dies, punches and special machinery. The company will take over the business of Arthur H. McCall, manufacturer of dies, punches, &c., 85 Allen street. A. H. McCall will be president of the new company.

The city of Syracuse, N. Y., is having plans prepared for a vocational high school, comprising a power plant, machine shop, foundry and woodworking shop. Henry C. Allen, city engineer, has supervision of the plans.

Business Changes

The McCabe Machine Company has moved its office from 95 Liberty street, New York, to 36 Rapelyea street, Brooklyn, where the company has extensive warehouse facilities.

Chicago

CHICAGO, ILL., April 18, 1911.

Machine tool business in this district is brightening by the inquiries now afloat, and better conditions are evidently in store. Western railroads are showing some indications of breaking away from their long continued retrenchment policy, and among the activities of to-day we note the third of a series of lists issued by the Northwestern Railway, as mentioned in our recent report. This list amounts to about \$15,000, and will be purchased at the same time as the two lists previously issued. The Chicago, Burlington & Quincy is inquiring for several special machines which are contemplated for use in some of its shops. The value of these special machines will probably run somewhere around \$10,000, and it is expected that lists will be issued in the near future. Bids have been submitted to the Union Pacific by several machine tool concerns in this district on the lists recently issued for Omaha shops. The approximate total of the list is \$20,000. The materialization of some of this business will decidedly brighten the machinery sky.

The National Brake & Electric Company, Milwaukee, Wis., is in the market in that district for about \$20,000 worth of machinery and tools. Among the purchasing visitors in Chicago the past week have been buyers representing the International Steam Pump Company of Cudahy, Wis., who have bought supplies for general shop improvements.

Inquiries continue to improve and city business still maintains a slight lead over that from the country in daily floor sales.

The Joseph H. Whitehead Company, long and favorably known in Chicago as a dealer in machinists', mill and railroad supplies, has passed into the hands of a receiver. Edwin D. Buell, 98 Jackson street, was appointed by the District Court on April 11 to take charge of the business. Hopes are held out that the company will be reorganized and the business continued.

By the time this publication goes to press the International Harvester Company will have closed pending deals for turbo-generators, air compressors and boilers for its McCormick, Plano and Champion plants. This company will also have closed the purchase of cupolas, tumbling mills and other foundry equipment for its plant at Springfield, Ohio. The amount expended in these purchases totals \$250,000.

The Spengler Brothers Company, Rockford, Ill., metal specialties, is contemplating the erection of a new factory building, details of which have not been decided upon.

The Cannery Can Company, Chicago, has purchased a tract of 9¾ acres of land on Western avenue, on which it will eventually erect a factory at a cost of \$250,000. Details of the new plant, however, have not yet been decided upon.

The Sprague Machinery Company, Hoopeston, Ill., has been incorporated with a capital stock of \$200,000. The

THE MACHINERY MARKETS

incorporators are H. A. Lundahl, J. W. Taylor and R. J. Bieg.

The Rockford Paper Box Board Company, Rockford, Ill., has increased its capital stock from \$5000 to \$200,000.

The Barry Mills & Elevator, Barry, Ill., were destroyed by fire April 8. The loss will exceed \$30,000, partially insured. The plant also furnished the town with electric lighting for the streets.

The plant of the Rawleigh Medical Company, Freeport, Ill., was burned April 7, causing a loss of upward of \$100,000.

The enlargement of the plant of the Joliet Steel Construction Company, Joliet, Ill., has been decided upon as a result of the increase in its capital stock from \$25,000 to \$60,000. F. D. Mateer is the president and general manager.

The Marion Pressed Brick & Tile Company, Marion, Ill., has been incorporated with a capital stock of \$10,000. The incorporators are E. C. Forbush, W. H. Warder and H. V. Ferrell.

The Aluminum Goods Mfg. Company, Manitowoc, Wis., will soon have plans completed for the construction of a factory building, 300 x 400 ft., and a power house and service tower. The power house will be of 300 hp. capacity, direct connected to generator. All equipment will be run in group system with motor on each line shaft.

The United Refrigerator & Ice Machine Company, Kenosha, Wis., has been incorporated with \$750,000 capital stock. The company has absorbed the plant of the Racine Refrigerator & Ice Machine Company, and will make extensive additions to the factory buildings and equipment. About \$100,000 will be expended by the company for new buildings and equipment.

The City Council of Sparta, Wis., has been authorized to issue bonds in the sum of \$15,000 to be used for making improvements to the city's water works system.

The Advance Mfg. Company, Racine Junction, Wis., manufacturer of curry combs, is contemplating the erection of a new factory building for its rapidly increasing business.

The Phillips-Carlton Electric Company, Hankinson, N. D., recently incorporated, will erect a plant of reinforced construction, 48 x 64 ft. The company will install a 72-in. high pressure boiler and a 12 x 36 in. Corliss engine belted to a 75-k.v.a., 2300-volt, 60-cycle, three-phase a. c. generator.

Bonds in the sum of \$8000 have been issued by Vail, Iowa, for extension of water mains and new tank.

An election will be held at Roland, Iowa, April 18, to vote on the question of bonding the city for \$10,000 for a water works system and \$8000 for an electric light plant.

The citizens of Edgewood, Iowa, are encouraging a movement looking to the installation of an electric light plant in that city.

The Crane Company, Chicago, will erect a six-story building on West Fifteenth and Walnut streets in Des Moines, Iowa.

Philadelphia

PHILADELPHIA, PA., April 17, 1911.

While there has been no specific movement in the local machinery market a spotty betterment is reported by some sellers, who have been successful in closing up a few orders against inquiries which have, for the greater part, been under negotiation for some little time. The bulk of the business continues of the small lot order, and sales have been confined almost entirely to single tool propositions, and principally those of the medium and lighter character. So far the month of April will show as a rule a slightly better volume of business than was the case during the first half of March, but on the whole the demand still drags. The demand from the railroads in this district is still of a negligent character; the larger industrial concerns also show little interest in new equipment, the greater part of the buying coming from the smaller users of tools. A scattered demand for special equipment is reported and manufacturers keep moderately well employed, but in few cases are plants operated at anything like full capacity. A fair inquiry for boilers and engines is noted, but negotiations are usually confined to equipment of the smaller powers. In some lines of power transmission equipment a good foreign demand is noted, but that for the general lines of machine tools is very light. The second-hand machine tool trade has not been particularly active, inquiry for special equipment is fair, but the general movement in used machinery and tools drags.

The pattern storage department of the James Barker Company, Inc., iron founder, Sixth and Cayuga streets, was destroyed by fire April 13. A large number of its customers' patterns were destroyed, but they, as well as the building,

were fully protected by insurance. The loss is estimated at \$30,000. No other department of the plant was damaged. Plans for a new fireproof pattern storage building are being made, and the work of rebuilding will be started at an early date.

John G. Brown, contracting engineer, has begun work on the erection of a large plant, designed by him for the Saurer Motor Company of Asbon, Switzerland, at Plainfield, N. J., where the American plant of that company will be established. When completed the plant will include two one-story brick and concrete buildings, one 80 x 150 ft. and another 100 x 150 ft.

The A. A. Denslinger Machinery Company has been granted a charter under the laws of Delaware, with a capital stock of \$50,000. This concern is located at 866 Pallas street, and manufactures special machinery, largely used in the manufacture of shoes.

The A. F. Witteman Company continues to make extensive improvements to its plant at Chester, Pa. It has recently installed a new power plant, equipping it with a 200-hp. boiler and engine installation. This company is now completing arrangements to increase its capital stock from \$100,000 to \$200,000, in order to take care of its steadily increasing business, and contemplates the erection of an additional machine shop. While plans are not complete, it is probable that the new addition will be 80 x 200 ft.

The old Wilbraham-Green Blower Company foundry buildings, at Cumberland and Amber streets, which have been occupied by the Scott & Williams Company for some time in the manufacture of knitting machinery, have been purchased by the latter. No further additions or improvements to the plant are contemplated at this time.

The North Brothers Company, American and Lehigh avenues, is taking bids through Wm. Steele & Sons, for the erection of a brick and concrete addition to its factory building. This addition is to be five stories, 60 x 100 ft., and will provide increased facilities for a number of its manufacturing departments.

The Chester Lace Mills, Chester, Pa., will, it is stated, make considerable improvement to its power plant. Particulars are not available, but it is reported that the power house is to be enlarged, new boilers installed, and the efficiency of the plant increased 50 per cent.

The Philadelphia & Reading Railroad has awarded the contract for the erection of a new concrete arch bridge over the Delaware River, at Yardley, to F. M. Talbot & Co., 1 Madison avenue, New York. The bridge is to consist of 14 arches, and will carry two tracks, and replace a steel bridge which has been in use at that point for a number of years.

The Consumers' Light & Power Company, Reading, Pa., has given notice of its intention to apply for a charter April 26 empowering it to manufacture, distribute and sell electricity in that vicinity. The incorporators named are T. J. Connelly, J. A. Murray and Thomas A. Dunn.

Efforts by means of a taxpayers' suit to have the contract recently awarded by the city of Philadelphia to W. S. P. Shields, contractor, for the building of the superstructure of the Vine street pier, who also had the contract for the substructure, declared illegal, owing to his not having been the lowest bidder, were unsuccessful. The lowest bidder did not pay, it was stated, the union scale of wages, as provided by the specifications, nor did the city wish to divide the responsibility of the work between two contractors, which might have resulted in delays had the work been given the lowest bidder.

St. Louis

ST. LOUIS, Mo., April 17, 1911.

The Scott Gasoline Rock Drill Mfg. Company, St. Louis, has filed articles of incorporation, with \$500,000 capital stock. It is the intention of the company to establish a factory in St. Louis for the manufacture of a drill invented by Louis L. Scott. The drill is attached directly to the cylinder of a gasoline engine, doing away with the use of a steam plant, air compressor and hose in drilling rock and other substances. The machine is being manufactured under contract at present. The incorporators are Louis L. Scott, John R. Williams, Samuel D. Martin and others.

The H. D. Williams Cooperage Company, St. Louis, has increased its capital stock from \$200,000 to \$750,000. The company's principal plant is at Leslie, Ark., where it owns a railroad. It has a storehouse at 118 North Commercial street.

The Acme Hoisting Machine Company, St. Louis, has been incorporated, with a capital stock of \$50,000. The incorporators are F. R. McCune, Geo. S. Cornell and John M. Patke. The company will manufacture hoisting and power, illuminating, excavating and carrying machinery.

The Continental Motor Equipment Company, St. Louis,

THE MACHINERY MARKETS

has been incorporated, with a capital stock of \$25,000. The incorporators are N. H. Davis, John Shuford and H. S. Gilbert.

The National Railways Valve Gear & Equipment Company, St. Louis, has been incorporated, with a capital stock of \$200,000. The incorporators are L. A. Wind, I. F. Watkins and D. L. Price. The company will manufacture valve gears and other railroad equipment.

During the tornado which prevailed here April 13 the Burlington elevator was partially destroyed, involving a loss to the building, machinery and grain estimated at \$150,000.

The St. Louis Screw Company, St. Louis, has been incorporated, with a capital stock of \$200,000. The incorporators are Edward J. Miller, Walter S. Ashton, Geo. Gruenewald, Henry J. Jaeger and Charles Niekamp. The company is engaged in the manufacture of screws.

The C. A. Wood Preserver Company, St. Louis, has been incorporated, with a capital stock of \$10,000. The incorporators are M. F. Gerhard, H. H. Gerhard, H. A. Giesen and others. The company will manufacture wood preservers and wood preserving processes.

The Standard Spring Wheel Company, room 407, Reliance Building, Kansas City, Mo., recently incorporated with \$100,000 capital stock, expects to establish a factory in the near future to manufacture spring wheels for automobiles.

F. S. Ackerman and associates of Chicago have bought the electric light plant of the Eureka Springs Electric Company, Eureka Springs, Ark. The deal includes the properties of the street car system, lighting and ice plants.

A. P. Kincade of Scranton, Ark., in addition to arranging for erecting a \$10,000 cotton gin, has applied for a franchise for an electric light system to be installed at that place.

Cincinnati

CINCINNATI, OHIO, April 18, 1911.

Machine tool builders are somewhat disappointed with spring business, but if every line of manufacture was considered, conditions in this territory might be reported as being nearly normal. In spite of long delayed orders for tools that were expected from certain quarters, there is generally an optimistic feeling. Many local manufacturers have been impressed with the importance of having a foreign trade to keep their factories busy during slack periods, and European business appears to be more attractive for machine tool builders than that from any other part of the world, although considerable attention is being aroused in the Spanish-American field.

Second-hand machinery dealers report a fairly good business in small machine tools, but used sawmill equipment is moving very slowly. Manufacturers of sawmill machinery, on the other hand, state there is a slow but steady increase in orders received.

The Alvey-Ferguson Company, Louisville, Ky., manufacturer of conveying machinery, has bought a site of four acres at Oakley, Cincinnati suburb, and plans will be prepared at an early date for the erection of a large manufacturing plant. It has not yet been announced whether the company will have its own power plant or will obtain its power and light from the large central plant at Oakley.

President M. A. McGuire of the Vulcan Trunk Company, 608 Vine street, Cincinnati, confirms the report that his company has acquired a manufacturing site on Spring Grove avenue, on which will be erected a trunk factory. No plans have yet been drawn up.

The Niles Tool Works Company, Hamilton, Ohio, advises that the building for its new foundry has been completed, but that it will be about 60 days before the equipment is installed and the addition in operation.

The Indian Refining Company, whose headquarters have heretofore been in Cincinnati, has decided to move its executive department to New York. A branch office, to take care of Western business, will be maintained in the First National Bank Building.

The Lowe Bros. Paint Company, Dayton, Ohio, has commenced work on a factory building that will have a total floor space of 30,000 sq. ft.

It is reported that the Dayton Engineering Laboratories Company, whose headquarters have heretofore been in Chicago, has leased the Beaver Power Building in Dayton, Ohio, and will hereafter manufacture its special automobile parts in the last named city.

The J. A. Fay & Eagan Company, Cincinnati, confirms the report that it intends moving its manufacturing plant from the present location on Front street to Bond Hill suburb, where a large site has been secured. Delay in extension of a car line has held up building plans, but this matter is expected to be arranged shortly.

Plans for the large car repair shops recently mentioned,

to be erected by the Cincinnati Traction Company, have not yet been completed. The two shop buildings will be about 150 x 250 ft., and in addition there will be an immense car barn. The total building expenditure will be in the neighborhood of \$250,000.

The Industrial Club of Covington, Ky., was recently incorporated with the primary purpose of inducing manufacturers to locate in that city. Its membership increased so fast, however, that clubrooms were secured and social features were added. Richard S. Stewart of the Stewart Iron Works will be the first president.

The A. J. B. Ice & Storage Company is a new incorporation at Parkersburg, W. Va., with \$50,000 capital stock. W. F. Thayer and Robert Wilson of Parkersburg are named among the principal incorporators.

To manufacture seed separators the Benson Mfg. Company was incorporated at Buchanan, W. Va., with \$25,000 capital stock. The incorporators are O. B. Beer, T. P. Sexton, W. L. Talbot, A. Layfield and F. M. Carpenter.

The Avon Coal Company, Cincinnati, is a new incorporation with \$100,000 capital stock, formed by A. Cunningham, Daniel McLaren, Walter J. Friedlander and Harry Levi of Cincinnati, and J. H. Keyes of Terre Haute, Ind. It is the purpose of the company to begin mining coal in West Virginia at an early date, and later coke ovens will be installed. The company has a lease on about 1500 acres of coal lands that are yet undeveloped.

Cleveland

CLEVELAND, OHIO, April 18, 1911.

The local machinery and machine tool market continues quiet. Dealers are getting no inquiries of any size, but are doing a moderate amount of business in single tools. Some of the builders report an improvement in inquiries and a better outlook than a few weeks ago. While some manufacturing plants in metal working lines are complaining of a scarcity of orders others have about all the work they can do. Plants making agricultural implements and other products used largely on farms are very busy. While there are about the usual number of new concerns being organized to engage in metal working lines, these companies are mostly small ones for the manufacture of specialties and require but little in machinery equipment. In spite of the inactivity in some lines very little good second-hand machinery is being placed on the market. The demand for electrical equipment, which improved recently, continues fairly active. The demand for mill supplies is quite good.

The general contract for the new plant to be erected in Cleveland by the Taylor & Boggis Foundry Company has been let to John Gill & Sons, Cleveland. Plans for the plant and number of buildings have not yet been decided upon. The plant will include a large foundry and one or more buildings for the manufacture of builders' hardware.

The Cleveland Auto Spring Company has been incorporated with a capital stock of \$15,000 by H. F. Ehlert, J. A. Flajole and others. The company will manufacture a new automobile spring. It will occupy a plant containing 5000 sq. ft. of floor space, to be built for it on Scranton road, by the Bradford Carter Estate.

The National Electric Lamp Company has purchased a 30-acre site at Euclid avenue and Noble road, East Cleveland, and is having plans prepared for a group of buildings, including a power plant, engineering and testing departments, chemical laboratory, executive offices, &c. Its present large plant at Hough avenue and East Forty-fifth street will not be moved.

The Service Recorder Company, Cleveland, has been incorporated with a capital stock of \$60,000 to manufacture an automatic time recorder for vehicles. A plant will be provided, which for the present will be used only for assembling. F. Baumgartner and others are interested in the company. The incorporators are H. R. Cool, Richard Inglis, F. A. Quail, J. C. Barkley and E. Denner.

The Cleveland Autocraft Boat Company, now located at 1036 West Eleventh street, Cleveland, will build a new plant in Lorain, Ohio, which it expects to have ready for occupancy November 1. The present company will be reorganized and its capital stock increased to \$100,000. Machinery equipment will be required for the new plant. The company makes steamboat tenders and small wooden boats of various kinds.

The Crystal Paper Company, Amanda, Ohio, has awarded contracts for the erection of a paper mill and power house, 50 x 500 ft. It will be of brick, steel and reinforced steel construction.

The Krouse Konstant Carburetor Company, Cleveland, has been incorporated with a capital stock of \$15,000 by

THE MACHINERY MARKETS

R. E. Krouse, Edward Younger, F. G. Castle, F. E. Pfeiffer and W. K. Caldwell.

The annual dinner given by the metal trade manufacturers of Cleveland to their shop superintendents and foremen will be held at Wohls' Hungarian restaurant April 29.

The Silver Mfg. Company, Salem, Ohio, is increasing its foundry capacity by the erection of a new building, now under construction, 54 x 116 ft.

The National Fire Proofing Company, Canton, Ohio, will double the capacity of its plant at Magnolia, Ohio, by the erection of a new one-story concrete building, 65 x 157 ft.

The Economy Switch Box & Mfg. Company, Sweeney avenue, Cleveland, has increased its capital stock from \$5000 to \$25,000, to provide for the growth of its business.

The Standard Tool Company, Cleveland, has increased its capital stock from \$1,000,000 to \$1,500,000.

The Board of Trade of Canal Dover, Ohio, is making efforts to secure a steel plant for that city, and has appointed a committee to gather information concerning the project.

The Star Drilling Machine Company, Akron, Ohio, has purchased an 8-acre site in Los Angeles, Cal., where, it is announced, it will erect a factory for the manufacture of oil, gas and water well machinery. It is reported that the company will spend about \$150,000 in the erection of a plant.

The village of Logan, Ohio, is preparing plans for an electric light plant.

It is announced that the Lake Shore Railroad Company will erect two machine shops on the Union and Superior docks at Ashtabula, Ohio, one 40 x 120 ft. and the other 63 x 130 ft.

New England

BOSTON, MASS., April 18, 1911.

The market for machinery shows little variation from the conditions which have existed for a month past. Manufacturers of grinding machinery are finding a good business, though they could take care of more orders. The Brown & Sharpe Mfg. Company, Providence, R. I., reports that its great works are producing in large volume, with considerable foreign business, but with the bulk of the new orders from American customers.

W. A. Viall, superintendent of the Brown & Sharpe Mfg. Company, sailed last week for a European trip.

The Norton Grinding Company, Worcester, Mass., manufacturer of grinding machines, has decided to make large additions to its works at Greendale. The present plant consists of two buildings, each 84 x 260 ft., connected at the front by a structure 40 x 75 ft. The addition will consist of a third shop unit, 84 x 260 ft., connected with the remainder of the plant by a brick building the duplicate of the present intermediate structure. The main building will be devoted to a general extension of the machine shops. Like the other buildings, it will be one story, with monitor roof, and with broad galleries extending around three sides, to take the lighter machinery. The open space of the main floor will be served by a 10-ton traveling electric crane. The floor will be of special construction, so heavy that the largest types of grinders built by the company may be set anywhere for testing. The second floor of the connecting building will be devoted to the drafting rooms and the lower to storage. The business of the Norton Grinding Company has grown with extraordinary rapidity. The first shop was only a part of the first large building, and was occupied in 1902, shortly after the business was established. The building was soon extended, and four years ago it became necessary to duplicate it and erect the office building. Now the growth of the industry has reached the point where the plant is again inadequate for the needs of the business.

The business of L. H. Snyder & Co., Bristol, Conn., manufacturers of floor and ceiling plates, has been incorporated in Connecticut with capital stock of \$30,000, the incorporators being Lyman H. Snyder, Flora C. Snyder and Losee B. Snyder. The management will remain unchanged, but it is the intention to increase the business materially and the factory will be enlarged at once.

The Galpin-Griffin Mfg. Company, Hotchkissville, Conn., has been organized under a Connecticut charter, to manufacture handles, faucets and measuring poles and to do a general wood turning business. The factory will be located in Hotchkissville and will be operating in about two months. The incorporators are Thomas G. Galpin and W. A. Galpin, both of Hotchkissville, and James E. Griffin, Waterbury, Conn.

The Norton Company, Worcester, Mass., manufacturer of abrasive wheels, including the alundum products, will build a four-story addition to its plant at Worcester, 24 x 40 ft., of brick and steel.

The Wyman & Gordon Company, Worcester, Mass., manufacturer of drop forgings, has secured several lots of land adjacent to its premises in Worcester, but has nothing to say as yet as to plans for the development of the property for its manufacturing purposes.

The International Silver Company, Meriden, Conn., will build an addition to its Factory B, otherwise known as the Derby Silver Company, Shelton, Conn. It will be used for a plating room and no additional equipment will be installed.

The repair shop of the Boston & Maine Railroad, Sanbornville, N. H., was burned April 8, with a loss to contents of \$10,000. Doubt is expressed as to whether the shops will be rebuilt.

The local press states that the Writerpress Company, Buffalo, N. Y., will remove its business to Shelton, Conn., and will occupy a brick building about to be erected for the Shelton Business Men's Association, 40 x 100 ft., three stories.

The American Writing Paper Company will establish a new power house at the Crocker Division, Holyoke, Mass., to cost \$35,000. A steam plant will be installed, to supply the division.

The Pejepscot Paper Company is erecting a large pulp mill at Topsham, Me. Another large pulp and paper project is announced in connection with the creation of additional water power at Shawmut, Me., in the Kennebec River, above Waterville. The paper and pulp mills require repair shops of some size. Other additions to New England industries just announced follow: Standard Fabric Company, Fall River, Mass., new mill, 92 x 200 ft., three stories; E. A. Mallory & Sons, Inc., Danbury, Conn., addition, 40 x 105 ft., four stories; American Hosiery Company, New Britain, Conn., additional story to a building, 26 x 92 ft., and a three-story addition, 20 x 25 ft.; Gagnier & Angers, Springfield, Mass., manufacturing and storage building, 50 x 102 ft., six stories; Fletcher Mfg. Company, Providence, R. I., textiles, one-story addition; Henry J. Perkins Company, Springfield, Mass., large concrete and steel building, in which cold storage equipment will be installed.

The Meriden Board of Trade Industrial Corporation, Meriden, Conn., states that its purpose is to erect a building or buildings in which small manufacturers who have insufficient capital to own their own buildings can find a place to operate. The city has had many opportunities in the past to secure small or young manufacturing concerns had a factory been available for them. It has, therefore, been deemed wise to establish this new company.

The Connecticut Legislature has passed an act authorizing the Crane Valve Company, Bridgeport, to increase its capital stock from \$800,000 to \$5,000,000. The company states that this is merely a permission secured at this time because the Connecticut Legislature does not meet again for two years. No intention exists of issuing the new stock for the present.

Detroit

DETROIT, MICH., April 17, 1911.

Manufacturers report the past week as rather quiet in point of orders, but are not looking to the continuance of such conditions for any length of time. One thing that is pleasing to motor car manufacturers is the fact that they are carrying no stock, but almost universally are behind in their orders. Building operations are picking up, with plenty of structural work ahead. Automobile makers are fighting a bill pending in the Legislature which will make automobile companies adopt the United States standard thread for all screws used in the manufacture of the motor car. As nearly every motor car company uses a thread especially adapted to the motor car, it is easily seen that the switching over to a new standard would mean considerable loss to them. Manufacturers in general are helping to defeat the bill.

The Adjustable Hub Company has been organized here to make a patented automobile hub. The company has a capital stock of \$100,000. W. F. E. Woodhouse and A. V. Woodward are prominent stockholders. The company will build a plant in this city.

The Detroit Aeronautic Construction Company is being incorporated this week, with a capital stock of \$65,000. A factory is being planned to manufacture motors and planes on a large scale. Max Dingfelder, Emil W. Snyder and John T. Patterson are the principal stockholders.

The Farrand Organ Company of this city is planning several improvements. The main item is the erection of a two-story factory building, to cost in the neighborhood of \$20,000.

The Piedmont Graphite Company, which is now located at Atlanta, Ga., is to move its large plant to this city. The company has purchased a factory site on Jefferson avenue

THE MACHINERY MARKETS

and will erect a modern plant. The electric process will be used for graphite refining. William Reinke is the Detroit manager.

One of the most important building projects of the past week is the proposed new plant of the Commercial Milling Company. The company plans to erect a 25,000-barrel mill, with 16 storage tanks of 250,000-barrel capacity. The mechanical equipment will include a cross compound condensing engine of 250 hp. Robert Henkel is president.

The Adrian Cereal Company, which has been operating a small mill near Adrian, Mich., is to engage in business on a much larger scale. Robert McFall, who has the company's affairs in hand, says that the company will build a mill in Adrian early this summer.

The Edward Hines Company, Chicago, Ill., has bought out the Gogebic Lumber Company, a Grand Rapids enterprise, and will build extensively at Marquette. The deal included the purchase of the sawmill and lands and involved about \$1,000,000.

Albion, Mich., is to have an aeroplane factory. The work of organization is in the hands of R. Wilcox of Detroit, formerly of the Detroit Aeroplane Company, and he has announced his intention of erecting a plant at the former city.

A roundhouse, to cost in the neighborhood of \$30,000, is to be erected at Port Huron, Mich., by the Pere Marquette Railroad. The erection of the roundhouse is in line with other improvements included in the recent loan.

A brickmaking concern of importance is the South Michigan Brick Company, Kalamazoo, Mich., which has been incorporated with a capital stock of \$40,000. Resident stockholders are John L. Jackson, Sheldon Ruby and S. O. Church.

The Detroit Cushion Tire Company has been organized in this city, with a capital stock of \$100,000. The tire is the invention of a Detroit man.

The Waterloo Woolen Mills, Monroe, Mich., has been taken over by Ed. J. Lauer and I. S. Harrington of the same city. The new owners plan considerable improvements.

The G. W. Bunker Company, Grand Rapids, Mich., filed articles of incorporation last week, with a capital stock of \$85,000; will take over the business of the Bunker & Wallin Company and will conduct a general engineering business.

The plant of the Grand Rapids-Muskegon Power Company, with headquarters at Grand Rapids, Mich., is to be increased by the installation of a new 10,000-hp. turbine. The business of the company has rapidly increased, making the enlargement necessary.

The Newwaygo Engineering Company, Newaygo, Mich., has begun the erection of a new factory building, 50 x 160 ft., three stories. Besides separator machinery, the company will make various engineering parts.

Another Newwaygo enterprise reported by the Newaygo Business Men's Association is the enlargement of the plant of the Henry Rowe Mfg. Company. The company will build a large factory addition late this spring and will materially increase its force of men.

The International Milk Products Company will erect a plant at Standish, Mich., with a capacity of 30,000 lb. per day.

Hillsdale, Mich., is in the market for a 300-kw. generator to be used in connection with a turbine engine. The Hillsdale municipal lighting plant will spend \$12,000 in improvements.

Whitehall, Mich., is to have a large canning factory. George Miller of the same city will ship the machinery of his basket making plant to a northern city and will replace it with canning machinery.

The New Century Rod & Bait Company, Holland, Mich., and the Bowler Mfg. Company, Chicago, Ill., have consolidated under the name of the Holland Sporting Goods Company. The new company has a capital stock of \$50,000 and will occupy a big cereal mill in Holland.

If present plans carry, Detroit will spend \$3,500,000 on improvements to its water works system and plant. Circulars are being distributed by the Board of Commerce advocating the plan, which has a large following.

The East Side Lumber Company, Saginaw, Mich., has purchased the plant, buildings and machinery of Wm. T. Cooper & Sons of the same city. Considerable repairs and improvements will be made by the new company.

The A. F. Anderson Lumber Company, whose plant at South Boardman was burned out two months ago, will rebuild its factory at Cadillac, Mich., if present plans carry. The company desires better shipping facilities.

The Erb Motor Car Company, Saginaw, Mich., has increased its capital stock from \$25,000 to \$40,000. The company is planning to make several improvements to its plant to enable it to increase the capacity.

The Douglas & Lomason Company, Detroit, manufacturer of brass wind shields and storm fronts for automob-

iles, is erecting a factory building, 80 x 160 ft., of reinforced concrete construction, to be equipped with the latest improved machinery electrically driven from a generator in its own plant.

The Celfor Tool Company, Railway Exchange Building, Chicago, Ill., is erecting a small steel foundry at Buchanan, Mich., but states that it will not be in the market for any equipment.

Escanaba, Mich., has voted \$30,000 in bonds to construct a municipal gas plant, work upon which will be commenced as soon as possible.

Toronto

TORONTO, ONT., April 15, 1911.

Construction work is being delayed by the backwardness of the spring, and the movement of merchandise is being somewhat retarded by the deferred opening of navigation, when lower freight rates come into effect. But there is no lack of confidence in the outlook. A busy season is being expected, and manufacturers and conductors of commercial enterprise generally find no difficulty in making financial arrangements for normal operations. Concerns with an established connection are apparently having no trouble in getting their fair share of the orders that are being placed, notwithstanding that competition from outside is more plentiful and more active than ever. The recent announcement of the Finance Minister that the British preference would not at present be increased and that the Knox-Fielding reciprocity agreement included all the tariff changes contemplated this year gave satisfaction in manufacturing circles and lifted a load of uncertainty off the minds of many. The plans of the Ontario Hydroelectric Commission to spread out its transmission system in the western and eastern districts of the older part of the Province foreshadows much new business, not merely in supplying material and equipment for the commission, but also in the furnishing of distribution plant to the various towns and cities to be served. Six hundred and fifty thousand dollars will be required, according to the estimate of the chairman of the commission, to install a transmission system in eastern Ontario and about \$1,500,000 to install one in western Ontario, not to speak of the millions that will be required for distributing works in the municipalities served. The Electric Power Company, whose head office is in Toronto, now controls a great group of operating companies, in the extensive and flourishing region known as the Trent Valley, in Ontario. It is expected that under the new holding company large expenditures will be made to develop power rights owned by a number of these operating companies, to improve the plants of others and to extend the range of their transmission systems. The activity of the Ontario Hydroelectric Commission is impelling certain of these companies to action. As the Trent River is under Dominion jurisdiction, it being a navigable river in course of canalization by the Dominion Government, the Ontario Hydroelectric Commission cannot interfere with the arrangements of the Electric Power Company and its component corporations. The incorporation of the \$10,000,000 British Canadian Shipbuilding & Dry Dock Company, Toronto, and the agreement between the Vickers-Maxim Company and the Montreal Harbor Commission for the building of a dry dock, ship repair plant and steel plant are features.

The Deputy Minister of Marine and Fisheries, Ottawa, is calling for tenders, to be put in by May 1, for the construction of two twin screw gasoline launches for the fisheries patrol service. They are to be equipped with two 34-hp. gasoline engines.

Work is about to be begun upon the construction of the plant of Steel & Radiation, Ltd., at St. Catharines, Ont. It is to occupy 30 acres adjacent to the property of the Yale & Towne Company and is to cost \$125,000.

Specifications have been prepared and tenders are about to be invited for the construction of Montreal's filtration plant. The work, which is to be completed by September, 1913, is to cost about \$2,000,000. There are four contracts to be let—one for the installation of 10 pumps, one for the prefilter, one for the main filter and one for the concrete covering for the filter beds. The capacity of the plant is to be of 50,000,000 gal. per day.

Up to April 25 tenders will be received by the Mayor of Toronto for testing transformer, also for lightning arresters. Tenders will be received by the Mayor of Toronto to April 25 for a priming equipment for centrifugal pumps at the municipal filtration plant.

Alex. Cross & Sons, Ltd., Glasgow, Scotland, will shortly begin the construction of a \$100,000 fertilizer plant at Sydney, N. S.

The Albert Mfg. Company, Hillsboro, N. S., will rebuild its plaster mill at a cost of \$100,000.

THE MACHINERY MARKETS

It is reported that the Municipal Council of Thessalon, Ont., will install an electric lighting plant and power house.

Albert Vickers and V. Caillard, for the Vickers-Maxim Company, have entered into an agreement with the Montreal Harbor Commission for the building and operating of a dry dock and ship repair plant at Montreal. The Vickers-Maxim people agree to organize a Canadian company, under the name Canadian Vickers, Ltd., with a capital stock of \$5,000,000. There are to be engine and boiler shops, a foundry and an efficient steel working shop, the whole cost, including that of the dry dock, to be at least \$2,000,000. The Harbor Commission undertakes to give certain location privileges and to accept a certain rental.

The Erie Tobacco Company, Windsor, Ont., has arranged for the building of a large factory at Kingsville, Ont.

J. Waterson & Co., Ltd., has been incorporated as a Dominion company to manufacture iron and steel, &c. The capital stock is \$250,000, the head office Montreal.

The British Canadian Shipbuilding & Dry Dock Company has been incorporated as a Dominion concern, with very large powers relating to the class of enterprise indicated in its name. The incorporators are all prominent men. They are Sir Henry Pellatt, Toronto; J. M. Gibson, Lieutenant-Governor of Ontario, Toronto; Charles Ellis, Clydebank, Scotland, managing director of John Browne, Ltd.; Alexander Gracie, Glasgow, Scotland, chairman of the Fairfield Shipbuilding Company, and Alexander C. Ross, Sydney, N. S. The company's capital stock is \$10,000,000. Its head office is to be in Toronto, but its charter gives it the power to operate in any part of Canada.

It is announced that the Lake Superior Paper Company, which purchased the Lake Superior Corporation's pulp mill at Sault Ste. Marie, Ont., will spend \$2,000,000 on its buildings and plant.

The Gillette Safety Razor Company, Boston, Mass., is about to erect a plant for the manufacture of its safety razors at Montreal, Canada. Plans are now being prepared by Lockwood, Green & Co. of Boston, who will be the engineers in charge. The factory is to be 76 x 105 ft., six stories, of reinforced concrete construction throughout, and to contain approximately 52,000 sq. ft. of floor space.

The Canadian General Electric Company, Ltd., has leased the large plant of the Canadian Ship Building Company on the Niagara River, at Bridgeburg, Ont., opposite Buffalo, N. Y., for the use of its structural steel department.

Indianapolis

INDIANAPOLIS, IND., April 18, 1911.

The Foxworthy Electric Company, Indianapolis, has been incorporated, with \$10,000 capital stock, to manufacture electrical supplies. The directors are M. K. and E. H. Foxworthy and L. R. Miller.

The Bell Piano Company is preparing plans for two factory buildings in Muncie, Ind.

Morton Bros. & Co. have been incorporated at Washington, Ind., with \$10,000 capital stock, to manufacture concrete blocks, drain tile, &c. The directors are Zed Morton, L. E. Hamersley and P. A. Hastings.

The Clay Products Company, Brazil, Ind., has increased its capital stock from \$50,000 to \$150,000. C. F. Shannon is secretary of the company.

The Caswell-Runyan Mfg. Company, Huntington, Ind., maker of cedar chests and boxes, will double the capacity of its plant.

The Hunter Brothers Stone Company, Bloomington, Ind., has been incorporated, with \$5000 capital stock, to quarry stone. The directors are John A., Morton T. and M. M. Hunter.

The W. R. Clark Mfg. Company has been organized at Muncie, Ind., with \$30,000 capital stock, to do a manufacturing business. The directors are William R. Clark, F. H. Bartle and E. J. Reisner.

The Rensselaer Commercial Club, Rensselaer, Ind., has a working fund of \$10,000 and owns a 75-acre tract of land adjoining the city. It is looking for an industry and offers to pay well to induce one to locate in its city.

A Business Men's Association has been organized at Delphi, Ind., with Dr. H. M. Hall as president and F. G. Armick secretary.

The C. & L. Company, South Bend, Ind., has been incorporated, with \$9000 capital stock, to operate zinc and lead mines. The directors are J. H. Chandler, J. H. Loughman, F. J. Loughman, A. P. Hubbard and J. R. Jordan.

The East Bedford Stone Company, Bedford, Ind., has been incorporated, with \$10,000 capital stock, to quarry stone. The directors are William Shryer, Charles Stasting, William Bahr, John Rager and John Quayle.

The Wearwell Rubber Company, Marion, Ind., has increased its capital stock from \$9000 to \$15,000. It will

move to Kokomo, Ind. G. B. Van Aukin is president of the company.

The Consolidated Automobile Company, Anderson, Ind., has been incorporated, with \$50,000 capital stock, to manufacture automobiles. The directors are Henry Nyberg, Harry Hamilton and P. H. Doyle.

The Bell Brothers Piano Company, Muncie, Ind., has commenced work on the construction of two factory buildings, one of which will be 60 x 130 ft., two stories, and the other 60 x 130 ft., three stories. A full equipment of wood-working machinery will be installed after completion of the buildings.

The LaGrange Electric Light Company, LaGrange, Ind., will commence work in the near future on the construction of a new electric light plant to be equipped with new machinery. Definite plans have not been decided upon.

Ducas & Harp have started a brass and aluminum foundry at Anderson, Ind., and will install a polishing and plating department in the near future to be operated by motor power.

The South

LOUISVILLE, KY., April 18, 1911.

The demand for machinery continues good and the number of new projects which are being announced seems to insure active business for some time to come. Sales of power equipment continue to lead in point of volume. Dynamos, motors and other electrical equipment are selling well. Contractors' outfits continue to form an important item in the total of sales being made.

The Bray Clothing Company, Louisville, which has purchased the buildings of the Kentucky Woolen Mills, has let contracts for the equipment which it will install. The Lane & Bodley Company, Cincinnati, will build a Corliss engine; C. J. Walton & Sons, Louisville, have the contract for the boilers and smokestack, and the motors will be supplied by the James Clark, Jr., Electrical Company, Louisville.

The Henry Vogt Machine Company, Louisville, will install a 75-hp. boiler in the plant of the Southern Brick & Tile Company of this city.

C. C. Mengel & Bro. Company, Louisville, is in the market for a pump to be installed in connection with an artesian well which has been sunk on its mahogany concession in Yucatan.

The plant of the Southern Wall Plaster Company, Louisville, which was burned recently, has been rebuilt and will be put in operation within a few weeks. New mixers were installed by the J. H. Day Company, Cincinnati, and the electrical motors were bought from the James Clark, Jr., Electrical Company, Louisville.

A permit for the construction of the concrete foundations of its new power house has been secured by the Kentucky Electrical Company, Louisville. Contracts for the superstructure will be let early next month. The Alberger Condenser Company, New York, has been awarded a contract to install two large condensers in the plant, and Henry R. Worthington, Inc., New York, secured the contract for the necessary boiler feed pumps. The heaters will be installed by the Platt Iron Works, Chicago. Plans have been drawn for a plant which will be constructed in four sections, as the growth of the city demands. Sargent & Lundy, Chicago, are the designers of the plant.

The American Machine Company, Louisville, now has under construction two electric elevators which are to be installed in the Commercial Building at Monterey, Mexico. A good demand for elevators is reported by this concern.

A combination of many of the largest coal mines of eastern Kentucky is being negotiated by Peyton N. Clarke, a well-known capitalist of Louisville. The companies involved are the Continental Coal Corporation, Straight Creek Coal & Coke Company, Straight Creek Coal Mining Company, Left Fork Coal Company and Walsend Coal & Coke Company, which control about 18 miles. A new company, with a capital stock of \$3,000,000, will probably be formed to take over the properties, and in that event it is likely that additional development work will be undertaken.

The Leyman Motor Company has been formed to represent the Buick automobile in Louisville, and has leased quarters at Jackson street and Broadway. A large repair shop will be equipped. H. S. Leyman, Cincinnati, is head of the company.

The Fiscal Court of Adair County, at Columbia, Ky., has decided upon the construction of a steel bridge costing \$5000 over Green River.

The George Mayo Machine Company has purchased the machinery of the Wisdom Hosiery Mills of Paducah, Ky., its business having been wound up. The plant has not been in operation for several years.

The plant of the Richmond Electric Company, Rich-

THE MACHINERY MARKETS.

mond, Ky., was demolished April 12 by an explosion which destroyed the engine and boiler, which had only recently been installed, the loss being estimated at \$10,000. It is understood that the plant will be rebuilt at once.

The Wilhoit Consolidated Coal Company has been organized at Pineville, Ky., with \$50,000 capital stock, and will develop some coal property in Harlan County. Roy Wilhoit, Frankfort, Ky., is the principal member of the company, which plans to begin work at once.

The Kister Lumber & Furniture Company has been organized at Bowling Green, Ky., with \$25,000 capital stock, for the manufacture of furniture and the operation of saw and planing mills. F. L. Kister, Jr., W. E. Kister and Mrs. Dora Kister are the incorporators.

It is reported that the Chesapeake & Ohio Railway is planning the construction of a bridge across the Ohio River between South Portsmouth, Ky., and Portsmouth, Ohio.

G. B. Jones is making inquiries for concrete block machinery and other cement equipment. His address is Winchester, Ky.

The Fiscal Court of Scott County, at Georgetown, Ky., is in the market for a road roller. The court has decided upon the construction of seven new steel bridges.

The Mt. Pleasant Auto & Machine Company has been incorporated at Mt. Pleasant, Tenn., with \$5000 capital stock, by Ernest Irwin, Percy S. Chandler and others.

The Lenoir Light & Power Company, Lenoir, Tenn., has filed articles of incorporation. Its capital stock is \$10,000, and T. C. Foster, J. R. Brower, H. C. Foster and others are the incorporators.

The lighting and power companies of Memphis, Tenn., are entering strong protest against the bill now pending in the Tennessee Legislature to provide for a bond issue of \$1,000,000 by Memphis for the construction of a municipal electric light and power plant.

J. W. Finch, who has invented a wagon brake for which many improved features are claimed, has been negotiating with Secretary Winn of the Chamber of Commerce of Chattanooga, Tenn., with reference to the establishment of a plant in that city.

New machinery will be installed in an addition to the plant of the Scholze Tanning Company, Chattanooga, Tenn., which is to be erected at a cost of \$15,000.

J. R. East of La Follette, Tenn., is organizing a company for the manufacture of a machine to be used in the construction of railroad tunnels.

The Rising Creek Marble Company has been incorporated at Knoxville, Tenn., with \$20,000 capital stock, by O. Kunison, Noble Smithson, Guy Smithson and others. It will operate a marble quarry in Knox County.

The Johnson City Foundry & Machine Works, Johnson City, Tenn., has arranged to manufacture the device of the Automatic Wire Reel Company, which is intended for use by telephone companies in laying wire.

The Memphis Natural Gas & Oil Company, Memphis, Tenn., has increased its capital stock from \$200,000 to \$300,000.

A good deal of power equipment, as well as operating machinery, will be purchased by the Memphis Rice Mill Company, which has been incorporated with \$100,000 capital stock, with J. D. Mack of Crowley, La., as general manager. The plant will have a daily capacity of 5000 bushels. The cost of the mill and equipment will be \$60,000.

Mohr, Michael & Bros., Paducah, Ky., are planning the establishment of a plant for the manufacture of saddlery and harness at Memphis, Tenn.

The Murch Bros. Construction Company is erecting a power and engine house for the Memphis Union Station Company, Memphis, Tenn. It will cost \$50,000 and is fireproof.

The John G. Duncan Company, Knoxville, Tenn., is in the market for an iron lathe with a 22 to 26 in. swing, a small planer and a 20-in. drill press. Second-hand equipment is preferred.

J. H. Erwin of Memphis is planning the erection of a cotton mill in that city which would represent an investment of \$250,000. South Carolina interests will be represented.

The New Virginia Power Company, East Radford, Va., has purchased the plant of the Radford Water Power Company and is planning the development of the water power of New River.

The City Commissioners of Shreveport, La., are considering the establishment of a pumping station for carrying the water supply of the city through Twelve-Mile Bayou.

The plant of the Baton Rouge Veneer Company, Baton Rouge, La., which was destroyed by fire, is to be rebuilt. Equipment for the manufacture of lumber, veneers and boxes will be installed.

E. O. Parker of Waldron, Ill., is negotiating with the Business Men's Club of Huntsville, Ala., concerning the establishment of an automobile factory. A committee was appointed to investigate the project.

Efforts are being made by the business interests of

Gadsden, Ala., to establish a paper mill there for the purpose of consuming the low grade lumber produced in that territory which cannot be worked up into anything else at present.

An electric plant of 1400-hp. capacity is to be constructed at Troy, Ala., by the Standard Chemical & Oil Company, of which Fox Henderson is president. The plant will be used to operate two mills of the company.

The B. J. Robinson Machine Works, Vicksburg, Miss., has decided definitely upon the erection of an iron foundry and garage.

Homer, La., may take over and improve the electric light plant now operated by Edward Sawyers.

The Atlanta Motor Car Company, Atlanta, Ga., is reported to have under way plans for the construction of a factory for the manufacture of commercial trucks at New Orleans, La. The investment involved is \$200,000. Clarence Houston is president of the company.

Bonds have been authorized by Bassfield, Miss., for the purpose of establishing a water works system.

An additional pump is to be installed in the water works plant at Tuscaloosa, Ala. F. G. Blair is president of the Water Works Commission.

A company is being formed at Aliceville, Ala., for the construction of a water works plant.

The Mercantile & Machine Company, Laurel Hill, N. C., recently incorporated with \$10,000 capital stock, will erect a factory building, 35 x 100 ft., of brick and wood construction. The company will deal in merchandise and automobiles and do general machine repair work. At present it is in the market for pipe and fittings and one lathe and shaper. J. T. Flythe is president of the company.

The city of Newport News, Va., will vote on the issuance of \$150,000 of bonds for the construction of an electric light plant.

The North Pacific Coast

PORTLAND, ORE., April 12, 1911.

Aside from an active and healthy demand for the smaller classes of tools, there is little feature to the machine tool market. Few large inquiries are coming out, and only scattered orders are received for tools of the heavier types. The volume of work on hand at most machine shops in this territory is considered satisfactory. Large inquiries for machinery of other classes are principally in connection with power and electrical development, which is expected to be one of the leading features of the North Pacific Coast market during the next few years. A few inquiries are coming up for complete saw mill outfits, but the principal business in this line is in the way of renewals, individual orders being rather light. The lumber industry is still comparatively quiet, and logging interests along the Columbia River are still working on a small scale. There is some business in crushers and dredges, and general contractors' equipment is increasingly active with the approach of summer. The development of agricultural industries in Oregon is giving rise to a good general demand for small machinery of various kinds.

Two of the new submarine torpedo boats for the Government, for which contracts have just been let, will be built by the Moran Company, Seattle, Wash.

Bids will be received April 14 by the Board of Public Works of Seattle, Wash., for water wheels and generators to be used in the Lake Union substation. The inquiry includes one 2500-hp. turbine water wheel with governor, one 50-hp. impulse wheel, one 1500-kw. alternating current generator and a 30-kw. exciter.

The Yaquina Electric Company has succeeded the Newport Power Company, Newport, Ore., and is arranging for the installation of a lot of new equipment.

Rapid progress is being made on the new addition to the Griffin Wheel Works, Tacoma, Wash., and the new shop will be ready for operation early in the fall.

The Spokane Hydraulic Motor & Irrigation Company has been incorporated at Spokane, Wash., with a capital stock of \$200,000, for the purpose of manufacturing and marketing the Zeigler current motor. W. G. Mulligan is president of the company.

The F. S. Steel Machine Company has been incorporated at Walla Walla, Wash., with a capital stock of \$10,000, F. S. Steel being president. The company will operate a general machine shop, making a specialty of automobile work.

T. H. Scheumann has bought out the Chehalis, Wash., foundry. The plant has been overhauled and improved and will be operated on a special line of machinery for the use of gas works.

The Twin City Light & Traction Company, Chehalis, Wash., is preparing to build a new hydroelectric plant near its present power house on Cole Creek.

The Western Granite Company, Baker City, Ore., will shortly install an electric power outfit at its quarry.

THE MACHINERY MARKETS

The Cove Power Company is installing a hydroelectric plant on Crooked River, near Culver, Ore.

The Central Oregon Well Company is starting a machine shop at Culver, Ore.

Work will be started shortly on an electric power plant for the Valley Development Company at Kelso, Ore.

The McCully-Rumble Land & Power Company is preparing to install a new electric power plant at Elgin, Ore.

The Seattle Drydock Company, recently incorporated at Seattle, Wash., with a capital stock of \$1,000,000, intends to start a large ship repair plant on Elliott Bay. George Bennett and H. G. Sauer are the promoters of the project.

The Morgan-Stansbie Company, Eugene, Ore., is planning to add a number of new machines to its planing mill.

The Pacific Car & Equipment Company has been incorporated at San Francisco, Cal., with a capital stock of \$250,000, by N. B. Livermore, C. G. Myers, A. H. Reddington, P. F. Schneider and W. H. Siebrecht. The company will operate the large car and locomotive repair shops which Mr. Livermore and associates have been erecting at South San Francisco.

The Sequoia Chain-Band Saw Company has been incorporated at Oakland, Cal., with a capital stock of \$10,000, by J. H. Wyruck, J. V. Devoto and John Horning.

The Capital Box Company, Sacramento, Cal., whose large factory was recently destroyed by fire, will be in the market shortly for a complete outfit of new machinery.

The Water Commission of Lewiston, Idaho, has let a contract for repairs to the municipal steam pumping plant to the Idaho Foundry & Machine Company.

The Jordan-Endret Lumber Company, Dorris, Cal., has installed a 200-ft. slab conveyor.

A complete rock crushing plant, including a No. 10 McCully crusher, is being delivered to the Rhyolite Crushed Rock Company, Corona, Cal.

The Hutchinson Construction Company, Oakland, Cal., has placed orders for a No. 5 and a No. 3 McCully crusher and a screening outfit.

The Brown Hoisting Machinery Company has just delivered a locomotive crane to the Santa Cruz, Cal., Portland Cement Company.

Estimates are about complete on material required for the navy collier to be built by the navy yard at Mare Island, Cal.

The McCloud River Lumber Company, operating at McCloud, Cal., has purchased a General Electric turbine generator and will operate part of its plant by electricity. It has also purchased two Shay switching engines.

A meeting of creditors of Henshaw, Bulkley & Co., prominent San Francisco machinery merchants, has been set for April 18. According to the company's statement, the apparent assets exceed the liabilities.

The hull of a new gold dredger, machinery for which is being built by the Yuba Construction Company, Marysville, Cal., has just been launched in the Yuba River near that place. It is said to be the largest gold dredger ever built, being about twice the size of most of those now used in California, and having a daily capacity of about 10,000 cu. yd. of earth.

Western Canada

WINNIPEG, MAN., April 15, 1911.

John C. Eaton, president of the T. Eaton Company, Toronto, has announced that his company will build a great department store at Calgary, Alberta.

Frank P. Jones, general manager of the Canada Cement Company, Montreal, says that the company will as soon as possible establish a plant in Winnipeg. Its capacity is to be 400,000 barrels per annum.

The Progressive Tugboat Company, Vancouver, B. C., last week received a cargo of boilers and machinery from the McKie & Baxter Works, Glasgow, Scotland. Most of this cargo was transhipped to the Tehuantepec Railway from a Morrison Line vessel, which carried it across the Atlantic. A Canadian-Mexican steamer carried it from the Pacific terminus of that railway.

A bond issue of \$175,000 for sewer and water extensions and one of \$50,000 for an incinerator has been authorized by the ratepayers of Moose Jaw, Sask.

The British Columbia Telephone Company, Victoria, B. C., requires equipment for 900 additional telephones.

Tenders are called for, up to May 15, by F. E. Lily, Municipal Clerk, Penticton, B. C., for the construction of infiltration chambers, reservoir works and excavation for and laying of pipes for the local water works system; for galvanized wrought iron; for hydrants, valves and other fittings; for meters; for steel pipe, lap welded.

Up to April 30 tenders will be received by John Marshall, chief engineer of the Trunk Sewer Works, Regina, Sask., for tenders for sewage pumps and motor, switchboard

and apparatus. The capacity of the pump is to be 1,000,000 gal. per 24 hours.

The Ontario Wind Engine & Pump Company, Toronto, is erecting a warehouse in Winnipeg to cost \$50,000.

The Hudson's Bay Company has purchased land in Winnipeg on which it is to build a \$2,000,000 store.

E. Loftus, Winnipeg, is preparing to build a large business block in that city.

Peter Lyall, Jr., has had plans approved by the municipal authorities, Winnipeg, for the building of a 14-story structure there.

At Saskatoon, Sask., Cushing Bros. will erect a large planing mill, sash and door factory. Electricity produced by steam plant will be the motive power for the machinery.

The contract for the building of coal conveyers and bunkers for the power house at Victoria Park, Calgary, Alberta, has been awarded to Phillips & Lang, Chicago. The conveying machinery will be supplied by the C. W. Hunt Company, New York. Contracts for the equipment of the electrical plant at Victoria Park will probably go to the Allis-Chalmers-Bullock Company.

The ratepayers of Revelstoke, B. C., have approved a by-law to raise \$50,000 to complete the municipal power plant.

There is a very large demand for automobiles in the Canadian West, the farmers being in the market more than ever before. At agricultural points where the farmers are wealthy, such as Weyburn, Indian Head, Swift Current, North Battleford and at several places along the Soo line, several carload lots have been laid down at each place.

Robert E. Kennedy, New Westminster, B. C., announces that the Western Steel Corporation has purchased 2000 acres of land on the Fraser River, and that a steel plant will be erected there within the next three years. A start will be made this year. Iron deposits up the Pacific Coast have been secured.

At the Dominion Bridge Works, Winnipeg, big preparations are being made for an active summer. Further equipment will be added.

The Anthers Foundry Company, Ltd., of Toronto, has purchased 4 acres of land at Winnipeg, on which a plant will be established this summer. The plans are now in the hands of the architect.

The Wortman & Ward Company, manufacturer of pumps and farming tools, has bought a site in Winnipeg. One building has been erected already, and the company announces that it will extend the plant as soon as Winnipeg is ready to supply electricity for power.

It is announced that a glass factory to cost \$100,000 will be established at Medicine Hat, Alberta. One of the leading men in this new industry is D. C. Cameron, president of the Rat Portage Lumber Company, Ltd., Winnipeg.

The Czerwinski Box Company, Winnipeg, will add two more stories to its plant, at a cost of \$75,000, and additional machinery will be put in.

Preparations are being made for the erection of a large cement plant in Alberta, about 120 miles west of Edmonton. The scheme is being promoted by A. Haynes of Spokane, Wash., who is getting Edmonton capitalists interested to get the industry under way. The intention is to build a plant that will have an output of 1000 barrels per day.

Texas

AUSTIN, TEXAS, April 15, 1911.

The demand for electrical machinery and equipment shows a notable increase in Texas, the Southwest and Mexico during the last few months. Besides the several large hydroelectric projects that are on foot, many of the existing electric power enterprises are being enlarged. In Mexico the use of electricity in the operation of mines is becoming quite general. This is also true of the mining industry in New Mexico and Arizona. Plans are being prepared for the construction of a number of important interurban electric railroads in Texas, all of which will require a considerable amount of electrical machinery and equipment.

The authoritative announcement is made that former Governor David R. Francis, St. Louis, Mo., is at the head of a syndicate that has had the preliminary surveys made and other work done toward the construction of a great system of irrigation and hydroelectric plant in western Texas. Two large dams are to be constructed, one across the Pecos River and the other across Devil's River, and the water of those two streams utilized to irrigate about 350,000 acres of land and to generate about 30,000 hp. of electrical energy. Power transmission lines will be constructed to San Antonio and a number of towns in western and southwestern Texas.

C. H. Alexander of Dallas, who is at the head of a syndicate that is developing the power resources of the Colorado River in Texas, is preparing to install a second hydroelectric

THE MACHINERY MARKETS

plant, to be located near Kingsland, where he and associates will construct another reinforced dam across the Colorado River. It is stated that about 10,000 hp. will be developed by this proposed plant. The Colorado River Power Company, in which Mr. Alexander is largely interested, is constructing a reinforced concrete dam and hydroelectric plant on the Colorado River, near Marble Falls.

The work of constructing a new cotton compress at Harlingen by O. P. Slack of Houston and associates will soon be started. It will cost about \$25,000.

The lowest bid received by the Board of Commissioners of Galveston for the construction of a duplicate water main across Galveston Bay via the new causeway was from Isaac Heffron of that city for \$66,389, and he will probably be given the contract. The duplicate main is to be 30 in. and approximately 10,766 ft. long.

A system of water works will be installed at Eastland, Texas, bonds to the amount of \$15,000 having been recently voted for the purpose.

The construction of a drainage system in a district that has been created in Cameron County, and for which \$204,000 of bonds have been voted and issued, will require considerable ditching and other machinery, it is stated. The proposed system will bring about the reclamation of about 81,000 acres of land.

The Board of Commissioners of Galveston County has under consideration the creation of another drainage district in that county and the calling of an election to vote on issuing bonds for constructing the proposed system. Considerable dredging and ditching machinery will be required if the proposition is favorably acted upon.

Two new steel bridge will be constructed across the Brazos River in Brazoria County, bonds to the amount of \$100,000 having been recently voted by the tax-payers of the county for the purpose. The county judge, Angleton, Texas, can give information.

The Balsas Power & Irrigation Company, in which German capital is largely interested, and which was promoted by A. B. Adams, Inc., of the City of Mexico, is having surveys made for its proposed irrigation system and hydroelectric plant that it is to establish on the Balsas River, in the state of Guerrero. The hydroelectric plant is to have a minimum capacity of about 40,000-hp., it is stated. Tentative contracts for the sale of a large amount of electric power have already been entered into by the company with mine owners and others, situated within a radius of about 100 miles of the proposed plant.

The installation of a gas manufacturing plant and the construction of a distributing system at Monterey, Mex., will soon be started by William Mackenzie of Toronto, Canada, president of the Canadian Northern Railroad, and associates. They obtained a concession from the State and municipal governments for the proposed enterprise some time ago. The Mackenzie syndicate already owns the water works, sewers and electric street railway system in Monterey. Lewis Lukes is in charge of the several properties in that city.

The Guadalajara Gas Company will soon finish the installation of a gas plant and construction of a distributing system in Guadalajara, Mex. The work is being done under the direction of W. A. Aldrich, Grand Rapids, Mich.

The Pioneer Smelting Company will erect a large smelter at or near Tucson, Ariz.

The Arizona Consolidated Smelting & Mining Company will soon begin the construction of a large smelter near Tucson, Ariz. The plant will cost about \$350,000.

J. F. Wilkie of Bisbee, Ariz., will erect a 50-ton ore reduction mill near Courtland, Ariz.

The East Side Gold Mining Company will install a steam hoist and compressor at its mines near Bisbee, Ariz.

Dr. J. W. Yard and Martin Fishback of El Paso, Texas, will install a steam hoist and pumping plant at their mine in the State of Sinaloa, Mexico.

Paul Traylor and associates will install a concentrating and cyanide plant at their mine near Sabinal, State of Chihuahua, Mexico.

The Dolores Mining Company will enlarge its ore reduction mill at Dolores, State of Chihuahua, Mexico. A new 150-hp. Corliss engine, two sand tanks, concentrating tables and other equipment will be installed.

D. C. Sutton and associates will equip the shafts of their mines, near Sabinal, State of Chihuahua, Mexico, with heavy machinery. A churn drill will also be installed.

The International Gold & Copper Company will install an ore reduction plant at its mines near Guyimopas, State of Chihuahua, Mexico.

The Guyimopas Mining Company will install an ore reduction mill at its mines near Guyimopas, State of Chihuahua, Mexico.

The City Council of Monterey, Mexico, contemplates installing a municipal electric light and power plant and system.

The Beaumont Waterworks Company, Beaumont, has made a proposition to the City Council to either sell the plant to the city or be permitted to charge higher rates for service if it is to be required to seek a new source of water supply to avoid the chances of impregnation from ocean water. The Council has the proposition under consideration.

Fred B. Pittman of New Orleans, La., is arranging to establish a cracker factory in San Antonio, Texas. It is planned to invest about \$200,000 in the enterprise.

The cotton gin of the Harlingen Ice & Gin Company, at Harlingen, will be enlarged.

The Consolidated Mutual Reservoir Company, Grand Falls, has filed its charter in the Secretary of State's office. It has a capital stock of \$600,000. The incorporators are J. F. Gaylor, J. I. Earley, M. T. Endaly, W. A. White and others.

An election will be held by Clarksville on April 25 to vote on the question of issuing bonds in the amount of \$10,000 for water works extensions and improvements.

The Wiesenborn Mfg. Company, Houston, has recently completed the erection of a new factory for the manufacture of wire fencing and will erect another building in the near future, to be used for foundry and machine shop purposes. The company is using gasoline engines at present for operating its plant, but later on expects to use electricity. A number of galvanizing kettles will also be installed.

B. Gardner, Glen Flora, will erect a cotton gin at Bay City.

The Saratoga Iron & Steel Company, Saratoga, has been incorporated with a capital stock of \$15,000. The incorporators are C. G. Hooks, H. L. Graham and W. P. Vick.

The ice plant owned by the business men of De Leon, which cost \$12,500, has doubled its capital stock and taken over the water and light system.

The Lufkin Foundry & Machine Company, Lufkin, has increased its capital stock from \$125,000 to \$200,000.

The Princeton Waterworks Company, Princeton, has been incorporated with a capital stock of \$5000. The incorporators are J. H. Goodwin, J. H. Stinson and C. A. Wilson.

Government Purchases

WASHINGTON, D. C., April 17, 1911.

Commissioners of the District of Columbia will open bids April 25 for furnishing two steam engines and two generators for use in the McKinley Manual Training School, Washington.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 11, as follows:

Class 31.—For furnishing and installing 10 mechanical stokers.—No bids.

Class 41.—Two electric hoists.—Bidder 35, Estate of Alfred Box, Philadelphia, Pa., \$425; 108, Lidgerwood Mfg. Company, New York, \$303 and \$440; 115, V. W. Mason & Co., Providence, R. I., \$575; 118, Marine Electric Company, Portsmouth, Me., \$265; 182, Toledo Bridge & Crane Company, Toledo, Ohio, \$560; 201, Williamson Brothers Company, Philadelphia, Pa., \$230 and \$245.

Class 51.—One radial drill, complete.—Bidder 7, American Tool Works, Cincinnati, Ohio, \$1090; 71, Fairbanks Company, Washington, D. C., \$819; 82, Grisco-Spencer Company, New York, \$1123; 100, J. P. Kemp, Baltimore, Md., \$996.50, \$1065.20, \$1076.80 and \$1145.50; 124, Manning, Maxwell & Moore, New York, \$1006; 138, Niles-Bement-Pond Company, New York, \$1015.

Class 61.—One hand sawing machine.—Bidder 17, American Woodworking Machinery Company, Rochester, N. Y., \$410; 70, J. A. Fay & Egan Company, Cincinnati, Ohio, \$540; 71, Fairbanks Company, Washington, D. C., \$527; 74, Frevert Machinery Company, New York, \$518; 100, J. P. Kemp, Baltimore, Md., \$315.20 and \$292.20; 124, Manning, Maxwell & Moore, New York, \$527; 130, Norfolk Woodworking Machinery Company, Norfolk, Va., \$513; 147, Oliver Machinery Company, New York, \$664, \$575, \$561, \$540 and \$526.

Bids were opened March 14 by the inspector of the first lighthouse district, Portland, Maine, for furnishing two oil engine compressor plants for installation at the Whaleback Light Station, Maine, as follows: American Air Compressor Works, \$3273; De La Vergne Machine Company, \$3460; Charles J. Jager Company, \$5550; Frani E. Davis, \$4920.

The Isthmian Canal Commission, Washington, opened bids April 11 for furnishing one pneumatic post drill, as follows: Chicago Pneumatic Tool Company, New York, \$70; Manning, Maxwell & Moore, New York, \$75.

The Valley Mould & Iron Company, Sharpsville, Pa., manufacturer of ingot molds, is operating its plant to fair capacity on contracts from various steel works. The month of March showed increased operations over any previous recent month, while the present month will surpass March. The company recently started work on the erection of a large brick office building, which will contain the executive and general offices, a dining hall and a well equipped hospital.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from store—		Galvanized.		Tin—	
Refined Iron—		Nos. 22 and 24.....		Straits Pig.....	
1 to 1 1/2 in. round and square		.....		.....
1 1/2 to 2 in. round and square		.....		.....
2 to 2 1/2 in. round and square		.....		.....
Angles—		Corrugated Roofing—		Copper—	
1 in. x 1/2 in. and larger		26 in. corrugation, Painted		Lake Ingot.....	
1 in. x 3/4 in. and larger		No. 21.....		Electrolytic.....	
1 1/2 to 2 in. x 1/2 in.		No. 26.....		Casting.....	
1 1/2 to 2 1/2 in. x 3/4 in. and larger		No. 28.....		Spelter—	
1 to 2 1/2 in. x 3/4 in.		Tin Plates—		Western.....	
1 to 2 1/2 in. x 1 in.		American Charcoal Plates (per box.)		Zinc.	
1 to 2 1/2 in. x 1 1/4 in.		A. A. A. Charcoal.....		No. 9, base, casks.....	
1 to 2 1/2 in. x 1 1/2 in.		A. A. A. Charcoal.....		Lead.	
1 to 2 1/2 in. x 1 3/4 in.		A. A. A. Charcoal.....		American Pig.....	
1 to 2 1/2 in. x 2 in.		A. A. A. Charcoal.....		Balt.....	
Beams—		American Coke Plates—Bessemer—		Solder.	
Channels, 3 in. and larger		10, 11 x 2.....		1/2 & 3/4, guaranteed.....	
I-beams, 1 to 6 in. deep, No. 8		10, 11 x 2.....		No. 1.....	
Burrhead's Best.....		10, 11 x 2.....		Rehmed.....	
Burrhead's Best.....		10, 11 x 2.....		Prices of Solder indicated by private brand vary according to composition.	
Burrhead's Best.....		10, 11 x 2.....		Antimony—	
Norway Bars.....		10, 11 x 2.....		Cookson.....	
Merchant Steel from Store—		10, 11 x 2.....		Harris.....	
Bessemer Machinery.....		10, 11 x 2.....		Other Brands.....	
Tool, 1 to 6 in. Sleigh Shoe.....		10, 11 x 2.....		Bismuth—	
Best Cast Steel, base price in small lots.....		10, 11 x 2.....		Per lb.....	
Sheets from Store—		10, 11 x 2.....		Aluminum—	
Black		10, 11 x 2.....		No. 1 Aluminum guaranteed over 99.2 pure, in ingots for remelting.....	
One Pass, 1 R		10, 11 x 2.....		Rods & Wire.....	
Soft Steel.....		10, 11 x 2.....		Sheets.....	
No. 6.....		10, 11 x 2.....		Old Metals.	
No. 10.....		10, 11 x 2.....		Dealers' Purchasing Prices Paid in New York	
No. 22 and 24.....		10, 11 x 2.....		Copper, Heavy cut and crucible.....	
No. 26.....		10, 11 x 2.....		Copper, Heavy and Wire.....	
No. 28.....		10, 11 x 2.....		Copper, Light and Bottoms.....	
Russia, Planished, &c.		10, 11 x 2.....		Brass, Heavy.....	
Genuine Russia, according to assortment.....		10, 11 x 2.....		Brass, Light.....	
Patent Planished, W. D. W. & Co. A. 1, 1 1/2; B. 9¢ net.		10, 11 x 2.....		Heavy Machine Composition.....	
Galvanized.		10, 11 x 2.....		Clean Brass Turnings.....	
Nos. 12 and 14.....		10, 11 x 2.....		Composition Turnings.....	
Nos. 22 to 24.....		10, 11 x 2.....		Lead, Heavy.....	
No. 26.....		10, 11 x 2.....		Lead, Tea.....	
No. 28.....		10, 11 x 2.....		Zinc Scrap.....	
No. 20 and lighter 36 inches wide, 25 1/2 higher		10, 11 x 2.....			

NICHOLSON
U.S.A.
TRADE MARK



NICHOLSON
U.S.A.
TRADE MARK

Time is not the only saving effected through the use of **Nicholson Files.**

Their hard cutting surface and perfect temper gives them a **lasting quality** that makes them by far the most **economical** of all files to use.

Our Catalog shows what styles to use. Our book, "File Philosophy," tells how best to use them.

NICHOLSON
U.S.A.
TRADE MARK



NICHOLSON
U.S.A.
TRADE MARK

PROVIDENCE,

FILE

R. I., U. S. A.

THE IRON AGE

Established
1855

New York, April 27, 1911

VOL. 87: No. 17

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY

GEO. W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
H. R. COBLEIGH,	-	-	-	-	

MECHANICAL EDITOR

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Ore Buying by Steel Companies.....	1003
Tariff Hysterics and Industry.....	1004
The Reduction in Lake Iron Ore.....	1004
The Navy an Industrial School.....	1004
English and American Labor Conditions.....	1005
The Alleged Structural Steel Dynamiters.....	1005
The Industrial Education Evangelist.....	1005
United States Steel Corporation's Earnings.....	1006
The General Electric Company's Annual Report.....	1006
The Question of Extras in the Eastern Jobbing Trade....	1007
Pacific Coast Metal Trades Convention.....	1007
The Donnelly-McArdle Case.....	1007
The Itabira Iron Mines in Brazil.....	1007
The Iron and Metal Market Reports.....	1008 to 1016
Iron and Industrial Stocks.....	1017
Notes on Prices.....	1017
Tropenas Converter with Double Door Bottom.....	1018
La Belle Improvements Deferred.....	1018
American Iron and Steel Institute.....	1018
Some Unsolved Problems in Electroplating.....	1019
Personal	1020
Obituary	1020
American Export Methods.....	1021
Erie Canal Terminals on Lake Erie.....	1021
Mechanical Handling of Materials.....	1022
German Iron Ore Production in 1910.....	1023
A Roll-Over Core Machine. Illustrated.....	1024
Specifications for Cold Drawn Weldless Steel Tubes.....	1024
The New Dreeses Vertical Boring Machine. Illustrated....	1025
Federal Regulation of Corporations Proposed.....	1025
Die-Casting Machines. Illustrated.....	1026
A Special Bridge for Ladle Cars. Illustrated.....	1031
The Sure Center Finder. Illustrated.....	1031
Transmission Rope Splicing. Illustrated.....	1032
The Mechanical Engineers' Pittsburgh Meeting.....	1033
A New Baird Ball Burnishing Barrel. Illustrated.....	1033
The Libby 18-In. Turret Lathe. Illustrated.....	1034
A Suggestive Antiaccident Epigram. Illustrated.....	1035
American Society for Testing Materials.....	1035
The Waterbury Cam Pillar Press. Illustrated.....	1036
The Murchey Motor Driven Pipe Threader. Illustrated..	1036
The New Westinghouse Interpole Direct Current Gen- erators. Illustrated.....	1037
The Allner-Boswell Radius Planer Attachment. Illustrated	1038
The Firth-Stirling Steel Company's New Hand-Book....	1038
An Exceptionally Small Toledo Electric Welding Machine. Illustrated	1038
The No. 5 Cincinnati Gear Cutter. Illustrated.....	1039
Kerr Turbines in the New York Post-Office. Illustrated..	1040
The American Association of Commerce and Trade, Berlin	1040
The Cincinnati Heavy Duty Pulley Lathe. Illustrated...	1041
The Allen-Bradley Company's Electrical Products.....	1041
The Arcade Rotary Sand Sifter. Illustrated.....	1042
New Prentice Ball Bearing Drill. Illustrated.....	1042
The Machinery Market Reports.....	1043 to 1051
Current Metal Prices.....	1052

Ore Buying by Steel Companies

Less Business in Finished Lines—Large Sales of Copper at New Low Prices

The knot has been cut in the lake ore trade, releasing it from a position that was little short of paralysis. A Pittsburgh ore company has sold from its Mesaba mines 200,000 tons of Bessemer and 550,000 tons of non-Bessemer ores on a \$4.25 and \$3.50 basis respectively, or a reduction of 50 cents a ton from last year's prices. Cleveland firms have sold several blocks of ore at the same reduction, and with the price thus fixed various reservations made in the past few months become contracts.

Naturally the merchant furnaces will be slow to buy. Some of them have ore enough to carry them into the fall. Purchases thus far have been chiefly for steel companies and for furnaces affiliated with ore interests.

In the East considerable sales of Lake Champlain ores have already been made at 25 to 35 cents less than in 1910, but these ores, like those imported from Newfoundland and Europe, can still be delivered at eastern Pennsylvania furnaces at 1 to 2 cents a unit below the delivered price of lake ores.

The effect of the lower ore level is widely discussed. Pig iron, on any paper reckoning of costs, has been sold ex-ore reduction for some months. What remains to be seen is what sacrifice financial reasons may lead individual producers to make, if the iron market drags on with no new impetus. Temporarily pig iron buying, which has been growing less, may be put off to let the situation develop.

Two merchant furnaces in the Mahoning Valley have blown in, but several merchant furnaces in other districts are going out. The Carnegie Steel Company has put out four of its furnaces in the week, and the Steel Corporation's percentage of active furnaces has declined from 70 to 67.

There is continued weakness in open hearth billets in the Central West. While \$23, Pittsburgh, is the nominal basis, \$23, Cleveland, has been quoted.

Finishing mills in most lines are operating on reduced schedules, the output of the past week being the smallest in two months. With the falling off of new business, reports of irregularity in prices are more frequent, but these affect only a small proportion of the total business. In the main, co-operation continues, and the present scale of orders puts it under no great strain.

In steel bars, while the 1.40-cent basis is maintained, makers of hard steel bars have been more active, and as low as 1.27½ cents, Pittsburgh, has been quoted, while in Western markets bars rolled from bloom crop ends have been sold at concessions.

Export trade is quieter. The Steel Corporation's statement of earnings shows that an important percentage of its business in the first quarter was based on export prices.

Rail orders include 5000 tons for the B. & O., 5000

tons for the Reading, and 3000 tons for the Chicago, St. Paul, Minneapolis & Omaha. It is understood that the recent New Zealand business, 10,500 tons of 70-pound rails, came to this country.

The tonnage of new structural steel work has fallen off somewhat, and the smaller fabricators are getting less and less, prices having reached a prohibitive level for most of them. The Henry Corn building at Fifth avenue and Twelfth street, New York, 4000 tons, has been awarded, and at Philadelphia the Philadelphia & Western Electric Railroad has bought 2500 tons. For the elevated railroad extensions in New York, bids have gone in on 78,500 tons, of which 40,000 tons may not be let at present.

The week has made a record for the year in copper sales. The total has been estimated above 75,000,000 lb. It is known that several blocks of electrolytic sold at 11 $\frac{7}{8}$ c., but the bulk of the business was done at 12c. and the market has now stiffened at 12 $\frac{1}{8}$ c., New York.

Tariff Hysterics and Industry

A certain amount of hysteria may be counted upon as an accompaniment of Congressional proceedings for some time to come. Those to whom the dramatic appeals were no doubt much impressed in the closing of the debate on Canadian reciprocity last week by the performance of a member representing a Southern iron and steel district. Waving a telegram aloft, he announced that he had just received word from his constituents that construction work on a new wire plant in his district had been stopped and several hundred men had been thrown out of work because he favored the proposal to put a wire product on the free list. The member's declamatory defiance of such intimidation was rewarded with ample applause. It seemed not to occur to any one joining in the demonstration that when construction work on a new plant is finished, the services of the men engaged as builders are not required. It was more in line with the spirit of animosity which is being fanned in all public discussions of the tariff, to charge manufacturers with a menacing attitude.

There is also under way in the same Congressional district an important piece of engineering work which will provide an adequate water supply for a large steel plant. When the reservoir is completed, which the Tennessee Company has been building in accordance with plans widely published, there will be other hundreds of workmen whose services will be dispensed with. It may be also that a stretch of railroad track will be completed this spring in one of the Western States, and that several hundred track layers will thereupon be paid off. If the special session of Congress is prolonged until that time, we may look for another scene, with more spectacular declamation on the machinations of capital.

The performance of last Friday is notification that every slightest move in the business world in the next few months will be wrested into significance as a tariff factor. If business falls off, we shall be told that manufacturers are giving an advance object lesson in the fruits of tariff revision. And what might be called every day credulity under other conditions will be appealed to in perfect confidence by political leaders, for, with a Presidential election drawing on, politics must be allowed to do its perfect work, whatever becomes of sanity or business.

The Reduction in Lake Iron Ore

That a basis has been at last established for sales of Lake Superior ores in 1911 is almost as significant a fact as that a reduction of 50 cents a ton has been made from the prices of 1910. The season of navigation was opening with ore producers apparently as far from a decision as when the season of 1910 closed with ore stocks on dock and in blast furnace yards greater than had ever been known. Opposing views of the proper policy to be followed were urged so strongly that the ore trade seemed powerless to make a move. Consumers had been asking for weeks that the question be decided, arguing that continued uncertainty was hurtful. At the same time certain sellers favored delay, even on the eve of the sales made last week. Their hope was that time would bring some development pointing the way out of their dilemma. The buying movement in finished steel, that lasted for two months from the middle of January, gave some support to those who favored the old basis, but it diminished as April advanced. Leading steel interests, with no ore to sell, but with a natural desire to safeguard the finished steel market against further decline, exerted their influence in favor of the old schedule. They had done the same in 1908, when pig iron had dropped well below the level which was held to justify for 1907 the highest ore price since 1900. But the 1908 ore market broke under its own weight in June. Pig iron furnished the gauge then as now, in spite of a controlled market in finished material.

Merchant furnacemen, who buy all their ore in the market, have been divided in opinion. Some, who still have large piles of ore, have favored holding the old price. Others have been as insistent that new ore should sell at prices more in line with those for pig iron, as in the old days when the control of ore was less concentrated. Now that the 50-cent reduction has actually been made, it must be said that the new price really registers in a formal way what the pig iron market had already practically settled. Figuring coke at \$1.60, at oven, labor per ton of iron at \$1.25 and limestone per ton of iron at 60 cents, the cost of basic iron at Mahoning or Shenango Valley furnace comes out close to \$13.50 even on the new ore level, a showing that goes far toward answering the question whether the ore reduction means a further decline in pig iron. While the furnace company mining its own ore still has a margin on the dual operation, the experience of the past 12 months has left little relish for a continued telescoping of profits.

So much ore and pig iron are ahead of the blast furnacemen of the Central West that their ore buying this year will be on a very moderate scale. The iron mining companies, with reduced outputs and with wages on the high level of last year, while fixed charges per ton of ore will naturally increase, will find 1911 the least satisfactory year in a decade, barring only 1904 and 1905.

The Navy an Industrial School

The four experts in scientific management, Frederick W. Taylor, Henry L. Gantt, Charles P. Day and Harrington Emerson, who are studying the methods of the navy yards for the Federal Government, were present during the recent battle practice of the Atlantic battleship fleet, and expressed their opinion of the gen-

eral efficiency throughout the various departments of the vessels in the statement that they had not seen "anywhere in the world, either in an industrial plant or any other operation, anything that begins to equal the navy." Thousands of young men are receiving their training under these conditions. A large proportion of them have been given a preliminary education in government training schools, where the mechanical trades occupy an important place. The great majority of the boys are going out into the world to seek employment in industry. The leaven of a training in an environment of practically perfect efficiency, coupled with the discipline of naval life, should have an increasing influence in industrial work everywhere. In other words, the navy has become a great industrial school, the ultimate commercial results of which should be taken into account in considering the cost of the naval establishment. Some keen American observers have seen useful results of the military training of the German youth in their after life in the manufacturing plants of that country. If such is the case, the condition should be even more pronounced with the graduates of the American navy.

English and American Labor Conditions

A notable contribution to current economic literature is the report of the British Board of Trade, which has been investigating labor conditions in the United States for the purpose of making a comparison with those existing in England. The investigation appears to have been quite thorough and intelligent. It was confined to that section of the United States lying east of the Mississippi River and was conducted in 28 representative industrial towns and cities. The most important feature of the report is the comparison made as to wages, cost of living and margin of income above ordinary cost of subsistence.

To ascertain the level of wages, three generally distributed employments were selected, comprising the engineering, building and printing trades. The occupations selected in the engineering trades were those of fitters, turners, smiths, patternmakers and laborers. The occupations covered in the building trades were those of brick layers, stone masons, carpenters, plasterers, plumbers, painters and laborers. In the printing trade the wages of hand compositors on job work were taken as the basis. It was found that the hours of labor in most trades, with the exception of engineering, are shorter than in the United Kingdom, while the money earnings of the American workman are nearly two and one-third times as great as in England. The comparison of retail prices of food showed a considerably higher rate in the United States than in England. Put in concrete form, a British housewife could have purchased in February, 1909, for \$3.27, articles which would have cost an American housewife \$4.69, so that her weekly expense may be considered as less by \$1.42 per week than if she lived in the United States.

The conclusion derived from the figures secured is that while rent and food in America are dearer than in England, the higher rate of wages more than compensates for the difference. The margin of income in America is so large, when rent and food have been allowed for, that for those who desire to do so, and choose to exercise the necessary strength and will and foresight, saving is easier for the American than for

the British workman, because of the larger income at his disposal. No proof was offered that employment is more intermittent here than it is in Great Britain, and the result is seen in the higher standard of material comfort maintained by the American workman.

The investigation thus made is of vastly greater importance than those which have so frequently been conducted by American commissions of various kinds. It may be assumed that it was directed on thoroughly impartial lines, with no disposition whatever to lean toward the side of the American workman, as the British Board of Trade is a department of the government. It rather effectually disposes of the time-honored assertion that the cost of living is so much higher in the United States than abroad as to more than offset the higher rate of wages prevailing here.

The Alleged Structural Steel Dynamiters

Although the officers of the American Federation of Labor are quick to spring to the defense of the members of the International Association of Bridge and Structural Iron Workers who have been arrested on the charge of having caused the explosion in the *Times* Building in Los Angeles, October 1, 1910, the feeling of satisfaction is general that at last sufficient evidence has been secured to point definitely to somebody as guilty of that awful crime. The dynamiting of the *Times* Building was only one of a series of dynamite outrages that have occurred all over the United States. These outrages have usually been perpetrated in connection with structural steel work that had been erected by nonunion workmen. The inference was strong that this dastardly work was being conducted in a systematic manner by those who had special reasons for discouraging the employment of nonunion structural steel workers. The mere arrest of the parties mentioned in the daily newspapers is, of course, not proof that they are guilty of the crimes charged. Sufficient information has been given to the public, however, to make the presumption strong that the excellent detective work which has led to these arrests includes very damaging evidence of the guilt of the persons now in custody.

The Industrial Education Evangelist

The action of the National Metal Trades Association at its recent convention, in appropriating \$5000 toward the employment of an "evangelist," who will conduct a propaganda for the improvement and spread of industrial education, marks an important step in the progress of a great movement. While an excellent beginning has been made in the United States in establishing industrial schools, the surface has hardly been scratched, taking the country as a whole. This was demonstrated in the results of the investigation conducted by the Committee on Industrial Education of the association, as stated by its chairman, Fred A. Geier. From questions framed to find the existing status, only 136 out of 402 individual firms composing the membership made reply, and it was evident from the answers received that "the majority of the firms had not given the questions proper consideration, nor made any investigation of the conditions of industrial education in their respective communities." The replies further indicated that "there was apathy in those

communities where industrial education had not been advocated and introduced. In contrast to this, replies from such communities where industrial education had been studied and inaugurated showed the keenest interest in this subject and the greatest desire to see further development."

This whole matter is one of the uttermost importance in American industry. A dwindling apprentice system, taking the aggregate, coupled with a tremendously increased demand for skilled workmen, has made it imperative that the effort toward the training of boys in industrial schools be as universal as industry itself. The very small communities cannot support such schools, but the industries existing in these centers can establish courses of their own. The "evangelist," who will have to be a man of sagacity and trained ability, should do a great deal toward this general end.

United States Steel Corporation's Earnings

The statement of the United States Steel Corporation's earnings for the quarter ended March 31, 1911, makes the following showing, as compared with the corresponding period of 1910:

	1911.	1910.
January	\$5,869,416	\$11,316,014
February	7,180,928	11,616,861
March	10,468,859	14,684,004
Total after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants, and interest on bonds and fixed charges of the subsidiary companies.....	\$23,519,203	\$37,616,876
Less charges and appropriations for the following purposes:		
Sinking funds on bonds of subsidiary companies and depreciation and replacement funds.....	3,517,386	6,113,682
Net earnings.....	\$20,001,817	\$31,503,194
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding	\$5,810,794	\$5,876,612
Sinking funds for the quarter on U. S. Steel Corporation bonds:		
Installments	1,012,500	1,012,500
Interest on bonds in sinking funds	488,668	422,351
	\$7,311,962	\$7,311,963
Profit	\$12,689,855	\$24,191,231
Dividends for the quarter:		
Preferred, 7 per cent.	\$6,304,919	\$6,304,919
Common, 1 1/4 per cent.....	6,353,781	6,353,781
Surplus for the quarter.....	\$12,658,700	\$11,532,531
Appropriated for new plants, construction, &c.		5,000,000
Balance of surplus for the quarter	\$31,155	\$6,532,531
	Tons.	Tons.
Unfilled orders on hand, March 31.	3,447,301	5,402,514

The net earnings for the quarter ended December 31, 1910, were \$25,990,978, and the surplus carried over for the quarter was \$408,032.

The American Gröndal Kjellin Company, 45 Wall street, New York, has changed its name to the American Gröndal Company. Announcement is made that the company has added to its engineering force men who have made a special study of various methods of treating iron ores. It has a testing plant in which it makes commercial tests on ores submitted and determines the proper method of treating the ore, whether by concentration and briquetting or otherwise.

Frank Millner, Inc., iron and steel scrap merchant, Trenton, N. J., has materially increased its facilities at its yard at Florence, N. J., which now covers from four to five acres. Additional railroad trackage has been laid and the capacity of the yard trebled.

The General Electric Company's Annual Report

The General Electric Company's report for the year ending December 31, 1910, gives the following income account, as compared with the previous year:

	1910.	1909.
Total receipts.....	\$74,707,689	\$54,102,051
Manufacturing costs, interest, depreciation, &c.....	63,841,996	47,608,389
Net profits.....	\$10,855,692	\$6,493,670
Dividends	5,214,368	5,214,352
Balance.....	\$5,641,324	\$1,279,319
Previous surplus.....	17,381,381	16,102,062
Total surplus.....	\$23,022,706	\$17,381,381

The balance sheet as of December 31 compares as follows:

Assets.	1910.	1909.
Patents, &c.....	\$1	\$1
Factory plants.....	15,516,314	14,330,958
Real estate.....	245,719	118,063
Stocks and bonds.....	23,666,883	22,329,663
Accounts and notes receivable.....	19,047,459	19,377,972
Inventories	27,796,276	25,150,035
Work in progress.....	589,788	462,223
Cash	14,912,400	17,623,466
Copper mining investment.....	2,805,077	3,408,604
Due from allied companies.....	2,923,483	.....
Totals	\$107,767,017	\$102,440,988
Liabilities		
Stock	\$65,179,600	\$65,179,600
Debentures	14,962,000	14,962,000
Accrued interest.....	83,664	83,664
Accounts payable.....	2,796,230	2,753,617
Uncollected dividends.....	1,303,592	1,303,592
Profit and loss surplus.....	23,022,706	17,381,381
Advance payments.....	245,819	777,133
Accrued taxes.....	173,405	.....
Totals	\$107,767,017	\$102,440,988

Vice-President J. R. Lovejoy remarks in part as follows: "Sales billed and orders received during the past year were the largest for any year since the organization of the company. The orders exceeded those received in the year ended January 31, 1907, the largest previous year, by 17.7 per cent., and were 105 per cent. greater than for the year ending January 31, 1905. The yearly rate of orders was substantially uniform for each quarterly period, increasing slightly during the last quarter. The total number of orders and contracts received during the year was 338,272—exceeding all previous records. The increased business this year came largely from our many thousand established customers in small contracts and current orders, rather than from new enterprises requiring large amounts of electrical apparatus. Unfilled orders as of December 31, 1910, amounted to \$15,500,000. The business of our foreign department was larger than for any previous year. We are constantly establishing new relations and seeking new outlets for our product."

Vice-President Rice says in part: "Expenditures for building and extension and other additional equipment during 1910 amounted to \$5,846,531. About one-third of these expenditures were applied to enlargement of productive capacity. On December 31 the company had 8,530,000 sq. ft. of floor space and 32,000 employees. The total land area of the works is 608 acres. In 1907 we purchased a large tract of land in Erie, Pa., and during the past year considerable grading work has been done preparing the site for manufacturing. A large iron foundry, pattern shop and machine shop are now under construction."

The company has \$2,805,076 invested in copper mining, of which \$1,129,961 represents capital stock and \$1,675,115 advances, largely to the Bully Hill Copper Mining Company.

The V & O Press Company, Glendale, Long Island, N. Y., announces the establishment of a new Chicago agency. Hereafter the company will be exclusively represented in Chicago territory by Hill, Clarke & Co., who carry a full line of presses in stock, and in addition have a fully equipped demonstration shop where V & O presses, as well as other machinery, may be seen in operation.

The Question of Extras in the Eastern Jobbing Trade

Some conferences have been held recently between iron and steel jobbers in Eastern territory and the manufacturers of bars and other products, such as have been sold from the Waverly, N. J., warehouse of the Carnegie Steel Company in the past two or three years. One of the questions involved has been the maintenance of full extras on sizes of bars carrying extras, in sales made to the trade ordinarily supplied by jobbers. One steel company sells on a card, the printed extras of which are half the extras of the card on which the jobbers sell. Other manufacturers have used the same card as the jobbers, showing full extras. In the New York district particularly the jobbing trade has found it difficult to secure these full extras, which it is contended a jobber must charge to get a living profit on bar business. A compromise proposal has been discussed providing that warehouse sales be made on a net card on which the extras should be three-fourths of the full extras. This has met with some favor among jobbers in the New York district, but is not so regarded by the jobbing trade in Philadelphia and Boston. The chief objection is that there would be added confusion, since the compromise card would not lead to the elimination of either the half-extra or the full-extra cards. There has been no adjustment as yet of the questions involved, but a sentiment has developed in favor of a more satisfactory footing for the jobbing trade.

Pacific Coast Metal Trades Convention

The fifth annual convention of the United Metal Trades Association of the Pacific Coast, held in Tacoma, Wash., April 14 and 15, was highly successful. Representatives were present from Los Angeles, San Francisco, Portland, Spokane, Tacoma, Seattle, Everett, Bellingham and Vancouver to the number of about 100. The reports of the retiring officers showed that the past year was the most prosperous the association has known. Three new districts were created: the Inland Empire district, the British Columbia district and the district in California. The following officers were elected for the coming year: President, H. T. Clarke, Portland Iron Works, Portland, Ore.; first vice-president, John Hartman, Atlas Foundry & Machine Company, Tacoma, Wash.; second vice-president, F. G. Frink, Washington Iron Works, Seattle, Wash.; third vice-president, J. M. Fitzpatrick, Union Iron Works, Spokane, Wash.; treasurer, A. M. Clark, Columbia Steel Company, Portland, Ore. Saturday afternoon, through the courtesy of the Tacoma members, the delegates were taken over the city and to the Country Club and the smelter. Saturday evening a banquet was held, attended by 88 persons.

The Universal Vanadium Company has been formed for the purpose of acting as selling agent throughout the world for ferrovanadium manufactured by the American Vanadium Company, Pittsburgh, Pa., and will act in conjunction with the Vanadium Sales Company of America. It has been incorporated under the laws of Delaware. The directors and officers are as follows: Edward M. McIlvain, president, 30 Church street, New York; Col. Millard Hunsiker, vice-president, 23 Rue De La Paix, Paris, France; James C. Gray, secretary and treasurer, Frick Building, Pittsburgh, Pa.; Joseph W. De Wyckoff, European representative, 64 Victoria street, Westminster, London, England; E. Marshall Fox, Wetley Rocks, Staffordshire, England; Sylvester D. Townsend, Jr., Wilmington, Del.; William McIlvain, Reading, Pa.

The Singer Mfg. Company, says the *Wall Street Journal*, controls approximately 80 per cent. of the world's output of sewing machines. Over 2,000,000 machines of 1000 different types per annum are now being turned out by the company's nine factories, which employ 28,000 operatives. Two of these factories are in the United States, at Elizabethport, N. J., and Bridgeport, Conn. In

Canada a large plant has recently been completed at St. John. The largest sewing machine factory in the world is operated near Glasgow, Scotland, while other plants are situated at Wittenberg, Saxony; Berlin, Prussia, and Podolsk, Russia.

The Donnelly-McArdle Case

Another stage has been reached in the now famous 20-year lawsuit, in which Michael Donnelly, 247 West Fifteenth street, New York, and Patrick J. McArdle, Albany, N. Y., brothers-in-law, are the contestants. In the 50's, when Donnelly was engaged in the scrap iron business in New York and McArdle in Albany, they became partners. In 1889, to tide over financial troubles of the firm, Donnelly transferred his interest in the business to McArdle for a consideration of \$1, to protect the latter in case the firm was found to be insolvent. According to Donnelly, the bill of sale was to be void and half the net proceeds of the firm's assets, the total being about \$158,000, was to be paid over to him if investigation proved the firm to be solvent. McArdle, however, contended that the document was an absolute bill of sale, and that Donnelly had no further interest in the business or its assets. Donnelly was thus forced to begin action to recover the interest in the firm's business claimed by him. The litigation has been almost a continuous proceeding since then.

The last decision in the case was rendered last week by a referee, to whom had at length been given the duty of fixing Donnelly's equity in the partnership. The referee's report gives Donnelly's share at \$41,000, which, with costs and extra allowances, makes his total about \$60,000. This is not satisfactory to Donnelly, who claims that the referee disallowed improperly items totaling \$567,131. Up to this time there have been seven trials in this case, taking 97 trial days, employing 93 lawyers, involving 40 judges and 249 witnesses, costing Donnelly \$163,500 in counsel fees and McArdle about \$200,000.

The Itabira Iron Mines in Brazil

In the published details concerning the iron ore deposits of Conceicao Sant Anna and Caué, near the town of Itabira in the Province of Minas Geraes, Brazil, it has been stated that these properties were in the hands of the B. H. Syndicate, Ltd. The *London Iron and Coal Trades Review* says that "the Itabira Iron Ore Company, Ltd., has just been registered to adopt an agreement with the B. H. Syndicate, Ltd., as well as the agreements by that syndicate with the Companhia do Porto da Victoria, and the Companhia E. F. Victoria à Minas." The capital of the company is given at £2,000,000 sterling, in £1,500,000 ordinary and £500,000 preference shares of £1 each. No public issue has been made. The board embraces J. W. Beaumont Pease, Newcastle-on-Tyne; Col. J. R. Wright, Swansea; Walter McLaren, M.P.; F. Samuelson, Middlesbrough; I. Hamilton Benn, M.P., and Austin Harris and T. H. C. Levick of Harris & Dixon, Ltd. Through its directors and shareholders the company is associated with a strong group of iron and steel masters, as well as having considerable financial backing. A number of iron ore properties in Brazil are at present on the market, and the success of the Itabira Iron Ore Company may bring on a boom in Brazilian iron ore lands, though it is predicted that it will be some years before the deposits in the western part of the State of Minas can be exploited. The Itabira Company will build its own railroad to Port Victoria, where a dock 850 ft. long will be built, according to a recent Brazilian decree. There will be 28 ft. of water alongside dock.

The Philadelphia & Western Railway Company, Philadelphia, Pa., has awarded a contract to the Keystone State Construction Company, of that city, for the construction of a two-track line between Villanova and Bridgeport. The same company has awarded a contract for highway and railroad bridges, including one over the Schuylkill River, to the Pennsylvania Steel Company, requiring about 3000 tons of material.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.				
	Apr.26,	Apr.19,	Mar.22,	Apr.27,
	1911.	1911.	1911.	1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Phila- delphia.....	\$15.50	\$15.50	\$15.50	\$17.50
Foundry No. 2, Valley furnace.....	13.75	13.75	13.75	15.50
Foundry No. 2, Southern, Cincin- nati.....	11.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00	12.00
Foundry No. 2, local, Chicago*.....	15.00	15.00	15.50	17.25
Basic, delivered, eastern, Pa.....	15.00	15.25	15.25	17.50
Basic, Valley furnace.....	13.75	13.75	13.75	15.75
Bessemer, Pittsburgh.....	15.90	15.90	15.90	17.90
Gray forge, Pittsburgh.....	14.40	14.40	14.40	15.90
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00
COKE, CONNELLSVILLE.				
Per Net Ton, at oven:				
Furnace coke, prompt shipment.....	1.55	1.60	1.55	1.70
Furnace coke, future delivery.....	1.75	1.75	1.75	1.90
Foundry coke, prompt shipment.....	2.00	2.00	2.00	2.25
Foundry coke, future delivery....	2.20	2.25	2.25	2.40
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh....	23.00	23.00	23.00	20.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.00
Wire rods, Pittsburgh.....	29.00	29.00	29.00	32.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago.....	14.25	14.50	14.50	18.50
Iron rails, Philadelphia.....	17.00	17.50	18.50	20.50
Car wheels, Chicago.....	13.25	13.25	13.25	16.00
Car wheels, Philadelphia.....	13.00	13.25	14.00	15.50
Heavy steel scrap, Pittsburgh....	12.50	12.75	14.00	15.75
Heavy steel scrap, Chicago.....	11.50	11.50	12.00	14.25
Heavy steel scrap, Philadelphia..	13.00	13.25	14.00	15.75
FINISHED IRON AND STEEL.				
Per Pound:				
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.32½	1.35	1.37½	1.50
Common iron bars, Chicago....	1.25	1.25	1.27½	1.60
Common iron bars, Pittsburgh..	1.35	1.35	1.35	1.61
Steel bars, tidewater, New York	1.56	1.56	1.56	1.45
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.71
Tank plates, tidewater, New York	1.56	1.56	1.56	1.55
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.66
Beams, tidewater, New York....	1.56	1.56	1.56	1.50
Beams, Pittsburgh.....	1.40	1.40	1.40	1.66
Angles, tidewater, New York....	1.56	1.56	1.56	1.50
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.	1.30	1.30	1.30	1.60
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.35	...
SHEETS, NAILS AND WIRE.				
Per Pound:				
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh.....	1.65	1.70	1.70	1.85
Barb wire, galv., Pittsburgh....	2.10	2.10	2.10	2.15
METALS, Per Pound:				
Lake copper, New York.....	12.37½	12.37½	12.50	13.25
Electrolytic copper, New York..	12.12½	12.12½	12.25	12.75
Spelter, New York.....	5.50	5.50	5.65	5.60
Spelter, St. Louis.....	5.30	5.30	5.50	5.45
Lead, New York.....	4.42½	4.45	4.40	4.40
Lead, St. Louis.....	4.27½	4.30	4.25	4.25
Tin, New York.....	42.50	41.70	40.50	32.90
Antimony, Hallett, New York...	9.00	8.75	9.12½	8.25
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

* This price is at furnace and not delivered in Chicago.
† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b.
Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on steels, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in.

and up, 1.45c., net; zeos, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, ¾ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.			
	Steel.	Black. Galv.	Iron.	Black. Galv.
1 to 1½ in.....	75	63	49	43
1½ in. to 2 in.....	79	69	71	59
2 to 3 in.....	80	70	75	66
Lap Weld.				
2 in.....	76	66	72	62
2½ to 4 in.....	78	68	74	64
4½ to 6 in.....	77	67	73	63
7 to 12 in.....	75	59	71	55
13 to 15 in.....	61½	..	..	..
Butt Weld, extra strong, plain ends, card weight.				
1½, ¼, ¾ in.....	69	59	65	55
1½ in.....	74	68	70	64
¾ to 1½ in.....	78	72	74	68
2 to 3 in.....	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.....	75	69	71	65
2½ to 4 in.....	77	71	73	67
4½ to 6 in.....	76	70	72	66
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
1½ in.....	64	58	60	54
¾ to 1½ in.....	67	61	63	57
2 to 3 in.....	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.....	65	59	61	55
2½ to 4 in.....	67	61	63	57
4½ to 6 in.....	66	60	62	56
7 to 8 in.....	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.
1 to 1 1/2 in. 2 to 3 in. Butt Weld Will be sold at two or three points lower basing (higher price) than malleable or card weight pipe, Butt or Lap Weld as specified.
2, 2 1/2, to 4 in. Lap Weld
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1 1/2 to 2 1/4 in.	85.00
2 1/2 in.	87.00
3 to 3 1/2 in.	87.00
3 1/2 to 4 in.	87.00
4 to 4 1/2 in.	87.00
5 and 6 in.	85.00
7 to 13 in.	62.00

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$20. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.									
Nos.	0 to 9	10	11	12A	12B	13	14	15	16
Annealed	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30	2.30
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.50	2.60	2.60

Market and Stone Wire in Bundles, Discount from Standard List

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2 1/2
27 to 36	80 and 10 and 5
Galvanized:	
9 and coarser	75 and 10
10 to 18	75 and 10
17 to 26	72 1/2 and 10
27 to 36	72 1/2
Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Pittsburgh

PARK BUILDING, April 26, 1911.—(By Telegraph.)

Pig Iron.—The only inquiry of note in the market is for 900 tons of straight No. 2 foundry iron from a radiator interest at Johnstown, Pa. The iron will likely be bought from a nearby furnace, which has a lower freight rate than the Valley furnaces. Consumers of Bessemer add basic, while not badly in need of iron, are nevertheless holding off to see the effect of the reduction of 50c. a ton in the price of Lake ore. Considerable doubt is expressed as to whether present prices on pig iron can be maintained, in the face of the lack of demand and the heavy production. It is therefore believed that the market is likely to remain quiet for some time. Prices, which are regarded as nominal, are as follows: Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—There is decided weakness in the steel market, especially on open hearth billets, which have been offered at \$23, delivered in Cleveland. Prices on Bessemer steel continue fairly strong, but specifications from consumers of billets and sheet and tin bars have fallen off very materially, especially on billets. The larger steel mills are still quoting regular prices, which they claim they are holding firmly, as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1 1/2-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

The reduction in ore prices for 1911 delivery is the live topic in the iron trade at present. The break came last week when W. P. Snyder & Co. sold 750,000 tons of ore to six interests, all steel companies but one. Of this amount 200,000 tons was Mesaba Bessemer, at \$4.25 for base ore containing 55 per cent. iron (natural state), and the remainder was non-Bessemer Mesaba at \$3.50 for the base ore, containing 51.50 per cent. iron (natural state). These prices are 50 cents per ton less than 1910 prices, and are the same as were in force in 1908 and 1909. Opinions differ as to the effect the reduction will have on prices of

iron. Furnace men claim that lower ore prices have been discounted in the low prices that have been ruling for pig iron for some months. Consumers, however, do not take this view. The demand for pig iron has not been stimulated so far, consumers still holding off. The output of pig iron is again being curtailed. The Carnegie Steel Company has recently blown out one Edgar Thomson furnace, one Bellaire, one Isabella and one at Youngstown, and will blow out three or four more in the next week or so. The Youngstown Sheet & Tube Company has put out its furnace A for relining. On the other hand, Tod of Youngstown Steel Company and Mary of Ohio Iron & Steel Company have been started. The Pittsburgh Steel Company, which has been getting a part of its basic iron from the Canal Dover furnace of M. A. Hanna & Co., has transferred this business to the Shenango Furnace Company, and is now getting its entire requirements of basic iron from the latter interest. The Bessemer Pig Iron Association reports that it has not made a sale of Bessemer iron for several months, but is holding at \$15, Valley. The new demand for steel is dull, and some of the smaller open hearth plants continue to shade regular prices. Specifications against sheet and tin plate contracts have slowed down materially. Current new business in finished iron and steel is light, and reports are that concessions in prices are being made more frequently, especially in sheets. The market on tin plate is not so firm as it was some time ago. A surprising development is the slowing down in new orders and specifications in the wire trade, April having shown a large falling off as compared with March. The new wire and wire nail mills of the Cambria Steel Company, Johnstown, Pa., have started, and will add considerably to the supply. Coke is extremely quiet. Scrap is pretty badly demoralized, heavy steel scrap having sold at \$12.50, a record low price. All indications point to a further slowing down in operations among the blast furnaces and mills, until more business is being offered.

Ferromanganese.—An inquiry is in the market for 300 tons for third quarter delivery, and we note a sale of about 100 tons for May and June at \$36.50, Baltimore. We quote 80 per cent. foreign at \$36.50 to \$36.75, Baltimore, the rate for delivery in the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—New demand is very quiet. We quote 50 per cent. at \$53 to \$53.50, f.o.b., Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$23; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars. Jisco and Ashland furnaces.

Muck Bar.—With no recent sales reported, we continue to quote best grades of muck bar made from all pig iron at nominally \$29, Pittsburgh. The Wilkes Rolling Mill Company, Sharon, Pa., started up its muck bar mill on Monday: it had been shut down for several weeks.

Skelp.—The market is quiet, consumers being covered for some time ahead and not specifying freely against their contracts. Prices continue fairly strong and we quote: Grooved steel skelp, 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers mills in the Pittsburgh district, usual terms.

Wire Rods.—As most consumers are covered to July 1 on contracts placed some time ago, the new demand is light. Specifications are not coming in fast. The Cambria Steel Company will now consume in its wire mills a good part of the output of its rod mill. We quote Bessemer, open hearth and chain rods, ordinary carbons, at \$29, Pittsburgh.

Steel Rails.—In the past week the Carnegie Steel Company booked two contracts for standard section rails of 5000 tons each and one for 500 tons. New demand and specifications for light rails have been rather quiet, the same company taking about 1200 tons. It is also receiving some fairly large orders for both light rails and standard sections for export. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b., at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—The McClintic-Marshall Construction Company has taken 1100 tons for new steel buildings for the Union Steel Casting Company in this city and 500 tons for a sugar factory at New Orleans, La. The Henry W. Oliver Estate has a project under way for the building of a large hotel on Sixth avenue and Smithfield street in this city, the plans for which have been drawn by F. M. Andrews & Co., architects, New York, and it is probable that bids on the steel, 6000 to 8000 tons, will be asked for in a short time. There is still much complaint about the very low prices that are being made on fabricated work, one prominent structural company stating that on a number of recent jobs placed the prices were below actual cost to this concern, which is a leading one in the trade. Headway is being made on plans for the formation of an

THE IRON AND METAL MARKETS

association of steel fabricators. We continue to quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Plates.—New orders for cars continue light, but some fairly large inquiries are out. The Western Maryland Railroad has placed 500 composite steel cars with the Standard Steel Car Company, the plates and shapes, 5000 to 6000 tons, to be rolled by the Carnegie Steel Company. The Norfolk & Western Railroad will build 250 steel cars at its shops at Roanoke, Va., and has divided the material between the Portsmouth Steel Company, Portsmouth, Ohio, and the Carnegie Steel Company. The Chicago, Burlington & Quincy is in the market for 1000 cars and the Seaboard Air Line for 1000 cars. The Pressed Steel Car Company is making some extensive improvements to its car shops at Woods Run, which will somewhat increase the capacity of this plant. The general demand for plates from boiler shops and other consumers is quiet, and it is estimated that not more than 60 per cent. of plate capacity, if that much, is active at present. We quote $\frac{1}{2}$ -in. and heavier plates in the wide sizes at 1.40c., but on the narrower sizes it is stated that a few mills are slightly shading this price.

Sheets.—The general condition of the sheet trade is rather unsatisfactory, new demand being dull, while specifications against contracts are not active. There is also more or less cutting in prices, particularly in West Virginia and some other districts. The American Sheet & Tin Plate Company is operating to slightly less than 60 per cent. of the sheet capacity, and as a rule the independent mills are running on about the same basis. Regular prices on black, galvanized and roofing sheets are printed on a previous page.

Tin Plate.—The new demand for tin plate continues very quiet, and specifications against contracts so far this month have shown a sharp falling off as compared with the same period in March. There has been a gradual but material slowing down in operations among the tin plate mills, and at present not more than 75 per cent. of capacity, and possibly less, is active. We continue to quote 100 lb. coke plates at \$3.70 per base box, f.o.b. Pittsburgh.

Bars.—The steel bar and bar iron trades continue very quiet, only a small amount of new business being placed, while specifications against contracts have not been as good this month as in March. Indications for the near future are not very bright. All the mills rolling iron and steel bars are short of work. While the tone of the market is weaker, prices on steel bars are reported as being fairly well maintained, but on iron bars are slightly lower. We continue to quote steel bars at 1.40c. and common iron bars at 1.35c., Pittsburgh, but on a nice specification our price on iron bars might be shaded.

Shafting.—This trade has been very dull this month, very little new business being placed, while specifications against contracts are unsatisfactory. Discounts on cold rolled shafting are 57 per cent. on carloads and 52 per cent. in less than carloads, delivered in base territory, but these discounts are more or less flexible.

Spelter.—The new demand is light; but smelters are able to maintain prices fairly well by restricting output. We quote prime grades of Western at 5.30c., East St. Louis, equal to 5.42 $\frac{1}{2}$ c., Pittsburgh.

Hoops and Bands.—Specifications against contracts are not coming in well and the new demand continues quiet. From some sections specifications are fair, but from other places are being held up. We quote steel hoops at 1.45c. and bands at 1.40c., with extras on the latter as per steel bar card.

Merchant Steel.—Business entered by the mills so far this month shows a falling off as compared with March. Jobbers and consumers are placing only small orders to cover actual needs. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, $\frac{1}{2} \times 1\frac{1}{2}$ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—A meeting of the rivet makers was held in New York last week, at which the regular prices of 1.90c. on structural rivets and 2c. on boiler rivets were reaffirmed. These prices, however, are not being observed, structural rivets being quoted as low as 1.75c. and boiler rivets 1.85c. Some makers refuse to go below these prices.

Wire Products.—New demand and specifications against contracts have quieted down still more. The wire trade so far this month has been a distinct disappointment to the mills. The Cambria Steel Company having started up its wire and wire nail mills is now an important factor in the trade. In spite of the falling off in business, it is stated that prices are being quite firmly held. We quote galvanized

barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.65, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—New business in April has been dull, and no large inquiries are in the market. Several railroads, notably the Panhandle, have sent in some fair specifications on contracts in the past week. The base price of railroad spikes is \$1.60, Pittsburgh, and \$1.65, Chicago, the two points being nearly on an even base.

Merchant Pipe.—The pipe trade is dragging a good deal, the new demand for merchant pipe being rather light. No large inquiries for oil or gas lines are in the market. It is stated that discounts on both iron and steel pipe printed on a previous page are being quite generally held.

Boiler Tubes.—Consumers are specifying only at a fairly satisfactory rate against contracts placed early in the year and most of which expire on June 30. The new list and classification on boiler tubes is printed on a previous page.

Coke.—An inquiry is in the market from a Cleveland blast furnace interest for 2000 tons of furnace coke per month over the last half of the year, but the business has not been closed. New inquiry for foundry coke is rather light. The Jamison Coal & Coke Company reports that it has sold in the last three weeks upward of 150,000 tons of standard grade 72-hour foundry coke for delivery over the last half at \$2.40 per net ton, at oven. The output of coke in the Upper and Lower Connellsville regions last week was about 349,000 net tons, a decrease over the previous week of 13,000 tons. It is probable that more ovens will be laid off, as the consumption of both furnace and foundry coke is lighter than for some time. We quote standard makes of 72-hour foundry coke at about \$2 for prompt shipment and \$2.25 to \$2.40 per net ton, at oven, for delivery over the remainder of the year. We quote standard makes of furnace coke for prompt shipment at \$1.60 to \$1.65, and for delivery over the next six months from \$1.80 to \$2 per net ton, at oven.

Iron and Steel Scrap.—The market is practically stagnant. There have not been any sales of moment in the past week, and there is absolutely no new inquiry. In many cases consumers are holding up shipments, or are rejecting material that under other conditions would be accepted. Embargoes on scrap are still in force at Monessen, Pa., and Follansbee, W. Va., and this has thrown much scrap on the market that is loaded on cars and has to be sold. Some small lots of heavy steel scrap ranging from carloads up to 100 tons and already loaded have sold as low as \$12.50, Pittsburgh, which is the lowest price for a very long time. The whole scrap trade is now in worse condition in every way than it has been at any time in some months. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$12.50 to \$12.75
No. 1 foundry cast.....	13.75 to 14.00
No. 2 foundry cast.....	12.75 to 13.00
Bundled sheet scrap, at point of shipment.....	9.00 to 9.25
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.50
No. 1 railroad malleable stock.....	12.50 to 12.75
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.75 to 17.00
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 busheling scrap.....	12.50 to 12.75
No. 2 busheling scrap.....	9.00 to 9.25
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	8.60 to 8.75
*M. L. scrap, lump.....	9.15 to 9.40
*Old iron rails.....	14.00 to 14.25
*No. 1 wrought scrap.....	14.25 to 14.50
*Heavy steel axle turnings.....	10.25
Stove plate.....	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, April 26, 1911.—(By Telegraph.)

General business conditions are not such as would call forth any great amount of enthusiasm. The pig iron market is still quiet, and sales of moderate size have begun to look big. The demand for structural material has somewhat subsided, and the bulk of Chicago business for the year has probably been let. Wire products easily maintain the lead in the lighter finished materials, with barb wire decidedly the most active item. Bars are not very active for the season, and there is constant rumor of price cutting. Old material continues to weaken, and as mills are well supplied little trading is being done. Several additional railroad ac-

THE IRON AND METAL MARKETS

cumulations of scrap are being offered, but will probably be held for better prices, as have most recent accumulations of this nature. There is plenty of money in sight which bankers are anxious to see go into use, but the uncertainty instills timidity. Every natural condition definable is indicating a prosperous year in agricultural districts, yet industrial interests of all kinds dependent upon this condition continue to issue discouraging reports.

Pig Iron.—Although the market is far from active, a slight improvement in demand is noted. The reduction in the price of Lake ore made the past week has brought no change in prices of pig iron, and little business is being accepted on Northern brands for the last half at the present quotations. A Chicago foundry has purchased 780 tons of No. 2 Southern foundry. A sale reported to be of about 800 tons of Southern iron, which runs 5 to 6 per cent. silicon, has been made to a Milwaukee manufacturer of saw-mill machinery. A northern Illinois manufacturer of agricultural implements is reported to be in the market for about 800 tons of No. 2 foundry. Foundry stocks are decidedly lower than a month ago, and much of the last half business that has been held back these last few weeks can reasonably be expected to materialize soon. Most of the transactions that have been closed in the last week are the result of personal solicitation rather than mail bids. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace, the minimum quotations being for April, May and June shipment, and the maximum for third quarter delivery:

Lake Superior charcoal.....	\$17.50 to \$18.00
Northern coke foundry, No. 1.....	15.50 to 16.00
Northern coke foundry, No. 2.....	15.00 to 15.50
Northern coke foundry, No. 3.....	14.75 to 15.25
Northern Scotch, No. 1.....	16.00 to 16.50
Southern coke, No. 1 foundry and No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 foundry and No. 2 soft.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	15.00 to 15.50
Standard Bessemer.....	17.40 to 17.90
Basic.....	15.85 to 16.35
Jackson Co. and Kentucky silvery, 6%.....	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%.....	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%.....	19.90 to 20.40

(By Mail.)

Billets.—The Billet market has been somewhat quiet for the past few weeks, though small sales are continually being made. The leading interest maintains its price of \$30.60, base, Chicago, on open hearth forging billets, though this price is reported to be shaded by independent concerns. On rerolling billets the price continues \$25.60, base, Chicago.

Rails and Track Supplies.—Very little new business on either rails or track supplies has developed in the past seven days. Specifications are good and inquiries fair, but new business has been very light. Western railroads are still drawing in their nets of retrenchment, but the rail mills of this district have a fair amount of tonnage booked. Business that has been taken comes from a variety of sources and in small orders. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—The demand for structural material has been only fair for the past week. Mills are running at about 75 per cent. of their capacity and are making prompt delivery. Marshall & Fox, architects on the Federal Life Building, Chicago, are requesting bids on that building, which is designed for both standard and Bethlehem shapes. The Pan-American Bridge Company, Indianapolis, Ind., was the successful bidder on the buildings of the Haynes Automobile Company, Kokomo, Ind. This contract will consume 400 tons of steel. Railroad business continues to be extremely dull, and only imperative needs are receiving the attention of such purchasers. We quote plain material from mill 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Plate mills are running at about 70 per cent. capacity, with no great volume of business in sight. As week after week comes up, however, sufficient business to keep the mills going comes to light. Rumors of price cutting are common, but the principal producers firmly maintain mill prices, which we quote 1.58c. to 1.63c.; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—A spirit of timidity is apparently dominating purchasers of sheets. Sales are small and evidently going into immediate consumption. Speculative buying and an-

ticipation of wants seem to have been entirely eliminated from the buyers' code. Mills are running at about 65 per cent. capacity, which is considered a fair amount of business at this time. The leading interests are maintaining prices, but it is reported that mills of smaller productive power are making concessions. Prices continue for Chicago as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—As the season advances a better demand is noted for concrete reinforcing bars, which are not so much governed by price as by the ability to make prompt delivery. There is evidently a price weakening in iron bars, and constant rumors of prices as low as 1.22½c. are heard. It is believed by the principal producers that wherever these prices exist they must be made by mills whose rolls are limited to certain sizes. Regular prices are as follows: Soft steel bars, 1.58c.; bar iron, 1.25c. to 1.30c.; hard steel bar rolled from old rails, 1.30c. to 1.35c., all Chicago; from store, soft steel bars, 1.80c. to 1.90c., Chicago.

Wire Products.—The demand for all kinds of wire products continues very active. Nail and fence wire orders are now being taken care of with comparative ease, and shipments are being made promptly. Orders for barb wire are crowding mills to their utmost capacity, producers being about two weeks behind with their orders. The South and Southwest continue to send in a fine volume of business, and the Northwest, where trade has been a little dull, is improving. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—Actual business lately closed has been comparatively small, yet specifications are liberal and inquiries frequent. Kansas City, Kan., has purchased 400 tons of water pipe for additions to its system. Helena, Mont., has been in the market for 4000 tons of water pipe, but this week all bids were rejected, awaiting the probable purchase by that city of the old water works system now in use. This matter will be brought before the consideration of the Helena voters in the near future, and at no distant date this inquiry will probably again become active. Considerable purchases have been made by the smaller gas producing companies, but none of these was of large tonnage. Prices remain firm, per net ton, Chicago: Water pipe, 4-in., \$25.50; 6 to 12 in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—The scrap market has been a little more active than for the past few weeks, although most of it has been done on a scale that continues down. New railroad lists have appeared in this district from the Nickel Plate, the Chicago, Milwaukee & St. Paul and the Rock Island. The list of the first mentioned road approximates 600 tons and closes April 26. The Chicago, Milwaukee & St. Paul list totals 3000 tons and closed Tuesday. The principal item on this list is 500 tons of No. 1 cast. The Rock Island list approximates 3200 tons and the principal item is 600 tons of No. 1 steel rails. This list closes April 27. Comparatively little railroad scrap is being sold, and stocks that tax the storage yards are being accumulated. Scrap prices are without strength and mills are well supplied. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows, per gross ton:

Old iron rails.....	\$14.25 to \$14.75
Old steel rails, rerolling.....	13.00 to 13.50
Old steel rails, less than 3 ft.....	12.25 to 12.75
Relaying rails, standard sections, subject to inspection.....	22.00 to 23.00
Old car wheels.....	13.25 to 13.75
Heavy melting steel scrap.....	11.50 to 12.00
Frogs, switches and guards, cut apart.....	11.25 to 11.75
Shoveling steel.....	10.75 to 11.25

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	11.00 to 11.50
Iron car axles.....	18.75 to 19.25
Steel car axles.....	17.75 to 18.25
No. 1 railroad wrought.....	11.25 to 11.75
No. 2 railroad wrought.....	10.25 to 10.75
Steel knuckles and couplers.....	10.25 to 10.75
Locomotive tires, smooth.....	17.00 to 17.50
Steel axle turnings.....	7.50 to 8.00
Machine shop turnings.....	6.50 to 7.00
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	7.00 to 7.50
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	11.25 to 11.75
Stove plate and light cast scrap.....	9.50 to 10.00
Railroad malleable.....	11.00 to 11.50
Agricultural malleable.....	9.75 to 10.25
Pipes and flues.....	8.25 to 8.75

THE IRON AND METAL MARKETS

Philadelphia

PHILADELPHIA, PA., April 25, 1911.

The demand in general continues along narrow lines, structural shapes being the only exception. Pig iron is very dull, consumers showing little interest in the market. About an even demand is reported for steel plates. The demand for billets and sheets drags. Refined iron bars are lower, with little business moving. Old material shows but little movement, and prices continue weak.

Iron Ore.—The announcement that independent Lake ore producers had reduced the price 50c. a ton for this year's ore supply has been received with considerable interest. A reduction is also announced ranging from 25c. to 35c. a ton on Fort Henry ores for this season's delivery. These reductions are not expected to affect the foreign ore situation in this district, although transactions in Swedish ore have been held up pending the settlement of the Lake ore question. The inability to secure charters at favorable rates restricts the movement in Spanish ores. Importations at this port for the week ending April 22 included 11,430 tons of Cuban and 9660 tons of Swedish ore, at a total value of \$87,161. The steamship Tellus arrived to-day with 12,400 tons of ore, the first of the season's movement in Wabana ore to this port. It was the largest cargo of ore ever received here.

Pig Iron.—The probable effect of lower lake ore prices is the leading topic of interest, but it is pretty generally believed that no reductions in pig iron prices will result, as the action of ore producers had been largely discounted. With the lower cost of ore, however, consumers see no immediate prospect of higher prices for second quarter iron, and, therefore, show little interest in the market. Producers are not disposed to force sales, as it is apparent that consumption is about equal to the current make, and from reports of stocks in buyers' yards it is evident that the iron taken is being pretty freely consumed. It is not unlikely that some further curtailment of the merchant furnace production will be made in the near future, as some makers contend that they will do this rather than reduce the present level of prices. In a few cases, however, orders for third quarter are being taken at the prices now prevailing for second quarter. The principal transactions during the week have been in low grade iron, one of the Delaware River cast iron pipe makers closing for several thousand tons, understood to include both Northern and Southern iron, for June and July shipment. In one instance \$10.50, Birmingham, was done for No. 3 Southern foundry. Pipe makers are still showing some interest in the market. In the higher grades of foundry iron the movement has been light. Sales of No. 2 X and No. 2 plain foundry iron have been confined to small lots, few exceeding 200 tons, for comparatively early delivery. Prices show no change, eastern Pennsylvania No. 2 X ranging from \$15.50 to \$16, delivered in this vicinity. Few sales are reported by sellers of Virginia foundry irons, and the ruling price of \$13, furnace, for standard No. 2 X iron is maintained, although report has it that a small lot of special analysis iron was sold slightly under that basis. Some of the Virginia producers are seriously considering selling into the third quarter at present prices, but so far deliveries have been confined to the second quarter. Forge iron has been in less active demand, but prices appear to be firm at recent quotations. Little interest is shown by consumers of the steel making grades. Sales of low phosphorus iron have been light, with prices unchanged. One consumer in the central part of the State has been negotiating for a small lot of basic iron, and is understood to have bought 1000 tons at \$15, delivered. While quotations for this grade are largely nominal, some sellers state that they would be willing to do business if it were offered at that figure. The following range of prices represents the market for standard brands, delivered in buyers' yards, eastern Pennsylvania and nearby points during the second quarter:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.00
Basic.....	15.00
Standard low phosphorus.....	21.50 to 22.00

Ferromanganese.—No fresh demand has come out in this territory, although sellers are figuring on several moderate inquiries from the West. Quotations still show considerable variation, but \$36.50 to \$37, Baltimore, about represents the range at which business has been done.

Billets.—Buyers are still satisfied to place orders for small lots for immediate consumption and show no interest in business of a forward character. Current orders are just about sufficient to keep Eastern mills operating at their recent productive rate. Prices are maintained at \$25.40 for open hearth rolling billets and \$30.40 for ordinary forging billets, delivered in this vicinity.

Plates.—There has been a fair run of small orders, which

just about enables mills to maintain their recent rate of production. Considerable business is in sight, particularly for bridge, structural, tank and boiler work, and the trade considers the outlook a shade more favorable. With few exceptions, mills are not well supplied with forward orders and are compelled to depend on the day to day demand to maintain their present operating rate. Prices are well held, 1.55c. minimum, being quoted for ordinary plates, delivered in buyers' yards in this district.

Structural Material.—The demand for fabricated work for buildings and bridges continues quite active, due to a large extent, no doubt, to the extremely low prices prevailing. Efforts to bring about an end to the sharp cutting which has prevailed for some little time continue, but as far as can be learned not much progress has been made. The contract for the structural work for the new mill of the Reading Iron Company, 900 tons, has been let, as has also that for highway bridges and a bridge over the Schuylkill River at Norristown, for the Philadelphia & Western Railroad, for which about 3000 tons will be required. Bridge work in connection with the elevation of the Philadelphia & Reading Railway, in the Kensington district, is up, as are also structural requirements ranging from 200 to 300 tons for small buildings. A fair demand for plain shapes is reported, for which prices are firmly maintained at 1.55c. minimum, delivered in this territory.

Sheets.—Current business is in small lots and principally for prompt delivery. Consumers are not disposed to place orders for extended shipment, and mills in this district have but little tonnage ahead on their books. The current demand is sufficient in the aggregate to keep plants pretty fully engaged. Eastern mill quotations for prompt shipments are unchanged as follows: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—There has been a decided slackening in the demand for refined iron bars, and lower quotations are named in competition for desirable specifications. Mill quotations range from 1.25c. to 1.30c., depending on the character of the business, which is equal to 1.32½c. to 1.37½c., delivered in this vicinity, and hardly considered strong at that level. A slight increase in specifications against steel bar contracts comes from agricultural interests, but the quantity is still below normal. Steel bars are firm at 1.55c., delivered in this neighborhood.

Coke.—The movement has been extremely light. Consumers are supplying their needs with purchases of prompt coke, which can be had at unchanged prices. Little forward business is being transacted. Furnace coke for prompt shipment can be had at \$1.55 to \$1.65, at oven, while for forward delivery \$1.75 to \$2, at oven, is asked. Foundry coke for prompt shipment is quoted at \$2, at oven, with \$2.20 to \$2.40 for extended shipment. The following range of prices, per net ton, is named for delivery in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke.....	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke.....	3.75 to 4.15

Old Material.—Consumers show little interest in the market, and even bargain lots are losing their attraction. In some cases buyers are canceling uncompleted shipments against monthly deliveries, particularly when purchases were made at prices above the present level. Heavy melting steel is lower, with odd lots offered to consumers at \$13, delivered; in a number of instances, however, consumers will pay \$13.25 and even \$13.50 if the material is strictly high grade. There has been little movement in the rolling mill grades of old material. No. 1 wrought is in light demand, while wrought iron pipe is 25c. under last week's quotations. Special grades are inactive, although sales of old iron rails and old car wheels have been made at prices under recent quotations. In the majority of grades quotations are nominal, insufficient business being transacted to establish a market. The following range of prices about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.50
Old steel rails, rerolling.....	14.50 to 15.00
Low phosphorus heavy melting steel scrap.....	17.75 to 18.25
Old steel axles.....	20.00 to 20.50
Old iron axles.....	25.00 to 26.00*
Old iron rails.....	17.00 to 17.50
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	16.00 to 16.50
Wrought iron pipe.....	18.50 to 14.00
No. 1 forge fire.....	11.75 to 12.25
No. 2 light iron.....	7.50 to 8.00*
Wrought turnings.....	8.50 to 9.00
Cast borings.....	8.00 to 8.50
Machinery cast.....	13.25 to 13.75
Railroad malleable.....	12.00 to 12.50
Grate bars.....	11.50 to 12.00
Stove plate.....	10.50 to 11.00

* Nominal.

THE IRON AND METAL MARKETS

Cincinnati

(CINCINNATI, OHIO, April 26, 1911.—(By Telegraph.)

Pig Iron.—Transactions are very light and the small spot shipment business that was reasonably good 30 days ago continues to fall off materially. Both producer and consumer seem to have adopted a waiting policy, and the marked lack of inquiry does not augur well for any immediate change. Probably the largest inquiry being worked on here is for 500 tons for a local manufacturer for last half shipment. Southern iron will probably be purchased. A local agency sold 1000 tons of No. 3 Southern foundry for June-July shipment at \$10.50, Birmingham. Several producers are quoting for last half shipment above present prompt delivery prices of \$11, Birmingham, and \$14, Iron-ton, for No. 2 foundry, but a number of standard brands are available at these figures for movement through the last half. Northern basic is quiet and is quotable around \$14 to \$14.25, Iron-ton, for prompt shipment, with the probabilities that at the last named figure delivery could be extended throughout the year. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	\$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	17.70
Lake Superior coke, No. 1	15.70
Lake Superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Basic, Northern	\$15.20 to 15.45
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

(By Mail.)

Coke.—A few scattered contracts for foundry coke have been closed, but the tonnage involved is very small. Inquiries for both foundry and furnace coke are scarce, although one for 48-hour coke is being figured on, aggregating about 600 tons per month. Prices are not quite so firm, but on standard brands there has been no appreciable change, and for spot shipment foundry coke is quoted in all three districts around \$2 per net ton, at oven, and from \$2.10 to \$2.25, and, in some cases, as high as \$2.40 per net ton on contracts. Furnace coke remains at \$1.50 to \$1.55 for immediate shipment and from \$1.65 to \$1.75 per net ton, at oven, for future delivery.

Finished Material.—Structural material, in small quantities, continues to move freely, but no large contracts have been reported lately. However, there are a number of buildings contemplated in this section that will call for a large tonnage; work on several of these is expected to commence before the fall season begins. Mill agencies are understood to be adhering strictly to the 1.40c., Pittsburgh, quotation, and warehouse prices are from 1.90c. to 1.95c.

Old Material.—The past week was extremely dull. In a few instances there has been a shading of present quotations, but inquiry reveals the fact that the scrap was already loaded on cars, and to save rehandling some sacrifices in prices were made. Buying on the part of the dealers is very light. Prices for delivery in dealers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	\$11.50 to \$12.00
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	5.75 to 6.25
No. 1 cast scrap, net ton	10.00 to 10.50
Burnt scrap, net ton	7.50 to 8.00
Old iron axes, net ton	16.50 to 17.00
Bundled sheet scrap, gross ton	7.50 to 8.50
Old iron rails, gross ton	14.00 to 15.00
Relaying rails, 50 lb. and up, gross ton	21.00 to 22.00
Old car wheels, gross ton	11.50 to 12.50
Heavy melting steel scrap, gross ton	10.00 to 10.50

Birmingham

BIRMINGHAM, ALA., April 24, 1911.

Pig Iron.—Perhaps there have been periods in the iron history of Alabama when the market was more quiet, but a canvass of the situation here now would lead one to believe that such was not the case. The general report is that there have been no sales of consequence. While there is no doubt that, as a general proposition, business in iron and steel lines has developed unusual dullness, yet it is felt here that the present condition of tariff legislation is responsible for the immediate lack of orders. Then, buyers are waiting to see what result a 50c. cut in Lake ore will have on the pig iron market. It is believed here, however, that this reduction in ore prices had been thoroughly discounted. Still the announcement itself has a tendency to further delay buying. The \$11 schedule seems meanwhile to have been well established for prompt and for forward de-

livery running through the year 1911. Well posted ironmen here insist that the basis of \$11 for No. 2 means no margin of profit to the manufacturer, despite the statement reported to have been made in Congress the past week to the effect that pig iron costs only \$7.50 to produce in this district. It is more generally thought here that a proper range of cost at the different furnaces, with necessary allowances made for depreciation, overhead charges, royalties, &c., would show from \$9.50 to \$11.50. With \$11 for No. 2, it would mean an average of less than \$10.50 at the furnace for the total output, and from this figure must come the cost of selling; but, as one party suggested, "much depends upon how costs are figured month by month." The following schedule of prices represents the current pig iron market, these prices being per gross ton on board cars at furnaces in this immediate district:

No. 1 foundry and 1 soft	\$11.50
No. 2 foundry and 2 soft	11.00
No. 3 foundry	10.50
No. 4 foundry	\$10.00 to 10.25
Gray forge	9.50 to 9.75
Standard basic, chill cast	11.00
"Off" basic	10.50
Charcoal car wheel iron	22.50

Cast Iron Pipe.—The past week proved barren of results as to any large lettings. The same "wait-a-while" feeling that is experienced with buyers of pig iron is met with in dealing with consumers of cast iron pipe. Prices are firmer and being well maintained, due to the fact that the foundries are still fairly busy shipping on old contracts and feel that present asking prices could be obtained on what business is going as well as a cut price of, say, \$1 per ton. Quotations, therefore, remain as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$23; 8 to 12 in., \$22 over \$12-in., average \$21, with the customary differential of \$1 more for gas pipe.

Old Material.—Some dealers report a still better feeling in the scrap market, but the state of trade is such that any sale of consequence has the tendency to make the parties interested feel that conditions are on the up grade. From this it may be judged that the scrap situation in this district is not as yet a very happy one. Dealers' asking prices are as follows, per gross ton, 2240 lb., on board cars here:

Old iron axes (light)	\$14.50 to \$15.00
Old steel axes (light)	13.50 to 14.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.50 to 11.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.50 to 8.00
No. 1 machinery	10.50 to 11.00
No. 1 steel	9.50 to 10.00
Tram car wheels	9.00 to 9.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, April 24, 1911.

The market for pig iron is very dull, as far as new business is concerned, but specifications on contracts are coming in satisfactorily. There is some movement in coke, two large sales having been made last week. It is reported that \$1,000,000 is being expended this spring in this city in the construction of apartment houses alone, and dealers in building material and house furnishings are busy. Leading jobbers in heavy hardware and iron are having a good country trade.

Pig Iron.—Large consumers of pig iron in this district seem to have withdrawn from the market temporarily, as none of the leading brokers was able to report either inquiries or sales for the past week which represented any tonnage of importance. The same conditions prevailed with the merchant sellers, though one house stated that it had made several small sales for prompt shipment. Buyers seem to be waiting to note the course of the market, and also to gauge the demand for the finished product, and in the meantime a hand-to-mouth policy will prevail among consumers who are in the habit of buying round lots. The only inquiries reported were for 300 tons of No. 2 Southern foundry, for shipment over the last half, and 150 tons of No. 1 soft for prompt delivery. While there is no change in price to report, the tone of the market is weaker. We quote No. 2 Southern foundry at \$11, Birmingham, for any shipment prior to January, 1912, except for fourth quarter only, which is held at \$11.50. No. 2 Northern is offered at \$14, Iron-ton, Ohio, for any delivery except last quarter, which is held at \$14.50.

Coke.—Large buyers are in the market for coke to some extent. The inquiry from a local steel foundry for 1500 tons of foundry and furnace is still pending, and this also is the case with the inquiry for 5000 tons of foundry. Among the sales reported are 3000 tons of Stonega foundry, for shipment over the year, and 4000 tons of by-product coke, for shipment over the second quarter. The market

THE IRON AND METAL MARKETS

is steady, with prices ranging from \$2.15 to \$2.40 per net ton for selected Connellsville 72-hour foundry, at oven; carloads 25c. per ton higher.

Finished Iron and Steel.—The demand for finished products has eased up somewhat each week since the month came in. The leading interest reports the sale of 500 tons of standard rails to an Oklahoma interurban railroad. For light rails the demand is limited. Structural material is in fair request. Bars are in moderate demand. The call for track fastenings, while steady, is not large.

Old Material.—Business in scrap iron and steel is wholly confined to dealers, there being no demand from consumers. Stocks, however, are pretty well cleaned up. The railroad offerings the past week were small—700 tons by the St. Louis & San Francisco and 100 tons by the Clover Leaf Line. Relaying rails are in fair demand and steady, but the market is softer and prices for several items in the list are lower. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.00 to \$13.50
Old steel rails, rerolling.....	11.75 to 12.25
Old steel rails, less than 3 ft.....	10.75 to 11.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.75 to 11.25
Frogs, switches and guards, cut apart.....	10.75 to 11.25

The following quotations are per net ton:

Iron fish plates.....	\$10.75 to \$11.25
Iron car axles.....	17.00 to 17.50
Steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	9.75 to 10.25
Railway springs.....	9.50 to 10.00
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	9.00 to 9.50
No. 1 boilers, cut to sheets and rings.....	7.75 to 8.25
No. 1 cast scrap.....	10.00 to 10.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	7.50 to 8.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	7.50 to 8.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00

The Missouri Valley Bridge & Iron Company has been awarded the contract for a three-span bridge in California, requiring 130 tons of steel.

Smoke Inspector E. C. Parker, in his report to Mayor Kreismann, states that \$505,000 was spent in St. Louis in the past year for the installation of smoke-consuming devices, and \$317,000 was expended in the reconstruction of factories in order to do away with the smoke nuisance. He estimates that not less than \$1,000,000 will be expended in this direction the coming year. Thus far 824 plants have been altered.

William Love, Lafayette, Ind., has been awarded the contract to build and equip the Oklahoma & Golden City Railroad, to run from Jefferson City, Mo., to Fairview, Okla., a distance of 388 miles.

An 18-story office building will be erected at Dallas, Texas, for the Southwestern Life Insurance Company, by the American Construction Company, Houston.

Cleveland

CLEVELAND, OHIO, April 25, 1911.

Iron Ore.—As forecasted last week, prices on Lake Superior ores have been established for 1911 at a reduction of 50c. a ton from last season's prices on both Bessemer and non-Bessemer grades. A number of sales fixing the prices on the new basis were made by both Cleveland and Pittsburgh interests late in the week. The ore actually contracted for in the past few days, and for which negotiations are now pending, aggregates a good round tonnage, but the bulk of it goes to affiliated blast furnace and steel interests. Otherwise, not much activity has been aroused in the market, little tonnage being sold to independent merchant furnaces. Quite a large tonnage of ore reservations that were made earlier in the season, mostly for Bessemer grades, are now being converted into contracts. After the requirements of a few of the large consumers having ore connections are provided for, the market is expected to settle down without any active general buying movement. A large share of the merchant furnace interests have enough ore on hand to last them until late in the year, and many of these are not able to estimate their requirements and will probably not come into the market until late in the year. Many will require only a small tonnage as compared with their usual purchases. Ore carrying charges have not yet been fixed by vesselmen, but will probably be decided upon this week. The Pittsburgh Steamship Company has started 10 of its boats. Not many boats have as yet been placed in commission by other owners. So far only two cargoes of ore have reached lower

lake ports. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The establishment of ore prices has as yet aroused no activity in the pig iron market. Some buyers, however, are known to have been holding off until the ore price question was disposed of, and it is expected that these will begin feeling around shortly for prices. Prices remain nominally unchanged, and whether present quotations will be reduced cannot be determined until sufficient inquiry comes out to test the market. As the reduction in the price of ore had been discounted for some time by furnacemen, many of whom claim they have been selling their product at or below cost, it is believed that present prices will be pretty well maintained. Another factor that will enter the situation is the fact that very little iron made from the lower priced ore will be offered on the market for some time. The largest inquiry pending is from an Akron, Ohio, furnace manufacturer for 500 tons of No. 2 Southern iron for the last half delivery. For the last half delivery Northern foundry iron is held at \$14.25 to \$14.50 for No. 2. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Basic	14.50
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Gray forge.....	13.50
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—The only sales reported are foundry grades in small lots for spot shipment. We quote standard Connellsville furnace coke at \$1.60 to \$1.65 per net ton, at oven, for spot shipment, and \$1.75 to \$2 for the last half. Connellsville 72-hour foundry coke is held at \$2 for spot shipment and \$2.25 to \$2.50 for the last half.

Finished Iron and Steel.—The demand in finished lines is not active. Mills are getting a fair volume of orders, but they are nearly all for small lots. Jobbers report a fair volume of warehouse orders. Mill agencies report more competition than usual from mills that reroll hard steel bars. The latter are quoting low prices and are taking some orders from the implement trade and other consumers that usually take soft steel bars. A price as low as 1.20c., Pittsburgh, has been quoted on hard steel bars for prompt shipment, and low prices for contracts for a year. In spite of the activity of the rerolling mills, prices on soft steel bars remain firm at 1.40c., Pittsburgh. The Cleveland, Alliance & Mahoning Valley Railroad has placed a contract with the Cambria Steel Company for 2000 tons of rails for a new traction line. In structural material and plates not much new business is coming out, but good specifications for plates are being received from the shipbuilding companies. The Bellefontaine Bridge Company has taken the contract for 400 tons of steel for a beet sugar plant to be built by the Dyer Company of Cleveland at Findlay, Ohio. John Eichley, Pittsburgh, has secured the contract for 300 tons of steel for a hotel in Youngstown, Ohio. Some of the local structural work that has been pending for some time will be let shortly. Bids will be asked for in a few days for the Central Y. M. C. A. building, requiring 2000 tons, and the Statler hotel, requiring 1200 tons. The demand for sheets is only fair. While some price concessions are being made, a number of the independent producers are holding firmly to the established prices. The demand for iron bars continues light. One local mill is running full and the other at half capacity. Bar iron prices are stationary at 1.30c. to 1.35c., at mill.

Old Material.—The market is very quiet and prices on several grades have declined. Heavy melting steel is 50c. a ton lower in the local market. Cleveland consumers are offering a maximum price of \$12 a ton. For outside shipment, dealers report that the best price they can obtain is \$13, delivered. Local mills are well supplied with scrap and are holding back on shipments. The Nickel Plate Railroad will close April 26 on about its usual list. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$13.50 to \$14.00
Old iron rails.....	15.00 to 15.50
Steel car axles.....	18.50 to 19.00
Heavy melting steel.....	11.50 to 12.00
Old car wheels.....	12.50 to 13.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.50 to 12.00
Railroad malleable.....	12.50 to 12.75
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are for net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.25 to 6.50
Iron and steel turnings and drillings.....	6.75 to 7.00
Steel axle turnings.....	9.00 to 9.25
No. 1 busheling.....	10.50 to 11.00
No. 1 railroad wrought.....	12.25 to 12.50
No. 1 cast.....	11.25 to 11.50
Stove plate.....	10.25 to 10.50
Bundled tin scrap.....	11.00 to 11.50

THE IRON AND METAL MARKETS

Buffalo

BUFFALO, N. Y., April 25, 1911.

Pig Iron.—Sales by furnaces in this district aggregate about 15,000 tons since last week's report, principally foundry grades, with inquiries pending for 12,000 to 15,000 tons of foundry and forge irons. The tendency of the market since the first of the present week, however, has been toward inactivity, as buyers as a rule are now waiting to see what effect the reduction in the price of ore will have. In consequence there has been comparatively little buying the present week to date. Furnaces are apparently apathetic regarding new business, even at previously prevailing prices, for the reason that the reduction in the price of ore was fully discounted by them some weeks ago, and, in fact, over-discounted in some instances. Some furnaces are inclined to restrict production in preference to continuing to sell below cost. Furnace C of the Buffalo Union Furnace Company was blown out on Tuesday. Shipments on contracts are going forward from furnaces in fairly good volume. Price schedules remain practically unchanged since last week, although it is learned that in some particular instances slightly lower offers have been accepted. We quote as follows, f.o.b. Buffalo, for second quarter delivery:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 3 foundry.....	13.50 to 13.75
Gray forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Basic.....	14.25 to 14.75
Charcoal.....	16.75 to 17.50

Finished Iron and Steel.—Steel bars and plates are rather quiet and current orders running in smaller tonnages as a rule than for two or three weeks. A little inquiry is being received from agricultural implement makers, who are beginning to manifest some interest in the market for their season's requirements in bars. One selling interest reports the closing of two bar contracts of moderate tonnage. The Canadian export trade is holding a good pace, the same as for the past several months, showing a good total for the week both for current orders and specifications on contracts. Increased activity is noted in shapes and in fabricated structural material. Bids are being received this week for the 350 tons of fabricated steel for the Eastman Kodak Company's new building, Rochester; also for 400 tons for the Hickey-Freeman Company's building, Rochester, and for steel for a seven-story department store for I. Rosenbloom, Syracuse, and a six-story building of similar character for Rosenbloom & Sons of the same city, both requiring considerable tonnages. Bids will also soon be received for steel for the German Deaconess' Hospital building, Buffalo, about 200 tons. Contract for the Huebner-Bleistein Patents Company's lithographing plant, Buffalo, 200 tons, was awarded to the Buffalo Structural Steel Company.

Old Material.—The market remains exceedingly quiet. Buyers are taking no interest at present, their requirements being covered apparently for business in hand. There is no quotable change in prices, although the tendency is weak. There has, however, been insufficient business to test the market. We quote as follows, per gross ton, f.o.b. Buffalo, the prices shown being almost entirely nominal:

Heavy melting steel.....	\$12.00 to \$12.50
Low phosphorus steel.....	16.00 to 16.50
No. 1 railroad wrought.....	14.00 to 14.25
No. 1 railroad and machinery cast scrap..	13.50 to 14.00
Old steel axles.....	19.00 to 19.50
Old iron axles.....	22.50 to 23.50
Old car wheels.....	13.75 to 14.25
Railroad malleable.....	13.50 to 13.75
Boiler plate.....	10.50 to 10.75
Locomotive grate bars.....	10.75 to 11.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings..	6.50 to 7.00
Clean cast borings.....	6.00 to 6.25

The German Iron Market

BERLIN, April 13, 1911.

The news from the industrial districts indicates that a very quiet tone prevails, but that work is proceeding at the furnaces and mills at a normal pace. The March pig iron production was announced several days ago as having again established a new record. The total was 1,322,144 metric tons, or about 1400 tons more than in January, the month of greatest previous production; and it exceeded the production of March, 1910, by 72,000 tons. The Steel Works Union has also given out shipment figures for March beating all previous records. The movement in rails and other track material, structural shapes and semimanufactured steel reached a total of 633,000 tons, or about 219,000 tons more than in February. The March shipments included 235,000 tons of steel rails and ties. The shipments were heavily increased by reason of the fact that the month ended the

Union's fiscal year, and the companies were rushing shipments in order to finish up the year's business.

The calls for delivery of native ores are of regular and normal volume. The price for brown iron ore from the Nassau district for the second half year has been recently marked up to 15.50 marks, on a basis of 50 per cent. iron. Furnacemen complain that this price is too high, considering the price of iron, and this, they say, is also true of foreign ore prices. The latter are still firmly held, and this is also the case with manganese ores. Imports of iron ore in March reached extraordinary proportions, having amounted to 1,074,000 tons, as compared with 530,000 tons in March, 1910. Exports amounted to 227,000 tons, or about 11,000 less than a year ago.

The pig iron trade is quiet, but foreign orders continue to come in. The great establishments of Westphalia and the lower Rhine are said to have orders sufficient to keep their furnaces running till the end of the year, along with the usual supplementary orders that are regularly to be expected; but the Siegen furnaces can still take on orders for the latter half of the year. The furnaces of that region have called a meeting to consider new overtures of the Essen Syndicate looking toward their joining the combination. Another effort is also to be made to persuade the Luxemburg-Lorraine furnaces to join.

After the export trade in steel material had been active for some weeks it has now grown more quiet. The home demand continues unchanged, and prices are fixed. Business in bars has been somewhat better of late, but the change is not marked. Foreign demand continues, but prices for export have been lifted somewhat since the convention broke up, involving the discontinuance of the export drawbacks. It is asserted that bars for export cannot be had now under 97.50 marks, and some selling is done as high as 100 marks. The bar iron mills are doing well, and orders are coming in freely. Orders for hoops and bands are also rather heavy, and the mills have work ahead for a considerable time. The manufacturers of cold rolled strips are well supplied with orders, but new business is not coming in so fast as previously. Mills running on steel tubing are working to their full capacity; orders are heavy, but prices are poor, and there is no prospect of reconstructing the trade combination that broke up last year. Export business in steel beams is pretty good at 106 marks, on board ship. Export orders for heavy plates are brisk, and home business also seems rather better; the latter is also true of export business in the thinner qualities of sheets. The tin plate mills are enjoying an unusually prosperous trade.

The home railroad authorities have placed some supplementary orders for rails and ties for summer delivery, and foreign orders for heavy rails continue to arrive in good quantities. The heavier qualities of grooved rails are also in better demand, for both home and foreign consumption.

The annual report of the Steel Works Union shows that two-thirds of its increase in shipments for the past year was made in rails, which would mean a gain of about 200,000 tons in that specialty. The total shipments of the Union in class A products reached 5,314,900 tons, as against 5,017,200 tons for the previous year.

Business in steel castings continues to gain in volume, but prices are too low to meet the views of manufacturers. The seven largest German manufacturers of cast iron pipes have effected a trade combination, with headquarters at Cologne.

The spring trade in most branches of the hardware trade has grown quite brisk. It is reported, however, that the export trade has grown more difficult, especially in the United States and Austria. Larger orders have been sent in for builders' hardware in expectation of greater activity in building operations. Makers of tools report that their trade is quieter, and this seems also to be the case with the cutlery trade at Solingen.

The news from the Belgian market this week is less favorable. The export price for bar iron has been reduced 1 shilling, and for basic steel bars 1 to 2 shillings.

New York

NEW YORK, April 26, 1911.

Iron Ore.—Considerable sales of Port Henry ores have been made recently for 1911 delivery at prices about 25 cents below those of 1910 for furnace and lump ores and 35 cents a ton less than in 1910 for concentrates. Prices for 1911 are per ton rather than on the unit basis which in 1910 was 6¼ cents. Sales made by Witherbee, Sherman & Co., Inc., and the Port Henry Iron Ore Company have been on the following basis, f.o.b. mines at Mineville, N. Y., for this year's delivery: Old Bed No. 21 furnace ore, \$2.90; Old Bed No. 21 lump ore, \$3.40; Old Bed concentrates, carrying 65 per cent. iron, \$3.70; Harmony ore, carrying 62 per cent. iron, \$3.50.

THE IRON AND METAL MARKETS

Cast Iron Pipe.—Conditions are exceedingly quiet in this branch of trade. A few public lettings are coming up, but in no case is the quantity of much significance. Quotations on carload lots of 6-in. are continued at \$21 to \$22 per net ton, tidewater.

Finished Iron and Steel.—Although the mills have not yet shortened their output materially, being still at nearly 70 per cent capacity on the average, it is principally due to the business originating in the West. Except in structural lines, this territory is not active, and even that showing, good as it is, is likely to be overshadowed by some very large projects developing in the Western part of the country. The unplaced structural contracts and those on which bids will shortly be taken in New York and vicinity make an attractive total, but the tonnage closed last week was considerably behind the records of recent weeks. Plates and bars, both iron and steel, are less fortunate even in prospects, and it is probable that April will close considerably behind the previous month. Prices, however, are as firm as ever, for it is felt that no lower profitable prices could be made, and that they would bring out no additional business. Labor troubles looming up in the boiler and tank trades induce employers to keep their stocks low, particularly as there is no delay in getting material as fast as it is needed. The principal structural awards during the week were the loft for Henry Corn at Fifth avenue and Twelfth street, New York, 4000 tons, to the Hay Foundry & Iron Works; the Henry Heide candy factory, New York, 2200 tons, to Post & McCord; the Black, Starr & Frost building, Fifth avenue, New York, 1100 tons, to the American Bridge Company; the bar and puddling mill for the Reading Iron Company, Reading, Pa., 800 tons, to the McClintic-Marshall Construction Company, and a crane runway, 100 tons, at the same plant to the Pennsylvania Steel Company; 600 tons of bridge material for viaducts in the suburban area of the New York terminal of the New York Central, to the Fort Pitt Bridge Company; a loft at 117 East Twenty-fourth street, New York, 400 tons, to Levering & Garrigues; a building for the Liberty Storage Warehouse Company on West Sixty-fifth street, New York, 400 tons, to the Radley Steel Construction Company, and a grandstand in the baseball park at Washington, D. C., 400 tons, to Brown & Ketchum. The New England Structural Company will probably get the 600 tons of bridge material for the Boston & Albany. Awards are expected shortly on 600 tons for the Boston Elevated Railway for substations, and 200 tons or bridge material for the Delaware & Hudson. Bids closed April 24 on the 1200 to 2000 tons for the Essex County Bank Building, Newark, N. J. The time for receiving bids on the Interborough Rapid Transit Company's improvements to the elevated structures in Manhattan is understood to have been extended, and it is not expected that awards will be made for some little time. The work will require 80,000 tons in all, and is divided in 10 sections, the largest one of which will need 23,000 tons. The Thompson-Starrett Company has the general contract for the Woolworth Building, the plans for which have been filed. Those for the new building for the New York Telephone Company on Walker street, New York, have been approved by the Building Department, and bids will probably be asked in about two weeks. It is estimated that between 4000 and 5000 tons of steel will be required. The Chesapeake & Ohio is in the market for several small bridge spans aggregating about 1000 tons, and the Boston & Maine has another inquiry out for a double track bridge at Groton, Mass., of about 75 tons. April 28 bids will close on between 500 and 700 tons for another section of work in the New York Central terminal area. Quotations remain unchanged, as follows: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Pig Iron.—The reduction of 50c. in the price of Lake Superior ores and the announcement that Eastern ores have sold at from 25c. to 35c. a ton below the basis of 1910, have been factors in the pig iron market of the week. However, business has not been at a standstill, the end of last week bringing a number of orders to local offices in lots of 500 tons and less. The largest single transaction reported was 1500 tons. The inquiry for 4750 tons of foundry iron from a railroad supply interest has not yet resulted in business, but it may be closed this week. New England buyers seem to be pretty well covered for the next few months, but several interests in the New York district are expected to be in the market within a month for iron on which shipments will probably begin in June. Inquiries for iron for the third quarter are met with quotations as low as those for early delivery in some cases, and, while it is recognized that the pig iron market some time ago reached a level corresponding to the new ore prices, the sentimental effect of the reduction in ore may operate to project prompt delivery prices well into the last quarter of the year. Erie

Canal navigation opens May 15 and the first boat deliveries of Buffalo iron in this district will not be made before the early part of June. Buffalo prices vary, \$14 being the minimum with some furnaces for delivery in the third quarter, while in other cases this is shaded considerably. Buying of pipe iron continues, but the basic iron market is very quiet. We quote for early delivery, at tidewater, as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.25 to \$15.75; No. 2 plain, \$15 to \$15.25; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15.25 to \$15.50.

Steel Rails.—Among the week's sales reported by the leading interest are 5000 tons for the Philadelphia & Reading and 5000 tons for the Baltimore & Ohio, which will be rolled at Pittsburgh, and 3000 tons for the Chicago, St. Paul, Minneapolis & Omaha. The St. Paul's order, of which there has been some advance talk, will probably not be placed for several months.

Ferroalloys.—Inquiries are out for some fair-sized quantities of ferromanganese, but the market is not particularly strong. Dealers are quoting around \$36.50 for ferromanganese at seaboard. Ferrosilicon is very quiet, and it is quoted by New York dealers at \$53 to \$54, Pittsburgh.

Old Material.—If possible, business in this line is in even more deplorable shape than at the time of our last report. Dealers are not only contending with rejections by steel companies and rolling mills, but are experiencing cancellations of contracts which they had good reason to suppose would be complied with because of the high standing of the companies concerned. The most important transaction of the week, as far as could be ascertained, was the sale of 1000 tons of cast scrap. Nothing is moving in heavy melting steel scrap but a few moderate shipments on old orders, and even these are being made with trepidation for fear of rejections. While the nominal quotation of \$13, delivered eastern Pennsylvania, is being made by dealers in that section, it is the almost invariable experience of New York shippers that rejections and claims of allowances for slight departures from rigid specifications will involve a reduction in the price received of at least \$1 a ton. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.00 to \$10.50
Heavy melting steel scrap.....	10.00 to 10.50
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	15.50 to 16.00
No. 1 railroad wrought.....	12.00 to 12.50
Wrought iron track scrap.....	11.50 to 12.00
No. 1 yard wrought, long.....	11.00 to 11.50
No. 1 yard wrought, short.....	9.50 to 10.00
Light iron.....	5.00 to 5.50
Cast borings.....	5.00 to 5.50
Wrought turnings.....	5.50 to 6.00
Wrought pipe.....	10.00 to 10.50
Old car wheels.....	11.50 to 12.00
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	9.00 to 9.50
Malleable cast.....	10.00 to 10.50

The Joseph Joseph & Brothers Company, old material, will remove May 1 from 100 Broadway to rooms 1454-6-8 on the fourteenth floor of the Hudson Terminal Building, 50 Church street, New York.

Metal Market

NEW YORK, April 26, 1911.

THE WEEK'S PRICES

		Copper, New York.				Spelter.			
		Copper, New York.		Tin.		Lead.		New St.	
		Electro-lytic.	New York.	New York.	St. Louis.	New York.	St. Louis.	New York.	St. Louis.
April.	Lake.	12.37½	12.12½	42.35	4.45	4.30	5.50	5.30	
20.....	12.37½	12.12½	42.35	4.45	4.30	5.50	5.30		
21.....	12.30	12.00	42.30	4.45	4.30	5.50	5.30		
22.....	12.30	12.00	42.30	4.45	4.30	5.50	5.30		
23.....	12.37½	12.12½	42.35	4.42½	4.27½	5.50	5.30		
24.....	12.37½	12.12½	42.50	4.42½	4.27½	5.50	5.30		
25.....	12.37½	12.12½	42.50	4.42½	4.27½	5.50	5.30		
26.....	12.37½	12.12½	42.50	4.42½	4.27½	5.50	5.30		

More copper was sold in the past week than in any other week in the last six months. Large sales of electrolytic were made under 12c., but the market has since strengthened. Spot tin is below the import parity, but consumers are neglecting it. Lead is dull and lower. Spelter is very quiet. Antimony is in better demand and is stronger.

Copper.—Beginning last Friday, one of the biggest buying movements in copper recorded in many months took place. Sales were made at varying prices. The movement was precipitated by offerings of large amounts of copper at resale by holders who do not as a rule appear as sellers. This copper was offered in several blocks and from 400,000 to 1,000,000 lb. of electrolytic was disposed of at 11.92½c. Another offering of a block of 750,000 lb. was taken up at 12c., and 500,000 lb. of lake was sold for 12.12½c. After these resale offerings were contracted for the market assumed a stronger tone. Representatives of large brass manu-

THE IRON AND METAL MARKETS

facturers and important sheet copper producers had been bidding for the bargain copper and they at once looked elsewhere to fill their wants. A number of people were also asking for quotations on large lots for export. In consequence, when the market opened on Monday, consumers appeared very anxious to buy. The morning cable from London showed that quotations there on spot copper had advanced 11s. 3d., and this added to the excitement. Heavy sales were made for both export and domestic consumption at around 12.12½c. for electrolytic and 12.35c. for lake. Yesterday the United Metals Selling Company came out with an announcement that it would accept 12.12½c. for electrolytic and 12.37½c. for lake for spot delivery. This announcement seems to fix the price for other sellers, and considerably more copper was sold on that basis. It would be hard to estimate how much has been sold in all, as a great deal was disposed of for export, which will not be accounted for for some weeks. The deliveries of copper into export so far this month have been very heavy, amounting in all to 25,155 tons. The United Metals Selling Company, it is understood, has changed its policy of naming a price for electrolytic and holding it for some length of time, but will be governed by market conditions. The London market to-day closed steady, with spot quoted at £54 2s. 6d. and futures £54 15s.

Waterbury Average.—The Waterbury average for March was 12.50c.

Pig Tin.—The pig tin market is dull and flat, but it is favorable to the consumer, as plenty of tin is offered in this market at below the cost of import. The market advanced 55 points on Monday on the strength of reports that the shipments from the Straits for April would be very small, a conservative estimate placing them at 3000 tons. This information caused heavy buying in London, but had little effect on the market here. Consumers seem to be well supplied for the time being, and they are not taking enough interest as a rule to even inquire the price on future deliveries. The London market to-day closed dull, with spot quoted at £194 15s. and futures £190 10s. Spot tin sold in New York this afternoon at 42.50c.

Tin Plates.—The tin plate makers are busy delivering on contracts placed several weeks ago by the can manufacturers. The demand from the general manufacturing field improved slightly during the week, but, on the whole, consumers are buying very cautiously. Quotations are unchanged at \$3.94 for 100-lb. coke plates. The price of foreign tin plates is 3d. lower than it was a week ago, the quotation at Swansea, Wales, now being 14s.

Lead.—Lead is quiet and barely steady. The market weakened perceptibly Saturday, and the metal is now offered both here and in East St. Louis at 2½ points less than a week ago. It can be bought from independent sellers in St. Louis for 4.27½c. and in the New York market at 4.42½c.

Spelter.—Everything seems to be against spelter just now. The galvanizing interests are not particularly busy, and they seem to have enough stocks on hand to carry them along. Other consumers appear to have little faith in the present price of the metal, as they are buying only in small lots as they need it. The asking price is unchanged, and spot spelter can be had in New York at 5.50c. and in St. Louis for 5.30c. These prices are only nominal, it being very apparent that they can be shaded in some quarters.

Antimony.—Some leading manufacturers of Chinese antimony have entered into an agreement with the European syndicate, with the result that quotations have stiffened. The syndicate is playing a waiting game, as antimony can be bought in this country at less than the cost of import. The operators are apparently keeping their prices up, and expect to get their figure after the surplus stocks here have been disposed of. There has been some rather heavy buying of Hallett's and Chinese and Hungarian grades, with the result that the price of Hallett's has advanced again to 9c. Cookson's is held very firmly at 9.50c. and the Chinese and Hungarian brands are bringing various prices from 8.30c. up. There is still a good quantity of antimony available at resale, but the market has an advancing tendency.

Old Metals.—The demand is still reported light by dealers, whose selling quotations are unchanged as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Composition turnings.....	8.75 to 9.00
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, Chicago, April 25.—No sales of consequence have been made the past week, and the recent talk of the probability of an advance in copper seems to have been

forgotten. Tin, however, is very erratic and has jumped from 42¾c. to 44c., at which figure it is now being quoted. Business in lead is light, as is the case with spelter and other metals. Some business is being done in old metals at a sacrifice in prices. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12¾c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 44c.; small lots, 45¾c.; lead, desilverized, 4.40c. to 4.45c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c., per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10¾c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10½c.; copper clips, 12c.; red brass, 10¾c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, April 24.—Lead is quiet at 4.30c.; spelter is dull at 5.30c., both at East St. Louis. Zinc ore is lower, being quoted at \$35 to \$38 per ton, Joplin, base. Tin is easier at 42.55c.; antimony (Cookson's) a shade lower at 9.80c.; lake copper unchanged at 12.72½c.; electrolytic unchanged at 12.47½c., all at St. Louis. The demand for finished metals the past week was moderate.

Iron and Industrial Stocks

NEW YORK, April 26, 1911.

Prices of stocks have generally shown a declining tendency. The long delay in handing down the important Supreme Court decisions is affecting the nerves of holders of securities. In some stocks the decline has been marked. A notable exception was International Harvester common, which made a sharp advance. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	7¾	Pressed St., com.....	31¾- 32
Allis-Chalm., pref. 25 - 28½		Railway Spr., pref.....	99¾
Beth. Steel, com.....	31¾- 33	Republic, com.....	30¾- 32
Beth. Steel, pref.....	61 - 62½	Republic, pref.....	93 - 94
Can. Com.....	9¼- 9½	Sloss, com.....	49 - 51
Can. pref.....	82 - 83¾	Pipe, com.....	16½
Car. & Fdry, com.....	50¼- 52½	Pipe, pref.....	54½- 55¾
Car. & Fdry, pref.....	114¾- 115	U. S. Steel, com.....	72¾- 76¾
Steel Foundries.....	43¾- 44½	U. S. Steel, pref.....	118¾- 119¾
Colorado Fuel.....	28½- 30	Westinghouse Elec.....	64½- 65
General Elec.....	148¾- 152	Va. I. C. & C.....	59
Gr. N. ore cert.....	58½- 61¾	Chi. Pneu. Tool.....	49 - 51
Int. Harv., com.....	115½- 118¼	Cambria Steel.....	45 - 46½
Int. Harv., pref.....	124	Lake Sup. Corp.....	27½- 28¾
Int. Pump, com.....	38½- 39½	Pa. Steel, pref.....	104½- 109¾
Int. Pump, pref.....	87½	Warwick.....	10¾
Locomotive, com.....	35¾- 37	Crucible St., com.....	12 - 12¾
Locomotive, pref.....	104 - 105	Crucible St., pref.....	76 - 77¾
Pitts. Steel, pref.....	103¾- 104		

Dividends.—The International Harvester Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable June 1.

The Pennsylvania Steel Company has declared the regular semiannual dividend of 3½ per cent. on the preferred stock, payable May 1.

The Ashton Valve Company has declared the regular quarterly dividend of 1½ per cent., payable May 15.

The United States Steel Corporation has declared the regular quarterly dividends of 1¾ per cent. on the preferred stock, payable May 29, and 1¼ per cent. on the common, payable June 29.

The Cambria Steel Company has declared the regular quarterly dividend of 1¼ per cent., payable May 15.

The J. G. Brill Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable May 1.

Notes on Prices

Rope.—The demand still lags, not showing the improvement that was expected to be evidenced by this time. Prices are fairly well maintained on the highest grades of manila and sisal rope, while lower grades of both are subject to more or less variation from regular quotations. The following quotations represent regular prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per pound; second grade manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—The demand is light, but the market is slightly firmer in carload lots, in sympathy with the stronger position of both domestic and foreign flaxseed. Large buyers are holding off making contracts because of high prices and uncertainty of the future market, while crushers are not sure of being able to secure seed against orders for future delivery. The New York quotation for carload lots

is about 88c. to 90c. per gallon for raw oil. The following are New York prices in 5-barrel lots or more:

	Cents.
Standard, heavy, 100 lbs. net	91
City, heavy, 100 lbs. net	91
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Rebbed out, 1 cent advance per gallon over raw.	

Naval Stores.—The turpentine market is a little higher at this point than it was last week, owing to the fact that buying is quite active in Savannah. The demand has improved in the number of small lots which have been taken by manufacturing consumers. The high prices have also stimulated the sale of turpentine substitutes, correspondingly reducing the sale of the genuine article. New York turpentine quotations in 5-barrel lots are as follows:

	Cents.
In oil, 100 lbs. net	78
In molasses, 100 lbs. net	81
Less 1 cent 5 bbl. lots, 1/2 cent advance per gallon.	

A fair business has been done in rosins in New York. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$8 and grade D at \$8.20 in the New York market.

La Belle Improvements Deferred

At the monthly meeting of the Board of Directors of the La Belle Iron Works, held on Tuesday at Steubenville, Ohio, it was decided not to go ahead for the present with the building of the eight new sheet mills and two new jobbing mills, the erection of which has been under consideration for some time. The unsatisfactory outlook for business is the reason assigned for the deferring of this work. Wilmer Wickersham, who resigned recently as sales agent of the Pope Tin Plate Company, Pittsburgh, has become associated with the La Belle Iron Works in the sales department.

American Iron and Steel Institute

President E. H. Gary of the American Iron and Steel Institute and the directors and chairmen of committees held a luncheon meeting at the Railroad Club, New York, Wednesday, April 26. The committee which has under consideration plans for establishing as far as possible a six-day week for labor in the iron and steel industries held a preliminary meeting Wednesday morning. It consists of Wm. B. Schiller, E. A. S. Clarke, F. W. Wood, James A. Campbell and Geo. G. Crawford.

The Orenstein-Arthur Koppel Company, for its extensive additions at Koppel, Pa., has just placed with Tate, Jones & Co., Inc., Pittsburgh, Pa., a contract for the complete oil burning equipment and furnaces, consisting of pumping system, large rivet forges, open forges, forging furnaces and pipe bending furnaces.

The Phillips Sheet & Tin Plate Company, whose general offices are at Weirton, W. Va., has opened a sales office in 910 Morris Building, Philadelphia, Pa. Howard M. Davis, well known in the sheet and tin plate trades, is in charge of the office, and will look after the territory.

The Baldwin Locomotive Works, Philadelphia, Pa., has received orders this week for 25 heavy Mikado freight engines for the Southern Railway and 25 of the same type for the Cincinnati, New Orleans & Texas Pacific Railway.

The new plant of Koppers by-product coke ovens recently under construction for the Woodward Iron Company, Woodward, Ala., was started up last week. There are 60 ovens, having a capacity of 700 tons of coke in 24 hours.

Rowland Firth & Son, Phillipsburg, N. J., will add a steel foundry to their present plant. A 10-ton open hearth fuel oil furnace will be installed. Orders for the buildings and equipment will be placed in two weeks.

The Olive Foundry & Machine Company, Ironton, Ohio, has bought the patterns and good will of the Cincinnati Punch & Shear Company, Cincinnati, Ohio.

Tropenas Converter with Double Door Bottom

The Tropenas Converter Company, New York, recently transformed a crucible steel foundry into a converter foundry without suspending operations. Up to February 21 the Union Steel Casting Company, Boston, was making small steel castings by the crucible process, having four batteries of 10 crucibles each. To make room for the converter two of the furnaces were torn out, while the other two remained in continuous operation. On February 22 the plant was shut down, the finishing touches were put to the new equipment, and on February 23 the first blow was made, which proved to be perfectly satisfactory.

One of the main reasons for changing from the crucible to the converter process was the high price of the finished product due to the cost of crucibles, the company's allowance for this item being an average of 1 cent per pound. As against a monthly crucible bill of \$600 for a small foundry, the necessary repairs to the lining of a small converter are put at less than \$100 a year.

After 100 blows of the new "baby" converter, only one casting weighing a few ounces was returned. Tests showed also that the converter steel met the specifications readily and most of the time exceeded them.

With the installation of this Boston plant the Tropenas Converter Company brought out its new drop bottom converter. The criticism had often been made that in a one piece converter it was practically impossible to cool the lining quickly enough after a day's blowing, so as to allow a man to enter the converter the next morning and do the necessary patching. For a foundry wanting to cast every day it meant that a second converter had to be installed. Finally A. Tropenas, inventor of the process, thought of equipping the converter with a double door bottom, similar to that in use on the cupolas of iron foundries. The plan had been tested out in Europe, but the converter in Boston was the first one of this kind in the United States.

The procedure is as follows: After blowing, the bottom doors are dropped and the lining forming the bottom of the converter is knocked out. The opening thus created allows the air to circulate freely and the converter is perfectly cold every morning. To use the converter again the doors are closed, a special composition bottom lining rammed up on top of them, and by the time the converter is heated enough to receive the iron the bottom is entirely dried out. The new bottom has an added advantage in leaving a very large opening through which a man can enter the converter and do the necessary patching without being cramped for room.

The Union Steel Casting Company makes a specialty of very small castings and employs only 12 molders. The following is the daily schedule:

7.00 a.m., arrival of workmen.			
7.00 a.m. to 7.45 a.m., patching up of converter and cupola.			
7.45 a.m., fire started in converter.			
8.15 a.m., fire started in cupola.			
10.25 a.m., blast on cupola.			
10.45 a.m., first tap from cupola.			
No. of blow.	Blow started.	Blow ended.	Duration of blow.
1.....	10.54 a.m.	11.05 a.m.	11 min.
2.....	11.24 a.m.	11.35 a.m.	11 min.
3.....	11.57 a.m.	12.08 p.m.	11 min.
4.....	12.28 p.m.	12.38 p.m.	10 min.
5.....	12.59 p.m.	1.09 p.m.	10 min.
6.....	1.30 p.m.	1.40 p.m.	10 min.
7.....	2.02 p.m.	2.12 p.m.	10 min.
8.....	2.35 p.m.	2.45 p.m.	11 min.
3.00 p.m., pour off.			
3.00 to 5.00 p.m., molders resume molding and laborers shake out molds and temper the sand.			

The approximate capacity of the newly installed converter is 1200 lb., making the amount of steel poured in a day 9000 lb., all taken out of the converter in bull ladles.

The Orenstein-Arthur Koppel Company, manufacturer of industrial, narrow and standard gauge railroad materials, has moved from its old quarters in the Monadnock Building to 631-633 People's Gas Building, Chicago.

Some Unsolved Problems in Electroplating*

BY GEORGE B. HOGABOOM,†

As is well known, electroplating was the beginning of the science of electrochemistry, but it has lingered by the wayside and been neglected as a science, and to-day the unsolved problems are many.

Electroplating has been looked upon more as a trade than a science, and it is only during recent years that much study has been given to it by scientists, and that attention has been directed more to the electrolytic refining of metals than to the deposition of metal for decorative purposes. The solutions published by Roseleur in 1854 have been improved upon but little, and those who have published treatises upon the subject often give only a repetition of his formulas. Nickel-plating, as invented by Dr. I. Adams, is probably the only exception.

The field is broad, but its development has been left to the practical man, guided only by rule of the thumb. An electrochemist in the plating room of a factory is so rare that it probably can be said without fear of contradiction that they can be counted on the fingers of one's hands. The need to-day is mutual assistance in solving these problems and developing of new ideas. To a great extent they are useless each without the other—the plater producing results which he cannot duplicate—the electrochemist creating solutions that are not a commercial success.

So many phenomena have been encountered that to include the perplexing problems would necessitate a history of nearly every known solution and finish. The varying of the temperature and the electric current often proves a stumbling block, and these conditions cannot always be controlled. There is a vast difference between producing a homogeneous deposit at a minimum cost from a solution where the amount of cathode surface is being changed every 20 minutes, and a solution in which the amount of cathode surface is always the same and the rapid deposit of the metal is more desired than a deposit that can be easily burnished. Such would be the difference, for instance, between the surface of a sheet of electrolytic copper and that of a cast lead and antimony electrolyser with its deep reliefs and where a coarse crystalline structure would destroy its beauty. In the discussion of electroplating problems, it must be borne in mind that a mere deposit of a metal is not all, but that the deposit must be soft and smooth and lend itself to a decorative process; the anodes should be capable of being reduced easily; the electrolyte must offer little resistance to the electric current, and, last, but not least to the plater, who hears it so often that it becomes a part of him, the cost must be nominal.

Difficulties with Several Metals

The automobile industry has brought about, more than anything else, the need of a heavy deposit of brass. At present this is done in a solution of cyanide of copper. The deposit is not only slow, but unsatisfactory, because of what is known as spotting out—a discoloration in spots which appears on the work after it has been polished and lacquered. Deposits on cast metal give the most trouble. It is probably caused by the acids or alkaline solutions being absorbed in the pores of the metal, or in the small blow-holes, and the deposit covering these holes partially, leaving minute holes through which the solution oozes out. Several remedies have been suggested and tried, such as boiling out in some neutralizing chemical solution or placing in a drying oven for several days, but a satisfactory remedy has not been found. An acid brass solution would be a great advantage. There is an acid copper and an acid zinc solution, but no acid brass electrolyte. The difference between the deposit from a cyanide and a sulphate of copper solution

well illustrates the advantage of having an acid brass solution.

The formula for a tin solution published by Roseleur is the most generally used to-day, as little, if any, improvement has been made upon it, although a good solution, which would give a heavy deposit, is much desired. In Roseleur's solution the electrolyte is not replenished by the anode, but by the constant addition of a concentrated solution. This should be overcome, and would be appreciated by manufacturers of tinware. While several solutions have appeared from time to time for plating upon aluminum, none of them is in general use, and a good electrolyte that would deposit gold, silver, brass or copper, so that it would stand burnishing and not peel off in time, could be used. The successful removal of a deposit of nickel from another metal without affecting the latter has not been accomplished.

Unsolved Problems

To give all the unsolved problems in detail would make a lengthy paper, and a simple statement of those most desired will be given: An electrolyte that will remove the fire-scale from brass; also one that will produce a bright or a matte surface in place of using the present acid dips; and electric cleaner that will saponify the grease and take it into solution instead of driving it to the top, where it has to be constantly removed to prevent it adhering again to the work as the latter is removed from the solution; a heavy deposit of lead on the inside of iron pipes, to prevent rapid corrosion; a method to coat electrogalvanized iron or steel with decorative metals without destroying the rust-resisting properties of the zinc; an alkaline nickel-silver solution that can be worked with a low voltage; a method of etching steel without destroying a resistance film of gelatine; some alkaline substance that would replace cyanide of potassium. This would be universally welcomed.

For the above suggestions, the writer is indebted to 100 different platers, who were kind enough to answer a request for unsolved problems. It may be interesting to note that 80 per cent. of them requested an acid brass solution.

Lawrence Brothers, manufacturers of hardware specialties, Sterling, Ill., have begun construction work on their new plant. Local workmen will be employed under the direction and supervision of Raeder & Wood, 77 Jackson boulevard, Chicago. A warehouse and office building, 84 x 164 ft., five stories, and a main factory building, 108 x 160 x 420 ft. will be erected. The buildings will be of reinforced concrete construction throughout.

The Dakota Portland Cement Company, Sioux Falls, S. D., states that the construction of its plant at Chamberlain, S. D., is well under way, and that it is expected to be ready for operation about November 1. It will have a daily capacity of 2500 to 3000 barrels. The buildings are of steel and concrete construction, and together with the terminals cover an area equal to 12 acres. The company owns its own terminals, and will operate its own locomotives.

The Empire Iron & Steel Company, Niles, Ohio, has spent a large amount of money recently in improving its various departments. The electric plant has been enlarged by installing a 300-hp. engine and a 220-kw. generator. Additions have been made, which will materially increase the output of all forms of metal roofing, conductor pipe, eaves trough, &c. The puddling furnaces enable a product to be made, which is exactly like the old-fashioned iron of 50 years ago.

The statistics of the American Railway Association show that on April 12 the net surplus of idle cars on the railroads of the United States and Canada was 186,053, compared with 194,887 two weeks previous. The number of idle cars April 12 was about 100,000 more than on the corresponding date in 1910.

* A paper presented before the American Electrochemical Society, New York, April 6 to 8, 1911.

† Secretary of the National Electroplaters' Association.

Personal

W. J. Lytle has been appointed vice-president of the American Steel Foundries, taking charge of sales and traffic. He is now passenger traffic manager with the Lake Shore & Michigan Southern Railroad, and is expected to take up the duties of his new position about May 1, establishing his office in New York City.

Walter S. Timmis, consulting engineer, has removed his offices to the Marbridge Building, Herald Square, New York City.

J. H. Keefe has been appointed assistant general manager of the Gulf, Colorado & Santa Fé Railway Company, effective May 1, with headquarters at Galveston, Texas. In addition to his present duties he will have direct charge of transportation matters pertaining to export, import and coastwise traffic.

William A. Spear has taken a position with the sales department of the Waterbury Farrel Foundry & Machine Company, Williamson Building, Cleveland, Ohio.

The offices of W. E. Corey have been removed this week from 30 Church street to 111 Broadway, New York, and are in charge of James H. Slocum, who has been Mr. Corey's private secretary for a number of years. Mr. Corey will return from Europe in July.

A. W. Grier, for seven years connected with the order and shipping department of the Carnegie Steel Company, at Pittsburgh, Pa., and four years with the California Industrial Company, Los Angeles, Cal., has opened an office at 518 Higgins Building, Los Angeles, as manufacturers' representative in iron and steel products.

W. N. Pratt, general superintendent of the North Works, Illinois Steel Company, Chicago, has returned from California after an absence of two months.

H. A. Stillwell of the machinery selling firm of Charles Churchill & Co., London, England, has returned home after a visit among American machinery manufacturers.

C. W. Beaver, who is connected with the hoist department of the Yale & Towne Mfg. Company, 9 Murray street, New York, has returned from a four months' stay in Europe on business connected with the export department of the company.

Louis Renault, Paris, France, who conducts one of the largest French automobile manufacturing plants, is in this country visiting machine tool and automobile manufacturers.

John G. Wright, Eastern manager of the Hooven-Owens-Rentschler Company, has returned from a stay in Porto Rico.

Carl Hering, Philadelphia, Pa., presented a paper at a meeting of the electrical section of the Franklin Institute in that city on the evening of April 20, on "The Electric Furnace," which was illustrated with a large number of lantern slides showing the various types of electric furnaces used in the manufacture of iron, steel, aluminum, alloys and chemical products.

Charles A. Moore of Manning, Maxwell & Moore, New York, is seriously ill in Egypt, where he has been for some time.

J. L. Straub, secretary of the J. S. Bretz Company, New York, sailed Tuesday on his annual trip abroad to visit the plants which produce the goods his company markets here. Among these are the ball bearing plant of Fichtel & Sachs, Schweinfurt, Germany; the Fries & Hopfinger ball making shops in the same town; the electrical laboratories of Unterberg & Helmle, the producers of the U. & H. master magneto, Durlach, Germany, and wire interests in London, England.

The Colonial Steel Company announces that Frank C. Lewis, who has had charge of the Chicago warehouse and office for a number of years, has resigned to take up other lines. James S. Lewis will be associated with him. Ralph D. Van Valkenburg, formerly sales agent for the Taylor Iron & Steel Company, at Scranton, Pa., has been appointed district manager of the Chicago office of the Colonial Steel Company, and will take charge of his duties at once.

Obituary

MILLARD F. WILFONG, president of the M. F. Wilfong Iron Works Company, Philadelphia, Pa., died April 9, at Ocean City, N. J., after a short illness. He had been engaged in the manufacture of stacks, tanks, &c., in Philadelphia for nearly 40 years.

SAMUEL JOHNSTON, inventor and manufacturer of harvesting machinery, died at the home of his daughter in Buffalo April 18, aged 76 years. In the early '60s he invented his first successful reaper at Buffalo, where he was associated with the Howards in their iron works. From Buffalo he went to Syracuse and was associated with Bradley & Co. in 1865. In 1868 he went to Brockport, N. Y., and organized the firm of Johnston, Huntley & Co., and began the manufacture of the Sweepstakes reaper. In 1870 the Johnston Harvester Company was organized and a large plant built; this was destroyed by fire and the company then moved to Batavia. In recent years Mr. Johnston made a study of high temperature furnaces, and was engaged in this work up to the time of his last illness.

THOMAS F. STEVENSON, for many years an importer of machinery at Shanghai, China, died April 19 in Brooklyn, N. Y., aged 72 years.

EDWARD H. WARDWELL, secretary of the Barrett Mfg. Company and of the United States Gypsum Company, and a director of the American Coal Products Company, died April 22, at his home in New York City, aged 69 years.

ACHILLE A. DREYFUS disappeared some time ago, and his body was found April 15 in the East River at the foot of Eightieth street, New York. Mr. Dreyfus had for several years been an importer of steel, and recently had been conducting the Royal Metal Steel Company, New York, handling French tool steel. It is presumed that he had committed suicide while in a state of mental aberration. He leaves a widow and two children.

CHARLES W. GOODYEAR died at his home in Buffalo, N. Y., April 16, aged 65 years. He was president of the Buffalo & Susquehanna Railway Company, Buffalo, Utica & Attica Railway Company, Powhattan Coal Company, Buffalo & Susquehanna Coal & Coke Company, Goodyear Lumber Company and Great Southern Lumber Company, and was interested with Wm. A. Rogers, Hugh Kennedy and S. M. Clement in the organization of the Buffalo & Susquehanna Iron Company, which a year ago was merged with the Rogers-Brown Iron Company in the operation of blast furnaces in Buffalo and the development of coal and coke fields on the Goodyear properties in Pennsylvania.

The Bontempi Rust-Proofing Company, 111 Broadway, New York, has issued a pamphlet describing the process of rust-proofing patented by Augusto Bontempi. The articles to be treated are placed in a muffle, and after being heated are subjected to the fumes of a chemical compound which, it is stated, can reach a thickness or depth of 1-16 in. or more of oxide, depending on the time of treatment. Furnaces have been installed by the Eastern Rust-Proofing Company, as licensee of the process in the Blanchard Building, Borden avenue, Long Island City, N. Y., for the treatment of any product to which the process is applicable.

The exportation of high-grade steel sheets from the United States is probably something new. A few weeks ago the West Penn Steel Company sent samples of its first quality open hearth pickled and cold rolled material to England, orders resulted and specifications are now being executed at the works of the company at Brackenridge, Pa.

The thirty-sixth annual convention of the Amalgamated Association of Iron, Steel and Tin Workers will be held in Canton, Ohio, starting May 2. The Wage Committee will meet there on Friday of this week to draw up a tentative wage scale for puddling and finishing mills to be presented to the regular convention.

American Export Methods

A Detroit Manufacturer Finds Many Points in Which They Fall Short

Wm. C. Redfield, second vice-president of the American Blower Company, Detroit, Mich., started last November on a trip around the world to study foreign markets with a view to developing business for his company. From one of his recent letters to the home office, written at Calcutta, March 21, the following extracts are taken which are of value in indicating what is to be guarded against both by sales and shipping departments of exporting firms:

"I have now traversed Japan, the Philippines, Hong Kong, Java, the Straits Settlements and Burmah to India. This covers the possessions of the United States, Holland and Great Britain in the East, as well as Japan. I cannot say that thus far I have found any prejudice against American goods. Indeed, certain classes of American products have been everywhere in evidence. Among these are sewing machines, typewriters, toilet articles and soaps, locomotives (in Japan) and petroleum products. These are precisely those that have been most carefully and steadily brought before and kept before the attention of buyers in these various lands. I ought also to add that American cameras and photographic supplies were everywhere except in Java; there no films of any kind could be had, only plates. In many stores, finding one article selling, I would ask why not such and such another, only to find simply that they did not know of it, and in some cases to have a note at once made of it.

"I have run across horrible neglect in packing, even after attention was called to it. In one case oil stoves were formerly bought in America and the American product was concededly better, but, after warning, the American goods were so badly shipped that one-half of one shipment arrived broken. Now the dealer buys in Europe and pays a higher price. He told me he did not want to do this but he had to, for American makers would not listen to him.

"Bitter complaint is made that American houses trust young, irresponsible boys to do their mailing instead of having some clerk of fair responsibility attend to this important service. The result is misaddressed letters, so that responses are not received, and the regular habitual neglect to prepay postage, causing extra charges.

"A large Boston house wrote to Manila June 8, and on June 25 followed it up with a sharp letter insisting on an immediate reply. A New York firm referred an inquiry from Panama to its Manila agent. These are some of the things that handicap Americans.

"I do not find prices to be the obstacle. Several American manufacturers I have met tell me their prices are lower than their European competitors. This is true of locomotives, for example.

"What I find chiefly needed to greatly enhance our export trade in America is knowledge—knowledge of geography, of the peoples, their ways and needs, their business methods.

"Foreign trade does not essentially differ in its basis from domestic trade. A man selling in Michigan studies Michigan needs, offers goods Michiganders want, tells about them in the way the good people of Michigan understand. If he does not do so the wise ones in Michigan turn him down. A man in larger trade does not assume that Texas and Florida use the goods that sell in Maine; he finds out what are wanted or not wanted and acts accordingly. You don't spend much on heating apparatus for Louisiana. And this is all there is underlying export trade; but because it is just outside the immediate horizon and men are busy, they often do not even inquire about it, and when they do and find that it takes time and care and patience they take the near and obvious and let the other go. In this way the trade of empires is neglected and great opportunities are lost.

"Sometimes houses 'peter out' and give up the game too soon to win. Two concerns came from America to India where the prejudice, not so much against American goods as in favor of English goods, is very strong.

One after six months began to reduce expenses, took a smaller office, then a still smaller one, then closed up. The other lost \$20,000 the first year. They had a good man on the spot and held on. The second year they came out even. The third year they got back the \$20,000. Then they got it back many times with interest, for they had means and courage to hold on."

Erie Canal Terminals on Lake Erie

At a meeting of the Barge Canal Terminal Commission in Albany, April 14, plans for the construction of the Erie Barge Canal terminals, at Buffalo and Tonawanda, N. Y., were decided upon, at an estimated cost of \$2,800,000. The principal Buffalo terminal will be in the Erie Basin, which is on the harbor from north of and adjoining the mouth of the Buffalo River, 3000 ft. in length by 600 ft. in width, comprising about 42 acres. This basin is to be improved, and is to have a uniform depth of 23 ft., to accommodate deep draft lake vessels. It will be supplied with three piers—400, 600 and 800 ft. long, respectively—each 160 ft. wide. The longest pier is to be provided with a warehouse of concrete and steel, 350 ft. long by 60 ft. in width, three stories high, equipped with suitable internal elevators and machinery. Power operated cranes, with all necessary apparatus, are to be built on all these piers for the transfer of cargoes from lake vessels to canal boats. The slip between the Erie Basin and the present Erie Canal will be enlarged and deepened.

The Ohio Basin, which is on Buffalo River, about 1 mile from its mouth, is also to be improved and deepened sufficiently to secure 12 ft. of water at all times and provided with a warehouse equipped with cranes and other appliances for the handling of freight in that vicinity. Another important improvement which the plan provides for is a terminal on the outer harbor with piers having rail connection with the Buffalo Creek Railroad—a terminal and transfer road in touch with all the railroads entering the city, permitting the transfer of freight from the canal to all railroads as well as to lake vessels. This outer harbor terminal is to be adjacent to the United States Government pier, known as the light house pier, and to be connected with the inner harbor and Erie Basin by a slip having a depth of 13 ft. at mean lake level and of sufficient width to provide for the passage of the largest barges which can navigate the improved Erie Canal.

The Pennsylvania Railroad Company has issued a book of instruction published in nine languages for the government of employees working on or about its tracks. The English portion covers three pages, and following it are translations into German, Greek, Hungarian, Italian, Lithuanian, Polish, Slovak and Swedish. Contrary to the general belief that the poorer classes of immigrants are very ignorant, those in charge of the Pennsylvania track gangs say that practically all the men can read, and that one is rarely found who cannot sign his name.

The Kelly Reamer Company, Cleveland, Ohio, at its annual meeting, April 15, elected William E. Kelly, Albert H. Weed, John M. Marty, Jr., Edward B. Jessup and J. W. Strain directors, who elected for the ensuing year the following officers: William E. Kelly, president; Albert H. Weed, vice-president; John M. Marty, Jr., secretary-treasurer. William E. Kelly was appointed general manager. The company reports a large increase in its business. On May 1 it will move into its new quarters, 1547 to 1565 Columbus road, N. W., Cleveland.

The Westinghouse Machine Company, Pittsburgh, Pa., has received an order from the Weymouth Light & Power Company for a 625-kw., single flow, high-pressure turbine to be installed in its power house at East Weymouth, Mass. The turbine will use steam at 150-lb. pressure, and will exhaust into a vacuum of 27 in., maintained by a Lefebvre jet type condenser.

Mechanical Handling of Materials*

Ore Unloading Equipment and Its Great Reduction in Costs—How the Package Freight Problem of the Railroads May Be Solved

BY RICHARD DEVENS.†

Within the last few years some of our railroad, industrial and steamship companies have begun to realize the important part mechanical transference plays in the quick and economical handling of material. The most efficient advances have been made in the handling of bulk material, such as ore, coal and grain, while package freight, comprising boxes, barrels, bags and other packages, which make up the load of a freight car, or the cargo of a steamship, has just begun to receive serious consideration.

Early Advances in Iron Ore Handling

It is no doubt a fact that the proficiency in handling bulk material was due to the difficulties to be overcome in the transportation and handling of iron ore to the center of the iron industry. I have reference to the iron ore that was discovered in the Lake Superior country. The first problem was the transportation, and this was overcome in 1855 when the Federal Government completed its first system of locks at the falls of the St. Mary's River at Sault Saint Marie, Mich. The second problem was the loading and unloading of the vessel. The loading was readily accomplished by the building of a long line of pockets on a dock extending into the lake and the equipping of each pocket with chutes. The pockets were of such height that the ore would flow from them over the chutes and into the vessel by gravity. The railroad cars, of the bottom dump type, were brought over the top of the pockets and dumped into them.

It is interesting to note that the method used in the first loading dock is the one on which all docks have been constructed since. The unloading has been the most difficult to accomplish in a quick and economical manner. The first vessels to carry iron ore were not constructed for the purpose, and while they carried some ore in the hold, most of it was carried on deck. When it was carried in the hold, it was hoisted to the deck by horsepower, dumped into barrows; and then, like the deck cargo, wheeled ashore.

The next step was the substitution of a small hoisting engine for the horsepower. This early method was in operation many years, and it was not until the dock managers were forced into it by the great expense in carrying large storage on the dock, that any mechanical devices were attempted.

The First Machine for Ore Unloading

A cableway machine, built and erected at Cleveland, Ohio, in 1880, under Alexander E. Brown's design and supervision, was the first mechanical plant. The next machines were of the bridge type. The method of handling the iron ore, over either the cableway or bridge, was to fill iron buckets by hand in the hold of the vessel and then hoist them by the machine, and dump them automatically into railroad cars or storage. In the hold there were from 12 to 15 shovelers to each machine, and there were two men on the machine, one an operator and the other a fireman.

Both of the above equipments were a great improvement over the early methods, and handled the iron ore in a satisfactory manner; yet they did not cut down the cost of the hand labor in filling the buckets in the hold. This was a very large part of the cost of unloading. An automatic filling bucket had been worked successfully for a number of years in coal and similar soft material,

but on account of the hard and lumpy nature of the early iron ores it could not be operated in them.

The Grab Bucket Machine Greatly Lowers Cost

With the use of the soft Mesaba ores, interest in the automatic filling or grab bucket was renewed, and about 10 years ago the first successful grab bucket machines were erected and operated at the Illinois Steel Company's plant at Chicago by Hoover & Mason. This plant was designed to unload from the vessel direct into railroad cars. The success of this plant was the beginning of the present methods of unloading iron ore. There have developed two types of grab bucket machines—one with the grab bucket suspended from wire ropes and the other with the grab bucket carried on a rigid arm.

The cost of filling the buckets by hand was about 13 to 15 cents per gross ton, and the cost of hoisting and dumping into railroad cars or storage from 1½ to 2 cents per gross ton, making the total cost of unloading from 14½ to 17 cents. With the grab bucket machines, this total cost has been reduced to from 1 to 2 cents per gross ton, depending on the distance the ore is carried from the vessel.

The hand-filled buckets were of about 1-ton capacity, as this size had been found to be the most practical for filling and handling in the hold. With the grab bucket the size is only limited by the dimensions of the hatch and the shape of the vessel. The first grab buckets for iron ore were of 5 tons capacity, but since then machines have been built to handle 7½, 10 and 15 tons.

Besides reducing the cost of unloading the ability to handle in larger units has reduced the time. Whereas with the hand-filled buckets to unload a 6000-ton vessel was a question of days, it is now only a question of hours. The steamer Morgan of the Pittsburgh Steamship Company, with a cargo of 11,319 tons of ore, was recently unloaded at Fairport in 5 hours and 58 min. The work was done with six Brown electric unloaders.

Increased Number of Vessel Trips

These improvements have also increased the earning capacity of the vessel by making possible a greater number of trips during the season. This is seen in the following comparative statement for the years 1906 and 1910, showing the average stay at upper and lower ports of the vessels of the Pittsburgh Steamship Company:

	Year 1906.		Year 1910.	
	Hr.	Min.	Hr.	Min.
Average stay in lower lake ports.....	36	15	22	22
Average stay in upper lake ports.....	22	25	12	22
Average time spent in port receiving and discharging cargoes.....	58	38	34	44
	Gross tons.		Gross tons.	
Average cargo carried.....	5,954		6,634	
Largest cargo carried.....	13,333		13,296	
	In 70 min.		In 45 min.	
Fastest loading record.....	9,277		9,738	
	Tons.		Tons.	
	per hour.		per hour.	
Rate of fastest loading record.....	7,288		13,051	

Europe Ahead in Handling Package Freight

In the foregoing I have outlined the development of handling bulk material, using iron ore as an example. The handling of package freight has not been brought to the same degree of perfection. In many manufacturing concerns mechanical devices have been installed to reduce the cost of handling and to hasten the transportation of their products, but for quick and economical handling of freight at shipping docks and railroad terminals little has been done in this country. In Europe greater

* Presented before the Congress of Technology, Boston, April 11, 1911, at the 50th anniversary of the charter of the Massachusetts Institute of Technology.

† Manager Eastern office Brown Hoisting Machinery Company, New York.

advances have been made, due largely to the encouragement given by the city or Government, which frequently itself equips the docks. At Hamburg, Antwerp, Bremerhaven, Glasgow, London, Manchester, Havre, and many other ports are found mechanical appliances, each to meet the local requirements, but all aiming to reduce the number and cost of handlings.

In England at the freight stations and warehouses the practice is to instal jib cranes, so arranged that they can serve all the floor space from car or wagon. In this country many of the railroads have put in hand cranes of the pillar or bridge type for handling freight from cars to wagons or vice versa, but they are mostly for heavy lifts, and are slow in operation and cover only a limited area.

Some of the railroads have put in electric cranes in their freight yards and water terminals; for example, the Pennsylvania Railroad Company on its Greenville docks, the New York Central & Hudson River Railroad Company at Port Morris, the Philadelphia & Reading Railroad Company at Port Richmond and the Central Railroad of New Jersey at Communipaw.

Package Freight at Terminals

Many of the railroads are coaling their locomotives at greatly reduced cost and time by mechanical appliances, but the question of handling their package freight at terminals is still open. Most managers have known that there is a great loss of time in transferring freight at terminal and intermediate points, but few seem to realize the high costs that this involves.

Perhaps the most complex movements in the handling of package freight are at the large steamship piers, due to the great carrying capacity of the large vessels, the many consignees, each having his allotted space, and the limited floor area that has to be cleared quickly to make room for the next vessel. The larger railroad terminals also have their many consignees, but the floor area is not so restricted.

The placing of the packages in the proper space is done by the hand truck. A sling load from the vessel or a railroad car may contain packages for several consignees. The track man cannot wait to sort as he receives them, so must load his truck with them as they come. This means a long travel to get the packages to their allotted space. In order to tier them, several more handlings are necessary. All this leads to congestion and increasing cost per ton. This is further affected by the rise in the cost of labor, materials, rent and larger terminals. Each terminal is a problem in itself, as is each manufacturing establishment, so that it is necessary to make a careful study of the conditions to be met before any mechanical method can be proposed.

In the last 30 years there has been a steady increase in the capital invested in manufacture, which means an increase of tonnage of all kinds of package freight carried by the steamship and railroad companies. To meet this, the railroads have increased their rolling stock and either enlarged their terminals or built more. In large cities this has been at great cost for land and buildings. The method of handling the freight has remained the same.

At a terminal there are two kinds of freight—outbound and inbound. The outbound is transferred from wagons into the outbound freight house, and thence to the railroad cars or directly from the wagons to the cars. The inbound is vice versa.

All the above movements, except between wagons and cars, involve the sorting of packages and distributing each to its designated space. It is also necessary to transfer cars from one freight house to the other, as the use of the hand truck necessitates bringing the cars to the freight.

Requirements in Freight Handling

A mechanical equipment to be satisfactory must be able to distribute the outbound and inbound freight simultaneously; there should be no rehandling, and every square foot of floor space should be served with a single handling. All motions of lifting and conveying should be done by power. The machinery should be designed to

give the greatest list required and to transfer to any reasonable distance and then tier or lower into cars. Continuous operation should be sought for to avoid delay.

No part of the transference should be along the floor, and the equipment should not take up any floor space that can be used for other purposes. All movements of the mechanical equipment should allow of the assorting and distributing according to classification and allotted space readily and quickly. There must be reserve capacity to prevent congestion in case of extra demands. The justification for the investment of the mechanical installation lies in the reduction of cost and the saving of time in handling. The expense should be in proportion to the size of the terminal.

There are many companies in this country engaged in the manufacture of hoisting and conveying machinery. While perhaps no one makes all the necessary appliances, yet a combination of their product could be used to fill the special requirements of each terminal point.

How to Meet the Problem

Fully to cover the floor space and obtain all the different requirements for the satisfactory handling of the package freight, three units or different types of conveying machinery are necessary. These are the single rail electric trolley, the bridge traveler and the cross traveler. The electric trolley is the actual load carrying part of the equipment, the single rail, bridge traveler and cross traveler furnishing a combination of loop track system on which the trolley can reach any part of the area to be covered. All movements should be so regulated that there will be no interference, and many trolleys can be in operation following one another. Each trolley can draw a number of trailer trolleys, so that many packages can be hoisted and transported under the control of one man. This arrangement allows many loads to be transported in close sequence simultaneously, and with maximum hoisting and traversing speeds, gives the greatest range and capacity at a minimum of labor and maintenance. At some freight terminals it may be necessary to have, in combination with the above mechanical conveyors, motor trucks on the surface; in others, belt conveyors.

There is no doubt that some such scheme as outlined above, when properly carried out to meet the special requirements at any terminal, would materially reduce the time and cost involved in the present method. This has already been exemplified in the handling of bulk material.

Considering the special attention now being given this question by several engineers and the interest shown by many steamship and railroad managers, it can be safely stated that within the next few years great changes and developments will be accomplished.

German Iron Ore Production in 1910

The statistics of iron ore production in Germany and Luxemburg in 1910 have been compiled, showing a total of 28,709,654 metric tons, equivalent to 28,249,000 gross tons, as against a previous high record of 27,252,000 gross tons made in 1907. The importations last year were the greatest on record, at 9,653,000 gross tons. The comparison with the preceding five years is as follows:

	Output of native iron ore.	Exports of native iron ore.	Imported for home consumption.	Total home consumption.
1905.....	23,067,000	3,640,000	5,987,000	25,414,000
1906.....	26,305,000	3,790,000	7,507,000	30,022,000
1907.....	27,252,000	3,841,000	8,340,000	31,751,000
1908.....	23,896,000	3,019,000	7,611,000	28,488,000
1909.....	25,104,000	2,781,000	8,235,000	30,558,000
1910.....	28,249,000	2,903,000	9,653,000	34,799,000

The Standard Bridge Tool Company, manufacturer of Thomas spacing tables and laying off machines for structural shops, and builder of special equipment, has moved its office from the Penn Building to the Bessemer Building, Pittsburgh, where it has secured larger quarters.

A Roll-Over Core Machine

The Midland Machine Company, Detroit, Mich., which for some time has manufactured the Grimes roll-over molding machine, has recently developed the Grimes jolt rammed roll-over core machine shown in the accompanying cuts, to take care of small molds and to introduce a

been jolted with the foot lever and clamped, ready to turn over. In Fig. 3 the table is raised and the flask is being turned, the center of gravity of the core being the center of rotation. Fig. 4 shows the core on the two receiving arms and the core box raised off from the core by pressing on the foot lever.

For long work the receiving arms are swung out of the way and the core box turned without raising the

table. The machine has three bars rigidly fastened at top and bottom, which form the sliding guides. The top connection between these bars forms the bearing for the long trunnion for the revolving table. For small light work the clamp can be taken off and the plate held in place by hand, while rolling over the core. The cam and lever arrangement is counterweighted, adding to the ease of operating the machine. As part of the work of making a mold or core is performed by the foot, the machine is speedy, there being no lost time between the different operations. The machine is built in two sizes, with a rise of 10 in., which makes it possible to take care of a considerable variety of work, both as a molding machine and a core machine.

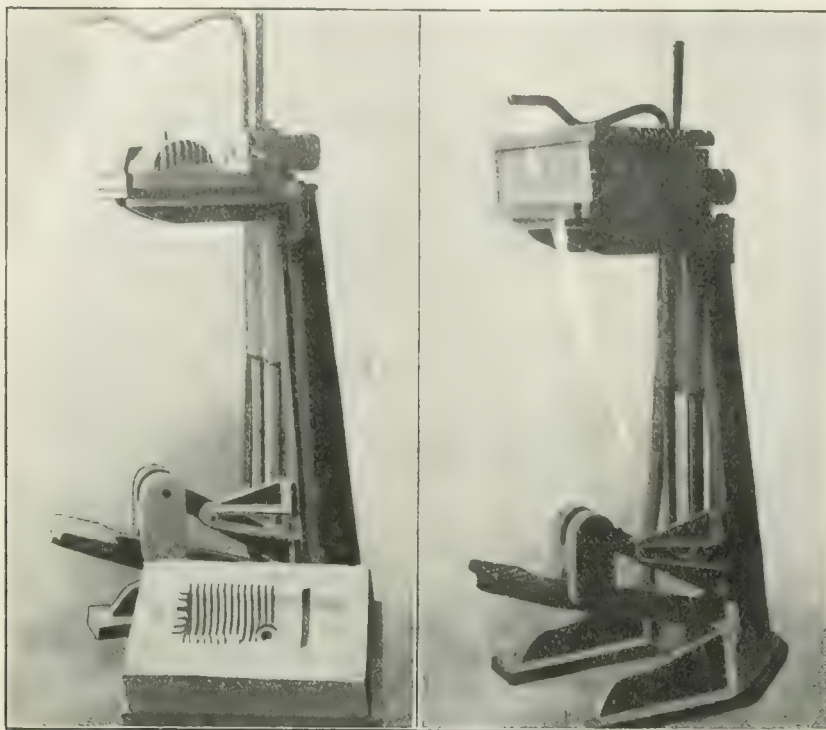


Fig. 1.—Core Machine with Pattern. Fig. 2.—Core Box Clamped Following Ramming.

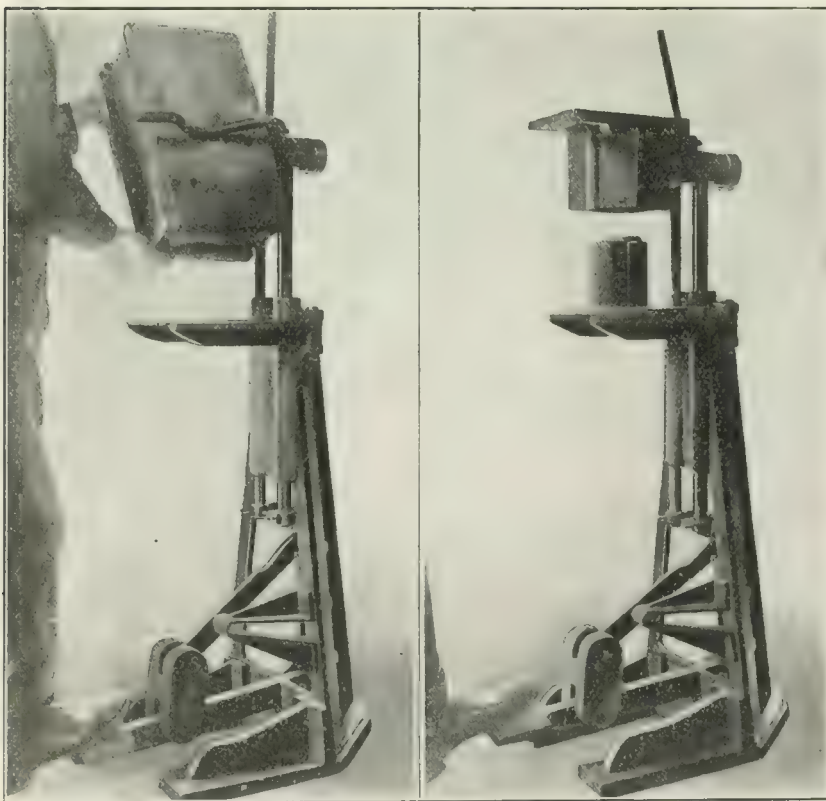


Fig. 3.—The Core Being Turned. Fig. 4.—Core Box Drawn Off the Core.

new economy in the core room. Core making machines for round or square stock cores are well known, but there has been a demand for a machine especially designed for the regular and special cores of various shapes and sizes. Fig. 1 shows an air cooled cylinder mounted on a plate and fastened to the rotating table of the Grimes machine, with a completed mold at the side. The air-cooled cylinder was jolt rammed and drawn without wires to hold the ribs. In Fig. 2 the mold is shown after it has

lb. per square inch, and any tubes failing to stand this test will be rejected.

Specifications for [Cold Drawn Weldless Steel Tubes

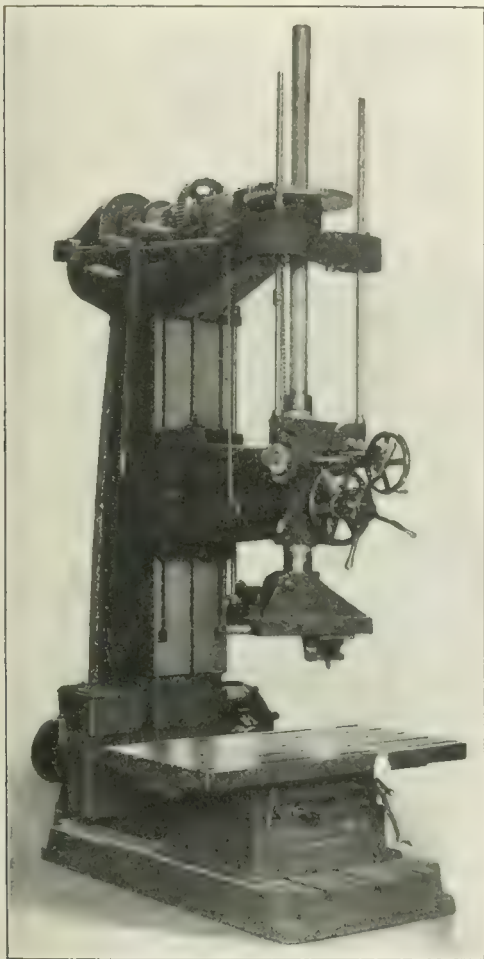
The British Engineering Standards Committee recently issued standard specifications for cold drawn weldless steel tubes for locomotive boilers. It is required that such tubes be manufactured from the best open hearth steel, and must not show on analysis more than 0.03 per cent. of sulphur or of phosphorus; that they shall be carefully annealed throughout their length after the operation of drawing; that when cold they must stand bulging without showing either crack or flaw until the diameter of the bulged end measures not less than 15 per cent. for tubes under 11 s. w. g. in thickness, and not less than 12½ per cent. for tubes 11 s. w. g. to 8 s. w. g. in thickness, greater than the original diameter; that a piece of tube 2 in. long shall be placed on end and must when cold stand hammering down, until it is reduced to 1½ in. high, without showing either crack or flaw; that the tubes must when cold stand flattening, without showing crack or flaw, until the interior surfaces of the tubes meet, or, when the tubes are over 11 s. w. g. in thickness, until the interior surfaces are brought to a distance apart equal to the thickness of the wall of the tube; and that every tube shall be tested by an internal hydraulic pressure of at least 1000

Peter A. Frasse & Co., distributors of Shelby seamless steel tubing, and sole American agents for Poldi superior tool steels, are now located at their new quarters, corner Sullivan and Canal streets New York, and very shortly will have their several departments in perfect order.

The New Dreses Vertical Boring Machine

In all shops pieces have to be handled at times that cannot be accommodated on a revolving table boring machine. For this class of work the Dreses Machine Tool Company, 227 West McMicken avenue, Cincinnati, Ohio, has developed a new type of vertical boring machine. This new tool is intended for heavy drilling and tapping, cutting holes in steel plates, bars or connecting rods and boring and facing pieces which cannot be put on a revolving table machine or boring mill conveniently.

The general design and arrangement of the driving mechanism is similar to that found in the builder's upright drills, but in addition it has a frictional stopping, starting and reversing device. This is operated by the bent handle on the left side of the machine, which can



The Latest Type of Vertical Boring Machine Built by the Dreses Machine Tool Company, Cincinnati, Ohio.

be adjusted so as to be within easy reach of the operator at all times. The fork and the friction clutch arrangement are attached to a balanced horizontal bar and as a further precaution against the latter accidentally engaging itself, it is held in place with spring dowel pins. The operation of the back gears is controlled by steel clutches which are engaged and disengaged by the long vertical lever at the left of the column.

Two rods control the different kinds of feed with which the machine is equipped. For ordinary boring and drilling four fine feeds are made available by manipulating the left feed rod, while leads equal to the standard pipe threads are regulated by the right feed rod. A weight on the inside of the column balances the spindle and the spindle head. A facing head, operated by a star feed, is furnished for the nose of the spindle. The compound type of table is furnished, the traverse movement being 8 in. and the longitudinal one five times as great.

A 12-hp. polyphase constant speed motor is employed for driving the machine and the necessary speed changes are secured by a five-step cone pulley and the back gears.

The complete weight of the machine is approximately 12,000 lb.

Federal Regulation of Corporations Proposed

Senator John Sharp Williams of Mississippi has introduced in the United States Senate a bill to regulate corporations that engage in interstate commerce, the principal provisions of which are given below as indicating the character of legislation now coming forward for consideration.

The bill provides that "no corporation shall engage in commerce between the States or territories, or in the District of Columbia, by the purchase, sale or consignment of any article of commerce, or otherwise, unless it is organized, conducted and managed" in accordance with the specific conditions named.

Railroad, insurance, banking and public service corporations and corporations doing the substantial bulk of their business in a single State or in foreign countries are excluded from its operation.

The conditions imposed deal first with organization and require that the stock shall be full paid in cash or property, and have equal voting power, "except that no other corporation or association shall be given any vote or voice directly or indirectly in its affairs." Its directors must be stockholders and are not to be officers or stockholders of any other corporation engaged in the same business. It is required to be incorporated in the State where its head office is located and its directors' meetings are regularly held.

Its capital stock shall not be permitted to exceed \$5,000,000 unless authorized by a court upon satisfactory proof of its purpose, which shall not involve any violation of the other requirements of the act as to conduct and management, and with reserved power to reduce the capital and to prevent any such violation. These other requirements, briefly stated, are that it shall not monopolize or unreasonably restrain trade or be a part of or a party to any combination for such purpose, and shall not in any part of the United States by unfair means destroy competition or restrain trade in any article of commerce. Heavy penalties are imposed for a violation of the act, and all contracts in violation of it are declared void.

The plan of the proposed law is to provide a uniform restrictive law applicable to business corporations, to effectively destroy and prevent corporate monopoly, without destroying efficient combinations of capital. It is also provided that any corporation complying with the conditions imposed shall have the right to engage in interstate commerce. There is no provision for Federal license, registration or regulation. One of the professed purposes of the proposal is to defeat all plans of centralization by making them unnecessary, confining Congress to its proper powers of regulating commerce by a general law preventing and punishing its evils.

On Friday evening, April 28, at the monthly meeting of the Pittsburgh Railway Club, F. N. Speller, metallurgical engineer, National Tube Company, will read a paper on locomotive boiler tubes. In the afternoon of the same day the National Tube Company has invited the club to visit the Ellwood City plant where the members will have an opportunity to observe the manufacture of Shelby cold drawn steel tubes and Shelby hot rolled seamless steel tubes. A special train has been arranged for, which will leave the Pittsburgh & Lake Erie Depot at 12.30 p.m., arriving at Ellwood City at 1.40.

The Washington Tin Plate Company, Washington, Pa., is having the engineering firm of S. Diescher & Sons, Farmers' Bank Building, Pittsburgh, make estimates on extensions to its plant. The improvements will include the installation of four additional cold tin mills, two additional hot tin mills, six sheet and pair furnaces, two annealing furnaces and a 15-ton electric traveling crane having a 56-ft. span.

Die-Casting Machines

A Study of the Various Types Used

BY L. L. LAKE, BAYONNE, N. J.

The process of making castings in metal molds and having them within 0.0005 in. of the correct size and with a surface as smooth as if machined, has been kept a secret for many years. Essentially it consists of injecting molten metal with considerable pressure into a steel die, opening the die, ejecting the casting, closing the die and injecting more metal. The idea was probably suggested by the line of type that was automatically cast by the type setting machines or by the lead bullets that used to be cast in iron hand molds. The process has developed steadily from the bullet molds, and each individual that has been brought in contact with it has added improvements of one kind or another with the result that better castings are now being made than was possible in the early stages of the industry.

Sufficient pressure is applied to the metal to make it fill the steel mold completely and prevent shrinkage after it solidifies. In this way a surface as smooth as though finished with machine tools is obtained, and castings several inches in size will not vary more than 0.001 in. from the required dimension.

Casting Metals

Up to the present time castings have been made only from metals that form a white alloy, but the writer has the necessary data to build machines that will cast some types of brasses and bronzes and possibly other metals are even stronger. The white metal alloy that is now cast is quite brittle and not as strong as yellow or red

Zinc, tin, copper, lead, aluminum, antimony and bismuth have been used in various combinations to make an alloy that could be cast without blemishes and have the necessary strength, lead, tin, zinc and antimony being most commonly employed. Fahrig metal, composed of

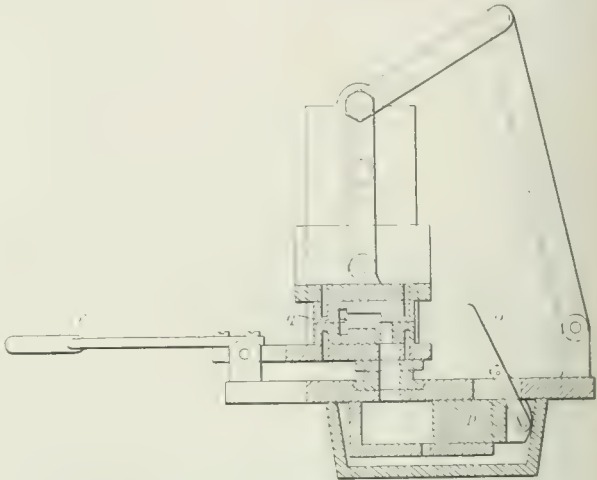


Fig. 2 — One of the Earlier Types of Die-Molded Casting Machines.

91 per cent. tin and 9 per cent. copper: Parsons white bronze, containing 65 per cent. tin, 29 per cent. zinc and 4½ per cent. copper, and pure Banca tin have also been cast successfully in the die-casting machines.

Many alloys were made and sent out in castings that would disintegrate enough to become worthless in two or three years. Many others were of such a combination, or were cast by such poor methods that holes would form in the center while the outer surfaces were as smooth as a piece of machined steel. These faults have only been overcome by a large amount of experimenting and practical experience. The more reliable die-casting firms are now sending out castings where the metal is solid all the way through and possess considerable strength. The metal, however, has not yet been made as strong as ordinary brass and the best casting shops are apt to ship a batch of castings with porous centers and smooth outer surfaces before they could detect them.

There are several conditions that must be right before castings that are sound and strong can be cast exactly to size in steel molds. First, the machine that contains the melting pot and injects the molten metal into the mold must be correct in design and easily operated; second, the metal alloy that is to be cast must be of the right composition; third, the temperature of the casting metal and the die-mold must be at the proper degree; fourth, the die-mold must be smooth on the inside, true to size and parted and vented properly; fifth, the shrinkage must be controlled or allowed for or both, and sixth, the time allowed for making each casting and removing it from the mold must be correct. The third and the sixth conditions are controlled by the operator of the machine: the metallurgist should decide the second entirely and the fifth partially, while the tool or die-maker should meet the fourth condition and aid the metallurgist in solving the fifth. This leaves only the first condition to be taken care of. As the whole process is based on this, the machine is therefore the most important factor.

A Modern Machine

One of the latest machines designed for rapidly casting the white metal alloys in steel molds is shown in Fig. 1. In this type a resistance coil, *a*, surrounds the crucible *b*, in which the metal is melted. The electric cur-

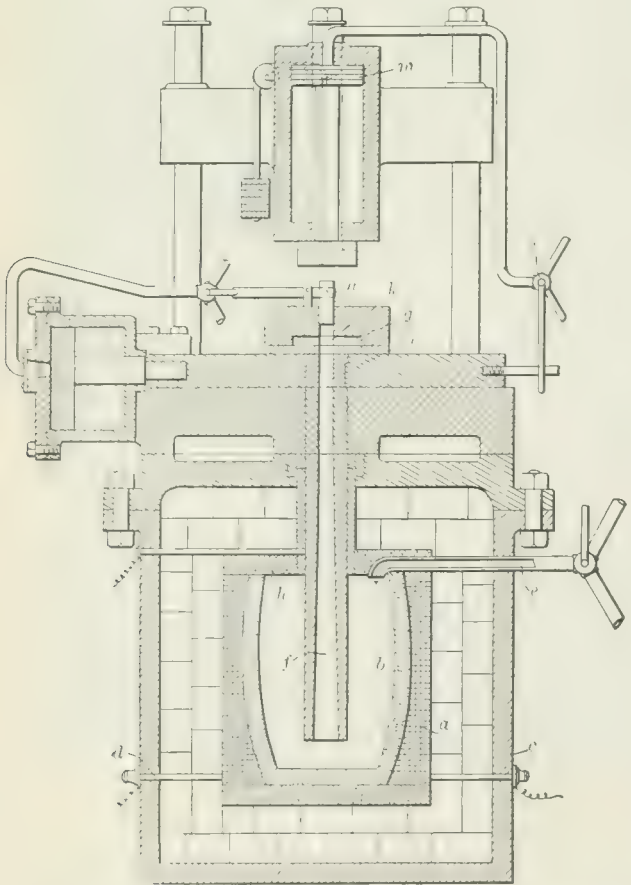


Fig. 1.—A Modern Pneumatic Die Casting Machine in Which the Metal Is Kept Melted by Electricity.

brass. It must melt at a temperature low enough not to destroy the steel mold, which means that most die-molded castings are made from alloys that melt at temperatures between 500 and 800 deg. F.

rent enters and leaves the coil at *c* and *d*. Compressed air is injected into the melting chamber at *e*, which is made tight by the slab *h* and forces the molten metal up through the tube *f* into the steel die-mold *g*. When the mold is filled with molten metal the slide valve *i* is pushed over by the air piston *j* until it closes the hole *k* in the mold. The compressed air is then turned on at the valve *l*, and the piston *m* forces the plunger *n* down in the mold until the metal completely fills the mold and becomes solid.

The operation of the pistons and the other moving parts can be controlled automatically, which leaves very little hand work for the operator. The opening of the mold, ejecting the casting and closing the mold to receive the next casting, can also be done automatically, so that all the operator would have to do then would be to see that the crucible was kept filled with metal.

Many attempts have been made in the past to force compressed air over the top of the metal bath to get the metal into the mold. This was done because in the original

to allow the air pressure machine to become a commercial success.

One of the earliest types of die-molded casting machines is shown in Fig. 2. When the lever *o* was pushed backward it moved the plunger *p*, and this forced the metal under pressure into the mold *q*. The lever *r* was then pulled over to cut off the metal so the casting would have no gate, or show imperfections where it had been located. The casting was then removed from the mold, and the machine made ready for the next casting.

Quick Acting Upright Machines

In Fig. 3 is shown one of the later types of upright, hand operated, plunger die-casting machines. It was designed specially for speed in opening and closing the mold.

As in the simpler machine illustrated in Fig. 2, the metal is kept molten in the cylinder *g* by gas flames that surround it in the chamber *h*. The plunger *i* is forced in by the lever *j* to squeeze the molten metal into the mold

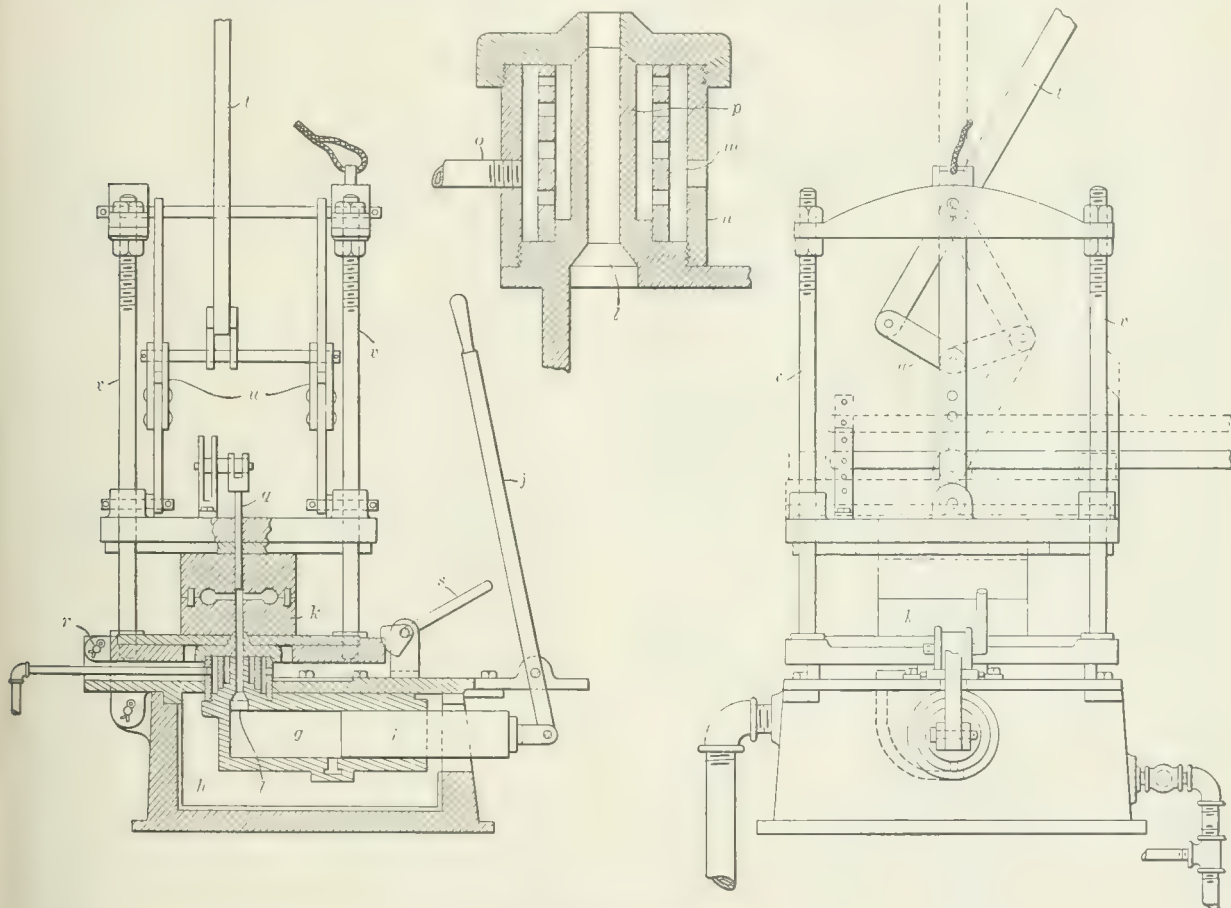


Fig. 3.—An Upright Hand-Operated Plunger Machine.

type of cylinder and plunger machine the plunger would stick owing to a thin film of casting metal getting around the bearing surface of the plunger and freezing with the result that the plungers had frequently to be removed for cleaning and often had to be replaced with new ones. As the plunger was located in the melting pot, which was placed inside the furnace chamber with the die-mold over it, the machine practically had to be taken apart to remove and to replace the plunger.

Compressed air was such a simple thing to use and, to the uninitiated, it seemed so impossible to make it enter the metal that it was hailed as the remedy for plunger troubles. The metallurgist had no part in this, as he knew that molten metals are covered with fluxes which many times take the form of heavy slags to prevent the air from attacking the surface of the metal. This is because the oxygen and nitrogen of the air—especially the oxygen—have such a great affinity for molten metals. Even though compressed air, for forcing the metal into the mold, has been tried by many different firms, it has, in time, always been abandoned. This was due to the fact that the percentage of poor castings was too great

k through the nozzle *l*. Around the discharge passage *l* is located a heating chamber, an enlarged sectional view of which is shown in the upper part of the drawing between the two main views of the machine. This chamber is formed by two rings, *m* and *n*. Gases are sent through the pipe *o* and are burned in the spaces between the discharge nozzle lining *p* and the rings *m* and *n*.

This chamber was designed to obviate one of the greatest troubles with die-molded casting machines. The passage between the mass of molten metal and the die-mold must of necessity be so small that the metal is apt to stay there long enough to become solid and clog up the passage. If the metal did not remain there long enough to freeze, small portions would be left after each casting was made, and these would accumulate until the passage was filled. This would cause the machine to be stopped and kept idle long enough to clean out the passage. Hence something had to be devised to prevent the clogging, and the above mechanism is one of the designs that have proved successful.

When the mold has been squeezed full of molten metal the rod *q* is forced down by a lever. It traps the metal

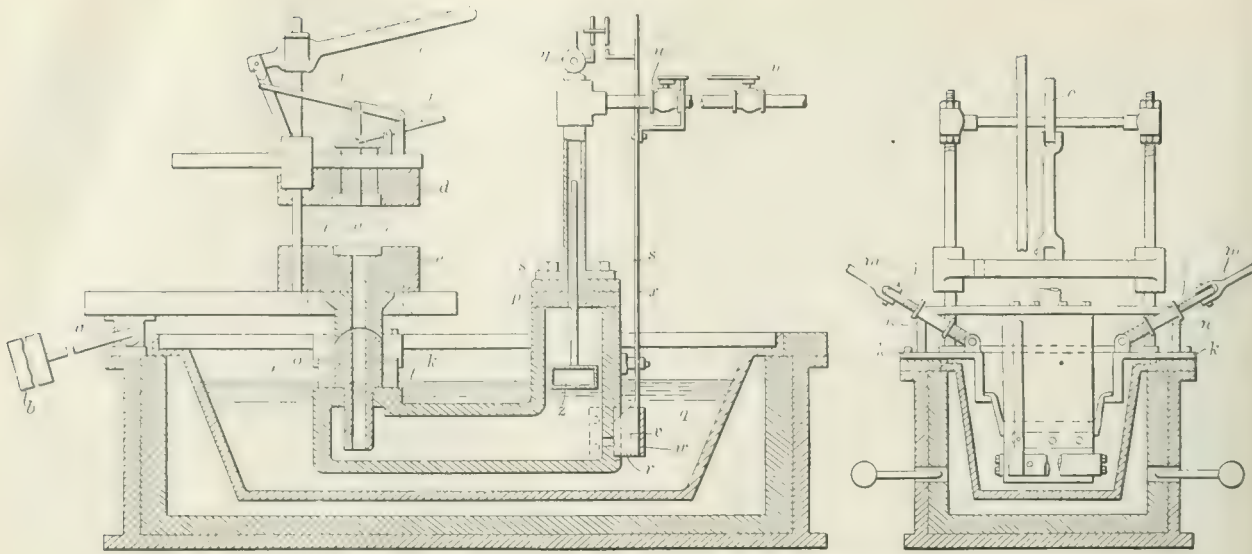


Fig. 4. A Machine Operated by Air Pressure with a Tilting Table for the Molds.

in the mold until it solidifies, and cuts off the balance of the molten metal so it will drop back into the cylinder *g*. This has been designated a sprue cutter, and where there is a hole in the center of the casting this is, without doubt, the best form of sprue cutter. The rod can be made to the exact size and shape of the hole desired, and the casting will mold to the rod. Where the casting has no center hole the sprue cutter has to be placed in other parts of the mold, in other positions, or take an entirely different form.

To set the die-mold in the correct position for molding, the upper part of the machine is tipped back on the hinge *r*. When set, it is again placed in the upright position and locked by the eccentric that is moved by the lever *s*. To remove the casting, the lever *t* is swung to the upright position. This operates the toggle joints *u* that raise the upper half of the mold on its guide rods *v*, of which there are four. The position taken by the lever and the toggle joints when the mold is opened is shown by the dotted lines in the right hand view of Fig. 3.

Fastening one-half of the die-mold on a plate and moving this plate up and down on rods by toggle joints is a means that has been employed to a large extent on die-casting machines. As the metal is forced into the

mold under considerable pressure, the two halves of the mold are likely to be forced apart and open at the joint unless they are securely held. A toggle joint of this design is simple and when well fitted will hold the two halves of the mold together against much more pressure than is met with in present methods of die-casting. It is well adapted to hand operated machines, but other devices are probably better when the casting machines are made more automatic.

An Air Pressure Machine

Fig. 4 illustrates a machine that has a pressure chamber submerged in a melting pot. The view at the right is a section through one end of the machine, with the air line and the valve bridge broken away to show the arrangement of the gate and the die-mold also removed. The metal enters the pressure chamber through a port near its bottom and thus keeps on a level with the

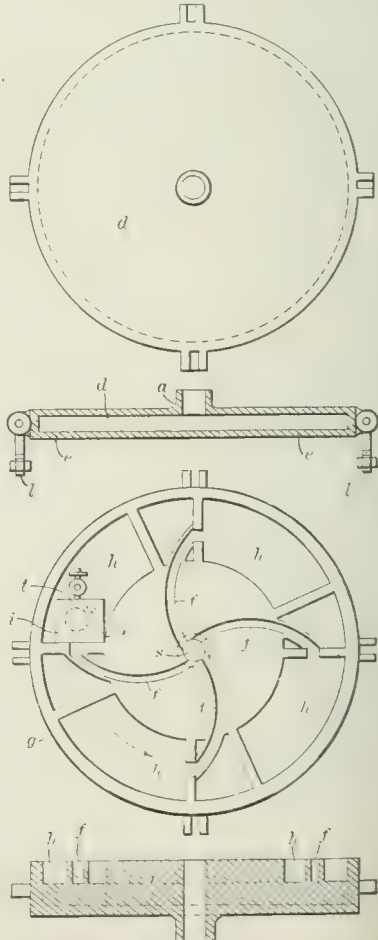
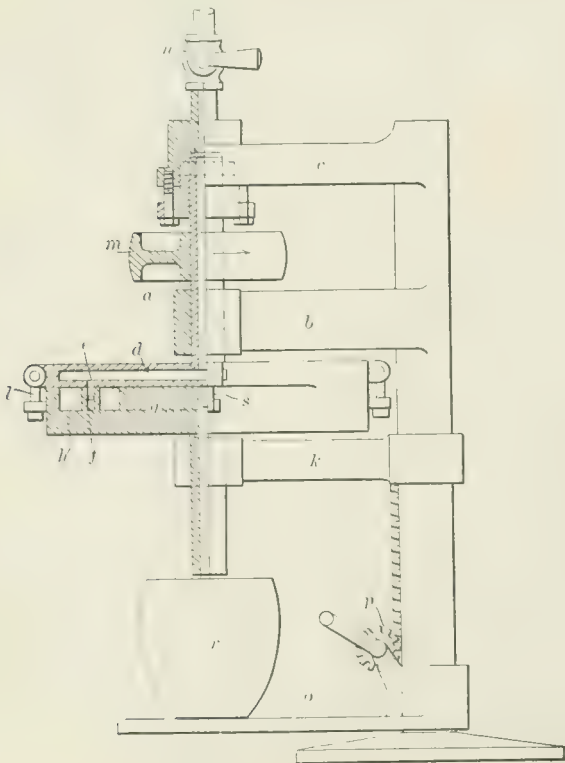


Fig. 5. A New Machine Utilizing the Principles of Vacuum and Centrifugal Force.

molten metal in the melting pot. From here it is forced by air pressure up into the mold.

The molds are located on a table that is hinged at *a* and counterbalanced by the weights *b* so it can easily be tilted. The lever *c* is used to raise and lower the upper half of the mold *d e* and thus open and close the mold. The lever *f* operates the sprue cutter *g*, and the lever *h* operates the rods *i i*, which are used to push the castings out of the mold. Tie rods, *j j*, hinged to lugs on the bracket *k*, swing into slots cut in the plate *l*, and by turn-

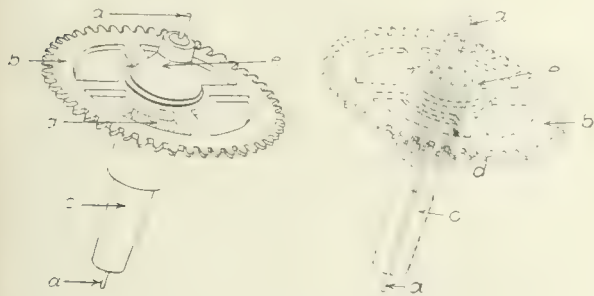
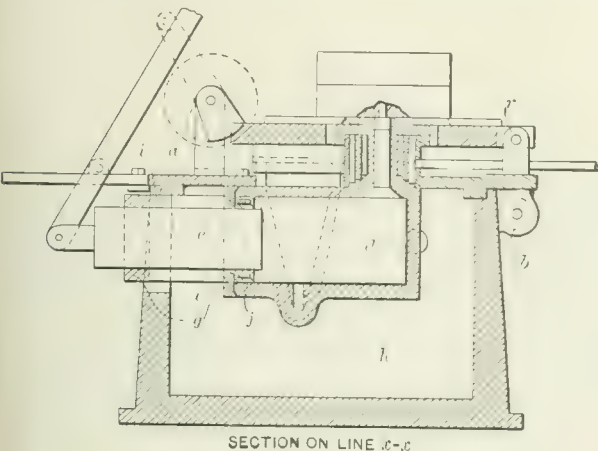


Fig. 6.—One of the Best Examples of Work Done with Die-Casting Machines.

ing down the levers *m m*, the eccentrics on their ends clamp the mold halves and their entire mechanism to the chamber containing the molten metal, and from which it is forced up into the mold. The turn-buckles *n n* are used to adjust the eccentrics to the proper length for clamping tightly.

In the mechanism that holds and operates the mold this machine is very similar to other die-casting machines. The principles adopted here have become almost the



SECTION ON LINE x-x

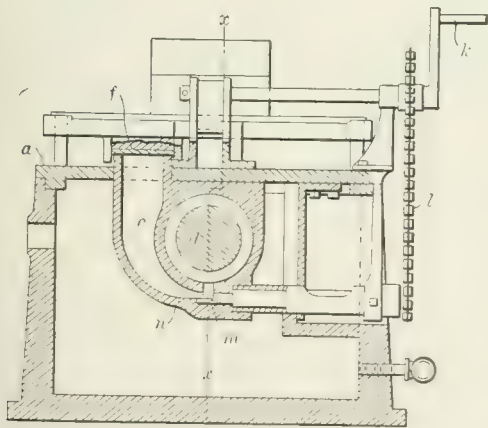


Fig. 7.—Recent Improvements Made in the Plunger Type of Machine.

universal and standard practice. On some machines the apparatus looks very crude and in some instances better mechanical principles could doubtless be applied.

The pressure pot and its pressure and intake mechanism are very different from those of other machines.

The main body of the pot is a casting, with the discharge nozzles *o* screwed into it and the cover *p* bolted on. The pot is located beneath the surface of the molten metal in the melting pot *q*, except at the round end where the air is injected and at the extreme end of the nozzle. It is held in position by the cross bars *s* and the lugs *t*.

The molten metal flows from the melting pot through the port *r* and into the pressure chamber. Air is then injected into the pressure chamber through the valves *u u* to force the metal up through the nozzle *o* into the mold *e* when it is closed. Two valves are used as a check on one another in case one should leak. Air leaking into the pressure chamber would cause the molten metal to flow out through the nozzle *o* when the mold was opened to take the casting out and thus cause trouble. For an additional safeguard the levers of the valves *u u* could be connected with the upper mold plate in such a manner as to turn off the air before the mold was opened.

To take metal into the pressure pot through the port *r* it is quite essential that there be no air pressure in this pot, as that would cause the metal to flow out of, instead of into, the pressure pot. The slide *v* covers the port *r* and is held in place by the plate *w*. To this slide is attached the rod *x*, and this in turn is attached to the lever of the pet cock *y*. Thus when the slide *v* uncovers the port *r*, the pet cock *y* is opened to let out any air pressure that might be in the pressure chamber. This method of opening and closing the intake port is the only practical and successful one that can be used when it is to operate underneath the surface of molten metal. An ordinary valve and valve seat soon accumulate oxide and dross, and these lodging on the seat make the valve fit poorly and cause a leakage of air. This leakage reduces the air pressure in the pressure chamber, and hence the metal will not enter the mold with force enough to completely fill all parts.

To prevent the air from striking the surface of the metal forcefully, a float is located at *x*. A rod is fastened to the upper side of the float and moves up and down in a tube to hold the float in position and prevent it from wedging or jamming and thus becoming fastened to the walls of the pressure chamber. If the air were allowed to strike the molten metal with its full force it would cause the latter to splash and the flying particles would lodge on the air inlet and freeze and eventually close the opening.

In this machine the designer has reduced the troubles inherent in the air pressure machine to a minimum. These troubles, however, have not been entirely removed nor can they be when air presses directly against the surface of the metal since if the air pressure on the surface of the molten metal is sufficient to force the metal into all parts of the mold, some of the air is bound to be absorbed by the metal and thus form oxides and dross, resulting in porous and spongy castings. This tendency has been reduced to a minimum by extending the discharge nozzle to the bottom of the pressure pot so it will only take in the cleanest and densest metal, by placing the inlet port *r* near the bottom of the pressure pot for the same reason and so it will not take in any of the dross that gathers and by confining the air pressure to a small space in a compartment of its own that is removed a considerable distance from the discharge nozzle.

Vacuum and Centrifugal Force

The machine shown in Fig. 5 is radically different from the others described and is based on a principle that should make it work successfully. Experimental castings have been successfully made in it, and it will soon be given commercial work to do.

The shaft *a*, running in bearings on the arms *b* and *c*, is hollow and terminates in a vacuum chamber, *d*, with openings at *e*. These openings are located directly over the curved ports *f* in the mold carrier *g*. The ports open into the chambers *h* in which the molds are located with their in-gates directly opposite the port openings, as shown at *i*. A second hollow shaft, *j*, is attached to the bottom of the mold carrier and runs in a bearing on the arm *k*. Lugs on mold carrier enable a vacuum chamber, *d*, to be bolted to it with pivotal bolts *l*.

To operate the machine the vacuum chamber and the

mold carrier are revolved by a belt running on the pulley *m* in the direction shown by the arrow. The valve *n* is then opened and an air pump sucks the air out of the shaft *a*, the vacuum chamber *d*, the curved ports *f* and the molds *i*. The table *o* is next raised up by the pinion and the rack *p* until the hollow shaft *j* is near the bottom of the crucible *r*. The partial vacuum in the upper part of the machine causes the metal to rise out of the crucible through the opening *s*, and the centrifugal force of the mold carrier aided by the vacuum causes the metal to flow through the ports *f* into the molds *i*, the vents *t*, helping the metal to fill all the corners of the mold. When the castings are completed the bolts *l* are unhooked, and the mold carrier *g* is swung on the arm *k* out from under the vacuum chamber *d*, so that the castings may be removed. Four pockets for molds are provided in this carrier, but this number may be made more or less according to the size of castings made.

With this type of machine the plunger is done away with and hence all the troubles connected with it. The melting pot with a submerged pressure chamber is also eliminated. There it is very difficult to keep the metal hot enough in the pressure chamber without making it too hot in the melting pot. While air is used in this machine, it is drawn away from the metal to create a vacuum and not compressed and forced down upon its surface. Thus air is used in the proper way, and no injurious effects should be seen in the metal.

If the vacuum and the centrifugal force can be controlled, so as to fill the molds completely before the metal chills and not clog up the machine, this should be one of the best methods established for making die-molded castings. With it an ordinary oil or gas heated melting furnace or a crucible may be used to melt the metal and the machine attached in a manner to draw the metal out.

It may be, however, that these two forces cannot be controlled properly, and it may be that it would not make castings fast enough to make it a commercial proposition, but if such were the case it would be easy to obtain a dense, clean metal in the castings and perhaps metals of a higher fusion point could be cast.

The above machines illustrate the fundamental principles that have made the casting of low fusion alloys a commercial success. The making of castings to accurate measurements from metals or alloys of a much higher melting temperature is the next step in the evolution of the industry and is bound to revolutionize some parts of the foundry business.

Casting machines are in use that are belt driven and automatic and semi-automatic. One machine is entirely automatic and is working daily in a Western clock factory. It makes the wheel, the pinion, the staff and the pivots in one piece, as shown in Fig. 6, by casting a white metal alloy around them. First the wire forming the pivots *a a* and the rounds of the pinion at *d* are unwound from a reel, straightened and pushed through accurately fitting holes in the die-mold. These holes locate the wires absolutely in the correct position, and the staff at *c* is cast around them. After this the mold opens and a perforated zinc disk is dropped over the pinion wires to hold them in position and act as a stop to the next half of the casting. A brass wheel, *b*, which has been previously formed with a hexagonal center large enough to clear the steel pinion wires *d* is next dropped into the mold, which is then closed. After this the part of the staff at *c* is cast and the casting thrown out of the machine. This is all done automatically and all the attendant has to do is keep the machine supplied with zinc disks, brass wheels and a reel of wire.

This method of inserting steel pieces, or those made of brass and bronze, in the molds, and then casting metal around them is carried on quite extensively; in fact, the re-inforcement of die-molded castings is common practice among the firms making this kind of castings, due to the inherent weakness of die-cast metals. None, however, have carried the automatic machine to the high state of perfection that this clock company has.

The wire used for the trundles *d*, in this lantern pinion, is 0.021 in. in diameter, and the holes through which it passes into the die-mold must be accurately spaced and of the correct size. If too small the wire will jam and

stop the machine, and if too large the metal will squeeze out around the wire and spoil the casting. Thus the holes act as a gauge for the wire, which, being held as it is, insures a correctness of size and shape in the piece, and a uniformity between the various pieces cast that could not be obtained in any other way.

Improvements in the Plunger Machine

In Fig. 7 is illustrated some improvements on the former types of plunger machines. The plate that holds the lower half of the die-mold and is hinged at *r* is the same as that shown on the machine in Fig. 3, as is also the furnace *h* and the specially heated discharge passage. Like the older machine the plate *a* is hinged at *b* and to its under side is fastened the melting pot *c*, the casting cylinder *d* and the plunger *e*. These are suspended in the furnace chamber *h* and surrounded by gas flames. A charging spout leads up through the plate *a* from the melting pot *c*. The cover to this spout is shown at *f*, and it is only necessary to remove this when new metal is added. The metal is usually melted in auxiliary furnaces and poured into the casting machines.

This machine differs from that illustrated in Fig. 3 in the diameter of the cylinder and plunger and the method of getting the molten metal into the cylinder. The plunger *e* is made considerably smaller in diameter than the cylinder *d* and slides in a sleeve, composed of the two collars *g*, held together by eight ribs like the two shown at *i i*. This is made of nickel steel and is machined outside and inside. To prevent the cylinder from leaking around the plunger, an asbestos washer, *j*, is placed next to the collar *y* on the inside of the cylinder *d*.

As the plunger is so much smaller in diameter than the cylinder, they do not touch at any point, and there is no danger of the two brazing or soldering together. In the ordinary design of plunger and cylinder, as shown in Figs. 2 and 3, the molten metal would squeeze in between them, harden and thus stick them together. Dross would also gather around the plunger and make it work hard. This is another source of trouble in the die-casting process and often meant that the machine had to be taken apart, the metal taken out, the plunger removed, the plunger and cylinder cleaned of the casting metal and the whole re-assembled. Many different ways have been tried to overcome this.

While this design greatly reduces the dangers of the plunger becoming stuck by the casting metal, special arrangements have to be made to get the molten metal into the cylinder. A better plan might be to draw the plunger out far enough for the inner end to rest on ribs and thus allow the molten metal in the melting pot *c* to flow around the ribs and into the end of the cylinder *d*. When the plunger was forced in, it would trap the metal that flowed into the cylinder *d* and force it into the mold.

The eccentric which locks down the mold plate that is hinged at *r* is thrown in and out by the crank *k*. This also turns a sprocket wheel around which runs a sprocket chain that turns another sprocket wheel at *l* at the bottom of machine. This in turn moves the rod *m*, one-half of which is cut away at the inner end, and thus opens and closes the port *n*. Through this port the metal flows from the melting pot *c* to the cylinder *d*.

After the plunger has been pulled back and while the mold is being opened to remove the casting and closed again, the rod *m* may be turned to the position shown in the lower portion of Fig. 7. Then metal flows into the cylinder *d* from the melting pot *c* to replace that which has been used in making the former casting. When the crank *k* is turned to clamp the mold into position for making another casting, the sprocket wheels and chain turn the rod *m* and close the port *n*. After this the plunger *e* is moved forward to force the metal up into the mold for making this other casting. This form of valve could be used to keep the casting metal in the melting pot until ready to use. The temperature could also be higher than if the metal were allowed to flow into the cylinder freely as in the ordinary casting machine. In this way metals of a higher melting temperature can be die-cast, providing the melting pot, the cylinder, the plunger and the molds can be made of a metal that will stand the higher temperature.

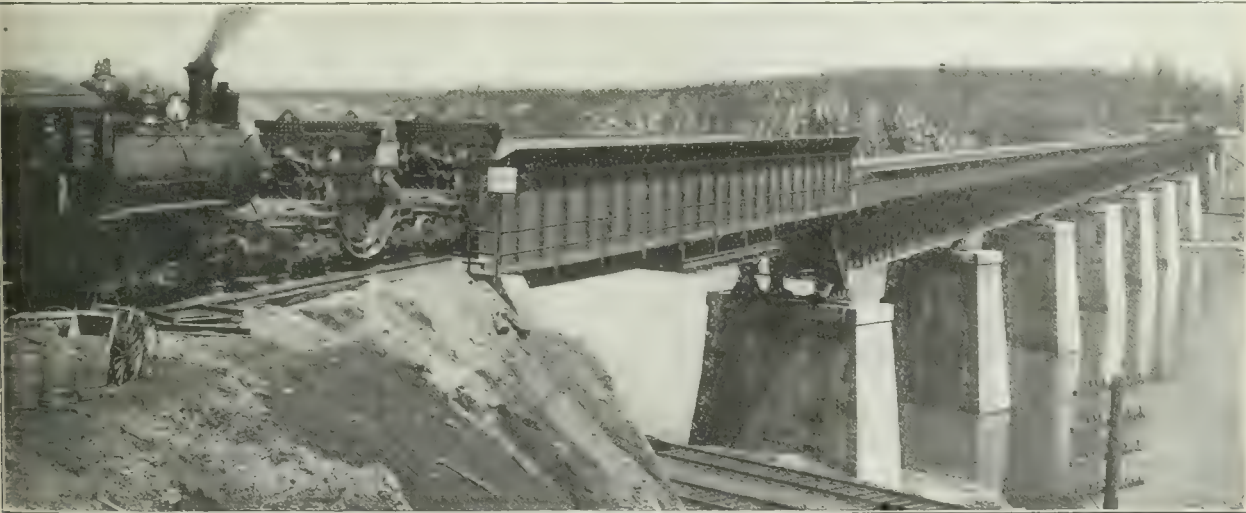
The use of automatic, semi automatic or hand operated machines depends largely on the number of castings that are to be made. As die-casting machines are always built by the users they can be made in either style that is the more economical. Any number of die-molds may be used on one machine, as these can be fitted in such a manner as to be easily and quickly interchangeable. The making of the machines automatic or otherwise is purely a mechanical proposition and nearly any machine shop is able to design and build this part of the machine according to order.

A Special Bridge for Ladle Cars

An interesting bridge was recently built under the supervision of Frank C. Roberts & Co., Philadelphia, Pa., for the Upper Merion & Plymouth Railroad Company. The structure, which is to be used primarily for the transfer of hot metal from the blast furnace plant of Richard Heckscher & Sons Company, Swedeland, Pa., to the steel works of the Alan Wood Iron & Steel Company, Ivy Rock, Pa., is 881 ft. 7 in. long. It spans the Schuylkill River at the hight of 43 ft. above low water and also crosses the tracks of the Philadelphia & Reading Railroad on both sides of the river and those of the Pennsylvania Railroad on the far side.

Although primarily designed for the use of ladle cars, the bridge can also be used for general purposes. The construction is very heavy, and the bridge is designed for a locomotive followed by a continuous train of hot metal ladle cars, spaced 20 ft. on centers and weighing 160,000 pounds each, including the contents. Plate girder construction is employed throughout with concrete piers to support the spans, which are of the deck type over the river and of the half through pattern where the railroad tracks pass underneath, as this style gives the necessary clearance.

The steel trough floor system is used and the steel is covered with concrete. On top of this concrete is a layer of waterproofing felt covered by a brick pavement laid in cement, on top of which is placed the stone ballast



The Bridge Over the Schuylkill River Connecting the Blast Furnaces of Richard Heckscher & Sons Company with the Steel Works of the Alan Wood Iron & Steel Company.

carrying the steel ties. The inside surfaces of the half through girders are covered with brick and concrete to protect them from injury by the hot metal. One of the special features of the structure is inwardly sloping splash plates, which are placed on the tops of these girders to prevent the hot metal from falling to the railroad tracks and similar plates extend the entire length of the deck spans at the top of the sidewalk guards to protect the steel sidewalks located on each side of the bridge. A very complete drainage system is also provided for the road bed.

The Cambria Steel Company, Johnstown, Pa., last week placed in operation its new wire mills, which have a capacity of about 300 tons daily.

The Sure Center Finder

A new tool for locating the centers of pieces held in a lathe chuck has been developed by W. A. Peck, 141

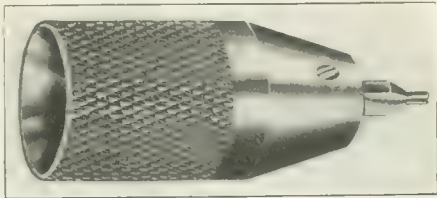


Fig. 1. The Sure Center Finder for Lathe Work Made by W. A. Peck, New Haven, Conn.

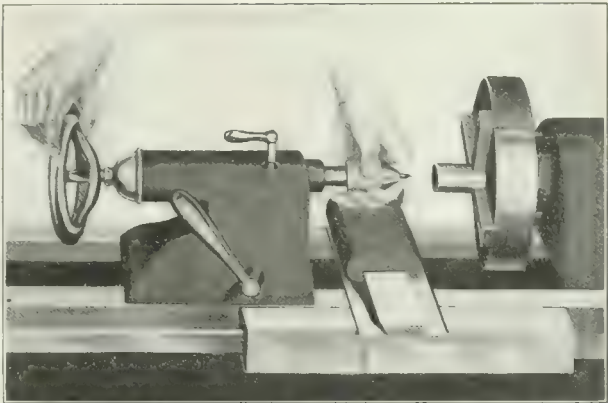


Fig. 2.—The Tool in Use.

Brewery street, New Haven, Conn. A view of the tool is given in Fig. 1, while its use in a lathe is shown in Fig. 2.

The finder has a socket which is tapered at an angle of 60 degrees to fit on the tailstock center of the lathe. When held in the position shown in Fig. 2 and fed up to the work, the tool immediately locates the center and the

friction between it and the lathe center is sufficient to hold it in position for drilling and countersinking. Each tool is fitted with a combination drill and countersink of one of the standard sizes.

Four sizes of finder are made and the following table gives the principal dimensions:

	No. 0.	No. 1.	No. 2.	No. 3.
Outside diameter, inches.....	1	1 1/4	1 3/4	2
Diameter of drill, inches.....	3/8	1/2	5/8	3/4
Diameter of body of combination drill and countersink, inches.....	3/8	1/2	5/8	3/4

The two smaller sizes are supplied with a short length single end drill and countersink which is about half the length of the double end ones on the market, but for the sake of compactness the double end ones may also be used. The other two sizes are furnished with the regular double end combination drill and countersink.

Transmission Rope Splicing

The Practice Recommended by the Dodge Mfg. Company

To secure a splice which will be best suited for the American system of rope driving, the Dodge Mfg. Com-

pany, Mishawaka, Ind., has conducted a number of interesting experiments. As a result of these tests a long splice has been decided on. The successive operations in making this splice are all illustrated, each separate engraving showing one step in splicing a 1½-in. four-strand rope.

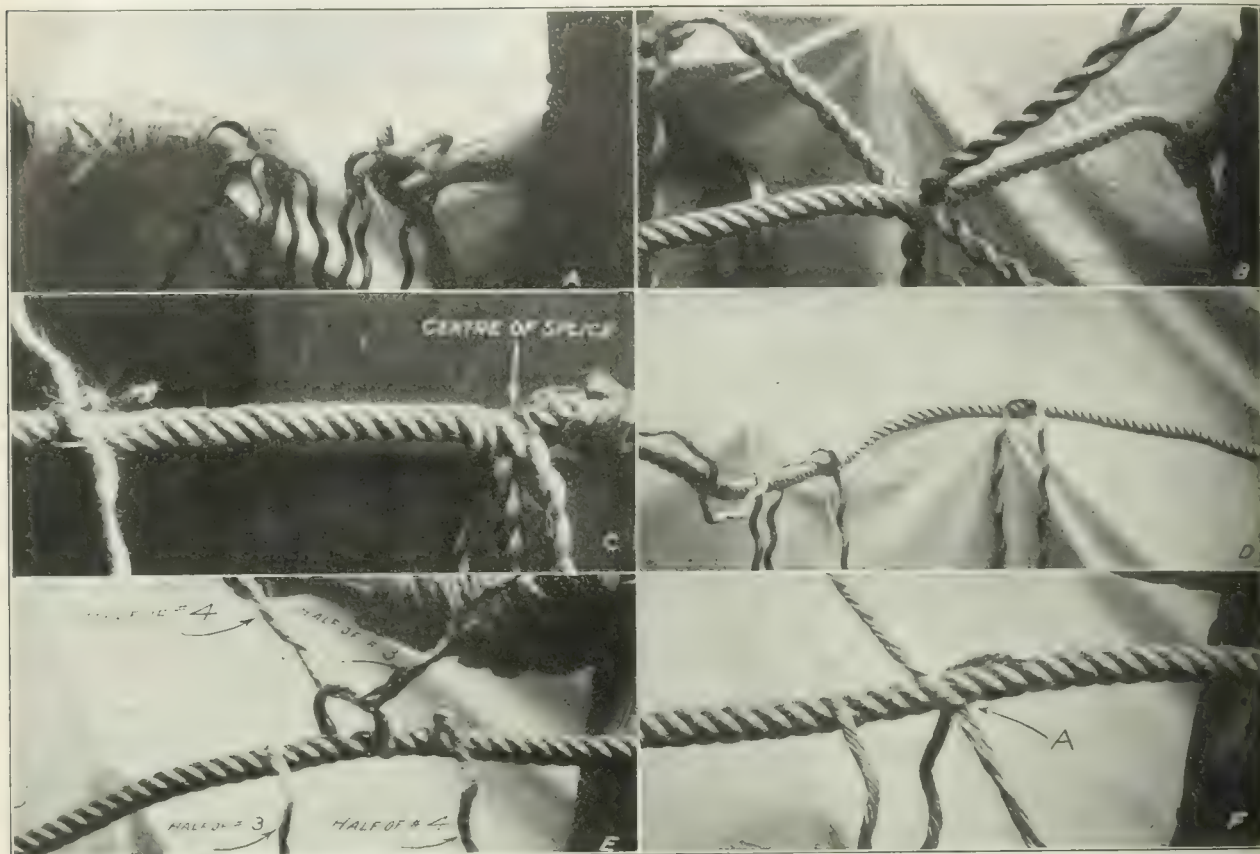


Fig. 1.—The First Set of Operations.

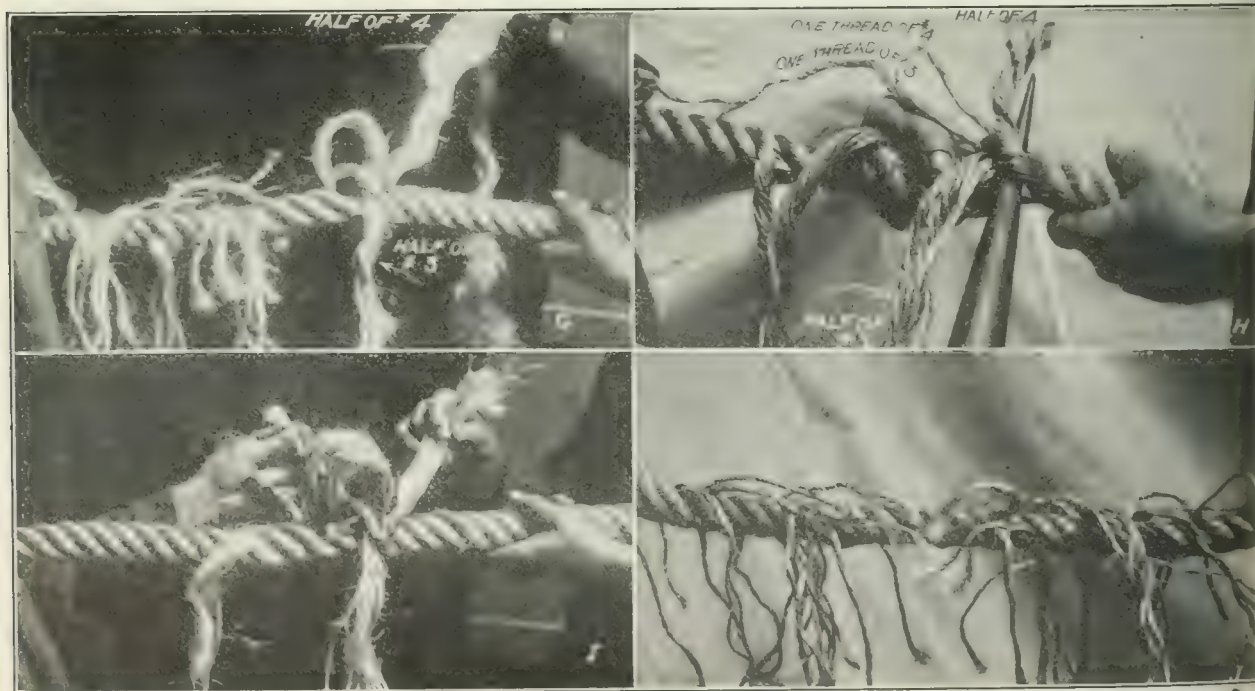


Fig. 2.—The Second Set of Operations.

pany, Mishawaka, Ind., has conducted a number of interesting experiments. As a result of these tests a long splice has been decided on. The successive operations in making this splice are all illustrated, each separate engraving showing one step in splicing a 1½-in. four-strand rope.

The rope is first tied and unraveled, a distance

until only enough of an end is left for tucking. This is then done with another pair, as shown at C. The two remaining pairs of strands are treated in the same manner until the three spaces between the strands are the same. This is clearly shown at D. Each pair is now unlaidd for two full turns back from the point of meeting, and two of the half strands are dropped below the rope,

as illustrated at E. The remaining halves are laid forward to the center of the space between the two dropped half strands and tied in a knot. Care should be taken in doing this to have the strands run the same direction in the knot as they do in the rope. This is clearly shown at the point A in F, Fig. 1, after the tie is made.

The two remaining half strands are taken and laid one around the other, as illustrated at G, Fig. 2. After the rope has been opened with a marlin spike, as illustrated at H, the threads of the loop are untwisted, as shown at G, and are next drawn in until they run in the same direction as in the body of the rope. This operation

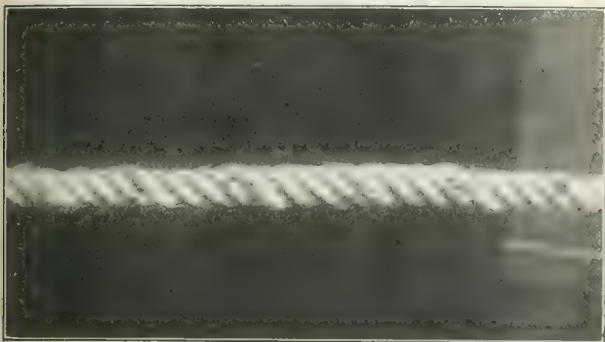


Fig. 3.—The Completed Splice.

is repeated for all the half strands at the points where they meet. Views of the successive stages of the tucking operation are given at H, I and J. For convenience the half strand No. 3 is cut and one thread taken out from it as well as from No. 4, which is the tucking strand. The marlin spike is inserted to open the strand and the rope held as shown. The remaining threads of No. 3 are pulled out and the half strand No. 4 is drawn over and under, which takes the twist out of the threads, as shown at I. These are pulled down firmly in the same direction as the strands run in the main body of the rope, and the operation is repeated until all the threads of each half strand are dropped. The rope will then look like the specimen illustrated at J. The final step is to cut the threads off close to the body of the rope, and the splice is completed, as shown in Fig. 3.

The operations for a three-strand rope are identically the same as in the four-strand, the only exception being that there is one pair of strands less and only one pair is laid out of each direction, a tucking end and one pair of strands being left, the latter in the center.

The Mechanical Engineers' Pittsburgh Meeting

The Local Committee of the American Society of Mechanical Engineers, E. M. Herr, chairman; Elmer K. Hiles, secretary, having in charge the preparations for the spring meeting of the society, which will be held in Pittsburgh, Pa., May 30 to June 2, inclusive, has nearly completed the work of arranging the programme. It has been settled that the arriving guests will be received and registered at the Hotel Schenley, the society headquarters, on Tuesday morning, May 30. In the evening there will be an informal reception for the members and ladies in the parlors of the hotel. Professional sessions will be held in the Lecture Hall of the Carnegie Institute, near the headquarters, Wednesday morning and evening, Thursday and Friday morning. In the meantime there will be a number of inspection trips to various industrial plants in the vicinity, a boat excursion for the members and ladies up the Monongahela River, a reception and ball at the Hotel Schenley on Thursday evening and, finally, on Friday evening a smoker and entertainment, given by the Engineers' Society of Western Pennsylvania, in its rooms in the Oliver Building. The number of inquiries already received from expected guests indicates a very large attendance.

The Ridgetown Fuel Supply Company of Canada has been organized by Lima, Ohio, capitalists and others

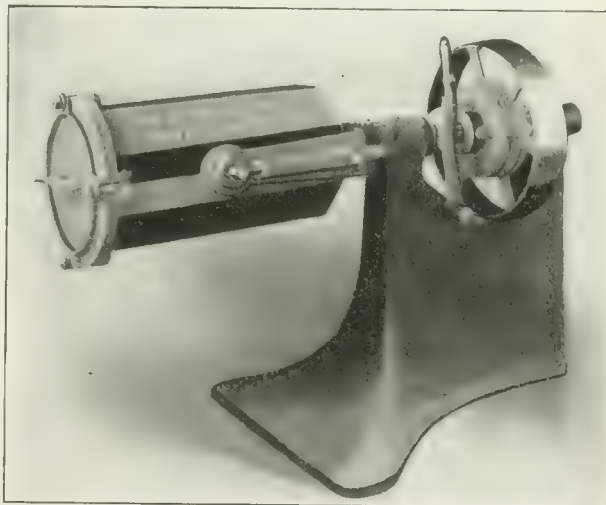
with a capital stock of \$800,000, to build a pipe line for natural gas between Canadian points. The line will be 80 miles long and 12-in. pipe will be used. Lemuel G. Neely is president.

A New Baird Ball Burnishing Barrel

For burnishing the output of small factories or experimental and special pieces for large firms a new kind of barrel has been built by the Baird Machine Company, Oakville, Conn. This new barrel is of the single type, but otherwise is the same as the double one illustrated in *The Iron Age* February 23, 1911.

The barrel proper is octagonal and is made of cast iron, with a maple wood lining, which is very durable. This type of construction enables all the parts subject to wear to be renewed easily and greatly prolongs the life of the machine. In use the barrel is kept in a horizontal position, but it can be easily tilted for emptying and filling, as trunnions near its center support it and connect it to a heavy yoke fastened to the driving shaft. A lock pin, engaging a recess on the side of the barrel near the lower end, keeps it in the horizontal operating position, and a slight push on the lever controlling the lock is sufficient to release the barrel for tilting. This type of locking device is convenient and simple, and at the same time holds the brass cover securely in position and prevents leakage. Another feature is the small amount of time required to operate it, and since the cover bolts are hinged to the barrel itself, the nuts have only to be loosened and not taken off, and there is no danger of any parts getting lost.

A friction clutch is used to drive the barrel, and in this way the driving pulley can be belted directly to the line shaft, thus eliminating a countershaft. All of the



The No. 1 S Burnishing Barrel Made by the Baird Machine Company, Oakville, Conn.

bearings in the barrel have bronze bushings of ample proportions, while those of the main shaft are provided with ring oilers. Two sizes of barrel are made, one measuring 10½ in. in diameter and 24 in. long, which is the one illustrated, and the other having a diameter of 16 in. and a length of 30 in. The builder has found that the use of a comparatively small diameter lessens the chances of denting or otherwise injuring delicate or small parts which are burnished, and at the same time the quality of the finish and the speed at which the work is turned out are not affected.

The Sharon Iron & Metal Company, Sharon, Pa., has been organized with a capital stock of \$50,000, to deal in scrap iron and steel and other metals. The company has taken over the business of Carnick Brothers & Speer in Sharon. It has secured the plant formerly occupied by the Damascus Brake Beam Company, which recently moved its business to Cleveland. The incorporators are Harry B. McDowell, George H. Allen, Glen Carley, H. W. Davis and Morris Speer.

The Libby 18-In. Turret Lathe

A New Tool for the Rapid Production of Duplicate Parts

A new turret lathe capable of handling heavy chucking and bar work and designed for the rapid and the accurate production of duplicate work has been placed on the market by the International Machine Tool Company, West Twenty-first street and Belt Railway, Indianapolis, Ind. This tool has a swing of 18 in. over the ways and can be arranged for either belt or motor drive. Fig. 1 illustrates the operating side of the lathe, while Fig. 2 is a rear view of the headstock showing the driving mechanism.

The headstock housing is cast integral with the bed which has heavy flat ways. Reinforcement is supplied by a rib extending through the center of the bed its entire length and cross ribs spaced every 13 in. The ways of the bed are flat and lie close to the bed proper. The

$7\frac{1}{2}$ hp. motor with a speed not exceeding 1800 rev. per min. is used. The spindle speeds vary from 8 to 300 rev. per min. with eight changes, and with a two-speed countershaft this number is doubled, and the range is from 6.4 to 300 rev. per min. Where a constant speed motor is used the spindle speeds are the same as those for the one-speed countershaft and can be varied still further by using an adjustable speed motor.

The chuck is of the three-jaw universal type designed especially for heavy service. Two or four-jaw independent or combination chucks can be employed if desired, and for bar work a collet chuck can be furnished.

The Tool Holding Parts

The tool post carriage is of the side carriage type and has a bearing on the front way $5\frac{7}{8}$ in. wide and 24 in. long. This bearing has a long taper gib on the side of the front way and is also gibbed to a 60-deg. angle on the lower side of the bed to take care of cross strains. In this type of carriage construction, the bearing, which in an ordinary engine lathe goes on the back way, is

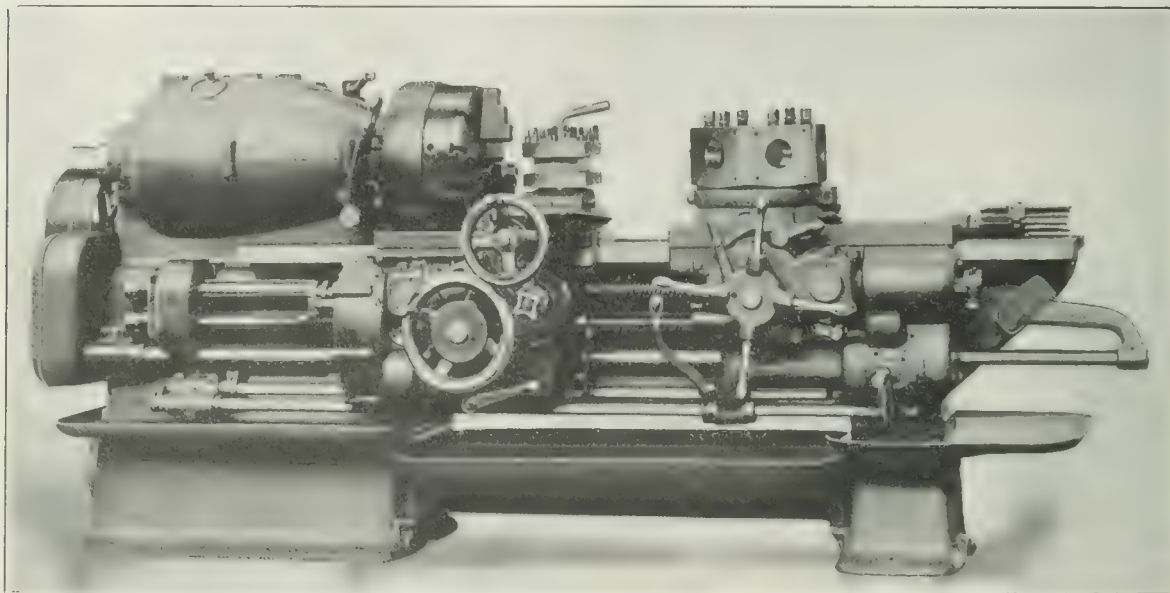


FIG. 1. The Operating Side of the Libby 18-In. Turret Lathe Built by the International Machine Tool Company, Indianapolis, Ind.

width of the front way is $5\frac{7}{8}$ in. and that of the back one $3\frac{1}{8}$ in.

The Drive

In the headstock are two double frictions, one of which is a band friction in the driving mechanism and the other a cone friction on the intermediate shaft. The former is on a shaft running at 480 rev. per min., and the latter is on a shaft, the lowest speed of which is 240 rev. per min. These frictions give the operator complete control of the spindle, and the chuck and the locking mechanism are of such a design as to produce the effect of a positive clutch. All parts of the friction dogs subjected to wear are made of hardened tool steel. The main spindle is of 0.4 per cent. carbon steel and has a $3\frac{1}{8}$ -in. hole through it. It is carried in large bronze bearings, adjustable for wear and ring oiled.

The single belt drive mechanism is entirely separate from the headstock proper and is fitted into a housing, which is cast solid with the bed and the headstock, so that it can be removed for repairs or adjustments. It includes two friction gear drives transmitting power to the intermediate shaft, giving two speeds in a forward direction and in conjunction with the four mechanical speed changes of the headstock renders eight forward speeds available. The lathe is driven by a belt from a one or two speed countershaft, or else by an electric motor. If a one-speed countershaft is used, the drive is through a 4-in. belt to a 16-in. pulley, which drives the high-speed shaft at 480 rev. per min. When a two-speed countershaft is used, the first speed is the same, and the second one is 384 rev. per min. For motor drive a 5 or

transferred to a bearing on the bottom of the side of the bed, an arrangement which gets the cross slide out of the way and renders the full swing capacity of the lathe available. Another advantage of this construction is that the necessity of long overhanging tools is done away with, as the tool post can pass the chuck and the turret and come up flush to the former. Each carriage has a rapid power traverse which operates at the rate of 40 ft. per minute and stops instantly when thrown off. The traverse for each carriage is entirely independent of the other and can be operated in either direction, irrespective of whether the feed is engaged or not and what the other carriage is doing. The mechanism for this rapid traverse is driven from the main driving shaft of the lathe and does require a separate countershaft or motor. In operation none of the headstock gears or feed gears are included with the result that neither the pilot wheel on the turret slide nor the hand wheel of the tool post carriage turn or move when the rapid traverse is in use.

A rectangular turret type tool post is used which will carry four tools at one time, each being independently adjustable for height. It is very rigid and has a double acting clamping device operating on both the inside and the outside, so that broad faced tools can be used. Both cross and lateral power feeds are provided, as well as a rapid lateral traverse which is entirely independent and will operate in either direction whether the feed is engaged or not. The tool post can be locked in eight different positions and if desired can be clamped in intermediate ones. A hollow hexagonal turret 12 in. in diameter is used with a $3\frac{1}{4}$ -in. hole in each face. The lock

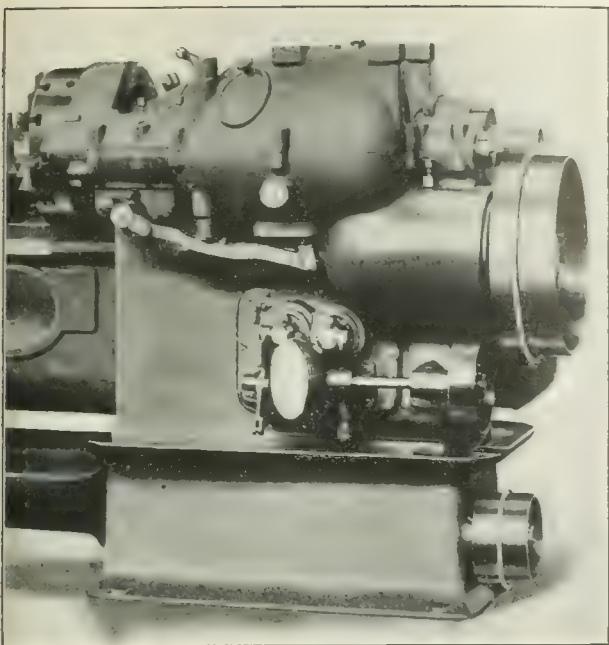


Fig. 2. Rear View of the Headstock, Showing the Driving Mechanism.

pin and clamp are operated by one lever, and the former is of hardened tool steel in a hardened tool steel bushed hole. Automatic stops are provided for each of the turret faces. A 10-in. die head can be mounted on the turret face and swing clear of the ways, as the centers of the holes in the turret faces are 9 in. above the ways. The turret is operated by hand and has rapid power traverse at the rate of 40 ft. per minute in either direction, irrespective of whether the feeds are engaged or not. One revolution of the pilot wheel moves the turret 1 in. and gives a powerful leverage when coming up against a heavy cut. A sight indicator is furnished which tells the operator the depth of the cut if he should want to use it after the turret stop has operated.

Other Features

All the feeds are positively geared, and those in each apron are entirely independent of the other, both as regards amount and direction. Nine feeds ranging in either direction from 0.25 to 0.00391 in. per minute are available for the turret, while the tool post carriage has six feeds ranging from 0.25 to 0.00781 in. per minute. The tool post carriage cross feeds are one-half the longitudinal feeds, but if desired can have the same range as the turret feeds and are reversible. Hand feeds are also available, one revolution of the wheel moving the carriage 1 in. Automatic feed trips are furnished for each turret face and laterally for each tool post face. After these trips have operated, an index pointer on a graduated scale on the turret indicates the amount of cut taken which is a great convenience in forming work to an accurate depth and thickness. Seven change gears are furnished, and any of the ordinary pitches of screw thread can be cut, including an 11½ pipe thread.

A steady rest which has a three-jaw universal chuck is feathered to a heavy shaft on the back of the machine, so that when in use it is clamped to the back way and rests firmly upon it. When in use it is not fastened to and does not interfere with the use of any other part of the machine and can be thrown back out of the way when not being used.

Cast iron oil pans are placed at a convenient height from the floor and the cutting lubricant drains into a large pan in the center of the machine containing a strainer. From here the lubricant flows into the front leg of the machine which contains the reservoir, and from the latter is pumped back to the work by a rotary pump located on the back of the machine and driven from the rapid traverse shaft. A pressure valve is provided for the pump, and when the flow is shut off at the work the lubricant is by-passed back to the reservoir. One of the special features of the lathe is an exceptionally complete

lubricating system for the running part. Ring oilers fed from reservoirs having sight gauges are employed for the main bearings, and the oil is distributed on the shafts by a system of spiral grooves. All the parts of the apron, the feed box and the rapid traverse requiring lubrication have oil tubes leading to them.

The following table gives the principal dimensions and specifications of the lathe:

Swing over ways, inches	78
Swing over carriage, inches	16
Overall length, feet	70
Travel of turret, inches	40
Travel of carriage, inches	40
Diameter of hole in spindle, inches	3½
Diameter of hole in turret face, inches	3¼
Diameter of chuck, inches	16
Width of driving belt, inches	4
Shipping weight, pounds	6,000

The regular equipment of the machine includes either a one or two speed countershaft as may be desired, but brackets for motor drive can be supplied to order instead.

A Suggestive Antiaccident Epigram

The employees of the Indiana Steel Company, at Gary, Ind., pass beneath the sign herewith illustrated every time they go on shift. The picture tells a complete story. It is not only a caution against carelessness that may result in injury, but a notification that workmen whose



carelessness may cause an accident are not desirable employees.

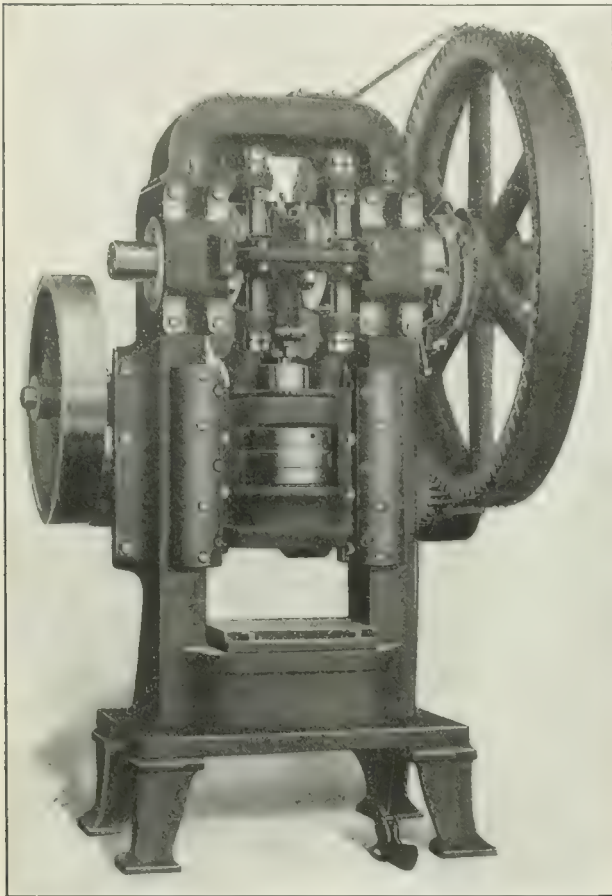
American Society for Testing Materials.—The fourteenth annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., Tuesday to Saturday, inclusive, June 27 to July 1. This year it is expected that most of the papers and committee reports will be printed and circulated in advance of the meeting. The present membership of the society is 1342.

The Board of Trade of Easton, Pa., has acquired a large tract of land in the suburbs of that city, with a spur connecting with the Lehigh Valley Railroad. The Board of Trade has \$600,000 available capital for the purpose of promoting industrial enterprises seeking locations. It is its intention to furnish sites, take stock and assist in every way possible those who would locate there.

The Waterbury Cam Pillar Press

A line of double-acting cam pillar presses known as the special No. 8 press is being built by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn. They are used for heavy cutting, forming and drawing, and have a capacity for drawing or cutting steel shells 4 in. in diameter, 1/2 in. thick and 2 in. deep. The No. 4160 machine, which is one illustrated, is used for drawing shells where they pass through the die and strip from the punch, falling through the bed of the press into some receptacle placed beneath it.

The construction of the machine is very rigid to withstand the severe work to which it is subjected and to develop the necessary power, back gears are used. Round nuts having holes for use with a pin wrench provide for the adjustment of the cutting slide up and down the



The No. 4160 Double Acting Cam Pillar Press Built by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn.

sleeve. This sleeve is attached to the yokes against rolls in which the cams act, an arrangement which keeps the bottom of the cutting slide always parallel with the bed of the press. The center or drawing slide is driven by a ball connection.

Another type of press known as the No. 4182 is employed for cupping and forming, and is equipped with a single motion and a cam actuated knock-out for lifting the shells from the die. On this machine the cutting slide remains down after cutting the blank until the center slide has operated and has risen 10 degrees.

The cams in both of these machines are of hardened tool steel, while the rolls are bronze bushed and revolve on hardened and ground tool steel pins. The crank shaft runs in bronze lined capped bearings, and the back shaft in bearings lined with babbit metal.

The following table gives the principal dimensions and specifications of the two presses:

	No. 4160, No. 4182	
Distance from bed to center of crank shaft, inches	56 1/4	58 1/4
Distance from bed to cutting slide when down, inches	12	13 3/4
Distance from bed to drawing slide when down, inches	13	16 3/4

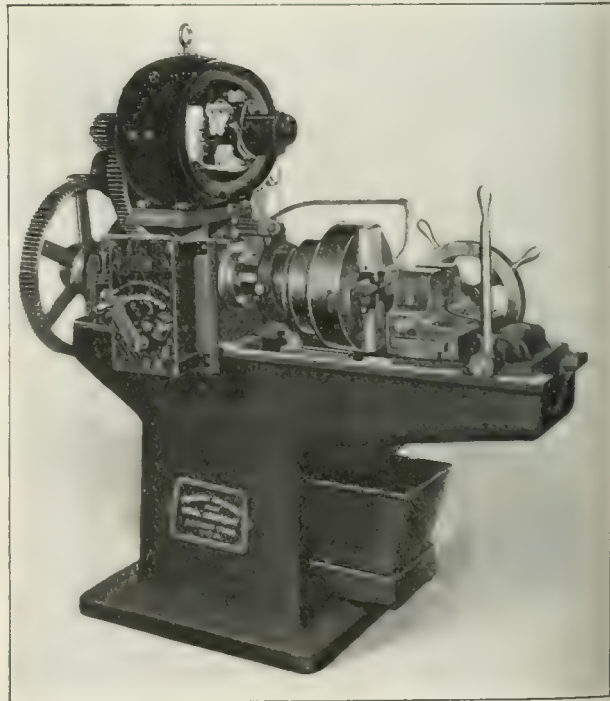
Standard length of cutting slide stroke, inches.	2	3 1/2
Standard length of drawing slide stroke, inches.	9	8
Distance from bed to bottom of ways, inches..	12	13 3/4
Distance between ways, inches.....	20	20
Depth of bottom of cutting slide, inches.....	13 1/2	14
Diameter of bottom of drawing slide, inches..	7	7
Distance between uprights at bed, inches.....	25	25
Depth of top of bed, inches.....	24	24
Diameter of opening through bed, inches.....	9	9
Length of knock-out stroke, inches.....	..	3
Thickness of bolster plate, inches.....	3 1/4	4
Cross section of uprights, inches.....	11 1/2 x 7	11 1/2 x 7
Floor space required, inches.....	75 x 82	73 x 80
Overall height, inches.....	120	123
Diameter of flywheel, inches.....	30	38
Face width of flywheel, inches.....	6 1/2	6
Ratio of gearing.....	17.7 to 1	17.7 to 1
Weight of flywheel, pounds.....	600	680
Weight of press, pounds.....	19,850	22,630

The equipment of the presses includes the builder's patented Johnson clutch and a set of wrenches for making all the necessary adjustments. As these presses are generally built to order, the bottom of the drawing slide can be made to suit any tool which the purchaser is using at the time the order is placed.

The Murchey Motor Driven Pipe Threader

A new single head motor driven semiautomatic pipe threading machine designed especially for mill and factory work has recently been placed on the market by the Murchey Machine & Tool Company, Detroit, Mich. It is rigidly built to withstand the hard and continuous service required of a machine in constant operation and one of the chief features claimed for it is the rapidity with which it turns out work. In general construction and mechanical operation, the threader is similar to the No. 2 semiautomatic double head nipple and pipe threading machine made by this company. The die head with which both of these machines are equipped is of the maker's improved automatic opening type which was described in *The Iron Age*, June 3, 1909.

The construction of the machine throughout is heavy, and the semisteel journal bearings are of ample proportions, measuring 4 x 20 in. Machine cut gears with wide faces are used for transmitting power. The capacity of the threader ranges from 1/2 to 2 in. pipe, which it will thread and ream in one operation. It will cut threads of uniform size and length on pipes ranging from a close nipple to a full length pipe, and it is claimed that it is possible to cut 200, 1-in. standard threads per hour.



A New Motor Driven Semi-Automatic Pipe Threading Machine Built by the Murchey Machine & Tool Company, Detroit, Mich.

After the work is started in the die head, which is simply and strongly constructed and has few wearing parts, no further attention is required. The die head is composed of four principal parts: the body, the sliding collar, the adjustable shell and the die holders, and the adjustments for the different sizes and lengths of thread and the amounts of internal reaming for the end of the pipe are few in number and easily and quickly made. The dies are made of tool steel with plain straight backs, which are firmly held in position by a pointed set screw which enters a pit in the die so that the latter can be changed quickly. A special design of reamer is used, which can be quickly removed and easily sharpened without altering its form.

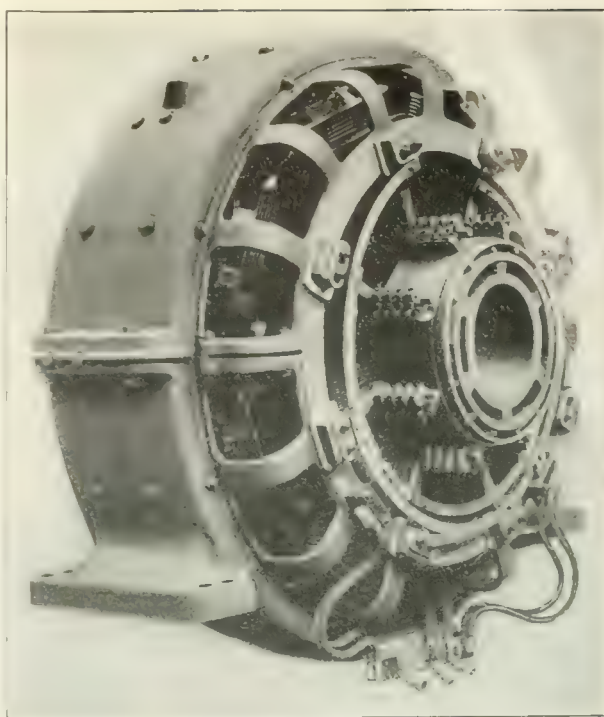
The quick-acting chuck has jaws of the chisel grip type that will not crush the pipe but will nevertheless grip it strongly with a slight pressure and can be easily sharpened on an emery wheel without drawing the temper. The jaws, a set of which is furnished for every size of pipe within the capacity of the machine, have long and rigid bearings and to prevent them spreading, the gripping screw is placed close to the work. The tempered tool steel threaded nipple tool holders employed for close nipples are made in halves and will grip the threaded end of the pipe without special attention on the part of the operator. For holding short nipples or long lengths of pipe, the regular gripping jaws are used and the projection of the pipe through these has no effect on the length of the thread. The reaming of the internal wall of the pipe is done at the same time that the thread is being cut, and there is an independent adjustment of the reamer for taking either light or heavy cuts as is desired. For cutting running threads 4 in. long, the reamer holder can be quickly removed. Bolt threading can also be done by this machine, but the rate of production is not as rapid as when it is employed for pipe threading.

The weight of the threader is approximately 1700 lb., and the floor space required measures 2 x 5 ft. When supplied with a motor, as shown, an adjustable speed 2-hp. motor having a speed variation of 4 to 1 is directly connected to the three-step cone pulley through a standard geared drive. If desired the machine can be furnished without a motor, and the speed of the countershaft is 200 rev. per min. The equipment of both types of threaders includes an automatic oil pan, a pump, an oil well and a drip pan.

The New Westinghouse Interpole Direct Current Generators

A new type of interpole direct current generators, possessing the ability to carry heavy overloads without sparking, thorough ventilation and ruggedness with relatively light weight has been developed by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. These machines are designed for furnishing current for two and three wire direct current systems, and are built in the customary sizes from 25 to 1000 kw. for operation at speeds conforming to the standard practice for engine drive.

In these machines, which are known as the type Q generators, sparkless commutation is secured by using small poles located between the main ones. The windings of these auxiliary poles are connected in series with the armature and set up a magnetic field, which annuls the effect of the field formed by armature magnetization and generates in the commutated armature coils an electromotive force which assists the reversal of the current at the instant of commutation. This electromotive force varies in proportion to the load and thus has the proper corrective effect at all loads, while at the same time a definite brush position is secured for all kinds of loads. Thus heavy overloads can be carried without sparking and flashing, and the wear on the commutator and the brushes is reduced to a minimum. The ventilation of all current carrying parts and the armature coils has received particular attention in designing these machines. All the windings are designed to give shallow coils, and the heat in any part has but an extremely



The New Type Q Engine Driven Direct Current Interpole Generator Built by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

short distance to travel before reaching the surface from which it is radiated. This feature of the design in combination with a very complete and thorough system of air circulation, it is claimed, prevents hot spots and at the same time secures a uniformity of temperature not obtained prior to this time.

Cast steel having a high magnetic permeability is used for the frames and furnishes a maximum amount of strength with a minimum of weight and space. The rotors of these generators are intended to be mounted directly on the shaft of the prime mover, which can be either a gas or a steam engine or an hydraulic or a steam turbine possessing the proper speed. The fields can be mounted either on masonry foundations or directly on the bed plate of the prime mover.

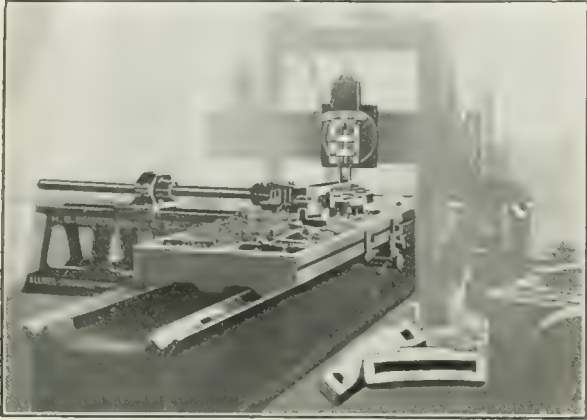
These machines are built in sizes ranging from 25 to 1000 kw. Up to 100 kw., the standard voltages are either 125 or 250, and from 100 to 300 kw. they are 125, 250 or 600 volts. All machines over 300 kw. are wound for either 250 or 600 volts, and all 250-volt generators are regularly equipped for a three-wire operation.

Wm. H. Washburne, formerly vice-president and sales manager of the Pyott Company, Chicago, has severed his connection with that company to engage in business for himself as direct mill representative. Offices have been established at 1030 Old Colony Building, Chicago, and Mr. Washburne will represent the following companies in the sale of the products mentioned in the Chicago territory: Beall Bros., Alton, Ill., shovel picks, spades, &c., blacksmiths' and miners' tools; Graves & Stamp, Desarc, Mo., hickory handles; Wm. Ganschow & Co., Chicago, metal and rawhide gears; Pyott Company, Chicago, power transmission appliances; Pyott Foundry Company, Chicago, general machinery castings; Sanford-Day Iron Works, Knoxville, Tenn., mining and dump cars, mining machinery, &c.; Highland Chemical Products Company, Connellsville, Pa., noncorrosive paint.

The Lufkin Foundry & Machine Company, Lufkin, Texas, has increased its capital stock from \$120,000 to \$200,000. The company states that the increase is for the purpose of meeting the demand of its fast growing trade. It recently erected a large brick and steel boiler and blacksmith shop, which has been equipped with new tools, and also increased the facilities in its foundry and machine shop. A large warehouse will probably be erected within the next year.

The Allner-Boswell Radius Planer Attachment

Various machines and methods have been tried at different times for machining motion links and obtaining the proper curve in the slot, but it has been demonstrated that for rapid and accurate work a device embodying the following six points should be used. The features which such an attachment should possess are an absolutely correct circle radius, a rigid construction, a wide range of adjustments for the rigging, absence of wear on all parts that might impair the accuracy of the curve, easy



The Allner-Boswell Radius Planer Attachment Manufactured by H. B. Underwood & Co., Philadelphia, Pa.

adjustments to radii of any length and interchangeability with straight planer work and a concentrated method of curve cutting so that the whole operation can be finished in one setting. In the Allner-Boswell radius planer attachment made by the H. B. Underwood & Co., 1026 Hamilton street, Philadelphia, Pa., all these points are said to have been covered.

This attachment enables very heavy cuts to be taken, and stands up to the limit of the machine tool without injury. A square block which is integral with the bottom plate that is fixed to the planer table transmits power for driving the top plate in the direction of the reciprocating movement. In this way the resultant of this force, combined with the resistance offered to the tool by the cut, is parallel with the motion of the tool, and the oscillating component of the mechanism is taken care of by an enlarged pin that surrounds the square block. This pin passes through an enlarged eye, and a retaining ring on the upper side of the eye forms the setting table. All the parts subject to stress have ample dimensions. The radial bar is subjected to very little stress, and on that account is made in the form of a comparatively light tube which is easily handled. This arrangement enables the adjustment for radii of different lengths to be secured by a guide that is double pivoted in a post sliding on a foot plate perpendicular to the movement of the planer tool.

After the link has been planed and milled around the edges and the end clearances drilled and slotted, it is set up on the chuck table by lining it up to a center line marked on the chuck. The center block is removed by parting with two tools simultaneously, and this operation, including the setting up of the link and lifting out the block after parting has been accomplished with a 3½-in. hammered steel link on a 15-hp. planer in 35 minutes. After parting the slot is finished by side tools kept steady in the other heads of the planer. In this way only one setting is required for blocking out and finishing both sides of the link, and at the same time absolutely correct inside and outside radii are secured.

The Firth-Stirling Steel Company's New Hand-Book.—The Firth-Stirling Steel Company, whose plant is at McKeesport, Pa., manufacturer of Blue Chip high speed steel and high grade tool steels for all purposes, has issued through its sales representatives, E. S. Jackson & Co., with offices in Chicago, Cleveland and Pitts-

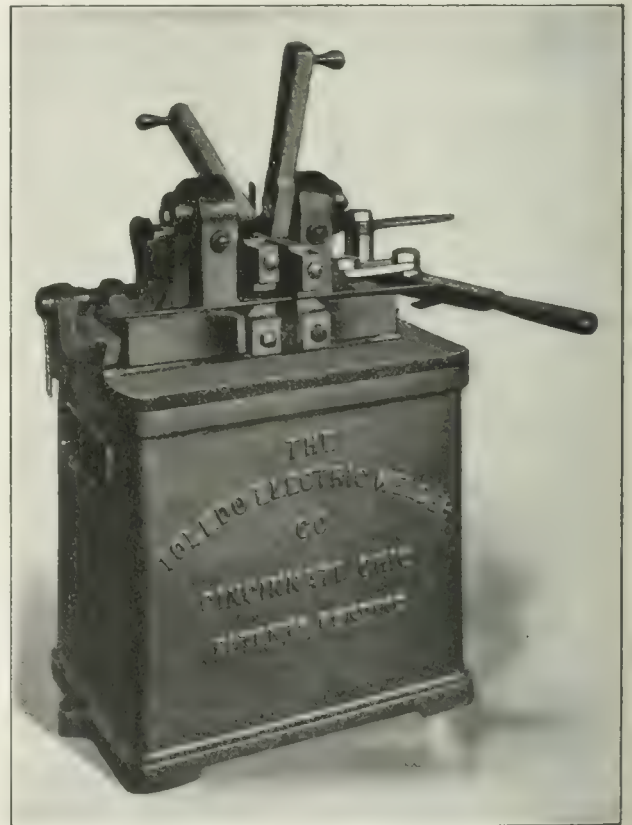
burgh, its new 1911 copyrighted hand-book, consisting of 64 pages, 3½ x 6½ in. The subjects treated include Blue Chip steel, tempering, special tool steel, alloy steel, stock list, extras, disc lists, drill rods, tables, memoranda, &c. It will be found of interest by every superintendent and manager of plants using tool steels in any form.

An Exceptionally Small Toledo Electric Welding Machine

A new welding machine, the special features of which are light weight and exceptionally small size, has been recently brought out by the Toledo Electric Welder Company, Cincinnati, Ohio. It is a small machine designed for butt welding stock ranging from No. 16 gauge wire to ¼-in. round iron or steel and weighs about 100 lb., as aluminum is employed in the construction of the case.

In operation the stock is clamped in the jaws of the welder by the lever handles at the top of the machine. The semiautomatic switch or compression lever at the right of the machine is moved toward the operator and the stock instantly begins to heat. When it has softened sufficiently, the ends are forced into contact with each other and the switch is then opened.

The time required to place stock in the jaws and complete the weld is from 3 to 5 seconds, and the cost



The No. 0 Electric Welding Machine Built by the Toledo Electric Welder Company, Cincinnati, Ohio.

for current based on a rate of 5 cents per kilowatt-hour is 35 cents per 1000 welds of the maximum size handled by the machine. This cost is proportionately lessened with a decrease in the size of the stock, since the current consumption decreases in direct proportion. To cut down the amount of current used when stock of a smaller size than the maximum capacity of the machine is to be welded a regulator is furnished as part of the equipment of the welder.

The following table gives the principal dimensions and specifications of the welder:

Distance from floor to center of jaws, inches.....	12½
Distance from floor to top of machine, inches.....	16½
Depth of jaw opening, inches.....	3
Width of jaw opening, inches.....	1
Size of dies, inches.....	5½ x 7½
Floor space, inches.....	11 x 8
Weight of machine pounds.....	100

The No. 5 Cincinnati Gear Cutter

A New Size of a Standard Automatic Machine

A new size of gear cutter capable of handling 16 x 48 in. blanks has been brought out by the Cincinnati Gear Cutting Machine Company, Elam street and Garrard avenue, Cincinnati, Ohio. It is a larger size of the builder's standard line, and like the No. 3A cutter which was illustrated in *The Iron Age*, September 30, 1909, in designing it an effort was made to secure rigidity, ample wearing surfaces and simplicity of parts. The power is transmitted from a single pulley running at a constant speed, and the various feeds and speeds are obtained by conveniently located transposing gears. All gibs are of the taper type and can be adjusted from the ends and

five to one, which reduces any binding action. The slide is fed forward and retracted by a screw. The adjustable dogs controlling the length of the cutter slide feed are operated by a crank wrench from the front of the bed and a retractable tappet for the dogs enables the slide to be run to the extreme rear position without disturbing the setting of the dogs when it is necessary to remove the blanks. For moving the slide by hand an automatic disengaging crank is provided. Twenty-four feeds arranged in two series of 12 each are provided for the cutter slide, which returns at a constant speed regardless of the rate at which it is fed forward. The extreme feeds are $\frac{1}{2}$ in. and $15\frac{1}{2}$ in. per minute.

The large diameter cutter spindle is accurately ground and wear can be easily compensated for. It is mounted in a bronze bearing which is capable of being adjusted longitudinally for centering the cutter to a

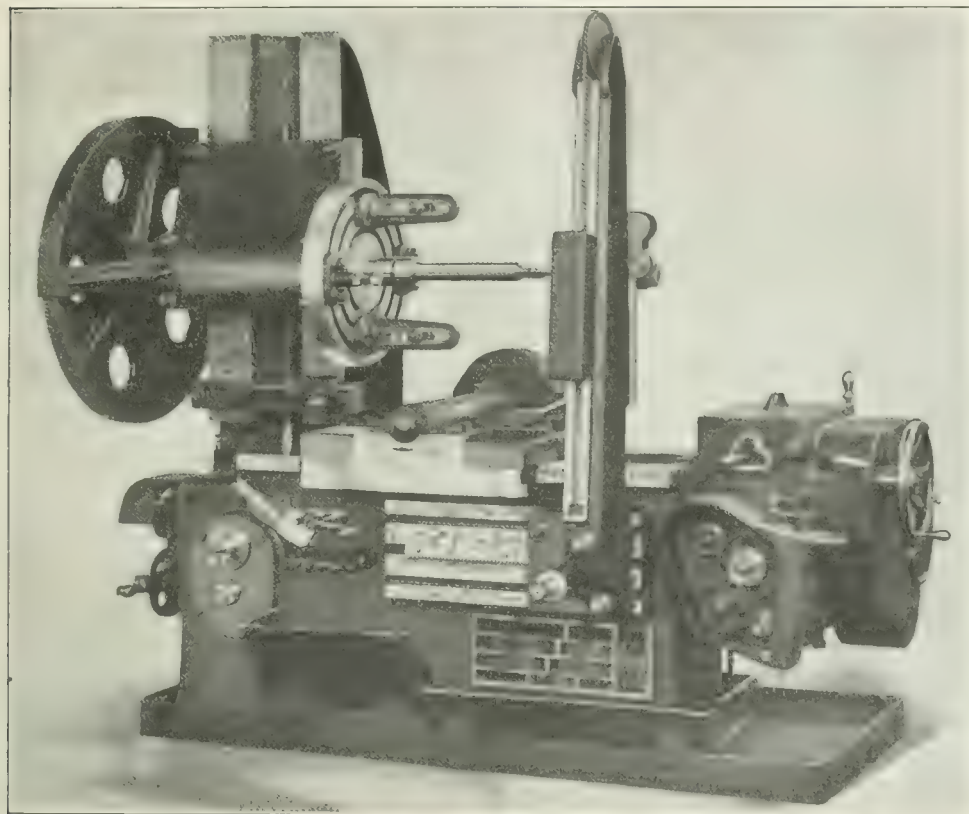
gauge furnished with the machine. A worm and a worm wheel are used to drive the spindle and any wear due to the end thrust of the worm can be taken up. For receiving the cutter arbor, which is keyed in the spindle and is drawn in and forced out by a threaded bolt, the cutter end of the spindle has a No. 11 Brown & Sharpe taper. A $1\frac{1}{2}$ -in. arbor is regularly furnished, but if desired others can be substituted, all of which are supported at the outer end by a removable bearing. Six spindle speed changes, ranging from 24 to 120 rev. per min., are available.

The construction of the indexing mechanism is very simple and it is claimed that there are fewer gears in the train than in any other machine on the market. If desired the index worm can

be quickly disengaged from the wheel and brought back into the exact meshing depth or it may be disengaged from the index gears, rotated any desired amount for resetting work and again secured to the gears. The feed for the cutter slide and the indexing mechanism are interlocked in such a way that it is impossible for cutter to advance until the work is properly indexed or when the cutter is feeding to index, thus preventing work from being spoiled. A hand movement under the control of the operator enables the work spindle to be spaced once or to revolve continuously. All numbers of teeth from 12 to 100 and from 100 to 450, with the exception of prime numbers and their multiples, can be cut by the index change gears regularly furnished. For cutting other numbers of teeth special gears can be supplied at an additional cost if desired.

The following table gives the principal dimensions and specifications of the cutter:

Maximum diameter of gear blanks, inches.....	48
Maximum face width of gear blanks, inches.....	16
Number of cutter slide feed changes.....	24
Minimum cutter slide feed, inches per minute.....	$\frac{1}{2}$
Maximum cutter slide feed, inches per minute.....	$15\frac{1}{2}$
Brown & Sharpe taper of work arbor.....	No. 16
Brown & Sharpe taper of cutter spindle.....	No. 11
Diameter of cutter arbor, inches.....	$1\frac{1}{2}$
Number of cutter spindle speeds.....	6
Minimum cutter spindle speed, revolutions per minute....	24



The No. 5 48 x 16 In. Gear Cutter Made by the Cincinnati Gear Cutting Machine Company, Cincinnati, Ohio.

all the shafts and the spindles are accurately ground and journaled in bronze bushings. All of the movements are automatic, each depending upon the preceding one and being prevented from taking place until that has been completed.

The work saddle is attached to the housing by gibs in such a way that the work arbor and the blank do not drop out of parallelism when the clamps are loosened for adjusting the work for the tooth depth. A single lever operates the power elevating device for the work saddle in either direction, and when the device is not in use no gears are running. A separate belt is not required for this device, as the power to operate it is taken from the machine pulley. A hand adjustment and a micrometer collar graduated to 0.001 in. are also furnished. The steel work arbor is accurately ground and journaled in bronze bushings and is provided with means for taking up wear. It is drawn in and forced out by a threaded shaft and a hand wheel. A face plate with a series of concentric T-slots and slotted dogs and jacks which can be clamped in any position on the face plate to permit of radial adjustment are furnished. A counterweight which is guided in a dovetail slot is provided for the work arbor support.

Rectangular guiding surfaces with long taper gibs for taking up wear, both vertically and horizontally, are provided for the cutter slide. The proportion between the length and the width of these guiding surfaces is

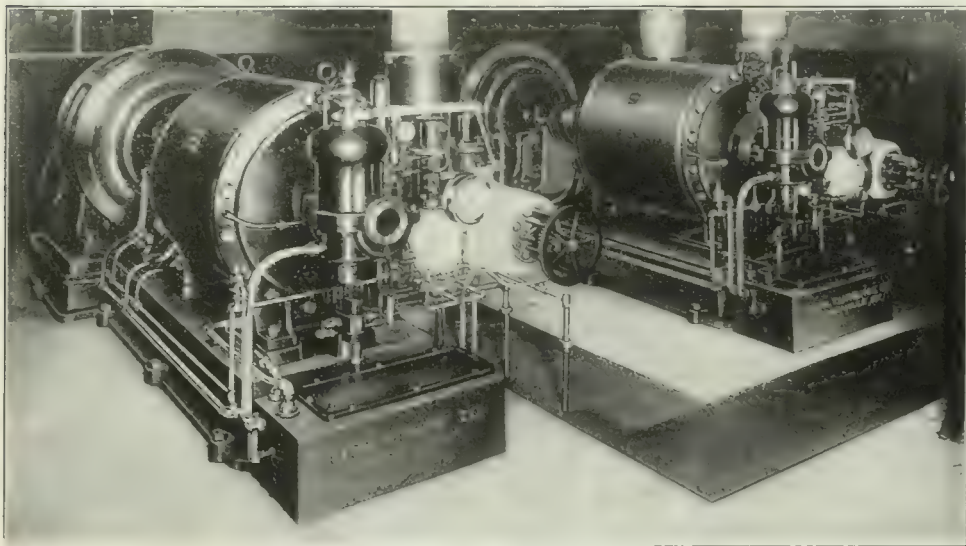
Maximum cutter spindle speed, revolutions per minute... 120
 Diameter of counter shaft pulleys, inches... 18
 Face width of counter shaft pulleys, inches... 5 1/2
 Speed of countershaft pulleys, revolutions per minute... 285
 Floor space required, inches... 101 x 53
 Net weight of machine with countershaft, lb... 7,740

The equipment regularly furnished with the machine includes an outer support for the work arbor and a rim support for the gear blanks together with a countershaft and tight and loose pulleys. If desired the machine can be furnished with the tight and loose pulleys mounted on the initial shaft and it can also be arranged for motor drive.

Kerr Turbines in the New York Post-Office

As few of the Government buildings are equipped with steam turbines for lighting purposes, the recent installation of two turbo generating units in the New York Post-Office is interesting. These supply current to the Moore vacuum tube lighting system, and each consists of a 200-kw. steam turbine built by the Kerr Turbine Company, Wellsville, N. Y., direct connected to a Crocker-Wheeler generator mounted on the same base.

The turbines use steam at 135 lb. pressure and run noncondensing. The governing mechanism is particu-



The Turbo-Generators Supplying Current to the Moore Vacuum Tube Lighting System in the General Post-office, New York City. These Units Were Built by the Kerr Turbine Company, Wellsville, N. Y.

larly sensitive and prevents any racing due to sudden changes of load. In fact, the extreme variation in speed from no load to full load does not exceed 2 per cent., and the momentary variation during any fluctuation within the rated capacity does not exceed 5 per cent. The regulation is secured by a governor of the centrifugal type actuating the throttle valve through a system of levers to regulate the admission of steam as required by the load. In addition there is an emergency stop governor which instantly shuts off the steam if the load drops suddenly or an excessive speed is reached.

The generators are of the revolving field type and deliver two-phase, 60-cycle, 230-volt alternating current. The frames are circular in form and possess high permeability, the field coils being wound on spools mounted on steel laminations with the windings carefully insulated. The armature spiders are of cast iron with the laminations and the windings constructed to produce a perfect mechanical and electrical balance. Air ducts provide a free circulation of air around the ends of the windings through openings in the outer frame. A separate direct current 125-volt unit mounted on each generator shaft furnishes the necessary excitation to maintain a pressure of 230 volts at the generator terminals. The excitation has a wide range, enabling the voltage to reach as high as 230 or as low as 200 under normal speed and full load conditions.

Before the turbines and the generators were accepted by the Treasury Department, both were tested at the

shops of their respective builders by Government inspectors. The turbines were tested for steam consumption per brake horsepower with a prony brake at 25, 75, 100 and 125 per cent. of their rated load at a steam pressure of 135 lb. and a 30-degree superheat. The following results were obtained:

Load. Per cent.	Pounds of steam per b.h.p. per hour. Turbine 1.	Turbine 2.
50	41.6	43.6
75	40.6	41.2
100	38.4	38.7
125	39.3	38.9

The generators under test showed efficiencies of 89.6 per cent. at one-half load, 92.4 per cent. at three-quarter load and 93.9 per cent. at full load. They were designed to run continuously for 12 hours at full rated current output with no part of the armature or field coils showing a temperature rise above the surrounding air of 35 degrees C., and they can carry a 25-per cent. overload for two hours, without injurious heating, successfully.

The American Association of Commerce and Trade, Berlin

For the purpose of aiding American manufacturers and business men in introducing their wares into Germany, the American Association of Commerce and Trade was organized in Berlin eight years ago by American business men having trade relations with the German Empire. The association, carried on as an American Chamber of Commerce, with its Board of Directors and its committees, is doing an unselfish work in aiding American manufacturers. The secretary, George S. Atwood, for the past 20 years in close touch with the German business world and the German Government departments, is able to answer promptly all inquiries

and save time in the establishment of American branches. The association is a live organization, as frequently evidenced by the gatherings of business men at its fine quarters, 59, 60 Friedrich-Strasse, Equitable Building, and at a very recent date by its dinner given to its Hamburg members at Hotel Atlantic, Hamburg, when the American ambassador, the presiding burgomasters of Hamburg and Lubeck, the presidents of the Chambers of Commerce in these cities, and representatives of the Hamburg-America Line and Hamburg's leading bankers and financiers were present as guests of the association. Its work extends over the entire United States and throughout Germany. It invites American business men to seek its help.

The Boston office of the Triumph Electric Company, Cincinnati, has been removed from 101 High street to 92 Pearl street. C. A. Cotton is district office manager. This change of location was made necessary by the large increase in the volume of business and the necessity of having larger and more commodious quarters.

The Warwood Tool Company, Warwood, near Wheeling, W. Va., manufacturer of hammers and track tools, recently struck gas on its property. The well showed a pressure equal to 4,000,000 cu. ft. of gas per day, which will be utilized in the heating furnaces of the plant. While the supply will likely last for several years, the company intends to drill another well.

The Cincinnati Heavy Duty Pulley Lathe

The Cincinnati Pulley Machinery Company, Cincinnati, Ohio, has recently designed a line of all geared heavy duty pulley lathes. Roughing cuts with a fine feed have to be taken on a machine of this character, and the finishing cut with a broad nose goose neck tool is

turn drives a worm and worm wheel in the apron. This worm wheel has a friction, and spur gears on the friction disk mesh with gears on the tumbler plate, which can be thrown to furnish a feed in either direction to the top slide. From this plate the power is transmitted to the gears on the cross feed screw.

The lathe has a three-step cone pulley and a two-speed countershaft, the speeds of the latter being 225 and

300 rev. per min. This combination gives six spindle speeds ranging from 7 to 30 rev. per min. The power is transmitted from the cone pulley shaft through gearing to a large intermediate gear, and from there to the intermediate gear A, Fig. 2. This in turn meshes with the gear B on the clutch gear in the gear box. When the lever in the gear box is thrown to the right, the clutch is engaged with the clutch gear transmitting motion to the tumbler shaft, which has four gears mounted upon it. By bringing these into mesh with the four gears on the cone shaft, six feeds are obtained, while throwing the lever in the opposite direction renders six more feeds available, thus giving 12 feed changes, rang-

ing from 1-32 to $\frac{1}{2}$ in. per revolution of the spindle. The motion to the worm shaft is transmitted through a bevel gear on the worm shaft meshing with a pinion on the pinion shaft, and between the pinion and the worm shaft universal joints are interposed on each side of the machine to care for changes in the position of the latter shaft when the table is swiveled.

The Allen-Bradley Company's Electrical Products.—McCoy & Brandt, House Building, Pittsburgh, dealers in new and second-hand machinery, represent the Allen-Bradley Company in the Pittsburgh district in the sale of that company's controlling apparatus, in which is incorporated the well-known graphite compression resistance of which the company is the sole patentee and exclusive manufacturer. Its products include constant speed rheostats, automatic overload releasing rheostats and rheostat panels and a complete line of alternating current rheostats and reversing controllers for crane and similar reversing motor duty. It will also soon commence the manufacture of a line of automatic motor controlling rheostats. The Allen Bradley Company is located at Milwaukee, Wis., occupying a building about 60 x 120 ft., four stories, of steel and brick construction, in which the most modern equipment is used throughout.

William Gardam & Son, Inc., expert and general machinists and manufacturers of adjustable multiple spindle drilling machines, adjustable gang drills and sensitive drill presses, announce the removal of their offices and workshop May 1 from 221 Fulton street to 80 to 86 Park place, southwest corner Greenwich street, New York. The new quarters, being more commodious, will provide facilities for doing a much larger business than has heretofore been possible. Their works for the manufacture of their larger and heavier machines are at Arlington, N. J., but all communications should be addressed to the office in New York.

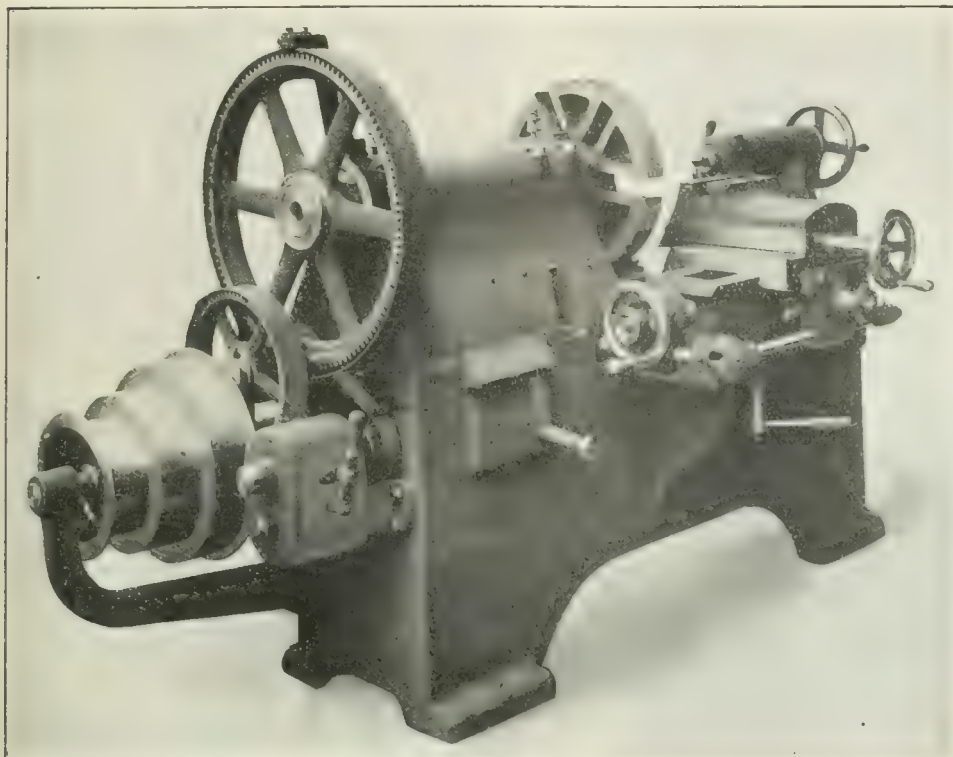


Fig. 1.—A New Heavy Duty Pulley Lathe Built by the Cincinnati Pulley Machinery Company, Cincinnati, Ohio.

very sweeping, so that the tool must have a wide range of positive feed changes. These lathes are intended to meet the increasing demand for a heavy and powerful tool possessing this important requirement. Fig. 1 shows a typical machine, while Fig. 2 gives a view of the change gear mechanism.

The lathe illustrated in Fig. 1 will turn gears, fly-wheels and pulleys having a diameter of 20 in. and an extreme face width of 14 in., and has 12 feed changes,

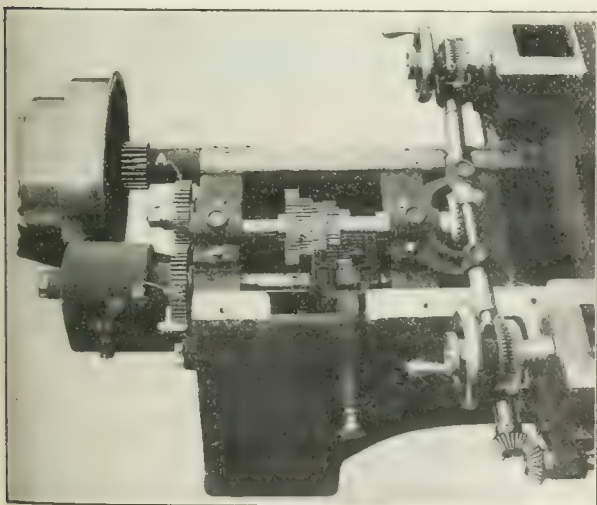
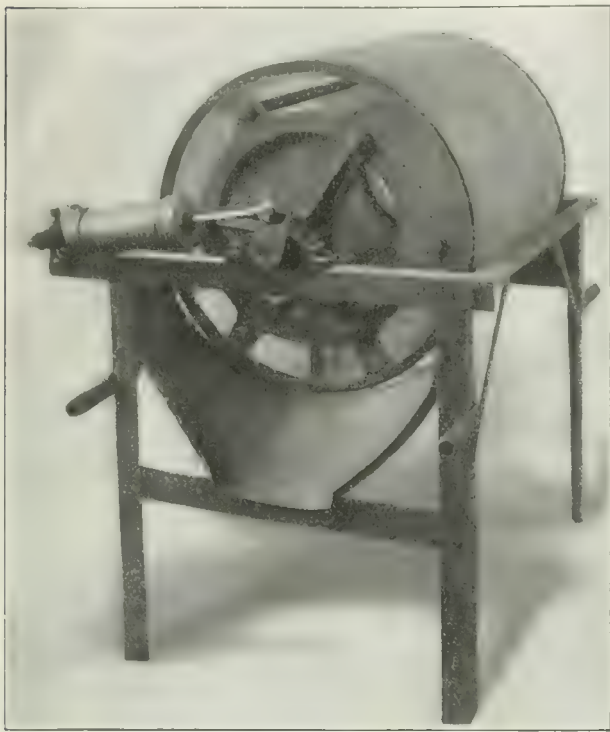


Fig. 2.—The Change Gear Mechanism.

the ratio between the two extremes being 16 to 1. The equipment includes either the engine lathe tail stock as illustrated or one of the swinging pattern. Power cross feed can be supplied by fastening a small apron to the saddle, the power being transmitted from the worm shaft through bevel gears to the feed shaft, which in

The Arcade Rotary Sand Sifter

The Arcade Mfg. Company, Freeport, Ill., has developed a machine for riddling sand in the foundry as fast as a man can keep it supplied. This machine consists of two wire cloth cylinders 30 in. long, mounted in a heavy revolving frame. The mesh of the inner cylinder, which is 14 in. in diameter, is $\frac{1}{2}$ in., while the 24-in. outer cylinder can be supplied with either No. 1, 5 or 6



A Rotary Sand Sifter for Foundry Use Made by the Arcade Mfg. Company, Freeport, Ill.

mesh as is required, and it is but the work of a moment to change the mesh.

In use the sand is shoveled into the inner cylinder at the far end and both cylinders are rotated by the piston at the opposite end. By a system of lugs and rollers the riddle is jolted four times during each revolution, which breaks the lumps and prevents the sand from clogging the mesh. In this way the sand passes through the sieve as fast as it is thrown in, and as the sieve is tilted slightly the foreign matter passes out through a chute at the end of the machine.

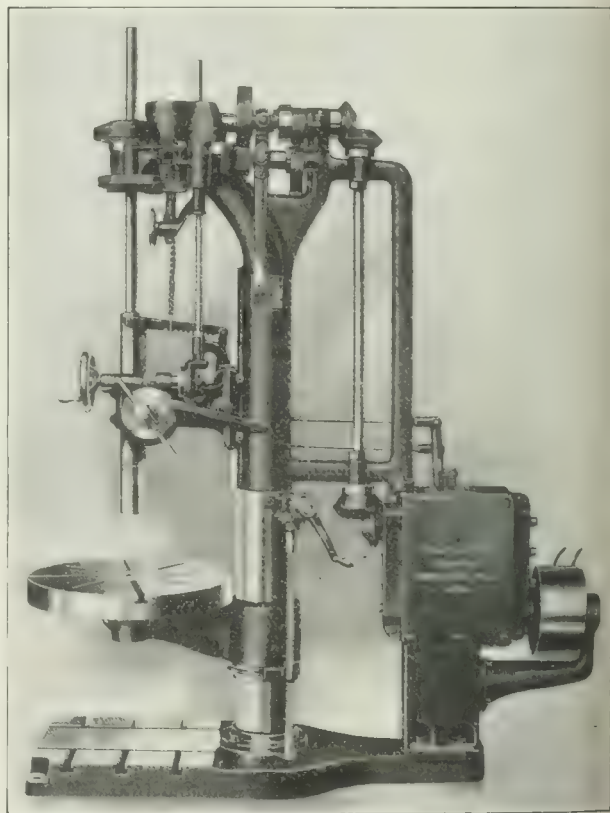
Angle steel is used in the construction of the frame which enables it to withstand hard usage, while at the same time two men can easily move it from place to place. The sifter can be operated either by hand or power. When hand operation is employed two men are generally used, one to shovel the sand into the sifter and the other to turn it, although there is a handle in the outer rim of the sand entrance so that one man can operate it without help, as the bearings are of the roller type and the cylinder revolves easily. The extreme height of the machine is 3 ft. 9 in. and the extreme width 2 ft. 5 in.

The Ziegler-Schryer Mfg. Company, Freeport, Ill., manufacturer of gasoline engines, has begun the construction of a reinforced concrete machine shop building. The plans provide for a large drafting room and superintendent's and administration offices on the second floor. Special attention has been given to the lighting and ventilation of the plant, while sanitary toilet and washrooms have been provided for the workmen. The main floor is arranged for overhead crane service. The heavy machine tools have a thoroughly worked out system of jib cranes, and industrial tracks serve all portions of the shop, so that heavy parts can be handled with the greatest expedition and economy. Many of the machine tools being installed are of special design. The contract provides for the completion of the building in 60 days.

New Prentice Ball Bearing Drill

In bringing out its new 30-in. geared speed change vertical drilling machine, the Prentice Brothers Company, Worcester, Mass., has made no changes in the design except that of equipping the tool with ball bearings throughout. This machine has 15 sets of ball bearings with races of high carbon chromium steel including those for taking the thrust. Experiments have demonstrated that this machine will drill any hole under the same conditions with the expenditure of one-half the power required for the same work where a machine equipped with ordinary bearings is used. It is the intention of the company to make this construction standard throughout its entire line, and at the present time experiments with a ball bearing radial drill are being made.

The back gears are so arranged in this drill that the speed of the spindle can be instantly changed or reversed without stopping the machine by simply operating the back gear lever, which is easily reached from the front of the column. Sixteen spindle speeds ranging from 12 to 309 rev. per min. are provided, as well as



A New 30 In. Drill with Geared Speed Changes and Ball Bearings Built by the Prentice Brothers Company, Worcester, Mass.

four geared feed changes. All of these changes are available without stopping the drill. An improved quick return and stop motion for the drill spindle also forms a part of the equipment.

The following table gives the principal dimensions and specifications of the drill:

Distance from center of spindle to column, inches.....	151
Maximum distance from spindle to base, inches.....	50
Maximum distance from spindle to table, inches.....	37
Vertical adjustment of table, inches.....	13 $\frac{1}{2}$
Vertical traverse of spindle, inches.....	14 $\frac{1}{2}$
Morse taper of spindle hole.....	No. 4
Overall height, inches.....	100
Diameter of spindle, inches.....	1 $\frac{1}{2}$
Diameter of table, inches.....	29
Diameter of driving pulley, inches.....	14
Face width of driving pulley, inches.....	3 $\frac{1}{2}$
Speed of countershaft, revolutions per minute.....	300
Net weight, pounds.....	2,800
Boxed shipping weight, pounds.....	2,860
Capacity of case, cubic feet.....	12 $\frac{1}{2}$

If desired, friction pulleys can be supplied for tapping or a special tapping device can be attached to the spindle.

The Machinery Markets

The event of the week was the appearance in the East of a list from the American Steel & Wire Company calling for more than \$100,000 worth of equipment for several of its plants. The New York trade is filling orders against one large railroad list and two automobile lists. Business is not so brisk in other parts of the country. The demand is irregular in Philadelphia, and there is keen competition for the business in sight. The machine tool demand has fallen off in New England, but there is a good call in that market for other kinds of mechanical equipment. A slight improvement is noted in Cleveland, where there is a fair demand for special machinery and electrical equipment. The foundries in the Cleveland market are busy with automobile castings. The machine tool business is fairly good in Chicago, but the general demand there is dull. Power equipment and quarrying machinery are being sold in the South. The Texas market has a cheerful tone. It is reported from there that there are many indications of a better business. Trade is sporadic in Cincinnati, the chief customers being the automobile builders and the railroads. More activity in the machine tool market is reported from the Pacific Coast, where some dealers claim they have done a better business of late than at any time in the last four years. Some good railroad buying is in sight in the San Francisco market. Business is generally good in Canada, and from all accounts increased buying can be looked for in that quarter.

New York

NEW YORK, April 26, 1911.

Although the general machinery trade is somewhat dull, business is better with New York machinery houses than in other parts of the country, as some large lists calling for metal working machinery are being closed out and some very good business is in sight. The American Steel & Wire Company has issued what is probably the largest list of the year, calling for more than \$100,000 worth of machine tools and special automatic machinery. A large part of the equipment is for delivery at Worcester, Mass., and some will be sent to Corey, Ala. The list was sent out by the general purchasing agent at Cleveland and from all accounts the Eastern machinery houses were the first to be favored with the inquiry. This list is only the forerunner of some extensive purchasing to be done by the subsidiary companies of the United States Steel Corporation. It is stated that further machinery requirements for the Corey plant will be called for in the near future. Some large orders were placed in this territory during the week by the Pope Mfg. Company, Hartford, Conn., and the Saurer Motor Company has been making further inquiries with a view to filling requirements included in its list now out. It is pretty certain that before the week is over the Ontario & Western Railroad will begin closing out its machine tool list, as assurances have been given that some of the purchases have been decided upon. While some of the leading houses are busy bidding against these large specifications, other machinery men are not so active. The demand for special machinery is very light, and manufacturers of woodworking equipment are experiencing a dull period. On the other hand, power plant men are busy, and the New York office of at least one manufacturer of power accessories has enough business on its books to give assurance that April will be its banner month for the year. There is an excellent call for Corliss engines and a large part of this machinery is wanted for replacement. The Standard Oil Company, which is generally a generous buyer of machinery in dull times when advantageous prices can be made, is purchasing a general line of mechanical equipment, chiefly for replacement, and most of its purchasing in this market has been for its large shops at Bayonne, N. J.

A Large Trade School List

Bids will be received May 30 by the Board of Education, Yonkers, N. Y., on a list of machine tools to be delivered to the Saunders Trade School by June 15. The list, which calls for an expenditure of fully \$15,000, follows:

Two 14-in. by 5-ft. lathes, arranged with three-step cone and double back gears in the headstock, complete with regular equipment, including compound rest, power cross feed, quick change gear feed mechanism and countershaft.

Eight 12-in. by 5-ft. engine lathes, arranged with four-step cone, back gears, complete with compound rest, power cross feed, large and small face plates, follow rest, steady rest, countershaft and wrenches, quick change gear feed mechanism.

One 15-in. by 5-ft. engine lathe, arranged with quick change feed, compound rest, three-step cone, double back gear, large and small face plates, steady and follow rests, complete with countershaft.

One 15-in. by 6-ft. engine lathe, arranged with geared head, taper attachment, complete with compound rest, large and small face plates, steady and follow rests.

One 16-in. by 6-ft. engine lathe, arranged with geared head, compound rest, power cross feed, complete with releasing attachment and all regular attachments.

One universal tool grinding machine with countershaft and surface and circular grinding attachments.

One 15-in. shaper with swivel table, power down feed, automatic step, graduated swivel base, arranged for D. C. motor drive.

One 18-in. shaper, complete with regular equipment, arranged for belt drive, with swivel table vise.

One 12-in. precision sensitive drill, complete.

One twist drill grinder complete, arranged for motor drive, with motor, to grind drills from 1/8-in. to 2 1/4-in., emery wheel 3/4 in., provided with guard.

One universal milling machine, constant speed drive, fitted with a 5-hp. motor wired complete with friction clutch, automatic vertical feed, complete with attachments.

One single pulley drive, heavy duty, Universal milling machine, complete with swivel base, center rest, universal chuck, tables for spacing and cutting spirals and No. 22 arbor and automatic feed.

One 28-in. drill press, arranged for motor drive, with gear, back gears, positive power feed, automatic stop, with tapping attachment, compound table and geared revolving table, complete.

One 14-in. combined turret chucking lathe and wire feed screw machine, complete, with three-jawed chuck.

One keyseater with regular equipment and countershaft.

One portable crane.

One motor driven oilstone grinder with AC motor.

One 36-in. band saw, arranged to be driven by individual motor, with guards for both upper and lower wheels.

One hand planer and jointer to plane 16 in. wide, with circular safety head, arranged for motor drive.

One hand planer and jointer to plane 6 in. wide, with circular safety cylinder, complete with countershaft.

Four 11-in. by 4-ft. lathes, with countershaft, complete.

One double forge with down draft hood.

One exhaust fan, direct connected to motor and inlet box, with one 2-hp. AC motor.

One motor blower direct connected to forge.

One 14-in. by 5-ft. engine lathe, complete with compound rest, countershaft, large and small face plates, center rest, tie-bar headstock.

One 14-in. by 5-ft. engine lathe, cone headstock, complete with compound rest, countershaft, large and small face plates, center rest.

Four engine lathes, 14-in. by 5-ft., arranged with quick change feed, complete with compound rest, large and small face plates, center rest and countershaft.

The American Radiator Company, whose main offices are at Chicago, Ill., with New York headquarters at 104 West Forty-second street, has purchased a large tract of land at Forty-ninth street, Bayonne, N. J., between the tracks of the Lehigh Valley Railroad and New York Bay. The company has not as yet made an announcement of its plans, but it is said that it intends to use the property for the erection of a plant which will give it manufacturing facilities at tide-water.

The International Steam Pump Company, through its foreign branch, has obtained a contract to build municipal water works at Buenos Ayres, the estimated cost of which will be \$1,090,000. The company has not decided as yet at which of its plants the pumping equipment will be made, but it is understood that the fulfilling of the contract will entail expenditures in the general market.

The Standard Compress Company, 115 Broadway, New York, has been organized to build cotton compresses. The company controls patents obtained by Charles J. Luce of Niantic, Conn., who is general superintendent of its mechanical department. It is understood that at first the company will have its machines made by contract.

The Lauter Piano Company, Newark, N. J., has plans completed for a large piano manufacturing plant at Sussex avenue and Durvea street, Newark, in which will be installed considerable woodworking machinery, machine tools and special machinery. The plant will consist of two buildings, each 50 x 150 ft. and six stories. The American Concrete Steel Company has the contract for the erection of the structure.

Kops Brothers, corset manufacturers at Twelfth street and Fourth avenue, New York, will receive bids on two 150-kw. and one 150-kw. power units to be installed in a new plant at Sixteenth street and Irving place, New York.

S. Sternau & Co., manufacturers of art metal goods, have

THE MACHINERY MARKETS

let a contract to the Fuller Construction Company, 11 Broadway, New York, for the erection of a 10-story and basement building, 85 x 122 ft., which is to be built at 195 Plymouth street, Brooklyn, N. Y.

The Otto Higel Company, Ltd., Toronto, will soon establish a large plant in Buffalo, N. Y., as its United States branch for the manufacture of its patent piano players. Aluminum is to be used in place of other metals in the manufacture of these players.

The Floss Shade Roller Company, Ogdensburg, N. Y., has let the contract for building a three-story factory to replace a building recently burned. Chas. F. Floss is president, Brooklyn, N. Y.

The American Locomotive Company will build at its Brooks plant, Dunkirk, N. Y., a wheel shop 120 ft. long, to be erected on a portion of the site of the old boiler shop. The remainder of the old boiler shop will be remodeled and used by the machine shop department; the rebuilt shop to be 90 x 400 ft.

Cornell University, Ithaca, N. Y., will soon receive bids for the erection and equipment of a machine shop and carpenter shop, 50 x 169 ft., three stories, with wing, 32 x 45 ft., three stories, to be built in connection with Sibley College.

The Star Electric Company, Binghamton, N. Y., will build a two-story factory, 60 x 90 ft.

The Spirella Company, Meadville, Pa., manufacturer of corsets, will move its plant to Niagara Falls, N. Y., where it has acquired a site of 4 acres on Whirlpool avenue at the north end of the city, and will erect manufacturing buildings which will cost about \$500,000, between the street and the edge of the high bluff overlooking Niagara Gorge. Contract has been let to Westinghouse, Church, Kerr & Co., New York City, for the first group of buildings, comprising the main building and two wings, each 50 x 300 ft., two stories, to cost \$200,000. The company will also erect a branch factory on the Canadian side of the river at Niagara Falls. W. W. Kinkaid is president of the Company, and J. H. Pardee, treasurer.

The Kitchenette Company has been incorporated at Buffalo, N. Y., with a capital stock of \$25,000, to manufacture household articles and utensils. The incorporators include Frank A. Converse and Philip B. Cary, Buffalo, and Eugene Cary, Niagara Falls. The company has established its factory at North Tonawanda, N. Y., temporarily, but will soon remove to Buffalo. Offices are at 728 Ellicott Square Building.

The De Carie Incinerator Company, Minneapolis, Minn., has received the contract for the construction of the rubbish incinerating plant for the city of Rochester, which will cost \$83,000.

The Ferrand Mfg. Company has been incorporated at Gardenville, N. Y., near Buffalo, with a capital stock of \$50,000, and purchased the Schoepflin Mills, with water power rights for a flour and feed mill. The mill will be enlarged and equipped with up-to-date machinery. Augustus B. Ferrand, president.

The Peerless Silk Finishing Company, Nyack, N. Y., has completed plans for a new silk finishing mill, 90 x 90 ft., three stories, which it will erect at once.

The Frontier Elevator & Milling Company, Buffalo, N. Y., will build a reinforced concrete elevator tower and equip it at a cost of \$20,000.

Chicago

CHICAGO, ILL., April 25, 1911.

A fair amount of machine tool business continues to come forward as the season advances, but it is plainly evident that unless something very unusual occurs the year's business is going to fall far short of normal. Many machine tool houses are complaining about sales, and, without exception, business is falling behind the records made by these firms in years. Collections are slow, and the matter of credits is receiving rigid scrutiny since the recent failures in the machinery district. A spirit of uneasiness seems to prevail, and this is only natural when a review of the past six months shows that machinery supply houses have been doing less than 60 per cent. of what they have come to call a normal volume of business. A disposition on the part of buyers to delay actual purchases until after the close of their fiscal year is plainly evident, and, while new lists are expected, little actual buying is anticipated until July 1.

The Illinois Central bids on recently issued lists were closed April 21. The Santa Fe will place its order by the middle of next month for delivery July 1.

Among purchases closed the Rock Island Railroad list amounting to about \$10,000 is the largest. This business was fairly well split, several local dealers sharing it.

McDowell, Stocker & Co.'s business is now being conducted by a receiver, pending a reorganization. Negotia-

tions have proceeded to such a point that the reorganization seems assured, and it is expected to be accomplished soon.

The Channon Emery Stone Company, Quincy, Ill., has near completion a new building, 50 x 125 ft., two stories, the first floor of which will be used as a cleaning room and the second floor as a mounting room.

The Kurtz Action Company, Rockford, Ill., manufacturer of piano actions, has increased its capital stock from \$100,000 to \$400,000, and is having plans prepared for extensive additions.

James W. Love, Joliet, Ill., carpenter and general jobber, is erecting a three-story fireproof factory building, which is to be arranged especially for shop and light factory purposes. The building will be 50 x 66 ft., and each floor will be divided longitudinally in the center, making six shops, 25 x 66 ft. One of the shops will be occupied by James W. Love, who will move the equipment he now has in his present location, and will also install a new planer. Whether a heating and power plant will be installed depends upon the requirements of future tenants.

The National Machine Company, Milwaukee, Wis., is having plans prepared for a new machine shop, 55 x 100 ft., two stories, of brick and steel construction. The building will also have a basement 14 x 35 ft., which will contain the heating plant and lavatories. The first floor will be 16 ft. in the clear and equipped with a 5-ton traveling crane, and the second floor will be 12 ft. in the clear. An electric elevator will be installed later.

Among the different manufacturing industries being located at Marinette, Wis., is the Kreiter Mfg. Company, which is being moved from Milwaukee; the Marinette Wood Working Company and the Lignum Chemical Company. The Kreiter Company manufactures pianos and has taken over an existing plant, which it is equipping with the necessary machinery.

The Minn Billiard Company, Milwaukee, Wis., has plans completed for the erection of a new factory building, 120 x 157 ft., three stories. Considerable woodworking machinery will be purchased.

The National Brake & Electric Company, Milwaukee, Wis., has plans prepared for a test shop 60 x 120 ft., to be of fireproof construction. The building will be used for testing gas engines and gas driven locomotives manufactured by the company. The company just completed an addition to its machine shop at a cost of \$150,000.

Bonds in the amount of \$46,000 have been voted by Longmont, Colo., for the construction of an electric light plant.

The Northwestern Steam Boiler & Mfg. Company, Duluth, Minn., has been purchased at receiver's sale by Michael S. Bright of that city, who advises that he has not decided upon plans for the future.

The Rice & Dayton Mfg. Company, Cedar Falls, Iowa, automobile supplies, is having erected a factory building 64 x 100 ft., of concrete construction. The building will be three stories and will be equipped with an electric elevator.

The Reliance Brick & Tile Company, Belle Plaine, Iowa, has been incorporated, with an authorized capital stock of \$400,000. The company has purchased 100 acres of land on the Chicago & Northwestern Railroad, containing extensive clay deposits, and will erect a brick and tile plant covering 5 acres, with a daily capacity of 100,000 bricks. Contract for the first unit of the plant has been let to the Nelson Construction Company, Miles City, Iowa, and work will be commenced at once. Twelve kilns will ultimately be installed. The company will operate its own electric light and power plant. The officers of the company are W. R. Law, president; P. W. Smith, vice-president; H. E. Law, treasurer; R. A. Law, secretary, all Waterloo capitalists.

Fred J. Cross is constructing on the Wapsipinicon River, at Central City, Iowa, a dam and power station of about 500 hp. capacity. Mr. Cross has franchises to light the towns of Central City, Alburnett, Center Point, Urbana and Walker.

The City Council of Mandan, N. D., has called a special election to be held on April 24, for the purpose of voting a bond issue of \$80,000 to be used for the construction of a water works system.

The Cottagewood Water & Light Company, Deephaven, Minn., has been granted a franchise to install a water works system. The company will also remodel its light plant.

New England

BOSTON, MASS., April 25, 1911.

The demand for machine tools has decreased rather than increased during the past fortnight. The manufacturers, with a few exceptions, agree with the dealers in this, which indicates that this territory is no exception to the rule throughout the country. Manufacturing machinery—that is to say, tools used in producing articles other than machin-

THE MACHINERY MARKETS

ery—are selling in fairly good volume, however. Apparently the nearer a product is to the consumer the better the trade condition in the metal lines. The tool steel people find that their market corresponds closely to that of the machine tool trade. The labor bureau conducted by the Boston branch, National Metal Trades Association, reports a slightly increasing demand for labor. The month of May is usually one of the largest of the year. The weather has been unusually cold and dreary, which always has a certain amount of influence on buying, and some degree of improvement seems almost inevitable.

The Southington Mfg. Company, Southington, Conn., manufacturer of hardware, has purchased the business of the W. A. Ives Mfg. Company, Wallingford, Conn., manufacturer of bit braces, and will remove the factory to Southington. The business will occupy an addition to the building of the Southington Industrial Improvement Company, one 30 x 33 ft., two stories, the other 30 x 35 ft., one story. The company states that it will be in the market for all the machine tools required in the manufacture of braces. A complete line of screwdrivers and small tools is manufactured, and the bit brace department will add to the scope of the industry.

The Yale & Towne Mfg. Company, Stamford, Conn., manufacturer of hardware, is planning a new brass foundry, but the plans are not advanced to the point of details.

The Lapointe Machine Tool Company, Hudson, Mass., states that there is no truth in the statement published in the daily papers that the business would be removed to Middletown, Conn. The industry will continue at its present site, where it is housed in large modern buildings.

The Alderhurst Iron Company, New Haven, Conn., successor to the Yale Safe & Iron Company, manufacturer of architectural iron work, has moved to its new plant.

The Waterbury Machine Company, Waterbury, Conn., manufacturer of wire machinery, has been formally merged into the Waterbury Farrel Foundry & Machine Company, which has controlled it for several years. The formal announcement is that the Waterbury Machine Company's plant has been leased to the Waterbury Farrel Foundry & Machine Company, which hereafter will render invoices and receive payment for orders for the product. The change will not affect the personnel of the business.

The Central Autogenous Welding Company, Worcester, Mass., has reincorporated with a Massachusetts charter and capital stock of \$20,000. John A. Braithwaite is the president and Walter Winton treasurer and clerk. The company has recently begun the manufacture of a ball bearing polishing and buffing machine, in addition to its business of autogenous welding, and requires additional capital to extend the industry.

The American Optical Company, Southbridge, Mass., will establish a die sinking shop at Providence, R. I. The company does a very large business and uses many dies and has found the supply of skilled die sinkers insufficient in Southbridge.

The Billings & Spencer Company, Hartford, Conn., manufacturer of drop forgings and small tools, will build at its Hartford plant an addition 40 x 113 ft., three stories, and an additional story to a building 40 x 70 ft.

Philadelphia

PHILADELPHIA, PA., April 24, 1911.

The demand still shows considerable irregularity. The improvement recently reported has been of rather short duration, the current week's business having hardly been up to that of the previous week. Inquiries have again been less pronounced. Transactions have been largely confined to single tools, and buyers appear to be in no particular haste to close for tools under negotiation. There is practically no fresh railroad demand, and some of the inquiries which have been before the trade for some little time are reported as still being unclosed. Practically all of the business in the way of a general inquiry that comes before the trade is subject to keen competition, and reports of concessions and special considerations in order to effect a sale are frequently heard. Manufacturers are for the most part operating plants at a reduced capacity, particularly those making the standard types of tools; special tool makers are, however, somewhat more actively engaged, but in few cases are plants actually busy. The local locomotive builder is less actively engaged and will, it is understood, make considerable reduction in its working force. Second-hand machinery merchants report business as rather dull, reflecting the general condition of the trade. While manufacturers of various classes of products, other than large machinery users, are making additions to their plants and general factory buildings are being erected, there is little ahead that would indicate any heavy machine tool buying.

In the majority of these cases small power plants cover the bulk of the requirements of interest to the machine tool trade, although occasionally the installation of elevators and, less frequently, overhead traveling cranes are being considered. The foundry trade is not particularly active, although the demand for steel castings is a trifle better, but by no means up to normal.

The Williamson Bros. Company, in connection with announced plans for the extensions of its plant, has awarded a contract for a new erecting shop, 70 x 270 ft., and blacksmith shop, 40 x 50 ft., of brick and steel construction, at Edgemont and Aramingo streets, to George Kessler, Drexel Building. One and probably two 15-ton electric traveling cranes are to be installed.

The Haney-White Company has awarded a contract for the rebuilding of a portion of its plant recently destroyed by fire, which will be altered into a modern garage. A three-story addition, 50 x 75 ft., will be raised on the present building, and a one-story building, 50 x 150 ft., added. An automobile elevator and a large tank for fire protection are to be installed. When completed the garage is to have a capacity of accommodating some 75 automobiles.

The Union Saw Company, Frackville, Pa., states that the reorganization of its company has been completed, and that it is now making some changes to its machinery and installing new tempering and hardening furnaces, and will shortly be operating its plant full handed.

The American Pully Company reports a slight increase in the volume of business coming in, both from its foreign and domestic customers. The demand has been largely for its standard types of pulleys, heavy shipments of which have been made for export to Switzerland, England, Holland and South America. Shipments in carload lots have also been made to customers in various parts of this country.

H. S. Kerbaugh, Inc., has been awarded a contract by the Baltimore & Ohio Railroad for the construction of a double track tunnel through the Allegheny Mountains in the vicinity of Sand Patch, Somerset County, Pa., on which work will be started at once.

The Electric Storage Battery Company has awarded a contract for the erection of a six-story factory building, 115 x 300 ft., at Nineteenth street and Allegheny avenue, to John G. Brown of this city. The building is to be of concrete construction. No information as to the nature of the equipment required is available.

The Nicetown Plate Washer Company, Nicetown, Philadelphia, has installed new plate and alligator shears and has purchased a new 26-in. roll lathe. Its facilities for the manufacture of washers, as well as refined iron bars, have been considerably increased. In addition to turning its own rolls, it now does roll turning for the trade.

The City Council of Bridgeton, N. J., at a recent meeting, passed an ordinance providing for the issuing of bonds amounting to \$75,000, for the installation of a new water system, pumping station and filtration plant.

Benjamin Friedenwald, trading as Friedenwald Brothers, Baltimore, Md., is about to retire from the business of manufacturing automobile parts and has arranged for the disposal of his entire equipment, consisting of 44 engine lathes, sizes 13 to 72 in., and one each 72-in. and 36-in. planers, a Fosdick No. 2 floor boring and milling machine, and an assorted line of radial drills, drill presses, shapers and three large universal milling machines. The sale is under the direction of Mr. Campbell at the plant in Baltimore, Md.

Indianapolis

INDIANAPOLIS, IND., April 25, 1911.

Hetherington & Berner, Indianapolis, Ind., engineers, have under construction a new plant which will cover about 4 acres. The plant will be of fireproof construction. The company will enlarge its line of manufacture, and in addition to its specialty of asphalt paving plants and machinery will manufacture other kinds of contractors' machinery, including concrete mixers, road rollers, steam shovels, &c. The company will also extend its operations in steel construction work.

The Smith Agricultural Chemical Company, Columbus, Ohio, will erect a large fertilizer plant at Indianapolis, Ind. A site has been secured along the right of way of the Vandalia Railroad and more than 7 acres of steel and concrete buildings will be erected.

The W. R. Clark Mfg. Company, Muncie, Ind., has filed articles of incorporation with \$30,000 capital stock. The company will manufacture safety cranks for automobiles, gasoline and other explosive engines. Plans regarding the erection of a factory have not been decided upon, but it is quite probable that a factory will be built in Muncie.

The business of the T. W. Warner Company, Muncie, Ind., manufacturer of automobile parts, has been incorpo-

THE MACHINERY MARKETS

rated with \$100,000 capital stock. The company has awarded contracts for the erection of factory buildings at Toledo, Ohio, at a cost of \$100,000.

The Knott Mfg. Company, Fort Wayne, Ind., recently incorporated with \$15,000 capital stock, has leased a plant located on the Nickel Plate tracks in that city, which it is equipping with the latest improved machinery, to be motor driven. The company will manufacture closet tanks and seats, which will embody new and practical ideas.

The F. & N. Lawn Mower Company, Richmond, Ind., has under consideration the erection of a new factory building, plans for which have not yet been determined upon.

Allen & Price, Washington, Ind., who have a plant in course of erection at Gonzales, Texas, are in the market for a combined punch and shear, drill press, pneumatic riveter, blacksmithing outfit, saw and electric motor, and will place the order within the next 30 days.

The Merchants and Manufacturers' Association of New Albany, Ind., has been organized for the purpose of protecting the interests of shippers there. The iron trade is well represented in the membership, Henry Terstegge of the O. K. Stove & Range Company being one of the officers.

The S. J. Gardner Foundry & Machine Company, New Albany, Ind., has filed articles of incorporation with \$50,000 capital stock, and the following incorporators: S. J. Gardner, Frank S. Sisloff and Margaret C. Gardner. The business has been operated heretofore by S. J. Gardner individually, but recently some improvements have been made and the business enlarged. A sheet iron shop and a foundry building have been erected, and a considerable amount of new equipment installed. A cupola manufactured by the S. Obermayer Company has been put in. The company is not in the market for any additional machinery.

Cleveland

CLEVELAND, OHIO, April 25, 1911.

While the local machine tool and machinery market continues quiet some of the dealers report a slight improvement during the week. Orders are still nearly all for single tools. New inquiries are also small, the largest that came out during the week being for six tools. While business did not develop during April, as many had expected, the month will show a little improvement over March. The rubber industry in Akron is bringing a fair volume of business at present in machinery for making molds for automobile tires. The demand for heavy handling machinery continues light. A local maker of bolt and nut machinery reports a fair demand for special machinery in that line. The demand for electrical equipment for traction companies shows a little more activity. Mining machinery is quiet. In the foundry trade orders are generally light, but some foundries that make a specialty of automobile castings now have all the work that they can do.

Specifications for the new power house to be built by the Northern Ohio Traction & Light Company at Cuyahoga Falls, Ohio, are expected to be out this week. Plans are being prepared by the Cleveland Construction Company.

The Cleveland, Painesville & Eastern Railroad has an inquiry out for two 1500-kw. turbines, switchboard and rotary for substation. The new equipment will be used for enlarging the company's power station at Willoughby, Ohio.

About 100 machine tools will be required for the new west technical high school in Cleveland, the construction of which has just been started. It is expected that the list will be out early in the summer. While it will not be the largest, the school authorities plan to have the best equipped technical high school in the country. There will be three pattern shops—38 x 40 ft. for pattern and cabinet work, each equipped with six lathes; a foundry, 40 x 48 ft.; two machine shops, one 43 x 56 ft. and one 48 x 52 ft.; a forge shop, 40 x 63 ft., and a pottery. The forge shop will be equipped with 31 forges. A power plant will be built independent of the main building, specifications for the equipment of which will be out shortly.

The Perfection Machine & Mfg. Company has been incorporated with a capital stock of \$25,000, to manufacture a gas heating sadiron. The company will be located at 5346 Hamilton avenue. The officers are A. H. Davies, president; W. J. Hurley, vice-president, and N. W. Thomas, secretary and treasurer.

The plant of the Orrville Pump & Furnace Company, Orrville, Ohio, consisting of a foundry, pattern and machine shop and power house, will be sold at bankruptcy sale April 29.

The Board of Education, Toledo, Ohio, will receive bids May 15 for an electric light and power system, interior telephone system and other equipment for the Scott and Waite high schools in that city, which will cost approximately \$400,000 each. Plans and specifications can be secured from G. L. McKesson, director of schools.

The Advance Machine Company, Toledo, Ohio, will enlarge its plant by the erection of an addition, 40 x 75 ft.

The Realty Rubber Company, Massillon, Ohio, which recently increased its capital stock to \$100,000, is planning the erection of a new plant in order to largely increase its present capacity. E. T. Rickert is president and manager.

The Board of Trustees of Public Affairs, Lakewood, Ohio, will receive bids May 9 for a steel water tower.

The Bremen Mfg. Company, Bremen, Ohio, which will manufacture a new pumping engine, has been organized with the following officers: President, W. S. Turner; vice-president, C. C. Hoskins; secretary and treasurer, H. M. Shelhamer; general manager, H. E. Young.

The National Automatic Machinery Company, Wellston, Ohio, has been incorporated with a capital stock of \$100,000, by J. C. Clatts, W. H. Kelly, J. H. Brown, J. C. Gooding, Geo. C. Sellers and S. M. Kelley.

The Cleveland Aluminum Casting Company, Cleveland, has been incorporated with a capital stock of \$10,000, by M. J. Hancox and others. The company will be located at the plant of the Industrial Pattern & Bronze Company on East Sixty-seventh street.

The Minster Machine Company, Minster, Ohio, maker of power transmission machinery, &c., will enlarge its plant by the erection of two buildings, one 70 x 180 ft., to be used for manufacturing and assembling, and the other 50 x 70 ft. to be used as a stockroom.

The Republic Rubber Company, Youngstown, Ohio, manufacturer of mechanical rubber goods, rubber hose for water and air service, automobile tires, &c., will in the latter part of May complete its new machine shop, and is in the market for a line of woodworking machinery and machine tools. Complete information can be furnished by the general manager. The building under construction is 72 x 136 ft., and fireproof. It contains a balcony for the storage of patterns. The company is busy in its various operating departments, considerable business having been booked for Western shipment.

The Sanitary Table & Mfg. Company, Cleveland, has been incorporated to manufacture kitchen tables with porcelain enameled steel tops. Calvin A. Judson is president; B. J. Doyle, vice-president, and James T. Harding, secretary and treasurer. The company has offices at 620 Society for Savings Building.

Cincinnati

CINCINNATI, OHIO, April 25, 1911.

As yet neither the railroads nor the automobile manufacturers have shown any signs of being heavy purchasers of machine tools at any time in the near future. There is, however, some sporadic buying on the part of both, and it is generally believed that the automobile trade will show considerable improvement during the summer season. A prominent local banker calls attention to the fact that money is plentiful, and a little confidence is all that is needed to start a healthy business boom.

Small motors and dynamos are in excellent demand, and gas engines are also good sellers. Second-hand equipment of all kinds is reported as showing some improvement. The jobbing foundries continue operating on hand-to-mouth orders and some weeks are working on full time, generally followed by a correspondingly dull period when they have to close down.

Several Cincinnati machine tool builders sent experts to Chicago April 24 for the purpose of assisting the Marshall & Huschart Machinery Company of that city in demonstrating the different tools of their manufacture to the graduating class of the Ohio State University.

The Union Central Life Insurance Company has definitely decided to erect a large office building in Cincinnati. Tentative plans call for a structure of over 30 stories. The architect has not yet been selected.

The Peck, Anderson & Peck Company, Cincinnati, heating and ventilating contractor, has leased the three-and-one-half-story building at Court and Sycamore streets, and on June 1 will move its metal working plant from Broadway and Court to the new location. The new plant will be fitted up with modern machinery and the firm's present output will be more than doubled.

The R. K. LeBlond Machine Tool Company, Cincinnati, has finished the new addition to its plant in East End and is now installing the necessary machinery.

The Kelley-Koett Mfg. Company, Covington, Ky., has made up plans for building a factory that will be used for the manufacture of X-ray apparatus.

The Riley Shoe Mfg. Company, Columbus, Ohio, has prepared plans for an addition to its factory that will more than double its present capacity.

Swift & Co., packers, Chicago, are having plans prepared

THE MACHINERY MARKETS

for a large cold storage plant to be erected in Cincinnati, the estimated cost of which will be over \$100,000.

It is rumored that the Louisville & Nashville Railroad Company is having plans made up for large car shops to be erected near Frankfort, Ky.

The Dayton, Lebanon & Cincinnati Railroad Company has definitely decided on constructing a large concrete freight station at Dayton, Ohio.

Architect Henry N. Hooper, Cincinnati, has completed plans for the concrete factory, recently mentioned, to be constructed in Carthage, Cincinnati suburb, by the Union Thread Company.

The American Tool Works Company, Cincinnati, has leased the building at 427 and 429 New street, which will be used for warehouse purposes.

Detroit

DETROIT, MICH., April 24, 1911.

Conditions are quite satisfactory, both in this city and throughout the State, for manufacturing interests. The automobile trade has been particularly active, and the volume of orders continues far in excess of the output. Shipments this month will not reach the total March attained. The big truck companies, however, bid fair to exceed the March output. The auto accessories firms are in a very prosperous state, which would naturally be true, inasmuch as the motor car companies are running to their limit. Several concerns are just entering profitable foreign fields, and are doing well in point of orders. Building operations are going well, with several big propositions in view. An immense auditorium is planned by prominent business men and will undoubtedly be put through. The nature of the building will call for considerable structural steel work.

The Michigan United Railways has put through an important deal, which will give this city a 10-hour direct service to Chicago. It has taken over the Kalamazoo, Lake Shore & Chicago Railway and has made traffic arrangements with the Detroit United Railways, welding the link between this city and Chicago. The Kalamazoo, Lake Shore & Chicago Railway is a steam road, and will be electrified as soon as possible. From the terminal at Benton Harbor the Michigan United Railways will run passenger boats to Chicago. Much needed equipment is to be purchased in addition to the new boats.

The Boyer-Campbell Company, machinist, has let the contract for the erection of a six-story factory building in the center of the city. This is to enable the company to care for its crowded condition.

A large glass cutting factory, at present located at Cleveland, Ohio, is planning to move its plant to Trenton, Mich. The one thing wanted is to secure a site large enough for the erection of a plant large enough to keep up with the company's output. The affairs are in the hands of the Trenton Business Men's Association.

The Michigan Carton Company, Battle Creek, Mich., which recently increased its capital stock from \$250,000 to \$500,000, will begin the erection of a one machine box board mill. The plant will be large and modern, and will be an important addition to Battle Creek's paper industries.

The Kerwin Machine Company, Detroit, Mich., has filed articles of incorporation. The company has a capital stock of \$100,000.

A new carriage concern has been organized at Holly, Mich. The new company, which is known as the Carter Dump Wagon & Mfg. Company, has filed articles of association with a capital stock of \$100,000.

The East Jordan Cooperage Company, at present incorporated under the laws of Ohio, has filed like articles with the Secretary of State for the establishment of a plant at East Jordan, Mich. The company has a capital stock of \$50,000.

On May 5 the city of Marquette, Mich., will vote on the proposition of bonding the city for \$75,000, to cover the cost of a modern water works plant.

The Tilden Saw Company of this city and the Campbell Mfg. Company of Wyandotte, Mich., have formed a consolidation, whereby the two are to be merged under the name of the Tilden Saw & Mfg. Company. The machinery of the Detroit plant will be removed to Wyandotte at once, where the company will occupy a much larger plant.

The Casey Mfg. Company, machinist, has filed articles of incorporation. It will start with a capital stock of \$20,000. J. P. Casey and Thomas A. Leary are the principal stockholders.

The Motor Wagon Company is the name of a new automobile truck concern organized in this city last week. The company is well financed, the capital stock being \$150,000, and will make light delivery trucks.

The National Lighting System Company was organized

this week with a capital stock of \$10,000. The company's product will be electrical installation parts. Maurice L. Chertak and Abraham Green are the organizers.

The Detroit Motor Cycle Company has incorporated with \$50,000 capital stock and will make a motorcycle with many new features. W. J. Nagle and W. J. Connolly are interested largely.

The Davies Mfg. Company is the second of two large companies filing articles of incorporation this week. The company has plenty of working capital, to the amount of \$150,000, and will commence operations as soon as the plant and equipment can be completed.

The Brady-Nagle Mfg. Company is the name of a small concern with a capital stock of \$11,000 incorporated this week. The company is backed by parties of good standing, and it is learned that the company will expand as soon as conditions warrant.

The Excelsior Foundry Company, Bay City, Mich., whose plant was completely destroyed by fire last week, will rebuild it as soon as possible.

The Cummer-Diggins Company, Cadillac, Mich., has announced plans for the erection of a two-story lath and shingle mill, 50 x 60 ft. The building will be of modern steel construction.

The Empire Portland Cement Company, Portsmouth, Ohio, which will build a big plant at Menominee, Mich., has announced plans for the construction of a main plant, 360 x 400 ft., and four kilns.

The Three Oaks Creamery Company, Three Oaks, Mich., lost its plant, including all machinery, by fire last week. The company states that it will rebuild and re-equip immediately. John Jacobson owns the plant.

The Newago Engineering Company, Newago, Mich., manufacturer of special machinery for cement plants, has begun the erection of a large addition. The building will be a steel and cement structure, three stories, 250 x 450 ft. W. J. Bell is president and general manager.

Benton Harbor will again vote on the \$100,000 bonding proposition for the building of a new electric light plant. The question was lost in the April election by the narrow margin of two votes.

The Skalla Furniture Company, Niles, Mich., suffered a severe loss in a fire that destroyed a large portion of the plant. It is understood that the company will rebuild the burned portion.

St. Louis

ST. LOUIS, MO., April 24, 1911.

Business in the machine tool line has been quiet. Some fair business is pending, but few orders of any consequence have come out. The manufacturers of shoe machinery have been quite busy, as have the several manufacturers of electric motors and similar apparatus.

The National Lead Company is making extensive additions to its St. Louis lead and oil plant on Manchester avenue, two large concrete buildings being in progress of erection.

The Scullin-Gallagher Iron & Steel Company contemplates some extensions.

The Bignall & Keeler Mfg. Company, Edwardsville, Ill., manufacturer of pipe machines, is very busy.

The Aluminum Company of America has some good sized improvements under way at its plant in East St. Louis.

The Anheuser Busch Brewing Association is proceeding with the construction of its new wagon factory and orders for some machinery have been placed.

The Ideal Vending Machine Mfg. Company, St. Louis, has been incorporated, with a capital stock, fully paid, of \$10,000. The incorporators are John Ford, J. L. Scheuble and J. G. Beckmann. The company will manufacture vending machines.

The Louis Werner Sawmill Company, St. Louis, has increased its capital stock from \$150,000 to \$600,000.

The Beck Automatic Electric Safety & Signal Switch Company, St. Louis, has been incorporated, with a capital stock of \$50,000. The incorporators are Charles Beck, Arthur Beck and Morris Tucker. The company will manufacture safety appliances, &c.

The mill and elevator at Greenfield, Mo., were destroyed by fire April 5, causing a loss of \$115,000, fully covered by insurance.

Cowell & Vermillion will erect at Fair Play, Mo., a large broom factory in the near future.

James Gray, Red Bird, Mo., will erect at St. James a flouring mill of 50 barrels daily capacity. Work on the mill will begin at once.

The Dupont & de Nemours Powder Company is erecting at Scotland Springs, near Joplin, Mo., the buildings for an extensive powder manufacturing plant. Two of the buildings are already started and a Missouri Pacific spur switch is under way, fully a mile of track being nearly completed. It is

THE MACHINERY MARKETS

reported that the Dupont Company will proceed with building until upward of 70 structures are completed, which includes provision for a water works system. The grounds owned by the company have their south boundary near Scotland and extend for 2 miles. They also own an extensive territory east and west.

Canterbury Bros., Higginsville, Mo., will erect a 10-ton ice plant at that place. Work will begin at once.

A. Robertson, Neelyville, Mo., is erecting a grist mill which will be equipped with the latest machinery.

The bonds for the new \$35,000 municipal electric light plant for Monett, Mo., have been placed in St. Louis and work on the plant will begin at once.

The Bituminous Gas Products Company, Kansas City, Mo., has been incorporated, with a capital stock of \$50,000. The incorporators are W. Clifton Hogan, L. E. Jones, W. A. Shoemaker and others.

The Eldorado Milling & Grain Company, Eldorado Springs, Mo., has been incorporated, with a capital stock of \$10,000. The incorporators are W. H. Anthony, M. A. Anthony, T. E. Eddlemore and others.

The Star Brass Works Company, Kansas City, Mo., has increased its capital stock from \$10,000 to \$30,000.

The Martin Machinery Company, Joplin, Mo., is preparing to erect new shops and offices, but advises that plans have not been definitely decided upon.

Waterville, Kan., has estimates prepared for the construction of a \$30,000 light plant and water works system.

The city of Waterloo, Neb., is considering the establishment of a \$12,000 water works system.

Homer, Neb., has under consideration the installation of a water works system.

Bids will be opened by Chappell, Neb., on May 8, for bonds, the proceeds of which are to be used for the construction of electric light plant and water works system.

The Oklahoma Railway Company, Oklahoma City, Okla., is making extensive improvements, including the erection of repair shops, 100 x 180 ft., new train sheds and the installation of new equipment in its power house.

The Acheson Water Elevator Company, Salt Lake City, Utah, has been incorporated, with \$100,000 capital stock, to manufacture a water elevator for irrigation projects invented by E. V. K. Acheson. The company is having the elevator manufactured by a local foundry at present, but later on expects to erect a factory, a site for which has not yet been selected.

The South

LOUISVILLE, Ky., April 25, 1911.

General conditions in this market remain good, machinery manufacturers and dealers doing a fair business. The local trade is dull, but out in the State and in Southern territory prospects are bright. The demand for machine tools is reported to be almost *nil*, but power equipment, quarry machinery and contractors' tools are selling well.

Manufacturers of agricultural implements in Kentucky and Tennessee are reported to be more active than any other class of iron consumers. Plants are running to capacity, and in several cases it will be necessary in a comparatively short time to prepare for enlargements. A big plow manufacturing plant at Louisville, which was only recently put in operation, is already crowded for room in some departments, it is stated.

Installation of equipment will be undertaken at once by the Standard Marble Company, Knoxville, Tenn., which has been incorporated, with \$500,000 capital stock, for the development of large deposits of marble 2 miles east of Knoxville. J. W. Agey, S. H. Bellow, H. C. Brandau, A. A. Schmid and A. Y. Burrows are the incorporators of the company.

W. Hume Logan, president of the Dow Wire & Iron Works, has been elected president of the Employers' Association of Louisville. Henry Vogt, president of the Henry Vogt Machine Company, has been chosen second vice-president of the organization.

The American Blower Company, Detroit, Mich., has secured contracts for the installation of its Sirocco fan system in the Tyler Hotel, the East Broadway school building and the First Christian Church, important structures now being completed in Louisville.

The Alvey-Ferguson Company, Louisville, manufacturer of conveying machinery, now located at Floyd and G streets, announces that it will move its plant to Cincinnati. Details regarding the removal have not as yet been decided. The company has a capital stock of \$50,000 and is in excellent condition, it is stated. The reason for the decision to move, it is understood, has to do with the present system of taxation in Kentucky.

Wood, Stubbs & Co., Louisville, have filed plans for the

erection of a warehouse at Fourteenth and Walnut streets. A freight elevator of considerable capacity will be installed.

The Bristol, Tenn., Tractor Company, which has recently been organized, and which has purchased the property of the Bristol Belt Line Railway, is pushing plans for betterments and will expend about \$100,000. Fred Dulaney is vice-president and general manager of the company.

Herren & Cundiff are planning the erection of an electric light plant at Liberty, Ky.

The Kentucky Distillers & Warehouse Company, Louisville, has announced plans for the erection of a distillery plant, with a capacity of 1000 bushels of grain a day, at Nicholasville, Ky.

A bond issue of \$85,000, for the purpose of providing a water works system, will be voted on by Madisonville, Ky., in the near future. It is understood that the issue will be approved without opposition.

The Elkhorn Consolidated Coal & Coke Company, Hellier, Ky., is completing the equipment of a coking plant, a 150-hp. engine and crushing equipment having been purchased. The company is building 50 beehive coke ovens and later will add an equal number. Fon Rogers, Pikeville, Ky., is president of the company.

The Wilhoit Consolidated Coal & Coke Company, Pineville, Ky., is building a railroad spur into its coal lands and will begin the development of its property at once. It is now inquiring for prices on an engine, a boiler and other power equipment. White L. Moss, Pineville, is secretary of the company, which has a capital stock of \$50,000.

The Sunset Coal Company, Madisonville, Ky., is planning the installation of a 150-hp. boiler. The equipment is not needed until September 1. W. R. Lynn is general manager of the company.

The plant of the Lancaster, Ky., Electric Light Company was destroyed by fire April 20, the loss being total. Alex. Walker, the principal stockholder of the company, has announced that the plant will be rebuilt at once. An expenditure of about \$10,000 will be required.

Manufacturers of quarry equipment report that plans are understood to be on foot looking to the organization of a building stone corporation to take over all of the quarries in the Indiana oolitic limestone district, including those near Bedford and Bloomington. Those interested in the Indiana Quarries Company are reported to have originated the plan.

Newport, Tenn., will vote on the question of issuing \$50,000 of water works bonds April 29. It is assured that the issue will be approved.

A bill has been introduced in the Tennessee Legislature authorizing Clinton, Tenn., to issue bonds for the purpose of purchasing an electric light plant.

The Champion Lumber Company is reported to have made plans to enlarge the capacity of its mill at Crestwood, Tenn., by the installation of new power and woodworking machinery.

The State Senate of Tennessee has approved a bill authorizing the city of Memphis to issue bonds for the construction of an electric light plant. The bill has yet to pass the House.

Kenton, Tenn., has been given authority by the State Legislature to issue bonds for the construction of a water works system.

Bids are to be received May 5 by the city of Gallatin, Tenn., on equipment which is to be installed in the municipal electric light plant. A Corliss engine, two 100-kw. dynamos, &c., will be required. Address E. L. Anderson, chairman Water and Light Commission.

A bond issue of \$25,000 has been voted at Manchester, Tenn., for the construction of water works and electric light plant.

The Maryville Foundry, Maryville, Tenn., has been succeeded by the Furnace Equipment Company, of which P. McNaughton is president. It makes a specialty of a grate bar, sales of which are handled through the McNaughton Grate Bar Company, Atlanta.

The Vesta Gas Range & Mfg. Company has been incorporated at Chattanooga, Tenn., with \$100,000 capital stock, by M. H. Coffey, Theodore Ringwald, J. A. Hill and others.

The Cherokee Commission Company, Bristol, Colo., will erect an elevator and warehouse at Memphis, Tenn. R. S. Green is manager of the company at Memphis.

A contract has been awarded for the erection of a building to be used by the Greenwood Advertising Company, Knoxville, Tenn., in the manufacture of metal signs. The structure will be three stories and will cost \$20,000.

The International Harrow & Cultivator Company is beginning operations at Birmingham, Ala. It has a capital stock of \$500,000 and has purchased the plant of the North Birmingham Forge Company. George R. Neal is president and general manager of the company and Robert B. Johnson is secretary.

The Ferrans Machine Works, Ltd., has been incorporated at New Orleans, La. It has a capital stock of \$25,000.

THE MACHINERY MARKETS

Charles Ferrans is president and Lewis B. Giraud is secretary of the concern.

The Atlantic Coast Line is reported to have made plans for the construction of a \$250,000 creosoting plant at North Gainesville, Fla.

Articles of incorporation have been filed by the Lafourche Boiler & Sheet Iron Works, Thibodaux, La. The capital stock of the company is \$10,000. Theophile Dupre is president.

The Southern Equipment Company, North Birmingham, Ala., is inquiring for prices on second-hand machine tools, including a 24-in. back geared shaper, a medium sized emery wheel stand with countershaft, milling machine, 30-in. back geared drill press, engine lathe with 24-in. swing, boring and turning mill with 76-in. swing and engine lathe with 24-in. swing.

The plant of the Eureka Springs Electric Light & Power Company, Eureka Springs, Ark., has been purchased by the Fidelity Trust Company of that city.

An electric light plant, to cost \$75,000, will be erected by the city of Colquitt, Ga. P. E. Wilkin is Mayor.

A 150-ft. dam is to be built at Cartersville, Ga., by the Blue Ridge Power Company for the development of 30,000 hp. for transmission by electricity. William A. Carlisle, Gainesville, Ga., is interested.

The capacity of the plant of the Union Phosphate Company, Union City, Ga., will be doubled by the installation of additional equipment. J. G. Eubanks is president of the company.

Two new pumps are to be installed in the water works plant at Biloxi, Miss., having capacities of 1500 and 5000 gal. respectively. E. I. Castanera is superintendent.

A sawmill, with machine shop, water system and electric light plant, is to be built at Folwell, Miss., by C. W. Robinson, M. C. Anderson and others. Much of the equipment has been bought.

A foundry is to be established at Stuttgart, Ark., by H. F. Roush and Syarling White, Hillsboro, Ohio.

Forrest City, Ark., has purchased a 115-hp. boiler for installation in the city electric light plant. Other improvements may be made.

The Gulf Machine & Engineering Company, Tampa, Fla., has filed amended articles of incorporation, increasing its capital stock from \$10,000 to \$50,000 and changing its name to the Gulf Iron Works.

Texas

AUSTIN, TEXAS, April 22, 1911.

'Crop conditions and prospects in Texas at this time could hardly be improved upon, and the feeling of optimism on the part of all kinds of business interests and the people generally was perhaps never more pronounced in the history of the State. Even the political complexion of State affairs has changed wonderfully in the last few years, and a new policy on the part of the State government toward corporations and financial investments is being practiced. Governor O. B. Colquitt was elected on a platform of fair and liberal treatment of legitimate business interests, was pledged to a policy of "political peace and legislative rest," and is living up to his promises.

A meat packing house and cold storage plant will be installed at Austin by W. B. Walker & Sons and operated in connection with their large canning factory. The proposed improvement will cost about \$100,000.

The Cuero Packing Company has been organized at Cuero, with a capital stock of \$10,000. The incorporators are A. D. Edson, E. C. Hesse and Walter Reiffert.

A 14,000-gal. tank is being erected at Runge for the water works system that is owned by Carl Mueller. He is also making other improvements to the plant and distributing system.

Machine shops will be installed at Port Aransas by R. P. Bracht.

The Gulf Coast Drilling Company, San Antonio, has been organized for the purpose of constructing, maintaining and operating dams, reservoirs, canals and irrigation plants. It has a capital stock of \$10,000. The incorporators are I. N. Bettison, M. J. Bass and H. G. Egli.

C. Q. Horton, Austin, has been awarded the contract for the construction of a steel bridge across Elm Creek in Milam County for \$1350.

The Missouri, Kansas & Texas Railroad Company has adopted plans for new shops that it will build at Greenville.

Preparations are being made by the Mission Land & Improvement Company to build an electric light and power plant and complete water works system at Mission. It also has under consideration the installation of an ice and pre-cooling plant.

L. K. Laursen, Memphis, Tenn., will erect a factory at

San Antonio for the manufacture of office furniture, store fixtures, stairways and wainscoting. He has purchased a site for the proposed plant.

The L. Frank Saddlery Company contemplates enlarging its factory at San Antonio.

The Alamo Iron Works, which recently finished the erection of a planing mill and carpenter shop at San Antonio, will also install a large amount of new machinery in its shops.

The Kohlberg Cigar Company, El Paso, will erect a four-story factory building there.

The Tyler Turpentine Company, which was recently organized at Colmesneil, with a capital stock of \$10,000, will install a turpentine distilling plant near that place. The incorporators are S. S. Day, W. H. Day and E. C. Ballantine.

The pickling station of the Price-Booker Company, San Antonio, situated at Rock Island, is to be enlarged.

A new cotton gin is being installed at Edgar Station by W. C. Perry and associates.

J. C. Merritt of Concrete is erecting a cotton gin at Cheapsid, Texas.

The Rosebud Compress Company has been organized at Rosebud, with a capital stock of \$20,000. The incorporators are Ben Loewenstein, E. C. Schmidt and George Roper.

C. E. Race, Los Angeles, Cal., and associates are preparing to develop extensive tracts of land that they own near Ensenada, Lower California, Mexico. Besides establishing different kinds of industrial plants, they will erect large wharves and other port improvements at Ensenada. It is stated that more than \$1,000,000 will be invested in the enterprise.

David E. Thompson, Lincoln, Neb., former United States Ambassador to Mexico, is at the head of an American syndicate that is preparing to erect several large factories in the States of Guanajuato and Jalisco, Mexico, for the manufacture of crude rubber from the palo amarillo tree. It is announced that the syndicate will invest several million dollars in the new industry.

The city of Terrell has issued \$12,000 of bonds for boring artesian wells.

The Briggs-Weaver Machinery Company, Dallas, has been awarded the contract for the erection of the new electric light station at Coleman.

The Big Bend Mining Company will install a new furnace and make other extensive improvements at its quick-silver mines near Terlingua. It is building a brickmaking plant for the purpose of manufacturing about 250,000 brick for its own use. The general offices of the company are at Dallas.

John Faulkner, Hutchinson, Kan., will install a 15-ton ice factory at Portales, N. M.

The Hammond-Farmington Canal Company, which was recently organized at Sante Fé, N. M., with a capital stock of \$250,000 will construct an extensive system of irrigation in the valley of the San Juan River in San Juan County, N. M.

Ralph E. Hoskat, Dayton, Ohio, and associates are promoting the construction of an electric street railroad system in Palestine, Texas.

The City Council of Austin will soon submit to a vote of the people of this city several pending propositions for the reconstruction of the big dam across the Colorado River here and the installation of a hydroelectric plant. None of these propositions involves a bond issue on the part of the city. It is planned that the enterprise shall be carried out and maintained by private interests for a period of years, and that the city shall pay for improvements in semiannual installments from the receipts of the municipal water and light plants. It is expected that the cost of the dam and hydroelectric plant will be in the neighborhood of \$1,000,000.

The system of irrigation of the American Rio Grande Land & Irrigation Company in the lower valley of the Rio Grande in Texas is to be greatly enlarged, so as to bring about the reclamation of about 30,000 acres in addition to the 35,000 acres that are now irrigated by this canal system. The company's office is at Mercedes.

The Citizens Light & Power Company, Wichita Falls, has been granted a franchise for the installation of an electric light plant, work upon the installation of which has already been commenced.

The Alvin Ice, Light & Power Company, Alvin, recently incorporated with \$15,000 capital stock, has taken over an existing plant, the capacity of which will be greatly increased. The company will install a water works system in the town and will be in the market for considerable material.

The Ennis Ice, Light & Power Company, Ennis, will install additional icemaking machinery.

The city of Rogers will install a modern water system. Brick buildings are now in the course of construction, covering a space of 115 x 380 ft.

THE MACHINERY MARKETS

The city of St. Louis will install a water works system with the proceeds of the sale of \$14,000 water works and sewerage bonds.

It is reported that a large Boston manufacturer of fire-works will establish a branch factory at Houston for the manufacture of the company's products.

W. C. Williams of Oklahoma is arranging to establish at Houston a construction company to engage in handling and installing heavy machinery.

The Gonzales Ice & Refrigerator Company, Gonzales, is making considerable improvements to its plant. New ammonia condensers and freezing tank will be added.

The Desert Gold Machine Company, Canton, has been incorporated, with a capital stock of \$25,000. The incorporators are A. C. Frazier, D. M. Owings, W. M. Osborne and E. C. Frazier.

The Pacific Coast

SAN FRANCISCO, CAL., April 19, 1911.

There is a little more stir in the California machine tool market and the present movement is fully normal, as judged by the standards of the last few years. Some dealers note a very marked improvement in the last two months and state that recent sales have been larger than for any similar period in nearly four years. The larger oil interests, most of which maintain well equipped shops, are now among the principal buyers, though general development work in the interior is beginning to have its effect on the market, and inquiries have recently been received from many shops in outside towns. Few orders are for more than one or two tools, but much of the equipment sold this month has been of comparatively large size for this territory, and as a rule immediate delivery is desired. There is a prospect of some fairly good railroad business in the near future.

The demand for woodworking equipment is irregular and much of the business is on second-hand machinery. This market was well filled up with woodworking machinery in the latter part of 1906 and only the larger, up-to-date mills are buying many new machines. Second-hand machinery of all descriptions finds a fair demand, though in most lines the supply is large.

Owing to an eight-hour female labor law, which takes effect May 22, several local laundries are increasing their plants. New six-roll mangles are being installed by the Metropolitan and Mercantile laundries, and the latter has just installed a pump of about 7000 gal. per hour capacity.

The Geo. E. Dow Pumping Engine Company is making several pump cylinders of cast steel for 600 lb. working pressure. The castings were made by the Columbia Steel Company and are the first of the kind ever machined on the coast for such heavy duty. The Dow Company has taken an order from the Cia. de Aguas de Santa Ana, Salvador, C. A., for two 11 x 12 in. horizontal duplex piston pumps, direct connected to two 40-hp. motors, to work against a head of about 1500 ft.

The Oliver Continuous Filter Company, San Francisco, is building cyanide filter outfits for the Nevada Wonder Mining Company, Wonder, Nev.; the Candelaria Consolidated Mining Company, San Dimas, Durango, Mexico; the Maricopa Mines Company, Austin, Nev., and the Cia. Minera Jesus Maria y Anexas, San Jose de Gracia, Sinaloa, Mexico.

H. L. Terwilliger has been appointed vice-president of Harron, Rickard & McCone, local machinery merchants, succeeding the late Thomas Rickard.

A. S. Kalenborn and A. J. Pahl have opened a machine shop and office at 37 Stevenson street. They will specialize on engineering work in connection with pumping plants, &c.

The sum of \$42,000 has been set aside for the extension of the building slip crane runway at the Mare Island, Cal., Navy Yard.

The shops of the Southern Pacific Railroad at Sacramento, Cal., which greatly curtailed operations a few days ago, are again running full time, and the Oakland shops are running on a larger scale than for some time past. It is reported that the company will make a number of improvements in the Sacramento plant, the principal item being a new foundry of double the capacity of that now in use. It is also reported that the Santa Fé Railroad will put in a machine shop at Fresno, Cal. An inquiry is expected shortly for an addition to the Southern Pacific shops at Los Angeles.

The Jackson-Church Pump Works has been incorporated at Los Angeles, with a capital stock of \$100,000, by S. B. Church, F. H. Jackson, T. S. Smith, A. J. Sherer and C. J. Walker.

The W. D. Hall Company, dealer in mill and shop supplies, has been incorporated at El Cajon, Cal., with a capital stock of \$100,000, by W. D. Hall, O. B. Avis, E. Dickson, L. T. Meacham and S. C. Hall.

The W. G. Augustine Foundry & Mfg. Company has been incorporated at Los Angeles, with a capital stock of \$50,000, by W. G. Augustine, J. E. and J. G. Hoyal, M. and L. M. Augustine.

The Pacific Corrugated Pipe Company has been incorporated at Los Angeles, with a capital stock of \$25,000, by G. B. Doak, H. E. and F. M. Teter.

The Midway Equipment Company, handling oil well supplies, has been incorporated at Bakersfield, Cal., with a capital stock of \$25,000, by Fred Marsh, F. R. Camp, W. W. Stephenson, C. M. Dunham and H. G. Moss.

O. H. Rogers, formerly of the Rogers & D'Artenay Mfg. Company, is contemplating the establishment of an implement factory near Lodi, Cal.

The Santa Fé Railroad is preparing to install a welding plant in connection with its shop at San Bernardino, Cal.

The Southern California Edison Company is taking bids on the second unit of its plant at Long Beach, Cal., the capacity of which will be about 20,000 hp. The first unit is expected to be in operation by July 1.

The Covina Irrigating Company, Covina, Cal., has placed a contract with the H. N. Tracy Company for the installation of a pumping plant near Irwindale, at a cost of \$38,452.

The United Engineering Works, Oakland, Cal., has taken a contract for a municipal pumping plant for Santa Cruz.

The Mare Island Navy Yard is making estimates on the installation of turbine engines in the navy tug Iroquois.

A pump of 200 gal. per minute capacity, with a head of 2000 ft., is being installed at the Brunswick mine, near Grass Valley, Cal.

The Western Engineering Company, Los Angeles, Cal., has taken a contract for equipping the Third Street Railway in that city with the American differential railroad axle device. A similar installation is being made for the Kahu-lui Railroad in the Hawaiian Islands.

The Kern River Oilfields of California, Ltd., is installing an electric motor system for drilling and pumping on its property in the Kern River district. About 200 motors are being used.

The Braden Mfg. Company, Hanford, Cal., is selling a large number of irrigation pumps, which are operated by Westinghouse motors of 2 to 10 hp.

The Hansborough Bros. Company, which has a large contract for work on the Oakland quay wall, has purchased a No. 4 McCully crusher and other equipment for installation at Point Richmond, on San Francisco Bay.

The San Francisco Supervisors have practically decided on a site for the power house for the Geary street municipal railroad.

The Los Angeles Brass Works and the Liebfried Brass Mfg. Company, both of Los Angeles, Cal., have been consolidated under the name of the Los Angeles Brass Mfg. Company, with a capital stock of \$25,000. The plant is at 711-713 North Main street. Those principally interested are F. Rice, L. R. Raymond, D. T. Mason and L. W. Swarts. The plant has a daily melting capacity of 3000 lb., using oil fuel.

A lot of new machinery has been ordered for the laundry of Hotel Del Monte, near Monterey, Cal.

The West Side Lumber Company, Tuolumne, Cal., has installed an 800-hp. steam turbine, in addition to a lot of new mill equipment.

Fairbanks, Morse & Co. have taken a contract for a water works pumping plant for the town of Ontario, Cal., at \$17,311.

An Oakland shop has a contract for machinery for a new steam schooner for the S. S. Freeman Company, San Francisco, the hull for which is being built at Aberdeen, Wash.

The Yosemite Power Company has acquired the property of the Tuolumne River Power Company, including numerous water rights, power sites, &c., and it is reported that work will soon be commenced on the development of the project.

The Temescal Clay Products Company, Los Angeles, Cal., will commence work in the near future on its plant to be erected on a 16-acre site in the southeast industrial district of Los Angeles. The plant was designed by the American Clay Working Machinery Company, Bucyrus, Ohio, and will represent an investment of \$135,000. The main factory building will be a frame structure covered with corrugated iron, 180 x 360 ft., three stories. The company is incorporated with \$1,000,000 capital stock.

Baker City, Ore., has voted bonds for the construction of water works system and electric light plant, work upon which will be commenced at once.

The Washington-Oregon Corporation, 1311 Yeon Building, Portland, Ore., will erect a large power plant on Coal Creek.

The Idaho Electric Mfg. Company, Pocatello, Idaho, has been organized to manufacture an electric range invented by John A. Tupper.

THE MACHINERY MARKETS

Eastern Canada

TORONTO, ONT., April 22, 1911.

Actual business is generally good and prospective business has a still better appearance. Immigration is larger than ever before and, on the whole, of superior economic quality, the great mass of newcomers being young, industrious, thrifty, with considerable resources and bent principally upon farming. It is expected that the immigrants of this year will be not much less than twice as numerous as those of last year. With so many more added to the farming population, and with weather conditions by no means adverse, there is good reason to expect a decided expansion of the area under crop, and therefore to look forward to an enlarged agricultural yield. In their monthly statement to the Government the banks show that their financial assistance to business is not stinted, there being a marked increase in commercial loans. Business in the West is reported to be particularly brisk and healthy. The land companies there have all raised their prices.

Under the Canadian companies act letters patent have been issued incorporating Henry R. Towne, New York; John H. Towne, New York; Walter C. Allen, Stamford, Conn.; John B. Milliken, Montclair, N. J., and L. H. Porter, Stamford, Conn., as the Canadian Yale & Towne, Ltd., with a capital stock of \$100,000, the chief place of business to be at St. Catharines, Ont. It is to engage in the business of making safes, safe locks, hinges and locks of all kinds, &c. It is announced from St. Catharines that this Canadian offshoot of the Yale & Towne Mfg. Company, Stamford, Conn., will employ about 200 hands. The city is to give a free site of 10 acres, to exempt the company's plant from taxation for 10 years and for a further five years give a fixed assessment. The agreement is to be submitted to the ratepayers. The company is to spend at least \$50,000 on buildings and machinery.

At a mass meeting of the citizens of Ridgetown, Ont., it was unanimously decided that the town should install a water works system. The estimated cost is \$35,000.

A by-law is to be submitted to the ratepayers of Owen Sound, Ont., on May 6, to ratify an agreement with C. S. Lloyd, Toronto, who undertakes to establish a children's vehicles factory in the town to cost \$50,000. On its part, the town is to lend him \$25,000 for 25 years at 4½ per cent.

The United Engineering Company, with a capital stock of \$1,000,000 and head office at Toronto, has been incorporated under Dominion laws.

The International Milling Company, with a capital stock of \$6,000,000 and head office at Toronto, has been incorporated as a Dominion company.

The Naseo Company, with a capital stock of \$100,000 and head office at Toronto, has been incorporated as a Dominion company to carry on business in the manufacture and sale of electrical machinery, &c.

The Martin Bennett Asbestos Mines, Ltd., with a capital stock of \$1,500,000, has been incorporated under Dominion laws. The head office of the company is to be at Thetford Mines, Que.

The Holeproof Company has been incorporated to carry on business at London, Ont., to manufacture hosiery, &c. Geo. M. Reid and F. F. Harper are London capitalists interested.

The Galt Brass Company, Galt, Ont., is about to enlarge its plant and put in some new machinery.

Western Canada

WINNIPEG, MAN., April 22, 1911.

The new blast furnace lighted at the steel plant of the Lake Superior Corporation, Sault Ste. Marie, Ont., last week, is of 500 tons daily capacity.

The Ladysmith Collieries, Ltd., has just been incorporated, with a capital stock of \$3,000,000. Its mines are on the outskirts of Ladysmith, B. C., which city is to be the company's headquarters for the time being.

The *News-Advertiser* of Vancouver, B. C., stated in its issue of April 16 that A. P. Gillies, who is connected with the promotion of the British Columbia Steel Corporation, promises that the construction of bar and tube mills to cost \$700,000 will be begun at Port Mann this summer. Next will follow blast furnaces, a rail mill and a structural steel mill, whose construction is expected to begin in about eight months. Mr. Gillies said that his mission was for the location of the site at Port Mann. It is reported to have spoken, in part, as follows: "Construction work will be under the direction of the United Engineering & Foundry Company, Pittsburgh. This company has already prepared all the estimates, plans and specifications. Associated with me are Charles P. Taft, a brother of the President of the

United States; Henry Hewitt, a Tacoma millionaire, and L. O. Heddon of New York."

Benjamin Ward, an American, has purchased 189 acres of land near Saskatoon, Sask., on which it is proposed to build a plant for the manufacture of flax binder twine and other flax products. The nail binder attachment is also to be made. Minneapolis men are said to be associated with him in the enterprise.

The Canadian Fish & Cold Storage Company of British Columbia has begun the construction at Prince Rupert, B. C., of a plant that is to cost \$350,000 and is to be completed by next March.

The Tofield Coal Company, Edmonton, Alberta, proposes to develop and operate its mines by machinery. Its manager, Charles Taylor, has returned from Europe, where he purchased a land dredge, said to be the only machine of its kind on this side of the Atlantic. It is to remove the layer of earth lying on the coal deposit. Other modern machinery has been purchased by the company for operations to begin in June.

The B. C. Telephone Company, Vancouver, has improvement and extension projects in hand that will call for the expenditure of \$1,000,000 this year.

The Power Specialty Company, 111 Broadway, New York, reports among recent contracts secured for Foster superheaters the following: Cleveland Electric Illuminating Company, 9162 hp. in Stirling boilers; Cleveland, Cincinnati, Chicago & St. Louis Railroad, 1548 hp. in Stirling boilers; Solvay Process Company, Detroit, 5400 hp. in Babcock & Wilcox boilers; Milwaukee Electric Railway Company, 6000 hp. in Edge Moor boilers; Winnipeg Electric Railway Company, 7500 hp. in Babcock & Wilcox boilers; New York, New Haven & Hartford Railroad Company, Waterbury, and Zylonite plants, 6000 hp. in Bigelow-Hornsby boilers; Stone & Webster in the plants of the Minneapolis General Electric Company, Jacksonville Electric Light Corporation, El Paso Electric Railway Company, 9450 hp. in Babcock & Wilcox boilers. With one exception, these contracts are all from previous users of Foster superheaters, and in many cases represent from the fifth to the fifteenth repeat order.

John J. McNamara, secretary-treasurer of the International Association of Bridge and Structural Iron Workers; James McNamara, his brother, and Ortie E. McManigal, a member of the Chicago branch of the association, have been arrested and taken to Los Angeles, Cal., charged with the blowing up of the *Times* Building, in that city, October 1, 1910, when 21 lives were lost. The officers making the arrests state that they have conclusive evidence of the guilt of the prisoners and of their connection with a very large number of the 70 or more dynamitings of nonunion structural steel work in the past five years.

The Columbus Iron & Steel Company, Columbus, Ohio, in a recent leaflet, refers to its Buckeye sandless pig iron for foundry use. This iron is cast in iron molds and is allowed to cool very slowly. The fracture is but little affected and the analysis is unchanged. Emphasis is put on the fact that sandless iron melts more quickly and with less coke than sand cast iron. Concerning the material required to make a ton of pig iron the leaflet gives this: Iron ore, 2 tons; coke, 1.1 tons; limestone, 0.6 ton; total, 3.7 tons. In addition it requires 5 tons of air per ton of pig iron to burn coke and 42.5 tons of water for cooling purposes.

A. M. Byers & Co., Inc., with general offices in Pittsburgh, and pipe mills on the South Side, Pittsburgh, will on May 1 have its new plate mill at Girard, Ohio, ready for operation. The mill is 26 x 76 in., two-high roughing and three-high finishing, with electrically driven tables. It will be driven by a 30 x 60 in. Wisconsin-Corliss engine, and its output will be lap weld pipe skelp for 4 to 12 in. pipe, inclusive. The plate mill building is 102 x 281 ft., of steel construction, and is laid out along modern lines.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—

Redded Iron:	
1 to 1 1/2 in. round and square	2 1/2
1 1/2 to 4 in. x 3/4 to 1 in.	2 1/2
1 1/2 to 4 in. x 1/2 to 3/4	2 1/2
Rods—3/4 and 1 1/2 in. round and square	2 1/2
Angles:	
3 in. x 1/2 in. and larger	2 1/2
3 in. x 3/4 in. and 1 in.	2 1/2
1 1/2 to 2 1/2 in. x 3/4 in.	2 1/2
1 1/2 to 2 1/2 in. x 3/4 in. and thicker	2 1/2
1 to 1 1/2 in. x 3/4 in.	2 1/2
1 to 1 1/2 in. x 1/2 in.	2 1/2
3/4 x 3/4 in.	2 1/2
3/4 x 1/2 in.	2 1/2
3/4 x 1/4 in.	2 1/2
1/2 x 1/2 in.	2 1/2
1/2 x 1/4 in.	2 1/2
3 in. and larger	2 1/2
Beams:	
Channels, 3 in. and larger	2 1/2
Band—1 1/2 to 3 in. x 3/4 in. No. 8	2 1/2
"Barren's Best" Iron, base price	2 1/2
Barren's "H. B. & S." Iron, base price	2 1/2
Norway Bars	2 1/2

Merchant Steel from Store—

Bessemer Machinery	2 1/2
Toe Calk, Tire and Sleigh Shoe	2 1/2
Best Cast Steel, base price in small lots	2 1/2

Sheets from Store—

	Black	One Pass, C R	R G.
		Soft Steel.	Cleaned.
No. 16	2 1/2	2 1/2	2 1/2
No. 18 to 20	2 1/2	2 1/2	2 1/2
No. 22 and 24	2 1/2	2 1/2	2 1/2
No. 26	2 1/2	2 1/2	2 1/2
No. 28	2 1/2	2 1/2	2 1/2

Russia, Planished, &c.

Genuine Russia, according to assortment	2 1/2
Patent Planished, W. Dewees Wood	2 1/2
	2 1/2

Galvanized.

No. 12 and 14	2 1/2
No. 22 to 24	2 1/2
No. 26	2 1/2
No. 28	2 1/2
No. 20 and lighter 36 inches wide, 25 in. higher	2 1/2

Genuine Iron Sheets— Galvanized.

No. 22 and 24	2 1/2
No. 26	2 1/2
No. 28	2 1/2

Corrugated Roofing—

	2 1/2 in. corrugated.	Painted	Galv'd
No. 24	2 1/2	4.35	4.80
No. 26	2 1/2	4.35	4.80
No. 28	2 1/2	4.35	4.80

Tin Plates—

American Charcoal Plates (per box.)

"A. A. A." Charcoal	2 1/2
1 1/2 x 20	2 1/2
1 1/2 x 2	2 1/2
A. Charcoal	2 1/2
1 1/2 x 20	2 1/2
1 1/2 x 2	2 1/2

American Coke Plates—Bessemer—

1 1/2 x 20	2 1/2
1 1/2 x 2	2 1/2

American Terne Plates—

1 1/2 x 20 with an 8 lb. coating	2 1/2
1 1/2 x 20 with an 8 lb. coating	2 1/2

Seamless Brass Tubes—

List November 11, 1908.	Base price 18¢
-------------------------	----------------

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908.	Base price 18¢
-------------------------	----------------

Copper Tubes—

List November 13, 1908.	Base price 21¢
-------------------------	----------------

Brazed Brass Tubes—

List February 1, 1911	19 1/2¢
-----------------------	---------

High Brass Rods—

List February 1, 1911.	14 1/2¢
------------------------	---------

Roll and Sheet Brass—

List February 1, 1911	14 1/2¢
-----------------------	---------

Brass Wire—

List February 1, 1911	14 1/2¢
-----------------------	---------

Copper Wire—

Base Price.	Carload lots mill 13 1/2¢
-------------	---------------------------

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. quantity lots	18
Sheet Copper Cold Rolled, 16 oz. quantity over Hot Rolled	18
Sheet Copper Polished 20 in. wide and under, 16 oz. square foot	18
Sheet Copper Polished over 20 in. wide, 26 oz. square foot	18
Planished Copper, 16 oz. square foot more than Polished.	18

METALS— Tin—

Straits Fig.	45
--------------	----

Copper—

Lake Ingot	14 1/2
Electrolytic	13 1/2
Castings	13 1/2

Spelter—

Western	6 1/2
---------	-------

Zinc.

No. 9, base, casks	8
Open	8 1/2

Lead.

American Fig.	5
Bar	6 1/2

Solder.

1/2 & 1/2, guaranteed	27 1/2
No. 1	27 1/2
Refluxed	26
Prices of Solder Indicated by private brand vary according to composition	

Antimony—

Cookson	10 1/2
Hanetis	10 1/2
Other Brands	10 1/2

Bismuth—

Per lb.	\$2.00 @ \$2.25
---------	-----------------

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting	23 1/2
Rods & Wire	23 1/2
Sheets	23 1/2

Old Metals.

Dealers Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	10 75 @ 11 00
Copper, Heavy and Wire	10 50 @ 10 75
Copper, Light and Bottoms	9 50 @ 9 75
Brass, Heavy	7 00 @ 7 25
Brass, Light	5 50 @ 5 75
Heavy Machine Composition	8 25 @ 8 50
Clean Brass Turnings	7 00 @ 7 25
Composition Turnings	8 25 @ 8 50
Lead, Heavy	3 00 @ 3 25
Lead, Tea	3 00 @ 3 25
Zinc Scrap	4 00 @ 4 25

NICHOLSON

We have had over forty years' experience in making Files and Rasps; we not only know what KIND of steel to use, but HOW to use it.

If NICHOLSON FILES did not hold their CUTTING edge—our order books would not hold so many CUSTOMERS.

We make over 3,000 different styles and sizes. Send for Catalog.

NICHOLSON FILE COMPANY
PROVIDENCE, R. I., U. S. A.

THE IRON AGE

Established
1855

New York, May 4, 1911

VOL. 87: No. 18

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada, \$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum. Single Copies, 20 Cents.

CHARLES T. ROOT,	-	-	-	-	PRESIDENT
W. H. TAYLOR,	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM,	-	-	-	-	SECRETARY
GEORGE W. COPE,	-	-	-	-	} EDITORS
A. I. FINDLEY,	-	-	-	-	
W. W. MACON,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Editorial:	PAGE.
Blast Furnaces Going Out.....	1053
New Steel Capacity in Germany and at Home.....	1054
The New York Machinists' Strike.....	1054
The Long Life of American Machine Tools.....	1055
A Concentrated Advisory Board.....	1055
The American Workman.....	1055
New Publications.....	1056
Lead and Spelter Production in 1910.....	1056
Steel Manufacturers Consider Welfare Work.....	1056
American Iron and Steel Institute.....	1056
The New York Barge Canals.....	1057
Manufactures in Utah.....	1057
Pig Iron Production. Illustrated.....	1058
Jones & Laughlin Improvements.....	1059
Reported Sale of Risdon Iron Works.....	1059
The Iron and Metal Market Reports.....	1060 to 1068
Notes on Prices.....	1068
Iron and Industrial Stocks.....	1068
Chicago Metal Market Report.....	1068
A New Charcoal Blast Furnace.....	1069
An Air Cooling System for Sheet and Tin Plate Mills.....	1069
Advantages of Worm Drive for Automobile.....	1070
Economy Tests of a Turbine-Driven Furnace Blower.....	1070
Essential Factors in the Formation of Producer Gas.....	1071
The Turin International Exposition.....	1071
Ensley Rail Mill Closed Down.....	1071
Unemployment Insurance in Great Britain.....	1072
Personal.....	1073
Obituary.....	1073
Securing Foreign Government Contracts.....	1074
The Essex-Merrimac Chain Bridge.....	1075
The Brooklyn Engineers' Club's Exhibition.....	1076
Strike of New York Machinists.....	1076
The Pittsburgh Foundrymen's Association.....	1077
Pittsburgh Railway Club at the Ellwood City, Pa., Tube Plant.....	1077
Mexico Oil Developments.....	1077
A New Charcoal Blast Furnace.....	1077
The Mechanical Engineers' Programme.....	1078
Customs Decisions.....	1078
Electric Steel Production at a German Works.....	1079
Iron Ore Reserves Underestimated.....	1080
Chokio Water Works Bids.....	1081
The Sterling Steel Foundry Company.....	1081
Official Changes in the Steel Corporation. Portraits.....	1082
Death of Alexander E. Brown. Portrait.....	1083
Right Principles in Works Management.....	1084
The Cincinnati Foundry Foremen.....	1085
Iron and Steel Exports and Imports.....	1086
General Electric Apparatus for Dilworth, Porter & Co., Inc.....	1086
Rails for the National Railway of Hayti.....	1086
A Novel Application of Motor Drive to Machine Tools. Illustrated.....	1088
The Sibley 24-In. Stationary Head Drilling Machine. Illus.....	1089
Steel Corporation Construction in the Birmingham District.....	1089
The Davis Cast Steel Car Wheel. Illustrated.....	1090
The New Reed High Speed Sensitive Drills. Illustrated.....	1093
The Machine Tool Builders' Convention.....	1093
Railroad Equipment Orders.....	1093
The Baily Electric Furnace. Illustrated.....	1094
The Robinson Automatic Polishing Machine. Illustrated.....	1097
The Story of a Grain of Iron.....	1097
Cast Iron Pipe Molding. Illustrated.....	1098
Railroad Rebates on Iron Ore.....	1100
The Paxson Grooved Roller Sand Mixer. Illustrated.....	1101
A Buyers' and Sellers' Bureau at Cleveland, Ohio.....	1101
Heavy Canadian Rail Contracts.....	1101
The Gang Sensitive Radial Drill. Illustrated.....	1102
The Cream City Accident Preventor. Illustrated.....	1103
Emery Testing Machines at the Bureau of Standards.....	1103
Locomotive Boiler Tubes. Illustrated.....	1104
A Modern Electric Tool Factory. Illustrated.....	1106
The Alvey-Ferguson Company's Removal.....	1107
A Special Fostick Horizontal Boring, Drilling and Milling Machine. Illustrated.....	1107
The Midland 30-In. Radial Drill. Illustrated.....	1108
New Tools and Appliances.....	1109
The Machinery Market Reports.....	1111 to 1121

Blast Furnaces Going Out

A Net Loss of 19 in the Active List

Business in Finished Lines Falling Off—Basic Iron Weaker

Our pig iron statistics for April show that the iron trade more than retraced last month the forward steps it took in March, and the pace of recession was rapid as April closed. With 212 coke and anthracite furnaces in blast May 1, or 19 less than one month previous, the country was producing at the rate of 64,432 tons a day against 70,752 tons on April 1 and 66,562 tons on March 1. Production is now at the rate of 23,850,000 tons a year, estimating charcoal iron, whereas one month ago the yearly rate was 25,750,000 tons. In the 30 days of April the output of coke and anthracite iron was 2,065,086 tons, or 68,836 tons a day, against 2,171,111 tons in March, or 70,036 tons a day.

Most of the furnaces which went out last month stopped in the second half. Steel companies show a net loss of 15 furnaces, against four for the merchant producers. One western Pennsylvania company had but two furnaces in blast May 1, against eight one month previous. The Steel Corporation now has 63 per cent. of its furnace capacity active, against 72 at the high point late in March. Several merchant furnaces will go out in the next week or two.

Pittsburgh reports that new business in finished lines has been falling off steadily. There is considerable unevenness, however, taking the trade as a whole. one day's total running up, to be followed by several of very meager bookings. The Steel Corporation's new orders have been averaging 25,000 tons a day lately. No new influences have come into the price situation, nor is any development expected from the steel manufacturers' conferences in New York this week.

The Rock Island has bought 8000 tons of rails for its St. Paul and Des Moines line. The Florida East Coast has placed 14,000 tons with the Maryland Steel Company, which will also roll 12,000 tons for the Seaboard Air Line. A sale of 3500 tons has been made to the Guatemala Central Railway, and the rails will be rolled at Pittsburgh. The National Railway of Hayti, for which a construction company has been organized in New York, will require 26,000 tons of 48-lb. rails.

The closing down of the rail mill at Ensley, Ala., illustrates the intermittent character of railroad buying. This mill will be idle in May, but has rollings scheduled for June, when the by-product coke plant and the new water system will be completed, adding to the economies of operation at the Ensley Works.

The large amount of structural work pending in and about New York City will severely test fabricating prices, as well as those of plain material. For the Pennsylvania Railroad connecting bridge at Ward's and Randall's islands specifications have just been issued for 35,000 tons. The Interborough Rapid Transit Company is seeking to place the entire 80,000 tons

for its extensions with one company. The Continental Fire Insurance Building was awarded to Milliken Brothers and the 8000 tons of steel will be in large part Bethlehem shapes. Lettings of loft buildings in New York this week amounted to 5000 tons.

In sheets further shading of prices is reported, particularly in the South and Southwest, and may lead to a formal reduction.

Bars are lagging and agricultural buying ostensibly waits to be stimulated by a price concession. Reinforcing bars have been quite active.

The reduction in iron ore has had no effect on prices of foundry iron, but the market is halting. Sellers are looking to May for the beginning of another buying movement, that month having more than once brought such a turn. Deliveries have been held up in some districts, and in the East the machinists' strike is cutting down foundry operations.

Basic iron is weaker at \$13.60, at Valley furnace. Small sales are reported in eastern Pennsylvania at \$15, delivered.

Iron ore charters on the lakes have established rates on the basis of 60c. from the head of the lakes, or 10c. below that of 1910. Furnacemen show little interest in the ore market, and the movement in May will be unusually light.

Connellsville coke output is being cut down, but meantime coke on cars that must be moved has sold as low as \$1.40, as against \$1.55 for May and June shipment.

New Steel Capacity in Germany and at Home

Attention has been called from time to time to the expanding capacity of German iron and steel works and the influence of the German Steel Works Union as a factor in this expansion. Two important new plants have been conspicuous in this connection, the works of the Gelsenkirchen Company at Esche in Luxemburg and the new Thyssen Works at Hagendingen in Lorraine. Quite as notable, however, have been the additions made to older works, in the balancing of blast furnace plants with steel works and rolling mills, or *vice versa*, and the entrance of established works upon the manufacture of new lines of product. All this new construction has an important bearing on the renewal of the syndicate agreement which expires at the end of June, 1912. It is no secret that the various companies have been getting in shape to make demands for a much larger share in the allotments under the new agreement, if one is made.

Another feature of this expansion is its relation to the prosperity the German iron and steel manufacturers have enjoyed in recent years. Reviews of the situation recently published in Germany call attention to the fact that the iron and steel works have contributed not a little to the trade in their own products by the new plants they have been erecting.

On the surface it would seem that the building of new iron and steel works in the United States and the expansion of old plants in the past few years are not due to any such cause as that operating in Germany. There is no syndicate in this country and there are no allotments of tonnage on the German syndicate plan. It is a question, however, whether the co-operative movement among the steel manufacturers of this country and the position of sponsor for the trade which the

United States Steel Corporation has had to assume, willingly or unwillingly, do not furnish some parallel to the German situation. It may be said that primarily the prosperity of the American iron trade in 1905, 1906 and 1907 and the profitable prices ruling through most of that period are responsible for the building of new works beyond the country's needs. At the same time it may be questioned whether as much capital would have gone into new plant but for the knowledge that back of the market was a powerful interest whose financial connections were such that it was bound to prevent demoralization in the prices of its products. Undoubtedly, too, there has entered into our steel plant expansion of recent years the level of prices maintained for semifinished steel. The policy of making a relatively small spread between the prices of steel billets and sheet bars and those of finished products rolled from them has no doubt added in no small amount to the open hearth steel capacity of the country.

The domestic situation plainly shows a parallel to that in Germany in the contribution the iron industry has made to its own prosperity by its own new construction. The same may be said of our railroads. Their unparalleled purchases of steel and equipment in the years 1905 to 1907, inclusive, involving hundreds of millions, contributed greatly to their earnings through the remarkable stimulus given to all industries affected by such buying. It is quite certain that the steel companies of this country will not be their own customers to any large extent through new plant construction in the next two or three years. It is not so certain, however, that the railroads, which always carry too far their abstention from the iron and steel and equipment markets, will not stimulate their own activities through large purchases for equipment long before the next era of steel works building.

The New York Machinists' Strike

Although intimations had been given for some time that the International Association of Machinists intended to put into execution a strike in New York and vicinity for an eight-hour day on May 1, the feeling had been quite confident that as the time approached the proposed strike would be abandoned. This belief was engendered by the fact that a decided recession in business had occurred since the first announcement was made that such a strike was contemplated. It is, therefore, a matter of some surprise that it has actually taken place. At this writing quite a number of machine shops in New York and vicinity have either been closed or have had their working forces seriously cut down by the strike.

It is quite significant that although the International Association of Machinists desires to put in effect a general eight-hour day for its members, this strike is confined to the immediate vicinity of New York. It would seem that this locality had been selected as probably presenting a weak point at which an attack could be made on proprietors of machine shops. The eight-hour day prevails in many trades in the vicinity. The building trades are, of course, prominent in this respect, as the eight-hour day has prevailed in this branch of industry for a number of years. Quite a number of other trades have from time to time yielded to the demand for a shorter work day. The machinists, therefore, have the backing of a very considerable

number of workmen who are now employed only eight hours a day, and who, of course, sympathize deeply with the efforts of the former to secure a shorter day in their trade.

It may be presumed that employers' associations will use their utmost endeavors to prevent this strike from being successful. They have in their favor the general slackness in business, which has already thrown a number of workmen out of employment, from among whom it will be possible to fill the places of many of those who have struck. If the contest is to be confined to the vicinity of New York, the International Association of Machinists unquestionably has a stubborn fight on its hands, with the chances strongly in favor of defeat. The union leaders, of course, have begun to talk of sympathetic strikes for the purpose of making their cause stronger. This, however, may apply to other labor in the vicinity and not to any effort to impose a general strike.

Many employers of labor in New York and vicinity are now seriously handicapped by the short hours of employment and the high rates of wages they are compelled to pay. In consequence of this, much work which ordinarily would be done in the shops in the locality has been transferred to other sections of the country. The business interests of New York have suffered, and the workmen themselves in the branches affected have not had the steady employment which would have been enjoyed by them if labor conditions in New York were more nearly on an equality with those of outside localities. It is now attempted to extend this unsatisfactory condition to the machine shops. The effort deserves to be defeated and to be defeated decisively.

The Long Life of American Machine Tools

Used machinery is generally considered hard to dispose of at advantageous prices, but of late in some parts of the country the demand for certain classes of second-hand machine tools has been in excess of the supply. This is a fair indication that the machine tool industry on the whole is not a sufferer through overproduction. However, there is another reason for the scarcity of used machine tools and that is the fact that American machinery of this class seems to be able to endure a long period of active work and is adaptable for use in shops where the highest state of efficiency is not an absolute necessity long after it has been discarded by some manufacturers. In certain lines of manufacture, such, for instance, as the automobile industry, rapid production is of paramount necessity, and consequently machine tools are discarded for more improved machines before they have outlived their usefulness. In machine shops where the tools are used for making repair parts such discarded machines are found satisfactory. The care used in the construction of American machinery of this class is evidenced by the readiness with which it can be sold.

Recently a good consignment of second-hand milling machines and shapers was bought for export to South America by a keen purchaser who could have obtained new machinery for early delivery if he had wished. The buyer stated that for his wants the used machines were almost as adaptable as new equipment. Machine tool salesmen tell interesting experiences of their encounters with shop owners who have been

using the machines they sell for unusually long periods. It can be seen from this that the scarcity of second-hand American tools is not so much the result of a leaning toward economy on the part of buyers as because of the lasting usefulness of the equipment.

A Concentrated Advisory Board

Commissions and legislative committees which have had to do with framing bills concerning workmen's compensation complain of insufficient co-operation on the part of the manufacturing industry. They have met with individual manufacturers and occasionally a representative of some organization of manufacturers, but the assistance that they have thus received has been comparatively trifling. They urge a concerted movement on the part of the great associations. This suggestion has been made in response to the plea that a commission be established made up of one representative of each of the associations of industrial employers. The National Metal Trades Association, the National Machine Tool Builders' Association, the National Manufacturers' Association, the foundrymen's associations, the great representative bodies of textile trades and other similar organizations could establish a commission which would be an important adviser of those to whom the question of employers' liability legislation is intrusted. The authorized delegate from each association, having the power to represent his fellows, in combination with others similarly selected, would concentrate the interests of employers, just as the interests of labor are concentrated in its organized bodies. Probably it would not be desirable to mingle employers and employees in the single commission, nor would it be wise to give representation to those organizations in which the theorist is the controlling force. The commission would be, strictly speaking, an advisory one. Each member would be picked by his association for his fitness and his interest in the subject. Such a commission would undoubtedly be of great assistance in molding legislation on this important subject on practical lines. The same commission could doubtless act as intelligently and effectively in connection with other forms of legislation which affect the manufacturing industry.

The American Workingman

Reference has already been made in these columns to the report of the commission appointed by the British Board of Trade to investigate the condition of the American workingman. The findings of the commission appointed by that department of the British Government have naturally excited much interest on the other side of the Atlantic, as comparison made with the British workingman's condition was so favorable to the United States. The London *Economist* devotes considerable space to an analysis of the report. It leads up to the higher prices paid for sundry articles in this country and concludes:

Despite these high prices, there is no doubt that from the monetary point of view the position of the skilled workman in the United States is better than that of a similar artisan in Great Britain. But the comparison is not between two countries on a similar economic plane. It is between our own industrially fully developed island and the enormous extent of country forming the United States, filled with natural resources, for the most part to a great extent still undeveloped, and dependent for progress upon a

rapid increase in population. In comparison with countries at the same stage of industrial development as ourselves, social conditions in Great Britain have been proved in every way more desirable. The previous reports for Germany, France and Belgium have shown that on the Continent wages are lower, hours are longer, while rent and cost of living are higher. But when we come to the New World it would indeed have been surprising if the comparison had been in our favor. Those who have followed recent American history cannot doubt that, but for the high tariff, we should have appeared to still greater disadvantage. In a new country like America we must expect to find these conditions to some slight extent reversed. Indeed, it is only the retention by the United States of a high customs tariff that has prevented the distinction becoming even more marked.

Of course, it was to be expected that the American tariff would be brought into the discussion of the subject by a British journal. The tariff is evidently held responsible for our prevailing higher level of prices than those ruling in Great Britain. The tariff, however, is from our viewpoint less responsible than labor conditions. Opportunities for remunerative employment are much more favorable in a country of expanding trade like the United States.

New Publications

Mechanical Engineers' Pocket-Book.—By William Kent. Eighth edition. Size, 4 x 6 $\frac{3}{4}$ in.; pages, 1461; 218 illustrations and diagrams and numerous tables. Bound in leather. Price \$5, net. Published by John Wiley & Sons, New York City.

In bringing out the eighth edition of this reference book of rules, tables, data and formulæ for the use of engineers, mechanics and students, many chapters have been entirely rewritten to take account of the advances made in engineering practice since the seventh edition was published in 1904. In spite of all efforts to save space by the condensation and the elision of much of the old matter, and resetting in a shorter form many of the tables and formulæ, the size of the book has been increased over 300 pages, although this change has not made the volume too large to be a convenient desk reference book. In general, the arrangement of the book does not differ from the preceding editions, and a table of contents and an alphabetical index covering 44 pages render the finding of any subject an easy matter. One of the special features of the index is the use of catch letters at the top of each page to indicate the first and the last subjects on it.

Lead and Spelter Production in 1910

The production of refined lead in the United States in 1910, as shown by an advance statement issued by the United States Geological Survey, was 470,380 net tons, an increase over the figures for 1909 of 22,268 tons.

From the same source comes the information that the production of spelter in this country in 1910 was 269,184 net tons, or about 5 per cent. greater than that for 1909, also that it was greater than that of any other country, Germany coming next with 251,059 tons. The production of the United States was between one-fourth and one-third of the total world's production for the year.

The Wolverine Supply & Mfg. Company, manufacturer of dies and stamped metal specialties, has removed its plant and offices from the Imperial Power Building, Pittsburgh, to Irwin avenue, N. S., Pittsburgh, where it has secured a long lease on a two-story brick building that contains about double the former floor space.

The plants of the Damascus Nickel Steel Company and of the Damascus Tool Steel Company, East Carnegie, near Pittsburgh, now in the hands of S. M. Wetmore, receiver, will be offered for sale at public auction, June 22, by the Trust Company of North America, trustee.

Steel Manufacturers Consider Welfare Work

The meeting of the directors of the American Iron and Steel Institute, held at its offices at 30 Church street, New York, Wednesday afternoon, April 26, was devoted almost entirely to the consideration of labor and welfare questions, which, it is stated, will be made an increasingly important part of the work of the organization. The committee appointed last year to consider measures for the establishment of a six-day week, so far as possible, for all iron and steel workers, presented a tentative report through its chairman, William B. Schiller. This report will be sent to all manufacturers who are members of the institute, and they will be asked to put into effect such of its recommendations for abolishing the seven-day working week as can be made applicable to their operations. It was decided to create a standing committee of the institute on welfare work. It will consist of nine members. President E. H. Gary will be chairman and five of the members will be those now constituting the special committee—namely, William B. Schiller, E. A. S. Clarke, F. W. Wood, James A. Campbell and George G. Crawford. The three remaining members are yet to be selected. There was also some discussion at the meeting of plans for the American representation at the international conference of steel manufacturers, to be held at Brussels, Belgium, in July.

In a published statement Judge Gary said that the meeting had nothing to do with prices of products. "At present," he said, "we are all strongly bent upon doing something thorough and lasting for the protection of the lives and health of the men who work in the steel mills. It is all a very difficult proposition and one that has received a great deal of earnest consideration from steel manufacturers in this country. The problem of keeping down the daily hours of labor to a reasonable basis and the problem of letting each man at work in the mills have the equivalent of a Sunday off each week are very difficult in an industry many of whose processes of manufacture have to be carried straight through from start to finish by a single set of men. We are naturally much bound down by the compulsions found inherently in the very nature of the physical processes used in the manufacture of steel products. However, thorough study of the problem will do much to relieve unequal strain upon the men at work."

American Iron and Steel Institute.—The annual meeting of the American Iron and Steel Institute was held at its offices, 30 Church street, New York, Monday, May 1. The following were elected directors for the three-year term expiring in 1914: J. A. Farrell, E. C. Felton, Elbert H. Gary, Charles M. Schwab and Powell Stackhouse. Mr. Farrell was elected in place of W. E. Corey. The others were re-elected. Officers will be elected at the regular meeting of the directors to be held Wednesday, May 24.

A notice has been posted at the Carnegie Steel Company's works, at South Sharon, Pa., that hereafter no employee will be allowed to work more than six days a week. In case a man is compelled to work on Sunday, he is to get a day off in that week for rest. The order not only applies to blast furnace and steel works labor, but to all other departments in which it is practicable to put it into effect.

The New York offices of the Detroit Steel Products Company were removed May 1 from 2 Rector street to 225 Fifth avenue, the company needing better facilities to meet the growing demand for Detroit Fenestra windows. Raymond H. Kinnear is the manager in charge of this office.

It is reported that the Baldwin Locomotive Works has reduced its forces at its plants in Philadelphia and Eddystone, Pa., from 16,000 to 12,000 men in the past few weeks, and many of the men now employed are on short time.

The New York Barge Canals

The new system of barge canals which will take the place of the Erie Canal, and open up a wider territory than that waterway ever reached, says the *Wall Street Journal*, is divided into four principal sections, the Champlain, the Erie, the Oswego and the Cayuga and Seneca. The Champlain Canal is a canalization of the Hudson River from Albany to Fort Edward, thence in a land line and by way of the canalized Wood Creek to Whitehall at the southern end of Lake Champlain. The Erie, Oswego and Cayuga and Seneca canals have a line that is common to all three as far as Three River Point. This is the canalized Mohawk River to Rome, thence by land line to Oneida Lake, thence by way of the lake and Oneida River to Three River Point, from which place the canalized Oswego River runs north to Lake Ontario. The Erie Canal continues west from Three River Point by way of the Seneca River. The Cayuga and Seneca Canal enters the Erie from the southward at a point near the village of Clyde. The western division of the Erie continues through Rochester, Lockport and smaller communities until it enters the Niagara River at Tonawanda.

The old Erie Canal was completed in 1825, and, including its side connections, was 363 miles long. Originally, the water surface width was 40 ft.; bottom width, 28 ft.; depth, 4 ft. The locks were 90 ft. long and 15 ft. wide. The boats employed at that time were bateaux of an average carrying capacity of 70 tons. The canal was subsequently enlarged, and in the following table are given the nominal dimensions which the improvements called for, as well as the figures showing dimensions of the new systems of barge canals:

	New barge canals.	Old Erie Canal.
	Feet.	Feet.
Depth	12	6 to 7
Surface width.....	123	70
Bottom width.....	75	50 to 60
Locks:		
Width	45	18
Length	325	100
Depth on sill.....	12	7
Capacity of barge (tons).....	1,000 to 2,000	230

Lock lifts on the new canal vary from 6 to 41 ft., which is the lift at Little Falls, the highest direct lift in the world.

Canal tolls were abolished in 1883, after having been in force since the completion of the canal in 1825. At that date net revenues from the canal had exceeded by \$44,000,000 the total original cost, plus cost of improvements, maintenance and repairs. At present the canal and lake rate on 100 lb. of merchandise from New York to Chicago is 42 cents. It is impossible to foretell what rate will be enforced over the new system, but it is certain that with the increase in size of vessel, rate of speed and improved facilities there will be a substantial reduction.

It is expected that the new system will be completed within three years. At present, only part of the Champlain Canal and a few places on the Oswego are open to navigation. In constructing the barge canals, it has been found impracticable to use any of the old works on the Champlain section. On the Erie and Oswego only about 15 per cent. of the old course is followed. The main portion of the old canal which will be utilized in the new system lies west of the town of Newark, which is 200 miles west of Albany.

During the current calendar year it is estimated that \$20,000,000 will be paid to contractors for work completed on the canals. The work is being pushed forward consistently. Contractors who have failed in their work have been replaced by others, or by their original bondsmen. New equipment has been provided on all important contract works and there is every reason to believe that the work, as a whole, will be completed at the time expected, three years from now. The Champlain Canal will be ready for use throughout its entire length within two years. Traffic on the canal averages about 4,000,000 tons a year, and the estimate for the current year is placed at the same amount.

Six years ago, on April 29, 1905, work on the new barge canal system began. The work was authorized under act of Legislature of 1903, by which \$101,000,000 was appropriated. This included construction, land damage and all other expenditures. Estimate for contract expenditure was \$75,112,547. This is exclusive of the Cayuga & Seneca Canal, the appropriation for whose construction was made by referendum in 1909. It is a noteworthy fact that the contracts actually let called for an expenditure of \$72,607,700, approximately \$2,500,000 below the estimate. Total expenditure on extra work to March 1, 1911, has amounted to only \$218,245.

Manufactures in Utah

A preliminary statement of the general results of the census of manufactures for the State of Utah shows a large increase at the census of 1909 as compared with that for 1904. It is important as indicating how Western business is growing.

There were 749 manufacturing establishments in 1909 and 606 in 1904, an increase of 143, or 24 per cent. The capital invested as reported in 1909 was \$52,627,000, a gain of \$26,623,000 or 102 per cent. over \$26,004,000 in 1904. The average capital per establishment for 1909 was approximately \$70,000, and in 1904, \$43,000.

The cost of materials used in 1909 was \$41,292,000, as against \$24,940,000 in 1904, an increase of \$16,352,000, or 66 per cent. The average cost of materials per establishment in 1909 was approximately \$55,000, and in 1904, \$41,000.

The value of products in 1909 was \$61,989,000, and \$38,926,000 in 1904, an increase of \$23,063,000, or 59 per cent. The average per establishment was approximately \$83,000 in 1909 and \$64,000 in 1904. In 1909 the value added by manufacture was \$20,697,000, and in 1904 \$13,986,000, an increase of \$6,711,000, or 48 per cent. The value added by manufacture in 1909 formed 33 per cent of the total value of products, and in 1904 36 per cent.

Salaries and wages in 1909 amounted to \$10,376,000, and in 1904, \$6,196,000, an increase of \$4,180,000, or 67 per cent. In 1909 the number of salaried officials and clerks was 1660, and in 1904, 979, an increase of 681, or 70 per cent. The average number of wage earners in 1909 was 11,785, and in 1904, 8052, an increase of 3733, or 46 per cent.

The International Hygiene Exposition, which is to open at Dresden, Germany, May 6, is without official representation by the United States, it being the only important country in the world to ignore the event. Congress failed to make an appropriation, although requested to do so by the State Department. The exposition will be open until November.

The Princess Royal, the largest cruiser battleship ever built for the British navy, was launched April 29 at Barrow-in-Furness, England. She has a displacement of 26,360 tons and turbine engines affording 70,000 hp. Her contract calls for a speed of 28 knots an hour. She will carry eight 13.5 in. guns, besides smaller weapons.

A meeting of the committee having in charge the merger of the Southern Iron & Steel Company and the Alabama Consolidated Coal & Iron Company was held this week, and it is expected that the details of the plan will be announced in the near future.

The Senate Finance Committee at Washington began this week to hold hearings on the Canadian reciprocity bill. All who desire to express their views will be heard, but the taking of testimony will be concluded May 13. The bill will probably be reported to the Senate without recommendation.

The Jones & Laughlin Steel Company's three Aliquippa blast furnaces have been inactive for some weeks, but it is expected they will be started up next month.

Pig Iron Production

A Substantial Falling Off in April

Active Capacity May 1 Well Below the Rate at the Beginning of March

Our blast furnace statistics appear earlier than usual through the promptness of the furnace companies in reporting. In the 30 days of April the coke and anthracite furnaces produced 2,065,086 tons, or 68,836 tons a day, against 2,171,111 tons in March, or 70,036 tons a day. Present conditions are better indicated by the fact that the month brought a net decrease of 19 in the number of furnaces active, this being 212 on May 1, against 231 on April 1, while the active capacity fell from 70,752 tons a day on April 1 to 64,432 tons on May 1. The industry thus lost in April considerably more than the gain of March, the active daily capacity on March 1 having been 66,562 tons. Production is now at the rate of 23,850,000 tons a year, estimating charcoal iron, whereas on April 1 the yearly rate was 25,750,000 tons. The loss is thus nearly 7½ per cent., and it is known that other furnaces will go out in the next week or two.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with April, 1910, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons.			
	Steel Works.	Merchant.	Total.
April, 1910.....	55,663	27,129	82,792
May	52,235	24,867	77,102
June	51,637	23,879	75,516
July	47,183	22,122	69,305
August	46,534	21,429	67,963
September	47,007	21,536	68,542
October	45,794	21,726	67,520
November	41,427	22,232	63,659
December	35,909	21,440	57,349
January, 1911.....	36,401	20,351	56,752
February	42,349	21,741	64,090
March	48,970	21,066	70,036
April	47,805	21,031	68,836

April Output by Districts

The table below gives the production of all coke and anthracite furnaces in April and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.					
	December. (31 days)	January. (31 days)	February. (28 days)	March. (31 days)	April. (30 days)
New York....	142,674	136,519	131,238	157,624	139,674
New Jersey...	15,437	12,627	6,006	5,869	5,150
Lehigh Valley.	68,531	68,324	56,367	69,263	78,182
Schuylkill Val.	51,466	60,592	57,321	67,634	55,305
Lower Susquehanna and Lebanon Val.	51,888	43,942	42,729	46,980	44,537
Pittsburgh dis.	397,379	409,698	424,517	531,521	488,447
Shenango Val.	82,706	82,922	86,908	109,799	109,239
West. Penn....	81,957	94,118	96,616	120,464	100,593
Mid. Va. and Kentucky ...	59,945	56,424	57,759	61,628	60,979
Wheeling dis..	74,225	77,715	95,571	135,775	119,489
Mahoning Val.	162,349	174,318	201,624	203,006	189,822
Central and North. Ohio..	112,662	127,579	144,806	170,914	161,742
Hocking Valley, Hanging Rock and S.W. Ohio	29,959	33,253	32,396	35,173	27,084
Mich., Minn., Mo., Wis., Col., Wash.	68,313	60,941	61,406	69,741	76,379
Chicago dis....	197,340	165,826	155,498	213,638	236,550
Alabama	154,025	128,188	118,594	143,751	149,737
Tenn., Georgia and Texas....	26,961	26,340	25,153	28,331	22,178
Total.....	1,777,817	1,759,326	1,794,509	2,171,111	2,065,086

Among furnaces blown out in April were Buffalo Union C at Buffalo, one Warwick in the Schuylkill Valley, one Paxton in the Lower Susquehanna Valley, one Clairton, one Duquesne, two Edgar Thomson and one Isabella in the Pittsburgh district, six Cambria and Adrian (May 1) in western Pennsylvania, one Mingo in the Wheeling district, three Ohio in the Mahoning Valley, Dover in Ohio, one Federal at Chicago, and Tuscaloosa in Alabama. Few furnaces were blown in, the list including one Bird Coleman in the Lebanon Valley, Tod and Mary in the Mahoning Valley, and one Gary in the Chicago district.

Capacity in Blast May 1 and April 1

The following table shows the daily capacity of furnaces in blast May 1 and April 1:

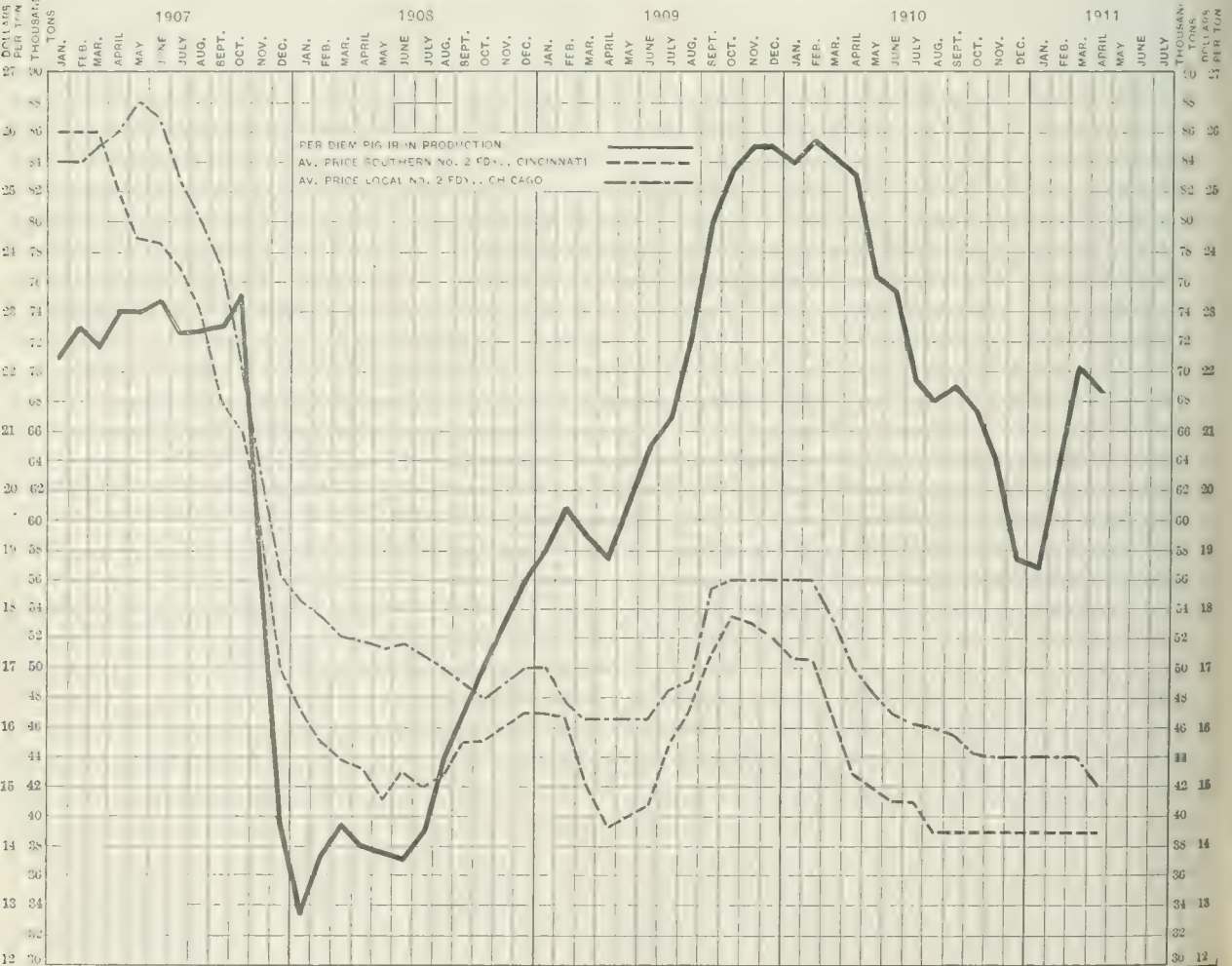


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to May 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace.

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	May 1.		April 1.	
		Number in blast.	Capacity per day.	Number in blast.	Capacity per day.
New York:					
Buffalo.....	17	12	4,327	13	4,375
Other New York.....	7	1	164	2	314
New Jersey.....	7	1	172	1	190
Spiegel.....	2	..	..	..	..
Pennsylvania:					
Lehigh Valley.....	24	13	2,524	13	2,625
Spiegel.....	3	1	82	1	88
Schuylkill Valley.....	16	7	1,810	8	2,182
Low. Susquehanna.....	7	3	583	4	726
Lebanon Valley.....	10	6	862	5	789
Pittsburgh district.....	50	34	14,467	39	16,725
Spiegel.....	3	2	273	2	295
Shenango Valley.....	20	11	3,641	11	3,638
West. Penn.....	27	6	1,755	13	4,095
Maryland.....	4	3	749	3	806
Wheeling district.....	14	11	3,983	12	4,380
Ohio:					
Mahoning Valley.....	23	16	6,085	17	6,590
Central and North.....	22	13	5,082	14	5,484
Hocking Val., Hanging Rock and S. W. Ohio.....	15	7	902	7	898
Illinois and Indiana.....	34	19	7,585	19	7,365
Mich., Wis. and Minn.....	10	6	1,455	6	1,380
Colo., Mo. and Wash.....	7	4	1,090	4	1,042
The South:					
Virginia.....	23	9	972	9	965
Kentucky.....	5	2	311	2	285
Alabama.....	46	18	4,823	19	4,710
Tenn. and Georgia.....	20	7	735	7	805
Total.....	416	212	64,432	231	70,752

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production":

Production of Steel Companies.—Gross Tons.

	—Fig.—Total production.			Spiegeleisen and ferromanganese.		
	1909.	1910.	1911.	1910.	1911.	
January.....	1,117,823	1,773,201	1,128,448	19,538	8,360	
February.....	1,073,363	1,620,539	1,185,782	21,396	12,821	
March.....	1,140,553	1,739,212	1,518,063	25,591	11,784	
April.....	1,093,092	1,669,898	1,434,142	22,304	10,657	
May.....	1,256,448	1,619,283	.....	26,529	.....
June.....	1,365,527	1,549,112	.....	27,680	.....
July.....	1,508,762	1,462,689	.....	22,924	.....
August.....	1,591,991	1,442,572	.....	25,756	.....
September.....	1,660,839	1,410,221	.....	15,151	.....
October.....	1,769,094	1,419,624	.....	8,500	.....
November.....	1,689,994	1,242,804	.....	9,032	.....
December.....	1,768,799	1,113,174	.....	12,178	.....

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.	1911.
January.....	71,149	33,718	57,975	84,148	56,752
February.....	73,038	37,163	60,976	85,616	64,090
March.....	71,821	39,619	59,232	84,459	70,036
April.....	73,885	38,289	57,962	82,792	68,836
May.....	74,048	37,603	60,753	77,102	.....
June.....	74,486	36,444	64,656	75,516	.....
July.....	72,763	39,287	67,793	69,305	.....
August.....	72,594	43,851	72,546	67,963	.....
September.....	72,783	47,300	79,507	68,476	.....
October.....	75,386	50,554	83,856	67,520	.....
November.....	60,937	52,595	84,917	63,659	.....
December.....	39,815	56,158	85,022	57,349	.....

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago District Furnace Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou.	Loc.	Sou.	Loc.	Sou.	Loc.	Sou.	Loc.
Jan.	26.00	25.50	16.15	18.10	16.25	17.00	17.25	18.50
Feb.	26.00	25.50	15.75	17.81	16.13	16.40	17.06	18.50
March	26.00	25.75	15.50	17.50	15.05	16.15	16.30	17.80
April	25.06	26.00	15.20	17.38	14.25	16.15	15.37	17.00
May	24.25	26.50	14.75	17.28	14.50	16.15	15.00	16.56
June	24.10	26.25	15.25	17.38	14.70	16.15	14.85	16.25
July	23.85	25.20	15.00	17.20	15.75	16.65	14.75	16.06
Aug.	23.00	24.50	15.25	17.00	16.38	16.78	14.31	16.00
Sept.	21.50	23.75	15.65	16.70	17.35	18.35	14.25	15.90
Oct.	20.95	22.10	15.75	16.50	17.88	18.50	14.25	15.56
Nov.	19.50	20.31	16.00	16.75	17.75	18.50	14.25	15.50
Dec.	17.00	18.55	16.25	17.00	17.45	18.50	14.25	15.50
Jan., 1911, 14.25, 15.00; Feb., 14.25, 15.00; March, 14.25, 15.00; April, 14.25, 15.00.								

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.
January.....	2,205,607	1,045,250	1,797,560	2,608,605
February.....	2,045,068	1,077,740	1,707,340	2,397,254
March.....	2,226,457	1,228,204	1,832,194	2,617,949
April.....	2,216,558	1,149,602	1,738,877	2,483,763
May.....	2,295,505	1,165,688	1,883,330	2,390,180
June.....	2,234,575	1,092,131	1,930,866	2,265,478
July.....	2,255,660	1,218,129	2,103,431	2,148,442
August.....	2,250,410	1,359,831	2,248,930	2,106,847
September.....	2,183,487	1,418,998	2,385,206	2,056,275
October.....	2,336,972	1,567,198	2,599,541	2,093,121
November.....	1,828,125	1,577,854	2,547,508	1,909,780
December.....	1,234,279	1,740,912	2,635,680	1,777,817
January, 1911, 1,759,326; February, 1911, 1,794,509; March, 1911, 2,171,111; April, 1911, 2,065,086.				

Jones & Laughlin Improvements

The No. 3 Eliza furnace of the Jones & Laughlin Steel Company at Pittsburgh was blown out February 11 last, the old furnace was torn down, the salamander was blown out and a complete new stack has been erected in the record-breaking time of 73 days. The work was done by the company itself, under the direct supervision of Eugene L. Messler, general superintendent of the Eliza furnaces. Stack No. 1 of the Eliza group was completely rebuilt last year in 95 days.

The four Talbot open hearth furnaces of the company at Aliquippa are ready for operation, but as yet no date has been fixed for starting them. Each of these furnaces will have a daily output of about 225 tons of steel. All of the four blast furnaces at Aliquippa are idle, and have been for some time on account of the depression in the steel market. It is intended that two of these blast furnaces will serve the four Talbot open hearth furnaces with pig iron, while the output from the other two stacks, about 900 tons of Bessemer iron per day, will be shipped to the company's South Side mills.

Work is progressing rapidly on the 12 hot tin mills being built by the company at Aliquippa, and they are expected to be ready for operating about October 1. The new Morgan double rod mill, also now being built at Aliquippa, is expected to be ready about the same time.

Reported Sale of Risdon Iron Works.—It is reported at San Francisco that the United States Steel Corporation has been negotiating for the purchase of the Risdon Iron Works, with its large tract of land and ½ mile of water front. The president of the San Francisco company has denied that the purchase has been made.

An important labor disturbance is the strike of the men employed in the Conemaugh, Youngwood, Pitcairn and Derry shops of the Pennsylvania Railroad. The men claim that the officials of the company discharged a number of old employees for becoming connected with labor organizations. Thus far the Altoona shops, which are the largest on the main line of the Pennsylvania Railroad, have not been affected.

Regarding the current report of the sale of the Baldwin Locomotive Works to Drexel & Co., Alba B. Johnson, vice-president, says that the company has officially taken the stand neither to confirm nor deny the report. Both parties concerned absolutely refuse to discuss the matter.

The William Tod Company, Youngstown, Ohio, builder of engines, rolling mill machinery and hydraulic presses, is now turning out in its shops runout tables for the Gary Works of the Indiana Steel Company, at Gary, Ind., the contract for which was taken some months ago.

The Finance Committee of the United States Steel Corporation has appropriated \$75,000 for improvements at the Rankin, Pa., plant of the American Steel & Wire Company.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

May 3, Apr. 26, Apr. 5, May 4,
1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia.....	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Valley furnace.....	13.75	13.75	13.75	15.50
Foundry No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.....	11.00	11.00	11.00	12.00
Foundry No. 2, local, Chicago*.....	15.00	15.00	15.50	17.25
Basic, delivered, eastern Pa....	15.00	15.00	15.25	17.00
Basic, Valley furnace.....	13.60	13.75	13.75	15.50
Bessemer, Pittsburgh.....	15.90	15.90	15.90	17.90
Gray forge, Pittsburgh.....	14.40	14.40	14.40	15.90
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00

COKE, CONNELLSVILLE,

Per Net Ton, at oven:				
Furnace coke, prompt shipment..	1.55	1.55	1.60	1.75
Furnace coke, future delivery...	1.75	1.75	1.75	2.00
Foundry coke, prompt shipment..	1.90	2.00	2.00	2.25
Foundry coke, future delivery...	2.15	2.20	2.25	2.50

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	23.00	23.00	23.00	26.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.00
Wire rods, Pittsburgh.....	29.00	29.00	29.00	32.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.25	14.25	14.50	18.00
Iron rails, Philadelphia.....	16.75	17.00	18.00	20.00
Car wheels, Chicago.....	13.25	13.25	13.25	16.00
Car wheels, Philadelphia.....	13.00	13.00	13.25	15.50
Heavy steel scrap, Pittsburgh....	12.50	12.50	13.75	15.50
Heavy steel scrap, Chicago.....	11.50	11.50	11.50	13.75
Heavy steel scrap, Philadelphia	13.00	13.00	13.50	15.00

FINISHED IRON AND STEEL,

Per Pound:				
	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.32½	1.32½	1.37½	1.50
Common iron bars, Chicago....	1.25	1.25	1.25	1.50
Common iron bars, Pittsburgh..	1.32½	1.35	1.35	1.55
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.55
Beams, tidewater, New York....	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York....	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:				
	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh.....	1.60	1.65	1.70	1.85
Barb wire, galv., Pittsburgh.....	2.10	2.10	2.10	2.15

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.30	12.37½	12.50	13.00
Electrolytic copper, New York..	12.10	12.12½	12.25	12.40
Spelter, New York.....	5.50	5.50	5.55	5.15
Spelter, St. Louis.....	5.30	5.30	5.35	5.00
Lead, New York.....	4.42½	4.42½	4.45	4.40
Lead, St. Louis.....	4.27½	4.27½	4.30	4.25
Tin, New York.....	42.00	42.50	41.75	32.70
Antimony, Hallett, New York...	9.00	9.00	9.12½	8.12½
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

* This price is at furnace and not delivered in Chicago. The average switching charge in the Chicago district is 50c. per ton.
† These prices are for largest lots to jobbers.

Prices of Finished Iron and (Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in. 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras

as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zeos, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel.		Iron.	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	71	59	49	43
1½ in.....	75	63	71	59	49	43
¾ to 1½ in.....	79	69	75	65	55	45
2 to 3 in.....	80	70	76	66	56	46
Lap Weld.						
2 in.....	76	66	72	62	52	42
2½ to 4 in.....	78	68	74	64	54	44
4½ to 6 in.....	77	67	73	63	53	43
7 to 12 in.....	75	59	71	55	45	35
13 to 15 in.....	51½					
Butt Weld, extra strong, plain ends, card weight.						
1½ in.....	60	59	65	55	45	35
1 in.....	74	68	70	64	54	44
¾ to 1½ in.....	78	72	74	68	58	48
2 to 3 in.....	79	73	75	69	59	49
Lap Weld, extra strong, plain ends, card weight.						
2 in.....	75	69	71	65	55	45
2½ to 4 in.....	77	71	73	67	57	47
4½ to 6 in.....	76	70	72	66	56	46
7 to 8 in.....	69	59	65	55	45	35
9 to 12 in.....	64	54	60	50	40	30
Butt Weld, double extra strong, plain ends, card weight.						
1½ in.....	64	58	60	54	44	34
¾ to 1½ in.....	67	61	63	57	47	37
2 to 3 in.....	69	63	65	59	49	39
Lap Weld, double extra strong, plain ends, card weight.						
2 in.....	65	59	61	55	45	35
2½ to 4 in.....	67	61	63	57	47	37
4½ to 6 in.....	66	60	62	56	46	36
7 to 8 in.....	59	49	55	45	35	25

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½. 2 to 3 in. Butt Weld { Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in. Lap Weld {
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

	Steel.
1½ to 2¼ in.	65
2½ in.	67½
2¾ to 3¼ in.	70
3½ to 4½ in.	72½
5 and 6 in.	65
7 to 13 in.	62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12	12½	13	14	15	16
Annealed.	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30	2.30
Galvanized.	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90	

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser.	.80
10 to 18.	.80 and 10
19 to 26.	.80 and 10 and 2½
27 to 36.	.80 and 5
Galvanized:	
9 and coarser.	.75 and 10
10 to 16.	.75 and 10
17 to 26.	.72½ and 10
27 to 36.	.72½
Coppered or Liquor Finished:	
9 and coarser.	.75 and 10
10 to 26.	.75 and 10
27 to 36.	.70 and 10 and 5
Tinned:	
6 to 18.	.75 and 10 and 10

Pittsburgh

PARK BUILDING, May 3, 1911.—(By Telegraph.)

Pig Iron.—The reduction in Lake ore prices has failed so far to stimulate the demand for pig iron. Prices on basic are weaker, a local steel casting concern being reported to have bought about 500 tons for May shipment at \$13.60. Valley furnace, or lower. The United Steel Company, Canton, Ohio, is inquiring for 3000 tons of basic for third quarter delivery, and it seems probable that some low prices will be made by sellers. There is no demand for Bessemer iron, and while the nominal price is \$15, Valley furnace, this is not regarded as firmly held. We quote as follows: Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.60; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—There is no new inquiry. Prices on open hearth billets and sheet bars are weak, small makers offering them at \$1 a ton, and in some cases \$1.50 lower than the prices named by the larger mills: Regular prices, but which do not represent the actual market on open hearth steel, are as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1½-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Extreme dullness continues to characterize the local iron trade, the volume of new business showing a decrease from day to day. Manufacturing plants are not operating to more than 60 per cent. of capacity. Pig iron continues dull. There is very little new demand for billets, which continue to be offered by small open hearth plants at \$1 a ton or

more below the prices quoted by the larger mills. Finished iron and steel are very quiet, the new demand being entirely of a hand-to-mouth nature. The situation could hardly be more unsatisfactory, except that there has so far been no serious break in prices.

Ferromanganese.—A sale of 300 tons of foreign 80 per cent., with deliveries of 50 tons a month over the last half of the year, is reported at \$36.50, Baltimore. We quote 80 per cent. at \$36.50 to \$36.75, Baltimore, the rate for delivery in the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—The new demand is dull and prices on 50 per cent. are weaker and lower. We quote 50 per cent. at \$52.50 to \$53, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—In the absence of sales, we quote best grades, made from all pig iron, at, nominally, \$29, Pittsburgh.

Skep.—The pipe mills are not operating at present to more than 50 per cent. of capacity, and the consumption of skelp is lighter now than for some months; hence the market is quiet. We quote: Grooved steel skelp, 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The new demand is light and consumers are not specifying freely against their contracts, in some cases shipments having been held up entirely. There seems to be a surplus supply of rods, and the tone of the market is weaker. We continue to quote Bessemer, open hearth and chain rods at \$29, Pittsburgh.

Steel Rails.—Actual orders and specifications against contracts for light rails received by the Carnegie Steel Company in the past week amounted to about 2500 tons, about double the previous week. The company has also booked some fairly large orders for standard sections for export. No domestic orders for standard sections have been placed in the past week. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b., at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—Actual bookings of the American Bridge Company in April showed a slight increase over March. This company has taken about 1600 tons of bridge work for the Piedmont Traction Company and the Greenville, Spartanburg & Anderson, Southern trolley lines. Work on the piers for the steel bridge to be erected by this city at the Point has started, and bids on the steel, about 6000 to 8000 tons, will probably soon be asked for. The hotel project of the Oliver Estate on Smithfield street now looks promising; it is estimated that this will take upward of 15,000 tons of steel. Very low prices continue to be made for fabricated work, but it is stated that the mills are holding firmly to regular prices on plain material. We continue to quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Plates.—While several fairly large inquiries for steel cars are out, no orders of moment have been placed in the past week. It is expected that the Seaboard Air Line will shortly purchase 1000 box cars with steel underframes and the Chicago, Burlington & Quincy the same number of all steel cars. The gas holder to be built by the Philadelphia Company, which will take about 6000 tons of plates, has been held up. All the plate mills are badly in need of orders. We quote ¼-in. and heavier plates in the wide sizes at 1.40c., but on the narrower sizes it is stated that a few mills are slightly shading this price.

Sheets.—Conditions in the sheet trade continue unsatisfactory, the new demand being dull, and specifications against contracts are not coming in well. Prices continue to be shaded, particularly in the South and Southwest, but hardly enough new business is being offered to test the market thoroughly. Some in the trade believe that a reduction in prices may be made, but nothing official has so far been given out. Regular prices on black, galvanized and roofing sheets, which are being slightly shaded in some cases, are printed on a previous page.

Tin Plate.—The tin plate mills now look for liberal specifications on bright plates from the can makers over the next three months, as this is their busy season. The new demand is dull, and it is estimated that only about 75 per cent. of the tin plate capacity is active at present. At a meeting of the tin plate mills held here last week prices were reported as being fairly well maintained. We quote 100-lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Bars.—The building season has opened quite actively.

THE IRON AND METAL MARKETS

and a larger demand is reported for concrete reinforcing bars, for which the mills have a good deal of business booked. The general demand for both iron and steel bars is quiet, and iron bars are lower, due to the decline in scrap. We quote soft steel bars at 1.40c. and common iron bars at 1.32½c. to 1.35c., Pittsburgh.

Shafting.—New orders and specifications against contracts in April showed a falling off as compared with March, and this condition continues. Regular discounts on cold rolled shafting remain at 57 per cent. off in carloads and 52 per cent. in less than carloads, but are not being strictly held.

Spelter.—The market is dull and prices have declined. We quote prime grades of Western at 5.20c., East St. Louis, equal to 5.32½c., Pittsburgh.

Hoops and Bands.—Specifications against contracts are unsatisfactory, while the new demand is dull. It is estimated that not more than 60 per cent. of mill capacity in hoops and bands is active at present. We continue to quote steel hoops at 1.35c. and bands at 1.40c., extras on the latter as per steel bar card, but it is claimed that these prices are not firmly held in all cases.

Merchant Steel.—April showed a marked falling off in new orders and specifications as compared with March. One leading mill reports that its business in April was only about one-half what it was the month before. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Consumers are ordering only such quantities as are required to meet current needs. None of the makers is operating full, and some of them to only 50 per cent. of capacity. We quote structural rivets at 1.75c. to 1.80c., and boiler rivets, 1.85c., Pittsburgh.

Wire Products.—The wire trade is about as dull now as any of the other lines of finished product. Jobbers and retailers are merely placing orders for such quantities of nails and wire as are absolutely needed, keeping their stocks as light as possible, looking for lower prices if conditions do not improve. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—There are no large inquiries in the market. The base price of railroad spikes is \$1.60, Pittsburgh.

Merchant Pipe.—Advices are that the Guaranty Pipe Line Company of California will not build its oil line at present and the inquiry has been withdrawn. The pipe market is quiet, jobbers placing only occasional carload orders to meet current needs and maintain a full assortment of sizes. In spite of the light demand, it is stated that discounts on both iron and steel pipe, printed on a previous page, are being firmly held.

Boiler Tubes.—Most consumers of tubes being covered by contracts up to July 1, the new demand is light. The new list and classification on steel boiler tubes, printed on a previous page, are being well maintained.

Coke.—Coke makers realize that the output has been too heavy for some time, and are putting out ovens at a pretty lively rate. A good deal of coke is being stocked and the new demand is dull. There are no inquiries in the market for furnace coke, but several large consumers of foundry coke are figuring on their requirements for the last half of the year. The output of coke in the Upper and Lower Connellsville regions for the first three months of 1911 is estimated at 4,242,574 net tons, a decrease over the first quarter of 1910 of nearly 2,000,000 tons. The output for last week showed a falling off of nearly 36,000 tons, as compared with the previous week. Low prices continue to be made on furnace coke loaded on cars and has to be moved. In some cases such coke has sold at \$1.40 to \$1.45 per net ton at oven, but this cannot be regarded as the market. We quote standard makes of furnace coke for May and June shipment at \$1.60 to \$1.65, and for delivery over the last half of the year, at \$1.75 to \$1.85 in net tons at oven. We quote standard makes of 72-hour foundry coke at \$1.90 to \$2 for spot shipment, and \$2.15 up to \$2.40 in net tons at oven for delivery over second half of the year.

Iron and Steel Scrap.—There seems to be no scrap market, consumers not needing material, with some holding up shipments, while dealers are not trying to press sales, knowing that it would be useless to do so under present conditions. Embargoes on scrap are still on at Follansbee, W. Va., and Monessen, Pa., and this is serving to make the local situation worse than it would be otherwise. In the absence of actual sales prices are largely nominal.

Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$12.50 to \$12.75
No. 1 foundry cast.....	13.75 to 14.00
No. 2 foundry cast.....	12.75 to 13.00
Bundled sheet scrap, at point of shipment.....	9.00 to 9.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.50
No. 1 railroad malleable stock.....	12.50 to 12.75
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.75 to 17.00
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 busheling scrap.....	12.50 to 12.75
No. 2 busheling scrap.....	9.00 to 9.25
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	8.60 to 8.75
*Machine shop turnings.....	9.15 to 9.40
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.25
Stove plate.....	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Philadelphia

PHILADELPHIA, PA., May 2, 1911.

Consumers show little interest in the market. Even small lot buying of pig iron has decreased. A moderate demand for heavy steel plates is reported, but structural material has been less active. Bars are dull. Very little business has been done in old material, with a downward tendency in a number of grades.

Iron Ore.—A waiting market prevails. Consumers, owing to the quiet condition of the iron trade, show hesitancy in placing contracts for ore and no sales of any importance have been reported. Importations during the week ending April 30 included 5458 tons of Spanish, 12,430 tons of Newfoundland and 10,400 tons of Cuban ore.

Pig Iron.—The movement continues light. Consumers are still taking deliveries freely on contracts already placed, but show little interest in purchasing for extended delivery, and the customary inquiries which usually follow a drop in ore prices, if only for the purpose of testing the market, have failed to materialize. Producers are watching the situation closely and contend that no reduction in price will be made for standard brands of foundry iron. Several merchant furnaces, including Carbon and Sheridan, are to be blown out this week, and further curtailment has been considered, but not definitely decided upon. The reports of the Eastern Pig Iron Association and the Virginia Pig Iron Association, both organizations holding their regular monthly meetings in this city this week, are awaited with interest. While no actual reduction in the price of standard brands of foundry iron is reported, the range of the market is narrower and the usual 50c. differential between No. 2 X and No. 2 plain has in several cases been narrowed down to 25 cents a ton. Sales of No. 2 X and No. 2 plain foundry grades have been light and confined largely to immediate requirements, with prices for No. 2 X ranging from \$15.50 to \$15.75, delivered. An odd lot may still go at the recent top of the market, \$16, but this quotation is no longer general. Negotiations are pending for a round lot of low grade foundry iron, pipe makers figuring against prospective business, but no sales of importance are reported. In a few instances better sales of Virginia foundry iron have been made, stove foundries and machinery makers taking lots ranging from 100 to 400 tons for delivery in June, July and August, at \$13, furnace, for No. 2 X. There has been little done in forge iron; rolling mills are not active and show little interest in the market. The range of prices for this grade has also narrowed and \$14.75 to \$15 now about represents the market. While the leading consumers of basic pig iron are not buying, the purchaser in the central part of the State who bought 1000 tons last week at \$15, delivered, has taken on another lot of the same quantity and at the same price. Some Eastern basic makers would take business at that level, although the quotation is not general. The demand for low phosphorus iron has been meager and sellers will accept business at prices below recent quotations: \$21, delivered, can be done for standard grade, delivered in this district. The following range of quotations about represents the market for standard brands, second and third quarter delivery, in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.80 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.00
Basic.....	15.00
Standard low phosphorus.....	21.00 to 21.50

THE IRON AND METAL MARKETS

Ferromanganese.—Negotiations are still pending for a lot of several hundred tons for an Eastern consumer, but no fresh inquiry is reported. Prices remain unchanged, at \$36.50 to \$37, Baltimore, for 80 per cent., delivery ranging from second quarter to last half of the year.

Billets.—Consumers continue to place small orders for prompt shipment, the maximum being about 100 tons. Mills get enough business, however, to enable them to maintain about an even rate of production. Notwithstanding reports of concessions in other districts, local makers are adhering firmly to recent quotations—\$25.40 for open hearth rolling billets and \$30.40 for ordinary forging billets, delivered in this vicinity.

Plates.—Business continues of a small lot character. Some mills report the volume taken during the past few weeks to have been maintained, but a falling off is reported by others. Boiler steel appears to be in active demand, with a fair amount of car and bridge work also coming out. Makers hold prices firmly, the minimum being 1.55c. for ordinary plates, delivered here.

Structural Material.—Actual orders placed during the week have been less numerous, although both makers of plain shapes and fabricators are figuring on considerable business. The major portion of the work under negotiation comes from surrounding districts, new business in this territory being small and of a miscellaneous character. The demand for plain shapes is somewhat easier, although prices are fully maintained at 1.55c., delivered in this vicinity.

Sheets.—Conditions are still unsatisfactory to the mills; orders continue small individually, and makers are unable to gauge mill operations except for a few days ahead. Consumers show no disposition to contract, but place small orders for prompt delivery covering immediate needs. Eastern mill quotations for prompt shipments range as follows: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—A very small amount of new business has been placed, and mills in almost every case are anxious for business, but are not willing to make any further concession in the price of refined iron bars. Consumers hold off, waiting for a firm basis before making large purchases. Specifications against contracts for steel bars are not coming out very freely. Prices are unchanged, refined iron bars being quoted at 1.32 $\frac{1}{2}$ c. to 1.37 $\frac{1}{2}$ c., delivered in this vicinity, with steel bars at 1.55c., delivered.

Old Material.—Buying has been lighter and in many grades transactions have not been sufficient to establish a market. Some cancellations of orders are noted. One Eastern consumer of wrought pipe has made heavy cancellations, while those against undelivered portions of contracts for heavy melting steel have probably not been as extensive as was anticipated. No. 1 heavy melting steel, from the consumer's viewpoint, is on a strictly \$13, delivered, basis, although for choice material \$13.25 will in instances be paid, and as high as \$13.50 has been done on transactions between dealers. In the latter case deliveries apply on old high priced contracts. One lot of 1000 tons of low phosphorus scrap was sold last week at \$17.50, but the market to-day is slightly lower. Railroad lists have not all come out, but such as have been received show a reduced tonnage. Old iron rails have been sold at a slightly lower level, but special grades are, as a rule, inactive. Prices generally are quoted lower than last week, largely against buyers' offers or in comparison with other grades. The following range of prices about represents sellers' ideas of the market for deliveries in consumers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	14.25 to 14.75*
Low phosphorus heavy melting steel scrap.....	17.25 to 17.75
Old steel axles.....	20.00 to 20.50
Old iron axles.....	25.00 to 26.00*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	16.00 to 16.50
Wrought iron pipe.....	13.00 to 13.50
No. 1 forge fire.....	10.75 to 11.25
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast.....	13.25 to 13.75
Railroad malleable.....	12.00 to 12.50
Grate bars, railroad.....	11.50 to 12.00
Stove plate.....	10.50 to 11.00

* Nominal.

Coke.—Several 1000-ton contracts for foundry coke, for delivery over the remainder of the year, have been closed at prices varying from \$2.25 to \$2.40 per net ton, at oven. Moderate sales of spot foundry coke at \$2, at oven, are also reported. Little movement in furnace coke is to be noted. Furnaces are unwilling to make large contracts, owing to the uncertainty of the iron market, and, as a rule, con-

sider their purchases to prompt lots, which are freely offered at \$1.55 to \$1.65, at oven. The following range of prices is named per net ton, for deliveries in this vicinity:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke.....	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke.....	3.75 to 4.15

The U. S. Metal & Mfg. Company, whose main office is at 165 Broadway, New York, has for about four years been maintaining an office at Lebanon, Pa., formerly in charge of Edward Boughter, who died in March, 1910, since which time it has been under the management of L. Weyer Murray. Owing to important changes which have occurred in business in the past year or two, the company has decided to transfer the Lebanon office to Philadelphia, where quarters have been secured in the Morris Building. The Philadelphia office is in charge of Mr. Murray, who will have a corps of competent assistants.

Cleveland

CLEVELAND, OHIO, May 2, 1911.

Iron Ore.—The prediction of ore firms that the establishment of prices would not cause a very active buying movement is being realized. Quite a number of sales of non-Bessemer grades are being made in small lots, but the aggregate tonnage sold, exclusive of reservations made before the fixing of prices, is not large. Furnacemen are showing more desire than usual to secure bargains this season. The demand for off grade ores is fairly good, as compared with standard ores. A fair tonnage of low grade ores has been sold in the East. Prices on these ores range from 10c. to 15c. below those that prevailed last year, but low grade ores were sold at a low figure during 1910. One independent ore firm, with a rather limited tonnage, which in the past has shaded the market, is selling old range non-Bessemer at a concession of about 20c. from regular prices. Lake freight rates on ore have finally been fixed at a reduction of 10c. a ton from last season's rates. The rates this year will be 60c. a ton from the head of the lakes, 55c. from Marquette and 45c. from Escanaba. Not much chartering has been done. Very little ore is being moved yet. The Pittsburgh Steamship Company has placed all but 10 of its vessels in commission, and expects to have the remainder in operation by the end of the week. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The market is almost lifeless. Foundries are well supplied for their second quarter requirements, and few are ready to buy for the last half. Only two inquiries are reported, one for 500 tons of Northern iron and the other for 300 tons of Southern, both for the last half. An inquiry from Chicago for 3000 tons of basic has been withdrawn from the market. One furnace interest is offering basic for the third quarter delivery at the current price of \$13.75. In spite of the dullness and the reduction in ore prices the market is generally firm at recent quotations. Last half quotations on foundry grades, however, are largely nominal, and it is probable that an inquiry for a fair tonnage would bring out quotations at about the current market price, or from 25 to 50 cents lower than most of the furnaces are now asking for that delivery. Southern foundry iron is now being quite generally quoted at \$11, Birmingham, for No. 2 for delivery through the last half. For prompt shipment and the second quarter, we quote, delivered Cleveland, as follows:

Bessemer.....	\$15.90
Basic.....	14.25
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Gray force.....	13.50
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

Coke.—Foundries are well supplied for the present and are not ready to contract for their last half requirements. Prices are stationary. We quote standard Connellsville furnace coke at \$1.60 to \$1.65, per net ton, at oven, for spot shipment, and \$1.75 to \$2 for the last half. Connellsville 72-hour foundry coke is held at \$2 for prompt shipment and \$2.25 to \$2.50 for the last half.

Finished Iron and Steel.—The demand in finished lines is less active. Mill agencies are getting a fair volume of orders, but they are nearly all for small tonnages. Inquiries for round lots are lacking. Buyers are placing orders only for their immediate needs. Very few contracts are being placed for delivery after July 1. Buyers feel certain that prices will go no higher, so they see no advantage in placing contracts. Only a moderate volume of structural work is coming out, and local shops are only fairly busy. The King

THE IRON AND METAL MARKETS

Bridge Company, Cleveland, has taken the contract for 1100 tons from the Nickel Plate Railroad, for bridge crossing elimination work in East Cleveland. The same company was low bidder on 800 tons for bridge work at East St. Louis. The McMyler Interstate Company, Cleveland, was low bidder on 475 tons for the Dunham road grade crossing elimination work near Cleveland, bids for which were received by the County Commissioners. That company's bid was \$59.50 per ton, erected. Steel bars and structural material are firm, at 1.40c., Pittsburgh. The demand for sheets is not active. Most of the sheet business is being taken at price concessions, the maximum shading being \$1 a ton. The 57 per cent. discount on shafting is not being firmly adhered to. The demand for iron bars continues light. While most mills are adhering to a minimum quotation of 1.30c., this has been shaded to 1.25c., at mill, on a 200-ton order during the week.

Old Material.—As a result of the continued inactivity prices on nearly all grades have suffered another sharp decline of from 50c. to \$1 a ton. Prices are said to be lower in the local market now than at any time in the past seven years. The only demand is for small lots, and with the present condition of the market dealers do not appear anxious either to buy or sell. Local mills are offering only \$11.25 for heavy melting steel. The Wheeling & Lake Erie Railroad closed May 2 on about its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.00 to 11.50
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.00 to 11.50
Railroad malleable.....	11.75 to 12.25
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.25
Iron and steel turnings and drillings..	6.25 to 6.50
Steel axle turnings.....	8.00 to 8.50
No. 1 busheling.....	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate.....	10.25 to 11.50
Bundled tin scrap.....	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., May 1, 1911.

Pig Iron.—The pipe makers continue to pick up odd lots of the lower grades when such offer, while there have been a few sales of regular foundry iron; but the volume of new business actually put on the books remains small. Shipments are not quite up to the month of March, yet it will take an actual canvass of the situation this week to determine the relative position of stocks on hand May 1, as compared with April 1. One foundry furnace blew out last night, and this will have its effect on the market, no doubt. The Birmingham schedule of prices remains unchanged at the following figures, per ton of 2240 lb., on board cars at furnaces in this immediate district:

No. 1 foundry and No. 1 soft.....	\$11.50
No. 2 foundry and No. 2 soft.....	11.00
No. 3 foundry.....	10.50
No. 4 foundry.....	\$10.00 to 10.25
Gray forge.....	9.50 to 9.75
Standard basic, chill cast.....	11.00
"Off" basic.....	10.50
Charcoal car wheel iron.....	22.50

Cast Iron Pipe.—A nice tonnage is up for consideration from Kansas City, and it is expected that Birmingham foundries will land the order the current week. Aside from this there is little tonnage of moment before the trade. Shipments remain fairly good. There has been no increase in stocks on producers' yards during April; in fact, it appears an actual reduction has been effected. Quotations remain as follows, per net ton, f.o.b. foundries here: 4 to 6 in., \$22.50 to \$23; 8 to 12 in., \$22; over 12 in., average \$21, with \$1 higher for gas pipe.

Old Material.—The scrap market has little of interest to offer the news gatherer. Dealers are not optimistic, but prices are firmly held. There is so little business moving that it is hard to really establish a market, but ruling prices are about as follows, per gross ton, 2240 lb., on board cars here:

Old iron axles (light).....	\$14.50 to \$15.00
Old steel axles (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 rail, and wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, May 3, 1911. (By Telegraph.)

Pig Iron.—A local firm calls attention to May as being the month of changes and predicts that the turning point has been reached. Generally speaking, this prediction is in line with the opinion of the majority of pig iron merchants here. While business is quieter, underlying conditions indicate that the turn will be for the better, although contrary reports are circulating, which are discouraging for any immediate improvement. Contract iron is moving freely, but the new inquiry is light and a scanty business is being booked either for prompt or deferred shipment. Quite a number of jobbing foundries in this vicinity have comparatively light stocks on hand, but as their melt is less than usual they are holding back making future contracts, and it would probably take a decided improvement in general business conditions to bring them into the market as heavy purchasers. A local manufacturer bought about 500 tons of foundry iron, divided equally between Northern and Southern, all for last half shipment. For the same delivery an Indiana consumer took 500 tons of Northern No. 2 foundry, and a small lot of gray forge for prompt movement also recently changed hands. Malleable and basic are not in demand. Among recent inquiries from some Central Western melters is one for 1000 tons of No. 2 Southern, for May, June and July shipment, and another for 300 tons of No. 1 Northern foundry. Reports that prices have been shaded on both Northern and Southern foundry iron for prompt shipment are not without some foundation. Special conditions, however, generally prevailed, and for the regular standard brands we continue our quotations of \$11, Birmingham, and \$14, Iron-ton, for either prompt or last half shipment. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Basic, Northern.....	\$15.20 to 15.45
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—The inquiry mentioned last week for about 600 tons of 48-hour coke per month is unclosed; this is understood to be for a nearby gas plant. There is also wanted between 2000 and 4000 tons of foundry coke, deliveries to run through the next 12 months. On account of the slack demand, Connellsville furnace coke, for spot shipment, has sold as low as \$1.40 per net ton, at oven, but the coke was on cars and had to be moved; the regular quotable figure is considerably higher. Pocahontas and Wise County furnace coke remain around \$1.65 to \$1.75, the first named figure representing prompt shipment quotations. Foundry coke is about the same in all three districts, \$1.95 to \$2 being quoted on 72-hour coke for prompt movement, with a premium of about 25c. per ton asked for contracts.

Finished Material.—With the exception of a moderate demand for small lots of steel bars and structural material from warehouse, there has been very little of note to report in this market. It is true that there are a number of large structural contracts in sight, but specifications will not be made up for any of them for some time to come. Hoops and bands continue very quiet. Manufacturers are evidently firm in their intention to adhere to the published mill base price of 1.40c., Pittsburgh, and local warehouses are quoting 1.90c. to 2c.

Old Material.—The past week has been an extremely dull one, and prices have not been well maintained. The rolling mills and foundries are not disposed to buy any large quantities of scrap, and as dealers have fairly good-sized stocks on hand they are indifferent about making any scramble for such material as is offered. Some change has been made in present market quotations, as will be noted below. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.50 to 8.50
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	11.00 to 12.00
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

THE IRON AND METAL MARKETS

St. Louis

St. Louis, May 1, 1911.

Quietness prevails in pig iron and coke. In the former intending buyers are holding out of the market, and in the latter many of the large consumers have during the past few weeks contracted for requirements for some months ahead. Considerable activity is noted in the promotion of new steam and interurban railroads and extensions of existing steam railroads in the Southwest.

Pig Iron.—The market for pig iron continues extremely quiet. The few sales made were for small tonnage, principally for prompt delivery. An inquiry is out from an Illinois foundry for 500 to 1000 tons each of malleable and No. 2 foundry for last quarter delivery; 300 tons of No. 2 foundry for last half delivery; 150 tons of No. 1 soft for immediate shipment and 100 tons of No. 2 foundry for last half delivery. In the case of one inquiry for 2000 tons, the buyer states that he is not inclined to execute a contract at present. We quote the market unchanged, as follows: Southern No. 2 foundry, \$11, Birmingham, for any shipment prior to January, 1912, except for fourth quarter only, which is held at \$11.50; No. 2 Northern, \$14, Ironton, Ohio, for any delivery except last quarter, which is held at \$14.50.

Coke.—There is very little doing, the inquiries and sales for the week being confined to small lots for spot delivery. Several of the large buyers in St. Louis and St. Louis territory have during the past 60 days covered their wants for several months. Specifications on contracts are coming in satisfactorily. The market is steady, with prices ranging from \$2.10 to \$2.30 per net ton for selected Connellsville 72-hour foundry at oven: carload lots 25c. per ton higher.

Finished Iron and Steel.—The leading interest reports an increased demand for structural material, though the tonnage is not heavy. Bars have been slightly better, with some increase in the inquiry from wagon and agricultural implement manufacturers. An Oklahoma railroad is in the market for 500 tons of standard rails. On light rails the coal companies are showing more interest and the tonnage purchased the past week was gratifying. Track fastenings have been in fair demand, orders being distributed between trunk lines and logging roads.

Old Material.—Market conditions in scrap iron and steel continue unchanged. Business is almost wholly confined to dealers, who still have some orders to fill. Conditions with the mills are not very satisfactory and they show but little disposition to do any buying at present. The only railroad list out the past week is the Missouri Pacific, of approximately 2000 tons. Prices are unchanged. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.00 to \$13.50
Old steel rails, rerolling.....	11.75 to 12.25
Old steel rails, less than 3 ft.....	10.75 to 11.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.75 to 11.25
Frogs, switches and guards, cut apart..	10.75 to 11.25

The following quotations are per net ton:

Iron fish plates.....	\$10.75 to \$11.25
Iron car axles.....	17.00 to 17.50
Steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	9.75 to 10.25
Railway springs.....	9.50 to 10.00
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushing.....	9.00 to 9.50
No. 1 boilers, cut to sheets and rings..	7.75 to 8.25
No. 1 cast scrap.....	10.00 to 10.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	7.50 to 8.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	7.50 to 8.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00

San Francisco

SAN FRANCISCO, April 26, 1911.

Local handlers of steel products are at a loss to understand the continued quietness of the market. The primary wealth-producing industries of the coast are in very satisfactory shape, and there is plenty of money in the banks, but the fact remains that most buyers of steel products are not coming into the market to as large an extent as usual at this season. A normal movement is noted in some departments, such as cast iron pipe, rails and wire products, but in other lines conditions are about the same as for some time. A few fairly large orders are coming out, but such business is not sufficient to compensate for the dullness in the smaller distributive trade. Both consumers and merchants are anxious to limit their supplies as closely as possible,

in the apparent expectation of weakness in the primary markets.

Bars.—The demand for soft steel bars continues very limited. Some of the larger consumers appear to be fairly busy, and are placing occasional orders, though as a rule their purchases cover only requirements of the near future. There is no animation to the small trade, and orders from merchants consist mainly of small lots for sorting-up purposes. Supplies of foreign material are somewhat in excess of requirements. The demand for reinforcing material is slowly increasing, and there is still some expectation of an active movement in the summer, though there is no strength to the market at present. The Benicia, Cal., Arsenal will receive bids May 1 for bars required during the fiscal year, and the city of Los Angeles is placing occasional orders for aqueduct work. Steel bars of coast manufacture are not expected to be much of a factor for some time, but a considerable tonnage of local iron bars is offered. There is a rather easy feeling in regard to prices from store, though quotations remain at 2c. for steel and 1.90c. for iron.

Structural Material.—General building is fairly active in most of the coast cities, though steel structures are not much in evidence, either in number or size. New local contracts include the Mount St. Joseph's Orphanage, about 500 tons, let to the Ralston Iron Works, and a small job for the Dominican Fathers at Pine and Steiner streets, taken by the Central Iron Works. The McClintic-Marshall Construction Company has taken the Security Savings Bank contract in Oakland, requiring about 600 tons. New figures are being taken on some projects which have been in view for some time. Fabricators are greatly dissatisfied over the action of certain builders, who have taken figures several times without placing their orders. Specifications for the Oakland city hall have been placed in the hands of the contractors, and the date for opening bids has been postponed to May 22. There is some talk of a number of buildings in prospect, both here and in the north coast cities, but the number of actual inquiries is small. It is reported that the Southern Pacific Railroad will shortly build a large passenger station at Sacramento, Cal. The California Wine Association is planning to add a new wing to its large steel and concrete building at Winehaven, near Richmond, Cal. Figures are being taken on a number of steel bridges, mostly of a small nature.

Rails.—Light rails have been rather quiet the last two weeks, some of the business expected having failed to materialize. Orders for heavy rails continue fairly numerous, with occasional inquiries from logging interests and a good demand from the smaller lines in all the coast States. There is some prospect of business from a few interurban projects which have been under consideration for several years. The Southern Pacific and allied interests are acquiring numerous franchises and rights of way, on which actual development may be started at any time. Bids have been received on a large lot of switches, and specials for the Geary street municipal line.

Sheets.—There is little feature to the jobbing trade, the movement, though fair, being hardly up to expectations. Few orders are being placed by merchants, who are carrying ample supplies for current needs.

Plates.—A good volume of business is anticipated for the summer season, and some improvement has been noted in the last few weeks. The principal business in prospect is in connection with several large hydroelectric projects, and some small orders have already been placed for work of this nature. Manufacturers of small oil tanks, &c., are well occupied, and are buying on a moderate scale. The city of Los Angeles will receive bids May 26 for steel and rivets for 1865 ft. of steel pipe, 9 ft. 3 in. diameter; 5163 ft., 10 ft. diameter, and 8313 ft., 11 ft. diameter. It is reported that the Western Water Company will erect a 110,000 barrel steel water tank near Taft, Cal.

Merchant Pipe.—No perceptible increase is noted in the demand from the small consuming trade, and merchants are accordingly buying in a very limited way. Supplies are not excessive, but appear ample for all current needs. As far as can be learned, bookings by mill representatives throughout the State are considerably smaller than last month, sales in the oil fields being of little consequence. According to some reports, small inquiries in that quarter are increasing, but no large business is expected for some time. There is some talk of a gas line in southern California which may result in a substantial order, but there is nothing definite about the project as yet. The city of Los Angeles is taking bids on 60,000 ft. of ½-in. and 10,000 ft. of ¾-in. galvanized pipe. The town of Corning, Cal., will take bids May 2 on a lot of pipe for its water system.

Cast Iron Pipe.—Business continues to come out in good volume, both from municipalities and private corporations. While recent business has been principally in small lots, inquiries on several large projects are expected in the

THE IRON AND METAL MARKETS

near future, from northern as well as California points. The San Francisco Gas and Electric Company has placed a fair order, and the Pacific Gas & Electric Company is buying considerable pipe for delivery to various parts of the State. The United States Pipe Company has taken an order for 200 tons for a line connecting two parks in San Francisco. The city of San Diego is figuring on extensive improvements to its water system, on which about \$340,000 will be spent, and the San Diego Consolidated Gas & Electric Company is also expected to place a large order shortly. The city of Portland, Ore., will take bids May 9 for about 1500 tons, and the city of Vancouver, B. C., will open bids on a lot of 18-in. pipe May 31. The city of Prince Rupert, B. C., has plans for a water system, with a capacity of 4,500,000 gal. daily.

Pig Iron.—The local movement continues on about the same scale as for some time, few of the larger foundries being operated at anything like their capacity. Some melters working on special lines of machinery castings are fairly busy, but only a moderate tonnage of pig iron is required, and considerable difficulty is experienced in selling large lots to arrive. No. 2 Southern foundry iron is valued at \$21 to \$22, but very little is used here. Importers quote about \$23 for all ordinary foundry grades of English, Continental and Chinese iron, though some concession could probably be obtained on round lots to arrive.

Old Material.—Aside from an export movement of steel scrap, there is little feature to the market. There is but little local demand for cast scrap, but prices remain steady in the absence of large offerings. The principal requirements of steel melting scrap are covered by former sales, though some new business is expected shortly, and recent shipments have relieved the market of all burdensome supplies. There is little movement of wrought scrap, and the demand for rerolling rails is limited. Quotations are as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$11 to \$12; wrought scrap, per net ton, \$12 to \$15; rerolling rails, per net ton, \$15.

The Crane Company has purchased the lot and one-story brick building adjoining its new building at Second and Brannan streets.

The Swartz & Cooper Iron & Metal Company has made application in the Superior Court for dissolution.

Buffalo

BUFFALO, N. Y., May 2, 1911.

Pig Iron.—With the exception of one order for 5000 tons of No. 4 iron from a pipe making interest, taken since last week's report, and another for 5000 tons No. 2 foundry for a radiator concern for second and third quarter delivery, sales have been comparatively light the past week, running mostly in carload to 300-ton lots with a small total and to cover short time requirements. Inquiry has tapered off perceptibly; such requests for quotations as are being received being to a large extent in the nature of feeling the market apparently and chiefly for more extended deliveries than furnaces care to consider. The price situation remains the same as last week. We quote as follows, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 3 foundry.....	13.50 to 13.75
Gray forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Basic.....	14.25 to 14.75
Charcoal.....	16.75 to 17.50

Finished Iron and Steel.—The most active line is structural material, in which a good total of new business is developing. Plates and bar products were quieter during the forepart of the week; but during the past two or three days new inquiry has been coming in quite freely, and a number of moderate sized orders in bar products have been placed, including one of 200 and one of 300 tons. Some business has also been done in light rails and rails for traction companies. Specifications on contracts for the Canadian export trade are coming in quite freely; but the aggregate of new orders from Canadian points has been less this week than during the preceding week. In fabricated structural lines a number of new building projects are developing. Plans are on architects' boards for the Marine Bank Building, a bank and office structure, 12 or 14 stories, of large dimensions, to be erected at Main, Seneca and Washington streets. Bids will not be asked, however, until leases on buildings at present on the site expire, which have several months to run. Bids will soon be received for steel for another factory building, requiring about 100 tons, to be erected by the Eastman Kodak Company, Rochester, to be known as Building No. 28, in addition to Building No. 43, mentioned last week, requiring 350 tons, for which bids have just been sent in. Contract for the 400

tons of steel for the Hickey-Freeman Company's clothing manufacturing building, Rochester, went to F. L. Hughes, of that city. The Charles Ernst Sons' Iron Works, Buffalo, this week took the steel fabricating and erecting contract, about 150 tons, for the Canisins College building, Buffalo.

Old Material.—The same stagnant condition of the market prevails as for the past week or two, and the continuance of these conditions has brought about a further decline in prices. There is practically no market to speak of in any grade; what few transactions there are being confined entirely to small tonnages or carload lots. We have revised price schedules, as shown below, which represent the market as closely as can be determined, many of the quotations shown being nominal:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery cast scrap	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.00 to 11.50
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings..	6.25 to 6.75
Clean cast borings.....	6.00 to 6.25

The German Iron Market

BERLIN, April 20, 1911.

Hardly any change in the situation can be reported this week. From the Siegerland district it is stated that ores are being called for shipment at a somewhat slower pace. This is probably due to the heavy importations of foreign ores in March.

In the absence of any striking news from the home industry the trade is looking eagerly for developments in the foreign iron markets this week. The weakness of prices in the United States and England has attracted much attention; especially has the unfavorable news from America reacted upon German iron share prices pretty sharply. The weakness of warrant prices reported this week from England is interpreted here as being chiefly due to German influences, since Germany remains the largest consumer of English pig. The latter, however, is meeting with sharper competition from German iron, and latterly its price has been declining at points on the lower Rhine.

In the Belgian market two tendencies are apparent. While the market for rails, beams, and plates continues in a favorable position, and other finished products are also in a fairly satisfactory way, pig iron prices still lose ground. The latest prices noted are 60.50 to 61 francs for puddling iron, 62 to 63 francs for basic, 67 to 68 francs for No. 3 foundry, but even these figures are hardly more than nominal. The news from the iron district of northern France indicates that conditions there remain most satisfactory. Orders in large amounts were received throughout the March quarter, and the works are supplied for a considerable period ahead. Latterly, however, orders for pig iron have not been placed so freely as hitherto, inasmuch as consumers are trying to get reductions in prices in view of developments in other countries, but furnacemen refuse to make any price concessions whatever. Considerable railroad building is planned in the Briey region because of the rapid development of the mining and smelting industry there.

In the German trade, interest is still centered on the negotiations for prolonging and extending the Essen Pig Iron Syndicate. Another meeting with the Siegen furnacemen is to be held within a few days, but it is quite uncertain what the outcome will be. The Siegerland furnaces are partly operated in connection with steel plants, and these occupy such a strong position as consumers of their own iron that they will certainly not enter the syndicate except upon the most favorable terms; in other words, they will demand very large allotments. Furnaces not run in connection with steel mills, however, would be glad to make terms with the Essen organization, and they will apparently accept even very moderate allotments. These latter furnaces are having a pretty hard time to hold their own in competition with the furnaces of the steel makers, inasmuch as both ores and coke are dearer than last year.

The Deutsch-Luxemburg Company, which only last year absorbed the Dortmunder Union Company and made a big addition to its capital in carrying out the deal, is now about to annex the Rümelingen-St. Ingbert Hochofen und Stahlwerk, another important concern. Apparently the operation will not be an amalgamation, but rather a long lease. The annexed company has an allotment of 182,600 tons in the German Steel Works Union and is very profitable, the dividend for the business year ending with this month being estimated at between 15 and 18 per cent.

THE IRON AND METAL MARKETS

New York

NEW YORK, May 3, 1911.

Pig Iron.—The market has gone on so long on substantially the present price basis that buyers are not as keen in the hunt for concessions, and, with less variation in quotations made them, are rather concerned about getting irons best suited to their wants. A certain amount of new inquiry is coming to the furnaces, but without signs of the sort of buying that came in February and early March. One sale of 5000 tons of foundry iron was made through a local office in the past week, but the ordinary run of business was in lots under 500 tons. The reduction in ores seems to be no factor in the situation except as it may cause some holding off; it has not affected the price of pig iron. Jobbing foundries are hardly as busy as in March, and they, as well as foundries connected with machine shops, are melting less iron because of the machinists' strike. Shipments from furnaces have been little affected so far. The inquiry for several thousand tons for air brake work is still pending, and further buying is expected from a sanitary pipe interest. We quote on iron at tidewater as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15 to \$15.25; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15.25.

Finished Iron and Steel.—The volume of business in this market continues fair, and there is little change in general conditions. The rumored weakness in bars reported from the West has not made its appearance in the East. Business in plates promises to be affected adversely here and there by a widespread local strike of machinists. In structural lines, some standing contracts have been closed; some large ones are still outstanding, but little of a large order has developed in the New York territory. The New York City Bridge Department is expected shortly to advertise for perhaps 3000 tons for reinforcement of the Williamsburg bridge; the tonnage involved in the Woolworth building, New York, will probably aggregate 20,000 to 25,000; the 4000 to 5000 tons of the Walker street building of the New York Telephone Company are still to be placed; the 6000-ton Bamberger department store letting has been postponed, and no announcement is yet forthcoming on the 80,000 tons of the Interborough system extensions, New York. The Atlantic Coast line has inquiries for material largely to replace wooden trestles and likely to aggregate before the end of a year a total of 5000 tons. The Chicago & Northwestern Railroad is reported to be in the market for 8000 tons for bridges; and figures for bridges have been asked by the Great Northern and the Pere Marquette, and 500 tons by the Pittsburgh, Shawmut & Northern. F. H. Harris, Jr., has the general contract for a 400-ton highway bridge at Rutherford, N. J. Of recent closures may be mentioned the following: Baltimore & Ohio, 1600 tons, Wheeling, W. Va., to American Bridge Company; loft for Fabian Construction Company, 1700 tons, to A. E. Norton Company; loft of Stone Construction Company, West Thirty-fifth street, 650 tons to Ravitch Brothers (the last two with Bethlehem shapes); the Haviland loft building, East Thirty-sixth street, 1400 tons, to American Bridge Company; Continental Fire Insurance Building, 8000 tons, part Bethlehem shapes, to Milliken Brothers; loft for Franklin Simon, 400 tons, to Hay Foundry & Iron Works; building for Crystal Spring Water Company, 200 tons, to Levering & Garrigues Company, and bridge for Erie Railroad, to Lewis F. Shoemaker & Co.

Cast Iron Pipe.—Buying continues extremely light, neither public nor private buyers manifesting much interest in the market. The only public letting of even moderate importance in this locality is that of Perth Amboy, N. J., involving 350 tons of 24-in. water pipe, which includes some flexible pipe, on which bids will be opened to-day. Prices show practically no indication of strengthening, carload lots of 6-in. being held at about \$21 to \$22 per net ton, tidewater.

Steel Rails.—The Maryland Steel Company has taken an order for 14,000 tons of rails for the Florida East Coast, and one of 12,000 tons for the Seaboard Air Line. The Rock Island has closed at Chicago for 8000 tons for early delivery to its St. Paul & Des Moines. The United States Steel Products Company has sold 3500 tons to the Guatemala Central. These will be rolled at the Edgar Thomson works. The Tennessee Company has sold 1000 tons to the Nashville, Chattanooga & St. Louis, and at Chicago 1250 tons has been sold to the Duluth, South Shore & Atlantic. A 1500-ton order for open hearth ferrotitanium rails for an Eastern line will be rolled at Pittsburgh.

Ferroalloys.—The market for ferromanganese is very quiet and rather weak. Dealers are quoting about \$36.50 for ferromanganese at seaboard. Inquiries for ferrosilicon are somewhat better, but only small lots are wanted. New York dealers are asking from \$53 to \$54, Pittsburgh.

Old Material.—The general condition of trade continues as unsatisfactory as at any time within the last few weeks. Dealers are steadily having trouble with rejections. A few transactions are reported among which is the purchase of 1000 tons of heavy melting steel scrap by a nearby consumer. Some sales have been made of rolling mill stock and cast scrap, but those making such sales have only been able to do so by the most energetic application. It is noteworthy that cast borings and wrought turnings are not overplentiful, indicating that machine shops have not been fully employed of late, and they are likely to be in still shorter supply in this immediate locality as the result of the machine shop strike inaugurated on Monday. Some quotations last week appear to have been too low, as the prices thus given represented sacrifice sales and hardly represented the true condition of the market. This applies particularly to wrought scrap. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old pig iron and T rails for melting	\$10.00 to \$10.50
Heavy melting steel scrap	10.00 to 10.50
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	21.00 to 21.50
Old steel car axles	15.50 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
No. 1 yard wrought, short	10.00 to 10.50
Light iron	5.00 to 5.50
Cast borings	5.00 to 5.50
Wrought turnings	5.50 to 6.00
Wrought pipe	10.00 to 10.50
Old car wheels	11.50 to 12.00
No. 1 heavy cast, broken up	11.50 to 12.00
Stove plate	9.00 to 9.25
Locomotive grate bars	9.00 to 9.50
Malleable cast	10.00 to 10.50

The Jones & Laughlin Steel Company announces the removal on May 1 of its New York sales department, H. F. Holloway, manager, from the St. Paul Building, 220 Broadway, to the City Investing Building, 165 Broadway.

Metal Market

NEW YORK, May 3, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.									
Copper, New York.		Electrolytic.		Tin.		Lead.		Spelter.	
April.	Lake.	lvitic.	New York.	York.	Louis.	York.	Louis.	York.	Louis.
27	12.37	12.12½	41.70	4.42½	4.27½	5.50	5.30		
28	12.37	12.12½	42.80	4.42½	4.27½	5.50	5.30		
29	12.35	12.12½		4.42½	4.27½	5.50	5.30		
May.									
1	12.30	12.10	42.30	4.42½	4.27½	5.50	5.30		
2	12.30	12.10	42.25	4.42½	4.27½	5.50	5.30		
3	12.30	12.10	42.00	4.42½	4.27½	5.50	5.30		

The copper market has quieted down, and new inquiries are scarce. Tin is very dull, and to-day was down to 42c. Lead continues weak. Inquiries for spelter are better, but few sales have been made.

Copper.—The copper market is in striking contrast to what it was a week ago. Last Thursday and Friday there was a fair amount of buying, but after that inquiries fell off, and to-day the market is almost stagnant. Some sellers have been readjusting their prices from day to day, lowering their quotations a few points at a time, and at present lake copper can be had at 12.30c., while electrolytic is freely quoted at 12.10c. Regardless of the fact that large amounts of copper were bought at five to ten points above these figures ten days ago, consumers are at present taking no interest in the situation. The London market was dull this morning, with spot copper offered at £54 1s. 3d., and futures at £54 13s. 9d. The exports of copper for the first three days in May amounted to but 20 tons, although it is expected that later in the month the movement will be heavier, as it is known that considerable copper was sold for foreign account during the recent activity.

Pig Tin.—Little interest is being taken in tin, and the first three days this week were the dulllest experienced in the tin trade in a long time. Even the dealers do not appear to be interested in the situation, as, notwithstanding the fact that plenty of tin is offered at below the import parity, they refuse to buy for stock. It is probable that a feeling of pessimism has been caused somewhat by the reports of small deliveries into consumption in this country for April. According to figures given out by the Metal Exchange, only 3300 tons was delivered into consumption, but this was not so surprising as that deliveries in March were very heavy. This morning tin was offered in New York at 42c., which is ½c. lower than it was a week ago. In London this morning the market opened with spot tin quoted at £193, and futures at £195 5s. The market was very weak.

Tin Plates.—The demand for tin plates is only fairly good, and stocks in the large dealers' hands seem to be ac-

THE IRON AND METAL MARKETS

cumulating. The New York price is unchanged at \$3.94 for 100-lb. coke plates.

Lead.—The lead market is weak and neglected. Prices have not changed, but some New York outside dealers show a decided anxiety to sell, and there are indications that they would be willing to make concessions. Inquiries are so scarce that quotations are largely nominal. The St. Louis market is reported to be better in tone than the New York, and the price there is 4.27½¢, while independent dealers here are offering lead at 4.42½¢. The American Smelting & Refining Company continues to hold its price firm at 4.50¢.

Spelter.—Although there are reports of better inquiries for spelter, no sales of any consequence have been recorded. Those desiring to buy do not seem to be satisfied with the quotations made by sellers who are holding the market fairly firm. The New York price of spelter is 5.50¢, and 5.30¢ is being asked in St. Louis.

Antimony.—Quotations on Chinese and Hungarian grades of antimony have stiffened as the result of the report that the European syndicate has secured control of some of the more important brands produced in China and Hungary. Cookson's antimony is very strong, as it does not seem to be so plentiful as other grades. Hallett's is offered at 9¢., and Chinese and Hungarian grades at from 8.20¢. up. Earlier in the week Hungarian antimony was offered at about 8.10¢. There is still plenty of antimony offered at resale at lower prices than those demanded by the regular importers.

Old Metals.—The market is weak. Dealers' selling quotations are as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Metals, St. Louis, May 1.—Lead is quiet but firm at 4.30¢; spelter is dull but steady at 5.30¢. to 5.32½¢., both at East St. Louis. Zinc ore is firmer, the Mexican war cutting off Mexican exports of ore and stimulating the demand for domestic; quoted at \$36 to \$39 per ton, Joplin base. Tin is steady at 42.55¢; antimony (Cookson's), 9.80¢; lake copper, 12.72½¢; electrolytic, 12.17½¢., all at St. Louis. The market for finished metals is quiet.

Notes on Prices

Rope.—The demand for cordage continues somewhat below normal, and orders are usually for comparatively small quantities. There is considerable diversity in prices of hard fiber rope, owing to the numerous grades of raw material used by different manufacturers. Some manufacturers who for years have kept the product that bears their brand up to a standard quality will, if necessary, it is thought, meet competition by lowering the standard. The following quotations represent regular prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½¢. to 9¢. per pound; second grade manila, 7½¢. to 8¢. per pound; hardware grade, 7¢. to 7½¢. per pound; pure sisal of the highest grade, 6½¢. per pound; second grade, 6¢. per pound; rove jute rope, ¼-in. and up, No. 1, 6½¢. to 7¢. per pound; No. 2, 6¢. to 6¼¢. per pound.

Linseed Oil.—Large consumers are doing very little buying. Carloads are held on the basis of raw at 88¢. to 89¢. per gallon. Some of the foreign oil which has been found to be adulterated is said to have contained rape seed oil, the seed having been mixed with flax seed before crushing, to improve the quality of the oil cake, which does not injure the linseed oil for soap making. There is a large demand abroad for linseed oil when it is the cheapest grease soap makers can buy, but the price of linseed oil is now too high to permit of its use for this purpose. Rape seed oil damages linseed oil to a certain extent for use in painting. The following are New York prices in 5-barrel lots or more:

	Cents.
State, raw.....	92
City, raw.....	91
Oil in lots of less than 5 bbl. 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

White Lead in Oil.—During the larger portion of April, white lead in oil was but moderately active, but toward the end of the month an improvement was noted. New York quotations are as follows: Lots of 500 lb. and over, 7¼¢. in 100, 250 and 500 lb. kegs; 7½¢. in 25 and 50

lb. kegs. In lots of less than 500 lb. the usual advance of ½¢. is charged.

Naval Stores.—The turpentine market ruled quiet and steady for the greater part of the period under review. Latterly, however, increased activity has been observed. Prices show a slight decline, as the new crop is coming in more freely at Southern points, causing stocks to accumulate. New York turpentine quotations in 5-barrel lots are as follows:

	Cents.
In oil barrels.....	78
In machine barrels.....	78½
Less than 5-bbl. lots, ½ cent advance per gallon.	

The rosin market is slightly lower in sympathy with Savannah. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$7.75 and grade D at \$8 in the New York market.

Iron and Industrial Stocks

NEW YORK, May 3, 1911.

For no apparent reason stock prices advanced the past week, just as they had declined the previous week. In some securities the advance made was quite important. It may be possible that interests connected with speculative movements have been able to discern signs of improvement which are denied to the general public. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	7½	Pressed St., pref..100	-101
Allis-Chalm., pref.. 27½	-28½	Railway Spr., com. 31½	-33
Beth. Steel, com.. 31½	-33½	Republic, com.....	32 - 32½
Beth. Steel, pref.. 61	-62	Republic, pref.....	92½-95½
Can. com.....	9½-11	Sloss, com.....	49 - 49½
Can. pref.....	83½-86½	Sloss, pref.....	112
Car & Fdry, com.. 51	-53½	Pipe, com.....	15½-16
Car & Fdry, pref..114	-115	Pipe, pref.....	54
Steel Foundries... 43½-45*		U. S. Steel, com.. 73½	-76½
Colorado Fuel... 29½-30		U. S. Steel, pref..118½	-120½
General Electric..152	-159	Westinghouse Elec. 66½	-70
Gr. N. ore cert... 59½-61½		Va. I. C. & C.....	59 - 60½
Int. Harv., com...117½	-120	Am. Ship, com... 70	-70½
Int. Harv., pref.....	124	Chi. Pneu. Tool... 48	-50½
Int. Pump, com... 38½-40½		Cambria Steel.... 45½-46½	
Int. Pump, pref.. 87½-88		Lake Sup. Corp... 28½-28½	
Locomotive, com... 36 - 38		Pa. Steel, pref.....	104½
Locomotive, pref..104½-107		Crucible St., com.. 12½-14½	
Nat. En. & St., com.... 17		Crucible St., pref.. 77½-83½	
Pressed St., com.. 32 - 33			

* Ex dividend.

Dividends.—The Pressed Steel Car Company has declared the regular quarterly dividend of 1¼ per cent. on its preferred stock, payable May 24.

The American Radiator Company has declared the regular quarterly dividends of 1¼ per cent. on the preferred and 2 per cent. on the common stock. The preferred dividend is payable May 15, and the common June 30.

The Inland Steel Company has declared the regular quarterly dividend of 1¼ per cent., payable June 1.

The Steel Company of Canada reports as follows for the six months ended December 31, 1910:

Profits from operations, less repairs and maintenance..	\$783,664
Depreciation and renewals.....	104,071
Balance.....	\$679,593
Interest on Steel Company bonds.....	190,500
Interest on Montreal Rolling Mill bonds.....	15,000
Interest on mortgage.....	805
Surplus.....	\$473,298
Preferred dividends.....	227,370
Net surplus.....	\$245,918

Chicago

FISHER BUILDING, May 3, 1911.—(By Telegraph.)

A slight improvement is noted in the sale of structural shapes, and rumors of price concessions on fabricated materials are less insistent. Although no very large tonnage has been placed by railroads, business has been better than last week in standard section rails, and Western lines are evidently about to close orders for cars. Iron bars have been weak and the lower prices which are now being named are still reported to be shaded. The Indiana Steel Company's new universal plate mill at Gary, Ind., has been given a most satisfactory trial and will soon be in operation. The demand for wire products, which has been extremely good through the entire year, is dropping off. General business conditions, while improved here and there, are on the whole unsatisfactory. Practically no new business is being developed by the producers of pig iron, and foundry stocks, which under ordinary conditions would be considered normal, are looked upon as large. There is no disposition on the part of purchasers of any commodity to anticipate wants, and all industries are suffering accordingly.

Pig Iron.—Stagnation pretty well describes the Chicago pig iron market. No new inquiries of note have made their appearance, and some of the old ones have been withdrawn. Buyers have somewhat taken the attitude of sellers, inasmuch as most inquiries are in the form of offers. Southern iron, which is being offered by sellers through the balance of the year on the basis of \$11, Birmingham, for No. 2 foundry, is calling forth inquiry offers of \$10.75 and \$10.50, but so far as can be learned no such offers have been accepted by Southern furnacemen. The recent reduction in the price of Northern ore and in navigation charges is being used freely as a wedge to pry concessions, but both Northern and Southern furnaces have well maintained prices. Numerous foundries are requiring that shipments on contract be delayed, which indicates strongly that business is not coming up to their expectations and that pig iron stocks in foundry yards are large. A manufacturer of gasoline engines in the Chicago district is in the market for 1000 tons of No. 2 Southern. Other inquiries are small. Most business closed by furnaces the past week has been with old customers renewing contracts. Rumor is apparently the only active feature of the market. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted, f.o.b. furnace:

Lake Superior charcoal.....	\$17.50
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft....	15.85
Southern coke, No. 2 foundry and No. 2 soft....	15.35
Southern coke, No. 3.....	15.10
Southern coke, No. 4.....	14.85
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.85
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

[NOTE.—The remainder of the Chicago market report had not been received up to the time of going to press.]

A New Charcoal Blast Furnace

A charcoal blast furnace is to be erected at Wells, Delta County, Mich., by Charles Schaffer of Marquette, an iron maker of many years' experience. At Wells is located the Mashek Iron & Chemical Works, in which Senator Isaac Stephenson is a leading stockholder. This company produces charcoal and the various by-products resulting from its manufacture. Mr. Schaffer has contracted with the Mashek Company for a 20 years' supply of charcoal, and will soon begin the erection of his furnace. It will have a capacity of 100 tons daily. The Mashek Company will enlarge its operations by the construction of additional kilns.

Both the Manistique and Newberry, Mich., furnaces of the Lake Superior Iron & Chemical Company continue out of blast. A large stock of charcoal iron is in storage in the yards. The chemical plant at Manistique is to be rebuilt and thoroughly modernized, as is now being done at Newberry.

An Air Cooling System for Sheet and Tin Plate Mills.—For some time the United States Steel Corporation has considered plans for installing a cooling system in each of the hot mill departments of the plants of the American Sheet & Tin Plate Company. At the Finance Committee meeting on Tuesday of this week the appropriation was passed and work will be started at once, so that workmen in all these mills in the coming summer will have the benefit of this arrangement for introducing cooled air.

The Maryland Steel Company, Sparrows Point, Md., has been awarded a contract to construct two self-propelled oil barges for the Navy Department. Each of the barges is to have a cargo capacity of 153,400 gal. The boats will be 165 ft. 9 in. over all, 25 ft. beam and will have a hold 11 ft. 1 in. deep. The motive power will be furnished by compound marine engines. A feature of the construction is that the vessels will be propelled by furnaces fed with oil instead of coal. Steam steering gears and electric lights will also be a part of their equipment.

The International Harvester Company

In presenting the annual report of the International Harvester Company for the year ended December 31, 1910, showing total sales of \$101,166,359, profits for the year of \$8,684,819, and a profit and loss surplus of \$16,069,549, President Cyrus H. McCormick remarks as follows:

The success of this company depends primarily upon the prosperity of the farmers throughout the world. The foreign trade in harvesting machinery, and the sales of the recently developed new lines at home and abroad, now constitute two-thirds of the company's total business, and contribute more than proportionately to the net earnings. The extension of the company's business throughout the world has established it upon a firmer basis and insures greatly stability and security from crop failures.

The rapid growth of the business has required large capital outlay for increased manufacturing facilities and country warehouse capacity, as outlined in the statement of property account. To meet the increasing demand with prompt and adequate service to customers, new warehouses, with a storage capacity of 2600 carloads, have been erected in the United States and Canada.

The manufacture and sale of harvesting machinery probably require a larger working capital in proportion to the volume of sales than any other commercial enterprise, because of the long credits extended to farmers and the necessarily large investment in inventories and manufacturing facilities. At December 31, 1910, the total assets of the company aggregated \$195,000,000, while the total sales of manufactured products for the year were less than half that amount.

The high tariffs on harvesting machinery in Europe and the necessity for better and prompter service to our customers have required the construction of works at Croix, France; Neuss, Germany; Lubertzy, Russia, and Norrköping, Sweden. The French and German factories were completed during 1910, and are now in satisfactory operation. Additions to the Russian plant, costing nearly \$1,250,000, are now being made for building lobogreikas, mowers and reapers in 1911; and a twine mill is building at Neuss.

The properties producing raw materials have been in successful operation during the year and supply a large proportion of the company's requirements. Increased facilities have been added to the blast furnace and steel mill property at South Chicago. Extensive development work is in progress on the company's coal lands in Kentucky, and a coking plant of 300 bee-hive coke ovens is being constructed. A new sawmill at Huttig, Ark., with a daily capacity of 80,000 ft. of hardwood lumber, was completed during the year.

Better and increased crops can be produced by more scientific methods of agriculture and intensive farming. The company is endeavoring to supplement the able and efficient work of the Department of Agriculture and the various State experimental stations and agricultural colleges by publishing pamphlets dealing with scientific farming. The company is financing three experimental farms in different sections of the country and is offering premiums in other districts to promote the raising of the finest crops.

A profit-sharing distribution was again made in 1910 to meritorious employees, in which 1976 participated. The plan of interesting employees as stockholders on a favorable basis has met with great favor, and 3600 employees are now stockholders.

Realizing the objections to the usual method of handling industrial accidents in the United States, the company in April, 1910, inaugurated an industrial accident plan providing liberal compensation for industrial accidents to be paid regardless of legal liability on the part of the company. Although it is not compulsory upon any employee to accept settlement for accidents under this plan, in the great majority of cases the amount is accepted and personal injury litigation is avoided. The plan requires a reserve fund to meet liabilities as they occur, and this year the company has appropriated \$250,000 for this purpose.

Advantages of Worm Drive for Automobiles

BY WARREN NOBLE, ST. LOUIS, MO.*

Worm or screw gearing is among the oldest mechanical movements and until recent years has been employed to obtain either a great mechanical advantage or a considerable reduction in speed between related machine parts. Later developments introduced it as a driving gear for higher speed mechanisms, and its users began to see greater possibilities than was at first expected. Worm drive for automobile purposes is counted by many as a new development, while, as a matter of fact, its use commenced with one of the earliest really successful automobiles built in Great Britain. The maker of this developed a special form of worm gear which he has employed continuously since 1897, and the mechanical success achieved with the worm gear led to other companies following the example, until to-day a very high percentage of the British cars, both commercial and pleasure, are worm driven, while reports from Europe indicate that the French and Germans are following in the lead as quickly as they can acquire the necessary experience. In America the same thing obtains and the merits of the worm drive have led to broad spread experimental investigation, and it is an open secret that not only are very many American firms about to announce worm driven models in the near future, but that certain of the truck manufacturers are already converted to its use.

Those unacquainted with modern worm driven mechanism will immediately call to mind a single-threaded irreversible worm. In place of the old single, double, triple or even quadruple thread worms which the practice of the past has rendered familiar, worms of peculiar tooth formation with seven, eight or even as many as fifteen threads or teeth, cut on them with very high spiral angles and perfectly reversible are employed. It is in the multiplication of the number of threads, or rather in the spiral angle employed, that the fundamental difference between the older form of worm gearing and the modern high efficiency type of the present day is found. The efficiency rises very rapidly until a 35-degree value for the speed angle is reached, and from there to 45 degrees the curve of efficiency is almost flat. The average efficiency is approximately 90 to 91 per cent. when the gear is new and may reach as high as 94.6 per cent. after continued use. This rise of efficiency on the part of worm gearing as its life proceeds is noteworthy. Every turn of a gearing properly mounted and suitably lubricated simply increases the degree of polish of both worm and wheel surfaces, causing them to approach more nearly the truly smooth condition demanded. This is borne out in practice and in pleasure automobile construction it is no uncommon thing to find an axle that shows no signs of wear in the gears after having run over 50,000 miles in hard service. The importance of this difference between worm gearing and other forms should not be overlooked, since with bevel and spur gears the commencement of wear is but the beginning of the end and instead of improving with life such gears steadily depreciate.

There are two types of worm in use, the double throated, or hour-glass, type, and the straight type, in which the wheel alone is throated. Advocates of the double throated type claim that the land, or bearing surface, of the worm with the wheel is considerably greater than with the straight type, and were it possible to pursue similar methods of manufacture in both cases, there might be some advantage from this quality alone. Practice, however, steps in and by vastly increasing the difficulties of very accurate cutting discounts the claimed advantage in the majority of cases and leaves the straight worm in the position of equal or superior advantage to the opposed type, since its threads may not only be more accurately formed initially, but may be finished and brought to an exceedingly high state of polish by a special grinding process.

The straight type is capable of more accurate produc-

tion at less cost than the other type, and, although certain European makers are successfully cutting and using the concave pattern the advantage of greater land surface is of little value in truck gears where the diameter of the worm gear is almost invariably large, and in which the lands extend in any case for at least two or three teeth. In worm gearing perfection of manufacture is most important, and the perfection of such manufacture has been a matter of extreme difficulty on the part of the English engineers who have engaged in it. The success or failure of a gearing depends chiefly upon the processes employed in its generation, and the utmost secrecy with regard to these processes is maintained by the firms engaged in its manufacture.

The silence of worm gear is indisputable. It demands less intricate mounting, involves no hardening risks, provides an exceedingly wide range of gear ratio without change of parts, has an exceptionally long life, is independent of subsequent adjustment and is as cheap to construct as the present bevel gear. Its efficiency under ideal conditions is at least equal to the most accurately cut and delicately adjusted bevel gearing, while its commercial efficiency is infinitely higher. There is a total lack of the short period vibration invariably set up with bevel gear, with the result that not only is the final drive silent, but the sound of the transmission devices between the final drive and the engine are themselves mitigated.

Economy Tests of a Turbine-Driven Furnace Blower

In the power plant of the Boston Woven Hose & Rubber Company, Cambridgeport, Mass., steam turbine driven blowers, made by the Exeter Machine Works, Exeter, N. H., have been installed, with a reduction in coal consumption of about 11 per cent. Before the installation of the blowers 378 tons of coal were burned per week, costing \$1512. After the blower installation the coal consumption was 336 tons, costing \$1344, which is equivalent to a saving of \$168 per week, or \$8736 per year. Exhaust gases from the furnace contained 14 per cent. of carbon dioxide.

In an evaporation test on one of the boilers fitted with one of these blowers, reported by J. C. Long, chief engineer of the Boston Woven Hose & Rubber Company, the coal used was a mixture of half anthracite wharf screenings and half New River coal. The water evaporated per pound of coal as fired was 8.64 lb. The equivalent evaporation from and at 212 degrees F. was 10.35 lb. The cost of the fuel used in evaporating 1000 lb. of water from and at 212 degrees was 14.6 cents. The reduction of coal cost due to the turbine blowers is \$27.60 per day. The boiler tested was a 72 in. x 18 ft. horizontal return tubular boiler, with 1614 sq. ft. of heating surface and 36 sq. ft. of grate surface. The forced draft pressure was 1½ in. The blower on this boiler has been operated at as low as 30 lb. pressure, and at this pressure the blower made 605 rev. per min.

Advantages of using the Exeter turbine blower are the saving in coal, the reduction of the amount of clinkers and smoke, the increase in the capacity and the ability to burn cheaper fuel. The blower is small and space can easily be found for it. It is recommended that it be placed against the side of the boiler and connected with a small steam pipe for the supply and arranged to discharge under the grate. A damper may be placed on the discharge to regulate the supply and deflect it to the ash pit floor so that the distribution is uniform. With or without such a damper a pressure regulator can be applied on the steam supply which will take care of the turbine operation automatically so that it requires no attention, or a damper regulator can be used and a connection made to a lever valve in the supply pipe. When the turbine cannot be placed in the position suggested it may be located in the rear or on top of the boiler or on a bracket on the wall or anywhere that is handiest for piping the air to deliver under the fire.

* Noble & Prewitt, consulting engineers.

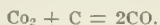
Essential Factors in the Formation of Producer Gas

Under the above title, bulletin No. 7 has just been issued by the Bureau of Mines, Washington, D. C. The authors, J. K. Clement, L. H. Adams and C. N. Haskins, detail an investigation of the chemical and physical processes that take place in the gas producer, in which they kept in view not only the possibility of increasing the efficiency of the producer as a source of energy and the ensuing benefits to the public of cheaper power and greater utilization of low grade fuels, but also the application of the results to the problems of boiler-furnace operations.

In experiments made by one of the authors at the bureau's experiment station, it was found that the temperature in the fuel bed of the gas producer varied greatly in different parts of the bed. To ascertain the conditions of temperature most favorable to the efficient operation of the producer it became necessary to determine the temperature required for the formation of carbon monoxide and hydrogen. Among other reasons for investigating the conditions for the reduction of carbon dioxide by carbon was that a small quantity of carbon monoxide is invariably contained in the flue gases of boiler furnaces, and it was hoped that means might be suggested of preventing its formation and the resulting loss in furnace efficiency.

These investigations demonstrated that a very high temperature is necessary for the production of carbon monoxide from carbon dioxide and carbon. There are conditions, however, which argue against operating the fuel bed and the gas producer at extremely high temperatures—above 1,300 C. A very hot fuel bed means that the gases will leave the producer at a high temperature, and thus lower the efficiency of the producer. The gain in capacity would, therefore, be accompanied by a loss in efficiency, unless the heat of the gases could be used for generating steam or preheating the air blast. A high temperature also favors clinkering. In the application of the results of these experiments to commercial producers and furnaces it will be necessary, of course, to consider the other questions which are involved.

Various explanations have been suggested to account for the presence of small amounts of carbon monoxide in the flue gases of boiler furnaces. Perhaps the one generally accepted by engineers is that the oxygen of the air first unites with carbon to form carbon dioxide, and that as this gas passes up through the bed it combines with carbon in accordance with the equation:



Assuming this to be the correct explanation, then the questions to be solved are what conditions favor this reaction and what conditions will tend to retard it. It has been shown by the authors that the higher the velocity of the gas and the thinner the fuel bed the less will be the percentage of carbon monoxide formed. A heavy fuel bed in the boiler furnace would therefore favor the formation of carbon monoxide; also the greater the supply of air to a given depth of bed the less would be the percentage of this gas formed; therefore with a hot fuel bed the formation of a small amount of carbon monoxide is inevitable. In order that this carbon monoxide may be burned to carbon dioxide in some way, sufficient air must be added to the hot gases as they leave the top of the fuel bed.

Temperatures for Water Gas Generation

The bulletin also contains a chapter by J. K. Clement and L. H. Adams on "Effective Temperatures for Water-Gas Generation." The results presented show that a high rate of gasification combined with a high percentage of carbon monoxide and a low percentage of carbon dioxide and water requires a high temperature in the fuel bed. The higher the temperature the better will be the quality of the gas and the greater the capacity of the producer. The use of large amounts of steam is inconsistent with the realization of high temperature, and is, therefore, to be avoided.

Although these investigations were undertaken primarily to determine the conditions governing the formation of producer gas, the results have an important bearing on the water-gas process. They show that, although with very low rates of steam supply the decomposition of the steam may be complete at 1100 degrees C., with higher rates of steam supply, such as are desirable in practice, a much higher temperature, 1300 to 1400 degrees C., is required to obtain complete decomposition. The highest efficiency will be obtained by raising the temperature of the bed during the blast as high as is possible without injury to the producer. As the bed cools during the run with steam, the steam should be gradually reduced, and when the temperature has dropped to 1000 degrees C., the steam should be cut off.

The bulletin is of a scientific character and will be of interest to engineers engaged in gas producer and gas engine work. Copies may be obtained by addressing the Director of the Bureau of Mines, Washington, D. C.

The Turin International Exposition.—At Turin, on April 30, the International Exposition of Industries and Labor, the biggest affair of the kind ever attempted in Italy, was opened auspiciously. There is a friendly rivalry between Turin and Rome, where the Art Exposition, the other great feature of the jubilee celebration of Italian unity, is in full swing, and intense popular interest in both undertakings has been a result. The Turin Exposition occupies 12,000,000 sq. ft., extending on either side of the River Po, the two parts being joined by four bridges, two built especially for this occasion. The American pavilion comprises the largest exhibit ever made abroad by our Government. In all there are 15,000 exhibitors, representing many countries. Francis B. Loomis is commissioner general from the United States and Albert H. Michelson, American consul at Turin, is deputy commissioner.

Ensley Rail Mill Closed Down.—The steel plant of the Tennessee Coal, Iron & Railroad Company at Ensley, Ala., closed down Saturday night, April 29, with the statement that lack of orders necessitates a shutdown temporarily. The finished product is steel rails exclusively. The company has orders for June rolling.

A number of changes have recently been made in the management of the Superior Axle & Forge Company, Buffalo, N. Y. The company this year started its new plant on Elmwood avenue and the New York Central Railroad Belt Line, Buffalo, and is now engaged in the manufacture of axles for automobiles and heavy drop forgings, eye beams, &c., for automobile and motor truck work. C. B. Kane, having resigned the position of general manager, H. G. Slining has been made manager of the works, and J. H. O. Bunge business manager. Mr. Slining was formerly superintendent of the Struthers-Wells Company, Warren, Pa., and Mr. Bunge was formerly connected with the Snow Steam Pump Works, Buffalo.

The Denver Rock Drill & Machinery Company, Denver, Colo., has established a branch at 500 and 502 San Francisco street, El Paso, Texas, comprising an office and wareroom. The El Paso branch will be known as the Rock Drill & Machinery Company.

The Newport News Shipbuilding & Dry Dock Company has been awarded a Government contract for the building of two revenue cutters at a total cost of \$476,000.

The Tuscaloosa Furnace of the Central Iron & Coal Company, at Holt, Ala., blew out April 30 for repairs, with no definite date fixed for resumption.

The Pope Tin Plate Company has removed its New York office from 29 Broadway to 50 Church street, room 1877. H. M. Easton is manager of this office.

Unemployment Insurance in Great Britain

The London *Economist* thus treats of this important subject, which is now agitating England:

When all is done, there must always remain a considerable amount of unemployment to which no remedy is applicable, and which can only be tided over by insurance. Both parties of the House of Commons are now agreed that this principle should be applied, the electors at the last election having been given to understand that the matter would be dealt with in this way. It only remains, therefore, to consider how it should be applied, and what difficulties have to be met in framing a scheme of universal insurance against unemployment.

In the first place, there is a preliminary question of principle to be decided. Should every trade bear its own risks, or are we to take the point of view that in trades of a fluctuating nature—the general public being held responsible for these fluctuations—the risk should be borne by the whole nation? At first sight the latter theory seems a plausible one, and it was rumored a week or so ago that Lloyd George meditated adopting this plan. But the only compulsory scheme of unemployment insurance which has ever existed in Europe, namely, that at St. Gall, in Switzerland, was wrecked largely on this very point. Employees in trades having steady employment were made to contribute to the insurance of workmen, such as those in the building trade, who are certain to be unemployed during some part of the year. Unless one has a very efficient system of administration, workers and employers in steady trades will use every possible device to escape paying a premium of which they will never reap the benefit; if they are represented on bodies whose duty it is to distribute the unemployment benefit, they will adopt a niggardly policy with the idea of saving their own pocket. But this method is objectionable also on grounds of equity. After all, the risky trades in general get back from the public a sufficient premium to cover their fluctuations in the shape of high prices. The risk is already paid for, though the high profits and wages of fat years may not often be set aside for lean years. There is scarcely room for any doubt whatsoever that organization by trades with premiums determined according to the risk run is essential if the scheme is to be a success. In this respect the Board of Trade's plan, which was put before the House of Commons two years ago by Winston Churchill, seems to be on the right lines.

But the greatest of all the problems connected with unemployment insurance is to find means of preventing malingering. We have said that this form of insurance is different from any other social insurance. The distinction lies in the fact that while the question whether a man is old, sick or infirm is determined by conditions over which, as a rule, he has no control, and can be certified by an independent witness, the same man may easily be and remain out of work for no other reason than that he is insured. The moment insurance is guaranteed the motive to find work is slightly altered. No actuary can estimate the necessary premium in such a case. The two years during which St. Gall's scheme was in existence the membership fell off from 4200 to 3035, while the premiums decreased from £867 to £636 in the second year. Nevertheless, the benefits paid rose from £890 to £1535. In St. Gall there was no doubt faulty administration, contributions were inadequate, and no proper control was kept over the payment of benefits, but the history of this scheme indicates that the difficulty is a serious one.

Successful unemployment insurance in this country turns upon efficient administration. Assuming that the Board of Trade scheme is the one ultimately adopted, the malingering will be kept out, in the first place, by the work test offered by the labor exchanges—a test which can only be made effective if the employers of this country lend their whole hearted support to the labor exchanges movement. A man will be offered work if a vacancy is known to the exchange: if he refuses to accept it, his insurance money will cease. The test is, however, not

nearly so simple as it looks, and some pretty problems will have to be faced in applying it. What work must a man be bound to do? What wages must he accept? Must he be willing to take work in a non-union shop if he is a member of a union? Must he accept work offered to him during a trade dispute? These questions are certain to cause friction. It is to be hoped that they are not so fundamental as to wreck the scheme. Another device for confining the scheme to genuine workers temporarily out of work is by limiting the payment of benefit to a period of 20 weeks only. If a man continues unemployed for 20 weeks and he is still unemployed he drops out of the scheme, and if afterward he obtains employment he must re-enter the system afresh. On the second occasion the workman must subscribe longer before he becomes eligible for benefit. The original period of probation is eight months; the second period (for those who have dropped out) will be extended, and the third will be more lengthy still. This has the effect of saving the fund. All those who are habitually unemployed, the frequently out-of-work, must then seek relief from the distress committees or the poor law, and are outside the scope of the unemployment insurance system.

Another difficulty arises when we attempt to count the cost. Various actuaries were asked by the royal commission on the poor law to estimate the premiums required to insure a laborer aged 21 against unemployment until 65 years of age, providing for (a) payments of 10s. a week, (b) one-half usual wages for a period of 12 weeks—the answer to distinguish suitable groups of occupations and various rates of wages. One gentleman answered: "At the present time I am not aware of any adequate data for answering the question submitted to me by the commission." Mr. Ackland ventured the suggestion that "if an average rate, for instance, of unemployment of 5 per cent. per annum is taken, and it is further assumed that the unemployment benefit is on the average 10s. weekly for three weeks, or say £1 10s. in all, it may, very roughly, be considered that an annual payment of about 1s. 6d. would, on the average, provide for such assumed benefit at such assumed rate. I should wish it to be understood, however, that the royal commission could not, in my opinion, place any reliance on such figures or deductions." George King made an estimate in more detail, ranging from 4d. per week to 11¼d. per week, according to the trade considered. But in view of such hesitating opinions and the unknown factors which may quite possibly be introduced by the scheme itself, it must be admitted that from a financial point of view the politicians are proposing to take a leap in the dark. The cost of the scheme proposed by Mr. Churchill was given as £1,500,000 a year to the Imperial Government, while the premiums were to work out at some £250 per year from an employer employing, say, 500 men, in addition to the worker's contribution of 2½d. a week. But in the result the exchequer may well find itself burdened with a much larger sum, while some employers may have to pay very much larger premiums than that suggested.

The position, then, amounts to this: The House of Commons is pledged to produce an insurance scheme which may be expected to cost several millions. The public, knowing little of the intricacies of the problem, are anxious for the experiment to be tried, and are willing to find funds if only there is a guarantee that the money will be well spent. On the other hand, a false step might do incalculable harm if the stimulus to find work is weakened. The scheme as a whole stands or falls on the capacity of officials to administer it without either becoming partisans in trade disputes, or encouraging indolent workers at the expense of the industries with which they are nominally connected. If these difficulties can be satisfactorily overcome, not only will the trade of the country be rid of a grave incubus, but a potent cause of social unrest will be disposed of, while the spending power of the working classes—being spread more evenly over good and bad times—will in itself tend to prevent fluctuations in industry in so far as they are due to variations in home trade.

Personal

Henry R. Cobleigh, for the past seven years mechanical editor of *The Iron Age*, has accepted the position of publicity manager for the International Steam Pump Company, 115 Broadway, New York. His associates wish him the large success to which his industry, ability and high character entitle him.

W. W. Macon, who has been editor of *The Metal Worker*, one of the David Williams Company publications, for the past six years, has been appointed one of the editors of *The Iron Age*, and will give special attention to the engineering department.

A. H. Tuechter, president of the Cincinnati Bickford Tool Company, Cincinnati, Ohio, will leave New York May 17 for a European tour, expecting to be absent about four months.

H. B. Gaylord, Scranton, Pa., has been appointed district manager for the Taylor Iron & Steel Company, High Bridge, N. J., succeeding R. D. Van Valkenburg.

H. P. Shaw, formerly sales agent of the American Steel Foundries, is now connected with the Hubbard Steel Foundry Company, East Chicago, Ind., as sales manager, with offices at No. 417 Fisher Building, Chicago.

Frank C. Lewis, Western manager for the Colonial Steel Company since it was established, and James S. Lewis, also with the same company, have resigned their positions to accept similar ones in the tool steel department of the Charles G. Stevens Company, Monroe and Jefferson streets, Chicago. Mr. Lewis will act as manager of the department, and Mr. Lewis will assist him.

C. W. Lytle, formerly superintendent of the Sharon, Pa., plant of the American Steel Foundries, has been made general manager of the Hubbard Steel Foundry Company, East Chicago, Ind.

W. T. Hays was made general superintendent of the plant of the Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., April 24, succeeding F. G. Dunbar, resigned.

A. A. Aranson, for a number of years one of the buyers at the Chicago office of the International Harvester Company, has been transferred to the management of the company's Canadian purchasing department, with headquarters at Hamilton, Ont. C. R. McDonald will succeed Mr. Aranson in the Chicago office.

W. H. Shephard, a director of T. Inman & Co., Ltd., steel manufacturers of Sheffield, England, who has been visiting the trade in this country, sailed May 3 for England.

Maurice Goodman, 32 Broadway, New York, has taken the agency for a number of foreign made high speed and motor car steels, including the Excelsior Austinite steels, and all of the lines formerly handled by the Royal Metal Steel Company, which is now out of existence.

Geo. G. Crawford, president of the Tennessee Coal, Iron & Railroad Company, returned this week from a European trip.

Charles M. Schwab sails for Europe this week. He will attend the international conference of steel manufacturers at Brussels in July before his return.

Frederick Hughes, for the past six years chief engineer for the Driggs-Seabury Ordnance Corporation, Sharon, Pa., has joined the engineering staff of the New Departure Mfg. Company, Bristol, Conn., manufacturer of ball bearings.

C. C. Hayward, formerly Cincinnati manager of the Whitney-Kemmerer Company, whose Western office was recently discontinued, has joined the sales force of the Jones & Laughlin Steel Company, and will have headquarters in Cincinnati.

The Eastern Steel Company, Pottsville, Pa., has appointed Edward C. Phelps as its Cincinnati sales agent, and offices have been opened in the Fourth National Bank Building.

George W. Whitehead, for several years night superintendent at the plant of the Lackawanna Steel Company, Buffalo, N. Y., has been appointed metallurgist for

the company in place of Dr. G. B. Waterhouse, who will hereafter devote his time to research and experimental work for the company.

George F. Alderdice, who has been manager of sales for the Republic Iron & Steel Company, at St. Louis, has been appointed assistant general manager of sales, effective May 1. He will be located at Pittsburgh. Paul W. Cotton, formerly connected with the Cleveland sales offices of the company, succeeds Mr. Alderdice in charge of the St. Louis office.

Daniel J. Hauer, Park Row Building, New York City, will hereafter devote his time entirely to consulting engineering and the introduction of methods of system and economy in contracting.

Effective May 1, E. Sidney Lewis, formerly salesman for the Standard Steel Works Company, Philadelphia, assumed the position of special sales agent of the Pittsburgh Steel Company, with headquarters in Pittsburgh, to perform such duties as may be assigned to him by the general manager of sales.

Obituary

THOMAS BRESLIN, Waterford, N. Y., died April 12. He had been associated with J. M. King & Co., Inc., manufacturers of dies and die stocks, for more than 60 years, and since the incorporation of the firm as president and treasurer.

WILLIAM H. PAXTON, treasurer of the Canonsburg Steel & Iron Works, died at his home in Canonsburg, Pa., April, 27, aged 65 years. He was also president of the First National Bank of Canonsburg. He was not married.

LEWIS F. GRAMMES, Allentown, Pa., died April 26, aged 67 years. He was an inventor of machinery, having much mechanical skill and aptitude, and his firm, L. F. Grammes & Son, conducted a large export trade.

JAMES J. CARRY, a pioneer railroad builder and the founder of the Waugh Steel Works, died at his home in Chicago April 26, aged 65 years. He leaves a widow and three sons.

JAMES P. WETHERILL, Chester, Pa., who was associated with his brother, Isaac Wetherill, in the machine business under the name of the Wetherill Brothers Machine Company, died May 1, aged 40 years. He leaves a widow and one child.

J. E. JOHNSON, manager of the Longdale Iron Company, Longdale, Va., died April 30. His son, J. E. Johnson, Jr., is manager of the Lake Superior Iron & Chemical Company, Ashland, Wis.

The Murray Iron Works Company, Burlington, Iowa, is completing an extensive addition to its shops in the shape of a steel frame building, 120 x 140 ft., having a large traveling crane down the middle and smaller cranes on the sides. This will enable the company to increase greatly its production of water tube, tubular and fire-box boilers.

The three Thomas, Ala., furnaces of the Republic Iron & Steel Company made a record for this plant in April, with an output of 24,398 tons, an average of 813 tons a day, or 271 tons per furnace. While larger outputs have been made per furnace, this is the highest daily average for an entire month with all three furnaces in operation.

At the Krupp works in Essen the 50-ton steam hammer Fritz, in use for 50 years, is being demolished, and new forging presses will take its place. It was built in 1861, Alfred Krupp deciding to make the outlay of 600,000 thalers, though many engineers advised that such a hammer was impracticable.

The Cooke Works of the American Locomotive Company, at Paterson, N. J., has been closed down because of a lack of orders, according to a telegram of April 29, and 150 men are laid off. The Rogers Works is still in operation.

Securing Foreign Government Contracts

European Methods of Pursuing Central and South American and Eastern Business

BY LIONEL SAMUEL, NEW YORK.

Much is being written about export trade with South America and the East. These articles usually ask why the United States does not get its share and point out how it should get it. Very little—at any rate, little of value—is said about business with the governments of these countries. This is vastly more important, especially at this time. There is no doubt that, because of economic and political reasons, many contracts from Central and South America and the East, which are now going to Europe, should come to the United States. The general European trade has been assisted largely because of relations created through contracts with these governments; contracts which have been secured by persistent and systematic work of what may be termed a most scientific nature.

Patience and Tenacity Required

The leading concerns in Europe, after deciding to enter these fields, have not hesitated to work at them with patience and tenacity until they have succeeded in gaining a strong foothold. They have always applied the efforts of the very ablest men they could secure, not ablest as experts in any special line, but men who can be relied upon, through great experience, to have the necessary tact to handle the Government officials with whom they may come in touch—as diplomats more than commercial men—attaching to them when the proper time arrives assistants with the necessary expert knowledge.

The wisest of these houses secure the services of high class men, experienced in, and with a knowledge of, how to meet the ways of these countries, particularly the ways of dealing with high officials—the main thing being to get on an equal social footing and become ingratiated with the ministers or officials who have the final word in such contracts, as well as with the lower officials who have to take care of the details. This takes time, and concerns that cannot see far enough ahead to be willing to await developments with patience cannot anticipate a successful issue in any such enterprise.

Once confidence is secured, it is permanent and lasting. In most cases it can be demonstrated that, in certain lines of construction, contracts have been repeatedly given to the company, which did the first work, even at higher prices than new competitors, because these governments prefer to continue with the concerns that they have come to know and trust. Many important houses in England owe their success largely to work they have done for South American and Eastern governments. From time to time they send men fully equipped on what may be termed exploring expeditions, to find out what is doing, and who is doing it, and what the prospects are for future contracts. They are men who travel with apparently no mission but to enjoy themselves, but who are quietly ingratiating themselves with the powers and finding out what is going on.

The building of warships and the construction of harbors, dry docks, water works, irrigation works and most public works of all kinds are placed principally in the hands of foreigners by South American and Asiatic governments.

Time Required to Develop Relations

It is useless to expect to secure important contracts with governments as expeditiously as with individuals or corporations. Even in Western countries, those who have had experience well know the time and persistency that such dealings necessitate. With South American and Asiatic governments even more patience is necessary. They move slower. Time is not so valuable. They take longer to consider things. They do not comprehend them so well. They have to become better acquainted with whom they are dealing and get to like them and trust them. In fact, their sympathy has to be conquered as a first step, and with the friendship and confidence obtained business can be secured on more advantageous conditions than proposed and submitted by those

who have not the faculty or fortune to become "personas gratas."

Business in South America and the East almost entirely results from the "simpatia" (good feeling) that the representative can inspire in the officials with whom he is treating. Only on rare occasions, if ever, can a beginner at this class of negotiation be successful. Their successful handling is the result of many years spent in such countries and in close touch with the people so as to have a thorough knowledge of their language and natures; at least in South America. In the East a knowledge of the language is not so essential.

As a general thing, even if officials in these countries be well versed technically and theoretically in the subject of such contracts, they have had no experience in commercial dealings, and as a result of their ignorance of the practical end of it, they are naturally suspicious of everything that is put before them. And they are also very sensitive. It does no good, but great harm, to point out to these officials, even if such be the case, that they are wrong and do not know what they are talking about. If the proper diplomatic methods are employed, they can be enabled themselves to discover where they are wrong, and, while they will not own up to it, they will quickly see the point and take advantage of the information they have gained, and appreciate very substantially their having been put on the right track without having had their sensitiveness in any way wounded.

Bribes No Longer Effective

It is still currently believed that, to a large extent, the successful negotiations with these governments depend upon the value of the bribes that in one form or another can be offered. It can confidently be asserted that such is no longer the fact. There may be still, as in all countries, spots where "grafting" can be used. But it can be taken for granted that where such grafting is accepted it is entirely thrown away, as those who take it have little to do with the final awarding of the business.

Twenty-five years ago, when revolutions were the order of the day and most of these governments were insolvent, bribery was a heavy consideration—first, because the men in power did not know how long they would be in power, and were looking after themselves, and, second, because, as the financial risk was great, exorbitant figures had to be obtained to cover them and bribery was often used to get such propositions accepted by the ministers, the congress and the president.

At the present day, however, the administration of the governments are in the hands of honest men, and these governments are financially sound, and apart from the red tape which has to be gone through in doing business with them (but not more than with any other government) may be looked upon as desirable clients from every point of view. In fact, for many reasons they are more desirable than many of the so-called "highly civilized" governments to do business with.

Doubtless many who have had dealings with departments of the United States have had bitter experience in questions of adjusting differences; the time it takes, the red tape, the difficulty and often impossibility of finding anyone who is the real person from whom a definite decision can be obtained, the shifting of the responsibility by one official on to another, and, finally, the exhaustion of patience and willingness to settle any how, so as to get it done with, often ending with neither profit nor honor. In South America and the East such conditions do not have to be encountered. It rarely, if ever, happens that the real head cannot be reached at once, and, unless there is some good reason for the contrary, it is not difficult to get an equitable adjustment of differences.

Experience Needed in the Home Office

It is essential to have at the home office in charge of such business a man who has had as much practical

experience in such negotiations as the man who is sent away. A man of this kind will be able to judge of the capability of the one who will be sent after such business by ascertaining his knowledge of such countries, his experience in handling these people and negotiations. A man may appear to one who has had no experience in these countries as perfectly apt for the mission, whereas one who knows and has experienced the different conditions to be encountered may decide to the contrary, and with very good reasons, which may not be apparent to the inexperienced. Many conditions present themselves in such dealings which are different from those incidental to similar enterprises in Western countries.

In the course of negotiations questions may arise which will necessitate consultations between the man on the spot and the man at home; questions that demand very quick resolutions and replies; questions caused by conditions obtaining at the other end, which, while presenting no difficulties to one who knows the ground, may appear onerous to one who does not.

A case can be cited of a concession having been granted by one of neighboring republics for the installation and operation of an underground telephone system in the capitol, where an overhead system already existed. The concessionaire offered the business to a very large company in this country, which, after looking at it from every side, but without real knowledge of the situation, and without sending to examine it on the spot, rejected the proposition. The concessionaire then offered it to one of the largest electrical engineering and manufacturing concerns in Europe, which had had previous experience in such dealings. The European company immediately secured an option on the concession, and sent its most reliable representative with experts to investigate on the spot. After investigating, they took over the concession with modifications and constructed and operated the telephone line, afterward forming a company to take it over at a very handsome profit.

As a result of their enterprise, in spite of the existing overhead company, which threatened to annihilate them, the parties referred to have since secured profitable contracts of a similar nature from other municipalities and corporations, their reputation having been firmly established, by the way, in which they entered into and carried out the first contract they obtained. It can safely be affirmed that they are now so strongly established in that country that it is scarcely probable that any competitor could make much way.

Another case is recalled of a firm of European contractors which some years ago was called in by a country on this continent to help it out on a drainage contract that had been undertaken by local contractors who proved incompetent to act up in any way to their undertaking. This firm never would have been called in, however, had it not been that it already had on the spot a gentleman, representing it, who had been there some time, looking around, a finished diplomat, and whose reason for being there nobody knew before. This European concern, while quite reputable and able, had not reached very best prominence. It sent out the best talent it could secure to take hold of the work, and also, above all, the highest class men obtainable to treat with the authorities, while at home it had in charge men who had gained great experience in such negotiations. Many difficulties presented themselves from time to time, which could not be foreseen, necessitating modifications of specifications, estimates, &c., increases in figures and prolongations of time for completion. The diplomats (if the word may be used) were always successful in the negotiations for modification, and the practical men were able to give a good account of themselves in their departments. This contract was not so very large, but since its completion the firm has enjoyed contracts in that country for over \$75,000,000, and it is doubtful if any competitors could get anything there, and its success in handling its affairs there led to its having obtained successfully large contracts in adjacent countries.

Foreign contracts are as of much interest to manufacturers of machinery of all kinds as to contractors. It is impossible for a contractor to construct any works without needing machinery and supplies, and it natural-

ly follows that orders for all this material, with very few exceptions, go to the country of the contractor. Skilled labor is also equally of interest, as naturally this will invariably come from the same center as the contractor. And so it is that the result of these contracts is beneficially and permanently felt by all industries in the country whose natives secure this class of business. The tools, machinery, &c., become known by the men in the countries to which they are taken and give further business from private sources.

The Essex-Merrimac Chain Bridge

The *Cornell Civil Engineer*, published by the Association of Civil Engineers of Cornell University, Ithaca, N. Y., presents in its April issue a most interesting article by A. P. Mills, assistant professor of materials, giving a history of the Essex-Merrimac chain suspension bridge at Newburyport, Mass. This is a bridge which was thrown open to the public in November, 1810, and in the late summer of 1909 was finally closed to travel on the assumption that it had become unsafe after a century of continuous use.

The bridge consisted of a single arch of 240-ft. span, which was originally constructed with 10 chains and had a total width of 15 ft. The whole weight of the flooring, chains, suspenders, &c., was about 100 tons, and the total cost was \$25,000. It was built on the principle invented by James Finley of Fayette County, Pa., and patented by him in 1808. Quite a number of chain bridges were built on the Finley pattern in other parts of the country about the same time.

The suspension chains for the Essex-Merrimac bridge were forged on the spot, and the old smithy in which the work was done is still standing, though for many years it has served as a dwelling house. In February, 1827, the bridge gave way by the fracture of five of the 10 chains, while a heavily loaded wagon drawn by six oxen and two horses was crossing. The accident was attributed to the united effect of the weight of an immense body of snow lying on the bridge, and the severe weather which had contracted the particles of iron. Repairs were effected at a cost of about \$4000, and thereafter the bridge met with no further disaster. In 1891 heavy electric cars began to pass over the bridge regularly, but in three years thereafter it was found desirable to strengthen the structure, and this was done by the John A. Roebling's Sons Company. The site of this bridge is now occupied by a wire cable suspension bridge.

Professor Mills gives a great deal of information regarding the construction of bridges of this character, and enters exhaustively into a report of tests of the links used in the chains of this particular bridge, which were made by the Cornell students in regular laboratory classes. The iron used in the links is stated to have been Norway or Swedish iron. An analysis by Dr. G. E. F. Lundell of the department of chemistry, Cornell University, shows the following contents:

	Per cent.		Per cent.
Graphitic carbon	0.100	Copper	0.350
Combined carbon	0.000	Nickel	0.040
Silicon	0.015	Tellurium	Trace
Sulphur	0.007	Slag	0.220
Manganese	0.006	Iron (by difference)	99.207
Phosphorus	0.055		

By far the most interesting, and it is believed the most significant, discovery revealed by the analysis was the existence of the high contents of copper in the iron. The bridge appears never to have been painted, and the iron work was not much corroded even where the unprotected anchor chains were 10 ft. deep in loose earth. The freedom from corrosion is stated to have been largely due to the presence of the copper and not merely to the purity of the iron, though Professor Mills says: "It is well known that pure iron is much less corrosive than impure iron." He states that the crystalline fracture often observed in the tests is primarily due to the presence of the copper, probably in greater amounts in the iron showing the most pronounced crystalline fracture. The most badly corroded links invariably revealed a fibrous structure, while those which revealed a coarsely crystalline fracture were most remarkably free from corrosion.

The Brooklyn Engineers' Club's Exhibition

From April 18 to 22 there was held at the clubhouse of the Brooklyn Engineers' Club, 117 Remsen street, Brooklyn, N. Y., an exhibition of engineering materials, processes and models that at once became so popular that instead of closing the affair on Friday night, as had been the original intention, it was decided to keep open the following Saturday night. There was each evening a continuous stream of visitors, including engineers from every branch of the profession from all parts of the metropolitan district. In addition to these there were specialists among constructors, contractors, builders and owners of large manufacturing as well as residential plants. Each exhibit was presided over by an expert of its own, and 10-minute talks were given, some a trifle longer when necessary, to fully demonstrate what the inventor or manufacturer had to show. There were two unusual features of this show, one being the fact that the admission was free to the public, and the other that there was no expense to the exhibitor.

Space will not permit a detailed description of each exhibit, but attention may be specially called to the photographic exhibit of the construction work accomplished, by months, along the line of the new Fourth Avenue Subway. Here was also shown, in mosaic work, the color schemes and arrangements of the walls and tilings of the various proposed stations along the line. As the subway question is now uppermost in the minds of all Brooklynites, as well as others in the Greater City of New York, a large map, 4 x 5 ft., was shown, depicting the proposed extensions of rapid transit that would give to the citizens of the different boroughs of the metropolis 90 miles of rapid transit, of which 23 miles would be subway and 67 miles elevated, without extra fare.

Another feature attracting considerable attention was a model dry dock, shown in a specially constructed tank on the stage of the large auditorium of the clubhouse. In this tank of water was the dry dock, and in the dock a full rigged ship. The mechanism was so arranged that the dock would fill and sink, leaving the ship floating gracefully; and then the water would be pumped out and the dock would rise again entirely dry. William T. Donnelly is the designer of the dry dock. That the show might have a realistic touch, the Nelson Goodyear Company caused to be moved into the clubhouse, which is situated on one of the fashionable residential streets of the city, a 1-ton portable oxyacetylene apparatus, with its tanks containing oxygen at a pressure of 1800 lb. to the square inch. Here a welding torch welded the seams of a steel pressure tank, and a cutting torch slid through an 1-in. slab of iron until the sparks flew about in gorgeous pyrotechnic display. "There is no reason why a steeple should be more pious than a smokestack," was the motto of the M. W. Kellogg Company, which had an exhibit showing, among other things, its chimney blocks, and it gave out many of its little model bricks as souvenirs.

This is the first exhibition of its kind ever held by an engineers' club in New York, and great credit reflects upon the members of the Brooklyn Club for their very successful endeavor to advertise Brooklyn, their profession and their club. The committee in charge of the exhibit consisted of C. A. Somner, Wm. T. Donnelly, John S. Simmons, Donato Cuozzo, Henry A. Sinclair, George Weideman and Wm. J. Grinden.

The following is a complete list of the features shown and the names of the demonstrators:

Wood paving, U. S. Wood Preserving Company.
Continuous rail joints, Rail Joint Company.
Digging machinery, Hayward Company.
Refuse destruction, Heenan Destructor Company.
Crushers, Gardner Crusher Company.
Floating dry dock, William T. Donnelly.
Cableways, Lidgerwood Company.
Specialties, Manning, Maxwell & Moore.
Wiring tests, H. T. Wrecks' Wire Inspection Bureau.
Modern fire extinguisher, Pyrene Company.
Fire alarm system, Gamewell Company.
Fireproof furniture, Van Dorn Iron Works and General Fire Proofing Company.
Fireproof doors, Grinden Art Metal Company.
Not stated, Brooklyn Edison Company.

Hydraulic engines, The Jefferson Union Company.
Power plant equipment, M. W. Kellogg Company.
Oxy-Acetylene Welding, Nelson Goodyear.
Ventilating blowers, American Blower Company.
Nash blower, National Meter Company.
Electric drill, Chicago Pneumatic Tool Company.
Hot air pumping machinery, Rider-Erickson Company.
Valves, Jenkins Bros. Company.
Belting, N. Y. Leather Belting Company and Chas. A. Schieren Company.
Concrete construction, Turner Construction Company.
Concrete reinforcing material, Corrugated Bar Company.
Metal lath and reinforcing, United Exchange Metal Company.
Concrete sewer pipe, Lock Joint Pipe Company.
Pedestal piling, McArthur Pile & Foundation Company.
Waterproofing, McCormick Waterproofing Portland Cement Company.

Joseph Strachan, 117 Remsen street, Brooklyn, is secretary of the club.

Strike of New York Machinists

The International Association of Machinists declared a strike May 1 in what is known as District 15, which includes all the members of the union in New York City and Hudson County, N. J. The men were called out by the union in an attempt to force the employers to agree to an eight-hour working day. No other question appears to be involved. Manufacturers employing machinists in the territory affected by the strike have joined hands with the members of the National Metal Trades Association in combating the trouble. It is estimated that about 6000 machinists walked out on the day the strike was declared, of whom 1200 were employed by members of the National Metal Trades Association. The latter organization has opened temporary offices at 120 Liberty street, New York, which are in charge of Robert Wuest, commissioner of the association, and Frank Cheske, who is a special representative. It is declared by Commissioner Wuest that all the shops operated by members of the Metal Trades Association will be in full operation before May 15, and work was resumed in most of them before the strike was three days old. In anticipation of the strike the Executive Committee of the association, at a meeting held shortly after the annual convention in New York, adopted the following resolutions as a declaration of principle:

Whereas, A demand has been made on certain members of the National Metal Trades Association by labor unions for an eight hour working day; and

Whereas, It is our belief that the existing hours of labor in vogue by the members of the National Metal Trades Association are not excessive, viewed with reference either to the physical capacity of the workman or his social, moral and intellectual welfare; and

Whereas, The actual physical exertion required from the shop workman has been in the last few years greatly reduced by the general introduction of labor saving appliances in every department of the shops, and this condition is rapidly increasing; and

Whereas, The greater cost of manufacture due to shorter working hours and other restrictions of production is a direct and important, though often overlooked, factor in increasing the cost of living; and

Whereas, The movement of the labor unions for a shorter working day, restriction of output and higher wage is directly responsible for higher cost of production and consequently higher cost of living; therefore, be it

Resolved, That the National Metal Trades Association hereby records its absolute disapproval of any decrease in the hours now worked by the members of the National Metal Trades Association.

In addition to the new equipment to be installed by the Washington Tin Plate Company, Washington, Pa., noted on page 1025 of *The Iron Age* of April 27, it is announced that 500-hp. water tube boilers and 150-kw. generator will also be purchased. All machinery heretofore belt driven will in the future be motor driven. Bids for all the new equipment will be asked for this week by S. Diescher & Sons, Farmers' Bank Building, Pittsburgh, and contracts will shortly be placed.

The McDonnell Boiler & Iron Works, Des Moines, Iowa, which recently suffered a loss in its foundry by fire amounting to about \$4000, states that it has made necessary arrangements for repairs, and will be in operation again within a few days.

Official Changes in the Steel Corporation

Two important appointments were made in the official list of the United States Steel Corporation last week—that of John Reis to be vice-president and that of Ward B. Perley to be assistant to President Farrell. Mr. Reis has been for several years assistant to the president, having immediate oversight of new construction work at the plants of the various subsidiaries. Mr. Perley has been for 10 years assistant to Wm. B. Dickson, whose resignation as vice-president became effective May 1.

John Reis was born in Niles, Ohio, in 1861. In the sixties his father, George C. Reis, formed at New Castle, Pa., the firm of Reis, Brown & Berger, which became one of the largest manufacturers of rolled iron in the



JOHN REIS.

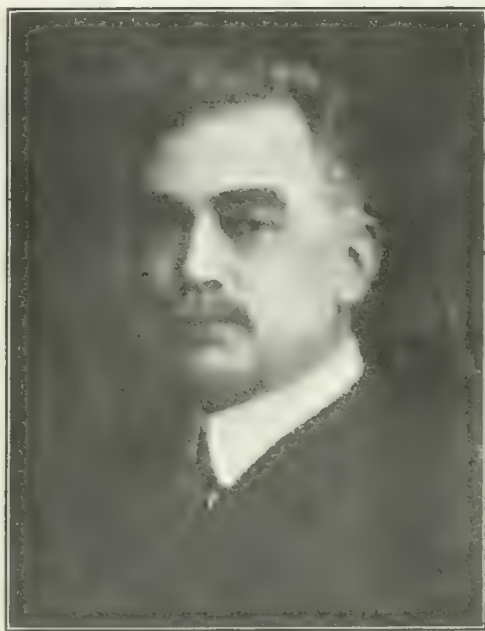
United States at that time. It is a noteworthy fact that all the six sons of George C. Reis learned in its practical details some branch of the iron and steel business, and most of them attained positions of national prominence in the industry. With the equipment of a common school education, John Reis began work in the New Castle Iron Works, operated by two of his brothers under the firm name of Reis Brothers. He learned the trade of sheet and plate rolling, and at the Neshannock Furnace, also operated by Reis Brothers, acquired a knowledge of blast furnace practice.

In 1886 he was vice-president and general manager of the Gogebic Furnace Company, Iron River, Mich., manufacturer of charcoal pig iron, and two years later became manager of the Nashville Iron, Steel & Charcoal Company, with furnaces at West Nashville, Tenn. In 1889 he was with the Tennessee Coal, Iron & Railroad Company as manager of Alice Furnace, at Birmingham, Ala., and in 1891 had charge of the blast furnaces of the Watts Iron & Steel Syndicate, Ltd., Middlesboro, Ky. In 1893 Mr. Reis went with the Oliver Iron & Steel Company, at Pittsburgh, as manager of Edith Furnace. At this time Mesaba ores were coming into use, and it was first demonstrated at these works that large quantities of these fine and dusty ores could be successfully used in blast furnace operations. At Edith Furnace and at Rosena Furnace, at New Castle, of which Mr. Reis also had charge, 100 per cent. Mesaba mixtures were charged with successful results.

In 1899, on the formation of the National Steel Company, Mr. Reis was made general manager of all blast furnace operations of the company, which included 16 active furnaces and three building. In 1901, when the United States Steel Corporation was formed the operation of the plants of the National Steel Company was taken over by the Carnegie Steel Company, and Mr. Reis

was made general superintendent of the Shenango Valley district, which included all blast furnaces, steel works and rolling mills at New Castle and Sharon, Pa. In 1905 he was made assistant to the president of the United States Steel Corporation. As vice-president he continues in charge of construction, in addition to other duties connected with that office.

Mr. Perley's connection with the iron industry began in the early eighteen-eighties when he was employed at the blast furnace of the Franklin Iron Works Company, at Columbus, Ohio, the product of which was then a well-known brand of foundry iron. The furnace is now No. 2 of the Columbus blast furnaces of the Carnegie Steel Company. King, Gilbert & Warner, with whom Mr. Perley was identified for a number of years, bought this furnace in 1883. The firm also operated the Moxahala Furnace in the Hocking Valley, and in the eighties it acquired the Standard Nail Company's rolling mill and cut nail works at Middleport, Ohio, Mr. Perley going to Middleport as manager. There was under construction at the same time a Bessemer steel plant at Middleport, also operated by the Columbus firm. About 1892 this was removed to Columbus, and the nail works were abandoned. The King, Gilbert & Warner Company purchased about 1893 the Cherry Valley Iron Works at Leetonia, Ohio, consisting of a rolling mill, blast furnace, coke ovens and coal mines, and Mr. Perley, who was a stock-



WARD B. PERLEY.

holder and a director, was active in the management at Leetonia. On the taking over of the King, Gilbert & Warner Company by the National Steel Company in 1899 Mr. Perley went to Chicago as assistant to Riley Gilbert, vice-president in charge of the operating department. Later the general offices were removed to New York, and in 1901 when the United States Steel Corporation took over the National Steel Company Mr. Perley became assistant to Vice-President Dickson, having to do chiefly with blast furnace operations, and at times with purchases of pig iron and old material.

The Keystone Tube Works, Inc., Connellsville, Pa., maker of round and square welded agricultural, bedstead and special tubing, has purchased about 15 acres of land adjoining its present plant at Wheeler Station, a suburb of Connellsville, and bids are now being asked for additions to its present mill building, which will increase the floor space about one-third. Contracts for the addition are to be closed May 5.

The Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., is operating four of its blast furnaces, the monthly output being somewhat above 28,000 tons. The pig iron stocks on hand are put at 105,000 tons.

The Mechanical Engineers' Programme

The application of mechanical engineering to the field of cement manufacture will be one of the important questions considered by the American Society of Mechanical Engineers at its annual spring meeting, to be held in Pittsburgh, Pa., May 30 to June 2. Papers will be presented covering different phases of the subject, among them one on "Edison Roll Crushers," by W. H. Mason, superintendent of the Edison Portland Cement Company, Stewartsville, N. J., and one on "Some Problems of the Cement Industry," by Walter S. Landis, associate professor of metallurgy, Lehigh University. A feature of the convention will be an excursion by special train to the plant of the Universal Portland Cement Company, Universal, Pa., on invitation of E. M. Hagar, president of the company. Other important topics will be turbo-compressors and forging presses.

In addition to papers already mentioned, the professional sessions of the convention will deal with machine shop practice, with papers on "The Assembling of Small Interchangeable Parts," by John Calder, manager Remington Typewriter Works, Ilion, N. Y.; "The Process of Assembling Small and Intricate Parts," by Halcolm Ellis, Ellis Adding-Typewriter Company, Newark, N. J.; "The Design of Milling Cutters and Their Efficiency," by A. L. De Leeuw, mechanical engineer, Cincinnati Milling Machine Company, Cincinnati, Ohio; also with steel works practice, with papers on "The Commercial Application of the Turbine Turbo-Compressor," by R. H. Rice, General Electric Company, West Lynn, Mass.; on hydraulic forging presses and blowing engines, and with miscellaneous topics, including papers on "Stresses in Tubes," by Reid T. Stewart, professor of mechanical engineering, University of Pittsburgh; "The Purchase of Coal on the Heat Unit Basis," by Dwight T. Randall, engineer in charge of the fuel engineering department of Arthur T. Little, Inc., Boston, Mass.; "Energy and Pressure Drop in Compound Steam Engines," by F. E. Cardullo, department of mechanical engineering, New Hampshire College of Agriculture and the Mechanic Arts, and "A Pressure Recording Indicator for Punching Machinery," by Gardner C. Anthony, dean of the engineering school of Tufts College. There will also be a session on gas power, with papers to be announced.

The convention will open Tuesday afternoon, May 30, with the registration and reunion of members at the headquarters in the Hotel Schenley, followed by an informal reception for members and guests on the evening of the same day. There will also be an opportunity on Tuesday and Wednesday afternoons for inspection of the Foundry & Machine Exhibition Company's exhibit, which will be in progress in the Exhibition Building. On Wednesday morning the mechanical engineering of cement manufacture will be the subject of the first of the technical sessions, all of which will be held in Carnegie Institute, in close proximity to the society's headquarters. In the afternoon a trip to the works of the Universal Portland Cement Company will be made, with a stop at East Pittsburgh to allow those who desire to visit the plants of the Westinghouse Electric & Mfg. Company and the Westinghouse Machine Company. The second technical session, at which the papers on machine shop practice will be presented, is scheduled for the evening of the same day.

The professional session of Thursday morning will deal with miscellaneous topics, and will be as brief as possible to leave ample time for an excursion up the Monongahela River, including a visit to the National Tube Company's works at McKeesport. A reception and informal dance will take place in the evening at the convention headquarters. The concluding professional session, when steel works practice will be the subject for consideration, will take place on Friday morning. An inspection trip to the Mesta Machine Company's works at Homestead, Pa., is planned for the afternoon of Friday, and the convention will close that evening with a smoker and entertainment, given by the Engineers' Society of Western Pennsylvania at its rooms in the Oliver Building. A Ladies' Committee, Mrs. Chester B. Albree,

chairman, will care for the pleasure of the guests of the society, and will, as is usual at these conventions, do much to add to the social features of the occasion.

Customs Decisions

Old Broken Electrotypes

In a decision adverse to the claims of Albert A. Moore, the Board of United States General Appraisers has made a ruling interpreting the tariff act of 1909 in relation to the classification of old broken electrotypes, invoiced as "old type fit only for remanufacture." The collector assessed duty at the rate of 45 per cent. under the provision for articles composed wholly or in chief value of metal. The importer's claim is that the merchandise is free of duty under paragraph 702, or alternatively as unenumerated manufactured articles at 20 per cent., or as "waste" at 10 per cent. General Appraiser Fischer states in his decision for the board that, while it may be true that these old articles are made of type metal, it is equally true that in their imported shape they are electroplates and not type. He holds that this refuse material is, in fact, old worn stereotype plates, and such forms of old metal do not respond to the description of "type," though composed of material similar to that of type, and no doubt originally used for printing purposes. He says:

As electroplates are not "types," it follows that such articles when old are not "old types." The court in the Sapery case found from the facts there presented that the electrotype plates were composed of or made from type metal, and held that the material was dutiable as type metal. In view of these rulings, we are of the opinion that the old metal "as material" is entitled to classification as "type metal" if it consists of an alloy of lead and antimony, with percentages of other metals of varying but small amounts, in which the antimony amounts to at least 9 per cent. of the mixture. The protests make no claim, however, under paragraph 191, act of 1909, as "type metal," and there is no proof in the record to show the composition of the refuse metal here in question. It is clear that the claim under paragraph 480 cannot successfully be maintained, as paragraph 199 contains a sufficient enumeration to take these articles out of the class of nonenumerated manufactured articles. The only remaining claim, that under paragraph 479, we do not regard as applicable to the goods. There appears to be no good reason to extend the provisions for "waste" to articles made in most part of lead, since Congress has evinced an evident intention in the various provisions of the act to provide and impose a duty on lead in any and all forms. On the record in this case we feel justified in following the ruling of the board in abstract No. 14,970, though had proof been offered to show that the old metal had the necessary composition to entitle it to be called type metal we would have held paragraph 191 to be applicable. The protests are overruled, and the decision of the collector will stand.

Machines for Making Igniters for Miners' Lamps

It has been decided by the Board of United States General Appraisers that machines used in making igniters for miners' lamps are not "printing presses" within the meaning of the tariff act of 1909. The issue was raised by W. W. Coe, who objected to the classification of the machines as manufactures of metal with duty at the rate of 45 per cent. The machines were invoiced as "printing machines," and are made of metal. These machines are used to apply a mixture of phosphorus in a semi-liquid state to a narrow cotton tape. This tape is covered with the phosphorus in the shape of small dots at intervals of $\frac{1}{2}$ in., and is used as the igniter in miners' lamps. The protestant, while claiming duty under paragraph 197, was not specific, but General Appraiser Fischer, who writes the decision for the board, says the probable intention was to claim duty at 30 per cent. as "printing presses." The evidence presented was not satisfactory, and the protest was accordingly overruled.

Empty Ammonia Drums

The board has refused to reduce the duty on empty ammonia drums made of iron and imported by B. N. Anderson & Co. They were assessed for duty at 30 per cent. as "cylindrical metal tanks or vessels." The claim is made that the articles are entitled to free entry as "drums used for the shipment of acids from the United States." The decision, which is adverse to the contention for exemption, says it was necessary for the importers to show that the drums were actually exported

from this country in the shipment of acids, while the identity of the articles reimported should have been established by proof.

Spinning Gears

F. B. Vandegrift & Co. succeeded in securing a reduction in the assessment made on cast iron wheels invoiced as "spinning gears" and "spinning change wheels." They were classified as "manufactures of Metal" at 45 per cent., and were alleged by the importer to be entitled to enter as "machined iron castings" with a duty of 1 cent a pound. This contention is upheld by the board.

Barbers' Hair Clippers

In overruling a claim filed by G. W. Sheldon & Co., the board holds that hair clippers used by barbers are not "scissors or shears," as those terms are used in the tariff act of 1909. They were assessed for duty at 45 per cent, as manufactured articles wholly or in chief value of metal, and are claimed to be entitled to classification as "scissors or shears" under paragraph 152 at rate lower than those assessed. General Appraiser Fischer, who writes the decision, says that the clippers in question do not answer to the terms "scissors and shears," and that a hair clipper is not "shears" as commercially known or within the ordinary acceptance of that term. Witnesses for the Government testified that the articles are not known in the cutlery trade either as scissors or shears. As the importers failed to substantiate their claim or successfully controvert the testimony of the Government witnesses, the protest is overruled.

Electric Steel Production at a German Works

An illustrated description of the electric steel plant of Le Gallais, Metz & Cie in Dommeldingen, is given in *Stahl und Eisen* of February 9, 1911. This plant is very complete and contains a blast furnace, electric furnaces, steel foundry, well equipped forge shop, machine shop and laboratories. The electric power is derived from gas engines using blast furnace gas. The open hearth furnace, which is of Wellman design, is rated at 20 tons and is used as a Talbot furnace. The hot metal contains on the average 3.5 per cent. carbon, 1.5 per cent. manganese, 0.6 per cent. silicon, 0.07 per cent. sulphur and 1.82 per cent. phosphorus. The bath is worked down to about 0.15 per cent. C., 0.25 per cent. Mn., trace of Si., 0.04 per cent. S. and 0.054 per cent. P. When an electric furnace is ready for a charge from 3½ to 4 tons of metal is poured off for further refining. The same amount of molten pig iron is then poured into the open hearth, and after this addition the average composition is 0.90 per cent. C., 0.5 per cent. Mn., 0.05 per cent. S. and 0.04 per cent. P. This is worked in the usual way with ore, mill scale and lime additions. After the first vigorous reaction, the slag, which contains most of the phosphorus, is removed and a new slag made. In about two hours the metal is ready for tapping.

The electric furnaces are all of the Röchling-Rodenhauser type. Three are of 3½ to 4 tons capacity, using single phase alternating current, and the fourth is of 1½ tons capacity and takes direct current. They are all basic furnaces, being lined with well burned dolomite thoroughly mixed with tar. The average life is from 90 to 125 heats.

When a furnace is ready for a charge, the metal is brought from the open hearth furnace and poured in. The proper slag making materials are added, and in about an hour the composition is 0.05 per cent. C., 0.10 per cent. Mn., 0.04 per cent. S., no Si., and the refining has practically eliminated the phosphorus. The slag is removed. Ferromanganese and the other alloys necessary are now added, and the desulphurizing slag prepared. The bath is now deoxidized, and apart from the removal of sulphur no further change takes place. This treatment lasts about an hour, and the sulphur averages from 0.005 to 0.01 per cent. During this time any special ferro-alloys desired may be added. The company makes castings from ½ lb. up to 10 tons weight, and also has a well

equipped forge and machine shop. The castings are divided into four classes, as follows:

Mark.	Ultimate stress. Lb. per sq. in.	Elongation. Per cent.
L. G. M. a	56,900 to 64,000	20
L. G. M. b	64,000 to 71,000	20
L. G. M. c	71,000 to 85,400	15 to 18
L. G. M. d	85,400 to 99,600	8 to 10

For the electrical industry a special grade is made of the following composition: C., 0.05 to 0.06 per cent.; Si., traces; Mn., 0.20 per cent.; P., 0.005 per cent.; S., 0.003 per cent.

The forge shop is equipped with a 500-ton press, a large steam hammer, a series of smaller hammers and different finishing hammers. Ingots up to 3 tons in weight are handled, both ordinary and special steels, and finished as rounds, squares and special shapes suitable for automobile construction. An idea of the excellent grades of steel produced may be drawn from the following tables:

Table 1.—Physical Tests of Various Steels

Heat No.	Grade.	C.	Si.	Mn.	S.	P.	Cr.	Ni	W.
1458	Very soft	0.04	tr.	0.24	0.006	0.007			
1406	Soft, case hard- ending	0.18	0.16	0.62	0.009	0.009			
1692	Machine and wag- on construction	0.45	0.20	0.62	0.011	0.008			
1738	Same	0.61	0.20	0.71	0.008	0.010			
1654	Medium tool steel	0.81	0.20	0.27	0.008	0.008			
1680	Hard tool steel	1.05	0.18	0.24	0.010	0.009			
1638	Very hard steel	1.23	0.20	0.23	0.008	0.009			
1654	Chrome steel	1.03	0.17	0.23	0.009	0.007	1.35		
1242	Nickel, case hardening	0.21	0.14	0.51	0.012	0.010		3.77	
1581	Nickel steel for fabricating	0.33	0.20	0.36	0.009	0.010		3.06	
1509	Chrome nickel, case hardening	0.12	0.20	0.29	0.011	0.010	0.91	3.93	
1292	Chrome nickel for fabrication	0.34	0.17	0.32	0.005	0.011	1.23	3.51	
1302	Special pen steel	0.57	1.53	0.44	0.004	0.011			
1300	Special tungsten steel	0.55	0.50	0.21	tr.	tr.	1.00		0.69

Table 2.—Physical Tests of Steel in Table 1.

Heat No.	Elastic limit. Pounds.	Ultimate stress. Pounds.	Elongation. Per cent.	Reduction of area. Per cent.
1458	31,300	43,400	35.4	70.0
1406	44,100	69,400	26.5	54.6
1692	61,150	96,580	20.2	42.0
1738	70,250	114,360	15.0	35.6
1242	54,600	76,100	23.5	64.0
1583	65,130	86,760	21.9	50.0
1509	64,560	83,900	22.3	64.0
1292	104,680	123,740	13.3	48.0
1302	68,260	112,640	15.2	43.0

Table 3.—Results on Annealed Castings.

Heat No.	C.	Si.	Mn.	S.	P.	Ultimate stress. Pounds.	Elongation. Per cent.
585	0.12	0.13	0.53	0.014	0.011	51,920	22.5
368	0.10	0.20	0.48	0.015	0.020	58,000	23.5
704	0.23	0.30	0.59	0.021	0.025	66,840	24.0
705	0.26	0.31	0.62	0.018	0.022	68,550	20.0
707	0.32	0.35	0.83	0.012	0.025	79,650	20.5
734	0.35	0.32	0.68	0.022	0.023	85,340	15.5
816	0.37	0.35	0.71	0.009	0.017	95,300	15.0

G. B. W.

Owing to the increase in its business within the past year, the W. A. Ives Mfg. Company, Wallingford, Conn., manufacturer of the Mephisto auger bits, bit braces, expansive bits, tap borers, &c., has found it necessary to have its bit braces manufactured elsewhere. With this in view the company has sold the machinery, tools and fixtures for the manufacture of bit braces to the Southington Mfg. Company and has not sold its entire business, as was erroneously stated in *The Iron Age* of April 27.

The offices of the S. Keighley Metal Ceiling & Mfg. Company, manufacturer of Moore's lock joint dust proof ceilings, Phoenix fireproof windows and architectural sheet metal work, have been removed from 819-823 Locust street to rooms 910-912 Union National Bank Building, Pittsburgh, Pa. The company will still maintain a warehouse at 819 Locust street, Pittsburgh, from which all local orders will be filled from stock.

Iron Ore Reserves Underestimated

A Discussion of the Mineral Resources of Michigan—Conservation Through Large Consolidations

BY DWIGHT F. WOODBRIDGE.

In a paper on the exhaustible mineral resources of Michigan and their conservation, read before the Michigan Academy of Sciences a short time ago, Prof. R. C. Allen, State geologist, brought forward interesting information and made timely comments that are reviewed below:

After an extended summary of the general conservation movement, Professor Allen says that Michigan originally possessed in its enormous stores of iron, copper, salt, natural brines and mineral waters, gypsums, clays, coal and other nonmetallic substances, its broad areas of timber, &c., natural resources unsurpassed by any political division on the continent. This is undoubtedly true. No mineral producing State bears in such quantity a greater variety of mineral products. And it may be added that none has shown more lavish and neglectful disregard for the future than has Michigan. Professor Allen adds that its stores of clays, gypsum, salt and natural brines and mineral waters are practically inexhaustible, but "its once magnificent forests have practically succumbed to the lumberman and to fire, and great inroads have been made upon its matchless deposits of iron and copper."

Michigan's Place in Copper, Iron and Coal

The exhaustible mineral resources of Michigan are its iron, coal and copper, and though these are absolutely exhaustible, the problems involved in their conservation are not so pressing and important as those affecting forests, water powers and soils. That this is true is due to the fact that the operators of copper and iron mines in particular consider natural conservation good business policy, and that it is demanded by economic laws. Natural conditions as to coal, on the contrary, rather invite than prevent waste.

Up to 1887 Michigan held first place as a producer of copper metal; then it fell to second, and has since become third, by reason of the exploitation of vast copper fields in Arizona, which has pushed both Montana and Michigan back one point. But in tonnage of ore mined Michigan still leads. And in the extent of copper ore reserves, also, Michigan probably leads the world, though its reserves are of low grade. However, the rapid increase of reserves of other districts, by reason of the discovery of vast tonnages of lean ores by the drill, may change this situation. Professor Allen says that by reason of the more rapid exhaustion of the reserves of Montana and Arizona, Michigan is destined to regain first place in copper production. If this is ever true, it will probably only be true in the distant future.

For nearly half a century, prior to 1901, Michigan held first place in the production of iron ores; but the Mesaba then brought about a change and its greatly accelerating production has since made Minnesota the first State in this regard. The Mesaba is now sending out more than two-thirds of the tonnage of Lake Superior and half the total iron ore of the United States. But, so great was the early lead of Michigan, whose production began when, in 1845, 300 lb. of iron ore were taken from the location of the Jackson mine and sent to the town of Jackson for use in a blacksmith's forge, that at the close of 1910 the State had produced almost half of the total Lake Superior output and about one-quarter of all iron mined in the United States to that date. Should these comparisons be expressed in terms of metallic iron, the proportion of the State would be still larger, on account of the generally high iron content of its ores.

In coal Michigan presents an inconsiderable proportion of the total of the United States; for its share in

1908 was but 4 per cent. of the whole, and of 29 States mining coal in that year it ranked as twenty-third in tonnage and twenty-second in the value thereof.

Depth of Iron Ore Bodies

Professor Allen presents at length geological theories and the conditions leading to the formation of iron ore bodies, of which the following paragraph is a very brief summary and discussion:

Iron bearing formations in which ore bodies occur are sedimentary rocks of the pre-Cambrian age, composed dominantly of silica, iron bearing carbonates and a ferrous silicate. In Michigan the original iron bearing mineral is mainly siderite. These iron bearing formations are interbedded with other sedimentaries and with igneous rocks of plutonic origin, and they are cut by dykes of younger intrusive igneous rocks, notably in the Marquette and Gogebic districts. The ore bearing formations vary greatly in thickness on the different iron ore ranges of the State. On the Gogebic the entire series of the formation is of a maximum thickness of 800 ft., on the Marquette from 1000 to possibly 1500 ft., and on the Crystal Falls and Menominee from 300 to 400 ft. These are the widths of formations, as they have been folded, contorted and deformed, fractured, faulted and displaced. It is in the basins formed by these movements that the ore deposits have become located.

As to the depth to which the ore bodies of Michigan may reach Professor Allen says that speculation is hazardous. This is for the reason that deposits of ore may be expected to occur to such depths as the active circulation of oxidizing and chemically active waters can penetrate, and the depth is governed by hidden factors of uncertain nature, and that will vary greatly with the character of the original foldings and fracturings of the rocks. He refers to the Newport mine at Ironwood, which is now finding large deposits of excellent ore at 2000 ft. from surface, and says that other mines are approaching this depth.

All men conversant with the history of the Gogebic range will remember when its mines were considered bottomed on almost flat floors of rock that cut across the formation at right angles to its dip, and with a pitch universally toward the east. More than 20 years ago the end of the Gogebic was in plain sight, just ahead, because these floors were accepted as the basement under which there was no concentration of ores. But floor after floor has been since penetrated and ores found beneath, until now it would be a rash man who would prophesy just where the bottom of Gogebic mines would be found. The Soudan mines of the Vermillion range (Minnesota) are now down to 1900 ft., and are far larger at that depth than when they seemed to be approaching exhaustion on the 1200-ft. level. The Mesaba has always been considered a blanket deposit of comparatively shallow depth—200 to 300 ft. at most—but a company is now proposing to sink a shaft more than 700 ft. to reach a very large deposit that is down to that level. Professor Allen is certainly wise in classing as exceedingly hazardous speculation as to the ultimate depth of Michigan's ore deposits, and I should recommend to others who are putting themselves on record as to approximate possible reserves that they follow his caution in this respect.

Grades of Ore Shipped

Michigan's ores are classed as hematite, though a small amount of both magnetites limonites is sometimes mined. In texture they vary from soft, granular and powdery to hard, specular and schistose. Professor Allen says: "No ores averaging less than 40 per cent. iron have been shipped from Michigan mines, and of these the total has been small, while the average grade of all shipments from the State is still between 55 and 60 per cent. metallic iron." In this connection, I may state, that the

averages of grades shipped from the various mining districts of Michigan for the past year were as follows:

Range	Percent	Mean
Marquette	52.00	8.30
Menominee	40.50	6.00
Gogebic	52.50	7.00

This it will be seen is a mean of about 55.5 per cent, dried, without taking into consideration the very trifling differences of totals from the three districts.

Great Extent of Iron Ore Reserves

Total available iron ore reserves of the United States, according to the computations of Dr. C. W. Hayes of the United States Geological Survey, and others, were estimated a year ago at 4,788,150,000 tons, and total unavailable ores at 75,116,070,000 tons, by the same authority. Of these totals Lake Superior was credited with 73 per cent. of the available and 95 per cent. of the unavailable ores. Still further to analyze these figures, Michigan was credited with 8 per cent. of the total reserve of available ores of Lake Superior and 6 per cent. of the total of the United States, with 285,000,000 tons. Of unavailable ores, Michigan was given credit for holding 38 per cent. of the reserves of Lake Superior and 36 per cent. of the total of the United States, with an aggregate of 27,160,000,000 tons. However close a guess this estimate may be, and opinions will differ very widely as to its value, Professor Allen places the reserves of Michigan at not less than one-third and possibly more than one-half, greater than estimated. He says: "In the last few years large areas of ore bearing formation have been located under deep overburden by magnetic methods, and other areas are yet to be discovered by these methods and by drilling. The ore reserves in these new found ranges will be known only when thorough development by drilling and actual mining has been done. The same remarks apply also to Minnesota and Wisconsin."

Of course this is undeniable, but I do not understand that Dr. Hayes attempted prognostication in his figures. How valueless such estimates are is evinced by discoveries made in the past year or so in southern Wisconsin on the Baraboo range, and in Minnesota on the Cuyuna, the former of which in time may have 1,000,000,000 tons of available ore, while the latter's already known reserve of now unavailable ore is probably another thousand million tons. And I am willing to go on record as saying that in northeastern Minnesota there will be found enormous quantities of ore that, at some future date, will become available. A large part of this ore will become useful, only after certain changes shall have been made in metallurgical methods.

"Three are many reasons to believe," says Professor Allen, "that high-grade ores will last much longer than the three decades estimated on the average rate of increasing production of the last four decades. Nevertheless, the exhaustion of our known high-grade ore reserves may occur within the next half century. It is certain, however, that the elimination of our reserves of low-grade ores will occur in the very remote future."

Conservation Through Consolidation

Professor Allen thinks the State can take no step looking toward conservation of its iron ores or copper. This is being done by the mining companies themselves. At the present time there is practically no preventable waste in the mining of iron ore. That this happy condition prevails is due to the concentration of the greater part of the iron and steel industry, including mines and reserves, transport and mills, in the hands of a few large and strong corporations.

There are many who cry out against the evils of combination monopoly. Such feeling, so far as it affects the iron mining industry, is in part the result of natural prejudice and in part of a lack of information. Combinations of small producers into large corporations has worked nothing but good in the Michigan iron ranges. It has made possible the utilization of lower grade ores by the elimination of competition on the market among the various independent mines. Low grades of one mine may now be mixed with the high grades of another and utilized, whereas under former conditions the lower grades were driven out of the market by the competition of the higher. Under necessity of producing ores salable on a competitive market, independent mines were forced into wasteful methods of mining. Workings

were conducted only to secure the choicest grades and were often left in such condition that large tonnages of valuable ores were left in the ground that can now be won only at great cost and danger to human life, and in many cases not at all. Combinations have made possible the installation of modern plants which have lowered the cost of mining and permitted ores to be broken and raised to surface from much greater depths than formerly, thus increasing our reserves. Combinations have made possible the acquisition of adequate transportation facilities, or the control of rates, thus affecting further economies. The importance of these may be realized when it is considered that nearly half the cost of a ton of Michigan iron ore delivered at Pittsburgh is in transportation charges. By combination co-ordination between all branches of the iron and steel trade has been brought about, with improvement of economic conditions on the iron ranges and steady employment of more men at better pay within improved social environments. Mines that, under a competitive system could not be worked at all are now kept in profitable steady employment. All of these things have resulted in practical conservation.

In other words, conservation has been accomplished on the Lake Superior iron ranges by consolidation. A tendency toward monopoly is the inevitable result of the operation of natural economic laws.

Chokio Water Works Bids

The Oscar Claussen Engineering Company, St. Paul, Minn., furnishes the following details regarding the bids opened April 26 for a water works system for Chokio, Minn.: Alternative bids were called for on (A) air compressor system, consisting of 3300 gal. reinforced concrete reservoir, about 5000 ft. of 4 and 6 in. cast iron pipe, pumping plant and accessories, including 15-hp. gasoline engine, 8 x 36 ft. compression tank, air compressor and air lift, and 25 x 40 ft. power house; (B) gravity system, consisting of 40,000-gal. steel tower and tank, about 5600 ft. of 4 and 6 in. cast iron pipe, 5-hp. gasoline engine, a deep well pumping head and 14 x 16 ft. pump house. The following bids were received:

	A.	B.
Cook Construction Company, Des Moines, Iowa..	\$9,460	\$9,993
C. W. Roland Company, Des Moines, Iowa.....	9,560	9,560
Gilbert W. Haggart, Fargo, N. D.....	10,500	10,600
J. G. Robertson, St. Paul, Minn.—contract awarded.....	8,776	9,159
Des Moines Bridge & Iron Company, Des Moines, Iowa.....	9,690	8,895
Blackhawk Construction Company, Waterloo, Iowa—pipe line, \$4,341; steel tower and tank, \$4,896.		
Minneapolis Steel & Machinery Company, Minneapolis, Minn.—steel tower and tank, \$3,500.		
Magnee Johnston, Minneapolis, Minn.—pipe line, \$5,611.		
Chicago Bridge & Iron Company, Chicago, Ill.—steel tower and tank, \$4,025.		

The Sterling Steel Foundry Company.—This company, whose plant is at Braddock, Pa., has increased its capital stock from \$100,000 to \$250,000. The increase was made so that the capital would more correctly represent the actual investment in the plant. Geo. W. Smith, for nine years superintendent of the Union Steel Casting Company, Pittsburgh, has bought a controlling interest in the Sterling Steel Foundry Company. Some minor improvements will be made, but no additional equipment will be needed. George W. Smith is president; William Nease, vice-president; H. G. Smith, treasurer; M. A. Quinn, secretary. With A. N. Marvin and Nelson McVickar, they constitute the Board of Directors. The company's Pittsburgh office, formerly located in the Frick Building, has been moved to the works at Braddock.

The United Engineering & Foundry Company, Pittsburgh, has received an order from the Republic Iron & Steel Company for a 32 x 90 in. two-high plate mill to be erected at East Youngstown, Ohio, on which open hearth plates will be rolled for the latter company's tube mills; also an order from the Heppenstall Forge & Knife Company, Pittsburgh, for a second high speed hydraulic forging press, the first one ordered being of 1000 tons capacity and the second 500 tons.

The Central Tube Company, Lewis Building, Pittsburgh, with works at Economy, Pa., has increased its capital stock from \$350,000 to \$500,000.

Death of Alexander E. Brown

Alexander E. Brown, president of the Brown Hoisting Machinery Company, Cleveland, Ohio, and pioneer in the development of machinery for handling material in bulk, particularly iron ore, died April 26 from a stroke of apoplexy which he suffered March 31. Although little hope had been entertained for his recovery the end came quite suddenly. He was first stricken with apoplexy in March, 1908, but recovered and was able to return to his office in November of that year. Last July a change for the worse occurred, and he had not visited his office since that time.

Mr. Brown was 58 years of age, having been born in Cleveland May 14, 1852. He was the son of Fayette Brown, a leading citizen of Cleveland, who was president of the Stewart Iron Company, and prominently identified with other industries. Mr. Brown attended the Cleveland public schools, and in 1869 entered the Brooklyn Polytechnic Institute, Brooklyn, N. Y., from which he graduated in 1872. After graduation he was connected for several months with the United States Geological Survey, engaged on work in the Yellowstone National Park. For the next two years he was with the Massillon Iron Bridge Company as chief engineer. From 1875 to 1878 he had an office in Cleveland as a consulting engineer, devoting his attention largely to designing, building and selling bridges. In 1878 he became connected with the engineering department of the Brush Electric Company, Cleveland, then known as the Cleveland Electric & Supply Company, and assisted in the development of the Brush arc light system and the manufacture of carbons for arc lights.

While engaged as a bridge engineer Mr. Brown took up the problem of developing machinery for the rapid and economical handling of iron ore from boats, and in 1880 organized the Brown Hoisting & Conveying Machine Company. He became vice-president and general manager of this company, his father being president. He succeeded his father in this office when the latter died in January, 1910. At first the company had its handling equipment made in other shops, not building its plant until 1886. In 1900 the name of the company was changed to its present form, and reincorporated with a capitalization of \$2,000,000.

Mr. Brown built the first cable machine for handling ore from boats in 1879. This was placed in operation on the Erie Railroad docks in Cleveland. His next step was the building in 1883 of the first bridge tramway; also for removing ore from vessels to dock piles. This, too, was erected on the Erie docks in Cleveland. The next important development by Mr. Brown in ore handling equipment was the building of the first fast plant, which was a modification of the tramway, being designed for unloading direct from the boats to cars. This plant was installed at the C. & P. docks in Cleveland in 1890. These early ore handling machines were operated by steam engines, the ore being conveyed in hand filled tubs of about 1 ton capacity. These two types of handling machinery, the bridge tramway and the fast plants as then developed, were the usual means employed for handling ore during the next 10 years. The next important im-

provement devised by Mr. Brown in machinery for handling ore was the grab bucket, which was adopted about 1900. With its advent came decided changes in the form of the handling machinery, including the development of the man trolley and the almost universal use of electricity for operating machinery of this character. In 1901 Mr. Brown also employed the man trolley for operating two-rope grab buckets.

During the years in which Mr. Brown was developing machinery for unloading iron ore from boats his ingenuity was also displayed in perfecting other handling equipment, largely for the iron and steel industry. In 1889 he brought out one of the first blast furnace hoists and top distributors, the general form of his hoist being used to-day by makers of that class of equipment. In the same year he designed and built the first cantilever crane, this being installed at the plant of the Jones & Laughlin Steel Company in Pittsburgh. In 1890 he built a coal storage plant in Buffalo for the Philadelphia & Reading Coal & Iron Company that attracted much attention among engineers. This plant covered over 5 acres

and was equipped with a traveling tramway inside for handling coal. In 1893 he developed special machinery that did remarkable work in the construction of the Chicago drainage canal. These machines, 11 in number, were of cantilever construction, reaching over the canal and carrying off excavated rock and earth, which was deposited on the spoil bank 200 ft. back from the canal face. He next developed in 1895 a car dumping apparatus for loading coal direct from cars into vessels, special attention being given to preventing breakage of coal. A number of these car dumps were placed in operation along the lake ports.

Mr. Brown was the first to apply the self-filling scoop bucket for taking ore from stock piles, building in 1895 three machines so equipped at the Duquesne plant of the Carnegie Steel Company. In the same year he developed the pig breaker in a plant built for the Iroquois Iron Company, Chicago. The general construction

of this pig breaker has since been followed. He built the first cantilever shipbuilding crane and trestle, this being erected for the Newport News Ship & Dry Dock Company in 1898. Among other work designed and erected by Mr. Brown, that attracted a great deal of attention in the engineering profession, was the building in 1905 of two wireless telegraph masts, each 450 ft. high, being the only masts ever built of that height. They were 3 ft. in diameter and were insulated against the earth to resist 100,000 volts. One mast was built at Brant Rock, Mass., and the other at Machrichanish, Scotland.

Handling machinery designed by Mr. Brown is in operation in practically every country in the world. His work was an important factor in the growth of the iron and steel industry in the United States, for the invention of machinery for the quick and economical handling of Lake Superior ore from vessels to the cars made possible the great production and low cost of iron and steel in the Pittsburgh district. As an engineer Mr. Brown ranked very high. As an inventor he displayed remarkable genius, and he possessed an analytical mind that was marvelous in its grasp of complex problems. His engineering courage was a matter of comment among his



ALEXANDER E. BROWN.

associates. When he finished designing a machine he never seemed a doubt in his mind as to its ability to do the work for which it was designed. Possessed of an artistic sense, he always bore the artistic as well as the practical in mind when designing a machine. He was possessed of a remarkable personality, made friends easily and was a charming man to meet. All his energies were devoted to his work. Had he been less engrossed in his business his friends believe that his life would have been prolonged.

Mr. Brown's wife is a daughter of the late Gen. James Barnett of Cleveland. He also leaves a son, Alexander C. Brown, who is a director of the Brown Hoisting Machinery Company and connected with the sales department, and a daughter. He also leaves a brother, Harvey H. Brown of Harvey H. Brown & Co., iron ore and pig iron dealers, Cleveland, and two sisters. He was a member of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the Civil Engineers' Club of Cleveland, the Electrical Engineers' Club, the Euclid Club, Country Club and Chamber of Commerce of Cleveland.

The Pittsburgh Foundrymen's Association

At the monthly meeting of the Pittsburgh Foundrymen's Association, held in the Fort Pitt Hotel, Pittsburgh, on the evening of May 1, three new members were added—Cyclops Foundry Company and A. C. Daft of Pittsburgh, and Samuel C. Weeks, foundry superintendent Lorain Steel Company, Johnstown, Pa. Reports were made by the various chairmen of the committees appointed for the entertainment of the American Foundrymen's Association, whose sessions will be held in Pittsburgh, commencing May 23.

H. E. Field, chairman of the Committee of Arrangements, stated that upward of 5000 people can be taken care of, and that the registration books will be opened in the registration booth in the Exposition Building on Monday, May 22, so that members arriving in the city the day before the convention opens can register and receive their badges. It has also been arranged to hold a subscription dinner in the Fort Pitt Hotel on Friday evening, May 26. Several noted speakers have been secured, who will talk on national topics, and two or three others on matters pertaining to foundry practice.

Reports were also made by Eliot A. Kebler, chairman of the Reception Committee, and George P. Bassett, Jr., chairman of the Committee for Entertainment of Ladies. Arrangements have been made to furnish the members with tickets to witness the ball game between the Pittsburgh and Cincinnati teams, Friday afternoon, May 26.

W. A. Bole, chairman of the Plant Visitation Committee, stated that arrangements had been made for a special train to take the members to the foundry of the Westinghouse Air Brake Company, Wilmerding, Pa., where the continuous pouring system is used, and after inspection of this plant the train will take the members to the Homestead Steel Works of the Carnegie Steel Company at Homestead, Pa., and then to the plant of the Mesta Machine Company at West Homestead. It has also been arranged that on Wednesday afternoon automobiles will be furnished to take the ladies through the parks in the East End and to the Pittsburgh Country Club in the evening for dinner. On Thursday the ladies will be taken for a visit through the art galleries and to the Phipps conservatories in Schenley Park, and also to the Margaret Morrison training schools.

All reports indicate that ample arrangements have been made and the sessions promise to be instructive. Dr. Richard Moldenke, secretary, reports that a large number of papers are now in the hands of the printers, while the exhibits will be more elaborate and larger in number than ever before. Already 102 booths have been engaged in the Pittsburgh Exposition Building and some elaborate displays will be made.

Dr. Moldenke made an informal address to the Pittsburgh Foundrymen's Association on "Modern Cupola Practice," his remarks being listened to with great interest. A Nominating Committee was then appointed,

consisting of Joseph T. Speer, William Yagle and C. H. Gale, to nominate officers for the coming year, the next meeting to be held June 5. F. H. Zimmers reported that the first meeting of the Pittsburgh Foundrymen's Association was held in Pittsburgh in July, 1896, a few concerns being represented; it started with 18 members, but now has 145 in good standing, and is regarded as one of the strongest foundrymen's associations in the country.

Pittsburgh Railway Club at the Ellwood City, Pa., Tube Plant.—Upon invitation of the National Tube Company, about 250 members of the Pittsburgh Railway Club and 150 other guests visited on Friday, April 28, the Shelby steel tube plant of the National Tube Company, located at Ellwood City, Pa. A special train left Pittsburgh at 12.30 p.m., and refreshments were served en route. The guests were shown through every part of the works and viewed the different processes of making Shelby seamless steel tubes from the bloom to the finished product. All the steel entering into Shelby seamless steel tubes is open hearth steel, three different grades being used, one running about 0.12 carbon, the second about 0.25 carbon and the third or highest quality about 0.45 carbon. The steel is shipped from its Lorain, Ohio, works in blooms 7 in. square in section, about 6 ft. long, and weighing approximately 750 lb. each. The operations of heating, piercing, rolling, drawing, pickling and annealing, involved in the manufacture of seamless boiler tubes were all seen by the visitors and explained in detail.

Mexican Oil Developments

TAMPICO, MEXICO, April 24, 1911.—Enormous storage facilities are being provided at Tampico and other localities of this section to properly care for the oil output of the larger operators. This output has increased heavily in the last few months, and one of the great problems which the larger oil producing interests are facing is the erection of steel tanks to afford permanent storage for the oil stocks. E. L. Doheny and associates, who have developed a very large oil production in the Juan Casiano field, 80 miles southwest of Tampico, have just issued a statement showing the extent of their operations, particularly in the matter of erecting steel storage tanks. The statement says:

"Our energies are directed largely toward the construction of steel storage. We are now building Tank No. 31 out of an order for 40, each of a capacity of 56,000 barrels. These tanks were ordered last October. Of the original order of 40, therefore, there are nine more to build. An order has also been placed for 20 more of these steel tanks, each of the same capacity as those constructed or in course of construction. These will afford a total of 3,300,000 barrels of steel storage capacity at the Tampico terminal of the Huasteca pipe line. There are also an 800,000-barrel reinforced concrete reservoir nearing completion, 200,000 barrels additional steel storage south from Tampico on the pipe line and at the end of it, and 1,175,000 barrels more at Ebano. These items, both steel and reinforced concrete, foot up the grand total of 6,095,000 barrels.

"With such storage capacity, we shall be able to take any contract that the world can offer. These storage facilities, counting in only the pipe connections, have cost \$1,250,000. Our pipe line and pumping stations to date represent an investment of \$2,250,000. These two undertakings alone, aggregating an outlay of \$3,750,000, will give an idea of the extent of our investments in Mexico. They do not tell the whole story, either, for our railroad, its rolling stock, water pipe line system, telegraph and telephone lines, our fleet of oil barges, steamboats and tugs all stand for an additional heavy investment, which, with the others, attest our confidence in the future of the great Huasteca field."

The Governor of Massachusetts has signed what is known as the "contempt bill," providing that in injunction cases in labor disputes the defendant shall be tried by a jury instead of by a judge.

Right Principles in Works Management

Machine Operators Reach Their Best Efficiency When Work Is Planned for Them— Piece Rate and Premium vs. Differential and Bonus Systems

BY STERLING H. BUNNELL.*

Inertia seems to be a property of mind as well as matter. The majority of men form habits of action and thought and continue on their lines until they are forced to change their courses. Every little while men engaged in work along regular lines are confronted by a new system or theory. At first the new idea appears absurd or chimerical. It is seen later that the novelty is only apparent, and that the new system is only a reduction to science of principles already employed, but unrecognized even by those who use them. The man of scientific methods, turning his attention to a new process or practice, perceives the underlying truths and states them concisely for ready application by other men to other problems. Put forth as a set of rules, the system appears novel, unusual and complicated; yet if studied it is found that it is merely a combination of principles and practices already used in part by successful men.

Scientific Management Not New

All of the methods of the new "scientific management" are old and well known. There were successful managers and prosperous shops before the Taylor system. However, many of the old school managers succeeded while in the act of killing their gold producing geese. Placed in charge of fairly well equipped factories, these managers proceeded to increase the output, when brisk sales made it necessary, and to decrease costs, when other factories cut prices, by the good old method of hustling. Each day's evil was sufficient unto itself. The manager was too busy to stop to think, and drove men and machinery until his equipment wore out and his workmen were superannuated. The feature of management of this type is earnest and thoughtless attention to the daily routine. In more than one case an old and experienced superintendent has been forced out by a young and apparently inexperienced man, who worked half the number of hours and spent twice as much money on nonproductive expense. Neither the old nor the young man had any accurate knowledge of his own mental processes. The old one followed the course laid down by habit; the young man cut loose along the lines suggested by common sense. Each made mistakes, but each made mistakes of a different character.

The efficiency engineers have made a science of factory management. They have borrowed the best from the old and the new. In this way they have brought together the ideas of many successful men, and have created what seems at the first glance to be a new, expensive and complicated system of red tape. The fact is, however, that management on scientific lines expresses the maximum of common sense coupled with technical training. The "unscientific" general practice is to tell the workman what his next job is to be, and then leave him to look up and get together his material, tools and supplies. The efficiency engineer has been at work for centuries trying to educate the human race beyond this point; for the tale may be found in the scriptures of the management of a brickyard which permitted its workers to leave their jobs to find and bring the necessary straw; and efficiency men were there to protest.

Machine Operators Not Likely to Find the Best Way

The basis of scientific management is the rule of putting trained men at the problem of finding out how best to undertake each item of factory work, and then having the selected methods taught to the workers. While this procedure may have had no justification in past years, the time has come when it is imperatively necessary. The

skillful "all-around" mechanics of former years, using the light machinery they knew so well, could determine methods of machining and maximum speeds and feeds quite as well as any available planning expert. But new tools were more easily made than new mechanics. Tools ten times as heavy as before must now be run by men of one-tenth the skill. Such tools, if they cost ten times as much to operate, should produce ten times as much work; so that lost moments become expensive. The good workman of former years could experiment a little to find out the best way. The machine runner of to-day must not be allowed to waste the time of his expensive tool, even if he had the necessary knowledge to experiment intelligently.

Nothing but mental inertia could have allowed the idea to become prevalent that the best and quickest ways of doing work could be discovered by machine runners under the stimulus of piecework prices, under any condition except accident. Managers and clerical help have been conspicuous, among those who are supposed to know how to think, in following along the same old lines instead of stopping short to evolve new and better ways. The man on the machine may, in fact, pull handles faster and keep more continuously at work if it is made worth his while to do so. He is not, however, the most competent man to study the proper forms of cutting tools, the proper ways of holding work, and the proper line between injurious overdriving of the machine, and wise forcing to its capacity so as to get the best return for the capital invested. Some men are careful and overcautious; others are impetuous and hasty; and each class furnishes good workmen. But these different kind of workmen need different handling. It pays the management to select the resourceful, ingenious man to develop new methods and to use the men who work better than they think to carry out the methods after they are planned.

Piece Work and Premium Systems

Piece work for the purpose of increasing the customary day's work is long out of date. The system was a frank confession that the management did not know what time the work should take, and hoped some of the men might blunder onto the quickest method. It put a premium on haste and inaccuracy, and set the inspector against the foreman and the workman against both. Being set by a mere guess, the piece rate was invariably too high, as the men gradually learned some of the possibilities of the equipment. Soon men of \$3-grade of skill were producing work priced at two or three times that amount. If the rates were set as a bargain between employer and employee their maintenance made it easy for any competitor to start men at lower rates and undersell the over-priced shop. If the rates were subject to reduction, no sensible workman would again exert himself to earn more than the highest rate he thought his employer would stand.

Premium payment was a device invented by F. A. Halsey with the intention of overcoming some of the difficulties of piece work. It is interesting to recall that the system was first exploited in the early '90s, at the time when the *American Machinist*, in the interest of the American machine tool builder, was declaiming against the ridiculously heavy machine tools in vogue across the ocean, and praising the light and graceful American tools which were so easy to ship and move about! A few years afterward the same paper was illustrating American tools of weight and bulk quite outclassing those "cumbersome" European machines. The premium

* Consulting engineer, New York.

system was directed especially at those competent mechanics of 20 years ago, who had grown up with their machinery and knew all there was to know about it. By piece work stimulation they were to be induced to study out faster ways of doing their work; but the employer would keep back part of the price of their efforts. To illustrate: If a certain job took 10 hours at the usual pace, the workman would be offered half pay for the time he might save. If he did the work in 8 hours he got 9 hours' pay. If he did it in 6 hours he got 8 hours' pay. If he did it in half the set time of 10 hours he received $7\frac{1}{2}$ hours' pay, so that he received for the job only three-quarters of the price paid him for the same work done in the slow time of 10 hours. With straight piece work the workman might attempt to make all he could, as long as the employer would stand for it. With the premium system the workman automatically cut his own pay as his speed increased, and soon reached the point where the increase of pay for extra effort was unimportant.

The Differential Payment and Bonus Systems

Both these methods of payment, it is apparent, belong to the go-as-you-please system of management, in which no one has any positive knowledge of what can be done with the means at hand. In contrast to them are the two systems based upon actual study of the possibilities, followed by the setting of the day's tasks. It is evident that one may set tasks to be performed, and still leave unsolved the problem of how to induce the workmen to meet the conditions. Obviously there must be a sufficient inducement. This may be the desire of holding the job, as where no other working places are open to the discharged man, or the other shops are less comfortable and agreeable as to conditions. It is probable that managers willing to take the trouble to improve the personal relations between workmen and shop can realize large earnings on a little inexpensive tact, diplomacy and personal "charity" in its original and broad sense. Every shop has a few men at least, who stay on regardless of conditions, held by some personal tie. These men do not strike or make trouble; and their number could be indefinitely increased by a little of the same thing that creates public opinion outside the factory, and sells the goods produced. But for those to whom the wage offers the only inducement, reward for following the instructions which insure turning out the maximum amount of work is offered by two methods of payment. One is Frederick W. Taylor's differential piece rate system; the other, H. L. Gantt's bonus payment.

Mr. Taylor, working then in the days just before the reconstruction of the whole machine tool practice to meet the demands of the Taylor-White high-speed tool steel, desired to attract the best of the skilled mechanics. He managed it by offering an extra high piece rate to those men who could attain the output he set as standard; but paying an unsatisfactory piece rate if less than the set quantity of perfect pieces were turned out. Thus, if five pieces were the day's work, the high rate might be set at 80 cents each, and the low rate at 60 cents. The man turning out five pieces in a day would then earn \$4, while a slow man, making only four pieces, would receive only \$2.40. The effect was to drive out the slow men and attract the very best workmen in their places. Needless to say, Mr. Taylor had already developed the principle of planning the work, so that he knew positively what speed could be made with the tools and equipment furnished, and that his highest rates would give abnormally high wages only to exceptionally 'good workers.

The bonus system was a later development in connection with scientific planning methods. It is the simplest of all wage payment systems, and involves no calculation whatever. Its inventor, Mr. Gantt, is well known for his use of schedules of factory work, showing clearly just what pieces must be made each day and just where failure or success in performing the set tasks has occurred. This kind of scheduling is of great use in routine operations, where machines that should make a stated number of revolutions per day may lose a large proportion of their running time by inefficient attendance, or slow work in supplying material and resetting

after stops. Schedule sheets are made, showing the performance of departments, machines and workmen, and checked up each day, so that the standard of performance of each is known. To insure the co-operation of the workman, a stated bonus is paid him for each satisfactory job or day's work. Regular wages are paid as usual, but at a minimum scale, and the bonus is an extra amount for efficiency. If one stops to consider that fixed charges, salaries, &c., go on every day regardless of output, it is easy to perceive that a moderate bonus for an extra 10 per cent. or so of work done with the same machines and without a cent of extra expense for labor or fixed charges may be the most profitable expenditure anywhere about the organization.

The days of the simple hustler are already past. For years our friends, the Germans, have been teaching boys trades as well as professions, in well equipped schools under competent instructors; while we have been inventing tools and taking no thought to find men competent to run them to advantage. Under the conditions which actually exist in this country, the only hope for efficient use of the remarkably excellent equipment of our newer shops, as well as for the best use of machinery of all kinds, lies in the study of its possibilities by picked men, followed by the instruction of the semiskilled workers along the lines laid down by the planners.

The Cincinnati Foundry Foremen

The Cincinnati Section of the Associated Foundry Foremen held its regular monthly meeting at the Grand Hotel, Cincinnati, on the evening of April 22. All the old officers were re-elected, as follows: Herbert M. Rapp, president; F. A. Elbert, vice-president; William McIntosh, treasurer; F. J. Brunner, secretary, and James W. McIntosh, sergeant-at-arms. In addition a second vice-president was elected, William Liddell being chosen for that honor. The following standing committees, to serve through the ensuing year, were appointed by the president: Educational—E. L. Binns, John A. Logan and James A. Murphy; Entertainment—W. McIntosh, F. C. Broerman and F. J. Brunner; Membership—John Hill, H. Schuh and C. Goehringer; Auditing—William Liddell, F. C. Broerman and H. M. Roberts. The following honorary members were elected: Prof. J. J. Porter, University of Cincinnati; F. O. Clements, National Cash Register Company, Dayton, Ohio; John A. Logan, ex-president Cincinnati Foundry Foremen's Association, and Prof. John J. Scheerer, Ohio Mechanics' Institute.

The association is very much interested in the apprentice problem, and a committee of four was appointed to confer with all local and national organizations, with a view of getting all possible information on the subject, and every effort will be made toward aiding in solving this question to the satisfaction of employer and employee. A representative number of foremen are expected to attend the coming Pittsburgh foundry convention.

At a meeting of the House Committee on Labor at Washington, D. C., April 29, Samuel Gompers, president of the American Federation of Labor, and James O'Connell, president of the International Association of Machinists, attacked the scientific management methods advocated by F. W. Taylor and others. The committee had under consideration the Pepper resolution providing for an investigation of the Taylor system. "The Taylor proposition," said Mr. Gompers, "would make more money for manufacturers, and it also would kill more workmen. It is certain that a man cannot work under a 'speeding-up' system for anything like the length of time that he can under normal conditions." President O'Connell declared that the Taylor system tends to wipe out manhood and would destroy the genius of the American workman.

The William Cramp Ship & Engine Building Company, Philadelphia, Pa., launched on April 29 the torpedo destroyer Patterson. This is the fifth vessel of the type built by the company.

Iron and Steel Exports and Imports

March Exports Largest in Our History

The report of the Bureau of Statistics of the Department of Commerce and Labor for March shows an increase in both the exports and imports of iron and steel, as compared with February. The exports were the largest for any month in our history. The value of the exports of iron and steel and manufactures thereof, exclusive of iron ore, was \$22,591,848 in March (against \$18,690,192 in February, while the value of similar imports was \$2,951,710 in March, against \$2,145,803 in February and \$4,079,763 in March, 1910.

The exports of commodities for which quantities are given were 215,667 gross tons in March, against 150,702 tons in February and 122,340 tons in March, 1910. The details of the exports of such commodities for March and nine months of the fiscal year ending with March, as compared with the corresponding periods of the previous year, are as follows:

Exports of Iron and Steel.

Comodities.	March.		Nine months ending March.	
	1911.	1910.	1911.	1910.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	15,189	5,944	126,602	51,346
Scrap.....	10,496	1,790	33,359	9,057
Bar iron.....	3,119	2,236	13,676	10,838
Wire rods.....	2,224	2,828	13,154	16,045
Steel bars.....	11,744	8,843	90,865	65,634
Billets, ingots and blooms.....	32,898	266	118,781	48,965
Steel rails.....	42,517	33,507	268,072	288,938
Iron sheets and plates.....	10,298	11,096	74,205	70,154
Steel sheets and plates.....	20,637	15,871	140,191	101,532
Tin and terne plates..	5,531	1,440	16,362	8,118
Structural iron and steel.....	16,374	10,272	118,455	73,281
Barb wire.....	6,888	5,949	60,702	53,375
All other wire.....	11,792	5,981	75,218	56,744
Cut nails.....	1,306	427	7,678	6,882
Wire nails.....	7,001	2,699	37,349	25,201
All other nails, including tacks.....	567	1,032	8,162	6,047
Pipe and fittings.....	17,066	12,159	126,611	126,835
Totals.....	215,667	122,340	1,329,442	1,019,012

It is interesting to note that of the above named March exports of billets 28,444 tons went to the United Kingdom, while the remainder went to Canada.

The imports of commodities for which quantities are given aggregated 23,533 gross tons in March, as compared with 20,454 tons in February. The details of such imports for March and for the nine months of the fiscal year ending with March, as compared with the corresponding periods of the previous year, are as follows:

Imports of Iron and Steel.

Comodities.	March.		Nine months ending March.	
	1911.	1910.	1911.	1910.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	11,578	21,362	159,092	178,167
Scrap.....	1,923	14,469	20,004	108,862
Bar iron.....	2,298	3,243	23,414	20,690
Billets, bars and steel forms n.e.s.....	5,041	5,386	32,514	25,604
Sheets and plates....	235	468	3,041	4,541
Tin and terne plates..	1,157	7,094	38,136	50,847
Wire rods.....	1,301	2,150	13,978	9,774
Totals.....	23,533	54,172	290,179	398,485

The imports of iron ore in March were 134,785 gross tons, against 94,820 tons in February and 163,633 tons in the month of March, 1910. The total importation of iron ore in the nine months of the fiscal year ending with March was 1,063,970 gross tons, against 1,741,293 tons in the similar period of the previous fiscal year and 718,759 tons in 1909. Of the March imports of iron ore 85,000 tons came from Cuba, 27,175 tons from Sweden, 22,357 tons from Spain, 230 tons from Canada and 23 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, exclusive of ore, in the nine months of the fiscal year ending with March, was \$164,881,449, against \$128,442,680 in a similar period of the previous fiscal year, and in the year 1909, \$105,148,957. The total

value of the imports of iron and steel and manufactures thereof, exclusive of ore, for the nine months of the fiscal year ending with March was \$26,249,869, against \$28,237,323 in a similar period of the fiscal year 1910 and \$15,579,347 in 1909.

General Electric Apparatus for Dilworth, Porter & Co., Inc.

Dilworth, Porter & Co., Ltd., Pittsburgh, Pa., are enlarging their mill and will install an electric drive. They have ordered the following apparatus from the General Electric Company: A 1500-kva. mixed pressure turbine, which will run from the company's present rolling mill engines; one 25-kw. turbo exciter, a 700-hp. mill motor, a 350-hp. mill motor, two 20-hp. totally inclosed motors, six 7-hp. mill motors, two 75-hp. vertical motors, three 40-kw. power transformers, switchboard, controlling apparatus, &c.

The 700-hp. motor will be connected by rope drive to an 18-in. mill. The 350-hp. motor will be direct connected to a spike rod mill, the 20-hp. motor driving the bull heads. The 7-hp. motors are of the reversing mill type and will drive tables, cooling beds, &c. The vertical motors will drive pumps that supply condensing water for the turbine, as well as water for general use around the mill. The small transformers will supply low tension current for the 20 and 7 hp. motors. The switchboard and control will be in accordance with the most modern steel mill practice. A graphic recording wattmeter, with transfer switch mounted on the power station switchboard, will enable a careful record to be made of the operation of either of the large motors.

Rails for the National Railway of Hayti

The National Railway of Hayti, which has received important concessions from the Haytian Government, will build 350 miles of railroad, and large outlays will be made in the United States for rails, bridges and equipment. The financing has been done in part in this country by W. R. Grace & Co. and others, and European capital is also interested. The construction work, which will begin at an early date, will be carried on by the Caribbean Construction Company, of which L. H. Shearman of W. R. Grace & Co. is president. C. G. Young, 60 Wall street, New York, is consulting engineer. It is expected that rail purchases will be made in the near future, the requirements being about 26,000 tons of 48-lb. rails. A considerable amount of bridge work will be needed, but for this specifications have not yet been completed.

J. C. Wallace of the American Shipbuilding Company, Cleveland, who is interested in the Western Dry Dock & Shipbuilding Company, Port Arthur, Canada, announced April 20 that the latter company would immediately start work on the erection of an additional plant to manufacture stationary, marine and locomotive boilers, engines and pumps, and to do general engineering contracting. He also stated that it was the intention of the company to make this works the largest in Canada. The company will build docks. A large amount of machinery will be required.

The plant of the Hoffman Heater Company, Lorain, Ohio, manufacturer of gas water heaters, has been sold to new interests, and the company has been reorganized by the election of the following officers: President, A. H. Babcock; vice-president and manager, S. A. Ault; secretary and treasurer, J. M. Jones. Mr. Ault was for several years traveling representative of the old company.

The Council Bluffs Junk Company, dealer in old material, claiming to be the largest dealer in scrap iron in Iowa, has installed in its yard at Council Bluffs, in that State, one of the Cedar Rapids Foundry & Machine Company's No. 6 shears.

A Large Toledo Single Crank Press

A single crank press capable of exerting a pressure of approximately 2000 tons has been recently completed by the Toledo Machine & Tool Company, 1736 Dorr street, Toledo, Ohio, for the Youngstown Iron & Steel Company, Youngstown, Ohio. This machine, which weighs 275,000 lb., is intended for manufacturing heavy steel products such as embossed plates for burial vaults or caskets; doors, platforms, plates and other parts for steel Pullman cars and passenger coaches; steel axle housings and large heavy brake drums for automobiles and work of a similar character. Fig. 1 is a general view of the machine and Fig. 2 shows the slide, the pitman and the pitman screw assembled, the combined weight of these parts being about 39,000 lb.

The customary threaded pitman screw fitted with a power elevating attachment controlled by the lever on the left of the press is provided for the slide. This slide is operated by a pair of friction clutches attached to the arch in the rear of the press. From these clutches power is transmitted by miter gears to a horizontal shaft, which runs forward and connects with the vertical shaft at the front of the machine through a second pair of gears. This vertical shaft runs down to the lower pitman and connects with the pitman screw through a worm and worm wheel. If it is desired to obtain a closer adjustment of the slide, a hand wheel attachment can be applied to the lower pitman.

A very large and powerful friction clutch attached to a shaft running in pedestal bearings operates the press

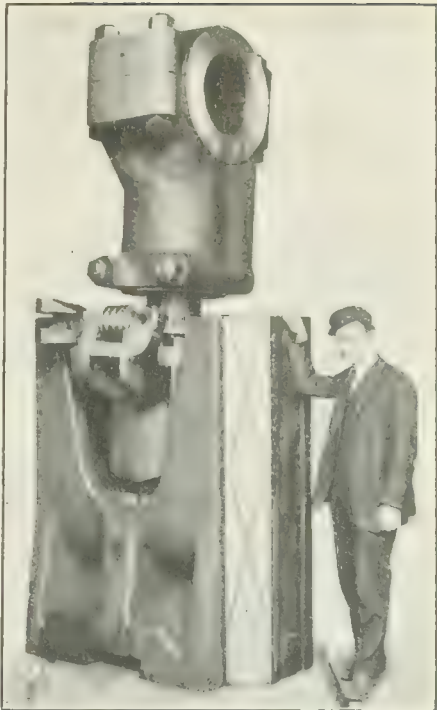


Fig. 2. The Slide, the Pitman and the Pitman Screw Assembled. The Weight of These Three Parts Is About 39,000 Lb.

The following table gives the principal dimensions and specifications of the press:

Overall height, feet.....	23
Size of bed, inches.....	60 x 60
Length of slide stroke, inches.....	18
Diameter of driving pulleys, inches.....	60
Face width of driving pulleys, inches.....	12 1/4
Width of driving belt, inches.....	12
Pressure exerted, tons.....	2,000
Ratio of double back gears.....	54 to 1
Diameter of crank shaft, inches.....	16
Weight of crank shaft, pounds.....	14,000
Diameter of main gears, inches.....	123
Weight of main gears, pounds.....	19,000
Weight of press, pounds.....	275,000

Before shipment the press was completely assembled, set up and tested at the builder's works under actual working conditions, except that the reinforcing rods were not shrunk in position and the nuts were merely tightened in the ordinary way. Afterward the entire press was dismantled and the frame taken apart for shipment. For shipping the press six cars were required, and when it arrived at the Youngstown plant the various parts of the large frame were fitted together. The reinforcing rods were heated, placed in position in the frame and allowed to cool and shrink the frame together solidly, thus securing practically the results of a solid steel frame.

Conference on Scientific Management.—Dartmouth College, through its school of business administration, the Amos Tuck School of Administration and Finance, announces a conference on scientific management for the benefit of the manufacturers and business men of New Hampshire and neighboring States to be held at Hanover, N. H., October 12, 13 and 14, 1911. Among the addresses scheduled are the following: Frederick W. Taylor, "The Principles of Scientific Management"; Henry L. Gantt, "The Task and the Proper Day's Work"; Harrington Emerson, "The Opportunity of Labor Under a System of Scientific Management"; James M. Dodge, "The Spirit in Which Scientific Management Should Be Conducted."

"Hurd's Iron Ore Manual," a handbook of Lake Superior ores, prepared by Rukard Hurd, secretary of the Minnesota Tax Commission, is in press and will be ready for distribution within two weeks. Orders placed through F. M. Catlin, sales agent, 510 Capital Bank Building, St. Paul, will be filled at the preliminary price, the regular price becoming effective June 1.

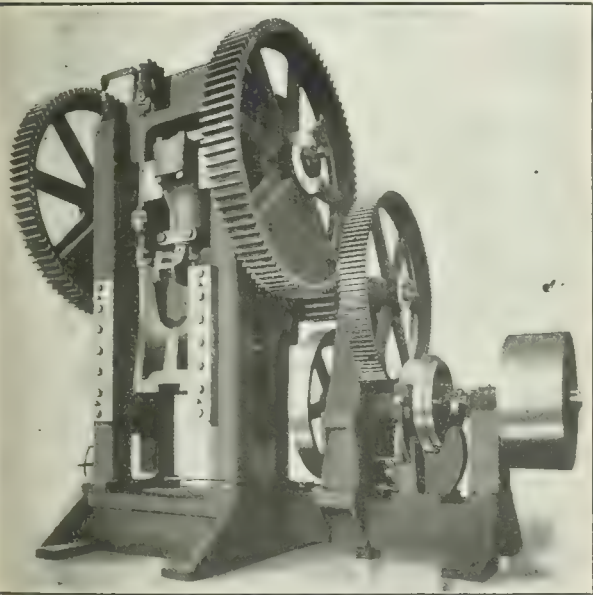


Fig. 1. A Single Crank Press Weighing 275,000 Lb. Built by the Toledo Machine & Tool Company, Toledo, Ohio.

itself. These bearings are mounted on an extension which is securely and accurately fitted to the main frame of the press. This shaft is 16 in. in diameter and weighs 14,000 lb. In this way the shaft which carries the belt pulleys and the balance wheel is kept in accurate alignment for the pinions and the gears. The friction clutch controlling the movement of the press is operated by a steel spider, which is keyed to the shaft and has a double hardwood facing. Powerful bell cranks connected to the sliding spider of the clutch give the friction required for driving. Double back gears with a ratio of 54 to 1 are provided for the press, and the larger back shaft, to which the two steel pinions engaging with the main twin gears are attached, is sufficiently large to prevent any distortion. In this way the large driving power required to give the necessary ram or slide pressure is divided equally between the two gears. The diameter of these gears is 123 in. and the weight is 19,000 lb. each. Four large steel rods, 8 1/2 in. in diameter, running up from the bottom of the press bed to the top of the arch, serve to reinforce the main frame.

A Novel Application of Motor Drive to Machine Tools

Details of the Changes Made in the Shops of the Chicago Railways Company

The West End avenue machine and woodworking shops of the Chicago Railways Company, Chicago, Ill., have been recently converted from belt driven shops to ones employing the individual motor drive. The special features of this installation are the application of motor drive to old machine tools, the use of strap iron brackets made in the company's shops to support the motors, and the large number of automatic starters which are used, not alone for the constant speed motors, but also for the adjustable speed ones, which is somewhat unusual. In making this change the engineering department of the company was assisted by the Reliance Electric & Engineering Company, Cleveland, Ohio, who furnished all the motor equipment.

The object sought in making the change was to effect a saving in power by making possible the use of individual machines especially for overtime work without running the 75-hp. motor, which was formerly used for driving the entire line shafting of the machine shop, to increase the productive capacity of the machines by a more powerful drive with an easy and convenient method of speed control for the wide ranges and to increase the efficiency of the shop in general by rearranging the machines to afford the greatest convenience in handling material. Fig. 1 shows an 18-in. lathe, which was converted in this way, and Fig. 2 gives a view of a portion of a group of radial drills.

A number of problems presented themselves in planning the installation, and one of these was to have as little wiring as possible on the machines, as the motors were installed on a 550-volt direct current grounded circuit, the power being taken from the company's lines. In the case of the constant speed motors this was overcome by selecting automatic starters that could be placed on the wall and controlled by push buttons, placed in convenient locations. In this way the only wiring required on the machine was for the push buttons, and these required a pilot circuit carrying only about 1-6 amp. In the case of the adjustable speed motors the choice of the controlling equipment proved more difficult.

When motor drive is applied to belt driven tools equipped with cone pulleys it is necessary to remove the cone pulley, which in some of the older types was designed to cover a wide range of speed with only a single

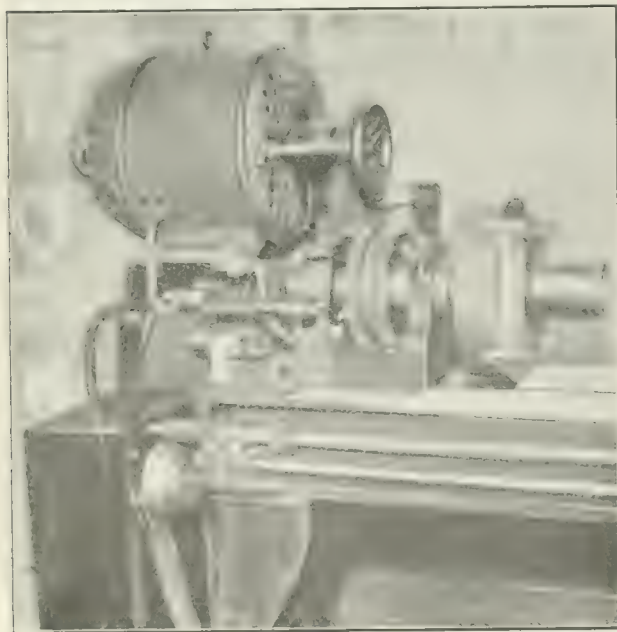


Fig. 1—An 18 In. Lathe Changed from Belt to Motor Drive by the Application of a 30 Hp. Motor Built by the Reliance Electric & Engineering Company, Cleveland, Ohio.

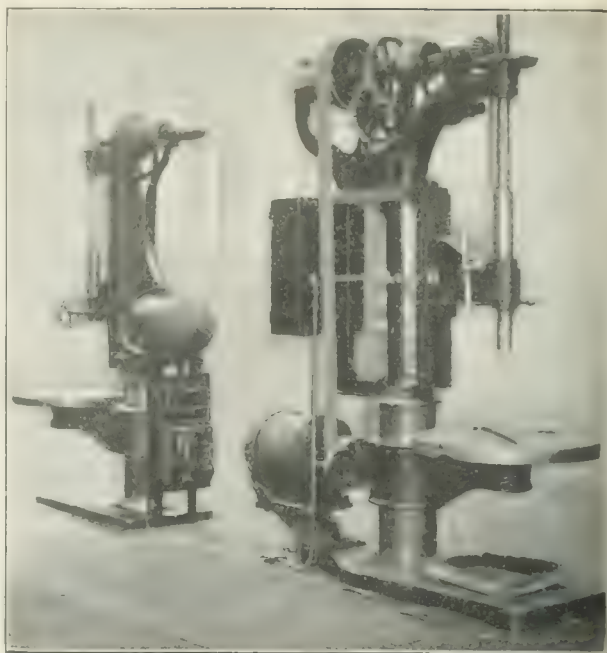


Fig. 2 Two of a Group of Upright Radial Drills.

back gear. On such machines it is necessary to use either a wide range adjustable speed motor or to provide a number of additional changes if one of medium range is selected. After a careful investigation of the different types of motors that could be used, the Reliance adjustable speed motor of the armature shifting type, which is practically the same as the Lincoln motor which was illustrated in *The Iron Age* March 1, 1906, was chosen.

As illustrated in Fig. 1 the lathes offer an example of the methods employed in making the changes. The cone pulley is replaced by a quill, as shown in the engraving, and the motor drives direct to this quill through an intermediate idler shaft which gives a double reduction. This shaft can be supported either from the head casting, as is the case in the lathe illustrated, or from a suitable boss on the vertical arm of the motor end yoke. For these idlers a stationary stub shaft is used, and the two idlers are mounted on a common bushing. The push button control is shown at A. In this particular instance the back gear ratio of the belt driven machine was 1 to 10, which was changed to 1 to 6, with a motor having a speed ratio of the same proportion. In this way a continuous range of spindle speeds having a ratio of from 1 to 36 was secured. If a motor having only half as great a speed ratio was used, an additional gear change would have to be provided, as otherwise there would be a difference of over 300 per cent. between the range of spindle speeds obtained with the back gear in and those obtained with it out. By using a motor having this speed ratio in connection with the back gear ratio of 1 to 6, a continuous range of spindle speeds was obtained without any gap. This change was made very easily, as all that had to be done was to change the diameter of the two tail gears without making any change in the face gears or the locking device between the large face gear and the quill. In changing these two tail gears they were moved to the front of the tool as shown, thus allowing the motor to be set low over the head.

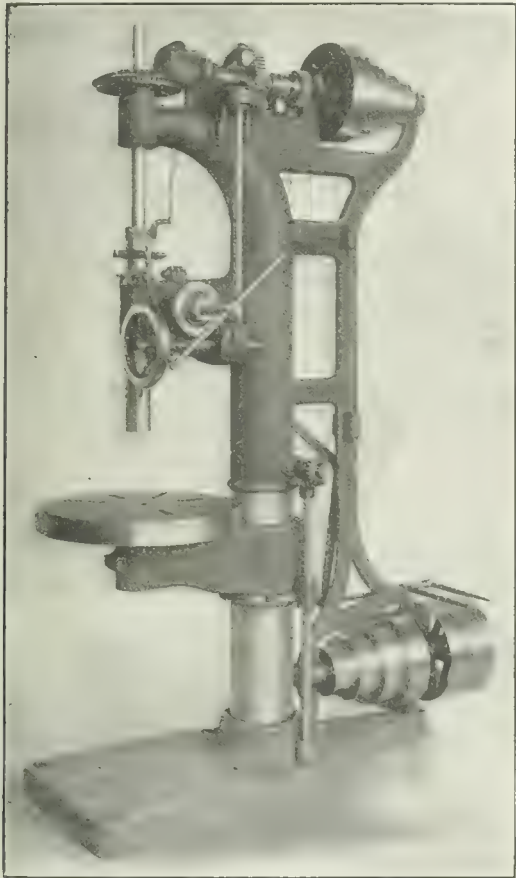
The way in which the drill presses were changed is illustrated in Fig. 2, as well as the manner of running the conduit and the use of an occasional casting to support the motors. In making these changes the lower cone pulley was removed and the motor mounted in its place on a casting or a strap iron bracket. In this way no more floor space is required than with the belt driven machine. The motor is connected to one of the steps of the upper driving cone pulley by a belt, and when additional power is needed this cone pulley can be replaced by a wide face single pulley giving, if necessary, double the belt capacity of the ordinary cone drive, and comparing favorably with an all-gear driven drill. In this

case motors having a speed range of 1 to 6 r.p.m. also employed and are controlled by the push buttons on the column, as at B.

In making these changes 48 machines in the machine shop were changed from belt to motor drive and 22 new motor driven machines added. In the woodworking shop 56 machines in all, including 23 practically new ones, were changed to the motor drive.

The Sibley 24-In. Stationary Head Drilling Machine

A recent product of the Sibley Machine Tool Company, South Bend, Ind., is a 24-in. stationary head drilling machine with geared feed. Its distinguishing fea-



The New 24 In. Stationary Head Drilling Machine Built by the Sibley Machine Tool Company, South Bend, Ind.

tures are the solid, compact design and the extreme simplicity of its construction. As compared with some other tools made by this company the hight, 82½ in., is considerably less, although the range of work and the feeds and the speeds are the same.

The power for the geared feed mechanism is transmitted from the top driving shaft, and all of the gearing in the train is completely inclosed and runs in an oil bath. Four feed changes ranging from 0.007 to 0.02 in. per revolution of the spindle are available, and, together with the neutral position in which none of the feeds are engaged, are secured by moving a small knob in the center of the hand wheel. An automatic stop collar on the spindle sleeve trips a latch when the hole has been drilled to the desired depth, and when this stop operates the worm is taken out of engagement with the worm gear operating the feed.

The following table gives the principal dimensions and specifications of the drill:

Overall hight, inches	82½
Maximum distance between spindle and base, inches	42½
Maximum distance between spindle and table, inches	27
Traverse of table on column, inches	16
Diameter of table, inches	21
Diameter of column, inches	7
Diameter of spindle, inches	1¼

Diameter of spindle sleeve, inches	2¼
Travel of spindle, inches	9
Morse taper of spindle	No. 4
Ratio of bevel gears	2 to 1
Ratio of back gears	4½ to 1
Number of spindle feeds	4
Minimum feed per revolution of spindle, inches	0.007
Maximum feed per revolution of spindle, inches	0.02
Diameter of driving pulleys, inches	12½
Number of cone pulley steps	2
Diameter of large cone pulley step, inches	11½
Diameter of small cone pulley step, inches	5½
Face width of cone pulley steps, inches	2½
Speed of countershaft, revolutions per minute	300
Minimum spindle speed, revolutions per minute	16
Maximum spindle speed, revolutions per minute	315
Floor space required, inches	55½ x 19½
Net weight of machines, pounds	1,400

The rigidity of the tool and the geared feeds adapt it for modern manufacturing where heavy cuts have to be taken, and the results obtained from the severe tests given this type of feed by the builder has led the company to adopt it for its entire line of drills, with the exception of the 20 and the 22½ in. sizes.

Steel Corporation Construction in the Birmingham District

Advices from Birmingham, Ala., are that about two-thirds of the men who were recently thrown out of employment by the completion of parts of the construction work on the new plant of the American Steel & Wire Company at Corey and by the stoppage of work on other parts have been re-employed. The tariff phases of the incident have been discussed pro and con in the Birmingham newspapers following the pronouncement of Congressman Underwood on the floor of the House at Washington. Chairman E. H. Gary of the United States Steel Corporation has issued the following statement:

The subsidiary companies of the United States Steel Corporation have been working upon a plan for the expenditure of large sums for extensions and new buildings and equipment at Birmingham. A large part of the buildings has been constructed, and they will be promptly completed. In fact, the work could not be interrupted without serious detriment. This includes a large reservoir and water plant and a large number of by-product coke ovens for the Tennessee Coal, Iron & Railroad Company, and also includes a large wire plant for the manufacture, among other things, of wire products by the American Steel & Wire Company. It was intended to erect a large number of residences for occupancy by the men to be employed, and it was also intended to install expensive machinery.

It has seemed to the officials of the Steel Corporation that House Bill No. 4413, reported by the Committee on Ways and Means to the House of Representatives, if it should become a law, would seriously affect the manufacture and sale of some wire products in the Birmingham district because of the low cost of production of these articles in foreign countries, and the low rate of transportation in returning ships. Therefore, local officials were advised to suspend or postpone consideration of the question of making contracts for residences or for extensions or equipment of the mill's until after the whole subject matter could be carefully considered. The advices seem to have been misinterpreted to some extent and all or much of the work on the buildings in progress of construction was interrupted. Upon learning this fact, the local officials were advised of the real intention of those in authority, as above stated, and work was thereupon resumed. As to exactly what uses the wire buildings will be put to cannot be definitely or certainly stated at this time, but it is believed they will eventually be utilized for some lines of steel manufacture.

There has been no intention or effort to influence or antagonize legislation. We present our views and reasons when asked, but submit without question to the decision of those who are responsible for legislation and its results. We have a good opinion of the Birmingham properties and hope in time to operate them at a reasonable profit. Our action, however, has been and will be based on what we consider sound business principles.

A large steel works will be built by the Krupps in Upper Silesia and negotiations are reported to be under way for a reduction in freight rates on products intended for the Russian, Austrian and Balkan States markets. Two railroads traverse the district in which the new site has been chosen.

No. 1 Paxton furnace of the Central Iron & Steel Company, Harrisburg, Pa., was blown out April 22 and will be relined.

The Davis Cast Steel Car Wheel

The conditions in railroad service which have brought forward the steel car wheel have been referred to in these columns from time to time. As is well known, different opinions have been advanced as to the type of wheel which will best meet the requirements of present day service—wheels which will not only have sufficient strength to carry the loads now put upon them, but that

a blank gear pattern. In these it was discovered that by adding ferromanganese to the molten steel when it was poured a casting of any desired degree of hardness could be produced. The problem was, however, to get the necessary hardness in the casting, where it was wanted, and at the same time leave the central part soft enough to be machined. This was finally solved by re-



Fig. 1. Making the Molds for the Davis Steel Wheel



Fig. 2. Molds Ready for Filling.

will meet the conditions resulting from high speeds. The American Steel Foundries has developed the Davis one wear cast steel wheel to meet the demand for a wheel for freight service having the strength of the steel tired wheel and the wearing qualities of the chilled cast iron wheel. It is the invention of J. C. Davis, assistant to the first vice-president of the American Steel Foundries.

The investigations which led to Mr. Davis' invention date back 10 years, when the inventor was on a train which was derailed by a broken flange of a cast iron wheel. Chemical and microscopic examination revealed sulphur segregation at the point of failure. The first experiments looking to the new development were with

volving the mold at the time of filling and introducing the ferromanganese in such a way that it would affect only the outer portion of the wheel. Thereupon special apparatus and molds suitable for full-sized wheels were prepared and the experiments continued on a more elaborate scale with proper safeguards at each step. From the thousands of tests thus made a standard was developed for each process involved. The tests at the foundry were supplemented by results from test wheels put in service on various railroads under heavy tender equipment, where the largest mileage would be obtained in the shortest time.

While minute data covering the various steps in the process of manufacture are not supplied, the successive



Fig. 3. The Mold on the Revolving Table During Pouring.

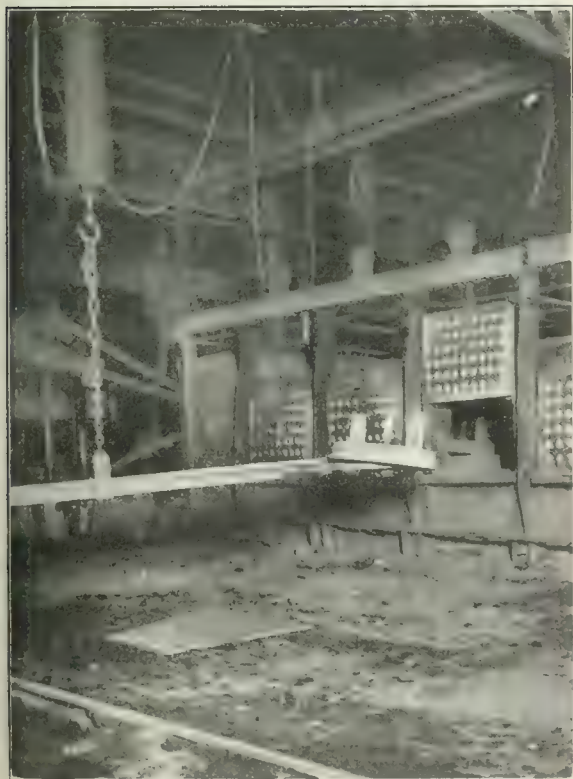


Fig. 4.—Charging Into the Annealing Furnace.

operations are represented in a general way in the illustrations, Figs. 1 to 8. Formulas have been made for every step from the melting of the material in the furnace to the final machining of the wheel. The methods of determining and controlling temperatures are such as eliminate dependence on human agency and insure uniformity in results. The molds are dried in ovens, the temperature of which is regulated by the use of special pyrometers. The pouring of the molds is an operation of particular interest. When ready for filling they are mounted on tables, which are made to revolve as the

molten metal is being poured into them. The first metal to enter the mold is treated with ferromanganese, introduced by compressed air as the metal passes from the ladle to the mold. The steel thus treated is followed up immediately by soft steel, which forms the plate and hub of the wheel. The revolution of the mold makes it possible to produce regularly in an integral wheel a manganese steel tread and flange with a soft steel hub. The manganese, being heavier than steel, is drawn by the

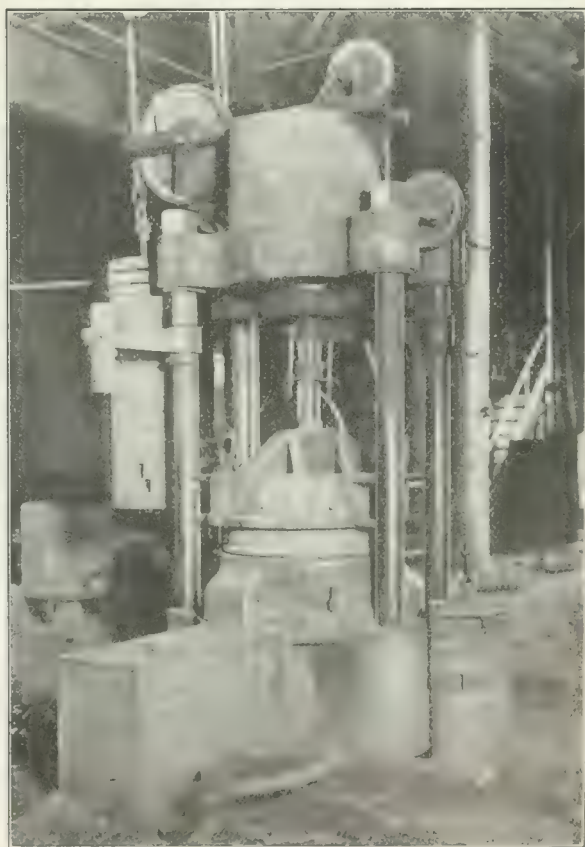


Fig. 5.—Hydraulic Straightening Press.

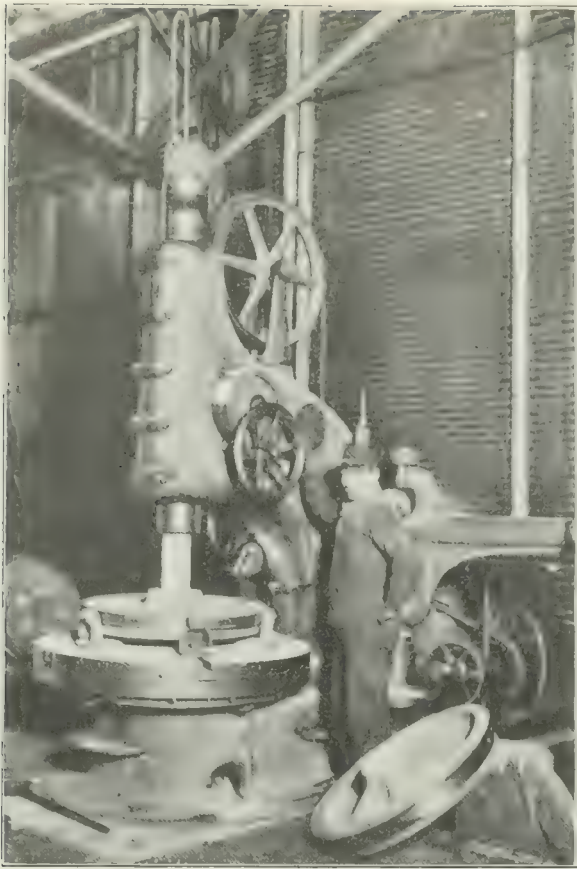


Fig. 6.—Rough Boring.

centrifugal motion to the outer parts of the mold.

The flasks, as the molds are being prepared, stand on tables consisting of parallel beams, as shown in Fig. 1, this arrangement facilitating the handling. The molds are set by cranes in the pit in which they are poured, two molds being in place in the pit at one time. While one is being poured the other is removed by an independent hoist and an empty mold set in its place. The steel from the open hearth furnaces is tapped into a 25-ton ladle, which is carried to the pit by a traveling crane. The steel is poured from the bottom of the ladle,

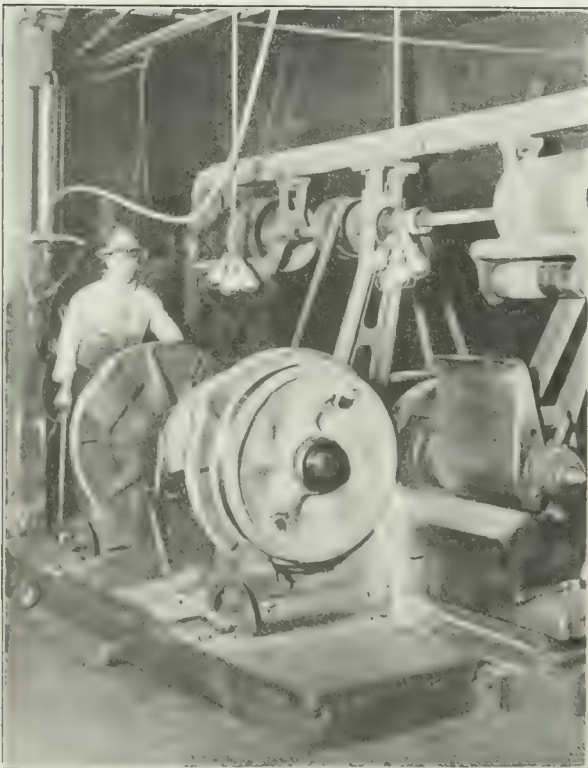


Fig. 7.—Grinding the Tread and Flange.

the flow of metal being regulated by a cone-shaped cup carried by a truck running on tracks laid across the pit, as shown in Fig. 3. As the molds are poured three cranes are in use. One carries the ladle, and on either side a crane takes out a flask that has been poured or puts in one ready for the next pouring.

On their removal from the molds the wheels are given an annealing, the temperature being regulated by a pyrometer. The object of this treatment is to secure a fine molecular structure and eliminate internal strains. From the annealing furnaces the wheels are taken first to a hydraulic straightening press, then to a boring mill where the wheel fit is accurately rough bored to within $\frac{1}{8}$ in. of the finished size. It then passes to a grinding machine where the tread and the throat of the flange are ground. The machines are arranged for grinding two wheels at the same time. The grinding operation gives a polished surface, and makes the wheels as nearly circular as possible, so that the chance of uneven wear in service is reduced to a minimum. Following the grinding the wheels are again heated and water tempered,

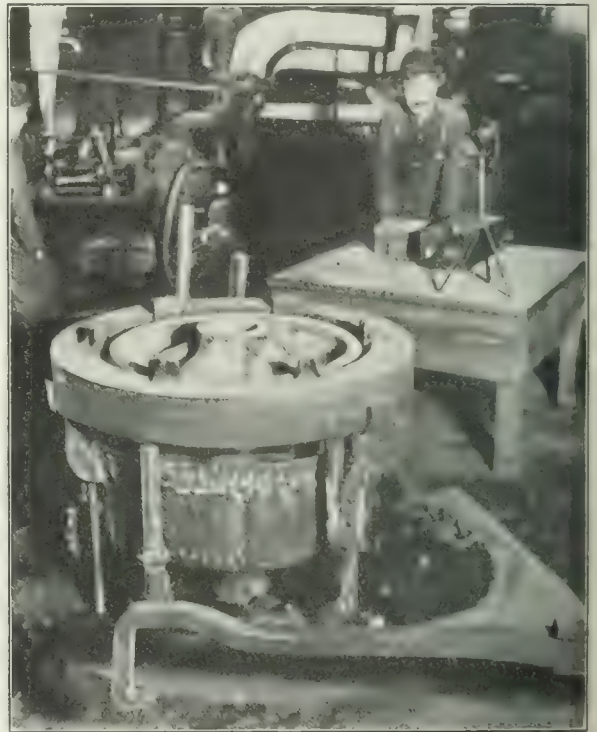


Fig. 8.—Water Toughening.

this operation giving a denser metal in the rim of the wheel and imparting toughness.

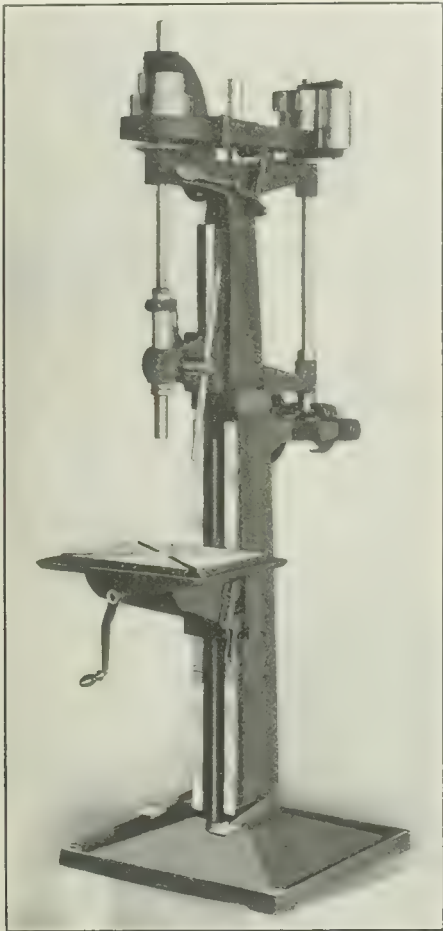
The usual custom in the commercial handling of car wheels is followed with the Davis steel wheel. When the full mileage has been made the wheel is applied on the purchase of a new one at scrap value. There is the difference that with the one wear steel wheel the question of temporary loss from service when a multiple mileage wheel is in the shop to be brought back to contour is eliminated, as well as the cost of handling, turning, loss of metal turned off, &c. There is the additional claim of the maintenance of the standard car and coupler bights, with the slight variation in diameter of the Davis wheel throughout its life. The standard 33-in. wheel recommended for heavy freight and tender service weighs 600 lb., so that for a car the total weight is nearly 1000 lb. less than that in the case of cast iron wheels and from 1200 to 1600 lb. less than for multiple mileage steel wheels.

The Brown Hoisting Machinery Company, Cleveland, Ohio, has received a contract from the Didier-Marsh Company of New York for a bridge and transfer car for the coke plant of the Bethlehem Steel Company, South Bethlehem, Pa. The same company has recently received an order from the Pittsburgh Coal Company for a bridge to be erected at Duluth.

The New Reed High Speed Sensitive Drills

A substantial and very convenient drilling machine has been developed by the Francis Reed Company, Worcester, Mass. In designing the tool, which is of the straight line box type, the proper distribution of metal and provision to withstand stress in use have received considerable attention. These drills are built with one, two, three or four spindles, the first being the type illustrated, and their special features are the shifting mechanisms for the cone pulley and the line shaft belts, the belt tightening device, rigid construction and a centralized control.

A lever at the right of the machine having a vertical movement shifts the cone pulley belts through belt eyes near either pulley. A free movement without causing a



The New Single Spindle High Speed Sensitive Drilling Machine
Built by the Francis Reed Company, Worcester, Mass.

severe strain on the belt is possible, as the lever is flexible, and any desired speed is instantly obtained by a slight movement of it. The device for shifting the line shaft belt is novel and consists of two pedals located one on either side of the column at the base of the machine. A slight pressure applied to either of them starts the machine, while continuous pressure stops it. The belt tightener swivels around the vertical back shaft and in addition to increasing the belt tension also changes the lap with a corresponding addition to the amount of power transmitted. A hand wheel operates the belt tightener through a rack and pinion on the left side of the machine. The cone pulley belt shifter is interlocked with the mechanism for tightening the belt and the initial movement of the former releases the belt tightener, so that when the belt is shifted it is not under tension.

An endless heavy leather belt is furnished for each spindle, which is bored to correspond to the Morse No. 3 taper to accommodate drills to the maximum capacity of the machine. A heavy top support is provided for the spindle cone pulley, which relieves the spindle of all strain. All the shafts are turned and ground so as to run true and smooth and are mounted in large bronze

boxes which can be renewed at a slight cost when necessary.

A test recently made of the single spindle machine will serve to give some idea of the rigidity of the line. Although this machine weighs only about 480 lb., a 1-in. high speed drill was driven through a piece of cast iron 1 in. thick in 5 sec., while an ordinary drill of the same size was sent through a similar piece of iron in 8 sec.

The following table gives the principal dimensions and specifications of the single spindle drill:

Diameter of spindle in cone pulley, inches	1 1/4
Diameter of spindle in quill, inches	1
Diameter of spindle quill, inches	1 1/4
Length of spindle quill, inches	8
Vertical movement of spindle, inches	6 1/2
Vertical movement of head, inches	9 1/2
Vertical movement of table, inches	30
Size of table, inches	12 x 16
Maximum distance between spindle and table, inches	36
Maximum size of drill handled, inches	1
Morse taper in spindle	No. 3
Diameter of tight and loose pulleys, inches	8
Face width of tight and loose pulleys, inches	3
Number of cone pulley steps	3
Diameter of smallest cone pulley step, inches	4 1/4
Diameter of largest cone pulley step, inches	7 1/16
Width of spindle cone pulley belt, inches	2
Width of countershaft belt, inches	3
Length of top belt, inches	34
Diameter of back shaft, inches	1 1/16
Length of rear bearings, inches	3
Speed of countershaft, revolutions per minute	750
Number of spindle speeds	3
Minimum spindle speed, revolutions per minute	450
Maximum spindle speed, revolutions per minute	1,250
Overall height, inches	90
Floor space required, inches	25 x 37
Weight, pounds	480

In designing this machine accessibility and convenience were made prominent features. The handles for tightening the table, the table elevating crank, the shifter handles for the cone pulley and the line shaft belts and the belt tightener are all operated from the front of the machine, and all movements and adjustments are arranged so as to be within easy reach of the operator when standing in front of the machine.

The Machine Tool Builders' Convention

In addition to the details given on page 884 of *The Iron Age* of April 13, the following will be features of the programme of the semiannual convention of the National Machine Tool Builders' Association, to be held at Atlantic City, N. J., Thursday and Friday, May 18 and 19: The Membership Committee's report will be presented by C. A. Hoefer, chairman; Patents, C. L. Taylor; Revision of Constitution, A. H. Tuechter; Preparing List of Machine Tool Users, E. B. Bullard, Jr.; Cancellation of Orders, C. Wood Walter; Incorporation, Rufus King; Delegates to Merchant Marine Congress, George J. Burns and P. G. March; Definition of Machine Tools, Fred L. Eberhardt. Alexander Taylor, works manager of the Westinghouse Electric & Mfg. Company, Pittsburgh, will deliver an address on "Department Plan of Machine Tool Arrangement on the Basis of Equipment," in addition to the addresses by speakers previously announced.

Railroad Equipment Orders.—The Southern Railway has ordered 65 coaches, baggage and postal cars. The Seaboard Air Line is in the market for 30 caboose cars in addition to the 1000 box and 200 phosphate cars already mentioned. The New York Central Lines are building 1000 refrigerator cars at East Rochester, N. Y. J. G. White & Co., New York, are in the market for 50 steel underframe box cars for Cuba. The Illinois Central is reported in the market for 94 all-steel passenger cars. The Louisville & Nashville has ordered 500 freight cars built at its shops in New Decatur, Ala. The Western Maryland has ordered 500 steel hopper cars from the Standard Steel Car Company. The Chicago & Northwestern has ordered 30 locomotives. The Southern Railway has ordered 50 freight, 23 switching and 20 passenger locomotives from the Baldwin, Lima and American companies, respectively.

The Baily Electric Furnace*

An Electric Furnace for Heating Bars and Billets

BY THIADDEUS F. BAILY, ALLIANCE, OHIO.

The possibility of an electric furnace for heating metal without melting was suggested to the writer some years ago on noting the very wasteful and thermally inefficient oil fired furnaces for heating forging stock in a comparatively modern plant in northern Ohio. A calculation of the thermal efficiency of the furnaces in question, which were said to be of the most modern construction, showed

Taking even a case where the least efficient of the modern prime movers, the noncondensing steam engine, was used for generating power, allowing a net thermal efficiency of 5 per cent. for converting the heat value of the coal into electrical energy and assuming a furnace efficiency of 40 per cent., the net overall efficiency for the entire heating equipment would be 2 per cent. The

fuel for creating the steam, however, would cost only one-third as much per heat unit as would the fuel oil for oil furnaces. The commercial efficiency, then, as far as cost of fuel alone was concerned, would be 33 1-3 per cent. in favor of the electric equipment, in spite of the low efficiency of the steam engine. Considering steam engine low pressure turbine units or gas engine driven units in place of the steam engine unit, above considered, the probable efficiencies of electric furnace equipments seemed favorable enough to deserve a place in the industry, while in plants where there was a large supply of exhaust steam available, as is the case in the majority of forge plants, electric energy could be so cheaply produced by the low pressure turbine that no direct fired furnaces could compete with such equipment in cost of heating. The only question then seemed to be whether an electric heating furnace could be designed to successfully heat metal at thermal efficiencies above a given limit.

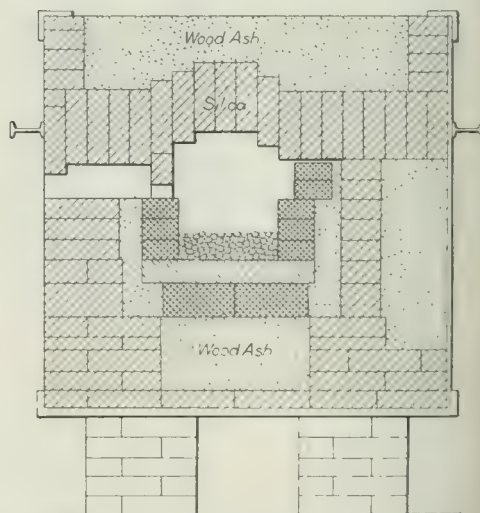
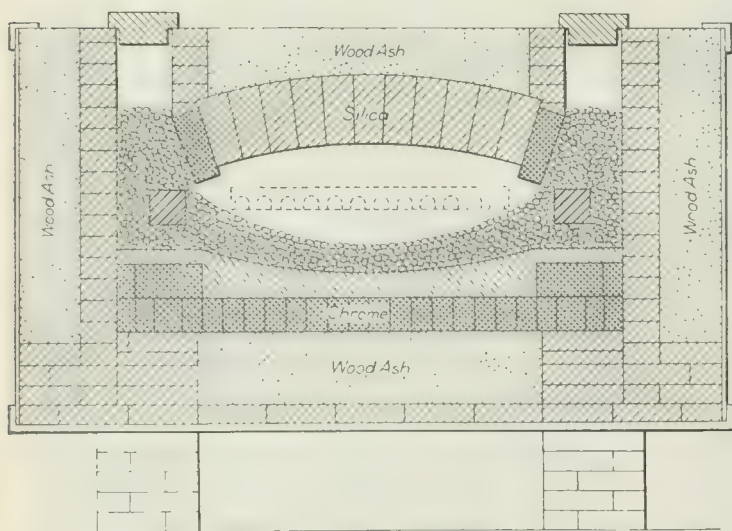
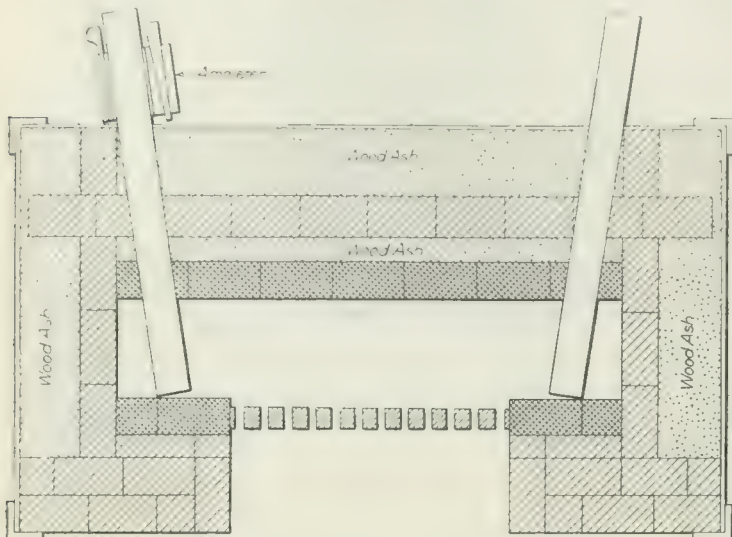


Fig. 1. Horizontal and Front and Side Vertical Elevations of the Baily Electric Bar and Billet Heating Furnace Built by the Electric Furnace Company, Alliance, Ohio.

that less than 4 per cent. of the heat value of the fuel was delivered into the steel. The technical press and various publications at the time contained a number of descriptions and tests of electric furnaces then in use in the chemical industry and also of furnaces for melting and refining steel. The thermal efficiency of these furnaces was given at from 40 to 80 per cent., and it was at once apparent that if a thermal efficiency of even 40 per cent. could be realized in a furnace for heating stock such as was heated in oil furnaces at a thermal efficiency of only 4 per cent., that a considerable loss could be allowed in the means for converting the heat value of any fuel into electrical energy for use in electric heating furnaces and still effect a saving.

The greatest difficulties encountered in the operation of the first experimental furnaces were due largely to lack of sufficient electric current and control devices. Suitable equipment was, however, obtained by installing the 120-kw. generator and transformer equipment, mentioned later, at the plant of the Transue & Williams Company, Alliance, Ohio, which company generously supplied the power for driving the generator from its gas engine for all the runs on the furnace.

Description of the Furnace

The following is a description of the furnace evolved out of the experiments commenced over four years ago. Reference may be had to Fig. 1, which gives sectional front and side elevations and a sectional plan of the furnace.

* From a paper presented before the American Electrochemical Society, in New York City, April 6 1911.



Fig. 2.—The Baily Electric Furnace Ready for Charging.

The furnace is of the resistance type and consists essentially of two carbon electrodes separated from each other and an intermediate resistance body of a carbonaceous composition in which the heat is generated. In the space directly above the resistance material and directly under the roof of the furnace is placed the metal to be heated, a ledge at the rear of the furnace and one at the opening sup-

porting the bars or billets, as the case may be. The electrodes enter the furnace through the rear wall and are placed slightly convergent, so that the path of the electric current will be shorter from electrode to electrode at the front of the furnace than at the back. This arrangement compensates for the cooling effect which is greater in the front of the furnace on account of the opening and the charging of the cold material. The electrodes entering the furnace from the rear present comparatively large contact surfaces to the resistance material without the use of

special electrode sections. The electrodes are also placed in a plane above the resistance material, which throws the shortest path for the electric current in the upper part of the resistance body and nearest the metal. This is a feature that seems almost indispensable in the successful operation of a furnace of this character, as in the furnaces constructed without this feature the cooling of the upper part of the resistance body by the cold steel caused the electric current to take a lower path, in which portion of the body the temperature became very high and melted out the bottom linings and the bottom of the furnace itself, and at the same time would not maintain the

heating chamber at a temperature high enough to heat the metal.

The resistance material is composed of coke or coal. Crushed foundry coke passing over a $\frac{1}{4}$ -in. mesh and through a $\frac{3}{8}$ -in mesh screen gives the most satisfactory and uniform results. For a 40-kw. furnace heating 150 lb. of metal per hour the distance between electrodes should be 36 in. and the cross sectional area about 24 sq. in. To maintain an electrical input of 40 kw. a voltage of 200 would be required with a coke resistance body; if the body be composed of coal the voltage should be about 150. It is extremely difficult to

determine the effective cross sectional area of the material through which the electric current passes, as at working temperatures the lining materials become almost as good conductors of electricity as the resistance material itself. The resistance body as it approaches the electrodes has a greatly increased cross section, so as to provide a better contact with the electrodes, prevent undue heating at

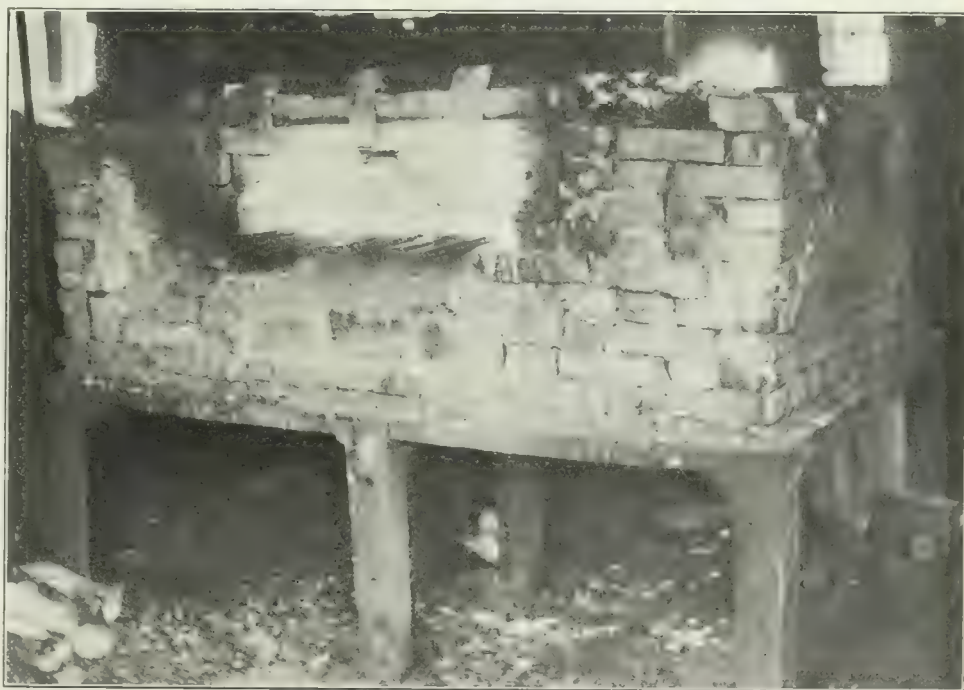


Fig. 3.—The Furnace in Action Heating Eight 12 x 36 In. Bars

the point of contact and prevent, as much as possible, the dissipation of heat through resistance to the passage of the current except at that part of the resistance body directly under the metal. Thus in a way these increased cross sections perform the mission of electrodes as they conduct the current from the electrodes proper, which are located in a protected part of the furnace, to the part where the transformation into heat is desired, and they do this without much heat being generated in these portions themselves.

The most serviceable lining material so far obtained is made of chrome brick and chrome ore, and while a

certain reducing action takes place between the chrome ore and brick and the carbon of the resistance material it is not of such nature as to seriously impair its usefulness as a lining material. This chrome lining is carried up to at least one course above the resistance material. The lining is readily accessible for repairs or inspection by removing the three courses of silica brick directly under the furnace opening.

The top of the furnace is of silica arch brick, 9 in. thick, and clamped from front to back. A row of chrome arch brick at each side of the roof prevents contact of the silica brick with the carbon in the hoppers above the electrodes.

The sides of the furnace are of silica brick and in the larger furnaces are incased in a sheet steel frame. Insulating material is placed between the silica brick and the casing.

The furnace base is a heavy cast iron plate supported by cast iron legs or brick piers.

The cable terminals are connected with the electrodes by iron sleeves, copper straps and iron wedges. In making the connection the iron sleeve is placed over the end of the electrode and copper straps placed against the four sides of the electrode. The copper cable terminal is then placed between one of the copper strips and the iron sleeve and wedges are driven in on the opposite side between the strap and sleeve to give a firm contact. Wedges are then driven in on the other two sides between the copper strips and the sleeve. In this way the current flow is equally distributed on all four sides of the electrode by the encircling iron sleeve.

The Electric Control

The furnace is controlled by a regulating transformer and controller. The transformer gives its full rated output at the lowest voltage rating. While hand regulation is usually provided, the regulation may be made automatic at a slight additional cost. A voltage range of from 33 1-3 to 50 per cent. is usually provided, depending on the operating and starting requirements.

Each furnace is provided with a single panel switchboard, having mounted on it a voltmeter, ammeter, watt-hour meter, circuit breaker and oil switch. The voltmeter and ammeter indicate at all times the conditions on the interior of the furnace, as irregularities are readily noticeable on the instruments. The watt-hour meter enables accurate data to be kept on the current consumption for heating any particular class of work.

Lining Renewals

The temperatures that may be obtained are limited solely by the electrical input and the temperatures allowable by the refractory linings of the furnace. The temperature usually maintained in a furnace for the rapid heating of stock for automobile forgings is such as to cause the fusion of the ends of the silica brick forming the roof and is probably not less than 3200 degrees F.; the resistance material, of course, reaches a much higher temperature. When working at the highest temperatures usually met in forge practice a renewal of the lining of the bottom of the furnace will be required every two or three weeks.

The replacing of the lining or portions of it and the replenishing of the resistance material are the only items that may be classed as renewals and should not exceed, in furnaces heating 150 lb. of metal per hour working at the highest temperatures, an average of 20 cents per day for lining material and 5 cents per day for resistance material.

Advantages of the Electric Furnace

The metal being heated is maintained in a reducing atmosphere, the high temperature carbon resistance material giving off a gas of a reducing nature. The electric furnace is the only furnace built in small units in which both a high temperature and a reducing atmosphere may be maintained. The saving in oxidation loss is very considerable in small furnaces of this character, as the oxidation in the usual combustion furnaces is the cause of the loss of a large number of forgings due to the fact

that the stock loses volume and does not contain enough metal to fill the dies.

The thermal efficiency of the furnaces varies with the size, the percentage of operation at full capacity and the ruling temperature required. Efficiencies of from 33 to 65 per cent. may be expected in furnaces with heating capacities of from 120 to 1000 lb. per hour.

Tests of the Equipment

At the plant of the Transue & Williams Company the power for driving the generator was supplied by a 12 x 16 in. Buckeye four-cylinder twin single acting gas engine, which also drove the generator for supplying current to part of the motors in the machine shop, so that only part of the time was sufficient power available for furnace operation. Belted to the flywheel of the gas engine was a 120-kw. two-phase 440-volt revolving field alternator, only one phase of which was connected up. The leads from this phase were connected with the low tension terminals of a 37½-kw. 440-2200-volt transformer. The current was then stepped down by a 2200 220 or 110 volt transformer. The coils on the low tension side were connected through a double throw switch for either series or parallel operation, so that a normal voltage of either 110 or 220 could be obtained. The variations between 110 and 220 volts on the lower voltage and also on the voltages above 220 were obtained by varying the field of the alternator. By this arrangement a possible range could be obtained of from 90 to 300 volts, which was more than ample for conditions of operation. Inability to readily obtain a 2200-volt generator of proper size accounted for the use of the 440-2200-volt step-up transformer. From the double throw switch the current was conducted to the furnace located in the forge shop, some 75 ft. distant.

The instruments mounted on the switchboard consisted of a 150-volt voltmeter and a 600-ampere ammeter, both made by the Westinghouse Electric & Mfg. Company. The voltmeter was so connected that when the low tension coils of the step-down transformer were thrown in parallel the instrument gave a direct reading and when in series the indicated voltage was half the actual voltage.

The furnace was constructed substantially as already described, except that air spaces were used in place of the insulating material shown in Fig. 1, and the furnace was rated as a 40-kw. unit, having a heating capacity of 120 lb. per hour. The heating capacity was rated somewhat lower than the usual practice on account of the high temperature required. Fig. 2 shows the furnace ready for charging and Fig. 3 shows it heating eight 1½ x ¾ in. bars.

The electrodes were 4 x 4 x 48 in. long, composed of carbon, and were spaced 36 in. from each other. The cross sectional area of the resistance material was approximately 24 sq. in. The walls were composed of 9 in. of silica brick and were of rather loose construction, owing to the numerous changes that were made and to the jar from the hammers in the plant. The runs on the furnace were made under rather unfavorable conditions, as the forgings that were made under the hammer which the furnace supplied were very difficult to make and unless the metal was very hot would not fill out in the dies. Much delay was also caused by trouble with both the hammer and the dies. Any such delays affected, of course, the amount of metal heated in the furnace.

The stock heated included 1¼ in. square, 1½ x ¾ in. flat, 1½ and ¾ in. round bars, in length from 22½ in. to 6 ft. Pieces 4 to 12 in. long were cut off at each heating and the bars replaced in the furnace. From seven to nine bars were heated at a time.

The current consumption was taken over periods of nine hours when heating the heavier of the above mentioned stock, and it was found that from 3 to 3 1-3 lb. of metal were heated per kilowatt-hour.

A voltage of 250 was usually used in starting the furnace in the morning, and from one to two hours was required to bring the furnace up to temperature. The voltage was then reduced to about 200 volts when using a coke resistance body or 150 volts for a coal body, which

tensions enabled the required electric input to be maintained.

Some of the various linings used before the chrome lining was selected were magnesia, carborundum and silica. The chrome lining, however, gave by far the most satisfactory and uniform service, lasting three weeks without renewal or repair. As only the bottom lining is subjected to very high temperature, it is practically the only part requiring renewal, and as the usual bridge wall used in oil furnaces is not required, that saving compensates for the cost of renewals of the lining of the electric furnace.

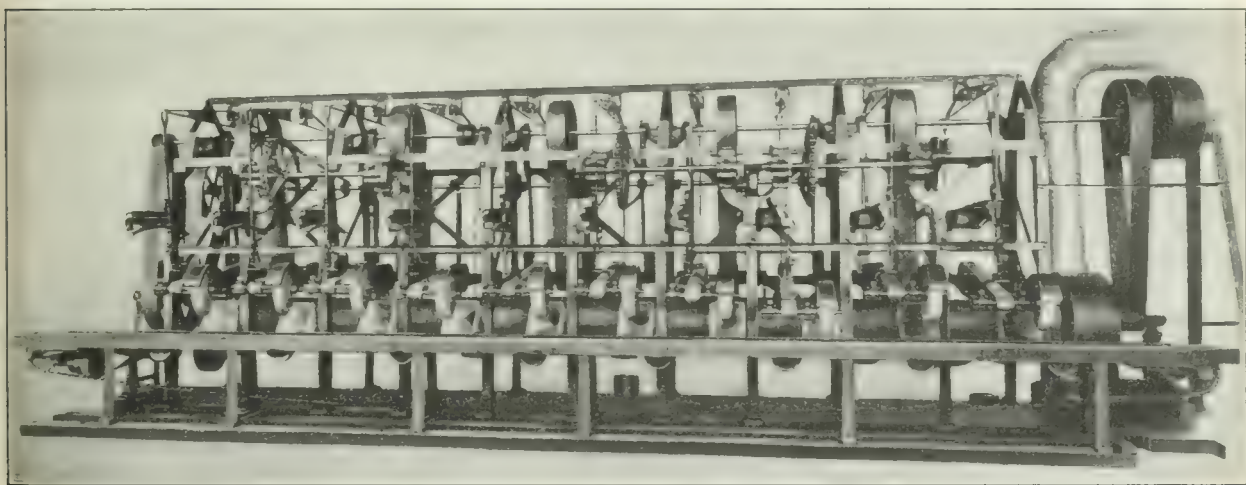
The principal advantages of this electric furnace are its high thermal efficiency, its nonoxidizing atmosphere in the furnace chamber at all temperatures and its freedom from soot, smoke and the hot contaminating gases of the products of combustion.

The Robinson Automatic Polishing Machine

An automatic polisher that is claimed to effect a saving of from 50 to 80 per cent. in expense and labor and will produce absolutely uniform polished surfaces by one pass through the machine is being manufactured

driven by a worm gear. The work is moved longitudinally on the carriage at an average speed of 1 ft. per minute, a 50 per cent. speed variation being provided by a three-step cone pulley connected to the worm gear. The polishing wheels are driven at a speed of 1850 rev. per min. by leather belting. The power required is $1\frac{1}{2}$ hp. for each wheel. The entire machine can be operated by belt or chain drive or a direct connected electric motor. The largest or 12-arm machine is 8 ft. wide, 9 ft. high and 34 ft. long.

The polishing wheels are 12 and 14 in. in diameter and are made of glued cotton sections, similar to those used by hand polishers. The first wheel on which the work starts is usually covered with emery cloth to remove the scale, and the last one is a leather finishing wheel of the regular type. Four different grades of abrasives are generally used. All bearings are babbitted and are readily accessible for rebabbiting. As shown in the engraving the machine is equipped with a blower having an opening at the back of each wheel to carry away the dust. The blower is located in the rear at the right end and is belt driven from the main shaft. A set of follow boards or carriages for the work to be polished can be made by a carpenter at a trifling cost. As compared with hand labor it is claimed that the use



An Automatic Machine for Polishing Large Surfaces Made by the Robinson Automatic Machine Company, Detroit, Mich.

by the Robinson Automatic Machine Company, Detroit, Mich. This machine is designed particularly for polishing stove plates and other large surfaces, and for that reason is of particular interest to large stove foundries, but it is claimed that it can be used just as successfully in polishing any surfaces that are free from abrupt angles. The polisher is rigid and simple in construction and easy to operate, one man being able to operate one of the largest size machines.

In operation the work is moved slowly in a longitudinal direction along a carriage operated by an endless chain, and the surface is polished by wheels resting on the work, which in addition to their rapid rotary motion, move backward and forward across the work, each wheel doing its share in polishing the entire surface. The machine is made in 6, 8, 10 and 12 wheel sizes, the 10-wheel type being the one illustrated, and will accommodate work up to 36 in. in width and any length.

The machine is compact, being self-contained in a steel frame, and the entire mechanism is centered in the main shaft that runs the length of the machine. This shaft transmits power to an oscillating countershaft that drives the polishing wheels directly. Crank shafts driven by link belts provide the oscillating motion for the polishing wheels and the table feed, the link belts connecting the crank shafts with a countershaft just back of the main shaft. The cross motion is regulated by an adjustable crank that allows an adjustment of from zero to 36 in. The polishing wheels are held in position by a guide, which is counterbalanced on a walking beam with a knife edge. After the wheels are placed on the machine and the proper adjustment made, no further attention is required. The sprocket wheels operating the endless chain that provides the longitudinal motion are

of the machine results in a saving of 80 per cent. in polishing stove plates and 50 to 60 per cent. on other work.

The Story of a Grain of Iron.—James Gayley has recently published a unique booklet entitled "The Story of a Grain of Iron." Little Grain and Oxygen, who are the hero and heroine, "lived deep down in the darkness of the earth surrounded by rich, warm Jasper between two immense strata of Rock." The reader is told how they were separated by the machinations of the Earth Gods, who used Coal to accomplish that end. The transportation of ore and coal and the operations of the blast furnace and the converter are dealt with in the language of fancy, Little Grain finally coming to rest in a steel rail. The denouement is the reuniting of Little Grain and Oxygen by the help of Water, in accord with the inexorable law of the Iron people. The conceit is most ingeniously worked out in a way that gives a new light on the imaginative possibilities of metallurgical science. The story is somewhat longer than Mr. Gayley's well-known comparison of the operations of the blast furnace with those of the human system, which is recalled by his latest excursion into literature.

The Joseph Dixon Crucible Company, Jersey City, N. J., has just published a neat folder entitled "Maintenance Painting for Electric Railways." It gives excellent photographs of street railroad viaducts, power plant stacks and car trucks painted with Dixon's silica-graphite paint. The folder explains in a very interesting way the special adaptability of this paint for street railroad uses.

Cast Iron Pipe Molding

The Ardelt Continuous Turntable System

BY R. ARDELT.

In the issue of the *Engineering* of January, 1911, the pipe foundry at Coshocton, Ohio, belonging to James B. Clow & Sons, Chicago, is described. This pipe foundry uses the new continuous principle brought out by Fred Herbert. It is supposed to represent an improvement over the continuous turntable system, which has for upward of 30 years proved satisfactory in Germany and more recently in other countries. I cannot find an improvement in the straightline method and will explain the reason for my opinion.

In comparing the circular with the rectangular system I refer to the Ardelt continuous molding and casting

hours, and each time only one-half of the flasks attached to the turntable are cast, so that each flask is used four times in 10 hours and each core bar twice.

Between each two turntables a sand tempering and preparing apparatus, with a sand bin which holds a sufficient stock, is always provided. The pipes are shaken out close to the elevator of the preparing apparatus, so that the sand after being moistened will be immediately delivered into the bins without any intermediate handling and falls from the bin directly to the place where it will be shoveled into the flasks.

With eight men at the turntable, four men at the

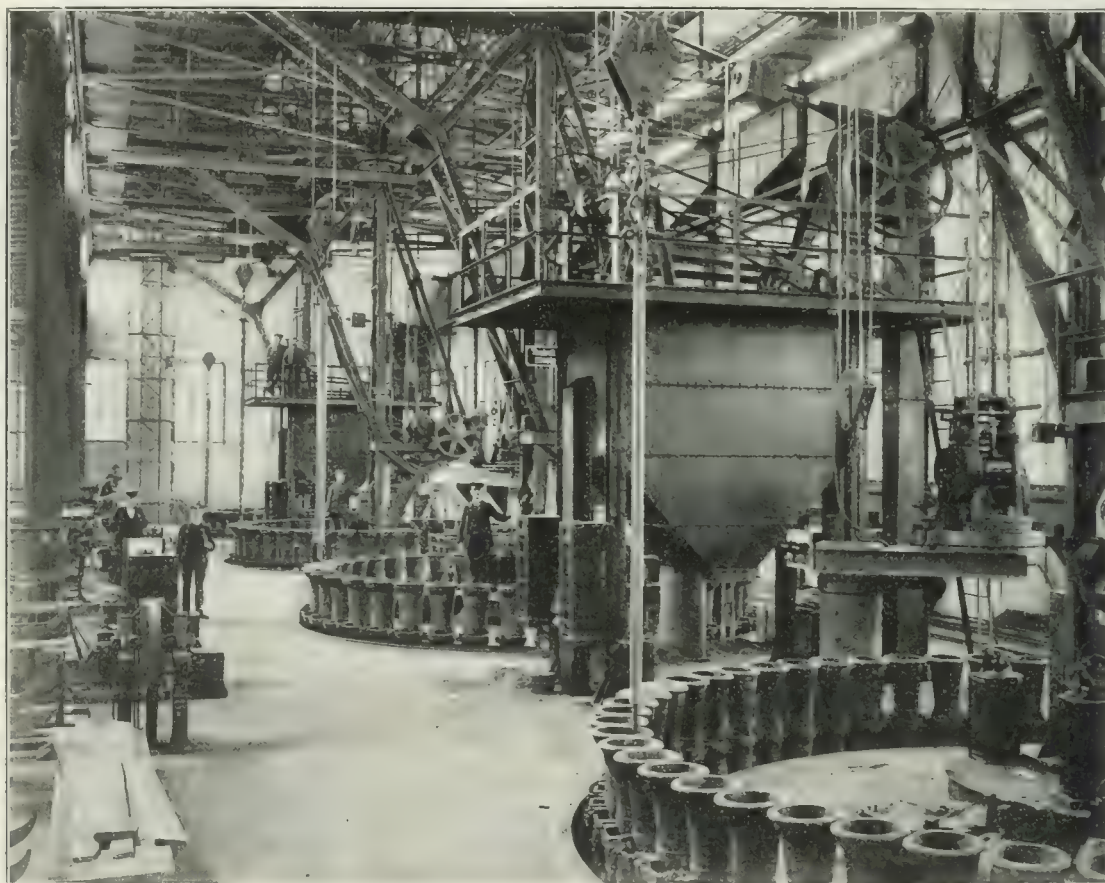


Fig. 1. The Continuous Turntable System of Molding Cast Iron Pipe, as developed by R. Ardelt & Sons, Eberswalde, Germany.

plant, with turntables and ramming machines, such as supplied by R. Ardelt & Sons, Eberswalde, Germany, and not to the plant of Cochrane & Co., Ltd., Middlesbrough, England, with which I am also familiar. The Ardelt turntable system is illustrated in the accompanying engraving, Fig. 1. At each turntable, to which the flasks are firmly connected, two core drying ovens with core lathes for making the main pipe cores are arranged in such a manner that the cores will be lifted by the three-motor electric jib crane standing in the center of the turntable directly from the drying oven cars and set into the molds. In the same manner the core bars pulled from the molds are returned, without the need of any intermediate means of industrial cars. The ramming machine at each turntable is practically continuously at work, as a separate electric winch is employed for setting and drawing the main patterns. The molten iron is carried by means of a traveling bracket crane, which travels the length of the building and transfers the iron to the jib crane on the turntable for casting. The molds are cast on a turntable eight times in 10

hours, and each time only one-half of the flasks attached to the turntable are cast, so that each flask is used four times in 10 hours and each core bar twice.

Those familiar with the operation of a pipe foundry know that, in consequence of the extremely dusty and rough work, the greatest simplicity must be observed, both in the construction of the molding devices and in other equipment, if subsequent high maintenance costs and expensive stoppages of work are to be avoided. The molding apparatus parts which have to be frequently taken off should be secured by cotter pins instead of screws, and all rollers and turning and friction parts should be avoided as far as possible. The molding sand, which will penetrate everywhere, and the inevitable particles of molten iron, which will widely spatter, will soon prevent the proper working of such parts.

Before erecting the Coshocton foundry, an engineer who made an investigation of all the American and European continuous systems of cast iron pipe manufacture

be required? Each flask is fitted with four rollers, which must be kept in use; with 144 flasks this means 576 rollers. The ways for the flasks must be kept in perfect order, as otherwise the movement of the flasks

In order to use this machine the simple, safe turntable has been discarded, the easily obtained circular travel of the flasks has been dispensed with and a more complicated travel in rectangular lines has been adopted. And how many more constructional parts, which in such a pipe foundry are subject to constant repair, will

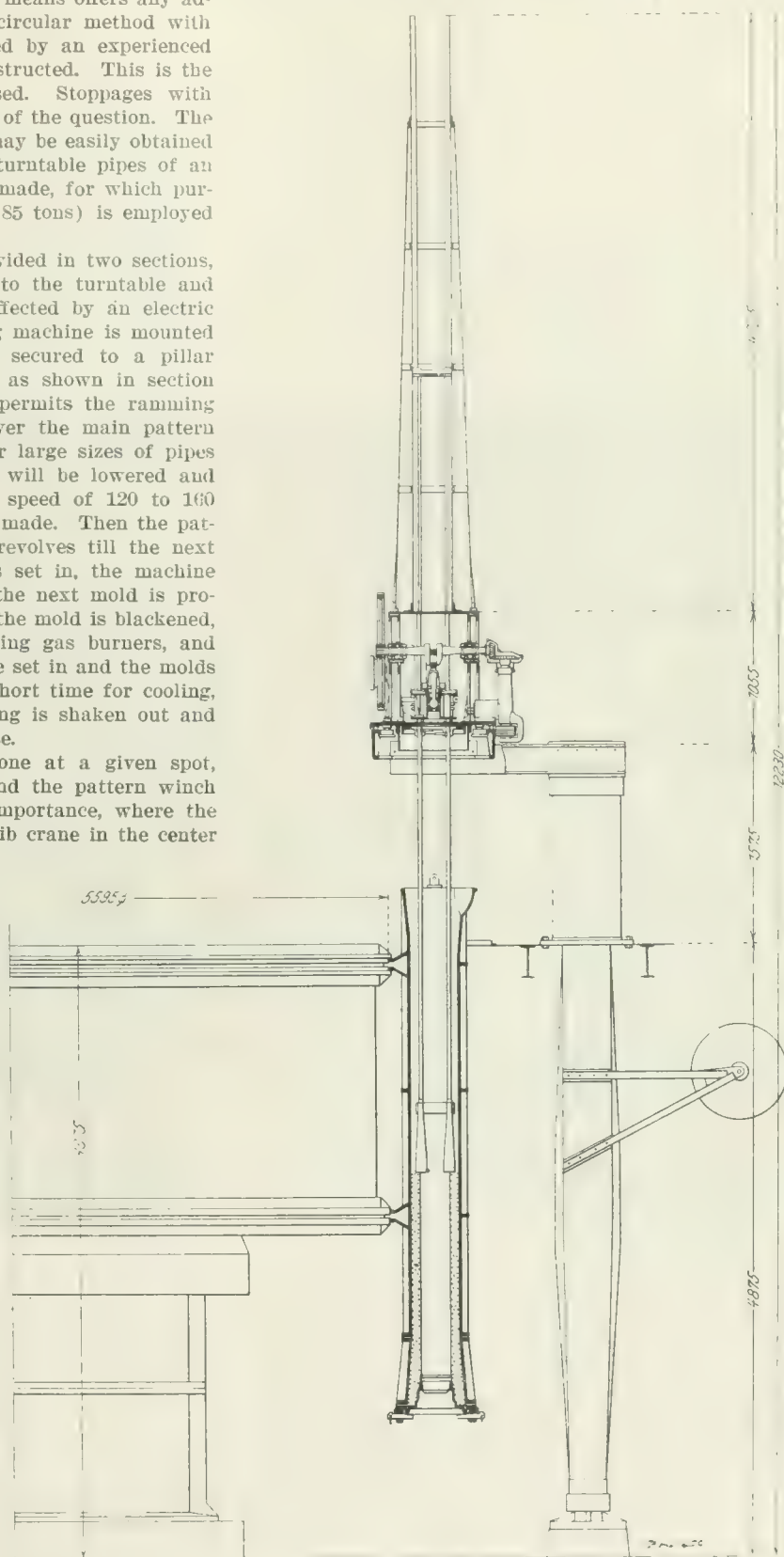


Fig. 2. —Sectional View of the Ardelet Ramming Machine.— Dimensions in Millimeters.

will be obstructed and the working of the plant impeded. For the longitudinal movement of the flasks four hydraulic pushers, and for the transverse movement two transfer cars, also operated by hydraulic rams, are required. The operation of all these apparatus is extremely tedious and wastes much time, as they are too distant from the points of work. (Each flask is used in 10 hours not more than two and one-half times.)

The Herbert system offers advantages with regard to neither simplicity nor safety in working over the turntable system, and still less with regard to cost of attendance and maintenance. The core drying ovens lie so far from the casting shop that each core must be delivered to the latter on cars, which is another disadvantage of this system.

With regard to the pipe molding machine, the objection may be raised that a pattern drawing machine requires high power for forcing the pattern through, therefore the flasks must be made very strong and heavy. With large molds it will be practically impossible to make them in such a manner. The wear on the patterns is also very severe, as they are under a very great superficial pressure through the sand. Therefore, it will be exceedingly difficult to maintain the standard weights of the pipes, as the core maker is not permitted to make the cores smaller so as to correspond with the constantly diminishing outer diameter of the pipes. Furthermore, it will be difficult to maintain the standard diameter sizes, so that serious complaints will arise that they make either too wide or too narrow lead joint openings. Also, the machine works too slowly. Each flask must be first attached to the machine; after the flask has been centered a measuring tube is lowered through, then the sand is filled in, and only then can the machine operate. With our ramming machines the mold is finished in the same time in which the sand is filled in. It, therefore, works considerably faster. There is no need of securing the flasks to the machine and detaching them again after ramming.

Railroad Rebates on Iron Ore

Government Prosecutions Under the Elkins Law

At Cleveland, Ohio, indictments against Dan R. Hanna and Robert L. Ireland of M. A. Hanna & Co., and D. T. McCabe, fourth vice-president of the Pennsylvania road, and 17 indictments against the Lake Shore, Pennsylvania, Bessemer & Lake Erie and the Nickel Plate railroads were returned on April 26 by the Federal Grand Jury which has been investigating charges of rebating against railroads and iron ore shippers. The cases are Interstate Commerce Commission cases brought to insure the enforcement of published ore shipping rates. The Government will seek to show that the indicted railroad companies own docking facilities in Ashtabula and Conneaut harbors; that these were operated by companies which were in effect "hired" by the railroads; that the railroads paid excessive rates to the docking companies for unloading iron ore; that the docking companies paid over a portion of the money thus received to the shippers, and that the whole constitutes a conspiracy in violation of the Elkins law.

It has been well known in the iron ore trade that rebates were given by the dock companies on ore unloaded at Lake Erie ports. At the end of the season the consignee received a repayment of 5 cents a ton on all ore put on dock to be later shipped to the furnace company and 12 cents on all ore that was loaded from vessel into cars for shipment to furnace without going on the dock. This practice, it is said, was discontinued in 1909. The old charges of the dock companies, which were in reality subsidiaries of the railroad companies, were 20 cents for unloading, which the vessel owner paid, and 20 cents to the railroad. The rebates were originally given instead of reducing these charges. When the rebates were discontinued the charges were reduced to a total of 17 cents to the vessel and the railroad. At the same time the one rate from Lake Erie dock to Valley furnace was reduced from 74 to 56 cents and to Pittsburgh district furnace from \$1.18 to 98 cents. The Government alleges that the rebates illegally paid by the Pennsylvania Railroad between April 1, 1908, and July 31, 1909, amounted to \$482,000, and those paid by the Bessemer & Lake Erie Railroad to the Carnegie Steel Company between January 1, 1908, and June 30, 1909, reached a total of \$798,000.

President James McCrea of the Pennsylvania Railroad has made public a statement in which, after referring to an "apparent misunderstanding of the public as to what is really involved in the case," he says:

The action of the grand jury, so far as I understand it, is based on the following condition of affairs: During the year 1908 and a portion of the year 1909 iron ore was landed from vessels at docks on Lake Erie belonging to the Pennsylvania Company, which docks were being operated by M. A. Hanna & Co. as a dock company, with whom an agreement was entered into for handling ore from the vessels to the cars and docks of the railroad company. The vessels paid a fixed price per ton for unloading, as the railroad company a fixed price per ton for loading the ore on the cars, the prices thus established being the current prices at practically all of the docks of all railroads at Lake Erie ports.

Owing to the introduction of improved ore handling machinery during this period the cost of handling the ore was found to be less than the sum of the payments made to the dock companies by the vessels and the railroad companies, but the exact amount of this possible saving could not be determined until the close of the season. It was therefore provided in the agreement that after deducting from the gross receipts of the dock company rental, cost of operation and maintenance, and proper remuneration for services rendered, that portion of the saving per ton published in the tariffs of the railroad company filed with the Interstate Commerce Commission, was to be paid currently by the dock company to the consumers of ore, and any additional surplus or saving that might possibly remain at the close of the year should also be apportioned among the consumers of ore in the proportion that the ore received by them over the Pennsylvania Company's lines and connections bore to the total ore tonnage forwarded from the Pennsylvania Company docks. This, of course, absolutely insured uniform rates to all consumers of ore forwarding from those docks.

The tariffs duly published and filed with the Interstate Commerce Commission showed clearly the current payments to be made by the dock company to all these consumers of ore, but appear to have been silent as to the final distribution to be made by the dock company of any possible additional saving; consequently, if in the company's effort to carry out the exact spirit of the law and insure impartial treatment to its patrons, the failure to note in the published tariffs the provision for the final distribution of the possible additional savings, of which every consumer had not only knowledge, but notice, was not strictly in accordance with the law, the violation was only technical and wholly unintentional.

There can be no question of discrimination involved, as all consumers, both large and small, were treated with strict impartiality; there never was, nor could be, any favoritism, for the rate to each one was exactly the same. The indictment of Mr. Hanna, president of the dock company, and of Mr. McCabe, vice-president of the railroad company, for alleged conspiracy, appears to be due solely to the fact that it was they who executed, on behalf of their respective companies, this contract by which exact and absolute equality of rates to all consumers of ore forwarded from the Pennsylvania Company's docks was guaranteed.

The United States Reduction Company, manufacturer of aluminum, babbitt metals, &c., has moved from 505-506 Manhattan Building, Chicago, where it has long been located, into its new offices at 410-426 South Clinton street, which is also the location of its new Chicago warehouse. From this warehouse the company will make local deliveries and less than carload shipments. The new offices are commodious and the warehouse is equipped in a manner that will insure prompt shipments of the high-grade products made by this company. The growing business of the United States Reduction Company has caused its facilities to be enlarged several times in recent years, and each succeeding enlargement has been met with increased demand. Its new building has been erected in anticipation of a continuance of this growth.

The Holophane Company's New York stock room has been removed to the seventh floor of the Sterling Bronze Building, 13 East Thirty-ninth street. All orders will hereafter be delivered to draymen and messengers from this address. The Holophane Company will endeavor to carry, subject to prior sale, sufficient stock of those types of Holophane glass globes and reflectors and Holophane-D'Olier reflectors for which there is the greatest demand. Orders for other types can be shipped direct from the factory at Newark, Ohio, or delivered from New York stock as a rule 10 days or two weeks after receipt of the order. E. N. Hyde is now manager of the New York branch, superseding John W. Foster, who has been assigned to the management of the Chicago branch.

The Paxson Grooved Roller Sand Mixer

A new type of sand mixer for mixing and blending molding sand in steel foundries has been placed on the market by the J. W. Paxson Company, Philadelphia, Pa. In this new machine rolls having grooved surfaces have been substituted for the heavy flat ones customarily em-

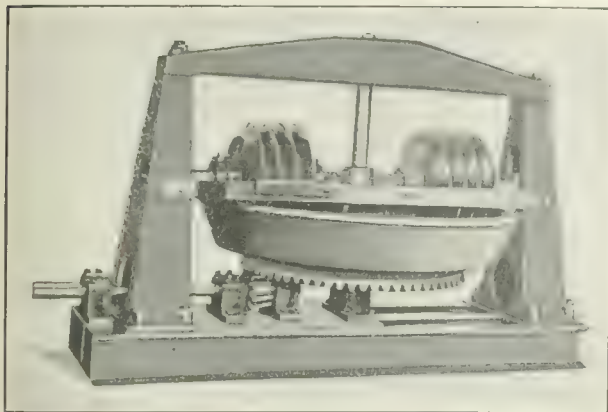


Fig. 1.—A New Type of Sand Mixer for Foundry Use Built by the J. W. Paxson Company, Philadelphia, Pa.

ployed. The use of this type of roll is said to result in a more thorough and intimate mixing of the sand, since their effect is that of cutting rather than crushing and the product of the machine is more refractory and more coarse, which enables the gases to escape readily when the mold is poured. Fig. 1 is a view of the new machine, while Fig. 2 gives an elevation and a plan view and shows some of the constructional details.

The grooved roller sand mixer, as the machine is called, consists of two cast iron box section standards

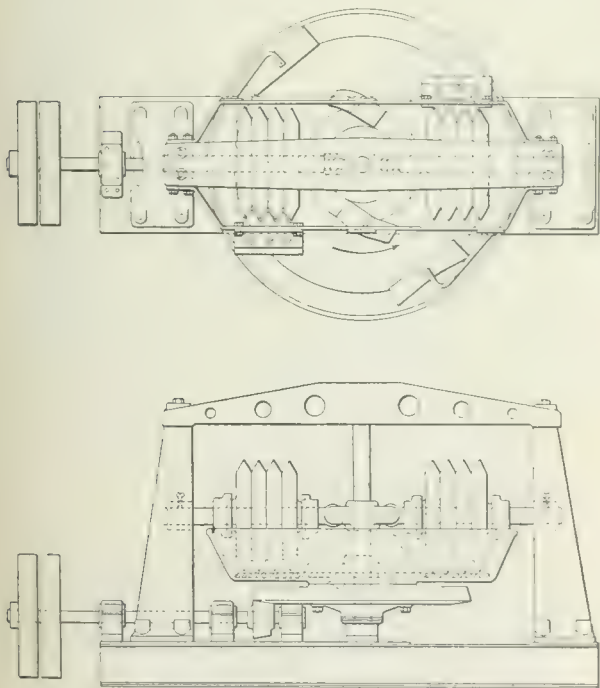


Fig. 2.—Plan View and Elevation of the Mixer.

bolted to 8-in. steel I-beams which form the base, while rigidity and substantial support to the frame are afforded by a top yoke. The sand pan, which revolves on a central shaft, is 5 ft. in diameter. It is a single gray iron casting and is fitted with a renewable chilled iron lining. The driving gear, which receives its power through the horizontal shaft at the left of Fig. 1, is cast in position on the bottom of the pan. The grooved chilled iron rollers are 22 in. in diameter and have a face width of 12 in. They run free on bushed bearings on a horizontal steel shaft held in place by collars, the use of keyways being entirely avoided. Cold rolled steel is em-

ployed for all the shafts. The ends of the roller shaft, which are machined and are fitted with boxes that can be renewed in case of wear, are mounted on the slides. Scrapers which are attached to the frame above the pan keep the rolls clean and direct the flow of sand in the pan. All of the working parts are protected from wear due to the sand falling upon them and are designed to be readily accessible for lubrication.

The machine is driven through the horizontal shaft at the left of Fig. 1 from either a pulley or an electric motor. When the mixer is belt driven a clutch reduces the wear and tear on the belting. The overall height of the mixer is 5 ft. 2½ in. and the floor space required measures 9 ft. 8 in. by 5 ft. The power required to operate the machine is 5 hp.

A Buyers' and Sellers' Bureau at Cleveland, Ohio

To enlarge the scope of its usefulness not only to its own members, but to all the manufacturing industries in that city, the Cleveland branch of the National Metal Trades Association has inaugurated a new departure, which will doubtless be watched with considerable interest by organizations of manufacturers in other cities. The plan, which has been under consideration for some time, was submitted to the executive board the past week by C. O. Bartlett, president of the branch, and Philip Frankel, secretary, and was adopted. It provides for the establishment of a buyers' and sellers' bureau, which is designed both to aid the buyer as well as to help the seller of products made in Cleveland.

At present, for example, a buyer goes to Cleveland and places an order with one concern for a machine or material. The seller has no further direct interest in the buyer as far as his other requirements are concerned, and the latter is allowed to go his way. Possibly he purchases the balance of his wares in Cleveland and perhaps he does not. He may be in the market for something that he does not know is made in the city. According to the plan to be placed in effect, when a buyer comes to the city he will be referred to a central office, where he will be informed where he can buy what he wants, and from which he will be taken to the places where he can make his purchases. In case a manufacturer receives an inquiry by mail for goods that he does not make and does not know where they can be procured, he is to refer that inquiry to the central office, which will furnish the desired information and bring the buyer and manufacturer in touch with each other.

A part of the plan is to have on file at the bureau of the association catalogues of the Cleveland manufacturers, photographs of their products and a complete card index system showing all the goods manufactured in Cleveland and who makes them. It is believed that when outside buyers become acquainted with the system they will write to the central office direct, and through that be quickly placed in touch with manufacturers of articles that they want. When the plan is permanently established it is the intention to have stenographic service, telephone service and other conveniences for bringing out-of-town buyers and Cleveland manufacturers together. While the plan will be inaugurated by the Cleveland branch of the National Metal Trades Association, all other manufacturers in the city will be invited to participate in the conduct of the bureau, and a conference with other manufacturers will be held the present week, at which the scheme will be submitted to them for approval.

Heavy Canadian Rail Contracts.—The Canadian Northern Railway Company, whose head office is in Toronto, has placed orders with the Dominion Steel Corporation and the Algoma Steel Company for 105,000 tons of steel rails, some of which are 60-lb. and others 80-lb. Of these rails 80,000 tons will be utilized on branch lines in the West. Besides its rail purchases, the company is spending \$1,500,000 on rolling stock and power. All the outlay, including an additional \$500,000 for rail fastenings, &c., will be made in Canada. The rail delivery is to be at the rate of 15,000 tons per month.

The Gang Sensitive Radial Drill

A New High Speed All Belt Driven Tool

The William E. Gang Company, 1543 Queen City avenue, Cincinnati, Ohio, has recently developed a new type of radial drill. The field which it was especially designed to cover is driving high speed twist drills ranging from $\frac{1}{4}$ to 1 in. in diameter at their maximum efficiency. All noise even when running at the highest speed is said to have been done away with by the elimination of all the transmission gears and the substitution

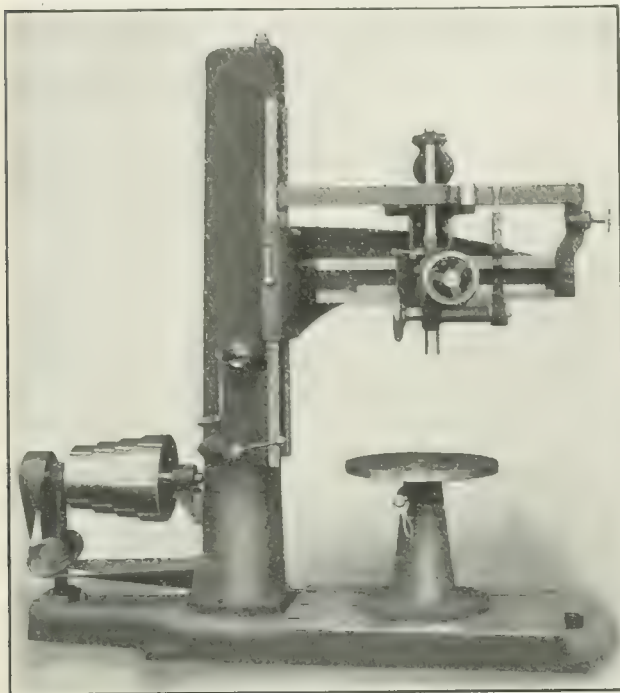


Fig. 1.—A New Type of Belted Sensitive Radial Drill Built by the William E. Gang Company, Cincinnati, Ohio.

of a belt. Fig. 1 is a view of the new tool, and Fig. 2 shows the attachment with which the drill can be supplied when tapping has to be done.

The construction of the machine is of such design as to insure long and satisfactory service. The arms, which are made in three sizes, namely $2\frac{1}{2}$, 3 and $3\frac{1}{2}$ ft., are very rigid, the cross section being in the form of a capital D. Reinforcement is secured by a number of webs. The arm is raised and lowered by a crank at the side of the column and is clamped in position by a ball lever. This crank is connected by a pair of bevel gears with the elevating screw which acts upon a stationary nut bolted to the arm, the thrust of the arm being taken by a ball thrust bearing. The column is clamped in any convenient position by a quick acting cam lever that actuates an hexagonal nut and a draw bolt and a conical roller bearing is supplied to take the weight. The head or saddle which can be securely clamped in any desired position on the arm is moved by a rack and pinion and a hand wheel. All the moving parts are in accurate running balance and are carried on annular ball bearings, which are so mounted that the ball bearings take all radial and thrust loads, and no moving part rests upon a stationary one. This arrangement reduces friction to a minimum, and as all the bearings are incased to protect them from dust or injury, they do not have to be lubricated except at long intervals.

The belt running into the base of the column transmits the power from the driving cone pulley shaft to one extending the full length of the column. On this vertical shaft there is a pulley which is carried on a bracket extending into the column from the radial arm. This pulley is driven from the shaft through a spline and a feather and transmits power to the spindle through a horizontal belt. The arrangement of this belt is such

that, although it encircles half the circumference of the spindle pulley at all times, the same tension is maintained irrespective of the location of the head by the position of the idler pulleys. These are so placed with reference to the spindle pulley that the driving belt exerts a balanced pull on both sides of the latter, due to its equal contact with them, and produces no side strain upon annular ball bearing of the spindle. In this arrangement no springs or counterweights are used, and provision is made for taking up the slack which occurs in both belts on account of stretching.

The hand wheel A, Fig. 2, at the left of the head, brings the spindle rapidly to the work, while the lever B, at the right, feeds it into the work. To maintain the most convenient position for drilling at all times, this lever has a ratchet which is automatically locked by a latch and kept from falling when the lever is thrown into the vertical position. This ratchet does not release the spindle from the control of the lever, but serves to maintain the same relative position of the lever and the drill point. It is not necessary to reset the feed lever for every hole where a number are to be drilled in the same plane. When the lever is pushed slightly beyond the first position of the locking latch, the spindle is freed from its control and can be moved in either direction by the hand wheel. The counterweight directly connected to the spindle makes this feed very sensitive.

Eight spindle speed changes, ranging in geometrical progression from 300 to 1170 rev. per min., are available by the use of a two-speed friction countershaft and a four-step cone pulley. This arrangement gives an average velocity of 80 ft. per minute for sizes of drills varying by 1-16 in. from $\frac{1}{4}$ to $\frac{3}{8}$ in., inclusive, and by $\frac{1}{2}$ in. from $\frac{1}{2}$ to 1 in., inclusive, and gives good results under average shop conditions. If desired the countershaft can be speeded up sufficiently to give the maximum speed that high speed twist drills will stand.

The tapping attachment illustrated in Fig. 2 operates without shock or jar at any speed required up to 1170 rev. per min., reverses instantly and is absolutely noiseless in operation. It is possible to adjust the tension of the driving belt so that any size of tap can be driven into a blind hole, strike the bottom and be reversed and back out without breaking the tap or injuring the machine. As the spindle alone reverses, sensitivity for tapping is secured as well as for drilling.

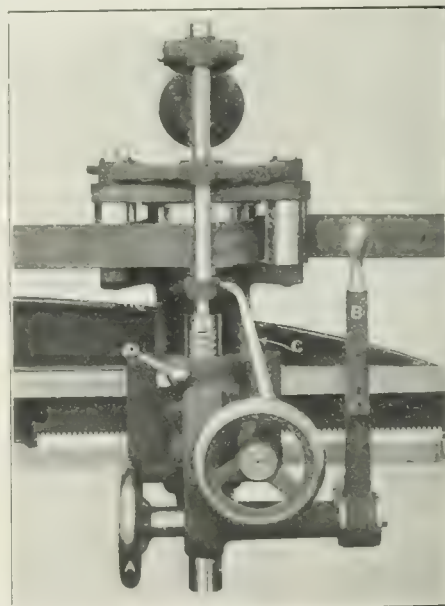


Fig. 2.—The Tapping Attachment Which Can Be Supplied for the Drill.

Like the drive of the machine proper, no gears are used in connection with this attachment and the spindle is reversed by the narrow belt at the top of the head on the upper spindle pulley. The power for this belt is secured from the idler pulleys on the head, which revolve in the opposite direction to the lower spindle pulley. This

belt then drives a pulley supported on a plate directly above the spindle pulley, which runs in the same direction as the idler pulley. A cone clutch is operated by the bent lever C, on the right side of the head, which is located between the two spindle pulleys and is kept in engagement with the lower spindle pulley by a powerful self-contained spring. In this position the spindle runs forward, but by moving this bent lever the clutch can be withdrawn from engagement with the forward spindle pulley and engaged with the reversing one. When the lever is released the spring instantly withdraws the clutch from the reversing pulley and re-engages it with the forward one. For taking up the slack in this belt due to stretching an adjustable idler pulley is provided.

This drill will pull all sizes of United States standard taps up to and including $\frac{3}{4}$ in. In a test made at the builder's shop a $\frac{1}{2}$ -in. high speed twist drill, running at 900 rev. per min., was driven through a 2-in. cast iron plate at the rate of 25 in. per minute with a feed of 0.028 in. per revolution of the spindle.

The Cream City Accident Preventor

A new type of safety device for presses and other similar machines has been developed by the Geuder, Paeschke & Frey Company, St. Paul avenue and Fifteenth street, Milwaukee, Wis. This is known as the Cream City accident preventor, and among the special features

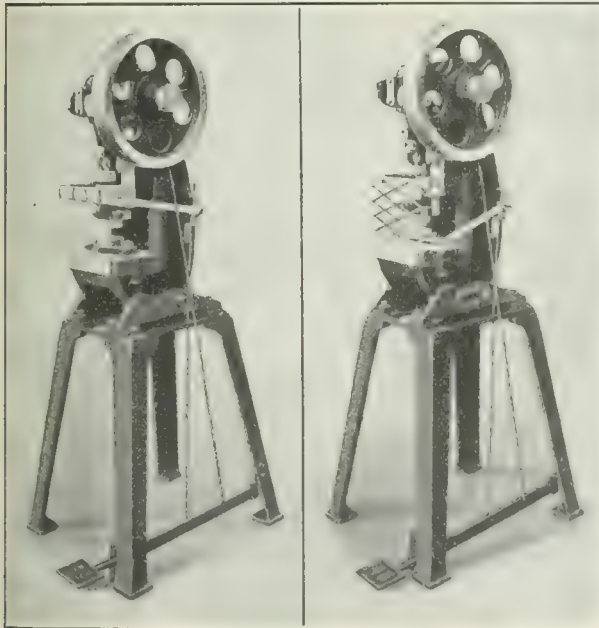


Fig. 1.—Position for Adjusting Tools. Fig. 2.—Position When Punch Is in Use.

The Cream City Accident Preventor for Punches and Similar Machinery Made by the Geuder, Paeschke & Frey Company, Milwaukee, Wis.

possessed by it are that the guard is entirely automatic in action and does not have to be touched when resetting the tools, the mechanism operating the guard is entirely separate from any other part of the machine and the use of the device does not in any way interfere with the output of the machine. Fig. 1 shows the position of the device when the tools are being adjusted, while Fig. 2 gives a view of it as it appears when the punch is in use.

The device consists of a folding gate which when the punch is in use extends downward, as shown in Fig. 2, and effectually blocks the approach to the die. When the operation is completed this gate jumps back into the folded position, Fig. 1, and is entirely out of the operator's way. The use of this device does not reduce the output of the press nor interfere with the rapid handling of the work in hand, as the operator can see the piece in the press at all times without having to turn his head.

The preventor is operated by a simple lever which is fulcrumed to one side of the press frame and is connected at one end with the folding gate of the device

and at the other with the clutch treadle. As soon as the operator places his foot upon the treadle, the lever controlling the operation of the gate causes it to drop in advance of the descent of the press. It is claimed that this device is so sensitive that if the operator's fingers or anything as small as $\frac{1}{8}$ in. thick is placed under the gate, the lever will not engage the pin controlling the clutch and the press will not operate. To apply this device to presses already in use the adjustment does not have to be disturbed. The device is fastened on the press by the gib screws and there is no need to alter the clutch or the treadle for attaching it to any style of press.

Emery Testing Machines at the Bureau of Standards

Parts of the new 2,300,000-lb. Emery testing machine are being received and erected at the Washington Laboratory of the Bureau of Standards. Two of the largest pieces of the machine recently arrived, one belonging to the scale or weighing end, the other being the main straining press at the power end. At the works of the Fore River Shipbuilding Company, Quincy, Mass., where the heavier parts of the testing machine have been fabricated, the straining press, piston and cylinder head were assembled and forwarded as one piece. The shipping weight of this piece was 22½ tons. When it reached Washington it was taken across the city on a heavy four-wheeled truck, drawn part of the distance by a team of 26 horses. On Massachusetts avenue, where rising ground was met, the number of horses was increased to 30. It was taken to the Bureau by a circuitous route to avoid one of the bridges of the city, which it was thought undesirable to strain with so great a concentrated load. This machine is being installed in the Engineering Building, one of the buildings recently erected at the Bureau, where a second and smaller Emery machine is also being placed. The latter has a capacity of 230,000 lb., or one-tenth that of the larger one.

Some of the dimensions of the larger machine are as follows: The main straining press has a diameter of 32 in. Its piston has a stem 22 in. in diameter, and a stroke of 60 in. The two screws connecting the power and the scale ends are 12 in. diameter by 49 ft. 8 in. long, 30 ft. 8 in. of each being threaded. The pitch of the thread is $1\frac{1}{2}$ in. and the depth $\frac{5}{8}$ in. The finished weight of these screws is about 17,800 lb. each. In the design of the machine one screw is located directly over the other, their axes being horizontal. This arrangement gives convenient access to all parts of the material under test, introducing a feature of great practical value. The center line of the machine is 44 in. above the laboratory floor. Hydraulic power will be used for operating both Emery machines. A central power plant, of three accumulators, is being installed. The dead weights used aggregate about 200,000 lb. Two 10-ton traveling cranes form a part of the equipment of the large machine and a 2-ton crane is provided for the smaller one.

These machines will be used for investigative tests on the physical properties of all classes of structural materials, in the development of physical constants and matters of detail pertaining to design and fabrication of structural shapes employed in engineering and architectural works.

The lower house of the Ohio Legislature has passed the Green workmen's compensation bill, which, it is believed, will be adopted by the Senate in practically its present form. The bill as passed is a compromise between one advocated by employers and another urged by organized labor. It provides that 90 per cent. of the fund from which awards are to be made for compensation for injuries shall be paid by employers and 10 per cent. by employees. Graded amounts of compensation are provided, the maximum amount to be allowed for injuries being \$3400. The fund is to be administered by a commission of three to be appointed by the Governor.

Locomotive Boiler Tubes*

The Processes of Manufacture, with Particular Reference to Heat Treatment

BY I. N. SPELLER,†

The manufacture of charcoal iron railroad boiler tubes was described by Geo. G. Crawford in a paper on that subject read before the Western Railway Club, January, 1904. His paper represented the old processes by which charcoal iron tubes were made by the National Tube Company until about two years ago. These are now rarely, if ever, used, and have become largely a matter of metallurgical history. The tube industry owes much to the railroads for its development; in fact, the invention of lap welding may be traced to the necessity which arose on the building of George Stephenson's first locomotive for a tube which would be safer and stronger than the butt welded tube, the only one made at that time. Since Stephenson's day the manufacture of locomotive tubes has increased in quantity and quality, as the demands of railroad service became more exacting, and the whole tubular industry was no doubt favorably affected thereby.

Seamless steel tubes were introduced about 1886, and established a new strength and ductility and endurance under many conditions of service. Later on a satisfactory grade of soft steel was produced, which could be lap welded like charcoal iron, and this also has been much improved, so that we now have practically three classes of tubes for locomotive service—charcoal iron lap welded, steel lap welded and seamless steel. Charcoal iron formerly was made from a special grade of pig iron made in a small blast furnace using charcoal as fuel. The product of this furnace was charged into the refinery, where about one-half of the impurities were oxidized and fluxed away, the metal being subsequently treated in lots of 300 lb. or so in a slightly modified type of the old Catalan forge with charcoal as fuel. The use of so much charcoal has necessarily been stopped, and in many other respects the manufacture of charcoal iron for tubes has of late years been considerably modified. Of these changes we are not in a position to speak, for as it was evidently impossible for obvious reasons to continue the manufacture of charcoal iron strictly along the old lines, we

Abandoned the Making of Charcoal Iron Tubes

about two years ago in favor of lap welded and seamless steel, which had by that time been proved a fit substitute and in some respects decidedly superior to the older material.

You all understand, of course, that when we speak of steel in this paper it refers more to the method of manufacture than the finished product, as the steel used in the manufacture of tubes, as a matter of fact, is a purer form of iron than that made by the charcoal process, and like the older metal cannot be tempered. A special grade of Bessemer steel was at first used in the manufacture of lap welded tubes, on account of its superior welding quality, but later on had to be abandoned as under some conditions it was found to develop brittleness in the beads after the tubes had been in service some time. The substitution of basic open hearth steel low in carbon and with less than 0.05 per cent. of phosphorus and sulphur has been found after more than two years' trial to do away entirely with any tendency of this kind, and as now made there is little difficulty in securing a strong weld with this steel. Seamless and lap welded tubes are made to-day from practically the same grade of soft basic open hearth steel. Let us take up what seem to be the main points requiring attention in the locomotive tube in order that it may give the best service under modern conditions.

1. Resistance to Corrosion

The manufacturer should furnish a tube in the best possible condition to withstand corrosion and pitting;

that is, the metal should be as uniform in composition and density as it is possible to make it. Much can be done to lessen the tendency to pitting by proper attention to the making of steel and the way it is worked. We have been experimenting on this problem now for several years and have gone to considerable trouble in the matter of testing and inspection of material, and in the process used for manipulating the steel so as to produce a tube which will resist corrosion as well as iron can be made to do so, and, judging from the reports of comparative service tests which have been received, steel so made is, in this respect, at least the equal of the best charcoal iron. After all, however, the solution of this problem is largely in the hands of the user. Iron or steel will corrode in spite of anything that can be done if certain material is in solution in the water, particularly dissolved oxygen or carbonic acid. By the removal of these harmful agencies corrosion may be reduced to practically nothing. It is generally understood nowadays that water conditions have everything to do with corrosion, and the simplest solution of the problem is to treat the water, with the object of making it as harmless as possible. The development of the modern tube to withstand corrosion and the treatment of water have together practically eliminated this trouble, so that it is rarely the case that tubes fail nowadays through pitting.

2. Leaking in the Flue Sheet

The construction and handling of the engine has so much to do with the trouble experienced from leaky flues that it is difficult to determine how much, if any, of the responsibility for this should be placed on the tube material. If railroad engineers will tell us what qualities are required in the tube to make it hold tight in the flue sheet, we will be glad to follow their suggestions as closely as possible. At the present time the steel tube is made as stiff as possible consistent with the best welding quality and ability to stand up successfully under expansion and beading in the tube sheet.

3. Strength and Ductility of Material

The tube should be of such quality as to stand repeated tightening in the flue sheet without cracking or showing undue evidence of fatigue, nor should these weaknesses develop during the life of the flue in service. The material found best adapted to give these properties is a special grade of soft open hearth steel carrying not over 0.05 per cent. phosphorus or sulphur.

4. Weldability

The quality of the metal and method of handling are equally important in safe ending. Soft steel has been found somewhat harder to weld than charcoal iron, but it has been greatly improved in this respect. The necessity for a good welding quality steel is of first consideration in making locomotive tubes so that they may be easily safe ended, and this point has received a great deal of study, especially in the manufacture of lap-welded tubes, where it is, of course, one of the first essentials to manufacture. Charcoal iron carries considerably more impurities than soft open hearth steel, and these impurities form a self-fluxing mixture which facilitates welding. Railroad specifications have been so tightly drawn on composition in some cases as to work against the production of a good quality of steel for locomotive boiler tubes by calling for unnecessarily low phosphorus and sulphur. There is now very good reason to think that a mistake has been made in this direction, and that the general welding quality of the steel would be much improved, and the steel at the same time would lose nothing in other respects, if the maximum phosphorus and sulphur limits were both raised to 0.05 per cent. With producer gas, now generally used of necessity, it is a very difficult matter to keep the average sulphur in the heat below 0.035 per cent., and in order to remove this sulphur in the open hearth furnace the steel has to be held and worked in such a way as frequently to leave it dry and difficult to weld.

HEAT TREATMENT.

Before the steel can be welded in practice a fluid clinder must be formed on the surfaces which are to be

* A paper read before the Pittsburgh Railway Club, April 28, 1911.

† Metallurgical engineer, National Tube Company, Pittsburgh, Pa.

united. If the metal is heated too far above the point at which this cinder should flow, it will be burned and destroyed. We endeavor to have the range of temperature between the cinder forming and burning points in the steel as wide as possible so as to assist in lap welding and give the largest margin of safety in safe ending. Considering the variety of the requirements it seems to us that the compositions of the metal should be left largely to the discretion of the manufacturer so far as is consistent with a certain specified standard of physical quality in the finished tube. We frequently go to the trouble of rephosphorizing for the purpose of improving the fluxing and welding quality of our steel.

The method of safe ending, we have said, has as much to do with obtaining satisfactory results as the ma-

body tube at or near the weld. Taking unnecessary risks of this kind often explains subsequent failures which should not be charged up to the flue maker.

It is not unusual for a flue welder who has never handled steel to have trouble for a few days. Remembering the above points and using his experience to the best advantage as to the condition of his furnace, the character of the flame, temperature, &c., the average man will soon be able to do equally reliable work with steel as with charcoal iron, as the experience of welders all over the country will show.

5. Uniformity of Material

This is a quality which the tubes should have in a high degree, both as to physical and chemical properties.



Flange, Crushing Down and Flattening Test for Boiler Tubes

terial, but we will not attempt to lay down specific rules as to construction of the furnace and heating, for many of the practical shop men present who are welding flues every day are much more able to discuss this side of the problem. However, there are a few broad principles on the heat treatment of tube steel which should be taken into consideration. The preliminary heating of the body tube preparatory to flaring out the end should be carried to a bright orange color judging by good shop light, 1750 degrees F. In the case of steel on steel, if the body tube is allowed to cool black after heating to this temperature and inserting the safe end, the grain structure will be refined and the metal put in much better condition for the welding operation which follows. Moreover, if the preheated body tube is returned to the furnace without cooling the metal may be crystallized or burned before the safe end has been heated hot enough to weld. Should there be any considerable difference in thickness between the safe end and body tube, it is evident that there is again a risk of overheating the one before the other is sufficiently heated to weld. If the body tube is returned to the furnace while red hot and the safe end is at the same time a gauge or two heavier, there is, of course, all the more chance of crystallizing or burning the

There is no difficulty as to the average steel tube nowadays standing the master mechanics' tests made on one sample out of each hundred tubes. We have, however, recently designed a machine to make the flange, crushing down and flattening test on each end of every tube, as shown in the illustration. This gives assurance both as to the character of the metal in each individual tube and also, in the case of lap welded tubes, as to the welding quality being satisfactory. Steel tubes are now made in one grade of material suitable for either body tube or safe ending.

The Sprague Electric Company has removed its Boston office from the Weld Building to 201 Devonshire street, where larger offices have been obtained in order to handle expeditiously the increased demand for the Sprague electric apparatus and Sprague conduit products in the New England territory.

The Bethlehem Steel Company, South Bethlehem, Pa., on April 21 turned out one of the largest crucible steel castings in its history. It weighed 11,000 lb., and required the contents of 120 pots of metal. The entire operation was effected in 14½ minutes.

A Modern Electric Tool Factory

The New Plant of the Hisey-Wolf Machine Company, Cincinnati, Ohio

The new plant of the Hisey-Wolf Machine Company, manufacturer of grinders and portable electric drills, at Colerain avenue and Marshall street, Cincinnati, Ohio, is attracting considerable notice, both on account of its

side of the lower floor. The floor is of concrete and cement, imbedded in which are wooden sleepers for supporting a maple floor. Cast iron columns and steel girders support the floor above.

The assembling and adjusting departments, shown in Fig. 2, occupy the second story. It is of almost identical construction as the floor below, with the exception that the maple floor is laid on 2¼-in. yellow pine flooring. The pillars in the second story, supporting the roof, are also of yellow pine. A flat composition roof, laid on



Fig. 1.—The Machine Shop on the First Floor.

construction and the unique way in which it is heated. Harry Hake designed the building and Robert S. Mayer the heating system.

The building is of semisteel construction, 75 x 175 ft., two stories. To provide ample light Detroit Fenestra

1¾-in. yellow pine sheathing, covers the building. The office occupies a front corner on the second floor, a space 20 x 45 ft. being partitioned off for this purpose. The two stairways inside the shop and at either end are inclosed with fireproof material.



Fig. 2.—A Portion of the Assembling and Adjusting Department.
Two Views in the New Plant of the Hisey-Wolf Machine Company, Cincinnati, Ohio.

steel sash windows, 12 ft. wide and extending to the ceiling, are placed in both upper and lower stories. These windows are separated by brick piers 17 in. thick and only 4 ft. wide.

Fig. 1 shows the machine shop, which occupies one

A direct current 65-hp. generator, made by the Jantze & Leist Electric Company, Cincinnati, Ohio, driven by an 85-hp. gas engine, made by the Miller Improved Gas Engine Company, Cincinnati, Ohio, furnishes the motive power for the shop.

The building is heated by a blower system, using hot water as the heating medium. The heat in the exhaust gases from the engine is utilized by passing these gases through an exhaust heater, a reverse current heater made by the Williams Tool Company, Erie, Pa., and blast coils. The water used for cooling the cylinder jacket of the engine is also circulated through this exhaust heater by a Buffalo centrifugal pump, driven by a motor made by the Reno-Kaetker Company, Cincinnati, Ohio. An auxiliary hot water boiler is provided for use in extremely cold weather or when starting up in the morning. The system is so arranged that this boiler can be used in conjunction with the hot water from the exhaust heater or separately through different sections.

It is planned to install a cooling tower for the water after it has completed the circuit of the system, so as to reduce the temperature enough to pass it back through the cylinder jacket, so that the same water can be used repeatedly for cooling the cylinders.

The Alvey-Ferguson Company's Removal

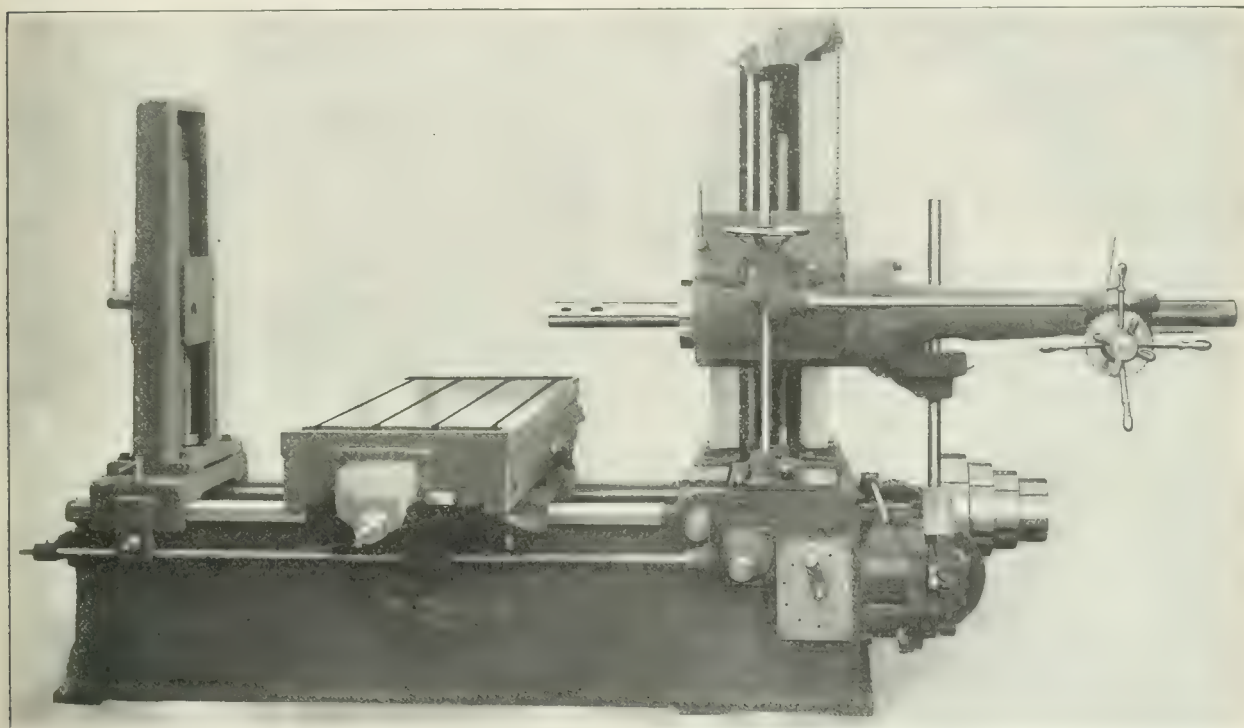
The Alvey-Ferguson Company, Louisville, Ky., manufacturer of the A-F gravity conveyers and conveying

A Special Fosdick Horizontal Boring, Drilling and Milling Machine

For use in a shop building sugar mill machinery, where it will be subjected to severe usage, the Fosdick Machine Tool Company, Cincinnati, Ohio, has recently completed a special horizontal boring, drilling and milling machine. The machine is of the same general type as the builder's No. 0 machine, which was illustrated in *The Iron Age* April 29, 1909, but is of special interest on account of the long table and the table traverse. In this new machine the table traverse was increased to 63 in., which necessitated a redesign of the saddle and the table. A corresponding increase in the traverse of the column and outer support was made, this dimension being 27 in.

The steel gears used in the machine are of the same type as the standard tool, and all of the bearings are bronzed bushed. The machine is driven by a belt and a four-step cone pulley. Eight speed changes are available, four are secured by the cone pulley and this number is doubled by the lever on the speed box.

The construction of the saddle and the bed is very rigid. In the specifications supplied to the builder, when



A Special No. 0 Horizontal Boring, Drilling and Milling Machine Built by the Fosdick Machine Tool Company, Cincinnati, Ohio.

machinery, announces its intention of moving its plant and home offices to Oakley, Cincinnati, Ohio. A desirable five-acre site has been secured in the factory district, and the erection of modern buildings will be commenced shortly. Increased facilities, with a better access to the markets, have become necessary to take care of the large business this company is enjoying, and its capacity will be more than doubled in the new location.

The plant will include the following: Structural department, 100 x 450 ft.; woodworking department, 50 x 100 ft.; machine shop, 50 x 100 ft., and an office building, 50 x 60 ft., two stories. The construction of the factory buildings will be uniformly of steel and concrete, with saw-tooth roofs, absolutely fireproof throughout. Sprinkler systems will be installed as an additional precaution against fire. The office building, which is to be apart from the other buildings, will conform in design and construction with the main plant. The plans are in charge of the Trussed Concrete Steel Company, Detroit, Mich. This will be a model plant in every particular, and will be completed by August 1. The operation of the plant at Louisville will continue without interruption until the new one at Oakley is completed.

the table was at its maximum distance on the saddle a drop of 0.008 in. was allowed. When the machine was tested upon its completion this amount was found to be only 0.002 in.

The Beck & Corbitt Iron Company, St. Louis, Mo., heavy hardware jobber, is erecting a new six-story and basement building, 125 x 126 ft. The company at present occupies three buildings, one of five stories, 125 x 126 ft., to which two additional stories will be added, and two of two stories, 100 x 126 ft. Upon completion of the new building the company will concentrate its business, which is at present scattered in different structures, thus enabling it to handle its trade more promptly than at present and also more economically.

The plant of the Lincoln Stove & Range Company, Fremont, Ohio, has been sold to Mozart Gallup, Sandusky, Ohio, and other mortgage holders for \$139,000. Reorganization of the company is planned.

The Hawley Down Draft Furnace Company, Chicago, has reduced its capital stock from \$500,000 to \$100,000 and the number of directors from seven to three.

The Midland 30-In. Radial Drill

A new 30 in. high speed radial drill for rapid drilling and tapping has recently been placed on the market by the Midland Machine Company, Detroit, Mich. The tool is said to possess all the advantages of the sensitive drill press combined with the large productive capacity of the radial drill and is designed for rapid jig work where the number of pieces is not large enough to warrant the use of a multiple spindle drill for tool and die work and in shops where a lighter tool than a geared radial drill is required. The machine is accurately and compactly built, occupies a small amount of floor space and is easily operated by levers within close reach of the machinist. Its special field is the handling of carbon and high speed drills having a maximum diameter of $\frac{3}{4}$ in. and taps up to $\frac{1}{2}$ in. in diameter at their maximum capacity. A general view of the drill is given in Fig. 1, while Fig. 2 shows the device employed for changing the feed and reversing the drill spindle.

No gears are employed in the drive or the reversing device, and the tool is driven by a 2-in. belt running at high speed, which transmits the power smoothly. Six-spindle speed changes varying from 270 to 1050 rev. per min. are available through the employment of a three-step cone pulley and the two levers shown in Fig. 2. The arrangement for reversing the spindle and for securing the three additional speeds consists of a continuous belt running around four pulleys, two on the vertical and two on the horizontal shaft. Between each pair of pulleys are clutches operated by separate levers, and the movement of either lever reverses the direction of rotation of the spindle, while moving both of them simultaneously provides the three additional speeds. The tapping lever A operates a friction clutch in the column, and the speed change lever B actuates a jaw clutch in the back shaft.

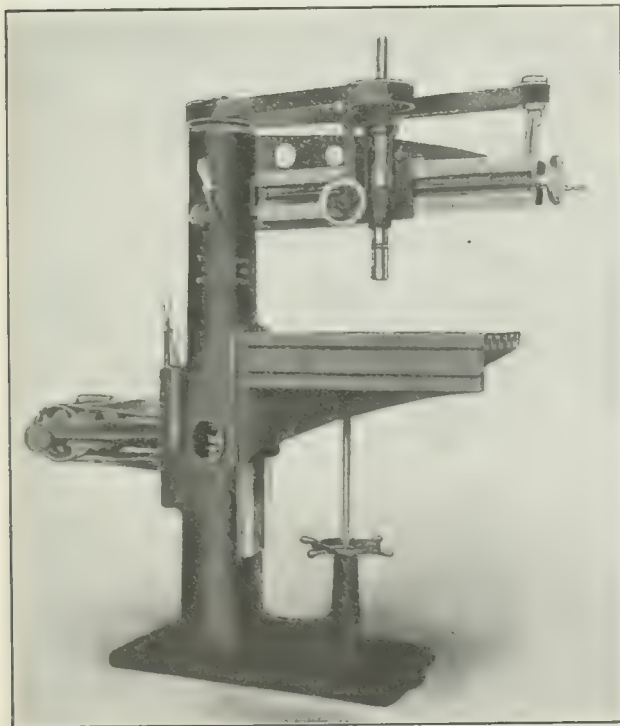


Fig. 1.—The New 30-In. High Speed Radial Drill Built by the Midland Machine Company, Detroit, Mich.

The spindle, which has dustproof ball bearings, is fed by a long feed lever with a ratchet device that automatically releases when the lever is in the upper position, while a small hand wheel controls the quick return. The spindle is of high carbon steel, has a large diameter and is accurately ground. A 2-in. endless belt that passes around two idler pulleys, one at the end of the radial arm and the other immediately back of the pulley, drives the spindle. The vertical movement of the spindle is 6 in., and that of the table 15 in., the movement of the latter being controlled by a hand wheel. The head has a move-

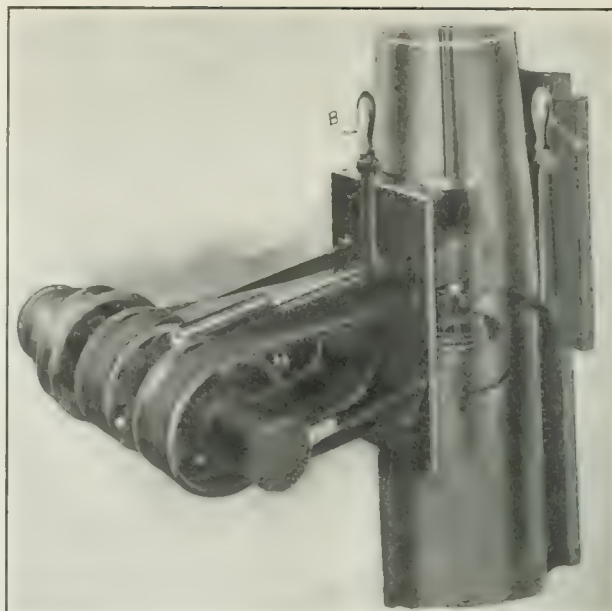


Fig. 2.—The Device for Changing the Feeds and Reversing the Spindle.

ment of 25 in. along the rail. The upper section of the column together with the arm revolves on the stump and can be turned through a complete circle, thus making it possible for the tool to drill over a large area. For releasing the arm or clamping it in any desired position, a lever operating in the upper part of the column is employed.

The following table gives the principal dimensions and specifications of the drill:

Maximum distance from spindle center to column, inches.	5
Maximum distance from spindle to table, inches.	24
Minimum height of table above floor, inches.	27
Maximum height of table above floor, inches.	42
Vertical movement of table, inches.	15
Vertical movement of spindle, inches.	6
Traverse of table on arm, inches.	25
Number of spindle speed changes.	6
Minimum spindle speed, revolutions per minute.	270
Maximum spindle speed, revolutions per minute.	1,050
Working surface top of table, inches.	18 x 28
Working surface side of table, inches.	6 x 28
Overall height, inches.	74
Width of driving belt, inches.	2
Speed of countershaft, revolutions per minute.	395
Floor space required, inches.	84 x 84
Total weight, pounds.	1,250

The equipment furnished with the drill includes a set of wrenches and all the other accessories ordinarily supplied with a tool of this character.

William T. Magruder, professor of mechanical engineering, Ohio State University, Columbus, Ohio, has favored us with a copy of a 48-page pamphlet giving the itinerary of the Western inspection trip which has been taken by four instructors and 102 students of the departments of mechanical and electrical engineering of that university. The pamphlet is a model, giving many details of industries to be visited. The trip began on Sunday night, April 23, and ended Sunday morning, April 30. The party spent three days in Chicago, two days in Milwaukee and one day in Gary. The students were provided with interleaved copies of the bulletin for use in note taking. The object of trips of this character was thoroughly explained in a paper entitled "Inspection Trips," by Professor Magruder at the last meeting of the Society for the Promotion of Engineering Education.

H. J. Koontz, manufacturer's agent, Pittsburgh, has sold to the Pardoe Coal Company, Sharon, Pa., a 12 x 12 x 14 in. Ingersoll-Rand belt-driven air compressor; an Appex nipple and pipe threading machine, manufactured by the Merrill Mfg. Company, Toledo, Ohio, to the Superior Mfg. Company, Pittsburgh, and a Bliss press for pressed steel work to the P. Wall Mfg. Company, Pittsburgh.

New Tools and Appliances

This is essentially a news department for which information is invited.

Electrically Driven Pipe Cutter and Threader.—A new design of motor driven pipe cutting and threading machine has been recently developed by the Curtis & Curtis Company, Bridgeport, Conn. The usual Forbes pattern of die cutting head having a range of 1 to 8 in. is used. This head is mounted on a cabinet base, and the motor which can be wound for any of the standard voltages and frequencies is mounted underneath. The design of the machine enables the operator to use a trolley over it for handling long and heavy lengths of pipe.

Large Milling Machines.—The Becker Milling Machine Company, Hyde Park, Mass., has recently brought out two new milling machines. One of these is of the vertical belt-driven type equipped with double back gears having ratios of 3 to 1 and 8 to 1 respectively. The spindle is driven by a $\frac{5}{8}$ -in. double belt passing over a pulley 20 in. in diameter, and the open belt possesses sufficient power to take cuts in cast iron 1-16 to 3-32 in. deep with surface mills 10 and 12 in. in diameter and a table feed of 8 in. per minute. The other machine is a duplex Lincoln type miller, having spindle speeds ranging from 15 to 38½ rev. per min. The two spindle heads have independent micrometer adjustments and are driven through spur gears with a back gear ratio of 6½ to 1. Both spindles are tapered and have a No. 10 Brown & Sharpe taper hole in them. All of the driving gears are protected by guards to prevent accidents. The overall dimensions of the table are 13½ x 48 in. and the working surface is 11 x 40 in.

Combination Screw Driver Set.—The J. C. Barrett Company, Hartford, Conn., is manufacturing a combination steel screw driver set in which all the blades fold into the handle and are held there by a knurled sleeve at the end. A quarter-turn of the sleeve loosens the blades so that they can be ejected from the handle by a flat spring within it. In use, the force employed to drive the screw holds the blade in position.

A New Precision Lathe.—The Rivett Lathe Mfg. Company, Brighton, Mass., is manufacturing a new precision lathe having a device for correcting any error in the lead screw when especially accurate precision threads are being cut. This device consists of a rod journaled in bearings on the back of the lathe bed. An adjustable slide having the same general appearance as the customary taper attachment is mounted on the back of the carriage. This attachment is so connected that any movement of the carriage is transmitted to the long rod. An arm at the right end of this rod connects with the lead screw on the front of the bed and controls the correcting movement of the latter so as to compensate for any errors which it may contain or to give any slight variation in pitch that may be desired. These variations are secured by moving the slide on the carriage to the desired angle.

Castellating Nut Fixture.—The Hendey Machine Company, Torrington, Conn., has developed a castellating fixture for use on its Lincoln milling machines. This attachment consists of a circular plate which has been milled so as to leave projections that prevent the nuts from turning while the slots are being milled. When this work is being done the nuts are held firmly in place between the locating blocks by short cap screws which enter from the back. Three passes are necessary to finish a plateful of hexagonal nuts. Two plates are furnished with each machine, so while the miller is operating on one lot, the operator is removing the finished nuts from the other fixture and refilling it with a fresh supply. Two swinging bolts are used to hold the fixture in place, so that but little time is required to shift it from one cut to the next.

Boring and Turning Mills.—The Betts Machine Company, Wilmington, Del., has developed a new type of boring and turning mill which is built in sizes ranging from 5 to 30 ft. These machines are designed for heavy duty with high speed steel, and they possess several interesting

features, one of which is the use of two pinions located on either side of the base plate to drive it, an arrangement which tends toward smoother running and increased stiffness where cuts are being taken that are not continuous. Eight continuous feeds ranging from 1-64 to 1¼ in. are provided for either vertical or horizontal movement. The power rapid traverse has two speeds for vertical or horizontal movements, the fast movement being employed to bring the tool to within 2 in. of the work and the slow one to take it from this point to within 1-64 in. of the work. In addition to the operating levers generally supplied at the side of the machine, others are located on the saddle. The fine tool adjustment on the saddles is another special feature. All the guiding surfaces on the cross rail and the spindles are rectangular and are fitted with taper shoes. The tool spindles are balanced directly on the swivel by a cast iron ring sliding on a tube.

A Motor-Driven Ferracut Press.—A form of press which is particularly adapted for the electric motor drive has been constructed by the Ferracut Machine Company, Bridgeton, N. J. One of the prominent features of this new machine is the enlargement of the upper portion of the frame to provide a base or shelf upon which the motor can be bolted. This way of attaching the motor economizes space and eliminates the chance of possible injury to the motor or the operator, thus giving a distinct advantage over the customary method of placing the motor on a projecting shelf or on the floor. The flywheel can be belted direct to the motor, or if desired a silent chain can be used to transmit the power.

Chip Guard.—A chip guard intended to protect the machinist's eyes against the heated chips which fly with considerable force from the cutting point of a tool has been brought out by the Universal Stamping Company, 47 Poultny street, Buffalo, N. Y. In designing this guard provision was made to use it without interfering with the operation of the machine, and the guard proper is made of glass so that the tool post and the work are always visible. A steel frame attached to a rod held by a clamp on the tool post supports the glass, and the guard can be set at any angle while, as the rod can also be moved in any direction, a universal adjustment is secured and at the same time the guard can be moved out of the way quickly when necessary.

The Reinforced Tile Roof Company, manufacturer of reinforced cement tile roofing, which is largely used on industrial buildings, has removed its plant from Youngstown to Hubbard, Ohio, where a large main building is nearing completion. Tile will be made there the latter part of May. The company also has a plant at Wilmington, Del., to supply the Eastern market. It reports a growing demand for its product, for which the principal claims are durability, light weight and fireproof qualities.

The Fort Smith Commercial League, Inc., H. G. Spaulding, manager, Fort Smith, Ark., has issued a pamphlet entitled "Facts About Fort Smith," which gives reasons for the location of industries at that point. The pamphlet states that genuine opportunities exist for a list of enterprises named. The city now has a population of 25,000 or more, with an extensive jobbing trade and a growing number of strong manufacturing enterprises. The pamphlet sets forth the natural resources and special advantages of the locality.

The Ward Nail Company, Struthers, Ohio, has been somewhat delayed in installing its machinery, but will be ready for operations about May 15. Its output will be principally large head nails for felt roofing. The sales will be handled from Struthers, and Thomas D. Irwin, the secretary and treasurer, will have charge of this department.

The Andresen-Evans Company, manufacturer of crab buckets for handling ore, coal, crushed stone, sand and excavating, has removed its offices from 1501 Monadnock Building to 635 Railway Exchange Building, Chicago.

Trade Publications

Automobile Ignition.—Bosch Magneto Company, 223 West Forty-sixth street, New York City. Pamphlet entitled "The Influence of Multi-Point Ignition on the Efficiency and Output of Internal Combustion Engines." Is a reprint of a paper presented before the Society of Automobile Engineers, January 11, 1911, and demonstrates the advantages of two-point ignition over the one-point type.

Calendar.—The Dexter Folder Company, 200 Fifth avenue, New York City, has issued a calendar hanger running from February 1, 1911, to January 31, 1912. The various types of printing machines are illustrated on the upper portion of the leaves for each month and a complete calendar for 1912 is given on the hanger.

Melting Furnace.—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin No. 28. Devoted to the Simplex melting furnace, which employs either oil or gas fuel for melting aluminum, brass, bronze, copper, ferromanganese, gray iron, semisteel, &c. This furnace is of the single chamber type, and it is claimed that, with proper operation, a quality of metal equal to that melted in crucibles can be produced in greater quantities without preparation and in less time at a greatly reduced cost for both fuel and labor. The construction of the furnace is briefly described and there are a number of engravings showing the furnace and some installations of it.

Motor Trucks.—The Seltz Automobile & Transmission Company, Detroit, Mich. Pamphlet. Devoted to the Seltz motor truck, which is built in several sizes ranging from 1500 lb. to 5 tons and propelled by a gasoline engine. The special feature of the truck is the double friction transmission system, which is said to be a very simple and effective arrangement for transmitting power from the engine to the driving wheels. The illustrations show the various types of bodies for this truck and views of the various parts.

Electric Fans.—Sprague Electric Company, 527 West Thirty-fourth street, New York City. Catalogue No. 323. Calls attention to the Lundell electric fans, which are made in a number of sizes and types for both alternating and direct current. The various sizes and styles of fans are all illustrated and their special features pointed out. The motors supplied with these fans are wound for all the standard voltages and frequencies.

Steel Treatment.—Tate, Jones & Co., Inc., Pittsburgh, Pa. Pamphlet, entitled "Heat Treatment of Steel." Is a handy reference book of formulae, expert methods and general information gleaned from practical experience along this line. After a brief introduction, the subjects of annealing, hardening and tempering are taken up and instructions given for these different processes. A list of tempering and hardening heats and a table of factors for converting the readings of the different thermometers from one scale to another complete the booklet.

Adjustable Shaft Bearing.—The Sauer Power Generating Company, 5115 Rosetta street, E. E., Pittsburgh, Pa. Pamphlet. Illustrates the Sauer adjustable shaft bearing, which is said to possess the advantages of reducing friction and enabling higher speeds to be used as well as heavier feeds with a corresponding increase in the output of the plant. Five types in all of bearing are made for different classes of work. All of these are illustrated, together with the various parts entering into their construction. *The Iron Age*, August 25, 1910, contained an illustrated description of these bearings.

Condensers.—Wheeler Condenser & Engineering Company, Carteret, N. J. Mailing card. Treats of the savings effected by operating a plant condensing instead of noncondensing and shows several typical installations of the condensers made by this company. A table giving the gain in horsepower capacity by increasing the vacuum by 1 in. for various sizes of engines operating at different piston speeds is given.

Convertible Dump Cars.—Ernst Wiener Company, 50 Church street, New York City. Circular. Calls attention to the Shelton convertible dump cars which this company has acquired the exclusive right to manufacture for use on narrow gauge railroads. As its name indicates, the car is one having the superstructure of a gondola, box or stock car and a flat bottom which can be converted into a hopper of the regular type. The special advantages of the car are that the usual devices for securing the doors while the cars are being loaded have been dispensed with and covering the dumping mechanism so that it does not interfere with the load in any way.

Electric Generators.—Triumph Electric Company, Cincinnati, Ohio. Bulletin No. 461, superseding No. 281. Covers the line of engine type direct current generators which this company builds in sizes ranging from 30 to 1000 kw. The construction of the various parts is described at length and the text is supplemented by illustrations.

Automatic Screw Machine Work.—National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. The piece is a cap screw with a hexagonal head and the illustrations show the operations performed in each of the four positions of the machine. Hexagonal bar stock is used and in the first position the body was milled half way and the point finished while the side tool formed the head. The milling of the body was finished as the threads were being cut by the die, and when this

was done the side tool cut the screw from the bar. This piece is offered as a typical example of the work it is possible to do on the Acme automatic multiple spindle screw machine. The simultaneous working of all the tools reduces the time required, and the time for the completion of any piece is never longer than that required for the longest operation on it.

Asphalt Floors.—The American Asphaltum & Rubber Company, 600 Harvester Building, Chicago, Ill. Pamphlet. Deals with the use of Asphalt Mastic floors, which are water and acid proof, dustless and noiseless and can be relaid at a small cost by breaking the floor up into small pieces, adding a small amount of new asphalt and remelting. They can be used in all classes of buildings, and the engravings show floors laid in depots, industrial plants, packing houses, breweries and office buildings.

Turbine Blowers.—Exeter Machine Works, Exeter, N. H. Circular. Contains a report of a test made at the Boston Woven Hose Company, where one of these blowers was used to supply the forced draft.

Traction Engines and Threshing Machinery.—The Heilman Machine Works, Pine and First streets, Evansville, Ind. Catalogue No. 64. Treats of a line of traction engines and threshing machines and in addition illustrates self-contained, Corliss and hoisting engines and a variety of sawmills and accessories.

Valves.—McNab & Harlin Mfg. Company, New York City. Folder. Describes a line of outside screw and yoke valves having iron bodies and bronze stems. The exterior of the valve is shown and a line drawing illustrates its construction.

Air Compressors.—Sullivan Machinery Company, Chicago, Ill. Bulletin No. 58J. Devoted to the WB-2 air compressor, which is of the horizontal straight line pattern with a simple steam and two-stage air cylinders. A detailed illustrated description of the machine is given and this is followed by a table giving the dimensions and the weights of the different sizes. The advantages of two-stage compression are pointed out and a table showing the gain in the amount of power required to compress 100 cu. ft. of free air to various pressures by the two-stage process as compared with single-stage compression completes the bulletin.

Internal Combustion Engine.—International Harvester Company of America, Inc., Chicago, Ill. Pamphlet entitled "Engine Operator's Guide." This is the third edition of a pamphlet which is designed to place at the disposal of every engine operator and owner reliable information concerning internal combustion engine troubles. The construction, installation and adjustment of these engines is first described, followed by a list of the various kinds of trouble experienced and their remedies. Hints on the care of an engine and starting and stopping it are also given. A few illustrations of the different types of internal combustion engines made by this company complete the pamphlet.

Sawmill and Woodworking Machinery.—Salem Iron Works, Winston-Salem, N. C. Catalogue No. 40. This is the company's 1911 catalogue, illustrating and describing the Hustler line of sawmills, planers, matchers, molders and other woodworking machinery. In the majority of cases the illustrations and the descriptions occupy facing pages and brief tables of specifications are included.

Car and Track Jacks.—Templeton, Kenly & Co., Ltd., Sloan street and C. & N. W. Ry., Chicago, Ill. Catalogue No. 13. Points out the advantages of using the Simplex jack for railroad, contractors', engineers' and industrial plant work. The various types of jacks are shown and an illustrated list of repair parts with prices completes the catalogue.

Eugene Meyer, Jr., & Co., 7 Wall street, New York, have issued "A Comparative Statement of Operations" of the United States Steel Corporation, which brings up to date a booklet on the corporation's finances, issued by that firm in May 1909. The new sheet covers nine full fiscal years of the corporation's existence, excluding the nine months of 1901. The figures are so arranged as to give a complete plotting of the total business, net earnings, dividends, stock and bond issues and other details for the period named.

Henry R. Merton & Co., Ltd., London, England, report the total stock of copper in England and France on April 15 at 79,603 tons, against 82,267 tons March 31. The stocks of copper in these countries have shown a continuous decline from February 28, 1910, when they stood at 113,455 tons.

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., has moved into its new five-story office and laboratory building at the corner of Seventh and Bedford avenues, where it will have more complete facilities for looking after its clients. This plant is claimed to be the largest of its kind in the country.

The Machinery Markets

The machinery demand has improved in Cleveland, Cincinnati and on the Pacific Coast. In other machinery selling centers business is not so brisk. In Cleveland the trade is bidding on a list of 70 machines required by the American Steel & Wire Company, and the New York Central lines are asking for quotations on 10 tools. Good orders were placed there during the week and the purchases were made in lots of four or five tools. The export business is especially active in Cincinnati, where it exceeds the domestic demand. The call for second-hand machinery in that market is good. On the Pacific Coast the business is pretty thoroughly scattered, as the demand is quite general. Inquiries for logging and lumber equipment have increased, and there is a better demand for agricultural machinery and traction engines. Three small railroad lists are out in Chicago, and, while actual sales have not improved there, the market has a strong undertone. Business has fallen off in the New York market, and conditions in Philadelphia are quiet, although a better movement in second-hand equipment is reported in the latter city. In Baltimore there is an immediate demand for wood-working machinery and special machinery. The automobile manufacturers have been active in Detroit and some good sales were made for foreign accounts. New England machinery dealers and manufacturers are watching the Boston & Maine Railroad, as a list from that source is expected. Other good business is in sight there, but the immediate demand is not very brisk. Unfavorable weather conditions in the South have affected trade slightly, although electrical equipment is in fair demand there.

New York

NEW YORK, May 3, 1911.

April was a good month for many New York machinery houses, but in most cases the month's business did not total as large as did that of March. During the last week inquiries fell off and aside from the large lists which have been mentioned in these columns during the last four weeks there was little to occupy the attention of machinery men. The list of the American Steel & Wire Company, which was issued from Cleveland, does not seem to be very generally distributed. It is judged from the tone of the inquiries that the orders will be placed in the Cleveland market, but the New York trade is bidding on the requirements for the Worcester plant, and some houses are quoting on the equipment needed for the plant at Corey, Ala. It is generally believed that the list now out will be followed by specifications for additional requirements. Most of the bids are now in for the large list of machine tools issued by the Board of Education of Yonkers, N. Y., but the trade is informed that the contracts will not be awarded until May 30. The export demand for machine tools and special automatics continues excellent. The foundry trade is quiet and several firms in this vicinity who do a foundry jobbing business report that they are operating at about 60 per cent. of their capacity. Inquiries in that line are fairly good, but buyers do not seem to want to commit themselves to the extent of placing orders for castings for delivery over any great length of time. In other words many machinery manufacturers who usually buy castings for stock are now placing orders for material for use only as they need it.

The Central Railroad of New Jersey, with main offices at 143 Liberty street, New York, whose car shops at Elizabeth were recently burned, proposes to build new shops near its present locomotive shops adjacent to the Elizabethport station. Plans are now being prepared for the structures, and it is announced that shops will be built much larger than the buildings that were burned.

The Newark Gear Cutting Machine Company, 68 Union street, Newark, N. J., is erecting a 100-ft., single story, brick extension to its factory. The floor will be of concrete covered with a wood surface. The extension will be used chiefly for assembling purposes in the manufacture of its line of gear cutting machines which the company makes a specialty of. The majority of the tools have been ordered.

Not much new mechanical equipment will be purchased for the new Sibley shops now being erected at Ithaca, N. Y., by the Cornell University. It is stated by the University authorities that the old shops are very well equipped, and the material in them will be moved to the new building when it is completed.

The Radial Reflector Company, 352 West Thirteenth street, New York, has organized a department for doing light and heavy sheet metal forming and stamping for the trade.

The Delaware, Lackawanna & Western Railroad Company is asking for bids on power equipment to be delivered to its coal mining department. The company is buying six Corliss engines with all accessories. Two engines are to

be capable of producing 250 hp. and the other four are smaller machines.

The Cattaraugus Tanning Company, Olean, N. Y., is arranging to build a two-story addition to its tannery.

The Kerr Turbine Company, Wellsville, N. Y., will soon award the contract for a one-story addition to its factory, 100 x 100 ft.

The Crescent Tool Company, Jamestown, N. Y., will build and equip a two-story addition, 50 x 132 ft., to its plant on Harrison street, and will also erect a new office building. Karl Peterson is president of the company.

The Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., will soon start the construction on an addition to its factory, 76 x 130 ft., one story. Some additional machinery equipment will be required.

The Wright Health Underwear Company, Troy, N. Y., is taking bids for a four-story mill, 50 x 100 ft., which it will erect on Second avenue North.

The Ideal Furniture Company, C. W. North, manager, Jamestown, N. Y., is arranging for an addition, 55 x 66 ft., two stories, to be built at its plant, for which some new equipment will be required.

The Cleveland Worsteds Mills is building at its Jamestown, N. Y., plant, located at Falconer, a power house, 90 x 140 ft., one story, and will soon arrange for its equipment.

The Weeks Scale Company, Buffalo, N. Y., is planning for the building and equipping of a new factory building about 32 x 132 ft., two stories, to meet the requirements of its increasing export trade.

The Ahlstrom Piano Company, Jamestown, N. Y., will add to its manufacturing plant on East Second street a five-story and a two-story factory building.

The Knox Gelatine Company, Johnstown, N. Y., will soon commence the erection of a four-story and basement factory building, 60 x 125 ft., to cost with equipment about \$50,000.

The Sanitary Machine Company has been incorporated at Buffalo, N. Y., with a capital stock of \$25,000 to manufacture machines for the automatic extraction of grease, fertilizer products and other by-products from city garbage and to build and operate garbage reduction plants in cities. W. D. Huntington, general manager of the Buffalo Fertilizer Company is president of the new company; Henry Thieroff, chemist and superintendent of the Buffalo Fertilizer Company, vice-president; and William H. Hotchkiss, secretary and treasurer. The offices of the company are at 62 and 64 Pearl street, Buffalo.

A special election is to be held at Olean, N. Y., this week to vote on the matter of a bond issue of \$75,000 for the construction of an electric lighting plant. John Gaynor is city engineer.

The Union Cutlery Company, Olean, N. Y., has let the contract for the erection of two additional factory buildings. W. R. Brown is president of the company.

Catalogues Wanted

The Canadian Steel Foundries Company, Ltd., Willard, Ont., intends installing additional manufacturing equipment in its rolling mill and steel foundry. The company is organizing a local purchasing department and desires to receive catalogues on machinery and mill supplies.

The Miller-Sandy Machinery Company, Kansas City, Mo., desires catalogues of manufacturers of machine tools, boilers, engines, pumps and machinists' supplies.

THE MACHINERY MARKETS

Chicago

CHICAGO, ILL., May 2, 1911.

Sales in the past week have not improved, but a stronger undertone is noted in the market, and floor sales have shown an improvement in small items. While the total of the week's business has not been great, inquiries have been such that most business places of this nature have put on an encouraging busy appearance. There has been some scarcity of good second-hand machine tools in this district, and a considerable quantity has been shipped in during the past week from Cincinnati. The quietness of the past few weeks is reflected in dealers' stocks, which are quite generally trimmed down to the necessities of the day. With quiet sales it has been but natural that machinery houses should curtail their purchases, and while this policy has been somewhat hard on the manufacturers, it puts retail stocks in a healthy, clean condition not always prevalent when business is rushing. The visit of the electrical and mechanical engineering classes, with their instructors, from the Ohio State University, was an interesting feature of the week. While in this city the Ohio visitors were entertained one afternoon by the Marshall-Huschart Machinery Company in its beautifully equipped store. Practically every machine on the sample floors was operated for the benefit of the students, and the demonstrations were keenly interesting and instructive. No extremely large railroad business has developed recently, although encouragement is found in two small lists issued by the Northwestern and Rock Island railroads. The Illinois Central is also out with a list approximating \$8000.

The Tri-City Pattern & Machine Company, Moline, Ill., has changed its name to the Reynolds Pattern & Machine Company. It has increased its capital stock from \$2400 to \$30,000.

The Peoria Artificial Ice Company, Peoria, Ill., has increased its capital stock from \$15,000 to \$60,000.

The Inter-County Light & Power Company, Elmwood, Wis., is contemplating the installation of a 50-kw., single-phase, substation on the Menominee-Red Wing transmission line, stepping the voltage down directly from 33,000 volts to a 220-volt distributing system.

The Proctor Water & Light Company, Proctor, Minn., has been granted a franchise to install a water works system.

Webster City, Iowa, will hold an election on May 22 for the purpose of voting bonds in the amount of \$25,000 for the purpose of purchasing boilers, engines, machinery and electrical apparatus for the improvement, extension and general equipment of its electric light and power plant.

Bonds in the sum of \$15,000 have been issued by Gilmore City, Iowa, for the installation of a water works system.

Pierpont, S. D., has voted bonds amounting to \$3500 for new water mains.

The Faith Light & Power Company, Faith, S. D., has been granted a franchise to install an electric light and central heating plant. The plant will be a single-phase alternating current, and will cost \$10,000.

The Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has under consideration the erection of new car barns and shops, definite plans for which have not been decided upon.

Owing to the efforts of a mob to tear up its railroad switches, the Seymour Mfg. Company, Seymour, Ind., is considering removing its plant, and has been in communication with the New Albany Commercial Club, New Albany, Ind., with reference to establishing itself there.

St. Louis

ST. LOUIS, Mo., May 1, 1911.

Business is very quiet here, and machinery dealers are becoming convinced that a dull summer may be expected.

The Mississippi Glass Company has placed an order for a 40-ton electric crane.

Orders have been closed for most of the equipment for a new street car manufacturing plant to be started at a point in North Carolina, which is backed by St. Louis capital.

A large new modern factory plant covering half a block for the Columbia Incandescent Lamp Company, is now nearing completion in the new factory district along the Wabash west tracks. This will be operated in addition to the present plant of the company, which will continue in service.

The Hydro Bursh Mfg. Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are C. Arthur Lewis, Henry W. Lewis and Edward E. Billups. The company will engage in general brush manufacturing.

The St. Louis Automobile & Engine Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are W. D. Williams, Charles F. Keene and F. H. Braden.

The Modern Auto Repair & Reconstruction Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are E. A. Freund, A. E. Roemmich, Charles Less and others.

The plant of the National Clock & Electric Company, St. Louis, situated at 2207 Pine street, was damaged by fire April 23, to the extent of about \$5000. The company manufactures electric clocks and thermostats. It will move to Thirteenth and Pine streets, as it had intended to do before the fire.

The American Roofing Company, Kansas City, Mo., has been incorporated with a capital stock of \$150,000. The incorporators are Robert Glendinning, John Logan and David S. Barbour.

Princeton, Mo., is considering the extension of its water works system. Improvements are also being considered for its light plant, and a new dynamo and pump will probably be installed.

Anselmo, Neb., has voted bonds in the sum of \$7000 for the installation of a water works system.

Bonds have been issued by Horton, Kan., for the purchase of the plant owned by the Horton Water & Light Company, but the plant will not be taken over until the bonds have been disposed of. A thorough investigation of the plant will be made, together with the necessary improvements.

Cleveland

CLEVELAND, OHIO, May 2, 1911.

Business with the local machine tool dealers has improved considerably during the week. Quite a fair volume of business in small lots of from two to four or five tools came out. During the previous few weeks there was seldom an order for more than a single tool. The interest of the trade centers in the inquiry of the American Steel & Wire Company. There are about 70 machine tools on this list. The new equipment will be distributed among the various plants of the company. The New York Central Lines have a list of 10 tools for a dock shop at Ashtabula Harbor, and another list of about the same size is expected shortly for a similar shop at the same point. Some of the local manufacturers in metal working lines have just announced plans for enlarging their plants and these with other plant extensions and new plants not yet announced, all of which will require machinery equipment, make more business in prospect than at any previous time this year.

The demand for electrical equipment is quite active, a good volume of business coming from traction companies and other sources. Specifications have just come out for the electrical equipment for the new main generating plant and six substations to be built by the Northern Ohio Traction & Light Company. This company has also decided to build a hydroelectric plant near its main generating plant at Cuyahoga Falls. It is estimated that the company will spend between \$2,000,000 and \$3,000,000 in replacing its present power plants.

The New York Central Lines have issued the following list of machine tools for one of the new machine shops to be erected on the docks at Ashtabula Harbor:

One 24-in. back geared crank shaper, motor driven.
One 30-in. throat combination punch and shear, motor driven.
One 32 x 56 in. swing sliding bed cap lathe, motor driven.
One 20-in. sensitive drill press, motor driven.
One 3-in. arm radial drill, motor driven.
One double wheel dry drill grinder, motor driven.
One double emery wheel, motor driven.
One 600-lb. single frame hammer.
One forge fire blower, motor driven.
One 17-in. power hack saw.

Another machine shop, to be built on the Ashtabula docks, it is understood, will be erected by the Pittsburgh & Conneaut Dock Company. The list of its machinery requirements is not yet out.

The Cleveland Construction Company, 606 Citizens Building, Cleveland, has issued specifications for the electrical equipment for the main power plant to be erected by the Northern Ohio Traction & Light Company near Cuyahoga Falls, Ohio, and for equipment for six substations, to be built at various points along the line. At the main generating station there will be required two turbo generators, each 5000-kw., 3-phase, 25-cycle; two turbo exciters, each 125 kw., 125 volt; nine raising transformers; one motor generating set for lighting, three outgoing lines, 13,200 volts, 3000 kw. each; three transformers for auxiliary motors and one transformer for lighting. A large amount of equipment will also be required for the substations, including rotary converters, transformers, switchboards, &c. The traction

THE MACHINERY MARKETS

company will also build a hydroelectric plant a short distance from its main generating plant, specifications for the equipment of which have not yet been prepared. The contract for the boilers for the main plant has been placed with the Babcock & Wilcox Company.

W. D. Sayle, president of the Cleveland Punch & Shear Works Company, Cleveland, Ohio, has purchased from W. D. Smith a controlling interest in the Ohio Machine & Tool Company, Kenton, Ohio, builder of planers and shapers. The company has been reorganized by the election of the following offices: President, W. D. Sayle; vice-president, H. W. Gramlich; secretary, H. A. Wise; treasurer, Charles C. Swift; superintendent, W. D. Smith. The capacity of the plant will be increased, and it is the plan to enlarge it considerably a little later.

The Hydraulic Pressed Steel Company, Cleveland, has let contracts for the enlargement of its plant by the erection of an extension, 80 x 140 ft., and four stories. The building will be of brick and steel construction. Considerable new machinery will be required, including presses and machine tools.

The Cleveland Foundry Company, Cleveland, Ohio, has awarded a contract to Andrew Dall & Son, Cleveland, for the erection of a six-story addition to its plant, 60 x 152 ft. It will be of steel and mill construction. It will be used for manufacturing purposes to increase its output of stoves. Specifications for the machinery requirements have not been prepared.

The Westman Motor Truck Company, Cleveland, has been incorporated with a capital stock of \$200,000, to manufacture motor trucks. The company has a temporary plant at 11,008 Sturtevant avenue, S. E. It is planning the erection of a large plant in Cleveland or elsewhere as soon as a site is decided upon. L. A. Westman is president.

The U. S. Automatic Company, Amherst, Ohio, will build a one story addition to its plant of brick and steel construction, 50 x 70 ft. with basement extending under the main building, doubling its present capacity. The company has recently increased its capital stock from \$50,000 to \$100,000. The company makes screw machine products.

Specifications for electrical equipment for the ore handling plant to be erected in Cleveland by the Pennsylvania Railroad, have been issued by George Demorest, engineer of the Pennsylvania Lines, West, Ft. Wayne, Ind. A 1000-kw. unit and some motors will be required.

Two 150 kw. generators and one 75 kw. generator will be required for the new warehouse of the Williams Edwards Company, Cleveland. The equipment will be purchased by W. S. Lougee, architect, American Trust Building.

The Brookside Machine & Repair Company, recently incorporated, has built a plant at Clark avenue and West Forty-first street, Cleveland, for the manufacture of gasoline and gas engines for motor boats.

The Tyler Furnace & Mfg. Company, Cleveland, recently incorporated with a capital stock of \$10,000, will build a plant for the manufacture of a warm air furnace. The officers are as follows: President, L. R. Dunham; vice-president, J. B. Corlett; secretary and treasurer, H. J. Probeck; general manager, E. W. Tyler.

The Board of Trustees of the Dayton State Hospital, Dayton, Ohio, will receive bids May 23 for a 250-kw. direct current generator, direct connected to slow speed Corliss engine.

The American Fork & Hoe Company, Cleveland, Ohio, has under consideration the erection of a large addition to the machine shop at its plant at Ashtabula, Ohio, but announces that the extension will not be built during the present year.

New England

BOSTON, MASS., May 2, 1911.

The striking news of the week is the purchase by the Potter & Johnston Machine Company, Pawtucket, R. I., of a controlling interest in the business of the Windsor Machine Company, Windsor, Vt., manufacture of the Gridley turret machines. The union is a most appropriate one, the Potter & Johnston machines making with the bar machines of the Windsor Company a very complete line.

Trade is not brisk. The machinery dealers are doing some business, but they could do a great deal more. The Boston & Maine list for the Concord shops should be out very soon, and it will be a good one. Some other good business is in sight. But the general run of buyers are waiting. The banking interests find difficulty in explaining present day conditions. Money is very easy. Credits are in excellent shape, the bank men state. The effects are shown of most excellent general conditions. Following the slump of 1898 the banks took up the task of compelling a more careful development in the business of their customers, hold-

ing back credits and discouraging everything but consistent business methods. The result is that manufacturing houses are ready financially to go ahead, with ample resources, when trade shall pick up again, and develop a full market. The wire people of this section are having a first-rate business. While the demand for tonnage products is not especially brisk, the market for specialties is exceedingly good, pretty much all along the line.

The Potter & Johnston Machine Company, Pawtucket, R. I., has acquired a controlling interest in the Windsor Machine Company, Windsor, Vt. A new board of officers of the latter corporation has been elected, with James C. Potter as president, and Maxwell Evarts, Windsor, and John Johnston as vice-presidents. Mr. Potter succeeds Charles A. Moore of Manning, Maxwell & Moore, New York, who retains a stock interest in the business. George O. Gridley, designer of the Gridley automatic, the product of the Windsor Company, will continue as manager of that business. The change in ownership will have no effect upon the personnel of the two organizations, nor is it the present intention to combine the selling departments, so far as this country is concerned. But abroad the Windsor Machine Company's products will hereafter be handled by the strong selling organization, which has been built up by the Potter & Johnston Company. The two corporations will be kept intact. The affiliation is one of much importance. The Potter & Johnston Machine Company builds a line of automatic machines which handles castings and forgings of all descriptions. The Windsor Machine Company builds the Gridley automatic, which is a bar machine. Thus the combined line is very complete. Both machines are of the highest type of modern design. The shops of the companies are among the finest in the world. That at Windsor is entirely new, and contains every possible facility for the economical production of machinery. The works at Pawtucket are practically as new; a large area has been added within two years, and the equipment throughout is of the highest class.

James C. Potter of the Potter & Johnston Company, Pawtucket, R. I., and George O. Gridley, Windsor Machine Company, Windsor, Vt., have returned from a business trip in Europe.

Much importance is attached to the announcement that the New York, New Haven & Hartford Railroad has secured joint use with the New York Central of the tracks of the Boston & Albany, which covers the important territory between those cities. In the first place, the action practically eliminates competing lines in the New England territory, the Grand Trunk and Vermont Central system being practically all that is left over which the New Haven management has no control. The Boston & Maine and Maine Central systems have been virtually absorbed by the New Haven. Of great interest to the trade is the fact that the Boston & Albany will have a Boston management. If the purchasing power comes to this city the trade should benefit, though it would prefer that the purchasing agent be separated from the New Haven. However, these details have not been announced. Probably they are not yet decided.

The Writerpress Company, Inc., Buffalo, N. Y., corroborates the statement that its entire works and its offices will be removed to Shelton, Conn. The company is not yet able to give out information as to its wants in the way of equipment.

The Billings & Spencer Company, Hartford, Conn., manufacturer of drop forgings, machinists' tools and forging machinery, states that the extension of its plant at Hartford will add about 100 per cent. to the capacity of the small tool department, and will double the capacity for the shipping and storage of finished goods. The building will be 40 x 168 ft., three stories. The company will also erect a large garage on the premises. The company's new plant at Dividend, a suburb of Hartford, is not yet in operation, but will be in the near future.

The Winchester Repeating Arms Company, New Haven, Conn., will erect a new paint and storage shop, two stories, and an addition to the testing plant to be used for offices.

It is given out in Maine that the Bangor & Aroostook Railroad will begin the construction of the so-called Alagash extension this season, involving the expenditure of \$7,750,000 and 157 miles of new track. The plans call for the construction of about 100 miles of line this summer. A great area of forest land will be opened. Charter rights held by this railroad give it a through route from St. John, N. B., to Quebec, a distance of 375 miles, as compared to the 578 miles of the present established line.

A dispatch from Canaan, Conn., states that the recently incorporated Allyndale White Marble & Lime Company, Hartford, will rebuild the plant at the J. G. Batterson marble quarry, Canaan, which was burned with a loss of \$100,000 some years ago. The latest type machinery will be installed, together with large lime kilns.

The census reports of factory growth in New England cities indicate a very satisfactory increase between the years

THE MACHINERY MARKETS

1901 and 1909. Worcester, a typical New England manufacturing city, with a wide variety of products, especially in metals, illustrates the increase. The number of establishments increased from 470 to 580, or 23 per cent.; the capital from \$49,000,000 to \$65,000,000, or 33 per cent.; the cost of materials used from \$27,000,000 to \$43,000,000, or 58 per cent.; the value of products from \$52,000,000 to \$77,000,000, or 48 per cent.; the value added by manufacture (products less cost of materials), from \$25,000,000 to \$35,000,000, or 37 per cent.; the average number of wage-earners employed during the year from 22,796 to 28,221, or 24 per cent., and the number of salaried officials and clerks from 2,043 to 3,383, or 56 per cent.

The Dosch Mfg. Company, Bridgeport, Conn., manufacturer of hardware specialties, will erect a factory building, 60 x 140 ft., one story and basement, of concrete blocks and reinforced concrete.

The name of the Bridgeport Forge Company, Bridgeport, Conn., has been changed to the Heppenstall Forge Company.

The round house and repair shop of the New York, New Haven & Hartford Railroad, at Danbury, Conn., were burned recently with a loss of \$50,000.

The Dwight Mfg. Company, Springfield, Mass., cotton goods, has awarded the contract for a mill building, 130 x 440 ft., six stories, to cost \$380,000. Other additions to general industry capacity include the K Mfg. Company, 165 Somerset street, Providence, R. I., factory 40 x 90 ft., two stories; Colored Worsted Company, Providence, addition to mill 25 x 98 ft., one story and basement; International Cotton Company, Killingly, Conn., re-equipping old mill throughout; R. N. Bassett Company, corsets, to add two stories to present buildings, and build in on intermediate space, doubling capacity; Vanderhoef & Co., South Norwalk, Conn., straw goods, three-story addition 40 x 60 ft., and an additional story on an existing structure; Pentucket Associates, Haverhill, Mass., eight-story brick factory building, for rental to shoe manufacturers; Rathbun Knitting Company, Woonsocket, R. I., addition to mill, 58 x 110 ft.; E. A. Mallory & Son, Danbury, Conn., addition 40 x 111 ft., two stories.

Detroit

DETROIT, MICH., April 29, 1911.

As a whole, April was not as satisfactory a month as March. There was not nearly so large a volume of orders, and their size generally was small. The automobile trade was quite active the past week, but the majority of the sales were foreign. Building has also been quite dull this week, the total value of proposed structures being the smallest of the month. There has been a number of new concerns to perfect organizations in this city and throughout the State, but in most cases of no considerable importance. One of the biggest contracting jobs let for some time was awarded this week, this being the dredging of the Saginaw River to the bay, involving the expenditure by the Government of about \$600,000.

The Fairview Foundry Company has voted to increase its capital stock from \$100,000 to \$200,000. The company recently purchased a large site in the Fox Creek subdivision of this city, and it is understood it will enlarge the plant.

The Albert F. Pudrith Company, a manufacturing concern, has been incorporated with a capital stock of \$100,000. The plant will be located in this city.

A pattern making company, to be known as the American Pattern Works, has perfected its organization, and will start business in this city on a small basis at first, increasing its capacity as business warrants.

The plant of the Newbro Herpicide Company, maker of hair medicine, was practically destroyed by fire April 23. The burned portion will be rebuilt immediately.

The Detroit Automatic Telephone Company has filed articles of incorporation. The company has a capital stock of \$250,000, and will put on the market a telephone designed to carry sound as far as 3000 miles.

Some changes and enlargements are under way in Jackson, by the Lewis Spring & Axle Company and the Standard Electric Car Company. The former will group its several scattered plant at one central site, involving the erection of large additions. The places vacated by it will be occupied by the latter concern. Both will install considerable new equipment.

The Big Rapids Electric Company has increased its capital stock for the purpose of enlarging its operations. The former capital stock of \$35,000 has been increased to \$50,000.

W. E. Stevens, Charlevoix, Mich., has begun the erection of a large new and modern sawmill on the site of the one burned several months ago. The plant will be fully equipped.

The Duryea Automobile Company has decided to move its large plant from Reading, Pa., to Saginaw, Mich. The matter has been in the hands of the Saginaw Board of Trade for some time. The company has a capital stock of \$300,000, and will purchase buildings and six acres of land of the Brooks Boat Company.

The Big Four Railroad Company suffered the loss by fire of its roundhouse and four engines at Benton Harbor this week. The loss will reach about \$50,000.

The Buick Motor Car Company, Flint, Mich., will erect a brass foundry as an addition to its present plant.

The Williams Bros. Company, Manton, Mich., will move its factory to the city of Cadillac. The company is engaged in the last block business.

The Traverse City Canning Company, Traverse City, Mich., has been organized, and proposes to expend about \$10,000 on canning machines. L. F. Mikesell of Shelby, Mich., has the controlling interest.

Lansing butchers and meat men are to have a modern abattoir to cost about \$60,000. The plant will be equipped with machinery to make use of all the waste material. Judge Edward Cahill has the matter in hand.

The lighting plant of the village of Milan, Mich., has been sold to the Edison Power & Electric Company. Considerable improvements will be made.

The Reed City Veneer plant, which was burned some weeks ago, will be rebuilt. Sufficient capital has been subscribed to insure the project, and work will be commenced immediately. The matter is in the hands of the Commercial Club.

E. M. Barnes, an inventor of vacuum cleaners, has leased a factory building at Hastings, which he will equip for the manufacture of his product.

The Fremont Canning Company, with a plant at Fremont, Mich., is planning to move to Big Rapids. The Board of Trade at the latter city has purchased the Armour factory building for industrial purposes, to be used in connection with new enterprises.

Edward G. Lanier and I. S. Harrington, Monroe, Mich., have purchased the Waterloo Woolen Mills, and propose to make extensive additions, for the manufacture of woolen products on a large scale.

The Jones Sanitary Flusher Company of this city has changed its name to the Excello Products Company.

The Remy Electric Company of this city has made a large increase in its capital stock for the purpose of extending its business. The former capital stock has been raised from \$100,000 to \$1,000,000.

Another increase of considerable importance is the raising of the capital stock of the Grand Rapids Paper Company from \$36,000 to \$100,000. The added capital will be used for improvements.

The Harriman Mfg. Company, Chicago, will move its plant to South Haven, Mich., where new structures will be built on an enlarged scale.

The Aero-Thermol Evaporator Company of this city has been organized with a capital stock of \$10,000. H. M. Dubois has the controlling interest.

A new machinery company of this city has filed articles of incorporation, under the name of the Kerwin Machine Company. The capital stock is placed at \$100,000.

Cincinnati

CINCINNATI, OHIO, May 2, 1911.

Manufacturers in this territory who have diligently sought export business in the past are now being rewarded. Orders for different kinds of machine tools have lately been coming in freely, and with a number of local houses the export trade is better than that from domestic customers. However, during the latter part of last week, there was some improvement in business from the domestic trade noted by almost every manufacturing firm in this vicinity. Machine tool builders, who have been neglecting the Spanish-American field, centering their energies on European and other foreign territory, recently had their attention called by A. Polhamus, Cuban consul at New Orleans, to the number of tools used in a repair shop of a sugar central in Cuba. Practically every large central not only has to keep in repair the machinery in the mill, but also a number of cars and locomotives; all of which work requires the best kind of shop equipment. The mines in Central and South America are also large users of power equipment and machine tools, and this particular field is now receiving attention.

Second-hand machinery is moving fairly well, with the demand still centered on the smaller sizes of machine tools.

The Fairbanks-Morse Company is now established in its new quarters at Eighth and Main streets, Cincinnati, and recently has acquired additional warehouse space by leasing

THE MACHINERY MARKETS

part of the Broadway Building, which will be used for storage purposes only.

Smith & Mills, machine tool manufacturers, Cincinnati, are now supplying the export trade with a large number of their shapers. Recent orders received are from Europe, Australia and Japan.

The recently mentioned additions to the plant of the Portsmouth Steel Company, Portsmouth, Ohio, are nearing completion; the new sheet mill is practically finished, and is expected to be in operation about July 1.

The Patented Specialties Mfg. Company is a new incorporation in Cincinnati, with \$10,000 capital stock. It is the company's purpose to manufacture fireproof steel sash. Practically all the necessary equipment has been provided for, and the new plant will be in full operation within 30 days. Headquarters are at 1610 Reading Road. The incorporators are John A. Jones, B. L. Heidingsfeld, Alphonse Reisenburg, Frank G. Jones and Gilbert Bettman.

The new plant of the United States Electrical Tool Company, Cincinnati, is nearing completion, and the company expects to move into its new quarters about June 1. It reports export business recently as being very good, and among recent orders booked is one for 28 of its larger sized drills for a shipyard in England.

The Miami Paper Novelty Company has leased a factory building on Colerain avenue, Cincinnati, and will move into the new quarters at an early date. Very little new equipment will be needed.

The Phillemac Rolling Mill Company, Cincinnati, advises that its capital stock has been increased from \$75,000 to \$125,000 in order to take care of additions being made to its plant that will increase its daily capacity to 2200 tons of bars. All equipment has been purchased.

The American Valve & Meter Company, Cincinnati, is now moving its machinery into the new plant on Spring Grove avenue, which will be in full operation within 30 days.

The Platt Iron Works Company, Dayton, Ohio, has lately received an order from the American Cotton Oil Company for machinery to equip an oil mill that will be erected in the South.

The Rahn-Larmon Company, Cincinnati, is shipping a number of its new gap lathes to the Pacific Coast.

The Whitaker Paper Company, Cincinnati, will build a large garage on Eggleston avenue, in connection with which will be a small repair shop.

The local members of the National Association of Manufacturers will have a conference at the Sinton Hotel May 8. A luncheon will be served, and among the principal subjects that will be discussed is that of the proposed Ohio employers' liability law now before the State Legislature. Thomas P. Eagan, ex-president of the association, is chairman of the Cincinnati Committee, and the following well-known manufacturers will be associated with him: Fred. A. Geier, William Lodge, Harry T. Atkins, Murray Shipley and James S. Taylor. John H. Kirby, president of the association, will be the guest of honor.

H. F. Roush, of the Roush-White Foundry & Machine Company, which is to establish a plant at Stuttgart, Ark., is receiving prices on machine shop equipment at Hillsboro, Ohio, the present address of the company. The equipment includes lathes, planers, shapers, drill presses, saws, visors, &c., as well as two motors, a three-ton cupola and other foundry equipment.

Philadelphia

PHILADELPHIA, Pa., May 1, 1911.

Continued quietness characterizes the market for both machinery and tools. Reports received from manufacturers and merchants, would appear to indicate that the volume of business transacted was even smaller than during the preceding week, and the month's total has been far from satisfactory. One or two propositions, including that of the Harrisburg Boiler & Mfg. Company, Harrisburg, Pa., for machine shop equipment, and of the Baltimore Gas Appliance & Mfg. Company, Baltimore, Md., for both foundry and general machinery equipment, are the only lists of any size before the trade, the general demand being confined to single tool propositions, while fresh inquiry for the latter class of business has not been as extensive as it was early in April. The railroad demand has been almost at a standstill, the retrenchment policy being closely followed by the roads in this district. Machine tool buying on the part of the large iron and steel interests and industrial establishments shows little promise of immediate betterment, as in many instances these plants have experienced a decline in activity. The

general consumer hesitates before placing any orders for extensive equipment, waiting until a clearer insight into the future can be had. A somewhat better movement in second-hand tool equipment is reported, a better supply of modern tools having recently come into the local market; business in second-hand equipment has, in instances, taken precedent over that for new tools. Special tool makers note an irregular demand, with but a small proportion of the orders placed coming from buyers in this immediate vicinity. Builders of power equipment, particularly boilers and engines of the smaller capacities, report a fair demand, but in few instances are plants very fully engaged. The foundry trade continues irregular.

The Pennsylvania Railroad has sent out inquiries during the week for a 12-in. grinder.

The organic Chemical Mfg. Company, 2559 Sydenham street, has had plans prepared by Guy King, architect, for a group of reinforced concrete buildings to be erected at Fort Washington, Pa. Present plans are understood to call for a building 40 x 120 ft., with a wing 32 x 34 ft. Particulars regarding equipment required are not available at this time.

The Philadelphia & Reading Railway is asking for proposals, which will be received until May 10, for further work appurtenant to the abolishing of grade crossings on the Richmond Branch Elevated. Contract No. 24 covers masonry, walls and abutments between Trenton avenue and Richmond street, while Contract No. 25 pertains to bridges, ready for ballast over Aramingo avenue, Belgrade and Thompson streets. Plans, specifications and forms for bidding are to be obtained, on payment of a deposit, refunded on return, by applying to the office of Chief Engineer W. Hunter, room 520, Reading Terminal.

Rowland Firth & Son, founders and machinists, Phillipsburg, N. J., will take bids next week for the erection and equipment of a new steel foundry, to be built on ground adjacent to their present plant. The main foundry will be 102 x 103 ft., and an adjoining building 29 x 40 ft., for the housing of the open hearth furnace. A 10-ton open hearth furnace will be installed, operated by fuel oil, and a tank of 20,000-gal. capacity will be used for storage purposes. The new plant is expected to be in operation during the coming summer.

The Mitchell & Van Meter Company, Pottstown, Pa., is planning a one-story brick addition to its plant, 40 x 84 ft. Contractors in this city are figuring on the work, but particulars are not available.

The Bureau of Surveys, City of Philadelphia, will open bids on May 9 for work on three important city bridges. These include the Chestnut Street bridge, which is to be widened, and for which previous bids were in excess of the appropriation; a bridge on the line of Springfield avenue, crossing the Philadelphia & Baltimore Central Railway, for which \$40,000 is available, and for additional work required by the War Department, in connection with the Passunk avenue bridge. Particulars regarding these projects are to be had on application to the office of the Bureau of Surveys, City Hall.

The Receivers of the Doylestown Sewerage Company will receive sealed bids on May 5 for the reconstruction of the disposal beds at Doylestown, Pa., in accordance with plans and specifications prepared by Harrison & Schreiber, and approved by the State Department of Health. Copies of the specifications may be seen at the office of the Receivers, Hart Building, Doylestown, Pa., or at the office of the engineers, 2215 Land Title Building, Philadelphia, Pa.

It is reported that F. W. Tunnell & Co., Wheatsheaf Lane and Gaul streets, have purchased a tract of land in the vicinity of Marcus Hook, Pa., on the Delaware River below Chester, Pa., aggregating 20 acres. They manufacture fertilizers and glue, and while no particulars are available at the time, they will, it is stated, erect a large plant on the site acquired.

A. H. & F. H. Lippincott, manufacturers of soda water apparatus, have purchased the John Baird marble yard at Twenty-fourth and Locust streets and extending to the Schuylkill River, at which location they will concentrate their various plants in this city. The facilities for marble work will be enlarged and rearranged to suit their business. A four-story re-enforced concrete factory is also to be erected to accommodate the company's machine and brass shops, woodwork finishing department and fitting and other departments. Some additional equipment will ultimately be required, but the project is not sufficiently advanced to enable this matter to be considered.

The Frankford Arsenal, Frankford, Philadelphia, will take bids until May 5 for supplies to be furnished during the fiscal year ending June 30, 1912. Included among the items are steel and iron, sheet tin and zinc, pig lead and tin, iron castings, cartridge metals, electrical supplies, leather belting and laces, tools and miscellaneous articles. Information may be had from the commanding officer.

THE MACHINERY MARKETS

Baltimore

BALTIMORE, Md., May 1, 1911.

With but a few exceptions the demand for machinery and tools shows a slight falling off when compared with that in March. The same conditions are reported in general industrial lines. In a few instances plants are fairly well engaged, but it is the exception, rather than the rule, to find builders of tools, machinery or fabricators or structural work operating at normal capacity. The demand for machine tools has been somewhat scattered and merchants report but few cases where any material list of tools has been purchased. The most important project now before the trade is the equipment for the new plant of the Baltimore Gas Appliance & Mfg. Company, details of which are given later. Some little business in woodworking machinery has been transacted, while a moderate demand for special machinery is reported. Bids are being asked for work in various departments for the City Government, but little of that recently out has been of interest to the machinery trade. With the opening up of the spring season the demand for contractors' tools and equipment has been a trifle broader. Less building work of any important size has developed and fabricators of structural work are not particularly encouraged with the outlook in this immediate vicinity. Estimating is under way for some fair sized buildings in Washington, D. C., and in the South, but competition is sharp and at the present price level some of the fabricators in this district are practically out of the market. There is still considerable figuring being done on power equipment as well as heating and ventilating projects. In several cases fair orders for power plants are reported, but the major portion of the equipment taken has been the smaller horsepower. The foundry trade is generally reported dull. Machine tool supplies have been a trifle more active, and a fair demand for some classes of second-hand machine tools is reported.

The Boston Iron & Metal Company, 305 North Holiday street, has acquired an acre of ground between First and Second streets, Highlandtown, on the Pennsylvania Railroad, where it is engaged in equipping a scrap yard, having a capacity of 75 to 100 tons a day. A frame building, 80 x 150 ft., is being erected to house the necessary machinery, which has already been purchased. The new plant will be operated in addition to the present yard at the first named location.

An addition to the heating plant of the Baltimore Bargain House, to serve one of the new sections of its warehouse, is being figured on.

The Ellicott Machine Company has taken on but little new work recently, although there is a slightly better inquiry for dredging machinery, with more in sight. The company's plant continues fairly busy on work under order.

The Board of Awards, City of Baltimore, will take proposals until May 10, for supplying the Department of the Superintendent of Lamps and Lighting with a quantity of ornamental lamp posts, in accordance with specifications to be had from Robert J. McCuen, Superintendent of the Department, City Hall.

The Pennsylvania Railroad Company has taken out permits for the erection of a fan house to be erected adjoining its station on Pennsylvania avenue. The building will be used for the installation of machinery necessary for the removal of smoke in its tunnels in this city.

John B. Adt has received several good orders for special tobacco working machinery for export. The domestic demand for similar equipment is also reported good. In elevator machinery the demand has been less active. The plant continues to be operated on full capacity.

The Montford Machine Casting Company has been closed for two weeks, pending arrangements for the sale of the plant. Hiram W. Friedenwald, proprietor, is retiring from business. The foundry has a capacity of 20 tons a day, is equipped with modern machinery and foundry equipment, and efforts will be made to sell the plant in its entirety.

Permits have been granted by the Building Inspectors' Office for the erection of a warehouse and storage building to be built for Swift & Co., 300 to 306 West Pratt street. The proposed structure is to be two stories, of brick, stone and steel, and with concrete foundations, measuring 68 x 75 ft. The B. F. Bennett Building Company is reported to have the contract for the general building work.

It is reported that the American Foundry Mfg. Company, Frederick, Md., with a capital stock of \$20,000, has been formed and will take over the business of the National Shutter Bar Company, of that city. The following officers are named: President, Charles Fisher; secretary-treasurer, James A. Brown. The new concern will, it is stated, also engage in the general foundry business.

The Crook-Kries Company, heating and ventilating engineer, is figuring on several good contracts, but reports actual orders of any material size as having been rather light during the past month. Current business has been made up of small orders of a general miscellaneous character. Considerable new work is under consideration but develops very slowly.

After several postponements the property and franchises of the Baltimore Refrigeration & Heating Company were sold at Trustees Sale on April 17. The plant is well equipped for the refrigerating, heating, cold storage and ice manufacturing business, and was bought in by the bondholders, who control a major portion of the shares of the company. No information as to the disposition the bondholders will make of the property is available, although it is stated that a reorganization and rehabilitation of the company is likely.

Proposals will be received at the office of the Governor of Maryland, Union Trust Building, this city, until May 8, for the construction of a power house and a building known as Cottage E, Women's Group, at the Springfield State Asylum, Sykesville, Md., according to plans and specifications prepared by Parker, Thomas & Rice, architects, Baltimore, Md. The buildings are to be of brick and stone, with concrete foundations. Henry Adams, Baltimore, Md., is the engineer.

Plans regarding the construction of the proposed industrial building at Preston and Clifton streets, have not yet been completed. Delays have been experienced in financing the project, which is in the nature of a public enterprise. Prominent members of the committee having the matter in charge express confidence that the proposition will be carried through.

The Chesapeake Iron Works notes a fair run of small business, but reports competition for fabricated structural work as very sharp. Business during April was about on the same basis as that for the previous month. Among others, orders taken included one for the steel work on the Bryan Estate Building, Richmond, Va., and another for the Plymouth Hall Apartments, in this city. A fair amount of inquiry is being estimated on, but the bulk of the new work offered is small in size.

The T. C. Bashor Company reports an increase in the volume of business taken, as compared with the previous month. Orders have probably not been so numerous, but have been individually larger. The boiler and tank shop is fully engaged, and a better volume of business is noted in its power equipment department. A contract has been closed with the Simpson & Doeller Company to install the electric light, heating and ventilating equipment in its new plant. An order for an engine and generator, 50 k.w. capacity, has been received from the Capitol Brewing Company, Washington, D. C., and a 125-hp. return tubular boiler, 14 x 78 ft., will be installed in the plant of the William Wilkins Company. A very fair amount of work of various classes is being figured on, and the outlook for future business is considered fairly good.

Dietrich Brothers have fully completed their new erecting shop and installed the necessary tools, and are now operating the new department at fairly good capacity. While the order for the steel work for the Baltimore Bargain House is now coming through, a number of smaller orders have been received, including the steel and ornamental work for a school in Highlandtown, and a fair amount of special work for a church building. The estimating department is busy on a considerable quantity of small work, the demand, on which the steel requirements run to any size, being rather light.

The Baltimore Bridge Company has taken orders for a fair amount of work for export. These include one for a single track, deck plate girder bridge of four spans, and 19 small I-beam span bridges for the Guatemala Railway, Guatemala, Central America. Domestic orders have not been so large. Contracts for additional buildings for the Tidewater Cement Company, Union Bridge, Md., requiring about 100 tons, are reported. Some little local viaduct work has also been taken, but there is an absence of any new projects of importance in this immediate territory.

The Baltimore Gas Appliance & Mfg. Company is making rapid progress in connection with the alterations of the buildings acquired at Bayard and Nanticoke streets, to adapt them for use as a modern plant for the manufacture of gas ranges and other gas appliances, with an ultimate capacity of 30,000 gas ranges per year. Plans under way include a complete foundry plant, as well as nickel plating, cleaning, mounting, pipe cutting and fitting, and sheet metal working departments. Electricity will be used throughout for power purpose, a battery of boilers already installed furnishing steam for various requirements. H. W. Hunter is president, D. C. Amidon, vice-president and treasurer, and Norman James, secretary, while M. W. Longfellow is the general superintendent. The company is now prepared to purchase

THE MACHINERY MARKETS

the equipment for the plant, as shown by the following list, the number of each item that will be purchased being reserved. H. W. Hunter and M. W. Longfellow will have charge of the purchases:

63-in. shell cupola, 63-in. shell lined up to 40 or 45 in.
Firebrick lining.
Blast gate, sliding type blast gate.
Blower, motor driven.
Large core drying oven.
Hand ladle shanks.
Cast ladle bowls.
Car trucks, pig iron coke castings.
Flask wheelbarrow.
Iron wheelbarrow for cupola.
Wood wheelbarrow.
Molders' shovels, split handle.
Coke forks.
No. 4 riddles, gal. wire.
No. 8 riddles, gal. wire.
No. 2 riddles, heavy wire.
Butt stick.
Tapping bars.
Cupola picks, two designs.
Bellows, soft leather.
Soft brushes.
Hard brushes.
Floor rammers.
Set bench hammers.
Foundry sprinkling cans.
Mallets, 1½ x 2½.
Snap flasks, about six.
Wire brushes, five-row wire.
Heavy stove plate facing.
Return facing.
Fire clay.
Molding sand.
Core lake sand.
Annealed core wire.
Facing bags.
Flask pins.
Flask hinges.
Flask clamps.
Core chaplets.
Crucibles.
Crucible tongs.
Cinder mill back of cupola.
Round mills for cleaning.
Square mills for cleaning.
Horizontal drill lathe.
Upright drill lathe.
Bench vises.
Wood patternmakers' work benches.
Band saws.

Wood trimmer.
Wood turning lathe.
Large pipe threading machine.
Pipe cutter.
Multiple drill.
Mixer face grinder.
Buffalo forge drill press.
Tapping machine, upright or horizontal.
Small speed lathe.
Sensitive drills.
Large press.
Middle size press.
Tilting press.
Wire straightener.
Horseshoe press.
Miter press notcher.
Square shear, 60-in. blades, 16-in. gauge capacity.
Foot power shear.
8-ft. brake.
3-ft. brake.
Forming roll.
Bar folder.
36-in. groover.
No. 4 beader.
18-in. deep throat lever shears.
No. 5 flanging machine.
Truck for sheet iron.
Fan and dust arrester for mills.
No. 2 stove trucks.
Emery stands for casting room.
Blacksmith forge and anvil.
Twist drill cabinet with full set of drills.
Files, all sizes.
Trimo wrenches, three sizes.
Monkey wrenches.
Drill chucks.
Glue.
Glue pots.
Grindstone.
17-in. swing engine lathe, 3 ft. 6 in. between centers.
Universal milling machine.
Shaper, 20 to 24 in. stroke.
Drill grinder.
Electric portable grinder.
Crimper.
Electric welding machine.

The South

LOUISVILLE, Ky., May 2, 1911.

There is probably not as much activity in local machinery circles this week as last, though unfavorable weather is regarded as a factor in retarding sales. Manufacturers of power equipment report that the demand has fallen off somewhat, but makers of electrical machinery have booked a good volume of business. Elevators and other equipment in connection with large buildings should be an important item in this section in the next few months.

The report that the Louisville & Nashville Railroad is intending to establish shops at Frankfort, Ky., is stated by an official of the road to be based on the fact that the repair shops of the Kentucky Highland Railroad, a short line, operating between Frankfort and Versailles, Ky., which has been taken over by the Louisville & Nashville, may be somewhat enlarged in the near future. No extensive construction is contemplated.

Plans have been completed for the 18-story office building of the Inter-Southern Life Insurance Company of Louisville, which is to be erected at Fifth and Jefferson streets. Brinton B. Davis of Louisville is the architect. The building, the construction of which has been approved by the stockholders of the company, will have its own power and heating plant, and will be equipped with five electric traction elevators.

The Kentucky Electric Company, Louisville, which is planning the expenditure of \$750,000 this year on its new plant, has let the contract for its switchboards to the General Electric Company. It will purchase shortly a 50-ton crane, and will also let a contract for a 250-ft. steel stack, lined with brick and having an inside diameter of 12 ft.

McDonald & Dodd, architects for the 10-story annex of the Weissinger-Gaulbert apartment house, announce that the contracts for the construction of the building will be let shortly. Two electric elevators are provided for. The building will be of reinforced concrete.

Kester & Heck, Chicago, have been awarded the contract for the installation of the elevators in the new Tyler Hotel, Louisville.

Plans are being completed by D. X. Murphy & Bro., Louisville, for the new Louisville city hospital, which is to cost \$1,000,000. There will be five buildings, each of which will be equipped with elevators. There will be a central

power and light plant of large capacity. John H. Leathers is chairman of the Hospital Commission.

It is stated locally that the Hugh McLean Lumber Company, Buffalo, N. Y., will rebuild its sawmill, which was recently destroyed by fire at Chattanooga, Tenn., and that the new mill will be of much larger capacity than the old. It is intended to make it fireproof, and to this end steel and concrete will be used in its construction.

The George Panke Monument Company, 630 East Jefferson street, Louisville, will install a considerable amount of polishing machinery. The contract for the equipment is to be let within the next six weeks.

Peter & Melcher, Baxter avenue and Broadway, Louisville, will enlarge the capacity of their monument cutting works. Details as to the equipment to be required have not yet been decided upon.

Steam heating plants are to be installed in four Louisville public schools. Direct radiation systems will be used in two, and the fan system in the others. Sam D. Jones is business director of the board.

The Louisville Herald has completed plans for the erection of a new building at Third and Walnut streets. The equipment to be required in the new plant will include several additional individual motors, a hydraulic lift for handling paper and other supplies, and a large freight elevator to be used between the press and stereotyping departments. W. K. McKay is in charge, and Thomas & Bohne are the architects.

John C. Haswell, Marion, Ind., has purchased a site at Thirty-first street and Alford avenue, Louisville, on the tracks of the Kentucky & Indiana Terminal Railroad Company, and it is stated on good authority that the site will be used for the establishment of a malleable iron foundry, which will be erected there early in the fall. J. C. Haswell and others associated with him control the Marion Gray Iron Foundry and the Marion Malleable Iron Company, Marion, Ind., and the Gartland Foundry, Terre Haute, Ind. The excellent railroad facilities afforded locally resulted in the decision to establish the new industry here, it is announced. The plant, details of which have not been definitely worked out, will cost in the neighborhood of \$100,000 and will employ 200 men.

The Smith Cooperage Company, Louisville, is completing the installation of equipment in its electric light plant at Livermore, Ky.

The American Machine Company, Louisville, reports a good demand for elevators. It has secured contracts for the installation of four in the Starks Building, Louisville, and two to be required by the Levering Investment Company, St. Louis.

The James Clark, Jr., Electrical Company, Louisville, has secured contracts for the installation of two 350 kw. 250-volt direct current generators in the new shops of the Louisville & Nashville at Boyles, Ala., and a 200 kw. Willey engine-type generator of 200 v.p.m. capacity at the Decatur, Ala., shops of that road. It has also received an order from the Memphis Terminal Company, Memphis, Tenn., for the installation of three 187½ k.v.a. 2300-volt generators in the power house of the company.

The Fairbanks-Morse Company has had an exhibition of motor-boat engines and equipment at its Louisville branch. The motor boat field is reported to offer excellent opportunities for the sale of engines, 300 of these boats being owned in the vicinity of Louisville.

E. D. Morton & Co., Louisville, have been made Kentucky sales agents for the line of transmission machinery manufactured by the Valley Iron Works, Williamsport, Pa.

The Brandeis Machinery & Supply Company, Louisville, has been appointed sales agent for this State of the Michigan Lubricator Company, Detroit, which manufactures automatic oiling devices.

The Consolidation Coal Company, Baltimore, Md., which has begun development work on a large scale in eastern Kentucky, where it has extensive coal and timber holdings, is building a concrete dam across Elkhorn Creek, and will develop hydro-electric power.

Considerable attention is being given the efforts of J. A. Brown to establish a model city near Henderson, Ky. It is called Mortalles, and is already equipped with a power plant, while a water works plant is planned.

The Kentucky Traction & Terminal Company has been organized at Lexington, Ky., to take over the Central Kentucky Traction Company, the Lexington Railway Company, the Bluegrass Traction Company and the Lexington Utilities Company. The merger is effective May 17. The new company will erect a \$500,000 power house at Lexington as part of the plan for improving the properties.

The electric power plant of the Proctor Coal Company, Williamsburg, Ky., will be enlarged to twice its present capacity. The company plans the installation of an electrical haulway and electrically operated mining machinery.

The J. B. Burch Hexagon Boat Wheel Company has

THE MACHINERY MARKETS

been organized at Bowling Green, Ky., for the manufacture of a patented hexagon boat wheel. The company has \$5000 capital stock. J. B. Burch and others are the incorporators.

Following the completion of the erection of a steel stand-pipe now under construction at Earlington, Ky., municipal authorities plan enlarging the capacity of the pumping station.

A contract will be let in the near future for the construction of a power house by the new Lincoln Institute, which is being established near Simpsonville, Ky., for the industrial education of negroes. A. E. Thompson of Berea, Ky., is in charge of the work.

The Henry Vogt Machine Company, Louisville, is in the market for two steam hammers for use in the forging department. They are to be a 600 or 800 pound and a 2000-pound hammer.

The car repair and blacksmith shops of the Tennessee, Alabama & Georgia Railroad at Alton Park, Tenn., were damaged by fire with a loss of \$7000. It is reported that the company is considering re-establishing the shops on a larger scale in another part of Alton Park.

Plans are being made at Cumberland Gap, Tenn., for the erection of a hydro-electric plant on Gap Creek for the purpose of supplying power to several manufacturers in Cumberland Gap. Arrangements may also be made by the Middlesboro Electric Company, Middleboro, Ky., to extend its service to Cumberland Gap.

The Memphis Bridge Company, Memphis, Tenn., has been given a contract for the erection of several bridges in Shelby County by the Commissioners of the county.

C. C. Hanson, Memphis, Tenn., is planning the organization of a company to establish a cotton mill in that city.

J. L. Girtton, Winchester, Tenn., is making inquiries for prices on machinery for drilling oil wells.

The Nashville-Gallatin Railway Company has filed articles of incorporation at Nashville, Tenn., giving its capital stock as \$75,000. It will build an electric line 30 miles long. H. H. Mayberry is the principal promoter of the line.

A fire pump is to be installed in the plant of the Athens Woolen Mills, Athens, Tenn. It will have a capacity of 1000 gal. a minute.

Hogenwood, O'Daniel & Co. are planning the erection of a cotton gin of large capacity at Rutherford, Tenn.

The Rodman Lumber Company, Rodman, Fla., which is planning the erection of a big double-band sawmill, has let contracts for the boilers to the Casey-Hedges Mfg. Company, Chattanooga, Tenn. The engines will be installed by the Chattanooga Machinery Company, and the Converse Bridge Company, Chattanooga, will erect the mill building, which will be of steel and concrete.

The East Tennessee Power Company, which is building an electric power plant on the Ocoee River, will erect a sub-station at Ridgedale, Tenn., for the transformation of the power for lighting, railway and commercial use. The building and equipment will cost in the neighborhood of \$75,000. J. G. White & Co., New York, are designing plans for it.

The Kline Motor Car Company has been organized at Richmond, Va., with a capital stock of \$500,000 for the manufacture of motor cars. A two-story building, 60 x 400 ft., will be built and equipped at once. James A. Kline of York, Pa., will be the engineer and general manager of the company, which plans an annual output of 2500 cars.

The Atlanta Hydro-Electric Company, Atlanta, Ga., announces that it will begin work in the near future on its hydro-electric plant on the Toogala River, which is intended to develop 30,000 hp. The total investment is expected to reach \$3,000,000.

Tupledo, Miss., will erect a lighting plant to cost \$50,000, bonds to that amount having been voted.

The Bartlesville Machine Company, Bartlesville, Okla., has taken over the plant of the Bartlesville Machine & Foundry Company, and will erect new buildings and make extensive improvements. H. G. Durnell is manager of the concern.

The Birmingham Sanitary Bed & Mfg. Company, Birmingham, Ala., is planning the installation of machinery for the manufacture of coil bed springs.

Xavier A. Kramer, Magnolia, Miss., is engineer for the city of Bassfield, Miss., which will award a contract shortly for the erection of a complete system of waterworks.

The Motor Device Company, Helena, Ark., will manufacture a self-starting device and carburetor for use on automobiles. The concern has been incorporated with \$5000 capital stock.

A modern sawmill, with a daily capacity of 200,000 ft. of lumber, is to be erected at Laurel, Miss., by the Wausau Southern Lumber Company, Arbor Vitae, Wis. The contract for the erection of the mill has been let, and equipment, including band-saws, gang-saws, resaws and other woodworking machinery, will be purchased. W. H. Bissell, of Wausau, is president of the company, which will develop a large tract of pine timber.

The Board of Control of Norfolk, Va., will open bids May 16 for furnishing, delivering and installing two 1000 gal. per minute and one 1500 gal. per minute centrifugal sewer pumps, electrically driven, including electrical apparatus, switch board, &c.

The National Aerial Navigation & Equipment Company, Cullman, Ala., has been incorporated with \$125,000 capital stock to manufacture aeroplanes under late patents. The company is planning the erection of temporary buildings of ordinary construction in the near future and will install but little machinery.

The Hines Buggy Company, Boykins, Va., has been incorporated with \$15,000 capital stock. The company has plans for the erection of a manufacturing building, 60 x 100 ft., at an approximate cost of \$8000, and will equip it with machinery for the manufacture of carriages. The officers are W. W. White, president; R. H. Powell, vice-president, and C. T. Beaton, secretary-treasurer.

Western Canada

WINNIPEG, MAN., April 28, 1911.

The Western Canada Power Company is making good progress in the construction of its \$3,000,000 plant at Stave River Falls, near Ruskin, B. C., 35 miles from Vancouver. Five hundred men are at work. The contracts upon which work is now proceeding are those for the construction of a \$200,000 power house, a \$100,000 receiving station, and the erection of steel towers for the transmission line along which power is to be brought to Vancouver. A trainload of generating machinery recently arrived.

The ratepayers of Burnaby, New Westminster, B. C., have approved by-laws for the expenditure of \$850,000 on public improvements. Of this sum \$350,000 is to be applied for the construction and equipment of a waterworks system.

The City Commissioner of Saskatoon, Sask., has reported in favor of the acceptance by the city of the tender of the McGougan Company, Port Arthur, Ont., to build the intercepting sewer for \$127,000; of the tender of the Lock Joint Pipe Company, New York, for reinforced concrete sewer pipe, \$137,000; of the tender of the Gartshore Thompson Pipe Company, Hamilton, for the cast iron pipe, \$13,481.

It is stated that work will be begun for the construction of the Port Arthur Wagon Works Company's plant at Port Arthur, Ont., May 1. The cost is to be \$750,000.

The Anthes Foundry Company, Toronto, has purchased a site in Winnipeg for a plant there.

Wortman & Ward, manufacturers of pumps and farm tools, Winnipeg, will extend their plant.

Tenders are called until May 15, for the supplying of six 500-kw. step-down transformers for No. 1 municipal sub-station at Winnipeg. Mr. Peterson, secretary of the Board of Trade, is to be addressed.

The contract for the power house and car sheds of the Moose Jaw Electric Railway Company, Moose Jaw, Sask., has been awarded to Navin Brothers.

An additional 10,500 hp. is being added to the generating plant of the British Columbia Electric Railway Company, Vancouver, B. C. The contract for the installation of the generator has been let to the Canadian General Electric Company, Toronto; and for the Dobil waterwheel to the John McDougall Company, Montreal.

J. C. Wallace, of the Western Dry Dock & Shipbuilding Company, Port Arthur, Ont., says that work will be begun at once on the construction there of the largest boiler plant in Canada.

The City Commissioners of Prince Albert, Sask., will receive tenders up to May 31 for a 100-hp. Cross compound engine with necessary condensing apparatus; for 600-kw., 2200-volt, 60 cycles, 3-phase engine type alternator, exciter, switchboard, automatic regulator, installed complete; for 18 x 72 in. return tubular boiler, suitable for 150 pounds working steam pressure.

The City Council of Port Arthur, Ont., is considering improvements in the municipal water works that will cost \$100,000. These would include an extension of the intake 334 ft. and a new stand pipe.

The City Council, Vancouver, B. C., has before it a proposal to install a rock crushing plant at an estimated cost of \$23,500.

The City Council of Edmonton, Alberta, has concluded to ask from the Dominion Government for an extension of time within which to decide whether or not to accept the terms for developing power at Grand Rapids several miles north of the city. The development of this water power and the building of the transmission line will cost several million dollars.

THE MACHINERY MARKETS

Eastern Canada

TORONTO, ONT., April 29, 1911.

A very notable feature in current Canadian developments is the activity in building operations. Brisk as was the building trade of 1910 in this country, it is much more so this year. According to returns published in *The Contract Record* of this city, the expenditure on new buildings in 26 leading cities of the Dominion for the first three months of the present year has been \$17,139,655, as compared with \$14,340,778 in the corresponding months of 1910. The largest increases were in Vancouver, Calgary and Montreal. Winnipeg shows a falling off from \$3,067,050 in 1910, to \$1,639,600 in 1911. It is expected, however that that city's total record for last year will be surpassed by that for this year. There are still some threatening labor troubles, but the agreeable settlement of several others is considered hopeful for the rest. One of the most serious looking is that between the workers on steel construction and their employers. A strike, which seems imminent, would cause the suspension of a lot of work. Buildings, railways and bridges now under contract are very numerous in Ontario. There is every indication that 1911 is to be a record year in railroad building in Canada. Much depends on labor. Nor is it only in the West new lines are being built. In Ontario there will be a large mileage added. As an indication of general business conditions, it may be mentioned that, although the amount of money at the disposal of Canadian enterprise was never before so great as it is to-day, the demand is exceeding the supply, especially in the West. Seeding is in an advanced state, and the crop area will be far more extensive than it was in any former year.

The Standard Ideal Company, manufacturer of enameled sanitary ware, &c., is planning extensions to its plant at Port Hope, Ont.

The Canadian Buffalo Sled Company will erect a two-story factory at Preston, Ont.

Construction is to be begun early in the summer on the extension of the union station at Quebec, Que., to cost \$750,000.

Conduits, Ltd., will build an 80 x 150 addition to its factory in Toronto.

Superintendent Glaubitz, London, Ont., has reported to the City Council that \$70,429 will be required to complete the municipal plant for the distribution of Niagara power in the city.

A municipal light and power plant will be constructed in Magog, Que., at a cost of \$100,000.

Up to June 6 tenders will be received by G. R. Geary, Mayor of Toronto, for vertical electrically driven pumps, motors and other electrical equipment, screens and cleaning apparatus, and for Venturi meters. The equipment is for drainage works. Specifications may be had from the City Engineer, Toronto, Ont.

Up to May 16 tenders will be received by James Warren, engineer, Walkerton, for the erection of a Warren truss steel bridge with a 60-ft. span.

On April 27 the works of the Canadian Car & Foundry Company at Amherst, N. S., were damaged by fire to the amount of \$150,000. The insurance on the works is nearly \$700,000.

It is reported that the C. W. Raymond Company, Dayton, Ohio, is considering the establishment in Toronto of a branch plant to manufacture clay-making machinery, the capacity of the proposed plant to be sufficient to employ 300 hands.

The ratepayers of Welland, Ont., have approved a by-law authorizing the expenditure of \$75,000 upon additions to the water works plant.

The municipal power plant in Millbrook, Ont., has been taken into the system of the Electric Power Company, Toronto, which now has a very large number of operating companies in its control. It intends to run a branch of its high-tension lines in the neighborhood of Millbrook, and install a step-down substation there.

The box factory of the Parry Sound Lumber Company, Parry Sound, Ont., was burned on Tuesday. As a consequence, over 50 hands are put out of employment.

A syndicate has been formed in London, England, to construct a railway from the Saguenay River in Quebec to Cape Charles Bay, on the east coast of Labrador, 650 miles from Quebec City.

A new forging plant, with massive hydraulic forging presses, is to be built at the New Glasgow works of the Nova Scotia Steel & Coal Company. In size, equipment and capacity, the new plant is to rival the best works of the class in Britain or Germany. More than \$500,000 will be expended on the plant. It is said that the heavy ma-

chinery for it will come from the other side of the Atlantic.

The Down Draft Furnace Company, Galt, Ont., is adding to its works, and is putting up a building, 40 x 110 ft.

The Council of Cape Breton County, Nova Scotia, has granted the recently-incorporated New Waterford Monorail Company a bonus of \$1000 a mile and exemption from taxes for five years.

E. A. Robert, president of the Canadian Light & Power Company, Montreal, has placed before the Dominion Government a plan to develop the vast power resources of the Cedar Rapids on the St. Lawrence. An outlay of from \$15,000,000 to \$20,000,000 would be involved.

Letters patent have been issued by the Dominion Government incorporating W. J. Reid & Son., Automobiles, Ltd., with a capital stock of \$100,000, and head office in London, Ont.

Commercial Engineering Corporation, Ltd., is the name of a company constituted by Dominion letters patent to do business from a head office in Toronto, and with a capital stock of \$100,000.

The same provisional directors named in the company mentioned in the preceding paragraph are incorporated as the San Antonio Land & Irrigation Company, head office in Toronto, and capital stock, \$10,000,000.

Contractors, Ltd., has been incorporated under Dominion laws with a capital stock of \$100,000, and head office at Toronto.

The Grand Metis Power Company has been incorporated under Dominion laws, with a capital stock of \$100,000, and head office at Montreal.

The Hamilton Bridge Works Company, Ltd., Hamilton, Ont., contemplates the immediate erection of an auxiliary plant on a site of about 10 acres recently purchased in the manufacturing annex in that city. Arrangements have already been made for the requisite machinery and equipment.

The Pacific Coast

PORTLAND, ORE., April 26, 1911.

The demand continues about normal for metal working tools of the ordinary descriptions, business being of a rather scattered nature, with few single sales of more than two or three tools. No material change in the situation is anticipated, as few especially heavy tools are required here, though conditions are favorable for a gradual increase of facilities by established shops. Local machinery manufacturers report some increase in business, and the shops on Puget Sound are also well occupied. Notwithstanding the comparative quietness in the lumber trade, there is a good inquiry for logging engines and general equipment, and a number of locomotives have been purchased by logging interests in the last few weeks. The demand for sawmill machinery is only fair, being mostly for small additions to existing mills. A material increase is noted in the movement of agricultural implements, traction engines, &c., in eastern Oregon, Washington and Idaho, and manufacturers of such articles are having a very busy season. Inquiry for road machinery is increasing, and some business is coming out in heavy equipment for railroad contractors, &c. Considerable business from Alaska is being booked by local and Puget Sound concerns, principally in mining machinery and sawmill equipment.

Rapid progress is being made on the addition to the Washington Iron Works plant, Seattle, Wash. According to the plans, the foundry will be the largest on the north Pacific Coast. Three cupolas will be installed, with a capacity of 40 tons daily, in addition to a 5-ton steel casting plant and a brass foundry. A 15-ton traveling crane and three 10-ton electric jib-cranes will be installed.

The Multa Machine Company has been incorporated at Albany, Ore., with a capital stock of \$10,000, by M. Stein, T. Slate and W. A. Slate. The company will install a small shop for the manufacture of a stump-puller patented by T. Slate.

The Washington Steel & Iron Company expects to start its plant at Leavenworth, Wash., about the end of the month.

Officers of the Pacific Fruit Express Company announce that they will erect a number of ice plants in Oregon this year.

The commissioners of Pierce County, Wash., will receive bids May 6 for a steam engine and electric generating unit.

M. F. Loosley is planning to establish a new sawmill near Klamath Falls, Ore.

A shipment of mining machinery, amounting to about 300 tons, was dispatched the first of the week from Seattle, Wash., for the Treadwell mine at Douglas Island, Alaska.

The Commissioners of Whatcom County, Wash., are figuring on a lot of modern road machinery, which will be purchased in the near future.

THE MACHINERY MARKETS

The town of Chehalis, Wash., is planning to install an electric hoist at the municipal rock bunkers.

The A. J. West Lumber Company, Aberdeen, Wash., whose mill was destroyed in February, has let contracts for the erection of a new plant.

The Star Machinery Company, Seattle, Wash., has recently shipped considerable machinery to Alaska, including a complete sawmill outfit to the Treadwell mine, and a donkey engine to the Yakutat & Southern Railroad.

A contract has just been let for a 650-ft. tunnel for the Chicago, Milwaukee & Puget Sound Railroad at Spokane, Wash. This is the beginning of construction work to be carried out at that point at an estimated cost of about \$2,500,000.

The Great Southern Railroad, now operating a line from The Dalles to Dufur, Ore., is taking figures on an extension of 40 miles to Juniper Flats.

Contracts have been let for the new mill of the Harding Lumber Company, Lindberg, Wash. The plant will include two large boilers, three steam engines, circular saws, &c., and two shingle machines.

The Hope Lumber Company, Lewiston, Idaho, is installing a lot of new machinery, including four boilers and engines with a total capacity of 600 hp.

The Standard Silver & Lead Mining Company, Silverton, B. C., has placed a contract for a concentrator plant, amounting to about \$30,000, with Chalmers & Williams of Chicago.

The machinery and concentrator of the Baker City, Ore., sampling works of the Oregon-Idaho Investment Company, which were destroyed by fire early this month, are to be replaced as soon as possible.

The town of Wenatchee, Wash., is in the market for a pumping outfit for the municipal water works.

The Canyon Mountain Mining Company is preparing to add a 2-stamp mill to its mine near Canyon City, Ore.

The Simonds Mfg. Company has installed at Seattle, Wash., a complete band-saw filing and fitting shop, capable of handling saws of any width.

The Plumas Power Company is planning to erect several hydro-electric power plants in Plumas County, Cal.

The Tilden & Eakle Lumber Company, Richmond, Cal., is installing a complete blower system in its planing mill.

Los Angeles County, Cal., will soon be in the market for a steam shovel, to be used in connection with the county rock quarry.

It is reported that the Automatic Electric Company of Chicago is contemplating the establishment of a factory at Spokane, Wash.

The Geo. E. Dow Pumping Engine Company, San Francisco, Cal., is building a 12 x 20 x 12-in. simplex steam driven air compressor for the Plumas Amalgamated Mines Company. The compressor will have a capacity of 500 cu. ft. per minute against 15 lbs. pressure, and is intended for cyanide agitation.

The San Pablo Ice & Cold Storage Company is planning to establish a new ice plant at Richmond, Cal.

Crescent City, Cal., has placed an order with the A. L. Young Machinery Company, San Francisco, for a rock crusher.

At the annual meeting of the Pacific Coast Machinery Dealers' Association at San Francisco, Cal., April 22, the following officers were elected for the ensuing year: President, A. L. Young of the A. L. Young Machinery Company, succeeding Chas. Stallman; vice-president, Alexander Hamilton of Baker & Hamilton; secretary-treasurer, H. H. Tracy of the Tracy Engineering Company. The association has under discussion a plan for incorporation.

At the recent meeting of the creditors of Henshaw, Bulkley & Co., San Francisco, Cal., arrangements were made whereby the company is granted an extension of time to meet its liabilities, as an investigation showed that the company was solvent and only temporarily embarrassed.

A water works system will be installed at the State Insane Hospital, Sedro-Woolley, Wash., at an estimated cost of \$20,000.

A resolution is before the City Council of Pasco, Wash., to the effect that the city issue bonds in the sum of \$50,000 for the purpose of purchasing the plant of the Pacific Power & Light Company. Of this amount it is proposed to use \$20,000 for improvements.

Texas

AUSTIN, TEXAS, April 29, 1911.

Excessive rains are reported from some parts of the State, and crop prospects are being somewhat impaired. It is thought, however, that the present unsatisfactory conditions will be speedily remedied by a period of brighter weather and that it will be a record-breaking crop year for Texas. Irrigation has not been necessary in any part of the

State so far this season, and this fact is lessening the demand for irrigation pumping machinery. With the settlement of the revolutionary troubles in Mexico a big revival of business of all lines in that country is expected to take place. Many industrial projects that will require American machinery are in contemplation as soon as order is restored.

The South Texas Engineering & Construction Company, San Antonio, is negotiating with the Business Men's Club of Kerrville, Texas, looking to the construction of a complete system of sewers for that town.

Authoritative announcement is made by John G. Willacy, Corpus Christi, business representative of Charles P. Taft, Cincinnati, that the latter has approved plans for about \$600,000 worth of improvements that are to be made upon his ranch in South Texas. Most of this sum will be spent in the installation of public utility works and other improvements in the town of Portland, which is situated upon the ranch. An electric light and power plant, a water works plant and distributing system and a number of other large industrial enterprises will be established there. The water for the proposed distributing system will be brought from artesian wells, a distance of eight miles. A deep water harbor will be created in Corpus Christi Bay near the town and wharves and other port facilities constructed. While the appropriation for the improvements that are to be made this year amounts to \$600,000, it is announced that more than \$2,000,000 will have been expended before the plans for improving and developing the big ranch and town properties are rounded out.

The Freear-Brin Furniture Company has begun the erection of the building for its furniture factory at Wichita Falls. The plant will cost about \$15,000.

The J. T. Cogan Company, New York, has submitted a proposition to the City Council of Austin to rebuild the dam across the Colorado River and to install a hydroelectric plant. The proposed improvement is to cost \$1,000,000, which shall be paid by the city at the rate of \$50,000 per annum from the earnings of the water works and electric light and power departments. The proposition along with others having the same object in view will be referred to the people at an election that will be called in the near future.

The Chamber of Commerce, of Wichita Falls, is negotiating with capitalists of Milwaukee, Wis., for the establishment of a plant for the manufacture of small dynamos and electrical appliances. The proposed company will have a capital stock of \$75,000.

Gordon Hill, Harlingen, Texas, will install a cotton-seed oil mill and cotton gin at that place.

The electric light and power plant at Troup, Texas, has been purchased by R. C. Shumate, Zephyr, from Clark Finch. Under the new management improvements and extensions will be made.

The Fort Stockton Land & Irrigation Company, Fort Stockton, is arranging to extend its canal system and to construct additional water storage reservoirs to bring under cultivation about 30,000 more acres of land.

The Toyah & Pecos Lake Irrigation Company, which has been organized with a capital stock of \$1,500,000, will construct large water storage reservoirs at the base of the Davis Mountains in Western Texas, and bring about the irrigation of about 60,000 acres of land in the Toyah Creek valley. The company's offices are at Pecos.

The Willard Naval Stores Company is installing large turpentine and rosin works near Livingston.

The Texas City Transportation Company has arranged for the installation of electric carriers in its warehouse C, which is devoted to New York business at Texas City. If these carriers prove satisfactory, it is the intention of the company to equip all of its warehouses with them. The company will also equip its pier with electric cranes to handle cotton and miscellaneous freight. It will install machine shops for the repair of its equipment. The shops will be operated by electricity.

Oscar Pacius, Monterey, Mexico, and associates have organized the Continental Wax Company with offices at Alpine, Texas, and it is announced that instead of installing one factory for the manufacture of wax from the candleilla weed as was originally planned it has been decided by the company to put up 10 such factories in different localities of Western Texas, where the weed grows profusely. The company has a capital stock of \$500,000, which sum will be invested in the erection and equipment of the factories. It claims to have already contracted for 5,000,000 tons of the weed.

Preliminary steps have been taken at Morgan City, La., to install a water works plant and distributing system. It will cost about \$60,000.

The Magnolia Petroleum Company has been organized as a joint stock association with offices at Galveston, for the purpose of taking over and operating the two large oil

refineries of John Sealy & Co., of that place. One of these refineries is at Beaumont and the other at Corsicana. They will be enlarged and otherwise improved. John Sealy is president of the new company.

James Artwin, Chihuahua, Mexico, has applied to the Government of that state for a concession to erect a smelter at Huisopa, district of Guerrero. He will invest about \$25,000 in the plant.

The Progressive broom factory at Tucumcari, N. M., owned by E. H. Fulwood and associates, will be enlarged. A number of new winding machines will be installed.

The Texas Handle Company has been organized at Houston with a capital stock of \$25,000. The incorporators are C. B. McClamroch, E. J. Gear and E. L. Gear.

The Calloway Coal & Sand Company has been organized at Houston with a capital stock of \$25,000. The incorporators are W. P. Callaway, Harry J. Hatch and Charles B. Hatch.

The Richardson Construction Company, Los Angeles, Cal., is making surveys on the Bavispe and Yaqui rivers, in the state of Sonora, Mexico, for its proposed dam and irrigation system and hydroelectric plant. The site for one of the dams and reservoirs has been located at Angustoria on the Bavispe River. The dam will be constructed across a narrow canyon and will have a width of only 100 ft. and will be 180 ft. high. The water will be conveyed in canals to the valley of the Yaqui River, where the company owns about 1,500,000 acres of land. The hydroelectric plant will be of large capacity and will afford power for the mines and other industries in a broad scope of territory.

Government Purchases

WASHINGTON, D. C., May 1, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 13 for electric lighting machinery and accessories, including one 12-kw. gasoline engine belted generating set, 200-ampere-hour storage battery, wiring material, &c., for the United States Marine Corps Rifle Range, Winthrop, Md.

The United States Reclamation Service, Los Angeles, Cal., will open bids May 15 for furnishing a steam power plant for the Rio Grande project, New Mexico-Texas, including the following equipment:

Two 625 K. V. A. turbo-generators, two steam turbine driven exciters, two horizontal surface condensers with turbine driven pump, one horizontal surface condenser with turbine driven pump, two horizontal surface condensers with engine driven pumps, three 250-hp. water tube boilers, two duplex boiler feed pumps, one open feed water heater, and the installation of one additional turbo-generator, one generator panel, one condenser and one boiler with necessary piping complete.

The Commissioners of the District of Columbia, Washington, opened bids April 25 for furnishing two steam engines and two generators for use in the McKinley Manual Training School as follows:

National Electrical Supply Company, Washington, D. C., \$2050 for generators; Western Electric Company, New York, \$2220 alternate, \$2036 for generators; Garwood Electric Company, Garwood, N. J., \$2168 for generators; Harrisburg Foundry & Machine Works, Harrisburg, Pa., \$2580 for generators; B. F. Sturtevant Company, Hyde Park, Mass., \$6675 for engines and generators; Mackay Engineering Company, Baltimore, Md., \$4600 for engines and generators; A. D. Granger Company, New York, \$5514 for engines and generators, \$5870 alternate; Shepherd Engineering Company, Williamsport, Pa., \$2248 for engines; Allis-Chalmers Company, Milwaukee, Wis., \$2850 and \$2185 for generators; Thomas E. Bashor, Baltimore, Md., \$4571 for engines and generators; Ames Iron Works, Baltimore, Md., \$2797 for engines; Burke Electric Company, Erie, Pa., \$2100 for generators, \$2300 alternate; Standard Engineering Company, Washington, D. C., \$2210 for generators, \$2830 alternate.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 25 for material and supplies for Charleston, as follows:

Class 51.—For furnishing and erecting complete one 20-ton electric crane—Bidder 20, Alfred Box & Co., Philadelphia, Pa., \$4744; 36, Cleveland Crane & Engine Company, Wickliff, Ohio, \$5723; 93, Manning, Maxwell & Moore, New York, \$6035; 94, Morgan Engineering Company, Alliance, Ohio, \$6595; 104, Niles-Bement-Pond Company, New York, \$5195, \$8800; 105, Northern Engineering Works, Detroit, Mich., \$5975; 153, Whiting Foundry Equipment Company, Harvey, Ill., \$6000.

Class 52.—For furnishing and erecting complete one 20-ton electric traveling crane—Bidder 20, Alfred Box & Co., Philadelphia, Pa., \$3286; 36, Cleveland Crane & Engine Company, Wickliff, Ohio, \$3843; 93, Manning, Maxwell & Moore, New York, \$4448; 94, Morgan Engineering Company, Alliance, Ohio, \$4775; 104, Niles-Bement-Pond Company, New York, \$3875, \$8800; 105, Northern Engineering Works, Detroit, Mich., \$4080; 153, Whiting Foundry Equipment Company, Harvey, Ill., \$4300.

Class 53.—One double back geared engine lathe—Bidder 12, American Tool Works, Cincinnati, Ohio, \$2961 and \$3081; 54, Fairbanks Company, Washington, D. C., \$2936; 55, Frevert Machinery Company, New York, \$2512; 63, Griscom-Spencer Company, New York, \$2765; 77, I. R. Johnson, Jr., Company, Philadelphia, Pa., \$2701; 78, J. P. Kemp, Baltimore, Md., \$3115; 82, R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, \$3221.25; 93, Manning, Maxwell & Moore, New York, \$3000, \$3167 and \$3265; 104, Niles-Bement-Pond Company, New York, \$2850.

Class 55.—One horizontal boring and drilling machine—Bidder 54, Fairbanks Company, Washington, D. C., \$1995; 85, Lucas Machine Tool Company, Cleveland, Ohio, \$2115 and \$1140; 104, Niles-Bement-Pond Company, New York, \$1395; 112, Prentiss Tool & Supply Company, New York, \$1323, \$1358, \$1389, \$1473, \$1458 and \$1489.

Class 56.—One boring and turning mill—Bidder 61, Gisholt Machine Company, New York, \$3585; 78, J. P. Kemp, Baltimore, Md., \$2700; 93, Manning, Maxwell & Moore, New York, \$3045, \$3075 and \$3075; 104, Niles-Bement-Pond Company, New York, \$2340; 159, Bullard Machine Tool Company, Bridgeport, Conn., \$2765.

Class 57.—One 5-ft. full universal radial drill—Bidder 12, American Tool Works, Cincinnati, Ohio, \$1186, \$1937 and \$2012; 54, Fairbanks Company, Washington, D. C., \$817; 55, Frevert Machinery Company, New York, \$2045; 63, Griscom-Spencer Company, New York, \$1833; 78, J. P. Kemp, Baltimore, Md., \$2070; 93, Manning, Maxwell & Moore, New York, \$2699; 104, Niles-Bement-Pond Company, New York, \$1395.

The Pittsburgh Foundry Convention

The Registration Committee of the association advises members that the registration at the Pittsburgh convention will be conducted in much the same manner as last year at Detroit. To expedite the registration and facilitate the work at the counter, the following requests are made:

1. That each person registering will do so according to the name in which the membership stands; for instance, if John Jones is representing John Brown & Co., who are members of the A. F. A. or A. B. F. A., he will go to the alphabetical division B, where he will present his card, saying that John Brown & Co. are members of either or both associations, and he will register as John Jones of John Brown & Co.

The members of the Associated Foundry Foremen will, of course, register individually in the proper alphabetical division.

2. It is also requested, when convenient, that those registering will present their business card, bearing their own name and firm name, thus making sure that the names will be recorded correctly.

With these advance hints, it is hoped to make the registration an ideal one for all concerned.

The Mumford Molding Machine Company, Plainfield, N. J., furnishes the following list of the machines it expects to exhibit at the convention: Split pattern power ramming machine, with vibrator 12 in.; plain squeezer, with match plate roll-over mechanism; 10-in. high trunnion squeezer, with match plate and vibrator; 10-in. plain jolt ramming machine, with new style valve; 3-in. plain jolt ramming machine, also with new style valve, and section of this machine showing in full detail the new valve arrangement.

The Pittsburgh Foundrymen's Association.—The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel, Pittsburgh, on the evening of May 1, preceded by a dinner. Dr. Richard Moldenke, secretary of the American Foundrymen's Association, made an address on the subject of "Modern Cupola Methods." The chairmen of the various committees appointed some time ago to make arrangements for the entertainment of the members of the American Foundrymen's Association at the convention to be held in Pittsburgh, commencing May 23, presented their reports; all indications point to a very successful meeting. The Pittsburgh Foundrymen's Association has rounded out 15 years of existence, and F. H. Zimmers of the Union Foundry & Machine Company, Pittsburgh, has served the association as secretary in a very efficient manner since its organization.

The Commercial Engineers' Association.—There has been organized in Chicago the Commercial Engineers' Association, composed of local representatives of manufacturers of machinery and mechanical devices. The purpose of the organization is solely one of self-help, combining an exchange of ideas and advance information with reference to new business. The officers are as follows: President, C. W. Aveling, Continental Bridge Company, Peotone, Ill.; vice-president, A. J. Reed, Cuthbert Electrical Mfg. Company, Chicago; secretary and treasurer, A. Engleman, Electric Controller & Mfg. Company. The Committee on Membership is as follows: Wm. M. Conley, Chicago, district manager of the Electric Controller & Mfg. Company; H. L. Musser, McMyler-Interstate Company, and A. G. A. Schmidt, National Equipment Company, Chicago.

CURRENT METAL PRICES.

Prices of various metals and alloys, and of various metal products, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Reinforced Iron:

1 in. x 10 ft. 10 lb. square	2.80
1 1/2 in. x 10 ft. 10 lb. square	3.10
2 in. x 10 ft. 10 lb. square	3.40
2 1/2 in. x 10 ft. 10 lb. square	3.70
3 in. x 10 ft. 10 lb. square	4.00
3 1/2 in. x 10 ft. 10 lb. square	4.30
4 in. x 10 ft. 10 lb. square	4.60
4 1/2 in. x 10 ft. 10 lb. square	4.90
5 in. x 10 ft. 10 lb. square	5.20
5 1/2 in. x 10 ft. 10 lb. square	5.50
6 in. x 10 ft. 10 lb. square	5.80
6 1/2 in. x 10 ft. 10 lb. square	6.10
7 in. x 10 ft. 10 lb. square	6.40
7 1/2 in. x 10 ft. 10 lb. square	6.70
8 in. x 10 ft. 10 lb. square	7.00
8 1/2 in. x 10 ft. 10 lb. square	7.30
9 in. x 10 ft. 10 lb. square	7.60
9 1/2 in. x 10 ft. 10 lb. square	7.90
10 in. x 10 ft. 10 lb. square	8.20

1 in. x 10 ft. 10 lb. square	2.80
1 1/2 in. x 10 ft. 10 lb. square	3.10
2 in. x 10 ft. 10 lb. square	3.40
2 1/2 in. x 10 ft. 10 lb. square	3.70
3 in. x 10 ft. 10 lb. square	4.00
3 1/2 in. x 10 ft. 10 lb. square	4.30
4 in. x 10 ft. 10 lb. square	4.60
4 1/2 in. x 10 ft. 10 lb. square	4.90
5 in. x 10 ft. 10 lb. square	5.20
5 1/2 in. x 10 ft. 10 lb. square	5.50
6 in. x 10 ft. 10 lb. square	5.80
6 1/2 in. x 10 ft. 10 lb. square	6.10
7 in. x 10 ft. 10 lb. square	6.40
7 1/2 in. x 10 ft. 10 lb. square	6.70
8 in. x 10 ft. 10 lb. square	7.00
8 1/2 in. x 10 ft. 10 lb. square	7.30
9 in. x 10 ft. 10 lb. square	7.60
9 1/2 in. x 10 ft. 10 lb. square	7.90
10 in. x 10 ft. 10 lb. square	8.20

Beams—	2.00
Channels, 3 in. and larger—	2.00
Hand—1 to 6 x 10 ft. 10 lb. square	2.50
"Burden's Best" Iron, base price	3.15
Burden's "H. B. & S." Iron, base price	3.95
Norway Bars	3.60

Merchant Steel from Store—

Bessemer Machinery—	1.95
Toe Chalk, Tire and Sleigh Shoe—	2.50
Best Cast Steel, base price in small lots	3.70

Sheets from Store—

	One Pass, C. R.	R. G.
	Soft Steel.	Cleaned.
No. 16	2.55	2.40
Nos. 18 to 20	2.70	2.90
No. 22 and 24	2.75	3.00
No. 26	2.80	3.10
No. 28	2.90	3.30

Russia, Planished, &c.

Genuine Russia, according to assortment—	12 @ 14
Patent Planished, W. Dewees Wood—	A, 10; B, 9; net

Galvanized.

Nos. 12 and 14	2.95
Nos. 22 to 24	3.30
No. 26	3.50
No. 28	3.80
No. 20 and lighter 36 inches wide, 25¢ higher	

Genuine Iron Sheets— Galvanized.

Corrugated Roofing—

1 in. x 10 ft. 10 lb. square	2.80
1 1/2 in. x 10 ft. 10 lb. square	3.10
2 in. x 10 ft. 10 lb. square	3.40
2 1/2 in. x 10 ft. 10 lb. square	3.70
3 in. x 10 ft. 10 lb. square	4.00
3 1/2 in. x 10 ft. 10 lb. square	4.30
4 in. x 10 ft. 10 lb. square	4.60
4 1/2 in. x 10 ft. 10 lb. square	4.90
5 in. x 10 ft. 10 lb. square	5.20
5 1/2 in. x 10 ft. 10 lb. square	5.50
6 in. x 10 ft. 10 lb. square	5.80
6 1/2 in. x 10 ft. 10 lb. square	6.10
7 in. x 10 ft. 10 lb. square	6.40
7 1/2 in. x 10 ft. 10 lb. square	6.70
8 in. x 10 ft. 10 lb. square	7.00
8 1/2 in. x 10 ft. 10 lb. square	7.30
9 in. x 10 ft. 10 lb. square	7.60
9 1/2 in. x 10 ft. 10 lb. square	7.90
10 in. x 10 ft. 10 lb. square	8.20

Tin Plates—

American Charcoal Plates (per box.)

1 in. x 10 ft. 10 lb. square	2.80
1 1/2 in. x 10 ft. 10 lb. square	3.10
2 in. x 10 ft. 10 lb. square	3.40
2 1/2 in. x 10 ft. 10 lb. square	3.70
3 in. x 10 ft. 10 lb. square	4.00
3 1/2 in. x 10 ft. 10 lb. square	4.30
4 in. x 10 ft. 10 lb. square	4.60
4 1/2 in. x 10 ft. 10 lb. square	4.90
5 in. x 10 ft. 10 lb. square	5.20
5 1/2 in. x 10 ft. 10 lb. square	5.50
6 in. x 10 ft. 10 lb. square	5.80
6 1/2 in. x 10 ft. 10 lb. square	6.10
7 in. x 10 ft. 10 lb. square	6.40
7 1/2 in. x 10 ft. 10 lb. square	6.70
8 in. x 10 ft. 10 lb. square	7.00
8 1/2 in. x 10 ft. 10 lb. square	7.30
9 in. x 10 ft. 10 lb. square	7.60
9 1/2 in. x 10 ft. 10 lb. square	7.90
10 in. x 10 ft. 10 lb. square	8.20

American Coke Plates—Bessemer—

1 in. x 10 ft. 10 lb. square	2.80
1 1/2 in. x 10 ft. 10 lb. square	3.10
2 in. x 10 ft. 10 lb. square	3.40
2 1/2 in. x 10 ft. 10 lb. square	3.70
3 in. x 10 ft. 10 lb. square	4.00
3 1/2 in. x 10 ft. 10 lb. square	4.30
4 in. x 10 ft. 10 lb. square	4.60
4 1/2 in. x 10 ft. 10 lb. square	4.90
5 in. x 10 ft. 10 lb. square	5.20
5 1/2 in. x 10 ft. 10 lb. square	5.50
6 in. x 10 ft. 10 lb. square	5.80
6 1/2 in. x 10 ft. 10 lb. square	6.10
7 in. x 10 ft. 10 lb. square	6.40
7 1/2 in. x 10 ft. 10 lb. square	6.70
8 in. x 10 ft. 10 lb. square	7.00
8 1/2 in. x 10 ft. 10 lb. square	7.30
9 in. x 10 ft. 10 lb. square	7.60
9 1/2 in. x 10 ft. 10 lb. square	7.90
10 in. x 10 ft. 10 lb. square	8.20

American Terne Plates—

1 in. x 10 ft. 10 lb. square	2.80
1 1/2 in. x 10 ft. 10 lb. square	3.10
2 in. x 10 ft. 10 lb. square	3.40
2 1/2 in. x 10 ft. 10 lb. square	3.70
3 in. x 10 ft. 10 lb. square	4.00
3 1/2 in. x 10 ft. 10 lb. square	4.30
4 in. x 10 ft. 10 lb. square	4.60
4 1/2 in. x 10 ft. 10 lb. square	4.90
5 in. x 10 ft. 10 lb. square	5.20
5 1/2 in. x 10 ft. 10 lb. square	5.50
6 in. x 10 ft. 10 lb. square	5.80
6 1/2 in. x 10 ft. 10 lb. square	6.10
7 in. x 10 ft. 10 lb. square	6.40
7 1/2 in. x 10 ft. 10 lb. square	6.70
8 in. x 10 ft. 10 lb. square	7.00
8 1/2 in. x 10 ft. 10 lb. square	7.30
9 in. x 10 ft. 10 lb. square	7.60
9 1/2 in. x 10 ft. 10 lb. square	7.90
10 in. x 10 ft. 10 lb. square	8.20

Seamless Brass Tubes—

List November 11, 1910	Base price 15¢
------------------------	----------------

Brass Tubes, Iron Pipe Sizes—

List November 13, 1910	Base price 15¢
------------------------	----------------

Copper Tubes—

List November 13, 1910	Base price 21¢
------------------------	----------------

Brazed Brass Tubes—

List February 1, 1911	193¢
-----------------------	------

High Brass Rods—

List February 1, 1911	141¢
-----------------------	------

Roll and Sheet Brass—

List February 1, 1911	141¢
-----------------------	------

Brass Wire—

List February 1, 1911	141¢
-----------------------	------

Copper Wire—

Base Price.	Carload lots mill 133¢
-------------	------------------------

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. quantity lots	118¢
---	------

Sheet Copper Cold Rolled, 16 oz. advance over Hot Rolled	
--	--

Sheet Copper Polished 20 in. wide and under, 16 oz. square foot	
---	--

Sheet Copper Polished over 20 in. wide, 2¢ square foot	
--	--

Planished Copper, 1¢ square foot more than Polished.	
--	--

METALS—

Tin—

Sheet Tin	45 @ 46
-----------	---------

Copper—

Sheet Copper	14 @ 14 1/2
Copper Wire	13 1/2 @ 14
Castings	13 1/2 @ 14

Spelter—

Weston	14 @ 14 1/2
--------	-------------

Zinc.

No. 9, base, cases	14 @ 14 1/2
--------------------	-------------

Lead.

American Pig	5 @ 5 1/2
Bar	6 1/2 @ 6 1/2

Solder.

1/2 & 1/2, guaranteed	27 1/2 @ 28
No. 1	25 1/2 @ 26
Reinforced	25 @ 26
Prices of Solder indicated by private brand vary according to composition.	

Antimony—

Cookson	11 @ 11 1/2
Hart's	11 @ 11 1/2
Other Brands	11 @ 11 1/2

Bismuth—

Per lb	\$2 1/2 @ \$2 1/2
--------	-------------------

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in bars for remelting	2 @ 2 1/2
Rods & Wire	17 @ 17 1/2
Sheets	Base 17 @ 17 1/2

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	10 1/2 @ 11
Copper, Heavy and Wire	10 1/2 @ 11
Copper, Light and Bottoms	9 1/2 @ 10
Brass, Heavy	7 1/2 @ 8
Brass, Light	5 1/2 @ 6
Heavy Machine Composition	9 1/2 @ 10
Clean Brass Turnings	7 1/2 @ 8
Composition Turnings	8 1/2 @ 9
Lead, Heavy	6 @ 6 1/2
Lead, Tea	6 @ 6 1/2
Zinc Scrap	4 @ 4 1/2

NICHOLSON

Granted that just ONE mechanic in your shop can save from ten to twenty minutes time per day through the use of NICHOLSON FILES—how great will be the saving when from fifty to one hundred or more men "get busy" with the fast cutting

NICHOLSON?



Nicholson File Company

Providence, R. I.

THE IRON AGE

Established
1855

New York, May 11, 1911

VOL. 87: No. 19

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada, \$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies 20 Cents.

CHARLES T. ROOT.	-	-	-	-	PRESIDENT
W. H. TAYLOR	-	-	-	-	TREASURER AND GENERAL MANAGER
HAROLD S. BUTTENHEIM	-	-	-	-	SECRETARY

GEO. W. COPE.	-	-	-	-	} EDITORS
A. I. FINDLEY	-	-	-	-	
W. W. MACON	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Further Rail Buying	1123
Pig Iron Costs in Alabama.....	1124
The New Art in Automobile Building.....	1124
Price Concessions on Export Trade.....	1125
Correspondence	1126
The Machinists' Strike in New York and New Jersey.....	1126
Employers' Liability in New York State.....	1126
The Blaisdell Machinery Company.....	1126
Lake Iron Ore Shipments in April.....	1127
The Vulcan Detinning Company's Year.....	1127
The Hess Steel Castings Company.....	1127
The Haskell & Barker Steel Car Plant.....	1127
The Iron and Metal Markets.....	1128-37
Obituary	1138
Personal	1138
Trade Publications.....	1139
Binders for Foundry Cores.....	1140
The Victor-Balata & Textile Belting Company.....	1142
Carnegie Publications on Steel Mine Timbers.....	1142
The Steel Corporation Buys the Risdon Works.....	1142
Extras on Bars and Shapes from Waverly Warehouse.....	1143
The Betterment of Steel Works Labor Conditions.....	1144
The Philadelphia Foundrymen's Association.....	1149
The Pennsylvania Steel Company's Report.....	1150
Government Purchases.....	1150
April Copper Production and Stocks.....	1150
German Automobiles—Depreciation and Repair Cost.....	1151
The Porceliron Stove Company.....	1151
A Railroad Shippers' Service.....	1151
Milling Cutters and Their Efficiency.....	1152
Railroad Equipment Orders.....	1156
The Determination of Manganese in the Presence of Chromium	1156
Dry Air Blast at a British Furnace Plant.....	1157
The American Institute of Mining Engineers.....	1157
The Newark Foundrymen's Association.....	1157
Molding a Cone Pulley on an International Turn-Over Machine	1158
A New Henry & Wright Radial Drilling Machine.....	1159
The White Star Individual-Continuous Oiling System.....	1160
Automatic Electric Freight Truck.....	1161
The Precision Simmance-Abady CO ₂ Recorder.....	1162
The Positive Improved Transmission Appliances.....	1163
A Very Large Dow Triplex Pump.....	1164
Customs Decisions.....	1164
Wire Cable Conveyor for Handling Kegs.....	1165
New Interests in Baldwin Locomotive Works.....	1165
Remarkable Records at Ensley Furnaces.....	1165
Connersville Blower Applied to Vacuum Cleaning.....	1166
A Huge Cast Iron Still.....	1166
The General Electric Company.....	1166
Pulleys with Cork Set in Faces.....	1167
Rust-Proof Slag Paint.....	1167
The Machinery Markets.....	1168

Further Rail Buying

A 40,000-Ton Order from the St. Paul

Low Prices on Bar Iron—Large Sales of
Southern Iron—The Steel Corporation's
Orders

The meetings of the steel manufacturers in New York in the past week have thrown little light on the situation. What was most marked was the resignation of the leaders of the industry to a condition of inactivity that has few parallels. That the question of prices was not the live issue it has been at other meetings shows that buyers are too indifferent even to make a serious effort to depress the market.

While the manufacturers agree that sales cannot be forced under such conditions, some take a more serious view than others of the immediate future. These see in legislative developments the possibility of changes in standards which may have a far-reaching effect upon values, and this explains to their minds the paralysis which has overtaken demand.

Actual developments in the market have been meagre, but are rather unfavorable than otherwise. A disturbing factor in the Lake ore trade has been the sales of scattering lots of non-Bessemer ores at cut prices. It is pointed out that the ores in question are at a disadvantage as to ease of furnace working, but the fact that they have sold below the parity determined by their analysis has been given significance.

Sales of Southern iron for quick shipment have been made at \$10.75 and in some cases at \$10.50 for No. 2 at Birmingham, and this weakness has developed in a very listless market. For delivery through the year \$11 is generally maintained and the low priced sales were made to realize on unwieldy stocks. Sales of Southern iron, chiefly to pipe companies, have amounted to more than 50,000 tons, the bulk of it being sold by the larger producers.

At Buffalo a better demand for foundry iron has appeared in the past few days, but in general Northern buyers of foundry irons are holding aloof.

A sale of 5000 tons of basic iron has been made in eastern Pennsylvania and negotiations are pending for a round lot for another steel company. Other business has been offered at a price below \$15, delivered, which furnaces refuse to consider. Low prices were brought out by an Ohio inquiry for 3000 tons of basic iron, but the business has not been closed. A steel foundry interest is inquiring for 5000 tons of basic for its Alliance, Ohio, and St. Louis district plants.

The operations of a number of rolling mills have fallen below 50 per cent. and steel companies are adjusting their pig iron output to the new situation as rapidly as possible. One steel company is blowing out two Shenango Valley furnaces this week. The Steel Corporation has 62 per cent. of its blast furnace capacity going.

There has been a further decline in bar iron in both Eastern and Western markets, and while the buying has not been large it has raised a question as to the maintenance of steel bar prices. Implement buyers are influenced by pending legislation affecting farming interests and there is continued uncertainty as to bar contracts usually placed before June.

The steel for the Woolworth Building, New York, 22,000 tons, has been placed with the American Bridge Company. In the West structural buying has been generally light.

For the battleship New York the contract for plates, 6500 tons, has been given to Worth Brothers. About 3100 tons of shapes are yet to be awarded. Los Angeles is planning to build an aqueduct which will take 4500 tons of plates.

The Louisville & Nashville has bought 15,000 tons of rails from the Tennessee Coal, Iron & Railroad Company, and the St. Paul has closed for 40,000 tons with the Illinois Steel Company, half of it for prompt shipment. The Kansas City Southern is in the market for 14,000 tons. The Monon has bought 4,000 tons. If the Seaboard Air Line order 3700 tons went to Sparrow's Point, 4000 tons to Bethlehem and 7500 tons to Ensley.

Among wrought pipe sales are reported 2000 tons of 6-in. pipe for a Wyoming line and 8000 tons of 8-in. pipe for the Mexican Petroleum Company.

The United States Steel Corporation's unfilled orders April 30 were 3,218,704 tons, against 3,447,301 tons reported for March 31, a falling off of 229,000 tons.

Pig Iron Costs in Alabama

The cost of making pig iron in the Birmingham, Ala., district has come up again in connection with the discussion, started at Washington, of the ability of that district to stand the addition of certain steel products to the free list. Again it has turned out that boastful statements of low cost of production made in the interest of a particular district or producing company have returned to plague the authors. Yet it would seem unnecessary to say over and over that costs reached in a time of the direst industrial distress the country has seen are no proof of ability to give an adequate return to capital and maintain any such wage rates as to-day's on the same market price.

Vice-President J. W. McQueen, of the Sloss-Sheffield Coal & Iron Company, writing in the Birmingham *Age-Herald* of the claims made as to the low cost of pig iron production at Birmingham, based on the exports of pig iron from that district to Europe in 1896 and 1897, tells what is well known in the iron trade of the basis on which such exports were made:

It was so exported without a dollar of profit to keep plants going and men employed to avoid a disruption of organizations at a time when Southern furnace companies were so poor that they could not have closed down and met their obligations. In counting the cost of such iron no allowance was made for the minerals taken out of the ground or the cost of replacing the land so exhausted; it was a matter of temporary expediency which if persisted in would have ruined the district exporting its valuable minerals for other people to work them up with cheap labor and return the finished products to our country.

In those days the cost of living was 60 per cent of what it is to-day, and wages were correspondingly low. If it becomes necessary again to produce pig iron at Mr. Underwood's figure—\$7.50 per ton—it will become necessary to accompany it by a 40 per cent reduction in all labor costs. At that time also the outcrop ores of Red Mountain, averaging 50 per cent in richness, were being mined by hand power, and loaded at trifling cost, in some cases not exceeding 50 cents per ton. It is now necessary to have expensive power plants, the soft ores having been exhausted, to follow the 32 to 38 per cent ores, in some cases even below the sea

level, with expensive drilling, hoisting, ventilating and pumping. Similar increases have followed in many cases the operation of coal mines, where the more accessible outcrops have long since been attacked, and operations are now pursued following the operation of deep shafts and slopes with expensive systems of underground

When iron was made cheaper in this district, day labor was getting from 85c to \$1 a day; the miner for cutting coal, 37½c per ton, and some mines lower than this; while now day labor is getting from \$1.25 to \$1.75, and the miner for cutting coal, 52½c and some mines more than this.

The tenacity with which some minds grip the idea that cost is a fixed quantity is only equaled by their persistence in thinking that a selling price fixed by the urgent necessities of a time of depression should be repeated indefinitely in prosperous times. It is evident that the claim of a \$7.50 pig iron cost in the Birmingham district has been about as useful to the industry there as the widely quoted remark of a Northern steel manufacturer concerning a \$12 rail cost has been to the steel rail producers of the country.

The New Art in Automobile Building

Shoddy-built automobiles soon begin to look shabby. But some automobiles of high price share this shortcoming. To remain presentable they require more than elaborate caretaking. Repairs relating mainly to their appearance take them out of commission with a frequency not paralleled in ordinary carriages. The bills, too, are annoying, partly because the auditing of them is irksome. And owners of automobiles, who have been more lenient in the past with the appearance of their automobiles than with that of their carriages, their persons or their houses, are now very generally reaching the point of demanding full service in style as well as in mechanical reliability. They demand that it shall be possible to keep the automobile very neat and trim long after its body shape may have become outfashioned, and that the price and trouble in doing so shall, of course, be at a minimum.

Certain fenders are easily crumpled or twisted. Certain motor hoods are liable to become scratched and dented, because they are in the way when the motor is looked after and the workman leans on them and puts tools on them, or they are too thin or shaped so as to lack strength and springiness; the enamel cracks off of them. Certain springs get rusty because the paint does not stick to them; others creak in the joints for lack of bushings in eyes and shackles and for lack of oil cups. Certain tire shoes ravel, and certain armor bands gather dirt at the sides, while others really make the whole wheel appear more businesslike and fit. Certain drip pans, besides adding to the fire risk in garages, are permanently dirty or permanently rusty, because their construction, involving large apertures, makes a convenient cleaning process, with a hose, inadvisable. Certain upholsteryings are anything but weatherproof and soon look cracked, grimy and faded. Certain rear wheels in conjunction with the brake-drum attachments lose their varnish and paint quickly, because mud has to be scraped and wiped off. It is possible to go through the whole list of parts and accessories of an up-to-date automobile and pick distinct preferences in design, types and arrangements wholly according to the greater or lesser amount of work, trouble and cost involved in keeping the vehicle looking trim and neat for a series of years. And all these minute considerations are, of course, to be reconciled with the operative requirements which have almost monopolized at-

tention in the past years, but which for lack of extensive experience in determining the conditions for a substantial durability have been viewed in many instances without systematic regard for the data of upkeep cost and depreciation.

The new art in automobile building seems to be nothing more nor less than a sharp accentuation of all those factors, often apparently minute, which bear upon the maintenance of a maximum value for the automobile in the second, third, fourth, fifth, perhaps the tenth year of its usefulness. All first-class manufacturers have, of course, always recognized the claims of this art. Their recognition of it was largely what gave them class over and above their competitors. But it is only lately that a sufficient volume of data on upkeep cost and depreciation has become available to permit a systematic cultivation of the art. In this sense it is new. It rests on the keeping of records with actuarial accuracy, the records telling just how and when, in the life of an automobile, its normal use leads up to the necessity for new expense. Some of the records are in the possession of manufacturers who keep them secret for their own guidance. They are not accurate nor exhaustive; they apply somewhat indiscriminately to automobiles of slightly varying design and materials; but, such as they are, they tell a story which leads to improvements which reduce the annual depreciation. Better records, more unbiased and more essential, in applying to many different types of automobiles with sharp distinction as to whether the data apply to one type or another, are in the hands of the automobile insurance companies and are guarded with jealous care, as their proper interpretation spells rates for premiums and for the yearly reduction of the insurance principal. The taxicab companies have accumulated data of high value in this branch of the industry, and the express companies and other large users of motor trucks and delivery wagons, who keep an account for each vehicle in their service, should be able to give most valuable pointers to the manufacturers whose products they employ, and have, in fact, given many such in the past. In these data generalities count for nothing, specific facts for everything. It is in truth the function and value of these specific facts that they round off and supplement the more generalized knowledge of construction science by which the designing engineer was guided in the first place.

The purchaser of automobiles is naturally interested in having the automobile industry in its entirety become deeply impressed with the necessity for studying the ways and means for increasing durability in all details and thereby reducing depreciation. A closer union of mechanics, art and general industrial experience than has heretofore been the rule is to this end desirable, but the first requisite of all is that both manufacturers and purchasers—the latter mainly for the sake of control and to spur on real efforts—become acquainted with the data of depreciation, which are also the data of maintenance cost seen in its relation to specific construction and materials. Publicity for the data already gathered would constitute the most effective means, but is opposed by private interests. There remains a public discussion of details to which all may contribute from their individual experience and which by degrees will be rounded off into a respectable aggregation of facts. The subject has been broached in Germany, and there is presented elsewhere

in this issue an extract from one of the articles appearing there. It will give an idea of what is expected of a pleasure automobile in Germany, by the insurance companies, and the schedule of repair "expectations" which it offers may be compared by the owner of American automobiles with the facts of his own experience, arranged in similar schedule form. The result could not help being of interest. A number of such schedules, although the specific construction may remain unrevealed in each instance, would at least disclose how much longer corresponding parts remain in good condition in one case than in another, and this knowledge gained by the owner would not be slow in reaching the maker who still lags behind and fails to provide his product with a "good constitution."

Price Concessions on Export Trade

Whereas the sale of manufactured products in the foreign trade at prices below those prevailing at home is generally charged upon protection countries like Germany and the United States, as growing out of their fiscal system, we note that one of our London exchanges finds fault with the same practice in Great Britain. The *Ironmonger* says that the Association of Bar Iron Manufacturers in Lancashire charges the home consumer £6 15s. per ton for crown bar iron, while "it is necessary, in order to get rid of the surplus, to sell large quantities for export at from 7s. 6d. to 10s. a ton below the association's price to home buyers." Then we are told that "the British home trade pays for the reduced rates for export," just as "the American consumer pays for the cheap semifinished steel which the Americans dump here."

The question is so old that we refer to the Lancashire bar iron case not so much to comment upon it as to show that the issue is bound to come up wherever there is an inner and an outer trade. For a manufacturer to sell all his product at the price made by the sharpest competition he meets anywhere in the world's markets would seriously curtail his profits. It is one way of putting it to say that his home customers who pay his usual price pay for the concession he makes on distant business. They pay for it in the same way, let us say, in which they pay for the product he sells to concerns from which he is unable to collect anything—the way, in fact, in which they pay for every other expense of his business. There is a question of expediency in all these concessions to secure distant foreign trade. If the industrial countries of the world were able to parcel out the business so that the producing country nearest a given market would supply that market the whole matter would be simplified. Some such arrangement is aimed at now and then, but it is exceptional. The web of the world's trade is so tangled, and political and national lines so connect widely separated countries, that economic considerations are often a small factor in determining the placing of an order.

It is common to condemn the sales various steel-making countries make to countries having no steel industry, and to inveigh against a condition under which countries that do not make steel pay the lowest price for it. Yet perhaps there is less to condemn in low prices on neutral ground, where several producing companies compete sharply for an order, than in the practice, once much more common than it is to-day so far as the steel trade is concerned, of dumping product

on a foreign producer's territory for the sake of making a hot pace for him at home. It is forgotten in some of the criticisms of lower prices to the buyer in a non-producing country that the price such a country pays may yet be higher, gauged by ability to pay, than that prevailing in the country of production. In other words, the basis of price which increases the use of steel in one country must necessarily be lower than that which will make a large demand for it in the country of production.

Divesting the question of all political and tariff phases, it comes down to a matter of national standards of value and of living. The buyer of material which enters into manufacture considers that he is handicapped in world markets if he must meet there a product into which similar material entered, which his foreign competitor bought at a concession from the same home producer. Yet, with all the unpopularity of the differential to a foreign buyer, it is quite certain that the alternative of such a general lowering of home standards as would permit the home manufacturer to sell all his product on the same low basis would be far more unpopular. It is an economic question, involving adjustments of far-reaching influence, and the problem will exist whatever may be the scale of duties on imports. In the effort to solve it, there must be weighed against individual inequalities or hardships the value of an export outlet for home products—one that can be counted upon, whatever the conditions at home. A price must be paid for it; of that there should be no doubt. It should not be difficult to decide, moreover, that a greater price would be involved in going without it.

Correspondence

Electric Steel Production at Dommeldingen

To the Editor: Referring to your issue of May 4, in the article entitled "Electric Steel Production at a German Works," a slight error was made in the second paragraph, in which it says that a 1½ ton furnace takes direct current. This should be 3-phase, alternating current of 50 cycles. It might also be of interest to your readers to know that all of the steel produced at the works of Le Gallais, Metz & Co., at Dommeldingen, is electric steel made in the Roehling-Rodenhauser furnace.

AMERICAN ELECTRIC FURNACE COMPANY.

The Machinists' Strike in New York and New Jersey

In Greater New York and Hudson County, N. J., 92 firms which have refused to grant the demand of the International Association of Machinists of the 15th District for an eight-hour day, have joined interests in fighting the strike which went into effect May 1. The committee of ten, consisting of five representatives of firms in the National Metal Trades Association and five representatives of firms not affiliated, has been appointed to handle the situation during the strike. The committee consists of H. N. Covell, Lidgerwood Mfg. Company; Stevenson Taylor, Quintard Iron Works; Andrew Fletcher, W. & A. Fletcher Company; George E. Franquist, Simplex Auto Company, and William J. Davidson, Staten Island Shipbuilding Company, representing the National Metal Trades Association, and the following representatives of the independent firms: Walter S. Smith, E. W. Bliss & Co.; William J. Blair, Blair Tool & Machine Works; Edwin E. Sherman, James Sherman & Sons; Walter H. Gill, P. H. Gill & Son; Conrad Hubert, American Ever Ready Company.

Commissioner Robert Wuest of the National Metal Trades Association, who is filling the places of the strik-

ers, has issued a statement that only 1268 machinists have left their employment in shops owned by members of the Metal Trades Association. The strike was declared in only five shops operated by the association, and from only two of these shops all of the machinists went on strike. Mr. Wuest's report includes the statement that an encouraging feature of the situation is the fact that members do not require all the machinists brought to New York to take the places vacated by the strikers. The union leaders declare that over 16,000 machinists are on strike, but the employers' committee places the number at 9000. R. Hoe & Co., manufacturers of printing presses, in a circular letter to their customers, explain their position regarding the strike as follows:

It is a serious matter to us, and to the publishers and printers as well, because the hours of work were not long ago reduced from ten to nine, and, in addition, wages have been steadily advanced and the cost of materials has greatly increased. We have reduced the prices of our presses by taking advantage of every improved method and appliance in manufacturing, until the lowest possible point has been reached, and any further shortening of the working day would necessitate a corresponding increase in the selling prices of presses. To run the shop but eight hours daily and continue the present output would necessitate increasing our plant by one-ninth, a proposition so serious that it cannot be considered for a moment, in the present condition of the printing press business.

Employers' Liability in New York State

In view of the New York Court of Appeals decision declaring unconstitutional the compulsory compensation law placed on the statute books as a result of the work of the Wainwright employers' liability commission, the commission submitted another report to the Legislature at Albany last week discussing the methods by which what was desired to be accomplished in that law can be secured for the workmen of the State. The best plan, the report says, is to amend the constitution, authorizing the Legislature to provide for the payment of compensation, with or without the right of trial by jury and with or without regard to fault, to employees injured by accidents of employment or to persons dependent upon them. Of the objection that such an amendment would leave unaffected the "due process" clause of the Federal Constitution the report says that from a careful study of United States Supreme Court decisions, there is good ground for expecting that in interpreting the "due process" clause the court will hold that reasonable legislation for the establishment of a compulsory compensation or insurance plan may be sustained as a legitimate exercise of the police power, particularly where there is a provision in the Constitution of the State enacting such legislation which expressly authorizes this method of dealing with industrial accidents.

The Blaisdell Machinery Company

The Blaisdell Machinery Company, Bradford, Pa., has opened a Pittsburgh office at 907 People's National Bank Building, in charge of J. M. Read. The business in the Pittsburgh district was formerly handled from the main office in Bradford. The company is manufacturing a very high grade of entirely inclosed self-oiling compressors and a line of vacuum cleaning machinery which embodies some of the latest and most advanced ideas in this work. Another product of the company is the Blaisdell automatic sewage ejector, used for raising sewage or other waste from below the same level. It is being used to a large extent in office buildings and for municipal plants where sewage by gravity is not possible. The company is installing a large municipal plant in Plainfield, N. J., which is designed to care for over 400 gal. of sewage per min. and is operated by electrically driven air compressors equipped with automatic controls. As the business of the company is steadily increasing, the opening of other offices within the next few months is contemplated.

The Ohio Society of Mechanical, Electrical and Steam Engineers will hold its twenty-third meeting May 18 and 19, in the Elks Club Auditorium, Youngstown, Ohio. An interesting programme has been issued, which gives the titles of quite a number of engineering papers to be read, together with details of excursions to be made to industries in the locality.

Lake Iron Ore Shipments in April

The April shipments of Lake Superior iron ore from upper lake docks were but little more than one-fifth of those in April, 1910—331,645 gross tons against 1,520,305 tons. The record for the various ports is as follows, with comparison with 1910:

	Gross Tons.	
	April, 1911.	April, 1910.
Escanaba	93,532	223,025
Marquette	14,838	135,559
Ashland	41,337	218,703
Superior	76,739	355,307
Duluth	51,042	309,427
	54,157	278,284
	331,645	1,520,305

The Franklin Machinery Company, Franklin, Pa., builder of high grade horizontal and universal boring, drilling and milling machines and power milling machines, has appointed Manning, Maxwell & Moore its sales representatives for the greater portion of the United States and also to handle its sales in Japan and China. The company has excellent connections with foundry and other outside machine interests which enables it to contract for quite a number of its machine tools at one time for installation at a later date. The company also endeavors at all times to have a certain number of machines going through the process of construction so that its stock of machines for immediate shipment permits of selection and quick replacement. It is about to install another gas engine and is considering both an individual engine and a direct-connected engine and generator for power and lighting. Its plant is built on the unit plan, and can be added to in a comparatively short time when desirable.

The Vulcan Detinning Company's Year

The Vulcan Detinning Company reports its net profits for the year ended March 31, 1911, after an allowance for depreciation, at \$110,056. The payment of preferred dividends, amounting to \$82,500, left \$27,556 to be added to surplus. President Eugene E. Spiegelberg says: "The slack condition of trade which has prevailed in most lines of business during the year, and the resulting unfavorable position of the steel market for the larger part of the period had a depressing influence upon the sale of our steel scrap product and upon the prices obtained for it. On the other hand, the price of pig tin, which likewise forms part of our output, experienced a considerable advance, beginning in July, 1910, and thereby offset to some degree the recession in steel scrap. In our proceedings against the American Can Company for an accounting of profits made by it in detinning by our process, the taking of testimony before the special master, William J. Magie, is completed, the arguments by opposing counsel have been made, and briefs are now being submitted. The finding of the special master should be handed to the court of chancery before very long, from which finding there may be an appeal."

The United Engineering & Foundry Company, Pittsburgh, has received a contract from Dilworth, Porter & Co., Ltd., of that city, for the building of a new 18-in. mill for rolling tie plates. The mill will consist of 2 stands of 18-in. 3-high rolls with pinions, tilting tables, transfeers runouts, etc. The mill will be motor driven, with rope drive.

The National Tube Company, Pittsburgh, has received an order for 40 miles of 6-in. steel pipe for shipment to Wyoming.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., has received an order from the Portsmouth Steel Company, Portsmouth, O., for the building of four hot sheet mills and other equipment.

A course in mining engineering is to be established in Sibley College, the mechanical engineering school of Cornell University. To supplement the theoretical work in mining and metallurgy it is planned to provide summer work in mining districts.

The Hess Steel Castings Company

The new foundry of the Hess Steel Castings Company, Bridgeton, N. J., is now completed and castings are being poured. The process is a new one, originating with the Flexilis Werke, of Germany, and it opens new possibilities in the economical production of automobile and engine parts, high-pressure piping, and other difficult shapes where the quantity or form does not justify the use of dies.

Castings made of this process can be poured in intricate shapes quite unknown in the steel founder's art as hitherto practiced. For example, thin ribs can be set on thick sections with small fillets and with no sponginess of texture where the light and heavy sections join. The allowance required for finishing is also very small, partly because the shrinkage is uniform, but chiefly because the metal is sound from the surface down, rendering it unnecessary to machine off from one-fourth to one-half inch in order to reach good metal. Another advantage of the process is the small time necessary for annealing, only a few hours being usually required.

The Haskell & Barker Steel Car Plant.—The Haskell & Barker Car Company, Michigan City, Ind., states that its recent purchase of land will be used for the purpose of erecting new shops, the board of trustees having voted to expend \$1,250,000 in enlarging and improving the plant. The present facilities of the company are limited to steel underframe cars, but with the contemplated improvements it will build all steel cars. Later the company also expects to take up the manufacture of front end steel cars for passenger trains. It further contemplates the installation of a steel foundry for the manufacture of cast-steel truck frames, cast-steel couplers, etc., its present foundries being devoted to malleable, gray iron, wheel and brass work.

The Associated Foundry Foremen of Philadelphia and Vicinity held their regular monthly meeting at the Manufacturers' Club, Philadelphia, Pa., on the evening of May 9 with Vice-president James Whitehead in the chair. R. T. Thum, representing the Girard Iron Works, Philadelphia, was elected a delegate to attend the convention of the Associated Foundry Foremen, at the Pittsburgh convention May 23 to 27. Action on the revision of the by-laws of the association was deferred until the June meeting. The paper for the evening's discussion was on "Methods of Coke Manufacture" by C. M. Schwerin, manager Vinton Colliery Company, New York. He described in detail the formation and adaptability of various coals for coking purposes, the various ovens, from the old beehive to the modern by-product types, and the adaptability of various classes of coke for foundry and general metallurgical practice. In the discussion which followed the reading of the paper, the question of melting ratio, the methods of charging cupolas and other points of interest in connection with foundry practice were brought out. A vote of thanks was extended Mr. Schwerin for his interesting paper, after which the meeting adjourned.

The Interstate Steel & Supply Company, 5102 Jenkins Arcade Building, Pittsburgh, of which C. T. Herron is president and treasurer, deals in iron, steel, coal, coke, sheets, and mine, mill and foundry supplies, and makes a specialty of Conneaut shovels and spades, made by the Conneaut Shovel Company, Conneaut, Ohio, and hickory handles for axes, hammers, sledges, etc., made by the Beamer Handle Company, Manor, Pa.

The proposed investigation of the United States Steel Corporation by Congress, it is believed, will force the government to make public the result of the thorough inquiry into its affairs by the Department of Commerce and Labor. It is known privately that this investigation has resulted in complete vindication of the corporation, both as a legal and manufacturing organization.

The Keystone Bronze Company, Pittsburgh, Pa., is installing some new machinery at its Brighton Works, New Brighton, Pa., and also at its Pittsburgh Works at Thirty-ninth street in that city. No additions are being made to buildings, and no material extensions are contemplated at present.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Types,
Declines in Italics.

At date, or week, one month and one year prices.

May 10, May 3, Apr. 12, May 11,
1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton:

Philadelphia	May 10, 1911	May 3, 1911	Apr. 12, 1911	May 11, 1910
Foundry No. 2, Valley furnace....	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Southern, Cincinnati	13.75	13.75	13.75	15.50
Foundry No. 2, Birmingham, Ala.	14.25	14.25	14.25	15.25
Chicago*	11.00	11.00	11.00	12.00
Basic, delivered, eastern Pa.	15.00	15.00	15.00	17.00
Basic, Valley furnace	13.50	13.60	13.75	15.25
Bessemer, Pittsburgh	15.90	15.90	15.90	17.90
Bray forge, Pittsburgh	14.40	14.40	14.40	15.90
Lake Superior charcoal, Chicago	17.50	17.50	17.50	18.50

COKE, CONNELLSVILLE,

Per Net Ton, at oven:

	May 10, 1911	May 3, 1911	Apr. 12, 1911	May 11, 1910
Furnace coke, prompt shipment....	1.55	1.55	1.60	1.65
Furnace coke, future delivery....	1.75	1.75	1.75	1.80
Foundry coke, prompt shipment....	1.85	1.90	2.00	2.15
Foundry coke, future delivery....	2.10	2.15	2.25	2.35

BILLETS, &c., Per Gross Ton:

	May 10, 1911	May 3, 1911	Apr. 12, 1911	May 11, 1910
Bessemer billets, Pittsburgh	23.00	23.00	23.00	26.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	29.00
Wire rods, Pittsburgh	29.00	29.00	29.00	32.00

OLD MATERIAL, Per Gross Ton:

	May 10, 1911	May 3, 1911	Apr. 12, 1911	May 11, 1910
Iron rails, Chicago	14.00	14.25	14.50	17.50
Iron rails, Philadelphia	16.75	16.75	17.50	20.00
Car wheels, Chicago	12.75	13.25	13.25	16.00
Car wheels, Philadelphia	13.00	13.00	13.25	15.00
Heavy steel scrap, Pittsburgh	12.50	12.50	13.25	15.50
Heavy steel scrap, Chicago	10.25	11.50	11.50	13.50
Heavy steel scrap, Philadelphia	13.00	13.00	13.50	15.00

FINISHED IRON AND STEEL,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.32½	1.32½	1.37½	1.50
Common iron bars, Chicago	1.22½	1.25	1.25	1.50
Common iron bars, Pittsburgh	1.30	1.32½	1.35	1.55
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.66
Tank plates, Pittsburgh	1.40	1.40	1.40	1.50
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh	1.60	1.60	1.70	1.85
Barb wire, galvanized, Pittsburgh	2.10	2.10	2.10	2.15

METALS, Per Pound

	Cents.	Cents.	Cents.	Cents.
Flashed copper, New York	12.25	12.30	12.37½	13.25
Spelter, New York	5.50	5.50	5.50	5.05
Spelter, St. Louis	5.25	5.30	5.30	4.90
Lead, New York	4.40	4.42½	4.45	4.35
Lead, St. Louis	4.25	4.27½	4.30	4.20
Tin, New York	41.50	42.00	42.25	33.25
Antimony, New York	50.00	50.00	50.00	50.00
Aluminum, New York	33.00	33.00	33.00	33.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets. Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8-in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in.,

on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS: Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, as are follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Black. Galv.	Iron. Galv.
1 to 1½ in.....	49	43
1½ to 2 in.....	63	71
2 to 3 in.....	69	75
3 to 4 in.....	70	76
4 to 6 in.....	76	62
6 to 8 in.....	68	74
8 to 12 in.....	77	73
12 to 15 in.....	75	71
15 to 18 in.....	51½	55
Butt Weld, extra strong, plain ends, card weight.		
1½ in.....	74	68
2 to 3 in.....	78	72
3 to 4 in.....	79	73
4 to 6 in.....	76	70
6 to 8 in.....	69	65
8 to 12 in.....	64	54
12 to 15 in.....	51	55
Butt Weld, double extra strong, plain ends, card weight.		
1½ in.....	64	58
2 to 3 in.....	67	61
3 to 4 in.....	69	63
4 to 6 in.....	66	60
6 to 8 in.....	59	49
8 to 12 in.....	54	45
12 to 15 in.....	51	55
Butt Weld, double extra strong, plain ends, card weight.		
1½ in.....	65	59
2 to 3 in.....	67	61
3 to 4 in.....	69	63
4 to 6 in.....	66	60
6 to 8 in.....	59	49
8 to 12 in.....	54	45
12 to 15 in.....	51	55

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1 1/2 in. to 3 in.	Butt Weld	Will be sold at the same price as the corresponding Lap Weld
2, 2 1/2 to 4 in.	Lap Weld	3 points lower than the corresponding er price) than merchant or card weight pipe. Butt or Lap Weld as specified.

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 feet, and under; longer lengths, f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Plates.—Tank plates, $\frac{1}{4}$ in. thick, $6\frac{1}{4}$ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 6 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

No.	0	9	10	11	12	12	13	14	15	16
Annealed	\$1									
Galvanized										
Machine										
Bright and Annealed:										
9 and coarser									.80	
10 to 18									.80 and 10	
19 to 26										
27 to 36										
Galvanized:										
9 and coarser									.75 and 10	
10 to 18										
19 to 26									.72½ and 10	
27 to 36										.72½
Coppered or Liquor Finished:										
9 and coarser									.75 and 10	
10 to 26									.75 and 10	
27 to 36									.70 and 10 and 5	
Tinned:										
6 to 18									.75 and 10 and 10	

Pittsburgh

Pig Iron.—The inquiry of the United Steel Company, Canton, Ohio, for 3000 tons of basic for third quarter delivery has brought out some low prices, but the business has not been closed. Canal Dover furnace has a freight rate of 50c. to Canton against 90c. from the valleys and the contract will probably go to Canal Dover. The American Steel foundries is inquiring for 5000 tons of basic for its Alliance, Ohio, and Granite City, Ill., plants for third quarter delivery. We note a sale of 150 tons of Bessemer for prompt shipment at \$14.85, Valley furnace. We quote as follows: Bessemer pig iron, \$15 nominally; malleable Bessemer, \$13.75; basic, \$13.50; No. 2 foundry, \$13.75, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—The market is very quiet, new inquiries being few and only for small lots. Regular prices on open-hearth billets and sheet bars are being shaded fully \$1 per ton by the smaller mills. Specifications against contracts for billets and sheet bars have fallen off very materially. Regular prices, but which do not represent the actual market on open-hearth steel, are as follows: Bessemer and open-hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1½-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

An encouraging feature of the situation is the fact that the railroads are showing more disposition to buy.

some fair-sized orders for steel cars having been placed in the past week, while there are some very good inquiries in the market for rails. The Carnegie Steel Company reports considerable activity in steel railroad ties and splice bars, and has entered some good orders. A material improvement in the volume of new business is looked for in the latter part of this month or very early in June, and it is confidently believed that the last six months of the year will show a material gain in business over the first half. There is a little more new inquiry for pig iron and some small lots have been closed but basic iron is weak and has sold below \$13.50 at Valley furnace. The steel market is quiet, specifications showing a large falling off in billets and sheet bars, while considerable cutting is going on in prices of open hearth steel. Coke and scrap are neglected.

Ferromanganese.—A sale of 100 tons for May and June delivery is reported on the basis of \$36.50, Baltimore. We quote 80 per cent. foreign ferro at \$36.50 to \$36.75, Baltimore, the freight rate for delivery in the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—There is some new inquiry in the market and we note sales of 150 to 175 tons for third quarter delivery at about \$52.50. Pittsburgh, for 50 per cent. We quote 50 per cent. at \$52.50 to \$53. Pittsburgh, for delivery through the third quarter: 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars. Ashland and Jisco furnaces.

Muck Bar.—There is no new inquiry and we do not hear of any sales. We quote best grades made from all pig iron at nominally \$29, Pittsburgh.

Skelp.—The market is dull, owing to the quiet conditions ruling in the pipe trade. A sale of 1000 tons of wide sheared iron plates is reported on the basis of about 1.70c., Pittsburgh. We quote: Grooved steel skelp, 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—A sale has been made of 500 tons of Bessemer steel rods, ordinary carbons, for delivery over four months commencing June, on the basis of \$20, Pittsburgh. New inquiry for rods is light, most consumers being covered for some time ahead, but specifications against contracts are not coming in very freely. We quote Bessemer, open hearth and chain rods, at \$20, Pittsburgh.

Steel Rails.—The Carnegie Steel Company reports sales of several fair-sized lots of standard sections, one of 1000 tons and others of smaller quantities. The company has also entered some orders for standard sections for export, and reports new sales and specifications against contracts in the past week for a little over 3000 tons of light rails, one sale of 1500 tons having been made to a coal company. It also reports active inquiries for steel railroad ties and splice bars, and has sold about 20,000 steel ties to the Columbus Traction Company, Columbus, Ohio, the Rochester Traction Company, Rochester, N. Y., and the Cleveland City Railways Company, Cleveland, Ohio, and 5100 pairs of splice bars to an Eastern railroad. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b., at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—In addition to the heavy contracts for structural material placed in the East, we note that the Riter-Conley Mfg. Company has taken about 1200 tons of steel for new buildings of the Gary Screw & Bolt Company at Gary, Ind., the material to be rolled by the Carnegie Steel Company. Local work coming up includes about 6000 tons or more of steel for new buildings for the Pittsburgh Crucible Steel Company at Aliquippa, Pa. It is expected that bids on this work will be asked for in a short time. We continue to quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Plates.—The city of Los Angeles, Cal., is to build an aqueduct which will take about 4500 tons of plates, and inquiries are now out for this material, the order for which will probably come to a local mill. Some car orders have been placed in the past week and more are pending. The Seaboard Air Line has placed with

THE IRON AND METAL MARKETS

the Pressed Steel Car Company 1000 60,000-lb. steel underframe box cars, also 200 all-steel 100,000-lb. box cars for hauling phosphate, and 30 cabooses, the latter to be built by the Western Steel Car & Foundry Company. The Chicago, Burlington & Quincy has ordered 500 refrigerator cars from the American Car & Foundry Company and is still in the market for 1000 general service gondolas. The Southern Railroad has bought 100 steel cars. The demand for plates from boiler shops and other consumers is light, and the mills are operating only to 60 per cent. of capacity or less. Some of the smaller plate mills are slightly shading 1.40c. on narrow plates. We quote $\frac{1}{4}$ -in. and heavier plates at 1.40c., Pittsburgh.

Sheets.—The new demand for sheets and the specifications against contracts do not show any betterment, and the condition of the trade therefore remains unsatisfactory. An order for about 250 tons of corrugated iron sheets for the new buildings of the Gary Screw & Bolt Company at Gary, Ind., is pending, and will be placed in a few days. Prices are fairly well maintained, but in some sections, notably in the South and Southwest, there is some slight cutting on desirable business coming up. So far there has been no intimation that an official reduction in prices of sheets will be made, and it is not believed that such action would help the market in a buying way. Regular prices on black, galvanized and roofing sheets, which continue to be shaded to a slight extent in some sections, are printed on a previous page.

Tin Plate.—The tin plate trade is in fairly satisfactory condition. While the new demand is light, specifications from the can makers are being received in large volume, and shipments to this class of consumers over the next three months will be heavy. The American Sheet & Tin Plate Company is operating to a little more than 75 per cent. of capacity, and this week is running two of its leading tin plate plants to full capacity that for several weeks were running only four days a week. It is stated that prices are being well maintained. We quote 100-lb. coke plates for delivery over remainder of this year at \$3.70 per base box, f.o.b. Pittsburgh.

Bars.—The new demand and specifications against contracts for soft steel bars are very light. It is not believed that the consumption of steel bars by the agricultural implement makers this year will be as heavy as usual. The demand for hard steel bars for reinforcing purposes is fairly active. Iron bars are quiet both in new demand and in specifications against contracts. We quote soft steel bars at 1.40c. and common iron bars at 1.30c. to 1.35c., f.o.b. Pittsburgh.

Shafting.—A slightly better inquiry is noted so far this month as compared with the same period in April. The new demand is still confined to small lots, and specifications against contracts are only fair. Distributors of shafting are carrying as small stocks as possible in the fear that possibly a revision in prices may be made. Regular discounts on cold rolled shafting are 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory, but in some cases these discounts are shaded.

Spelter.—New inquiry is slightly better, and prices are a shade firmer. We note a sale of 150 tons of prime grades of Western spelter for delivery to a Youngstown interest on the basis of 5.20c., East St. Louis. We quote prime grades of Western at 5.20c. to 5.25c., East St. Louis, the rate to the Pittsburgh district being 12 $\frac{1}{2}$ c. per 100 lbs.

Hoops and Bands.—By an unfortunate typographical error the quotation on hoops in this report last week was 1.35c., but it should have been 1.45c. The new demand for both hoops and bands is light, and specifications against contracts are only fair. We quote steel hoops at 1.45c., and bands at 1.40c., the extras on the latter as per the steel bar card. It is said that on desirable orders these prices are sometimes shaded.

Merchant Steel.—New orders entered for shipment by the mills and specifications against contracts are only fair and are mostly in small lots to cover actual needs. In spite of the light new demand, prices are quite firmly held, but hardly enough new business is being placed to test the market. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, $\frac{1}{2}$ x $\frac{1}{2}$ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes,

tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—The new demand is only for small lots to cover actual needs, and consumers are not specifying freely against their contracts. We quote structural rivets at 1.75c. to 1.80c., and boiler rivets 1.80c. to 1.85c., Pittsburgh.

Wire Products.—There is a little better feeling in the wire trade, the new demand being slightly more active, but still confined to carload and smaller lots. Jobbers and distributors of wire products are taking in only such quantities of material as are absolutely needed to cover present wants. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—No large inquiries are in the market from any of the leading roads, but two of the Western lines have sent in quite liberal specifications against contracts in the past two weeks. The best price of railroad spikes is \$1.60, Pittsburgh, with the usual extras for odd sizes.

Merchant Pipe.—Several leading operators in natural gas fields have a project under way to pipe natural gas from the West Virginia fields to Detroit, Mich. If this project goes through it will require from 225 to 250 miles of 20-in. pipe. The Southern California Gas Company, Los Angeles, Cal., is in the market for 90 miles of 10 to 12 in. Jobbers and small dealers continue to place only such orders for merchant pipe as are required to meet current needs. It is stated that discounts on iron and steel pipe, printed on a previous page, are being well maintained.

Coke.—A blast furnace interest is reported to have bought 5000 tons of standard grade furnace coke for May delivery at \$1.50 per net ton at oven. No large inquiries are in the market from blast furnace interests, but a number of important consumers of foundry coke, whose contracts expire on June 30, are now figuring on their needs for the last half of the year. The coke trade in general is dull, and prices are very low. We quote standard makes of furnace coke for May and June shipment at \$1.55 to \$1.60, and for delivery over the last half of the year at \$1.75 to \$1.85 per net ton at oven. Standard makes of furnace coke loaded on cars have sold for May shipment at \$1.50 per net ton at oven, while some other grades of furnace coke have sold as low as \$1.40. We quote standard makes of 72-hour foundry coke at \$1.85 to \$2 for spot shipment, and from \$2.10 to \$2.40 per net ton at oven for second half delivery. The output of coke in the Upper and Lower Connellsville regions last week was 300,540 net tons, a decrease over the previous week of about 13,000 tons, being the lowest output in any one week for some months.

Iron and Steel Scrap.—Conditions in this trade seem to be getting steadily worse. The new demand is light and a good deal of scrap is pressing the market to find sale. We note sales of 500 tons of old car wheels at a price equal to about \$13.50 per gross ton, Pittsburgh; 500 tons of turnings at \$9, delivered; about 2000 tons of borings at \$8.75 delivered, and about 1000 tons of heavy steel scrap at \$12.50 to \$12.75, delivered. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.	12.50
No. 1 foundry cast.	13.50 to 13.75
No. 2 foundry cast.	12.50 to 12.75
Bundled sheet scrap, at point of shipment	9.00 to 9.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	13.50 to 13.75
No. 1 railroad malleable stock.	12.00
Grate bars	10.50 to 10.75
Low phosphorus melting stock.	16.50 to 16.75
Iron car axles.	24.25 to 24.50
Steel car axles.	18.50 to 18.75
Locomotive axles.	23.00
No. 1 busheling scrap.	12.00 to 12.25
No. 2 busheling scrap.	8.50 to 8.75
Old car wheels.	13.50 to 13.75
Sheet bar chop ends.	15.50 to 15.75
*Cast iron borings.	8.60 to 8.75
*Machine shop turnings.	9.00 to 9.15
Old iron rails.	15.00 to 15.25
No. 1 wrought scrap.	14.25 to 14.50
Heavy steel axle turnings.	10.25
Stove plate.	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Boiler Tubes.—A good many contracts from the large consumers for boiler tubes expire June 30, and it is expected that within the next three or four weeks

THE IRON AND METAL MARKETS

some of these will be in the market for their requirements for the last half of the year. The new demand for merchant tubes is only for small lots.

Chicago

FISHER BUILDING, April 12, 1911.—(By Telegraph.)

No great change is noted in the condition of the Chicago market, although in a small way some Western railroads have been purchasers. Business on all lighter finished products seems to have fallen off. The one bright item in this week's report is cast iron pipe, the leading industry having closed a number of very desirable municipal lettings. The price of practically every item in the scrap list has fallen off, and, with some of the larger mills practically out of the market for this product, accumulations are rapidly increasing. A confusion of labor troubles is delaying the completion of many Chicago buildings, but so far structural iron workers have avoided the fray and such buildings as have been started are going forward nicely. The loop district of Chicago is undergoing a great transformation. At least a dozen of the old landmarks in this part of the city are being torn down by wrecking crews and will be replaced by larger buildings of modern construction.

Pig Iron.—Most pig iron business is being done in single carload lots. The number of such orders being received would indicate that foundries in this district are running close to the wind, with badly depleted stocks, but such is not the case, most orders being for special analysis iron which is evidently being used to tone up material already on hand. There seems to be a united opinion that more furnaces must go out of blast and pig iron production be held decidedly under consumption for some months before any marked improvement will result. Prices of Northern irons are reported to be somewhat shaded to secure desirable business, but the principal producers are firmly maintaining present prices. Lake Superior charcoal iron prices are known to have been shaded, the lower quotations being made for immediate delivery from large accumulations which must be moved. A Wisconsin foundry is reported to be in the market for its last half requirements of this nature. Prospective purchasers accompany practically every inquiry by the statement of what they are willing to pay, \$10.50 and \$10.75, Birmingham, for Southern No. 2 being prices commonly named in such a manner, but furnaces are adhering to \$11 for deliveries extending over the remainder of the year. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted, f.o.b. furnace:

Lake Superior charcoal.....	\$17.50
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	15.85
Southern coke, No. 2 foundry and No. 2 soft.....	15.35
Southern coke, No. 3.....	15.10
Southern coke, No. 4.....	14.85
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.85
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

(By Mail.)

Billets.—The demand for billets is never very great in this market. It is only occasionally that a large sale is made. For several months the leading interest has steadfastly maintained its price at \$30.60 on open hearth forging billets. This price is commonly reported to be shaded by smaller competitors, but little trading is being done at any figure. We continue to quote \$30.60, base, Chicago, on open hearth forging billets and \$25.60, base, on rerolling billets.

Plates.—As long as Western car and ship building remain in their present inactive condition, little change is expected in plate business. The Indiana Steel Company's universal plate mill at Gary has been given a very satisfactory tryout and is now ready for operation as soon as the demand warrants. At the present time, however, the South Chicago mills are able to care for all the plate business in sight without trouble. Rumors of price cutting are common, but the principal producers are maintaining mill prices at 1.58c. to 1.63c. Store prices are 1.80c. to 1.90c., Chicago.

Rails and Track Supplies.—A little better business is noted on rails and track supplies. The leading interest has booked orders for about 7000 tons of standard sections, while the light rail and track supply business has been good. Specifications are coming in freely and practically every item shows a modest improvement. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—This has been one of the quietest weeks on all sorts of structural material for many months. The total of the entire lettings for the week would not make one good contract. The Northwestern Railway is in the market for 8500 tons of bridge material. The contract for the postoffice at Bellingham, Wash., 220 tons, went to the Des Moines Bridge & Iron Works; the J. R. Watkins Medical Company's administration building, Winona, Minn., 190 tons, to the Modern Steel Structural Company; the Piru Creek bridge, Ventura County, Cal., 130 tons, to the Missouri Valley Bridge & Iron Company; the Y. M. C. A. building, Moline, Ill., 165 tons, to the Union Foundry Company, Chicago. We quote plain material from mill at 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Sheets.—Small orders continue to prevail and buyers are showing no disposition to anticipate their wants. Mills are running at about 60 per cent. capacity, with a very small volume of business in sight. Producers are inclined to take a cheerful view of the situation, however, and consider business very fair under existing conditions. Small mills are probably making concessions in prices, as rumors to this effect are common, but the principal producers, whose sheets are best known, are firmly maintaining prices as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Both steel and iron bar business has been far below normal for the first four months of the year. Merely a fair amount of business is coming forward for steel bars, with rumors of price concessions. Bar iron is decidedly weaker, and the quotations given this week represent a market that is strongly reported to be less, as prices have been rumored as low as 1.20c. or even 1.18c. These figures, however, are not verified. Regular prices, Chicago, are as follows: Soft steel bars, 1.58c.; bar iron, 1.22½c. to 1.27½c.; hard steel bars rolled from old rails, 1.30c. to 1.35c. From store, soft steel bars, 1.80c. to 1.90c., Chicago.

Wire Products.—The great rush of spring business is about over, and mills are now easily taking care of business as it comes in. Barb wire is the only item on which producers are making delayed shipments and these are not nearly as much held back as a few weeks ago. The spring months have brought out a remarkable amount of poultry netting business, the demand for this light fencing having increased steadily for some years. Many jobbers report their spring sales of poultry netting greater than in any similar period in their history. The sale of nails and fence wire has somewhat dropped off, and small local shipments are decidedly heavier in jobbing houses than are carload lots. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—The cast iron pipe business in the Chicago market is decidedly better. This business has been good all the spring when other products were somewhat backward. The railroads are still somewhat backward about placing their orders, and considerable business of this nature is known to be pending. During the past week the leading interest has closed contracts with the following municipalities: Milwaukee, Wis., 4500 tons of water pipe; Kansas City, Mo., 1600 tons; Springfield, Ohio, 900 tons; Saginaw, Mich., 400 tons. Toledo, Ohio, has also been the purchaser of 1575 tons of high pressure pipe. A number of small orders have been drifting in from various gas companies, although most of the larger business of this nature has been closed. The prospects for an exceptionally

THE IRON AND METAL MARKETS

good pipe season brighten as the year advances. Prices remain firm as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—The market has continued to settle, and its present unevenness is due to the lack of actual trading. Several railroad offerings have appeared during the week, prominent among which are 600 tons by the Soo Line, which closes May 12. The Chicago, Milwaukee & St. Paul came out with a list approximating 3500 tons, which closed May 8. The 30,000-ton accumulation of the Santa Fé closed on May 5, and although no sales were made the bids received give something of an idea of the market as follows: No. 1 busheling, \$8.80; No. 1 cast, \$10; steel knuckles and couplers, \$9; heavy melting, \$10.25; No. 1 wrought, \$11.15; long rails, re-rolling, \$13.25; short rails, \$11; bent and twisted, \$11; frogs, switches and guards, \$10.50. The record breaking accumulation in the scrap yards of this railroad company is being enlarged by the arrival of from one to ten cars of unassorted scrap every day. No two people vitally interested in the Chicago scrap market are holding the same opinion as to what the market really is. No. 1 busheling is an item upon which this diversity of opinion seems to have centered, but we are advised that the Milwaukee list, which closed to-day, brought \$9 on this item, f.o.b. connecting lines, which, with the bids on the Santa Fé list, pretty well establishes a price. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows, per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, re-rolling.....	14.00 to 14.25*
Old steel rails, less than 3 ft.....	11.25 to 11.50
Relaying rails, standard sections, subject to inspection.....	22.00 to 23.00
Old car wheels.....	12.75 to 13.25
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75
Shoveling steel.....	10.25 to 10.75
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.25 to \$12.75
Iron arch bars and transoms.....	13.50 to 14.00
Steel angle bars.....	10.50 to 11.00
Iron car axles.....	18.25 to 18.75
Steel car axles.....	17.25 to 17.75
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	9.75 to 10.25
Steel knuckles and couplers.....	9.75 to 10.25
Locomotive tires, smooth.....	16.50 to 17.00
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.00 to 9.50
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	11.50 to 12.00
No. 1 cast scrap.....	10.75 to 11.25
Stove plate and light cast scrap.....	9.25 to 9.75
Railroad malleable.....	10.50 to 11.00
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Philadelphia

PHILADELPHIA, Pa., May 9, 1911.

A few fair-sized sales of special grades of pig iron are reported, but the general demand still continues along very narrow lines. There is almost an entire absence of demand for foundry pig iron for forward delivery. In finished as well as semi-finished materials there has been little fresh business offered, and in some lines specifications are less numerous. A sharp falling off in the demand for steel billets is reported. Prices in practically all lines of finished materials are being firmly maintained by Eastern producers. The old material market is very quiet.

Iron Ore.—Consumers show no interest, awaiting further developments as to the pig iron situation. Some reports of deferred shipments are being heard. Importations in the week ended May 5 were confined to one cargo of 4900 tons of Cuban ore.

Pig Iron.—The movement in special grades has been more pronounced, with transactions in steelmaking grades of leading interest. A sale of 5000 tons of basic iron, to a consumer in the central part of the State, for second quarter shipment, at \$15.25, delivered, is reported, while one of the Eastern mills is testing the market in a small way for a block of the same grade, and another is negotiating for a considerable quantity. Low phosphorus iron is flatly on a \$21, delivered, basis in this district, several sales of moderate lots being reported at that figure. An interesting transaction is reported, involving the sale of about 1000 tons of Chinese basic iron, imported about four years ago, and which

has been held in storage since that time, which was disposed of to a cast iron pipe maker in this territory at private terms. This iron is subject to the old duty of \$4 a ton, and the buyer will use it in material for export, taking advantage of the drawback in the duty. The only transaction of importance in foundry grades was a sale of 1000 tons of No. 2 plain, for early shipment at \$15, delivered in this vicinity. This was a rather unusual transaction, as the buyer generally supplies all the iron required for its own use. The general demand for foundry grades has, if anything, been less active. The usual large lot buyers show no interest in the market and there is less inquiry for iron for forward delivery. The smaller buyers have also been purchasing less freely and the usual day to day sales have been in smaller number. For standard brands of eastern Pennsylvania No. 2 X foundry \$15.50 to \$15.75 represents the range of the market for second and third quarter deliveries. Reports of concessions, occasionally heard, usually develop the fact, on investigation, that the iron was somewhat off grade. The movement in Virginia foundry iron has been lighter. Prices are firm, but more extended deliveries can be had at quotations which recently applied strictly to second quarter deliveries. The cast iron pipe makers are still negotiating for low grade iron, but sellers refuse to meet their views regarding prices, and no important transactions have been reported. Little inquiry for forge iron comes from the rolling mills, and prices quoted are largely nominal. Meetings of the Eastern and Virginia Pig Iron associations, held in this city last week, brought out little of interest. In Virginia one furnace, Longdale, has gone out, while in the eastern Pennsylvania district Sheridan furnace has blown out and Carbon will go out the current week. While official statistics are refused, it is stated that those of the Eastern association show a slight decline in both orders and stocks on hand, while those of the Virginia association are practically unchanged. Quotations for standard brands of iron, delivered in buyers' yards in this district, show but minor changes, the following range being quoted for second and, in instances, third quarter deliveries:

Eastern Pennsylvania No. 2 X foundry....	\$15.50 to \$15.75
Eastern Pennsylvania No. 2 plain.....	15.00 to 15.25
Virginia No. 2 X foundry.....	15.80 to 16.00
Virginia No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.00
Basic.....	15.00 to 15.25
Standard low phosphorus.....	21.00

Ferromanganese.—A sale of a lot of 500 tons to a local consumer, for which negotiations have been under way for some time, has been made at \$36.60, Baltimore, delivery over the last half of the year. No new inquiry is reported in this district, although some little Western business has developed. Quotations still show considerable variance, but \$36.50 to \$37, Baltimore, about represents the range for either prompt or second half shipments.

Billets.—A marked falling off in the demand is reported. Even specifications have been lighter, and one of the Eastern mills has reduced its productive rate. Prices are maintained, makers contending that under existing conditions concessions would not attract business. Open hearth rolling billets are firm at \$25.40, and ordinary forging billets at \$30.40, delivered in this vicinity.

Plates.—Current orders are fairly numerous, but continue small individually, and the aggregate volume coming to the mills shows practically no change. Moderate specifications against orders for bridge and car plates are reported. Very little business of any size for immediate consumption is in sight. Eastern mills are maintaining prices firmly, the recent 1.55c. minimum being named for ordinary plates, delivered in this district.

Structural Material.—New business develops rather slowly, although fabricators are busy estimating on work already in hand. Probably the most important project in this territory now up for bids is the Riggs Hotel, Washington, D. C., for which about 1000 tons will be required. Several fair-sized propositions are believed to be near closing, including the new building for the Fire Association in this city, requiring about 900 tons. The demand for plain shapes, while orders are not large individually, aggregates a very fair total. Prices of plain shapes are unchanged at 1.55c., delivered in this vicinity; low prices, however, continue to be named for fabricated work.

Sheets.—A slightly better demand is reported, al-

THE IRON AND METAL MARKETS

though business continues of a day to day character. Some Eastern mills were operated at full capacity last week and have been fairly well engaged this week, but the volume of business on order books is light and mills are not very well fixed as to forward business. Prices show no change, the following range being quoted, Eastern makers' mills, for current prompt lot business: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Business continues extremely quiet. Consumers are waiting for assurances of the stability of prices before placing any orders in quantity, and while 1.25c. mill, or 1.32½c., delivered here, appears to be the minimum for the general run of business in refined iron bars, the opinion prevails that this price can be shaded if the specifications were desirable, although it is stated that some of the mills have turned down orders offered under that level. The demand for steel bars has been quiet, with specifications against contracts light.

Coke.—Transactions of any importance are scarce, the bulk of the business closed being for small prompt lots. Buyers are not willing to contract at prices asked when prompt coke can be had at material concessions. Prompt foundry coke ranges from \$1.90 to \$2 per net ton at oven, while for second half delivery \$2.20 to \$2.40 is quoted. Furnace coke for prompt shipment is available at \$1.50 to \$1.60, at oven, while forward deliveries are held at \$1.80 to \$2. The following range of prices, per net ton, is quoted for deliveries in this territory:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke.....	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke.....	3.75 to 4.15

Old Material.—There have been few purchases of any size by consumers, although occasional small transactions between dealers are reported, usually at prices higher than mills will pay, as they generally apply against contracts at higher prices on which deliveries must be made. Heavy melting steel has not been active; mills offer \$13, delivered, as a rule, but in exceptional cases higher prices will be paid for prime material. Rolling mills are practically out of the market. Sharp concessions would probably induce buying, but sellers refuse to dispose of any quantity of material at present prices. Railroads' lists, recently bid upon by both consumers and merchants, are still unclosed. The following range of prices about represents sellers' ideas of the market for deliveries in consumers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	14.00 to 14.25*
Low phosphorus heavy melting steel scrap..	17.25 to 17.75
Old steel axles.....	19.25 to 19.75*
Old iron axles.....	25.00 to 26.00*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.75 to 13.25
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast.....	13.25 to 13.75
Railroad malleable.....	11.50 to 12.00
Grate bars, railroad.....	11.00 to 11.50
Stove plate.....	10.50 to 11.00

*Nominal.

Cincinnati

CINCINNATI, OHIO, May 10, 1911.—(By Telegraph.)

Pig Iron.—There is not enough large inquiry to test the market for prices. A few small sales for prompt shipment of both Northern and Southern foundry have been made at figures slightly below the regular schedule. Buyers are covered for the first half, and in a number of instances have enough iron under contract to carry them into the third quarter, while it is generally conceded that the recent cut in Lake ore prices had already been discounted by the iron producers. Consumers, however, evidence a tendency to wait until it is definitely determined if this reduction will be reflected in iron quotations. The foundry melt is lighter, and the consumption of basic is not holding up to the usual standard. An inquiry for 3000 tons of basic is being figured on, but the business is expected to be taken by a furnace located near the consumer's plant. There is no demand for malleable, consequently it is difficult to obtain a correct quotation on it. Both mal-

leable and basic are obtainable in the Ironton district around \$14, with the probability that shipments could be extended through the last half at a small advance. There is considerable talk of further reduction in the output in both Southern and Northern iron, but nothing definite has yet been decided on in this direction. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Basic, Northern.....	\$15.20 to 15.45
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—Probably due to a decrease in the melt with the foundries, foundry coke is moving slower and there is also a reported let-up in furnace coke shipments. New contracts are scarce and none calling for any large amount has been closed lately. There is still a weakness shown in spot shipment furnace coke, especially in the Connellsville district, where a few 48-hour brands have been available around \$1.40 to \$1.45 per net ton at oven. In the Pocahontas and Wise County fields \$1.60 to \$1.75 is generally quoted and in all three fields the future shipment price ranges between \$1.70 to \$1.90 for the last half. For immediate delivery several small lots of foundry coke have been bought around \$1.90, but the average price is \$2 per net ton at oven, with an advance of 25c. to 30c. asked for future shipment.

Finished Material.—No improvement can be claimed, but there is certainly no decrease in the demand for steel bars and certain kinds of structural material. Business booked is for a limited amount. The principal encouraging feature to report is that specifications on contracts are very satisfactory, and there are orders in sight that only need a little more confidence in general business circles to get started. The mill price on steel bars, plates and structural material is 1.40c., and warehouse figures run from 1.90 to 2c. Reinforcing concrete bars are reported as being in better demand.

Old Material.—The quiet conditions previously reported continue to prevail and dealers do not claim to look for a better market for several months. Offerings are light and sales to foundries are stated to figure out less than for any corresponding period since 1908. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.50 to 8.50
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton....	21.00 to 22.00
Old car wheels, gross ton.....	11.00 to 12.00
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, May 9, 1911.

Iron Ore.—There were between 20,000,000 and 21,000,000 tons of Lake Superior ore on docks and in furnace yards May 1 according to careful estimates based on the ore on hand a year ago, the 1910 shipments and the consumption during the year as shown by the pig iron production. On May 1, 1910, the amount of unconsumed ore on docks and in furnace yards was approximately 13,000,000 tons. The consumption during the year from May 1 to May 1 was about 35,000,000 tons. The ore on docks and at furnaces at the close of navigation December 1, 1910, was estimated at close to 32,000,000 tons. The amount on docks and in furnace yards May 1 was much larger than on the same date of any previous year. The ore market is very quiet, the only sales reported being in small lots. No inquiries for any round tonnages are pending. Ore shipments for April were 331,645 tons, as compared with 1,520,305 tons during April, 1910. A year ago the early movement was quite heavy. The shipments in May will be very light. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Besse-

THE IRON AND METAL MARKETS

mer, \$4.25; Old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—There is practically no demand for any grade. Foundries are deferring their purchases for the last half and producers see little indication of an early buying movement. The United Steel Company, Canton, Ohio, had not closed early this week on its inquiry for 3000 tons of basic. This inquiry is understood to have brought out quotations lower than have prevailed recently. Prices on foundry grades are stationary but quotations are largely nominal, there not having been any inquiries large enough to test the market since the reduction of ore prices. No. 2 foundry is quoted at \$13.75 to \$14, Cleveland and Valley furnace, for the second quarter, and it is believed that iron can be bought for the third quarter delivery at about the same prices. Southern foundry is held at \$11, Birmingham, for the second quarter and last half. For prompt shipment and the second quarter, we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Basic	14.25
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Gray forge	13.50
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	18.00

Finished Iron and Steel.—Mill agencies are booking a good volume of orders, but they are for very small lots so that the aggregate tonnage is light. Manufacturing plants as a rule are not getting a satisfactory volume of orders for their products and the only material they are buying is in small lots for their immediate requirements. Although the market is very firm on steel bars and structural material and the price of plates is being maintained as well as usual, there is a feeling among buyers that prices may go lower, and for that reason many are limiting their purchases to their early requirements. In structural lines specifications have been issued for the Central Y. M. C. A. building, Cleveland, requiring 1500 tons. Specifications will probably be out late this month for the new city hall building in Cleveland, requiring about 2000 tons. The McMyler-Interstate Company has been awarded the contract for the Dunham road bridge, Cleveland, 475 tons, and bids have been received for the Commercial building which will take 500 tons. The agricultural implement makers are doing nothing as yet regarding soft steel bar contracts, but some of them are reported to have closed for their hard steel bar requirements for the year running from July 1 at close to 1.25c., Pittsburgh. The demand for sheets continues moderate, the usual concession being about \$1 a ton. The sale of 300 tons of blue annealed sheets to an Erie, Pa., boiler manufacturer is reported. Prices on rivets are fairly steady, the maximum quotations being 1.80c., Pittsburgh, on structural rivets, and 1.90c. on boiler rivets. Mill agencies report a good demand for wire products. The demand for iron bars is light, and they are quoted at 1.30c. at mill.

Old Material.—The market is very dull. Prices are weak, but quotations are unchanged. Mills are not in need of much material and low prices are not tempting them to buy. About the only demand is for small lots of heavy steel scrap, for which consumers are offering \$11 to \$11.25. Little scrap is being offered by either dealers or producers at current prices. The Pennsylvania Railroad has received bids this week for a large tonnage. The Norfolk & Western Railroad has a list on which bids will be received May 17. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	\$13.00 to \$13.50
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.00 to 11.50
Old car wheels	11.50 to 12.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	11.00 to 11.50
Railroad malleable	11.75 to 12.25
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	6.25 to 6.50
Steel axle turnings	8.00 to 8.50
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 cast	11.25 to 11.50
Stove plate	10.25 to 10.50
Bundled tin scrap	11.00 to 11.50

Coke.—The market is very quiet, the only demand being for small lots of foundry grades for prompt

shipment. We quote standard Connellsville furnace coke for spot shipment at \$1.60 to \$1.65 per net ton at oven, and \$1.75 to \$2 for the last half. Connellsville 72-hr. foundry coke is held at \$1.95 to \$2 for spot shipment, and \$2.15 to \$2.50 for the last half.

Buffalo

BUFFALO, N. Y., May 10, 1911

Pig Iron.—Inquiry during the fore part of the week just past was light, but a change in the situation has taken place in the last two days and inquiry covering a comparatively large aggregate tonnage has developed, all being for foundry iron and including both early and forward deliveries. The total of these recent inquiries now under negotiation in this territory is about 15,000 tons, some of it being from large consumers—shipments on contracts have been fairly good and a little better than last week—the price situation remains about the same as for the previous week or two and at a schedule which is wholly unattractive to furnace operators. We quote as follows, f.o.b. Buffalo, for second and third quarter delivery:

No. 1 X foundry	\$14.25 to \$14.75
No. 2 X foundry	14.00 to 14.50
No. 2 plain	13.75 to 14.00
No. 2 foundry	13.50 to 13.75
Gray forge	13.25 to 13.50
Malleable	14.00 to 14.50
Basic	14.25 to 14.75
Charcoal	16.75 to 17.50

Finished Iron and Steel.—The week has been extremely quiet except in fabricated structural lines which have been fairly active. Selling conditions in general lines of finished products have been less favorable apparently than for a number of weeks and a less tonnage of bars and bar products has been placed than usual. Considerable tonnages of finished material, negotiations for which were pending last week, are still held in abeyance. The week has shown practically no new buying in tin plate and wire products, but specifications on contracts in tin plate are of fair volume. Wire nails are not moving as rapidly as anticipated when contracts were closed by the jobbers before the recent advances, and in some instances nails have been disposed of by jobbers at less than present mill prices. In fabricated structural material, specifications are out this week for figures for steel for the Klopp store and loft building, Main and Tupper streets, Buffalo, about 250 tons, and for the J. H. Smith building, Main and Genesee street, Buffalo, 150 tons. Steel specifications for the two Rosenbloom department store buildings, Syracuse, aggregating about 1000 tons, are also to be figured this week, and a small amount of steel for the substation postoffice building, at Main and East Utica streets, Buffalo. Bids are also soon to be received for steel for the St. Mary's hospital buildings and power plant at Niagara Falls, and for the Spirella Corset Company's factory buildings at the same place. Plans are being prepared for a 10-story Temperance Hotel at Rochester, about 1200 tons. Plans are about completed for grade crossing elimination viaducts over the New York Central, Erie, Lackawanna, Grand Trunk and International Bridge railroads at Amherst, Austin and Tonawanda streets, Buffalo, requiring approximately 5000 tons of steel, and upon which it is expected work will be commenced the latter part of the summer.

Old Material.—The scrap market continues dull and inactive, very little trading being done in any line; an occasional car load is the extent of transaction by most dealers who, as a rule, are simply filling in regular customer's short-stock requirements. No forward buying whatever is in evidence and no negotiations with the idea of filling future wants. Prices have been stationary for the past week and the following schedule is largely nominal, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$11.50 to \$12.00
Low phosphorus steel	14.00 to 14.50
No. 1 railroad wrought	13.25 to 13.50
No. 1 railroad and machinery cast scrap	18.75 to 13.25
Old steel axles	12.00 to 12.50
Old iron axles	22.00 to 22.50
Old car wheels	12.50 to 13.00
Railroad malleable	11.00 to 11.50
Boiler plate	9.50 to 10.00
Locomotive grate bars	10.00 to 10.25
Pipe	9.00 to 9.25
Wrought iron and soft steel turnings	6.25 to 6.75
Clean cast borings	6.00 to 6.25

THE IRON AND METAL MARKETS

St. Louis

St. Louis, May 8, 1911.

While the demand for pig iron is quiet, consumption is continuing at a rather satisfactory rate, buyers taking out their iron according to contract. Some of the larger melters are well stocked, however, and consequently entirely indifferent as to the market. There is some increase in the demand for structural iron and steel. Finished metals are in light request.

Pig Iron.—The pig iron market continued along in its desultory manner, with but little inquiry and small purchases, most of which are for spot delivery. An inquiry for a sound lot of Northern and Southern iron for shipment over the last quarter, which had temporarily been withdrawn, was revived and closed up for the Northern. Negotiations are still on for the Southern iron. Outside of this, probably the total week's sales of pig iron will not aggregate over 750 tons. Prices are unchanged, though it is claimed that a concession of 25c. per ton is in some cases made for Southern iron for prompt shipment. We quote \$2 Southern iron for shipment over the second half at \$11, Birmingham, for last quarter delivery only, \$11.50 is asked; No. 2 Northern foundry is firm at \$14 to \$14.50; Ironton, Ohio, either for shipment to July 1, or for last half. The same figures apply to malleable Bessemer for the same deliveries.

Coke.—The only large transaction in coke for the past week was the sale of 5000 tons of Stonega foundry for forward delivery. Quotations are \$2 to \$2.50 per net ton at oven for 72-hour selected Connellsville or Stenega foundry coke.

Finished Iron and Steel.—The tonnage of structural sales has been somewhat increased, and the demand has come from various portions of the local territory, which would indicate that sellers can look for better results. The Mississippi Glass Company let a contract for its building this week, requiring 250 tons of structural material, to the Stupp Brothers Bridge & Iron Company. Plates have been in fair demand. Agricultural implement and wagon concerns are still specifying for bars rather liberally; jobbers continue to do a fair business, but their orders for steel bars have been rather light, due to the lower price of iron bars. Light rails have been somewhat active, with an increased inquiry from the coal trade. Track fastenings have been moderately active. A new interurban road will be built shortly from Kansas City to St. Joseph, Mo., and from Kansas City to Excelsior Springs, Mo., which will need standard rails.

Old Material.—The Missouri Pacific is offering 2000 tons and the St. Louis & San Francisco about 1200 tons. The demand is light and prices are lower. We quote dealers' prices, per gross ton, f.o.b. St. Louis, as follows:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	11.25 to 11.75
Old steel rails, less than 3 ft.....	10.25 to 10.75
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.00
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75
The following quotations are per net ton:	
Iron fish plates.....	10.25 to 10.75
Iron car axles.....	16.50 to 17.00
Steel car axles.....	16.25 to 16.75
No. 1 railroad wrought.....	10.25 to 10.75
No. 2 railroad wrought.....	9.25 to 9.75
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealer's forge.....	8.50 to 9.00
Mixed borings.....	4.00 to 4.50
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers, cut to sheets and rings.....	7.25 to 7.75
No. 1 cast scrap.....	9.50 to 10.00
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	8.00 to 8.50
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	7.50 to 8.00
Railroad sheet and tank scrap.....	7.00 to 7.50
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	6.00 to 6.50

Birmingham

BIRMINGHAM, ALA., May 8, 1911.

Pig Iron.—The week has been devoid of interest so far as actual transactions were concerned. The tonnage sold was undoubtedly very light. Buyers are still unable, however, to break the \$11 schedule. The May

production promises to be less than April. Shipments for the first week have been very fair. Producers and dealers are hopeful that a real buying movement may begin by the end of the month. It appears certain that a number of different interests will have to come in the market before another month passes. Prices remain as follows, f.o.b. cars at furnaces in this district:

No. 1 foundry and No. 1 soft.....	\$11.50
No. 2 foundry and No. 2 soft.....	11.00
No. 3 foundry.....	10.50
No. 4 foundry.....	\$10.00 to 10.25
Gray forge.....	9.50 to 9.75
Standard basic, chill cast.....	11.00
"Off" basic.....	10.50
Charcoal car wheel iron.....	22.50

Cast Iron Pipe.—Some business came in the past week from the Pacific slope. All told, the week was a very satisfactory one to the pipe makers of this particular section. It is not anticipated that the melt will be increased during May, but the outlook is very good for a favorable showing as to shipments of the current make. Prices are held very firmly as follows, per net ton, on board cars here: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., average, \$21; with the usual differential of \$1 per ton higher for gas pipe.

Old Material.—A little better movement is reported in scrap. Dealers are on the lookout for such tonnages as are offered at any concessions in price, realizing that present prices are certainly rock-bottom. Some fair-sized shipments have been made recently, and the outlook is brighter in this line than for several weeks. This has been one of the duller branches of the iron and steel business of the district, and dealers feel that the worst is over. Prices are as follows, per gross ton, on board cars here:

Old iron axles (light).....	\$14.50 to \$15.00
Old steel axles (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

The German Iron Market

BERLIN, April 27, 1911.

A weaker tendency in some products is mentioned in the reports from manufacturing centers. This applies in particular to bars, for which pressure to get orders is growing and offers to sell at 102 to 103 marks are now plentiful. Some of the larger makers, with orders for six weeks or two months ahead, are maintaining prices of 105 to 106 marks. On the other hand, a few cases are mentioned where bars were sold at less than 100 marks in the home market.

A Good Report by the Steel Works Union.

This week the most interesting news is the report of the Steel Works Union, which met yesterday for its regular monthly meeting. Its review of the situation is more optimistic than usual. The home trade in semimanufactured steel is described as keeping up to its former level, and the run of specifications is satisfactory. Sales for the September quarter were declared open at unchanged prices. The foreign market for this class of products has latterly grown somewhat more quiet, particularly in England, where the weakness of pig iron has checked the placing of orders. The calls for delivery on old orders are still of satisfactory volume. The Prussian railroad authorities have sent in orders for the supplementary amounts of rails, ties, and smaller steel supplies needed by the end of July. The foreign demand for heavy rails continues good, and further contracts for considerable quantities have recently been taken. Mills running on grooved rails have work till well into the autumn, both home and foreign orders having recently been taken in large amounts. Light rails for mines are being called for delivery on home and foreign orders at an active pace and the Prussian mines have recently placed orders for their yearly requirements. Orders for structural shapes have been of larger volume than a year ago and the revived activity in building operations warrants the expectation of rapid sales from now on.

The managers of several companies went to yesterday's meeting with applications in their pockets for raising their allotments in bars, plates, and tubing; but

THE IRON AND METAL MARKETS

after seeing how hopeless the prospects of getting these increases were they withdrew their requests.

Efforts to Organize Pig Iron Makers.

The attention of the market is still attracted in a lively manner by the negotiations for organizing the pig iron trade on a national basis. A meeting with the Siegerland furnaces was held by the Essen Syndicate managers last week, but it adjourned without tangible result. It is reported that the prospects of securing the accession of most of the furnaces of that region are regarded as considerably improved. Some four concerns, however, were not represented at last week's meeting, one of these being the Geisweider Works, a powerful concern with its own steel mill, which was chiefly responsible for the refusal of the Siegerland furnaces to join the Essen Syndicate at the time of its formation. Negotiations have also been commenced in an informal way with the furnaces of the Luxemburg-Lorraine district; and here, too, the prospects of reaching a satisfactory result are pronounced considerably better. The fact that so many of the big mixed establishments of the lower Rhine and Westphalian region are going into the Luxemburg-Lorraine district has not a little promoted the cause of the syndicate in the latter.

Trade in pig iron continues quiet, with few orders coming in. The Essen Syndicate, it is reported, has about 80 per cent. of its producing capacity for the rest of the year already under contract. The export demand for pig has latterly relaxed, supposedly in connection with the weaker situation in the United States.

This week the Coal Syndicate has reduced the make of coke; hitherto the mines had been turning out 75 per cent. of the coke allotments, but the Syndicate decided upon a restriction to 70 per cent. This action was doubtless taken in view of the accumulating stocks of coke, and not from any expectation of a reduced production of iron.

The news from the Belgian market is again unsatisfactory. A Brussels dispatch says that the price of basic pig at Charleroi has again been cut one franc; and that iron bars have been reduced 1.50 and 2 shillings for export. The bottom export price, free on board at Antwerp, is now 94 shillings.

The exports of some of the leading lines of iron and steel from Germany for the first quarter of the year compare as follows with the first quarter of 1910:

	Metric Tons.	
	1911.	1910.
Pig iron.....	183,300	191,900
Steel billets.....	164,000	122,000
Beams.....	76,400	81,100
Bars, plain and shaped.....	176,100	127,500
Steel rails.....	129,600	88,100
Heavy plates.....	68,600	61,800
Wire and rods.....	92,500	94,400

At a recent meeting of the German machine-tool builders' society Dr. Junghann of Berlin read a paper on China as a possible market for German machinery, and in the course of his address he made some interesting remarks on the German and the American machine-tool industry. He admitted that the German tool builders received a powerful impulse from their American rivals prior to 1900; but that year, he said, proved the turning point in America's predominance in the world's markets. The German makers came forward with leaps and bounds and overtook the Americans. The time for imitating American models, he added, has passed away once for all; and German makers are now giving foreign builders as many ideas as they receive from abroad.

New York

NEW YORK, May 10, 1911.

Pig Iron.—Sales have been for the most part in 200-ton to 300-ton lots and the aggregate is less than in the preceding week. Eastern Pennsylvania and New Jersey furnaces reduced stocks last month, but not enough to be significant. The situation in that territory is simply that enough furnaces have gone out to adjust production to a lessened consumption, and there will be a further slight curtailment in the Lehigh and Schuylkill valleys. One inquiry for upwards of 1500 tons is about to be closed. Prices are weaker to the extent that forward deliveries can be had at figures close to those for spot iron, and in some cases irons are being offered to foundries that have not used them at concessions from the prices asked for familiar brands. While little Southern iron has been coming into this market, the reported shading of the \$11, Birmingham, price for No. 2,

some transactions being reported at \$10.75, has had a weakening effect, together with the slackening of foundry operations, due in part to the machinists' strike. Buffalo irons are quoted at \$14 at furnace for No. 2, but \$13.75 can be done for early delivery and for part of the third quarter. We quote on Northern iron at tide-water as follows: No. 1 foundry, \$15.50 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15 to \$15.25. For Southern No. 1 foundry we quote \$15.50 to \$15.75; No. 2, \$15.25.

Finished Iron and Steel.—The week has been somewhat devoid of new inquiries of magnitude in finished iron and steel. The volume of business is still up to but no greater than the total of last year for the same period, but in one or two instances an attitude of confidence in the outlook was found. Prices are still maintained, but there is some weakness, at least hesitation, in Bar Iron and irregularities in fabricated material. Business in plates, especially for consumption in boiler shops, is dead owing to the machinists' strike. Of late awards the noteworthy are: 22,000 tons for the Woolworth 55-story building, New York, to the American Bridge Company; 6500 tons of plates, mostly 15 to 40 lb. per sq. ft., but ranging from 7.5 to 80 lb. per sq. ft., for the battleship New York, at Brooklyn Navy Yard, to the Worth Brothers Company; 3100 tons of shapes for this battleship may go to Carnegie Steel Company; 650 tons for a loft building at Wooster and Houston streets, New York, to the A. E. Norton Company; 500 tons for bridges, New York Central Railroad at the Gardenville Yards, to the Lackawanna Bridge Company, and 1400 tons for the building of the Southwestern Life Insurance Company, at Dallas, Tex., to the American Bridge Company. The Boston & Maine has taken bids for a 700-ton bridge; the American Smelting & Refining Company will erect a refinery at Baltimore requiring a hundred or more tons of steel involving relatively high labor cost for erection; about 100 tons of structural work is estimated for the Rockefeller residence at Pocantico Hills, N. Y., and an interesting concrete and steel structure is to be expected to replace the burned grandstand of the baseball field at the Polo Grounds, New York. Quotations are: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40 to 1.45c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—The demand shows no improvement. The transactions of the past week have been few and the quantities involved small. The Perth Amboy letting advertised for May 3 has been postponed to May 23. No further public lettings of importance are announced in this locality. Carload lots of 6 in. continue to be quoted at \$21 to \$22 per net ton, tide-water.

Old Material.—The volume of business has shrunk to very small proportions. Few transactions are reported in any class of scrap, even cast scrap being neglected. Dealers continue to report rejections and the cancellation of orders taken at higher prices than those now prevailing. While conditions are exceedingly unsatisfactory, dealers' quotations are unchanged as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.00 to \$10.50
Heavy melting steel scrap.....	10.00 to 10.50
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	15.50 to 16.00
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.00 to 11.50
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	5.00 to 5.50
Cast borings.....	5.00 to 5.50
Wrought turnings.....	5.50 to 6.00
Wrought pipe.....	10.00 to 10.50
Old car wheels.....	11.50 to 12.00
No. 1 heavy cast, broken up.....	11.50 to 12.00
Stove plate.....	9.00 to 9.25
Locomotive grate bars.....	9.00 to 9.50
Malleable cast.....	10.00 to 10.50

Metal Market

NEW YORK, May 10, 1911.

THE WEEK'S PRICES

		Copper, New York.		Cents Per Pound for Early Delivery.		Lead.		Spelter.	
May.	Lake.	Lyric.	T'n.	May.	Lake.	May.	Lake.	May.	Lake.
4.....	12.30	12.10	41.55	4.42½	4.27½	5.50	5.27		
5.....	12.25	12.10	41.85	4.42½	4.27½	5.50	5.25		
6.....	12.25	12.10		4.42½	4.27½	5.50	5.25		
8.....	12.25	12.12½	42.25	4.40	4.25	5.50	5.25		
9.....	12.25	12.12½	41.95	4.40	4.25	5.50	5.25		
10.....	12.25	12.12½	41.50	4.40	4.25	5.50	5.25		

Electrolytic copper is a little stronger, but Lake

THE IRON AND METAL MARKETS

is weak. Tin declined $\frac{1}{2}$ c. per lb. during the week. Lead is off $2\frac{1}{2}$ points from last week. Spelter is in better demand, but weak in price.

Copper.—The Copper Producers' report, issued May 8, showing April statistics, has given the market a better tone. All things considered, the report was much more favorable than was expected. The figures which are given elsewhere show a decrease in production and an increase in exports, but these favorable statistics are offset by the figures on domestic deliveries which show a decrease. It was pretty generally known, however, that April deliveries for domestic accounts were not heavy. Considering the general state of trade the report was good, and dealers are inclined to ask for better prices than they were demanding a week ago. A fair amount of copper was sold during the week, but no large transactions were noted and most of the sales of electrolytic were made on the basis of 12.25c., delivered in the Naugatuck Valley, 30 days cash. Lake was sold on the same terms at 12.37 $\frac{1}{2}$ c. Spot copper can now be had in New York at 12.12 $\frac{1}{2}$ c., while 12.25c. is asked for Lake. Casting copper is being offered at about 12.10c. The exports of copper so far this month have been good, amounting to 7704 tons. In London this morning the market opened rather weak with spot copper offered at £53 15s. and future at £54 6s. 3d. L. Vogelstein & Co. give the following figures of Germany's apparent consumption of foreign copper for the months of January-March: Imports, 42,004 tons; exports, 1898 tons; consumption, 40,106 tons, as compared with consumption during the same period in 1910 of 42,958 tons. Of the above quantity 36,232 tons was imported from the United States.

Copper Averages.—The Waterbury average for April was 12.50c. The average price of Lake copper in New York for the month was 12.40c., and the average price for electrolytic was 12.16c.

Pig Tin.—New inquiries are scarce, and although there is plenty of spot tin to be had consumers show no willingness to buy. This is, notwithstanding the fact that the market has declined $\frac{1}{2}$ c. per lb. during the week. The market here is decidedly firmer than in London where quotations have declined sharply. This morning the London market opened with spot tin £3 cheaper than it was a week ago, the opening quotations being spot £190 10s. and futures, £187 10s. Two weeks ago futures were bringing the same price as spot. It was declared that the unfavorable condition of trade in the United States and the indifference of American buyers as to future prospects are having a depressing effect on the London market. The arrivals of tin in American ports so far this month are 1223 tons and there are 1215 tons afloat. Pig tin could be had in New York this morning at 41.50c.

Tin Plates.—The price of foreign tin plates at Swansea, Wales, has declined $1\frac{1}{2}$ d. during the week and the quotation to-day was 13s. 9d. The demand for domestic tin plates is not strong, but quotations are unchanged at \$3.94 for 100-lb. coke plates.

Lead.—Independent sellers of lead reduced their quotations $2\frac{1}{2}$ points on Monday, but it does not appear that any trading has been induced, as buyers continue indifferent. The St. Louis market is weak at 4.25c. and independent sellers here are asking 4.40c. The American Smelting & Refining Company continues to hold its price firm in New York at 4.50c., but in St. Louis it is meeting outside competition.

Spelter.—The galvanizing interests have been buying spelter in fairly good quantities and purchasers at present appear to have the best of the situation. Sellers show a great anxiety to get business, and prices are being cut right and left. Spelter can be bought in St. Louis at 5.25c., and it is being offered in this market for prompt shipment from the West at 5.40c. Spot spelter is scarce here, however, and it can not be had for immediate delivery under 5.50c.

Antimony.—Antimony is not as strong as it has been of late. Details of the syndicate operations continue to leak out and they show the position of the operators to be very strong. It has become known that the first secured control of the output of crude antimony on which several refiners in Europe depended and later persuaded the refiners that it would be to their disadvantage if they did not join the combination. One prominent European antimony producer did not go in the selling pool, and some refiners of Chinese grades are not in the movement. These producers, however, are taking advantage of the situation and are holding their prices very firmly. Cookson's is nominally 9.45c., and Hallett's can be bought at 9c. The market on

Hungarian grades is weaker at 8.15c. for spot, and 8.10c. for futures, while Chinese grades are offered at 8.15c. to 8.20c.

Old Metals.—Trade is quiet. Dealers' selling quotations are as follows:

	—Cents—
Copper, heavy cut and crucible	11.75 to 12.00
Copper, heavy and wire	11.25 to 11.50
Copper, light and bottoms	10.50 to 10.75
Brass, heavy	7.75 to 8.00
Brass, light	6.50 to 6.75
Heavy machine composition	10.25 to 10.50
Composition turnings	8.50 to 8.75
Clean brass turnings	7.75 to 8.00
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.25 to 4.30

Chicago

May 9.—Trading has been very light the past week. Stocks are low, but there is no disposition on the part of buyers to build them up. Comparatively little business is being done in old metals and prices are weak. We quote Chicago prices as follows: Casting copper, 12 $\frac{3}{4}$ c.; lake, 12 $\frac{1}{2}$ c., in carloads, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{8}$ c. higher; pig tin, carloads, 43c.; small lots, 45 $\frac{3}{4}$ c.; lead, desilverized, 4.40c. to 4.45c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c., per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10 $\frac{1}{4}$ c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12 $\frac{3}{4}$ c.; copper bottoms, 10 $\frac{1}{2}$ c.; copper clips, 12c.; red brass, 10 $\frac{1}{4}$ c.; yellow brass, 9c.; lead pipe, 4 $\frac{3}{4}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin pipe, 36c.

St. Louis

May 8.—Lead is unchanged at 4.50c.; spelter is steady at 5.55c.; both at East St. Louis. Zinc ore is stronger and held at \$36 to \$39 per ton, Joplin base. Tin is easier at 42.50c.; antimony (Cookson's), unchanged at 9.60c.; lake copper unchanged at 12.72 $\frac{1}{2}$ c.; electrolytic, unchanged, at 12.47 $\frac{1}{2}$ c.; all at St. Louis.

Iron and Industrial Stocks

NEW YORK, May 10, 1911.

While the general course of prices of stocks has been downward, notable exceptions have occurred, a sharp upward movement having taken place in the International Harvester and Can stocks. Transactions have been light, as general conditions have not been favorable for stock market activity. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalmers, com.	7 - 7 $\frac{1}{2}$	Railway Spr., com.	32 $\frac{3}{4}$ - 33
Allis-Chalmers, pref.	27 - 29	Railway Spr., pref.	100 $\frac{1}{2}$ - 100 $\frac{3}{4}$
Beth. Steel, com.	32 - 33	Republic, com.	30 $\frac{1}{2}$ - 32 $\frac{1}{2}$
Beth. Steel, pref.	60 $\frac{1}{2}$ - 62	Republic, pref.	93 $\frac{3}{4}$ - 95
Can, com.	10 $\frac{1}{4}$ - 12 $\frac{1}{2}$	Sloss, com.	49 $\frac{1}{2}$ - 50 $\frac{1}{2}$
Can, pref.	85 $\frac{3}{8}$ - 87 $\frac{1}{2}$	Pipe, com.	16 - 17
Car & Fdry., com.	53 - 53 $\frac{1}{2}$	U. S. Steel, com.	74 $\frac{1}{2}$ - 76 $\frac{1}{2}$
Car & Fdry., pref.	115 - 117	U. S. Steel, pr.	118 $\frac{1}{4}$ - 119 $\frac{1}{2}$
Steel Foundries.	43 $\frac{1}{2}$ - 44 $\frac{1}{2}$	Westinghouse Elec.	68 - 69 $\frac{1}{2}$
Colorado Fuel.	30 - 31	Am. Ship, com.	72 - 73
General Electric.	155 $\frac{3}{4}$ - 158	Am. Ship, pref.	112 - 113
Gr. N. ore cert.	60 - 61 $\frac{1}{2}$	Chi. Pneu. Tool.	50 - 50 $\frac{1}{2}$
Int. Harv., com.	119 $\frac{1}{2}$ - 120 $\frac{1}{2}$	Cambria Steel.	45 $\frac{3}{4}$ - 46
Int. Harv., pref.	124 - 128 $\frac{1}{2}$	Lake Sup. Corp.	28 $\frac{1}{4}$ - 28 $\frac{3}{4}$
Int. Pump, com.	40 - 41 $\frac{1}{2}$	Pa. Steel, pref.	105 - 105 $\frac{1}{2}$
Int. Pump, pref.	88 - 88 $\frac{1}{2}$	Warwick	10 $\frac{1}{2}$ - 10 $\frac{3}{4}$
Locomotive, com.	37 - 38	Crucible Steel, com.	13 - 13 $\frac{1}{2}$
Nat. Enam. & Stamp, com.	16 $\frac{1}{2}$	Crucible Steel, pref.	80 $\frac{1}{4}$ - 81 $\frac{1}{4}$
Pittsburgh Steel, pref.	104	Harb Walk Ref., com.	40 $\frac{1}{2}$ - 41
Pressed St., com.	32 $\frac{1}{2}$	Harb Walk Ref., pref.	96 - 97

Dividends.—The General Electric Company has declared the regular quarterly dividend of 2 per cent. payable July 15.

The American Shipbuilding Company has declared the regular quarterly dividend of 1 per cent. on the common stock, and the final installment of 1 per cent. of the 4 per cent. extra dividend declared last year, payable June 1.

The Niles-Bement-Pond Company has declared the regular quarterly dividends of 1 $\frac{1}{2}$ per cent. on the common and preferred stocks. The preferred dividend is payable May 15. The common dividend is payable June 20.

The Pratt & Whitney Company has declared the regular quarterly dividend of 1 $\frac{1}{2}$ per cent. on the preferred stock, payable May 20.

The Studebaker Corporation has declared the regular quarterly dividend of 1 $\frac{3}{4}$ per cent. on the preferred stock, payable June 1.

Obituary

Niels Poulson

Niels Poulson, president of the Hecla Iron Works, Brooklyn, N. Y., died May 3 at his home at Ft. Hamilton, in that city, aged 68 years. He was born in Denmark, and was educated in Copenhagen as an architect and builder. For two years after coming to this country in 1864, he worked as a mason, then as a draftsman in the office of the supervising architect in Washington, where he remained for two years. He then connected himself with the New York Architectural Iron Works, where he had charge of the architectural and engineering department.

Mr. Poulson started in business for himself in 1876. Charles M. Eger, who had been a draftsman at the Architectural Iron Works, came to Mr. Poulson in a similar capacity and was taken in as a partner, the firm name being Poulson & Eger. In 1897 the firm was incorporated as the Hecla Iron Works, of which Mr. Poulson was president and Mr. Eger vice-president. They established an evening school for the education of their employees, which proved a great success. The School of Mines, some few years ago, made a comparison between European and American iron work, and gave this concern full credit for establishing the present high class of work.

He was the originator of many improvements in construction, few of which were patented, as he preferred to make them public property. They include fireproof stairs, elevator inclosures, elevator cages, bookstacks for libraries, etc. He furnished to the government, free of charge, modes of construction for the Congressional Library in Washington which proved so successful that his methods were eventually universally adopted in large libraries. Mr. Poulson often acted in the capacity of consulting engineer and architect in connection with public improvements.

Mr. Poulson was a public-spirited citizen, taking much interest in questions concerning the welfare of the people. He offered a prize of \$50,000 to any one who would solve the Brooklyn Bridge congestion problem, but his offer was not taken up by any of the numerous engineers who have studied that interesting subject. He was interested in the public schools and gave many prizes for athletics and other means of improving the physical and mental condition of the pupils. He gave \$100,000 to the American Scandinavian Society, to be held in trust for educational purposes.

Mr. Poulson and the Bower-Barff Process

George W. Maynard, 20 Nassau Street, New York, furnishes the following tribute to Mr. Poulson:

"In 1881 George Bower read a paper before the Iron and Steel Institute, describing his method of rendering iron and steel rustless, and shortly thereafter Sidney Gilchrist Thomas wrote me about the results which were being obtained in England, at the same time urging me to take up the introduction of the Bower-Barff rustless iron process in the United States. The outcome of the tests of samples sent to me by Mr. Bower was my appointment as his representative in the United States, and the subsequent formation of the Bower-Barff Rustless Iron Company. Shortly after the formation of the company Mr. Winslow, of the firm of Poulson & Eger, the owners of the Hecla Iron Works, called on me at the request of his firm for the purpose of obtaining a license for the use of the process. On the following day I went to the Hecla Iron Works and met Mr. Poulson. The result of the meeting was the adoption of the process and the installation of the first Bower-Barff furnace in America. Mr. Poulson quickly grasped the possibilities of the process in its application to artistic iron which would be exposed to the weather. At that time he had taken the contract to supply the iron work for the Produce Exchange in New York, which he agreed to furnish with the Bower-Barff finish without extra charge.

"The artistic iron work turned out by Poulson & Eger was a revelation as to the use of iron for decorative purposes, and the elimination of the paint brush had much to do with the wide and still increasing use of iron. I was greatly impressed with Mr. Poulson's liberality, in his willingness in permitting me to show the working of the furnace to those who desired to investigate the process with a view to its adoption. As a pioneer he would have

been fully justified in declining to admit competitors to his works; on the contrary, he gave me unreserved permission to show everything, and, furthermore, he treated hundreds of samples for parties who were contemplating the use of the process. Its adoption by competing manufacturers in its early stages was largely due to Mr. Poulson's liberality. Our business relations rapidly grew into warm personal friendship, and it has continued for these thirty years. He was always a gentleman, and as far as I know was beloved by the men who worked for him. His success is an illustration of what can be accomplished in our land by honest work, ability, ingenuity and fair dealing."

Frank S. Jackman, general manager of the Verona, Pa., plant of the Standard Steel Car Company, died May 5, aged 57 years. He was born at Norwalk, Ohio. When a young man he entered the employ of the Illinois Steel Company, Chicago, and thence went to Carpentersville, Ill. He next became associated with his brother, Joseph Jackman, in the foundry business in Chicago. Later he went to Franklin, Pa., where he became superintendent of the Franklin Steel Casting Company. He resigned after a few years to become superintendent of the Pittsburgh Mfg. Company, leaving that concern to become superintendent of the Colonial Steel Company, Pittsburgh. About a year ago, when the plant of the General Castings Company, at Verona, was taken over by the Standard Steel Car Company, Mr. Jackman was made general manager.

Harry W. Bush, who was for 20 years connected with James A. Coe & Co., jobbers in iron and steel and machinists' supplies, Newark, N. J., and who for the last five years was secretary of the company, died May 5 at his home in Newark.

Personal

Walter B. Snow, publicity engineer, 170 Summer street, Boston, Mass., has added to his staff John S. Nicholl, late of the New York Edison Company, and formerly acting manager for F. W. Horne, importer of American Machinery, Yokohama, Japan.

Hardy S. Ferguson, for many years chief engineer of the Great Northern Paper Company, is now established as an independent consulting engineer at 200 Fifth avenue, New York, and will devote himself to engineering work in connection with paper, pulp and fibre mills.

Wolcott Remington, well known as a designer and manufacturer of oil engines, has associated himself with the Blanchard Machine Company, Cambridge, Mass. He is now engaged in getting out a line of stationary and marine oil engines ranging from 10 to 100 h.p., which will be manufactured under the name of the Blanchard oil engine.

E. C. Green has again become associated with the Walpole Rubber Company, in the capacity of general purchasing agent of the consolidated companies, with headquarters at the factory office in Walpole, Mass.

C. W. Chappelle, chief engineer of the Electric Storage Battery Company, Cleveland, Ohio, addressed the Cleveland Engineering Society May 9 on "The Various Applications of Storage Batteries." At a special meeting of the society May 23 Claiborne Pirtle, vice-president of the Electric Controller & Mfg. Company, Cleveland, will present a paper on "Some Recent Improvements in Electric Motor Control."

A. B. Scully, president of the Scully Steel & Iron Company, Chicago, who has spent the last two months at his summer home at Santa Barbara, Cal., has returned to Chicago. He will leave shortly for a trip to Europe.

Gus F. Ziv, who for a number of years has been connected with the Crucible Steel Company of America in the Chicago office, is now connected with the Fitzsimons Steel & Iron Company, Chicago, which has recently accepted the Chicago agency of the Swedish Sisco Acorn tool and drill steels, and will carry a large stock at 218 to 224 North Jefferson street. In Mr. Ziv the Fitzsimons Company has secured a representative well known to the Western trade.

E. T. Mathewson, who for some time has been man-

ager of the machinery department of the Fairbanks Company, Philadelphia, Pa., has resigned, to take effect June 1, after which he will be connected with the White Company, Cleveland, Ohio, at its Philadelphia branch, in the sale of commercial trucks.

Percival Robert Moses, consulting engineer, 366 Fifth avenue, New York, has associated with him the following engineers as permanent additions to his staff: John Fallon, industrial engineer, recently mechanical engineer of the Tennessee Copper Company and Stanley G. Flagg & Company; Arthur V. Farr, textile engineer, formerly Szepesi & Farr; Alfonse Kaufman, formerly manager and chief engineer Alaska Chemical Company and associated with Charles B. Jacobs industrial laboratories; J. N. Walton, recently power engineer and storage battery expert, Brooklyn Edison Company. Mr. Moses announces that his office is prepared to handle complete industrial equipments.

F. A. Halsey has resigned as editor of the *American Machinist*. He will continue with the paper in a consulting capacity, with the title of editor emeritus. L. P. Alford succeeds him as editor of the paper.

F. S. Broadhurst, formerly in the employ of the C. H. Wheeler Mfg. Company, Philadelphia, and recently with the Westinghouse Machine Company, has rejoined the former company, assuming the position of sales manager, with his headquarters at the main office, Lehigh avenue and Eighteenth street, Philadelphia.

F. J. Mawby has resigned as machine tool salesman for the Vandyck-Churchill Company, and has joined the selling staff of the Peterson Engineering Company, manufacturer of power plant specialties, 50 Church street, New York.

James Morton, Jr., whose business address in this country is the Machinery Club, 50 Church street, New York, has returned from a selling trip around the world in the interests of several manufacturers of machinery and mill supplies.

W. M. White has become associated with the Allis-Chalmers Company, Milwaukee, Wis., as manager and chief engineer of the hydraulic turbine department. For the past five years he has had entire charge of the designing for the I. P. Morris Company, Philadelphia, Pa., in which position he has designed the hydraulic machinery for some of the largest installations in the country.

Edgar S. Cook, president of the Warwick Iron & Steel Company, Pottstown, Pa., returned from Europe last week.

C. A. Tupper, formerly manager of publicity for the Allis-Chalmers Company, has returned to his home in Milwaukee from a European trip of several months, which developed some interesting facts as to the continued demand for American metal-working machinery.

E. S. Mills, of the Carnegie Steel Company, Chicago, has returned from a trip to Europe.

W. B. Dickson, who recently resigned as vice-president of the United States Steel Corporation, also resigned as president of the Minnesota Steel Company, the subsidiary which is building steel works at Duluth. Chairman E. H. Gary has been elected president of the Minnesota company.

J. E. Rawson has been appointed northern Ohio sales agent of the Braeburn Steel Company, succeeding William F. Bonnell, resigned. New offices have been opened at 512 Cuyahoga Building, Cleveland, from which the business in Braeburn high-speed tool and other steels will be conducted. John E. Love, who covers the southern portion of Michigan, with headquarters in Detroit, will also hereafter be in charge of the Toledo district.

John F. Wallace, formerly chief engineer of the Panama Canal, who retired after inaugurating the American work on the canal and afterward designed the new Chicago & work on the canal and afterward designed the new Chicago & Northwestern passenger terminal at Chicago, which has just been completed at a cost of \$25,000,000, has assumed active charge as president of Westinghouse, Church, Kerr & Co., who were the engineers for the new Pennsylvania Station in New York.

H. Sanborn Smith has been elected a vice-president and the general sales agent of the Southern Iron & Steel Company, 24 Broad street, New York. C. C. Brown has been named assistant general sales agent. Mr. Smith was formerly general manager of sales of the Lackawanna Steel Company.

The Longdale Iron Company, Longdale, Va., on May 8 blew out the only furnace it had in blast.

The Warwick Iron & Steel Company, Pottstown, Pa., is now running its No. 1 furnace on low phosphorus iron. Repair work on the No. 2 furnace goes ahead steadily, and this stack may go in blast in July. Plans are also being made to repair the A furnace, so as to have it in shape, should the demand later in the year require its operation.

The returns of the American Railway Association put the number of idle freight cars on April 26 at 187,006, an increase of 1,953 in the preceding two weeks. The report of April 12 had shown a reduction of 9,834 idle cars from that of March 29, which in turn showed 12,374 fewer idle cars than on March 15, when the high point of the year was reached at 207,261 cars.

The Los Angeles Brass Mfg. Company and the Liebfried Brass Mfg. Company, both of Los Angeles, Cal., have been consolidated into one corporation to be known as the Los Angeles Brass Mfg. Company. The company manufactures all kinds of brass goods and has a plant fully equipped for this line of work.

Edward C. Phelps, district sales agent for the Eastern Steel Company, has established his office in rooms 1310 and 1311, First National Bank Building, Cincinnati, Ohio. An error was made in the last issue of *The Iron Age* in stating that the office was in the Fourth National Bank Building.

Trade Publications

Spray Nozzles and Strainers.—Buffalo Forge Company, Buffalo, N. Y. Booklet. Covers a line of spray nozzles for use in mines, steel and gas producer plants and other miscellaneous work. The construction of the nozzle, which is made in two parts, is shown, and a table of capacities is included. The Buffalo strainer, which is used for protecting plumbing fixtures, pumps and meters on water, steam or gas lines is also described.

Adjustable Reamers.—Gisholt Machine Company, Madison, Wis. and 50 Church street, New York City. Circular RC.—2. Concerned with the Gisholt solid adjustable high speed reamers which are made in the shell, taper shank and hand types, as well as in the shell and taper shank styles with a floating arbor for use on Gisholt turret lathes. All the various types of reamers are illustrated and tables giving the principal dimensions of each style are included.

Metal and Wood Working Machinery.—Badger State Machine Company, Janesville, Wis. Pamphlet. Size, 4 x 9 in.; pages, 48. Refers to an extensive line of metal and wood working machinery which includes punches, shears, combined punches and shears, leather and bench punches, bending rolls, saw tables and swinging cut-off saws. A page is devoted to each of the various machines and the general arrangement is a small half-tone engraving at the top with brief description and specifications occupying the remainder of the page.

Pattern Shop and Foundry Supplies.—The Cleveland Galvanizing Works Company, Cleveland, Ohio. Two bulletins. The first, C—11, illustrates the Samson and Cleveland galvanized pump chains. These are said to have double the life and greater strength than any other type of welded wire chain and will not kink. A variety of sizes ranging from No. 000 weighing 26 lb. per 100 feet to No. 1, weighing half as much, are made. The other bulletin, No. D—11, cancels No. D—9 and describes with numerous illustrations a complete line of supplies for pattern shops and foundries. An alphabetical index on the front cover of the bulletin shows exactly where the various lines can be found, and in addition to the illustrations in the body of the bulletin a complete price list is also given.

Taps, Dies and Screw Plates.—S. W. Card Mfg. Company, Mansfield, Mass. Catalogue No. 26. This catalogue supersedes all previous editions, and contains considerable data on taps of all kinds, hobs, reamers, screw plates, tap wrenches, dies and die stocks. The various types of threads are illustrated and a number of tables of useful information complete the catalogue.

Shakers and Dumping Riddles.—Hanna Engineering Works, 2059 Elston avenue, Chicago, Ill. Circular No. 36. Concerned with a line of shakers and dumping riddles for foundry use. The various types of shakers include tripod, trough and post shakers for both steam and air operation. A revolving dumping riddle operated by a direct connected 11 hp. electric motor is also shown.

Binders for Foundry Cores*

Results of Laboratory Investigations Intended to Give Greater Certainty in Core Room Operations

H. M. LAY.

About two years ago the writer started a series of investigations to determine the effects of the various natural and artificial core binders when used separately and in combination. A number of foundry friends throughout the country tried experiments at the writer's suggestion and the results of these were brought together. It was nearly impossible to get some core makers to make desired mixtures, as they were almost sure to slip in more binder than was specified. It finally became evident that this problem would never be solved and the core room placed on the same scientific basis as now rules the melting platform until the work was undertaken and carried to completion in one laboratory with the co-operation of others throughout the country. The writer was about to give up the project when he was tendered the use of the laboratory of the Robeson Process Company, at its Covington, Va., plant. A very large number of samples of sand have been shipped there and many of the standard commercial binders have been obtained on the open market or from foundries. Some of the binder manufacturers have also co-operated by donating samples. The results of the investigations will be embodied in a paper to be read before one of the technical societies next fall. Thus far, however, many points of interest have been brought out which should be presented to the foundrymen at large, so that they may be discussed in the next few months and further information added to the store.

The Character of the Sand

We all know that a core must resist great heat, and hence the material of which it is composed must be of a refractory nature. Quartz sand seems to answer this purpose better than any other material; but even quartz itself varies in different parts of the world and the sand found contains many impurities. Fortunately, nature has provided what we may call concentrated or purified bodies of sand in different places, and the degree to which these have been purified or concentrated determines their values as core sands. Theoretically, the grains composing the sand should all be of silica, but they do not necessarily all have to be sharp. In fact, the writer's investigation has convinced him that for some classes of cores rounded quartz grains are better than angular, as they afford a better means of venting, on account of the fact that angular grains often pack more closely while in rounded grains there is always the same proportion of vent.

Sieve tests have shown that the most successful core sand is one having all the grains of approximately uniform size. If it is composed of coarse and fine sand graded down to dust the voids or spaces between the grains of the larger will be filled by the smaller particles and the vent destroyed.

Binders with Bonded Sands

Briefly speaking, all core sands are divided into two classes, namely, bonded and bondless, or sharp. Some of the best known examples of bonded sands in America are Melville gravel and Pittsburgh loam. A natural bonded sand cannot be used with certain artificial binders, as the clay which forms the natural bond would neutralize or destroy the artificial bond. This is particularly true in cases where oil is used as the binder. Such binders as flour, pitch, rosin, dextrine and glutrin all work well with bonded sands, the proportion of bond determining to a large extent the action of the binder. Flour and dextrine together with pea meal and any similar starchy material belong to a class by themselves. The paste made with these binders unites with the clay and if the sand is thoroughly worked over to some extent accumulate at the

contact points, but more than half of the binder in all cases remains on the surface of the grains of sand in the vent spaces. The pasty material and clay remaining in the vent spaces decreases the vent by actually partially stopping the passages and by rendering the surface of the passages rough, so as to increase the friction which must be overcome by the rush of gas at the time of pouring.

Pitch and rosin (and under pitch should be included all the black compounds) bind in a different manner. All cores having starchy binders are hard as soon as they are baked, whether hot or cold. Cores having pitch or rosin binders if baked at ordinary temperatures are soft when hot, and only develop their maximum strength as the core cools after it is taken from the oven. The rosin or pitch is mixed with the sand mechanically, but when it melts it has a tendency to flow to the contact points. These binders, however, seem to require a certain percentage of clay in the mixture to develop their best qualities and are also best suited to relatively coarse sands, on account of the fact that the large percentage of clay usually present in these sands partly stop the vent passages.

Glutrin in a bonded sand seems to unite with the clay forming a homogeneous liquid that has a tendency to gather at the contact points, thus greatly strengthening them. Some of our experiments made by taking an absolutely bondless washed sand and adding bond have given surprising results in strength when glutrin was used as a binder.

Molasses has long been used as a foundry binder but the composition of molasses is uncertain, due first to variations in the amount of starch in the cane. Then, too, molasses is subject to fermentation, and this changes its adhesive powers. During baking molasses has a tendency to boil, and this may seriously deform the core. This binder is also very sensitive as to baking temperature.

Oil Binders for Bondless Sand

For bondless sand raw linseed oil is the best binder. As its price has been advanced through the demand in the paint trade, substitutes have come into the market. The commercial core oils are generally blends of these and other similar oils, with or without additions of rosin. In addition some core oils contain mineral oils either as a filler or spreader, or mineral oils with an asphaltic base which have binding value of their own.

The proper method of introducing a high grade core oil into the sand is to use some other material to increase the spreading value of the oil; in other words, to carry it over the sand. If the sand is mixed by hand fair results may be obtained by drying the sand, mixing the oil with it thoroughly, and then adding sufficient water to bring the whole to the proper consistency for ramming in the boxes. As the water is driven out as steam it distributes the oil thoroughly throughout the mass.

The strongest oil sand cores when considered from the basis of the amount of oil used are obtained by selecting a pure washed silica sand of comparatively uniform size of grain and then using raw linseed oil or one of its close neighbors as to strength. The best oil binders bind largely by the oxidation of the oil, just as a paint film dries by oxidation. The paint chemists have found that the addition of certain oxides to oil, among which are principally lead and manganese, hasten the drying of the oil. Applying to the core oven the principles governing in other industries using drying oils, we see that the old system of choking off the circulation and retaining the heat in the oven is not the proper method when drying oil sand cores.

Other Binders Than Oil

Cores in which the binder is pitch or rosin must have any contained moisture driven off as steam, and after that heat is all that is necessary to melt and distribute

*Extracts from a paper read before the Newark, N. J., Foundrymen's Association, May 4, 1911.

the binder material. In the case of binders having a starch or gluten base, as flour or dextrine, the moisture must be driven off and heat applied sufficient to harden the compound. In this case the proper temperature is the same as that required to bake bread or biscuits; and after the moisture is driven off a circulation of air is not necessary. In fact, if the oven were too hot it would be deleterious, as it would tend to burn the binder.

Molasses and glutrin are binders which do not require a circulation of air beyond the driving off of the contained moisture. Glutrin is frequently used in oil sand mixtures and the blend has been found to give good results, the glutrin replacing from 60 to 75 per cent. of the oil. In this case the moisture must be driven out first, during which time the vents in the oven must be opened for circulation of air. By simply leaving the oven in this condition for the entire baking period there is sufficient circulation for the hardening of the oil.

In our experiments we found that with glutrin the best results were obtained with a slightly bonded sand, and working on this clue we took sharp sand and added to it about 1 per cent. of clay and glutrin at the rate of one part of glutrin to 75 parts of sand. Glutrin alone in sharp sand has a tendency to sweat to the surface of the core, making a hard exterior and a soft interior. A core of this type may be particularly well fitted for aluminum or some similar purpose, but is not what is wanted for general foundry practice.

As the writer has visited different foundries throughout the country he has learned that a number of foundrymen have discovered the value of clay when mixed with certain binders. In one foundry the sand was wet down with a mixture composed of clay wash and glutrin. In another dry fire-clay was ground into the sand and the entire mass wet down with glutrin and water. Clay wash and molasses have long been used in steel foundries. In other cases clay and flour were used together, while in one case a core was being made from a mixture of sand, Welch Mountain clay and sawdust, the sawdust being used entirely for the purpose of opening the sand and rendering the core rotten, so that it would crush before the metal. Sawdust may be introduced into many cores to advantage when a core that will crush is required.

Colloidal Conditions of Clay an Important Factor

In studying the question of clay as a binder the writer realized that the natural bond occurring in the sand was clay. Formerly the method of determining the bond in a sand for either core work or molding was to determine the alumina and figure it as the bond; but sands having the same relative amount of bond as determined by chemical analysis vary greatly when subjected to physical tests, hence the necessity of further research along this line.

Chemists have recently begun to recognize a class of bodies known as colloids. These are essentially gelatinous masses possessing the property of holding in combination a considerable amount of water. In the case of clay this colloidal condition seems to have been brought about mainly by the presence of organic matter in surface clays. Some of the fireclays found in the coal measures were evidently once filled with organic matter and rendered colloidal, and these when exposed to moisture have a tendency to take up the moisture that has been forced out of them by pressure and, as the clayworker expresses it, to "fatten."

The difference in the bonding power of clays appears to be a direct function of the difference in their colloidal matter; hence, if we could obtain some method of measuring the colloidal matter, we should have a means of comparing the natural bond in clays and sands. A number of methods have been proposed for this purpose, and we are now experimenting with them at Covington. The most successful thus far is the measurement of the colloidal material with an aniline dyestuff known as malachite green. These tests, however, are evidently going to be laboratory tests, and not foundry tests, as they require too careful manipulation for the ordinary foundry and the use of delicate laboratory apparatus. The writer's investigations has convinced him that within a short time we shall be able to point out methods by means of which the chemist can test the supplies for the core room and predict the results with certainty, just as to-day he controls the products used on the melting platform; and the progressive foundryman should look forward to this with

confident expectation, as it will enable him to overcome many of the difficulties now encountered.

It will, however, necessitate the placing of the core room under the supervision of more highly skilled men than has been the case in the past. At present, in order to make sure that the cores will stand up and also to overcome unexpected irregularities in the sand, foundrymen are commonly using from 2 to 10 times as much binder as is necessary, and in many cases are using a much more expensive binder than is necessary. One problem which we hope to solve in the investigation now under way is to be able to point out how to ascertain the cost of producing a given strength in a core; in other words, a rational method of comparing core sands.

Effect of Alkalies on Binders

One of the greatest surprises to us in this core-room investigation has been the effect of alkalies on the binders. While investigating a certain gangway sand we found that the cores were rotten on the inside and not very strong even on the surface, no matter what liquid binder was used. The microscope showed that the oil was destroyed and that glutrin tended to come to the surface and was also largely destroyed. After various experiments we tried adding acid to the sand, and this greatly increased the strength of the cores. A number of other sands had been giving weak cores with all of the liquid binders we had tried. An acid was tried on these, with the result that the strength of the cores was increased from 5 to 10 times. Both hydrochloric and sulphuric acids have been tried for this purpose, but sulphuric is best on account of the fact that the sulphates formed have no tendency to absorb moisture, while hydrochloric acid forms salts that tend to absorb moisture and hence soften the core. We are now working to determine the best methods of examining the sand to ascertain just the amount of acid to be used.

Along the line of the discoveries made as to the effect of alkalies on core binders the writer has learned of some interesting facts concerning the water used in tempering and mixing core sand. A certain foundry was purchasing city water and everything was going smoothly in the foundry and core department, but the expense of the city water was a considerable item, so they drilled an artesian well. The artesian water immediately caused trouble in the foundry. It is evident that it was highly alkaline and that this was neutralizing the effect of the binder either by saponifying the oil or by affecting the strength of other binders used. From this and other cases the writer believes that in the future it may be found just as advantageous to treat water for the core room as it is to treat it for the boiler room.

Binder Ratio with Dry and Damp Sands

Another surprise that came to us during the investigation was a discovery made when comparing binders with the use of a given standard sand. When dry sand was used several more cores were obtained from a given measured amount than from damp sand. An investigation showed that if dry sand were taken and measured and then tempered with about 4 per cent. of moisture its volume was greatly increased. If the tempered sand were poured into a measure and struck off, the volume in some cases was increased as much as 40 per cent.; and when poured in carelessly, so that it piled up loosely, with some large voids, the volume was increased even more than this. The explanation is simply that the dry sand packs together thoroughly, the grains sliding past one another into perfect contact.

When damp sand is dumped or poured into a receptacle the moment two moist grains touch, motion ceases, on account of the fact that they adhere and so the sand piles up with a much larger percentage of vent spaces. If the amount of moisture is increased until the sand flows it will pack as closely as when dry, or closer, because it is then entirely surrounded by water and the effect of the thin films of moisture on the surface of the sand is thus eliminated. This discovery explains some irregularities which had occurred earlier in our core experiments. It is evident, when a measured amount of dry sand is placed with a measured amount of binder, that owing to the fact that there are more grains of sand present the ratio between the sand and the binder will be higher than when moist sand is taken in the same measured amount, with a consequent smaller number of grains of sand. It

is possible with certain grades of sand and certain percentages of moisture measured in this way to introduce variations of at least 25 per cent. in the binding ratio.

For this reason, where accurate results are required all of the sand should be dried previous to mixing. This is also important in order to obtain the proper percentage of moisture in the core mixture, as we have found that this is an important item.

We have used the microscope to a considerable extent in examining sands and the manner in which binders act, and a little later the writer hopes to publish a series of micrographs illustrating these investigations.

Conclusions

To sum up, the action of core binders must be considered from the following points of view: The core must have sufficient strength to stand up before and during drying. This means the use of a green binder for some classes of work. Flour and dextrine and other gluten products form the best green binders; next to these come clay, glutrin and molasses. Oil, rosin and pitch are all of little use as green binders, but the manufacturers of the black compounds frequently introduce dextrine or clay to serve as a green binder.

The most efficient final binder in the dry core would be one in which all of the binder would be gathered at the contact points of the sand so as to leave the vent passages free. Oil, or blends of oil and glutrin, or glutrin and clay seem to fill these requirements fairly well among the liquid binders, and rosin and pitch among the dry binding materials. But all of the dry binders have a greater or less tendency to roughen the surface of the sand in the vent passages and partly stop the vents. This is largely true on account of the fact that these binders are generally used with loamy sands or in conjunction with flour or dextrine.

The Victor-Balata & Textile Belting Company

On May 1 the new plant at Easton, Pa., for the manufacture of Victor-Balata belting in America was opened for active operations under the name of the Victor-Balata & Textile Belting Company. Victor-Balata belting has long been manufactured in Germany and imported into America by the New York Leather Belting Company. While this was satisfactory, as far as obtaining the great quality feature of the belting, there were delays due to importation, and it was finally decided to erect a plant in America. The new company is composed of German and American interests who have been connected in a business way in the balata belting line for a number of years. The German members of the company are the well-known belting manufacturers, C. Vollrath & Sohn, Blankenburgh, Germany, with C. E. Aaron and J. R. Stine, of New York, Mr. Aaron being the president and Mr. Stine the secretary-treasurer of the New York Leather Belting Company.

The officers of the new company are as follows: C. E. Aaron, president; J. R. Stine, treasurer; Edwin Vollrath, secretary and manager of the new plant at Easton. Mr. Vollrath was brought up in the textile belting business, and especially in the balata end of it; therefore he is familiar with the making of Victor-Balata belting from beginning to end and is consequently especially fitted to handle the process in the new factory. In addition to having the entire services and supervision of Mr. Vollrath, who has taken up his residence at Easton, the new company has secured the services of the German foreman who lately arrived for the purpose of taking charge of the factory end of the business. The superintendent of the German company also came over for a few months to assist in successfully starting the new factory and to teach the American workmen all the details of the many processes entering into the making of this belting. The making of Victor-Balata belting in America has therefore been started under the most favorable circumstances, nothing having been left undone to maintain the same great quality in it that characterized the belting when imported.

The preliminary buildings are of steel and concrete construction, of the most substantial character, and the total amount of floor space utilized solely for the manufacturing purposes is about 30,000 sq. ft. Over 10 acres of land has been acquired, thus allowing ample room for additions in the future. The city of Easton extended the

city limits and a special private railroad siding has been put in communicating with the Lehigh Valley Railroad. The power plant is in a special building of its own. High pressure tube boilers, 200 h.p. each, of the E. Keeler Company make, and a Corliss engine made by the Hewes & Phillips Company have been installed and room has been left for additional units as needed. The auxiliary power machinery, such as pumps, heaters, condensers, etc., are of the most modern pattern throughout. The special machinery involved in the many processes of manufacture was imported from Germany where it was made under special specifications and under the direction of Mr. Vollrath personally. The entire plant has been laid out with the view of economical manufacture of textile belting in all the details, as the raw materials enter at one end and come out at the other end in the shape of finished rolls of belting ready for the trade.

For various reasons, relative both to the manufacture and marketing of Victor-Balata belting, the New York Leather Belting Company decided to separate entirely the textile belting business from that of the leather. While the new textile factory is at Easton, the sales end of the business will be handled from 51 Beekman street, New York, and from 172 North Franklin street, Chicago, the sales offices of the new company. The opening of the new plant at Easton, Pa., will consequently do away with all of the past delays due to importation of Victor-Balata belting and place the manufacturers in position to deliver all commercial widths and plies at short notice.

Carnegie Publications on Steel Mine Timbers

An unusually complete discussion of the use of steel in the underground operations of mine timbering, replete with the information needed to lay out the work, has been prepared for general distribution in two booklets published by the Carnegie Steel Company, Pittsburgh, Pa. One of these takes up not merely the one side of the question, but deals at length with the considerations of the use of wood, including that given preservative treatment, and of concrete. Considerable space is given to the variety of designs of steel work available for roof supports, gangway supports, underground pump houses and mine-shaft strengthening and lining, and detailed tables are included of the safe loads of beams and struts, of H and I sections, and of square and round oak, yellow pine, white pine, spruce and other beams and posts. The extended engineering treatment of the subject is convincing of the amount of study given to mine timbering, and the array of half-tone engravings is illuminating regarding the character and widespread adoption of this form of underground steel construction.

The Steel Corporation Buys the Risdon Works

Representatives of the United States Steel Corporation closed last week for the Risdon Iron & Locomotive Works property in San Francisco, for which negotiations have been under way for some time. The deed of transfer showed that Thomas Murray, acting for the American Steel & Wire Company, made the purchase. The price is put at \$2,100,000 and the purchasers assume a bonded indebtedness of \$600,000. The works at Potrero and 30 acres of land, which takes in a half mile of valuable water front, are included in the purchase. The report that the Steel Corporation has plans for continuing the operations heretofore carried on at this plant is incorrect; also the report that the corporation will build a blast furnace and steel works. The intention is to concentrate on the newly acquired property the warehouses and yards now maintained in San Francisco by the American Steel & Wire Company, the American Sheet & Tin Plate Company, the American Bridge Company and other subsidiary companies.

The Pressed Steel Car Company, Pittsburgh, Pa., is taking advantage of the present lull in the demand for steel cars by making some extensive improvements and additions to its plant at Woods Run, Pittsburgh. These include installation of some cranes and considerable new machinery. The plant will be put in first class shape in every way, and its capacity for the manufacture of steel cars will be slightly increased.

Extras on Bars and Shapes from Waverly Warehouse

Below is given the standard classification of warehouse extras on steel bars and shapes adopted by the Carnegie Steel Company for use in business done from its Waverly warehouses, near Newark, N. J. These extras, which, for the most part, are an advance over those heretofore charged on shipments from this warehouse, are promulgated in response to the points made in the conferences held some time ago, participated in by iron and steel jobbers in the New York district and in the territories tributary to Philadelphia and Boston. In the main they are three-fourths of the full extras shown on the card long used in the trade in connection with mill shipments. The extras below are given in cents per pound:

ROUNDS AND SQUARES.

3/4 to 3 1/16 in.	Base
3/8 to 1 1/16 in.	.10c. extra
5/8 to 9/16 in.	.15c. extra
7/16 in.	.30c. extra
1 in.	.40c. extra
1 1/32 in.	.45c. extra
5/16 in.	.55c. extra
9/32 in.	.60c. extra
1/2 in.	.75c. extra
3 3/8 to 3 9/16 in.	.15c. extra
3 3/8 to 4 1/16 in.	.20c. extra
4 1/8 to 4 9/16 in.	.25c. extra
4 5/8 to 5 in.	.30c. extra
5 1/8 to 5 1/2 in.	.40c. extra
5 5/8 to 6 in.	.75c. extra
6 1/8 to 6 1/2 in.	.60c. extra
6 5/8 to 7 1/4 in.	.95c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

FLAT BARS AND HEAVY BANDS

1 to 6 in. x 3/8 to 1 in.	Base
1 to 6 in. x 1/4 to 5/16 in.	.15c. extra
1 1/16 to 15/16 in. x 3/8 to 3/4 in.	.30c. extra
1 1/16 to 15/16 in. x 1/4 to 5/16 in.	.40c. extra
9/16 to 5/2 in. x 3/8 to 1/2 in.	.40c. extra
9/16 to 5/2 in. x 1/4 to 5/16 in.	.55c. extra
1 1/2 in. x 3/8 to 7/16 in.	.75c. extra
1 1/2 in. x 1/4 to 5/16 in.	.90c. extra
7/16 in. x 3/8 in.	1.05c. extra
7/16 in. x 1/4 to 5/16 in.	1.20c. extra
3/4 in. x 1/4 to 5/16 in.	1.50c. extra
1 1/8 to 6 in. x 1 1/16 to 1 3/16 in.	.10c. extra
1 1/8 to 6 in. x 1 1/4 to 1 1/2 in.	.15c. extra
1 3/4 to 6 in. x 1 1/8 to 2 3/4 in.	.25c. extra
3 1/8 to 6 in. x 3 to 4 in.	.30c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

LIGHT BARS AND BANDS.

1 1/2 to 6 in. x Nos. 7, 8, 9 and 3/16 in.	.30c. extra
1 1/2 to 6 in. x Nos. 10, 11, 12 and 1/2 in.	.45c. extra
1 to 1 7/16 in. x Nos. 7, 8, 9 and 3/16 in.	.40c. extra
1 to 1 7/16 in. x Nos. 10, 11, 12 and 1/2 in.	.55c. extra
13/16 to 15/16 in. x Nos. 7, 8, 9 and 3/16 in.	.55c. extra
13/16 to 15/16 in. x Nos. 10, 11, 12 and 1/2 in.	.60c. extra
11/16 to 3/4 in. x Nos. 7, 8, 9 and 3/16 in.	.75c. extra
11/16 to 3/4 in. x Nos. 10, 11, 12 and 1/2 in.	.90c. extra
9/16 to 5/8 in. x Nos. 7, 8, 9 and 3/16 in.	.90c. extra
9/16 to 5/8 in. x Nos. 10, 11, 12 and 1/2 in.	1.00c. extra
1/2 in. x Nos. 7, 8, 9 and 3/16 in.	1.00c. extra
1/2 in. x Nos. 10, 11, 12 and 1/2 in.	1.15c. extra
7/16 in. x Nos. 7, 8, 9 and 3/16 in.	1.35c. extra
7/16 in. x Nos. 10, 11, 12 and 1/2 in.	1.60c. extra
3/4 in. x Nos. 7, 8, 9 and 3/16 in.	1.45c. extra
3/4 in. x Nos. 10, 11, 12 and 1/2 in.	1.80c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

ANGLES.

1 1/2 x 1 1/2 to 2 3/4 x 2 3/4 in., x 3/16 in. and thicker.	.15c. extra
1 1/2 x 1 1/2 to 2 3/4 x 2 3/4 in. x 1/8 in.	.25c. extra
1 x 1 to 1 1/4 x 1 1/4 in. x 3/16 in. and heavier.	.25c. extra
1 x 1 to 1 1/4 x 1 1/4 in. x 1/8 in.	.30c. extra
3/4 x 3/4 in. x 3/16 in.	.30c. extra
3/4 x 3/4 in. x 1/8 in.	.40c. extra
3/4 x 3/4 in. x 3/16 in.	.40c. extra
3/4 x 3/4 in. x 1/2 in.	.45c. extra
5/8 x 5/8 in. x 1/2 in.	1.65c. extra
5/8 x 5/8 in. x 3/32 in.	1.95c. extra
1/2 x 1/2 in. x 1/2 in.	2.40c. extra
1/2 x 1/2 in. x less than 1/2 in.	2.70c. extra
3 in. on one or both legs by 3/16 and 1/2 in.	.50c. extra
2 x 1 1/4 x 3/16 in. and thicker.	.25c. extra

1 1/8 x 1 1/8 in. x 3/16 in.	.40c. extra
1 x 3/4 in. x 1/8 in.	.45c. extra
1 x 5/8 in. x 1/4 in.	1.65c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

CHANNELS.

1 1/2 to 2 1/2 x 3/2 to 5/8 x 3/16 in. and thicker.	.15c. extra
1 1/2 to 2 1/2 x 3/2 to 5/8 x 1/2 in.	.25c. extra
1 to 1 1/4 inches x 3/16 in. and heavier.	.25c. extra
1 to 1 1/4 inches x 1/2 in.	.30c. extra
3/4 x 3/16 in. and heavier.	.30c. extra
3/4 x 1/2 in.	.40c. extra
5/8 to 3/4 in. x 3/16 in.	.40c. extra
3/4 x 1/2 in.	.45c. extra
5/8 x 1/2 in.	1.65c. extra
1/2 x 1/2 in.	2.40c. extra
1/2 x less than 1/2 in.	2.70c. extra

For immediate sizes, the next higher extra to be charged in all cases.

Channels not included above are subject to special prices.

TEES.

1 1/2 x 1 1/2 to 2 1/2 x 2 1/2 x 1/4 in. and thicker.	.20c. extra
1 1/2 x 1 1/2 to 2 1/2 x 2 1/2 x 3/16 in.	.30c. extra
1 1/2 x 1 1/2 in. x 1/2 in.	.40c. extra
1 1/4 x 1 1/4 in. x 1/4 in. and thicker.	.30c. extra
1 1/4 x 1 1/4 in. x 3/16 in.	.40c. extra
1 1/4 x 1 1/4 in. x 1/8 in.	.45c. extra
1x1 to 1 1/4 x 1 1/2 in. x 3/16 in. thick.	.45c. extra
1x1 to 1 1/4 x 1 1/2 in. x 1/8 in. thick.	.55c. extra
3/4 x 3/4 in. x 1/2 in. and thicker.	.70c. extra
3/4 x 3/4 in. x 1/4 in. and thicker.	.85c. extra
5/8 x 5/8 in. x 1/2 in. and thicker.	1.65c. extra
2 1/2 x 1 1/4 x 3/16 in.	.40c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

HEXAGONS.

3/4 to 2 1/2 in.	.25c. extra
5/8 to 1 1/16 in.	.40c. extra
1/2 to 9/16 in.	.55c. extra
7/16 in.	.85c. extra
3/8 in.	1.00c. extra
5/16 in.	1.15c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

OVALS.

3/4 to 1 1/4 in.	.25c. extra
5/8 to 1 1/16 in.	.40c. extra
9/16 in.	.45c. extra
1 1/2 in.	.60c. extra
7/16 in.	.75c. extra
3/8 in.	.90c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

HALF OVALS AND HALF ROUNDS.

3/8 to 4 inches x 7/32 in. and thicker.	.40c. extra
3/8 to 4 in. x Nos. 7, 8, 9 and 3/16 in.	.55c. extra
3/8 to 4 in. x Nos. 10, 11, 12 and 1/2 in.	.75c. extra
3/4 in. to 13/16 in. x 3/16 in. and thicker.	.60c. extra
3/4 in. to 13/16 in. x Nos. 10, 11, 12 and 1/2 in.	.90c. extra
3/4 in. to 13/16 in. x Nos. 13, 14 and 15.	1.05c. extra
5/8 in. to 11/16 in. x 5/32 in. (No. 9) and thicker.	.75c. extra
5/8 in. to 11/16 in. x Nos. 10, 11, 12 and 1/2 in.	1.00c. extra
5/8 in. to 11/16 in. x Nos. 13, 14 and 15.	1.15c. extra
1/2 in. to 9/16 in. x 1/2 in. and thicker.	1.00c. extra
1/2 in. to 9/16 in. x Nos. 13, 14 and 15.	1.35c. extra
7/16 in. x 7/64 in. and thicker.	1.60c. extra
7/16 in. x Nos. 13, 14 and 15.	1.75c. extra
3/4 in. x 3/32 in. and thicker.	1.90c. extra
3/4 in. x Nos. 14 and 15.	2.05c. extra
5/16 in. x 5/32 in. and thicker.	1.95c. extra
5/16 in. x less than 5/32 in. thick.	2.10c. extra

For intermediate sizes, the next higher extra to be charged in all cases.

The Charter Gas Engine Company, Sterling, Ill., recently shipped an 80-hp. and a 60-hp. gas engine to Arkansas for pumping water from deep wells for rice irrigation. The 80-hp. engine was fitted with two 8-ft. flywheels weighing nearly 4 tons. The company is shipping engines of this character for alfalfa and other mills and for grain elevators, as well as for irrigating and reclaiming land.

The David Lupton's Sons Company, Philadelphia, Pa., has opened an office at 1415 Oliver Building, Pittsburgh, Pa., for the sale of Lupton steel sash, Lupton rolled steel skylight, Pond continuous sash and Pond operating device. Walter C. Scott, civil engineer, has resigned his position with the National Tube Company to become manager of the new office.

The Betterment of Steel Works Labor Conditions

Welfare Work Discussed at Judge Gary's Dinner of May 4—Some Comment on the Present Condition of Business

The improvement of labor conditions at iron and steel works occupied nearly all of the time devoted to speaking at the dinner given by Judge Gary to iron and steel manufacturers at the Waldorf Astoria, New York, Thursday evening, May 4. About 80 representatives of the industry were present. Preliminary to the dinner the American Iron and Steel Institute's new standing committee on Welfare Work had a session at which the work it has undertaken was discussed at length. A few days previous the special committee appointed by Judge Gary last year to secure as far as possible a six-day work week in the continuous operations of iron and steel manufacture had met to draft a report. Between this meeting and the date of the dinner all the members of the special committee had been appointed on the new standing committee and thus their report became in part a starting point for the after dinner discussion of Thursday evening. The occasion differed from the dinner meetings which had preceded in that there was scarcely more than a reference to the question of prices of iron and steel products.

In introducing the after dinner programme, Judge Gary referred to the pleasure the social meetings of the steel manufacturers had given him and to the abiding friendships which had resulted from such mingling together. This friendship he considered of more importance and of greater honor to any man than any honor or any satisfaction that could come as the result of mere business success. "To my mind," he said, "it is a most agreeable thing that you gentlemen, many of whom by education and practice and almost by birth many years ago were in business matters consummate enemies, are now the best of friends, representing in my opinion the very highest type of American citizenship. You who a few years ago would almost have been fighting one another, now if necessary would fight for one another. No one could attack any one of you without attacking all of you."

Following Judge Gary, remarks were made by eight members of the Institute who were called out by him. The first five of these were members of the Committee on Welfare Work: E. A. S. Clarke, president Lackawanna Steel Company; James A. Campbell, president Youngstown Sheet & Tube Company; F. W. Wood, president Maryland Steel Company; William B. Schiller, president National Tube Company; George G. Crawford, president Tennessee Coal, Iron & Railroad Company. Mr. Clarke was introduced as the chairman of the Welfare Work Committee but explained that he was in reality vice-chairman, as Judge Gary is *ex-officio* chairman of all the Institute committees. Following the remarks on welfare work President Farrell of the United States Steel Corporation was asked to speak on business conditions. He was followed by Joseph G. Butler, Jr., president Bessemer Pig Iron Association, and the last speaker was Willis L. King, vice president Jones & Laughlin Steel Company. Judge Gary then said a few words in conclusion. The remarks of the various speakers are reported quite fully below.

Judge Gary's Remarks

Judge Gary spoke as follows on welfare work and the conditions affecting business in the United States:

One of the thoughts uppermost in my mind this evening relates to and grows out of the considerations of a committee of the American Iron and Steel Institute designated as the Welfare Committee, a regular standing committee, which is an enlargement of a special committee heretofore appointed to consider some of the subjects relating to the condition of our men at the mills. I think one of the most important questions which the American Iron and Steel Institute has to consider is the question of proper treatment of employees. It is not important to consider what the treatment of the employer by the employee is or may be. The man who has the intelligence and the success and the capital to employ labor has placed upon himself voluntarily a responsibility with reference to his men which he cannot escape and ought not to endeavor to escape. And I want to say to you, gentlemen, in my opinion one of the greatest questions for consideration by the capitalists of America today is the question of the treatment of their employees, so as to make it certain there will never in this country be any excuse for the

advancement of the ideas of the anarchist or the socialist. The American Iron and Steel Institute through the efforts of this general standing committee, has undertaken to do a work which in my opinion will be of the greatest benefit not only to the Institute itself but to the country at large.

INTERNATIONAL CONFERENCE

Another question I wish to refer to briefly is the question of a proposed international meeting in Europe during the coming summer. At the time of the meeting of the Institute last autumn, when about 30 of the members of the fraternity who live in foreign countries were in this country, it was suggested that there should be an international meeting held somewhere in Europe. That meeting has been called for July 5 and 6 at Brussels, and delegates have been appointed, consisting of the directors of the Institute. Delegates have also been appointed by similar institutes or associations of perhaps all the iron and steel manufacturing countries of Europe. I believe it will be one of the noteworthy meetings of this century. It has been most remarkable to my mind that so much interest has been taken in the meeting by the prominent manufacturers of foreign countries, and I hope and believe it will result in some form of international organization, with the same fraternal feeling and the same association and the same disposition to get together for the purpose of consultation and of helping one another. I think the meeting will be the beginning of an epoch which you will all look back to with pride.

THE CONDITION OF BUSINESS

One other subject I will briefly refer to is general business conditions. I think it would be a mistake for anyone to shut his eyes to the fact that in our lines and in business lines generally throughout this country conditions are not as good as we would like to have them. Business in January, February and March was very good, but the extra session of Congress had a very bad effect on business conditions throughout the country. It is a pity that an extra session of Congress seemed to be unavoidable and it is regrettable that politics should interfere with business progress. It is deplorable that so many politicians are mere politicians and not statesmen; that for political purposes action should be taken or proposed in the Congress of the United States which is to the great disadvantage of property and business success. Nevertheless it is a fact, we know by sad experience, that when Congress is in session there is a sudden and a marked hesitation, fear and doubt and distrust which enter the mind of the general business public. We have felt it very materially; others have felt it.

Gentlemen, I have presented the worst side of the case. Anyone can always see things in his business horizon which are not entirely satisfactory; anyone disposed to look down instead of up will find some feeling of discomfort. It is the hopeful man, the courageous man, the man who looks on the bright side, it is the man who realizes to the full extent the best things which appear to his view, who makes the greatest success. And there are

many things just now within our vision, if we have the disposition to see the best side, which are favorable and encouraging and should make us feel absolutely certain good times are ahead of us, and not so far ahead as to be out of sight or out of grasp. The fundamentals of the country were never better than they are today. Financial conditions were never before on as sound a basis in this country as they are today. Those of you who are connected with banks know that the trouble with the banker at the present time is that he has more money than he can profitably use. The circulation of money in this country per capita at the present time is almost 35 dollars—considerably larger than in other countries with very few exceptions. Moreover, the disposition of the people of this country at the present time is to have enacted into a law some provision similar if not entirely like the bill recommended by the Aldrich Committee. And if this shall become a law it is perfectly certain we will have no more financial panics in this country of great significance.

Then we have the one great thing which all of us look to eagerly every year, and that is the crop condition. Many of us have opportunities for ascertaining what the crop prospects are from time to time, and although no one can predict with certainty what will be the crop of any year, particularly until he sees the crops in the ground and nearly ripe, yet all the conditions which exist at the present time are evidence that we may expect, unless something unforeseen happens during the coming year, one of the best and largest crops we have ever had in this country.

THE WORK OF TROUBLE MAKERS

Then another thing is worthy of notice. There has been a disposition in this country during the last few years to throw stones at the business man; there has been a disposition to abuse, to criticise, to find fault, to attack. The demagogue has been more or less successful during the last few years and the people have been more or less deceived with respect to the conduct and the intention of the successful business man. It has been very popular for the man on the stump to say that because a business man is successful he is a dishonest man. And the people have been deceived. But you cannot deceive all the people all the time, as we know by experience and by the utterances of some of the great orators of the past. People are waking up; there is a reaction to some extent. The general mass of the people are coming around to the idea that the successful business man may be just as loyal to the country, just as honest in his dealings and just as friendly towards his competitors and his associates as the poor man, and that the successful business man is disposed to do as much as the statesman or the politician with respect to promoting the best interests of the people at large. And I tell you, gentlemen, the time is coming in the comparatively near future when we will see that the people have waked up to the fact there has been an imposition on the part of these demagogues, and that they have carried too far their attacks.

In saying this I do not mean to suggest for a moment that any of us should to any extent modify our view that we must do everything we possibly can every day, in season and out of season, to make it certain we are doing the right thing by everyone. And the disposition which we are showing among ourselves when we come together, in trying to help one another and to advance the interests of all others, we must also evidence in our treatment of everyone outside of our lines of activity, including our customers, including our employees, including all the makers and the administrators of the law, and including the public at large. We must put and keep ourselves on a platform so fair, so high, so reasonable, that we will attract the attention and invite and secure the approval of all who know what we are doing. In that way we will exercise an influence which should be of great benefit not only to ourselves but to all others. And let us focus all these thoughts and ideas which we advocate here, at the Iron and Steel Institute, making it the leader in these movements which are calculated to be of great benefit to all inside or outside, so that the Institute will be looked upon as something worthy and influential.

E. A. S. Clarke

Judge Gary has said that the question of the treatment of our employees and how we shall finally deal with that problem is of very great importance. It is very far reaching, as we look at it. We believe that the first thing

we all must do is, so to speak, to set our own house in order; to have our dealings with our employees and the conditions under which they work in our mills and factories such as are beyond reproach. We also realize that we have got to go further. We have to get at their manner of life when they go away from our factories; the conditions under which they are housed, the conditions of sanitation, of education, of relaxation, of amusement, their health and a great many other things. In view of these great problems there has grown up a new class of engineers, so to speak, those who call themselves sociological engineers. We believe that they have the right object in view; that what they are trying to accomplish is something we all want to accomplish; but we realize also that the problem is in many instances a special problem to each employer. Therefore the work we shall undertake primarily is to get together a statement of the problem, of how it is being solved in various branches of our industry elsewhere and to try to constitute this committee or the Institute a bureau of information, so that all those who are interested in the problem can find out what there is to do, what is being done and how it is being done, and in that way find a suggestion for the solution of each one of their individual problems.

The committee feels that it has tackled a very large problem; but it has a great deal of hope and courage, for it believes it is going to have the help, interest and entire co-operation of every member of the Iron and Steel Institute and of our industry. We have seen Judge Gary solve a problem which was as big and more difficult and harder to cope with; we have seen him bring it to a most successful conclusion and meet with the very greatest success in the face of conditions which to almost all of us, a few years ago, seemed to present obstacles almost impossible to overcome. And we believe, with his leadership and example, through this Institute, we are going to be the means of accomplishing another great reform, another great benefit for the industry.

James A. Campbell

We cannot expect that we are going to change entirely the present conditions, where they are not good, in a short time. You must not expect too much of this committee. We had our first meeting to-day and discussed this matter for two hours and over. The committee of the American Iron and Steel Institute will only be a sort of clearing house. The people in charge of the different plants must co-operate with us and put these plans in operation and do the work. You all know that the success of any business depends on its organization, and while you rely largely on your superintendents and your foremen in your different plants you also must rely on the men under them, and unless they are satisfied and contented and the conditions surrounding them are comfortable and congenial you are not going to get the high efficiency that we are talking so much about in the last few months. If you co-operate with us and do everything that you can to improve the conditions I think in a short time you will feel justified in having incurred any expense that you may have gone to; and, no matter whether you do or not, you owe this to your employees because your success is dependent entirely upon their co-operation and their work, and they cannot give you the best that is in them unless you give them good, sanitary working conditions. Those of you who furnish them houses to live in will have to make them as comfortable as possible.

A great many men treat labor organizations without any great consideration and try to get rid of them in order to take advantage of their men. You will find always when that is done they are continuously in trouble. The way to keep out of trouble with your employees, in my opinion, is to treat them fairly and not try to take advantage of them, either by reducing their wages when they cannot afford to have them reduced or making the working conditions so hard that they are unable to bear them.

I never have known a time when mills were running to only 50 or 60 per cent. of their capacity, and when there has been so much unemployed labor as there has been recently, that the wages have not been reduced. I think we can all thank Judge Gary for the policy that he has pursued. I remember when this condition first came upon us, during the panic, that at the meeting held he insisted that the wages be not reduced. There were some of us

who felt that employees ought to stand their share if we were reducing prices, but there were others who felt that the cost of living at that time was too high to justify us in interfering with the wages of the workmen. I think the wisdom of Judge Gary's attitude in that matter has been vindicated by the results; if we had reduced the wages we would have simply given that away to our customers; there would have been no greater profits for us and there would have been a great hardship to our employees who are getting to-day, I think, the highest wages that they ever have been paid in the history of this country, at least since I have been in the trade; and it is a remarkable situation.

Now if that was fair and right, which I think all of us will now agree, that it was for our benefit as well as for the benefit of our employees, we ought to go still further and give them all the comforts, surround them with the best working conditions that we can provide, and I hope that you will all co-operate with this committee because they will be obliged to ask you for information.

F. W. Wood

I feel that the functions of this committee are extremely important, and if the opportunities are fully improved its work will prove not only of great benefit to the trade but also be most valuable to this organization. I am very glad to hear Judge Gary make the suggestion that in considering the various steps that may be taken to improve the condition of our employees we should not be governed to too great an extent by the manner in which the efforts may be received at first. I think all of us feel that attempts to change conditions which are openly and distinctly in the direction of betterment are looked upon with suspicion by a great many of the employees. I do not think we should be influenced by that at all. It is not going to be possible for this Committee to do more than make suggestions, gather information, and perhaps lay down some general principles. We shall have to ask for the help of all members of the association and for suggestions from them. The agitation of this subject must be productive of good in the same way that the prominent discussion in recent years of conservation and increased efficiency in management is going to be productive of good. While perhaps some have gone to extremes and made statements that seem Utopian or incapable of accomplishment, still it has set the community thinking, and we see evidences in the press and in various ways of the new lines of thought that are opened up, and it is tending in the right direction. Now I conceive that in the same way this movement will result in the systematic building up of the material and social welfare of the employees of a great industry like the iron and steel industry.

William B. Schiller

The committee appointed last autumn by the American Iron and Steel Institute to consider the question of the six-day week in continuous operations has been at work on the subject for a good while and has carried on a very voluminous correspondence with a large number of those whose manufacturing operations involve the employment of labor seven days in the week. A number of different plans have been submitted. Finally a plan was evolved that seemed to meet the approval of a majority of those with whom the Committee communicated. Upon ascertaining that fact the Committee made its report to the directors of the American Iron and Steel Institute, at a recent meeting, and the directors passed a resolution instructing the committee to supply the Secretary of the Institute with copies of the plan, for distribution to such members as were engaged in manufacturing operations involving continuous employment. This will be done in the near future. I shall ask each member who is communicated with to express a willingness to make a trial. Any plan that is devised on paper is subject of course to more or less improvement upon actual trial. The Committee hopes that a really earnest effort will be made to put this plan, with such modifications as may be necessary to suit local conditions, into effect for a certain period and try it out. Pick all the holes in the plan that you want to; you will not hurt the feelings of the committee at all if you criticize it. It is not submitted as the last word at all, but in the hope that from it or through it may be evolved a practicable working plan that will abolish the seven-day week and abolish the long turn of 18 or

24 hours in changing from the day turn to the night turn.

The plan provides for what are termed relief men to take the places of men who are off duty, one day out of seven. These relief men are to be changed from one position to another. The suggestion has been made that, instead of doing that, when a man is off duty the man next below in position should be moved up. I think perhaps that is a better arrangement than the one outlined in the plan which will be sent to you. Other objections have been raised to this effect: That under the present system a foreman has a regular gang of men working under him, he is familiar with those men and the men are familiar with him—he knows what to expect of them; and it has been urged that to change that gang and introduce new men would impair its efficiency. I think that criticism is at least open to argument. At I view it, the changing of men from one position to another would in time make for greater efficiency of the whole force. A man who is working in a subordinate position and who is moved up into a position of greater importance and familiarizes himself with the duties of that position, naturally, in the course of time, becomes the more efficient workman, so I do not believe that criticism is well founded.

Another criticism is that the men themselves will object seriously to the loss of one day's compensation. That is to be expected. Every workman desires to earn just as much as he can; we all do. But again that does not seem to me to be a very sound position. In all other branches of our business we have men who work six days in the week and are paid for six days in the week. The wages of blast furnacemen particularly—and they are the ones most employed in continuous operation—are predicated upon what are termed common labor rates. The advances are paid above the common labor rates, depending upon the importance of the position; but nearly all are based upon common labor rates. That is true of a great many men in all other branches of the industry—common labor rates are the basis of all the other rates, except tonnage rates. Now, those men for all time have worked six days in the week and have been paid for six days in the week. If they, earning no more money than the men employed at the blast furnaces, per diem, are able to work six days a week, to be paid for six days and make a living on six days, surely the blast-furnacemen can. It may be found advisable, after trial, to make some adjustment in the blast furnace labor. I rather question it; but at all events it is well worthy of a sincere, hearty and earnest trial.

George G. Crawford

The scope of the work can be so large that it is going to be necessary to limit the scope at the start, and, as Mr. Wood expressed it, hit the high spots first. One of the high spots seems to be to arouse interest among members of the association in carrying on welfare work. I know that among some operating men there is a certain prejudice against it because they think it is sentimental, and the question of sentiment is a good one in its place. But I think it will be a comparatively easy matter to convince men of that tendency of thought that there is a practical application which can be made of welfare work which will make it easier for them to get their work done by having more efficient men to help them to do it.

Two divisions of the work were slightly indicated, and importance was given to plant conditions; and those suggestions were made by members of the committee who had plants where the operatives live in fairly large communities, where the communities themselves provide opportunities for amusement, and where they have municipal organizations that are supposed to look after hygiene and sanitary measures in the houses and yards. But there are some companies represented in the American Iron and Steel Institute, and particularly the mining companies, where the camps are entirely owned by the companies, and there the operatives are entirely dependent on what the management does for their sanitary and hygienic surroundings and their pleasures outside of work hours. And it seems to me that in those cases we are peculiarly under a moral responsibility to our employees.

James A. Farrell

While I do not wish to digress from the subject assigned to me, which relates to trade conditions, I would like to tell of a conversation which took place the other day between two gentlemen. One of them claimed that he was a philosopher, and the other asked him upon what grounds

he made that claim. "Well," he said, "I am the owner of two lime kilns. I actually own both of them, but I am only supposed to be the owner of one. I think I have gradually acquired a philosophical temperament, because it is part of my daily pastime to read a large correspondence from the customers of the lime kiln which people suppose I do not own, claiming that the proprietor of that lime kiln is continually cutting my prices."

There is a great deal in that story. There is a growing element to-day in the business world who can be believed on almost any other subject but the question of prices—competitors' prices especially.

Now, with regard to trade conditions, it has been evident to most of us for some time, perhaps for the best part of the year past, that a great deal of expansion is taking place in the steel industry in this country. Some months ago it was estimated that the productive capacity of this country in 1911 was fully 3,000,000 tons, in the shape of steel ingots, in excess of the consumptive requirements. If that is so, and statistics would seem to support the claim, it should not be difficult to appreciate that none of us can force a 100 per cent. capacity into a 60 per cent. consumptive demand. That is another form of commercial philosophy. If we realize that condition and can reconcile ourselves to its acceptance, we are going to lead a very comfortable existence in the steel business in 1911.

PRICES AND DEMAND.

A great deal is said about the present range of prices. Of course, those of us in the steel business are aware that prices to-day are from \$5 to \$6 per ton lower than when the readjustment was made in 1909. I do not believe that any business can be forced by any change of prices. Furthermore, I am firmly convinced that in the anaesthetic condition into which business has fallen since April 4—and it is likely to continue until Congress adjourns—it cannot be revived by any change in the policy which we have been carrying out for many months. There is no doubt whatever that the business is in the country—it has simply been interrupted. That was demonstrated in the months of January, February and March. I think, without exception, every manufacturer here felt a gradual impetus to his business during the months of January, February and March particularly. As soon as the extra session of Congress convened, business began to fall off. I think to some extent it was greatly assisted by pessimistic statements which were not altogether warranted, as to the condition of the business, but which a great many gentlemen of the press felt it was necessary to discount in order that they might perhaps be right, if conditions should happen to grow poorer.

Now, you have noticed that during the first three months of this year something over \$300,000,000 has gone into bonds and note issues of railroads and some industrial companies; but largely the railroads have derived that amount of money from the sale of bonds and note issues. I think that during the past week or ten days we have seen some evidences of the existence of that money in the hands of the railroads. The railroad buying has been better during the last week or ten days, and a great many railroads that felt that they would not require any material in 1911 have suddenly discovered that they require rails or accessories or fences or tools or sheets, or something of that character.

Mr. Buffington showed me a telegram yesterday which was an order from a railroad that had been forgotten—as far as purchasing was concerned it had been forgotten that the railroad was in existence. Now, I believe that we will hear other voices from the tomb, the cemetery being large enough. The main thing for us to possess at the present time is a little patience and submission to conditions as we find them.

THIS COUNTRY THE ONLY LAGGARD.

The United States is the only country that I know of which is in the position it is in to-day. Practically every country on the face of the globe is enjoying a business far in excess of anything in its history. Take Canada; its prosperity to-day is beyond the dreams of even Sir Wilfred Laurier, who has claimed that the 20th century belonged to Canada, the 19th century having been conceded to belong to the United States. Mr. Drummond, the president of the Algoma Steel Company, told me yesterday that they could not possibly accept another order in 1911. The same thing is true of every iron and steel mill in Canada.

A great deal is being said about the revolution in Mexico; but notwithstanding the conditions that exist there business appears to be going on in Mexico, and during the past week or two has increased rather than decreased.

The Board of Trade returns for Great Britain show that the foreign trade of Great Britain in 1910 was over one hundred millions sterling—\$500,000,000 more than for any year in the past ten years.

A gentleman engaged in the steel industry in Germany told me within the week that Germany had produced 13,000,000 tons of steel in 1910 and exported 6,000,000 tons. That reminds me that Germany is a great country, and also reminds me that on the 8th day of last December I attended a meeting of the German Iron and Steel Institute at Dusseldorf, at which 800 members were present. The principal address was made by the Finance Minister of Germany, Dr. Renheisen. The substance of his address was that it would be one of the greatest industrial calamities to Germany if anything happened to prevent the prolongation of the German Steel Syndicate. Well, I almost had to pinch myself to find out where I was. In Germany not any particular attention was paid to it, though I rather imagine there would be some small consternation here if such a statement were made by one of the Cabinet officers of this country.

Notwithstanding, it all goes to show that in practically every country but ours the government, as well as the people, is engaged in building up commerce, while most of our time is spent in defending it. Nevertheless, as Judge Gary has said, we fully believe that the time is not far distant when we shall probably witness a change in sentiment.

THE OUTLOOK.

With respect to the future, I cannot prophesy; but I am thoroughly convinced that, with the conditions existing in this country to-day in the matter of crops and everything that helps business, within a comparatively short time we shall all be busy and have plenty to do. In the meantime it is going to require patience. We have got to sacrifice our order book unless we want to precipitate a condition of affairs which, as Mr. Schwab says [in a cablegram to Judge Gary], means an era of low prices and perhaps a continued situation in that line. If we have patience I am satisfied within a very short time we are going to be very well pleased with the trade conditions in this country, although we should bear in mind that even a boom in this country to-day would not absorb the existing capacity of the country. If any man feels he can operate his plants at 100 per cent., or 80 per cent., and seeks to do it on a consumptive demand that is in a lesser ratio, he is simply contributing to an undesirable thing. We do not feel that way in the Steel Corporation. We believe in fair competition—in live and let live methods. All we are expecting is our fair share of the business, and we are prepared now, as we have been in the past, to make as many sacrifices as anybody else when it comes to keeping within what we consider to be our range or our share of that business.

Joseph G. Butler, Jr.

I think that perhaps with some pride I may say we have done in Youngstown, in proportion to the population, as much if not more than any other community in the matter of helping our employees. Something over a year ago I was instrumental in organizing the Modern Homes Company. I succeeded in interesting a number of people in Youngstown, some of them in the iron and steel business and many of them not. The concern was organized with a capital of \$200,000, and we got at the head of it the president of our First National Bank, Henry M. Garlick, a man who inspires confidence in everything that he undertakes. The capital was very quickly subscribed, a competent organization was formed, and some 200 houses were built, sanitary in every respect. The matter was not gone into with any particular desire to make money, but very much to our surprise at the close of the fiscal year it was shown that the concern, although it attempted to make the rents so that they would be attractive, had made 10 per cent. on the investment. The capital was increased and the increase was over-subscribed five to one. We expect in the course of another year to have not less than 1,000 of these sanitary houses built for the benefit of the employees of the different corporations in Youngstown. I mention this for I think that we have set a good example. The Jones &

Loughlin Steel Company is doing something in the same line.

I believe I stated at our last gathering that the pig iron end of this business had been neglected and overlooked. I have felt that for several months, and I still feel that way. We all agree that there is an overproduction. There are more furnaces built than are needed. In the early times there was a shortage. As I stated a few years ago at one of the early meetings, the independent furnaces made one sale of 400,000 tons to the Carnegie Steel Company before the Steel Corporation was organized. I really believe that if we had kept up the policy of buying from the independent companies we would have a much more healthy condition of affairs than we have today.

I firmly believe that in order to get the pig iron business and the steel business and the whole fabric in better shape we must make up our minds to increase our exports. Take Germany, England, France and Belgium; a large proportion of their output is sent elsewhere. On the contrary, we in the United States consume the great bulk of our product. In the future we must do one or two things—either restrain the further building of capacity or increase our exports.

I think we should try to form a national association of pig iron manufacturers, not with the idea of sustaining prices but with the idea of co-operating on the same lines that have been followed in the finished end. That I think applies more especially to the manufacture of foundry iron. The great bulk of the pig iron on hand in this country is foundry iron. The amount of steel making iron that has accumulated could be used up in a week, and if they would shut down for a month there would not be a ton of any sort of pig iron left. I earnestly hope that through the American Iron and Steel Institute or in some other way the producers of pig iron will get together and bring about a better condition of affairs.

Willis L. King

We are met together again through the courtesy of Judge Gary to renew and cement our friendship and get the consensus of opinion as to the condition of business and its future. It is certain that there is something out of gear; but we cannot find it in the basic conditions, for our crops and finances were never better. We are apt to think when these basic conditions are right that nothing much can be amiss. But even imaginary troubles unfortunately have the power to create doubt and then fear, and that is why we are suffering from the extra session of Congress, with its free trade tendencies, and from the delay of the Supreme Court and—I say this with great respect—for its inability to say just what the Sherman Act means. The great majority of thoughtful people believe that this country cannot be prosperous without an adequate protective tariff. But these people I think are unduly alarmed concerning the action of the House, for certainly free trade is not imminent or possible with a Republican President and Senate. And when the country gets over its scare, as in due time it will, I have the faith to believe that the business then offering will tax our facilities, great though they are.

We must be patient, however, for we will have to wait perhaps a long time. But in the meantime we should conserve our own interests, for the average buyer always wants the lowest price, the cost price, regardless of all conditions, especially when business is slack. We cannot create a demand of 100 per cent. nor tell when it will come, neither can any one or more of us run 100 per cent. on a demand of 60 per cent. But this we can do: we can run our mills according to the demand, and ask a fair and reasonable price for what we produce, and this in my opinion is the sensible and proper thing for us all to do. But should any of us elect to do the impossible, then this epigram of Benjamin Franklin will give advance information as to our finish: "He that spits against the wind spits in his own face."

Judge Gary

I would like to say that probably we will not have the pleasure of meeting at dinner again until autumn, until after some of us have returned from Europe; but in the early autumn I hope you will be good enough to come again to one of these dinners. And I hope in the meantime you will try and keep in close contact, that the feeling of friendly interest one for the other will continue

and remain solid, that no one will become demoralized by misrepresentation in regard to what others are doing or by business conditions that are not entirely satisfactory. We will accomplish more for ourselves if we try to benefit our neighbors. If anyone does anything that our company believes ought not to be done, with respect to trying to get away our business unfairly, we will be glad to go to that person and ascertain the facts before we rush out into a competition that will be destructive and bitter and opposed to the best interests of all the people. And I hope that disposition will control the action and feeling of everyone who is present here this evening.

Never before in the history of the iron and steel business in this country has the business been in such fine, careful, honest, intelligent management as it is at the present time. Never before has there been so large percentage of the iron and steel interests of the country disposed to come together and consider one another's interests as at the present time. There was a period when, from information, I supposed there were men engaged in the manufacture of iron and steel who were not at all inclined to be fair and reasonable in trying to keep within the domain of their natural legitimate business, and who were not inclined to accept an invitation to such a dinner as this for the purpose of exchanging friendly greetings. But I found by inquiry and by personal contact that I had been entirely mistaken. There are gentlemen here this evening of whom I entertained feelings of suspicion in regard to their intention to deal fairly and justly by their neighbors; and I am very glad to say that it was simply because I was misinformed that I entertained the opinion I held at that time. I have learned by personal contact with these gentlemen that they have exactly the same feelings, the same inclinations, the same desires and intentions that all the rest of us have. We may depend upon them; when they say they are doing a certain thing we know they are doing it. Of course, as I have said before, I would not under any circumstances ask such a man or any man to make an agreement with me as to what he would do, because I know that is not proper, because I know that is illegal, because I know it would not be approved but would be disapproved by the administrators of the law; and I would not ask any man to do what I would not do myself. I know that if we succeed as business men we must do it on principles that are honest, fair, lawful and just, and therefore we may not make any agreements of any sort or description, expressed or implied or by inference. And yet at the same time I feel confident that when I come into the open and say to any of you gentlemen that I am charging certain prices or that I am shipping certain quantities you know I tell the truth, that you can rely upon that, you can depend upon it. You know I do not say that for the purpose of deceiving you at all, nor for any purpose except to let you know exactly what I am doing. And therefore, as I have said before, gentlemen, we come together upon a platform that involves the honor of a man, which is far better and far higher and far more binding upon us than any contract which we could make.

Now, gentlemen, with my gratitude for your presence and my hope that you may keep well, strong and happy, and that your business will be prosperous, and that your feeling of friendship for one another and for me will in no respect be abated during the summer, and that we may meet in the early fall, I bid you good night.

Willis L. King then proposed in the following words a toast to Judge Gary, to which the guests heartily responded: "One of the poets has beautifully said that friendship is the wine of life, another that friendship is a sheltering tree. Here is to the man who has brought this boon to the iron and steel masters of America, who, while still competitors, are proud to call themselves friends."

Those in Attendance

M. Andrews, M. A. Hanna & Co., Cleveland.
George Bartol, General Manager, Otis Steel Company, Cleveland.
A. F. Banks, President, Elgin, Joliet & Eastern Railway Company, Chicago.
L. E. Block, Vice-President, Inland Steel Company, Chicago.
W. L. Brown, Pickands, Brown & Co., Chicago.
E. J. Buffington, President, Illinois Steel Company, Chicago.
J. G. Butler, Jr., President, Bessemer Pig Iron Association, Youngstown, Ohio.
James Bowron, President, American Brass & Copper Company, New York.
J. A. Campbell, President, Youngstown Sheet & Tube Company, Youngstown, Ohio.
Henry Chalfant, President, Spang, Chalfant & Company, Pittsburgh.

Capt. H. S. Chamberlain, President, Youngstown Sheet & Tube Company, Youngstown, Ohio.
 L. B. Cook, Manager, Warwick Iron & Steel Company, Warwick, Pa.
 G. G. Crawford, President, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.
 E. A. S. Clarke, President, Lackawanna Steel Company, Buffalo.
 D. M. Gleason, President, Carnegie Natural Gas Company, Pittsburgh.
 F. H. Crookard, Vice-President, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.
 Daniel Coolidge, President, Lorain Steel Company, Johnstown, Pa.
 Harry Coulby, President, Pittsburgh Steamship Company, Cleveland.
 A. C. Dinkey, President, Carnegie Steel Company, Pittsburgh.
 R. H. Edmonds, Editor, *Manufacturers' Record*, Baltimore.
 B. F. Fackenthal, Jr., President, Thomas Iron Company, Easton, Pa.
 J. A. Farrell, President, United States Steel Corporation, New York.
 E. C. Felton, President, Pennsylvania Steel Company, Philadelphia.
 W. J. Filbert, Comptroller, United States Steel Corporation, New York.
 A. I. Findley, Editor, *The Iron Age*, New York.
 E. H. Gary, Chairman, United States Steel Corporation, New York.
 E. G. Grace, General Manager, Bethlehem Steel Company, South Bethlehem, Pa.
 J. A. Hatfield, President, American Bridge Company, New York.
 C. R. Hubbard, President, Wheeling Steel & Iron Company, Wheeling, W. Va.
 A. F. Huston, President, Lukens Iron & Steel Company, Coatesville, Pa.
 O. N. Hutchinson, General Manager, Grand Crossing Tack Company, Grand Crossing, Ill.
 August Heckscher, Vice-President, Eastern Steel Company, New York.
 E. M. Hagar, President, Universal Portland Cement Company, Chicago.
 Harry R. Jones, General Manager, United Steel Company, Canton, Ohio.
 Jonathan R. Jones, Secretary and Treasurer, Alan Wood, Iron & Steel Company, Philadelphia.
 I. A. Kelly, President, Ashland Steel Company, Ashland, Ky.
 I. A. Kelly, Jr., Superintendent, Ashland Steel Company, Ashland, Ky.
 D. C. Kerr, Vice-President, United States Steel Corporation, New York.
 Willis L. King, Vice-President, Jones & Laughlin Steel Company, Pittsburgh.
 W. H. Love, President, New York State Steel Company, Buffalo.
 G. G. McMurtry, Chairman, American Sheet & Tin Plate Company, New York.
 James T. McCleary, Secretary, American Iron and Steel Institute, New York.
 John McGinley, Vice-President, West Penn Steel Company, Brackenridge, Pa.
 F. C. McMath, President, Canadian Bridge Company, Walkerville, Ont.
 Benjamin Nicoll, B. Nicoll & Co., New York.
 Chas. D. Norton, Vice-President, First National Bank, New York.
 W. J. Olcott, President, Oliver Iron Mining Company, Duluth, Minn.
 W. R. Palmer, President, American Steel & Wire Company, Cleveland.
 E. W. Pargny, President, American Sheet & Tin Plate Company, Pittsburgh.
 John A. Penton, Managing Editor, *Iron Trade Review*, Cleveland.
 Geo. W. Parkins, New York.
 Chas. S. Price, President, Cambria Steel Company, Johnstown, Pa.
 Leonard Peckitt, President, Empire Steel & Iron Company, Catsaqua, Pa.
 W. B. Perley, Assistant to President, United States Steel Company, New York.
 Chas. A. Rathbone, Buhl Malleable Company, Detroit.
 J. H. Reed, Chairman, Carnegie Steel Company, Pittsburgh.
 Davis Reeves, President, Phenix Iron Company, Philadelphia.
 F. B. Richards, M. A. Hanna & Co., Cleveland.
 Karl G. Roebing, John A. Roebing Sons' Company, Trenton.
 W. A. Rogers, President, Rogers-Brown Iron Company, Buffalo, N. Y.
 F. H. Rose, General Sales Manager, Upson Nut Company, Cleveland.
 Wallace H. Rowe, President, Pittsburgh Steel Company, Pittsburgh.
 James P. Roe, General Superintendent, Glasgow Iron Company, Pottstown, Pa.
 John Reis, Vice-President, United States Steel Corporation, New York.
 Geo. L. Reis, Vice-President, Minnesota Steel Company, Duluth, Minn.
 W. B. Schiller, President, National Tube Company, Pittsburgh.
 C. A. Severance, Davis, Kellogg & Severance, St. Paul, Minn.
 Moses Taylor, Vice-President, Lackawanna Steel Company, New York.
 Alexis W. Thompson, President, Inland Steel Company, Chicago.
 J. A. Topping, Chairman, Republic Iron & Steel Company, New York.
 Richard Trimble, Treasurer, United States Steel Corporation, New York.
 E. P. Thomas, President, United States Steel Products Company, New York.
 W. R. Walker, Assistant to President, United States Corporation, New York.
 F. S. Witherbee, President, Witherbee, Sherman & Co., New York.
 F. W. Wood, President, Maryland Steel Company, Sparrows Point, Md.
 W. P. Worth, Treasurer, Worth Bros. Company, Coatesville, Pa.
 F. A. Wilnot, President, American Tube & Stamping Company, Bridgeport, Conn.
 August Ziesing, President, American Bridge Company, Pittsburgh.

The Philadelphia Foundrymen's Association

The Philadelphia Foundrymen's Association held its regular monthly meeting at the Manufacturers' Club, Philadelphia, Pa., on the evening of May 3, George C. Davis occupying the chair. Quite a representative attendance of local and out of town members was present. Crocker Brothers, pig iron and coke merchants, Pennsylvania building, Philadelphia, represented by Charles H. Newcomb, were elected to membership.

Secretary Howard Evans made a report for the committee having in charge plans for attending the Pittsburgh convention of the American Foundrymen's Association, May 23 to 26. It is proposed that the association furnish a special Pullman sleeping car, without expense to the members, leaving Broad Street Station, Pennsylvania Railroad, Monday evening, May 22, at 9.02 o'clock. Members may return at their leisure, no plans being made for the return trip. Members wishing to join the party will communicate at once with Secretary Evans, Pier 45, North Wharves, Philadelphia.

Shepard Overhead Handling Devices

The paper for the evening's discussion was on, "Electric Overhead Handling Devices for Foundries and Other Industries," by James A. Shepard, chief engineer Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. Mr. Shepard prefaced his address, which was illustrated by a large number of lantern slides, by a discussion of elements of cost, of which the following is a part:

How many of us have compiled any careful record of the percentage of the weekly pay roll which is absorbed by inefficiently organized processes, or from delays of one sort or another, by which production is momentarily or longer delayed? How many of us have been pinning our faith to the "speeding up process," but have failed to remember that much more can be accomplished by keeping things moving at even a moderate pace? If we have tolerated delays and inefficiency at any point, has proper consideration been given to the frequency with which the little leaks repeat themselves?

Do any of us in the conduct of our foundries continue to unload pig iron by hand and perhaps wheel it, a couple of hundred weight at a time, across the yard to the cupola? Forgive me if I consider it entirely possible. I know of one foundry in another city which melts about 200 tons of iron per day and handles every pound of it by hand or in wheelbarrows.

Do we handle the molding sand, the coke, coal, slag and cinders in the same manner?

Probably few, if any of us, would answer in the affirmative as to all of the operations named: also few, if any of us, could answer in the negative as to all of these operations. Yet the handling of the materials represents for the year a large expenditure, because handling is an operation which is often repeated. Let us enumerate some of them: The iron from car to storage pile; storage pile to cupola; cupola to molds; molds to cleaning room; often several handlings in process of cleaning; cleaning room to final delivery.

If there is any delay, so that castings cannot proceed from an operation directly to the next, it may add one or two additional handlings. But there are at least six handlings. For each ton of finished castings you will have handled from one and one-fourth tons to two tons of raw material, not counting coal, coke, sand, cinders, etc., which should account for about 25 per cent. addition, giving an average total of about eleven tons handled once for each ton of finished castings.

So far we have considered the actual work of handling, but during these several handlings skilled mechanics have been more or less delayed by lack of expeditiousness; hence another item of expense often not given sufficient consideration, but representing an important item in the final account.

We have also neglected the matter of handling the molds, because it is assumed that every modern foundry is provided with crane service over the molding floors where the character of the work done warrants it. But does this type of hoisting apparatus just meet your requirements, or if it does should it not be supplemented by auxiliary hoists in small units so that several molders are not frequently compelled to wait while the large crane is serving one?

Mr. Shepard then described, by means of some 60 lantern slides, various types of overhead hoisting apparatus manufactured by his company, in use in foundries, workshops, storage yards, sugar houses and in other connections where extraordinary conditions prevail, explaining the particular adaptability of the devices under varying circumstances. He was given a vote of thanks for his interesting paper.

The Alamo Iron Works, San Antonio, Tex., in addition to building a planing mill and carpenter shop, has recently installed considerable new machinery, among which are the following: One 27 in. x 16 ft. Lodge & Shipley patent head lathe; one gang radial drill, 4 ft. arm; one Buffalo Forge Company splitting shear; one 8-in. pipe machine; two punches and shears for the sheet iron shop; one 1500-lb. double frame steam hammer. The company has also contracted for a steel frame saw-tooth roof blacksmith shop, 40 x 60 ft. With the equipment enumerated, the capacity of the plant will be about doubled and no further improvements will be made in the near future.

The Eastern Steel Company announces the removal, May 1, of its New York office to 60 Broadway.

The Pennsylvania Steel Company's Report

The Pennsylvania Steel Company's report for the year ended December 31, 1910, gives the combined income account for that company and its subsidiaries as follows:

	1910	1909
Income from operations.....	\$8,774,234	\$8,801,118
Other income.....	249,370	196,821
Total income.....	\$4,029,125	\$4,006,279
Interest on bonds, etc.....	\$1,702,918	\$1,441,379
Depreciation.....	855,403	526,854
Preferred dividends, 7%.....	1,412,293	1,155,000
Surplus.....	\$58,581	\$883,044

The above figures for income in 1910 are after payment of all expenses of operations, including \$4,903,463 for ordinary and extraordinary repairs and upkeep.

The 1910 surplus is equal to 0.54 per cent. on \$10,750,000 common stock, as compared with 8.21 per cent. earned on the same stock previous year.

The production of pig iron and steel ingots in the past two years was as follows:

	Gross Tons.	
	Pig Iron.	Steel Ingots.
1910.....	757,000	847,000
1909.....	700,000	800,000

The production of coal, coke and iron ore was as follows:

	1910	1909
Gross Tons.		
Coal.....	790,000	890,000
Coke.....	771,000	698,000
Iron ore.....	1,471,000	1,000,000

The combined balance sheet as of January 1, 1911, is as follows:

Assets.	
Property owned and operated.....	\$43,785,911
Sundry securities.....	1,139,479
Sinking funds.....	510,873
Materials, supplies, etc.....	8,913,595
Accounts receivable.....	4,389,821
Bills receivable.....	489,068
Cash.....	\$81,132
Total.....	\$60,109,879
Liabilities.	
Preferred stock.....	\$20,560,800
Common stock.....	10,750,000
Stock of subsidiary companies not owned.....	12,700
Bonded debt.....	20,679,000
Accounts payable, and pay rolls.....	1,728,926
Dividend payable May 1, 1911.....	719,628
Accrued interest and taxes.....	297,835
Profit and loss.....	5,360,990
Total.....	\$60,109,879

In 1910 the subsidiary companies were actively engaged in starting new operations and in the introduction of new methods of manufacture. In connection with mining operations in Cuba an initial organization was formed out of unskilled laborers for operating the new, and in many respects unique, machinery for mining and transportation, an unusually difficult task, and one which involved large expense. High costs for the first year were the natural results of these conditions. The difficulties encountered have been largely overcome, and an efficient force of men has been gathered together. During the same period the open hearth plant at Sparrow's Point was completed and started, and new methods of manufacturing steel were being perfected, both there and at Steelton, in connection with the use of the new Cuban ores, all of which of necessity increased costs. Notwithstanding these unfavorable conditions, these companies were able to charge more than in 1909 directly to depreciation, and to make larger payments to sinking funds, which latter, in reality, are also allowances for depreciation.

The company's coal mining properties, located in Cambria and Indiana Counties, Pennsylvania, consist of about 16,000 acres of coking coal lands, on which five mines are operating. They produced 790,000 tons of coal in 1900, as compared with 890,000 tons in 1909, the decrease being due to scarcity of labor early in the year. Iron ore is derived from Cuba and the mines at Cornwall, Pa.,

in which latter the controlling interest is owned by the company. In 1910 the mines near Santiago, Cuba, which have been owned for the last ten years, produced 523,000 tons of hard hematite ore. The mines can be relied on for some years to produce 500,000 tons of ore annually, but future supplies will come from the new mines on the north coast of Cuba, at Mayari and Moa, which contain about 1,400,000,000 tons of iron ore. The deposit consists of a shallow blanket of ore about 18 ft. deep, covering a great area, and contains, in addition to iron, nickel and chromium, both of which elements are very desirable and valuable in the manufacture of a large variety of steel products. The ore is fine and moist, and a considerable portion of it must be dried and sintered before it can be economically transported and used in the blast furnace. In 1910 there were mined at these new properties 411,000 tons of ore. The mines at Cornwall, in which the company owns 54 per cent. interest, produced 537,000 tons in 1910, compared with 478,000 tons in 1909. Early in the year the new plant for hoisting, crushing, sorting and storing ore was put into operation. This plant has cost \$500,000, which has been paid out of earnings of the ore property. Increased production and lessened cost have resulted.

The report describes the various manufacturing plants owned by the company, as well as the railroad lines and other properties, and dwells on the great strides made in the past 10 years in securing adequate supplies of raw materials.

Chilean Buyers in New York

The Goulds Mfg. Company, 16 Murray street, New York, states that its office is temporarily being made the headquarters of Louis I. Munoz and Ramon Vidal, who represent the firm of Morrison & Co., Valparaiso, Chile, having branch houses at Santiago, Concepcion, Talcahuano and San Felipe, Chile. Morrison & Co. are engineers and general importers of hardware and engineers' supplies and are contractors to the Chilean navy and state railroads. Heretofore this firm has been conducting its business for material purchased in the United States to be shipped to its establishments in Chile through commission houses in New York, but has now decided to establish its own offices in New York, London, Hamburg, and possibly Paris, and from these branch offices will make its own purchases and make its own shipments to Chile.

The gentlemen above-named will remain here long enough to place their New York office on a satisfactory working basis, and will then proceed to London. In the meantime, it is their desire to be put in communication with manufacturers of general hardware and engineering supplies, cutlery goods, silverware, sanitary material and plumbing supplies in general, house furnishings, mining supplies, naval stores and railroad supplies. Under no circumstances will they deal with agents or jobbers; they must have direct contracts with the manufacturers. They will have their headquarters at 16 Murray street, New York, for at least a month, and those manufacturers who would like to make their acquaintance should address a letter to them in care of the Goulds Mfg. Company, asking an appointment. It is imperative that appointments be made in advance, as they have great pressure of business on hand, and so that intending visitors will not, of necessity, be kept waiting.

April Copper Production and Stocks

The Copper Producers' Association has issued its monthly statement for April as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States April 1.....	162,007,934
Production of marketable copper in the United States from all domestic and foreign sources during April.....	118,085,223
Deliveries of marketable copper during April:	
For domestic consumption.....	52,407,650
For export.....	62,129,599
Total.....	114,537,249
Stock of marketable copper of all kinds on hand at all points in the United States May 1.....	165,555,908

These figures show an increase in stocks from April 1 to May 1 of 3,547,974 lb. There was a decrease of 12,446,857 lb. in the month's production as compared with that in March.

German Automobiles

Depreciation and Repair Cost

Engineer A. Koenig, for many years appraiser in German automobile insurance affairs and at inventories of automobile stocks, writes in *Der Motorwagen* an article on the methods of figuring depreciation of pleasure automobiles. From the data he supplies an interesting comparison may be instituted between the durability of parts and equipments there and here. The German expert writes in part as follows:

"Insurance companies figure on a depreciation of 20 per cent. from the first year's use of a private automobile and 15 per cent. for each year thereafter. Some companies include the tires in the valuation, others refuse to consider them. The 'life' is figured on a basis of five or six years, that of cabs and omnibuses as four or five years. Modern automobiles have a much longer period of usefulness in reality, but their depreciation should, on the other hand, be figured on a more rapid scale and progressively, partly by reason of the loss in value by demodernization.

"The durability of parts and accessories varies greatly in the different makes of machines, yet constitutes the only basis for figuring depreciation. The amount of service given to a car, while in reality of great importance, can in practice only be averaged. The following data of durability are based on average construction and average service and in some cases give a low and a high figure corresponding somewhat to the variations found in practice:

- 1.—Varnish, upholstery, coverings and casings, rugs, mats and fenders must be replaced in one to two years. The carriage bodywork also requires some repairing in the same period. Ordinarily, replacement of the body is not required within the amortization limits; that is, the period of six to eight years over which the investment in an automobile is financially considered as extending.
- 2.—All motor bearings must be scraped, recast or replaced in one to one-half years. Gear pinions for the cam shaft, magneto and pump are to be replaced in one to three years, according to the large variations in strains, materials and service.
- 3.—A cone clutch is every year to be provided with new leather, and a multiple plate clutch demands a similar outfit.
- 4.—Brakes should as a rule every year be provided with new wearing surfaces and with new bolts for the brake rods. Chains and universal joints require annual renewal.
- 5.—The change-gear box requires usually a complete overhauling every three years, especially renewal of the driving pinion and of all bearings. Also the differential, with its bevel gears and their bearings, requires renewal within three years.
- 6.—The joints in the steering gear, the worm, balls and sockets of the ball joints must be overhauled every two years.
- 7.—Magnetos and induction coils last about two years. All cables must be renewed after the same period.
- 8.—The operating rods and gears for carburetor and ignition control, as well as for gear-change and brake control, must be thoroughly worked over every two to three years, especially by renewal of bushings in joints and bearings.
- 9.—Ball bearings in front and rear wheels last about three years.
- 10.—Wooden-spoked wheels are to be renewed in four to six years, as they finally work loose in the tenons and expand and shrink with the weather.
- 11.—Springs show greatly varying durability. Some last ten to twenty years and still show no change, while others must be annealed and retempered after two years.
- 12.—Bushings and bolts for spring eyes and shackles must be replaced every three years.
- 13.—Aluminum casings for crankshaft and transmission usually outlast the amortization period of six to eight years.
- 14.—Front and rear axles usually have a life of ten to sixteen years, barring collisions.
- 15.—The frame lasts ten to sixteen years when riveted; longer when welded.
- 16.—Radiators require thorough repair after about two years, consisting in straightening of bent tubes, cleaning of water channels, replacement of injured tubes or honeycomb sections, soldering of leaks. Complete replacement is usually advisable after four to five years. The motor bonnet is ready to be replaced in three to four years.
- 17.—Oil tanks, oil ducts and the carburetor require overhauling every two to three years.
- 18.—Gasoline tanks show an average life of six to ten years.
- 19.—The gasoline pipes and their connections are subject to repairs every one to two years.
- 20.—The water pump with its connections is to be overhauled every two years.
- 21.—The tool equipment, lamps and reflectors, the folding top, window panes, the various accessories and luxuries, such as interior lamps, speaking tube, signal apparatus, odometer, etc., may be figured to require some repair or replacement every year.

The depreciation of an automobile after a certain time of service is figured from the following three items: 1. The cost of the repairs required in order to establish the vehicle in perfect condition; 2. The share, pro rata, of the elapsed time in the cost of repairs to be expected, for the first time, in the subsequent years of the vehicle's expected life; 3. The loss due to demodernization, depending on changes in style and progress in construction since the vehicle under consideration was built.

It is common among insurance companies or for financial appraisal purposes to figure that repairs of pleasure automobiles will amount annually to 8 to 10 per cent. of the first cost; for cabs, motor trucks and delivery wagons

to 10 to 15 per cent. and for automobile omnibuses to 15 to 20 per cent., but in readily the relations between first cost and repair cost run very differently; the first cost does not afford a reliable criterion. Frequently the first year of an automobile's life gives occasion for no repairs whatever, but in the case of untried constructions the repair cost during the first year, while the designer's or manufacturer's errors are being corrected, are often higher than in subsequent years.

The average repair cost for an automobile costing 15,000 marks, without tires, runs about as follows: For the first year, 800 marks; for the second year, 1300 marks; for the third year, 2400 marks, the repairs of the first year being repeated each of the following years and new ones added. The beginning of the fourth year now presents an automobile which is practically new in all parts subject to rapid wear. At the end of the fourth year the repairs made at the end of the second year are repeated. Repairs during the fifth year would be light but for the expensive replacements of wheels and radiator which it is usually advisable to undertake during this period. The first three years, taken as a whole, average a repair cost of 15 per cent. An increase of 2 to 3 per cent. may be estimated for each of the following years, making the repairs in the fifth year amount to 20 per cent. and in the tenth year to 33 1/3 per cent. It seems practical to consider the first three to four years a closed period for which repairs should be averaged and to add 2 to 3 per cent. afterward. This applies as well to cabs and trucks and delivery wagons.

The Porceliron Stove Company

The Porceliron Stove Company has been organized at Beaver Falls, Pa., and has applied for a charter with a capital of \$25,000. It proposes to engage in the manufacture of a general line of gas and oil stoves and ranges, with other specialties, from cast iron and a new material known as porceliron. The latter is a combination of wrought iron and porcelain which is treated by a special process, made from a secret formula, and will be covered by several patents which are now pending. It has the appearance of porcelain and the strength of iron. It is especially made to resist breakage, is a non-conductor of heat and has been developed particularly for use in connection with stoves and ranges. The designs will be copyrighted. The product is a radical departure from anything in this line in the United States.

The company will occupy the building formerly occupied by the Enameled Iron Company of Beaver Falls, which is the property of the incorporators. It expects to start operations with fifty skilled mechanics and will begin operations as soon as the patterns and designs are completed. The castings required will be purchased in the open market at first, but the company expects to build a large foundry later. It will be in the market for valves and trimmings in large quantities and also for tools consisting of motors, drills, presses, grinding and polishing machinery. Its line of product is to be ready for market by fall.

A Railroad Shippers' Service.—The Kridler System, expert traffic manager, 227 B. of L. E. Building, Cleveland, Ohio, is carrying on a valuable work for shippers and receivers of freight. The idea which it is pushing is to furnish shippers with expert railroad advice and to so handle all railroad matters that such shippers may be protected against overcharges and losses in connection therewith. The concern has been in business for two years and has a complete file of railroad tariffs and other information, enabling it to carefully and correctly verify any railroad bill, to furnish rate quotations and to compile rate sheets. Judging from letters of commendation received from its clients, the Kridler System is worthy of a trial by those who are without expert service in these matters.

The Myers Pump & Mfg. Company, St. Joseph, Mo., has been incorporated with \$60,000 capital stock. It has been operating a plant at St. Joseph which it will move to a new location, and would like to hear from any city desiring to secure its plant. When a location has been selected it will erect a factory building, about 60 x 150 ft., in addition to a separate foundry building, both of which will be thoroughly equipped.

Milling Cutters and Their Efficiency*

A Comparison of the Various Types

BY A. L. DE LUCA, CINCINNATI, O.[†]

The amount of metal which a machine tool can remove in a given time is limited by the strains caused by the cut. Great hardness of the material to be cut, or a dull tool, will severely strain the machine and so reduce the section of the chip, even if the machine is rigidly constructed and well supplied with driving power. This limitation of cutting capacity occurs in all metal cutting machines, although to a varying extent. While it is possible to increase the driving power of most machines ad-libitum, and almost any amount of metal can be put into machine elements to give them rigidity, there are certain classes of machines where practical considerations limit such increase of power and strength. This is especially true in machines where the main elements have to be adjusted and handled with great frequency.

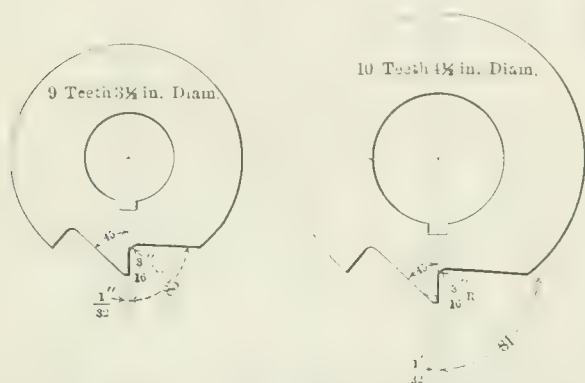


Fig. 1.—The Form of the Spiral Milling Cutters Now Used by the Cincinnati Milling Machine Company, Cincinnati, Ohio.

The knee-and-column type of milling machine owes its success to a large extent to the ease and rapidity with which it can be manipulated, and it is doubtful if it will ever be possible to increase the dimensions of the parts much beyond the present sizes, without losing the benefits of the peculiar construction of this type of machine. To increase the capacity of this type of milling machine it becomes necessary to reduce the strains set up by the cut, and there are only two elements which can be modified to accomplish this result. These are the hardness of the metal to be cut and the cutting qualities of the milling cutter. As it is impossible to control the first of these, the only avenue left for improvement leads in the direction of the milling cutter.

Experiments carried on at the works of the Cincinnati Milling Machine Company and extending over several years, starting with some isolated and almost desultory trials and gradually becoming a series of carefully planned experiments, have led to results which are believed to be of general interest. These tests embraced spiral mills; end mills, both of the shell end-mill type and the spiral taper-shank type; side mills, slitting saws, face mills and a new type of mill which for lack of a better name is called here a helical mill.

Action of Milling Cutters

The action of the ordinary milling cutter is not a true cutting action, as it is commonly understood. By a true cutting action is meant the driving of a wedge-shaped tool between the work and the chip, and although this definition is not based on a generally accepted meaning of the term, it is believed that it expresses fairly well what most mechanics understand by cutting. Practically all milling cutters have their teeth radial, and this, of course, excludes the possibility of driving a wedge between chip and work. The tooth compresses the metal until it produces a

strain great enough to cause a plane of cleavage at some angle with the direction of the cutter. It then begins to compress a new piece, push it off, and so on. This at least *seems* to be the action of the cutter, judging by the form of the chips. These chips are in the form of needles

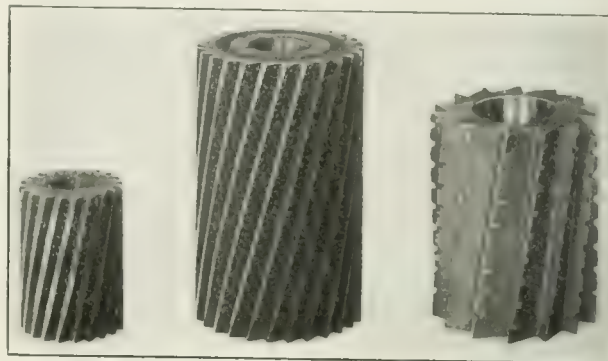


Fig. 2.—A Comparison of the Different Types of End Mills.

or small bars. The chip taken by a milling cutter varies very materially from those taken by a lathe or planer tool. These latter tools make chips of uniform section, whereas the section of a milling chip increases from zero to a maximum. This peculiar action of the milling cutter is inherent in its construction and cannot be avoided. The question, then, is how to minimize the harmful results of this action.

Another feature, which limits the ability of a milling cutter to remove metal, is the proportion between the chip to be removed and the amount of space between two adjoining teeth. Such a limitation does not exist with lathe or planer tools, where the chips have unlimited space in which to flow off. That this proportion between chip and chip space actually does form a limiting condition is well known, and was brought most forcibly to the writer's attention when a large and powerful machine stalled, taking a cut in cast iron about 1 1/2 in. wide, 3-16 in. deep and 12 1/2-in. feed per minute. Several times this amount of metal can be easily removed by the same machine without sign of stress; yet the machine was incapable of removing more than 3 cu. in. of cast iron per minute with this cut. Investigation showed that the amount of cast iron removed per tooth was sufficient to fill the chip space completely, and from that moment the action was like trying to push a solid bar of steel through a piece of cast iron. Another cutter, with more chip space, removed the same amount of metal with only a fraction of the power of the machine.

Development of New Spiral Cutters

Gradually cutters have taken the forms shown in Figs. 1 and 2. Two standard sizes are used, although other

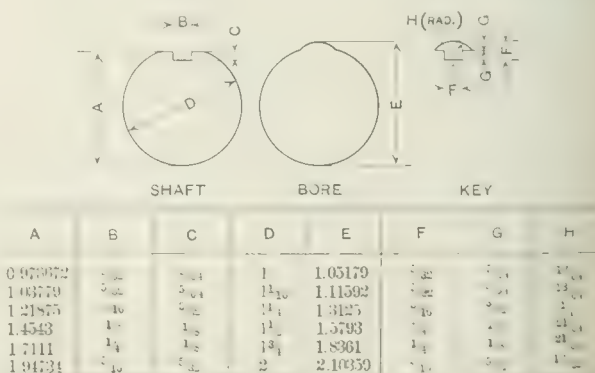


Fig. 3.—The Various Dimensions of Keys for Milling Cutter Arbors.

*From a paper to be presented at the spring meeting of the American Society of Mechanical Engineers, Pittsburgh, May 30-June 2.

[†]Mechanical Engineer, Cincinnati Milling Machine Company.

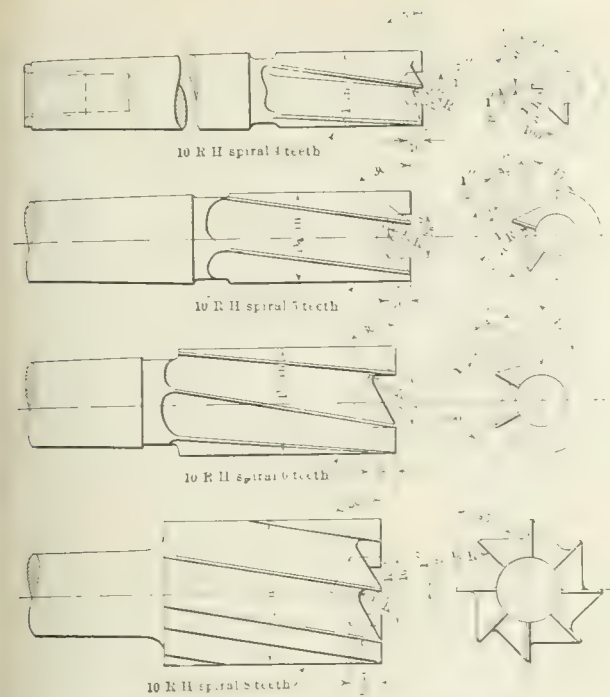


Fig. 4.—The New Type Taper Shank End Mills.

diameter cutters are made with nine and the $4\frac{1}{2}$ -in. diameter cutters with ten teeth, which corresponds to a sizes are required for special cutters and special gangs. The standard diameters are $3\frac{1}{2}$ in. and $4\frac{1}{2}$ in. The $3\frac{1}{2}$ -in. spacing of about $1\frac{1}{4}$ in. The point of the tooth has a land of 1-32 in., and the back of the tooth forms an angle of 45 deg. with the radial line. The chip space is approximately four times as great as in the usual standard cutter of the present time and is formed with a 3-16-in. radius at the bottom.

Attention should be called to the fact that present practice calls for arbors which are too small. In the cutters shown here the $3\frac{1}{2}$ -in. cutter is made with $1\frac{1}{2}$ -in. and $1\frac{3}{4}$ -in. arbor, and the $4\frac{1}{2}$ -in. cutter with $1\frac{3}{4}$ -in. and 2-in. arbor. It is often very difficult to remove cutters from an arbor after they have done heavy work. It is frequently necessary in such cases to press the arbor out of the cutters. This sticking of the cutter is caused by the burring up of the key and often the keyway in the arbor. For this reason keys are used for gangs of cutters, as shown in Fig. 3. A flat is milled on the arbor and the keyway milled central with this flat. The flat portion of the key presses against the flat part of the arbor, and this effectively prevents burring. Cutters which are held on the arbor with such a key can always be very readily removed, even after prolonged and hard work. The keys are made out of a piece of round stock, grooved at both sides and then sawed apart.

Very satisfactory results were obtained with these cutters when cuts were taken on cast-iron test blocks. A series of tests made on the left half of the block with one kind of cutter and on the right half with another cutter showed that the same amount of power was required to take a cut of $\frac{1}{4}$ in. deep and with 10.4-in. feed with a cutter of $\frac{5}{8}$ -in. pitch, and a cut $\frac{1}{4}$ in. deep and with 13.5-in. feed but with a cutter of $1\frac{1}{8}$ -in. pitch.

Though increased capacity for removing metal is one of the main advantages of this form of cutter, there are others of considerable importance. It was found that for roughing on the ordinary work in the shop a cutter with the wider-spaced teeth would remain sharp for a longer period, notwithstanding that feeds had been increased. The system of the Cincinnati Milling Machine Company requires all gangs and cutters to be resharpened after a lot of pieces has been milled. It used to be necessary, at least on the larger lots, to resharpen the gang once and sometimes twice for one lot, or if this was not deemed advisable the feed had to be reduced for at least part of the pieces, in order to make the cutter last during the entire lot. In all cases where the wide-spaced cutters were used the entire lot was run through without resharpening the cutter or reducing the feed; and it should be kept in

mind that this feed was from 25 to 100 per cent. greater than previously used. There is no case on record where the cutter or gang was dull at the end of the lot, so that our observations as to the endurance of the cutters are incomplete. However, it is perfectly safe to say that in all cases under observation the cutter maintained its sharpness longer; that in a great many cases double the amount of work could be done without resharpening, and that there is good reason to believe an even greater gain than this was obtained.

A further advantage is that as these cutters have approximately only half the number of teeth of what is now considered a standard cutter the time for resharpening is only half as much. It was pointed out that the ratio of pitch to depth is practically the same as in the present standard cutter, so that the depth of tooth is practically doubled, and this cutter can be sharpened much more frequently than the present standard cutter. Consequently the life of the cutter has been much increased, probably more than doubled.

A glance at the drawing of these cutters gives the impression that the teeth are weak, and the writer has watched this feature with great care. The cutters themselves do not give this impression; on the contrary, they look stout and well proportioned. They have been subjected to the heaviest class of work and many times were purposely abused in order to find their weak points; yet there is no case on record that any of them have broken, although they have been used for more than two years, and all breakages of cutters are carefully noted. On the other hand, breakages of the old cutters are not at all infrequent. Though these cutters are capable of removing metal more rapidly than the older type of cutter, there are many cases where this feature cannot be taken advantage of, as where light work is to be done or a small amount of stock is to be removed. In such cases the metal is removed with less power and consequently with less strain on the machine, and the life of the machine is lengthened without limiting its output. With the wide spacing of the teeth it may seem that there would be cause for apprehension as to the action of the feed, which might act with jerks. This is not the case, and, on the contrary, the feed is smoother and there is less of a jerk when the cutter first strikes the work, probably because there is less spring in the arbor and less tendency for the cutter to ride over the work.

When cast iron is milled by these wide-spaced cutters it

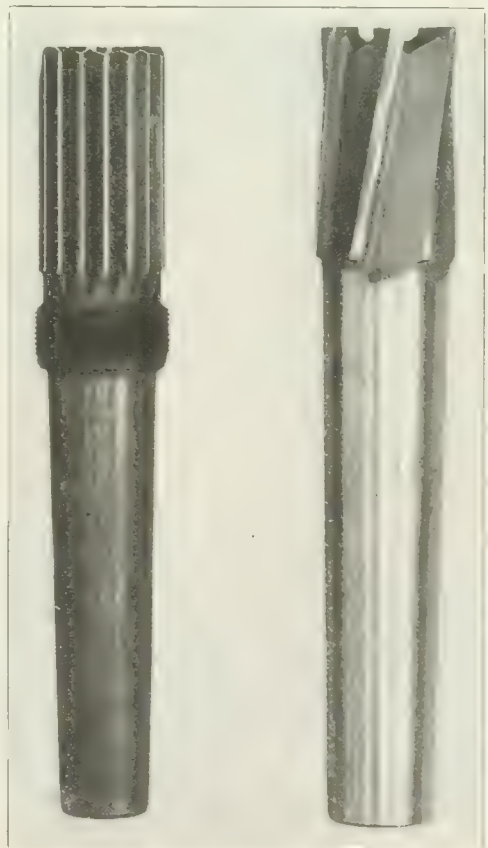


Fig. 5.—The New and the Old Style End Mills.

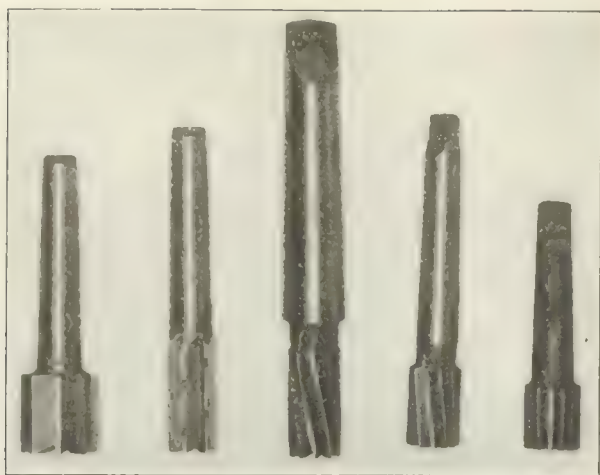


Fig. 6.—Some New and Old Style End Mills Compared.

appears to be very soft, and when the same piece is milled by an old-style cutter it appears to be much harder. When using the wide-spaced cutter there is a notable absence of jerking, chattering and of the peculiar singing noise which is so often noticed on milling machines. There is a difference in the hardness of different pieces of cast iron, and many recommendations as to the proper feeds and speeds for milling cast-iron work, made by the writer for his company, were looked at askance. The impression seemed to prevail that feeds and speeds which were possible on American iron were out of the question on European iron (especially English and German); and again, that feeds and speeds proper for western American iron were not suitable for eastern iron. To test the truth of the matter a number of bars of cast iron were obtained from different foundries in America, England, France and Germany. These bars covered a great many mixtures and makes, and the difference between English and American, or German and American iron, or between eastern American and western iron, was found to be no greater than that between different specimens of western American iron. Even German Spiegeleisen, famous for its hardness, cut just as freely as soft western iron and required but little more power. However, it did require more clearance, wide spaces and a low speed.

Use of Chip Breakers

These wide-spaced cutters were originally intended for roughing operations only, but the very satisfactory finish obtained when roughing led to their use for finishing also. If there is any difference at all in the finish produced the advantage is on the side of the wide-spaced cutter. It is generally believed that for finishing alone a milling cutter should be used without chip breakers, the effect of the chip breaker being to scratch the surface. To overcome this trouble chip breakers with clearance at both corners are made. This prevents the tearing up of metal, with the result that a cutter with these chip breakers produces as good a finish as one without chip breakers. This form of chip breaker has an advantage also for roughing cuts. The point of the cutter, where the unrelieved side of the chip breaker drags over the work, is the first point to give out, and making the chip breaker with clearance on both edges prolongs the life of the cutter.

One of the great advantages of this form of chip

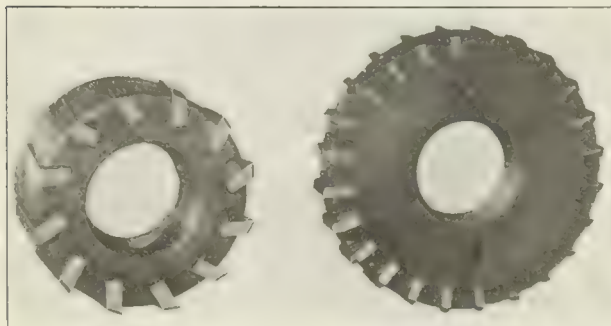


Fig. 7.—A Comparison of High Power and Regular Face Mills.

breaker is that one gang can be used for both roughing and finishing. A great many, if not most milling operations, call for two chuckings, one for roughing and one for finishing. This will be found to be necessary wherever much metal is to be removed, on account of distortion caused by the cut, the heavy clamping required, heating, spring of arbor or fixture and the unbalanced condition of the work after the scale has been removed on one side. To do the roughing as rapidly as possible chip breakers are required, and to get proper finish it has heretofore been necessary that the finishing gang be without chip breakers. It paid, therefore, to have two gangs whenever the number of pieces to be milled was sufficiently large, but this involved considerable extra expense for cutters. The new form of chip breaker, however, permits using one gang for both finishing and roughing.

It is a common belief that better finish can be obtained with teeth closely spaced, but experience with the wide-spaced cutters shows that there is no ground for this

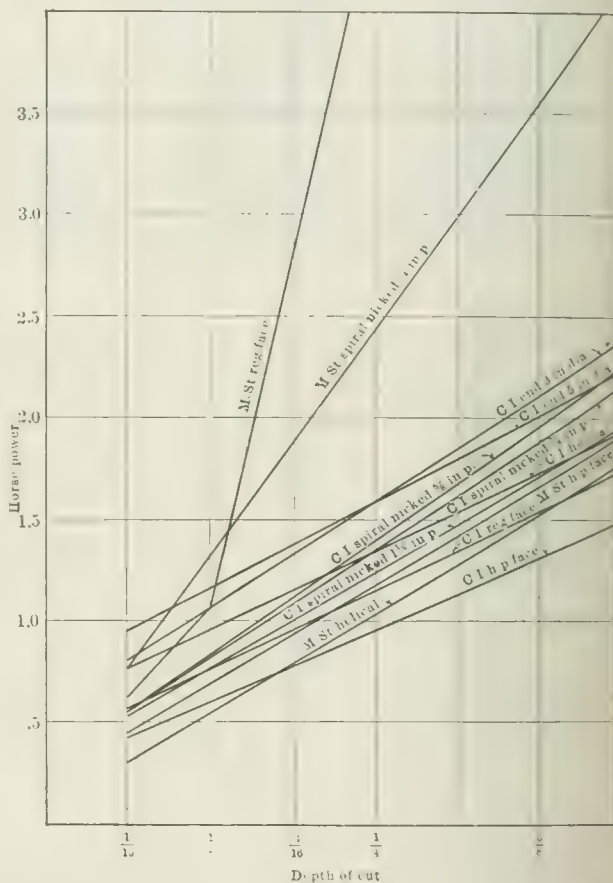


Fig. 8.—Efficiency Test Curves of Different Cutters Operating with a Feed of 4 In. per Minute.

belief. The grade of finish may be expressed by the distance between successive marks on the work, which are revolution marks and not tooth marks. It is practically impossible to avoid these revolution marks, which are caused by a number of things, each very small in any good milling machine, and yet the accumulation of these little errors is sufficient to cause a mark that needs to have a depth of only a fraction of a thousandth of an inch to be very plainly visible. As these marks are caused by conditions which return once for every revolution of the cutter it is plain that the spacing of the teeth can have no effect on the distance between them and, therefore, on the grade of finish.

To test this still further two cutters of the same size exactly were placed side by side on an arbor. The cutters were ground together so as to be sure they were of equal diameter, and they were ground on the arbor so as to be sure that the error would appear simultaneously for both cutters. A block of cast iron was finish milled with these cutters in such a way that each cutter would sweep half the width of the block. The same number of marks appeared on both sides of the block, and these marks were exactly in line with each other, as might have been expected. The grade of finish was the same for both sides.

It was neglected to mark the two sides of the casting to show which cutter was operating. After this test all of the teeth but one of one of the two cutters were ground lower, so as to be out of action entirely, leaving only one tooth of the one cutter operative. Another cut like the first one was taken over the same block, and again the finish appeared the same on both sides. There was a difference of opinion between different observers as to which side was cut by the single tooth. By close observation, however, a difference could be detected when light fell on the work in a certain direction, under which conditions one side showed more gloss than the other. Straightness, flatness and smoothness to the touch were exactly the same for both sides, notwithstanding that one cutter had one tooth only and the other fourteen teeth. Though it is not recommended here to use cutters with one tooth only for finishing, the foregoing test shows plainly that there is no merit in fine spacing. Attention is again called to the fact that even though the finish on a single piece *might* be better with more teeth in action, the *average* finish for an entire lot of pieces is better with less teeth.

Comparison of Old Style and New Style End Mills

Figs. 4, 5 and 6 show the end mills which are now considered standard by the Cincinnati Milling Machine Company and which fill practically all requirements. They are made in sizes of 1 in., 1¼ in., 1½ in. and 2 in. in diameter, the smallest with four and the largest with eight teeth. It will be noticed that in order to preserve the strength of the teeth it is necessary to mill the back of the teeth of the three smaller sizes with two faces. A number of tests have been made with these cutters, but no comparative tests as to power consumption. Their action is remarkably free. This was clearly demonstrated by the following experiment: A 2-in. taper shank end mill milled a slot 1 1/16 in. deep in a solid block of cast iron at a rate of 6 in. per minute. The block was clamped to the table of the milling machine and the knee was fed upward. Under these conditions the chips did not free themselves from the cutter, but were carried around and ground up. The cutter was cutting over half its circumference. These two conditions combined make the task for the milling cutter about as difficult as is imaginable. There was, however, no sign of choking, and the power consumption was not higher than it would have been with a spiral mill under ordinary conditions. The same cutter would remove from the end of the casting a section 1½ in. wide and 1½ in. deep. Under those conditions the chips would free themselves from the cutter, and these chips were rolled up in pieces much like the chips obtained from a broad planer tool when taking a finishing cut. This cut was taken with a feed of 11 in. per minute. Another similar cut, but 1 in. by 1¼ in. in section, was taken with a feed of 33 in. per minute. Similar though much lighter cuts were taken with ordinary end mills, and in the same piece of cast iron. Again the cast iron seemed to be very hard and became glossy when cut with an ordinary cutter, but appeared to be soft when cut with the wide-spaced cutter.

Face mills have also undergone a gradual evolution, and they are now used by the company and catalogued, though not made for use of customers. In Fig. 6 a new-type face mill is shown at the left and at the right a mill of the old or regular type.

However accurately a milling machine may be built the spindle is not exactly at right angles with the table. The amount of variation is very small in a properly built machine, but some exists and is likely to become greater when the machine wears. The result is that when feeding in one direction the leading teeth of the cutter dig deeper into the work, leaving the other side of the cutter entirely clear, but when feeding in the opposite direction the opposite takes place, which makes the teeth drag over the work. In order to provide the teeth with clearance the back end of the tooth is ground away at an angle of 3 to 5 deg., and there is a land of 3/16 in. only where the blade is straight.

It is the excess of width of the cutting blades which is liable to cause chatter, which, strange as it may seem, is more pronounced with a light than with a heavy cut, because the tooth does not enter the work, but tries to ride over it. When the cutter has been lifted sufficiently the pressure becomes great enough to make the blades enter.

This action causes a series of radial chatter marks, and is very much worse with wide blades than with narrow ones, and again, very much worse with a large number of blades than with a few. A 3/16-in. land proved to be an acceptable compromise, as a wider land would quickly dull the cutter, even if it did not make a chatter mark, while a narrower land would have the tendency to produce a scratchy finish.

The New Helical Cutter

The new helical cutters developed by this company consist of a cylindrical body with two or three screw threads wound around it at an angle of 69 deg. with the axis. The diameter is 3½ in. and the lead of the helix 4¼ in. They are made in two styles, either single or as interlocking right and left hand cutters. They are made with a rake of 15 deg. and clearance of 5 deg. when used for steel, and with a rake of 8 deg. and clearance of 7 deg. when used for cast iron. Their most distinguishing feature is that they push the chip off in the direction of the axis of the cutter, or at right angles to the feed. The power

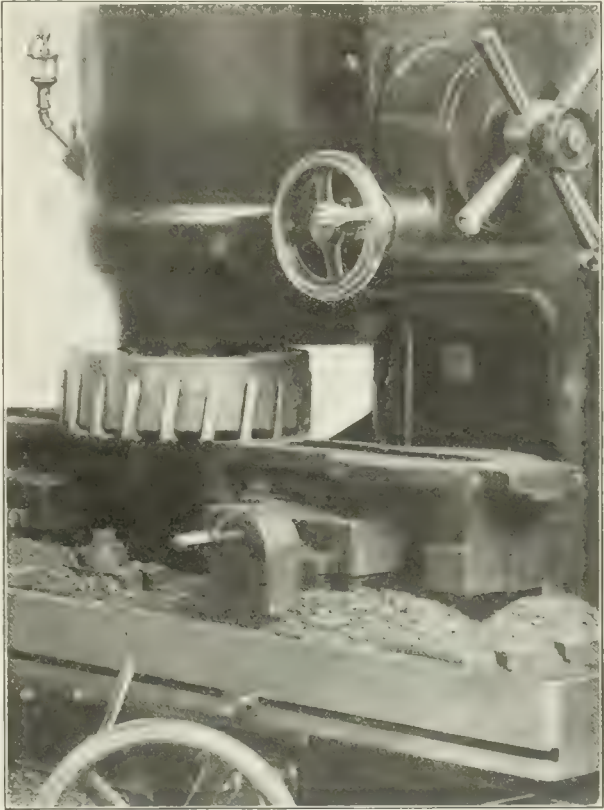


Fig. 6 A High Power Face Mill Roughing Vise Body Bottoms, One Piece Being Chucked While the Other Is Being Operated On.

consumption is extremely low for steel, but does not show up so favorably for cast iron. A roughing cut in steel requires only about one-third the power of an old-style spiral mill.

Another distinguishing feature is that this cutter does not make revolution marks, but tooth marks. As a result a much coarser feed can be used for finishing. A cutter with three teeth will allow of a finish three times as fast as an ordinary spiral mill. Still another feature of this cutter is the entire absence of spring in the arbor when cutting steel. It is possible to take a finishing cut over a piece of steel, then return the work under the cutter and let the cutter revolve any length of time without producing a mark.

It was originally thought that a single cutter of this description would do well for finishing, but not for roughing, on account of the excessive end pressure on the spindle and the interlocking cutter was made to obviate this end pressure. However, it was found that this end pressure, though perceptible, was no disturbing element. Cuts which required 80 amperes with the interlocking cutter required 85 amperes with the single cutter. In order to see if continued use of the single cutter would cause increasing friction at the spindle end, a great number of cuts were taken in as rapid succession as it was possible

to adjust the machine for the next cut. The fact that there is no spring in the arbor makes it possible to use the milling machine without braces in a great many cases where they would otherwise be needed.

The chips come from the work in the form of gimlets, the back of the chip being polished or burnished, and the surface of the work shows no sign of tearing of the metal. It was first believed that these cutters would work best at a high speed, but it was found that this was not the case. They produce the best results when run at the same number of revolutions as the ordinary spiral mill.

The writer believes that remarkably low-power consumption is due to what might be called virtual rake, which is an angle depending on the angle of rake and on the angle the thread or tooth makes with the axis. This virtual rake becomes a small angle when the actual rake is small, as is the case with the cutter used for steel, where the actual rake is 75 deg. Where, however, the angle of rake approaches 90 deg. the influence of the helix becomes very much less pronounced, and if the actual rake were 90 deg. the influence of the spirality would be zero; in other words, the virtual would equal the actual rake. This may explain why the saving in power consumption is not so pronounced when cutting cast iron. It is believed that this saving of power would be equally great with cast iron as with steel if the same virtual rake could be obtained, and this supposition was borne out by a few tests made on cast iron with a helical cutter ground for steel. The fact, however, that the edge of the cutter would not stand up made it impossible to extend the tests far enough to come to a safe conclusion.

Another reason which suggests itself to the writer as to why the helical cutter shows less saving in power on cast iron than on steel, is the result of a series of tests made on cast iron and steel with spiral mills with and without rake, the rake being in all cases 9 deg. These cutters showed improved efficiency for steel and cast iron, but much more for the first than for the latter. A cutting tool must detach the chip from the work, bend the chip and at least partially break it up. When cutting steel the radius of curvature of the chip becomes greater with increased rake and the extent to which the chip is broken up becomes less. Cast iron will stand much less bending before breaking, so that even with increased rake the chip is still broken up as before, and no saving in power can be effected in this part of the process.

Efficiency of Different Cutters

Fig. 8 is a diagram comparing the performance of different styles of cutters for different materials and the different depths of cut, with feeds of 4 in. per minute. It will be noticed that all lines are practically straight, with the exception of the line for the regular face mill when cutting machinery steel. This line makes a sharp turn, which is believed to be due to the fact that the blades of this face mill did not project far enough beyond the body. As cast-iron chips were crumbled up the effect was not noticeable for cast iron, but became quite important for machine steel. This diagram shows that for cutting cast iron the high-power face mill is the most efficient. Then comes the regular face mill, then the spiral mill with 1½-in. spacing, then the spiral mill with ¾-in., then the spiral mill with 5⁄8-in. spacing. The 5-in. and 3-in. end mills come last in efficiency. These mills are of the old type, with relatively fine spacing. The order of efficiency of the different cutters is somewhat different for machine steel. The helical mill comes first, then the high-power face mill, then the spiral mill with ¾-in. spacing (no tests were made with spiral mills with 5⁄8-in. and 1½-in. spacing on machine steel) and finally the regular face mill; but it should be noticed that if the curve for this mill had continued the way it started it would have been below the curve for a spiral mill.

Railroad Equipment Orders.—The Seaboard Air Line has ordered 1,000 box cars, 200 phosphate cars and 30 caboose cars. The Pennsylvania Railroad Company will build 81 steel cars at Altoona. The Pere Marquette has placed 12 coaches and 2 combination cars with the Pullman Company. Locomotive orders include 16 for the Missouri, Kansas & Texas, 25 for the Seaboard Air Line and 10 for the B. & O. The Pennsylvania will build 77 locomotives at its Altoona shops, and the Norfolk & Western 12 Mikado locomotives at its shops.

The Determination of Manganese in the Presence of Chromium

BY THOMAS C. WATTERS.*

*Chemist, Columbia Tool Steel Company, Chicago Heights, Ill.

The accurate determination of manganese in high speed and air hardening tool steel or in any alloy steel containing chromium has given the metallurgical chemist considerable trouble, both in the volumetric and color methods. This is due to the fact that in oxidizing the manganese to permanganic acid part of the chromium present is oxidized to chromate and has an action similar to that of the permanganate upon reducing agents used in volumetric determinations; and in the color method the yellow color of the chromate interferes with the pink produced by the manganese and destroys its accuracy. We are using a method in our laboratory, which is a combination of the Volhard and bismuthate methods and are inclined to think the application original.

Two grams of drillings are dissolved in 20 c.cm. of sulphuric acid (1.2 sp.gr.), enough water being added from time to time to keep the iron sulphate in solution. The solution when complete is oxidized by adding 5 c.cm. of nitric acid (1.32 sp.gr.) and then evaporated until fumes of sulphuric acid are given off and the carbonaceous matter is destroyed. Water to the amount of 100 c.cm. is added and the solution of the ferric sulphate effected by boiling. The liquid and residue are washed into a graduated 500 c.c. flask and a solution of sodium carbonate added until the solution becomes dark in color and the precipitate formed by the addition of the carbonate dissolves with difficulty. An emulsion of zinc oxide and water is run into the flask a little at a time and the flask shaken after each addition until all the iron and chromium have been precipitated. The volume is then made up to 500 c.cm. with water and the precipitate allowed to settle. Then 250 c.cm. (equivalent to 1 gram of sample) of the supernatant liquid is decanted, following which come a dry filter and transfer to an Erlenmeyer flask.

The solution is acidified with 25 c.cm. of nitric acid (1.32 sp.gr.) and one gram of sodium bismuthate is added. It is well to shake the flask for several minutes after the addition of the bismuthate and then allow the residue to settle for a few minutes, after which it is filtered through asbestos, the filter pump being used. The flask and filter are washed with water containing a little nitric acid until free from the pink color of the permanganic acid. The filtrate is transferred to a beaker and a measured volume of ferrous sulphate solution, in excess of the permanganic acid, is dropped into the solution to reduce it; its excess is titrated with a standard solution of potassium permanganate until a delicate pink color is obtained. The ferrous sulphate solution should be made equivalent in strength to the permanganate. The difference between the number of c.cm. of ferrous sulphate solution added and the number of c.cm. of permanganate used to titrate the excess will give the number of cubic centimeters of permanganate which are equivalent to the manganese in the steel. By multiplying the number of c.cm. of permanganate found by its manganese value the weight of manganese in the sample is found.

A solution of convenient strength for steel of low manganese content is made by dissolving one gram of potassium permanganate to a litre of water. It is standardized in the usual way, either with iron wire or ammonium ferrous sulphate, to find its exact value per c.cm. in iron. Its iron value multiplied by the factor 0.1068 gives its value in manganese.

The ferrous sulphate solution may be made of such a strength as exactly to equal the permanganate solution; or if not quite equal in value, a blank titrate is made and its value in c.cm. of the permanganate solution found. Fifty c.c. of sulphuric acid to the litre will keep the ferrous sulphate from crystallizing out of solution.

I trust that this method of determining manganese in the presence of chromium may prove of value where it is desired to combine accuracy with reasonable speed.

The Titusville Forge Company, Titusville, Pa., manufacturer of iron and steel forgings, making a specialty of hammer forgings, has recently installed a large forging press. The company's equipment is modern in every way, enabling it to contract on a large variety of work in quantities.

Dry Air Blast at a British Furnace Plant

At the blast furnaces of the Brymbo Steel Company, Ltd., in North Wales, Great Britain, a refrigerating plant has been installed recently for furnishing dry air blast, the power being derived from the exhaust steam of the blowing engine. The *London Iron and Coal Trades Review* gives the following data concerning the absorption system used in refrigeration:

The essential elements of the system are shown diagrammatically in the illustration. Ordinary liquor ammonia is placed in the generator and heated by means of steam. The ammonia gas in solution is driven off by the heat of the steam and passes into the condenser, which may be either of the shell or atmospheric type, where it is cooled and liquefied. From here the liquid is allowed to escape into the evaporator, where it evaporates back into the gaseous form, producing intense cold, the gas so formed passing into the absorber. At the same time the liquor in the generator from which the ammonia gas is driven off, called "weak liquor," is allowed to escape slowly into the absorber, which is kept cool, and there it meets the gas coming from the evaporator and rapidly absorbs it. A strong solution of ammonia is thus formed, which is pumped back into the generator to be heated and the ammonia again driven off and used over again, the proc-

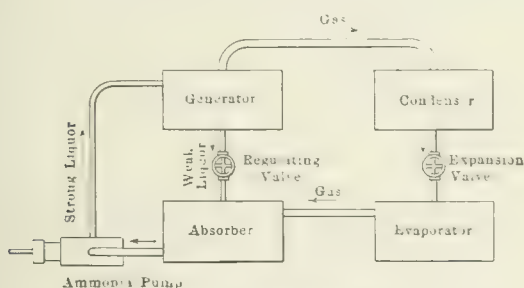


Diagram of Refrigerating Plant.

ess thus going on continuously. In practice, additions are made to the above with the object of increasing the efficiency of the apparatus. The ammonia gas, before entering the condenser, is made to pass through an analyzer and rectifier, where the water vapor is condensed and passed back into the generator. A heat economizer is also provided to cool the weak liquor before it enters the absorber, and at the same time heat the strong liquor before it enters the generator.

The evaporator may either be of the shell or continuous pipe coil type. In this the heat is abstracted from the air to be cooled, by evaporation of the anhydrous ammonia. The air is dried on its way to the blowing engine by drawing it over the cooling coils. In this way the moisture contained in the air is deposited and frozen on to the pipes. The frost is thawed off sections of the coils at regular intervals by the incoming air while the sections are cut off the machine. The use of brine is dispensed with, both for abstracting the heat and moisture and for thawing off purposes. The cost of maintaining the strength of brine by constant evaporation or by the frequent addition of calcium is also entirely avoided.

It is impossible at the present moment to determine the exact benefit of the recently installed plant, as it has not been long enough in operation, although the indications even now are most favorable. As far as the refrigerating plant is concerned, this has worked most successfully right from the start, the moisture in the air being kept constantly below 15 grains per cu. ft. The refrigerating machine has been working continuously with a steam pressure of only 1 lb. per sq. in. In many cases where the steam is at present passed into a condenser from a steam-driven plant, a much better result would probably be obtained by substituting one of these machines for the condenser and making use of the latent heat of the steam for refrigerating purposes. To work these machines with low-pressure steam very liberal surfaces have to be provided, and consequently the first cost is rather more than for certain makes of compression machines. As only a small liquor-circulating pump is required, apart from the water supply, they are almost without working or wearing parts. They are therefore specially suited for long continuous running, and by duplicating the ammonia pump

practically all the advantages of duplicating an entire compression machine are secured.

The suggestion sometimes made that absorption machines require more cooling water than compression machines is not correct if the latter are provided with an adequate supply of water. In some cases, however, when a proper water supply cannot be obtained, compression machines are fitted with ammonia condensers of the "evaporative" type, whereby the bulk of the water is used over again. By this means the condensers fulfil the double purpose of condensing the ammonia and re-cooling the water. The economy is, however, secured at the expense of greatly increased power required to drive the compressors, due to the higher temperature of the water going over the condensers. When it is desirable to economize the water separate water re-coolers are used, which cool the water much more effectively. The extra cost of this type of cooler is soon repaid by the saving in fuel consumption alone.

The American Institute of Mining Engineers

Among the papers to be read at the one hundredth meeting of the American Institute of Mining Engineers, to be held at Glen Summit Springs Hotel, near Wilkes-Barre, Pa., June 6 to 9, are the following:

"Origin of Iron Ores of Central and Northeastern Cuba." By C. K. Leith and W. J. Mead, Madison, Wis.

"Occurrence, Origin and Character of the Surficial Iron Ores of Camaguey and Oriente Provinces, Cuba." By Arthur C. Spencer, Washington.

"The Mayari and Moa Iron-Ore Deposits in Cuba." By C. Willard Hayes, Washington.

"Exploration of Cuban Iron-Ore Deposits." By Dwight E. Woodbridge, Duluth, Minn.

"The Iron-Ore Deposits of the Moa District, Oriente Province, Island of Cuba." By Jennings S. Cox, Jr., Santiago de Cuba, Cuba.

"Characteristics and Origin of the Brown Iron Ores of Camaguey and Moa, Cuba." By Benjamin L. Miller and Willard L. Cummings, Bethlehem, Pa.

"The Fuel Efficiency of the Iron Blast Furnace." By John Jeremiah Porter, Cincinnati, Ohio.

"Briquetting Plant of the Lehigh Coal & Navigation Company." By Charles Dorrance, Jr., Lansford, Pa.

An informal meeting of members and friends of the institute was held at the United Engineering Society Building, 29 West Thirty-ninth street, New York, on the evening of May 8, at which Jennings S. Cox, Jr., general manager of the Spanish-American Iron Company, delivered a most interesting address on iron ore mining in Cuba, illustrated by a large number of photographs. The meeting was well attended, and President Charles Kirchhoff states that it is the intention to arrange for similar gatherings in the future, in order to promote a more active intercourse among the members of the institute.

The Newark Foundrymen's Association

The Newark Foundrymen's Association, Newark, N. J., met on the evening of May 4 and after the usual dinner held its annual election, with the following result: President, Franklin Phillips, Hewes & Phillips Iron Works; vice-president, James Flockhart, Maher & Flockhart; secretary, Arthur E. Barlow, Barlow Foundry Company; treasurer, G. Hanney, Oscar Barnet Foundry Company; executive committee, James Flockhart, James Morrison, Morrison Foundry Company; Thomas Malcolm, Riverside Steel Casting Company; Louis Sacks, Star Heel Plate Company; S. M. Miller, Meeker Foundry Company. Mr. Hanney, who has served as treasurer of the association since its organization, and without compensation, was presented with a handsome scarf pin by his fellow members. After the election the members and their guests listened to an address by H. M. Lane, editor of *Castings*, on "The Action of Core Binders," which was illustrated by lantern slides and samples of his experiments.

The Champion Ice Machine Company, Springfield, Ill., has been incorporated with \$200,000 capital stock. It will manufacture ice machines for use in private residences, and will erect a factory but has not decided whether it will locate in Springfield or elsewhere. The machines will be manufactured under contract for the present. The company states that it will probably not be in the market for equipment until some time this fall. T. M. Dolan, of the Illinois Plumbing & Heating Company, is president of the company.

Molding a Cone Pulley on an International Turn-Over Machine

By Employing It the Cost Was Materially Decreased

The molding of a cone pulley by machine is more difficult probably than is generally imagined, and for that reason the use for that purpose of a turn-over draw design molding machine built by the International Molding Machine Company 2300 South Western avenue, Chicago, Ill., is interesting. The machine was recently installed in

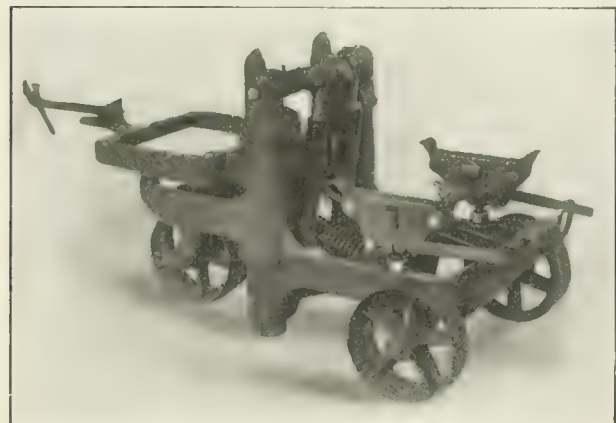


Fig. 1.—The Turn-Over Molding Machine Built by the International Molding Machine Company, Chicago, Ill.

the foundry of a large eastern builder of machine tools, and in making the pulley the mold was turned over on the receiving table and the pattern drawn up out of the mold. In this particular foundry especially good results have been secured with this pattern, and the cost of making the mold, it is stated, was reduced 62½ per cent.

Fig. 1 shows the machine before the pattern was mounted and Fig. 2 is a view of the machine after the pattern board, with the pattern attached, had been fastened to the turn-over frame. In Figs. 3 and 4 the next two stages in the preparation of the mold are illustrated, Fig. 3 being a view after the flask has been rammed up and clamped with the bottom board to the turn-over pattern frame, and in the other engraving the mold has been turned over and the pattern drawn. The position of the machine after the flask has been lifted out and the pattern frame swung back preparatory to making another mold is illustrated in Fig. 5.

The turn-over frame, which gives the machine its name, is mounted upon a horizontal steel shaft and revolves with it. Both ends of this shaft have heavy cast-

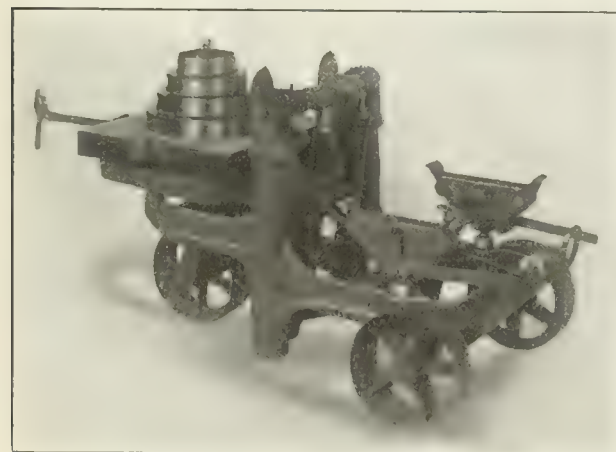


Fig. 2.—The Pattern Mounted on the Turn-Over Frame.

iron bearings with circular openings drilled in their underside. Parallel steel uprights are fastened into these openings and travel in the circular columns of the main frame of the machine, which control the action of the shaft raising the pattern frame. On account of the accuracy re-

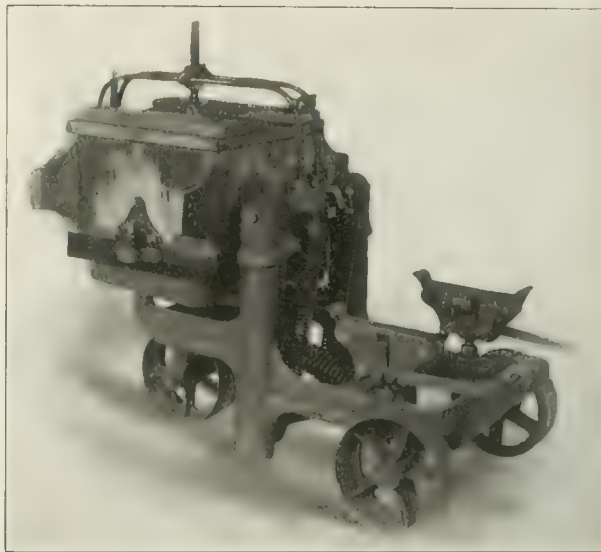


Fig. 3.—The Machine After the Flask Has Been Rammed.

quired for this work, the columns are drilled by a templet and have brass bushings extending their entire length, the diameter of these bushings corresponding exactly to that of the steel shafts which they engage. Pressing the foot lever, which is located in a convenient position in front of the machine, draws the pattern as illustrated in Fig. 4. Connection between this foot lever and the shaft supporting the turn-over frame is made by a heavy cast-iron crank and connecting rod.

The size and strength of the turn-over frame balance springs, together with the manner of attaching and fitting them, are calculated to secure perfect equalization of the leveling device. This equalization is secured by having four contact points, each acting independently of the other. This arrangement counterbalances the weight of the frame with the pattern board and the pattern, as shown in Fig. 5, and relieves the operator of exertion in turning the mold over.

The flask used for making this mold is of necessity a deep one from the shape of the pattern, and in designing the machine provision was made for this feature by locating the ramming bed close to the floor. As the pattern should be practically free from draft, it is necessary for the machine to draw the pattern in an absolutely straight line, and the way in which this is accomplished is shown in Figs. 3 and 4 by the change in the position of the pattern-carrying frame and the frame shaft and bearings.



Fig. 4.—View Showing the Pattern Drawn from the Flask.

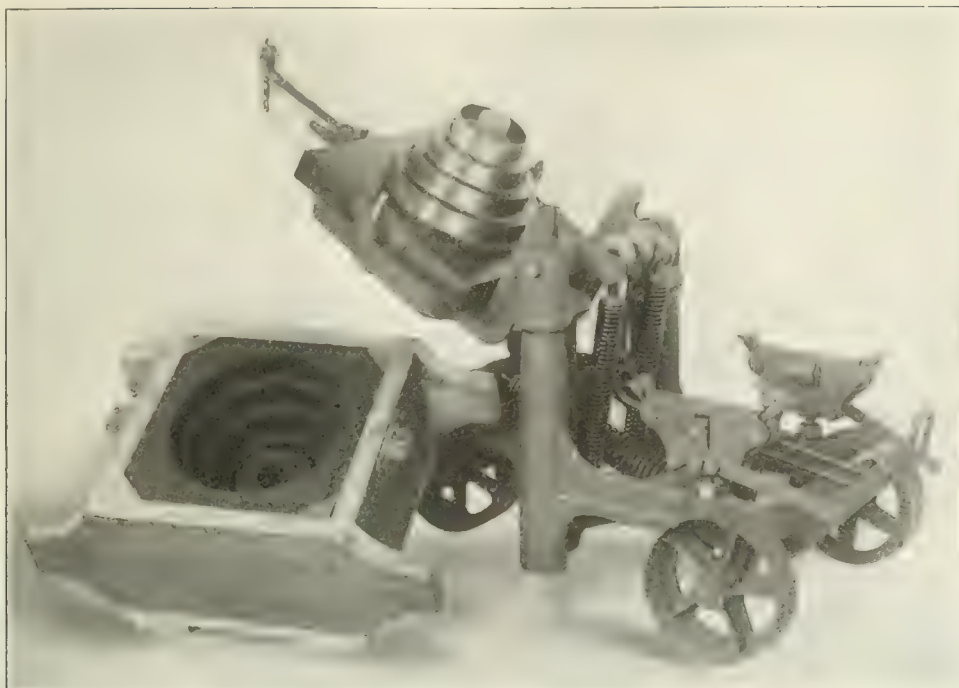
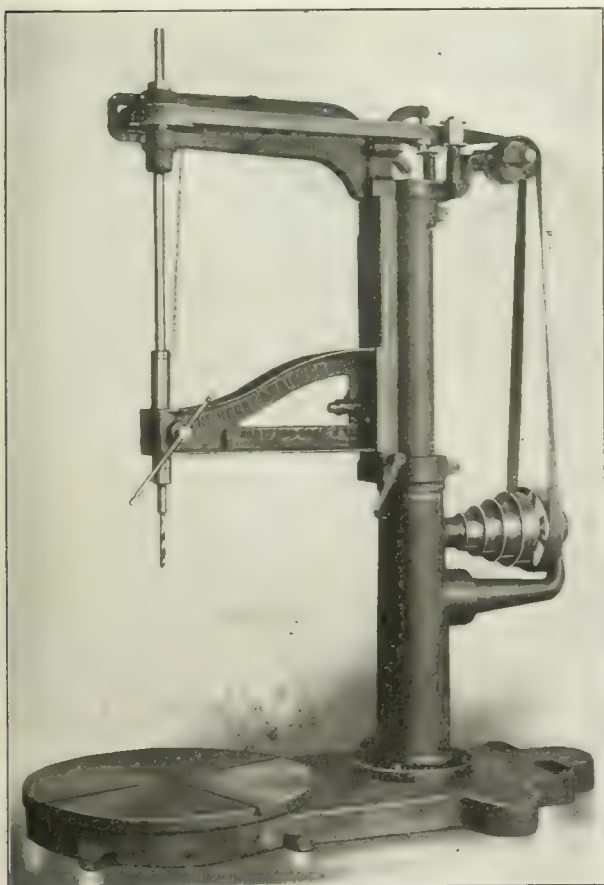


Fig. 5.—The Machine Ready to Make Another Mold

A New Henry & Wright Radial Drilling Machine

For driving drills that depend for their efficiency more on the speed at which the work is done than the rate of feed the Henry & Wright Mfg. Company, 111 Sheldon



A New Light High-Speed Radial Drilling Machine Built by the Henry & Wright Mfg. Company, Hartford, Conn.

street, Hartford, Conn., has designed a new light, high-speed, radial drilling machine. It has been found efficient for drilling bulky parts with the smaller sizes of drills, and crossing the arm with the circle of the table, it is

claimed, enables the operator to find any drilling position in a small fraction of the time required with the other types of machines.

The power supplied to a machine of this character has to be divided into two portions, one for rotating the drill and the other for feeding it into the work. For drills $\frac{1}{2}$ in. in diameter or less it is emphasized that it is economical to divide the power so that the greater part is used in the first way. With a $\frac{1}{2}$ -in. drill the power should be equally divided between the two, while above that point the power must be used in an increasingly greater proportion for feed and in a correspondingly less one in the form of speed. For this reason machines driving drills having larger diameters than $\frac{1}{2}$ in. must be stiffer and heavier than those employed for driving the lighter ones, and are heavy, slow, expensive and inefficient, comparatively speaking, when using drills less than $\frac{1}{2}$ in. in diameter.

The new radial drilling machine is driven by a 2-in. belt and is designed to drive drills up to $1\frac{1}{8}$ in. in diameter. In this field it is claimed that the machine will be found much more efficient than the heavier machines, as the drills can be driven at a much greater speed than is possible with the more powerful machines, while at the same time only a fraction of the power consumed by the larger machines is used. Eight spindle speeds are available, and, in addition to drilling, the machine can be used to tap holes up to a maximum of $\frac{1}{2}$ in. Ball bearings are employed throughout, including the swinging column, and both the column and the table are equipped with locking screws so that they may be kept in any desired position.

One of the special features of the spindle drive is that the driving pulley is located about midway of the column, instead of at the top. In this way a shorter and stiffer spindle can be used, and the spindle pulley is inclosed by a bracket to eliminate as far as possible all belt strains, except a rotary one, from reaching the spindles. The overhang of the arm is 30 in., but the table, which revolves on ball bearings, permits the operator to reach a point 60 in. from the column by swinging the table with his foot.

The equipment of the machine includes a countershaft with a clutch and sub-table for handling small parts.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has recently ordered four 9-retort Taylor gravity underfeed stokers to be used with four 800 h.p. boilers. They are to be installed in the Commerce street plant in which stoker experiments have been carried on for a long period.

The White Star Individual-Continuous Oiling System

A New Lubricating Arrangement for Engines, Pumps and Air Compressors

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., has developed and recently placed on the market the White Star individual-continuous oiling system. This arrangement is to meet the demand for an individual oiling system for use where a central oiling system cannot be operated advantageously or where only a single engine, pump or air compressor is installed. Two sizes of system are built, one of which provides for the lubrication of engines up to a maximum of 250 hp. and the other for engines ranging from that figure to 500 hp., the latter being the one illustrated in Fig. 1. Figs 2 and 3 show two of the special features of the system, the former being a sectional view of the filter while the latter illustrates the automatic drain tank.

The essential parts of the system are an oil filter, an automatic drain tank, a pump for circulating the oil through the system and the necessary sight feeds, tubing and compression fittings. The engine type of oil filter, a sectional of which is given in Fig. 2, is cylindrical in form and is divided into two compartments with a removable cover. When the oil enters the filter from the drain tank it passes through the removable screen shown at the top and thence into the funnel at the right, which is located in the water compartment. The waste oil is thus discharged under water, and as it rises to the surface is freed from any sediment. After the oil has risen to the top it flows into the filtering chamber, where it passes through cloth wrapped around a cylindrical basket and emerges thoroughly cleansed and purified. This compartment of the filter has a large capacity for storing the purified oil until it is required for lubrication. The filter cylinder can be easily removed and cleaned without interrupting the use of the system. The filter is supported by a 4-ft. pipe pedestal at any convenient point on the engine frame, and the upper end of this pedestal screws into a 2-in. standard pipe flange on the bottom of the filter. Pedestals either longer or shorter than 4 ft. can be furnished if desired, but the customary height of the filter above the highest point to be lubricated is 12 in. The filter has faucets for drawing off the oil and for

draining the water which accumulates in it, as well as gauges to indicate the levels of the oil and the water.

After the oil passes through the bearings it flows by gravity to the automatic drain tank shown in Fig. 3, where the foreign matter and entrained water are removed. This tank has an automatic overflow for removing the accumulations of water, and can be placed on or below the engine room floor with the necessary drain and return connections leading to it. As fast as the oil rises to the top of the tank it is pumped directly to the filter.

In use, the oil drains from the various bearings to the automatic drain tank, although in some cases this is omitted and a sump built in the engine foundation is employed instead. From either the sump or the drain tank

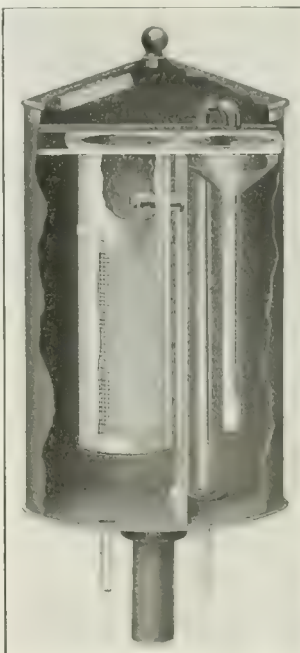


Fig. 2 Sectional View of the Oil Filter. Fig. 3.—The Automatic Drain Tank.

Two of the Special Features of the System.

the oil is forced by one of the customary types of pumps deriving its motion from some conveniently located part of the engine to the filter. After being filtered the oil flows by gravity through a system of piping to each point to be lubricated. At the bearings the lubricant is fed through the Gaco sight feed of the manu-

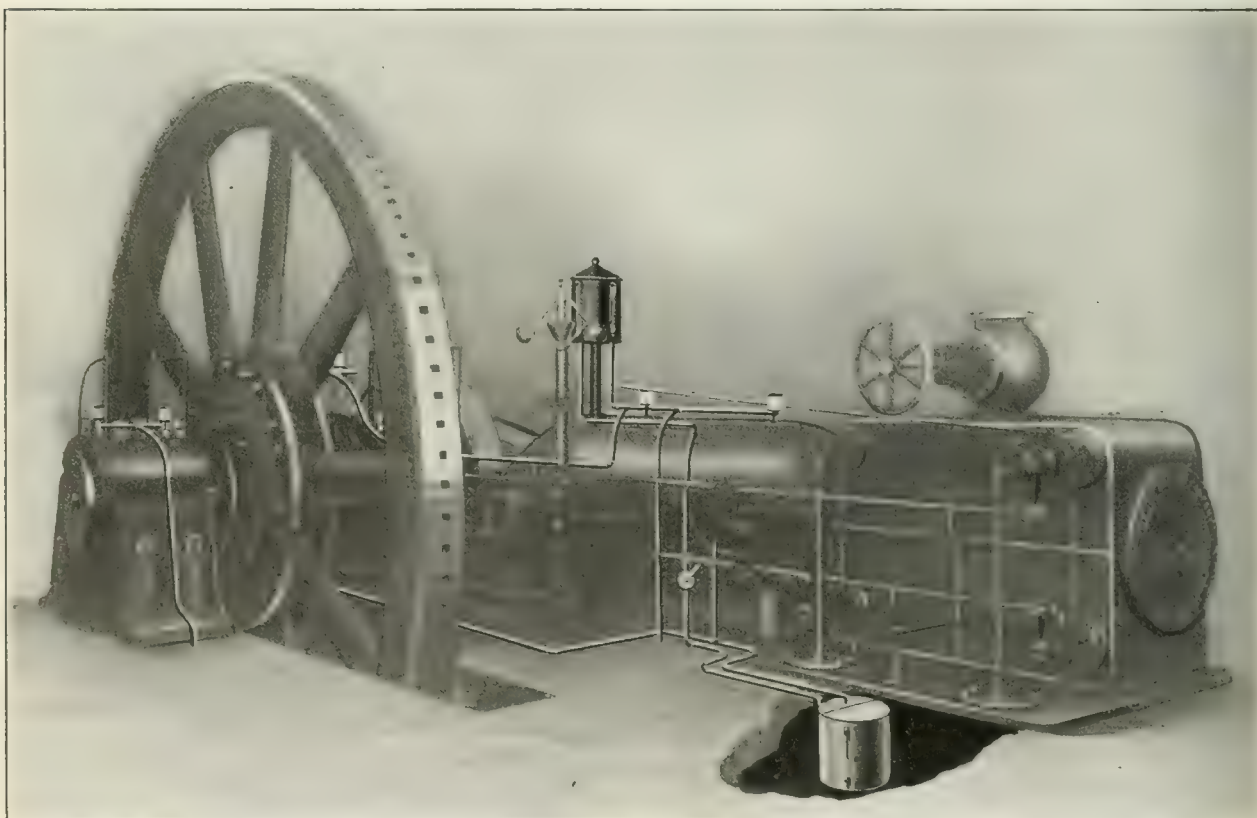


Fig. 1 Corbiss Engine Equipped with the White Star Individual-Continuous Oiling System. Made by the Pittsburgh Gage & Supply Company, Pittsburgh, Pa.

facturer which shows the rate at which the oil is being fed and is capable of being adjusted to regulate the feed. After the oil has lubricated the bearings it flows back to the sump or the automatic drain tank and is pumped back to the filter to be purified and used over again.

The piping connecting the various parts of the system can consist either of screwed fittings and threaded pipe or compression ells, tees, couplings and seamless steel tubing can be supplied by the manufacturer to make the connections between the filter, the drain tank, the pump and the sight feeds. If the latter are used the entire system can be easily and quickly connected without threading, soldering or expanding the ends of the tubing, as it is only necessary to cut the tubing and tighten the compression couplings, when tight joints are quickly made. The annealed seamless steel tubing supplied can be readily bent to conform to the frame of the engine and adds to the appearance of the system. As special tools are not required to erect the system it is not necessary to employ an experienced pipe fitter, and the work can be done very quickly.

Automatic Electric Freight Truck

Under patents recently granted William C. Carr, the Automatic Transportation Company, 2933 Main street, Buffalo, N. Y., is manufacturing a new type of electric truck. While this vehicle is primarily designed for handling package freight at railroad and steamship terminals, it can nevertheless be used in industrial estab-



Fig. 1. The Standard Electric Freight Truck Built by the Automatic Transportation Company, Buffalo, N. Y.

lishments where packages, cases and machine parts or machines, not exceeding 4,000 lb. in weight, have to be handled. The special features are a low body, light weight and the ability to carry loads up any grade. Fig. 1 is the view of the standard truck in use, while Fig. 2 shows the end gate lowered to increase the amount of loading space. The arrangement of the driving mechanism is clearly illustrated in Fig. 3.

The truck can be readily operated by unskilled laborers from either end and in either direction, is easily controlled and can be turned in very small space. The storage batteries contained in the steel receptacle on one end of the truck supply the power for operating. The controller is located beneath the battery box and is attached



Fig. 2.—The Truck with End Gate Lowered to Increase the Loading Space.

to the truck frame while the motor is located in the center as shown in Fig. 3. At the other end of the truck is a movable gate, hinged at the bottom, which can be lowered to increase the available loading space as illustrated in Fig. 2. The platform is supported by springs mounted on the axles, and the wheels also have rubber tires to make the operation of the truck both easy and noiseless.

The two handles and the foot lever shown in Figs. 2 and 3 control the movement of the truck in either direction and from side to side. One of these handles controls the movement of the truck in a straight line, and the other reverses the controller. The foot treadle, which is located a few inches above the step, controls the application of the power by opening and closing the motor supply circuit and at the same time releases the brake. When pressure is removed from the treadle, the current is instantly cut off and the brake set. When the brake has been set, the motor circuit cannot be closed until the

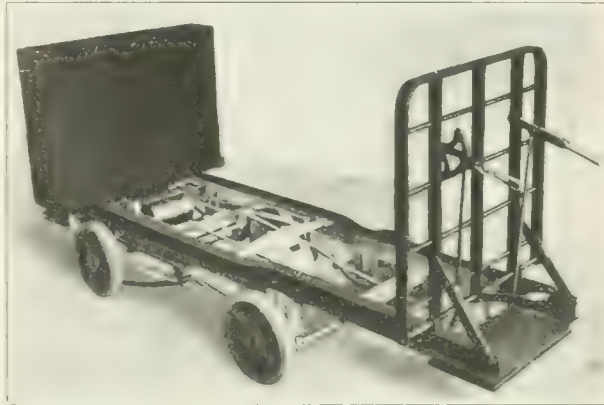


Fig. 3.—View Showing the Arrangement of the Driving Mechanism.

brake is released. These controlling devices are all interlocked so that when it is desired to reverse the direction of the car the brake must be applied and the car brought to a standstill before the direction can be changed and the current again turned on.

The following table gives the principal dimensions and specifications of the standard truck:

Width of loading platform (inches).....	45
Length of loading platform (inches).....	88
Length of loading platform with gate lowered (inches).....	125
Height of platform above floor (inches).....	20
Diameter of wheels (inches).....	16
Wheel base (inches).....	50
Tread (inches).....	36
Minimum load (pounds).....	2,000
Maximum load (pounds).....	4,000
Minimum speed (miles per hour).....	2
Maximum speed (miles per hour).....	10
Weight, including batteries (pounds).....	1,800

If desired the truck can be furnished with a platform 60 in. wide and 36 in. from the floor. The truck having the higher platform is designed more especially for handling mail, express and baggage from a regular car.

The Kane Blind & Screen Company, Kane, Pa., whose plant was destroyed by fire about a year ago, has just completed its new factory. The main building is of brick and timber construction, 60 x 150 ft., two stories. It is equipped throughout with modern woodworking machinery, electrically operated, for the manufacture of rust-proof doors and window fly screens, inside sliding blinds, etc. The capacity is considerably larger than that of the burned plant. W. S. Calderwood is president of the company, D. J. Gampp is secretary, and E. H. Watkins, treasurer.

The Aetna Foundry & Machine Company, Warren, Ohio, general founder and machinist, has some important contracts on hand, among which are all the fittings complete for two new blast-furnace stoves for the Thomas Iron Company, Milwaukee, Wis., and the contract for the operating machinery for locks for one of the new dams on the Ohio River for the United States Government. The company is also building a slab transfer from furnaces to mills for the new plant of the American Sheet & Tin Plate Company, at Gary, Ind.

The Precision Simmance-Abady CO₂ Recorder

A New Automatic Instrument for Recording the Thoroughness of Combustion

The Precision Instrument Company, 49 Larned street W., Detroit, Mich., is manufacturing under the Simmance-Abady patents a line of automatic recorders for indicating the percentage of carbon dioxide produced in the combustion of coal. These instruments are made in a number of different types for disk, drum and tape records for various periods of time. All of these instruments have practically the same dimensions and the same general appearance. Fig. 1 is a view of one of the recorders, while Fig. 2 shows the details of its construction.

Cast iron painted in dark colors is generally used in the construction of the cases, although if desired steel or wood can be substituted, and the metal parts showing through the glass door are made of polished brass. The recorder is not affected by outside conditions and can be placed in the location which is most convenient for the fireman to see regardless of whether the place is hot, dusty or drafty. The construction of the instrument is very simple and there is nothing to get out of order and no glass vessels to break. It can be used on boilers with either forced, induced or natural draft and will draw flue gas continuously from one end of the year to the other.

Referring to Fig. 2, which gives some details of the recorder's construction, the principal parts with the exception of the pen movement, which is not shown, are a siphon tank and float, an extractor tank and bell, a recorder tank and counterbalanced bell, a balance valve, a vessel for containing the caustic potash and gas and water supply connections. A small stream of water is the motive power for producing the cycle of operations in the recorder. This stream flows through the hollow valve stem *e* to the small reservoir *k* which has a safety over-

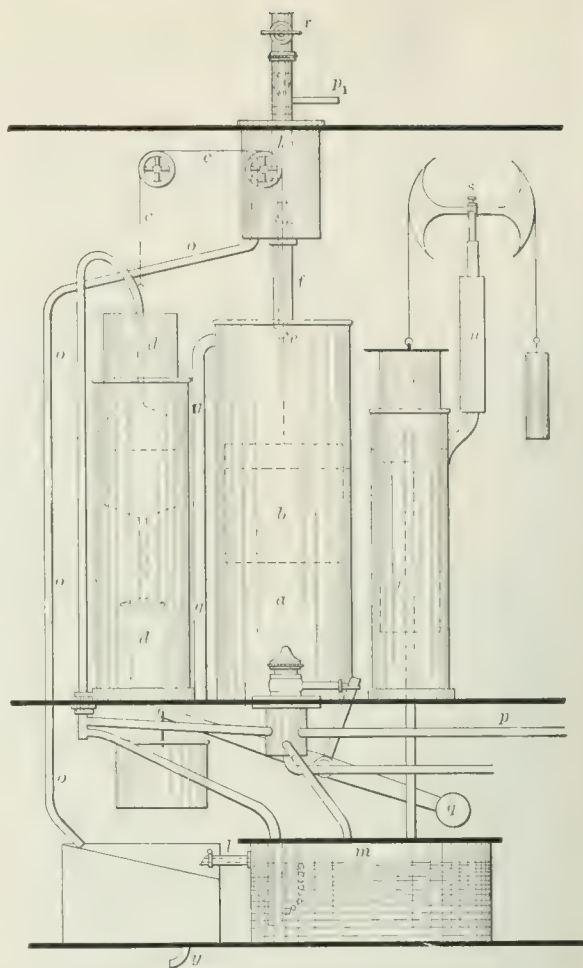


Fig. 2—View Giving Details of the Recorder.

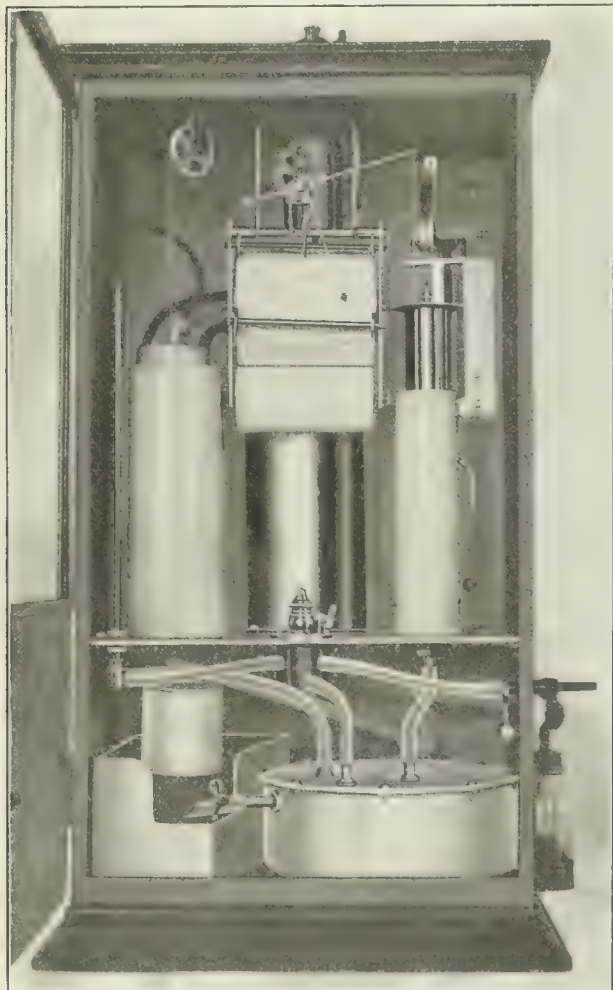


Fig. 1—The Precision CO₂ Recorder Manufactured Under the Simmance-Abady Patents by the Precision Instrument Company, Detroit, Mich.

flow, *o*. A weighted float, *b*, in the siphon tank *a* is attached by a chain, *c*, to the bell *d* of the extractor. As this float rises with the water the valve falls. When the float reaches the top of its stroke it raises the valve stem *e* and trips the valve. This flushes the siphon tank momentarily and the water siphons out of it through the siphon tube *g*. This permits the weighted float to fall and as it does so the water sealed extractor bell *d* is drawn up. A partial vacuum has been created in this bell and gas flows into it from the flue through the gas connection *p* and the balance valve *h*. This point may be considered as the beginning of the cycle. The weight of the water which has passed through the siphon tube *g* into the small receptacle beneath it now overcomes the weight of the balance weight *q* and closes the valve *h*, thus cutting off a definite sample of the gas. Water is then released from this small receptacle in time to permit the valve to open at the proper interval. As the stream of water is continually flowing into the tank *a*, the float *b* again rises and causes the extractor bell *d* to sink. As this takes place the gas in the bell, which since the valve *h* has closed is not influenced by vacuum or other conditions in the flue, is first reduced to atmospheric pressure. It is then put under actual pressure and is next forced into the caustic potash vessel *m* where it bubbles up through the solution and the CO₂ is absorbed. The gas then passes on into the recorder *j* and raises the bell. The boxwood scale *n* at the side of the recorder tank is graduated in percentages of carbon dioxide from 100 at the bottom to zero at the top. The capacity of the bell *d* is such that when the apparatus is run on air the total volume is transferred to the recorder bell *j*, which in this case rises to the zero point. When flue gas is admitted to the apparatus the same quantity of gas is passed from the extractor bell *d*, but as the CO₂ is absorbed by the caustic potash in the vessel *m* the volume of the gas is reduced and the recorder bell will not rise to its full height. The bell *j* is allowed to rise automatically as far as it will and a pen marks its final position on the chart and this records the percentage of carbon dioxide in the gas being analyzed. The bell then discharges the analyzed gas through the valve *k* without coming in contact with the fresh charge of gas which is dealt with in the same way. The whole operation, includ-

ing the drawing forward of the flue gas, takes place automatically, the stream of water furnishing the power. To insure a constant supply of gas an aspirator, *p*, is attached to the top of the case below the valve *x*. This is an auxiliary gas connection to the aspirator from the main inlet pipe *p* and in this way the gas is exhausted from the pipes connecting the recorder to the boilers so that the successive samples analyzed by the instrument are from the boiler flue and are not stagnant gases in the pipes. The small stream of water which furnishes the motive power for the instrument is so connected at *x* that it operates the aspirator before it enters the upper tank *k* of the recorder and thus no extra water is used for this continuous pump.

As will be noticed from Fig. 1, an arm or lever which supports the pen at the zero point of the chart projects from behind the chart. This lever is supported from the interior of the top of the case and at its opposite end is a counterweight which is hung in the siphon tank *a*, Fig. 2, and is operated by the weighted float *b*. When the recorder bell *j* has reached the position indicating on the scale the percentage of carbon dioxide in the gas, the float in the siphon tank rises and operates the lever which withdraws its support from the pen arm. In this way the arm starts from zero and records on the chart the percentage of CO₂ in the flue gas, the length of this line being limited by the position of a stop hanging from the arm and touching the disk of the recorder bell. Before the gas in the recorder bell is expelled the float in the siphon tank falls and the counterweight of the pen lever follows it and lifts the arm back to zero. The bearings upon which this arm works are hardened and gilded metal points and the quadrant arm supporting the recorder bell and its counterbalance are suspended in a like manner. The pen movement is of brass throughout and fine adjustments are provided in all directions.

In installing the recorder in connection with one or a number of boilers two pipes have to be run to it. One of these, a 1½-in. gas pipe, runs from the flue, and the other furnishes a constant supply of clean water preferably from a ball valve cistern. Drainage for the waste water must be provided and the instrument can be set up in any convenient position where these connections can be made. To prevent the pipes from becoming choked by hot and dusty gases a simple method of filtering the flue gases before they enter the pipes has been devised. A header is run along the battery of boilers with a T opposite the sampling tubes from each boiler but having no valves. A small cast iron oil cup is screwed on each of these T's and a cap is dropped over it after a little lubricating oil has been poured into the cup, thus sealing it. A length of perforated iron pipe is inserted in each flue and on the end of these sampling tubes an oil sealed cup and cap are also screwed. This arrangement makes it possible to test the gas in any boiler. A filter filled with any convenient filtering material is placed in the oil cup on the boiler to be tested and after the cap has been removed the channel of the filter is also filled with oil. A piece of cheesecloth is next placed over the filtering material and the filter cover is then dropped on and sealed by the oil in the filter channel. A short length of pipe with an elbow and cover is attached to the filter cover and reaches the oil cup on the header. The cover on this length of pipe is inserted in the oil cup after the cap has been removed and in this way a perfect connection for the flue gas is secured which can be removed for cleaning the filter or for testing another boiler instantly.

The McInnes Steel Company, Ltd., Corry, Pa., manufacturer of crucible tool steel in various grades, die blocks and steel forgings, such as crank shafts, etc., is operating to good capacity its different departments, and is erecting an addition to its machine shop, 40 x 40 ft. As soon as business reaches the point where conditions warrant it the company will build quite an addition to its plant.

The United States Brake Shoe Company reports business to be satisfactory when compared with that of other concerns in its line, its current business aggregating a good tonnage. The company contemplates making an addition to its Corry, Pa., plant, to be of steel frame and cement block construction, 100 x 100 ft., to serve as increased space for its cleaning department.

The Positive Improved Transmission Appliances

A new line of transmission appliances, which includes a special type of split wood rim pulley and a combined jaw and friction clutch, has been placed on the market by the Positive Clutch & Pulley Works, 30 Lansing street, Buffalo, N. Y. The special features claimed for the pulleys, one of which is illustrated in Fig. 1, are lightness, strength

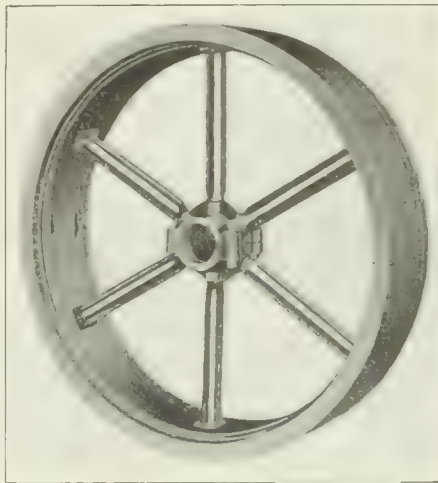


Fig. 1.—A New Type of Wood Split Pulley Made by the Positive Clutch & Pulley Company, Buffalo, N. Y.

and durability, low windage and increased belt efficiency. The clutch which is shown in Fig. 2 utilizes the principles of both the jaw and the friction clutch.

The pulleys are of an entirely new design and are made in a number of sizes ranging from 10 in. in diameter with 3-in. face width to 120 in. in diameter and a 48-in. face. The construction is of the combination type, consisting of a wood rim built up of segments by a special process, cold drawn annealed steel tubing arms and a split malleable iron compression hub in which are inserted cast iron bushings. As compared with a wood pulley of the ordinary type, these new pulleys are lighter for the same diameter and are equally as strong and durable as a steel pulley while an increase of 50 per cent. in the efficiency of the belt contact is claimed.

The company's clutch, which is illustrated in Fig. 2, has been given the trade name of Positive and the essential im-

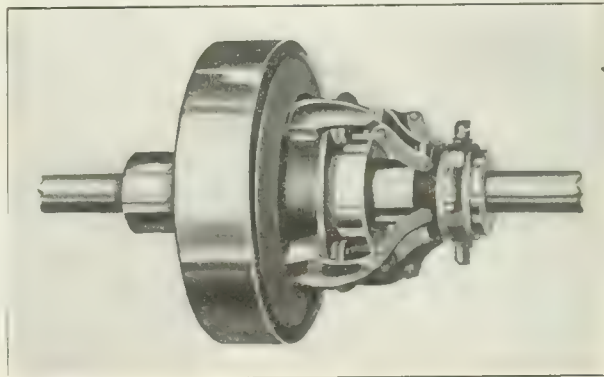


Fig. 2.—The Positive Combination Jaw and Friction Clutch.

provement in its design is the utilization of both the friction and the jaw principles. The design of this clutch enables it to be employed for coupling shafts running at any of the ordinary speeds as the friction portion of the clutch may be first thrown in and when the driven shaft has been brought up to the speed of the driver, the clutch can be converted into one of the jaw type without any loss of either time or power.

Corrigan, McKinney & Co.'s blast furnace at Josephine, Pa., which has been out of blast for a number of weeks, will probably be started up in the near future.

A Very Large Dow Triplex Pump

What is said to be the largest triplex pump on the Pacific Coast was designed and built by the George E. Dow Pumping Engine Company, San Francisco, Cal. One of the special features of this pump, which was installed at the plant of the California Domestic Water

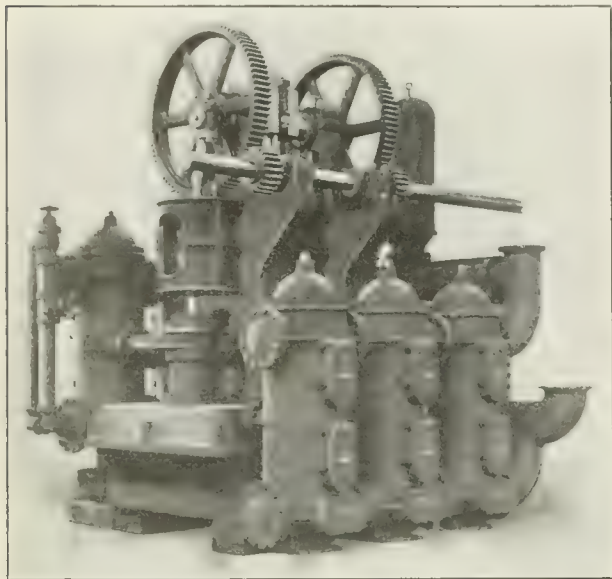


Fig. 1.—A 14x16 In. Double-Acting Triplex Pump, Operating Against a 250-Ft. Head, Built by the Geo. E. Dow Pumping Engine Company, San Francisco, Cal.

Company, Whittier, Cal., is its high mechanical efficiency. Fig. 1 is an exterior view of the pump, while Fig. 2, which is a sectional elevation, shows some of the constructional details.

The pump is of the double-acting type, having a capacity of 4,000,000 gal. per day when pumping against a total head of 250 ft. The cylinders measure 14 x 16 in. and the valves are of an improved design having a piston area of 100 per cent. and a very short lift. This arrangement is to allow the pump to be operated at a higher speed than is customary with triplex pumps, since the water passages are of the full area and the valves seat quickly. Hydraulic leather is used for facing the valves, and, as there is only a short movement in seating, they do not, it is found, strike the seat with destructive force,

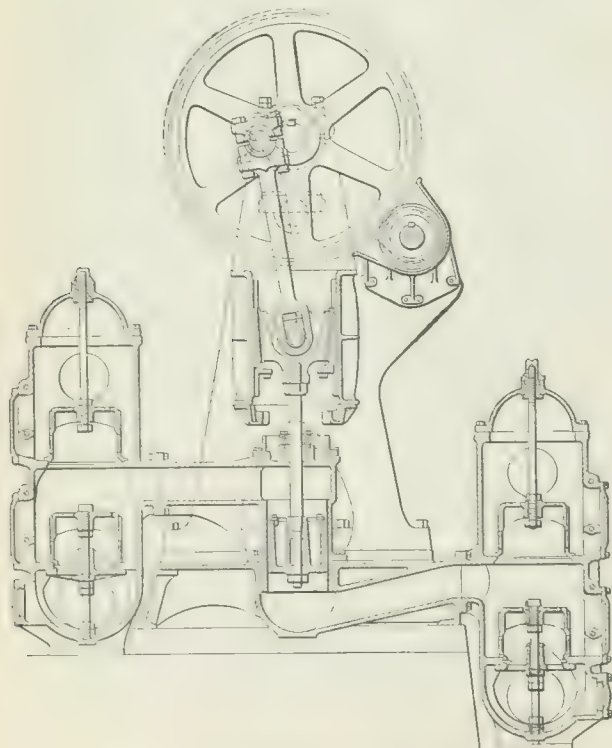


Fig. 2.—A Sectional Elevation of the Pump.

and thus long life is greatly favored. Another thing which tends to secure long life for the pump is the use of large air chambers on both the suction and the discharge, with the result that water hammer is almost entirely eliminated and an even discharge and suction are secured.

The pump is driven by a tandem compound engine having Corliss valve gear, which is directly connected to the extended shaft shown in Fig. 1. A mechanical efficiency of slightly more than 90 per cent. is secured, it is explained, a figure which compares favorably with that of the costly high duty crank and flywheel pumping engine. On account of the high efficiency, the pump is regarded as filling the demand for units combining large capacity and high efficiency.

Customs Decisions

Automobile Parts

The Board of United States General Appraisers has sustained in part claims filed by Harrison Bros. & Richardson, the Packard Motor Car Company regarding the classification of certain parts of automobiles under the tariff act of 1909. The merchandise consisted of magneto coils or windings, magneto coil condensers and distributor shaft arms, all of which were returned for duty under paragraph 141 at the rate of 45 per cent. on the value of the goods.

The importers alleged in their protests that the windings are dutiable properly at 40 per cent. as articles composed wholly or in chief value of wire. The condensers are claimed dutiable at 10 cents per pound and 20 per cent. ad valorem under paragraph 91 as manufactures of which mica is the component material of chief value, while the distributor shafts are alleged to be dutiable at 35 per cent. as manufactures in chief value of rubber. All of the rates claimed are lower than those assessed by the collector of customs at New York.

It appears from the official record that the windings and the condensers are of the same character as the articles passed on by the board in an earlier case, while it is held that the distributor shaft arm is an essential part of the magnetos used in motors of the explosive type. The decision by General Appraiser Fischer holds that the distributor shaft arms are in chief value of hard rubber. In sustaining the claims filed it is held that the collector's classification of the articles as "parts of automobiles" was erroneous.

Jute Machinery Parts

The Chelsea Fibre Mills and the Allentown Spinning Company have been unsuccessful before the board in a controversy regarding the classification of metal parts for jute machinery. The goods are invoiced as "fallers without gills for push bar drawing frames" or as "spindles or flyers" or as "steel pins." The collector at New York assessed duty either at 45 per cent. as manufactures in chief value of metal or at 40 per cent. as manufactures of round steel wire, under provisions of the present tariff act. The importers alleged the articles to be dutiable properly at 30 per cent. under paragraph 197, as jute manufacturing machinery. General Appraiser Fischer states in his decision that the articles in question are a number of similar individual parts intended to be used as repair parts for jute manufacturing machinery and are of such a character that it is impossible to sustain the importers' contention, the collector's classification being affirmed.

The Follansbee Brothers Company, Pittsburg, Pa., with mills at Follansbee, W. Va., manufacturer of bright and terne plates and black and galvanized sheets, has received so many requests, especially from the roofers, for its publication known as *Tin Truth Bulletin* that it has decided to send all the roofers and metal workers in the United States this publication on the first and fifteenth of each month. It will also be sent to architects, while about 100,000 will be sent to owners of buildings throughout the United States.

The Chicago Pneumatic Tool Company, Chicago, will locate a plant at Chicago Heights, Ill., for the manufacture of Rockford gasoline railroad cars and commercial cars. The company has purchased an existing plant and will at once make such alterations as may be found necessary.

Wire Cable Conveyor for Handling Kegs

A wire cable conveyor, affording another instance of the special service obtainable in conveying systems, was recently installed at the works of the Youngstown Sheet & Tube Company, Youngstown, Ohio, for carrying empty kegs from the cooperage plant to the rod and



Wire Cable Conveyor Bridge Built by the Jeffrey Mfg. Company, Columbus, Ohio.

wire department of the works. Formerly it was necessary to carry the empty kegs by hand into cars of the cooperage plant and transfer them to the packing room some distance away. This was a slow and expensive proposition and the conveying system, an insight into which may be obtained from the accompanying illustrations, was accordingly instilled by the Jeffrey Mfg. Company, maker of elevating, conveying and mining machinery, Columbus, Ohio.

One of the views shows the cooperage plant in the distance and the light steel bridge on which the conveyor is mounted, extending a horizontal distance of 140 ft. from the cooperage plant to the rod and wire department. The inclined portion of the conveyor leading upward from the cooperage house makes the entire length of the conveyor 152 ft. between centers. At the delivery end of the conveyor is located a gravity discharge chute of the special construction indicated in the second of the views. The conveyor is driven by a $3\frac{1}{2}$ -hp. motor and travels at a rate of 60 ft. per minute, giving the conveyor a capacity of 9600 empty kegs for an 8-hr. day.

In writing to the Jeffrey Mfg. Company, Mr. Robinson, second vice-president of the Youngstown Sheet & Tube Company, stated that by the use of the conveyor the company is able in about two hours' time to transfer sufficient kegs to keep the mail department supplied for 24 hrs. He added that the kegs are handled with less breakage and are deposited right where it is desired to use them. Incidentally it may be mentioned that the conveyor is equipped with an automatic counter which gives an accurate account of the number of kegs transferred from one to the other department.

The New Haven Machine Screw Company, manufacturer of screw machine products, New Haven, Conn., which has been in existence four years as a partnership, was incorporated May 2. Officers were elected as follows: J. J. Reidy, president; Pierrepont B. Foster, treasurer; D. F. Reidy, secretary. President Reidy has had 21 years' experience in the machine screw business. Treasurer Foster is a banker, being a director of the Yale National Bank, New Haven. The company will greatly increase the capacity of its plant. It has already placed orders for a considerable part of the new machinery required for the enlargement of the equipment.

H. C. Tatum will establish a broom factory at Blessing, Texas.

New Interests in Baldwin Locomotive Works

The Baldwin Locomotive Works, Philadelphia, Pa., announced officially May 3, after refusing for several days to discuss reports that some plan of reorganization of its ownership was under way: "At a meeting of its directors and stockholders, held to-day, it was decided to reconstruct the present close corporation in such a way as to admit new interests into the organization. No change, however, in policy or management is contemplated. The business has long been one of the standard industries of Philadelphia, and the same principles of management, which have built up its present proportions, and have always yielded adequate profit, will continue to prevail. Drexel & Co., Philadelphia, and White, Weed & Co., New York, will act as bankers in connection with the matter." It is stated that a month will elapse before the matter will be definitely settled.

The Baldwin Works has just received orders for 10 heavy combination locomotives and five yard engines from the Seaboard Air Line, but there is little work ahead, and under the present buying policy of the railroads the outlook for any great activity during the summer months is not particularly bright.

Remarkable Records at Ensley Furnaces

The No. 2 and No. 3 Ensley furnaces of the Tennessee



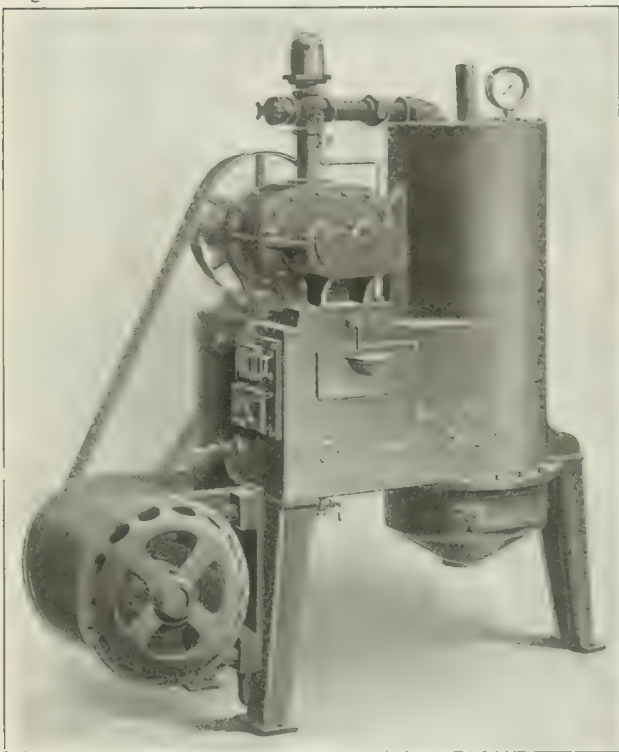
Delivery End of Jeffrey Conveyor in Rod and Wire Department of the Youngstown Sheet & Tube Company, Youngstown, Ohio.

Coal, Iron & Railroad Company have been making records for a good many months that have attracted attention widely. All these records were exceeded in April, when the No. 3 furnace produced 13,983 tons and the No. 2 furnace 13,555 tons, a daily average of 466 tons and 452 tons respectively. It is stated that this result was accomplished on the regular basic ore mixture of these furnaces and was not secured by unusual scrap additions. The fuel consumption averaged 2258 lb. to the ton of pig iron.

Connersville Blower Applied to Vacuum Cleaning

A new type of vacuum cleaner for residences and small office buildings, where all the dust can be conveyed to a single receptacle in the basement, has been brought out by the United Vacuum Appliance Company, Connersville, Ind. As will be noted, the outfit consists of a motor, a vacuum pump and a separator tank all compactly grouped on a single base. The vacuum is produced by a standard rotary blower of the Connersville type which has been in use for many years for pumping gases and for removing the air from condensers and doing similar work, and its application to vacuum cleaning systems is taken as a logical development.

In operation the air and the dirt from the house piping system enter the top of the tank and pass through a pipe which is immersed in water. In this way the entrained air is allowed to filter out, but all the dirt is caught by the water and held in suspension until the



A New Type of Vacuum Cleaner Made by the United Vacuum Appliance Company, Connersville, Ind.

motor is stopped, when the dirty water is automatically discharged into the sewer. When the motor is started again, the separator tank receives a fresh supply of water automatically. About 6 or 8 gal. is required for each filling of the tank, and this arrangement insures that only clean air will be used by the pump. In this way the wear and tear due to entrained foreign matter passing through the pump, it is held, is eliminated. The air is then carried to the chimney or other vent. The sewer and water connections can be dispensed with if desired and a canvas screen separator which catches the dirt in a galvanized iron receiver that is afterward emptied by the operator substituted.

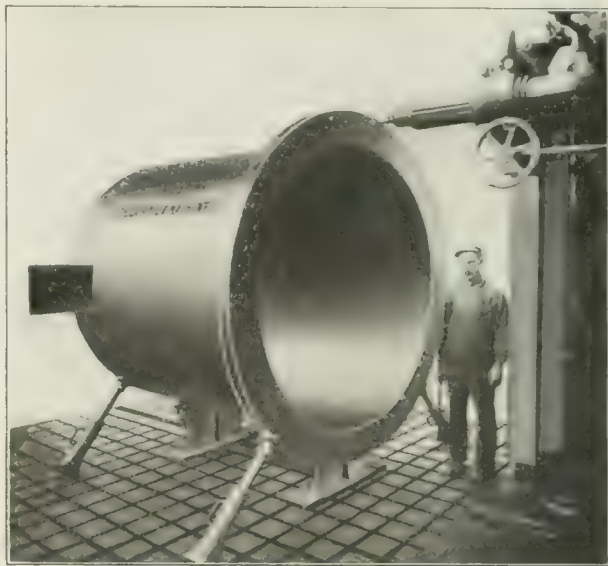
The construction of the pump used in this unit is simple. The part consists of a shell and two revolving impellers, with no valves or complicated parts. The bearings have oil wells and ring oiling devices so that the only attention required by the outfit is an occasional filling of the oil reservoirs. A vertically hinged frame is used to mount the motor, and the proper belt tension is secured by a few turns of a set screw. The starting mechanism is conveniently grouped on the unit as illustrated, needing merely the wiring to the motor when the unit is installed.

Forty of the largest mines are said to be producing copper at a cost of about nine cents a pound.

A Huge Cast Iron Still

The Philadelphia Roll & Machine Company, Philadelphia, Pa., has recently completed a very large and interesting charcoal iron air furnace casting. A special heat resisting mixture of iron was employed for the casting, which will be used as a still for the ingredients entering into the manufacture of paint, lead and chemicals.

The casting, which was made in a loam mold, weighed



A 6-Ft. Cast-Iron Still Made by the Philadelphia Roll & Machine Company, Philadelphia, Pa.

about 12,000 lb. in the rough state and forms the body of the still. The metal of the casting is 2 in. thick except in the flange, where it is $\frac{1}{2}$ in. thicker, and the internal diameter and the depth are 6 ft. The bottom of the still in this case was also made of $2\frac{1}{2}$ -in. charcoal iron, although in some cases cast steel is employed instead. The bottom is slightly dished and is bolted to the flange, which has first been accurately machined with 132 $\frac{3}{4}$ -in. bolts. When the photograph from which the engraving was made was taken, these holes were being drilled. A manhole and an outlet for the distilled products are located in the top of the still, which is the farther end in the engraving. When repairs to the bottom of the still have to be made or the entire bottom renewed the body of the still is jacked up on the lugs at the rear.

The General Electric Company.—Arrangements for the conversion of the General Electric Company's \$12,875,000 5 per cent. 10-year gold debenture bonds of 1907 into stock have been made. The bonds are convertible into stock at par after June 1 next. The capital stock of the company as of December 31 last was \$65,179,600. Provided all the bonds are converted, the capital stock will then amount to \$78,054,600. With the conversion of all the bonds, the General Electric Company would have no bonded debt, with the exception of \$2,047,000 3½ per cent. gold debenture 30-year convertibles of 1892. There are authorized and available, but not yet issued, \$1,912,066 5 per cent. bonds. The company's business is running at the rate of about 85 per cent. of what it was last year, in which year sales aggregated the record-breaking total of \$71,478,000.

The Cutler-Hammer Mfg. Company announces the establishment of a new department to be devoted to the design and manufacture of electrical appliances for industrial heating. The company's New York City factory at 144th street and Southern boulevard will be devoted principally to the manufacture of this class of apparatus, under the direct supervision of W. S. Hadaway, Jr., who for many years has specialized on applications of electric heat to industrial purposes.

Adrian Furnace Company blew out its furnace at Du Bois, Pa., May 1 and it will remain out indefinitely.

Pulleys with Cork Set in Faces

Patents have been recently secured by the American Pulley Company, 4200 Wissahickon avenue, Philadelphia, Pa., covering a method of applying cork insets to the faces of belt pulleys. The special advantages claimed for the use of this type of pulley are the elimination of practically all slip between the belt and the pulley face, and in general an increase of 50 per cent. in the amount of power transmitted. Fig. 1 gives a general idea of the construction of these pulleys, while Fig. 2 is a view of a portion of

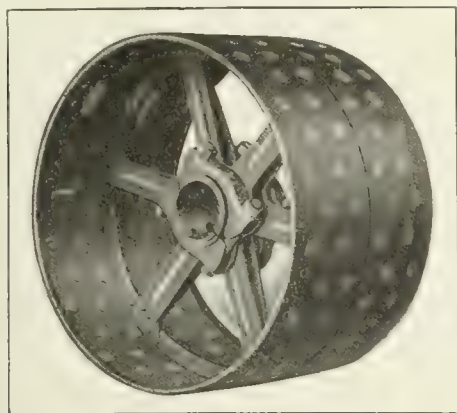


Fig. 1.—A Steel Pulley with Cork Insets Made by the American Pulley Company, Philadelphia, Pa.

the rim and shows the way in which the corks are held in place.

In inserting these corks in the rim a series of circular depressions, having sufficient depth to partly shear the metal at these points but still leave enough to support the corks and prevent them from being pushed through the face of the rim, is made in the metal. For producing these depressions a special type of power press having an overhung ram and a horn to support the die is employed. After these depressions have been made in the rim the corks are forced into place by a special small press. This tool is operated by hand and has a lever and a special motion for securing considerable power at the ram with relatively little exertion by the operator. The diameter of these corks before they are placed in position in the face of the pulley is considerably larger than the diameter of the depressions into which they are forced. Before inserting the corks they are compressed and are forced into position in this condition. The compression is relieved

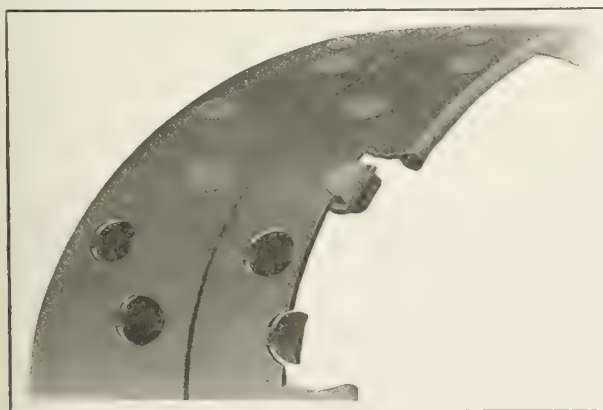


Fig. 2.—Portion of Rim Showing Manner of Inserting Cork.

after the corks are put in place, and they expand against the sides of these depressions and force themselves out between the sheared edges of these depressions and the rim face. In this way the corks become so tightly wedged in position that all danger of their coming out while in service is practically eliminated.

The line of pulleys made with these insets is the same as the company's regular line of steel split pulleys and ranges from 6 in. in diameter and a 2-in. face to 60 in. in diameter and a 36-in. face. If desired, these insets can also be furnished for the cast-iron and the wood-rim pulleys of this company.

Rust-Proof Slag Paint

E. C. E. Lord, Office of Public Roads, United States Department of Agriculture, Washington, D. C., furnishes the following article to the *Engineering Record*:

For the last quarter of a century the waste products from iron blast furnaces and smelters have been used as paint pigments, either with a linseed-oil vehicle or mixed with oil of turpentine and bituminous compounds. Recent investigations carried on in the Office of Public Roads have indicated that certain varieties of slag resulting from the manufacture of steel by the basic open-hearth process, as commonly practiced in the United States, may be utilized as a rust-inhibitive pigment. Slags from basic open-hearth furnaces vary considerably in composition owing to frequent chemical changes in the metal bath during the process of refining, but the material suitable for an inhibitive-paint base may be readily recognized by anyone familiar with the manufacture of steel. It is a porous, brittle, dark brown or grayish brown cinder, having a specific gravity of about 3.30 and a dull, stony luster, in contradistinction to the darker, harder and more lustrous types which have little or no rust-preventive qualities.

Under the microscope the brown slag is characterized by the presence of colorless hexagonal crystals consisting chiefly of a calcium silicate containing an excess of lime in solid solution, and by dark brown cubical crystals containing the oxides of iron, manganese and magnesia. When ground to a proper degree of fineness and mixed with a suitable quantity of raw linseed oil, this slag forms a very quick drying paint of a metallic brown color, with excellent spreading properties.

It is well known that iron is rust-proof, in the presence of free lime or in a saturated solution of calcic hydrate, hence steel structures properly embedded in concrete will remain bright under ordinary conditions for a long period of time. The same is true of metal protected by basic open-hearth slag paint, where the excess of lime contained in the silicate component of the slag is partly liberated as hydrate by the action of moisture, and partly combines with the fatty acids of the oil to form difficultly soluble lime soaps. That is to say, the inhibitive properties of the basic slag paint in the presence of moisture is due to the liberation of calcic hydrate in conjunction with saponification of the oil vehicle. Experience has shown that this saponification, if allowed to proceed beyond a certain point, is injurious to the paint film, owing to the brittleness of the resulting soaps, and it would therefore appear necessary to apply this paint as a priming coat only and to cover the same as soon as possible after drying with a good protective paint of any desired color.

It would seem that the most practical and efficient method of reducing the slag to a proper degree of fineness would be to first pass the coarse material of the proper composition through an ordinary jaw stone crusher, and then convey the screenings (from $\frac{1}{4}$ in. to dust) over an electro-magnetic field to a centrifugal grinder, and thence to the tube mill for final reduction, as is the common practice in the pulverization of Portland cement clinker; or the screenings, freed from their metallic iron content, may be readily ground to an impalpable powder in an ordinary pebble mill. About 6 lb. of this powder to 1 gal. of oil is the proper proportion for mixing the paint.

Experience only will determine to what extent this cheap slag dust may replace red lead and other expensive pigments, but its value as a base for priming coats on iron and steel seems to give great promise.

The annual meeting of the stockholders of the Crane Iron Works was held at its offices in Catasauqua, Pa., May 4. The present directors, Leonard Peckitt, James W. Fuller, Jr., J. S. Stillman, F. M. Jeffrey, C. H. Zehnder, A. A. Fowler and A. H. Brown, were re-elected. The officers also hold over as follows: President, Leonard Peckitt; vice-president, C. H. Zehnder; secretary, J. S. Stillman, and treasurer, H. S. Hart.

Sheridan Furnace, of the Berkshire Iron Works, Sheridan, Pa., was blown out May 4. The stack will be relined and other repairs made. The greater portion of the stock of pig iron on the yard is covered by orders in hand.

The Machinery Markets

Foreign orders continue to contribute materially toward the support of the machinery market in a number of machinery selling centers. In New York current business is good, but new inquiries are not so plentiful as they were four weeks ago. In Chicago a fair volume of business is being done, and the outlook is encouraging, as the Santa Fé Railroad is reported to be about to close on a recently issued machine tool list and the trade there is bidding on the wood-working equipment required by the American Steel & Wire Company. A good order has been placed in the Chicago market for machine tools for delivery in Cuba and another consignment has been bought for a Spanish account. Business appears to be on the mend in Cincinnati, and reports from Cleveland indicate that inquiries in that market are increasing. The rebuilding of the destroyed section of Bangor, Me., is expected to bring out some good business in the New England market, and at present there is an excellent demand in that section for special machinery. The automobile industry is helping the machinery trade in Detroit, but the demand from other sources is somewhat light. A renewed call for logging equipment is looked for on the Pacific Coast, where at present sales of gas engines and pumps are occupying most attention. Inquiries are more plentiful in Philadelphia and the call for special machinery is good.

New York

NEW YORK, MAY 10, 1911.

New inquiries are scarce, but machinery houses report that they are having better success in closing out business, as buyers of late are more prompt in placing orders after the bids are in. Some excellent business has been placed by the two automobile companies whose lists have been out for the last few weeks, and manufacturers in other lines who have been getting figures on small lots of tools have bought in such volume as to make the week's business a good one as far as orders are concerned. There seems to be a lack of new enterprises and extensions, however, so there is not as much business in sight as there was early last month. The Ontario & Western Railroad is disappointingly slow in closing out the large list it has had before the trade for many weeks past. The delay has been brought about, however, by the disposition on the part of some machinery houses to readjust their quotations, and in consequence new bids will be received on a great deal of the machinery the company intends purchasing. Manufacturers of power equipment are getting some good trade and inquiries for that class of equipment have increased of late. There is a good export demand, but manufacturers of mining equipment are losing some business as the result of the war in Mexico. New York houses have received a number of communications asking them to hold material ordered for delivery in Mexico until further notice.

The Prest-o-Lite Company, Indianapolis, Ind., and with offices at 2104 Broadway, New York, will build a brick and concrete factory at 786 Frelinghuysen avenue, Newark, N. J. The plans call for a one and two-story building, 98x102 ft., at an estimated cost of \$7,000, which will be equipped with special machinery for the repair of gas tanks and the filling of tanks with gas.

The Stevenson Engineering Company, 29 Broadway, New York, has plans prepared for a machine shop to be erected at Tottenville, S. I. The building will be 26x50 ft., one story, and will be equipped with the most modern machinery.

A work shop is to be built by the city of New York on the grounds of the Fordham Hospital, on Crotona avenue, in the Borough of the Bronx, which will be used as a repair shop for the Bellevue and allied hospitals. It is understood that later on mechanical equipment will be purchased to be installed in the shops.

A new plant is being built on Highland avenue, Niagara Falls, N. Y., by Fitzgerald & Bennie, electro-metallurgists, and will be used for experimental laboratory and furnace work.

The Graphic Art Company, Buffalo, N. Y., will build and equip a one-story brick addition, 60x150 ft., to its lithographing plant at Halbert street and the New York Central Railroad Belt Line.

The Wood Products Company, Buffalo, N. Y., has commenced the construction of a two-story brick building, 60x260 ft., at its wood alcohol plant at Fourth street and the Erie Canal, to replace a building recently destroyed by fire.

The Golden Furniture Company, Jamestown, N. Y., will at once rebuild its five-story factory which was partially destroyed by fire on May 6.

An addition, 88x110 ft., three stories, is to be made to the Huyck Mills, Albany, N. Y.

The Ewing American Motor Company has been incorporated at Ulster, N. Y., with a capital stock of \$1,500,000, and will establish a plant for the manufac-

ture of automobiles. The incorporators are C. A. Hamlin, A. P. Anderson and H. Gorham, Jr., New York City.

The Carter-Crume Company, with a large plant at Niagara Falls, N. Y., for the manufacture of triplicate salesbooks; the American Salesbook Company, Elmira, and the Eastern Salesbook Company, Glendale, Long Island, have been merged into the Carter-American Salesbook Company, with a capital stock of \$10,000,000. An enlargement of the Niagara Falls plant is contemplated.

The foundry, machine shop and storehouse buildings of the King Construction Company's plant, on Geneva street, North Tonawanda, N. Y., which were destroyed by fire May 3, are to be rebuilt at once. The company manufactures equipment for greenhouses, multiple window sash operating and controlling apparatus, etc.

The Bogart Gas Power Engineering Company, Buffalo, N. Y., has increased its capital stock from \$25,000 to \$100,000, for the purpose of enlarging its manufacturing facilities. The gas engines it manufactures in various sizes are now made under contract at Bradford, Pa.; Dayton, Ohio; Detroit, Mich., and Buffalo. The company's offices are in the Chamber of Commerce Building, in the latter city.

Burcroff & Shuman, Newark, N. Y., have been awarded the contract for construction of a boiler house for the New York State Custodial Asylum, at Newark, to cost \$18,000.

Bids are being received by W. P. Ginther, architect, Akron, Ohio, for a power plant and boiler house to be erected in connection with extensive new hospital buildings by St. Mary's Hospital, Niagara Falls, N. Y.

The Canadian Steel Foundries, Ltd., Welland, Ont., will shortly be in the market for rolling mill machinery and steel foundry equipment. The company is collecting catalogues on that class of machinery with a view to asking for bids.

New England

BOSTON, MASS., May 9, 1911.

Several announcements of importance have characterized the week. The business of the George G. Prentice & Co., New Haven, Conn., manufacturers of automatic turret machines, has been purchased by the New Britain Machine Company, New Britain, Conn. William H. Farrell, a brother of James A. Farrell, president of the United States Steel Corporation, is organizing the Bridgeport Screw Company, Bridgeport, Conn., with a paid in capital stock of \$350,000 and will establish large works in that city. The General Electric Company will build a large extension to one of its Lynn buildings, and the Royal Typewriter Company, Hartford, Conn., will double its plant.

A broad inquiry among the machine tool builders of New England finds few exceptions to a condition of dullness. In some cases foreign orders are helping out in a large way, but the common experience is that shops are running with reduced forces. Special machinery is in good demand. The tap and die people of Greenfield seem to be busy and are making preparations for a large demand a little later. The rebuilding of the burned section of Bangor, Maine, should have some stimulating effect upon local business. Labor conditions are excellent. Outside of some isolated cases among the building and allied trades little unrest is evident. Certainly May day brought exceptionally few strikes, nor have

THE MACHINERY MARKETS

manufacturers received word which could be termed threatening.

The notable transaction of the week in New England machine tool circles was the sale of the business of George G. Prentice & Co., New Haven, Conn., manufacturers of multi-spindle automatic turret machines, to the New Britain Machine Company, New Britain, Conn. The business will be moved to New Britain as soon as the new owner has completed a large building, the work of which will progress immediately. George G. Prentice, principal owner of the New Haven industry, is in poor health, which rendered it desirable that he give up the care of the business. He is the inventor of the machine and has manufactured it for something over 10 years, during which time many important developments and improvements have been made. The type has become well known abroad as well as in America. Its function is the machining, drilling and tapping of castings and forgings of any shape, the work being held in a revolving chuck, which is advanced and withdrawn from the spindles, and is indexed, with complete automatic motions, the only labor for the operator being the placing of the blank in the chuck, which has one section beyond the number of the spindles. The New Britain Machine Company manufactures a miscellaneous line of standard machinery and other metal products, as well as special work for other manufacturers. The Prentice machines will constitute an important addition to the company's products. The new building in which the department will be located will extend the present structure and will cover an area 56 x 130 ft. In the beginning the building will be five stories, conforming to the present building, but the construction will be such as to provide for two additional stories later. The Prentice concern employs about 200 hands.

The Bridgeport Screw Company, Bridgeport, Conn., is in process of organization under the leadership of William H. Farrell, recently Canadian representative of the United States Steel Corporation. W. H. Farrell is a brother of James A. Farrell, president of the United States Steel Corporation, but it is given out officially that the new company has no affiliation whatever with the large corporation. The purpose is to manufacture all sorts of wood and machine screws in their larger sizes, and also hardware and metal specialties. The company is incorporated in Connecticut, with a capital stock of \$500,000, of which \$350,000 will be paid in. In addition to W. H. Farrell the incorporators are Fred Enos, head of the Bridgeport Board of Trade, and Charles Stuart Canfield, a Bridgeport attorney. The two latter gentlemen are acting merely during the preliminary organization. A large piece of land has been purchased located between the tracks of the New York, New Haven & Hartford Railroad and Union and Central avenues and Williston street. A large factory will be built on the premises this season, according to the plans.

The General Electric Company, Lynn, Mass., has awarded the contract for an extension of one of the buildings of the River Works, Lynn, Mass., to be 80 x 360 ft., two stories.

The Royal Typewriter Company, Hartford, Conn., has let the contract for a factory building 50 x 130 ft., four stories, of brick, mill construction. The business is a young one and has grown with great rapidity until it has become necessary to practically double the capacity. Electric motors will be required and an electric pumping plant.

Additions to general manufacturing plants in New England, just announced, include the following: Omo Company, South Farms, Middletown, Conn., addition 40 x 240 ft.; J. O. Cloggston & Co., New Haven, Conn., paper boxes, factory 60 x 175 ft., two stories; Famiglietti Bros. Company, Providence, R. I., boxes, addition; Meriden Board of Trade Industrial Association, Meriden, Conn., manufacturing building 40 x 162 ft., four stories, and boiler house, the plant to be occupied by the Brown & Dowd Mfg. Company, Meriden; Metropolitan Carriage Company, Bridgeport, Conn., factory 40 x 70 ft., two stories.

The Corbin Wrench Company, Easthampton, Mass., has been organized with a Massachusetts charter to manufacture a new pipe wrench, the invention of Frank F. Corbin, designed for general use after the manner of the Stillson type. A distinguishing feature is a sliding ratchet which replaces the usual screw. F. F. Corbin is the president, Edward P. Eagan treasurer, and N. S. Hitchcock the third director, all of Easthampton. For the present the company will have the parts made by outside parties and will do the assembling itself.

Manning, Bowman & Co., Meriden, Conn., manufacturers of silver and nickel plated ware, are building an addition which will largely increase the size of the press room and about double the capacity of the dipping room. The addition is to the factory building erected in 1907.

The American & British Mfg. Company, Bridgeport, Conn., has secured the contract for 25 additional landing guns for the United States Navy, and this department of the works at Bridgeport, Conn., will have to operate with double force to carry out the order.

Fay & Scott, Dexter, Maine, manufacturers of engine lathes and patternmakers' lathes, are increasing their works by 11,000 sq. ft. of floor space. An addition to the planer and milling rooms will be 40 x 50 ft., one story, while another building will be 40 x 90 ft., two stories, and will be used chiefly for store and stock rooms. Concrete construction will be employed. No new equipment will be required in connection with the extensions.

The Birmingham Iron Foundry, Derby, Conn., rolls rubber mill machinery and general heavy machinery and castings, is preparing plans for a three-story office building 40 x 50 ft., of brick with concrete floors, and containing a three-story vault 10 ft. square. A 10-16-ft. boring mill has just been purchased of the Betts Machine Company. Business is quite good with the company and the works are running full.

The Bridgeport Window Hardware Company has been organized at Bridgeport, Conn., to manufacture various specialties, including a transom operator, blind opener and a burglar proof window lock. It is a Connecticut corporation with paid in capital stock of \$10,000. J. H. Crossley is the president and Arthur B. Lieberum the secretary and treasurer. For the present the products will be manufactured for the company by the R. P. K. Pressed Metal Company, Bridgeport.

The Hubbard & Jopson Mfg. Company, 2 Billard street, Meriden, Conn., successor to the Connecticut Novelty Company, has established a factory for the manufacture of wood and metal novelties. H. E. Hubbard is president and treasurer, and G. W. Jopson vice-president.

The Bridgeport Forge Company, Bridgeport, Conn., has made formal announcement of the change in name of the corporation to the Heppenstall Forge Company, which was mentioned in last week's issue. Sam Heppenstall is the president of the company, H. P. Kuhn vice-president, C. W. Heppenstall manager, Charles S. Lindsay secretary and treasurer, C. J. Sauer sales manager.

The Mossberg Wrench Company, Central Falls, R. I., is building for the Wardwell Braiding Machine Company a line of braiding machines for covering code wire. It is a high speed machine, having a covering capacity of 75 in. a minute on No. 14 code wire.

The L. S. Starrett Company, Athol, Mass., is having plans and specifications prepared by Charles T. Main, mill engineer and architect, Boston, Mass., for a new office and graduating building. The construction will consist of outer walls of brick with reinforced concrete columns and steel framing protected by concrete. The main portion of the building will be 122 ft. 10 in. long and 89 ft. wide. Plans and specifications are also being prepared by Mr. Main for the new seven-story brass foundry of the Yale & Towne Mfg. Co., Stamford, Conn. He is receiving bids for the new hexagonal netting shop of the Clinton Wire Cloth Company, Clinton, Mass. The main part of the building will be 164 ft. 8 in. long and 84 ft. wide, with a 40 ft. x 52 ft. 4 in. connecting wing at one end. The structure will be three stories.

Through its consulting engineer, the Hooper-Faulkenau Engineering Company, 165 Broadway, New York City, the Crane Valve Company, Bridgeport, Conn., has just let to the W. H. Boardman Company, New York City, the contract for a heavy machine shop, 50 ft. x 353 ft. It is of interest to learn that the building, which is to be equipped with traveling cranes, was designed, specifications drawn and bid submitted and accepted in just two weeks from the day on which the engineering company took the work in hand.

On the basis of the Government crop report, the statistician of the New York Produce Exchange finds an indicated yield of 508,145,000 bushels of wheat. If the indicated crop is harvested it will mean about 16,000,000 bushels more than the greatest crop on record, which was that of 1906.

THE MACHINERY MARKETS

Philadelphia

PHILADELPHIA, Pa., May 10, 1911.

Very little change is to be noted in the local demand for machine tools. A slight betterment in some directions, particularly special equipment, usually averages with declines reported in others, and the general trend of the market appears to be toward continued dullness. While merchants, owing to their varied lines, find some scattered business in one direction or another, builders of the standard types of machine tools do not report conditions as favorable as they were, particularly in this territory. In the majority of instances plant operations are on a smaller scale, as orders have not come along with the same frequency as was the case some time ago, and current scattered orders can be supplied from stock in the majority of cases. Builders of heavy special tools find business quieter, but some of the smaller manufacturers are quite busy, as the amount of work required to keep them so engaged is not necessarily large. In second hand machinery a moderate business has been done in some directions, but the general demand is not very extensive. Inquiries are not plentiful, and the few that develop are mostly for single tools, with competition in the majority of cases keen, small propositions receiving as much attention as is usually given to the larger ones. In engines and boilers a fair amount of new business comes out, but pending negotiations close slowly. Iron and steel casting plants show but little improvement in their operative rate.

The plant of the Homer Brass Works, Water and Mifflin streets, was badly damaged by fire May 3. The foundry did not suffer to any great extent, but the machine shop and office were damaged considerably. It is probable that considerable machinery will have to be replaced, but requirements have not yet been decided upon.

The Shipley Machinery Company, Bourse Building, which represents the Toledo Electric Welder Company, Toledo, Ohio, in this territory, reports the installation of a number of special electric welders of that company's manufacture for customers in this territory.

F. W. Tunnell & Co., who have purchased a manufacturing site aggregating 20 acres at Marcus Hook, near Chester, Pa., advise that the purchase was made not with a view of the immediate building of a plant at the new location, but that they were preparing for the future, and nothing had been decided upon or was expected to develop soon in reference to the erection of a new plant.

The purchase, through Samuel Emmert, Hagerstown, Md., of a 15-acre tract of land, in the vicinity of that city, by the New York Central Iron Works, Geneva, N. Y., is announced. It is said that the purchasers will erect a modern plant and remove there from their present location on its completion.

Dienelt & Eisenhardt, Inc., report a very fair volume of business, particularly for special machinery for printing and manufacturing oil cloth. The demand for dead stroke hammers has not been very good, nor has that for hydraulic jacks. Considerable business has been done in its line of Monarch electric motors, but orders for pipe expanding machinery have been comparatively light.

The Energy Elevator Company is operating its plant at practically full capacity, the demand for elevators of all classes being reported as fairly active. An average business is being done in electric, power and hand elevators. Several large automobile lifts are being installed in this as well as other cities, while hand elevators are being shipped to the middle and far West as well as to customers in the South and in New England.

Fire damaged the plant of J. R. Wotherspoon, manufacturer of gas and sheet metal stoves, 240 North Front street, May 4. The nickel plating plant was practically destroyed, while machinery in the sheet metal working department was badly damaged. Repairs and re-equipment of the plant will be made at once.

It is reported that the Southwark Plating Company will erect a three-story brick addition to its plant, 16 x 40 ft., at Fifteenth street and Washington avenue, particulars regarding which are not yet available.

Over 30 charters have been granted to electric and gas companies under Pennsylvania laws during the past week. The majority of these concerns are located in the eastern part of the State, in Delaware, Bucks, Montgomery, Luzerne, and Chester counties. Most of these concerns have been chartered by one group of incorporators residing in Philadelphia and in Luzerne

County, and each company has a nominal capital stock of \$5000. These companies operate in different townships, supplying gas and electric power from central stations, not being in themselves operative companies.

Local builders are estimating on plans for a one and two-story factory building 136 x 176 ft., to be erected for the Manheim Belting Company, Manheim, Pa.

Cincinnati

CINCINNATI, OHIO, May 9, 1911.

Although business generally appears to be on the mend, a few machine tool builders have considered it expedient to operate their shops on short time. This action was decided on to reduce stocks on hand that have been steadily accumulating for several months. It is believed that this situation will be relieved anyhow by mid-summer, and probably before then if Congress would adjourn. The export demand continues good, and as the American Steel and Wire Company's list is expected to furnish some business for local tool builders the general feeling is optimistic.

Gas engines and small electric dynamos and motors are in demand. Inquiries for large units of power plant equipment are scarce and when a job does come in sight there is some spirited bidding to get it.

On the evening of May 5 the Toledo Electric Welder Company, Cincinnati, Ohio, demonstrated its different electric welding machines to the local stationary engineers. Others present included representatives of the technical press and of the University of Cincinnati. Among the machines that attracted particular attention was one for spot-welding sheets, which it is claimed will revolutionize the manufacture of sheet stoves and ranges.

It is announced that the Ohio Mechanics Institute will move into its new six-story home July 1. The machine shop will be equipped entirely with tools made in Cincinnati, donated by the manufacturers, which generous action on their part was accomplished through the efforts of a committee of the National Metal Trades Association's local branch. Fred A. Geier is chairman of this committee.

It is expected that a large number of Cincinnati engineers will attend the annual meeting of the American Society of Mechanical Engineers to be held in Pittsburgh May 30 to June 2. A. L. DeLeeuw, mechanical engineer of the Cincinnati Milling Machine Company, will read a paper on the "Design of Milling Cutters and Their Efficiency."

The United States Machine & Tool Export Company has been incorporated with a nominal capital stock of \$10,000. It is the purpose of the company to build up an export business in China for machine tools and railway equipment and supplies. A branch office will be established in Shanghai, China, and will be in charge of Fred J. Mitchell, of Portland, Ore. Headquarters will be in Cincinnati and temporary offices have been taken in the Lyric Theatre Building. The principal incorporators are William Haas, Fred Pagels, Jr., Reinhart Pagels, Spencer M. Jones and E. R. Passel.

In addition to its proposed repair shops, the Cincinnati Traction Company has decided to erect a large storage barn that will be 350 x 370 ft., one story and of brick construction.

The Zimmerman Boiler & Tank Works has been organized at Dayton, Ohio, by William M. Zimmerman. A site has been secured on which three manufacturing buildings will be erected at an early date.

There is an unconfirmed report that the Hamilton Caster & Mfg. Company, Hamilton, Ohio, intends to add to its manufacturing facilities. The company recently increased its capital stock from \$10,000 to \$30,000.

The Board of Trustees, Dayton State Hospital, Dayton, Ohio, will receive bids until May 23 for furnishing and erecting one 250-kw. direct current generator, direct connected to a slow speed Corliss engine. Specifications may be secured from A. F. Shepherd, superintendent of the hospital.

Architect B. S. Hughes, Commercial Tribune Building, Cincinnati, is inviting bids for the construction of a paper factory to be erected at Franklin, Ohio, for the Franklin Coated Paper Company, whose organization was recently mentioned. The new structure will be 90 x 360 ft., one story, with a power house 40 x 80 ft., all of regular mill construction. It is stated that not all of the equipment, which will largely be of a special nature, has yet been provided.

Work on the new addition to the Oakley plant of

THE MACHINERY MARKETS

the Cincinnati Milling Machine Company is now well under way, and the building will probably be under cover before August 1.

It is stated that the Wright Bros. have definitely decided to proceed with work on the proposed addition to their Dayton aeroplane factory, mentioned some time ago. E. W. Russ, Dayton, Ohio, is architect in charge of the plans.

The Mansfield Specialty & Machine Company is a new incorporation at Mansfield, Ohio, to take over the machine shop business of Krebs & Beilstein. The capital stock of the company is \$5,000.

The Smith & Johnson Mfg. Company is a new Cincinnati incorporation with \$15,000 capital stock and has taken over the business of Smith & Baxter, manufacturers and dealers in hardware specialties. No plans have been made for any immediate enlargement of present manufacturing facilities.

The Seufferle Cooperage Company, a new Cincinnati incorporation, has taken over the cooperage business of William Seufferle, and in a short time will commence work on a large factory for the manufacture of whisky barrels. Equipment for dry kilns and a large power plant will be required for the new plant.

It is reported from Portsmouth, Ohio, that the American Drying Machine Company, maker of dryers, cotton pickers and other machinery, has decided to locate its plant in Portsmouth, occupying quarters in the building of the Portsmouth Machine & Castings Company.

Cleveland

CLEVELAND, OHIO, May 9, 1911.

Business is not brisk in machinery lines, but there is some improvement over April in the volume of small inquiries. Dealers are figuring on considerable prospective business but orders are slow in coming out. Sales during the week were limited closely to single tools. April business footed up somewhat better than was expected during the latter part of the month, the volume being about the same as during March. Local builders of machine tools appear confident of an early increase in orders and are making considerable machinery for stock. Makers of turret lathes report a slight improvement in orders. The demand for handling machinery is light. The boiler trade is fairly active. The demand for second-hand machinery is only moderate. Conditions in the local foundry trade show little change. Orders for castings are mostly for small lots for early delivery, and with few exceptions foundries are not running at full capacity.

The Cleveland Motor Truck Company, Cleveland, expects shortly to buy some additional machine shop equipment, including a 30-in. boring mill, screw machine, tool room lathe and a turret lathe.

The Cleveland Railway Company is planning the expenditure of about \$2,500,000 in extensions and improvements during the coming year. A large portion of the expenditure will be for new cars and additional power equipment.

The Warner & Swasey Company, Cleveland, has practically completed a large addition to its plant. Additional machinery equipment will not be purchased for the present.

The National Tool Company, Cleveland, has purchased a site for a new plant in order to largely increase its capacity. Building operations will not be started for some time.

The Banner Electric Company, Youngstown, Ohio, will shortly begin the erection of an addition to its plant for the manufacture of globes for incandescent lights. The building will be about 150 x 230 ft., four stories.

The C. E. Squires Company, Cleveland, maker of steam specialties, has just completed a new plant at East Fortieth street and Kelley avenue. The building is 64 x 90 ft., one story.

The Plumbers' Fixture Mfg. Company, Cleveland, has been incorporated with a capital stock of \$10,000 by W. H. Dettlebach, W. J. Bergens, E. P. Strong, William McMahon and J. Grohs.

The Standard Sad Iron Company, Mansfield, Ohio, has been incorporated with a capital stock of \$2,000 by Fred D. Stotter, George H. Nagle and others.

With a capital stock of \$20,000 the O'Donnell Elevator & Machine Company, Cleveland, has been incorporated by J. P. O'Donnell, G. Brandenburg, John E. Nygren, J. L. Benson and M. H. Leonard.

The Canton Electric Company, Canton, Ohio, will build an addition to its power plant 72 x 124 ft. and is planning other improvements involving an aggregate expenditure of \$300,000. The new equipment to be purchased will include one 3000-hp. and two 6000-hp. generators.

The Director of Public Service, Toledo, Ohio, will receive bids May 26 for one rotary pump of 15,000,000 gal. daily capacity, direct connected to a vertical gas engine of sufficient capacity to operate on producer gas; also for one bituminous coal gas producer and accessories of approximately 400 hp. continuous capacity.

The Olive Machine Company, Ironton, Ohio, is planning extensive additions to its plant involving an expenditure of about \$50,000. A new building 80 x 200 ft. will be erected.

The Board of Trade of Massillon, Ohio, has made a proposition to Bertsch & Co., Cambridge, Ind., for the removal of their plant to Massillon. They make bending, shearing, punching and corrugating machinery.

The property of the Orrville Pump & Furnace Company, Orrville, Ohio, comprising a foundry and machine shop, has been sold at bankruptcy sale to the Citizens' National Bank of Wooster, Ohio, for \$6,850.

Chicago

CHICAGO, ILL., May 9, 1911.

Machinery dealers in the Chicago market are taking a decidedly more optimistic view of the business situation than for some weeks. This condition is not the result of large sales, but is rather due to a fair volume of business emanating from a variety of sources. Sales as a rule are small, but the number of purchasers is most pleasing. No new railroad lists have appeared during the week under review, but the Santa Fé is reported to be on the point of closing the purchase of its recently issued machine tool list, which totals about \$10,000. The American Steel & Wire Company is out with a list approximating about \$75,000, the great bulk of which is machine tools, but it also contains about \$5,000 worth of woodworking machinery. This equipment is intended for the various shops of the American Steel & Wire Company's plants in several States. Among the most interesting sales made in this market during the past seven days are \$4,000 worth of machine tools going to a manufacturer in Cuba and \$700 worth for export to Spain. Country business is very fair.

The Shirley Radiator & Foundry Company, Shirley, Ind., manufacturer of boilers and radiators, has just completed additions to its plant which will more than double its capacity. The buildings erected are of concrete construction, with walls seven feet high, the position above being entirely of glass. The company has increased its equipment for both boilers and radiators. An industrial track system has been installed throughout the entire plant, making it possible to deliver iron direct to the molding floor, and at the same time taking away the manufactured product. The company's shipping facilities have also been improved so as to load ten cars from the platform at one time without interfering with inbound freight. Additional warehouses are being erected and all departments are being enlarged.

New Athens, Ill., will expend \$35,000 for the installation of a water works system, contracts for which will be let in about 60 days.

The Bradley Polytechnic Institute, Peoria, Ill., is planning to erect during the coming summer a power house to be equipped with machinery of sufficient capacity to care for both its present and future needs. C. A. Hoppin is the architect in charge.

The H. W. Clark Company, Mattoon, Ill., has been incorporated with a capital stock of \$50,000. The incorporators are Horace W. Clark, Charles H. Tillotson and Dwight P. Child. The company will engage in general manufacturing.

The American Zinc, Lead & Smelting Company is preparing to erect a six-block zinc smelter at Hillsboro, Ill. W. F. Rossman, manager of the company's smelters in Kansas, will have charge of the building operations there. The plant, when completed, will save its sulphur fumes in the roasting of the blend ores and convert it into sulphuric acid.

Charles G. Shaw, Missouri City, Mo., is rebuilding his coal mining plant which was destroyed by fire about a month since.

The East St. Louis Cotton Oil Company, East St. Louis, Ill., has closed a deal for the remnants of the

THE MACHINERY MARKETS

plant of the Farmers' Union Gin & Milling Company, which was destroyed by fire last December.

Sealed bids will be received by North Mankato, Minn., until May 22, for the construction of a water-works system. Bids will also be received at the same time on electric pumping equipment consisting of two three-phase, 60-cycle, 220-volt motors, direct connected to single-stage centrifugal pumps. Alternate bids will be received on gasoline equipment, consisting of engine and triplex pump.

The Star Foundry Company, Albert Lea, Minn., is erecting a new foundry building, 60 x 160 ft., at Waterloo, Ia., into which it will move its plant when completed in the course of about 60 days. The building will be equipped with electric traveling cranes and will be located in North Waterloo.

The Antigo Water Company, Antigo, Wis., will construct a 400,000-gal. reservoir and make other improvements to its plant.

Preparations are being made for the consolidation of the International Hoist Company and the Pioneer Iron Works Company, both of Antigo, Wis. Improvements will be made and new equipment installed, but details have not been decided upon.

Jamestown, S. D., will extend its water-works system.

Detroit

DETROIT, MICH., May 8, 1911.

The first week of May, marked by excellent weather, has also been prominent for the large amount of spring orders. The automobile industry has been the recipient of many good orders and shipments were large. The auto equipment makers are still enjoying an excellent trade, and numerous new concerns are springing up through the State. The stove manufacturers of this city report very quiet conditions, with no large volume of new business in sight. Paper mills, principally in Kalamazoo, find trade dull, owing to the condition brought about by the reciprocity proposal. Building in this city is very active, with two new skyscrapers planned this week.

The Ford Automobile Company shattered all records in shipments of machines for April. Exactly 5430 cars were manufactured this month, which shows the prosperous condition of the automobile trade.

The Packard Automobile Company has plans completed for additions to its plant, in an effort to keep up with the demand for its new trucks. The additions will practically triple the capacity of the truck shops. A new foundry of 9600 ft. of floor space is one item, while additional floors to the service shops will bring the total of new floor space to 160,000 sq. ft.

The Solvay Process Company, of this city, is engaged in the construction of one of the largest additions to its mammoth plant of any undertaken in this city for several years. The building is an entire steel structure, three stories, and covering about seven acres.

A concern of some magnitude was organized at Grand Rapids this week, when the Keeler Brass Company filed articles of incorporation with the secretary of state. The company starts with a capital stock of \$250,000.

A fair-sized plant will be erected in this city by the Simplex Bolt & Nut Company, which filed articles of incorporation this week, with a capital stock of \$10,000. Frank H. Kimball and Edward Barret are the principal stockholders.

The branch plant of the Carter-Car Automobile Company, of this city, suffered a \$50,000 loss by fire this week. About ten cars were consumed in the blaze.

The Withington-Cooly Company, Jackson, Mich., will soon undertake some very important improvements. Entirely new buildings will be erected, allowing a floor space of 60,000 sq. ft. The company will install new hoistings and conveying machinery, and will add, when improvements are complete, 200 men to its working force.

The Board of Trade of Rochester, Mich., will raise \$15,000 to finance the organization of a gas engine concern, \$10,000 of which will be expended for machinery and equipment. The company will have a capital stock of \$25,000.

The Terrel Equipment Company, Grand Rapids, Mich., will shortly lease a new factory building, being erected by Caulfield & Co., to care for its increasing

business. The building is a two-story structure, 70 x 320 ft. The company makes steel lockers and other equipment.

The Advance Mfg. Company has located at Hastings, Mich., and will manufacture a suction sweeper, the invention of a local man.

The Duroy Mfg. Co., with mills near Cadillac, Mich., is building a reinforced concrete addition to its plant, 50 x 60 ft. in size. The company makes woolen goods.

The Schlitz Brewing Company, Grand Rapids, Mich., has secured building permits for the erection of a good-sized addition to its plant. The building will cost about \$6,000.

The Excelsior Wrapping Company, Grand Rapids, Mich., will soon commence the erection of a large addition to its factory at Godfrey and Hall streets. The structure is to be of brick, and will cost about \$5,000. This will give the company needed space for its growing business.

A comparatively new Grand Rapids industry is the Grand Rapids Hosiery Company, which at this time is growing at a rapid rate. The company started with 40 machines in March, and now has 69. It has just placed an order for 14 more, and will continue to increase its plant capacity as its business warrants it.

The New Holland Lumber Company, New Holland, Mich., filed articles of incorporation this week with a capital stock of \$25,000, and will commence the erection of mills and sheds at an early date. D. W. Jellama is a prominent stockholder.

The Grand Rapids Cigar Box Company, Grand Rapids, Mich., is undertaking some important improvements to its plant. A three-story brick factory addition is to be erected immediately, to cost \$10,000.

The Detroit Free Press Company, of this city, has commenced the construction of a fine new office building that will also contain the printing plant. The new plant is to be one of the most modern and perfect that money can buy, including presses, typesetting machines and stereotyping outfits. The work of printing the paper has heretofore been in the hands of the Record Printing Company.

The plant of the Charlotte Mfg. Company, Charlotte, Mich., which was closed down several weeks ago, has resumed operations with plenty of orders on hand and a full force.

The Bauer Metal Body Company, Detroit, is seriously considering the moving of its plant to Big Rapids, Mich. It is understood that the removal rests upon the lease of its buildings in this city.

An industry of importance to the auto accessory trade of this city is the new Michigan Bow Socket Company, which filed articles of incorporation this week. The company has a capital stock of \$15,000.

A new paint and enamel manufacturing company, of Kalamazoo, Mich., is the American Enamel Company, incorporated with a capital stock of \$10,000.

For the purpose of caring for more trade and for the purpose of new machinery, the Coopersville Creamery Company, Coopersville, Mich., has increased its capital stock from \$18,000 to \$36,000.

Extensive improvements are in contemplation at the Caro plant of the Michigan Sugar Company. The company will add three new pulp presses to the battery of five already in use.

A good-sized woodenware plant is to be built at Munising, Mich. The financing of the plant will be taken care of by the Business Men's Association.

The Scott-Lutgers Company, Holland, Mich., is planning the erection of a new planing mill for interior finish material. The mill will be built on the shore of Macatawa Bay.

The Michelson Lumber Company, operating two mills at Michelson, Mich., the new lumber town at Houghton Lake, may erect another mill there this season. Plans are being considered.

Augustus Kitzinger, Charlevoix, Mich., is at the head of a company planning to finance the erection of a new \$50,000 mill on Beaver Island. A mill on this site was destroyed by fire last winter.

The Excelsior Foundry Company, Bay City, Mich., whose plant was recently destroyed by fire, states that it will rebuild on a much large scale, of steel and concrete construction. The company will probably be in the market for traveling crane and some other equipment. A steel converter may also be installed, but this has not been definitely decided upon.

THE MACHINERY MARKETS

Indianapolis

INDIANAPOLIS, IND., May 9, 1911.

The Automatic Machinery Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture automatic bottle machinery. The directors are John J. Gaynor, E. W. Miller and Clifford Remler.

The Russel Windstacker Company has been incorporated at Indianapolis, with \$100,000 capital stock to manufacture windstackers and other agricultural machinery. H. A. Russell is president of the company.

The Arbogast Aero Company, Anderson, Ind., has been incorporated with \$10,000 capital stock, to manufacture air craft. The directors are Ernest W. Daniel and John R. Arbogast.

J. A. Swinehart, Akron, Ohio, has bought the Goshen Rubber Works, Goshen, Ind., from the receiver, George R. Harper.

J. L. McCulloch, Marion, Ind., has secured a franchise in that city for an artificial gas plant, which is to be in operation within a year.

The Spencer Construction & Equipment Company, Rockport, Ind., has been incorporated with \$25,000 capital stock as a general contractor. The directors are B. F. Huffman, R. S. Crowder, E. P. Cox, J. G. Rieusted and H. C. Watkins.

Two receivers have been appointed for the Jenney Electric Mfg. Company, Anderson, Ind., the Security Trust Company, Indianapolis, and J. J. Netterville, Anderson.

Flavius J. Jackson, receiver for the Home Heating Company, Anderson, has been ordered by the court to sell the plant. The prospect is that it will be purchased by local capitalists, who will organize a new company and rebuild and enlarge the plant.

The Commercial Club of Greenfield, Ind., has contracted with the American Roller Screen & Stamping Company for the establishment of a plant there to manufacture patent roller screens. The company will employ 50 men.

The Builders' Supply Company, Indianapolis, has changed its name to the Capital Builders' Supply Company.

The James C. B. Beatty & Sons Mfg. Company has been incorporated at Frankfort, Ind., with \$10,000 capital stock, to manufacture kitchen cabinets and other furniture. The directors are J. C. B. Beatty, G. K. Beatty and G. O. Beatty.

The Terre Haute Manufacturers' Club, Terre Haute, Ind., has elected the following officers: President, Charles W. Hoff; vice-president, T. F. Grover; secretary, W. C. Ball; Treasurer, D. C. Worsham.

The S. J. Gardner Foundry & Machine Company, New Albany, Ind., has been incorporated with \$50,000 capital stock. The directors are S. J. Gardner, F. S. Sisloff and Margaret C. Gardner.

Fred S. Hunting, Ft. Wayne, Ind., has been appointed receiver of the Angola Railway & Power Company, Angola, Ind., which operates the street railroad lines there and the electric light and waterworks system.

The Monarch Cut Stone Company, Clear Creek, Ind., has been incorporated, with \$25,000 capital stock, to manufacture building stone. The directors are A. Lawson and James Lawrence, of Bloomington, Ind., and C. H. Moline, Clear Creek.

The Calumet United Railways Company, a \$5,000,000 corporation, with C. H. Geist, of Philadelphia, at the head of it, has been granted a 50-year franchise to operate a street railroad in Gary, Ind. The system to be built will give Gary connection with Chicago.

The Terre Haute Electrical Porcelain Company, Terre Haute, Ind., has been incorporated with \$25,000 capital stock to manufacture electrical porcelain. The incorporators are William H. Glover, J. G. Hamilton and E. R. Coleman.

The Carbo Light Company, Anderson, Ind., has been incorporated with \$30,000 capital stock to manufacture automobile lighting devices. The directors are E. S. Albright, P. H. Doyle, A. A. Beckman, E. W. Fenwick and G. R. Burkdoll.

The Jones Automatic Measuring Pump Company, Shelbyville, Ind., has increased its capital stock from \$25,000 to \$35,000. T. E. Goodrich is president of the company.

The Richmond Lamp Mfg. Company, Richmond, Ind., has been incorporated with \$50,000 capital stock to manufacture carriage and other lamps. The directors are James M. Judson, F. W. Judson and Henry Wetzell.

The Goshen Churn & Ladder Company, Goshen,

Ind., has commenced work on the construction of a new factory building, 64 x 165 ft., two stories, which will triple its present floor space. A new engine and boiler room will also be erected and equipped with new boilers and an engine of 100 to 150 hp., the type of which has not yet been determined upon. New dry kilns will also be installed.

The Frank Prox Company, Terre Haute, Ind., manufacturer of steam and hot water boilers, hot water heaters and plumbing, steam and gas fitting supplies, will commence work in the near future on the construction of three factory buildings to be completed by August 1. One of the buildings will be 80 x 400 ft., one story, and the other two 80 x 200 ft. The buildings will be constructed with steel sash. The site upon which they are to be erected consists of nine acres. It is the intention of the company to install its present equipment in its new plant and purchase new equipment sufficient in quantity to increase its output about 50 per cent.

St. Louis

ST. LOUIS, MO., May 8, 1911.

The Zwallo Light, Ice & Power Company, St. Louis, has been incorporated with a capital stock of \$25,000. The incorporators are William D. Stock, John W. Stock and James A. Steele. The company will engage in manufacturing gas and electricity for light, heat and power, and also manufacture ice.

The American Co-operative Union Supply Company, St. Louis, has been incorporated with a capital stock of \$5,000. The incorporators are William S. McAdams, Louis A. Ragan and John P. McDonough. The company will engage in the manufacture of household supplies.

The U-need Sanitarium & Manufacturing Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are Ida R. Cook, James H. Campbell and John Kean. The company will engage in the manufacture of toilet articles.

The American Presta Vending Machine Company, St. Louis, has been incorporated, with a capital stock of \$100,000. The incorporators are William H. Palmer, Joseph Laeckener and J. W. George. The company will engage in the manufacture of automatic vending machinery.

General Manager Tyler, of the St. Louis & San Francisco Railroad, recently visited Rolla, Mo., for the purpose of conferring with the business men of that town with reference to the location for a new bridge to span the Little Piney River at that place. It was finally decided to locate it at or near the present swinging bridge.

The King Foundry Company, St. Joseph, Mo., has been incorporated with a capital stock of \$15,000. The incorporators are Oliver M. King, David E. Heaton and Lewis Siegel.

The Lafayette Coal & Brick Company, Kansas City, Mo., has been incorporated with a capital stock of \$150,000. The incorporators are H. P. Allen, S. E. Snyder and J. E. Wilson.

The Randolph County Gas & Electric Company, Moberly, Mo., has been incorporated with a capital stock of \$100,000. The incorporators are Thomas F. Fulkerson, Walter C. Duncan and James T. Menefee.

The Garden City Buggy Company has completed arrangements for the removal of its factory from Garden City, Mo., to Fort Smith, Ark., where it will erect a new plant, the main building of which will be 100 x 200 ft., three stories. The factory is to be completed in time for occupancy October 1. Considerable more equipment than is used in the present plant of the company will be required.

A Kirksville, Mo., manufacturer of cash registers is negotiating with the Commercial Club of Rogers, Ark., with a view to securing a location there.

The electric light plant at Fort Scott, Kas., was destroyed by fire May 2. The loss was \$75,000. The plant was owned by John E. McKinney and others, of St. Louis.

The Red Fork Gin & Milling Company, Red Fork, Okla., has been incorporated with a capital stock of \$4,000. The incorporators are O. C. Brooks, R. M. Brown and George Sawyer.

The Wood-Knight-Hawk Company, Oklahoma City, Okla., has filed articles of incorporation with \$400,000 capital stock. The company will manufacture a motor

THE MACHINERY MARKETS

plow recently invented and known as the Alltivor, and will begin the construction of a factory in the near future, and will be in the market for all the machinery required for its equipment. H. D. Knight, a wealthy capitalist of Oklahoma City, will be president of the company. Other stockholders are H. B. Wood, Homer H. Dunlap and F. J. Hawk.

The Oklahoma Lightning Arrester Company, Tulsa, Okla., has awarded a contract for the erection of a two-story factory building at a cost of \$12,000.

The South

LOUISVILLE, Ky., May 9, 1911.

Business locally remains rather quiet, as far as the booking of new orders is concerned. Reports still emphasize the fact that there is plenty of business in prospect, although buyers seem to be hesitating about closing for equipment. There has been a lull in the demand for boilers and other power equipment. Quarrying and crushing machinery, on account of the activity of road building in this section, is selling in volume.

The Carbondale Machine Company, Carbondale, Pa., is installing refrigerating machinery in the plant of the Fetter Heating & Lighting Company, Louisville.

The Defiance Machine Works, Defiance, Ohio, has secured the contract for the installation of rim manufacturing machinery in the plant of the Kentucky Rim & Shaft Company, Louisville.

The Brinly-Hardy Company, Louisville, manufacturer of farm implements, is preparing to close for a number of machines to be installed in the forging department, including drophammers, bulldozers, &c.

The Brandeis Machinery & Supply Company, Louisville, has secured the contract for equipping the rock-crushing plant of the Kentucky River Stone & Sand Company, Lawrenceburg, Ky. This concern has been incorporated with \$15,000 capital stock by E. W. Ripy, William Edwards and J. C. Ripy.

Although it will not need the equipment in the immediate future, the Kentucky Electric Company, Louisville, has drawn plans for a coal crushing and conveying plant which is to be installed in its new plant later on.

The University of Louisville, of which John Patterson is dean, will require some equipment for its electrical department, which will be fitted up in connection with the engineering courses which have been planned for the coming session.

Machinery men interested in the coal mines of eastern Kentucky-Tennessee have learned of the consolidation of many of the most important properties in that section under the name of the Continental Coal Corporation, which has a capital stock of \$3,000,000 and will issue \$3,000,000 of bonds. Chattanooga and Louisville capital controls the new company, of which Eagle Martin is President and general manager, with headquarters at Chattanooga. The company has 30,000 acres of coal lands and owns 11 miles of railroad.

Work has been begun, it has been announced, at the New Decatur, Ala., shops of the Louisville & Nashville Railroad, on the safety appliances which are to be installed on the freight cars of the road. The changes are being made at heavy expense.

The Selden-Breck Construction Company, St. Louis, Mo., has been awarded the general contract for the erection of the 10-story annex of the Weissinger-Gaulbert apartment house at Third street and Broadway, Louisville. The contract amounts to about \$250,000. Contracts will be let by the company for the elevators and other equipment of the building in the near future.

Adam Vogt has purchased the plant of the old Northern Lake Ice Company, at Sixteenth and High streets, Louisville, from the Merchants' Ice & Cold Storage Company. It is probable that improvements will be made and the plant put into operation again.

The Kentucky Foundry Company, Eddyville, Ky., has filed a certificate of dissolution.

The Luton Coal Company has been organized at Providence, Ky., and will begin the development of 500 acres of coal lands at once. R. W. Hunter, J. E. Morgan and S. K. Luton are interested.

The Dyeoplane Company of America has been incorporated at Newport, Ky., with \$50,000 capital stock by Cleveland H. Dye, J. Frank Dye and E. P. Taylor for the manufacture of aeroplanes. The company will require some wood-working machinery for its plant, which will be erected in July. The address of the concern is 502 Monmouth street, Newport.

The United Water, Light & Traction Company, Somerset, Ky., which recently took over the public service corporations of Somerset, has begun plans for improvements, which will include adding to the equipment of the power house of the street railroad. The water plant is to be given an enlarged reservoir capacity.

The Model Laundry & Cleaning Company has been organized at Hopkinsville, Ky., with \$10,000 capital stock by S. D. Langley, of Madisonville, Ky., and others. A building is now being erected and power equipment and laundry machinery will be purchased at once.

The fiscal court of Henderson county, at Henderson, Ky., is to let contracts for the erection of 14 steel bridges in the near future.

C. E. James and others have secured a franchise at Chattanooga, Tenn., for the construction of an electric line in the city and suburban roads leading out from it. Work must be begun in the next six months. The company to be formed will have no connection with the Chattanooga Railway & Light Company, so that it will build its own power-house.

The Lexington Ice Factory Company has filed articles of incorporation at Lexington, Tenn., with \$5,000 capital stock. C. P. Wilson and Davis E. Aden are interested.

The Champion Lumber Company has acquired the Tennessee & North Carolina Railroad Company and is planning extensions into its timber holdings, which are to be developed on a large scale. Its big sawmill at Crestmont, N. C., is to be greatly enlarged.

New machinery is to be installed in the plant of the Humboldt Marble & Granite Works, Humboldt, Tenn. The floor space of the plant will be doubled.

The Memphis Automobile & Garage Company has been incorporated at Memphis, Tenn., with a capital stock of \$150,000. A large repair shop is to be equipped. The incorporators of the company are J. W. Falls, R. H. Lake, N. C. Perkins, S. T. Carnes and E. B. LeMaster.

W. W. Hendrix, Cookeville, Tenn., is to build an electric light and power plant at Livingston, Tenn. He is planning the development of several water power sites near Cookeville.

The Tennessee Cotton Oil Company, Memphis, Tenn., is to install machinery for the manufacture of fertilizer and the ginning and baling of cotton. It has filed an amendment to its charter providing that it may engage in these businesses.

Announcement has been made that the J. A. Wilkinson Lumber Company, which has been incorporated with \$100,000 capital stock at Bristol, Tenn., will require no equipment, as it will take over the sawmills of J. A. Wilkinson.

The Hager-Elliott Engineering Company is erecting a plant at Nashville, Tenn., for the practice of automobile engineering of all kinds. It has maintained a large automobile garage and repair shop for some time. A new building of reinforced concrete and brick is now being put up.

A cement mill will probably be established at Lime-stone, Tenn., by N. A. Morelock, who is inquiring for prices on crushers, burners, grinders and other equipment for a plant of that character.

The Cookeville Roller Mill, Cookeville, Tenn., is planning to increase its capacity considerably.

Machine tools and other equipment are wanted by the Mt. Pleasant Auto & Machine Company, Mt. Pleasant, Tenn., which was recently incorporated with \$5,000 capital stock. J. P. Warnack is manager of the company.

The Roberts & Schaefer Company, Chicago, Ill., has been given the contract for the construction of a coaling station with 500 tons capacity for the Queen & Crescent Route at Montlake, Tenn. Conveying machinery will be required.

J. A. Shull, Neva, Tenn., is in the market for a gasoline engine to furnish the power for a threshing machine.

J. M. Camerson, Johnson City, Tenn., has invented a universal nozzle for use on fire hose. Arrangements are being made for its manufacture, following several successful demonstrations.

The Thompson Electric Clock Company has been incorporated at Memphis, Tenn., by W. H. Thompson and others with a capital stock of \$1,000.

It is reported that a company will be organized at Johnson City, Tenn., for the construction of an electric interurban line between that city and Newport, Tenn.,

THE MACHINERY MARKETS

a distance of 55 miles. If the plans are carried out a hydro-electric power plant will be built at Embreville, on the Chucky River. The proposed capital stock of the company is \$100,000.

Knoxville, Tenn., is a good market for smoke consumers at present, as the result of a campaign which is being waged. The Knoxville Railway & Light Company has equipped its eight boilers with consumers.

The Lake County Mfg. Company, Tiptonville, Tenn., is in the market for a pump and other well-drilling machinery.

Ashdown, Ark., is contemplating the construction of municipal electric light and water plants.

Quitman, Ga., is in the market for an engine and dynamo of limited capacity.

F. S. Twitty is organizing a company for the establishment of an electric power plant to cost \$15,000 at Columbia, Ala.

The municipal water works, Mena, Ark., is to be rebuilt at a cost of \$60,000. Winters & Dove, Fort Smith, Ark., are drawing plans for the work.

The American Granite Company is being organized at Augusta, Ga., with a capital stock of \$600,000, for the development of 100 acres of granite property near Augusta. Charles F. McKenzie will be president of the company, which will install a modern plant.

A compound condensing steam turbine plant is to be built at North Montgomery, Ala., by Richard Tillis, of the Citizens' Light, Heat & Power Company, Montgomery. Contracts for the equipment are now being let.

A machine shop is being built at Madisonville, Ga., by the Madisonville Auto & Machine Company, of which O. L. Hedenburg is manager.

A jet type condenser to cost about \$25,000 is to be purchased by the Montgomery Light & Water Power Company, Montgomery, Ala. H. W. Scott is general manager.

The Westbrook Mfg. Company, Jackson, Miss., will buy a chain mortiser and other woodworking machinery.

A 20-h.p., three-phase motor is wanted by the Capital Mfg. Company, Jackson, Miss. Address J. M. Hartfield, president.

The city of Swanquarter, S. C., will open bids May 16 for the installation of a pumping plant, including suitable pumps, engines and boilers, to discharge 1800 cu. ft. of water per second against a head of 8 ft. J. O. Wright, Tallahassee, Fla., is consulting engineer.

The town of Fort Valley, Ga., has voted for the issuance of \$40,000 of bonds for the construction of a water works system.

The city of Oglethorpe, Ga., has voted \$18,000 of bonds for the construction of a water works and electric light plant. Bids will be opened June 1 by the Mayor, J. P. Nelson.

The Gulf Machine Works, successor to the Gulf Machine & Auto Works, Tampa, Fla., has about completed the construction of its new building and will be in the market shortly for one radial drill with 4 or 5 ft. arm, a boring mill with 8-ft. swing and a 40-in. planer.

Western Canada

WINNIPEG, MAN., MAY 5, 1911.

The Sandstone Brick & Sewer Pipe Company, whose works are 20 miles south of Calgary, Alberta, and whose head office is in that city, will be ready to begin manufacturing operations in July. Some of the machinery has arrived and more is on the way.

The Commissioners of Edmonton, Alberta, have referred to the superintendent of works the tenders received for the power machinery. Owing to delay on the part of the municipal authorities it is found that the mixed pressure turbines cannot be installed in time to be in use next winter. As the high pressure turbines can be set up before the end of the summer it has been decided that this type of machine will be preferred for part of the plant and a 1,200-kw. high pressure turbine is to be purchased from the Allis Chalmers Company.

The Esquimault Graving Dock & Shipbuilding Company, Victoria, B. C., is now in a position to proceed with the great works it proposes to establish at Esquimault, B. C. An order in council has been passed by the Dominion government granting the company the benefit of the arrangement provided for by Parliament last year—namely, the paying by the government of 3½ per cent. per annum for 35 years upon the total cost

of the dry dock and ship repair plant. According to the estimate of the Public Works Department's engineers, the dry dock, wharf, repair machinery and buildings will cost \$2,637,800. The promoters are the Bullens, well-known shipbuilders on the Pacific Coast, and with them are associated in the company the Denny Bros. of Dunbarton, Scotland.

It is stated that the National Transcontinental is about to give out a contract to build car shops and other works at Winnipeg, to cost \$2,500,000.

R. B. McArthur, Deseronto, Ont., is negotiating with the municipal authorities in Port Arthur, Ont., to establish a match factory there to employ 200 hands.

Eastern Canada

TORONTO, ONT., MAY 6, 1911.

Fine weather has had a wonderfully accelerating effect upon trade that was already rather active. The season is now completely open, navigation having got started on the Lakes and St. Lawrence, seeding being nearly over, and growth well advanced in various parts of the country. It will need an additional strong wave of British capital to supply the funds required for current business. Capital, of course, is not brought into the country to be used merely as advances and current loans to business men, but there has been a large incidental use of money borrowed abroad in recent years. The various large borrowings or flotations have brought in scores of millions as the result of our financial operations in several cases. The Dominion government, or the particular Provincial government, or the railroad company, or other large corporation, could not spend the money in a period much shorter than two or three years, as the work to which it was being applied would be very extensive. Thus there would be lying on deposit in the banks large balances to the credit of such importers of capital. But as the works were being carried out the capital became absorbed, and the extra quantity of funds that had been at the disposal of the banks for current business needs became much smaller. There will be great replenishments, however, as the result of forthcoming issues, and then the banks will be in a position to take better care of manufacturing and mercantile customers. There is a present danger of a perceptible money shortage. The strike of the structural steel workers, though the number of them is not great, is disturbing, as it arrests the work of other bodies of men in the building trades. There is an expectation of a strike on the part of the brass moulders of Toronto.

Work has begun upon the construction of the Canadian General Electric Company's new lamp department building at its plant in Peterborough, Ont.

The Blairton iron mines, in the township of Belmont, Ont., have been taken over by a company known as the Blairton Iron Mines Company of Toronto, the price paid, according to current report, being \$75,000.

Dredging has been commenced at Longue Pointe, Montreal, on the site chosen for the large dry dock to be constructed at that city.

It is announced by the Industrial Commissioner of Brantford, Ont., that a Canadian branch factory will be established in that city by the Buffalo Brake Beam Company. The coming of the branch is a consequence of the large railway development in this country.

The Bain Wagon Company, Woodstock, Ont., will extend its buildings and enlarge its equipment sufficiently to add employment for 50 to 75 more hands. It will then have about 400 men at work. The company will also erect a large warehouse in western Canada this summer, either at Winnipeg or Calgary.

The Canadian Light & Power Company, Montreal, has applied to the Dominion government for permission to build a dam on the St. Lawrence, from Coteau du Lac to Clark's Island. The purpose is to develop 62,000 hp. Sluiceways would be put in for the passage of boats. The application was opposed by the Cedar Rapids Power Company, the Beauharnois Power Company, the Richelieu & Ontario Navigation Company and the Dominion Marine Association. Sir Wilfrid Laurier, Premier of Canada, promised that a commission would be appointed to inquire into the whole question of St. Lawrence River dams and effect on navigation.

The tenders for the construction of the four cruisers and six destroyers required for the Canadian navy are now in the hands of the Dominion government. It is said that six firms tendered. These are named as fol-

THE MACHINERY MARKETS

lows: The Swan, Hunter, Wigham, Richardson Company, Vickers-Maxim Company, Armstrong Shipbuilding Company, Harland & Wolff and Fairfield Company. As the ships must be built in Canada the successful tenderer or co-operating tenderers must build works in Canada.

G. M. Berry, secretary of the Thomas B. Jeffrey Company, Kenosha, Wis., was in Ottawa, Ont., some days ago. He says that the company will open in Canada two selling branches, one of which will be in Winnipeg, the other in Toronto, Ottawa, or Montreal. If the business warrants it this departure will, he says, be followed by the establishment of a plant in Canada to make the company's Rambler automobiles.

The Canadian Westinghouse Company, Hamilton, Ont., has taken out a permit to erect an addition to its pattern shop and an addition to its machine shop, at a cost of \$65,000.

The Jules Motor Company, Toronto, is negotiating with the municipal authorities of Peterborough, Ont., to establish works in the latter city.

The large extension to the Canadian Pacific Railway Company's Angus locomotive works, at Montreal, is nearly finished.

The City Council of Toronto is about to advertise for tenders for the supplying of a long intake pipe, 6 ft. in diameter, for the municipal waterworks. Sufficient time is to be given for local agents of British houses to get the contract before their principals.

M. J. O'Brien has obtained the contract to build the 56 miles of the Quebec & Saguenay Railway from a point near Ste. Anne de Beaupré to Murray Bay, Que. The work is to be finished by September, 1912, and is to cost \$2,000,000.

Plans for the greatest railroad shops in Canada outside of Winnipeg have been prepared for the National Transcontinental Railway Commission. The shops are to be built near Quebec city. It is announced that tenders will be called for at the end of this month for the construction of the Grand Trunk Pacific Railway station at Quebec city, and that tenders for the shops mentioned will be advertised for soon afterward.

The following concerns in Berlin, Ont., are extending their plants: Lang Tanning Company, Kaufmann Rubber Company, D. Hibner Furniture Company, T. McBrien Trunk Company, Western Shoe Company, Interior Hardwood Company, Walker Bin Company and C. H. Doerr & Co. The Brierthaupt Leather Company is branching into the manufacture of shoe counters and tap soles. The Cloisonné Glass Company and the Onward Mfg. Company—which makes sliding furniture, stoves and vacuum cleaners—will erect new factories in Berlin. The Canadian Pyroflutout Flooring Company has started into business there with a capital stock of \$50,000.

The Grand Trunk Railway Company will spend \$10,000,000 upon the improvement of its terminal facilities at Montreal. Plans have been laid before the Railway Board of Canada and before the City Council of Montreal.

The laborers employed in the foundry of the Mal-leable Iron Works, Smith's Falls, Ont., have struck for an increase of 15 cents per day. About 360 men are affected.

The Canadian Steel Foundry Company has given contracts for the construction at Welland, Ont., of several new buildings, to cost about \$250,000, and afford employment for about 50 per cent. more labor.

It is expected that the International Tool Steel Company's plant, in Port Hope, Ont., will be completed in June.

Large additions are planned at the Standard Ideal Company's works in Port Hope, Ont.

The Sunbeam Incandescent Company of Canada, Toronto, has purchased land near its present premises, on which to extend its plant. The new building is to cost \$225,000.

Rails for the municipal street railway the City Council of Toronto is to build in certain sections not served by the Toronto Railway Company have been ordered from the United States Steel Products Company.

The Dominion Government is now having the boxes and equipment used in the rural mail delivery service manufactured in Toronto, whereas up to the present it imported the boxes from the United States.

The contract for the 3,300,000-gal. pump, 250-hp. turbine and an electric traveling crane for the equipment of the new water-works pumping station at Welland, Ont., has been awarded by the water commissioners to the Canadian Boring Company, Toronto.

The contract for construction of the new plant of the Page-Hersey Iron Tube & Lead Company, at Welland, Ont., has been awarded to David Dick & Sons, of Welland, at \$151,000.

Texas

AUSTIN, TEXAS, May 6, 1911.

The continued rains that lasted all through April and during the first few days of the present month caused a temporary dullness of trade that was felt by machinery dealers. It is expected, however, that with the unusually bright prospects that now exist for a good crop season business in all lines will exceed that of any previous year in the history of the State's industrial development. Many large manufacturing and other enterprises that will require considerable machinery are being planned and will probably be in a fair way of consummation before the year comes to a close.

The Clark & Boice Lumber Company, Jefferson, is making improvements to its lumber mill and extending its logging road, preparatory to resuming operations on a larger scale.

The Land Milling Company, Marshall, Mo., and Neodesha, Kan., will install a branch plant at Texarkana at a cost of about \$30,000.

Luckett Bros. are arranging to install a general automobile and machine repair shop at Coleman. The building is now being erected.

The Caney Valley Truck Growers' Association and the Commercial Club of Wharton, are promoting the establishment at that place of a crate, barrel and box factory of a capacity sufficient to meet the demands of the truck growers of that section.

The city of Jacksboro has finished the construction of the new reservoir for its water works system, and the erection of a large standpipe and laying of mains for the distributing system will soon be started. The cost of the improvements will be about \$30,000.

A cotton gin will be built at Bay City by James Rugeley, at a cost of about \$8,000.

The Farmers' Union Gin Company that was recently organized at Walsh, will build a cotton gin. W. G. May, Sam Lester, U. C. Bennett and E. C. Jones are interested.

The City Council of Clarksville is arranging to extend the mains of the water works distributing system and make improvements to the pumping plant. Bonds have been voted for these purposes.

The Southern Hay Press Mfg. Company will establish a large factory at Houston for the manufacture of hay presses. The company's present headquarters are at Silver Creek, Miss.

W. H. Milliken, of Tulsa, Okla., who recently purchased the Black ranch of 22,000 acres, situated near Cotulla, Texas, will construct a large system of irrigation and establish a town upon the land. He has also taken preliminary steps toward the construction of a railroad between Aransas Pass and Eagle Pass, about 300 miles. The route of the proposed line is through his ranch.

The stockholders of the Brenham Cotton Mills, of Brenham, who recently acquired that plant for \$18,500 at sheriff's sale, are preparing to reorganize the company and install new machinery. The mills will be entirely overhauled and placed in operation on an enlarged scale.

Mayor A. P. Wooldridge, of Austin, has under consideration plans for the construction of an extensive sewer system for this city. It is probable that the present private sewer system of the town may be taken over by the city.

The city of Bonham has under consideration the matter of issuing \$30,000 of water works and improvement bonds.

The City Council of Bryan has closed the deal that has been pending for some time for the purchase of the local electric light and power plant. Improvements and extensions will be made to the property.

W. D. Shelly, of Austin, and associates, are promoting the construction of an electric street railroad system for the western part of the city. The proposed line will be about two miles long and will connect a residence district with the business part of the city.

The Whitewright Farmers' Co-operative Ginning Company has been organized with a capital stock of \$6,000 for the purpose of installing a cotton gin at Whitewright. The incorporators are E. Edens, J. L. Denton and A. C. Keeling.

W. M. Grant, of Cleveland, Ohio, will build an ice

THE MACHINERY MARKETS

plant and an electric light and power plant at Fort Stockton.

A. B. Crawford, of San Antonio, contemplates an electric light and power plant at Floresville.

Additional machinery will be installed in the municipal water works plant at Brownsville.

The Breckenridge Townsite Company has let the large cotton gin at Clarksville.

The Clarksville Cotton Oil Company will build a contract to A. J. Curry for the construction of a dam 900 ft. long for the purpose of forming a large water storage reservoir at Breckenridge.

The City Council of Pecos is negotiating with the Fountain-Shaw Engineering Company, Dallas, for the construction of a water works system at that place. The water supply will be brought to the city through a pipe line 10 to 14 miles long.

M. B. Goldenberg and associates, who are preparing to construct an extensive system of irrigation near Tucumcari, N. M., are having surveys made with the view of determining the feasibility of running a tunnel through the range of hills two miles east of the proposed dam site and convey the water through it. The dam will be constructed at Pajarita, 10 miles from Tucumcari.

The preliminary contracts for the erection of a beet sugar factory at Portales, N. M., by the American Beet Sugar Company, to cost about \$1,500,000, have been signed. Farmers have pledged the company 30,000 acres of sugar beets. Many irrigation pumping plants will be installed to provide water for the beet crops.

I. G. La Fite, of Denver, Col., who has acquired the electric light and power plant at Tucumcari, N. M., from W. F. Buchanan, W. A. Jackson and W. H. Fuqua, will make improvements and enlargements at a cost of \$10,000.

The taxpayers of Tucumcari, N. M., have voted favorably on the proposition to acquire the local water works plant and distributing system. Bonds to the amount of \$75,000 will be issued to pay for the plant and to make improvements and extensions.

It is announced that good progress is being made with the plans for the construction of a great system of irrigation and the installation of a hydroelectric plant on the Devil's River, near Del Rio, by D. B. Chapin, Edinburg, and associates. The preliminary estimates of the engineers who are making the surveys place the cost of the proposed enterprise at approximately \$4,000,000. It is stated that more than 200,000 acres may be irrigated from one reservoir that is to be formed by constructing a large dam across the river, and that this water power will generate upwards of 50,000 hp. of electrical energy.

William Cameron & Co. have bought a large tract of land in Waco, and will erect a manufacturing plant there.

The Pacific Coast

SAN FRANCISCO, CAL., May 2, 1911.

April closed with a very satisfactory volume of business in the machine tool trade, and so far the buying movement is well maintained, though reports from many shops indicate rather quiet conditions in manufacturing lines. Most of the sales have been made from the floors of local dealers and no individually notable transactions have been closed. The automobile repair business is more of a feature than for some months past, and while one of these shops only requires three or four small tools, the aggregate of this business is of some importance. Sales of larger tools are only of a scattering nature. A few shops are figuring on some important improvements, but no actual business is likely to result for some time.

While there is no general demand for new wood-working machinery, several orders for large machines of high capacity have been placed by the leading mills. Logging is being resumed on a larger scale in both coast and mountain districts and a renewed demand for general logging equipment is expected within the next month.

The lines of machinery in heaviest demand at present are pumps and gas engines, manufacturers of these articles being fully occupied. Pumping machinery is especially active with the approach of summer, owing to the increasing area of land under irrigation. A good many orders for large pumps are also being placed by mining interests. Gas engines are largely used in connection with pumps, but the use of electric power is increasing in some localities. Business in other lines

continues on about the same scale as last month, with less improvement than was expected. There has been no general demand for road machinery, though considerable activity is anticipated for the summer months.

The creditors' committee in the matter of the G. W. Price Pump Company reports the company's assets at \$48,844 and liabilities at \$75,440.

The George E. Dow Pumping Engine Company is working on a large outfit for the California Oil Fields, Ltd., San Francisco, including a complete fuel oil burning set, a 500 sq. ft. suction surface condenser, a 6½ x 5 x 10-in. horizontal air pump, two 140-hp. Parker water-tube boilers, a 12 and 22 x 10 and 18½ x 18-in. two-stage cross compound steam air compressor, two boiler feed pumps and a 16 and 24 x 5½ x 18-in. horizontal compound duplex crank and flywheel pumping engine.

The furnace building and warehouse of the Illinois-Pacific Glass Works, this city, was destroyed by fire on the morning of May 1. The value of the property destroyed is said to be over \$300,000.

Considerable contractors' equipment will probably be required for work in connection with the Sacramento Valley Irrigation Company, which has asked for bids on the excavation of 1,500,000 cu. yd. of earth on its canal near Willows, Cal. The letting of the work, however, is contingent on the settlement of several right-of-way controversies.

Louis Brenneis and associates, interested in a machine shop at Oxnard, Cal., have incorporated as the Brenneis Mfg. Company, with the object of adding a foundry and enlarging the shops. The company specializes on the manufacture of implements for use in the bean and sugar beet industries.

The Western Refrigerating Company has ordered a lot of ice machinery, etc., for the improvement of its plant at Petaluma, Cal.

The Sunrise Mine, near Placerville, Cal., is remodeling its mill and installing a new 10-stamp outfit.

The King Machine & Mfg. Company has been incorporated at Los Angeles, Cal., with a capital stock of \$50,000 by S. W. King, J. E. Atkins and E. Toley.

The water commissioners of San Bernardino, Cal., have let a contract for a number of pumps and motors to the George E. Dow Pumping Engine Company, San Francisco. Fairbanks-Morse motors will be used.

Cotton Bros., contractors, are equipping their rock crushing plant near Petaluma, Cal., with electric power.

According to a report from Los Angeles, the Riverdale Brokerage Company is preparing to install a lot of coal handling machinery, to be operated by electric power, at Los Angeles Harbor.

The Hartford-Arizona Mining Company, Hamburg, Ariz., is installing a 1½-mile aerial tramway.

The Southern Belle mine, near Randsburg, Cal., will shortly install a pump of 6000 gal. per hour capacity.

The California Motor Car Company has made a proposition to the Chamber of Commerce of Oakland, Cal., in regard to the establishment of an automobile factory in that city. The company is incorporated at \$250,000, those most interested being Walter Sachs, L. Schramm and H. Ball.

Los Angeles county, Cal., has called for bids on a steam shovel for the Pacoima rock quarry. Bids will be opened May 8.

It is reported that Eastern people, whose names have not been given out, are considering the installation of a dry dock and large machine shop at Los Angeles Harbor. Those interested are said to have been negotiating with the Pacific Wharf & Storage Company, of which J. C. Wickham is secretary.

The Union Gas Engine Company, this city, has taken an order for a 200-hp. engine for a steel barge. The hull is being built by the United Engineering Works for the Standard Oil Company.

The Holt Mfg. Company, San Francisco and Stockton, Cal., is having great success with its Caterpillar traction engines. In addition to local business, several large orders have been received from its representative in the Argentine Republic.

The town of Anaheim, Cal., will receive bids May 11 for a steam engine and a 150-kw. generator.

The Northern California Power Company is installing a great many small electric motors in connection with irrigating plants in the Sacramento Valley around Willows, Cal.

Work is to be started in a few days on buildings for a new stove foundry project at Sunnyvale, Cal.

The Universal Mining & Delevopment Company, Los Angeles, Cal., has purchased a mine near San Diego and will install a lot of modern machinery.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices at which large lots only can be bought are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Refined Iron:		Nos. 22 and 24		Straits Pig	
1 to 1½ in. round and square		No. 26			
1½ to 2 in. round and square		No. 28		Copper—	
2 to 3 in. round and square				Lake Ingot	
3 to 4 in. round and square				Electrolytic	
4 to 5 in. round and square				Casting	
5 to 6 in. round and square				Spelter—	
6 to 8 in. round and square				Western	
8 to 10 in. round and square				Zinc—	
10 to 12 in. round and square				No. 9, base, cast	
12 to 14 in. round and square				Lead—	
14 to 16 in. round and square				American Pig	
16 to 18 in. round and square				Bar	
18 to 20 in. round and square				Solder—	
20 to 22 in. round and square				No. 1, guaranteed	
22 to 24 in. round and square				No. 2	
24 to 26 in. round and square				Refined	
26 to 28 in. round and square				Prices of Solder indicated by private brand vary according to composition.	
28 to 30 in. round and square				Antimony—	
30 to 32 in. round and square				Cookson	
32 to 34 in. round and square				Ballets	
34 to 36 in. round and square				Other Brands	
36 to 38 in. round and square				Bismuth—	
38 to 40 in. round and square				Per lb	
40 to 42 in. round and square				Aluminum—	
42 to 44 in. round and square				No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting	
44 to 46 in. round and square				Rods & Wire	
46 to 48 in. round and square				Sheets	
48 to 50 in. round and square				Old Metals—	
50 to 52 in. round and square				Dealers' Purchasing Prices Paid in New York.	
52 to 54 in. round and square				Copper, heavy and crucible	
54 to 56 in. round and square				Copper, heavy and wire	
56 to 58 in. round and square				Copper, light and bottoms	
58 to 60 in. round and square				Brass, heavy	
60 to 62 in. round and square				Brass, light	
62 to 64 in. round and square				Heavy machine composition	
64 to 66 in. round and square				Clean brass turnings	
66 to 68 in. round and square				Composition turnings	
68 to 70 in. round and square				Lead, heavy	
70 to 72 in. round and square				Lead, tea	
72 to 74 in. round and square				Zinc, scrap	
74 to 76 in. round and square					
76 to 78 in. round and square					
78 to 80 in. round and square					
80 to 82 in. round and square					
82 to 84 in. round and square					
84 to 86 in. round and square					
86 to 88 in. round and square					
88 to 90 in. round and square					
90 to 92 in. round and square					
92 to 94 in. round and square					
94 to 96 in. round and square					
96 to 98 in. round and square					
98 to 100 in. round and square					
100 to 102 in. round and square					
102 to 104 in. round and square					
104 to 106 in. round and square					
106 to 108 in. round and square					
108 to 110 in. round and square					
110 to 112 in. round and square					
112 to 114 in. round and square					
114 to 116 in. round and square					
116 to 118 in. round and square					
118 to 120 in. round and square					
120 to 122 in. round and square					
122 to 124 in. round and square					
124 to 126 in. round and square					
126 to 128 in. round and square					
128 to 130 in. round and square					
130 to 132 in. round and square					
132 to 134 in. round and square					
134 to 136 in. round and square					
136 to 138 in. round and square					
138 to 140 in. round and square					
140 to 142 in. round and square					
142 to 144 in. round and square					
144 to 146 in. round and square					
146 to 148 in. round and square					
148 to 150 in. round and square					
150 to 152 in. round and square					
152 to 154 in. round and square					
154 to 156 in. round and square					
156 to 158 in. round and square					
158 to 160 in. round and square					
160 to 162 in. round and square					
162 to 164 in. round and square					
164 to 166 in. round and square					
166 to 168 in. round and square					
168 to 170 in. round and square					
170 to 172 in. round and square					
172 to 174 in. round and square					
174 to 176 in. round and square					
176 to 178 in. round and square					
178 to 180 in. round and square					
180 to 182 in. round and square					
182 to 184 in. round and square					
184 to 186 in. round and square					
186 to 188 in. round and square					
188 to 190 in. round and square					
190 to 192 in. round and square					
192 to 194 in. round and square					
194 to 196 in. round and square					
196 to 198 in. round and square					
198 to 200 in. round and square					
200 to 202 in. round and square					
202 to 204 in. round and square					
204 to 206 in. round and square					
206 to 208 in. round and square					
208 to 210 in. round and square					
210 to 212 in. round and square					
212 to 214 in. round and square					
214 to 216 in. round and square					
216 to 218 in. round and square					
218 to 220 in. round and square					
220 to 222 in. round and square					
222 to 224 in. round and square					
224 to 226 in. round and square					
226 to 228 in. round and square					
228 to 230 in. round and square					
230 to 232 in. round and square					
232 to 234 in. round and square					
234 to 236 in. round and square					
236 to 238 in. round and square					
238 to 240 in. round and square					
240 to 242 in. round and square					
242 to 244 in. round and square					
244 to 246 in. round and square					
246 to 248 in. round and square					
248 to 250 in. round and square					
250 to 252 in. round and square					
252 to 254 in. round and square					
254 to 256 in. round and square					
256 to 258 in. round and square					
258 to 260 in. round and square					
260 to 262 in. round and square					
262 to 264 in. round and square					
264 to 266 in. round and square					
266 to 268 in. round and square					
268 to 270 in. round and square					
270 to 272 in. round and square					
272 to 274 in. round and square					
274 to 276 in. round and square					

THE IRON AGE

Established
1855

New York, May 18, 1911

VOL. 87: No. 20

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
Harold S. Buttenheim,	-	-	-	-	Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

No Change in Steel Bar Prices.....	1179
Reason in Anti-Trust Cases.....	1180
The Country's Minimum Iron Requirements.....	1181
The Iron Age Directory.....	1182
The Steel Corporation to Be Investigated.....	1182
The National Association of Manufacturers.....	1182
The Manhattan Perforated Metal Company.....	1183
White Star Oil Filter Orders.....	1183
The Iron and Metal Markets.....	1184
The Steel Corporation to Be Investigated.....	1193
Personal	1193
Blast Furnace and Coke Oven Gases. The Results of Their Increasing Utilization at German Iron and Steel Works....	1194
The Infallible Man.....	1195
Ottawa's Advantages.....	1195
The Jones Step Process.....	1195
The Selection of Factory Equipment.....	1196
American Machinery in Europe.....	1198
Customs Decisions. Mantel or Fireplace Castings.....	1199
Tests of Steel at Watertown. A Study of Microstructure of Ingots and Rolled Products.....	1200
The Kane & Roach Radial Drill.....	1203
A Buffalo Forge Fan 30 Feet High.....	1203
The Central Foundry Company Reorganized.....	1203
Accident Prevention in the Machine Shop.....	1204
The Dick Belt Factory at Passaic, N. J.....	1207
The Production of Coal in 1910.....	1207
Practical Side of Electric Spot Welding.....	1208
The New Richmond Forgings Plant.....	1210
The Rotrex Pump. A New Rotary Type for Producing High Vacuums	1211
The Harris Transmission Gear.....	1212
The Stockbridge 16-Inch Single Geared Shaper.....	1213
The German Foundrymen's Association.....	1213
The National Building Material Exhibition.....	1213
Pawling & Harnischfeger Cranes in a Material Yard.....	1214
Foreign Tariff Work of the Bureau of Manufactures.....	1214
Forming Special Shapes by Cold Rolling of Standard Sections. New Publication.....	1215
The Contrast in Air Compressors.....	1216
The H. C. Frick Coke Company's Safety Committee.....	1216
Holbeck Gas Plants for Bituminous Coals.....	1217
The Swift-Waters Plant to Be Sold.....	1217
The Williams 12-Inch Steamdriven Pipe Threader.....	1218
The Atha Automatic Handle Sander.....	1218
The Hydromatic Water Valve.....	1219
An Unusual Dust Exhausting System.....	1220
Steel Stack for 10,800-hp. Boiler Plant.....	1221
Lake Superior Iron Mining Veterans.....	1221
Notable Installation of Pelton-Francis Water-Wheels.....	1221
The Ventura Disk Fan.....	1222
The Buffalo Feed Water Strainer.....	1222
The Machinery Markets.....	1223 to 1231
The National Association of Stove Manufacturers.....	1232
Westinghouse Turbines and Reduction Gears for a Naval Vessel	1232
The Use of Coke-Oven Gas in Open-Hearth Furnaces.....	1232
Trade Publications	1233
The New York Machinists' Strike.....	1233

No Change in Steel Bar Prices

Manufacturers Confer on the Situation

Railroad Buying Shows Improvement—Contracts for Rails and Bridges

The iron trade has at no time made more than the vaguest appraisal of its interest in the anti-trust cases and is not now trying to measure the effect of Monday's decision. It is general opinion that business should move with less restraint, with one of the commonly recognized checks upon confidence removed. However, the immediate future of the iron market is more likely to be affected by other influences. New demand having fallen much below consumption since the beginning of April, there have been signs in the past week of slightly better buying, to which the railroads have contributed a larger share than in some time.

A flurry in the bar trade has been the leading development of the week. At a meeting of the leading manufacturers of steel bars in New York on Tuesday the situation was canvassed, but the final decision was against any change in prices though a reduction was favored by one or two interests. In the conditions affecting bars one factor is the mid-year wage adjustment which involves the labor of some manufacturers. A reduction in bar prices would mean a reduction in labor in mills governed by the sliding scale.

Railroad buying is represented chiefly in rails and bridge work. New car orders have fallen off, but Canadian railroads are expected to place some equipment in this country which their home shops cannot deliver in time for the crop movement. Track supplies have been more active and at Pittsburgh light rail business has been better in the past week.

Of the Kansas City & Southern's expected order for 14,000 tons, a good part will probably be rolled at Sparrows Point and delivered by water to Texas port. The Great Northern inquiry for 28,000 tons is pending. An order for 8500 tons for the Kansas City, Mexico & Orient has been placed at Pittsburgh. The Entrerios Railway in Argentina has bought 5000 tons of 60-lb. rails which will be rolled by the Carnegie Steel Company. At Chicago the Pennsylvania Steel Company has sold 5000 tons of girder rails to the Chicago Railways.

The largest contract for railroad bridge steel was 8200 tons for the Chicago & Northwestern, divided between the Cambria Steel Company and the American Bridge Company. The latter company was low bidder on the Reading track elevation work at Philadelphia—4300 tons. At Pittsburgh three pending contracts, those for the Hotel Oliver, the new bridge at the Point and the Pittsburgh Crucible Steel Company's new plant at Midland will require more than 15,000 tons.

Plate mills have had little encouragement in recent developments. For a section of the Catskill aqueduct about 3300 tons of plates and shapes are about to

be awarded and bids have gone in on 4500 tons of plates for the Los Angeles aqueduct.

Markets in the lighter products are drifting along with little change. Wire manufacturers met in New York Tuesday and reaffirmed prices. Tin plate shipments are better than in April, while the sheet market still shows some irregularity in prices.

The pig iron situation is more unpromising. Prices in some Northern markets are weaker and spot sales of Southern iron continue to be made at \$10.50 and \$10.75 for No. 2 foundry.

Small sales of Bessemer iron are reported at less than \$15 at Valley furnace, while basic iron is on a \$13.25 basis. A sale of 6000 tons of basic was made at that price for third quarter delivery. A Canadian car works is in the market for 2500 tons of basic and 2500 tons of low phosphorus iron.

Several more merchant furnaces have gone out of blast. The Steel Corporation has increased its operations, however, one South Chicago and one Duquesne furnace having been blown in this week, making 64 per cent. of its capacity active.

Some Eastern furnaces have been in the market for coke for the second half of the year. More Connelville ovens are blowing out in view of the declining production of pig iron.

Sales of electrolytic copper have been made at 11.90c and 11.95c., and indications increase that sound adjustment of production to consumption will only come through market prices which temporarily eliminate the higher cost properties.

Reason in Anti-Trust Cases

The business community finds encouragement in the decision of the United States Supreme Court this week in the case against the Standard Oil Company, just as it found ground for apprehension in the unanimous decision of the same case by the United States circuit court in November, 1909. Both decisions order the dissolution of the Standard Oil Company because its existence is a violation of the Sherman anti-trust act. They diverge sharply in their interpretation of the act, and in this divergence those who have so long feared for the foundations of present-day business are taking hope. The United States circuit court had caused widespread doubt as to the legality of all the large consolidations, its decision being almost in terms that a combination between competitors is a combination in restraint of trade. The country has worn out the fright immediately produced by that decision, but the ground for it will appear on quoting again one of its most significant paragraphs:

If the necessary effect of a contract, combination or conspiracy is to stifle or directly and substantially to restrict free competition in commerce among the States or with foreign nations, it is a contract, combination or conspiracy in restraint of that trade and it violates this law. The parties to it are presumed to intend the inevitable result of their acts, and neither their actual intent nor the reasonableness of the restraint imposed may withdraw it from the denunciation of the statute.

Over against this view the Supreme Court decision, as given by Chief Justice White, lays down the "rule of reason" as the guide in deciding whether the anti-trust act has been violated. In answering the Government contention that in the Freight Association case and in that against the Joint Tariff Association, the Supreme Court has held all contracts, combinations or acts in restraint of trade to be unlawful, under a literal interpretation of the Sherman law, the Chief Justice said:

If the criterion by which it is to be determined in all cases whether every contract, combination, etc., is a restraint of trade within the intendment of the law, is the direct or indirect effect of the acts involved, then of course the rule of reason becomes the idea, and the construction which we have given the statute instead of being refuted by the cases relied upon is by those cases demonstrated to be correct. This is true, because as the construction which we have deduced from the history of the act and the analysis of its text is simply that in every case where it is claimed that an act or acts are in violation of the statute, the rule of reason, in the light of the principles of law and the public policy which the act embodies, must be applied.

To put even more strongly this view of the act, the Chief Justice intimated that by refusing to apply a literal construction to it the court had saved it from condemnation as unconstitutional. It had been argued by the Standard Oil Company attorneys that the act, applied as the Government attempted to apply it, impaired rights of property and destroyed freedom of contract or trade. To this the Chief Justice makes answer:

The ultimate foundation of all these arguments is the assumption that reason may not be resorted to in interpreting and applying the statute and therefore that the statute unreasonably restricts the right to contract and unreasonably operates upon the right to acquire and hold property. As the premise is demonstrated to be unsound by the construction we have given the statute, of course the propositions which rest upon that premise need not be further noticed.

The Supreme Court has thus read into the law the distinction made in some Presidential utterances in recent years between "good trusts" and "bad trusts." The consolidations are to be judged by their fruits. The court does not supply in terms the definition of restraint of trade which the Sherman act omitted, taking the view that it was the express design of the act not to limit unduly its application by precise definition. In holding against the Standard Oil Company the court finds that its acts were "with the purpose of excluding others from the trade and thus centralizing the combination in perpetual control of the movements of petroleum and its products in the channels of interstate commerce." It is added that the court's decision was reached "by weighing the modes in which the power vested in that corporation has been exerted and the results which have arisen from it." Elsewhere it is stated that "freedom to contract is the essence of freedom from undue restraint on the right to contract," and in the case of the companies gathered together by the Standard Oil Company this freedom to contract did not exist. The company is thus judged by its acts and their effect upon trade. In so holding the Supreme Court has given definite assurance to the business world that what is done with the consolidations must be done "in the light of reason." Great organizations that have been built up without let or hindrance from the Government in the 21 years since the Sherman anti-trust act was passed are not to be attacked indiscriminately at the bidding of reckless trust smashers. That that menace has been taken out of the situation is cause for congratulation.

On the other hand, the decision gives no comfort to consolidations that have set about to defy economic laws and to use their power against the consumers of their products. There must be no mistaking the extent of popular feeling on this question. The belief that the consolidations were responsible in large part for the high cost of living, small foundation as there was for it, was at the bottom of the political revolution of last November. And under the "rule of reason" which the Supreme Court has announced there can still be many prosecutions with the same outcome as in the

Standard Oil case. It behooves the consolidations to justify the promises of public benefits which were made when they were formed. If they have divided their economies with the consumer; if they have not destroyed competitors or sought a monopoly; if they have been fair to labor; if they have given stability to the market and helped to curb advances; if they have really brought better conditions, from all standpoints, than prevailed under unrestrained competition, they need not fear judicial examination "in the light of reason."

It is to be expected that business will improve because of the decision, though the extent to which the Standard Oil case has held up enterprise has doubtless been exaggerated. Other questions having more to do with prices of commodities and labor are still unsettled. But it is something to know that the steps taken in the past 25 years in the organization of business for economical production and the elimination of some of its greatest wastes—those arising from demoralizing competition—are not to be retraced. Germany has fostered industrial combinations. Her inroads upon foreign trade, under the regime of syndicates and consolidations, have been phenomenal. It is no time for the United States, with the urgings upon our manufacturers to push into outer markets more imperative with every year, to say that they must discard modern trade machinery and go back to the hand tools of a quarter of a century ago.

The Country's Minimum Iron Requirements

The current experience of greatly reduced orders for steel products is provoking a great deal of discussion as to what are the country's minimum requirements. Experience gives some valuable indications, while it is possible to analyze conditions in some of the more important channels of consumption and obtain information.

In scrutinizing statistical records it is necessary to make allowance for the normal rate of increase, for the ups and downs in demand have not been departures from a fixed standard, but from a steadily rising standard. However bad conditions have become, the country has always taken a larger tonnage than it would have taken a few years earlier under very good conditions. Experience has established the law of doubling in pig iron every ten years so thoroughly that this principle must be considered in all analysis. The production of steel, as commonly understood—or rather misunderstood—has followed a different rule, but the familiar statistics showing successive doubling in periods much shorter than ten years; but the showing of the figures is due in large part to two incidents: the replacement of wrought iron by steel some years ago, and the appearance in the ingot statistics of steel which becomes scrap, in the various croppings of the mills, and is remelted, to appear again in the ingot statistics. In other words, while pig iron production has doubled every ten years and steel ingot production has doubled in periods much shorter, the production of rolled iron and rolled steel taken together has increased by approximately the same law as pig iron.

The leanest year in the past quarter century was 1894, with a production of 6,657,388 tons of pig iron. This was 27 per cent. less than the output in 1892, two years earlier, and nearly 28 per cent. less than the output of 1890, four years earlier, the year 1890 and 1892

having been the two years of largest production, with 1890 slightly in the lead. The 1894 production, however, was in excess of the output in any year preceding 1889. Thus there was a recession of not more than six years. In recent years the leanest was 1908, with an output of 15,936,018 tons of pig iron, which was 38 per cent. less than in the best previous year—the year immediately preceding—but a gain over any year prior to 1902, so that there was a recession of no more than seven years. A computation shows that if the normal is a doubling every ten years and two years six or seven years apart show identical production, then the earlier year showed production between 20 and 25 per cent. above the normal and the later year production between 20 and 25 per cent. below the normal. Taking this as the greatest possible departure from normal, if one year should be abnormally good by that margin and the next year abnormally bad by the same amount, a very large drop would be seen, but such juxtaposition has never occurred, and no drop as great as 40 per cent. has actually been experienced.

In the past, calendar years have been fairly representative of conditions, for as a rule fairly uniform conditions have prevailed over any single calendar year. In the recent past such was not the case, for 1909 had a very bad beginning and 1910 a very bad ending, the result being that the twelvemonth ended August 1 last was the period of maximum production, falling only 200,000 tons short of 30,000,000 tons of pig iron, or 2,500,000 tons in excess of either of the calendar years. While there was undoubtedly stocking of material at times during that twelvemonth, there is no ground for believing there were any large stocks of material on August 1 last. But taking 29,000,000 tons instead of 30,000,000 tons as the standard, a decrease of 40 per cent. would call for 17,400,000 tons. No decrease of such percentage has ever occurred, and the country has had some time to grow since then, so that experience would indicate that the very worst slump ever experienced would not bring demand as low as 20,000,000 tons, to which should be added an allowance on account of our increased facilities for exporting material. This is really the mathematical minimum, based on a repetition of past conditions. There is, however, no ground for assuming such conditions. The years 1894 and 1908 upon which this experience is based immediately followed great panics, with financial conditions extremely unsatisfactory. Now, on the other hand, is the soundness of financial conditions which causes wonder that trade conditions are as they are.

Study of individual lines of production and consumption indicate that there have been numerous cross currents in demand in the past few years. The distribution of steel tonnage last year was quite different from that of 1906 and 1907, although the total showed but a slight increase. Rails decreased, and plates probably also, while wire, sheets and tin plates showed great increases. There was a trend towards greater tonnage in the lines which are least subject to fluctuation, because their consumption is an everyday occurrence and does not depend upon the undertaking of large projects. This change in the character of consumption tends to reduce the fluctuations in tonnage from year to year. The increases in consumption of these lines are likely to continue with considerable uniformity through thick and thin.

The absence of railroad demand is usually cited as

the great cause of light buying at this time. As a matter of fact railroad orders for cars and locomotives in the past two or three months have been fairly numerous, but not spectacular as to size. On account of the steady increase in traffic and the wearing out of wooden cars, for there are hardly any wooden cars in service less than about ten years old, the railroads are coming to have normal requirements, besides their special requirements due to expansions. The freight traffic of the country doubles on an average about once in 12 years, so that roughly speaking rails and equipment are being worn out four times as fast as was the case a quarter century ago, when the heaviest railroad building was in progress and when railroad requirements were almost wholly for extensions instead of for upkeep.

Thus there is ground for a firm conviction that the irreducible minimum of the country's actual requirements, under present financial conditions, is really quite large, and much larger than is indicated by the low rate of buying of the past few weeks. This must yield eventually, and in the not distant future, to a much larger rate, or the precedents in the whole history of the iron trade will be broken.

The Iron Age Directory

The publishers of *The Iron Age* are pleased to announce that *The Iron Age Directory* for 1911 is now in press. This will be a much more complete Directory than has ever been published by this company, as it will contain the names of all the advertisers in all four of its publications. It will contain more classifications, having been laid out on a better and a more comprehensive plan than ever before.

The cost of preparing and publishing this Directory will be necessarily increased for the reasons above given. It is our purpose to furnish it to those subscribers of *The Iron Age* who have use for it and therefore desire it. We do not wish, however, to send it to people who have no need for it, and thus have it wasted. We shall therefore require that subscribers who desire to get this Directory must ask for it in order to have it sent to them. Requests should be sent in as promptly as possible, addressed to the Directory Department of *The Iron Age*, 239 West 39th street, New York City.

The previous editions of the Directory have been found to be of great value to railroad and other purchasing agents and to officials of manufacturing establishments who have a large amount of buying to do, and want to know just where to find good, live industrial concerns who are prepared to furnish things that they are in need of. We are confident that the 1911 edition will be found still more valuable.

The price of the Directory to non-subscribers will be \$2 per copy.

The Standard Scale & Supply Company, 1345-1347 Wabash avenue, Chicago, has received an order from N. M. Stark & Co., Des Moines, Iowa, for 10 Eclipse low-charging batch concrete mixers. Representatives of the buyers had spent several days at the last Chicago Cement Show inspecting the different types of concrete mixers, and after considering the merits of all the machines decided in favor of the Eclipse. The points of merit especially regarded were the low charging platform, the large open drum which permits the batch to be seen while mixing, the simplicity in construction, and the few working parts, enabling the complete outfits to be so lightly built as to be capable of easy removal from place to place.

The National Association of Manufacturers

Sixteenth Annual Convention

The sixteenth annual convention of the National Association of Manufacturers, held May 15 to 17 at the Waldorf-Astoria, New York, was attended by nearly 400 members and visitors. In connection with the convention an interesting exhibit of accident prevention devices was made in a room adjoining the convention hall, where was shown the most complete collection of photographs of safety apparatus that has ever been gathered together. Interiors of plants of more than 40 members of the association were thus shown, and photographs of accident prevention apparatus in factories of all descriptions were exhibited. The meeting on Monday was enlivened shortly before the close of the session by the announcement of the decision of the United States Supreme Court in the Gompers-Mitchell contempt case, and in that connection James A. Emery, counsel for the association, said: "I have not had the opportunity to read the opinion, but attorneys who heard it believe that on every substantial issue of principle the contentions raised by Mr. Gompers and his associates are vigorously condemned. Their escape from imprisonment is due to a technical error in procedure and not, as was contended by them, to a lack of power in the court to enjoin a boycott or punish parties who, being prohibited from prosecuting a boycott, used tongue or pen as a means of doing so and then pleaded the constitutional right to liberty of speech or of the press as a means of escaping punishment for their disobedience."

President John Kirby, Jr., presided over the deliberations of the association. On Monday afternoon an address was made by John Foster Carr, secretary of the National Liberal Immigration League, on the "New Immigrant Labor—Keep Open the Gates." Addresses were also delivered by Edmund Wetmore, ex-president of the American Bar Association, who talked on "Our Patent Laws," and by Charles M. Jarvis, who presented observations regarding the Panama Canal, based on a recent visit.

Tuesday morning's session was largely given over to the reports of the officers and committees. In the afternoon James A. Emery spoke on "How Workmen's Compensation Plans Can be Effectuated by Taxation." There were also addresses by M. W. Alexander, of the General Electric Company, who talked on "Accident Prevention," and Walter Drew, counsel for the National Erectors' Association, who discussed "Industrial Disputes."

The Presidential Address.

President Kirby's address was an able presentation of the work now being accomplished by the association. After paying a tribute to the members for the assistance and support given him during the year, he called attention to the growth of the association, the past year having recorded the largest yearly increase shown in a long period. Setting forth the desirability of organization and co-operation, he strongly commended the American Anti-Boycott Association, the National Council for Industrial Defense, the National Metal Trades Association and the National Founders' Association, stating that the time is at hand when all business men should no longer have to be coaxed into supporting not one only but all of them, and that the men who give freely of their time, their energies and their money in carrying on the work of such organizations should not have to plead for assistance from those who are among its beneficiaries.

He called attention to the work of the committee on industrial indemnity insurance and the investigation made in Europe by Mr. Schwedtmann, the chairman of the committee, and Mr. Emery, its general counsel, the result of which has been published in book form, making a volume which will form an epoch in industrial literature. He discussed the subject of employers' liability, expressing the opinion that gradual and not hasty exertion should be applied to the solution of the problem. With regard to industrial education, he declared that the antagonism of the National Association of Manufacturers to the principle of the closed shop and the methods employed to establish it is too strongly entrenched in the minds of its members ever to permit of any mixing up with the labor

trust in its policy with respect to industrial education. He strongly commended what is being done in establishing practical and efficient manual training or trade schools, believing that the subject should be handled by an organization formed expressly for the purpose. He again advocated a permanent tariff commission. A considerable part of his address was devoted to the condemnation of those who dynamited the building of the Times at Los Angeles, Cal., and in that connection denounced the manner in which organized labor has either supported or condoned deeds of violence.

Resolutions Adopted

At the session on Tuesday afternoon quite a number of resolutions were adopted, in each case after a full discussion of their purposes. Omitting the preambles, these resolutions were as follows:

THE LOS ANGELES DYNAMITERS.

Resolved (1), That we take this occasion to reaffirm and reiterate our full belief in the right of workmen to organize for the betterment of their conditions, and to seek to secure that betterment by any and every means that is lawful for any organization of persons, political, religious, social or industrial to employ;

(2) That we deplore the widespread expression of class hatred and the manifest attempt to prejudice the full and fair workings of our laws and courts as a matter of more grave than sinister importance to our nation than the crime which has been the occasion thereof, though the enormity of such crime is beyond words;

(3) That we refuse to believe that such expressions are at all representative of the real thought and feeling of any considerable number of our citizens, whether within or without the ranks of organized labor, and we prefer rather to seek their source and animus among those so-called leaders of organized labor who habitually employ, countenance and believe in the use of all forms of force, coercion and intimidation in industrial disputes, and who foresee in the public indignation aroused by the carrying of the doctrine of force to its logical and awful conclusion, in the shape of dynamite, a serious check upon their own future activities;

(4) That we express our earnest desire, in common with that of every right-thinking citizen of our country that said accused persons may have a fair, impartial, and speedy trial, free from the influence of class feeling, and irrespective of any question save only that of their guilt or innocence of the crime charged, and we assure the public officers, upon whom devolves the duty of conducting said trial, of our full faith and confidence in their purpose and ability to try the accused without fear or favor.

CLASS LEGISLATION

Resolved, That the National Association of Manufacturers does herewith vehemently protest and sternly rebuke any attempt by our national or State legislatures to foster, consider or enact hasty, undigested and special legislation designed, directly or indirectly, to create class legislation, with all its attendant constitutional dangers and industrial disorders.

CRIMINAL USE OF DYNAMITE.

Resolved, That we consider the criminal use of dynamite and other explosives as a matter of grave national concern, and the employment of all the lawful agencies of government to check and prevent such use as of vital importance, and be it further

Resolved (1), That we urge upon the legislatures of the various States the passage of laws regulating the sale, transfer, storage and use of dynamite and other high explosives, to the end that the greatest measure of safety and protection to life and property from the criminal use of said explosives can be secured with as little interference as may be with the legitimate and industrial uses of the same.

(2) That we believe and therefore urge that the possession of a bomb or of a time clock contrivance, or other infernal machine accompanied by possession of dynamite or other explosive possible to be set off and exploded thereby, which bomb, contrivance or infernal machine is manifestly not suitable to or intended for any legitimate industrial use, should be made a felony, and that, in general, penalty should be provided for the criminal use of dynamite and other explosives sufficiently commensurate with the enormity of the offense to afford a deterrent effect upon said use.

(3) That we urge upon our national Congress the passage of laws upon the above lines for the District of Columbia and the territories, and also such laws as may be proper and expedient, governing, regulating, or making criminal the transportation from State to State of high explosives, bombs and infernal machines.

(4) That the president of this association be instructed to appoint a permanent committee either on its own initiative or in cooperation with other organizations, to make this resolution effective so far as may be possible.

TRIBUTE TO PRESIDENT KIRBY

Resolved, That the delegates gathered at this convention of the National Association of Manufacturers rejoice to express their appreciation and admiration for the uniform dignity, skill and courtesy with which our distinguished president, John Kirby, Jr., has presided over its deliberations.

Further Resolved, That we record the gratification for the untiring zeal, enthusiastic devotion and sustained loyalty with which he has so admirably administered the affairs of the association during the past year, and that we extend to him the assurances of the obligation we feel for his unselfish dedication of time and labor to the principles for which the association immutably stands.

The proceedings of Tuesday afternoon included addresses by Gen. Harrison Gray Otis, proprietor of the Los Angeles Times, and by Walter Drew, the counsel of the National Erectors' Association. Mr. Drew told how the members of his association, who form about 80 per cent of the structural steel builders of the country, had split with the unions five years ago and for the last three years had suffered about 80 dynamite outrages.

Reports were received from the committee on legislation regarding the legislative activities of the last year in the endeavor by unions to limit the power of injunction, and from F. C. Schwedtmann and James A. Emery, the commissioners sent to Europe by the association last year to investigate the prevention of accidents and the subject of workmen's compensation. A number of views were shown by Mr. Schwedtmann to demonstrate how the Germans safeguard their machinery.

The Manhattan Perforated Metal Company.—Christian Eidt, senior member of the Manhattan Perforated Metal Company, completed 25 years in the perforated metals line on May 17. In 1886 he began his apprenticeship with the firm of Mundt & Creter, 88-90 Walker street, at that time the only metal perforators in New York City. When this firm dissolved partnership Mr. Eidt cast his lot with the new firm of Charles Mundt & Son, at the old location, and worked his way up to shop superintendent. In 1902, with Charles Schreyer and Phillip Creter, he established the Manhattan Perforated Metal Company, locating at 237 Center street, in what is now the wholesale hardware district. Considerably improved machinery, built from the designs of the firm, enabled it to turn out the best class of work very rapidly, and its business grew steadily, extending to all parts of the world. It is of interest that Mr. Eidt started with the only perforated metal establishment in New York City, and his firm holds the same distinction at present.

White Star Oil Filter Orders.—The Pittsburgh Gage & Supply Company, Pittsburgh, has received an order from the Berwind-White Coal Mining Company, Windber, Pa., for five White Star oil filters of the duplex type. These filters are designed for use in connection with continuous oiling systems, and each has a filtering capacity of 200 gal. per day. Other contracts recently secured are as follows: Bethlehem Steel Company, South Bethlehem, Pa., one multiplex type filter, 1000 gal. per day; Republic Iron & Steel Company, Haselton, Ohio, one multiplex type filter, 500 gal. per day; Vulcan Iron Works, South Wilkes-Barre, Pa., one duplex type filter, 200 gal. per day; Minneapolis Steel & Machinery Company, Minneapolis, Minn., one duplex type filter, 200 gal. per day. A large number of orders for smaller units have also been received. New agencies for the sale of White Star oil filters and oiling systems have been established in Cleveland, Ohio; Houston, Texas; Tampa, Fla.; Nashville, Tenn.; Birmingham, Ala.; Dallas, Tex., and Augusta, Ga.

The Q. M. S. Company, Plainfield, N. J., has just issued attractive loose leaf catalogues illustrating its line of metal sawing machines, hand power traveling cranes, jib cranes, I-beam trolleys, pneumatic hoists, power hack saws, car wheel grinding machines, Stanwood car steps and pneumatic pit jacks.

The Defiance Paper Company, of which J. A. Adams is general manager, Niagara Falls, N. Y., manufacturer of wall paper, has let contracts for two additions to be made to its manufacturing plant on Second street. The new buildings are to be completed, equipped and ready for operation early the coming fall.

The Columbia Steel & Shafting Company, with works at Rankin and Carnegie, Pa., has removed its offices from Rankin to the Empire Building, Pittsburgh. The company manufactures cold drawn, turned and polished steel shafting.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.
At date, one week, one month and one year previous.
May 17, May 10, Apr. 19, May 18,
1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Valley Furnace ..	13.75	13.75	13.75	15.25
Foundry No. 2, Southern, Cincinnati	13.75	14.25	14.25	14.75
Foundry No. 2, Birmingham, Ala ..	10.50	11.00	11.00	11.50
Foundry No. 2 local, at furnace, Chicago	15.00	15.00	15.00	17.00
Basic, delivered, eastern Pa.	14.50	15.00	15.25	16.50
Basic, Valley furnace	13.25	13.50	13.75	15.00
Bessemer, Pittsburgh	15.90	15.90	15.90	17.40
Gray forge, Pittsburgh	14.15	14.40	14.40	15.90
Lake Superior charcoal, Chicago ..	17.00	17.50	17.50	18.50

COKE, CONNELLSVILLE, Per Net Ton, at oven:				
Furnace coke, prompt shipment ..	1.45	1.55	1.60	1.55
Furnace coke, future delivery ..	1.75	1.75	1.75	1.75
Foundry coke, prompt shipment ..	1.75	1.85	2.00	2.15
Foundry coke, future delivery ..	2.10	2.10	2.25	2.25

BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	23.00	23.00	23.00	32.00
Forging billets, Pittsburgh	28.00	28.00	28.00	29.00
Open hearth billets, Philadelphia ..	25.40	25.40	25.40	32.00
Wire rods, Pittsburgh	29.00	29.00	29.00	28.00

OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	14.75	14.00	14.50	17.50
Iron rails, Philadelphia	16.75	16.75	17.50	20.00
Car wheels, Chicago	12.75	12.75	13.25	15.50
Car wheels, Philadelphia	13.00	13.00	13.25	15.00
Heavy steel scrap, Pittsburgh	12.50	12.50	12.75	15.00
Heavy steel scrap, Chicago	10.25	10.25	11.50	13.50
Heavy steel scrap, Philadelphia ..	13.00	13.00	13.25	14.50

FINISHED IRON AND STEEL, Per Pound:				
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia ..	1.30	1.32½	1.35	1.50
Common iron bars, Chicago	1.22½	1.22½	1.25	1.50
Common iron bars, Pittsburgh ..	1.30	1.30	1.35	1.55
Steel bars, tidewater, New York ..	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York ..	1.56	1.56	1.56	1.66
Tank plates, Pittsburgh	1.40	1.40	1.40	1.50
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh ..	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh ..	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE, Per Pound:				
Sheets, black, No. 28, Pittsburgh ..	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh	1.80	1.80	1.80	1.80
Cut nails, Pittsburgh	1.60	1.60	1.70	1.80
Barb wire, galvanized, Pittsburgh ..	2.10	2.10	2.10	2.10

METALS, Per Pound:				
Lake copper, New York	12.25	12.25	13.37½	13.00
Electrolytic copper, New York ..	12.00	12.12½	12.12½	12.75
Spelter, New York	5.50	5.50	5.50	5.30
Spelter, St. Louis	5.20	5.25	5.30	5.15
Lead, New York	4.40	4.40	4.45	4.35
Lead, St. Louis	4.25	4.25	4.30	4.20
Tin, New York	43.00	41.50	41.70	33.20
Antimony, Hallett, New York ..	9.00	9.00	8.75	8.12½
Tin plate, 100 lb. box, New York ..	\$3.94	\$3.94	\$3.94	\$3.84

* The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.; New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50 c. to 1.55c., net; H-beams over 8-in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c.

to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8 .....	.15
Gauges under No. 8 to and including No. 9 .....	.25
Gauges under No. 9 to and including No. 10 .....	.30
Gauges under No. 10 to and including No. 12 .....	.40
Sketches (including all straight taper plates) 3 ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over .....	.20
Boiler and flange steel .....	.10
"A. B. M. A." and ordinary firebox steel .....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive .....	.05
Widths over 110 in. up to 115 in., inclusive .....	.10
Widths over 115 in. up to 120 in., inclusive .....	.15
Widths over 120 in. up to 125 in., inclusive .....	.25
Widths over 125 in. up to 130 in., inclusive .....	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over ..	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel		Iron	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1 to 1½ in.	75	63	71	59	49	43
1½ in.	75	63	71	59	49	43
¾ to 1½ in.	79	69	75	65	51	45
2 to 3 in.	80	70	76	66	52	46
Lap Weld.						
2 in.	76	66	72	62	50	44
2½ to 4 in.	78	68	74	64	52	46
4½ to 6 in.	77	67	73	63	51	45
7 to 12 in.	75	59	71	55	49	43
13 to 15 in.	51½	..	..	..	..	..
Butt Weld, extra strong, plain ends, card weight.						
¾, 1, 1½ in.	69	59	65	55	45	39
1½ in.	74	68	70	64	52	46
¾ to 1½ in.	78	72	74	68	56	50
2 to 3 in.	79	73	75	69	57	51
Lap Weld, extra strong, plain ends, card weight.						
2 in.	75	69	71	65	53	47
2½ to 4 in.	77	71	73	67	55	49
4½ to 6 in.	76	70	72	66	54	48
7 to 8 in.	69	59	65	55	47	41
9 to 12 in.	64	54	60	50	42	36
Butt Weld, double extra strong, plain ends, card weight.						
1½ in.	64	58	60	54	46	40
¾ to 1½ in.	67	61	63	57	49	43
2 to 3 in.	69	63	65	59	51	45
Lap Weld, double extra strong, plain ends, card weight.						
2 in.	65	59	61	55	47	41
2½ to 4 in.	67	61	63	57	49	43
4½ to 6 in.	66	60	62	56	48	42
7 to 8 in.	59	49	55	45	37	31

THE IRON AND METAL MARKETS

	Plugged and Reamed.
1 to 1½, 2 to 3 in. Butt Weld	{ Will be sold at tw (2) points lower basing (high- er price) than merchant or card weight pipe. Butt or
2, 2½ to 4 in. Lap Weld	{ lap weld, as specified.
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.	

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1 ¹ / ₄ to 2 ¹ / ₄ in.	Steel.
2 ¹ / ₂ in.	65
3 ¹ / ₄ to 3 ¹ / ₂ in.	67 1/2
3 ³ / ₄ to 4 ¹ / ₂ in.	70
4 ³ / ₄ to 5 ¹ / ₂ in.	72 1/2
5 and 6 in.	65
7 to 13 in.	62 1/2

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

		Fence Wire, Per 100 Lb.							
Nos.		0 to 9	10	11	12 & 12½	13	14	15	16
Annealed		\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized		2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90
<i>Market and Stone Wire in Bundles, Discount from Standard List.</i>									
Bright and Annealed:									
9 and coarser								.80	
10 to 18								.80 and 10	
19 to 26					.80	and 10	and 2½		
27 to 36							.80 and 5		
Galvanized:									
9 and coarser							.75 and 10		
10 to 16							.75 and 10		
17 to 26						.72½	and 10		
27 to 36							.72½		
Coppered or Liquor Finished:									
9 and coarser							.75 and 10		
10 to 26							.75 and 10		
27 to 36					.70	and 10	and 5		
Tinned:									
6 to 18						.75 and 10	and 10		

Pittsburgh

PARK BUILDING, May 17, 1911.—(By Telephone.)

Pig Iron.—The American Steel Foundries has bought 6000 tons of basic iron for third quarter delivery from a Valley furnace at \$13.25 at furnace. The Canadian Car & Foundry Company is inquiring for 2500 tons of basic and 2500 tons of low phosphorus iron, but the business will likely go to Buffalo or Cleveland furnaces, which have a lower rate of freight to Montreal than the Valley furnaces. Small lots of Bessemer pig iron are being sold by dealers at \$14.75 and \$14.85 at Valley furnace. The furnaces comprising the Bessemer Pig Iron Association are still holding Bessemer at \$15, but report no sales being made. We note a sale of 100 tons of Bessemer at \$14.75 and 200 tons at \$14.85, both by dealers. We quote as follows: Bessemer pig iron, \$15 nominally; malleable Bessemer, \$13.75; basic, \$13.25; No. 2 foundry, \$13.50 for prompt and \$13.75 for forward delivery; gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Regular prices on Bessemer and open-hearth steel in the Pittsburgh district are being maintained, but in Cleveland and at other consuming points open-hearth steel is being offered at \$1 per ton less than regular prices. We note a sale of 300 tons of open-hearth slabs to a pipe mill, to be rolled into skelp, at \$23, Pittsburgh. Regular prices are as follows: Bessemer and open-hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1½-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

The Supreme Court decision on the Standard Oil Company case is the chief topic of discussion in local steel circles, but as there has hardly been time to digest the decision thoroughly, no definite opinions have been expressed as to what its effect will be; nevertheless, the fact that a decision has been handed down cannot but be helpful. General conditions in the steel trade remain very quiet, new buying being at a low ebb and

specifications against contracts not coming in as freely as desired. Perhaps the greatest falling off in new business and specifications is in the wire trade, one leading interest reporting that its specifications so far this month are 60 per cent. less than in the first half of April. The pig iron market is weak, Bessemer iron having sold below \$15 in small lots and basic as low as \$13.25 at Valley furnace. Jobbers and consumers of finished material are buying only in small lots to cover actual needs, but in many cases specific requests are made for prompt shipment, showing that stocks all over the country are light. Two embargoes have been lifted on scrap and a little more is moving. Coke is dull, with the lowest prices ruling for some months.

Ferromanganese.—No sales are reported and new inquiries are very light. Most consumers are covered for the remainder of this year. We quote 80 per cent. foreign at \$36.50 to \$36.75, Baltimore, to which a freight rate of \$1.95 should be added for delivery in the Pittsburgh district.

Ferrosilicon.—Some small lots of 50 per cent., ranging from 25 to 100 tons, have been sold the past week at \$52 to \$52.50 delivered. We quote 50 per cent. at \$52.50 to \$53, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—The market is dull and neglected and we quote best grades of all pig iron muck bar at \$28.50 to \$29, Pittsburgh.

Skelp.—This trade is very quiet, the new demand being light on account of the dull condition of the pipe market. We quote: Grooved steel skelp, 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—Nearly all consumers of wire rods now roll their own supply and very few rods are sold in the open market. We quote: Bessemer, open hearth and chain rods, nominally at \$29, Pittsburgh.

Steel Rails.—Among orders for standard sections received by the Carnegie Steel Company in the past week was one from a Western railroad for 8500 tons and an export order for 5000 tons. The company also received new orders and specifications against contracts in the past week for nearly 4000 tons of light rails and is having a fairly large demand for steel ties and splice bars. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b., at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—A good deal of local work is in sight, including the Hotel Oliver to be built on Smithfield street, another large hotel on Penn avenue, the new steel bridge to be erected by the city at the Point crossing the Allegheny River, and the Pittsburgh Crucible Steel Company's works at Midland. It is estimated that these four jobs will take from 15,000 to 20,000 tons. The McClintic-Marshall Construction Company has taken 900 tons for the Detroit Free Press Building at Detroit, of which 700 tons will be Bethlehem sections. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Plates.—Few car orders have been placed the past week and new inquiries are light. Bids will go in May 22 for the aqueduct for the city of Los Angeles, Cal., about 4500 tons. The Philadelphia company is still in the market for a gas holder requiring about 6000 tons and this contract may be given out soon. Actual orders for plates booked so far this month are very much lighter than in the first half of April. Some mills continue to shade 1.40c. on narrow plates, but the general market on the wide sizes of $\frac{1}{4}$ in. and heavier plates is 1.40c., Pittsburgh.

Sheets.—Present conditions in the sheet trade are about as they have been for some weeks, the new demand being quiet and for small lots, while specification against contracts are not satisfactory to the mills. It is estimated that not more than 60 per cent., if that much, of capacity is active at present. Prices, in the main, are fairly well observed, but there is still some cutting being done in certain sections. The contract for about 250 tons of iron sheets for the roofs and sidings of the new buildings of the Gary Screw & Bolt Company, Gary, Ind., will likely be placed this week. Regular prices on black galvanized and roofing sheets are printed on a previous page.

Tin Plate.—The new demand for tin plate is very

THE IRON AND METAL MARKETS

dull, but specifications from the can makers have been coming in very heavily for several weeks and shipments of bright plate by the mills this month will probably show an increase over April. Present operations in tin plate capacity are at the rate of about 75 per cent. Prices are said to be very well maintained and we quote 100-lb. cokes at \$3.70 per base box f.o.b. Pittsburgh.

Bars.—The volume of new orders in both iron and steel bars and the shipments by the mills so far this year have been much below normal, and the outlook is that this condition will continue for some time. In previous years the implement makers and other large consumers of bars had by this time either placed their contracts for the year beginning July 1 or else were negotiating with the mills, but so far this year little or nothing in this direction has been done. About a month ago there were some preliminary negotiations, but when the steel mills named 1.40c. as their price on steel bars for the year beginning July 1 the buyers dropped the subject and it has not been taken up actively since. The implement makers and other large users of steel bars are using the argument that, being such heavy consumers, they are entitled to a concession over the ordinary buyer, which the mills do not feel inclined to give. The new demand for both iron and steel bars is light, and specifications against contracts are slow. We continue to quote soft steel bars rolled from billets at 1.40c., and common iron bars at 1.30c. to 1.32½c., Pittsburgh.

Shafting.—Several makers state that specifications from the automobile builders are coming in a little more freely, but new business and shipments are much below normal. Consumers are buying only such quantities of shafting as they absolutely need. Regular discounts on cold rolled shafting are 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory, but in some cases these discounts are shaded.

Spelter.—The market has quieted down again, the new demand being dull, while prices are weak. We quote prime grades of Western at 5.20c. East St. Louis, equal to 5.32½c., Pittsburgh.

Hoops and Bands.—New buying is confined to small lots to cover actual needs, and specifications against contracts are far from being satisfactory. The four leading mills rolling hoops and bands are not operating to more than 50 per cent. of capacity. We quote steel hoops at 1.45c. and bands at 1.40c., extras on the latter as per the present steel bar card. These prices are reported as being sometimes slightly shaded on desirable orders.

Merchant Steel.—The new demand is quiet and jobbers and consumers are specifying only for such quantities of material as they absolutely need. Prices are being fairly well held, but not enough new business is being offered to test the market. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Jobbers and consumers are taking in only such quantities of rivets as they must have, there being no desire to accumulate stocks. We quote structural rivets at 1.75c. to 1.80c. and boiler rivets 1.80c. to 1.85c., Pittsburgh.

Wire Products.—The new demand and specifications against contracts continue to fall off steadily. Jobbers are specifying only for such quantities of nails and wire as they must have to meet the demand of retailers and to carry fairly complete stocks. There are signs of slight weakening in prices, but so far this is confined to a few points where competition is usually severe. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—A Southern road is reported in the market for 5000 kegs of spikes for delivery commencing July, and several of the Western roads have fair-sized inquiries out. The base price of railroad spikes in standard sizes is \$1.50, Pittsburgh, with the usual extras for odd sizes.

Merchant Pipe.—The only two active inquiries in the market for line pipe are those of the Southern California Gas Company, of Los Angeles, for 90 to 100 miles of 10 to 12 in. pipe and the Guaranty Pipe Line Company, of San Francisco, for about 80 miles of 4 to 8-in., but they may not be placed for some months, if

at all. The new demand for merchant pipe is only for small lots to cover actual needs. Jobbers are taking in merely such quantities of pipe as are absolutely needed to meet current orders. Regular discounts on iron and steel pipe, printed on a previous page, are reported as being fairly well maintained.

Boiler Tubes.—Negotiations are on with a number of leading consumers of boiler tubes for their requirements for the last half of the year, their present contracts expiring July 1. Some of these will run into the third quarter, as the tonnage involved in these contracts has not been taken out. The new demand for merchant tubes is very dull, being only for small lots to cover actual needs.

Coke.—No large inquiries for furnace coke are in the market from nearby furnaces, but several of the Eastern furnaces are asking prices for last half delivery. Several large consumers of foundry coke whose contracts expire July 1 are now negotiating for their supply for the last half of the year. We quote standard makes of furnace coke for May and June shipment at \$1.50 to \$1.60, and for delivery over the last half of the year at \$1.75 to \$1.85 per net ton, at oven. We quote standard makes of 72-hour foundry coke at \$1.75 to \$2 for spot shipment and from \$2.10 to \$2.40 to consumers, per net ton at oven, for the last half of the year. There has been a heavy reduction in the output of coke, the Upper and Lower Connellsville regions last week turning out only 280,367 tons, a decrease over the previous week of more than 20,000 tons. Further blowing out of ovens will likely take place owing to the very dull demand.

Iron and Steel Scrap.—The embargoes on scrap at Monessen, Pa., and Follansbee, W. Va., have been lifted and as a result a slightly larger tonnage of scrap on old contracts is now being shipped into these two consuming points than for some time. There is practically no new demand for scrap. Leading consumers have a very large tonnage due them on old contracts against which they have not been specifying very freely. Several leading brokers are not trying to effect new sales of scrap, taking the position that with so much undelivered tonnage on their books it is foolish to take on more new business. Not enough is being done to test prices, which are about the same as those ruling for several weeks. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon Monessen and Pittsburgh delivery.....	\$12.50
No. 1 foundry cast.....	\$13.50 to 13.75
No. 2 foundry cast.....	12.50 to 12.75
Bundled sheet scrap, at point of shipment.....	9.00 to 9.25
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	13.50 to 13.75
No. 1 railroad malleable stock.....	12.00
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.50 to 16.75
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 busheling scrap.....	12.00 to 12.25
No. 2 busheling scrap.....	8.50 to 8.75
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	8.60 to 8.75
*Machine shop turnings.....	9.00 to 9.15
Old iron rails.....	15.00 to 15.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.25
Stove plate.....	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, CHICAGO, May 16, 1911.

Decided activity in structural material is the feature of this week's market in the Chicago district. An improvement in railroad purchases is also noted, although the business of this nature is still small considering the needs known to exist. An additional blast furnace has gone out at Mayville, Wis., and it is quite probable that others in this territory will follow, the present consumption of pig iron being so far below expectations.

Pig Iron.—The activities of the week have scarcely made a ripple on the calmness that seems to have settled over the pig iron market. Foundry business is as dull as it has been for years, and anticipated pig iron wants covered earlier in the year for the first half are in numerous cases proving sufficient for the third or even fourth quarter. Several orders for spot delivery have been closed this week, but these are generally for single carload lots and in no instance have been for large tonnages. A Chicago manufacturer of mining machinery is in the market for 250 tons of Southern

THE IRON AND METAL MARKETS

No. 2, and an inquiry for 1000 tons of Lake Superior charcoal is also reported. A slight reduction has been made in the price of the latter iron, and even that reduction is reported to be shaded. Prospective purchasers are not numerous and practically every buyer seems insistent upon lower prices. Very few consumers are offering more than \$10.50, Birmingham, for Southern No. 2, although so far as can be ascertained no such concessions have been made in this territory by Southern furnaces. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace:

Lake Superior charcoal.....	\$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	15.85
Southern coke, No. 2 foundry and No. 2 soft.....	15.35
Southern coke, No. 3.....	15.10
Southern coke, No. 4.....	14.85
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.85
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

Billets.—Several small quantities of forging billets have been sold. We continue to quote \$30.60, base, Chicago, on open hearth forging billets and \$25.60, base, on reolling billets.

Sheets.—There has been little change in the demand for sheets. Mills continue to run at about two-thirds capacity, and the volume of business in sight is very moderate. Western mills are firmly maintaining prices, but constant rumors of price concessions reach here from the East. Producers here believe that some of the smaller mills, whose product is not as well known, are cutting prices, but this is not influencing their evident intention of maintaining the prices now in effect. While business so far this year has been less than that of the corresponding period last year, it is felt that under existing circumstances there is no great cause for complaint. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Wire Products.—The demand for wire products has somewhat eased off, as is naturally expected at this time of year, and mills are now making prompt shipments of all items. Specifications continue to be good and the volume of new business coming in is very satisfactory considering that orders are of the sort-up nature. Prices are being well maintained. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Rails and Track Supplies.—Business in rails and track supplies has shown no improvement. The leading interest has booked orders for about 6000 tons of standard sections. Liberal orders for track supplies continue to come in and general specifications are very good. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—This is easily the most active item in the local market. The lettings of the week have emanated from a variety of sources, the largest single order coming from the Chicago, Rock Island & Pacific Railway Company. Other railroad companies have been inquiring, and it is practically certain that more business of this nature will be closed in the near future. Among the principal lettings of the week are the following: Main street bridge at Pendleton, Ore., 135 tons, to American Bridge Company; 1911 requirements for Chicago, Rock Island & Pacific Railway Company, 2500 tons, to American Bridge Company; high school, Omaha, Neb., 735 tons, to Ottumwa Bridge Company; McKinney, Hodge & Manse Building, Chicago, 975 tons, reinforced concrete; North Side Manual Training shops, school district No. 1, Denver, Col., 135 tons, to Paxton & Vierling; railroad bridges over drainage canal, East St. Louis, Ill., 810 tons, to King Bridge Company; W. A. Wieboldt theater and office building, Chicago, 485 tons, to George E. Laubenheimer Com-

pany; floor system for pit furnaces for Minnesota Steel Company, New Duluth, Minn., 180 tons, to American Bridge Company; substation for Minneapolis General Electric Company, Minneapolis, Minn., 210 tons, and Sixth street substation, 120 tons, to Minneapolis Steel & Machinery Company; J. K. Stewart building, Chicago, 295 tons, to Hansell-Elcock Foundry Company; Chicago, Burlington & Quincy freight house, Omaha division, 530 tons, to Paxton & Vierling. We quote plain material from mill at 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Some little improvement is noted in this week's plate market. The Burlington Railroad has placed additional car orders with the American Car & Foundry Company. The May rollings of plate are so far somewhat behind those of April, but a slight improvement is anticipated for the latter part of the month. The principal producers are maintaining Chicago mill prices at 1.58c. to 1.63c. Store prices are 1.80c. to 1.90c., Chicago.

Cast Iron Pipe.—Although the lettings of the week are small, the market is healthy and inquiries are such that no complaints are heard. Some of the small Western municipal bonds have proved a drag on the market, though the number is comparatively small. Some of the principal gas producers have been in the market and have closed for about 2500 tons of gas pipe. A Portland, Ore., interest has purchased 1500 tons. The leading maker has closed with Lewiston, Mont., for 1200 tons of water pipe. It is interesting to note in connection with this purchase that the freight rate from the manufacturing plant to the Montana town is \$23.40 per ton, which is about equal to the cost of the pipe. Enough business is in sight to make producers optimistic. Prices are firm as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Bars.—Very little change is noted in the conditions that govern the bar market. Business is moderate and the supply is in excess of the demand. Rumors of price concessions, both on steel and iron bars, are common. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.58c.; bar iron, 1.22½c. to 1.27½c.; hard steel bars rolled from old rails, 1.30c. to 1.35c. From store, soft steel bars, 1.80c. to 1.90c., Chicago.

Old Material.—Few sales of scrap are being made in this market. Prices are shifting constantly, with little actual trading upon which to base changes. The weather has been extremely well adapted to the accumulation of scrap, and large quantities are being received daily in this territory. The Union Pacific Railroad is out with a list totaling about 6000 tons. Last week's prices on old steel rails for reolling should have been \$12.25 to \$12.75, a typographical error having been made in setting up the table. Prices below are for delivery to buyers' works, all freight and transfer charges paid, per gross ton:

Old iron rails.....	\$14.75 to \$15.25
Old steel rails, reolling.....	12.50 to 13.00
Old steel rails, less than 3 ft.....	11.25 to 11.75
Relaying rails, standard sections, subject to inspection.....	22.00 to 23.00
Old car wheels.....	12.75 to 13.25
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.50 to 11.00
Shoveling steel.....	10.25 to 10.75
Steel axle turnings.....	8.50 to 9.00
The following quotations are per net ton:	
Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	13.50 to 14.00
Steel angle bars.....	10.50 to 11.00
Iron car axles.....	18.50 to 18.75
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	10.00 to 10.50
Locomotive tires, smooth.....	17.00 to 17.50
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	9.00 to 9.50
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.75 to 11.25
Stove plate and light cast scrap.....	9.25 to 9.75
Railroad malleable.....	10.25 to 10.75
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cincinnati

CINCINNATI, May 17, 1911.—(By Telegraph.)

Pig Iron.—Local interests are unanimously of the opinion that the Standard Oil decision will tend to stimulate business. As the suspense is now over a general buying movement is expected to follow gradually. Last week, however, was an extremely dull one

THE IRON AND METAL MARKETS

with pig iron dealers, and concessions were made that would justify the prompt shipment price of Southern iron being reduced to \$10.50 to \$11.00, Birmingham basis; for delivery through the remainder of the year, \$11 at furnace is quoted. Northern iron is generally quoted at \$14, Ironton, for immediate shipment, but a few sales have been made around \$13.75. The shading in prices appears to be centered on No. 2 foundry, as some small sales of lower grade foundry iron have been made at the regular market quotation. Malleable is not in demand. Standard Southern car wheel has shown some activity, and about 900 tons was taken on a basis of \$22.50, Birmingham, which represents the market price. There is no call for Northern basic, and it can be bought for \$14, Ironton, with delivery through the third quarter. Among the few inquiries out is one for 300 tons of foundry iron from Illinois melters. Inquiries from southern Indiana call for small lots of foundry iron for shipment during the third quarter. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.25 to	\$14.75
Southern coke, No. 2 foundry.....	13.75 to	14.25
Southern coke, No. 3 foundry.....	13.25 to	13.75
Southern coke, No. 4 foundry.....	13.00 to	13.50
Southern coke, No. 1 soft.....	14.25 to	14.75
Southern coke, No. 2 soft.....	13.75 to	14.25
Southern gray forge.....	12.50 to	13.00
Ohio silvery, 8 per cent. silicon.....		17.70
Lake Superior coke, No. 1.....		15.70
Lake Superior coke, No. 2.....		15.20
Lake Superior coke, No. 3.....		14.70
Basic, Northern.....	15.20 to	15.45
Standard Southern car wheel.....	22.50 to	23.00
Lake Superior car wheel.....		19.50

(By Mail.)

Coke.—Foundry coke is lagging and it is reported that contracts extending through the year can be made around \$2 at oven, including a few standard brands in the Connellsville, Wise County and Pocahontas field. For prompt shipment this figure can be shaded some. However, \$2.25 to \$2.30 is generally adhered to by a number of producers for future shipment orders. Furnace coke has practically no new demand, and shipments on contracts are moving only moderately well. Connellsville 48-hour coke is still obtainable around \$1.40 per net ton at oven, for prompt delivery, but Pocahontas and Wise County interests are holding out for a premium of 20c. to 25c. per ton. Contract figures on furnace coke in all three fields indicate a wide range, and the average price quoted is between \$1.70 to \$1.90 at oven.

Finished Material.—Railroad purchases of track material are very light, but there is a little improvement in plates; steel bars also appear to be holding up fairly well. Mill agencies quote a base price of 1.40c. Pittsburgh, but there has been some reported shading on the part of independents. The inquiry for hoops and bands is better, but actual business booked is about the same as for the past few weeks. Warehouse quotations on steel bars and structural material are from 1.90c. to 2c.

Old Material.—Dealers claim that they can buy all the scrap iron they want at figures below the recognized market quotations, but as the mills are taking very little scrap, there is an absence of incentive to take on any larger yard stocks. On the other hand, holders of scrap material, especially the railroads, are not inclined to unload at this time. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to	\$12.00
Cast borings, net ton.....	4.50 to	5.00
Steel turnings, net ton.....	5.75 to	6.25
No. 1 cast scrap, net ton.....	9.75 to	10.00
Burnt scrap, net ton.....	7.00 to	7.50
Old iron axles, net ton.....	16.50 to	17.00
Bundled sheet scrap, gross ton.....	7.50 to	8.50
Old iron rails, gross ton.....	13.50 to	14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to	22.00
Old car wheels, gross ton.....	11.00 to	12.00
Heavy melting steel scrap, gross ton.....	10.00 to	10.50

Philadelphia

PHILADELPHIA, PA., May 16, 1911.

Consumers appear to show even less interest in the market than has been the case for several weeks, and in some lines business has been almost suspended. The decision of the Supreme Court in the Standard Oil case, handed down Monday, has been so long delayed that the outcome has been largely discounted, and while it removes one of the unfavorable elements of business, other conditions, as yet unsettled, still restrict the normal movement. Pig iron transactions have been on a very small scale, and in steel making grades prices have shown weakness. There is practically no change

in the finished material situation. Buying in most lines drags, and prospects for new business of any size are not very bright. Sellers in this district maintain recent quotations, except for iron bars, which show a decline.

Iron Ore.—With the demand for pig iron dragging, ore buyers hesitate to enter into negotiations for further supplies. Little business is pending and no important sales have been made. Importations in the week ending May 15 include 11,400 tons of Cuban and 11,425 tons of Spanish ore.

Pig Iron.—The movement in foundry grades has been extremely light. A considerable quantity of basic iron for prompt and early delivery has been sold to Eastern consumers at \$14.50, delivered, a concession from recent prices, and negotiations are pending for a further large amount, which buyers would take for more extended delivery, but sellers have not yet decided to sell for forward shipment at the same price they have been willing to accept for early delivery. Inquiry for low phosphorus iron, particularly for more extended delivery, is said to have been quietly made, while some small lot sales of standard grades have been made for early shipment at \$21, delivered here. In the foundry grades business has been confined to small lots, consumers apparently paring down purchases to the smallest quantities. Transactions in few instances exceed 100-ton lots. Inquiries for forward delivery are light, although in several cases buyers have been testing the market, but sellers are not disposed to sell ahead at the present range. Negotiations for lots of several hundred tons of regular brands are pending, but little of this business is coming into the open market. Prices of standard brands of No. 2 X foundry are pretty well maintained at \$15.50 to \$15.75, delivered, either for prompt shipment, or extending into the third quarter. Very little business in low grade iron is reported, but negotiations are pending for several small lots. The movement in Virginia foundry grades has been unimportant and prices are unchanged. Forge iron continues uncalled for and prices are quoted nominally. The following range of prices is named for standard brands, delivered in buyers' yards, eastern Pennsylvania and vicinity, for shipment extending over the remainder of the second quarter and in instances also over the third quarter:

Eastern Pennsylvania No. 2 X foundry.....	\$15.50 to	\$15.75
Eastern Pennsylvania No. 2 plain.....	15.00 to	15.25
Virginia No. 2 X foundry.....	15.80 to	16.00
Virginia No. 2 plain.....	15.80 to	16.00
Gray forge.....	14.75 to	15.00
Basic.....	14.50 to	15.00
Standard low phosphorus.....		21.00

Ferromanganese.—No fresh inquiry has developed in this district and the market is practically at a standstill. Prices are quoted by sellers at \$36.50 to \$37, Baltimore, depending on quantity, delivery and the customer.

Billets.—The demand continues light and conditions confronting producers are unchanged. In some instances efforts have been made to get price concessions, but inquiries are confined to small lots, and makers continue to hold recent quotations. Prices are firm at \$25.40 for open hearth rolling billets and \$30.40 for ordinary forging billets, delivered in buyers' yards in this vicinity.

Plates.—While there has been a fairly good run of orders, mostly of a miscellaneous character, the aggregate volume of business shows no gain. A good day's business is frequently followed by a poor one, and mill order books are hardly in as good shape as they were some weeks ago. A trifle better prospect is to be noted in boat and structural plates. Prices are being fully maintained by Eastern sellers at 1.55c., delivered here, which represents the minimum for ordinary plates.

Structural Material.—Few propositions of any importance have developed in this immediate vicinity. Bids for the addition to the building of the Maryland Casualty Company, Baltimore, will be opened early next week, requirements for which will be about 1100 tons. The American Bridge Company is reported low bidder on the Philadelphia & Reading elevation work on its Port Richmond Branch, some 4300 tons being involved. Several small building contracts and some small bridge work for the city will shortly be placed, but there is an absence of any new business of large size in this district. There is a fair demand for plain shapes, but mills show practically no gain in their productive rate. Prices of plain shapes are firm at 1.55c. minimum, delivered. While cutting for fabricated work is not so pronounced, low prices for this class of work continue to be made.

THE IRON AND METAL MARKETS

Sheets.—Several mills in this district have again been operating at full capacity, but the demand has been so irregular that producers cannot figure far ahead as to any probable basis of operation. Buyers come into the market for immediate and near future requirements, but show no interest in forward buying. Current business is entirely of a day-to-day character, and no change in this condition is expected in the near future. The following range of prices is quoted for prompt shipments, Eastern makers' mill: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Mills for the most part are operating on an unsatisfactory basis, as orders coming out are small. Consumers of refined iron bars hold business back, awaiting price developments, and usually find makers who are anxious for orders willing to make concessions. Refined iron bars for early delivery, on which specifications are desirable, are to be had at 1.22½c., Eastern mill, equal to 1.30c., delivered here, although some producers will not accept business at that figure. A full range of the market for refined iron bars is about 1.30c. to 1.35c., delivered in this district. Steel bars are reported as somewhat quieter, specifications being less plentiful.

Coke.—A few small contracts for foundry coke, for delivery extending over the last half, at \$2.25 to \$2.40 per net ton at oven, have been reported, but the general demand is not active. Prompt foundry coke continues to be taken by some producers at close to \$2 at oven. Less interest is being shown in furnace coke; consumers being to some extent uncertain as to their requirements continue to place orders merely for prompt and near future needs. For delivery in this vicinity the following range of prices, per net ton, is named:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke	3.75 to 4.15

Old Material.—The market shows little variation; consumers are not in need of material and confine purchases to bargain lots. Steel mills do not offer over \$13 for No. 1 heavy melting steel, but if the grade was particularly good and a round lot offered, \$13.25 would be paid. Dealers pay the latter figure for No. 1 material to apply on higher price contracts, but there are few sellers who are willing to dispose of any quantity at the present price level. In some instances rejections have been heavy, buyers making close inspection before accepting shipments. Rolling mill grades are particularly quiet, and any important sales are usually at price concessions. Machinery cast has been offered freely at \$13 to \$13.50, without getting buyers. There has been a little movement in wrought iron pipe at prices lower than quoted last week. In many grades an absence of sales is noted, while in others hardly enough business has been done to establish a market. The following range of prices about represents sellers' ideas of the market for deliveries in consumers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	14.00 to 14.25*
Low phosphorus heavy melting steel scrap.	16.75 to 17.25
Old steel axles.....	19.25 to 19.75*
Old iron axles.....	24.00 to 24.50*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.50 to 12.75
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast.....	13.00 to 13.50
Railroad malleable.....	11.50 to 12.00
Grate bars, railroad.....	10.50 to 11.00
Stove plate.....	10.00 to 10.50

*Nominal.

Buffalo

BUFFALO, N. Y., May 16, 1911.

Pig Iron.—The market continues quiet. Only a small proportion of the inquiry which developed late last week has materialized into orders. The remainder, together with a good share of the inquiry coming in during the current week, is still pending. Included in the current inquiry is 2500 tons, basic, from a Canadian source, said to be for a Welland concern. Other Canadian inquiries are for "hematite," for a considerable tonnage of low silicon and for low phosphorus. Three inquiries for 500 tons each for foundry grades are

noted, one from New England and the others from local points. An air brake company has placed an order for about 1000 tons of foundry grades and orders for several carloads of charcoal iron are reported. Most inquiry is for comparatively prompt delivery, starting in June and finishing by the end of the third quarter. Prices are unchanged and fully as firm as a week ago, furnacemen believing that consumers are beginning to realize that furnaces cannot stay in blast if any lower prices are made and that curtailment in production will ensue rather than a reduction in price. We quote as follows, f.o.b. Buffalo, for second and third-quarter delivery:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 2 foundry.....	13.50 to 13.75
Gray forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Basic.....	14.25 to 14.75
Charcoal.....	16.75 to 17.50

Coke is selling fairly well, although principally in small contracts.

Finished Iron and Steel.—Almost all lines of finished material show quiet conditions and a contraction in the amount of new business placed, although in bar material and plates preliminary negotiations are under way on one or two large contracts. The leading interest reports the sale of 2000 tons of bar products to a New York State interest. Canadian export trade is of fair volume, although not as good as it was in April. In fabricated structural material a good amount of new business is coming out. Figures are soon to be received for another large addition to the plant of the Johnston Harvester Company, Batavia, N. Y., requiring 1000 to 1100 tons of steel. The Syracuse Bridge Company was low bidder for the fabrication and erection of the Rosenbloom department store and loft buildings, Syracuse, 1000 tons, and the Lackawanna Bridge Company has received the contract for the steel for the Atlas Steel Casting Company's plant at Buffalo, 150 tons.

Old Material.—The market continues flat and without signs of improvement, conditions being practically the same as reported a week ago. No interest is being manifested by consumers. Only exigency orders to cover immediate needs are going through, and these in insufficient volume to affect values or to be used as a basis for quoting. Price schedules remain unchanged and nominal. We quote as follows, per gross ton f.o.b. Buffalo:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery cast scrap...	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.00 to 11.50
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings.....	6.25 to 6.75
Clean cast forgings.....	6.00 to 6.25

Cleveland

CLEVELAND, OHIO, May 16, 1911.

Iron Ore.—The market is very quiet. Sales during the week were limited to a few small lots. Some of the furnace interests that will need ore later announce that they will probably not come into the market before August. An Eastern steel company has been feeling the market with an inquiry for about 100,000 tons of low grade non-Bessemer ore a year for five or ten years, but the business has not been placed. There was 6,850,285 tons of ore on Lake Erie docks May 1, as compared with 5,444,080 tons May 1, 1910. Shipments from Lake Erie docks to furnaces from December 1 to May 1 were 2,576,596 tons. The entire movement of Lake Superior ore to furnaces from Lake Erie ports during the year ending May 1 was 32,636,692 tons. This was the largest movement in any one year with the exception of the year ended May 1, 1910, when the movement was nearly 1,000,000 tons greater. The amount on docks May 1 exceeds the previous record of 1908 by 1,572,034 tons. Ore boats owned by shippers are being gradually placed in commission, but many of the independent boats will not be started before June. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The market shows very little activity.

THE IRON AND METAL MARKETS

Some sales of small lots of foundry iron for spot shipment and the third quarter are reported, this business coming entirely from the smaller foundries. Shipments on considerable foundry iron has been held up recently and some of the consumers will have enough iron left over from their first half contracts to last them through July or August. In spite of lower quotations in the valley on basic, ranging from \$13.25 to \$13.50, a local furnace is still quoting basic at \$14. There is a local inquiry for 300 tons of basic for prompt shipment. No. 2 foundry is quoted at \$13.75, Valley furnace, for the second quarter, and \$14 for the last half. Some of the producers are holding firmly to \$11, Birmingham, for No. 2 Southern foundry for the last half, but some resale Southern iron for prompt shipment was sold during the week at \$10.75. For prompt shipment and the second quarter we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Basic	\$14.00 to 14.25
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Gray forge	13.50
Southern foundry, No. 2	\$15.10 to 15.35
Jackson Co. silvery, 8 per cent. silicon	18.00

Coke.—The market is quiet and prices on furnace grades for prompt shipment are weak. Some contracts for Wise County foundry coke have just been made for shipment in this territory at \$2.25 per net ton, at oven, for delivery during the year from July 1. We quote standard Connellsville furnace coke for spot shipment at \$1.45 to \$1.60 per net ton at oven, and \$1.75 to \$1.80 for the last half. Connellsville 72-hour foundry coke is held at \$1.95 to \$2 for prompt shipment and \$2.15 to \$2.40 for the last half.

Finished Iron and Steel.—Mill agencies are getting a good volume of orders for small tonnages, buyers ordering only for their immediate needs. The structural situations shows some improvement. Specifications are out for the Statler Hotel in Cleveland. It will require 3500 tons of steel. It is understood that the contract will be placed in Buffalo. Bids on the Central Y. M. C. A. building, Cleveland, 1500 tons, will close May 22. The Forest City Steel & Iron Company has taken the contract for 125 tons for a memorial building to be erected in Cleveland for the Woman's College. Considerable structural work will be closed shortly requiring from 100 to 200 tons. Prices on steel bars and structural material are firm at 1.40c., Pittsburgh, and very little shading is reported on plates. The Upson Steel Company, Cleveland, is now in the market for steel bar orders. This company expects to start up its bar mill some time next month. The demand for sheets continues only moderate. Some of the leading independent mills are maintaining prices, but a considerable concession is being made by a few of the smaller mills. The placing of a sheet contract for 2500 tons for delivery during the last half of the year is reported at a concession of \$2 a ton on black and \$3 a ton on galvanized. A western New York car company has an inquiry out for 1150 tons of iron bars and considerable other material, including bolts and rivets. This is the largest inquiry for iron bars that has come out for some time, and it is expected that it will call forth some low prices. Bar iron is generally quoted at 1.30c. at mill. The local bar iron mills are now running at about 75 per cent. of their capacity. Jobbers are getting a fair volume of local business, but warehouse orders for outside shipment are light.

Old Material.—The inactivity in the market continues. Quotations are for the most part unchanged, but the market is weak and prices on most grades are largely nominal. Mills are buying only in small lots for their early needs and the offerings are light. Dealers are refusing to sell yard stocks at present prices. One local consumer is offering \$11 for heavy melting steel, but is getting very little at that price. The Michigan Central Railroad list will close May 18 on about its usual quantity. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	\$13.00 to \$13.50
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.00 to 11.50
Old car wheels	11.50 to 12.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	11.00 to 11.50
Railroad malleable	11.50 to 12.00
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.00 to 6.25

Iron and steel turnings and drillings	6.25 to 6.50
Steel axle turnings	8.00 to 8.50
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 cast	11.25 to 11.50
Stove plate	10.25 to 10.50
Bundled tin scrap	11.00 to 11.50

San Francisco

SAN FRANCISCO, May 9, 1911.

Aside from some indication of activity in structural material, little improvement is noted in the Pacific Coast market for steel products. Excessive offerings and continued apathy of purchasers have caused a weakening of prices in some branches. Speculative business is entirely lacking, and so far the consuming demand has been below normal, purchases even by the larger interests being of a hand-to-mouth order.

Bars.—There is a fair demand for reinforcing material, with prospects of improvement within the next few months, owing to plans which are coming out for concrete buildings and a large amount of development work to be carried out in the interior of the State. According to figures recently compiled, shipments of cement from California to Oregon since the first of the year have been heavier than ever before. The bar market in general, however, remains quiet, and orders placed with domestic mills, either by merchants or consumers, are very small. Imported bars are moving to some extent, but mostly in a small jobbing way, and with large supplies in store there is increasing pressure to sell. The market is also weakened by the competition of local iron bars, and prices are unsettled, occasional sales being reported of iron bars as low as 1.80c. and steel at 1.90c., though the prevailing quotations are still 2c. for steel and 1.90c. for iron.

Structural Material.—The April building record in San Francisco was hardly as favorable as for March, and a slight decrease occurred in a number of other coast cities, though dealers in most building materials report increasing activity. An improvement is assured for this month, if awards are made on the buildings which are now being figured. Local fabricators have a fair amount of unfinished work on hand, including a few jobs which have come out since the first of the month, though little important work has been booked. Dyer Bros. have on hand a Spanish church at Broadway and Mason streets, and have just taken the Marye Building, at Seventh and Mission streets, requiring about 70 tons. The Schrader Iron Works has taken a contract for about 100 tons for the Ohlandt & Buck Building, and the Ralston Iron Works has a small job for the Lexington Realty Company. A number of small highway bridges are coming out, both in California and the north coast States. The plans for the Oakland city hall are said to call for about 3,500 tons of steel. Bids on the L. C. Smith Building at Seattle, Wash., will be opened May 10 at Syracuse, N. Y. This plan is said to call for about 3,600 tons. New figures are being taken on the Masonic Temple in this city, and it is believed that the contract will be let. Plans for the new St. Luke's Hospital, San Francisco, will be completed in two or three months. It will be class A throughout, the estimated cost being about \$400,000. The Pacific Gas & Electric Company is planning to build three steel towers at San Jose, Cal. Plans will soon be out for the D. O. Mills bank at Sacramento, Cal., and it is reported that William Land will erect a six-story class A building in the same city. The Harri-man railroad interests are planning to build steel frame passenger stations at Aberdeen and Hoquiam, Wash.

Rails.—There is a fair inquiry for light rails for the mines, and an increasing movement is expected, though at the moment there is less activity than a month ago. The movement of standard sections is keeping up fairly well, though individual orders are small, and the immediate requirements of the logging interests seem to be pretty well satisfied. Reports are current of several deals which may bring out a good volume of business before the end of the year. A contract has been closed for construction work on the portion of the Oakland & Antioch Railroad between Walnut Creek and Oakland, a distance of 17½ miles. The East Shore & Suburban line, between Oakland and Richmond, Cal., has been acquired by the United Properties Company, and there is some talk of its being extended to compete with the Oakland & Antioch. It is also rumored that Speyer & Co., of New York, have secured control of the Ocean Shore Railway, and that the road will be completed.

Sheets.—The distributive trade in black and galvan-

THE IRON AND METAL MARKETS

ized sheets shows more life than for some time past, though there is no really active demand. Some orders are being placed by merchants, however, and an increasing movement is expected.

Plates.—The small jobbing trade is very quiet, and no new business of any consequence has come out in the line of tank or penstock construction, though inquiries are expected shortly for a considerable tonnage.

Merchant Pipe.—The oil pipe business is practically dormant, and no revival is expected for some time to come. There is at present more oil on the surface than can be readily marketed, and both storage and transportation facilities are severely taxed, while financial conditions appear unfavorable for any large development in the way of pipe lines. Work has been stopped on most of the independent wells, and while some of the larger interests are operating on the usual scale they are buying little pipe. Local merchants report continued dullness in the small trade, though some of the mill representatives note a slight increase in business, and a few inquiries in connection with water-works are coming out. It is believed that steel pipe will be used in several new municipal projects in northern California.

Cast Iron Pipe.—Recent bookings include nothing of an unusual nature, though the tonnage is satisfactory for this territory, and several large inquiries are in the market. San Diego, Cal., is out with an inquiry for 8,000 tons, on which considerable competition is expected. The People's Water Company, Oakland, Cal., is coming into the market and expects to replace a large part of its old system of steel mains. The Chico Water Supply Company, Chico, Cal., has purchased 100 tons. The Pacific Gas & Electric Company and the Southern California Gas Company continue to place small orders at frequent intervals. By a compromise of the local gas rate controversy, the San Francisco Gas & Electric Company has received \$500,000 on condition that it be used for extensions. The city of Spokane, Wash., has ordered 2,500 ft. of 4 and 6-in. pipe. A government contract for the local Presidio water system will be let May 17.

Pig Iron.—The foundry trade is buying in a very small way. Values are unsettled and buyers can pick up small lots of good English or Continental foundry iron, brought as ballast, at about \$20 on the wharf. Domestic pig iron is not moving here to any extent, but is nominally valued at \$21.

Old Material.—The local demand has been extremely small for some time, and with increased offerings prices have declined sharply. A heavy tonnage of cast scrap has been sold by the railroads to dealers, and rerolling rails are offered freely with practically no market at the moment. Prices are quoted as follows: Cast iron scrap, per gross ton, \$16; steel melting scrap, per gross ton, \$10.50 to \$11; railroad wrought scrap, per net ton, \$12.50 to \$15; country wrought, \$11 to \$12; rerolling rails, per net ton, \$11.

The Rudgear-Merle Company, San Francisco, is installing a new furnace in connection with its rolling mill, and on completion of the furnace will overhaul the mill, which has not been in operation for some time. The mill is intended to reroll old rails, the output of small shapes being used for the manufacture of bedsteads and ornamental work.

Birmingham

BIRMINGHAM, ALA., May 15, 1911.

Pig Iron.—Strong denial is still made that the \$11 schedule on pig iron has been broken, yet it is pretty generally felt that a firm offer of \$10.50 for No. 2 foundry would be accepted, especially if the tonnage were attractive and shipments to be made within the current quarter. It is believed, however, that no iron has been sold for consumption in the South at less than the \$11 figures. There are several large inquiries pending. One manufacturer of pipe has a feeler before the local trade for 2000 to 3000 tons. Actual transactions closed the past week were without doubt light. Foundry stocks on furnace yards in Alabama showed an increase the past month of approximately 17,500 tons, while stocks of basic iron showed a decrease of 14,000 tons, with practically no change in the stocks of pig iron in warrant yards. Some buyers claim to be looking for and confidently expecting a price of \$10, Birmingham, but such parties are evidently not familiar with conditions attending the present cost of producing pig iron on the wage scales prevailing in this district. Unless there should be a very material reduction in

the cost of mining ore and coal it is quite certain that such a price on iron would result in putting a number of furnaces out of blast. Quotations are nominally as follows, all per ton of 2240 lb., f. o. b. cars, furnace yards, in this district:

No. 1 foundry and No. 1 soft.....	\$11.50
No. 2 foundry and No. 2 soft.....	11.00
No. 3 foundry.....	10.50
No. 4 foundry.....	10.00
Gray forge.....	9.50
Standard basic, chill cast.....	11.00
"Of" basic.....	10.50
Charcoal car wheel iron.....	22.50

Cast-Iron Pipe.—Some fair contracts were closed the past week; in fact, sufficient business appears to have been booked to put the pipe makers in a decidedly pleasant frame of mind, and it is the expressed opinion that there is little expectation of any material reduction in the output of cast-iron pipe in this section for several months. Prices are firmly held at recent prevailing schedules, which are approximately as follows, per net ton, on board cars at foundries here: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., average \$21, with \$1 per ton extra for gas pipe.

Coal and Coke.—Coke is in better demand, especially the higher grades of foundry coke. Prices are very firm, both on Virginia and Alabama brands. Coal is exceedingly dull, with mines running at a materially reduced rate of production as compared with last year. As a result, prices of coal are as low as they have been at any time in several years.

Old Material.—Some slight improvement is noted in the movement of scrap, but principally at the expense of the price. It is taking concessions to move any quantities of consequence. At the same time, dealers are not letting any opportunity get away to close for any tonnages that are offering at unusually low figures. Chattanooga has taken some scrap, and the mills at Alabama City and Knoxville continue to purchase, though the buying is generally of the hand-to-mouth character. Prices remain nominally as follows, per gross ton, f. o. b. cars here:

Old iron axles (light).....	\$14.50 to \$15.00
Old steel axles (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

New York

NEW YORK, May 17, 1911.

Pig Iron.—The market has been duller than for several weeks. One sale of 2000 tons is reported, but few were beyond 200 tons. Rather freer competition has appeared in the Buffalo market. New York State and New England foundries are generally taking deliveries according to contract, but there is some holding up of shipments in New York and the New York City district. We quote on Northern iron at tide-water as follows: No. 1 foundry, \$15.50 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15 to \$15.25. For Southern No. 1 Foundry we quote \$15.50 to \$15.75; No. 2, \$15.25.

Steel Rails.—The principal export sale is one of 5000 tons to the Entrerios Railroad in Argentina. In New England scattered inquiries have come up for 2150 tons of rails and out of these one order for 1100 tons has been placed. The Pennsylvania Steel Company has the contract for 5000 tons of girder rails for the Chicago Railways. The Monongahela Railroad has bought 1000 tons from the Carnegie Steel Company; the New Orleans, Mobile & Chicago, 500 tons from the Tennessee Company, and Stone & Webster, 530 tons from the Colorado Fuel & Iron Company.

Finished Iron and Steel.—Marked dullness continues. Though there is probably a widening belief that fundamentally conditions are improved, no one seems to look for quick manifestation of the change. In fact, some mills are reported so eager for business that prices have been shaded. Plates have been cut by some Eastern concerns, it is claimed; bar iron is admittedly quite weak, and close figuring by fabricators is still charged. It is believed that about 65 per cent. of plate-rolling

THE IRON AND METAL MARKETS

capacity is in operation. In this branch there is better outlook for activity in the weakening of the local machinists' strike. There is seemingly considerable variation in bar iron selling prices, and they are probably as low now as they have been at any time since the summer of 1900. Large work in structural lines is conspicuous for its small aggregate volume. Of new projects may be mentioned: 1200 tons for a power and pump house in Brooklyn of the American Sugar Refining Company; a building for the National Express Company, and 3300 tons of plates and shapes for concrete-steel work of the aqueduct being built for New York by its Board of Water Supply. The so-called connecting bridge, involving, it is reported, 36,000 tons, for making railroad connection between Long Island and the upper part of New York City, has reached the stage of asking for bids, but at this writing it is not known that the financial arrangements have all been effected. The structure of the New York Telephone Building on Walker street will be erected by the Levering & Garrigues Company, and a 700-ton contract for the Ordway Building, Newark, N. J., has gone to the Hay Foundry & Iron Works. An award on the 6000 tons of the Bamberger department store in Newark is expected at this writing. The Osborn Engineering Company, Cleveland, has the contract for the concrete-steel grandstand at the Polo Grounds, New York, and the American Bridge Company has an order for 4500 tons for track elevation for the Philadelphia & Reading Railroad. Quotations are: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.30c. to 1.40c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—Prospects for business have improved materially. While private buying is light, the inquiry has notably increased. Quite a number of public lettings are announced for the near future. The Metropolitan Water and Sewerage Board, Boston, Mass., will open bids May 22 for 2750 tons of water pipe. Lynn, Mass., will open bids on the same day for 1200 tons. The Department of Water Supply, Gas and Electricity of the City of New York will open bids on contracts for laying water pipe involving the quantities named as follows: May 19, for the borough of Richmond, 6500 tons, including specials; May 24, for the borough of Queens, 1580 tons, and on the same date for the borough of the Bronx, 8900 tons. Carload lots of 6 in. are quoted at \$21 to \$22 per net ton, tidewater.

Ferroalloys.—The ferromanganese market is very quiet and consumers are confining their inquiries to requests for quotations on lots of 50 tons and less. Dealers here are asking from \$36.50 to \$36.75, Baltimore. Very little ferrosilicon is being sold and the usual quotation is \$52.50 to \$53, Pittsburgh.

Old Material.—About the only business of any importance recently closed in this market has been in heavy melting steel scrap. While the demand was closely confined to small lots, the aggregate reached a fair tonnage. Very little rolling mill stock has either been sold or moved, as the rolling mills in the East are only running spasmodically. Cast scrap is almost neglected, with rather large offerings. Quotations are as follows, per gross ton, New York and vicinity:

Re-rolling rails.....	\$12.00 to \$12.25
Old girder and T rails for melting.....	10.50 to 11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles (nominal).....	22.00 to 22.50
Old steel car axles (nominal).....	17.25 to 17.75
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.50 to 5.00
Cast borings.....	5.50 to 6.00
Wrought turnings.....	6.00 to 6.50
Wrought pipe.....	10.50 to 11.00
Old car wheels.....	11.50 to 12.00
No. 1 heavy cast, broken up.....	11.50 to 12.00
Stove plate.....	9.00 to 9.50
Locomotive grate bars.....	9.00 to 9.50
Malleable cast.....	10.00 to 10.50

Metal Market

NEW YORK, May 17, 1911.

THE WEEK'S PRICES

		Cents per Pound for Early Delivery.					
Copper, New York.		Lead.		Spelter.			
May.	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
11.....	12.25	12.10	42.40	4.40	4.20	5.50	5.25
12.....	12.25	12.00	42.50	4.40	4.20	5.50	5.25
13.....	12.20	11.90		4.40	4.20	5.50	5.20
14.....	12.20	11.90	42.35	4.40	4.20	5.50	5.20
15.....	12.25	11.95	42.80	4.40	4.20	5.50	5.20
16.....	12.25	12.00	43.00	4.40	4.20	5.50	5.20
17.....	12.25						

Electrolytic copper was sold during the week as low as 11.90c. There have been heavy deliveries for export. Pig tin was up to 43c. this morning, which is 1½c. higher than a week ago. Spelter and lead are weak and dull.

Copper.—Copper is weaker and the market is much disorganized. This situation has been brought about by the fact that some of the leading selling interests have declined to make any price announcements and the suspicion is abroad that considerable cutting is being done. Electrolytic copper has been sold during the week as low as 11.90c. and some good sales were recorded at 11.95c. The deliveries into export during the month so far have been heavy, amounting in all to 13,529 tons. It is understood that some good sales of both electrolytic and lake were made for foreign account during the week and most of this copper was sold for delivery during the next six weeks. Lake seems to be stronger than electrolytic and as a rule 12.25c. is being quoted, although it is known that some sales were made at around 12.20c. The London market has been strong all the week and has gradually advanced from day to day. This morning the market there opened with spot copper selling at £54 3s. 9d. and futures at £54 15s.

Pig Tin.—Good sales of pig tin for early delivery were made on Monday and Tuesday, and there were inquiries for some fair-sized lots this morning. Although pig tin has been below the import parity all the week, the market has steadily strengthened from day to day and this morning sellers were demanding 43c. a lb., which is 1½c. higher than the price a week ago today. There seems to be plenty of spot tin available, and while the demand from the consumers have been fairly good during the last few days the business is not very well distributed. Yesterday afternoon some good sales were made at 42.80c., but dealers who were quoting that price yesterday are asking 43c. this morning, as there has been a corresponding advance in the London market which opened with spot tin selling at £190 8s. 10d. and futures at £190 15s. The arrivals of pig tin so far this month have not been heavy, amounting in all to 1659 tons. There are 1245 tons of tin afloat, much of which will arrive before the month is out.

Tin Plates.—Following an advance in the London price of pig tin, quotations on foreign tin plates have advanced 1½d. Early in the week Swansea plates were offered as low as 13s. 6d., but this morning's price in London was 13s. 7½d. The call for foreign tin plates is not very good as the present price is considered somewhat prohibitive. The domestic demand is light and there is considerable pressure to sell on the part of Western independent tin plate manufacturers who have invaded the Eastern market in search of business. Quotations are unchanged at \$3.94 for 100 coke plates.

Lead.—Lead continues weak and independent sellers are making the price both here and in St. Louis. The leading interest continues to ask 4.50c. in New York while outside sellers are demanding 4.40c. The St. Louis market is weak at 4.25c. and concessions are being made rather freely.

Spelter.—Spelter is selling fairly well, but buyers do not seem to want to commit themselves as to their future needs. They are taking stock only as they use it and the competition for the business in sight is so keen that prices vary. There are dealers in St. Louis who are willing to sell at 5.20c. and some offers of August spelter are being made as low as 5.15c. Most of the consumers here are buying for prompt shipment from the West as spot spelter continues high in this market, the usual quotation being 5.50c.

Antimony.—Antimony is dull and consumers seem interested only in the Hungarian and Chinese grades, which are being offered at around 8.12½c. Hallett's can be had at 9c. while Cookson's is very firm at 9.00c.

Old Metals.—Domestic business is very slow. Dealers' selling quotations are nominally unchanged as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Chicago

CHICAGO, May 16.

The market for metals continues practically on

the same level as for the past few weeks, with buyers purchasing only for immediate consumption and new inquiries scarce. Copper is weak and the price of lead has declined five points. Tin is very erratic, although the price quoted is the same as for the past week. The market for old metals is lifeless. We quote Chicago prices as follows: Casting copper, 12 $\frac{3}{4}$ c.; lake, 12 $\frac{1}{2}$ c., in carloads, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; pig tin, carloads, 43c.; small lots, 45 $\frac{3}{4}$ c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10 $\frac{1}{4}$ c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12c.; copper bottoms, 10c.; copper clips, 11 $\frac{3}{4}$ c.; red brass, 10 $\frac{1}{4}$ c.; yellow brass, 9c.; lead pipe, 4 $\frac{3}{8}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin pipe, 36c.

Iron and Industrial Stocks

NEW YORK, May 17, 1911.

The stock market drifted the greater part of the past few days but on Tuesday of this week prices decidedly stiffened, following the United States Supreme Court decision in the Standard Oil case, made public on Monday. This decision was regarded as distinctly favorable to such large corporations as are not engaged in any attempt to restrain trade unreasonably. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalmers, com. 7 $\frac{1}{8}$	Railway Spr., com. 32 $\frac{1}{4}$ -33 $\frac{1}{2}$
Allis-Chalmers, pref. 27 - 29	Railway Spr., pref. 100 $\frac{1}{2}$ -101
Beth. Steel, com. 31 $\frac{1}{2}$ -32 $\frac{1}{2}$	Republic, com. 29 $\frac{1}{8}$ -31
Beth. Steel, pref. 60 $\frac{1}{2}$ -62	Republic, pref. 93 - 95
Can., com. 11 $\frac{1}{2}$ -12 $\frac{1}{2}$	Sloss, com. 49 - 49 $\frac{1}{2}$
Can., pref. 85 $\frac{1}{4}$ -87 $\frac{1}{4}$	Sloss, pref. 112
Car & Fdry., com. 52 - 54	Pipe, com. 16 $\frac{1}{2}$
Car & Fdry., pref. 115 $\frac{1}{4}$ -117 $\frac{1}{4}$	Pipe, pref. 55
Steel Foundries, com. 41 - 43	U. S. Steel, com. 74 $\frac{3}{8}$ -77
Colorado Fuel, com. 30 $\frac{1}{2}$ -31 $\frac{1}{2}$	U. S. Steel, pref. 118 $\frac{3}{4}$ -119 $\frac{3}{4}$
General Electric, com. 155 $\frac{1}{2}$ -160	Westinghouse Elec. 68 - 72 $\frac{3}{8}$
Gr. N. ore cert. 59 $\frac{3}{8}$ -62	Va. I. C. & C. 60 - 62
Int. Harv., com. 125 $\frac{1}{2}$ -128 $\frac{3}{4}$	Am. Ship, com. 70
Int. Harv., pref. 126 - 127	Chic. Pneu. Tool. 49 $\frac{1}{2}$ -52 $\frac{1}{4}$
Int. Pump, com. 38 $\frac{1}{2}$ -40	Cambria Steel, com. 45 $\frac{1}{8}$ -46
Int. Pump, pref. 88 - 88 $\frac{3}{4}$	Lake Sup. Corp. 29 $\frac{1}{2}$
Locomotive, com. 37 $\frac{3}{4}$ -38 $\frac{1}{4}$	Pa. Steel, pref. 105 $\frac{1}{4}$ -106
Locomotive, pref. 106 - 106 $\frac{1}{4}$	Crucible Steel, com. 13 - 13 $\frac{3}{4}$
Nat. Enam. & Stamp, pref. 86	Crucible Steel, pref. 80 $\frac{1}{4}$ -81 $\frac{1}{2}$
Pressed Steel, com. 32 $\frac{1}{2}$ -33 $\frac{1}{2}$	Harb. Walk Ref., pref. 96

Dividends.

The Republic Iron & Steel Company has declared the regular quarterly dividend of 1 $\frac{3}{4}$ per cent. on the preferred stock, payable July 1.

The American Iron & Steel Mfg. Company has declared dividends of 2 per cent. on the preferred and common stock, payable June 1.

The Standard Chain Company, Pittsburgh, Pa., has declared a quarterly dividend of 1 per cent. on the preferred stock, payable June 15.

The Steel Corporation to Be Investigated

The House of Representatives on May 16 passed the Stanley resolution for the investigation of the United States Steel Corporation. The committee on rules named the following members as a special committee to conduct the inquiry: Democrats—A. O. Stanley of Kentucky, Charles L. Bartlett of Georgia, Jack Beall of Texas, Martin B. Littleton of New York and Daniel J. McGillicuddy of Maine; Republicans—M. E. Olmstead of Pennsylvania, Olin Young of Michigan, John A. Sterling of Illinois, and Henry G. Danforth of New York.

The resolution was adopted without much debate and with no opposition. The primary purpose of the inquiry is to determine whether the United States Steel Corporation or other corporations or persons have violated the anti-trust, inter-State commerce and other acts. The organization and operation of the Steel Corporation and its relations with the Pennsylvania Steel Company, the Cambria Steel Company, the Lackawanna Steel Company, the Pennsylvania Railroad Company, and with coal companies, national banks, trust and insurance companies, and any other interests are all to be investigated. Mr. Austin, a Republican from Tennessee, urged caution in disturbing the business interests of the country, and said that the absorption of the Tennessee corporation had been of advantage to the South. Mr. Mann, minority leader, said

that the Republican side would not obstruct the investigation, and hoped that it would result in benefit to the country.

Personal

Clarence A. Bartlett has accepted a position with the Garry Iron & Steel Company, Niles, Ohio, as sales agent traveling out of Philadelphia and working through the States of New Jersey, Maryland, Virginia, Pennsylvania and Delaware.

L. A. Irwin, formerly purchasing agent of the Quincy, Omaha & Kansas City Railroad, is now associated with the Western Railway Supply Company, Kansas City, Mo.

E. G. Eldridge, formerly with the E. L. Essley Machinery Company, Chicago, has severed that connection to engage in business for himself, in new and second-hand machine tools. He has opened an office and store at 566 Washington boulevard, Chicago.

L. A. Osborn of the J. M. & L. A. Osborn Company, Cleveland, Ohio, has decided to lay aside business cares for an indefinite period for the benefit of his health. He will spend some time in the South, where he is at present, and during the summer will go to Europe.

The Burt Mfg. Company, Akron, Ohio, recently received an order from Stone & Webster, engineering corporation, Minneapolis, Minn., for five 12-in., twelve 48-in. and two 60-in. ventilators. They will be made of Toncan metal.

The Chicago office of the J. E. Marshall Company, representative of the George H. Smith Steel Casting Company, Milwaukee, has been removed from 40 Dearborn street to room 755, First National Bank Building, Chicago.

David Evans & Co., The Rookery, Chicago, have been appointed exclusive Western sales agents for the Otis Steel Company, Cleveland, Ohio, in the sale of its open hearth steel castings.

Charles C. Gano, who was formerly connected with the sales force of J. K. Dimmick & Co., at Uniontown, Pa., has been appointed assistant manager for that firm at Cincinnati, Ohio.

Frank Samuel, Philadelphia, Pa., returned May 13 from a month's business trip abroad.

B. S. Harrison, of London, representing Sota & Aznar, producers of Spanish iron ore, arrived in this country May 13 on a business errand.

C. E. Swenson has been appointed assistant sales agent of the Hazard Mfg. Company in its Pittsburgh office in the Conestoga Building. He was formerly connected with Lee C. Moore & Co., consulting engineers.

H. D. Miles, of the Buffalo Foundry Company, Buffalo, N. Y., has been spending some weeks in Europe.

Edward Bailey, president of the Central Iron & Steel Co., Harrisburg, Pa., is recovering from a severe illness involving a surgical operation.

Powell Stackhouse has sailed for Europe. He will attend the international iron and steel conference at Brussels early in July as a director of the American Iron and Steel Institute.

E. A. S. Clarke, president of the Lackawanna Steel Company, sails for Europe May 27. He will make a tour of England before attending the Brussels conference of iron and steel manufacturers.

E. A. McKelvey, formerly Pittsburgh salesman of the Harbison-Walker Refractories Company, and R. A. MacDonald, formerly its Western Pennsylvania and Ohio representative, have severed their connection with that company and have been made sales managers for the Pittsburgh and Western territory for the General Refractories Company. The general sales offices will be suite 1243 Oliver Building, Pittsburgh, Pa.

Frank B. Ward, for several years in charge of Manning, Maxwell & Moore's Cleveland office and afterward manager of the Pittsburgh and Cleveland offices of the Niles-Bement-Pond Company, has opened an office in room 1203 Machesney Building, Pittsburg, as the representative of Henry Pels & Co., New York, manufacturers of punching and shearing machines, also of the Nazel Engineering & Machine Works, Philadelphia, manufacturer of Beche patent pneumatic forge hammers, H. B. Underwood & Co., Edwin Harrington, Son & Co., of Philadelphia, and others.

Blast Furnace and Coke Oven Gases

The Results of Their Increasing Utilization at German Iron and Steel Works

BERLIN, May 4.—The Spring meeting of the Verein Deutscher Eisenhüttenleute, which was held at Duesseldorf on Sunday, April 30, and was unusually well attended, called forth two highly interesting papers on power and other problems in the iron and coal industries. Chief Engineer H. Hoff, of Duedelingen, spoke on "Important Problems in Connection with Supplying Iron Works with Furnace Gas." A considerable part of the furnace gases, he said, is required for heating the blast; the rest is available for generating power. The statements of engineers regarding the amount of gas needed for heating the blast vary greatly; but this is due chiefly to the difficulties in making accurate measurements of consumption, while local circumstances do produce some real variation. The speaker recommended the general introduction of efficient measuring instruments in order to secure accurate information regarding the economic advantages of the various methods of heating and power development.

Engineers are by no means agreed to-day, he said, as to the best method of generating and transmitting power in iron works, and the disagreement is greatest in respect to power for driving rolling mills. The speaker had circularized the great iron companies of Germany and Luxemburg which have electrical generating plants, and from the 29 answers received he concluded that an average of 38 per cent. of the power of the gas plants is utilized. Some plants utilize little above 22 per cent., while one gets 51.7 per cent. This difference is due to the secondary machinery; there are only two larger motors, each of 325 h. p. and these drive centrifugal pumps. One plant with 85.9 per cent. utilization is a steam plant. Corresponding to the degree of utilization, the allowance for interest and amortization is relatively high, reaching with some works $\frac{1}{2}$ cent per kw. hour when the allowance for those purposes is 15 per cent. The utilization can be increased by using turbine aggregates capable of carrying an overload-up to 50 per cent.

Steam Turbines vs. Gas Engines

Mr. Hoff announced it as his conviction that electric current can be produced more cheaply with steam turbines than with gas motors, and he went into great detail to prove this. As a result of his investigations he expressed grave doubt whether iron works should resort to electrical transmission so extensively as is done at present by most of them, particularly in view of the progress being made in rendering the steam engine more economical in operation. He also drew attention to the fact that German engineers, as a consequence of the development of the large gas motor, have apparently lost interest in efforts to improve steam plants; for, in establishments with great electrical generators driven by gas engines it is often found that their boilers are operated at a pressure of only 5 or 6 atmospheres, and that superheating is done only to a limited extent. Owners of antiquated steam plants are seldom willing to displace them with modern, economically working machines. The best steam plants are found at the smaller rolling mills. Quite recently, however, a change can be seen. One can now hear of establishments ordering steam engines which had hitherto adopted the principle of running everything by electricity.

The speaker next took up the subject of utilizing furnace gas under boilers. Special precautions must be taken, he showed, for preventing gas waste in burning. With boilers equipped for burning gas more importance is attached to the system used and to the flame flues than is the case with boilers fired with coal, owing to the lower calorific efficiency of the burning gas. The speaker also referred to the merits of the expansion turbines, which have been much under discussion of late, and described a plant that has been in operation at Duedelingen for a year, utilizing the exhaust steam from the steam turbine.

Utilizing Coke Oven Gas

The second paper referred to was read by F. W. Lührmann, of Berlin, and treated of the utilization of gases in iron works and coking plants. He referred, among other

things, to the enormous excess of gas production at coking ovens above the demand for illuminating gas. This excess he estimates for the Dortmund mining jurisdiction alone at 1,800,000,000 cubic metres, and for all Germany at 2,400,000,000 cubic metres a year. He suggested that, in view of the high heating value of coke oven gas, iron works would find it to their advantage to heat their coke ovens with inferior gas, like blast furnace gases, and reserve their coke oven gas for their heating furnaces and open-hearth furnaces. German cities have latterly begun to obtain their gas supply from coking plants. According to this speaker, ovens heated by their own gases require only half of their product for this purpose. The surplus is sold to the cities at 2.25 to 2.50 pfennigs per cubic metre (0.409 to 0.455 cent per cubic yard). Thus half of the gas, along with the by-products of coal tar and sulphate of ammonia, gives a yield of about \$1.30 per ton of coke produced.

At this meeting various investigations undertaken by the association were referred to. It has proposed to the Ministry of Public Works the appointment of a special commission to study the utilization of blast furnace slag in making concrete. The Association is also engaged in experiments for determining the manganese contents of irons and ores.

Iron and Steel Works as Buyers of Coal

In connection with the utilization of gas for power purposes at iron works, it is highly interesting to note that the Coal Syndicate is not a little concerned about the reduction in the consumption of coal thus occasioned. In its annual report for 1910, which was given out this week, the Syndicate says, in explaining the smaller increase in coal than in coke consumption: "The technical progress in the utilization of gas, which has made it possible to use blast furnace gases for power purposes to an ever-increasing degree, has enabled iron works to give up the use of coal for fuel purposes more and more. Inasmuch as the iron works were formerly among our heaviest consumers of coal, and in view of the fact that the technical experts are predicting that they will consume only coke at no distant day, we must count upon considerable difficulties in selling coal, now and in the future."

Financial Results of Technical Advances

The yearly report of the Düsseldorf Chamber of Commerce, issued a few days ago, contains some noteworthy remarks about the financial effects of the technical improvements introduced by German iron works within the past few years. Those improvements, the report shows, have had a remarkably favorable effect upon the earning capacity of the iron companies. The prices of iron in 1910, it says, "were on an average 25 per cent. to 30 per cent. lower than those of 1906 and 1907, and only 5 per cent. to 10 per cent. higher than those of 1909. The good earnings of the great iron works were therefore due only in part to higher prices and larger outputs. Substantial results were produced by the improvements carried out in the dull years 1908 and 1909. The gross profits of the Hasper Eisen und Stahlwerke, for example, rose in one year from \$214,000 to \$465,000, and a great part of this gain was due to the technical improvements introduced. That was the case at other establishments. Everywhere the companies have been modernizing, and they continue to modernize. The increasing utilization of blast furnace gas, in particular, has accomplished extraordinary economies."

Large Contract for Scales.—The Standard Scale & Supply Company, Pittsburgh, has secured a large contract for scales to be installed at the various pumping plants of the Department of Water Supply, Gas and Electricity, Borough of Brooklyn, N. Y. These scales aggregate 35 in number and include several 100-ton 42-ft. railroad track scales, both pit and suspension pattern, and a large number of wagon scales of 10-ton capacity, heavy railroad pattern. All these scales are to be built in steel and concrete construction. The contract will be completed during the summer. This is one of the largest installations of high capacity scales ever placed.

The Infallible Man

Instructive Reading for the Iron Man Who Speculates

The following article, taken from the New York Evening Post, will probably interest quite a number of our readers who pay some attention to speculation in stocks as a diversion from their cares in the manufacture of iron and steel:

A tender customer who was neglecting his silk business to speculate in stocks one day met a friend whom he had known casually for many years as a man who got his living in Wall street, between 10 a.m. and 3 p.m., and would never give a fellow a tip on the market. They went to lunch and regarded each other with mutual distrust. The tender customer wondered if the Wall street man got his living by ethical means, and the Wall street man wondered what the silk merchant was doing in Wall street.

"Business is dull with me," said the tender customer, apologetically, "and a friend I have with a Stock Exchange house got me interested in a little stock operation."

"It's a pretty hard market to beat," remarked the Wall street friend, as if there was nothing more to be said. The tender customer asked him what he thought of Steel common.

"I don't know what to think of it," said the Wall street man; "though I'm short of it I'm afraid there is too much company on the short side."

"I have sold it short," ventured the tender customer. "In the office where I have my account they are very bearish on it. There is a man in that office who, I am told, is an authority on the steel trade. He seems to know a great deal. He says——"

"Who is he?"

The tender customer cast his eyes about to make sure that nobody was listening and then mentioned the name of the steel trade authority as if in confidence.

"Oh!" said the Wall street man. "He's now with that house, is he?"

"Yes," replied the tender customer. "I don't know whether he is a member of the firm or not. The head of the house seems to be very proud of him—refers to him continually on questions of Steel."

"No," said the Wall street man, "he is not a member of the firm. He is just trading there. No doubt the firm gives him an interest in the market for his information."

"You know about him, then?"

"I have known him for years."

"He's very well posted on steel-trade conditions, is he not?"

"He is," returned the Wall street man. "He knows the steel trade thoroughly. He sits up nights with it. I think he must have been raised on pig iron. He understands it chemically, mineralogically and commercially. The only other thing he knows is his way home and back."

"I'm glad to hear you say so," said the tender customer. "Since I sold Steel it has gone up two points. So he is really an authority, then?"

"His knowledge of trade conditions is amazing, really," said the Wall street man. "You will notice that when he leaves Wall street in the afternoon he takes with him all that has been contributed during the day to the literature of steel, together with material of a heavier sort—the foreign trade statement, the Statistical Abstract of the United States, or the annual reports of the United States Steel Corporation. He reads every line of *The Iron Age* each week. He can give you the statistics of pig-iron production by months for years past out of his head. He knows every steel-making process there is, and the cost of producing anything from a ten-penny nail to a steel rail. It's marvelous what he knows about steel and iron. I believe he was once in the steel business. On trade conditions he is infallible."

"Well," said the tender customer, "he is very bearish on Steel common. You think yourself it will go down, don't you?"

"I can't see anything in conditions to put it up," said the Wall street man.

The tender customer went back to the house where he had his account, offered the steel authority a good cigar, and got in return the story of how the steel authority

disapproved of the formation of the United States Steel Corporation, and told Mr. Morgan and others how it was going to turn out. Did he tell them personally? Well, not exactly; but he told everybody else and wrote letters to the newspapers which no paper dared to print at that time. Also, he wrote a series of circulars for a large Stock Exchange house predicting the slump which took place in the Steel shares.

The man whom the tender customer knew as one who got his living in Wall street went back to his office and gave orders to buy all the Steel common he was short of.

"Do you know anything?" asked the broker in surprise. "I thought you were very bearish on Steel."

"I have been," said the man who got his living in Wall street. "I am bearish on it still, but I'm wrong."

"What makes you think so?"

"I've been talking to a lamb."

"One who was bearish on Steel?" inquired the broker.

"Worse than that. He had been selling Steel common short on the advice of the only infallible man in Wall street."

A month afterward the tender customer who had been neglecting his silk business met his Wall street friend uptown. "Our authority was not infallible this time," he remarked. "I lost nearly ten points in that Steel common I sold short."

"But our friend is infallible, all the same," said the Wall street man.

"I don't know what you mean," said the tender customer. "He certainly was very wrong on Steel common."

"That's what I mean," answered the Wall street man. "He is infallibly wrong."

"But you said yourself that he was undoubtedly an authority on the steel trade."

"He is, but Steel common is always nine months or a year ahead of him, and he never catches up with it. He has been running that race for ten years."

"Why couldn't you have told me before?"

"Steel might have gone down."

"What do you think of it now?"

"I don't know what to think of it."

"That's what you said before," complained the tender customer. "Why is a speculator like yourself so unwilling to give an opinion?"

"You are in the silk business?" asked the Wall street man.

"Yes."

"Well, then, perhaps you can tell me if silks are going to rise. I should like to buy if they will rise."

Ottawa's Advantages.—The Publicity and Industrial Bureau of Ottawa, Canada, has issued a beautifully illustrated brochure calling attention to the economic and advantageous facilities for the successful operation of nearly every kind of industry which are offered by the city of Ottawa. The Chaudiere Falls of the Ottawa River, located within the city limits, provide an abundance of cheap electric power, approximately 73,000 hp. being at present utilized, with 27,000 hp. available. On the same river, above the city, 589,320 hp., and below the city 269,680 hp. are capable of development. The claim is made that the city is in possession of more power than Niagara, and at less cost. A list of 168 factories is given which shows the great diversity of the local industries.

The Jones Step Process.—The Kloman Mining Company has decided to install at its property in the Republic district of the Marquette range three furnaces of the Step process type, of which John T. Jones is the inventor. The equipment for the plants is now arriving from the shops of the Allis-Chalmers Company. The construction of the furnaces will differ somewhat from that employed in the experimental plant at Iron Mountain, Mich., Mr. Jones' home city. The most noticeable radical change will be in the cylindrical kiln, the position of which will be horizontal instead of inclined. The capacity of the furnaces will range from 200 tons to 400 tons of "metalized" ore in 24 hours.

R. A. Rowland & Co., Bessemer Bldg., Pittsburgh, has secured a contract for the cast iron, ornamental iron and brass work for a new depot for the Pennsylvania Railroad at Steubenville, Ohio, which will be 50 x 200 ft. in size.

The Selection of Factory Equipment

Considerations Bearing on the Economical Installation and Operation of Machinery

BY STERLING H. BUNNELL.

In looking over a well designed factory, with material traveling forward on regular routes, workmen actively employed at all times, supplies furnished as required without delay and light, power and all facilities supplied in full measure and without interruption, there is little evidence of the elaborate process of investigation which precedes getting the equipment and putting it in working order. One of the most difficult problems which must be solved by the manager or engineer taking hold of a factory problem is the planning of the equipment to handle the work to the best advantage. The steps to be followed in the case of a new factory intended to take over the work of one already in operation are easily determined. If, however, an old factory is to be purchased and adapted to handle new work, much more study is necessary than if the whole problem began with a sheet of blank paper. The most difficult of all situations is to lay out the work in connection with a new machine or process which has never before been handled in a shop, and which therefore cannot be reduced to practice on the lines of what someone else has done. It is always easy to take another man's ideas and do better than he did. It is quite another matter to start in the first place with no information at all and establish a scheme so good that the second man cannot pick holes in it at the first glance.

Things to Be Decided First

Taking up the work at the beginning, the first step is to go over the machine or process in detail, item by item, and estimate the kind of machine, character of labor and time element necessary to complete each operation in detail. If the work is the construction of a small machine in one size only a list of parts of the machine taken from the drawings is the starting point. Each part is then to be studied and the best method of construction determined and set down. The size of machine which it is proposed to use and the time required for the operation should be put down each in its proper column. A complete list of job time is thus prepared. A series of totals is taken of the list when completed, so that the total of minutes or hours time for each size of machine tool may be determined. The desired output of the factory in units of product per day being known, it is easy to determine how many machines of each type will be required to produce the necessary number of each part.

At this point an element of judgment comes in. Some machines will be found to have idle time, as where the number of operations for one machine is not enough to keep it busy for a full day while turning out its quota of the day's output of the factory. The planner does here just what the foreman would do in an actual factory. He endeavors to see if he can shift some of the work from tools of near the same size, or whether he can increase the speed of machines when necessary so that they can finish within the scheduled time.

Standard vs. Special Machines.

The difficult operations and the most expensive items of work need the most careful study. Some of these operations may be found to form the centers around which all the shop work may be said to revolve. If a special machine is required to perform some one operation the output of the entire factory may be measured by the capacity of this machine to do work. In selecting the types of machine for difficult or special work too much thought cannot be given to arranging to use standard tools and devices rather than special construction. While there are cases where special machines are desirable, it is much more often advisable for the one planning the work to arrange for special devices to be applied to standard machines so as to avoid the purchase of expensive machinery which will represent too large a proportion of the invested capital and which cannot be readily shifted to other work. Among machine tools some of the special turret lathes which have been advocated universally for work which was formerly

done on engine lathes are being replaced to advantage by lathes of simpler types provided with automatic stops. A cheaper and stronger machine is thus put within the capacities of semi-skilled help. Such lathes can be "set up" by a foreman in the same way as is common practice with turret lathes and screw machines, and unskilled men can easily be taught to run them, the accuracy of the work being secured by proper setting of the automatic stops.

In putting new work into an old shop purchased for the purpose it is worth while to go over the whole ground from the beginning, just as if the shop were new, and then to compare the schedule of tools and see where discrepancies occur. Naturally, having certain machines on hand, there will be more opportunity for revising the first schedule and shifting some kinds of work to other tools than those for which they were first intended, so as to utilize the facilities as far as possible. Managers are recognizing more in these days the value of time spent in careful planning before starting to spend money upon equipment which cannot be changed. A few days and the necessary expense put into the careful study of a manufacturing problem cannot fail to realize much more in the way of profit than the same amount spent in a machine which later proves to be unsatisfactory and loses money from first to last.

Sequence in Ordering and Installing Machines

When the time comes for the actual purchase of the new machinery the management should remember first that it will be impossible to commence work on all of the machines on the same day. There are always successive steps to be performed in every manufacturing operation. The purchaser should therefore ascertain which machines he can probably get soonest and should work with the men concerned in fitting up the tools, making the necessary fixtures and commencing the construction of factory product, so that they may make ready to use the machines as soon as they come in. In setting up a large factory much interest may be saved by careful planning in this way. Some of the machines first purchased can be put to work making fixtures for others. In machine work some of the lathes intended for manufacturing may be started as toolmaking machines and afterward transferred as the volume of toolmaking work decreases, which will often be the case where large quantities of jigs must be made up in advance for a machine which will afterward remain with little change.

A Tendency To Too Heavy Machines

Considerable saving can often be made in purchasing tools, if the craze for extra weight is kept in check, where this is justifiable. Machine tool builders sometimes persuade purchasers to take extra heavy patterns of tools, when in fact the work which will be put on the tools is not of a character which permits of using their full power. In a forge shop the heaviest possible pattern of lathe is justifiable for taking very heavy cuts on rough orders; but the same type of lathe would not be desirable for finishing crank shafts in a machine shop, since the shafts are not stiff enough to permit of using the full power of such a tool. There are excellent special machines made for such work as the turning of crank shafts; but while they work with great speed and accuracy, they are naturally not constructed with the same character of strength and rigidity as is necessary in ripping off the steel from a rough forging. There are boring mills on the market capable of taking the heaviest kind of a cut at the greatest speed possible for the steel, on the outside of the full diameter of which the machine is capable. Such tools, however, are not desirable for shops where nine-tenths of the machine's work is to be done on small diameters. In many cases, careful preliminary thought will show how to save unnecessary outlay, and where the shop can better afford to lose a little time on occasional large work than to suffer a constant loss through the fixed charges connected with a heavy and expensive tool worked to only half its capacity.

In planning a factory, it is always necessary to provide liberally for growth. This requires a quality of the imagination beyond that needed to determine the necessary tools for work in hand. The designer of the shop should consider whether, in purchasing a machine of, say, 40 in. diameter, he can provide, on the one hand, for the extreme of work which he may desire to take care of in the shop, or whether, on the other hand, he would not do well to buy a small machine in the first place and later add a larger one. A common fault of purchasers of shop equipment is to put in overgrown tools in the hope of being able to take care of anything which may be required. The result is that the tool is worked for years on small size, at continual disadvantage. The loss of profits on a tool poorly adapted to the work is enough in many cases to have covered at least the interest on the cost of another machine of smaller size, and often, indeed, will pay for the small machine in a short time.

Finally, in planning and purchasing, the management should be conservative, and endeavor to keep within the limits set by prudence in every direction. Not all the tools should be purchased in one order. Some capital should be reserved for additions. The most careful planning cannot foresee all the development of the future. Some machines will be found insufficient in output to meet the requirements. New devices will come to the notice of the construction department, which will put in requisitions for them, often calling for no small amount of money. All plans have a tendency to overrun the expected limits. By purchasing the small machines first, and keeping back portions of lots of machines of the same size, the man with limited capital is much more safe than with his last dollar spent on the purchase of equipment. The same consideration should hold with large and wealthy corporations, which are justified in purchasing to fill their needs, but which should always retain a generous reserve for the unexpected additions which success will require for the plant.

The American Foundrymen's Association

The following provisional programme has just been issued for the Pittsburgh convention of the American Foundrymen's Association, May 23 to 26. The sessions will be held at the Pittsburgh Exposition building on Duquesne Way, in which will be shown the exhibits of the foundry supply and machinery firms. The "joint sessions" referred to are those held in conjunction with the American Brass Founders' Association. The latter association holds a separate session on Wednesday afternoon, also one for the election of officers on Friday morning.

MONDAY, MAY 22

2 P. M.—Registration Only.

TUESDAY, MAY 23

9 A. M.—Registration.

10 A. M.—Joint Session.

Addresses of Welcome, Presidential Addresses, Reports of Secretaries, Committees, etc.

"Economic Insurance for Foundry Properties," by S. G. Walker, Providence, R. I.

"Production Costs," by Ellsworth M. Taylor, New York.

"The Efficiency Movement in the Foundry," by C. E. Knoepfel, New York.

"Foundry Costs," by F. E. Webner, New York.

"Why Cost Systems Fail," by S. E. Nold, Alliance, Ohio.

Presentation of Molding Sand Data of the A. F. A.

Memorandum on the Standard Test Bar for Cast Iron.

2 P. M.—A. F. A. Session.

"Cupola Melting Practice," by P. Munnoch.

"Cupola Practice," by R. H. Palmer, Salem, Ohio.

"The Briquetting of Metal Borings," by Dr. R. Moldenke, Watschung, N. J.

"Mechanical Charging of Cupolas," by G. R. Brandon, Harvey, Ill.

"Progress in Heated Foundry Mixers," by J. B. Nau, New York.

"Titanium in Iron Castings" by Chas. V. Slocum, Pittsburgh.

"Defective Castings, and how to Handle Them," by John M. Perkins, St. Louis.

"Molding Machine Practice," by E. H. Mumford, Plainfield, N. J.

"Machine vs. Hand Molding," by John Alexander, Philadelphia.

WEDNESDAY, MAY 24.

9.30 A. M.—Joint Session.

"The Permanent Mold," by Edgar A. Custer, Philadelphia, Pa.

"The Foundry at Close Range," by Benj. D. Fuller, Cleveland, Ohio.

"Core Making and Core Machines," by Archie M. Loudon, Elmira, N. Y.

"Core Room Practice" by F. A. Coleman, Cleveland, Ohio.

"Recent Developments in Pyrometry," by S. H. Stupakoff, Pittsburgh.

"Recovery of Foundry Waste," by S. A. Capron, Westfield, Mass.

2 P. M.—Steel Session.

"Open Hearth Steel Foundry Practice," by R. E. Bull, Granite City, Ill.

"The Manufacture and Annealing of Converter Steel Castings," by Bradley Stoughton, New York.

"The Small Open Hearth Furnace for Steel Castings," by Walter MacGreggor, Chicago.

"The Practicability of the Induction Furnace for the Making of Steel Castings," by C. H. Von Baur, New York.

"The Electric Furnace for Steel Castings," by Dr. P. Heroult, New York.

"Microscopic Structure of Iron and Steel," by Prof. Wm. Campbell, New York.

"Titanium in Steel Castings," by Chas. V. Slocum, Pittsburgh.

"Vanadium in Iron and Steel Castings," by G. L. Norris, Pittsburgh.

THURSDAY, MAY 25.

9.30 A. M.—Joint Session.

"Foundry Construction," by Geo. K. Hooper, New York.

"Electric Motor Drive for Foundries," by Brent Wiley, Pittsburgh.

"The Rotary Blower for Cupola Use," by R. H. Rice, Schenectady, N. Y.

"The Application of Lifting Magnets for Foundry Work," by H. F. Stratton, Cleveland.

"Pattern Equipment," by W. S. Giele, Philadelphia.

"Titanium in Malleable Castings," by C. H. Gale, Pittsburgh.

"The Physical and Chemical Characteristics of Malleable Iron," by W. P. Putnam, Detroit, Mich.

"The Equipment of Air Furnaces Using Oil as Fuel," by N. W. Best, New York.

1 P. M. Train excursion to foundries and steel works. (Pa. R. R. Union Station.)

8 P. M. Entertainment by Foundry & Machine Exhibition Company to members, ladies and guests attending the convention.

FRIDAY, MAY 26.

9.30 A. M.—A. F. A. Session.

"Gas Cavities, Shot and Chilled Iron in Iron Castings," by Thos. D. West, Cleveland.

"Manganese and Silicon in the Foundry," by A. E. Outerbridge, Jr., Philadelphia, Pa.

"Instruction Paper on Phosphorus," by H. E. Field, Pittsburgh.

"The Foundry Foremen's Educational Movement," by D. O. Wilson, Newark, N. J.

Election of officers and concluding business.

3.30 P. M.—Pittsburgh and Cincinnati Ball game at the Million Dollar Forbes Field.

6.30 P. M.—Subscription dinner open to all who attend the convention.

The visiting ladies will be specially entertained by a special committee.

Railroad Equipment Orders.—In addition to the 500 refrigerator cars already reported as ordered by the Burlington, it has placed 10 gondolas with the American Car & Foundry Company. The Key West Route of the San Francisco, Oakland & San Jose Railway has ordered 25 motor coaches and trucks from the St. Louis Car Company, St. Louis. The Merchants Despatch Transportation will build 100 refrigerator cars at its shops and is taking prices on 1000 additional refrigerator cars. Among pending inquiries are the following: Cambria & Indiana, Philadelphia, 200 all-steel hopper cars; Seattle Mfg. Company, 50 hopper cars; Grand Trunk, 1000 box cars; Duluth, Rainy Lake & Winnipeg, 250 box cars and 100 flat cars; Canadian Pacific, 1000 to 2000 box cars and 300 to 500 gondola cars. The Grand Trunk is in the market for 136 locomotives. The Atlantic Coast Line has ordered placed 35 locomotives with the Baldwin Locomotive Works.

The National Clock & Electric Mfg. Company, St. Louis, Mo., states that its factory was damaged by fire April 22 to the extent of \$18,000 to \$20,000. The company manufactures thermostatic instruments, making a specialty of oven thermometers. It has been compelled to move to 1906 Pine street, owing partly to the damage done to its building and partly to the necessity for occupying larger quarters so as to meet the constantly increasing demand for its products. The insurance inspectors, after making a thorough investigation, attributed the origin of the fire to a lighted cigarette, spontaneous combustion or the crossing of wires.

The Mumford Molding Machine Company, Plainfield, N. J., has just issued a loose leaf sheet catalogue illustrating its line of molding machines for foundry work and including jolt ramming machines, split pattern machines, power squeezers and pneumatic vibrators.

American Machinery in Europe

A Recent Study of the Situation Is Encouraging to Manufacturers of Machine Tools—Agencies and Prices

BY C. A. TUPPER.

Returning from a three months' trip through all of the important industrial districts of Europe west of Russia and north of Buda-Pesth, I can summarize the situation as one most favorable to the further extension of American trade in machinery of every description, for metal working and allied branches. It is now a fact well recognized that, with the extensive domestic market open to them, American manufacturers have developed specialties in machinery construction to a far greater extent than those of any other nation, particularly in the line of high speeds, large capacities per unit of labor, easy control and automatic or semi-automatic operation. This specialization, with its accompanying changes in shop methods, European users were slow to appreciate in the beginning, but in recent years they have seen its advantages. The increasing cost of labor has forced the very general adoption of American labor-saving methods and machinery, with consequent necessity for the purchase of the latter by concerns that can find no equivalent or reasonably satisfactory substitute for it among their home producers. It is also freely admitted abroad at this time that the tendency of many American manufacturers to limit their activities to one tool, or one special line of machinery, has resulted in a degree of efficiency not ordinarily reached by manufacturers abroad, who must depend upon a wide range of demand from a limited field—limited both geographically and by racial prejudices. It is necessary, therefore, for the latter to turn out numerous distinct varieties of apparatus in order to keep their shops working to capacity.

The High Standing of American Tool Builders

For many years there has been dinning into the ears of Americans, and with good reason, the tale of our deficiencies in catering to export trade. It is, therefore, extremely gratifying to find in every industrial center of Europe evidences of the really efficient, trustworthy work done abroad by American machine tool builders. If our national reputation in Europe, as designers and reliable manufacturers of machinery, depended upon this class of trade alone it would stand very high. I found represented in installations no less than 113 American builders of machine shop equipment and many additional concerns furnishing other apparatus identified with the metal working industries, including pattern making machinery, foundry equipment, pneumatic appliances, electric power and pumping machinery—the last two, however, being represented by branches or affiliations of the principal companies operating in this country.

There is, of course, extensive imitation of American tools, both for wood and metal working. The best of these imitations have been brought out in Germany or Switzerland, and in not a few cases it is difficult to distinguish any inferiority. In fact, one meets with some undoubted improvements over American designs, due to characteristic Teutonic thoroughness in reducing all calculations to a mathematical certainty. As a rule, however, the imitations are merely imitations, not real equivalents, and there appears to be an increasing tendency on the part of European users to equip their shops with the most efficient American tools, even at considerably higher prices than would need to be paid for substitutes. Comments on the latter were, in most cases, accompanied by a shrug of the shoulders which left no doubt as to the speaker's opinion.

Agencies for American Tools

The sale of American tools in Europe is so largely in the hands of agencies that the proper selection of such representation by the American manufacturer is a primal element of profitable trade. Nor are his subsequent education and support of these agencies of less importance. The larger agencies, having their headquarters in the capital cities of Great Britain, France, Germany, Austro-Hungary, Russia and the Scandinavian countries and (note the

distinction) in the chief manufacturing centers of Italy, Switzerland, Spain, Holland and Belgium, are in the main treating American interests fairly and efficiently. This is also true of large European manufacturers who carry a stock of American tools, non-competitive with their own and furnish complete shop installations. Many smaller agencies or individual agents located directly in industrial districts, each intensively cultivating a strictly limited territory, are, however, rendering very good service to American manufacturers; and in planning a new or extended campaign the possibilities of this class of representation should not be overlooked.

Great Industrial Activity Abroad

All through Europe, particularly in Switzerland, Germany and Belgium, I found the most pronounced activity in every line of industry, with many plants working two long shifts or three 8-hour shifts per day. There is a corresponding need of equipment of all kinds to meet current demands, and no American manufacturer having machinery which will save time and labor or otherwise effect economies in production should hesitate to place it before the European trade. He will find no better time for doing so. Any tool offered abroad, however, should possess unqualified merit. Of ordinary machinery, mediocre in quality, there is a great abundance in all European countries. Much of this class of equipment can be more cheaply produced there, especially when the differences in delivery charges are considered, and, other things being equal, the home product naturally has preference.

The matter of price is of far less importance than is generally supposed in this country. When a European selects an American tool he ordinarily does so because of its decided superiority to other makes and the saving in production that can be effected by its use is figured out to the last decimal. Having before him, therefore, the sum total of possible annual economy, on a conservative basis, he is willing to pay a fair price for the machine, and there is no good end gained by making undue concessions. The more American manufacturers adhere to the "one price" standard the more European users respect them. Considerable injury to our trade abroad has been done by the tendency of some tool builders on this side to get a footing in certain territory by means of low prices, and the present slackness in all lines here is having, in this respect, an unfavorable influence on American trade all through Europe.

Personal Cultivation of Trade

Some of the smaller American manufacturers of metal working machinery, machine tools in particular, have entrenched themselves in Europe to a surprising degree, and they are at present cultivating the field more thoroughly than the greater number of the large concerns. I met in numerous instances with the excellent results accomplished through visits of members of these firms, or special representatives from their works, and the demonstrations given by them of the efficiency of their machines. Tons of catalogue matter or correspondence, and any amount of ordinary selling effort, are not equal to one good demonstration, particularly if it can be made in the presence of the managing directors or superintendents of a number of plants in the district, with the close and comprehensive questioning which this is sure to bring out. It is, naturally, of great advantage if the demonstrator can speak the language of the country; but even that is not essential. Not only is English very generally understood abroad, but the sign language goes far in Europe and people there are adepts in comprehending it.

Outside of the line of the wood and metal working industries there are many other opportunities in Europe for the extension of American trade; but most of these, such as flour milling, timber cutting, ore and stone crush-

ing, concrete mixing, etc., would not interest the majority of readers of *The Iron Age*.

Power Equipment Lags

In relation to power equipment, which does have such interest, I found the situation unfavorable. Except in the matter of gas engines, the best American makes of which undoubtedly excel those of Europe both for simplicity of construction and economy of maintenance, the power and electrical machinery manufactured abroad is, in my judgment, fully equal or superior to the average of that produced in this country. The best work appears to be done in Switzerland, where an amazing degree of efficiency has been attained. From the first European plant visited, which was a wood working shop equipped wholly with American tools, in the island of St. Michaels, Azores, I found Swiss generators, motors, switchboards and other electrical apparatus, as well as steam and hydraulic turbines, engines, etc., more largely used than those of any other country. Apart from machinery of the European branches of the General Electric Company and the Westinghouse companies, American products in this line have a very limited representation in Europe. There are some Corliss engines in operation that were built in the United States, but I saw only one of recent make and this was from a "repeat" order based on the extremely satisfactory service of a similar engine installed years ago. One practically as good could have been purchased from shops in the same city at a very much lower price. It is noteworthy, however, that in the line of hydroelectric machinery European builders are now copying American types to the practical exclusion of their own earlier designs. In one large plant that I visited every important piece of work on the floor represented this tendency.

American steam driven pumps have heretofore commanded a fairly large sale in Europe, but Swiss and German manufacturers have been pressing them very closely during late years and the increasing use of motor driven pumps threatens to displace these types almost altogether. In the line of electrically operated pumps foreign manufacturers have taken the lead and our own best designs are mainly adaptations of European practice. Hence the sale of American motor driven pumps abroad, especially those of the centrifugal type, would appear to be like carrying coals to Newcastle.

Mining and Metallurgical Machinery

In the treatment of iron ore, the manufacture of coke, in steel making, etc., the flow of ideas and improvements in equipment has been, in the judgment of Europeans, from Europe to the United States, with very little of a return movement; but machinery in general for mining work and the recovery of values from metallic ores other than iron has been developed to a greater degree of efficiency in this country owing to the larger range of our experience. Hence the field for the sale of American mining and metallurgical equipment is very large. This might not be true if the continent of Europe only were to be considered; but the investments made by British and Continental capital in mining enterprises the world over, particularly in the colonies or other dependencies of European countries, lead annually to the purchase in London, Paris, Berlin, Hamburg, St. Petersburg, Vienna, Prague, Budapest and other large commercial centers of enormous quantities of machinery for their development and operation. Some of the leading American manufacturers, through branch houses and agencies, are securing a large part of this trade, and a portion of it is even placed directly in New York by representatives of European owners; but there is much more of the business that can be obtained by proper cultivation of the field abroad. Having been given exceptional opportunities of observing conditions I can state this most emphatically.

McDowell & Co., North Side, Pittsburgh, Pa., have recently completed a shipment of pipe from the oil fields of Indiana and Ohio, consisting of 13 miles of second hand and six miles of new pipe, sizes 4, 6 and 8 in., to the Wichita Falls Gas Company, Wichita Falls, Texas, and has an order from the same company for four more miles of pipe. McDowell & Co. for years have made a specialty of buying, repairing and selling second hand pipes, casing, tubing, rods, etc.

Customs Decisions

Mantel or Fireplace Castings

Although Congress, in passing the tariff act of 1909, liberalized the corresponding provision in the Dingley act of 1897 relating to iron castings, the Board of United States General Appraisers rules that mantels or fireplaces are not included in the category of castings within the meaning of the existing law. The collector at New York classified the articles as "not specially provided for, composed wholly of iron, partly or wholly manufactured," and imposed duty at the rate of 45 per cent. The importers, including Warren & Wetmore, the W. H. Jackson Company and the E. B. Currier Company, objected to the collector's classification, alleging in their protests that the merchandise is entitled to enter at 8/10 of a cent a pound, or at 1 cent per pound, under paragraph 147 as "castings of iron or cast-iron plates." The testimony shows that the articles are metal interiors or linings for mantels, made of cast iron in several sections. These are imported in sets, each piece of which has been fitted to the other, the respective parts being finished and ready to be set up to form the lining for the fireplace or the frieze for the mantel.

The decision of the board states that the goods are no longer mere castings of iron, or plates, having passed beyond that stage when the frieze or interior of the mantel was fashioned so as to fit together. The decision refers to the fact that the new law is perhaps more liberal in its treatment of castings than its predecessor, but holds that the words "but not made up into articles" appearing in paragraph 147 are fatal to the contention of the importers. In passing on the meaning to be given to the phrase "but not made up into articles," the board rules that it was a limitation so as to exclude three classes of articles: 1. An article made up of more than one casting, the separate parts of which are fitted and ready to be put together. 2. A casting joined or fitted as a part of something else. 3. A single casting which is a completed and usable article in itself. The decision concludes:

The merchandise here before us is excluded by reason of above limitation. The goods are interiors of mantels, etc., all ready and fitted for use, and have lost their character as "castings of iron." The real claim seems to be based on the fact that the goods are imported in sections, but that fact cannot alter the classification of the goods as completed manufactured articles. As well might it be said that the sections necessary to make a complete machine when imported collectively are entitled to be separately considered as castings. We hold the merchandise dutiable under paragraph 199, and overrule the claims at lower rates as filed in the protests.

Automobile Horns

It has been decided by the board that automobile horns and bulbs will have to pay duty as entireties. The test case stands in the name of the Motor Car Equipment Company, but the decision has general application to this line of articles. The horns are of metal while the bulbs are of India rubber, metal mounted. The appraiser of the port reported to the collector of New York that with each bulb is packed the remaining part of the horn, the two parts constituting a complete horn, of which metal is the component material of chief value. The collector assessed duty at 45 per cent. under the provision in the tariff for parts of automobiles, while the importer set up the contention that, as the bulbs are in chief value of rubber, horns and bulbs should be allowed to enter at 35 per cent. as manufactures of India rubber. In finding against the contention the decision says:

The record unquestionably shows that the bulbs are useless without the horns and that the horns cannot be used without the bulbs. They come packed together, and we do not believe it would be proper to separate for duty purposes such articles into parts subject to different classifications. The horns and the bulbs, therefore, are imported at the same time, and as each horn requires its bulb, so as to be available for use, it would appear to us that such articles when imported together constitute complete assembled articles subject to classification as entireties. We hold the merchandise dutiable at 45 per cent under paragraph 199 as manufactures of metal, and, as paragraph 141 levies this same rate, we affirm the collector's assessment.

The Homestead Valve & Mfg. Company, Homestead, Pa., has appointed E. D. Morton & Co. its agents in Louisville, Ky., and vicinity.

Tests of Steel at Watertown

A Study of Microstructure of Ingots and Rolled Products

The report of tests of metals made at the Watertown Arsenal during the fiscal year ending June 30, 1909, has recently been published. It appears in three volumes, containing in all 1044 pages. Volume 1 refers to the examination of Bessemer rail steel, from the ingot down to the finished rail. Volume 2 deals with finished Bessemer rails, also open hearth steel and rails and some electric furnace rails. Volume 3 contains steel column tests and miscellaneous material. This last comprises forged steel bars, drawn down in the direction of the length of the ingot, at different temperatures and with different amounts of reduction; also the examination of some locomotive fire box sheets, a number of tests of building stone from the West Virginia Geological Survey and some reinforced concrete columns. Among the columns were some fabricated at Chicago and at St. Louis on regular construction work and forwarded to Watertown, where the tests were made.

The report deals chiefly, however, with an examination of the material in thirty steel ingots, representing five acid Bessemer heats and is largely illustrative of the appearance of the metal as it was found in the ingot and in the various passes of the blooming and rail mills down to the finished rail. There were modifications in the treatment of the ingots, some being charged hot and soaked and rolled; others cooled in a vertical position, reheated and rolled, while in still other cases the ingot was laid on its

and what was taken to be detached ferrite appeared here and there. Some of the entrained slag globules were surrounded by ferrite and some were not. The metal at the edges of some blow holes was apparently decarburized, while in other cases it was not.

Different structures were brought to view when etched—one structure when etched with iodine and another when etched with picric acid, as shown by the reproductions in

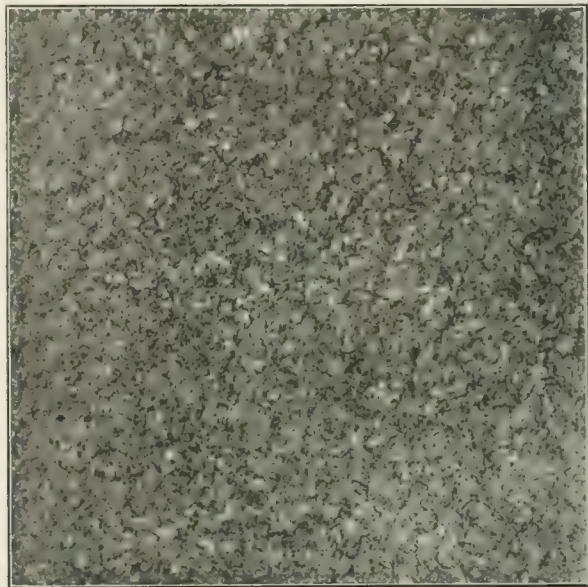


Fig. 2.—Steel Ingot Structure, Etched with Picric Acid. Magnification, 3 Diameters.

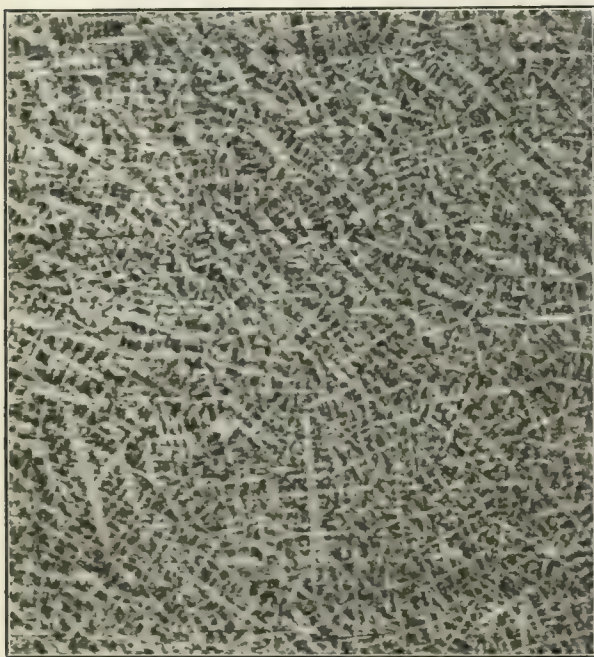


Fig. 1.—Steel Ingot Structure, Etched with Iodine. Magnification, 3 Diameters.

side to cool immediately after stripping, then was reheated and rolled. The substance of some of the comments made in the report will be of interest.

Certain of the ingots were examined in that state, not having been rolled, after cutting up in the planer, in longitudinal and cross-section slices. Illustrations show the appearance of the sections before and after etching with iodine and notes were made of the slag inclusions. The upward flow of the slag in the ingot, before freezing, was shown by small buttons collecting on the lower surfaces of blow holes which were located in the upper end of the ingot. Slag entrained in the lower parts was in a finely divided state in the form of small globules.

The microstructure of the metal showed elongated crystals or grains next the sides of the ingot, while in the body the crystals were of a more regular form. Considerable diversity of size characterized the crystals and there were large crystals in close proximity to fine ones. The meshes surrounding the crystals were incomplete in many places

and what was taken to be detached ferrite appeared here and there. Some of the entrained slag globules were surrounded by ferrite and some were not. The metal at the edges of some blow holes was apparently decarburized, while in other cases it was not.

Different structures were brought to view when etched—one structure when etched with iodine and another when etched with picric acid, as shown by the reproductions in Figs. 1 and 2. Both structures were brought out on the same surface by first etching with one medium and then with the other, as in Fig. 3.

In the rolled shapes practically the entire metal of the ingot was used, discarding only the small part needed to get the metal safely through the rolls. It was observed that the blowholes were quite early obliterated, so far as they were visible to the eye, on the longitudinal slices into which the shapes were cut. The welding of the steel, whether more or less complete, was subsequently made the subject of special inquiry. The fractured ends of some tension test pieces were used, as illustrated herewith. A butt weld is shown in Fig. 4. The decarburized zone will be noted. Scarf welds when planed off below the decarburized surfaces showed little trace of the weld in the microstructure. Fig. 5 shows such a portion of the weld. From such an example it would appear that welding of the metal of these ingots could be accomplished very satisfactorily under favorable conditions, where the surfaces were neither oxidized nor decarburized.

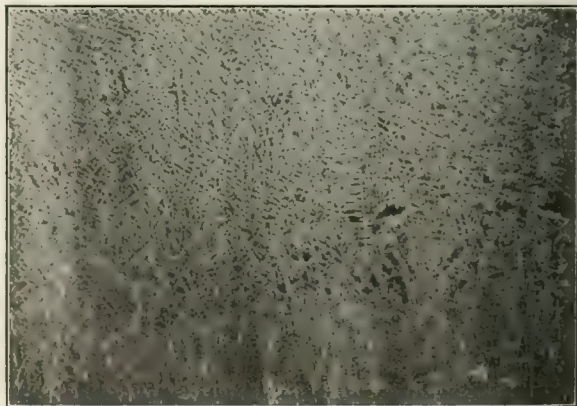


Fig. 3.—Steel Ingot Structure, Etched with Both Iodine and Picric Acid. Natural Size.

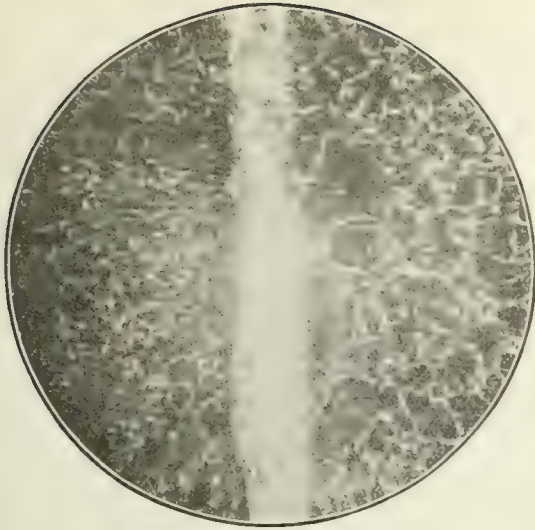


Fig. 4.—Butt Weld Made with Ends of Fractured Tensile Test Piece. Magnification, 62.5 Diameters.

Carbon determinations were made with drillings taken from axial longitudinal sections from the sixth and ninth blooming passes. The average carbon content appeared about 0.50 per cent. along the middle part of the ingot. The highest carbon noted was 0.85 per cent. about one-quarter down from the top. Negative segregation was shown in the center of the lower half, where the carbon fell to 0.40 per cent.

The metal throughout the different passes from the ingot to the finished rail, when etched with iodine, was characterized by those markings which have been familiarly shown from time to time in steel rail discussions.

It was a very rare occurrence in any pass or in any part of the ingot when markings fairly well pronounced were not brought out when etched with iodine. Dark dots or irregular patches brought out by the iodine on the cross section slices were dark streaks on the longitudinal sections. Primarily these markings show a difference in the solubility or oxidation of one part of the metal over another, this difference being due to causes not in all cases reached in the experiments recorded.

In the metal of the ingot the proximity of blow holes appeared to have been indicated. In the finished rail some of the dark zones showed differences in chemical composition, higher carbon occurring in the dark zones than in the metal of the less attacked portions. The method of treatment of the ingot was carried through the several passes down to the finished rail.

Fig. 6 shows a cross section of the second rail length from an ingot treated in the usual manner, charged hot and soaked as usual, and not laid on its side until it reached the blooming mill for rolling.

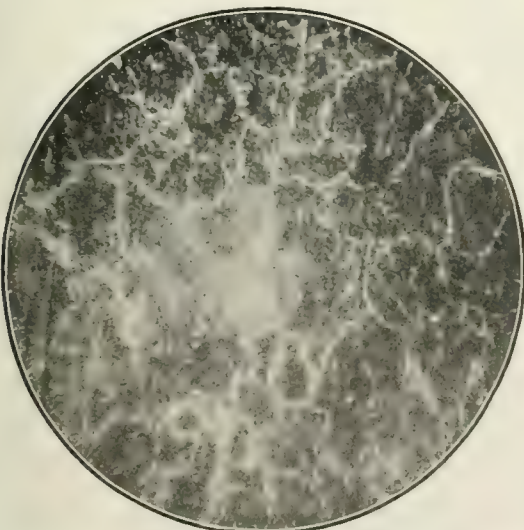


Fig. 5.—Scarf Weld Made with Ends of Fractured Tensile Test Piece. Magnification, 62.5 Diameters.

In Fig. 7 is a cross section from the sixth rail length of another ingot which was laid on its side to cool immediately after stripping and was reheated and rolled. The pronounced markings in the head of the rail seen in this cut were generally found in the other sections examined. Fig. 8 shows the cross section from the second rail length of another ingot which was laid on its side immediately after stripping, web up. All of the sections examined which came from this ingot had their characteristic mark-



Fig. 6.—Etched Section from Second Rail Length. Ingot Treated in Regular Way, Charged Hot and Soaked as Usual.

ings the same as shown by this illustration, the darkest lines after etching with iodine being on the same side of the web.

A state of seaminess was found in shapes from ingots which were laid on their side immediately after stripping. The iodine markings in such cases were taken to indicate a lack of structural continuity in the metal. Tensile tests of the steel were made for each of the passes. In the earlier ones several specimens were taken from different



Fig. 7.—Etched Section from Sixth Rail Length. Ingot Laid on Side to Cool, Head Up, Reheated and Rolled.

parts of the cross section. It was noted that some of the inside specimens, particularly those from the bloom, were deficient in strength and incidentally in elongation and contraction of area. This behavior suggested to the investigators a plausible cause for the frequency of web fractures in rails across the bolt holes.

The markings brought by iodine etching of the Bessemer rails and earlier shapes were also brought out in the open hearth rails and shapes. Likewise the markings

appeared to some extent in the rails from the electric furnace.

It was remarked that flange fractures made during the tests correlated the end markings on the etched cross sections with the characteristic laminated metal displayed in the case of crescent breaks which attracted attention in



Fig. 8.—Etched Section from Second Rail Length. Ingot Laid on Side to Cool, Web Up, Reheated and Rolled.

engineering circles not long ago.

The report is an important contribution to the metallurgy of steel rails and reflects much credit upon James E. Howard, who conducted this work at Watertown. Later he accepted a position at the Bureau of Standards, Washington, where research tests of this character are now being continued.

The "Original" Babbitt Metal Formula

The discovery that soft metal makes an excellent bearing surface belongs to Isaac Babbitt, of Boston, Mass., who patented his invention in the United States July 17, 1839 (No. 1252). Since that time the use of soft metals as bearings has grown until to-day more is employed than ever before. It is an erroneous idea that Isaac Babbitt patented the actual white metal mixture itself. His patent was upon the use of a white or soft metal in bearings. While he did not claim any particular metal mixture, he recommended the use of the following:

Tin	50 lb.
Antimony	5 lb.
Copper	1 lb.

This mixture is somewhat softer than that now employed as "genuine Babbitt metal," as it has been found expeditious to use more copper in order to obtain a harder metal.—*Brass World*.

The Murray Iron Works Company, Burlington, Iowa, is completing an extensive addition to its boiler shops. This addition is 120 x 140 ft., and will have a large traveling crane covering the center and smaller cranes on the side. The building is of substantial construction, having a steel frame. The addition will enable the company to increase greatly its production of water tube, tubular and fire-box boilers. Other products of the company are Corliss engines, heavy castings and steel plate work. It is therefore able to supply complete power plants.

The Mining & Coking Equipment Company, recently incorporated under the laws of Pennsylvania, will have its main offices in Pittsburgh, Pa. Besides manufacturing and selling the Beutlich coke oven door and other equipment, the company will design special requirements of the mining and coking industry. A. F. Ehrenhaft is president and Richard F. Beutlich is secretary and treasurer.

Belgian Supplies of Iron Ore

The London *Iron and Coal Trades Review* discusses in the following the falling off in shipments of German iron ore to Belgium:

The iron and steel industry of Belgium is entirely founded upon the inland coal resources, as the native supplies of iron ore are insignificant, and the ore requirements of the blast furnaces are principally met by the French department of the Meurthe and Moselle and by Luxemburg and Lorraine, which form part of the German Customs Union. In 1910 the Belgian imports of iron ore amounted to 5,182,400 tons, of which 2,910,000 tons, or 56.15 per cent., were furnished by the French Minette basin and 1,827,300 tons, or 35.25 per cent., by the German Customs Union, the two districts having consequently supplied 91.40 per cent. of the Belgian imports. The balance of the imports was obtained to the amount of 140,800 tons from Spain, and 304,300 tons from Sweden and other countries. The great preponderance of French ore supplies over the German Customs Union in Belgium is all the more surprising as Germany had an indisputable supremacy in the Belgian iron ore market as late as 1907, with 2,209,000 tons, or 61 per cent. of the total Belgian imports. This position was maintained with 2,130,000 tons, or 54.8 per cent. in 1908, but it declined to 1,787,400 tons, or 40.08 per cent. in 1909, and only reached slightly over 35 per cent. in 1910. On the other hand the exports of France to Belgium have increased on a very considerable scale since 1901, when they only amounted to 69,313 tons. In 1905 the quantity of ore had risen to 644,676 tons, in 1909 to 2,261,493 tons and in 1910 to 2,910,000 tons the greater portion being exported from the Briey district.

The falling off of German supplies of iron ore to Belgium was bound to take place in a great measure as soon as the rich ore in the newly opened Briey district entered into serious competition with Luxemburg and Lorraine ore, which has an iron content of only 30 to 32 per cent. as compared with 38 to 40 per cent. in the case of the French ore. Not only so, but it is asserted that the Briey producers are able to forward their output by means of the French Eastern Railway Company and the Belgian State Railways at extremely low rates to the destination desired. If the proposed North East canal should be carried out within a reasonable period and thus place the Briey basin in direct communication with the French and Belgian system of waterways, it is calculated that iron ore from Luxemburg and Lorraine would be still further supplanted, if not wholly excluded.

"At one time Belgian iron and steel masters sought investment in the iron ore fields of Luxemburg and Lorraine, and secured possession of a number of fields. When the French Government granted concessions in the Briey district in 1902 the applicants included a number of Belgian manufacturers who had undertaken boring operations in the locality, and the latter received various concessions. A similar policy was pursued by the Belgian Government in the allocation of the newly discovered coalfields in the Campine, inasmuch as a fairly large share was granted to French interests. It is therefore considered that from this point of view there is little hope of Luxemburg or any other part of the German Customs Union recovering the position which has been lost in the Belgian iron ore market.

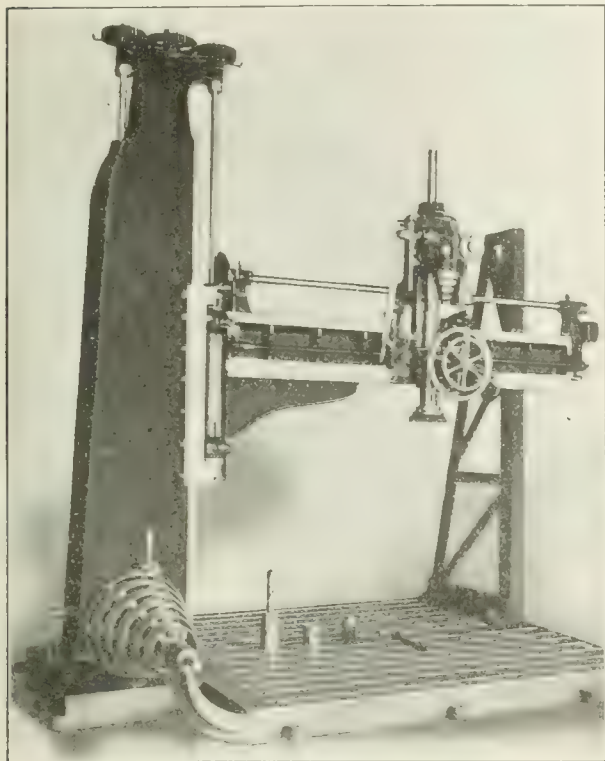
Luxemburg and Lorraine, however, have gained compensation in pig-iron for what they have lost in iron ore in the Belgian market. Thus in 1908 the exports of pig-iron from Luxemburg to Belgium only amounted to 33,100 tons, but in 1909 they rose to 119,900 tons, and a further advance to 163,900 tons took place in 1910, being an increase of about 400 per cent. since 1908. In the case of Germany the exports to Belgium were 117,400 tons in 1908, 141,500 tons in 1909 and 308,300 tons in 1910. On the other hand the French exports to Belgium, which amounted to 131,200 tons in 1908, declined to 87,900 tons in 1910."

The Pittsburgh office of the Youngstown Sheet & Tube Company, E. S. Rooney, resident manager, has been removed from the Farmers' Bank Building to 1433 Oliver Building, Pittsburgh, Pa. The Youngstown Sheet & Tube Company manufactures pig iron, steel billets, sheet and tin bars, iron and steel pipe, pure puddled iron and steel sheets, wire rods, wire and wire nails.

The Kane & Roach Radial Drill

Kane & Roach, Niagara and Shonnard streets, Syracuse, N. Y., have recently placed on the market a new radial drill which is designed to cover a wide range of work. Extra heavy work, and especially pump castings, can be accommodated, and the machine is claimed to be one of the largest built in this country. The drive is of the all-gear type, and the radius of the arm is 9 ft. Another special feature of the drill is the ability to use any desired style of attachment.

The radial arm is of semi-box construction with reinforcing ribs spaced about 1 ft. apart. The bearings upon which it swings have a ball-bearing, and the arm is raised



A 9-ft. Radial Drill Built by Kane & Roach, Syracuse, N. Y.

and lowered by power through a set of gears which actuate the elevating screw in the interior of the column. A special attachment is furnished for use when heavy boring is being done or large castings are being milled off.

The head can be fed in and out on the radial arm by power by the feed screw when large castings are being milled, or by hand when the rack at the lower portion is used. The spindle is $4 \frac{9}{16}$ in. in diameter and has a 20-in. travel. A large number of speeds can be secured, and powerful back gears are also furnished. The control of the machine and the speed variation is secured by manipulating the two levers at the left of the head. The spindle runs in a bronze bushing of ample proportion, which can be replaced easily. Four feed changes are available, and the spindle is counterbalanced with a coil spring that keeps it at any point within the full range of its travel without employing a counterweight. In the engraving the machine is illustrated with a large milling cutter screwed on the spindle. If desired, any style or size of milling cutter can be fastened on the spindle, or a threaded chuck can be attached and a boring bar screwed in when heavy boring has to be done. A chuck for holding taper shank drills, or a large head or face plate having a gear, can also be substituted. An extra journal and gear are provided with this face plate, so that it is driven from the back gear in the same way as a triple-gear lathe for very large boring, facing or milling operations. Some of the different attachments which can be used with this drill are shown on the base.

In the drive, gears are employed exclusively. The power can be transmitted to the six-step cone pulley on the side of the column by a belt, or it can be driven from the back, whichever arrangement gives the straight belt

drive. The column has an overall height of 14 ft., and the height from the base to the top of the slide is 10 ft. 6 in. Work 8 ft. high can be accommodated under the spindle. The dimensions of the base are 10 by 14 ft., and the machine weighs approximately 13 tons.

A Buffalo Forge Fan 30 Feet High

One of the largest fans ever made is the subject of the accompanying illustration. It is over 32 ft. high and was made by the Buffalo Forge Company. It is used in connection with a heating, ventilating and air conditioning system, supplying 25,000 cu. ft. of air per hour to the new mill of the Sharp Mfg. Company, New Bedford, Mass., which is understood to be the largest individual yarn mill in that city. The air is washed before entering the mill, dust, dirt and foreign matter being removed. In winter the air is heated with independent regulation on each floor. Provision is also made for cooling the air, so that in the hottest days of summer the temperature throughout the mill, even in the spinning room where the machinery generates an immense amount of heat, may be from 15 to 20 deg. cooler than is possible by ordinary window ventilation.



The Central Foundry Company Reorganized

The reorganization of the Central Foundry Company, which failed in February, 1910, has been completed by the election of directors and officers. The new company, a Maine corporation, has a total capitalization of \$9,200,000, of which \$3,600,000 is common and \$4,600,000 is preferred stock. An issue of \$1,000,000 6 per cent. first mortgage bonds has supplied \$1,000,000 working capital. The new preferred stock may not receive more than 4 per cent. in dividends in 1911 and 1912, and thereafter no more than 5 per cent. until a like amount may be paid on the common.

Waddell Catchings, who carried the company through its receivership, was elected president; De Courcy Cleveland, secretary and treasurer, and W. H. Felt, assistant secretary and treasurer. The new directors are J. N. Wallace, C. D. Smithers, August Hecksher, G. D. Halleck, N. D. Bill, P. J. Goodhart and G. H. Kinnicutt. Three other temporary directors are to be replaced later by practical iron men.

More than one-third of a billion passengers carried in eighteen years and a half, and not one killed as the result of a train accident, is the record of the Long Island Railroad. The official figures, just announced, show that this subsidiary of the Pennsylvania Railroad has carried exactly 335,148,826 passengers since June 1, 1893. The Long Island Railroad has probably the densest passenger traffic in the country, and, due to the restricted territory covered, all of this traffic is properly termed suburban. It is thus seen that commuting on the Long Island has been made as safe as modern science and engineering can make it. The density of the traffic is shown by the fact that the number of passengers carried one mile since 1893 is 4,904,736,994, or more than one-third of the population of the entire world.

Accident Prevention in the Machine Shop

How a Machine Tool Factory Safeguards Its Own Employees as Well as Those Who Operate the Lathes of Its Manufacture

BY HENRY M. WOOD, CINCINNATI, OHIO

Accidents to workmen in our various industries can never be entirely eliminated. They can, however, be very much lessened by reasonable precautions in the way of education of the workmen, inspection of buildings, efficient lighting and guards on dangerous moving parts of machinery. This last item, the providing of gear guards and other safety devices for the protection of machine operators offers probably the greatest field for accident prevention in the majority of factories.

Labor laws of the various States have for a number of years embodied different accident clauses, but the provisions for enforcing such laws were usually inadequate. Recently several State legislatures have passed comprehensive bills requiring that all gearing and other dangerous moving parts of machinery be covered, and the factory inspector is becoming more watchful.

To the credit of the managements of many firms let it be said that they did not wait for legal compulsion to take proper precautions for the protection of workmen. Many firms outside of those States in which stringent laws have recently been passed are taking up the matter. And many corporations are making much more of a study of the question than any law could compel.

The United States Steel Corporation has recently organized a Committee of Safety consisting of executives from its different plants, which publishes from time to time a Safety Bulletin describing new devices for safeguarding machinery and reducing accidents in its steel mills. The American Steel & Wire Company, with large mills in several sections of the country, has recently inserted a clause in its form inquiries for machinery to the effect that preference will be given to machines equipped with complete gear guards and safety devices.

The Machinery Manufacturer's View-Point

The machinery manufacturer is, or should be, interested

in two phases of safeguarding machinery: 1. "How can I best equip my own factory for the safety of my own workmen?" 2. "What safety devices can I incorporate in the machines I manufacture, so as to reduce the accidents attending their operation and to increase their salability?"

The accompanying illustrations show how the Lodge &



Fig. 1.—Safety Stacking of Heavy Round Bar Stock.

Shipley Machine Tool Company, Cincinnati, Ohio, has answered both of these questions. Most of the principles described are applicable to any type of factory in the metal trades, and, with some modifications, to the majority of plants using power-driven machinery.



Fig. 2 Metal Racks of Pipe and Fittings for Storing the Lighter Bar Stock, Lodge & Shipley Works, Cincinnati.

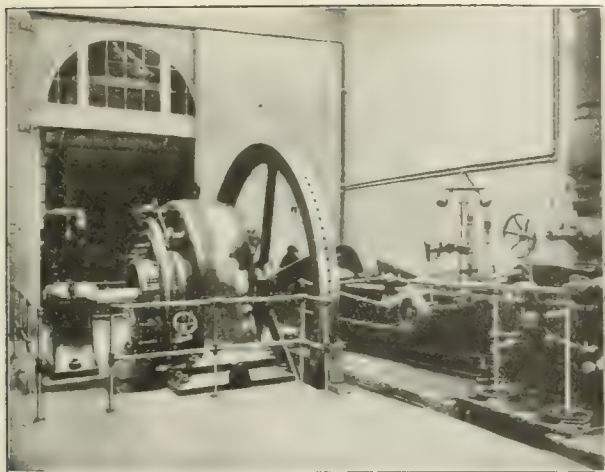


Fig. 3.—Metal Railing Around Moving Parts.

Safety Storage in Stock Room

Beginning with the receipt of the raw material, there are safe and unsafe methods of storing it until ready for use. Fig. 1 is a view in the stockroom to show a method of safety stacking for heavy round-bar stock. Retaining pieces made of small bar-iron are bent up on each end like a sled runner; two of these strips are placed on top of each layer of bar stock. The upturned ends prevent the bars in the next layer above from rolling out. This not only prevents the mashed foot which is an occasional result of the usual triangular stack of bar stock tumbling down, but also allows more stock to be stored in the same space because the section of the pile is square instead of triangular.

The lighter stock is stored in specially constructed metal racks illustrated in Fig. 2. The racks in the foreground which hold the round bar stock have a framework built up of pipe and fittings. Cast-iron clamps are attached wherever desired and crossbars on which the stock is laid are placed across the clamps. Miscellaneous parts are kept on the racks in the background, which are built up of angle irons. Such racks allow easy access to all material, and permit stock to be removed without danger of other pieces falling.

Guard Rails in the Power Plant

A double metal railing about three feet high should surround the rotating and reciprocating parts of the engine



Fig. 4.—Boarded Up Band Wheel.

room equipment. Such a railing is shown in Fig. 3 around the generator and fly-wheel. A similar railing is placed in front of the cross-head and connecting rod of the engine, but, of course, does not show in this particular view. The same sort of railing would be used around the pulley and driving belt if the engine were belted direct to the line shaft. In no case should the railing be closer than a foot to any moving part of the engine.

If the prime mover is a gas engine it can be guarded with a similar railing, which in this case would include the starting crank used on the small sizes of gas engine. Steam turbines, from the nature of their construction, are totally enclosed, and in this respect present quite a contrast to the ordinary reciprocating engine.

The belt or rope used to drive from engine to factory, where electrical transmission is not used, should be surrounded by adequate railing or casing so that it is impossible for a workman in passing to come accidentally in contact with the belt.

Transmission Machinery Guards

All belts near the floor should be fully protected; for

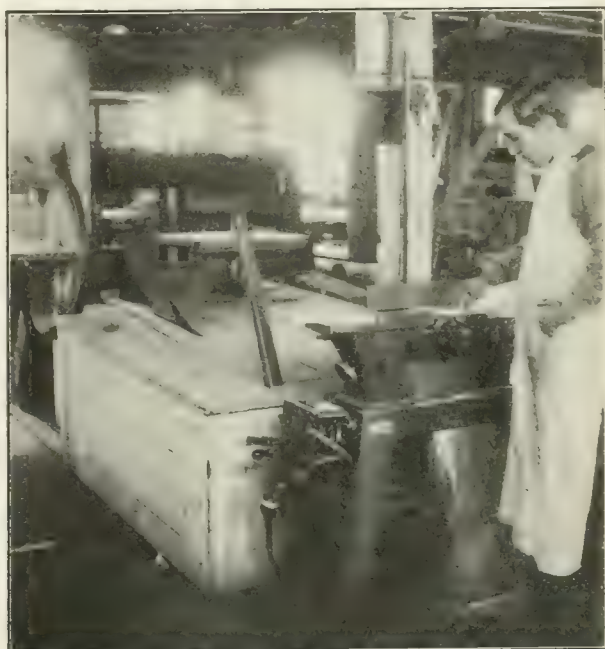


Fig. 5.—Safety Wood Planer; Sanding Wheel in Background.

example, if power is transmitted by belt from a motor on the floor to the line shaft, the vertical belt should be fully surrounded by railing, or better yet, covered by screen to a height of about seven feet. Shafting and pulleys should always be guarded if near the floor, and in many cases should have a protecting guard if on the ceiling, where a workman has to go frequently.

A belt-driven sand-papering wheel seen in the background in Figs. 4 and 5 illustrates one way of enclosing transmission machinery when on or near the floor. There is no overhead shafting in that department, so that the countershaft for driving the sanding wheel has to be placed on the floor and driven through a hole in the floor from the ceiling line-shaft of the room below. The countershaft and most of the belt are enclosed in a tight box, with a slot in the top, through which projects a shifter lever for starting and stopping the machine.

A simple guard for shafts and pulleys consists of a sleeve or pipe fitted over the shaft with a disk attached to the end of the sleeve next the pulley so as to entirely cover up pulley arms. The sleeve, of course, is stationary, and therefore has to be mounted in brackets so that it may remain concentric with the shaft, but not touching it.

Shafting couplings used for connecting adjoining sections of line shaft should have bolts and nuts countersunk. Set screws used in hubs of pulleys and similar locations, if of the usual cap-screw type, should be countersunk into the hub. There is also on the market a safety set-screw which is headless and operated by a hollow key from the inside, thus entirely preventing any projecting corners.

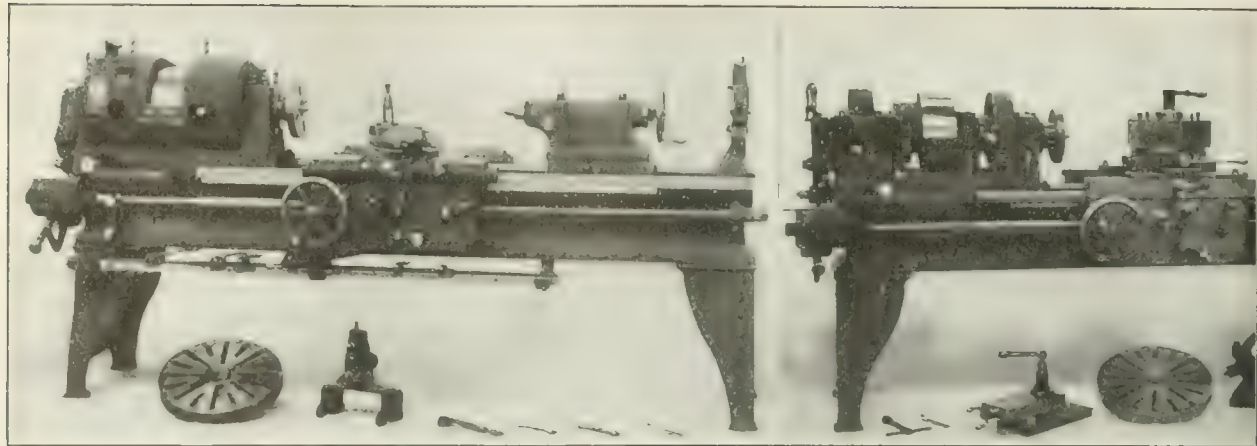


Fig. 7.—Cast Iron Cover Completely Inclosing Headstock Gearing.
Gear Covers for 19-in. Patent Head Lathes Made by Lodge & Shipley Machine Tool Company.

Fig. 6.—Partially Guarded Gears.
Gear Covers for 19-in. Patent Head Lathes Made by Lodge & Shipley Machine Tool Company.

Safeguards in the Pattern Shop

A band-saw as regularly furnished is dangerous because of the possibility of a workman's carelessly pushing the end of a board into the revolving band wheel at top or bottom, to say nothing of the continuous risk from breakage of the saw. Fig. 4 shows a band-saw fully protected by tightly boarding up the band wheels at the top and bottom. The only exposed portion of the saw is that directly in front of the operator, the part which actually does the cutting.

A safety cylinder wood planer is illustrated in Fig. 5. In this machine the revolving cylinder carrying the planing knives is cut away for a small distance only, directly in front of each of the knives. This makes it impossible for the operator to accidentally lose a finger between the knife and the table. The old-style planer as known to most patternmakers is dangerous because of the great clearance between the knife and cylinder.

The Danger with Grinding Stands

The tool grinders located in different departments of the machine shop are usually placed in an open space on the

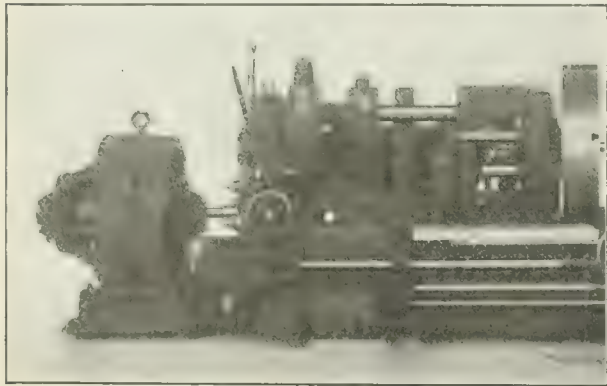


Fig. 8.—Partial Gear Guards for 36-in. Headstock.

floor, and in such cases the driving belt and the grinding wheel should be guarded by screen or hood. Several grinding stands on the market have heavy iron hoods covering the greater portion of the grinding wheel, thus protecting the workman against contact with the revolving wheel and guarding against accident as a result of bursting of the wheel.

To further guard against the danger of bursting, some grinding wheels are made thicker at the hub than at the rim, that is, the side of the wheel is convex and fitted with concave collars. The collars being screwed up tightly against either side of the wheel would, in case the wheel should burst, hold the center portion of the wheel to the spindle.

Safety Provisions for Metal Planers

The usual medium-sized, spur-gear planer has driving belts on one side and reducing gearing on the other. Both the driving belts and the gears should be fully covered. A tight box made of matched boards slotted for the belts to pass through answers very nicely for the driving side of the planer. The gears can be totally covered by boards or screen.

In the spiral-gear type of planer the driving belts and exposed portion of the gearing are on the same side of the machine. If a metal gear guard is furnished with the planer a light protecting railing around the belt will be sufficient. If, on the other hand, the planer is not fitted with an



Fig. 9.—Complete Gear Guards for 36-in. Headstock.

adequate gear guard it is well to build a box around both the driving pulleys and the gears.

Engine Lathes

The only dangerous gearing on an engine lathe consists of the driving gears in the headstock and the change gears or reversing gears carried on the end of the headstock. The accompanying illustrations show recent Lodge & Shipley designs for totally covering all of these gears in contrast with the partial gear guards formerly used.

Figs. 6 and 7 illustrate 19-in. belt-driven Patent Head engine lathes with double back gears as regularly manufactured in the smaller sizes. Fig. 6 shows the machine as formerly built with partially guarded gears. Fig. 7 shows the present construction of the same size of

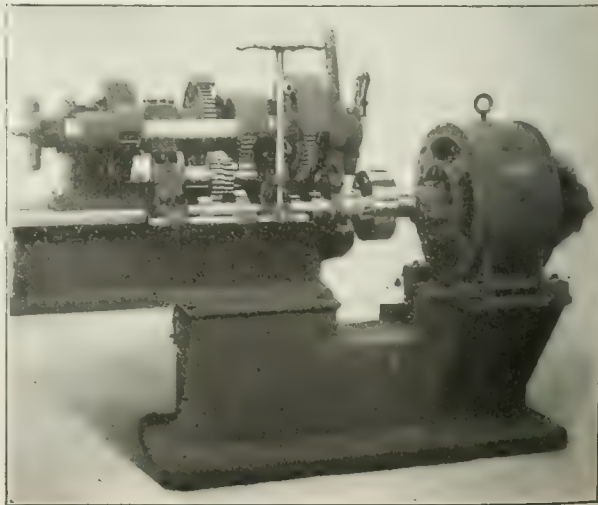


Fig. 10.—Former Partial Guarding of Small Lathe Headstock.

lathe in which a large cast-iron cover, with just enough opening in the center for the driving pulley, completely incloses all of the headstock gearing.

Large lathes require an entirely different style of gear guard, because they are triple-gearred and carry the triple-gearing as well as the back-gearing at the front of the headstock.

In the remainder of the illustrations of different styles of lathe guards we show the headstock end of the machines only, because, as previously mentioned, that is the only part of an engine lathe where safety devices are necessary to the protection of the operator.

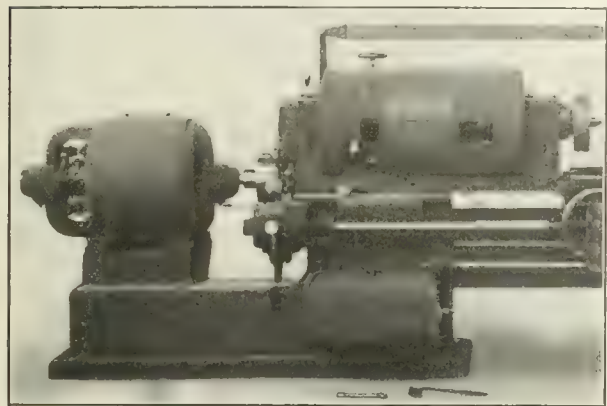


Fig. 11. Fully Inclosed Gears of 24-in. Headstock.

Figs. 8 and 9 illustrate 36-in. motor-driven, triple-gearred headstocks "before and after" the application of complete gear covers. The latter view is made at an angle to show not only the covers over the back gears and triple gears, but also the guard over the reverse-plate gears on the end of the headstock and the guard over the internal gear of the face plate.

The last group of cuts shows front and rear views of back-gearred, motor-driven headstocks, with and without complete gear covers. Formerly the small sizes of motor-driven lathes were built with headstocks as shown in Fig. 10, in which the gears were partially guarded, but not completely inclosed. The present Lodge & Shipley design for such machines is illustrated in Figs. 11 and 12. As shown by these cuts, it will be seen that guards are now placed over every gear, so that there is not a single exposed tooth on any one of the gears of the lathe.

Results

The main object in enclosing gears and other moving parts of machinery is, of course, the protection of the workman. That this can be easily and thoroughly accomplished in the case of the majority of machine shop tools has just been shown.

At the same time, the former convenience of operation of the several machines has in no way been impaired. The gear guards on the lathes illustrated can quickly be re-

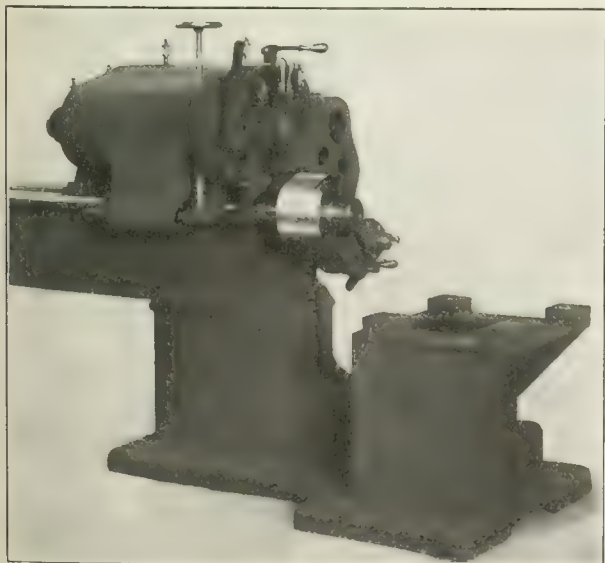


Fig. 12.—Fully Inclosed Gears of 20-in. Headstock.

moved for inspection of the gears and shafts when necessary. Provision is made for oiling from the outside so that it is seldom necessary to remove any of the gear covers. There is therefore no temptation to the workman to throw the gear guard to one side as being too cumbersome.

A secondary feature of the totally inclosed gearing, but, nevertheless, one of considerable importance, is that chips and other foreign matter are kept entirely out of all the gearing. This prevents noise and greatly increases the life of the machine.

The Dick Belt Factory at Passaic, N. J.

The firm of R. & J. Dick, Ltd., was founded in 1847 by the late Robert and James Dick, their business then being guttapercha specialties. Robert Dick was an inventive genius. He experimented for many years on a canvas driving belt, using as a foundation the materials guttapercha and balata with which he was very familiar. He experimented on this belt for about 20 years before producing the present Dickbelt, which was, of course, protected by patents and is the original balata belt. A large factory for the manufacture of this belting was erected by the firm in Glasgow, Scotland, about 30 years ago and is now its main works. The sales increased so much that the factory has had to be enlarged on several occasions.

By reason of the high tariff in this country, and also as the firm's business in other countries of the world was so large, keeping its main works fully worked, it had done practically no business in the United States up to two years ago. It was then decided to erect a factory here. The building at Passaic, N. J., was completed last year. All the machinery, which is secret, was imported from Scotland, except the engines, boilers, pumps, such appliances as could easily be obtained in this country. A certain number of the men, together with the superintendent of the Glasgow Works, who have been making this belt all along, came over and spent several months educating American workmen in the manufacture of the Dick belt, and the firm is now producing exactly the same belt here as it has produced for so long a time at its other works.

The Passaic plant is a very large one, capable of turning out as much belting as the main works in Glasgow, Scotland. It can supply any width of belt up to and including 72 in. within 48 hours of the receipt of the order.

R. & J. Dick, Ltd., are working their business mainly through jobbers, but have opened branch stores at 50 Church street, New York City; 289 Market street, Newark, N. J.; 147 North Seventh street, Philadelphia, Pa.; 29 West Lake street, Chicago, Ill., and 912 Candler Building, Atlanta, Ga.

The Production of Coal in 1910

The unofficial estimate of the coal production of the United States for 1910, by E. W. Parker, coal statistician of the United States Geological Survey, is between 480 and 490 million tons. As shown by the Survey's chart of coal production, just issued, the first recorded production of coal was 22 tons in 1814. By 1850 the production had grown to what was then considered the enormous amount of 7,018,181 tons, but by 1860 this figure had doubled and the production for that year was 14,610,042 tons. This was less than the production of Alabama alone for 1909. The centennial year of 1876 saw a production of 53,280,000 tons. In 1880 the figure had reached 71,481,570 tons, yet this is less than the production of the single State of Pennsylvania in 1909. By 1890 the production had jumped to 157,770,000 tons and by 1900 it was 269,684,027 tons. Surely this was about as high as it was believed by most people that coal production would go, yet the figures for 1907 showed the enormous total of 480,363,424 tons, those for 1909 were 460,803,416 tons, and according to Mr. Parker's estimate the production for 1910 may come very near the half-billion mark.

Henry Hornbostel, architect, Pittsburgh, has completed plans for new buildings to be added to the Margaret Morrison School and the School of Applied Design of the Carnegie Technical Schools at Pittsburgh, for which Andrew Carnegie recently donated \$1,500,000. It is expected that bids for the erection of these buildings will be asked for during this week.

Practical Side of Electric Spot Welding

Possibilities and Limitations of the Method of Riveting Without Punching Holes or Using Rivets

Spot welding, as indicated by the name, is a method of joining metal sheets together at any desired point, by a

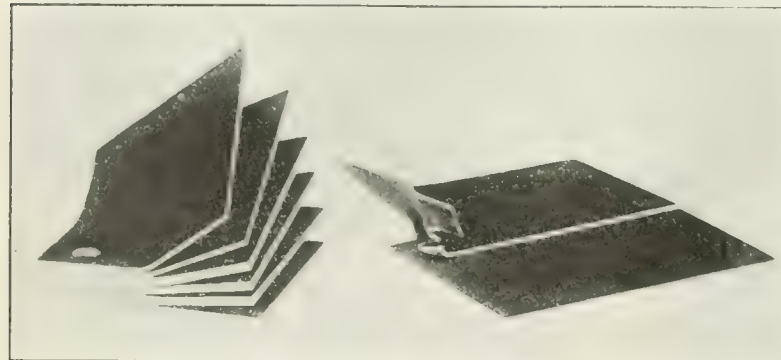


FIG. 1.—Six Sheets Electrically Welded; Proof of Fusing.

spot the size of a rivet, without punching holes or using rivets. It is done electrically by fusing or melting the metal at the point desired, and at the same instant applying sufficient pressure to force the particles of molten metal together.

In spot welding, a large volume of current at such low voltage or pressure that it cannot be felt by the bare hand passes through a pair of copper die points; two pieces or more of sheet steel are placed between these points, and when the current is turned on with the switch the pieces of steel offer so much resistance to the flow of current that they instantly become hot at the point opposite the copper dies. The hotter the steel becomes, the greater is the resistance, and automatically the current is forced into the adjacent cooler parts until all the metal in proximity to the dies is brought up to the welding temperature, when a slight pressure on the lever handle mounted on the machine forces the molecules of molten metal together and they are united. This is done in an incredibly short space of time, taking only a fraction of a second when stock as light as 20 gauge is welded. In actual practice one of the copper dies only is pointed and the opposing one is flat. The pointed die leaves a slight indentation on one side of the metal and the opposite side is perfectly smooth.

Fig. 1 shows six pieces of sheet steel of varying thick-

nesses welded together at one time; also two pieces torn apart—near the weld—indicating that the metal has been absolutely fused together and is not pulled apart at the weld.

Fig. 2 shows a front and back view of a spot welded piece. A photographed sectional view of a spot welded and a riveted piece of metal are also shown, which illustrates why a riveted piece is regarded as not standing within 60 per cent as much of a strain as a welded piece. The spot welded piece is fused together at the point where the slight depression is shown, making a union of the particles of steel at that point. A piece of galvanized iron is also, shown which has been hammered until the metal was torn out in attempting to break the weld apart.

Fig. 3 shows a foot operated spot welder. When the foot lever is pressed down, the dies are brought together to clamp the stock, and a slight pressure with the heel on the outside pedal turns on the current to complete the operation. Where it is necessary to have the use of both hands in placing the stock in the machine, this type of welder possesses many advantages over the hand operated machine.

Fig. 4 illustrates a machine especially adapted for stove and sheet metal work. With the extended horn, almost any part of a range, it has been found, can be welded without any difficulty.

The accompanying photographic reproduction of a diagram shows the stove welder with the different parts of the machine marked. The special transformer in the welder is used to reduce the 220 or 440 volts to the 3 to 5 volts used in making the welds.

The specimens of hoop steel shown in Fig. 6 were sub-

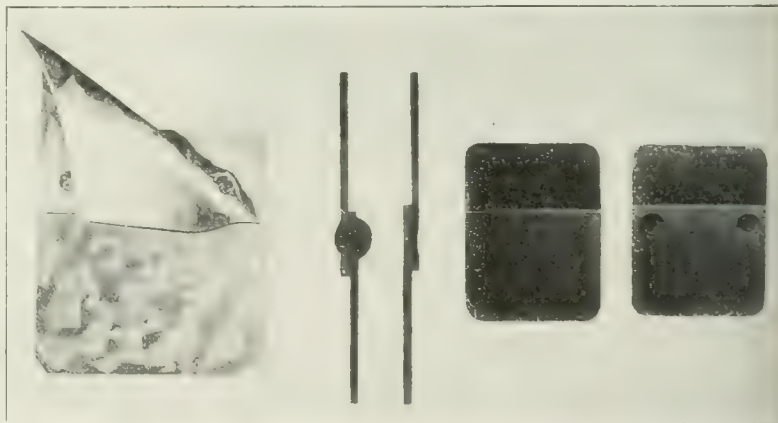


FIG. 2.—Front and Back of Spot Weld, Welding of Galvanized Sheets.

jected to a test at the Lunkenheimer Laboratory in Cincinnati. It will be noted on

Test No. 1—One spot weld broke
Test No. 7—One rivet broke
Test No. 8—Two spot welds broke

at 1625 lb.
at 990 lb.
at 2275 lb.

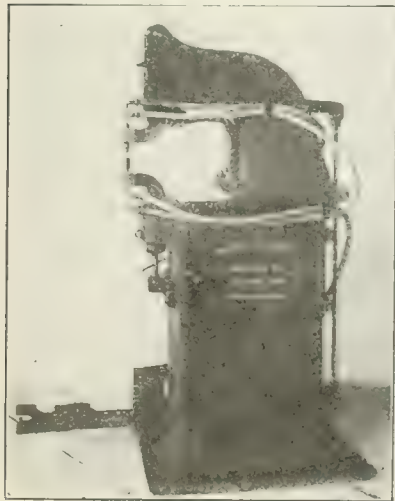


FIG. 3.—Foot Operated Spot Welder.

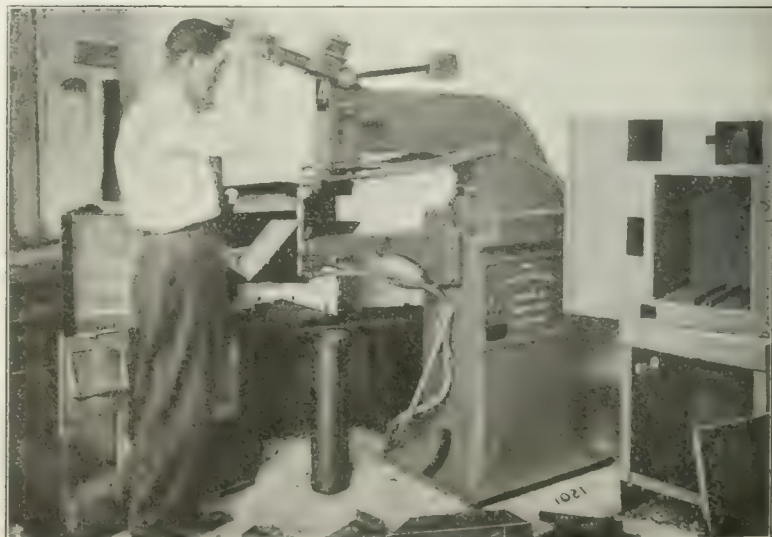


FIG. 4.—Welding Machine for Stove and Sheet Metal Work.

Test No. 2—Two rivets broke at 1,555 lb.
Test No. 3—Three spot welds broke outside of the weld at 2,715 lb.
Test No. 4—Three rivets tore apart at 2,055 lb.

Single-phase alternating current must be used in electric welding. Where two or three-phase current is available, one phase only of the multiphase system is used. Any voltage from 110 to 500 can be used, but 220 or 440 is preferred as being more nearly standard than any other, and all stock machines for quick delivery are arranged for 220 volts. Any frequency from 25 cycles to 140 cycles can be used, but owing to the large transformer required in the welder when less than 60 cycles are used an additional price is charged for welders operating on 25 to 40 cycles. The power factor varies from 70 to 85 per cent. according to the work and the way it is handled. Inside the welder and part of it, is a special transformer to reduce this outside current to the 3 to 5 volts used in making welds. This is so low that it cannot be felt by the bare hand and explains why the confidence of the operator is secured.

Based on current costing 1 cent per kilowatt hour, it will cost from 1 cent to 3½ cents per 1,000 welds. One may multiply the price given in the accompanying table by the rate charged by the lighting company to give the actual cost per 1,000 welds.

Gauge of Sheet Steel.	Thickness in Fractions of an Inch.	Approx. K.W. Capacity.	H. P. at Dynamo.	Time in Seconds to Weld.	Cost Per 1,000 Welds at 1c. per K. W. Hr.
10	9-64	18	25	1.5	3½¢
12	7-64	16	23	1.3	3
14	5-64	14	20	1.0	3¼
16	1-16	12	18	.9	2½
18	1-20	10	15	.8	2¼
20	3-80	9	14	.7	2
22	1-32	8	13	.6	1¾
24	1-40	7	11	.5	1½
26	3-160	6	9	.4	1¼
28	1-64	5	8	.3	1

No preparation of stock is required unless it is very rusty or scaly, in which case it will be found economical to clean off the rust or scale to minimize current requirements.

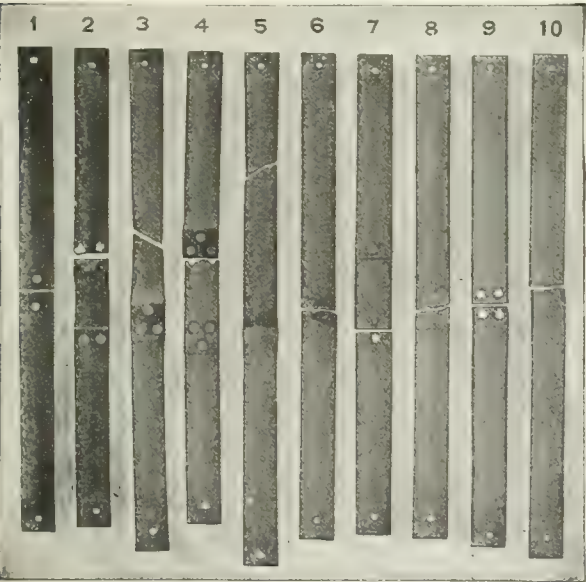


Fig. 6.—Convincing Tests of Electric Welding.
Ten specimens of hoop steel subjected to test showing tensile strength. All pieces the same size, 1.12" x .035".
No. 1. Spot welded in one place—broke at weld at 1,625 lb.
No. 2. Spot welded in two places, also two rivets—broke at rivets at 1,555 lb.
No. 3. Spot welded in three places—broke outside weld at 2,715 lb. (Notice elongation of metal.)
No. 4. Spot welded in three places, also three rivets—broke at rivets at 2,055 lb.
No. 5. Solid lap weld—broke outside weld at 2,720 lb.
No. 6. Butt welded—broke at weld at 2,555 lb.
No. 7. Spot welded in one place and riveted once—broke at rivet at 990 lb.
No. 8. Solid lap weld—broke at weld at 2,125 lb.
No. 9. Spot welded in two places—broke at weld at 2,275 lbs.
No. 10. Plain piece of hoop iron, not welded—pulled apart at 2,690 lb.

There is a limit to the thickness of sheet metal that it is practical to spot weld. This is due to two causes: 1—The fact that the copper rods which conduct the electric current can only carry a certain quantity of current without excessive heating. When sufficient current is carried over these copper rods or die points to bring very heavy metal between them up to the welding temperature, the copper rods, it is found, will become so hot they will soften and the points wear away so rapidly that it is not practical to use them for this kind of work. 2—It is necessary to have the two pieces of metal touch each other at the point where the weld is made. With very heavy stock, a slight kink

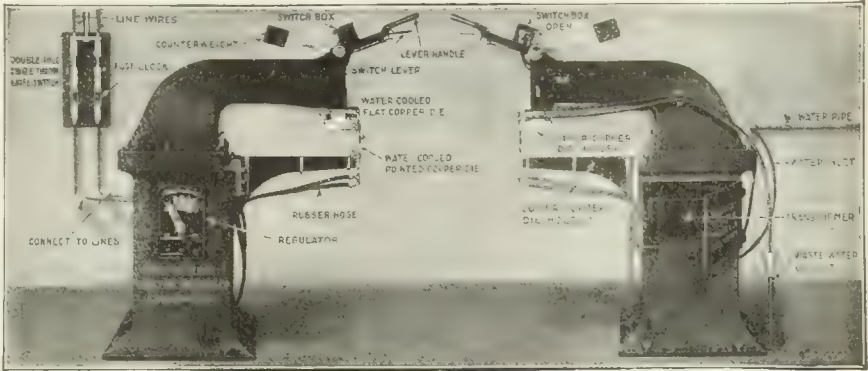


Fig. 5.—Diagram Showing Different Parts of Toledo Electric Welder.

COST OF WELDING DIFFERENT GAUGE SHEETS.

or bucking of the metal will prevent the flat surfaces from making good contact. Stock as heavy as 3/16 or ¼ in. can be welded, but the best results, it is stated, are obtained when ⅛ in. or lighter stock is welded. Copper and brass cannot be spot welded for the reason that they are both good conductors of electricity and offer no resistance to the flow of the current. It is impracticable to weld cast iron as there is no fibre to stock of this kind and the metal will tear out at the welded spots.

Galvanized iron can be welded although it will burn off the zinc, leaving the iron exposed at the point where the copper dies come in contact with the metal. Heat has no effect on the electric weld and for this reason this process is largely used by stove manufacturers in making sheet steel ranges and similar work. It is not found practical to make more than one spot weld at a time, as it is almost impossible to make a number of die points bear on the stock with equal pressure, and the one die point making the best contact, will carry all of the current, and the result will be that so much current is concentrated at this point that the metal is likely to be burned.

The foregoing information was obtained from the Toledo Electric Welder Company, Cincinnati, Ohio. The machines used for this work can be furnished either hand operated, foot operated, or power driven. A depth of throat can be furnished from 6 to 48 in., and a variety of types are made to suit almost any kind of sheet metal work where rivets are used.

The Government Asks for a Substitute for Turpentine.—The Bureau of Supplies and Accounts of the Navy Department is being severely criticized by paint and oil manufacturers and dealers for having advertised for bids on 10,500 gal. of "turpentine substitute." It is contended that the government, which is putting forth so much effort to do away with adulterated foods, drugs, etc., should not encourage the manufacture and sale of substitutes for such a common and useful article as turpentine; and, furthermore, that if substitutes are desired they should be designated by some other name than the one used in the Navy Department schedule. It is also pointed out that the federal authorities in the present instance are seeking to have manufacturers turn out goods which are prohibited by the laws of Georgia and Florida.

The New Richmond Forgings Plant

The Richmond Forgings Corporation, Richmond, Va., was incorporated September 20, 1905, and began work March 15, 1906. The equipment consisted of one 2000-lb., one 1250-lb. and one 400-lb. steam hammers and one 2-in. upsetting machine, with a power plant designed to cover about 100 per cent. increase in equipment. The business developed rapidly, and within six months a 1500-lb. steam hammer was added. The plant was located on the historic Belle Isle in the James River and within the corporate limits of the city of Richmond. This location was selected to take advantage of the abundant water power as well as its very low cost, while the transportation facilities were good as the Southern Railway tracks ran into the yards.

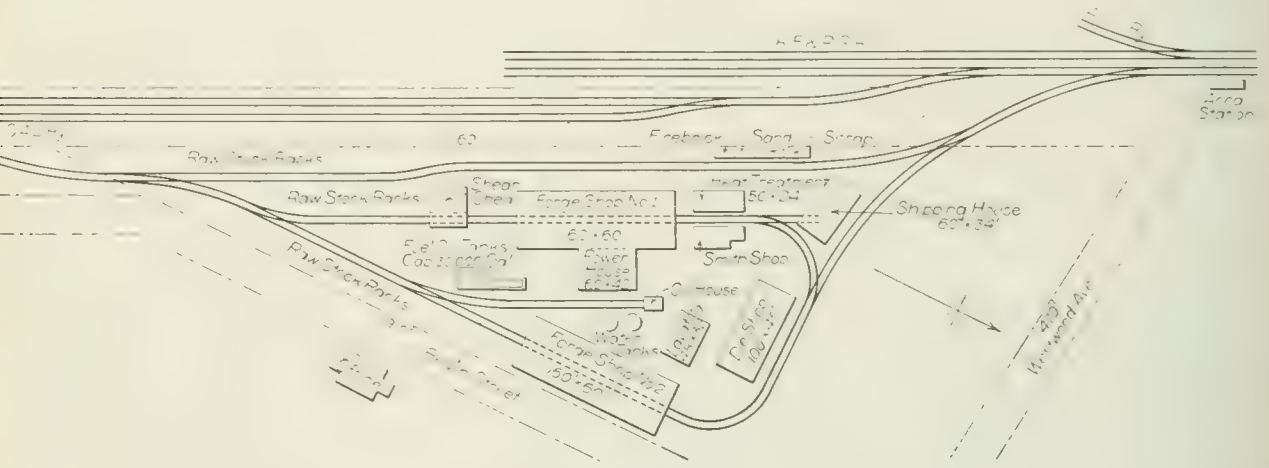
The incorporators and principal stockholders were Joseph Bryan, director of the Southern Railway Company and the American Locomotive Company; Jonathan Bryan, director of the Birmingham Land Company and the Bank of Commerce and Trusts; O. J. Sands, president American National Bank; Coleman Wortham, of Davenport & Co., bankers; T. S. Wheelwright, vice-president Old Dominion Iron & Nail Works Company, all of Richmond, Va.; Frank J. Gould, capitalist, New York; W. R. Williams, formerly secretary Richmond Locomotive Works, and O. P. Redford, formerly engineer for the same company. Jonathan Bryan is president of the company; W. R. Williams, vice-president and treasurer, and O. P. Redford, secretary and general superintendent.

The business of the company was the making of special

cemented pit just below the level of the ground and contain the fuel oil used in all heating furnaces. This fuel oil is also used in a large De La Vergne engine supplying all the power required. This engine is directly connected with the main shaft of forge shop No. 1 by a Dodge rope drive and it also runs a generator supplying electric current to all other shops. This engine is of the most modern type and makes the necessary power at a cost of about 6/10c. h.p.h.

At this new shop there are steam hammers varying in size from 400 to 7000 lb. and board drop hammers from 1000 to 3000 lb., in addition to the auxiliary machines. While there are other drop forging shops in the country larger, the company states that there are none better equipped and probably no one has quite all the advantages of this new shop, which has been designed to overcome the troubles known only to experienced drop forging men and to reduce manufacturing expenses to a minimum.

Acca has not heretofore been a station, but the Richmond-Washington Railroad, with its usual enterprise and its spirit of cooperation has made Acca a station for the Richmond Forgings Corporation, taking the most favorable freight rates which are given to the city of Richmond and delivering all freight on the tracks of the company. It also stops a number of its passenger trains going north and south for the accommodation of the Forgings Corporation and runs a special train from the city to Acca bringing the employees to the shop by 7 a. m. and taking them back at 6 p. m., and putting in a special rate of five cents for tickets in large lots, which are purchased by the company and sold to its employees.



Plan of the New Shops of the Richmond Forgings Corporation, Richmond, Va.

drop forgings of every description from any kind of material which could be forged, but no machining was done except in the preparation of the dies, tools and repairs.

The activities of the company were not local, but it sought business successfully throughout the North into Canada and to the Mississippi River. So vigorously was the business pushed that several additional hammers and various machine tools were added to the equipment, and it soon became evident that the business was outgrowing the building and facilities available at Belle Isle. About one year ago the capital stock was increased to \$200,000 and it was determined to move the plant and to provide abundant room in order that the company might undertake the finishing of various tools and parts which could be made from drop forgings.

The present site, consisting of 28 acres of level ground, is situated within one mile of Richmond and at the junction of the Richmond-Washington Line, the Atlantic Coast Line and the Seaboard Air Line railroads. The Seaboard tracks enter the south end of the yards and the Richmond-Washington tracks enter from the north and these tracks extend throughout the yards of the company in such a way as to reduce the cost of handling materials to a minimum. It will be noted from the accompanying ground plan that the tracks extend over 1000 ft. along one side of the property, while a broad avenue borders the north side. There is a gentle slope from the southern to the northern end of the yard, so that all material, such as raw stock, is easily run from the yards to the shears, thence to the forge shop, and forgings from the forge shop to the pickling and heat treating rooms and on to the shipping rooms.

Large tanks of 30,000 gal. capacity are located in a

The Richmond Forgings Corporation can now supply at its new shops forgings weighing singly a few ounces or several hundred pounds. This is strictly a Southern industry and illustrates the rapid growth of manufacturing in that section. It further demonstrates the ability of factories of this kind to compete with similar factories throughout the North and West, as the company is now selling its product from Boston to Detroit and from Canada to the Gulf of Mexico, and is able to handle all this business at a fair profit, due to its low manufacturing cost. The establishment of this successful plant at Richmond is expected to be influential in encouraging other factories to locate in the South. They can now get the materials needed, which not long ago could be secured only in the North.

The Sunshine Coal & Coke Company, First National Bank Building, Uniontown, Pa., miner of coal and maker of foundry and furnace coke, advises through J. B. Topham, its general manager, that it is operating six of its plants in Fayette and Westmoreland counties, Pennsylvania, which aggregate about 75 per cent. of its oven capacity. The greater part of this capacity is on furnace coke, the balance being on its foundry brands, Hester, Cyrilla, Francis, Chester and Eleanor, which are meeting with increasing favor among foundrymen. The company is also mining and shipping a good quantity of coal, and taken altogether is operating to a greater extent than most of the coal and coke companies in the region. It is not curtailing any development and improvement work it had contemplated and is bringing its holdings to a higher state of efficiency when this can be done.

The Rotrex Pump

A New Rotary Type for Producing High Vacuums

A new type of rotary high-vacuum pump known as the Pratt Rotrex vacuum pump is being constructed by the C. H. Wheeler Mfg. Company, Lehigh avenue and Eighteenth street, Philadelphia, Pa. This pump represents a very recent development in the line of high-efficiency vacuum apparatus and is of the single rotor type. It is designed for steam, belt or motor drive, and is built in a number of sizes to suit any ordinary power plant. Axial and end sections and an end elevation of the pump are given in Fig. 1, while Fig. 2 shows an application of it for steam turbine drive in conjunction with a centrifugal circulating pump.

As will be noticed from Fig. 1, the construction is very

vided which are arranged so as to take any overload without excessive shock. The power requirements are very low on account of the minimum number of moving parts, and the improved discharge valve arrangement enables the rotor to operate with vacuum on both sides until the discharge point at the end of each revolution is reached.

In Fig. 2, a steam turbine-driven outfit is shown where the Rotrex pump and a centrifugal circulating pump are driven either directly or through reduction gears from the turbine. One of the advantages of this arrangement is simplicity as well as the small amount of floor space required. At the present time this combination is being supplied quite extensively to surface and low-level jet conductor equipments. Other applications of the pump are in connection with a centrifugal circulating pump and a hot well lift pump mounted on the one base with a surface condenser. In one of the latter units a pump having a rotor 12¾ in.

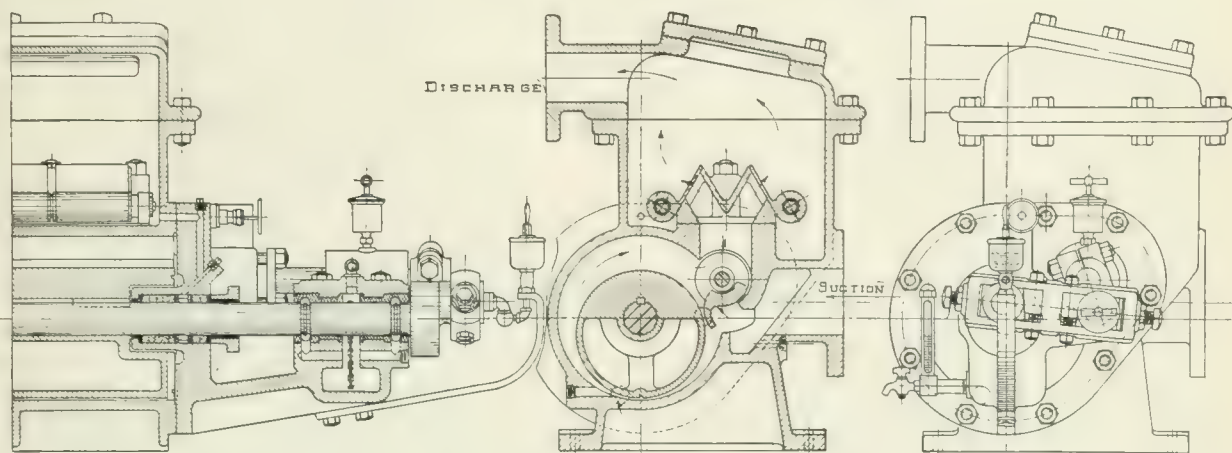


Fig. 1.—Axial and End Sections and End Elevation of the Rotrex Pump Built by the C. H. Wheeler Mfg. Company, Philadelphia, Pa.

simple, and the pump consists of a cylindrical casing and a rotor mounted eccentrically on a heavy shaft. This shaft is carried in outboard ring-oiling bearings, which are entirely independent of the stuffing boxes. The division between the suction and the discharge space in the pump cylinder is maintained by a radius cam carried on a shaft which is journaled in bearings that are also independent of the stuffing boxes. This cam shaft is operated from the rotor shaft by a lever and a crank on the outside of the casing, the arrangement being clearly shown in the end elevation at right of Fig. 1. The eccentric rotor revolves in the pump casing bore, with a clearance, as is clearly

diameter and 32 in. long was installed in conjunction with a 3000-sq. ft. surface condenser for an 800-kw. steam turbine. The pump rotor revolved at a speed of 240 rev. per min. and the circulating water entered at 74 deg. F., and was discharged at a temperature of 16 deg. higher. When steam for a load of 775 kw. was being condensed, the vacuum maintained as measured on a mercury gauge was 28.2 in. At the time the test was made, the barometer was 29.58 in., and, assuming that the temperature at which the water left the condenser was 80 deg. F., the pump maintained over 90 per cent. of the possible vacuum, which was about 28.57 in.

The manufacturer guarantees that on dead-end test this

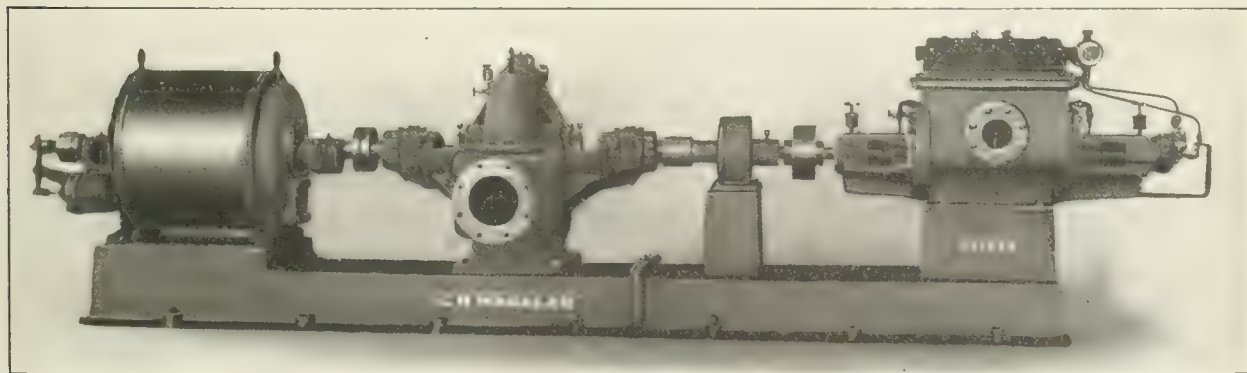


Fig. 2.—A Turbine Driven Pratt Rotrex and Centrifugal Pump Combination.

brought out in the central portion of Fig. 1, and the cam for maintaining the division between the two parts of the pump can be adjusted to give the same clearance between itself and the rotor as exists between the rotor and the casing. These clearances are sealed by water fed from the discharge chamber, and the arrows show the flow of the water. There are no rubbing parts or sliding fits in any portion of the suction or the discharge space. At the entrance to the discharge chamber metal flap valves are pro-

pump can produce a vacuum within ½ in. of the barometer, and will maintain it within 1 in. of the barometer under operating conditions. Ordinarily, the pump is of the wet-vacuum type and handles both air and water, but if it is to be used for dry-vacuum service a small connection is made into the suction to furnish the necessary sealing and cooling water. The amount required for these purposes is said to be less than that needed by a reciprocating dry-vacuum pump.

The Harris Transmission Gear

A New Device for Driving Shafting at a Reduced Speed

The Transmission Gear Company, 96 Broadway, New York City, has brought out a number of new types of transmission gears, among which is one known as the Harris transmission gear. This device is intended to be coupled directly to the motor shaft or driven by a belt when used on separate lines of shafting, or on separate machines. It may also be mounted on the engine bed plate or motor frame. It is designed to be used wherever any change in speed, either an increase or a reduction, is desired from the normal one of the driving shaft. Its use is said to effect a very large reduction in the amount of belting required for power transmission.

Two general types of gears are made, one with a per-

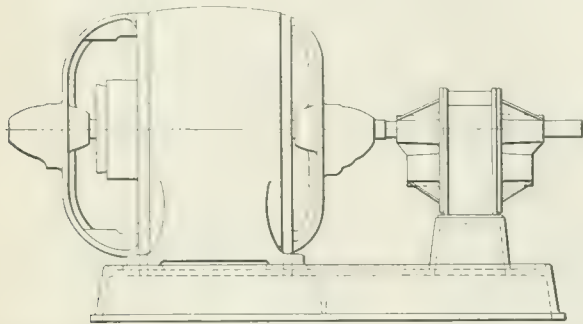


Fig. 1.—An Electric Motor Driving Through the Class A Harris Transmission Gear, Made by the Transmission Gear Company, New York City.

manent speed change between the motor and ventilating fans and blowers, air and centrifugal pumps, propellers and general machinery, while in the other type the normal speed as well as one or more changes can be secured. The first, which is known as the class A gear, is illustrated in Fig. 1 as installed in connection with an electric motor, while a view of the different parts is given in Fig. 2. The class B, or second type of gear, is shown in Fig. 3, with the cover removed, and Fig. 4 is a sectional elevation of the gear.

In the construction of the gears special metals cut to the exact diameters and then hardened are used. The bearings, which have ample proportions, are made from a special grade of bronze. In this way a smooth and easy-running yet rigid machine with a maximum amount of service is secured. Provision is made for taking up any wear occurring in the gears and the bearings, and the lubrication is automatically accomplished by maintaining a continuous flow of oil over the gears and through the bearings.

In the class B gear shown in Figs. 3 and 4, the change in the speed of the driven shaft is secured by shifting the long lever at the top of the gear. When this lever, which is denoted by *c*, Fig. 4, is at the left, the speeds of the driving and driven shafts are the same, while by throwing

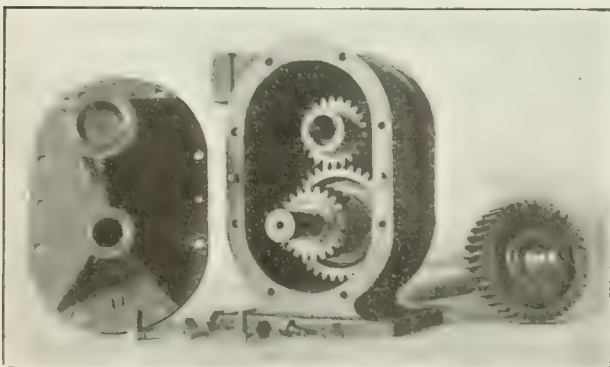


Fig. 2.—View Showing the Parts of the Class A Gear.

the lever to the right an increase or reduction is secured in accordance with the ratio of the back gear arrangement. Referring to Fig. 4, which shows in section the

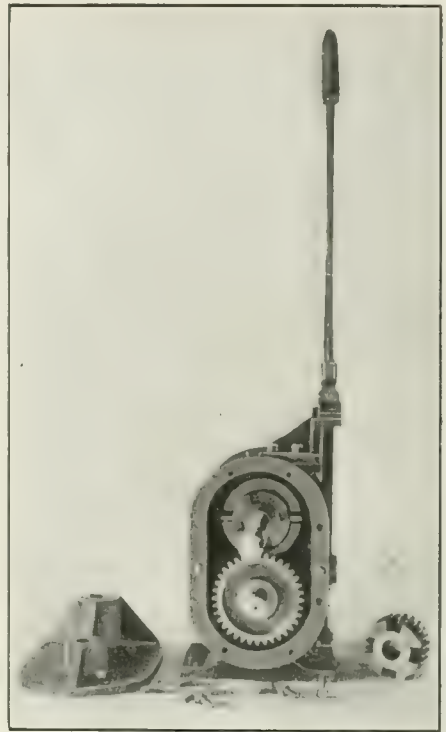


Fig. 3.—The Class B Gear With the Cover Removed.

arrangement of the various parts, *a* is the driving shaft and *b* the driven. When the handle *c*, operating the gear, is in the position shown the shaft *b* is not engaged. When the shaft *a* is driving through the back gears, the keys *d* engage in the jaws *e*, which are cut in a sleeve mounted on the shaft *a*. This causes the gear *f* to mesh with the gear *g*, the latter transmitting its power through the short lower shaft to the gear *h*, which in turn engages with the one *i*, securely mounted on the driven shaft. When it is desired to drive the driven shaft at the same speed as that of the driver, the lever *c* is thrown to the left, which causes the keys *d* to engage with the jaws *k*.

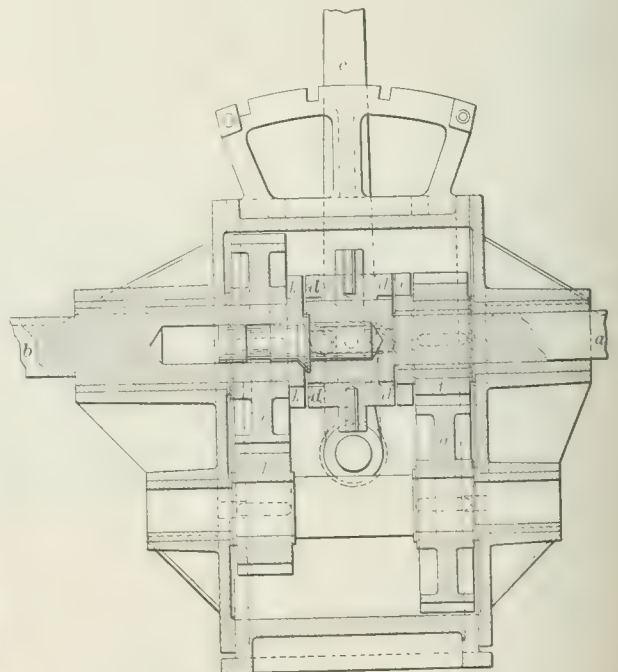


Fig. 4.—Sectional Elevation of the Class B Gear.

The company is prepared to furnish these gears for transmitting any desired power, and besides its regular stock ratios can supply any ratio of gearing up to 100 to 1.

The Stockbridge 16-Inch Single Geared Shaper

In a tool room or for doing die work a universal shaping machine capable of being worked to or within limits is required. The Stockbridge Machine Company, Worcester, Mass., has developed a 16-in. single geared shaper with a number of special attachments, which will fulfill practically all the requirements of this class of work. One of the special features of the machine is the mounting of the power rotary feed for the tool slide on the top of the ram.

A worm and worm gear, the former connected through a train of gears to the pawl on the side of the ram, revolves the head. The amount of feed to the worm gear is determined by the amount of throw of the pawl, which is reciprocated by a dog that is adjustable along the ram gib to vary the amount of throw of the pawl. The worm can be rotated in either direction and its construction is such that if desired the head can be rotated by hand. Two bolts on either side of the head provide a means for locking the rotary head when it is not in use to the ram head.

Automatic feed in either direction is provided for the head slide and its amount is regulated by the position of the dog on the ram gib. The down feed has an automatic stop, which can be used to advantage in producing duplicate

with the Stockbridge two-piece crank. This crank, it is claimed, delivers all the power developed by the driving shaft to the tool point and in addition secures an even cutting speed throughout the length of the cut with a quick return of 3.5 to 1. This quick return is maintained on short strokes. No jar is sustained by the machine due to the high rate of return, as the speed, while great during the middle of the stroke, is gradually accelerated and retarded by the construction used, and the stroke is thus reversed easily and smoothly.

The German Foundrymen's Association

The Verein Deutscher Gie Bereifachleute (German Foundrymen's Association) will hold its annual meeting in Berlin May 25 to 28. The programme provides for a visit to the foundry of the German Niles Tool Works at Oberschöneweide. A paper on "A New Molding Process for Making Hollow Castings" will be read by Prof. Dr. Ing. A. Nachtweh, Royal Technical Institute, Hanover, illustrated by cinematographic pictures. A lecture on "The Present State of Metallography with Special Reference to Foundry Practice," with cinematograph pictures, will be delivered by Dr. F. Bennigson, Berlin. Papers will also be read on "The Rotary Fore-Hearth," by Th. Löhe, foundry expert and engineer, Hanover, and "The Use of Oil as a Heating Material in Foundries," by Oberingenieur Karl Schiel, Berlin.

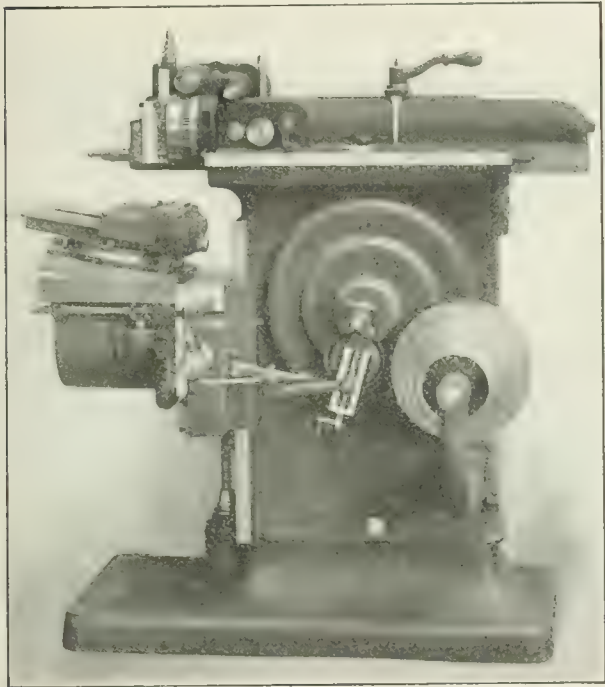
The National Building Material Exhibition

The recent great loss of property and life through fire disasters has brought prominently before the trade and the public the fact that the National Building Material Exhibition, which is to take place at Madison Square Garden, New York City, September 9 to 16 inclusive, is to be held at a time when such a show has become a real necessity from an educational standpoint. The inadequate fireproofing of our so-called fireproof buildings, both private and public, has brought home to the American public the absolute necessity for a complete revolution in the field of building construction. The work that ex-Chief Edward F. Croker, who has long been recognized as America's greatest fire chief, has taken up for the prevention and protection of property and lives from disastrous fires, has aroused and brought about the commendation of the public and press of the entire country. An interesting feature of the show will be an exhibition by Mr. Croker demonstrating methods of fire prevention.

The project of the Building Material Exhibition will be primarily to afford architects and manufacturers of building materials, both exterior and interior, and building appliances an opportunity to get into closer touch not only with each other, but with the public at large. Expressions of approval and hearty co-operation have followed the announcement of the enterprise from all quarters. Noted architects have publicly voiced their appreciation of the fact that the exhibition is now an assured thing. Benjamin D. Traitel, president of the Building Trades Employers' Association of New York City, writes a letter of indorsement. The Mechanics' and Traders' Exchange has also placed the stamp of approval upon the project. The scope of the show, as its name implies, will comprise a large field, including everything of interest to the architect, the general builder, the manufacturer and the consumer of interior and exterior appurtenances of every description, and to the layman householder. The executive offices of the promoters are located in the Flatiron Building, suite 508-9, New York City, the general management of the show being under the direction of P. T. Powers.

It is officially announced that the steel plant and rail mill of the Tennessee Coal, Iron & Railroad Company at Ensley, Ala., will be put in operation again in June. If some orders are booked that are now expected to come in, the rail mill will resume early in that month.

The Producers' Coke Company, 732 First National Bank Building, Uniontown, Pa., maker of Connellsville furnace and foundry coke, has appointed the Black Gem Coal & Coke Company, 1535 Old Colony Building, Chicago, as its sales representative for that district.



A New 16-in. Single Geared Shaper for Toolroom and Die Work, Built by the Stockbridge Machine Company, Worcester, Mass.

work. This stop prevents the tool from feeding down too far and spoiling the work, and at the same time enables the operator to attend to other work while the machine is running. The down feed screw has a micrometer which is graduated to read in thousandths of an inch and can always be set at zero. If desired, the feed to the slide can be operated by hand. The shaper is equipped with a swiveling or rotary knee having two working sides. This knee is revolved by a worm and worm gear through an arc of 90 deg. in either direction. One of the working sides is arranged to tilt for planing angles and is useful in die making. All the feeds and the adjustments are located within easy reach of the operators.

The following table gives the principal dimensions and specifications of the machine:

Length of stroke.....	16 in.
Vertical travel of knee.....	16 in.
Horizontal travel of knee.....	20 1/2 in.
Length of ram bearing in column.....	26 in.
Weight of machine.....	2000 lb.

In common with the 24-in. shaper and the 16-in. back geared shaper which were illustrated in *The Iron Age*, March 24 and October 27, 1910, respectively, and all the others made by this company, the new machine is equipped

Pawling & Harnischfeger Cranes in a Material Yard

An interesting installation of an electric crane serving the factory yard and transporting materials for charging the cupolas at a minimum cost has been made at the plant of the Simmons Mfg. Company, Kenosha, Wis., by the Pawling & Harnischfeger Company, Milwaukee, Wis. This installation consists of one 60-ft. span electric traveling crane and one 5-ton and one 3-ton standard two-motor electric traveling hoists with inclosed trailing operators' cages. One of these hoists is equipped with an electro-magnet for handling pig and scrap iron, while the other has a large capacity dumping bucket for carrying coke and other raw materials. The operating speed of the bridge and the two hoists is from 400 to 450 ft. per minute.

The structural runways for the crane bridge are 400 ft. long and consist of lattice-riveted plate girders kept in position by structural frame ends. Two 15-in. I-beams are suspended on 5-ft. centers from the underside of each girder and form the runways for the traveling hoists. The bridge travel motor and the driving mechanism is located on one of the girders, while the controller is located in the

way. This enables one or both of the hoists to run off the crane onto the spur to deposit the iron, coke or other material constituting their loads, and at the same time furnishes a reserve in case of breakdown as the hoists can be used interchangeably with the lifting magnet or the grab bucket if necessary.

Foreign Tariff Work of the Bureau of Manufactures

The Bureau of Manufactures of the Department of Commerce and Labor, Washington, D. C., is planning to make its foreign tariff work more directly helpful to manufacturers and exporters of the United States. It possesses exceptional facilities for supplying the latest exact information concerning tariff rates and the customs formalities incident to the entry of goods into foreign countries. In addition to the latest official customs tariffs of nearly all foreign countries, customs decisions and other official publications to the number of 1000 a month are regularly read and filed to keep the tariffs fully up to date. The tariff publications of the bureau, which are



The Traveling Transfer Bridge and Electric Hoists Installed in the Material Yard of the Simmons Mfg. Company by the Pawling & Harnischfeger Company, Milwaukee, Wis.

cage of the 5-ton hoist, which is the one equipped with the electro-magnet. The 3-ton hoist can also be used on the bridge, but its controller cannot be used for regulating the travel of the bridge. The crane, which is of the double-beam, swivel-truck transfer type with lift of 19 ft. 2¼ in., is covered to protect it from exposure to the weather. The hoisting speed of the 5-ton hoist, which is equipped with swivel trucks, is 50 ft. per minute for a light load, 40 ft. per minute for a 3-ton load and slightly less for a 5-ton load.

Prior to the installation of the crane, small cars running on narrow-gauge industrial tracks and elevators were used to supply the material for charging the three cupolas of the plant. This required the services of from 25 to 30 men working 10 hours per day. With the electric crane and two hoists the number of men required for this work was reduced to three or four, and these have sufficient time to unload material from the cars in the yard, one or two of these being on the ground, while the other two operated the electric hoists. The amount of power consumed by this crane is comparatively small.

As is clearly shown in the engraving, there are a number of I-beam spurs which run from the structure of the crane runway to the various cupola buildings. These spurs are intended to be in exact alignment with the beams on the crane bridge, and a latching device operated from the hoist cage enables the crane to be kept exactly opposite the run-

being extended as rapidly as possible, now fall into the following general classes:

1. The translation and publication in pamphlet form of the entire customs tariffs of particular countries, with such explanatory matter as seems desirable. The customs tariffs of Germany, Italy, France, Mexico, the United Kingdom, Australia, New Zealand and several other British colonies have already been published.
2. The publication in similar form of rates of duty of all countries on particular classes of commodities—for example, leather and leather manufacturers, agricultural products, and machinery of every description. Similar pamphlets give the regulations governing commercial travelers abroad and the consular regulations of all foreign countries.
3. All proposed and recent changes in rates or regulations of foreign countries that affect imports of merchandise from the United States are given publicity through the columns of the Daily Consular and Trade Reports immediately upon their receipt, and for convenience of reference are assembled and issued separately, as often as is deemed necessary, under the title, "Foreign Tariff Notes."

A list of individuals and firms engaged in foreign trade is being formed, showing the articles of merchandise and the countries in which each is particularly interested, with the two-fold object of keeping exporters fully informed of all tariff changes abroad and of selecting for immediate treatment the subjects that will prove most generally helpful. To facilitate the compilation of such a list a circular letter is being sent out to the trade, and copies may be obtained from the Bureau of Manufactures.

Forming Special Shapes by Cold Rolling of Standard Sections

Important American Development for Quick Supply of Metal Furniture and Building Mouldings and of Shapes for Implement, Automobile and Other Manufacturing

A cold-rolling plant for the manufacture of irregular shapes and special rolled steel sections has been established by the Garrett & Amberg Company, at Forty-seventh and West Kinzie streets, Chicago, Ill. No reduction from billets or hot rolling of any kind will be done, the company restricting its operations exclusively to the re-shaping of standard sections, band-iron and flat-strip steel into almost any shape that can be designed or desired.

It has always been difficult to secure special sections from mills unless a large tonnage was ordered or unless there was a chance of developing a demand in other quarters; and even under these conditions the business was frequently unwelcome and subject to exasperating delays and deliveries. This indifference, largely because of the special equipment required for the production of special shapes, has left this department of the steel business in America in a somewhat undeveloped stage. Foreign mills have endeavored to cater to the demand, but the slow deliveries and

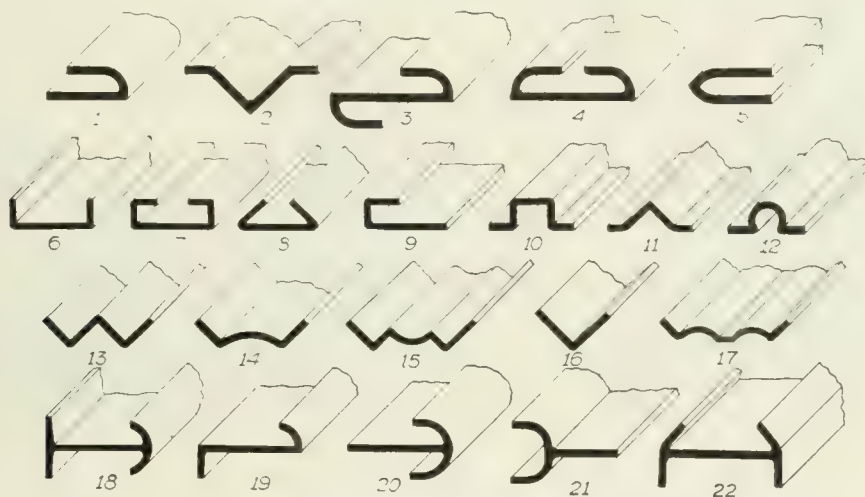
facturers, car builders, automobile makers and the hardware trade generally demand a heavy line of special shapes of even greater variety.

All sections are made in a very few operations; in fact, the greater number of shapes are made in one or two passes, a procedure calculated to bring the producing cost low. The manufacturers claim that the steel used can have any finish desired, as the re-rolling or re-drawing process does not destroy the original finish on the steel as it comes from the mill. The offices of the Garrett & Amberg Company are at 1713 Fisher Building, Chicago.

New Publication

THE IRON ORES OF LAKE SUPERIOR. By Crowell & Murray. Cloth bound; pages, 186, 6 x 9 in.; inserted maps and data sheets. Published by the Penton Publishing Company, Cleveland, Ohio. Price, \$3.50, postpaid.

Considering the vast amount of information, statistical and descriptive, that has appeared in the past 25 years relative to Lake Superior iron mining, it is surprising that no handbook of the industry has appeared until now. The authors of this book, whose task has been in large part one of compilation, are chemists and metallurgists at Cleveland and their work has put them in possession of much data from original sources. They give in the earlier part of the book a brief history of Lake Superior iron ore discovery and development, with chapters on the geology,



Standard Sections, Band-Iron and Flat-Strip Steel Reshaped by Cold Rolling by the Garrett & Amberg Company, Chicago, Ill.

other restrictions have hampered their efforts

With the Garrett & Amberg plant in operation, which is the only one of its kind in the West, it will be possible to secure special sections in any quantity at a comparatively moderate price, and in a reasonably quick period, providing such sections can be rolled or drawn cold from some standard form of steel.

The accompanying illustrations show several sample sections that are being produced regularly. Figs. 1 to 5 inclusive and Figs. 18 to 22 inclusive show types of shapes re-rolled from I beams, angles, channels, tees and zee bars; while the other cuts show the variety of shapes drawn from flat strip steel and band-iron. The distinction between re-rolled and drawn sections is that the former process is usually used on such steel as comes from the mills in lengths under 50 ft., while the latter method is used on band-iron or flat steel which comes in any form of hoops or scrolls.

In Fig. 1 is shown a standard angle-iron with one leg formed parallel to the other, making a special U-shape section. Fig. 5 shows another U section with both legs of the angle bent equally. Another type is made from the standard angle shape as shown in Fig. 2, where a part of both legs of the angle is bent outward to form a track or grooved section. Figs. 3 and 4 and all of the figures on the bottom row show the application to the flanges of zee bars, I beams, channel irons and tees.

Figs. 6 to 17 inclusive show just a few of the innumerable shapes that can be drawn from flat steel. Their uses are mainly for moldings on steel furniture, building interiors, steel window sash, doors, etc. Implement manu-

mineralogy and mining methods of the region. The transportation of ore is briefly described, while considerable space is given to the classification of ores, sampling and methods of analysis. The rather intricate system of arriving at the values of Lake Superior ores on the basis of their chemical analysis is elaborated upon, the explanation showing more closely the scheme adopted by the Lake Superior ore shippers graduates the price according to the actual value of the ore to the furnaceman. The penalties for lower iron content and higher content of metalloids advance as the percentage of iron diminishes and are intended to represent as closely as may be the larger outlay of the furnaceman for fuel and fluxes and the higher unit cost due to diminished pig iron output. The greater portion of the book is given up to details of the various mines and ores, with location, ownership, shipments by years and analyses, dried and natural. Valuable data sheets are inserted which give graphically the shipments from the various ranges by years and the loading and unloading equipment of the various docks; there are also several maps, one containing all the ranges while a more detailed map is devoted to each range. Probably so much of the data generally inquired for concerning Lake iron ores and mining has not been brought together before in a single volume. The authors have done a service to the entire trade they represent and the result is highly creditable.

The Walsh Mfg. Company, Pittsburgh, organized recently for manufacturing light machinery, has purchased a plot, 120 x 120 ft., on Jane street, Pittsburgh, and will erect a factory building.

The Contrast in Air Compressors

An interesting commentary upon the wide range of sizes of air compressors manufactured by the Chicago Pneumatic Tool Company, 1010 Fisher Building, Chicago, Ill., is afforded by a photograph recently taken on the testing floor of the company's air compressor works at Franklin, Pa. The two compressors shown are very dissimilar as regards size and the use to which they will be put, although both represent the latest designs of their kind.

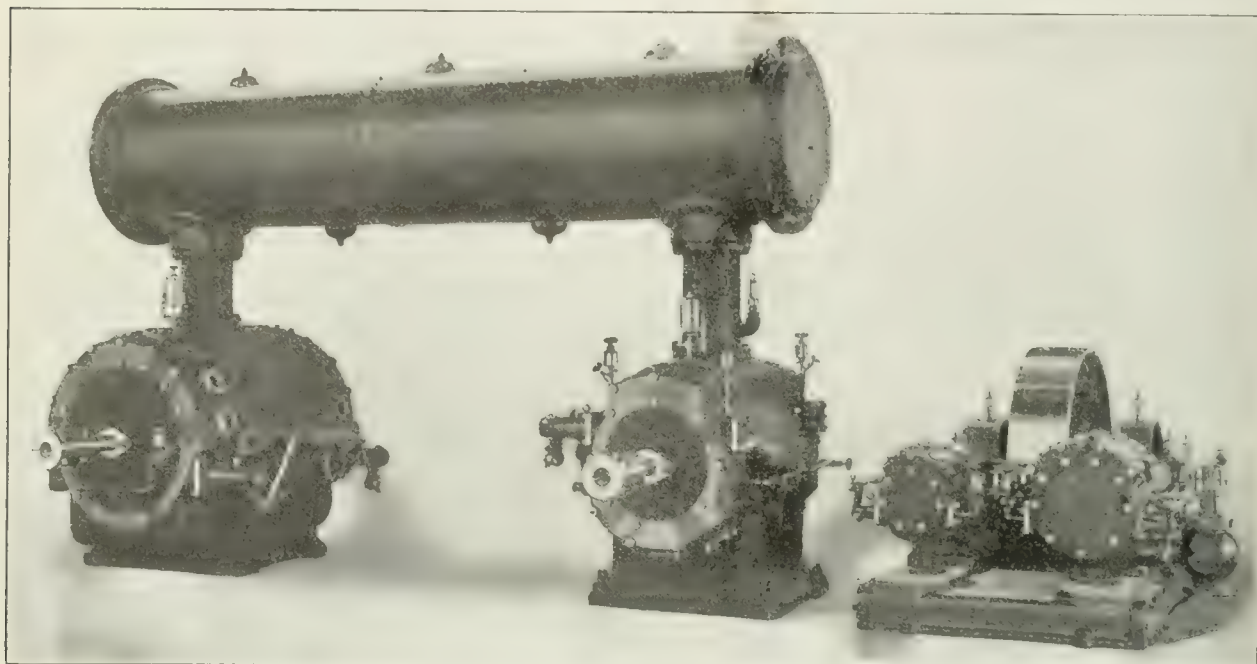
The air cylinders at the left with the overhead inter-cooler form the air end of one of the two Corliss engine-driven air compressors which will be installed in the new Grand Central Terminal, New York City. The diameters of the low and the high-pressure cylinders are 23 and 13 in., respectively, and the stroke is 24 in. When operating at a speed of 90 rev. per min. a displacement of 1038 cu. ft. of free air per minute is provided. These

The H. C. Frick Coke Company's Safety Committee

A committee of safety composed of nearly 500 employees of the H. C. Frick Coke Company, has been organized to look after the welfare of the thousands of employees of that company in the Connellsville coke regions. A recent issue of the Courier of Connellsville, Pa., contained the following account of the organization of this committee and its plans:

A permanent safety committee is established in each plant, consisting of the superintendent, mine foreman, assistant mine foreman, fire bosses, rib bosses and boss driver. In addition to, and working in connection with, this permanent committee there is a committee composed of three workmen, who serve for six months, when three other workmen are appointed.

Every week the committee gets together, and anything affecting the safety of the employees is taken up and



Two Very Different Air Compressors Recently Built by the Chicago Pneumatic Tool Company, Chicago, Ill.

cylinders have mechanically actuated intake valves and are arranged for direct connection to the steam end, which has cylinders 24 and 14 in. in diameter and a 24-in. stroke. The other compressor which this company is building for the Grand Central Terminal will have a displacement of 2031 cu. ft. of free air per minute. This larger displacement is due to an increase in the size of the steam and air cylinders and a change of the operating speed. In this compressor the steam cylinders are 17 and 30 in. in diameter, and the two-stage air cylinders are 28 and 17 in. in diameter, the stroke being the same as in the other unit, 24 in. The operating speed is 95 rev. per min. The smaller compressor at the right was built for the company's Russian branch house, and is a belt-driven two-stage machine having mechanically actuated intake valves and a capacity of 197 cu. ft. of free air per minute.

The line of compressors built by this company comprises more than 100 sizes and styles, and can be used for every purpose employing compressed air. Some of the special uses to which these compressors are put are operating pneumatic tools, compressing natural gas, pumping water by the air-lift system, in mining and caisson work, and for a great variety of purposes in industrial establishments.

The Eureka Steel Company, Pittsburgh, which placed its new plant in operation last week, is arranging to increase its capital stock from \$25,000 to \$250,000 and is preparing plans for a new open hearth furnace, a blooming mill and a bar mill. It has completed a small plant for the manufacture of automobile parts and tool steel. The main building is 45 x 110 ft. The officers of the company are: G. B. Smith, president; J. J. Tattigan, vice-president, and George D. Hutshon, secretary-treasurer.

thoroughly discussed. One plain fact is recognized by all—no accident is without its cause, and it is the duty of the safety committee to ascertain the cause and apply the remedy.

A written report is made of every accident resulting in personal injury, or that might in any way endanger the lives of the men. This report, which is prepared by the head of the department in which the accident occurred, gives every detail, and is taken up for general discussion, with a view of devising some means of preventing recurrence. The fullest expression of opinion is encouraged, and no suggestion is ignored. Each plan is carefully considered, its good and bad points are gone over and impartially weighed, and the suggestion is accepted or rejected, as the committee decides. A report of each case and the conclusion arrived at as to the method of preventing similar accidents is sent to the general superintendent's office at Scottdale, from where it is transmitted to the other plants.

Each member of the permanent safety committee wears an attractive blue enameled button, around the edge of which are the words, "Permanent Safety Committee," and in the center "H. C. F. C. Co." in monogram. The movement is a most laudable one and has aroused unbounded enthusiasm among the employees.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., has received a contract from the Portsmouth Steel Company, Portsmouth, Ohio, for the building of two Junt roughing mills, three finishing mills and three cold mills. This will give the company in its sheet department three jobbing and five sheet mills, with the necessary cold mills. These mills are expected to be ready for operation in the fall.

Holbeck Gas Plants for Bituminous Coals

Gas producer apparatus, designed especially to use bituminous coals and lignites, and interesting particularly in respect to a rotary washer for cleaning the gas, is made by the Holbeck-Riverside Gas Power Company, Oil City, Pa. The accompanying drawing indicates the general features.

The generator is of the pressure type, steam blown, and is shown equipped with automatic fuel feed. The generator revolves on steel trunnions making about one complete revolution every 10 min., and the fuel is agitated by means of a water-cooled cast-steel poker automatically oscillated. The gas generated passes through the water space of the cooler and then through the rotary air washer, both of which parts of the equipment are designed to recover the tar carried over from the generator. Beyond the gas washer the gas passes through a dry scrubber and is then ready for distribution to the gas engine installation, or the melting, annealing, case hardening, tempering or other furnaces equipped for the use of gas fuel. The operation of the producer gas power plant may be described as follows:

Bituminous crushed, nut or slack coal, stored in a

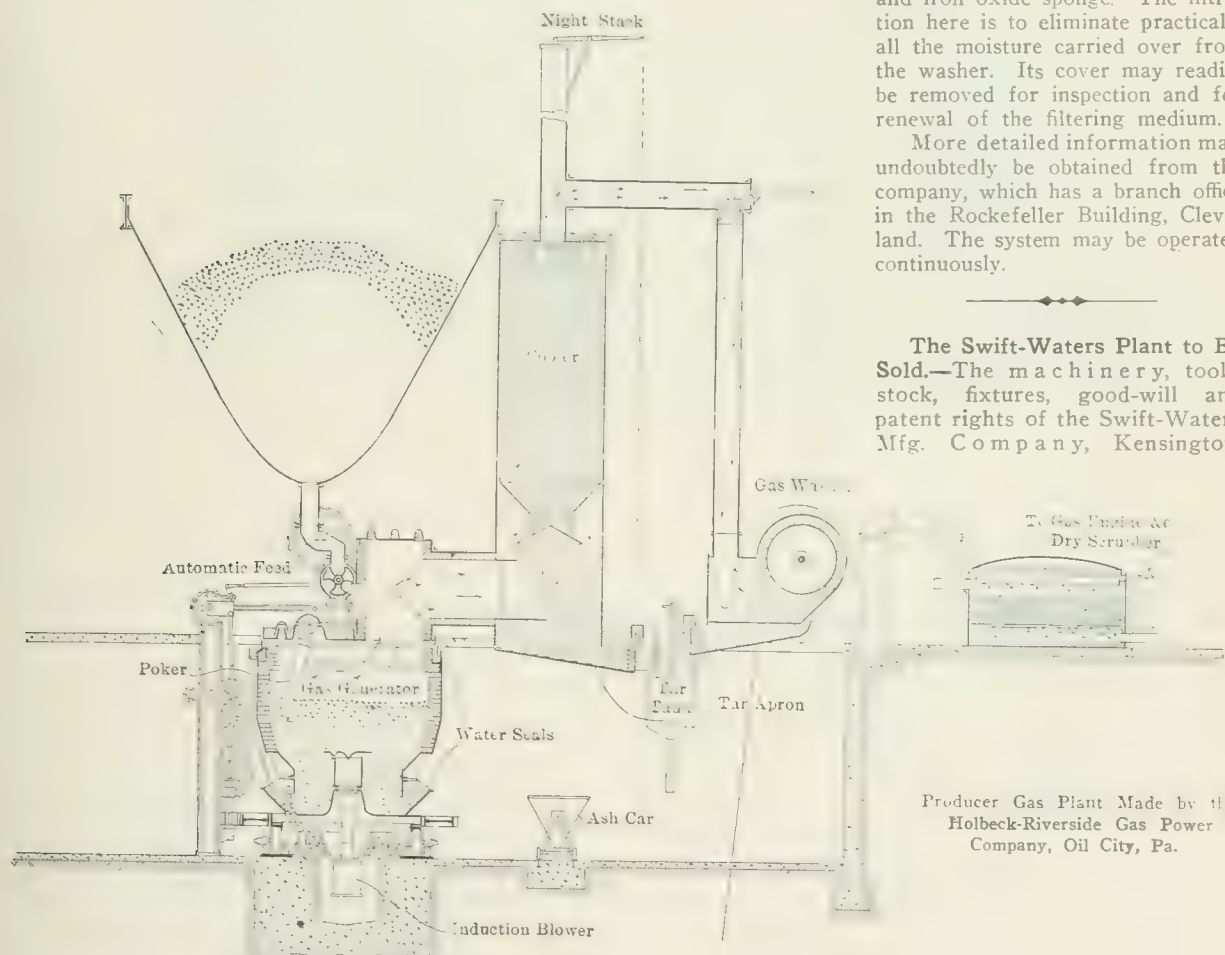
The cooler is a tall, riveted steel tank with sprinklers at the top and an arrangement to bring the hot gas in as intimate contact with the spray as possible. The tar and other impurities are caught on the apron in the water seal below the cooler. The gases leaving the cooler reach the gas washer, where a rapidly revolving drum is designed to throw out the tar bubbles still remaining. A film of water covering the interior of the casing of the gas washer is calculated to prevent the tar from adhering to the iron casing and otherwise clogging the washer, and the tar, as in the case of the cooler, collects on an apron in the water seal, finally being drawn off into the pot or tar tank, where, by means of compressed air or other ways, the tar may be sent to a storage tank for such use as may be made of it.

The rotary washer is regarded as the vital part of the plant. It is designed to effect the mechanical separation of the tar and moisture still in entrainment. The vanes on the revolving drum are placed so that the gas comes in contact with a water spray impelled in the opposite direction by the vanes. It is stated that the combined action of centrifugal effect and washing results in the purified gas containing not more than 0.015 grain of impurities per cubic foot. The washer also has impeller vanes, acting to draw the gas through the machine and to deliver it at uniform pressure without needing a gas holder.

The dry scrubber is a low tank containing excelsior and iron oxide sponge. The filtration here is to eliminate practically all the moisture carried over from the washer. Its cover may readily be removed for inspection and for renewal of the filtering medium.

More detailed information may undoubtedly be obtained from the company, which has a branch office in the Rockefeller Building, Cleveland. The system may be operated continuously.

The Swift-Waters Plant to Be Sold.—The machinery, tools, stock, fixtures, good-will and patent rights of the Swift-Waters Mfg. Company, Kensington.



Producer Gas Plant Made by the
Holbeck-Riverside Gas Power
Company, Oil City, Pa.

bunker as indicated, may be supplied in measured quantities through the drum automatically rotated along with the rotation of the generator itself. The scheme of intercepting measured amounts of fuel from the chute is clear, as is the means by which the cast-steel poker is oscillated as the fuel-filled generator rotates. Steam used at low pressure is introduced through the induction blower, which serves to draw in the proper amount of air. The water seals, by means of which the generator is kept tight, are indicated, and through the lower one are, of course, taken the ashes, an operation found to be necessary only about once in 24 hr.

The raw gas produced is made to pass through as short a connection as possible to the cooler, and this connection is brick-lined and provided with clean-out doors.

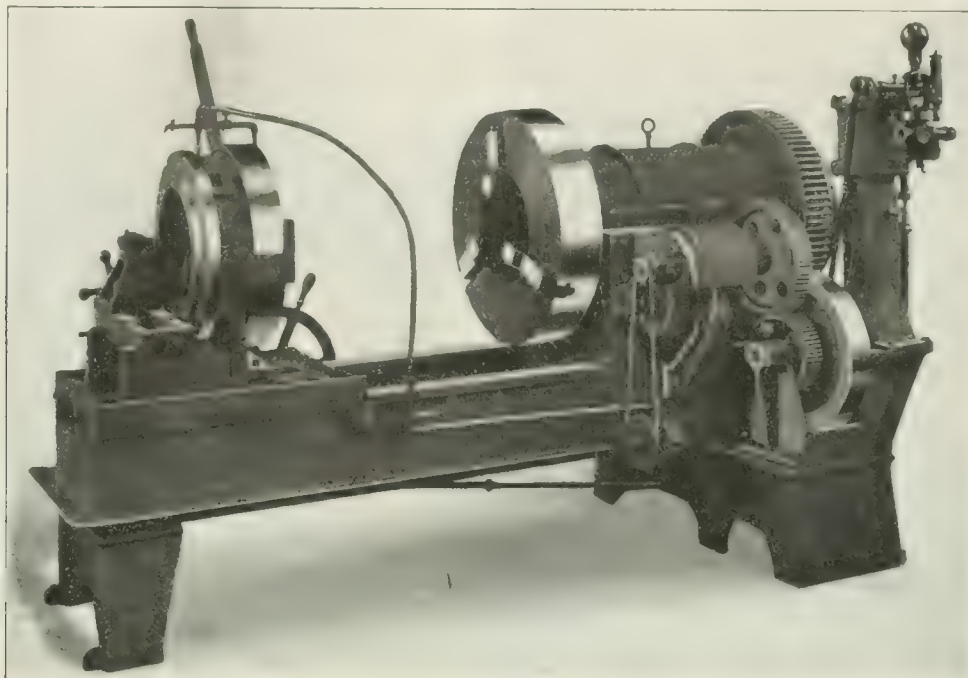
Conn., will be sold in one lot at public auction to the highest bidder, on the premises, on Wednesday, May 24, at 3 p. m. The property is in part as follows: One 15-hp. gas engine, 25-lb. Scranton hammer, Farrell press, American gas furnace, drill presses, lathes, shaper, polishing room outfit, handscrew machine, milling machines, dies and small tools, shafting, pulleys, belting, steam heater, typewriter and office fixtures. The machinery is in place and ready to start; much of it is nearly new. The property will be shown by appointment with the trustee, telephone Elizabeth 1483, Hartford, post office box 165, or with the auctioneer, Kendrick, Hartford.

The Williams 12-Inch Steamdriven Pipe Threader

A 12-in. pipe-threading and cutting-off machine driven by a direct-connected steam engine has been recently brought out by the Williams Tool Company, Erie, Pa. With the exception of the change in the drive, this machine is similar to the No. 5 pipe threader previously built by this company with either belt or motor drives. Both of these machines operated at a constant speed, the former being driven by a single pulley, while the power for the other type was supplied by a 5-hp. constant speed direct-connected motor. This machine is the outcome of more than thirty-five years of experience in designing and building pipe-threading and cutting machines, and an effort

rotary oil pump connected to the die head and the cut-off knife by a flexible steel hose, and dies of high-grade tool steel to secure the best cutting and lasting qualities. The last are easily resharpened, and when badly worn can be recut at a small cost. Eight sets are furnished, one for threading 3½ and 4-in. pipe, one set for 4½ and 5-in. pipe, and one set each for 6, 7, 8, 9, 10 and 12-in. pipe. But one die head is necessary, as a hinged latched cover plate on the front of the die head permits the dies to be quickly and easily changed and the die slots cleaned. Backing the pipe out of the dies after the thread has been cut is avoided, as the dies expand sufficiently to permit the pipe to be cut off or removed from the machine.

The machine weighs 10,000 lb. and requires a floor space 4 x 9 ft. By adding a set of nipple holders to the regular equipment nipples from 3½ to 12 in. can be cut,



A 12 In. Pipe Threading and Cutting-Off Machine. Built by the Williams Tool Company, Erie, Pa.

has been made to combine in it convenience and durability with the best devices for securing rapid and accurate work. Two of these machines have been recently built, one for the Arkansas Natural Gas Company and the other for the Diamond Alkali Company, Fairport, Ohio.

The engine is mounted on the same base as the machine, an arrangement which eliminates vibration. From the engine power is transmitted through machine-cut gears having a coarse pitch, thus making the machine a quiet and easy-running one. Eight speed changes are available, and these are secured through gears controlled by levers in front of the headstock. When it is desired to stop the spindle for putting in or removing pipe this can be done without stopping the driving gears. Complete control of the machine from the operating side is given the operator, and all gears are out of his way and are protected from dirt and chips. If it is desired to cut a left-hand thread, a pin releases the eccentric, which slips half-way round and is again engaged at a point that makes the engine run in the opposite direction.

The bed of the machine is of the lathe type and possesses the necessary weight and strength to insure rigidity under heavy strains. The headstock is bolted to the bed and is doweled to prevent it from getting out of line. The spindle is hollow, the pipe passing through it to the die head, which is strong and compact. It is mounted on a carriage that slides on broad ways, the carriage being moved backward and forward by a machine-cut rack and pinion operated by a hand wheel on the front of the machine.

The equipment furnished includes a graduated die head with a cam lever for setting the dies, a quick-operating, self-centering scroll chuck for steadying the pipe while it is being cut off, a device for duplicating threads on the same size of pipe, a rapid cut-off block just behind the die head with a chamfering tool for removing the burrs, a

and by adding an independent chuck to the rear end of the spindle flanges and fittings can be turned up.

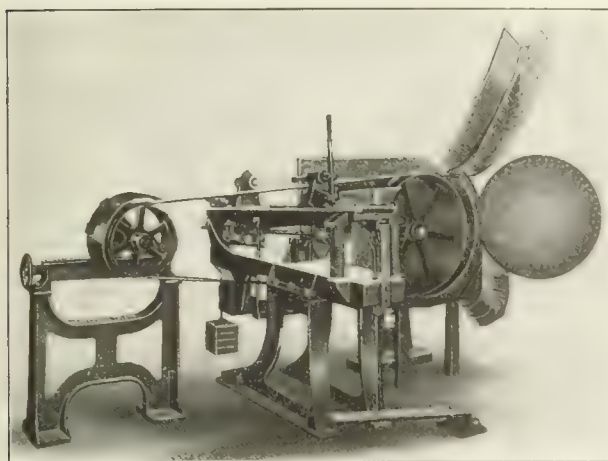
The Atha Automatic Handle Sander

An automatic machine for sanding adze or hatchet handles has been placed on the market by the Atha Tool Company, Newark, N. J. The sander was originally developed by the company for its own use and the success obtained has led it to manufacture the machine regularly. The machine was designed to take the place of skilled labor that is required to produce good work on sand belt machines and can be used in conjunction with modern sand belt stands and adapted to any horizontal belt.

The machine is located at right angles to the travel of the sand belt at approximately half the distance between the driving and the idler pulleys. The working portion of the belt passes over the bed of the machine and under the handle being sanded, while the lower part of the belt passes under the machine which is so designed that the belts can be taken off and put on without interfering with any part of it. The stands used should have sufficient height to locate the top of the belt 38 in. and the lower side of the belt 19½ in. from the floor. If the stand and the machine are not of the same height, blocking has to be resorted to to give the required distance, 18½ in., between the two belts. A surface speed of approximately 6,000 ft. per minute is recommended by the manufacturer for the sand belt which gives 200 rev. per min. of the 6-in. driving pulley of the machine. The distance between the pulleys of the sand belt should be approximately 5 ft. 3 in.

In operation the handle is automatically raised from the belt and the carriage returned to the starting point by the machine. The operator holds a rough handle loosely in his left hand and places the eye end in the chuck while

the lever controlling the movement of the dead center is pulled back with the other hand. He then holds the handle to the dead center, releases the lever controlling its movement and the center engages. The movement of the



A New Automatic Handle Sanding Machine, Built by the Atha Tool Company, Newark, N. J.

table is controlled by the treadle at the right of the machine and when pressure is applied to it the handle is brought down upon the belt and the machine automatically releases and feeds it across the belt until it is entirely sanded. After the operation is completed, the machine automatically trips and raises the handle from the belt. The operator then removes the finished product by releasing the lever with his right hand and puts another handle in the machine with his left.

With this machine a uniformity of finish is claimed to be secured which cannot be done when hand sanding is employed and if the handles are slightly chipped in turning, the flat spots are removed because the handle revolves steadily. About 3,000 adze hammer handles can be produced in a 10-hr. day on one of these machines. When operating on handles for adze eye tools or hatchets the round and the oval portions of the handles are sanded by the machine while the flat or square portion is finished by hand on the same belt by the operator.

The Hydromatic Water Valve

For controlling the water level in open-feed water heaters and for use on tanks, vats, cisterns, large water mains, etc., the Cleveland Steel Tool Company, Cleveland, Ohio, has placed a new water valve known as the Hydro-

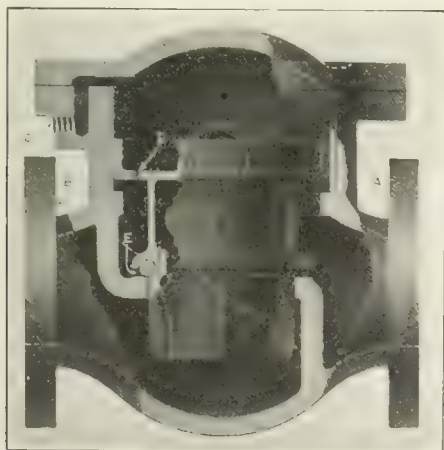


Fig. 1.—Section of the Hydromatic Valve, Made by the Cleveland Steel Tool Company, Cleveland, Ohio

matic valve on the market. The special advantages claimed for this valve, which is made in ten sizes, ranging from 1 to 8 in. in diameter, are the maintaining of the water level constant at all times within 1 in., the elimination of

leaky balance valves and the regrinding of balance valve seats, tanks and feed water heaters are prevented from overflowing, and a saving in water, coal and machine shop expenses is effected. The capacity is claimed to be greater than that of other valves of a similar rating, which is due to the form of its construction and the manner of its operation. The only part of the valve subjected to wear is the ring, which can be replaced without disturbing the piping in about 10 min. at a trifling cost. Fig. 1 shows an interior view of the valve, and Fig. 2 illustrates its application to an open feed water heater.

Referring to Fig. 1, which shows the construction, A is the inlet and B the outlet; C is a $\frac{1}{4}$ -in. pipe through

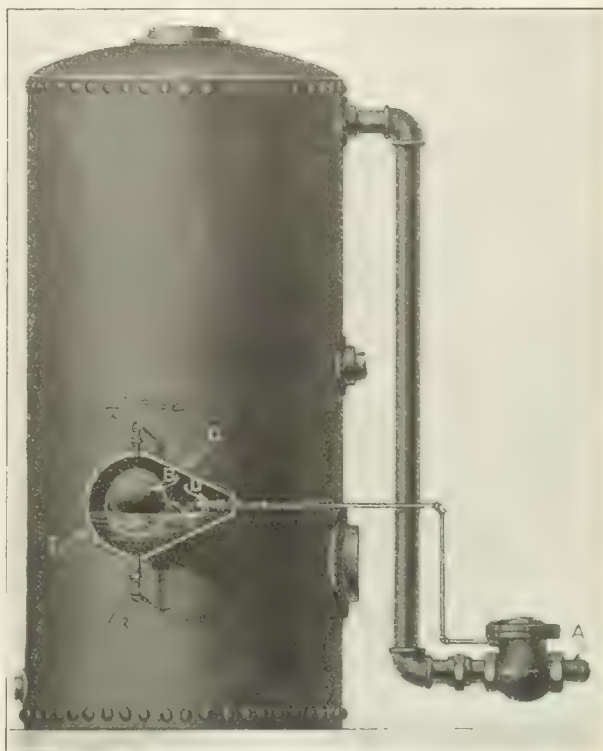


Fig. 2. The Hydromatic Valve Applied to an Open Feed Water Heater to Control the Water Level.

which water passes from the head chamber above the plunger to the tank when water has been drawn from the latter. Vent holes in the plunger top are located at D, and a lead or rubber gasket at E makes a tight joint between the plunger and its seat. When the valve is installed in conjunction with an open feed water heater, as illustrated in Fig. 2, the water enters through the supply pipe A, and after passing through the valve enters the feed water heater through the large pipe. As the copper float B is lowered by the withdrawal of water from the tank or feed water heater, the pilot valve D is opened. This causes water to flow from the head chamber above the valve plunger through the $\frac{1}{4}$ -in. pipe C, Fig. 1, and relieves the pressure on the upper part of the plunger enough to enable the pressure of the water entering the inlet A to force the plunger up. The flow of water through the valve into the tank then starts, and when the water level is re-established the pilot valve D, Fig. 2, closes. The pressure above the plunger is then built up through the vent holes D, Fig. 1, in the plunger top and the plunger is forced down against the gasket E and the flow of water through the valve shut off.

The valve body is of cast iron and has a removable cover plate of the same material. The brass plunger is made in two parts and the lower portion is threaded to screw into the upper one at E, Fig. 1. The top of the plunger is piston-fitted into a brass bushing. A 5-in. seamless Hercules copper float, B, Fig. 2, is used in all sizes of valves, and is set at the height of the required water level inside the tank or in a casing C, Fig. 2, on the outside. When mounted in this way the float casing is connected through the heater by a $1\frac{1}{2}$ -in. pipe below and a $\frac{1}{2}$ -in. pipe above. The valve is connected in the supply pipe at any distance either above or below the float.

An Unusual Dust Exhausting System

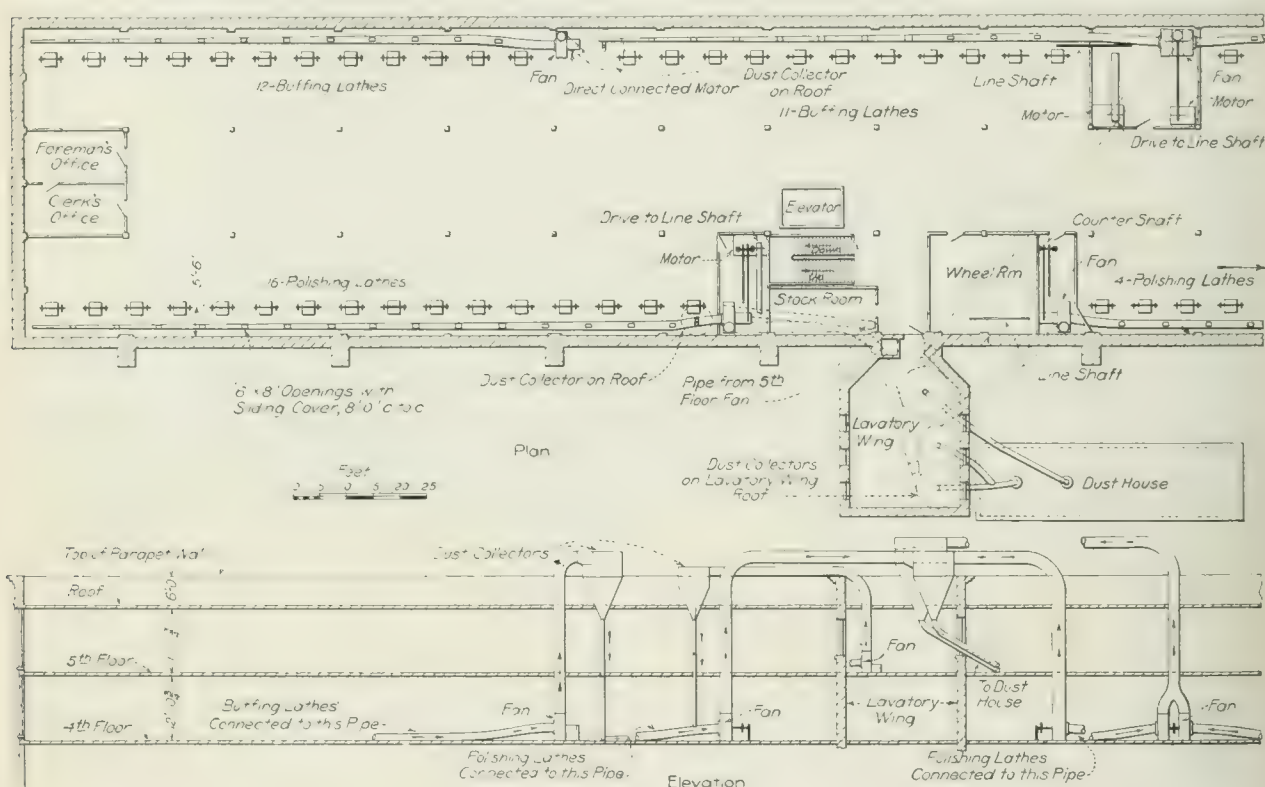
Relay Arrangement of Fans and Dust Collectors

An unusual installation of dust exhausting, involving what may be called a relay arrangement of fans and dust collectors, has been incorporated in building No. 3 of the plant of the National Cash Register Company, Dayton, Ohio. This is a building no less than 540 ft. long and 62 ft. wide and accommodates on the fourth floor and part of the fifth or top floor polishing and buffing lathes, which are of course arranged along the outside walls, and make a long line of machines which must be provided with the dust exhausting system. The building is of the type in which a wing is built to provide lavatory facilities on each floor, and a single story building for the reception of dust was provided, demanding that all the dust be discharged at this one relatively central point.

In laying out such a system one might well consider at the outset the plan of locating exhausters and dust collectors at a point about vertically above the location of the dust house. Each fan would then take care of the line of

mon discharge which sufficed in this one case in a single dust collector for the fan.

The sub-division of the system is indicated in the cut. The air and dust coming from one set of machines is passed through a fan into a dust collector, where the air escapes. Then the dust flows into the second section of the system, the section taking this dust and the dust and air from the second set of machines and finally reaching the second fan with its dust collector located above the roof of the lavatory wing so that by a gravity discharge the dust may reach the dust house. While the pair of fans for each sub-division may be given the capacity of the single fan which they displace, one is able to provide a system of relatively small size air piping and the escape at the point of division of the air collected up to that point reduces the amount of work to be done over the usual plan. The work of the fan in maintaining the difference in pressure below the atmosphere necessary to cause the desired flow of air is materially reduced, it is felt, in minimizing the amount of air handled, and as a matter of fact the capacity of the two fans figures out considerably less than the capacity of the single exhauster which they replace.



Plan and Elevation of Part of Kirk & Blum Dust Removal System at National Cash Register Works.

machinery extending from the central point toward one of the ends of the building. In short each line of machinery might be regarded as divided into two sections, making two sections along one wall and two along the opposite wall. There would be four exhausters, one for each section, with a dust collector located conveniently adjacent. The number of machines in a measure establishes the capacity of the fans necessary. The pipe lines gradually increase in size in accordance with the volume of air and the desired velocity. There is a point of course at which the fan becomes quite large and incidentally the piping work, with the additional point of consideration that the extended length of piping is calculated to impose undue resistance to the flow of air and this it is desirable to avoid.

It was thus decided to bisect each of the four sections of piping work into which the system is logically divided. At the point of sub-division is located a fan and dust collector with an arrangement by means of which the dust collected in the first division of each system flows into the beginning of the second section of each system. Accordingly eight fans are required and each needing a dust collector eight dust collectors in all would be needed. It happened that two of the fans could be located side by side—in other words a double fan was provided with a com-

The general scheme of the installation is shown in the accompanying drawing, which includes a plan of the fourth floor and an elevation of the fourth and fifth floors. The fans in general are located on the fourth floor and the discharge is carried up vertically to a point above the roof, where it is connected to the dust collector, of the common inverted cone type allowing the dust to come to rest and the air to escape. From the bottom of the dust collector the dust drops to the beginning of the next section and at the end of this the second fan similarly delivers to the dust collector above roof level.

In one case there are a few machines on the fifth floor and the fan belonging to these is similarly located on that floor and the dust collector is in an adjacent position above roof level, but the discharge from this collector enters the dust system on the fourth floor at a point close to the intake of one of the fans, this arrangement being a little unusual.

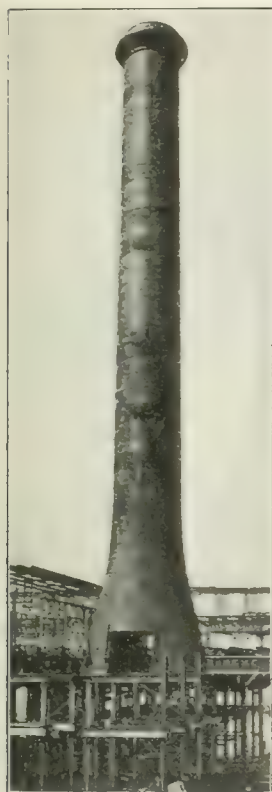
An idea of the extent of the plant may be gained from the following figures: There is a line of 12 buffing lathes and the dust collected is about 140 ft. long to the point where it delivers it to the dust collector. The dust from this collector travels then through the piping provided for 11 more buffing lathes an additional distance of 140 ft. to one side of the double fan shown. From this point it is

about 120 ft. to the pipe about the lavatory wing and the dust then has a direct drop of about 70 ft. to the dust house. The dust from the farthest machine has a total distance of probably 475 ft. to travel before it comes to rest in the dust house.

The installation is one made by Kirk & Blum, Cincinnati, Ohio. The system, it is emphasized, has given entire satisfaction and it is claimed that the relay system of fans brings the fan closer to the work by ridding the system of the air as early as is convenient and by eliminating friction in long lines of pipe, as compared with the central fan idea. That about 25 per cent. in power requirements is saved is the experience, and satisfactory control of the suction at the machines has been found possible.

Steel Stack for 10,800-hp. Boiler Plant

The James McNeil & Bro. Company, Pittsburgh, has just completed a riveted steel stack which is probably the largest, though not the highest, of its kind in the world. The stack was built in Pittsburgh at the company's works on Twenty-ninth street and was erected by the company in Cleveland at the foot of East Seventieth street for the new power house of The Cleveland Electric Illuminating Company, and it will supply draft to eighteen 600-hp. boilers. The bottom diameter is 40 ft. and the diameter at the top is 22 ft. It is supported by heavy structural columns firmly anchored in a concrete foundation and an idea of the structural work is gained in the accompanying cut. The height of the stack including the structural supports is 275 ft. The weight of material used for stack only, not including supports, was about 400,000 lb. and it required the driving of about 30,000 rivets. The erection of this stack during the winter season was accompanied with difficulties, owing to its position on the lake front, being exposed and subject to high winds.



Lake Superior Iron Mining Veterans

MARQUETTE, MICH., May 13.—Captain John McEnroe has resigned the position of underground superintendent of the Oliver Iron Mining Company's hard ore properties at Ishpeming, Marquette range, after more than fifty-three years of continuous service. He will retire on a pension. Captain McEnroe has the distinction of having been in the employ of one mining company much longer than any other man in the Lake Superior region. A singular feature about his record is the fact that he has been employed continuously at one mine, serving successively in the capacity of miner, captain and underground superintendent.

Another Lake Superior mining veteran who has retired from active work is Capt. James F. Foley, of Negaunee. Captain Foley is 80 years of age. He has been engaged in mining in Upper Michigan since 1850, a period of sixty-one years, although not at one property. He has had service both in the copper and iron districts and for many years past has been in charge of the Negaunee properties of the Breitung interests of Marquette. He has been pensioned at his full annual salary.

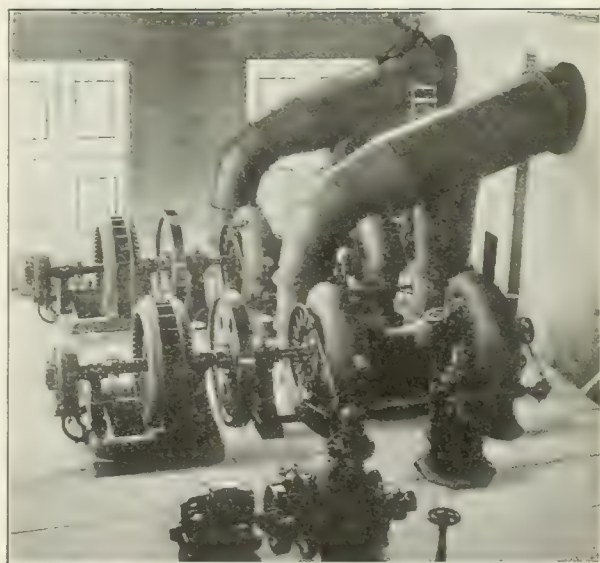
The Under-Feed Stoker Company of America has removed its general offices to the Harris Trust Building, Monroe street, between Clark and La Salle streets, Chicago.

Notable Installation of Pelton-Francis Water-Wheels.

One of the most modern hydroelectric power plants in this country was recently completed for the Consumers' Power Company, Mankato, Minn., on the Blue Earth River, nine miles southwest of the city of Mankato. An interesting feature of the plant was the installation of twin central discharge Pelton-Francis turbines, a type of water wheel not often used in hydroelectric power plant construction. The power plant is planned so that it can be extended to develop 3500 hp., of which 2320 hp. is now installed and in operation.

In developing the needed amount of water fall some rather difficult problems were overcome. The site chosen was formerly a rapids and falls in the Blue Earth River and it was found necessary to build a dam of hollow reinforced concrete, which is surmounted by a 16-ft. roadway. This dam impounds water for approximately six miles along the river valley, creating a pond surface of something over 500 acres. In order to make way for the pond a county bridge near the dam, which would have been submerged, was removed and the power company built a roadway over its dam to take the place of the bridge, while the latter structure was moved four miles up stream, thus increasing the traffic facilities across the river in that neighborhood.

The dam spillway is 272 ft. long and has fifteen bays marked by 24-in. concrete buttresses. These buttresses support a wall sloping up stream 45 degrees over which the water passes. There are seven 32-ft. water gates operated from hand wheel shafts and chain drums. The power house structure forms part of the dam bulkhead and it is a concrete building 38x73 ft. in plan and 30 ft. high. Two 1160-hp. water wheel driven generator sets and one water wheel driven exciter set now occupy the building, and later another alternator set and one exciter set will be added.



Pelton-Francis Turbines, Consumers Power Company, Mankato, Minn.

Each of the two main alternator units now in the power house consist of a twin pair of horizontal 32-in. spiral case Pelton-Francis water turbines made by the Pelton Water Wheel Company, San Francisco and New York, direct connected to drive a 750-kw. 2300-volt, 60-cycle three-phase General Electric generator at 300 r.p.m. Individual 16-kw. direct current exciter units are mounted on extensions of the main shafts of these machines. A 12,000-lb. flywheel is mounted between the water wheels and the main generator of each unit to assist regulation of the machines. The units are controlled by Pelton oil pressure governors operating rocker arms which manipulate the gates of the twin water wheels simultaneously. The water wheels discharge into steel draft tubes 16 ft. in length. The water wheels are contained in cast iron cases and have bronze runners and outside regulating mechanism.

The Ventura Disk Fan

A new curved disk blade fan, to which the trade name Ventura has been given, is a recent product of the American Blower Company, Detroit, Mich. The ventilating appliance is the result of a series of experiments covering

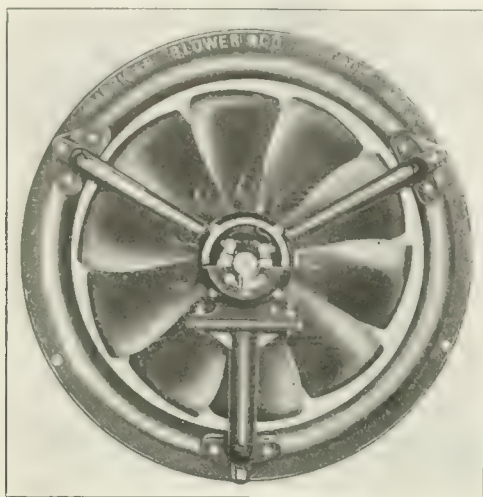


Fig. 1.—The Ventura Disk Fan. Made by the American Blower Company, Detroit, Mich.

four years and in its construction all the good features which a fan of this character should possess have been retained while a number of new ones have been added. Among the special points upon which emphasis should be laid are an exceptionally high mechanical efficiency, ability to overcome resistance, a speed as high if not higher than other fans of the disk type and the throwing of the current of air straight ahead as it leaves the fan. Fig. 1 is a view of the fan and Fig. 2 shows the efficiency of the new fan as compared with two of the propeller type which were formerly used.

As will be noticed from Fig. 1, the fan consists of ten broad blades having a dip or curve to produce large volumes of air freely or against pressure with low power consumption and application has been made for patents covering the constructional features. As the air leaves the fan it tends to bend inward for a considerable distance, a feature which is claimed to be contrary to the action of any other disk fan on the market. With one of

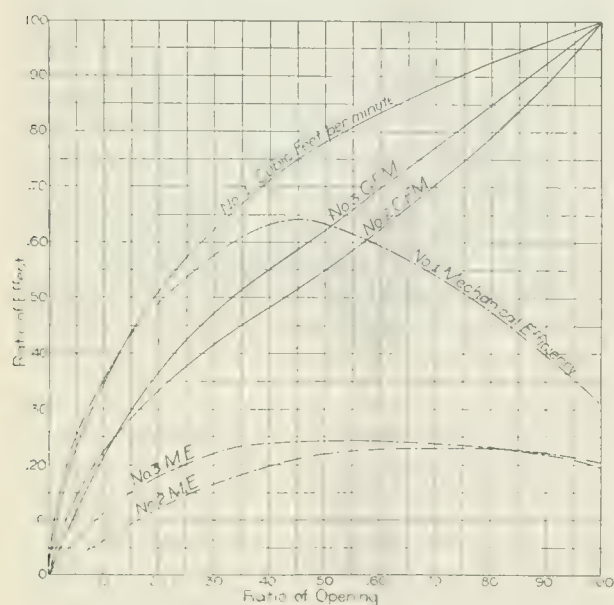


Fig. 2.—Chart Showing the Efficiency of the Ventura Fan as Compared with Two Standard Disk Fans.

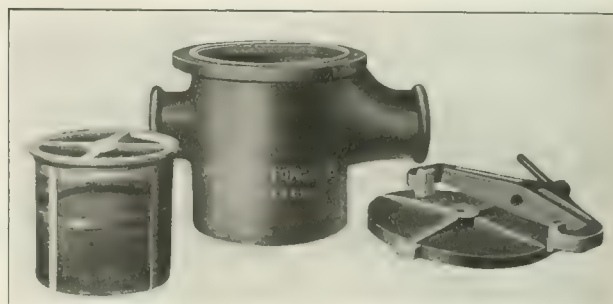
these fans it is said to be possible to set it 16 in. away from a hole in a box and discharge more air on the farther side of the opening than is handled by the fan itself as a result of the siphonic action of the air drawing in more along the face of the box as it passes through the opening.

The mechanical efficiency and capacity of the Ventura fan as compared with two others of the propeller type is shown in Fig. 2. The curves were plotted from the results of tests made under exactly similar conditions. The curves marked No. 1 are for the Ventura fan while those marked No. 2 and No. 3 are the two competing ones. One of the special points to which attention should be called in this connection is the high mechanical efficiency of the Ventura fan which has a maximum value of 64 per cent. while the highest efficiencies with the other two were 24.5 and 23 per cent. respectively.

The Buffalo Feed Water Strainer

For a number of years the Buffalo Forge Company, Buffalo, N. Y., has used a strainer in connection with its air washing apparatus. As a result of the very good service given by it, the device has been placed on the market by the company for removing foreign matter from feed water and water supply and similar systems.

This strainer differs from the customary styles which have been developed along the automatic and semi-auto-



An Improved Type of Feed Water Strainer, Made by the Buffalo Forge Company, Buffalo, N. Y.

matic lines involving a more or less complicated design. The special feature of the Buffalo strainer is its simplicity and it consists of only four parts, the body, the top, the basket and the clamp. The basket, which is the vital part, is made of fine mesh brass screen soldered into a brass former or top piece and reinforced by strong brass strips and bands running in both horizontal and vertical directions. To decrease the resistance offered to the passage of the water the strainer has been made exceptionally large and the minimum area is 15 times that of the connecting pipe, an arrangement which not only increases the effectiveness of the device but also lengthens the time that it can be used without cleaning. When it becomes necessary to clean the strainer, the clamping bolts holding the cover in place are loosened and the cover removed. The basket can then be taken out and held under a faucet until thoroughly cleaned, the whole operation requiring about 2 min. If the strainer is installed in a location where continuous operation is required, a by-pass which may or may not be equipped with a strainer is used.

The Mumford Molding Machine Company, Plainfield, N. J., reports a rapid increase of business. In addition to a large number of its jolt rammers shipped mainly on single orders to separate shops, the following orders have been received within the last few days: One 32-in. jolt rammer, with table 6 ft. x 9 ft., for the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.; one 20-in. and one 16 in. for the Pennsylvania Steel Company, Steelton, Pa.; one 16-in. and one 14-in. jolt rammer, among other machines, for the Treadwell Engineering Company, Easton, Pa. Within the few days since Judge Holland dismissed the bills in the suits of the Tabor Mfg. Company against the Mumford interests, business in small vibrator machines has been exceptionally good.

L. P. Brodeur, Dominion Minister of Marine and Fisheries, says that the contract for the dry dock at Montreal has been awarded to Vickers Sons & Maxim. The Dominion government will pay a subsidy of 3½ per cent. per annum and capital outlay of \$3,000,000 for a period of 38 years. The dry dock will have a lifting capacity of 25,000 tons.

The Machinery Markets

A better machinery demand has developed in the Middle West. A decided improvement is noted in Chicago where machine tool lists issued by the government for the Rock Island Arsenal and the Reclamation Service will shortly be closed. The western railroads are closing out against inquiries previously sent out and are preparing new machinery lists. In Detroit the automobile manufacturers are steadily placing orders and the demand from other sources is sufficient to make business generally good. New inquiries and foreign orders are plentiful in Cleveland and a good business is being done by makers of metal working machinery other than machine tools. The automobile demand in the Cleveland market has increased materially. Trade is somewhat slower in Cincinnati, but there is an improved call for radial drills and dynamos. The Ralston Steel Car Company is buying against a small list in that market. General improvement is shown in Texas, notwithstanding the fact that the Mexican trouble is holding up business which was expected to develop from the mining centers. Trade is more quiet in the South, although the demand for cold storage plant equipment has improved. Good orders were placed during the week in New York, but new inquiries are scarce. There is not enough business to go round in Philadelphia and the outlook there is not very encouraging.

New York

NEW YORK, May 17, 1911.

Large orders have been placed by the Ontario & Western Railroad against the extensive list it issued several months ago. It is estimated that the company bought fully \$50,000 worth of equipment. The placing of the orders so soon after receiving additional bids on much of the equipment the company had been inquiring for came as something of a surprise, as many machinery men who had been asked to submit new bids two weeks ago were not expecting to see the business closed so soon. The Pennsylvania General Electric Company was also a generous purchaser during the week. The company bought machinery for delivery to the large plant at Erie, Pa., and it will be installed in a machine shop now operated in connection with the foundry there. The same company is planning for further extensions at Erie, which includes a machine shop of a size not yet decided upon. In addition to these large orders New York machinery houses booked an encouraging amount of business from day to day, but while current business is good the outlook is not so encouraging. New inquiries are scarce and there is not much in sight in the way of factory extensions and new enterprises. New York machinery men are watching the Canadian Car & Foundry Company in the expectation of getting some good orders from there soon, as a few weeks ago the Amherst plant of this company, including its forge shops and machine shops, were destroyed by fire. Much of the equipment in this plant was sold by New York houses and it is stated that it will have to be replaced. Export trade continues especially good and some large orders for machine tools have been booked of late for delivery in England and Germany. German manufacturers of railroad equipment, including locomotive and car builders, are buying rather extensively and two Japanese engineering houses will shortly purchase machine tools. The war in Mexico is affecting the mining trade rather seriously, as some good business that was expected from Mexican mining companies has not materialized.

The citizens of Rockville Center, Long Island, N. Y., have decided to hold a special election for the purpose of voting an appropriation of \$17,000 for the erection of a new power house to be operated in connection with the public lighting plant. Plans for the power house include the installation of two 800-hp. boilers and a coal conveying plant.

The Hatfield Rail Joint Mfg. Company, 11 Broadway, New York, has been incorporated with \$500,000 capital stock under the laws of the State of Delaware to manufacture a patented device for the continuous joining of railway rails. For the present the company will have its product manufactured by contract with a view to establishing a factory in the near future. The officers of the company are: President, F. B. Stubbs; vice-president, J. F. Scott.

A portion of the iron working plant of Theodore Smith, Hudson and Essex streets, Jersey City, N. J., was recently destroyed by fire, causing a loss of \$30,000. Most of the damage was to patterns and machinery in the upper floors of the main building and plans are under way for the rebuilding and replacement of the burned portion and equipment.

The Wilson Case Company has been incorporated at Gloversville, N. Y., with a capital stock of \$50,000 to manufacture articles of leather. The incorporators are W. J. Wilson, F. J. Fisher and T. H. Bartlett.

The Wood & Brooks Company, Buffalo, N. Y., manufacturers of piano keys and keyboards, is building

a five-story concrete addition, 56 x 230 ft., with a seven-story tower, at its plant on Military Road, Kenmore avenue and the New York Central Railroad, North Buffalo. The Turner Construction Company, New York and Buffalo, has the contract for erection.

The Hutchins-Kilbourne Company has been incorporated at Buffalo with a capital stock of \$50,000 and will establish a plant in that city for the manufacture of wire and hardware specialties. The incorporators are W. W. Lytle, O. J. Manchester and J. J. Price.

The American Agricultural Chemical Company is building at its Buffalo plant at Babcock and Lyman streets and the Erie Railroad a large storage warehouse and a power house to cost about \$50,000.

The F. N. Burt Company, Ltd., Buffalo, is building a large power house to operate its extensive plant at Seneca, Hamburg and Myrtle streets for the manufacture of paper boxes. The power house will cost \$25,000.

The Frontier Iron Works, Buffalo, will at once commence the construction of a two-story brick addition to its plant at Letchworth and Grant streets and the New York Central Railroad.

The plant of the Crandall Packing Company, Palmyra, N. Y., was totally destroyed by fire on May 9. Plans for the rebuilding and equipment of the plant are being taken.

The Manning & Peckham Paper Company, Troy, N. Y., has let contract for the construction of a two-story paper mill 87 x 106 ft. which it will build at the foot of Cypress street.

The Buffalo Standard Mfg. Company has been incorporated at Buffalo to manufacture hardware specialties and has established its factory at 77 Washington street. The directors are Thos. C. Amsden, Charles Slosberg and William Herman.

The village of Mexico, N. Y., is having plans prepared by W. G. Stone, engineer, Mann Building, Utica, N. Y., for water works to be constructed at once at an estimated cost of \$50,000.

The Johnston Harvester Company, Batavia, N. Y., in addition to the two foundry buildings, each 70 x 500 ft., two stories, of reinforced concrete, now under construction, will erect a four-story structure 80 x 500 ft. to afford increased manufacturing facilities for other departments.

The Sherwood Shoe Factory, Rochester, N. Y., has completed plans for a five-story addition 50 x 100 ft. to be made to its factory on South Goodman street.

Catalogues Wanted

The Oxy-Acetylene Appliance Company, 149 Broadway, New York, will soon be in the market for machinery and desires catalogues of manufacturers of machinery, tools, etc.

New England

BOSTON, MASS., May 16, 1911.

No change for the better or the worse is apparent in the machinery market. Occasionally one finds a builder of machinery or of appurtenances of machinery who is fairly busy. The chuck manufacturers, for example, seem to be faring better than most of those who provide machine shop equipment. Dullness is the rule, however. The textile machinery builders find conditions very bad. The bottom appears to have dropped out of the textile market for some reason, and naturally the manufacturers of equipment for the industry are suffering in consequence. Most of these shops are running on short time with reduced working forces.

The Baird Machine Company, Oakville, Conn., has

THE MACHINERY MARKETS

completed plans for the new plant which will be erected in a suburb of Bridgeport, Conn., and the contracts will be let immediately. The works will consist of a two-story office building, a one-story machine shop, with gallery, a power house, pattern shop and storehouse.

The Rollins Engine Company, Nashua, N. H., builders of steam engines, is considering the installation of a new power plant at its own works later in the summer.

In regard to the purchase of the business of George G. Prentice & Co., Inc., New Haven, Conn., by the New Britain Machine Company, New Britain, Conn., mentioned last week, the transaction includes all the patents on the Prentice automatic turret lathe, which have been extensively adopted for manufacturing operations, involving boring, threading, facing and milling. The machine is built in all sizes and styles. The extensive work of development which G. G. Prentice has undertaken in connection with the machine in the last 10 years has been very arduous, and he finds himself in need of relief from business cares. It is his plan to spend some time abroad in search of health. The New Britain Company proposes to operate the New Haven plant for a time, until the business can be taken care of in new works. Land adjoining the factory on Chestnut street, New Britain, has been purchased, giving a frontage of over 600 ft. on that thoroughfare. The present works will be extended by a building 58x128 ft., five stories. This plan permits the serving of the first floor by a crane, taking from cars at one end and delivering anywhere in the 400 ft. of the building.

Edward Blake, Jr., formerly manager of sales for the Wells Bros. Company, Greenfield, Mass., and recently manager of the Canadian Tap & Die Company, Ltd., Galt, Ontario, has been made general manager of the J. T. Slocomb Company, Providence, R. I., manufacturer of machinists' tools. He has had a most successful business career and leaves the Canadian field only because of the opportunity offered by the line of the J. T. Slocomb Company. The company was the pioneer in the large micrometer and combination center drill, which lines have been widely amplified.

The large addition which will be built on one of the buildings of the Lynn Works of the General Electric Company will be devoted to storage.

The machine tool business of the late George W. Fifield, Lowell, Mass., is for sale, including the building and machinery.

The Mead-Morrison Mfg. Company, Cambridge, Mass., manufacturer of coal handling and hoisting machinery, has plans in hand for increasing its works, but will be held in abeyance for the present. The company finds business fair, but not quite normal.

The Bantam Anti-Friction Company, Bantam, Conn., is planning to extend its factory this season.

The F. E. Wells & Son Company, Greenfield, Mass., manufacturer of machine tools and pipe tools, is planning the erection of a factory which will be used by the E. F. Reece Company, which was consolidated in the business a few months ago.

The works of G. W. Bradley's Sons, Inc., Westport, Conn., manufacturer of axes and edge tools, has been destroyed by fire, with a loss of \$50,000. The company states that it plans to resume the manufacture of its line but whether the factory will be built at Westport or elsewhere has not been definitely decided. Several cities and towns are bidding for the business.

R. M. Clough, Tolland, Conn., has brought out a new vertical bench milling and drilling machine, with a capacity to drill ½-in. holes or smaller, and for mills ½ in. or smaller with heavy cut and larger sizes for light cuts.

The business of the Connecticut Brass Company, West Cheshire, Conn., has been incorporated as the Connecticut Brass Company, Inc., with a Connecticut charter, and a paid in cash capital stock of \$100,000. Michael Keeley is the president, Michael E. Keeley, vice-president and treasurer, and George J. Lines, secretary. The management and ownership remain unchanged. The company manufactures sheet brass, german silver, etc. The plant has grown rapidly under the ownership of M. E. Keeley, the capacity being now about twice what it was before he assumed the management.

The National Pipe Bending Company, New Haven, Conn., has let the contract for a fireproof addition to its works, which will be used for a setting up shop. The company has just added to its line a new direct contact open type feed water heater in which an oil separator is embodied.

The new plant of the Royal Typewriter Company, Hartford, Conn., mentioned last week, will be 50x310 ft., four stories. Between 10 and 15 motors of from 5 to 35 hp. will be required. The sprinkler system will be installed by the owners. The electric pumping plant will have as an auxiliary a concrete tank of 112,000 gal. capacity.

The Standard Mfg. Company, Bridgeport, Conn., manufacturer of automatic gear cutters, automatic slotting machines and electrical specialties, will probably erect an additional factory building this summer, which will double the present floor space. This will be in addition to a building, now in course of construction, 20x62 ft., three stories, which will be used for receiving and shipping, stock room and office. The company has more orders on its books than at any time in its history and the outlook indicates the need of more manufacturing capacity. The business was established only six years ago by Clarence E. Bilton, the president and treasurer, and has grown very rapidly.

The Artistic Bronze Company, South Norwalk, Conn., is to move to Bridgeport, Conn., where it will occupy a large factory building.

Additions to general manufacturing plants of New England include the following: Houlton Woolen Mills Company, Houlton, Me., addition, to double present capacity; Union Packing & Refrigerating Company, Montvale, Woburn, Mass., large plant at Portland, Me.; Kroger Piano Company, Stamford, Conn., four-story addition 160 ft. in length; American Paper Goods Company, New Britain, Conn., additional story on buildings 65x75 ft. and 65x90 ft.; Thames Dye & Bleaching Company, Montville, Conn., concrete addition 40x55 ft., three stories.

The Chapman Valve Mfg. Company, Springfield, Mass., has carried through its plan of financial reorganization. A new corporation has been organized under the same name, with the exception that a "the" has been introduced before the corporation title. The nominal capital stock is reduced from \$1,300,000 to \$1,000,000, but the actual cash capital is \$200,000 greater. Of the shares \$500,000 are 7 per cent. cumulative preferred and an equal amount common stock. The incorporators are members of the old board, namely, Adolph W. Gilbert, Edwin A. Carter, George B. Holbrook, Dwight O. Gilmore and William C. Godfrey.

The International Silver Company, Meriden, Conn., will build an addition to its factory to be 58x122 ft., four stories.

Philadelphia

PHILADELPHIA, PA., May 17, 1911.

The general demand for machinery and tools shows no material betterment. A few requirements of moderate size are still under negotiation, but orders develop very slowly. New business in this territory continues quiet, the day to day demand for ordinary equipment showing little improvement. Merchants pick up a few odd orders for various tools, but there has not been enough business offered to go around, as a result of which the market continues to show an irregular appearance. In many instances sales are confined to small individual tool propositions. There is still an absence of buying on the part of the railroads centering in this district, although a little better movement among some of the Southern and Western roads is reported. Manufacturers of both special tools and those of the usual standard types are not so actively engaged, new business coming in being on a somewhat smaller scale. Builders of heavy engines report a slowing down in the demand, but continue fairly busy on orders already on hand. Transactions in second hand machinery and tools has been irregular. While there is a moderate amount of small business in sight, the outlook for any marked improvement in the machine tool business is not considered particularly promising. With continued inactivity on the part of machine tool builders, the volume of business coming to manufacturers of both gray iron and steel machinery castings is light and few are engaged at anything like normal capacity.

The Treadwell Engineering Company, Easton, Pa., will be prepared to begin operations in its gray iron foundry before June 1. The foundry will have a daily capacity of 100 tons, served by two cupolas, one of 14 and the other of 8 tons hourly melting capacity.

The Standard Dental Mfg. Company, Twenty-sixth and Oxford streets, has awarded a contract to the Philip Haibach Construction Company for the erection of a factory building of the slow burning mill construc-

THE MACHINERY MARKETS

tion type, 37 x 136 ft., two stories, for the general manufacture of dental supplies. Furnaces for burning purposes and some machinery of the lighter type are to be installed. Electricity will be used for power purposes. The new plant will enable the company to double its present capacity.

H. B. Pancoast & Co., 243 South Third street, are taking estimates for the erection of a warehouse and storage building to be built at Front and Ellen streets. The plans call for a building 54 x 160 ft., three and two stories, which will be used for the storage of wrought iron pipe, fittings and general supplies. A railroad siding from the Philadelphia & Reading Railroad will extend into the warehouse.

The Baldwin Locomotive Company has purchased an additional tract of 30 acres of land adjoining its present plant at Eddystone, Pa. The purchase has not been made, we are advised, with a view of any immediate improvement in the plant, but largely for the purpose of control and for possible future use. This concern reports business conditions unchanged. Orders are light, but negotiations are pending, among others, against an inquiry for 20 engines for export.

The Sweet Steel Company, Williamsport, Pa., is tearing out its old 9 and 14 in. rolling mills and will install new mills of the same size, driven tandem, for re-rolling rails. A new Corliss engine is being installed to drive these mills.

The Reading Foundry & Supply Company has recently been formed under the laws of the State of Delaware with a capital stock of \$50,000 and has taken over the business of the McCambridge Cooper Company, Seventh and Chestnut streets, Reading, Pa., manufacturing and conducting a general foundry and plumbing supply business. The officers of the company are John G. Fleck, president; James McC. Chase, vice president, and S. W. Fleck, secretary and treasurer.

A contract has been placed, it is reported, with H. E. Baton, for the erection of a two-story factory building and the rebuilding the power house and the main portion of the plant of Gordon Brothers, manufacturers of curled hair, etc., at Pierce and Orthodox streets, Frankford, which was damaged by fire some time ago. Particulars regarding requirements in the way of power equipment are not available at this time.

Harris & Richards, architects and engineers, are engaged on plans for a building known as No. 14, for the new plant under erection for the General Electric Company at Erie, Pa. This building will be of brick and reinforced concrete, 75 x 400 ft., five stories, and will be designed, to a considerable extent, for pattern storage purposes.

Information regarding the equipment required by the Organic Chemical Company for its new plant at Fort Washington, Pa., will be available at an early date. Dr. S. Lewis Summers, Fort Washington, Pa., will have charge of purchases.

The Adams & Westlake Company, manufacturer of railroad and ship hardware and supplies, has purchased property at Twenty-second and Ontario streets, extending through to Bellevue street, on which it will erect a new plant. Plans are now in preparations by M. Ward Eashy, engineer, but little of a definite nature in connection with the new plant has yet been decided upon.

The Keystone Type Foundry Company has purchased a tract of land in Chester, Pa., and a contract for the erection of a manufacturing building, 60 x 240 ft., three stories, is about to be placed. The plant is to be located in the vicinity of Fourth and Engle streets.

Contracts for bridge work were awarded recently for improvement to city bridges, previously reported in this report. M. & J. B. McHugh have the contract for widening Chestnut street bridge, while that for the bridge on the line of Springfield avenue and the Baltimore Central Branch of the Pennsylvania Railroad was awarded to Donato Delise.

Cincinnati

CINCINNATI, OHIO, May 16, 1911.

If there is any change at all in the machine tool situation it is probably a trifle slower. The demand for lathes is lighter, but radial drills show some improvement over the previous week. Second-hand equipment is holding up fairly well, and there is yet no falling off in the number of inquiries and orders for small electrical dynamos and motors.

The Ralston Steel Car Company, Columbus, Ohio, is inquiring in this market for prices on the following machinery:

One Plate shear, motor driven, to shear 84 x 12-in. plates. Equipped with counterweights.
Two heavy axle lathes, to turn 5½ x 10-in. axles. To be motor driven.
Two car wheel borers, 42 in., of sufficient capacity to bore steel wheels for 100,000-lb. capacity trucks; motor driven.
One wheel press of 200 tons capacity, latest type and design; motor driven.
Two heavy punching machines of sufficient capacity to punch 20 13-16-in. holes through ¾-in. plate at least 54 in. between centers of outside holes. Motor driven.
Two heavy punching machines, 48 or 60-in. throat, arranged for single punching and to have attachments for punching holes up to 20 in. in diameter through ¾-in. plates. Also to have shearing capacity to cut 12 x 2-in. flats. Motor driven.

All of these machines are to be equipped with Westinghouse motors. Later the company will purchase a hydraulic press from 800 to 1000 tons capacity, with a bed 10 or 12 x 16 ft., press to be arranged for 1500 lb. water pressure. A drop hammer of sufficient size to handle arch bars and light material for car work will also probably be required.

A large amount of structural material will be necessary for building the proposed Cincinnati General Hospital, work on which is expected to begin soon. The Westlake Construction Company, St. Louis, was the lowest bidder at the opening last week, submitting a figure of \$1,544,135 for the entire work, but contract has not yet been formally awarded.

Merely for the purpose of preserving its name the Cincinnati Machine Tool Company, now a part of the Cincinnati Bickford Tool Company, has been incorporated with a nominal capital stock of \$1,000. A. H. Teuchter, S. C. Senauer, W. H. Shafer, C. C. Stete and C. P. Gradolf are named as the incorporators.

John Kirby, Jr., president of the National Association of Manufacturers, was host at a banquet given at the Dayton Club, Dayton, Ohio, on the evening of May 11, in honor of Gen. Harrison Gray Otis, of Los Angeles, Cal. General Otis was en route to the annual meeting of the association.

The Cincinnati Business Men's Club, whose quarters were destroyed in the recent Chamber of Commerce fire, has leased the Phoenix Club Building at Ninth and Race streets, and will move from its temporary quarters in the Grand Hotel some time in July.

Rapp, Zettel & Rapp, Cincinnati, are architects in charge of plans for an addition to the plant of the R. Wurlitzer Company at Tonawanda, N. Y. The main building will be 60 x 300 ft., three stories, and of concrete construction. There will also be two large dry kilns and a storekeeper's building.

The Foote-Rolaff Machinery Company, San Antonio, Texas, is asking in this market for prices on the following machine tools: One 42 x 42-in. planer; one 36-in. x 9-ft. bed lathe; one 24-in. sliding head drill press; one 16 or 18-in. shaper; one 36-in. radial drill and one power hack saw. It is understood that second-hand tools are wanted.

The Corcoran Lamp Company, Cincinnati, has had plans for its factory building revised. The new structure will be 72 x 92 ft., four stories.

The Chamber of Commerce, Hamilton, Ohio, announces that arrangements have been about concluded with an outside firm for establishing a factory in Hamilton to manufacture roller bearings.

The Cincinnati Reduction Company, Cincinnati, has taken out a permit to erect a small ice factory at Anderson's Ferry.

The Alvey-Ferguson Company is a new Ohio incorporation with \$300,000 capital stock. The incorporators are Morris U. and E. P. Bernheim, J. B. Frenkie, Albert Seasongood and Louis T. Fecheimer. Mention was recently made of the company's intention to move its plant from Louisville, Ky., to Oakley, Cincinnati, Ohio.

Cleveland

CLEVELAND, OHIO, May 16, 1911.

While conditions in the local machine tool market remain nearly stationary, the little change that has occurred from week to week recently has been for the better. The past week there was a fairly good inquiry for single tools and a few inquiries came out for several small tools. Builders of automatic screw machinery and turret lathes report quite a gratifying increase in the volume of their foreign orders. Manufacturers in most metal working lines outside of machine tools report a fair volume of business. In the automobile trade conditions appear to have improved materially during the past few weeks. Many of the automobile manufacturers who restricted their output very mate-

THE MACHINERY MARKETS

rially early in the year are now compelled to crowd their plants to keep up on orders. In Akron, which is the center of the rubber tire making industry, the tire making plants are very busy and their activity is reflected among the allied metal working industries in that city. Business is generally good with local manufacturers of automobile parts and specialties.

The Booth Demountable Rim Company, Cleveland, is considering the removal of its plant to Detroit, Mich. If the change in site is decided upon a new plant will be built. In case the company remains in Cleveland its present plant will be enlarged considerably. In either event the company will buy considerable new machinery, mostly presses. The company has just increased its capital stock from \$100,000 to \$200,000.

The Wise Furnace Company, Akron, Ohio, which recently purchased a site for a new plant, is having plans prepared for a foundry, on which work will be started during the summer. The erection of the remainder of the plant will be deferred until next year.

The Knight Tire & Rubber Company, Canton, Ohio, is being organized to build a plant for the manufacture of solid and pneumatic tires, the erection of which will be started about June 1. The plant will be two stories, of brick construction, 50 x 250 ft. The company will be incorporated with a capital stock of \$300,000 by G. F. Knight, C. H. Knight, W. S. Cunningham, H. C. Evans and M. J. Shea.

The Biggs Boiler Company, Akron, Ohio, will enlarge its plant by the erection of a boiler shop, machine shop and power plant. The new building will be 120 x 225 ft., of brick construction. It will be equipped with electric traveling cranes.

The Auto Appliance Mfg. Company, Akron, Ohio, has been organized with a capital stock of \$50,000 to build a plant for the manufacture of an automatic starting device and other automobile accessories. The plant will be located on West Buchtel avenue. Andrew Auble is the president.

The Acme Specialty Mfg. Company, Toledo, Ohio, has been incorporated with a capital stock of \$25,000 to manufacture metal specialties and water heaters. The incorporators are A. Schlett, C. J. Schneider, Karl A. Flickinger and others.

The Lundgren Aeroplane Company, Youngstown, Ohio, has been incorporated with a capital stock of \$10,000 by L. Lungren, H. C. Dunn and others. It is stated that the company will build a plant for the manufacture of aeroplanes.

The Bucyrus Steel Casting Company, Bucyrus, Ohio, has increased its capital stock from \$200,000 to \$400,000.

The Phelps Tin Can Company, Baltimore, Md., is erecting a large tin can plant at Wierton, near Steubenville. The machinery will be driven by individual motors.

The Johnson Coin Lock Company, Columbus, Ohio, has been incorporated with a capital stock of \$25,000 to manufacture lock specialties. The incorporators are S. M. Comby, H. Milles, W. M. Huffman, M. R. Thornton and Barton Griffith.

It is announced from Warren, Ohio, that the Ohio Universal Motor Truck Company will build a plant in that city. The local Board of Trade will furnish a site.

The Elyria Foundry Company, Elyria, Ohio, has increased its capital stock from \$25,000 to \$50,000.

Chicago

CHICAGO, ILL., May 16, 1911.

Although most branches of business are extremely quiet an improvement is noted in the Chicago machinery market. Small floor sales emanating from a variety of sources have been extremely active. Inquiry has been very good. Among the most recent machinery lists issued are those of the United States Reclamation Service and the Rock Island Arsenal. The Reclamation Service business will amount to about \$6,500 and that of the Arsenal, which closes June 6, to about \$5,000. The Santa Fé Railroad is reported to be closing its business on a recently issued list which totals between \$10,000 and \$12,000. Other railroad activity in this market seems assured for the immediate future, as in all probability the Northwestern will purchase between \$30,000 and \$40,000 worth of machine tools and the Illinois Central a good sized quantity within the next week or two. The leading harvester industry and one of the large electrical companies of this city have been fairly liberal purchasers during the week. The Milwaukee Electric Railway & Light Company is out with a fair-sized list which will be closed in the near future.

Scattering inquiries of all kinds are appearing and have done much to eliminate the depression that so marked this market a few weeks ago. Dull business, coupled with labor troubles in some of the principal furniture manufacturing cities of the country, is having its effect upon wood-working machinery.

The Wheeling Corrugating Company, Chicago, Ill., has leased the property located at the southwest corner of Campbell avenue and Harvard street, 134 x 627 ft., for a term of 99 years, upon which it will erect a warehouse at a cost of between \$50,000 and \$75,000.

The Chamber of Commerce of Springfield, Ill., is negotiating with an Indiana firm engaged in the manufacture of drainage tile and sewer pipe for the removal of its plant to Springfield.

It is reported the Holbrook-Armstrong Iron Company, Racine, Wis., is preparing to manufacture a line of gasoline engines. The company recently increased its capital stock from \$100,000 to \$300,000.

The Fairview Milling Company, Fairview, S. D., has had surveys made with a view to constructing a hydro-electric plant on the Big Sioux River at Fairview at an estimated cost of about \$116,000.

Bonds in the sum of \$14,000 have been voted by Bradley, S. D., for the installation of a water works system.

Detroit

DETROIT, MICH., May 15, 1911.

A very satisfactory week has been the general reply to trade questions. The automobile people have received a steady volume of orders as well as the accessory lines. Shipments have been large and will continue so far at least this month, based on the orders placed ahead. Two important building permits were taken out this week, both large structures in the downtown district, requiring considerable structural steel work.

The Brunswick-Balke-Collender Company, manufacturer of billiard and pool tables, suffered a disastrous fire the past week. Practically nothing was saved. The company is well insured.

The Detroit Auto Dash Company filed articles of incorporation with the Secretary of State this week. The company will start with a capital stock of about \$15,000, and has with it Stephen B. Miller and Herbert C. Whitney, who hold the majority of the stock.

The Kelsey Herbert Company has increased its capital stock from \$100,000 to \$200,000 with the purpose of increasing the capacity of the plant. The added capital will be placed as preferred stock.

A new iron industry is the Detroit Metal Drawing & Rolling Company, organized this week, with a capital stock of \$10,000. No new building will be erected at present but factory structures will be leased. Hugo Newman and Charles Klein the principal stockholders.

A company of considerable importance is the new Metal Shingle Company, incorporated this week with the Secretary of State. The company has a capital stock of \$20,000 and is well supported by local capital. The control of the stock is held by Cyrus Dolph.

The Wentworth Mfg. Company, metal worker, filed articles of association this week with a capital stock of \$10,000. No new structures will be built at present, the main expenditures being for equipment. Eugene H. Wentworth is the organizer.

The Continental Motor Car Company, at present located at Muskegon, Mich., has at least decided on its future location. The company will build in this city a large and important structure adjoining the plant of the Hudson Motor Car Company. The building will give 200,000 sq. ft. of floor space and will be equipped throughout, the plant at Muskegon being operated in conjunction with the plant in this city.

For the purpose of expansion and improvements the McKinnon Boiler & Machine Works, Bay City, Mich., has raised its capital stock from \$50,000 to \$100,000.

The Holland Furnace Company, Holland, Mich., is planning to increase the capacity of its plant this summer by an addition 50 x 80 ft. It turns out nine furnaces daily.

The Detroit Steel Castings Company of this city held its annual meeting this week and reported a very prosperous year. The following officers were elected: J. S. Newberry, president; S. W. Utley, vice-president and general manager, and F. P. Warren, treasurer.

The Lake Shore Railroad will spend about \$100,000 in the city of Kalamazoo, Mich., for improvements. The

THE MACHINERY MARKETS

list includes the purchase of a site for the building of a new freight depot and the erection of a good-sized repair shop.

The huge deposits of limestone in Presque Isle County are to be utilized on a large scale by a number of promoters. A New York syndicate, with a capital stock of \$2,000,000 will spend about \$300,000 on steam shovels and stone crushers. A cement plant and sugar beet factory are among other industries planned. Particulars can be had from the Detroit & Mackinac Railroad, which is laying about 14 miles of track for the syndicate.

The Miller Grain Company, with large elevators at Vassar, Mich., suffered from fire the past week to the extent of \$14,000, partly covered by insurance.

Several Emmet County men are preparing to establish a woodenware plant at Munising, Mich. They are L. W. Beebe, of Kalkaska; Milton Bonz, of Alanson, and C. D. Panghorn, of the same city.

Charles Clark, Adrian, Mich., will take over the plant of the Adrian Basket & Veneer Works, which has been quiet for some months. The plant will employ about 100 men. The purchase does not take over the old machinery, as new equipment will be purchased.

The Hancock Mfg. Company, Charlotte, Mich., which for some time has been contemplating removal to another city, in view of crowded conditions, has decided to remain and will start immediately the construction of a new plant nearly double the size of the present factory.

Negotiations were completed this week whereby the erection of a charcoal iron furnace will be started within two weeks at Wells, Mich. The Stephenson Charcoal Iron Company has been organized with a capital stock of \$200,000. The furnace will be of a capacity of seventy tons per day and will be built adjoining the main plant of the Mashek Chemical & Iron Company. The principal stockholders are U. S. Senator Isaac Stephenson and C. H. Schaffer, of Marquette.

The Michigan Condensed Milk Company, Jackson, Mich., has completed the foundation walls of its 60x60 ft. addition. Two floors are to be added. New machinery of the latest types will be purchased and present machinery will be overhauled.

A three story brick factory building will be erected by the Hillsdale Screen Company, Hillsdale, Mich., this summer. Material has been ordered for the construction and the contract will soon be let. The factory is to cost in the neighborhood of \$12,000.

Minor S. Keeler and C. Norman Webb are the principal stockholders of the Keeler Brass Company, recently organized at Grand Rapids, Mich., with a capital stock of \$200,000.

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., is engaged in the erection of a good sized addition to its plant.

The Beckwith Estate, manufacturer of stoves and warm air furnaces, Dowagiac, Mich., is engaged in making numerous improvements to its plant, including the construction of a large addition to the main building.

The Wolverine Roofing Company, Saginaw, Mich., has voted to make an increase in its capital stock for needed improvements.

been incorporated with \$700,000 capital stock, to manufacture automobiles. The directors are H. H. Elmer, H. H. Murden and J. P. O'Shaughnessy.

The Vincennes Tractor Company, Vincennes, Ind., has been incorporated, with \$50,000 capital stock, as manufacturer of engines. The directors are F. L. Oliphant, Edward Watson, Charles Bierhaus, B. F. Nesbitt, R. M. Robinson, W. M. Alsop and J. N. Dyer.

The Superior Flour-Spar Company, Evansville, Ind., has been incorporated with \$50,000 capital stock. The directors are P. Y. McCoy, H. D. Moran, J. W. Waggoner, R. F. Taylor, Roy Griffith, J. B. Blackman and F. M. Fowler.

The American Automobile Mfg. Company, chartered in Arizona, with \$1,000,000 capital stock, has been certified for operation in Indiana, its offices being in New Albany. Its investment in Indiana is given at \$300,000. Its directors are H. K. Cole, Powell McRoberts and A. C. Davis. Berton B. Bales is president of the company.

The Iowa Pump & Silo Company will establish a pump and silo plant in Indianapolis, L. M. Rich and T. C. Munger, of Des Moines, having obtained a lease on a factory building. The Iowa factory owned by the company has been sold.

Alvin Johnson, Greenfield, Ind., and W. R. Rafferty and E. R. Sisson will establish a plant in that city for the manufacture of small refrigerators for automobiles.

Thomas Warner, of Muncie, formerly of the Warner Gear Company of that city, is erecting an automobile parts factory at Toledo, Ohio, and is enlarging a similar factory in Muncie in which he is interested.

The Hardsogg Mfg. Company, Evansville, Ind., has been incorporated, with \$30,000 capital stock, to manufacture mining tools. The directors are Martin Hardsogg, C. R. Anderson and M. P. Duffield.

The Evansville Store Fixture Company, Evansville, Ind., has increased its capital stock from \$10,000 to \$50,000.

The shovel department of the Indiana Rolling Mill Company, Newcastle, Ind., was burned May 9, causing \$200,000 loss. The office and a large warehouse, stocked with handles, were also destroyed. The fire started in the acid section of the finishing department. The company carried \$72,000 on the building burned. The part of the plant destroyed will be rebuilt.

The Remy Electric Company, Anderson, Ind., has purchased the interests and patents of the American Electric Headlight Company, Indianapolis, and the plant will be consolidated with that of the Remy Company after the erection of additional buildings.

The Miller & Donahue Lumber Company's plant, South Bend, Ind., the largest in northern Indiana, has been sold to John W. Paxton for \$37,125. The company failed recently with liabilities of \$325,000. The property was appraised at \$72,000.

Edward O. Hopkins, formerly connected with the Sloss-Sheffield Steel & Iron Company's plant at Birmingham, Ala., has been elected president of the Indiana Tie Company, Evansville, Ind.

A company to be known as the Vincennes Gas Traction Company is in process of organization at Vincennes, Ind. It will be incorporated with \$50,000 and will manufacture gasoline and kerosene tractors and large stationary gasoline engines. The enterprise is being promoted by J. M. Dyer, and an existing plant will be utilized for manufacturing purposes.

Indianapolis

INDIANAPOLIS, IND., May 16, 1911.

The Sanitary Ventilating Window Company, Indianapolis, has been incorporated with \$250,000 capital stock. The directors are Oran Perry, Howell Waddle, W. H. Burton, R. E. Springsteen and G. H. Rehm.

The Lafayette Electric & Mfg. Company has been incorporated at Lafayette, Ind., with \$200,000 capital stock, to manufacture electrical appliances. The directors are A. E. Scheithe, W. M. Baker and B. P. Shearer.

The Orton-Steinbrenner Steam Shovel Works, Huntington, Ind., though in operation only three weeks, is already making plans to double the size of the plant. Orders are in hand sufficient to keep the factory running until January 1.

The South Bend Chandelier Company has been incorporated at South Bend, Ind., with \$8,500 capital stock, to manufacture chandeliers and other articles of metal. The directors are Albert Listenberger, Louis P. Teuscher and Adam S. Teuscher.

The Elmer Auto Corporation, Elkhart, Ind., has

St. Louis

ST. LOUIS, Mo., May 15, 1911.

The Dorris Motor Car Company, St. Louis, advises that it will erect a new plant within the coming year.

The Acme Hoisting Machine Company, St. Louis, has been incorporated with \$50,000 capital stock. The company will manufacture a combination concrete and brick hoisting machine for use in building operations. George S. Cornell, 4149 West Bell place, St. Louis, is president of the company.

The Wrisberg Mining & Milling Company, St. Louis, has been incorporated with a capital stock of \$60,000. The incorporators are W. C. Wrisberg, Charles G. Wrisberg, Edward F. Wrisberg and others.

The new plant of the St. Clair County Gas Company at Nineteenth street and Lynch avenue was damaged by fire May 9 to the extent of \$2,500.

The Victor Iron & Furnace Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are William H. Ballmann, William A. Chambers, L. W. and M. L. Brown and G. L. Graham.

THE MACHINERY MARKETS

The Holbrook-Helicopter Aeroplane Company proposes to build a factory at Monett, Mo. The company is composed principally of Monett citizens.

Ellis D. Munger, 850 East Walnut street, Springfield, Mo., and J. Neff, of the Berryville Milling Company, Berryville, Ark., have closed a deal for 20 acres of land in the White River near Grand View, where they intend to locate a hydroelectric power plant to develop 2000 hp. The estimated cost of the undertaking is \$75,000.

E. Becker, a Milwaukee capitalist, has purchased a lease on the North Pole mine, near Carthage, Mo., and will erect a 250-ton mill which will cost upward of \$20,000.

An organization has been formed at Plevna, Kan., to build and operate a farmer's cooperative elevator. The following officers were elected: President, S. C. Davidson; secretary, P. T. Snyder; treasurer, George N. Pew.

The Commercial Club of Tulsa, Okla., has just executed a contract with the Oklahoma Iron Works to construct a foundry in that city.

Sand Springs City, Okla., is planning to install electric lighting and water works.

The Union Iron & Steel Company, Sapulpa, Okla., has been incorporated with a capital stock of \$1,000,000. The directors are S. R. Wells, W. C. Wells and W. A. Borah.

S. B. Dunbar, Oklahoma City, has been awarded the contract to build the power plant at the State penitentiary at McAlister, Texas, to cost \$25,000; also a cold storage plant with 32-car capacity. The power plant will furnish lighting and heating for all the penitentiary buildings.

The Imperial Steel & Iron Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$100,000. The incorporators are Mora C. Clark, E. H. Dorsey, E. J. Deupree and others.

The North Arkansas Power Company, Berryville, Ark., will construct on the White River, near Grand View, Ark., a hydroelectric power plant, for which it will be necessary to construct a concrete dam 300 ft. long and drive a tunnel 180 ft. through solid rock. The tunnel and dam will give a 28-ft. head of water and shorten the river two miles. Bids will be asked about August 1 with the expectation of commencing work by September 1.

Nowata, Okla., will award a contract for the installation of a water works system, for which bonds in the sum of \$75,000 have been voted. The contract will include two 125-hp. boilers, two pumps.

A petition is in circulation at Upland, Neb., asking for a special election to be called for the purpose of voting bonds in the sum of \$10,000 for the installation of a water works system.

The South

LOUISVILLE, KY., May 16, 1911.

Business generally is quieter in the local market than it has been, this condition applying especially to power equipment. There seems to be plenty of prospects, but the volume of business which is being closed is not altogether satisfactory. Weather conditions have steadied considerably, and this is expected to cause an improvement. Quarry machinery manufacturers, who have been having a fair trade, report that the demand has subsided considerably. There appears to be a good call for refrigerating equipment.

The Northern Engineering Works, Detroit, Mich., has been given the contract for the erection of a 40-ton crane in the plant of the Kentucky Electric Company, Louisville. It will have a 5-ton auxiliary hoist and will be operated by four 3-phase alternating current motors.

The Henry Vogt Machine Company has contracted for the delivery of a 125-ton refrigerating machine to the Texas Company, Port Arthur, Tex.

Officials of the Louisville & Nashville Railroad have stated, in reference to the report that the new shops of the company at Boyles, Ala., are to be placed in operation in the immediate future, that the shops are still far from completed, and that it will be several months before operations can be begun there.

The Brinly-Hardy Company, Louisville, manufacturer of plows, will erect a new foundry building adjoining the present plant at Preston and Main streets. The present foundry will be turned into an extension of the forging department. New equipment for both parts of the plant will be required.

James Clark, Jr., president of the James Clark, Jr.,

Electrical Company, has returned from a trip to the Pacific Coast, taken in company with a number of other business men. He said that business on the coast is generally quiet, Portland, Ore., being the only city where conditions are regarded as active.

It has developed that the plans for the organization of the Western Steel & Iron Company, which was to have located a plant at Pittsburg, Kan., for the manufacture of bar iron, have not been carried out, and its future is rather indefinite. The equipment of the Louisville Bolt & Iron Company, which was to have been transferred to the mill of the new company, is still intact.

E. D. Morton & Co., Louisville, report sales of screw conveyors manufactured by the Weber Mfg. Company and several Williams feed water regulators. The company has secured the agency for the line of the Howe Scales Company, Rutland, Vt., including scales, trucks and safes.

The Hydraulic Brick Company, Louisville, is installing some new equipment, including conveyors of the Jeffery Company. They are operated by steam.

The Board of Public Works of Louisville, of which M. W. Neal is chairman, is considering the reconstruction of an abandoned garbage reduction plant and equipping it for use.

Adolph Mueller, Louisville, has perfected an improved screw for use on ocean steamships. It is likely that the manufacture of it will be arranged for.

The Wood-Stubbs Company, Louisville, which is erecting a new warehouse, will require machinery for the sorting of seeds, including sifters, etc.

The Independent Quarry Company, Louisville, is in the market for an air compressor.

The improvements on the waterworks plant at Somerset, Ky., include the addition of a new pump. J. L. Waddle is general manager of the United Water, Light & Traction Company, which operates the plant.

The L. M. Booth Company, Columbus, Ohio, has been awarded the contract for the equipment which is to be installed in the new water plant at Owensboro, Ky.

The Nortonville Traction Company, Nortonville, Ky., of which Frank E. Mohr is president, will begin the construction of its electric railroad within the next month. Its power plant will be located at Nortonville, and arrangements will be made to develop a lighting service as well. The capital stock of the company is \$100,000.

The Kentweva Coal & Lumber Company, Elkins, W. Va., has filed a charter providing a capital stock of \$500,000. It will develop coal properties in eastern Kentucky. Charles S. Robb, W. A. Pugh and others are the incorporators.

The fiscal court of Meade County, Ky., with headquarters at Brandenburg, will probably purchase a road roller and other road-making equipment.

The Capital Gas & Electric Company, Frankfort, Ky., is installing additional equipment and will practically double the capacity of the plant.

The fiscal court of Henderson County, Ky., has closed a contract with the Vincennes, Ind., Bridge Company for the erection of six steel bridges, the cost of which will be \$9,720.

F. N. Bradford and B. F. Jewell have taken over the Home Steam Laundry at Glasgow, Ky., and will install additional machinery.

The hydroelectric plant of the Watauga Power Company, located on the Watauga River, near Elizabethton, Tenn., will be completed within the next three months. The power will be transmitted to Bristol, Tenn., where it will be used by the Bristol Gas & Electric Company.

Contracts have been let for the construction of the new sawmill of the McLean Lumber Company, of Chattanooga, Tenn. The woodworking equipment will be furnished by the Chattanooga Machinery Company, while the engines will be built by the Wheland Machine Works, Chattanooga. Boilers will be installed by the Casey-Hedges Company, of that city.

J. F. Boyd, D. D. Hicks and their associates have purchased power rights at Manchester, Tenn., and will develop a hydroelectric power plant. A franchise to furnish the city with electric lights will be asked for. A dam is to be built at once.

A cottonseed oil mill is to be built by the Madison Cotton Oil Company at Jackson, Tenn. James L. Talbot is superintendent of the company.

An addition to the factory of the Brock Candy Company, Chattanooga, Tenn., is to be built. The contract for the building has already been let.

THE MACHINERY MARKETS

Machinery is to be installed by the Hollow Handle Hoe Company, Hope, Ark., which has completed the erection of its factory building. Address L. A. Sandoe.

The plant of the Mobile Stove & Pulley Works, of Mobile, Ala., which was destroyed by fire recently, is being rebuilt. The mounting department building is now going up and plans will be completed shortly for the main building. New machinery will be installed throughout.

The Booneville Oil & Gas Company, Booneville, Ark., is considering the construction of a water works system and a gas plant. A franchise has been applied for.

The Central Cotton Oil Company, Jackson, Miss., is asking for prices on a second-hand 220-volt generator of 150 hp.

The Louisiana State University at Baton Rouge is in the market for a refrigerating plant. Address R. L. Himes.

Wayne Young, Mena, Ark., wants quarrying equipment consisting of air drills, compressors, crushers, hoist, pumps, etc., as well as power equipment.

W. M. Johnson, president of the Louisiana Stave & Heading Company, is considering the erection of a stave mill at Monroe, La.

The Edge-Dowling Lumber Company, Taylorville, Fla., has announced that it will rebuild the plant recently destroyed by fire.

The Southern Gasoline Engine Company has been incorporated at Spartanburg, S. C., with \$15,000 capital stock, for the manufacture of gasoline engines for agricultural, stationary and marine use. A shop is being equipped and the company is in the market for a hobbing machine for spiral gears. W. F. Robinson is president and W. D. Wilcox vice-president.

The Board of Water and Light Commissioners, Concord, N. C., will receive bids until May 31 for building an auxiliary pumping station, furnishing turbine pumps and motors, cast iron pipe, etc. Plans and specifications are on file at the office of the engineer, Gilbert C. White, Durham, N. C.

Western Canada

WINNIPEG, MAN., May 12, 1911.

An agreement has been entered into by the city council of Port Arthur, Ont., with J. L. MacRae for the construction and operation by a company he represents of a hard wood finishing plant to cost not less than \$60,000, the city to guarantee bonds for \$35,000.

An arrangement has been approved by the Dominion Government whereby the \$200,000 subsidy to the V. W. & Y. Railway Company for the building of a bridge at the Second Narrows, near Vancouver, B. C., will be transferred to the Burrard Inlet & Tunnel Company, Vancouver, which corporation is to build the bridge, the railroad company to build the approaches. Funds are also voted for this bridge by the British Columbia Legislature and by the cities of Vancouver, North Vancouver and adjacent municipalities. Plans of the bridge are at once to be filed with the Board of Railway Commissioners, Ottawa.

The Polson Iron Works Company, Toronto, is forwarding to Nelson, B. C., material for the construction at the Fairview shipyards there of a steel barge for the Canadian Pacific Railway Company. The barge will be the first made of steel to be floated on the lakes of the Kootenay district. A foreman and 20 hands have been sent from the Polson works in Toronto to put the vessel together.

Gorman, Clancey & Grindley, Calgary, Alberta, have secured for the United States Steel Corporation the contract for rails and specials to be used in the construction of the Moose Jaw street railroad system.

The Western Canada Cement Company has been incorporated as a provincial company, with headquarters at Edmonton, Alberta, and a capital stock of \$1,500,000. Lieutenant-Governor Bulyea is chairman of the company's board of directors.

The Port Arthur Trades and Labor Council is opposing the project to establish in the city a factory for the making of phosphorus matches.

The Tyee Copper Company, Ladysmith, B. C., proposes to instal a converter to turn out blister copper.

The Calgary City Council offers the Calgary Stove & Furnace Company site for a factory at cost.

The Canada Cement Company has purchased a site of 100 acres near Winnipeg, on which it intends to place a cement-grinding plant to cost \$400,000.

The Canadian Pacific Railway Company has laid be-

fore the municipal council of Coquitlam, B. C., plans for repair shops and yards to be established there. The plant is to be an immense one. About 90 miles of track will be laid for yard purposes.

Sealed proposals for an incinerator plant will be received by W. F. Heal, city clerk, Moosejaw, Sask., up to May 22.

Eastern Canada

TORONTO, ONT., May 13, 1911.

Excellent reports are given as to the state of business. Labor is fully employed and the government has temporarily let down the bars for immigrants coming, not directly from native land or country of adoption, but immediately through another country. This is found necessary because of labor shortage on construction contract account. The Canadian Northern Railway Company is to be assisted in the financing of the construction of the 1,000-mile section between Port Arthur and Montreal by a Dominion government bond guarantee of \$35,000 per mile. Immigration will this year distance all previous records, as many as half a million newcomers being expected. There is a demand for money rather in excess of supply.

The Dominion Power & Transmission Company, Hamilton, Ont., is making a large addition to its generating plant at Decew Falls. The capacity of that plant will be increased from its present limit of 38,000 hp. to 60,000 hp., and 200 ft. will be added to the penstock.

The Massey-Harris Company, farm implement manufacturer, Toronto, is arranging to enlarge its plant in Brantford, Ont.

It is announced that work will be commenced shortly on the great plant to be built at Welland, Ont., for the Deere Plow Works. A site of 250 acres has been purchased and the Dain factory in Welland has been acquired for the company.

By-laws to aid projected local industries by small loans have been approved by the ratepayers of Owen Sound, Ont. Lake & Wood are to establish a knitting factory; a furniture factory is to be put up by Toronto parties; C. S. Lloyd & Co., Toronto, are to build a factory in which to make children's carriages.

Fire damaged the testing department of the Allis-Chalmers-Bullock Company's plant in Montreal, near Lachine, to an amount variously estimated at from \$50,000 to \$100,000. The loss is covered by insurance.

The city council of Guelph, Ont., has passed a by-law authorizing a loan by the municipality of \$20,000 to the Independent Tire Company, Toronto, for the establishment in Guelph of a factory to cost \$50,000.

S. L. McKay, Sarnia, Ont., is negotiating for the supplying of natural gas from the Tilbury field to the city of London, Ont. The aim is to use the city gas company's mains for the local distribution of the gas. Twenty-five miles of the 78 miles of pipe required are already laid. It is estimated that it will cost \$800,000 to lay the total 12-in. line.

The Canadian Detroit Lubricating Company is the name of a concern that is about to start operations in Windsor, Ont.

Representatives of the Crumback Motor Company, Detroit, are endeavoring to interest investors in Brantford, Ont., in a proposal to establish there a plant for the manufacture of motor cars. The capital stock would be \$100,000.

The Fire Committee of the City Council of Guelph, Ont., has recommended the purchase of a combination hose and pump automobile to cost about \$9,000.

The Grand Trunk Railway Company has advised the city council of Montreal that its plans for station accommodation there and other works, including track elevation will call for an outlay estimated at \$9,419,000. The cost of the station is to be \$3,210,751, and of other steel work, \$539,172. The city is to contribute \$2,000,000.

Tenders are called until May 22 for the supply of 280 tons of 8-in. cast iron water pipe for Lachute, Que. J. W. Raitt, town clerk.

Up to May 23 the Mayor of Toronto will receive tenders for the supply of 3,500 ft. of steel pipe, 72 in. in diameter, for waterworks intake purposes.

The Dominion Metals Company, Ltd., now located on Dufferin street, Toronto, is selling its plant in that city and moving to Welland, Ont., where it has secured a site and will erect a thoroughly up-to-date silver and gold smelting and refining plant. John N. Lake is president of the company.

THE MACHINERY MARKETS

Texas

AUSTIN, TEXAS, May 12, 1911.

An unusually large number of industrial enterprises are reported from different parts of Texas and the Southwest. The business situation shows a general improvement. In Mexico the restoration of peace is expected to result quickly in a great revival of various kind of industries, particularly mining. Many orders for new mining machinery and other plants are being held up pending a settlement of the interior troubles.

The Granger Oil Mill Company is installing a 30-ton ice factory at Granger. The water supply will come from an artesian well that is flowing 350,000 gal. per day.

The Elkins Mattress Mfg. Company, El Paso, will install a mattress factory at Flatonia. J. L. Elkins is at the head of the project.

The San Benito Sugar Mfg. Company has commenced the erection of a 1200-ton sugar mill at San Benito. Stanley S. Dudds, of Proctor, Vt., has charge of construction.

C. D. Webster, of Orange, is at the head of the Webster Refining Company that has just been organized with a capital stock of \$25,000 to erect an oil refinery at Mooringsport, La.

Dubney White will install a modern cotton gin and other manufacturing plants at Tyler.

The City Council has granted a franchise to Henry M. Wallace and Raymond G. St. John, Detroit, Mich., for the installation of a gas plant and the construction of a distributing system at Waxahachie, Texas. The rate for gas is fixed at \$1.65 per 1000 ft. The franchise is for a period of 30 years.

The Central Mfg. Company, which has taken over the brick plant and clay deposit of the Prewitt Brick Company near Elgin, will enlarge the works and expand the business in other respects.

The Board of City Commissioners of Waco has decided to call an election at some future date to vote on the proposition of issuing \$80,000 of bonds for the construction of extensions of the sewer system.

The Waco Land, Mining & Fuel Company is arranging for installing machinery and making other improvements to its lignite property that it will open up near Teague. W. M. Foster, of Waco, has charge of operations.

R. W. Warren and associates will install an electric light plant, an ice plant and a steam laundry at Knox City.

W. C. Bondzieher will install a sawmill at Chriesman.

Bonds have been issued for the erection of two bridges across the Brazos River in Fort Bend County to cost about \$30,000 each.

The Temple Gas Company has approved plans for the rehabilitation of its gas plant and distributing system at Temple. The work will be started immediately and it is expected that the plant will be ready for operation in about six months. P. L. Downs is president.

The City Council of Temple has just granted a franchise to Henry M. Wallace and Raymond G. St. John, of Detroit, Mich., for the installation of a gas plant and distributing system. It is required that the construction works shall be started by July 1 and be finished within one year from that date.

A number of business men of Bellville have joined in a movement to erect a cotton seed oil mill there. The cost of the proposed plant will be about \$30,000, that amount of stock having been subscribed to the company that is being organized.

The City Council is arranging for the installation of an electric light and power plant at Rosenberg.

The Pearland Canning Company, which has just been organized, will build a fruit and vegetable canning factory at Pearland. C. R. Richey is president.

W. L. Green and associates will establish a cotton gin at Citrus Grove.

E. H. Young, Galveston, is erecting a large cotton seed meal grinding plant at Texas City. It will have a capacity of 500 tons of meal per day and will be the largest plant of its kind in the United States, Mr. Young says. The machinery will be housed in a building 100 x 400 ft., of frame construction, with corrugated iron sides and concrete foundation and will be operated by individual electric motors. The Texas City Transportation Company will construct two miles of track and sidings to connect the proposed plant with its terminal system.

The West Side Farmers' League has just been organized at Carlsbad, N. M., for the purpose of aiding

in bringing about an enlargement of the Carlsbad irrigation project. The proposed work involved the construction of a third reservoir that will have a storage capacity equal to both of the present reservoirs at a cost of about \$700,000, the cementing of a portion of the present canal at a cost of about \$300,000 and the installation of a pumping plant to lift the water into a higher canal in order that a scope of upland may be irrigated. The officers of the new organization are: President, W. H. Merchant; vice-president, Samuel Hughes; secretary and treasurer, Charles P. Jones, all of Carlsbad.

The Spring River Power Company, recently organized with a capital stock of \$100,000, will install hydro-electric plants on Spring River in Arkansas and construct power transmission lines to a number of towns. The main offices of the company are at Jonesboro, Ark. F. R. Land is president, J. D. Brown, secretary, and W. H. Vaughan, treasurer.

The first steps looking to the creation of an irrigation district that will embrace 180,000 acres of land have been taken by the taxpayers of the Raymondville section in the lower Rio Grande Valley, and the formal petitions asking that an election be held in the proposed district to vote on the proposition of issuing about \$3,000,000 of bonds for the construction of a gigantic canal system, ditches and the installation of the necessary pumping machinery will soon be presented to the commissioners' courts of Cameron and Hidalgo counties out of which the district is to be created.

Allen & Riche, Brownsville, Texas, are looking after the details of the new irrigation district proposition.

It is announced that the Consolidated Mutual Reservoir Company, of Grand Falls, will soon award contracts for the construction of three large reservoirs for storing water for irrigation purposes. It is estimated that the construction of these reservoirs will involve the handling of more than 700,000 cu. yd. of earth and that their cost will be more than \$250,000. This company recently acquired all the holdings of the Grand Falls Mutual Irrigation Company, the Big Valley Irrigation Company, and the Grand Falls Lake & Irrigation Company, all situated in the western portion of the State. The main canals of the consolidated company, leading from the Pecos River, will be greatly enlarged. Considerable dredging and other machinery will be required for the proposed work.

The Southern Hay Press Mfg. Company is now dismantling its plant at Silver Creek, Miss., preparatory to removing to Houston, having secured a suitable site on the ship channel for the erection of factory buildings, four in number.

William Harbenck is erecting a cotton gin plant at Midway, with a capacity of 50 bales of cotton per day.

J. Rugeley, Bay City, Texas, will erect a modern cotton gin plant to cost upward of \$8,000, including a storage room.

J. L. Vought, Georgetown, will build a modern cotton gin, to cost upward of \$7,500.

Gordon Hill, Harlingen, will erect a cotton seed oil mill and cotton gin.

The Texas Handle Company, Houston, has been incorporated with a capital stock of \$25,000. The incorporators are C. B. McClamroch, E. J. Coar and Dr. E. L. Coar.

The Pacific Coast

PORTLAND, ORE., May 9, 1911.

While no especially large inquiries are coming out, small orders are being received from machine shops all over the north Pacific Coast, and the aggregate volume of business appears to be somewhat greater than that of a year ago. There is a good movement of tools of fairly large capacity for this territory, which requires very little of the heavy equipment used in many of the Eastern shops, the majority of the business being in small tools. Most shops are normally busy, few of them having any unusual rush of work on hand.

The demand for woodworking machinery continues on about the same scale as for some time past. Many mills have been slow in starting operations for the summer, but a number of them are now being overhauled, and there is some inquiry for machinery for new plants.

Mining machinery continues in active demand. A number of large orders have been placed recently by Alaska mining interests, and deliveries are rapidly going forward through Puget Sound ports. Reports from the Orient indicate prospects of a material increase in

THE MACHINERY MARKETS

the exportation of machinery in that direction in the next few years. Projects are under way for the development of large mining properties in Korea, for which American machinery will probably be used, and a number of heavy shipments of implements and harvesting machinery have already been sent to Manchuria and eastern Siberia.

Implements and farm machinery are now in strong demand through eastern Oregon and Washington and in Idaho, and the market for irrigating pumps is increasing rapidly. An increase is also noted in the inquiry for road machinery, rock crushers, etc., and numerous orders are being placed for general contractors' equipment, though these include but few large items. Several new inquiries are coming out for electrical and hydro-electric machinery, and an unusually active season in this line is expected.

Bids have been received by the government engineers for installing oil burners in the dredge Clatsop, the lowest figure being \$23,850, submitted by the Vulcan Iron Works. All bids were considerably higher than the estimate.

Contracts have been let for the erection of new car shop buildings for the Oregon & Washington Railroad in this city.

The city of Portland will receive bids May 25 for pumping machinery and boilers for a new fireboat.

Bids have just been received at Olympia, Wash., for an air lift pumping plant for the Washington penitentiary, Walla Walla.

The city of Seattle, Wash., is working on a project to build an auxiliary hydro-electric power plant on Lake Union.

Polk county, Ore., has placed an order with Beall & Co., of this city, for a No. 2 Aurora crusher, a 32-ft. elevator, gasoline roller, trucks, etc.

The Burns Flour Mill Company, Burns, Ore., is planning to replace its power plant with a hydro-electric outfit.

Contracts were recently let for the new power station of the Olympic Power Company, near Port Angeles, Wash.

The Moran Company, Seattle, Wash., has taken a contract for alterations to the steamer Seward, amounting to about \$40,000.

It is reported that the Spokane Lumber Company, Spokane, Wash., is preparing to erect a band-saw mill at Diamond Lake.

I. A. Boynton is preparing to install a planing mill at Kennewick, Wash.

The Union Woolen Mills Company, Washougal, Wash., is considering the installation of a large mill at Bend, Ore.

The Western Cooperage Company, with offices in this city and a large stave mill at Aberdeen, Wash., is about to open up a new timber tract near the Columbia River, for which considerable equipment will probably be required in the near future.

The report of the transfer of the Risdon Iron Works property at San Francisco to the United States Steel Corporation interests is followed by several rumors regarding the prospect of similar transactions in Portland and Seattle. It is reported that representatives of the corporation have recently taken an option on 700 ft. of river frontage in this city, and also that negotiations are in progress for the Morgan Company's plant at Seattle, Wash.

The government engineers are preparing plans for two dredges to be used in deepening the channel of the Sacramento River near Rio Vista, Cal.

Material abandoned by the Atlantic, Gulf & Pacific Company, including a locomotive crane, ore cars, machine tools, etc., will be sold at the Mare Island, Cal., Navy Yard, bids to be opened June 2.

The Western Tool & Mfg. Company, recently incorporated at Oakland, Cal., by W. A. Sturgeon, J. H. Rackerby, J. W. Howard and A. J. Sturgeon, is preparing to start a factory in that city.

The United States Laundry Company is preparing to establish a new plant in this city.

The Oro Rico Mining Company, operating near Coulterville, Cal., has placed an order for a 20-stamp mill.

The California Corrugated Culvert Company, Berkeley, Cal., expects to make a large addition to its factory this summer.

According to a report from Vallejo, Cal., steam turbo-generators will probably be installed in several cruisers at the Mare Island navy yard, owing to the high cost of repairing the old engines in connection with the electrical plants.

The Pacific Improvement Company has ordered equipment for a rock crushing plant to be installed in San Roque Canyon, near Santa Barbara, Cal.

The government engineers have let contracts for compressed air machinery to be used in tunnel work near Yuma, Ariz.

The town of Ellensburg, Wash., is preparing to add a 200 kw. generator to the municipal electric plant.

Government Purchases

WASHINGTON, D. C., May 15, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 23, under schedule 3540, for furnishing and installing at Charleston, S. C., one molding machine, one rod and dowel machine and one shaping machine.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids June 6, under schedule 3541, for one boring, drilling and milling machine for Mare Island, Cal.

The Quartermaster's Office, Federal Building, Chicago, Ill., will open bids June 15 for furnishing and delivering at Fort Mills, Corregidor, P. I., six 1,000,000-gal. pumps and one overhead crane and automatic device.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 31 for two gasoline engines for Norfolk, Va., under schedule 3558.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 31, under schedule 3557, for one wood-turning lathe and one surfacing machine for delivery at Charleston, S. C.

Major F. W. Altstaetter, Engineer Corps, United States Army, opened bids April 10 for furnishing and delivering river wall valve jacks, gate engines, gate winches, for dam No. 26, Ohio River, as follows:

Item 1, River Wall Jacks—New Jersey Foundry & Machine Company, New York, \$3,225; H. P. Cazzam Machine Company, Pittsburgh, Pa., \$2,840.50; John Baizley Iron Works, Philadelphia, Pa., \$2,998; A. D. Granger Company, New York, \$4,560; Ellicott Machine Company, Baltimore, Md., \$3,974; Union Foundry & Machine Company, \$3,388.46; Charles Hegewald Company, New Albany, Ind., \$2,639.99; Aetna Foundry & Machine Company, Warren, Ohio, \$2,470; Thomas Carlin's Company, Pittsburgh, Pa., \$2,670; Vermilye & Power, New York, \$3,795; Exeter Machine Works, Pittston, Pa., \$4,106; Richard Mfg. Company, Bloomsburg, Pa., \$4,320; M. L. Bayard & Co., Philadelphia, Pa., \$2,550; The Fawcus Machine Company, Pittsburgh, Pa., \$3,643; M. H. Treadwell & Co., Lebanon, Pa., \$3,925; J. & J. B. Milholland Company, Pittsburgh, Pa., \$3,151.

Item 2, for Gate Engines—New Jersey Foundry & Machine Company, New York, \$1,530; H. P. Cazzam Machine Company, Pittsburgh, Pa., \$1,696.50; A. D. Granger Company, New York, \$1,852; Ellicott Machine Company, Baltimore, Md., \$1,980; Union Foundry & Machine Company, Pittsburgh, Pa., \$1,537.20; Thomas Carlin's Sons Company, Pittsburgh, Pa., \$1,200; Vermilye & Power, New York, \$1,197; Exeter Machine Works, Pittston, Pa., \$1,985; M. L. Bayard & Co., Philadelphia, Pa., \$1,350; Mead, Morrison Mfg. Company, Pittsburgh, Pa., \$1,200; J. & J. B. Milholland Company, Pittsburgh, Pa., \$1,600.

Bids were opened April 22 by the Inspector of the Eleventh Lighthouse District, Detroit, Mich., for furnishing two tandem gasoline-driven air compressors for Marquette light station as follows: Chicago Pneumatic Tool Company, \$1800; Fairbanks, Morse & Co., \$3030.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids April 29 for boilers, oil burning apparatus, superheaters, etc., for the United States naval station, Pearl Harbor, H. T. Various alternate bids were received. The bids for the entire equipment in accordance with plan are as follows: E. Keeler Company, Williamsport, Pa., \$67,173 and \$70,839; Charles C. Moore & Co., San Francisco, Cal., \$81,360; B. & W. boilers and Foster superheaters, and \$75,725; B. & W. cross drum boilers, Foster superheaters.

President Plummer says that the Dominion Steel Company, Sydney, Nova Scotia, cannot have ready in less than 18 months the new machinery required to finish in more profitable forms the material now turned into wire rods, and that the merchant mill contracted for last year should be ready by next autumn. The demand for rails is heavy, and a portion of the wire rod tonnage can be diverted thereto, and there is a good demand for billets.

Copper stocks in England and France were reduced from 69,253 tons April 15 to 67,643 tons April 29, according to the report issued by Henry R. Merton & Co., Ltd., London. This reduction more than counterbalanced the increase in copper stocks in the United States from April 1 to May 1.

The National Association of Stove Manufacturers.

The fortieth annual convention of the National Association of Stove Manufacturers was held May 11 and 12 at the Hotel Astor, New York. The attendance was excellent, and many important questions were considered in connection with the stove business. The association is partly educational and partly commercial. It is understood that valuable information collected by the secretary was placed before the members, relating to the stock of stoves in hand, the sales made during the year, the number and value of different kinds of stoves made and sold, factors of cost, etc. A number of papers were read and the discussion on some of them was interesting and spirited.

President William J. Myers made an address giving valuable suggestions. Harvey J. Fueller presented a paper on "Uniformity of Methods," which was a discussion of the desirability of uniform discount, datings, terms, collections, returned goods, traffic regulations, damage claims and limitation of salesmen's trips. W. G. Henry made an address on "Railroad Rates," showing that changed conditions now confront manufacturers.

George H. Barbour suggested the establishment of a traffic bureau in charge of an expert familiar with railroad usages, with the object of protecting the members and the interests of the stove trade generally. His suggestion was approved, and an appropriation of not more than \$3,000 was made for the employment of such an expert.

Frederic W. Gardner read a paper on "Stove Associations;" Charles S. Prizer, on "Neglected Issues;" Frederick Will, Jr., on "The Economic Aspect of Advertising;" J. W. Conchar, on "Training Salesmen;" John J. Fisher, on "Molding Machinery and Appliances, Aluminum Match Plates for Floor Molding, etc."

The election of officers resulted as follows: President, Abram C. Mott, Philadelphia, Pa.; first vice-president, N. H. Burt, Leavenworth, Kansas; second vice-president, R. D. Rennolds, Richmond, Va.; treasurer, W. T. Barbour, Detroit, Mich.; secretary, E. C. Hanrahan, Chicago; executive committee—Frederic W. Gardner, St. Louis; Arthur W. Walker, Boston; Charles A. Du Charme, Detroit; J. H. O'Brien, Cleveland, Ohio; Edward Bowditch, Albany, N. Y., and J. W. Emery, Quincy, Ill. The subject of "Piracy in the Stove Business" was discussed at some length. Appropriate action was taken on the deaths in the past year of James W. Van Cleave, St. Louis; William H. Knowlson, New York City; M. Brayton McKnight, Reading, Pa.; Edward P. Willson, Leavenworth, Kansas; Ralph S. Buck, St. Louis, and Henry Cribben, Chicago.

The association has held its annual meeting in New York for several successive years, but it was decided to make a change in this respect, and a committee appointed to consider the selection of a place for the next convention recommended that it be held in Detroit, Mich., which was adopted.

Westinghouse Turbines and Reduction Gears for a Naval Vessel

Two marine turbines and reduction gears have been finished and shipped by the Westinghouse Machine Company, and are now being installed on the U. S. collier Neptune, a ship of about 19,000 tons. The second outfit was shipped on Saturday, May 13, and put in place in order to permit of official trials of the Neptune in June. These tests are regarded by naval men as of the highest importance because of the use of comparatively small turbines and reduction gears interposed between their shafts and the propeller shafts. It is claimed that the weight of this class of machinery will be less than half of the weight of other turbines having the propellers coupled directly to the turbine shafts or of reciprocating engines, and that, by reason of the higher speed, the turbines used with reduction gears will require, especially for cruising speeds, from 20 to 30 per cent. less steam than is now needed by any of the turbine-driven ships or ships driven by reciprocating engines. It is interesting to add that by means of the control mechanism already mentioned in these columns the man on the bridge can reverse either or both turbines from full speed ahead to full speed astern in less than 15 sec., or in much less time than it now takes to communicate signals from the bridge to the engine

room with other types of control. All steam and exhaust connections are made to the lower half of the turbine and the general construction is such that the steam may be turned directly into the apparatus when cold, and full speed attained in less than a minute.

The Use of Coke-Oven Gas in Open-Hearth Furnaces

The issue of *Stahl und Eisen* for March 2, 1911, contains a short article on the use of coke oven gas in open-hearth furnaces, which criticizes a paper by E. Trasenster published in a French journal. This writer has obtained successful results on a 7-ton furnace. Where coke-oven gas is used the air alone needs to be preheated. The total heat to carry on the operation is obtained from the combustion of the gas, and the reactions in the bath. The heat is partly absorbed by the fluid metal and slag, part is lost through radiation and the rest is removed by the waste gases. The heat taken up by the bath is independent of the method of heating. The radiation loss naturally depends on the length of time of the heat. Trasenster investigates the amount of heat belonging to the waste gases. The analyses of the producer and coke-oven gas are given below:

Producer Gas.		Coke-Oven Gas.	
Weight.	Volume.	Weight.	Volume.
CO ₂ 11.5	7.5	5.6	1.5
CO 22.8	19.3	16.4	6.0
CH ₄ 0.8	1.3	33.8	22.5
H 0.9	12.3	9.8	57.0
N 64.0	59.6	34.4	13.0

If it is assumed that an excess of 6 per cent. of air is necessary for complete combustion, then 1 kg. (2.2046 lb.) of producer gas requires 1.2 kg. (2.6455 lb.) of air. The same weight of coke-oven gas will require 12.9 kg. (28.439 lb.) of air. In the case of the producer gas, one-half of the heat of the waste gases preheats the air, the other half the gas.

The preheating of the gas is necessary in order to obtain a high enough temperature in the furnace, and is therefore of great importance. If the gas were not preheated, then one half of the heat won from the waste gases would be lost up the chimney. With the use of coke-oven gas the relationship is somewhat different. Preheating of the gas is not necessary in order to reach a sufficiently high temperature. By heating the air alone the writer finds a loss of heat of about 7.5 per cent.; then the gas and air mixture is about 92.5 per cent. preheated. Because of this, the fact that there is no preheating of gas necessary when coke-oven gas is used has not the importance that would at first be supposed. Using coke-oven gas, the waste gases pass to the chimney at about 525 deg. C, instead of 450 deg. C. This means, when the weight of the waste gases is considered, an increase in loss of heat of about 16.5 per cent. The weight of waste gases is, however, very different in the two cases, as the following will show:

	Producer Gas.	Coke-Oven Gas.
Heat value of 1 cubic metre....	1024 heat units	3640 heat units
Weight, 1 cubic metre.....	1.09 kg.	0.43 kg.
Heat value of 1 kg.....	940 heat units	8460 heat units
1 kg. gas furnishes waste gases.	2.2 kg.	13.9 kg.
1 kg. waste gases contains....	427 heat units	634 heat units

If the heat absorption of the bath remains the same in both cases, then, when using coke-oven gas, 33 per cent. less waste gases will pass to the chimney. Even if 16.5 per cent. of the heat in the waste gases is not used, the thermal efficiency is better than with producer gas.

The exchange of heat between the gases and the bath depends, in the first place, on the difference of temperature between them. The theoretical temperatures, however, will be lowered by various factors, such as the difficulty of obtaining the right amount of air and the dissociation of gases at high temperatures, which are difficult to estimate exactly. The results, therefore, notwithstanding the good thermal efficiency obtained in this case, are not altogether favorable.—G. B. W.

The Niles-Bement-Pond Company, whose offices are at 111 Broadway, New York, has removed its warehouse from 30-31 West street to Hudson and Van Dam streets, New York. This applies particularly to the large stock of Pratt & Whitney small tools of all kinds which are sold at retail at the warehouse.

Trade Publications

Power Press Attachments.—The V & O Press Company, Glendale, N. Y. Bulletin No. 6. Pertains to a line of power press attachments which are automatic in action. These are shown as part of the equipment of various types of presses and a short description of the device is given below the engraving. While the attachments illustrated are standard for the most part, the company will modify the regular design or make special appliances to meet the requirements of particular cases.

Incinerator.—The McCall Incinerator Company of North America, Memphis, Tenn. Several circulars. Describe and illustrate different types of incinerator for the disposal of excreta and other wastes of construction and permanent or semi-permanent camps.

Air Compressors.—Thomas H. Dallett Company, York and Twenty-third streets, Philadelphia, Pa. Two bulletins. No. 203 illustrates a line of duplex and compound belt-driven compressors which are made in a number of different sizes. The construction of these machines is shown by half-tone and line engravings and a table of specifications completes the bulletin. No. 204 describes the duplex and compound steam-driven machines and points out their special features, one of which is the use of an automatic regulating and pressure device for governing the amount of power consumed.

Rock Drills and Steam Pumps.—Ingersoll-Rand Company, 11 Broadway, New York City. Three bulletins. The first, No. 4003, relates to the Little Giant drill of this company which is of the dependent valve tappet type. The construction and operation of the drill are covered at length and there are numerous engravings supplementing the text. In the second, No. 4016, illustrations and descriptive matter explain the operation of the Imperial valveless telescope feed hammer drill. Its special features are pointed out and numerous line drawings serve to make the description clear. In both of these bulletins brief specifications and an illustrated list of repair parts are included. Bulletin No. 7004 deals with the Cameron steam pumps. After pointing out the advantages of installing this type of pump and discussing its operation, the various patterns are illustrated with specification tables.

Cinder Cars.—The William B. Pollock Company, Youngstown, Ohio. Pamphlet. Devoted to the improved Berg cinder car which this company builds under patents granted to P. T. Berg. The construction of the car, which has a capacity of 260 cu. ft., is described at length and the engravings show the car in both the carrying and the dumping positions and the mechanism controlling the movement of the cinder pot. *The Iron Age*, March 23, 1911, contained an illustrated description of the car.

Electrical Measuring Instruments.—Weston Electrical Instrument Company, Waverly Park, Newark, N. J. Folder. Calls attention to the different styles of alternating current instruments made for switchboard use which include ammeters, voltmeters, power-factor and frequency meters, synchroscopes and wattmeters. All of these are illustrated and their construction is briefly described.

Pumps.—Geo. E. Dow Pumping Engine Company, San Francisco, Cal. Catalogue. This is the company's 1911 catalogue describing and illustrating a complete line of pumps for all purposes. These include centrifugal and triplex pumps and other types for deep well pumping and direct connected use. A number of tables giving useful information on the friction loss in pipes, conversion factors for changing gauge pressure into head in feet and vacuum in inches to feet suction and the measurement of water are included.

Automatic Tapping Machine.—The Beaman & Smith Company, Providence, R. I. Booklet. Illustrates and describes the Evans' automatic tapping machine for malleable and cast-iron fittings. Four different styles of machine are built for cutting the threads on fittings having two, three or four outlets, bushings, unions and valves. Data on the output of these machines are included as well as a table of brief specifications.

Sheet Metal.—The Edwards Mfg. Company, Cincinnati, Ohio. Catalogue. Size, 10 x 13½ in.; pages, 186. Treats of a very extensive line of metal sheets for building purposes which are made in a great variety of patterns. The majority of these are given full page illustrations and the different parts of the design are listed with prices.

Lathes and Shapers.—The Springfield Machine Tool Company, Springfield, Ohio. Catalogue G. Relates to the complete line of machine tools manufactured by this company. The parts of the lathes are first described with illustrations supplementing the text and this is followed by descriptions of the different tools. These include lathes with and without friction geared heads and with double and plain back gears, triple gearing, single pulley drive and turrets. Space is also given to a shafting lathe, a spindle and axle boring machine and motor-driven engine lathes and shapers. In describing these tools, the half-tone engraving and brief specifications occupy facing pages for the most part. An illustrated description of the 36-in. motor-driven lathe appeared in *The Iron Age*, January 27, 1910.

Milling Machines.—The Ingersoll Milling Machine Company, Rockford, Ill. Bulletin No. 25—I. Shows a line of heavy duty knee type millers in which the vertical and the horizontal spindles can be used either separately or in combination.

Turbo-Generators and Centrifugal Pumps.—Allis-Chalmers Company, Milwaukee, Wis. Two bulletins. No. 1079, superseding No. 1054, illustrates and describes the standard line of Allis-Chalmers turbo-generating sets, which are built in sizes ranging from 300 kw. up. A general description of the operation of the turbine is given, and this is followed by detail descriptions of both the turbine and the generator supplemented by illustrations. The second bulletin, No. 1624, superseding No. 1608, treats of the company's standard single-stage centrifugal pump. The various parts are illustrated and described, and these are supplemented by line drawings showing constructional details and reproductions of efficiency curves and half-tones of different installations.

Black and Galvanized Sheets.—Seneca Iron & Steel Company, Buffalo, N. Y. Catalogue. Size, 4 x 9 in.; pages, 24. Relates to the various kinds of black and galvanized sheets which this company manufactures. These include corrugated and crimped sheets, plain roll roofing, siding of various kinds and different styles of flat and galvanized sheets. Tables giving the various sizes of sheets made together with the weights per sheet and per bundle complete the catalogue.

Electric Machinery and Fans.—General Electric Company, Schenectady, N. Y. Three bulletins. No. 4799 illustrates and describes with considerable detail the various types of both horizontal and vertical shaft alternators manufactured by this company. No. 4806, superseding No. 4719, treats of the various types of electric fans which have been brought out for home, office and restaurant use, and which can be placed on the desk or table or fastened to the wall or ceiling. These fans are made for either alternating or direct current and in various styles and sizes to meet different installation conditions. In addition to the fans a line of small power motors is also listed. No. 4820, superseding No. 4706, pertains to the line of curve drawing ammeters and voltmeters of this company and shows both the switchboard and portable types as well as the different forms of standard charts which can be furnished. The construction of these instruments is described at length, and a table giving the dimensions of the various sizes of instruments completes the bulletin.

Feed Water Heater Valve Timing Gear.—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Celluloid model. Shows the valve timing gear which is furnished with new Cochrane steam stack and cut-out valve feed water heater and receiver. The action of the valve is clearly illustrated and it is shown that when the heater is cut off from the exhaust steam supply, the separator which forms a part of it continues to furnish a supply of oil-free exhaust steam to the heating or drying systems.

Evaporators and Ammonia Condensers.—The Griscom-Spencer Company, 90 West street, New York City. Two catalogues. The first, No. 301, pertains to the line of Reilly multicoil evaporators for producing pure water by distillation from sea water or impure natural water. The use of these evaporators on shipboard and in ice and industrial plants is described at length, and there are a number of illustrations showing the evaporators and also suggestive schemes for installing them. The second catalogue, No. 401, describes and illustrates the G-S evaporative ammonia condenser which is said to require only 4 per cent. of the amount of water ordinarily used in pipe condensers and will maintain a low head pressure in extremely hot weather. The construction of this condenser is briefly described and its advantages pointed out.

The New York Machinists' Strike

The strike of the machinists in Greater New York and Hudson County, N. J., for an eight-hour working day has spread to a number of new plants, but the efforts of the committee appointed by employers to fight the strike in conjunction with the National Metal Trades Association have offset this gain, as many of their men have returned to work. Fully 150 employees of the Garvin Machine Company have gone back and other desertions from the union ranks are reported from several shops. The officials of the National Metal Trades Association declare that they have been able to obtain all the labor required. With the exception of two plants, work has been resumed in all of the affected shops. In the case of manufacturers whose plants have not been started up, it is declared that they do not desire to resume immediately, and the Metal Trades officials say that if they wish to begin operations the necessary labor can be obtained.

The nineteenth annual meeting of the Society for the Promotion of Engineering Education will be held at Pittsburgh, Pa., June 27, 28 and 29. The headquarters will be at the Carnegie Technical Schools. At the meeting special attention will be given to the reports of the committees on the teaching of mathematics to engineering students and entrance examinations for technical schools. The secretary of the society is Prof. H. H. Norris, Cornell University, Ithaca, N. Y.

THE IRON AGE

Established
1855

New York, May 25, 1911

VOL. 87: No. 21

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
I. A. McKeel,	-	-	-	-	First Vice-President
Harold S. Bittenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS:

Pig Iron More Active.....	1235
A New Dry Blast Method.....	1236
Our Trade Balance Due to Our Manufactures.....	1236
The Massachusetts Eight-Hour Bill Invalid.....	1237
Correspondence	1238
To Market American Machinery Abroad.....	1239
Pig Iron Output the Criterion.....	1239
The Iron and Metal Markets.....	1240
Iron and Industrial Stocks.....	1249
Personal	1249
The American Foundrymen's Association.....	1250
New Tools and Appliances.....	1251
The National Machine Tool Builders' Association.....	1252
The National Tube Company.....	1255
Hardness of Quenched Tool Steels.....	1256
The Calculation of Air Furnace Dimensions.....	1257
British Pig Iron Production in 1910.....	1257
Paxson Foundry Supplies.....	1257
The National Association of Manufacturers.....	1258
Bailey Sheet Furnace Equipment.....	1258
The Canadian Wire Rod Trade.....	1260
The Langelier Swaging Machine.....	1261
The Strong Steel Foundry Company.....	1261
Steel Ingot Treatment.....	1262
A Labor-Saving Staybolt Press.....	1266
The Prony Brake.....	1266
The Hooper Continuous Pouring Spout.....	1267
The Orenstein-Arthur Koppel Company.....	1267
Cutting Worm Gears with a Fly Cutter.....	1268
Chilled Rolls with Passes Cast In.....	1269
Automatic Welding of Hoops by Toledo Welder.....	1269
Pratt Institute Exhibition.....	1269
Calcium Chloride for Drying the Blast.....	1270
The Sherman Anti-Trust Law Muddle.....	1272
New Welch Hammer of the Helve Type.....	1273
Vertical Combination Bench Miller and Drill.....	1273
Molding Machine with Stripping Plate.....	1274
The Baker Hammer Flue Cleaner.....	1274
The Standard Screw Company.....	1275
Welfare Work.—Its Tendencies and Potential Results.....	1276
Machine Tool Arrangement.....	1278
Paper by F. C. Kent.....	1279
New Automatic Tap Fluter.....	1281
A Reversible Window Ventilating Device.....	1281
Machine for Boring Engine Valves.....	1282
The Machinery Market.....	1283 to 1291

Pig Iron More Active

Lower Prices in All Markets

Sharp Reduction in Virginia Iron—Foreign Rail Inquiries, but Little Home Business

Iron and steel markets have realized no measurable benefit thus far from the Supreme Court decision, though expectation of tangible betterment has grown, as bearings have been taken under the new status. It appears that influences immediately operating upon buyers in some lines have to do with prices, and hesitancy is still a factor.

In actual developments the pig iron market has taken the lead in the past week. The semi-deadlock that has existed for some time as to the basis of sales for the second half of the year has been effectively broken in the buyer's favor. Prices have declined in all markets and some sellers appear willing to sell on the low basis for delivery far into the second half of the year.

In the East the leading Virginia pig iron interests set out to sell 25,000 tons of No. 2 X foundry iron at \$12.25 at furnace for third quarter and \$12.50 for fourth quarter, as against a nominal price of \$13 previously. Sales of about 12,000 tons have been made, chiefly in New England and eastern Pennsylvania. Other Virginia producers have not followed the cut, but some of them will sell at \$12.50.

Buffalo iron has been more active in New England and in New York State at lower prices. One good-sized sale to a malleable foundry is reported. Shipments by Erie Canal have made Buffalo iron more sharply competitive in the New York district and at Sound and Hudson Valley points. At Chicago inquiry for 15,000 tons of Northern and Southern grades is pending and sales have been made more freely there as buyers' views have been met.

Further prompt sales of Southern iron are reported at \$10.50, while \$10.75 has been the basis on deliveries extending over the third quarter.

The total of basic pig iron sales in eastern Pennsylvania last week is now put above 20,000 tons, two lots of 5000 tons and one of 10,000 tons being placed at \$14.50 delivered. Other negotiations are pending. In the Central West both Bessemer and basic irons are very quiet. Stocks of all kinds of iron in Ohio and western Pennsylvania furnace yards, including steel companies outside the Steel Corporation, increased about 5000 tons the first half of May to 880,000 tons.

Finished material markets have shown no new tendency. The bar situation is naturally being watched closely. Sales of hard steel bars have been made at 1.25c in the Chicago district, but there is no confirmation of the published report that a round sale of soft steel bars has been made below 1.40c Pittsburgh. Bar iron is on a 1.20c basis at Eastern mill.

Some variations have appeared in hoop prices and 1.40c has been done on desirable business.

For the Panama emergency dams 12,000 tons of

rolled steel and 1000 tons of pig iron for counterweights were taken by the United States Steel Products Company. The structural market is only fairly active. In New York City over 5600 tons was closed last week, while 8700 tons is pending. The American Bridge Company took the steel for the Statler Hotel at Cleveland, 4000 tons. At Chicago the Mallers and Rand-McNally buildings will require 7000 tons.

Wire nail manufacturers have given notice that after June 1 all unfilled tonnage on contracts made some time ago at \$1.75 will be charged at \$1.80, the present price. Business in wire products is holding up well.

Rail sales are light. One 10,000-ton contract is pending. In the foreign trade inquiries have come up for 54,000 tons for Queensland and 30,000 tons for the Union of South Africa. Bids will be asked on 4000 to 5000 cars, including 1000 for the Queen and Crescent.

The wrought pipe trade is encouraged by a considerable increase in orders over the April rate. A contract has been taken for 100 miles of 8-in. pipe for Mexico and various other orders for gas and oil pipe amount to nearly 100 miles.

In cast-iron pipe several good contracts are pending. San Diego will buy 7500 tons and bids were opened, or will be opened, this week for 16,000 tons for the various boroughs of Greater New York.

Sales of 400,000 tons of non-Bessemer Lake ores are reported, including a contract for 300,000 tons to be delivered over the next three years at Lake Michigan ports. The offer of an Eastern steel company to buy 300,000 tons of Lake ores a year for 5 or 10 years, at about 80 cents a ton below present Mesaba prices, has not yet resulted in business.

A New Dry Blast Method

An interesting paper read before the recent meeting of the Iron and Steel Institute at London dealt with the calcium chloride method of drying air at the blast furnaces of the Differdange Works in Luxemburg. The apparatus is described in a liberal synopsis of the paper given elsewhere in this issue, and the authors' claim of saving in construction, as compared with the cost of refrigerating machinery, is stated, as well as the claim of decreased working cost. The installation, we are told, cost only about one-fourth as much as would have been paid for refrigerating equipment. No details of the blowing tests of dry air at Differdange are given, and in this particular the paper contrasts notably with that of James Gayley on his dry-blast system, presented at the New York meeting of the Iron and Steel Institute in October, 1904. Naturally some questions were asked in the discussion of this joint paper of Felix A. Daubiné and Eugene V. Roy at London as to the comparative costs of the freezing and the calcium chloride methods, but these were not answered in the absence of the authors.

J. E. Stead, the well-known British metallurgist, referring to the proposal made 25 years ago to use calcium chloride as a desiccator, said that it was not made practical then because there was no provision for cooling the calcium chloride after it had been heated to expel the moisture taken up from the air. This has now been met, as the article elsewhere shows, there being first an air cooling and then a cooling with water introduced through coils.

The economies of the new method remain to be demonstrated. The apparatus required is on a scale indicating that some revision must be made of the authors' claim of less than 25 per cent. of the cost of refrigerating apparatus. It is suggested further that the use of so many pipes in the "cooling stove" is objectionable, as corrosion would require their frequent replacement. The chief value of the present paper is in emphasizing the economies of dry blast and in showing that blast furnacemen abroad are increasingly interested in securing savings in which thus far only a small minority of American blast furnacemen have taken a practical interest.

Our Trade Balance Due to Our Manufactures

The reestablishment of a distinctly favorable balance in our foreign trade last September, after a decidedly unsatisfactory period, prompts careful study at this season of the year in the hope of reaching a conclusion whether the turn is due chiefly to a revival of heavy crop exports, to the establishment of a much heavier rate in the exportation of manufactured goods, or to a decrease in imports. The presentation of the mere figures of total exports and imports by months, as is so often done, is not always enlightening, for on account of the nature of the business there are tremendous swings in the monthly trade balance. For instance, in the fiscal year 1897 the favorable balance was \$286,000,000, while in the next fiscal year it was \$614,000,000. The winter exports were not greatly different in the two years, the maximum monthly balance in the first year being \$63,000,000, in October, and the maximum in the second \$74,000,000, in December, these representing the peaks in the crop movement. The greater difference between the two fiscal years was caused by a difference in the movement of other commodities, in the summer, for in the first year April, May and June showed adverse balances, averaging \$12,000,000 per month, while in the second year those same months showed average favorable balances of \$49,000,000 per month.

Thus the accumulation of a large favorable balance in the ten months of the present fiscal year is not in itself conclusive as to the showing of the whole fiscal year. It is necessary to trace the exports by commodities in order to determine their character. There are, indeed, several wholly distinct streams, influenced each by its own conditions, which in the aggregate determine the character and extent of our trade balance. Late in 1909 James J. Hill brought out very forcibly the unfortunate trend in our position as to wheat. Mr. Hill's object, of course, was to illustrate the necessity of our practicing intensive farming. He showed in convincing manner that our wheat yield per acre had been steadily decreasing, while our population is increasing and the consumption of wheat per capita has slightly increased. Accordingly the indications were that our wheat production would become wholly inadequate to the needs of the population and there would be pressure to import large quantities, without any good source from which to draw it. It might be urged that before the pinch becomes severe an adjustment will be made, but such reasoning does not apply to the disappearance of our exports of wheat, because that would not produce a severe pinch. The reduction in our exports not only of wheat but of other cereals also is a factor very active at this time and the move-

ment therefore deserves very careful study. To an extent decreased cereal exports are made up by increased exports of manufactured goods, and if that represents a natural trend the showing is good, for the reason that we can hardly contemplate the cereal position continuing to change at the same rate indefinitely, whereby we should eventually come to import large quantities, whereas if the increase in our exports of manufactures is upon a good basis it can be expected to continue indefinitely, and after the change in our cereal position has ceased to exert an adverse influence upon the trade balance.

The monthly trade balance has been as follows, in the present and the last fiscal year, the balance being favorable except where indicated:

	1909-10	1910-11
July	\$3,151,402*	\$2,688,099*
August	7,342,187*	3,691,929*
September	32,948,265	51,609,130
October	73,023,992	83,662,755
November	53,489,905	76,834,840
December	33,733,470	90,505,449
January	10,791,157	66,581,886
February	5,559,950*	54,155,651
March	19,341,578*	22,876,776
April	811,658*	37,876,094
May	12,245,983	
June	8,011,293	
Ten months' total.....	\$167,780,014	\$478,839,898
Twelve months' total....	\$188,037,290	

*Unfavorable balance.

Each month in the ten which have elapsed of the present fiscal year shows a better trade balance than the corresponding month a year earlier, last July showing a small improvement, while in each succeeding month there was a larger improvement until February, which showed a gain of \$60,000,000, an adverse balance of \$6,000,000 being succeeded by a favorable balance of \$54,000,000. The March balance was smaller and the April balance still smaller. To a degree this represents the familiar course of the trade years ago, when the crop movement continually swelled the trade balance until some time in the late fall or winter. An examination of the detailed figures, however, shows that in the present fiscal year exports of agricultural products have not been increasing, the total to date being practically the same as in the last fiscal year, and being at the rate of only about \$380,000,000 a year. They do not in the slightest degree account for the increase in the favorable trade balance, nor, indeed, could they hope to account for much of it, since they amount altogether to just about the gain in the favorable balance which the past ten months have shown.

As the greatest increase in the favorable trade balance occurred last February, being approximately \$60,000,000, it is interesting to observe the details. The increase was made up by a decrease of \$8,000,000 in imports and the following increases in exports: Foodstuffs in crude condition, and food animals, \$2,000,000; foodstuffs, partly or wholly manufactured, \$4,000,000; crude materials for use in manufacturing, \$35,000,000; manufactures for further use in manufacturing, \$500,000; manufactures ready for consumption, \$10,000,000.

The gains in the trade balance in March and April were of the same origin as the gains in March, but were not so extensive, the decrease in imports in April being only \$2,000,000, while the gain in exports was nearly \$36,000,000.

A glance at the statistics of exports in the eighteen nineties would appear to indicate that our exports of agricultural products have very greatly fallen off, but

questions have been raised lately in certain quarters as to the relevancy of various changes which have been made by the government in the method of compiling the statistics and the grouping of the products. Investigation along this line is promised, and for the present it is perhaps not well to attempt any precise comparison. Enough is known, however, to indicate that our exports of agricultural products have greatly decreased since the nineties, while our exports of manufactures have greatly increased.

From the viewpoint of the moment the position is substantially as follows: After a period of generally unsatisfactory trade balances, beginning with February, 1909, and ending with August, 1910, large favorable trade balances have been restored. They have averaged \$48,500,000 a month, beginning with last September, against an average of \$46,000,000 per month in the calendar years 1898 to 1908, inclusive, that being clearly marked as the period of by far the most favorable trade balances the country ever had. The recent restoration of a large favorable balance is due in small measure to a reduction in imports, in no measure to an increase in exports of agricultural products, and in very large measure to a great increase in manufactures and manufacturers' materials. Crude materials for manufacturing have shown the largest gain, manufactures ready for consumption the next largest, and manufactures for further use in manufacturing the smallest. The obvious conclusion is that we must improve our position for exporting manufactured products. Having lately made progress along this line, there is promise of success to further efforts.

The Massachusetts Eight-Hour Bill Invalid

The Massachusetts Supreme Court has dealt the final blow to an eight-hour bill which has been before the Legislature of that State for two years, and which would have become a law a year ago had it not been for the veto of the Governor.

This legislation has been considered pernicious because it provided that "working more than eight hours in any one day shall be prima facie evidence of the violation of the statute." The Legislature caused the bill to be brought before the Supreme Court for a decision as to its legality. The court holds that the clause quoted is unconstitutional. The decision reads:

There are many statutes in which the Legislature has enacted that the existence of a fact which ordinarily creates a strong probability of the commission of an offense shall be prima facie evidence of guilt, and such statutes have been held constitutional. The provision of this section of the proposed act differs from those referred to . . . and is not within the principles on which the cited cases rest.

Under this act "in cases where a Saturday half-holiday is given" employees may work more than eight hours on other days of the week. Such cases will be common, and, in all of them, work for a longer time than eight hours on any other day will not indicate a probability of violation of the law. To provide that such a fact shall constitute prima facie evidence that warrants a finding of guilty beyond a reasonable doubt would be contrary to fundamental principles of criminal law.

The bill applied only to employment upon public works by the commonwealth, the county, and such cities and towns as have accepted the provisions of certain earlier acts. No one disputed that the Legislature has the power up to a certain point to direct how the government shall conduct the public business, although it has no power to limit a citizen in the exercise of his right to make contracts and to use his powers, by the enactment of a statute forbidding his

employment for more than eight hours a day as has been decided by the Supreme Court of the United States.

Correspondence

A Remarkable Boiler Performance

To the Editor.—I have recently read, with a great deal of interest, an article entitled "Economical Fire Room Methods," by F. R. Low, published by the B. F. Sturtevant Company, giving an account of a day recently spent with the consulting engineer of the American Woolen Company, at Lawrence. Among other things, it showed a very low temperature in the stack, which should always occur in every case, and simply emphasizes the necessity of having a stack large enough. It also gives analyses of flue gas made from time to time, which show remarkably well, although I can show plenty just as good made some time ago at the plant of the Packing & Provision Company, Somerville, Mass.

It was from this plant that I got the most complete set of evaporation tests of any plant which I have ever tested. Here they had a very unique method of running the night gang against the day gang, in the boiler room, posting up, at each change of watch, the record made by the previous watch, as a spur to each gang to do a little better than the previous one. It also showed the differences in coal tests made at different periods of the year and the rate of evaporation. Each of these tests were run for comparatively long periods, some of them as great as 221 hr. and some as short at 48 hr., but, at any rate, long enough so as to wipe out all the errors. And they are very interesting, as showing how ordinary commercial firing can be done.

It was during one of these sets of tests, 60 hr. long, that I obtained the unprecedented figure for equivalent evaporation per pound of dry combustible of 13.156 lb. of water, which produced a boiler efficiency, in return tubular boilers, of 82.32 per cent. This plant had neither mechanical draft nor economizers, although I am aware, in other plants, of the advantages of both of these devices, and I put mechanical drafts, for instance, in the plant of the Morse Twist Drill Company, at New Bedford, and the Union Carpet Lining Company, at Watertown, in place of tall chimneys, and get the best results. I would put myself on record for the use of mechanical draft with economizers, requiring a good, strong and steady draft through many corners. It certainly is more reasonable to make a draft mechanically under those circumstances than by wasting a lot of heat up the stack in order to get such draft.

I also agree that the place to save fuel is in the boiler room, and I also prefer to make a fireman myself, out of a good, intelligent man, than attempt to hire one. There is no doubt of the fact that the place to learn firing of a boiler is on a locomotive, where the steam must be kept uniform and where a failure means losing time. Good, intelligent firemen are made on locomotives, but they can also be trained on stationary plants by a man who knows his job, and then they are the best ever.

RESULTS OF BOILER TESTS

Type of boilers—Return flue tubular.

Number of boilers in use.....	2	9	72
Diameter of boilers, in.....	5	78	84
Length of boilers, ft.....	17	78	82
Width of grate, in.....	5	84	64
Length of grate, in.....	5	72	72
Number of tubes in boilers.....	2	140	164
Diameter of tubes, in.....	3	186	3
Length of tubes, ft.....	16	728.5	118.00
Total water heating surface, sq. ft.....	0.5	0.5	23.00
Total grate surface, sq. ft.....	61.76	to 1	19.6
Width of air space in grate, in.....	175.00	0.166	to 1
Width of metal in grate bars, in.....	60	60	78
Distance of grate to sheet, in.....	29.40	29.80	29.63
Ratio of water heating surface to grate.....	77.9	78.15	77.8
Area of stack, sq. ft.....	92.31	92.75	92.32
Height of stack, ft.....	.283	.257	.364
Ratio of stack area to grate.....			
Duration of trials, hr.....			
Atmospheric pressure, in.....			
Pressure in boilers, gauge, lb.....			
Absolute steam pressure, lb.....			
Chimney draft, in. of water.....			

External air, deg. F.....	43.4	27.7	28.9
Fire room, deg. F.....			
Steam, deg. F.....	321.8	322.7	321.8
Feed water, deg. F.....	158.9	168.2	150.9
Escaping gases by metal pyrometer, deg. F.....	340.6	345.	352.2

Coal consumed, lb.....	137,407	140,006	177,920
Moisture in coal, per cent.....	6.12	5.	3.6
Dry coal consumed, lb.....	129,162.6	133,005.7	171,504.9
Total ash and refuse, lb.....	16,373.9	9,110.	18,162.4
Ash and refuse in dry coal, per cent.....	12.7	6.85	10.6
Ash and refuse by analysis, per cent.....	7.9	5.	6.18
Combustible, lb.....	112,788.7	123,895.7	153,342.5

Moisture in steam, per cent.....	2.70	2.76	2.98
Water apparently evaporated lb.....	1,399,535.2	1,451,605.85	1,817,430.56
Water actually evaporated, corrected for moistures, lb.....	1,361,757.74	1,411,541.47	1,763,271.
Water evaporated into dry steam from 212 deg. F., lb.....	1,484,315.93	1,525,876.36	1,936,072.55
Equivalent water evaporated into dry steam for 212 deg. per hour, lb.....	24,738.6	25,431.27	24,821.4
Total heat derived from coal in B.t.u.....	10,764.5	10,737.	10,580.1
British thermal units per analysis of coal.....	13,078	14,028.6	13,514.3
Efficiency of boilers, per cent.....	82.32	76.53	78.29

Water actually evaporated per lb. of dry coal, lb.....	10.54	10.61	10.28
Equivalent water evaporated per lb. of dry coal for 212 deg., lb.....	11.48	11.47	11.29
Equivalent evaporation per lb. of combustible for 212 deg., lb.....	13.156	12.31	12.616

Dry coal actually burned per sq. ft. of grate per hr., lb.....	18.22	18.79	18.6
Combustible actually burned per sq. ft. of grate per hr., lb.....	15.93	17.5	16.66
Combustible actually burned per sq. ft. water heating surface, lb.....	0.258	0.283	0.269
Water evaporated from and at 212 deg. per hr. per sq. ft. of grate surface, lb.....	209.6	215.5	210.3
Water evaporated from and at 212 deg. per hr. per sq. ft. of water heating surface, lb.....	3.39	3.49	3.4.

On a basis of 30 lb. water per hour from feed at 100 deg. F. into steam at 70-lb. pressure, hp.....	877.14	900.39	825.06
Builders' rating, hp.....	1400.	1400.	1400.
Per cent developed below rating.....	37.25	35.7	41.
Dry coal per hour per hp developed, lb.....	2.46	2.46	2.65
Cost per ton (2240 lb.) of combustible.....	\$3.78	\$3.78	\$4.12
Coal per 1000 hp per hr., developed.....	\$4.15	\$4.15	\$4.87
Cost per 1000 lb. steam.....	\$14.7	\$14.7	\$16.27

Carbonic acid gas, per cent.....	11.2	9.88	6.8
Oxygen, per cent.....	7.15	9.3	12.18
Carbonic oxide, per cent.....	0.8	0.3	0.25
Nitrogen, per cent.....	80.5	80.4	80.5
Flue gas per lb. of carbon, lb.....	22.3	25.23	36.2

Heat balance, Dr.			
In coal (all referred to 32 deg. F.), units.....	1000.	1000.	1000.
In water, units.....	105.7	106.9	94.3
In air, units.....	4.	0	11
	1109.7	1106.9	1094.3

Heat balance, Cr.			
In dry steam, units.....	982.4	927.	935.
In flue gas, extra temp. of gases, units.....	113.9	130.7	103.5
In evaporation of water in coal, units.....	5.1	3.9	2.8
In priming or moisture in steam, units.....	2.2	3.14	2.3
In radiation and unaccounted for.....	6.1	42.16	50.6
	1109.7	1106.9	1094.3

Heat balance 1897 method			
Heat absorbed in useful work, per cent.....	80.	77.2	79.6
Loss in moisture and hydrogen in coal, per cent.....	3.55	3.6	3.5
Loss in heat in chimney gases, per cent.....	9.9	12.5	16.0
Loss in incomplete combustion of carbon, per cent.....	3.9	1.86	1.7
Loss in radiation and unaccounted for.....	2.65	4.84	0.0
	100.00	100.00	100.18

WILLIAM O. WEBBER.

BOSTON, MASS., May 11, 1911.

To Market American Machinery Abroad

Pig Iron Output the Criterion

A company that gives promise of being an important factor in the marketing of American machinery abroad has been incorporated at Albany, N. Y., under the title of the Allied Machinery Company of America, by interests directly connected with the National City Bank of New York. The incorporators, most of whom are important officials in the bank, have far-reaching plans for extending American business in foreign countries. They have already made arrangements with between 35 and 40 manufacturers of mechanical equipment in this country, most of whom are makers of machine tools and other metal working machinery, whereby the new company will take charge of the selling arrangements for their clients abroad. It is their purpose to operate with the National City Bank so as to arrange for foreign banking facilities, and this plan will give American manufacturers an opportunity to sell their product direct in a manner that they have not been afforded before.

Its Fluctuations Correspond with Those in Orders for Machinery Supplies

An officer of a large manufacturing corporation, the products of which go to a vast variety of industries and trades, has plotted the curve of the company's deliveries from January 1, 1907, to April 1 last, and compared it with the chart published in *The Iron Age* of April 6, 1911, page 824, showing the course of pig iron production in the United States in that period. The two curves are given in the accompanying chart.

The plant in question manufactures wood screws, machine screws, taps and dies, screw machine products, chair and stove rods, stove bolts, tire bolts, cap screws, set screws, small nuts, rivets and burrs, hanger bolts, small brass castings and hardware specialties. The list of consumers is of necessity greatly diversified.



Curves Showing the Relation Between the Output of a Large Manufacturing Plant and the Production of Pig Iron. The Dotted Curve Indicates the Former and the Solid One the Latter.

The National City Bank, through its broad connections, now has a powerful influence in Europe and the Orient, where it is an important factor in the arrangement of foreign loans. It is understood that the purposes of the projectors of the company are to use this influence in increasing the foreign sale of American-made machinery.

Captain G. L. Carden, of the United States revenue cutter service, who was formerly connected with the Department of Commerce and Labor, and whose reports on machine tool making abroad have attracted great attention, is on a leave of absence from the government and is prominently associated with the organizers of the company. Samuel McRoberts, a vice-president of the National City Bank, is president of the Allied Machinery Company, and F. A. Vanderlip, president of the bank, and J. T. Talbert, another vice-president, are deeply interested in the plan. Captain Carden and Mr. McRoberts will leave for Europe within a week on business connected with the enterprise.

The immediate and simultaneous response of general trade to the conditions which govern the iron market is graphically demonstrated by this common experience. The manufacturer's curve was plotted by three months' periods, with the exception of the last quarter of 1907. But the suggestion is almost as strong as if the flowing curve based on monthly intervals were given.

The investigation brought out one interesting fact—that during the falling off of shipments in the last six months of 1910 the average price received for the products increased. One reason for this was that a larger percentage of sales was for the higher priced products. But this was not the whole reason. Doubtless the fact may be attributed in no small part to the sound conditions underlying all business in the past year and the large extent to which the purchases made were prompted by imperative need.

The Bessemer Gas Engine Company, Grove City, Pa., has received an order from the Air Tight Steel Tank Company, Pittsburgh, for an 85-hp. gas engine, and also an order from the Frick Company, Waynesboro, Pa., for a 20-h.p. gas engine to be used in connection with refrigerating machinery, the installation to be made in Texas.

A steel bracelet around the city forms a special feature of the improved gas distributing facilities which have been in process of development for San Francisco. It is a 16-in. pipe line, 7½ miles long, for carrying high-pressure gas to feed at distributed points the ordinary low-pressure gas system. It is stated that it has been kept at 60-lb. pressure for days at a time and may be counted on as one of the steps in high-pressure gas distribution, calculated to erase the common gas holder and its desolated contiguous area.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.
PIG IRON, Per Gross Ton:

	May 24, 1911.	May 17, 1911.	April 26, 1911.	May 25, 1910.
Foundry No. 2 standard, Phila- delphia	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Valley Furnace	13.75	13.75	13.75	15.00
Foundry No. 2 Southern, Cin- cinnati	13.75	13.75	14.25	14.75
Foundry No. 2, Birmingham, Ala Foundry No. 2 local, at furnace, Chicago*	10.50	10.50	11.00	11.50
Basic, delivered, eastern Pa....	15.00	15.00	15.00	17.00
Basic, Valley furnace.....	14.50	14.50	15.00	16.25
Bessemer, Pittsburgh.....	13.25	13.25	13.75	15.00
Gray forge, Pittsburgh.....	15.90	15.90	15.90	16.90
Lake Superior charcoal, Chicago.	14.15	14.15	14.40	15.90
	17.00	17.00	17.50	18.50

COKE, CONNELLSVILLE.

Per Net Ton, at oven:				
Furnace coke, prompt shipment.	1.45	1.45	1.55	1.70
Furnace coke, future delivery..	1.75	1.75	1.75	1.80
Foundry coke, prompt shipment	1.75	1.75	2.00	2.25
Foundry coke, future delivery..	2.00	2.10	2.20	2.40

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	23.00	23.00	23.00	25.50
Forging billets, Pittsburgh.....	28.00	28.00	28.00	31.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	29.00
Wire rods, Pittsburgh.....	29.00	29.00	29.00	32.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.50	14.75	14.25	17.50
Iron rails, Philadelphia.....	16.75	16.75	17.00	20.00
Car wheels, Chicago.....	12.75	12.75	13.25	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	15.00
Heavy steel scrap, Pittsburgh..	13.00	12.50	12.50	15.25
Heavy steel scrap, Chicago.....	10.25	10.25	11.50	13.50
Heavy steel scrap, Philadelphia.	13.00	13.00	13.00	14.50

FINISHED IRON AND STEEL.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.27	1.30	1.32½	1.52½
Common iron bars, Chicago.....	1.22	1.22½	1.25	1.47½
Common iron bars, Pittsburgh..	1.30	1.30	1.35	1.55
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.66
Tank plates, Pittsburgh.....	1.40	1.40	1.40	1.50
Beams, tidewater, New York....	1.56	1.56	1.56	1.66
Beams, Pittsburgh.....	1.40	1.40	1.40	1.50
Angles, tidewater, New York....	1.56	1.56	1.56	1.66
Angles, Pittsburgh.....	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.80
Cut nails, Pittsburgh.....	1.60	1.60	1.65	1.80
Barb wire, galvanized, Pitts- burgh.....	2.10	2.10	2.10	2.10

METALS.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.37½	12.25	12.37½	13.00
Electrolytic copper, New York.	12.12½	12.00	12.12½	12.87½
Spelter, New York.....	5.50	5.50	5.50	5.30
Spelter, St. Louis.....	5.20	5.20	5.30	5.15
Lead, New York.....	4.37½	4.40	4.42½	4.37½
Lead, St. Louis.....	4.21½	4.25	4.27½	4.22½
Tin, New York.....	44.60	43.00	42.50	33.25
Antimony, Hallett, New York..	9.00	9.00	9.00	8.12½
Tin plate, 100 lb. box, New York	3.94	3.94	3.94	3.84

*The average switching charge for delivery to foundries in the
Chicago district is 50c. per ton.
†These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b.
Pittsburgh

Freight rates from Pittsburgh in carloads, per 100
lb.; New York, 16c.; Philadelphia, 15c.; Boston, 18c.;
Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indian-
apolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis,
22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.
Rates to the Pacific Coast are 80c. on plates, structural
shapes and sheets, No. 11 and heavier; 85c. on sheets,
Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c.
on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15
in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in.,
1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.;
angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c.,
net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in.,

on one or both legs, less than ¼ in. thick, 1.45c., plus
full extras as per steel bar card effective September 1,
1909; tees, 3 in. and up, 1.45c., net; zeos, 3 in. and up,
1.40c. to 1.45c., net; angles, channels and tees, under 3
in., 1.45c., base, plus full extras as per steel bar card of
September 1, 1909; deck beams and bulb angles, 1.70c.
to 1.75c., net; hand rail tees, 2.50c.; checkered and cor-
rugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in.
wide, 1.40c. to 1.45c., base. Following are stipulations
prescribed by manufacturers, with extras to be added to
base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers'
standard specifications for structural steel dated February 6, 1903, or
equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and
under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square
foot, are considered ¼-in. plates. Plates over 72 in. wide must be
ordered ¼-in. thick on edge, or not less than 11 lb. per square foot,
to take base price. Plates over 72 in. wide ordered less than 11 lb.
per square foot down to the weight of 3-16-in. take the price of
3-16-in.

Allowable overweight, whether plates are ordered to gauge or
weight, to be governed by the standard specifications of the Asso-
ciation of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thin- nest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.20
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	
TERMS.—Net cash 30 days.	

Sheets.—Makers' prices for mill shipments on sheets
in carload and larger lots, on which jobbers charge the
usual discounts for small lots from store, are as fol-
lows: Blue annealed sheets, Nos. 3 to 8, U. S. standard
gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12,
1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One
pass, cold rolled, box annealed sheets, Nos. 10 to 12,
1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos.
17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26,
2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No.
30, 2.35c. Three pass, cold rolled sheets, box annealed,
are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21,
2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No.
27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c.
Galvanized sheets, Nos. 10 and 11, black sheet gauge,
2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17,
2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos.
25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29,
3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28,
\$1.55 per square. Galvanized sheets, No. 28, \$2.75 per
square for 2½-in. corrugations. All above prices are
f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash
discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' car-
load discounts on the Pittsburgh basing card on
wrought pipe, in effect from October 1:

	Butt Weld.			
	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	49	43
¾ in.....	75	63	71	59
¾ to 1½ in.....	79	69	75	65
2 to 3 in.....	80	70	76	66
Lap Weld.				
2 in.....	76	66	72	62
2½ to 4 in.....	78	68	74	64
4½ to 6 in.....	77	67	73	63
7 to 12 in.....	75	59	71	55
13 to 15 in.....	51½	..	..	..
Butt Weld, extra strong, plain ends, card weight.				
1, ¾, ¾ in.....	69	59	65	55
¾ in.....	74	68	70	64
¾ to 1½ in.....	78	72	74	68
2 to 3 in.....	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.....	75	69	71	65
2½ to 4 in.....	77	71	73	67
4½ to 6 in.....	76	70	72	66
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
¾ in.....	64	58	60	54
¾ to 1½ in.....	67	61	63	57
2 to 3 in.....	69	63	65	59

THE IRON AND METAL MARKETS

Lap Weld, double extra strong, plain ends, card weight.			
2 in.....	65	59	61 55
2½ to 4 in.....	67	61	63 57
4½ to 6 in.....	66	60	62 56
7 to 8 in.....	59	49	55 45
Plugged and Reamed.			
1 to 1½, 2 to 3 in..Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe. Butt or lap weld, as specified.		
2, 2½ to 4 in.....Lap Weld			
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.			
Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:			

1¾ to 2½ in.....	Steel.	65
2½ in.....		67½
2¾ to 3½ in.....		70
3½ to 4½ in.....		72½
5 and 6 in.....		65
7 to 13 in.....		62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

		Fence Wire, Per 100 Lb.					
Nos.		0 to 9	10	11	12 & 12½	13	14 15 16
Annealed	....	\$1.75	1.80	1.85	1.90	2.00	2.10 2.20 2.30
Galvanized	..	2.05	2.10	2.15	2.20	2.30	2.40 2.80 2.90
Market and Stone Wire in Bundles, Discount from Standard List.							
Bright and Annealed:							
9 and coarser.....							.80
10 to 18.....							.80 and 10
19 to 26.....							.80 and 10 and 2½
27 to 36.....							.80 and 5
Galvanized:							
9 and coarser.....							.75 and 10
10 to 16.....							.75 and 10
17 to 26.....							.72½ and 10
27 to 36.....							.72½
Coppered or Liquor Finished:							
9 and coarser.....							.75 and 10
10 to 26.....							.75 and 10
27 to 36.....							.79 and 10 and 5
Tinned:							
6 to 18.....							.75 and 10 and 10

Pittsburgh

PARK BUILDING, May 24, 1911.—(By Telephone.)

Pig Iron.—The market is dull and neglected, with no new inquiry. Local foundrymen are attending the sessions of the convention of the American Foundrymen's Association here this week, and state that there is considerable large work under way, but it is very slow in developing. Bessemer pig iron is still being offered by dealers at \$14.75 to \$14.85, Valley furnace, but furnacemen are holding for \$15. Not enough new business is coming out in pig iron to test prices. We quote as follows: Bessemer pig iron, \$15 nominally; malleable Bessemer, \$13.75; basic, \$13.25; No. 2 foundry, \$13.50 for prompt and \$13.75 for forward delivery; gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—There is no new business in billets or sheet bars, and specifications against contracts from sheet and tinplate mills are only fair. Small lots of open-hearth steel are still being offered by small makers below the regular prices made by the larger mills. Regular prices are as follows: Bessemer and open-hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1½-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Sentiment in the local iron trade has undergone a material change, being more optimistic now than at any time for the past two or three months. The Standard Oil decision is regarded as having partially clarified the situation, and with reasonable assurance of heavy crops it is expected that trade should show some im-

provement over the next two or three months, with a more decided change for the better about September. The pipe and scrap trades have shown considerable activity, some fairly heavy sales of line pipe having been made, while large transactions in heavy steel scrap for forward delivery were consummated at 50 cents a ton higher than dealers were quoting one week ago. The leading wire and wire nail makers have taken the situation in hand and have notified the large trade that, taking effect June 1, all unfilled tonnage on contracts made some time ago will be charged for at the present prices and that no orders will be booked at a lower figure than \$1.80 for wire nails on and after that date. The trade is gradually accepting the belief that no revision of prices on finished iron and steel will be made, and as a result there is more confidence in the future. The weakest spot in the whole situation is in pig iron, stocks at the furnaces being heavy, while the new demand is very light. There is no new inquiry for steel to speak of, but regular prices are being pretty firmly held.

Ferromanganese.—No sales are reported. We continue to quote 80 per cent. foreign at \$36.50 to \$36.75, Baltimore, the freight rate to Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—A leading local consumer is in the market for 200 to 250 tons of 50 per cent., but there is not much new inquiry. We quote 50 per cent. at \$52.50 to \$53, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—The market continues dull. We quote best grades of pig iron muck bar nominally at \$28.50 to \$29, Pittsburgh.

Skelp.—In spite of lack of new demand prices are fairly firm. We quote: Grooved steel skelp, 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—A sale of 300 tons of Bessemer wire rods for June and July shipment is reported on the basis of \$28. New inquiry is light. We quote Bessemer, open hearth and chain rods at \$29, Pittsburgh.

Steel Rails.—There is some active inquiry for standard sections amounting to 20,000 tons or over, which bear the earmarks of live business that may be closed in a short time. The Carnegie Steel Company sold in the past week 500 tons of light rails to a coal company and 300 tons to a lumber interest, and in addition has taken several fairly large orders of standard sections for export. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b., at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—No local jobs have been placed in the past week. An inquiry is out from the city of Pittsburgh for about 500 tons for an extension to the Smithfield street bridge, and there is also an inquiry for 800 tons for the proposed Peoples Theater in this city. New inquiries are better and considerable local work is in sight, some of which is expected to be placed in the very near future. Prices are reported firmer and we quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Plates.—No important orders for steel cars have been placed, but the Queen & Crescent route is in the market for 1000 steel hopper cars. On May 26 bids will be opened for 4500 tons of plates for the Los Angeles aqueduct. A little better inquiry is reported for plates and prices are said to be firmer. Narrow sizes of sheared plates are being sold at about 1.35c., while tank plate ¼ in. and heavier, in the wider sizes, is held at 1.40c., Pittsburgh.

Sheets.—Conditions in the sheet trade do not show much betterment, the new demand being rather quiet, being mostly for small lots to cover actual needs. Specifications against contracts are not satisfactory and have not been for some time. Prices in the main are pretty well observed, although in some sections some mills are still slightly shading what are regarded as regular quotations and will be found on a previous page.

Tin Plate.—In the past two weeks specifications from the can makers have been quite heavy and ship-

THE IRON AND METAL MARKETS

ments over the next 60 days or more to this class of consumers are expected to be very large. The new demand is quiet, as this is the dull season in the tin plate trade as far as new buying is concerned. The American Sheet & Tin Plate Company on Monday put its Shenango Works at New Castle, Pa., containing 30 hot mills, on full time, while its New Castle Works, also at New Castle, containing 20 hot mills, is running to full capacity. It is estimated that about 75 per cent. of tin plate capacity is active at present, showing a considerable gain over the conditions of a month ago. Prices are firm and we continue to quote 100 lb. coke plates for delivery over remainder of this year at \$3.70 per base box f.o.b. Pittsburgh.

Bars.—As a result of the recent conference of makers of steel bars, the market to-day is firmer than it has been for some time, but whether the 1.40c. price can be maintained, in view of the very low prices ruling for hard bars for concrete reinforcing purposes and also on iron bars, is problematical. So far the implement makers and the wagon builders have not shown much interest in the market or in prices by making contracts for their requirements for the year beginning July 1. In previous years a very heavy tonnage of steel bars has been under contract prior to June 1, but so far this year nothing has been done. The new demand for both iron and soft steel bars is quiet, but is fairly active for hard steel bars. We continue to quote soft steel bars rolled from billets at 1.40c., and common iron bars at 1.30c., f.o.b., Pittsburgh.

Shafting.—A meeting of the shafting makers was held in New York last week. Discounts of 57 per cent. off in carload and larger lots, and 52 per cent. in smaller lots, are continued, but are not always rigidly held. The new demand is quiet, being mostly for small lots to cover actual needs, and specifications against contracts have not been large.

Spelter.—The market is weak and dull. We quote prime grades of Western at 5.17½c., East St. Louis, equal to 5.30c., Pittsburgh.

Hoops and Bands.—There has been some unevenness in prices of hoops recently, 1.40c. having been done on desirable contracts. The new demand is quiet, and specifications against contracts on both hoops and bands have not been coming in well for some time. We quote steel hoops at 1.45c. and bands at 1.40c., extras on the latter as per the present steel bar card.

Merchant Steel.—New orders entered by the mills and shipments in May were not satisfactory, showing a falling off as compared with the same period last month with no indications of an early betterment in demand. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Several of the leading makers of rivets report that some heavy inquiries are in the market for structural rivets from fabricating concerns and also for boiler rivets from boiler makers and other consumers. These inquiries are taken to mean that a good deal of new business in both boiler and structural rivets is likely to be placed at any time. Regular prices on structural rivets are 1.90c. and boiler rivets 2c., but these prices are not being strictly observed, some makers continuing to quote structural rivets at 1.75c. to 1.80c. and boiler rivets 1.80c. to 1.85c., f.o.b., Pittsburgh. We are advised that only desirable orders are accepted at these prices.

Wire Products.—Several of these leading wire nail makers have notified the large trade that on all contracts for wire nails placed some time ago at \$1.75 and under the price on all unshipped tonnage after June 1 will be \$1.80. It is believed that this will stimulate specifications against contracts, which have been dull for some time, and will also have the effect of firming up prices. The tone of the market is already slightly stronger as a result of this action, and regular prices are being quoted on new business by all the mills. We quote galvanized barb wire at \$2.10, painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—No large inquiries from railroads are in the market, the new demand being for small lots only. The best price of railroad spikes in standard sizes is \$1.50, Pittsburgh, with usual extras for odd sizes.

Merchant Pipe.—Conditions in this trade are showing decided improvement, the demand being much bet-

ter. Some large contracts for line pipe have been placed. Three or four of the leading pipe mills report that orders booked so far this month show an increase over the same period in April. The National Tube Company has taken an order for over 100 miles of 8-in. pipe for shipment to Mexico. The Caney River Gas Company has placed an order for 22 miles of 8-in. line pipe, plain ends; Logan Natural Gas & Fuel Company, 15 miles of 12-in.; Dominion Natural Gas Company, 10 miles of 6-in. and 10 miles of 4-in., and Medina Natural Gas & Fuel Company, St. Mary's, Ohio, 15 miles of 10-in. and 12 miles of 8-in. Regular discounts on iron and steel pipe, printed on a previous page, are said to be firmly held.

Boiler Tubes.—The new demand is dull and with not much prospect of early betterment. The tube trade was fairly good in the latter part of April and in the early part of May, but has fallen off considerably in the past two or three weeks. Regular discounts on tubes as revised recently and printed on a previous page are reported as being firmly held.

Coke.—The coke trade continues quiet. No large inquiries are in the market either for blast furnace or foundry coke. Most blast furnaces that buy their coke in the open market are covered for the remainder of the year, while the few that have not contracted are buying their coke from month to month. A Valley blast furnace is reported to have bought 5000 tons of standard grade coke for June shipment at about \$1.55 per net ton at oven. The output in the Upper and Lower Connells-ville regions has been steadily reduced for some weeks, the production for the last week having been about 275,000 net tons, much the lowest in any one week for a long time. We quote standard makes of furnace coke for June shipment at \$1.50 to \$1.55 per net ton at oven, and for delivery over the second half of the year at \$1.75 to \$1.85. We quote standard makes of 72-hour foundry coke at \$1.75 to \$1.90 for June shipment, and from \$2.10 up to \$2.40 to consumers, per net ton at oven, for delivery over the second half of the year. Some makes of both furnace and foundry coke have sold for prompt shipment at somewhat under the above prices.

Iron and Steel Scrap.—There has been decided improvement in the scrap trade in the past week, due largely to the purchase of 10,000 to 12,000 tons of heavy steel scrap for delivery to two important consuming points in this vicinity at \$12.75 to \$13, delivered, and it is said that even higher than \$13 was paid for part. Consumers have been staying out of the market for some time and prices had gone to such a low figure, especially on steel scrap, that as soon as it was known that these heavy sales were made nearly all grades of scrap advanced from 25c. to 50c. per ton. Dealers are now quoting, per gross ton, Pittsburgh, about as follows:

Heavy steel scrap, Steubenville, Follansbee, Sharon	
Monessen and Pittsburgh delivery.....	\$13.00 to \$13.25
No. 1 foundry cast.....	13.50 to 13.75
No. 2 foundry cast.....	12.50 to 12.75
Bundled sheet scrap, at point of shipment..	9.75 to 10.00
Re-rolling rails, Newark and Cambridge, Ohio,	
and Cumberland, Md.....	13.50 to 13.75
No. 1 railroad malleable stock.....	12.00
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.50 to 16.75
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 busheling scrap.....	12.00 to 12.25
No. 2 busheling scrap.....	8.50 to 8.75
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	9.00 to 9.15
*Machine shop turnings.....	9.15 to 9.25
Old iron rails.....	15.00 to 15.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.25
Stove plate.....	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, CHICAGO, May 23, 1911.—(By Telegraph.)

Pig Iron.—There has been more activity in this market in the past seven days than in any week since the flurry of last February. The season for purchases of castings is here, and last half inquiries have appeared from many quarters for all kinds of iron. The total inquiries for Southern iron in this market will probably total about 7000 tons and inquiries for Northern will about equal that amount. It is felt that the improvement here is not due to recent important court decisions, but is rather that time has at last forced out some of the many cases where buyers have been holding back for price inducements. These demands were met with

THE IRON AND METAL MARKETS

refusal on the part of furnaces for many weeks, but have been conceded recently. Southern spot and resale irons are commonly selling for \$10.75, Birmingham, and the great bulk of Southern business now being placed is on the basis of that price for No. 2 foundry. Particularly attractive specifications are said to have brought quotations as low as \$10.50, but these are not verified. Some producers are holding for \$11, Birmingham, for the last half, but it is very generally conceded that \$10.75 is the price upon which purchases are being made for that delivery. A Wisconsin manufacturer of gasoline engines is in the market for 1000 tons of No. 2 analysis, deliveries extending over the last half. A northern Illinois manufacturer of agricultural implements is inquiring for 1000 tons of No. 1 foundry. An inquiry for 1000 tons of malleable for Eastern shipment during the last quarter of this year and the first quarter of next is also reported. Among the numerous smaller inquiries in this district are 500 tons of high silicon, 300 tons of Southern foundry and 100 tons of high silicon. Two sales, 500 tons each, of Lake Superior charcoal have been made near Chicago. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace:

Lake Superior charcoal.....	\$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	15.60
Southern coke, No. 2 foundry and No. 2 soft.....	15.10
Southern coke, No. 3.....	14.85
Southern coke, No. 4.....	14.60
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.50
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

(By Mail.)

Billets.—There are very few billet inquiries. The leading interest is maintaining \$30.60, base, Chicago, on open-hearth forging billets, but this price is being decidedly cut by producers making less discard. In some instances it has been shaded fully \$6. We continue to quote \$25.60, base, Chicago, on rerolling billets.

Rails and Track Supplies.—Specifications against standing contracts have been better the past seven days than for some weeks, but new business has fallen off. The total of standard section sales is probably less than 3000 tons, no large percentage of which has emanated from the same source. Light rails continue to hold up well, and track supply business is satisfactory. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—Structural shapes are keeping up better than bars. The Mallers and the Rand-McNally buildings are reported to be a certainty for Chicago this year, and will probably require 4,000 tons and 3,000 tons respectively. Among the principal lettings of the week are the following: Mother House and Academy, Sisters of Notre Dame, Mankato, Minn., 307 tons; warehouse for Harshaw, Fuller & Goodwin Company, Elyria, Ohio, 116 tons; Chicago & Northwestern Railroad, bridges, 7,400 tons, let to American Bridge Company; Chicago & Northwestern Railroad, bridges, 650 tons, to Cambria Steel Company; Satcoy bridge, Ventura County, Cal., 300 tons; addition to post office, Salt Lake City, Utah, 225 tons, to Minneapolis Steel & Machinery Company; one 216-ft. and two 75-ft. spans over Spokane River, Spokane, Wash., 115 tons, to American Bridge Company. We quote plain material from mill at 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Sheets.—The sheet market is suffering from temporary quietness that has reduced the output to about 50 per cent. of mill capacity. Prices are not as firm as they have been for some weeks, and more or less cutting constantly taking place. Specifications against contracts are only moderate and new business is scarce. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Plates.—Mills are running at about 60 per cent. capacity, with no business booked ahead. Every week closes upon mills that have cleaned up all standing orders. Car business is at a standstill, and there is not a single active railroad inquiry in the market. Principal producers are maintaining Chicago mill prices at 1.58c. to 1.63c.; store prices 1.80c. to 1.90c., Chicago.

Bars.—The bar market is very slow. New business is below normal and specifications are light for the season. Rumors of concessions on rerolled hard steel bars are now confirmed and we quote the reduction in this report. Some bar iron sales have been made as low as 1.20c., but they are made by mills whose rolling capacity is limited to certain sizes and cannot be taken as the market. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.58c.; bar iron, 1.22c. to 1.25c.; hard steel bars rolled from old rails, 1.25c. to 1.30c. From store, soft steel bars, 1.80c. to 1.90c., Chicago.

Wire Products.—This branch of trade is holding up remarkably, and new business of greater volume than is usual at this season is reported. Barb wire is easily the most active item in the list, requests for prompt shipment accompanying practically every order. Prices are being well maintained as follows: Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—Routine inquiries for the week under review have been very good, and specifications against contracts are liberal. Kansas City, Kans., has purchased about 200 tons of water pipe. The leading interest was the low bidder on 3,000 tons of water pipe for the city of St. Louis, Mo., but the contract has not yet been awarded. Bids close May 23 on 1200 tons for La Crosse, Wis. Gas business is fair for the season, although business of such nature is largely pickup, as large requirements were bought earlier in the year. Railroad business is at a standstill, the only orders of this nature the past week having been for single carloads. Considerable business is pending, important among probable lettings being the requirements of the city of San Diego, Cal., which will probably total about 7500 tons. Prices are firm as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—There is little life to the scrap market in Chicago, and prices have been reduced on several items; in fact, the entire market is weak. The Chicago, Milwaukee & St. Paul list, approximating 1200 tons, closes today and the Burlington list, aggregating 3500 tons, closes May 25. Prices below are for delivery to buyers' works, all freight and transfer charges paid, per gross ton:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	12.25 to 12.75
Old steel rails, less than 3 ft.....	11.25 to 11.75
Rerolling rails, standard sections, subject to inspection.....	21.00 to 22.00
Old car wheels.....	12.75 to 13.25
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.50 to 11.00
Shoveling steel.....	10.00 to 10.50
Steel axle turnings.....	8.50 to 9.00
The following quotations are per net ton:	
Iron angles and splice bars.....	12.25 to 12.75
Iron arch bars and transoms.....	13.50 to 14.00
Steel angle bars.....	12.25 to 12.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	10.00 to 10.50
Locomotive tires, smooth.....	17.00 to 17.50
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.75 to 11.25
Stove plate and light cast scrap.....	9.25 to 9.75
Railroad malleable.....	10.25 to 10.75
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, May 24, 1911. — By Telegram.

Pig Iron.—There is a slightly more favorable tone to the market, probably due to a few more inquiries coming out and to a little better movement of contract iron. The new carload business also shows some im-

THE IRON AND METAL MARKETS

provement. While the majority of Southern producers are holding out for \$11 at furnace for either prompt or deferred shipment there is a sufficient quantity of \$10.50 No. 2 foundry for sale to make this latter figure the basis for a minimum quotation. Northern No. 2 foundry is quoted around \$13.75 to \$14. Iron-ton, both malleable and basic, are firm at \$14, at furnace, and orders for all three irons covering shipment through the remainder of the year could doubtless be placed at this figure. Southern No. 2 foundry appears to be suffering more from the present weakness in prompt shipment prices than are the lower grades, and instead of the usual differential of 50c. a ton between the lower grades only 25c. is now observed. For July-August movement 200 tons of Southern special analysis iron was sold to a Northwestern melter at \$11, Birmingham; for the same delivery and price a small lot of No. 2 foundry was taken by a nearby consumer. Two orders, totaling about 500 tons of Northern No. 2 foundry, were received from Illinois consumers at \$14 for the last half, and at this price an Indiana firm took 200 tons of malleable. *Inquiries include 200 tons of 8 per cent. silicon for an Indiana purchaser and 300 tons of Southern foundry for northern Indiana, both for the third quarter. There is also a miscellaneous lot of inquiries from nearby consumers for small tonnages of foundry iron. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.25 to \$14.75
Southern coke, No. 2 foundry.....	13.75 to 14.25
Southern coke, No. 3 foundry.....	13.50 to 13.75
Southern coke, No. 4 foundry.....	13.25 to 13.50
Southern coke, No. 1 soft.....	14.25 to 14.75
Southern coke, No. 2 soft.....	13.75 to 14.25
Southern gray forge.....	13.00 to 13.25
Ohio silvery, 8 per cent. silicon.....	17.45 to 17.70
Lake Superior coke, No. 1.....	15.45
Lake Superior coke, No. 2.....	14.95
Lake Superior coke, No. 3.....	14.45
Basic, Northern.....	15.20 to 15.45
Standard Southern car wheel.....	25.75 to 26.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—There is some improvement both in the inquiry and number of orders booked for foundry coke. Quite a number of contracts expire July 1, and foundrymen are beginning to take some interest in the situation, although the majority of them are not operating on anything like full time. Foundry coke prices appear to be fixed around \$2 for prompt shipment and at \$2.10 to \$2.40 for extended contracts. Furnace coke, especially in the Connellsville district, still shows signs of weakness and as low as \$1.40 is quoted for prompt movement, and on a few brands that are considered standard \$1.35 has been done. Contract quotations are between \$1.65 to \$1.90. All the above prices are per net ton oven in the Wise County, Pocahontas and Connellsville fields.

Finished Material.—Reinforcing bars for concrete work are in fairly good demand; hoops and bands also show some improvement, but beams and channels are just about holding their own. Boiler and tank plates have had a better week, and in comparison with previous nearby reports neither mill agencies nor dealers have any complaints to make. Soft steel bars are quoted at 1.40c. mill, Pittsburgh, and around 1.80c. warehouse, Cincinnati. The warehouse price of structural material averages about 1.90c.

Old Material.—The softening in pig iron prices, as well as the slack business in that line, appears to be reflected in the scrap market. There is very little demand for scrap material, and dealers are not disposed to take on additional stocks. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.50 to 8.00
Old iron rails, gross ton.....	13.50 to 14.50
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	11.00 to 12.00
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Philadelphia

PHILADELPHIA, Pa., May 23, 1911.

The only movement in the pig iron market has been in Virginia foundry grades, and this has been the result of a cut of 75 cents a ton by the leading interest. Transactions in other foundry grades have been practically at a standstill, as eastern Pennsylvania producers

have not met the reduction. Further quiet sales of basic iron are reported at \$14.50, delivered. The finished material situation is practically unchanged; there has been a better run of business in heavy steel plates, but in the other lines the volume of business has been somewhat lighter. The demand for steel billets has been smaller. Bars are in light demand, with prices easier. The old material market is practically at a standstill.

Iron Ore.—Buyers continue to show hesitancy in considering purchases, owing to uncertainties confronting the iron trade, and no business of any importance is reported. Importations at this port in the week ended May 20 included 18,252 tons of Swedish, 6364 tons of Spanish and 4900 tons of Cuban ore.

Pig Iron.—Some excitement has been caused in the market by the announced policy of the Virginia Iron, Coal & Coke Company in reducing its price of Virginia foundry grades from the recent \$13 level to \$12.25, at furnace, for prompt and third quarter, and \$12.50 for fourth quarter shipment. These reductions have induced a certain amount of buying in this as well as other districts. Sales here in the last few days aggregate from 2500 to 3000 tons, the largest reported being 500 tons, at prices ranging from \$15.05 to \$15.25, delivered here, for prompt and third quarter, and \$15.30 to \$15.50 for fourth quarter, according to routing of shipments. What effect this reduction will have on other Virginia producers is somewhat problematical. Some talk of blowing out their furnaces, but with one company the new low level has partially been met by its expressing a willingness to take care of its regular trade on a basis of \$12.50, furnace, for delivery up to the end of the second quarter, but refusing to consider new business or enter orders for more extended delivery. The effect of the movement in Virginia iron has practically suspended business in eastern Pennsylvania foundry grades during the week. The principal producers in this territory have, so far, maintained \$15.50 minimum for No. 2 X foundry, although at the present inside range lower grades can still compete with Virginia iron. Under pressure it might be possible to do \$15.25, delivered, for some brands of No. 2 X not so firmly established, but at this time the market is not quotable at that price. Cast iron pipe makers have shown less interest in the market and no important transactions have been closed. The demand for forge iron has been practically at a standstill, and quotations are purely nominal. There have been no fresh sales of any consequence in steel-making grades. One transaction in basic, reported last week, at \$14.50 for second and third quarter shipment, we now learn aggregated 10,000 tons, while reports are heard of another sale, understood to cover even a larger quantity, for the same delivery and at the same price, but definite information is being kept carefully covered. Consumers of basic would probably place orders for that grade for fourth quarter shipment, but producers still refuse to quote for deliveries so far ahead. Negotiations are pending for a fairly good sized lot of low phosphorus iron, but progress slowly, and sales in this grade have been small. The recent price concessions have made general buyers a trifle more cautious, and while moderate quantities of low priced iron have been taken, the general disposition appears to be to await further developments, particularly when it is possible to obtain iron for extended delivery at prices which are lower than recently prevailed for early shipment. The following range of prices is named for standard brands, delivered in buyers' yards in this district, for varying periods up to the end of the second quarter:

Eastern Pennsylvania No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania No. 2 plain.....	15.00 to 15.25
Virginia foundry.....	15.05 to 15.50
Gray forge.....	14.75 to 15.00
Basic.....	14.50 to 15.00
Standard low phosphorus.....	21.00

Ferromanganese.—There is still an absence of inquiry from consumers in this territory, but a light demand from buyers in other districts is reported. Prices are nominally quoted at \$36.50 to \$37, Baltimore, depending on quantity and delivery.

Billets.—Orders have been somewhat smaller in the aggregate, and mills are less actively engaged. The principal maker in this district has been operating its mill on reduced time, having been idle for several days the past week. Prices, however, are fully maintained, consumers as a rule being willing to pay the market price for their moderate purchases. For early shipment open-hearth rolling billets are quoted at \$25.40, and ordinary forging billets, \$30.40, delivered in this vicinity.

Plates.—Eastern mills report a better run of miscel-

THE IRON AND METAL MARKETS

laneous business, and some producers have been more actively engaged the past week, but orders being largely for early delivery do not insure continued activity unless the same rate of demand is maintained. There has been very little business in large quantities, although an inquiry for 2200 tons for steel pipe for western shipment is being figured on. A fair demand for locomotive and boiler steel is noted. Prices are being fully maintained, ordinary heavy plates being quoted at 1.55c. minimum, for delivery in this territory.

Structural Material.—No new propositions of importance have developed in this immediate vicinity. The contract for the tower building for the Maryland Casualty Company, Baltimore, about 1100 tons, has been awarded to Dietrich Brothers, of that city. Local building work has been confined to small jobs. The demand for plain shapes has not been large and mills show no gain in their productive rate. Fabricators are fairly busy with work in hand. Prices of plain shapes are unchanged at 1.55c. minimum, delivered here, while fabricated prices are still reported as being ragged.

Sheets.—Considerable irregularity prevails in the volume of business and size of individual orders. While mills continue fairly active they have, as a rule, little forward business on their books and can seldom figure on an operating rate for more than a few days ahead. Recent orders have been lighter. The following range of prices is named for prompt shipments, Eastern maker's mill: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The demand for defined iron bars continues to drag and, as mills are anxious for business, concessions have been made when the tonnage and specifications offered have been considered desirable. For such business 1.20c., Eastern mill, now represents the minimum, although for ordinary business 1.25c. is the usual price. For delivery in this territory 1.27c. to 1.35c. about represents the range of the market. Steel bars are not very active, but the price remains at 1.55c. minimum, delivered here.

Coke.—Little business has been done. The larger consumers do not appear anxious to contract, buying in small lots for prompt shipments, both in furnace and foundry grades. The only important inquiry is from the United States Government, which is inquiring for 3000 tons of foundry coke for use at the Boston, Brooklyn and League Island Navy Yards. Producers are not forcing business at current prices, although an occasional lot of cheap prompt coke comes out. The following range of quotations is named, per net ton, for delivery in buyers' yards, in this district:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke	4.15 to 4.55
Mountain furnace coke	3.30 to 3.65
Foundry coke	3.75 to 4.15

Old Material.—Actual business has been light. Sellers of heavy melting steel have become a little firmer in their ideas as to prices, based on sales in other districts, but these, while a trifle higher, have not advanced to a point at which material would be diverted from this district. Small lots of No. 1 heavy melting steel are occasionally sold at \$13, delivered, although any quantity would easily command \$13.25, but sellers are not offering at that basis, preferring to hold what steel they have. The movement in special and rolling mill grades has been small and in many grades insufficient business to establish quotations has been done. The following range of prices about represents sellers' ideas of the market for deliveries in consumers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.75
Old steel rails, rerolling.....	14.00 to 14.25*
Low phosphorus heavy melting steel scrap.....	16.75 to 17.25
Old steel axles.....	19.25 to 19.75*
Old iron axles.....	24.00 to 24.50*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.50 to 12.75
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast.....	13.00 to 13.50
Railroad malleable.....	11.50 to 12.00
Grate bars, railroad.....	10.50 to 11.00
Stove plate.....	10.00 to 10.50

*Nominal.

Birmingham

BIRMINGHAM, ALA., May 22, 1911.

Pig Iron.—It develops that the buyers have to a certain extent won out in their fight to break down the

\$11 schedule on pig iron. About 9,000 tons is known to have been sold by one large interest the last few days on a basis of \$10.50 for No. 2, though the price on lots under 500 tons appears to be held still very firmly at \$11. Some of the larger buyers are now arguing just as insistently for a \$10 price as they did before for \$10.50, and still claim they will not buy at better than their own ideas of prices. It still appears to be a buyer's market, and undoubtedly, with the accumulation that appears on the yards of one or two interests, it would take a very heavy buying movement to establish the desired feeling of confidence in the situation. Some fair-sized sales of carwheel iron are reported at \$22 to \$22.50. Despite the feeling that prices may go lower, shipments continue at a fair rate, and it is felt that the showing for May will not be a bad one in the comparison of stocks on May 31 with April 30. Quotations seem well established this week on the following schedule for second and third quarter shipment:

No. 1 foundry and No. 1 soft.....	\$11.00
No. 2 foundry and No. 2 soft.....	10.50
No. 3 foundry and No. 3 soft.....	10.00
No. 4 foundry.....	9.75
Gray forge.....	9.50
Mottled.....	9.25
Standard basic, chill cast.....	10.50
"Off basic".....	10.00
Charcoal carwheel iron.....	22.50

Cast Iron Pipe.—The demand and general inquiry are reported good. Shipments are going forward day by day at a liberal rate on contracts. The requirements for San Diego, Cal., about 7,500 tons, are expected to be placed with local foundries the current week, and it is stated that no concessions in price are being made. Some good business for oil lines is up for consideration. All told the cast iron pipe makers seem to be better satisfied with conditions than has been the case for a year. Prices are quoted, per net ton, on board cars here, as follows: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., average, \$21, with the usual differential of \$1 more for gas pipe.

Old Material.—Dealers are slow to make any large commitments either way, and the market continues in the state of apathy which has characterized it for many weeks. It would take a most active pig iron market to put any life in the scrap market, and dealers are far from optimistic. Prices continue to rule about as follows, per gross ton, on board cars here:

Old iron axles (light).....	\$14.50 to \$15.00
Old steel axles (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, May 23, 1911.

Iron Ore.—The market is extremely dull. A few small sales are reported, but no new inquiries for round lots are pending. Some of the ore operators are still hopeful of being able to close a contract with the Bethlehem Steel Company, which recently came out with an inquiry for a round tonnage of non-Bessemer ore for delivery over a period of five or ten years. Figuring on the Mesaba basis, the price offered is about 80 cents below the present market. While it appears improbable that high-grade ore can thus be secured, there is a possibility that the steel company may close a contract for an off-grade ore. Shipments continue light and there is practically no wild chartering of vessel tonnage. Independent vessel interests do not look for much improvement for several weeks. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

(By Telegraph.)

A local ore firm has just closed contracts for the sale of 400,000 tons of non-Bessemer ore. One sale was 300,000 tons for delivery at a Lake Michigan port over three years and another sale was 100,000 tons of low grade ore for delivery at Lake Erie ports this season.

Pig Iron.—Inquiries appear to be slightly better, but sales are mostly in very small lots. The foundry trade continues dull, and foundrymen see little incentive in placing last half iron contracts at present. Some in-

THE IRON AND METAL MARKETS

definite inquiries have come out from consumers who say that they are feeling the market and that they have not yet decided when they will place contracts. A central Michigan foundry is in the market for 500 tons of No. 3 foundry for the last half. There is an inquiry from a New England consumer for 500 tons of malleable for the last half of 1911, and 500 tons for the first half of next year. We note one sale of 200 tons of malleable for early delivery to a Michigan plant at \$13.75, southern Ohio furnace. There is a scattering inquiry for small lots of Ohio silvery iron for early delivery, and the usual quotation of \$16.50 at furnace for 8 per cent is being shaded at least 25 cents a ton. Prices on Northern foundry iron are unchanged, but inquiry for a round lot might bring out lower quotations. Buyers are offering prices for Southern iron ranging from \$10 to \$10.50, Birmingham. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	\$15.90
Basic	14.00
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Gray forge	13.50
Southern foundry, No. 2.....	\$15.10 to 15.35
Jackson Co. silvery, 8 per cent. silicon.....	17.75 to 18.00

Coke.—Some contracts are being taken for foundry grades for the last half and in a few cases for a year, buyers getting the same prices for an entire year as for the last half. There is no demand for furnace grades. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton at oven, for spot shipment, and \$1.75 to \$1.80 for the last half. Connellsville 72-hr. foundry coke is held at \$1.75 to \$2 for prompt shipment, and \$2 to \$2.40 for the last half. Wise County coke is quoted at \$2 for spot shipment and \$2.25 for the last half.

Finished Iron and Steel.—The demand for structural material is holding up well, but only a limited amount of business is coming from manufacturing plants. The latter are following the policy of ordering often, but in very small lots. The largest new structural inquiry is for 1,000 tons for the new Eastern plant of the Peck, Stow & Wilcox Company, bids for which will be received in Cleveland this week. Bids were received May 22 for the Y. M. C. A. building in Cleveland, 1500 tons; some bidders submitted special proposals so that it will require a little time to figure out the lowest bid. John Gill & Son have been awarded the contract for the new plant of the Taylor & Boggis Foundry Company, Cleveland, about 350 tons, and will sublet the steel contract shortly. Some of the implement makers are feeling the market on steel bar prices, but mill agencies do not expect that contracts will be placed by this trade for some time. There are occasional reports that prices on steel bars are being shaded, but there appears to be no ground for these reports. The demand for steel girder rails for traction lines shows more activity than for a long time. There is also considerable inquiry from this source for spikes. The Lorain Steel Company has taken an order for 1000 tons of girder rails from the Cleveland Railway Company, and an order from the Columbus Railway & Light Company for 1100 tons, as well as several orders from Ohio traction lines for 200 to 300 tons. The demand for sheet continues rather light and the usual concessions are being made by the smaller independent mills. The inquiry from a western New York car company last week for 1150 tons of iron bars brought out prices as low as 1.20c., at mill. The usual quotation on small orders is 1.30c., at mill.

Old Material.—Inquiries for fair tonnages of heavy melting steel have come from the Pittsburgh district in the past few days, and local dealers have sold some steel scrap for Monessen, Pa., and Steubenville, Ohio, delivery, these sales being made at about \$13, delivered, or \$11.50, Cleveland. Sentimentally the market is slightly firmer, as a result of this activity in steel scrap. The local demand is limited to very small lots. Turnings have advanced slightly; otherwise prices remain about stationary. Not much scrap is being offered for sale in this market. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.00 to 11.50
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	10.75 to 11.00
Railroad malleable	11.50 to 12.00
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings.....	8.00 to 8.50
No. 1 busheling.....	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate	10.25 to 10.50
Bundled tin scrap.....	11.00 to 11.50

The German Iron Market

BERLIN, May 12, 1911.

The iron trade situation continues to be involved in considerable uncertainty and doubt as to future developments. While little change has occurred within a fortnight, the tendency appears to have grown somewhat weaker in certain sections of the trade. Two tendencies are observable, according as any given concern operates on a large scale or belongs to the smaller class of producers. The former are still pretty well satisfied with the state of business, but the smaller establishments are in many cases complaining of insufficient work and low prices. Some sections report considerable price cutting, which may be taken as a sure indication that in general the situation has weakened. Some cutting in heavy plates is asserted to be going on, notwithstanding the fact that this specialty is covered by a price agreement. It is also stated positively by one western newspaper of prominence that price cutting on beams is very general, even 80 per cent. of the sales being at cut prices; but as beams are included in the class fully controlled by the Steelworks Union this report must refer to sales by dealers.

A Quieter Trade in Ores

The trade in ores has grown quieter, and prices have weakened somewhat for Spanish ores, but Swedish ores remain firm. Buying in foreign grades is light. Imports for April, however, remained very heavy. They reached 1,208,000 tons, as against 990,000 for April, 1910. The feeling in the trade is that Spanish ores are too high in proportion to the price of iron, and this is why furnacemen are rather hesitating about laying in stocks at existing rates. Russian manganese ores are also neglected and dull. Iron manufacturers are congratulating themselves that the new commercial treaty with Sweden contains a provision pledging Sweden not to collect an export duty on ores. This is a most important consideration for the German iron trade, which uses very large quantities of Swedish ores. The contracts for them extend for some years ahead.

Pig-Iron Market Unchanged

The pig-iron market remains practically unchanged. Iron on contract is being called for delivery at a satisfactory rate, but little new ordering is going on. There is still considerable foreign buying of foundry iron, but mainly in small lots. Some little supplementary buying for home delivery is reported, but most consumers have contracted for their requirements to the end of the year. The furnaces, according to agreement pending the existing negotiations for extending the syndicate, are taking no orders for 1912 delivery. The prospects for a general organization of the trade have materially improved. Several days ago a compromise was agreed upon with the Siegerland group of furnaces by which they are allowed an increase of 70,000 tons in their allotments over what the syndicate had first offered them. One important establishment of that district, the Geisweider Eisenwerke, will not enter, but as it consumes its entire make, except about 10,000 tons, in its own mills its independent position will not disturb the trade. It remains now to reach an agreement with the Lorraine-Luxemburg group, but the task of getting them to come in is expected to prove a considerably harder job than with the Siegerland people.

The production of pig in April was 1,285,400 tons, comparing with 1,322,000 in March, and 1,202,000 tons in April, 1910. For the first four months of the year production reached 5,107,300 tons, being a gain of 386,000 tons.

Waste and scrap iron shows a weaker tendency. More material is coming upon the market, and prices have given way within the past few weeks.

Structural Trade Is Active

Trade in semi-manufactured steel remains normal, and calls for delivery can be regarded as satisfactory,

THE IRON AND METAL MARKETS

after the remarkably heavy movement in March. Structural steel continues active under the brisk building operations at home, and foreign buying continues pretty good. In steel rails the volume of business has increased, partly owing to the larger orders of the Prussian railway authorities, and partly owing to good foreign business.

In the bar-iron trade there is a continuance of the confused and unsatisfactory conditions previously reported, and the fluctuating and uncertain price situation remains unchanged. Some of the mills, chiefly the great establishments, have orders as far as two months ahead, but not a few of the smaller works are in lack of orders; and they are doing most of the price cutting previously referred to. The reports do not agree as to heavy plates. Most of them state that orders have increased, but a few assert the opposite to be the case. Business in ship plates is very heavy; but it appears that not much new work is coming in. In the home trade prices are maintained, under the agreement, without difficulty; but in the export trade they are depressed by Belgian competition. Wire rods are quite active, especially for export. Home business in wire and in wire nails is very quiet. Piping is in active demand in the western part of the country, but from the Silesian district very unsatisfactory conditions are reported.

The spring trade in the hardware line was considerably more active than hitherto, but still it disappointed the high hopes of manufacturers. Many sections of the trade report overproduction, and nearly all complain of unsatisfactory prices. At Selingen a lighter home demand for cutlery is mentioned, but the export requirements are pretty heavy. A big demand for automobile and bicycle parts is mentioned as one of the most favorable points in the trade. There is considerable export business in locks and other builders' hardware.

April Exports Unsatisfactory

The April exports of steel were not of satisfactory volume. According to the trade returns the exports of blooms, billets, ingots, etc., amounted to 41,958 tons, against 57,122 tons in April, 1910; beams 28,390, against 45,925 tons; steel rails, 37,406 against 42,432 tons; and ties, 4,828 against 11,806 tons.

This week's news from the Belgian trade is again unsatisfactory. Prices are still falling, foundry iron and steel-making qualities are lower, and a cut of one franc on thin sheets for export is mentioned.

The German Niles Machine Tool Works, situated near Berlin, again failed last year to earn a dividend. After meeting all expenses and writing off a moderate amount, the company had net profits of less than 13,000 marks. It was established some ten years ago, but has never paid a dividend, and even lost a great part of its capital in the first five years of its existence.

Buffalo

BUFFALO, N. Y., May 23, 1911.

Pig Iron.—The fore part of the week gave indications of renewal of interest among consumers and inquiry for a considerable aggregate tonnage was received, including about 3000 tons of medium high silicon. Orders for about 3000 tons were also placed, mostly in small lots, but embracing one order for 1500 tons from a New Jersey buyer for No. 2X iron for last half delivery. The interest was not sustained during the week, however, and slackened to about the pace of the few weeks preceding, for scattering small lots. Specifications on contracts show a good volume. Prices are unchanged from last week, although a little better tone is observable and a somewhat more confident feeling on the part of furnace men that prices will soon improve. We quote as follows, for second and third quarter delivery, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 2 foundry.....	13.50 to 13.75
Grav forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Basic.....	14.25 to 14.75
Charcoal.....	16.75 to 17.50

Finished Iron and Steel.—Plain and fabricated structural material are the lines showing the greatest activity. Steel bars and angles are quiet, although a fair aggregate of small orders is coming in. Plates are dull and inactive and the demand for shafting has fallen off noticeably. Specifications on contracts from agricultural implement makers tributary to this district and

from Canada are well maintained. Business continues good in material for traction lines, and one or two new projects are reaching a stage which will result in orders for considerable tonnages during the summer. The leading interest reports a large order for steel products, aggregating 1500 tons, from the interior of the State; also the closing of contracts for considerable tonnages in railroad material and bar products for Canadian export. Prices of steel bars are being firmly maintained. The American Bridge Company has been awarded the contract for the 4000 tons of steel required for the 12-story hotel to be erected at Cleveland by E. M. Statler, of Buffalo. Bids for the Buffalo General Electric Company's 17-story office building, requiring about 2000 tons, will be closed May 24.

Old Material.—There has been no perceptible change in conditions in this market from the stagnation which has existed for the past several weeks. There is practically no buying by consumers, who apparently take no interest in the market, and the only tonnage moving is on very limited transactions between dealers. Prices are unchanged and nominal. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery cast scrap....	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.00 to 11.50
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings.....	6.25 to 6.75
Clean cast forgings.....	6.00 to 6.25

New York

NEW YORK, May 24, 1911.

Pig Iron.—The market has been rather more active in the past week, partly under the stimulus of the reduction of 75 cents on iron for early and third quarter delivery made by the largest Virginia producer. This company, it is understood, started out to sell 25,000 tons of its accumulated stock at \$12.25 at furnace for No. 2 X foundry iron, delivery in the third quarter, and at \$12.50 for fourth quarter delivery. Sales for this company are made through various firms, but most of the selling at the new prices has been by one interest. Something over 12,000 tons has been sold, chiefly in New England and eastern Pennsylvania. Not much has been done in the New York district. Other Virginia sellers have not met the low prices, although it is understood some would sell at \$12.50 at furnace for early delivery. One sale of 1500 tons of No. 2 X iron has been made in New Jersey, the iron coming from Buffalo. Buffalo prices vary. It is understood that as low as \$13.25 has been done out of Buffalo on early delivery iron, while \$13.50 is asked for forward delivery. With \$1.25 canal freight Buffalo iron now makes very sharp competition for Eastern producers selling in New York territory. Some business in malleable pig iron has been done in New England, the most of it by one Buffalo interest. There is rather more willingness to buy, but prices have been coming closer to buyers' ideas. Whether attributable to the reduction in Lake ores or not the whole pig iron market has been on a lower basis in the past two weeks. As has been the case for weeks little Alabama or Tennessee iron is coming into the East, and even at the recent concessions on Alabama iron Northern producers are holding this market. We quote on Northern iron at tidewater as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.75 to \$15. For Southern No. 1 Foundry we quote \$15 to \$15.75; No. 2, \$15 to \$15.25.

Steel Rails.—The Carnegie Steel Company has sold 2000 tons to Z. W. Davis. The Buffalo, Rochester & Pittsburgh has bought 600 tons and the McClintic-Marshall Construction Company 500 tons. The Kansas City Southern's purchase of 14,000 tons is practically closed, being divided between the Maryland Steel Company and the Steel Corporation. A 10,000-ton lot is now under negotiation.

Finished Iron and Steel.—A better tone pervades the market, but it is doubtful if inquiries for material have come in any increased volume over what has been the prevailing rate of the last few weeks. The tonnage of structural materials is good, all things considered, with awards of promising size likely to be settled in the immediate future. The American Radiator Company is asking for bids on its projected plant at

THE IRON AND METAL MARKETS

Bayonne, N. J., involving about 600 tons, and bids have lately been asked for the Aeolian building, New York 3300 tons; Riggs office building and theater, Washington, D. C., 2000 tons; highway bridge, McElhattan, Clinton County, Pa., 1000 tons, and extension of plant, International Harvester Company, Auburn, N. Y., 300 tons. A building for the east side of Broadway, at Liberty street, New York, is projected. Other new work includes 1500 tons of structural material for the Crowell, Sherman, Stalter Company for the New York Barge canal and 1000 tons for late delivery for piershed work at Thirty-third street, Brooklyn, N. Y. The general contractor for the 6000-ton Bamberger store building structure in Newark, N. J., the Geo. A. Fuller Company, has not placed the steel contract at this writing. Late structural contract awards are in part as follows: Maryland Casualty Company building, Baltimore, 1000 tons to Dietrich Brothers; McGibbon loft building, West Thirty-first street, New York, 900 tons, to Radley Steel Construction Company; viaducts at Scranton, Pa., 1600 tons, to York Bridge Company; building, American Smelting & Refining Company, Baltimore, 400 tons, to McClintic-Marshall Construction Company; asylum, Schuylkill Haven, Pottsville, Pa., 350 tons, to Eastern Steel Company; highway bridge, New Jersey, 500 tons, to Milliken Brothers; building (fire insurance company), Philadelphia, 900 tons, to Jones & Laughlin Steel Company. Some 12,000 tons of rolled steel and 1000 tons of pig iron for the emergency dams for the Panama Canal Commission will be furnished by an American company. Quotations are: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.30c. to 1.40c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Old Material.—The market is inactive. All business now being done is the result of solicitation, as there appears to be a complete absence of inquiry. Heavy melting steel scrap is the leader in transactions, but even in this material only small lots are changing hands, the largest sale reported in the week having been 200 tons. The limited character of current business is shown by the fact that frequent sales are reported of carload lots of steel scrap. The iron rolling mills are almost completely out of the market as buyers. The foundries are imitating the example of the steel works in becoming exceedingly critical as to the deliveries made on contracts, and rejections have lately been quite numerous in this line. Quotations under these circumstances are practically nominal, as follows per gross ton, New York and vicinity:

Old girder and T-rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Rerolling rails.....	12.00 to 12.25
Standard hammered iron car axles.....	22.00 to 22.50
Old steel car axles.....	17.25 to 17.75
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.50 to 5.00
Cast borings.....	5.50 to 6.00
Wrought turnings.....	6.00 to 6.50
Wrought pipe.....	10.50 to 11.00
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

Cast Iron Pipe.—The successful bidder, May 19, on the contract placed by the New York Department of Water Supply, Gas & Electricity for laying pipe in the borough of Richmond, involving 6500 tons, was of course a contractor, who will buy the pipe. The same department opens bids to-day on pipe-laying contracts for the borough of the Bronx, involving 8000 tons of pipe, and for the borough of Queens, 1580 tons. No other important lettings are at present in sight in this section. More inquiry is reported from private buyers, indicating that considerable business is on the way. Carload lots of 6 in. continue to be quoted at \$21 to \$22 per net ton, tidewater.

Ferroalloys.—A slightly better demand for ferromanganese has developed, but there is considerable anxiety to sell and as low at \$36.50, Baltimore, has been done. Buyers are inquiring for a few small lots of ferrosilicon and dealers are quoting on the basis of \$52.50, Pittsburgh.

Reports that the Westinghouse Electric & Mfg. Company had placed contracts for the building of a new pattern shop at Trafford City, Pa., are incorrect. No contracts for new buildings or other equipment at Trafford City have been placed by this company, and probably will not be for some time.

Metal Market

NEW YORK, May 24, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.									
Copper, New York.		Electrolytic.		Tin.		New York.		Lead.	
May.	Lake.	May.	Lake.	May.	Lake.	May.	Lake.	May.	Lake.
18.....	12.25	12.00	12.00	43.20	43.20	4.40	4.25	5.50	5.20
19.....	12.25	12.00	12.00	43.60	43.60	4.40	4.25	5.50	5.20
20.....	12.37½	12.12½	12.12½	43.50	43.50	4.37½	4.22½	5.50	5.20
22.....	12.37½	12.12½	12.12½	43.50	43.50	4.37½	4.22½	5.50	5.20
23.....	12.37½	12.12½	12.12½	44.35	44.35	4.37½	4.22½	5.50	5.20
24.....	12.37½	12.12½	12.12½	44.55	44.60	4.37½	4.22½	5.50	5.20

A sensational advance in the price of spot tin has taken place in London but this market has not followed the rise so closely, as supplies here for immediate use are plentiful. Copper is stronger than it was a week ago, selling at ½c. higher. Lead is weaker. Spelter is dull and neglected. Hungarian grades of antimony are freely offered at lower prices.

Copper.—The market is decidedly stronger than it was a week ago and some excellent sales have been made, especially for export. The United Metals Selling Company is offering electrolytic copper at 12.25c., delivered in the Naugatuck Valley, 30 days, which is equal to 12.12½c., New York. Some large selling interests are demanding more than that figure and others are meeting the price. Last Thursday and Friday there were good sales of copper at 12c. for electrolytic and 12.25c. for lake, and on Monday the price strengthened perceptibly. A great deal of the copper sold was for early delivery, and the action of the buyers clearly indicated that they are willing to take stocks at around 12c. but the demand fell off yesterday and to-day. The exports of copper have been very good so far this month, amounting in all to 21,046 tons with seven days to hear from. In London to-day spot copper was stronger than a week ago at £55 5s. and futures were selling at £55 16s. 3d.

Pig Tin.—The London market witnessed a sensational advance in pig tin prices during the week, the quotation on tin for immediate delivery going from £190 8s. 10d. last Wednesday to £204 this morning. There was an advance of £5 during the last two days. On the other hand, the price of futures has been practically stationary. Last Wednesday futures were quoted at £190 15s. and the same price was made this morning, the fluctuations during the week being very light. This means that the London syndicate has again cornered the market on spot stocks, but the available supplies here are so plentiful that the American market has not answered to the advance to a corresponding extent. A week ago spot tin was offered at 43c., New York, and this morning it could be had at 44.55c., which is considerably below the import parity. Consumers here are not taking much interest in the situation and there is hardly any trading between dealers. This market has now been below the London parity for more than six weeks, and as there are prospects of a squeeze in London in June it will not surprise those who are following the situation closely to see tin bought in this market very shortly for re-export. Consequently it would seem wise for consumers who are in need of stocks for early use to supply their wants before this takes place. Tin for delivery after the middle of June is plentiful enough in London at present at around £14 less than the price of spot tin, but if the syndicate operations continue successful the July supplies will shortly go up in value. The arrivals of tin so far this month have been very light, amounting in all to 2219 tons. It is judged that the month's arrivals will not exceed 2400 tons, as of 945 tons afloat only about 175 tons are expected to be at dock before the month is out.

Tin Plates.—Quotations on foreign tin plates have receded 1½d., the price this morning for plates at Swansea, Wales, being £13 6d. Good deliveries of domestic tin plates are being made, but new inquiries are not plentiful and there is considerable competition for the business in sight. Quotations, however, are firm at \$3.94 for 100 coke plates.

Lead.—Lead is considerably weaker, and since last Monday it has been sold both in St. Louis and this market at 2½ points less than a week ago. The demand is very light and there are rumors to the effect that the leading interest is preparing to make a reduction in its quotation on desilverized lead. The price today in St. Louis was 4.22½c., and in New York it is being sold by outside interests at 4.37½c.

Spelter.—While spelter appears steady at 5.20c., St.

Louis, it is apparent that some important sellers are cutting that price, as dealers who have offered a slight concession have been losing the business. The price of spot spelter here is 5.50c., because of the scarcity of supplies in New York, but most buyers are placing their orders for stocks for immediate shipment from East St. Louis.

Antimony.—Interest is being taken in Hungarian antimony, good sized quantities of which are being offered in Europe at a price corresponding to 8c. Some holders of outside lots here are meeting that quotation, but both buyers and sellers seem to be awaiting developments. Cookson's is nominally 9.50c. and Hallett's 9c.

Old Metals.—Consumers are buying cautiously. Sellers' selling quotations are unchanged as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Chicago

CHICAGO, May 23, 1911.

A fair tonnage of copper is being sold, but consumers are buying only for immediate consumption. Tin is somewhat stronger and is now quoted at 43.75c. No change is noted in lead. The prices quoted on antimony are largely nominal, and it is reported that considerable shading is being done on desirable specifications. We quote Chicago prices as follows: Casting copper, 12 $\frac{3}{4}$ c.; lake, 12 $\frac{1}{2}$ c., in carloads, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; pig tin, carloads, 43.75c.; small lots, 46.50c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10 $\frac{1}{4}$ c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12c.; copper bottoms, 10c.; copper clips, 11 $\frac{1}{4}$ c.; red brass, 10 $\frac{1}{4}$ c.; yellow brass, 9c.; lead pipe, 4 $\frac{3}{8}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin pipe, 36c.

Iron and Industrial Stocks

NEW YORK, May 24, 1911.

The stock market has continued its upward course, on which it was started by the Supreme Court decision in the Standard Oil case. Some of the advances made in the past week were quite important. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com...	7 $\frac{3}{4}$ -8 $\frac{1}{4}$	Railway Spg., com...	33 $\frac{1}{2}$ -35 $\frac{7}{8}$
Allis-Chalm., pref...	29 $\frac{1}{4}$ -31	Railway Spg., pref...	100 $\frac{7}{8}$ -102 $\frac{3}{4}$
Beth. Steel, com...	32 $\frac{3}{4}$ -34	Republic, com.....	30 $\frac{7}{8}$ -32 $\frac{1}{4}$
Beth. Steel, pref...	61-64	Republic, pref.....	95-96 $\frac{7}{8}$
Can, com.....	11 $\frac{3}{4}$ -12 $\frac{1}{2}$	Sloss, com.....	52 $\frac{1}{2}$
Can, pref.....	85 $\frac{3}{4}$ -88 $\frac{7}{8}$	Pipe, com.....	17-18 $\frac{1}{2}$
Car & Fdry., com...	54-57	Pipe, pref.....	56 $\frac{3}{4}$ -58 $\frac{3}{4}$
Car & Fdry., pref...	118-120	U. S. Steel, com.....	78 $\frac{5}{8}$ -81 $\frac{1}{4}$
Steel Foundries.....	43-44 $\frac{1}{2}$	U. S. Steel, pref...	119 $\frac{5}{8}$ -120 $\frac{3}{4}$
Colorado Fuel.....	31 $\frac{1}{2}$ -35	Westinghouse Elec...	72 $\frac{1}{2}$ -75 $\frac{1}{4}$
General Electric...	159 $\frac{3}{4}$ -161 $\frac{3}{4}$	Va. I. C. & C.....	61 $\frac{3}{4}$ -62
Gr. N. ore cert.....	62 $\frac{1}{4}$ -63 $\frac{1}{2}$	Am. Ship, com.....	67-68 $\frac{3}{4}$
Int. Harv., com...	126-128 $\frac{7}{8}$	Am. Ship, pref...	112 $\frac{1}{2}$ -113
Int. Harv., pref...	126-127	Chi. Pneu. Tool.....	51 $\frac{3}{4}$ -53 $\frac{3}{8}$
Int. Pump, com...	40-40 $\frac{3}{4}$	Cambria Steel.....	45 $\frac{3}{4}$ -46 $\frac{1}{4}$
Int. Pump, pref...	88 $\frac{1}{2}$ -88 $\frac{7}{8}$	Lake Sup. Corp.....	28 $\frac{7}{8}$ -29 $\frac{1}{4}$
Locomotive, com...	38 $\frac{1}{2}$ -43 $\frac{1}{4}$	Pa. Steel, pref...	106 $\frac{1}{4}$ -106 $\frac{3}{4}$
Locomotive, pref...	106 $\frac{1}{4}$ -109	Warwick.....	10 $\frac{1}{2}$
Nat. En. & St., com...	17-17 $\frac{5}{8}$	Crucible Steel, com...	13 $\frac{1}{4}$ -14 $\frac{1}{8}$
Pittsburgh Steel, pref...	105	Crucible Steel, pref...	81 $\frac{1}{2}$ -82 $\frac{3}{4}$
Pressed Steel, com...	33 $\frac{1}{2}$ -36 $\frac{1}{4}$	Harb. Wk. Ref., com...	40 $\frac{3}{4}$ -41
Pressed Steel, pref...	100-101 $\frac{3}{4}$	Harb. Wk. Ref., pref.....	96

Dividends

The Crucible Steel Company of America has declared the regularly quarterly dividend of $\frac{1}{4}$ per cent on the preferred stock, payable June 30.

The United States Cast Iron Pipe & Foundry Company has declared the regular quarterly dividend of $\frac{1}{4}$ per cent on the preferred stock, payable June 1.

The Pittsburgh Steel Company has declared the regular quarterly dividend of $\frac{1}{4}$ per cent on the preferred stock, payable June 1.

The Harbison-Walker Refractories Company has declared the regular quarterly dividend of $\frac{1}{2}$ of 1 per cent on the common stock, payable June 1.

The West Penn Steel Company, Brackenridge, Pa., in the Pittsburgh District, has declared an initial dividend of $1\frac{1}{2}$ per cent on the common stock.

Personal

Several changes have just been made in the sales department of the National-Acme Mfg. Company, Cleveland, Ohio. W. S. Chase, who has been sales manager, has become general sales manager. A. W. Hopkins, formerly purchasing agent and office manager, has been appointed sales manager of the product department. E. C. Woolgar, formerly Western sales manager, has been appointed sales manager of the machinery department. R. J. Preston succeeds Mr. Woolgar as manager of the Western office and warehouse in Chicago.

Gordon C. Keith, managing editor of Canadian Machinery, the Power House and Canadian Foundryman, has resigned to join the editorial staff of the Canadian Manufacturer, Toronto. He is a graduate of Queen's University in mechanical and civil engineering and previous to making his connection with the technical publishing business had six years' experience in manufacturing plans.

The J. Faessler Mfg. Company, Moberly, Mo., maker of Boss and Universal flue expanders, flue cutters and other boiler tools, has reorganized its sales department and placed Charles F. Palmer in charge, as sales manager, with office at 810 Olive St., St. Louis. He was formerly representative of the Frank E. Palmer Supply Company, St. Louis.

Charles W. Cade has recently resigned as foundry manager of the Blake & Knowles Steam Pump Works, East Cambridge, Mass., which position he has held for the last eight years. He is at present engaged in consulting work.

W. M. Chamberlin, for many years associated with Detroit firms as advertising manager, will conduct a general advertising agency for trade and technical service, with headquarters in that city. He has already secured several active accounts, including the Detroit Twist Drill Company, Wright Mfg. Company, Austin Separator Company and the American Supply and Machinery Manufacturers' Association. This last account combines advertising service to the members of the association, together with a campaign for securing new members.

William C. Redfield, vice-president of the American Blower Company, Detroit, Mich., who is Congressman from the Fifth District of New York, has returned home from the trip around the world, on which he started two or three months ago. The extra session of Congress necessitated his cutting short the trip while in India.

William Heindel, president of the Cincinnati Lathe & Tool Company, Cincinnati, Ohio, was operated on for appendicitis May 18, and is now recovering rapidly.

Harry A. Hunt has been appointed, and assumes the duties at once, as Eastern sales agent of the Edgar Allen American Manganese Steel Company, with offices at the company's plant, at New Castle, Del. He was for fifteen years connected with the Taylor Iron & Steel Company at High Bridge, N. J., where he was engaged in the engineering, operating and sales department. Mr. Hunt takes the place formerly held by Volney W. Mason, Jr., who has resigned and retired from the employ of the Edgar Allen American Manganese Steel Company.

Durand C. Alexander, Jr., who is a special agent for the Bureau of Manufactures, Department of Commerce and Labor, and who formerly represented the Nicholson File Company in the Far East, will sail for the Orient June 6 and will make reports to the government on the possibilities for selling American machinery there.

William Hill, of the machine tool building firm of Alfred Herbert, Ltd., Coventry, England, is spending several weeks in this country visiting American machine tool builders.

D. M. Weir, formerly secretary and manager of the Phillips Sheet & Tin Plate Company, operating mills at Weirton and Clarksburg, W. Va., has been elected vice-president and secretary of the company.

The American Foundrymen's Association

Sixteenth Annual Convention

PITTSBURGH, PA., May 23, 1911.—The sixteenth annual convention of the American Foundrymen's Association opened most auspiciously today in the Pittsburgh Exposition Building. Not at any previous meeting was such a wide range of machinery exhibited as at this, and a most gratifying feature of the exhibits this year is that practically all of them were installed and in operation when the doors were opened. A very large number of molding machines are shown, and as indicative of the development in this direction, there is an increased number and variety of jolt ramming machines on exhibition. One new type, which is attracting much attention, is electrically driven. Core making machines, of various kinds, are also plentiful. The registration of members and visitors since Monday has been very heavy, and the indications are for a record breaking attendance.

Major Joseph T. Spear, of the Pittsburgh Valve Foundry & Construction Company, president of the American Foundrymen's Association, opened the convention promptly at ten o'clock. This was a joint session of the two sections, with the parent body, and there was a large attendance present. Major Spear introduced J. S. Seaman, president of the Pittsburgh Foundrymen's Association, who, on behalf of the local organization, welcomed the visitors most heartily to the Steel City.

H. M. Irons, assistant city solicitor, representing Mayor William A. Magee, and W. H. Stevenson, vice-president of the Pittsburgh Chamber of Commerce, followed Mr. Seaman with felicitations of welcome. These were responded to by Alfred E. Howell, Nashville, Tenn., one of the vice-presidents of the American Foundrymen's Association.

Major Spear followed with a brief address, in which he reviewed the progress of the foundry industry from the days when the rule of thumb methods prevailed to the present scientific methods of melting iron and making castings, for which advancement, he added, most credit was due to the work of the American Foundrymen's Association. He particularly complimented H. E. Field and Dr. Moldenke for the diligence and interest shown in the securing of papers for the present meeting. Reviewing briefly trade conditions, he said:

The conditions of the foundry industry to-day have been caused, in my opinion, by a combination of circumstances which I cannot recall ever having occurred before in my business experience. The prosperous business of 1906 and 1907, as we all remember, was followed by a panic which commenced in the autumn of 1907 and continued through the year 1908 and was succeeded by a fictitious boom early in 1909 which resulted in a large advance in wages and an increased producing capacity, but it soon developed that the country at large was not ready for the improvement, and after struggling along for almost two years we find ourselves to-day face to face with business conditions almost as bad as in October, 1907, except from a financial standpoint. In addition to this the changed political conditions of the country which indicate a complete revolution in regard to the tariff, the unrest of labor, the probability of a sufficient number of the State Legislatures fighting for an amendment to the Constitution of the United States authorizing Congress to levy an income tax, the time fast approaching for the Presidential election of 1912, together with other conditions which will finally arise, to my mind account largely for the position in which we find our business to-day.

Nathaniel K. B. Patch, president of the Brass Founders' section, in his annual report dwelt gratifyingly on the appointment of an official chemist. The organization will receive from this official each year a paper on any subject of interest to the association, designated by the executive committee, the research work and experiments to be conducted by him. This official is Arthur D. Little, Inc., Boston, Mass. The association will also receive annually from Mr. Little's firm a report reviewing the developments for the year in the non-ferrous metal industry, and he further agrees to furnish members with analyses of non-ferrous metals at a nominal charge.

The report of Secretary Corse showed a net gain in membership of 5½ per cent. since the Detroit convention. The present enrollment is 287. The report further called

attention to the monthly Bulletin issued by the organization, which, in addition to publishing association news, also carried abstracts from the American Chemical Society Journal. No particular progress was reported in the work of the standardization committee, which had been delayed by the press of work at the Bureau of Standards; but tangible results were hoped for this coming year. There was cash on hand in the treasury of \$94.88, after disbursements during the year of \$1,386.59.

Dr. Moldenke followed with his report as secretary of the American Foundrymen's Association.

Report of the Secretary-Treasurer

Your secretary is happy to report that the affairs of the association are in a flourishing condition. The recent increase in the annual dues, while reducing the membership somewhat, has placed it upon a sound financial basis, so that there need be no hesitancy in expanding the work of the association, and thereby increasing its usefulness to the membership and the industry at large.

For the first time in the history of the association, its Transactions have been sent to the membership in bound form, in addition to the usual pamphlets, and a substantial volume of nearly 500 pages formed the record of the splendid Detroit convention of last June. So great was the demand for Dr. Porter's exhaustive report on the Chemistry of Cast Iron that the very few additional copies struck off, and only allowed to go out by special subscription to members, were quickly exhausted. The same can be said of a number of the other papers presented, all of which indicates a healthy desire on the part of foundrymen to keep informed.

The present slackness in our establishments has had the usual result of stimulating investigation along the lines of effective economy, and the mail of the secretary's office has reflected this most voluminously. The awakening of cities to the smoke problem has also seriously embarrassed many foundries, and it is respectfully suggested to our supply houses to get busy and devise ways and means to wash the gases emanating from the cupola, so that an ever-growing problem may be met.

TECHNICAL WORK OF THE YEAR.

The year has seen much progress along lines of continuous melting and the permanent mold, and perhaps the distinctive feature has been activity in utilizing waste metals in the foundry. Whether by briquetting or special methods of melting to avoid undue oxidation, the problem has been solved, and only proper introduction to the industry remains.

The special investigations carried on by the association have not been neglected. You will have before you a paper on the action of titanium on "malleable" presented by our member Mr. Gale, and Mr. Field will bring before us a short criticism of the molding sand tests so far carried out, his firm having been good enough to give us from its laboratory all the chemical data required.

Most of the physical tests on the 80 odd molding sands have been completed, and considering that this meant over 1500 separate tests the magnitude of the work can be imagined. In addition the Ohio State Geological Survey requested our association to add to this investigation the complete series of molding sands of that State, which meant a further 850 tests. It will still take some time to digest and complete this work, and then a report will be issued on the subject of molding sand. Your secretary looked after this work, aided by three assistants for the time being.

CONVENTION PAPERS.

The association is highly indebted to the Committee on Papers created at the Detroit convention. Particular thanks are due the chairman, H. E. Field, for his activity and success in getting valuable papers for this convention. Your secretary sincerely hopes that the committee will be continued. The indulgence of the convention is asked for the incompleteness of the printed matter distributed at this time. Whether the secretaries of other organizations have similar difficulty in getting the good writers of papers to complete their task in fair time is not known, but when it is stated here that on March 1 only one paper was in the hands of your secretary, and the outlook for more very gloomy, and this in spite of an early campaign, the fact that the programme has 43 separate items shows that interest comes late and all bunched together. The result is that the nerves of the secretary, the managers of two big printing houses, artists, engravers, etc., are in tatters, and only half of the papers in print and ready here, with more coming every day during the convention.

MEMBERSHIP AND FINANCES.

The instructions adopted at the Detroit convention have all been duly carried out. A new membership list has been

issued, and as funds are now available one will be brought out each year.

At the time of this report the membership of the association in good standing was 692. This will probably be reduced somewhat when the arrangement with the members of the former Supply Association ceases July 1. We have, however, every reason to congratulate ourselves upon the growing interest manifested in our work; for in spite of what may be said of the origin and development of the foundry revolution of recent years this has been the actual work of our individual members, and has had the hearty backing of the association as a body.

The financial statement for the year is as follows:

<i>Receipts.</i>	
Balance	\$ 268.53
Dues and subscriptions.....	5,085.50
Interest	40.18
	\$5,394.21
<i>Disbursements.</i>	
Transactions	\$2,100.27
Printing	138.60
Convention expenses	233.85
Salaries	1,100.00
Postage	437.00
Sundries	43.79
	\$4,053.51
Balance	\$1,340.70
Special fund	201.25
Total.....	\$1,541.95

At the morning session, S. G. Walker, Providence, R. I., read an elaborate paper on "The Control of Industrial Fire Insurance Cost," which was an outline of the principles underlying the cost of insurance as exemplified by the practice of the factory mutuals of Providence, R. I. He was followed by Elsworth M. Taylor, New York, with a paper on "Production Costs—a Factor in Scientific Management." A paper by S. E. Nold, Alliance, Ohio, "Why Cost Systems Fail," closed the morning session.

Before adjournment, Dr. Moldenke called the attention of the association to the recent deaths of W. W. Sly, president of the W. W. Sly Mfg. Company, Cleveland, and A. N. Spencer, vice-president of the Oliver Machinery Company, Grand Rapids, both of whom had made arrangements to attend the convention this year as usual. On motion of Henry M. Lane, Cleveland, seconded by A. W. White, London, Canada, the president was instructed to appoint a committee of three to draft resolutions of condolence and regard, copies to be sent to the bereaved families and to be spread upon the minutes of the organization.

G. H. G.

New Tools and Appliances

This is essentially a news department for which information is invited

Improved Boring Machines.—A new horizontal boring machine possessing features which render it especially adapted for performing drilling, boring, reaming and facing operations on castings for aeroplanes or automobile engines has been recently built by the Binsse Machine Company, Newark, N. J. The saddle supporting the carriage is gibbed to the table from the sides, an arrangement which provides a stronger table and one less likely to vibrate when heavy cuts are being taken than when the other method of fastening the saddle by bolts and tongues in T-slots is employed. The outer bearing for the boring bar and the table support is so made that if desired it can be brought in close to the carriage, an arrangement which gives additional steadiness. All the working parts, the operating wheels and the levers of the head are conveniently located for the operator. The boring bar is 3 in. in diameter and has a 24-in. feed without resetting. The working surface of the table is 24 x 60 in. and the carriage has a reversible cross feed having a range of 36 in. The amount of floor space required by the machine is 5 x 12 ft. and the weight is 6500 lb.

A Heavy Gear Train for an Engine Lathe.—The Bradford Machine Tool Company, Cincinnati, Ohio, is equipping all of its engine lathes with a new type gear train in which the feed gears are entirely separate, thus making the feed independent of screw cutting. In this train the change gears can be used for feed purposes if desired.

A New Type of Twisted Drill.—A. C. Vauclain, 401 North Thirty-third street, Philadelphia, Pa., has re-

cently placed on the market a new type of twisted drill. This differs from drills of the ordinary type in that the cutting edges of both lips meet at the center so that the abrading action of the point which is encountered in drills of the usual section and is one of the difficulties in the way of drilling large holes rapidly without an excessive expenditure of power has been eliminated. This peculiar construction of the point makes it possible to employ drills of any size without using a small drill for the pilot hole. Low power consumption is claimed as the result of a series of tests made with this drill, and the interior of the hole is smooth, instead of being rough, as is sometimes the case where a heavy feed has been used with drills of the twisted type.

Kerosene Torch.—The Hauck Mfg. Company, Brooklyn, N. Y., has recently placed on the market a line of kerosene torches for heating, light, blazing, tinning, etc. The torch is made in a variety of sizes and is constructed so that the tank will remain cool while the burner is in operation.

Flaming Arc Lamps.—In addition to the 10 and the 17-hr. lamps which were illustrated in *The Iron Age*, March 31, 1910, the Stave Electrical Company, 27 West Twenty-seventh street, New York City, has brought out two new types of lamps, one burning 100 hr. without trimming and the other lasting from 150 to 200 hr. The general construction of these lamps is the same as the earlier type, and the carbons are fed by a motor. The heights of the two types are 32 and 37 in. respectively.

Acetylene Relief Valves.—Nelson Goodyear, 50 Church street, New York City, is making a valve for safeguarding acetylene apparatus by preventing the generation of excess pressure under any conditions. The device depends upon its operation upon a float which rises and falls with the water in the float chamber as the acetylene passes through. If for any reason the gas does not pass through the valve as rapidly as it has been generated, the water in the chamber falls and the float drops, closing the port leading to the generator and opening a vent.

A Turret Machine for Multiple Operation Work.—The Pottstown Machine Company, Pottstown, Pa., has developed a turret machine for handling a large variety of work that is ordinarily done with two or more chuckings. The construction of the entire machine is very rigid and the turret is hung between bearings which are placed a considerable distance from each other and is surrounded by the body of the machine, an arrangement which eliminates any tendency to spring or chatter. The turret is locked in position in the regular way, and while the tools are at work it is bound immovably in its seat by a cam and lever arrangement. When the turret is being indexed a spring releases the binding device. In designing the machine it has been made impossible for the operator to move the turret until the automatic gripping device is released, which takes place the moment the taps are clear of the work.

Large Tubular Calipers.—A line of tubular calipers with micrometer attachment has been placed on the market by the Davis Mfg. Company, Milwaukee, Wis. The sizes made range from the ordinary ones to a maximum of 78 in. in diameter.

Thrust Ball Bearing.—A new type of ball bearing known as the Nicé thrust ball bearing is being made by the Pressed Steel Mfg. Company, Philadelphia, Pa. This bearing is being largely used for motors and engines, and is shaped in dies instead of being turned. The material employed in this construction is the same as that from which the all turned bearings are made, and after the bearings come from the dies they are hardened in the usual way.

Storage Battery Locomotive and Crane.—A new type of industrial locomotive has been brought out by the Atlas Car & Mfg. Company, Cleveland, Ohio. The capacity of the locomotive, which is equipped with a platform, is 8 tons, and that of the crane is 2 tons. The latter is mounted on a small truck at one end of the locomotive. Spring suspension is used for the motor, which is mounted at one end of the frame and connected to the driving axle through reduction gears. The various electrical instruments are mounted at one end, and the platform is removable to give access to the parts underneath.

The National Machine Tool Builders' Association

Ninth Semi-Annual Meeting at Atlantic City, N. J., Proves of Unusual Interest

The ninth semi-annual convention of the National Machine Tool Builders' Association, held at Atlantic City, N. J., Thursday and Friday, May 18 and 19, was a notable meeting, the papers and discussions being of exceptional value to those in the machine tool making industry. It was the eighteenth convention the organization has held. An indication of its success is contained in the remarks of Murray Shipley, Lodge & Shipley Machine Tool Company, Cincinnati, who at the end of the third session, in proposing a rising vote of thanks to the speakers, remarked: "This convention is the most successful the association has ever held, inasmuch as the papers presented and their discussion have brought us particularly close to the great problems in our business." There were about 150 members and visitors in attendance at the meeting, and remarkably few of them neglected any of the sessions. A large measure of the success of the meeting was due to the very efficient manner in which President F. A. Geier conducted the programme, with the able assistance of Secretary C. E. Hildreth.

The convention was organized on Thursday morning. After the usual convention committees were appointed a number of communications were read from members who were unable to attend. One of these brought forth some amusement as the reason given by the writer for not being present was "press of business." The members seemed to think that in view of the general business apathy the press of business excuse should be applauded, and it was. A communication from the Fairbanks Company, Springfield, Ohio, asking that the company be suspended from membership because of its being out of the machine tool making business temporarily, and suggesting that the organization have an associate membership, was referred to the resolutions committee.

President Geier, in his formal report, spoke optimistically as to the future of business. He said in part: "The business sky is clearer today than it was a few weeks ago and I feel that the recent decision affecting the Standard Oil Company should tend to clarify the atmosphere. In times like these, when we expect a growth of business, a careful analysis of shop conditions with a view that economies be effected should occupy our attention in order that we will be better prepared to meet an increased demand for our product and overcome the trying difficulties of manufacture. I cannot impress this upon you too much. Germany is so often mentioned that I hesitate to bring that country up once more, but the scientific thought of the Germans in the management of affairs is an example well worth our study. I hope that this convention will bring out an even higher state of efficiency in machine tool construction than exists today."

Secretary Hildreth, in his report, referred to the fact that an unusual number of new applications for membership were to be acted upon and spoke of the keen interest the members were taking in the association's affairs. The report of Treasurer A. E. Newton showed the organization to be on a good financial footing. There were no reports from the patent committee or the committee on the revision of the constitution. The committee on preparing list of machine tool users distributed reports that its work was not as yet completed. This committee has met with considerable co-operation, but some lists in the hands of machine tool builders prepared for their own use have not been available, for obvious reasons.

Non-Cancellation of Orders

C. Wood Walter, chairman of the cancellation of orders committee, presented a comprehensive report of the work done by the committeemen which indicated that their efforts in obtaining the co-operation of dealers toward doing away with the cancellation of orders has met with unusual success. Mr. Walter's report was as follows:

In making the final report of your committee on this subject, I offer a brief resume of its work: At the Rochester convention in May, 1910, several papers were presented suggesting various ways and means of abating the then too prevalent custom of cancellation of machine tool orders. As a result of this discussion the following resolution was passed at that meeting:

Resolved, That a thorough effort should be made by the Machine Tool Builders' Association, machine tool manufacturers and their agents, to eliminate the cancellation of machine tool orders, and to this end machine tool dealers should embody in their selling contracts, uniformly, the following clause, "This order is not subject to cancellation."

It is further resolved that the chair appoint a committee of three to confer with the proper committee of the Machine Tool Dealers' Association to co-operate with them in developing a concrete plan to bring about a general custom of trade which shall eliminate the cancellation of machine tool orders.

Upon the publication of the papers read at this meeting, a considerable discussion followed in the trade press, the leading papers editorially approving the efforts initiated by our association to bring about this reform, and making further suggestions as to how a better custom of trade might be established. Subsequent to this convention, your committee addressed all the leading machine tool manufacturers and dealers, suggesting the adoption of a "proposed non-cancellation clause" to be made a part of all proposals, quotations and contracts of sale. The replies brought in a consensus of opinion as to this method of procedure, which was placed before a joint meeting of our committee and a similar committee appointed by the National Supply and Machinery Dealers' Association. This meeting was held just prior to our New York convention in October, 1910. The following resolution was unanimously passed at the joint committee meeting referred to:

Resolved, That the following clause (to be made a part of quotations and order acceptances, as between the consumer and the machine tool dealer or the consumer and the manufacturer who sells direct) be reported to members of both associations for adoption, and uniform use immediately after adoption:

(CLAUSE)—"Note that all our proposals, quotations and acceptances of orders are made with the mutual understanding that orders are not subject to cancellation, provided shipment is made within the time specified."

This joint resolution was subsequently presented by your committee to our association at the October, 1910, convention. After a complete and full discussion on the floor, your committee offered a resolution which was adopted by unanimous vote, as follows:

Resolved, That we approve of the proposed non-cancellation clause agreed upon by the committee from this association acting jointly with the committee from the National Supply and Machinery Dealers' Association, and, further, that we agree to put same into use as soon as similar action is taken by the membership of the National Supply and Machinery Dealers' Association, which action we strongly urge the latter association to take at the earliest possible date.

This resolution was reported to the dealers' committee, and several weeks later the chairman of your committee was notified that the machine tool members of the National Supply and Machinery Dealers' Association by mail ballot had approved of the action of the joint committees and also our association, and had voted the adoption and uniform use of the "non-cancellation clause" as proposed.

Our secretary reports that the replies to postal cards mailed out to our membership last February indicated at that time that 84 members were making use of this clause. While some members failed to reply, yet it is apparent that a small percentage of our membership is at this time not making use of the clause. This may have occurred through the fact that many of our members do not sell or quote the consumer direct. However, notwithstanding this fact, it is urged that all members incorporate this clause in their literature and correspondence, placing same on their letterheads, so as to add moral effect to the dealers' effort to hold the buyer to the legitimate obligation he assumes when he places an order for machine tools.

On February 8 the secretary of the Dealers' Association wrote your chairman as follows: "We have followed this matter up largely through individual correspondence, and as a result of this have found but three members who have not placed the clause into effect." Under date of May 13, he advised again as follows: "I am very greatly pleased to be able to confirm my letter of February 8, and to advise you that the members of this association have adopted the 'non-cancellation clause' practically unanimously and are heartily in accord with the letter and spirit of the clause."

Representatives of other trades have been in correspondence with your chairman and are already adopting similar clauses, having heard of our action in this matter. It is very essential that manufacturers and dealers alike uniformly make use of this clause and persistently enforce its terms, if we are to bring about a better custom of trade and abolish the cancellation privilege with its attendant evils, so readily admitted by all. We want to make it disreputable as well as illegal to cancel an order except for failure on the part of the seller to fulfill the conditions of the sale. Remember, custom is stronger

than law, especially a "bad" custom. Unless we give notice in advance through the universal and uniform use of this clause, we cannot expect to correct or limit the custom of cancellation privilege.

Rufus King, chairman of the committee on incorporation, submitted a report, which was not read, giving the committee's reasons for recommending that the association be not incorporated. The report was filed with the committee on resolutions.

Arguments for Ship Subsidy Action

George J. Burns, who with P. G. March was delegated to attend the Merchant Marine Congress, made an eloquent address urging the members to lend their efforts toward establishing a merchant marine for the United States. Mr. Burns said in part:

One of the most important subjects before the manufacturers of this country is the matter of our transportation facilities to other countries. We are sitting in convention on the eve of one of the severest penalties ever inflicted on a business organization, but while we are inflicting penalties we are at the mercy of one of the grossest monopolies in existence, the restriction of transportation. Over 90 per cent. of our foreign commerce is in control of a foreign combine and it is at least doubtful whether our tribunals have any jurisdiction over it.

We are discriminated against in the most outrageous manner, and this trust possesses a fighting fleet prepared to drive out of existence any independent competition. This combine is either coercing our railroads or cooperating with them. For instance, the freight on a ton of steel from Pittsburgh to Japan is less than from Seattle to Japan, notwithstanding that both cargoes go on the same boat. The violations of this combine are so serious that the violations of the Standard Oil Company are in comparison beneficent philanthropy. One of its articles of agreement is that no member of that trust shall advertise in any newspaper that opposed the combination. Years ago we were transporting practically all of our own commerce on American-made and American-manned ships. To-day England has a merchant marine of over 7000 boats, Germany has more than 2000, Japan over 1000 while the United States has 14, ten on the Pacific and four on the Atlantic. The only solution is for our nation to rehabilitate our merchant marine by establishing some form of ship subsidy.

Mr. Burns' remarks were heartily applauded, and on the suggestion of one of the members his report was referred to the resolutions committee.

The Definition of Machine Tools

Fred L. Eberhardt, as chairman on the committee on the definition of machine tools, submitted the following report:

As a healthy mental exercise, and a pleasant change from chess and other similar amusements, try defining the above subject. It will prove instructive. One learns so much more about the subject he wishes to discuss if he will only stop just long enough to write it down clearly. After having satisfied himself as to its correctness, proceed to submit it to another, and to have him feel equally as satisfied with the result or conclusions first obtained will be found an entirely different problem.

Five years ago, at our New York meeting, one of our members proposed the name of a chuck manufacturer for membership in our association. Immediately diverse views were expressed as to his eligibility, in view of his line of manufacture, and quite a diversion of opinion prevailed over the subject. By referring to our constitution we found that all those engaged in the manufacture of machine tools were eligible. The question then arose—"What is a machine tool?" Various comments have since been received with more or less degree of amusement. It is a subject, however, which, if rightly treated, should prove of advantage and credit to our association.

Since our association has been seriously considering the term, writers from across the pond, as well as those from this side, have expressed their views in some of our leading mechanical papers. Your chairman, after a certain amount of work, received from our secretary a follow-up letter, urging the possibility of making a report on the subject for this meeting, and expressing some of his own views. His remarks were very opportune and decidedly refreshing, and he was immediately pressed into service, and admitted "at sight" into the innermost secrets, and as a result we have the coining of a new term, and are told that we have been following a false god, and that in place of "machine tools" we really have been making "tool machines." Our secretary has given us a very good view on the subject from this angle, in a paper written to the *American Machinist*, issue of May 11, page 895.

If you ask for the reason for the discussion of the subject, we would state:

1. The dignity of our profession deserves it as a guide to define our industry intelligently.

2. Our government can make use of it in the customs department, bureau of the census, and bureau of statistics, all of which will in time benefit our industry by reason of more completely kept records, etc.

Your committee has collected a quantity of information from leading individuals and concerns in this country, expressing their views, together with searching such works of reference as Lockwood's Dictionary of Mechanical and Engineering Terms, Century Dictionary, Webster's New International Dictionary, Standard Dictionary, Knight's Mechanical Dictionary, and Worcester's Dictionary as to the definition of a "tool," "machine," and "machine tool."

It is true of almost any question that one obtains a view depending largely upon the angle from which one approaches the subject. If we analyze the term from a grammatical standpoint, the question arises as to whether "tool" should be considered as a noun and "machine" as the adjective, or consider the words hyphenated, as some authorities treat it, as "machine-tool," and you have a compound noun. The mind can, without much apparent effort, find good reasons for both interpretations, and in the end it is a question whether or not the entire subject is not one which can be only solved by the rule of interpretation called habit or custom. A definition of the former, found in the Standard Dictionary, is: "A tendency or inclination toward an action or condition, which by repetition has become easy, spontaneous, or even unconscious." And of the latter: "An ordinary or usual manner of doing or acting, whether of a person or a body of persons."

Machine-tool by habit rightly is a compound noun, and grammatically should be hyphenated; but through habit again, apparently, the hyphen has been dropped, but the sense and inference have remained. You cannot make water run uphill, and we would not wish to undertake the impossible. Neither should we try the experiment of the "new spelling idea," the fate of which we all know, notwithstanding it had an able champion and advocate. But if some plan was sufficiently satisfactory for a body like our association to approve of and adopt it would, we believe, be recognized with authority, and be observed throughout the country.

As against the argument of the "tool machine" theory, we would cite the present-day practice of referring to tools, such as the hammer, chisel, etc., as "hand tools," and of the twist drill, reamer, tap, etc., as "small tools." (See Brown & Sharpe and Pratt & Whitney's latest catalogues.)

In view of the above reasoning, it would not be illogical to define a "machine-tool" as a "machine to actuate mechanically a tool and work piece relative to each other, to alter, shape or change the condition of said work piece;" or, "a machine adapted to actuate mechanically either the tool, the material to be operated upon by the tool, or both, in such relation to each other, as to alter the shape of the material or the condition of the same," the last phrase referring to such machines as the arbor press and electric welding machines.

The entire subject could be classified as machinery:

CHIP PRODUCING.

Metal Cutting Machines—

- Turning machines, vertical and horizontal.
- Drilling machines, vertical and horizontal.
- Planing machines, shapers, broachers, slotters.
- Milling machines, vertical and horizontal.
- Grinding machines, polishing.
- Shearing machines.
- Punching machines.

NON-CHIP PRODUCING.

- Metal forming machines.
- Spinning machines.
- Wood-working machines.
- Rolling machines.
- Paper-working machines.
- Pressing machines.
- Thread and cloth-working machine.
- Fibre-working machine.
- Clay and stone-working machine.
- Welding machines.

This line of analysis would be similar to the Government practice, for instance, in the Department of Commerce and Labor, under which the following distinct department heads will be found, each presided over by a separate chief:

- Bureau of the Census.
- Bureau of Immigration and Naturalization.
- Bureau of Corporations.
- Bureau of Labor.
- Bureau of Manufactures.
- Bureau of Statistics.
- Bureau of Standards.
- Bureau of Fisheries.
- Bureau of Navigation.

The morning session closed with an address by A.

Hamilton Church, accountant, Boston, Mass., on "The Proper Distribution of Expense Burden." Thursday afternoon's session was given over to committee meetings. Not in a number of years have committees held such extended meetings. It is understood that the questions of machine tool classification and shop economies came in for a great deal of attention in the committee session.

The meeting of what was termed on the programme the "turning machine committee" was fraught with considerable interest. Many lathe manufacturers desire to have their product known as turning machines, and the appearance of that name on the programme supplanting the usual lathe committee announcement brought forth a great deal of discussion. It was significant that the programme committee and those in charge of making the committee room signs were at odds on the matter as "Lathe Committee" appeared over the door of the meeting room. During the discussion of committee matters some members referred repeatedly to turning machines, while others used lathe in frequent reiteration.

Machine Tool Arrangement in Shops

The session of Friday morning was an eventful one, as two papers on the department plan of machine tool arrangement—one on the basis of equipment and the other on the basis of product—were read and they aroused considerable comment. The first paper was read by F. C. Kent, superintendent Pierce-Great Arrow Company, Buffalo, N. Y., and the second by C. B. Auel, assistant manager of works, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Both papers are reproduced elsewhere in this issue.

In the discussion which followed C. A. Johnson, Gisholt Machine Company, Madison, Wis., said that where the products of a factory are all alike it is probable that better results might be obtained by grouping the machines in one department. Where the same type of machines are grouped together the men see other operators develop new ideas and so increase their efficiency through co-operation. Where machines are used, however, for turning out diversified products Mr. Johnson held that the group arrangement might not work so well.

Fred L. Eberhardt, Gould & Eberhardt, Newark, N. J., said that in his mind the keynote of the papers read was the placing of the responsibility and the group plan might help in that direction. In the Gould & Eberhardt shops two types of machines are built—shapers and automatic gear cutters—and they are built in two separate departments.

William Hill, of the machine tool building firm of Alfred Herbert, Ltd., Coventry, England, who was a visitor at the meeting, said that his experience was that English shops which formerly were run at a loss had made money by organizing departmental groups. In a number of English shops test operations were made of the work after it left each group of machines, and he gave it as his opinion that test management went hand in hand with department management. In speaking of the use of grinding machines, he said that the group plan had been followed to such an extent that specialists in running grinding equipment had developed, and departmental management in other lines coupled with test management tended to bring out difficulties in workmanship and made it an easy matter to find out where work was costing more than it should.

Scientific Management

Following this discussion F. W. Taylor, general manager Tabor Mfg. Company, Philadelphia, Pa., spoke on the "Principle of Scientific Management," talking along lines that have been presented by him before other organizations and concluding with the statement that machine tool building is not a manufacturing proposition but largely an engineering problem. He outlined some of the work which had been done by himself and fellow-engineers in the scientific management of machine shops and displayed a number of slide rules designed to facilitate the solution of machine tool operation problems. He made the statement that in 30 years of scientific management of a number of establishments no strike had ever been declared, and he claimed that scientific management could be applied to machine shop work in a manner that would increase machine tool production to a surprising extent.

Durand C. Alexander, Jr., who will shortly make a

trip to the Orient in the interests of American manufacturers as an attache of the Bureau of Manufactures of the Department of Commerce and Labor, was introduced by the president. Mr. Alexander said that the growth in the use of metal working machinery in the Orient, Australia and South Africa in the last few years has been sufficient to attract the attention of foreign manufacturers of metal working machinery. Present facts show that shipments of American machine tools to the entire Orient are not as large as those to one single European country, but, he added, the possibilities in the Orient are far greater than those of Europe. With the exception of Japan the duties are practically nominal and the market there will grow more rapidly than the European market. He asked for the machine tool builders' co-operation and stated that some of his special reports to the department will be of interest to machinery makers.

The session of Friday afternoon was given over to the consideration of employers' liability and workmen's compensation. Addresses were made by F. C. Schwedtmann, of the Citizens' Industrial Association of St. Louis, and James A. Emery, counsel for the National Association of Manufacturers.

Resolutions Adopted

The association adopted the following resolutions:

WORKMEN'S COMPENSATION.

Resolved, That a committee be appointed to work in cooperation with similar committees of other organizations for improvement of present conditions on the lines pointed out by Messrs. Emery and Schwedtmann:

1. Continuous and close relations with state and federal legislators, legislative committees or commissions engaged in the drafting of new liability or compensation bills.
2. Close cooperation with all organizations, national, state or local, who are interested in voluntary or compulsory compensation for injured workers.
3. Advice to members of our association on voluntary relief systems, liability or accident insurance, accident prevention and accident legislation.
4. A general educational campaign among the public, the newspapers, the colleges and among business and professional men in general, through the aid of addresses, illustrated talks, circulars and letters, all in the furtherance of our accepted principles for a sound compensation system.
5. A vigorous general campaign for early adoption of a statistical system on works accidents, so that at the earliest possible moment we may secure facts, instead of guess work to build upon.
6. A special campaign among state factory inspectors, to the end of securing higher ability and efficiency and less political influence.
7. The encouragement of mutual insurance and close cooperation with existing insurance concerns, with a view of securing rates for our members, in proportion to their individual accident prevention efforts.

And be it further Resolved, That the following cardinal principles and explanations shall be the basis of our association's future legislative endeavors:

1. All legislation must be for compensation (every kind of employers' liability legislation has proved a failure in every civilized nation).
2. Compensation legislation must cover every wage worker. (The man who, without his own fault, loses his hand in a farm machine is as much entitled to compensation as the engineer who loses his hand in an engine gear.)
3. Compensation must be assured. (It must be certain as the interest on United States bonds. This can be accomplished through insurance, approved and preferably guaranteed by the state or national government. However, every safe method of such approved insurance should be permitted. State, mutual and stock insurance, as well as relief systems covering individual shops, should be encouraged and none of them must be barred.)
4. Compensation must be efficient. (Not less than 75 cents, and preferably 90 cents, out of every dollar paid into the insurance fund should be paid to injured workers or their dependents. To this end legislation and solicitation expenses must be reduced to a minimum, and arbitration courts, or a simplified court procedure, are required for settlement of disputes.)
5. Employer and employees are jointly responsible for all unpreventable accidents and should therefore jointly meet the compensation expenditures (the employer covering approximately that part which is due to his fault and to the inherent hazard of the industry; the employee covering approximately that part which arises from his fault).
6. Every injury, except those due to criminal carelessness or drunkenness on the part of the worker, should be compensated.
7. Humanity and efficiency demand that prevention of accidents is made of prime importance. (Therefore, an efficient official inspection and statistical system which increases or decreases insurance rates in proportion to the accident prevention activities of each individual establishment is essential.)
8. Since the progressive individual usually provides voluntarily for reasonable accident compensation, it is right that the reactionary or selfish individual be compelled to do likewise through universal compulsory insurance.
9. To prevent unfair competition between employers in different localities it is necessary that compensation laws of the various states are reasonably uniform.
10. Single liability is essential for reasons of efficiency and equity.

Resolved, That we favor the principle of state taxation and the creation of a state fund if adopted in connection with the legislation providing for the alternative lawful creation and administration of private funds, and upon no other condition.

MERCHANT MARINE AND PENNY POSTAGE.

Resolved, That it is the duty of the Senate and House of Representatives in Congress assembled to take such action as will assure the building up of a vigorous, independent steamship service of American-built and manned ships for the American merchant marine in time of peace and a powerful naval reserve in time of war.

Resolved, That the National Association of Machine Tool Builders, in convention assembled, favor a reduction in letter postage from two cents to one cent, with as little delay as possible.

The following firms were elected to membership in the association: Standard Mfg. Company, Bridgeport, Conn.; Cincinnati Gear Cutting Machine Company, Cincinnati, Ohio; Miami Valley Machine Tool Company, Dayton, Ohio; Stoeber Foundry & Mfg. Company, Myerstown, Pa.; United States Electrical Tool Company, Cincinnati, Ohio; Burke Machinery Company, Conneaut, Ohio; Higley Machine Company, Croton Falls, N. Y.; Massillon Foundry & Machine Company, Massillon, Ohio; Stenle Turret Machine Company, Madison, Wis.; Cochran-Bly Company, Rochester, N. Y.; Brown & Sharpe Mfg. Company, Providence, R. I.; Meisselbach-Cattucci Mfg. Company, Newark, N. J.

The National Tube Company

Plant at McKeesport Inspected by Gas Men

The Natural Gas Association of America held its sixth annual convention in Pittsburgh, on May 16 to 18. On the afternoon of the last day a delegation of over 300, representative of the gas and oil trades, manufacturers, jobbers and consumers of pipe, casing and tubular goods in all forms, at the invitation of the National Tube Company, left the Exposition Building on a steamboat for a trip up the Monongahela River to the National Works of the company at McKeesport. This is the largest plant in the world devoted to the manufacture of pipe, tubes, casing, etc. The trip made it possible to see just what constitutes the "workshop of the world," for along the banks of the river are the large plants of the Jones & Laughlin Steel Company, American Steel & Wire Company, McClintic-Marshall Construction Company, Mesta Machine Company, Homestead and Clairton works of the Carnegie Steel Company, the Republic, Continental and Pennsylvania plants of the National Tube Company and many others. The visitors reached the objective point about 4 o'clock. George N. Riley had charge of the party, while on arriving the visitors were received by Edward Worcester, first vice-president; William A. Cornelius, manager of the National Works, and operating officials. A group picture was taken by the company's photographer on arrival, and the visitors then divided into small parties and were escorted through the different departments.

The first operation witnessed was the pushing of a standard gauge railroad car on a large electrically operated ore car unloader, which tilted the full car of ore into the large ore yards, where grab buckets in turn transported it to the blast furnace skips for charging. The tapping and pouring of the blast furnaces and the rolling of ingots were not inspected, as the officials considered it more interesting for the visitors to see the entire making of tubular goods from the plates up. Accordingly they were taken through the plate mill department, the continuous heating furnaces serving the continuous skelp mills, mostly electrically operated, and the butt and lap weld departments, where pipe was being made, cut, tested, threaded, etc. The manufacture of couplings was also witnessed, besides the coal handling machinery on the river, the boiler and engine rooms, pattern shops, foundry, machine shops, roll turning department, sanitary hospital and the new hydraulic pipe pulling machine for testing the strength of the body of pipe, threads and couplings. These operations proved of much interest and enabled the gas men to understand how the goods which they handle so extensively are made. Following is a brief description of the plant:

Description of the National Works

The National Works of the National Tube Company, situated on the Monongahela River, at McKeesport, Pa., has a length of a little over one mile, covering about 100 acres. It is protected along the entire river front by a concrete coped, steel pipe railed slag wall, being well above the ordinary flood line. It has its own McKeesport connecting railroad system, with direct connections with the Pennsylvania, the Baltimore & Ohio and the Pittsburgh & Lake Erie railroads, as well as facilities for shipping by river. The works is self-contained in its product, from the iron ore to the finished goods, embracing in its manufacture tubular goods, both butt and lap weld, from $\frac{1}{8}$ in. to 30 in. in diameter, both black and galvanized, as well as

a specialty in the way of Spellerized steel boiler tubes. In addition to the regular surface inspection and hydraulic test, in the case of boiler tubes, a special machine has recently been installed by which a test piece cut from each end of every tube is crushed and a flange is turned, all in one operation, insuring a very thorough and effective test, both for quality of material and workmanship, on every tube.

At the lower end of the plant are situated four large modern blast furnaces with their accessories of car dumper, ore bridge, etc., a steel plant and blooming and slabbing mills. The slabbing mill is one of the largest in the world and having the largest electric shear ever built. The furnace blowing engine room, in which is also located the central pumping station for the entire plant, is a most interesting aggregation of ponderous machinery.

The skelp mills are in the center of the plant, four in number, and all of the most approved type. The two mills for the narrower plates are of the continuous mill construction. The blooms go in at one end, and without any handling are delivered beyond the shear as skelp, cut to length, piled and ready to deliver to the trucks on their way to the tube and pipe mill end.

The tube and pipe mill building is approximately 1600 ft. long and 600 ft. wide, containing in all 23 acres, and being the largest building under one continuous roof in the world. In this building are twelve lap weld furnaces and six butt weld furnaces, two of the butt mill furnaces being of the double length type and able to produce pipe 40 ft. in length. This is true also of No. 1 lap weld, which is the only double length lap weld mill which has ever been operated; it will produce 40 ft. lap weld pipe from 3 to 12 in. and has been run on even larger sizes.

The shops of the works are all located at the upper end of the plant and are conveniently connected with the several mills by a telpherage system. The coal for the plant is lifted from the river by a coal hoist capable of lifting, crushing and screening 2000 tons of coal in 10 hr., this coal being distributed overhead in larries pulled by small electric locomotives. These and the telpherage system relieve a great deal of the handling of material on the surface tracks.

Every possible care is taken throughout the entire plant for the convenience and protection of the employees. All danger points are carefully railed off. All moving parts of machines are protected by gratings. Convenient lavatories and shower baths are provided. An emergency hospital is maintained where a doctor is in daily attendance, and a trained nurse is provided on each turn for dressings and emergencies.

The works employ from 6000 to 10,000 men, according to working conditions.

The Return

The party re-embarked at 5:45 o'clock. While refreshments were served the boat continued up the Monongahela River past Elizabeth, Pa. Coming down after dark, the trip greatly impressed the visitors, who observed the lighting effect of the open-hearth furnaces, rolling mills, etc., throwing out their flashes of fire. An orchestra on the boat made the time pass pleasantly, while the social intercourse made it possible to make many new acquaintances. On motion of David O. Holbrook, the chairman of the local executive committee of arrangements of the Natural Gas Association, a unanimous vote of thanks was extended to the officers of the National Tube Company for the manner in which it had cared for the visitors.

The Kerr Turbine Company, Wellsville, N. Y., has been reorganized and \$125,000 new capital added. The stock interests of the company are now controlled by F. P. Merrill, Hornell, N. Y., and P. B. Hanks, Wellsville, who, as trustees, have directed its affairs for several years. Mr. Kerr is no longer with the company, his position as chief engineer now being filled by J. L. Moore, formerly a designer with the Westinghouse Electric & Mfg. Company and later in the engineering department of the Santa Fé Railroad. The plant will be materially enlarged, a new machine shop being already in course of erection. It is also the intention to incorporate into the Kerr turbine design changes which are based upon two years' experiments and which will improve the steam economy on all sizes by 15 to 20 per cent.

Hardness of Quenched Tool Steels

A Comparison of Carbon and Tungsten Steels

The *Revue de Metallurgie* for February contains an article by S. N. Brayshaw, giving the results obtained on quenching a series of tool steels, both of ordinary carbon steel and with a low percentage of tungsten. The analyses of the steels worked on are given below:

Table 1.						
No.	C.	Mn.	S.	P.	Si.	W.
W 1	1.18	0.42	0.023	0.014	0.18	0.47
W 2	1.16	0.37	0.023	0.014	0.10	0.48
W 3	1.19	0.28	0.012	0.011	0.23	0.57
W 4	1.15	0.31	0.012	0.011	0.21	0.50
A 1	1.16	0.37	0.018	0.014	0.07	..
A 2	1.14	0.40	0.018	0.014	0.09	..

The type of gas heated furnace used in the experiments is shown in the accompanying illustration. The interior vessel contains about 12 lb. of a fusible mixture of potassium and sodium chlorides with other salts, the names of which are not given. The bath is perfectly fluid at 680 deg. C. The two furnaces were equipped with electric resistance pyrometers. One was of such delicacy that ¼ deg. could be read, and the other was about one-third as sensitive. Very careful heating and cooling curves were made on a steel of the same composition as W 3. The arrest on heating was well marked at 738 deg. C. and on cooling at 7140 deg. C.; but if the temperature is raised above 880 deg. C., the arrest point is lowered, and in one case was found to be at 709 deg. C.

Hardness Tests

In Tables 2 and 3 are given the results obtained on samples of steel W 4, placed successively in two furnaces and quenched in salt water on leaving the second furnace:

Table 2—First Series.						
No.	1st Furnace		2nd Furnace		Brin-ell No.	Sclero-scope No.
	Temp.	Time in Fce. Min.	Temp.	Time in Fce. Min.		
1 X .....	..	..	731° C	30	196	36
3 X .....	..	..	..	120	196	35
5 X .....	..	..	..	240	179	36
7 X	760° C.	10	..	30	600	103
9 X .....	..	..	..	120	477	88
29 X .....	..	..	..	240	241	53
12 X	802° C.	..	..	30	600	103
14 X .....	..	..	..	120	269	66
28 X .....	..	..	..	240	241	45
17 X	862° C.	..	..	30	600	99
19 X .....	..	..	..	120	340	70
21 X .....	..	..	..	240	302	54
23 X	893° C.	..	..	30	600	98
25 X .....	..	..	..	120	418	84
27 X .....	..	..	..	240	321	72

Table 3—Second Series.						
No.	1st Furnace		2nd Furnace		Brin-ell No.	Sclero-scope No.
	Temp.	Time in Fce. Min.	Temp.	Time in Fce. Min.		
2 X .....	..	..	725° C	30	187	35
4 X .....	..	..	..	120	179	35
10 X .....	..	..	..	240	196	37
31 X	762° C.	10	..	10	269	64
6 X .....	..	..	..	30	163	33
30 X .....	..	..	..	60	159	32
8 X .....	..	..	..	120	163	31
11 X	802° C.	..	..	30	174	23
13 X .....	..	..	..	120	156	31
15 X .....	..	..	..	240	156	30
16 X	859° C.	..	..	30	217	45
18 X .....	..	..	..	120	170	32
20 X .....	..	..	..	240	166	32
22 X	890° C.	..	..	30	418	82
26 X .....	..	..	..	120	207	51
21 X .....	..	..	..	240	187	38

The author's conclusions are that the change on cooling takes place gradually at 731 deg. C., and more quickly at 725 deg. Moreover, it is notably retarded by a preliminary heating to 890 deg. If the steel is heated above the arrest point and then held a sufficiently long time at a certain temperature between the arrest on heating and that on cooling, and then quenched, the steel is softer than a sample heated to this same temperature and then quenched.

Temperature and Hardness

The author insists on the influence of a preliminary heating to about 880 deg. C., which brings about a change that is of great practical importance. Bend tests and tensile tests were carried out in connection with Sir Robert A. Hadfield and led to the following conclusions:

1. The necessary temperatures from which to quench carbon and tungsten steels are fixed, and complete hardness is attained in an interval of less than 6 deg. C. This temperature naturally coincides with the arrest of the curve on heating of the particular steel.
2. After the temperature has risen 20 or 30 deg. above

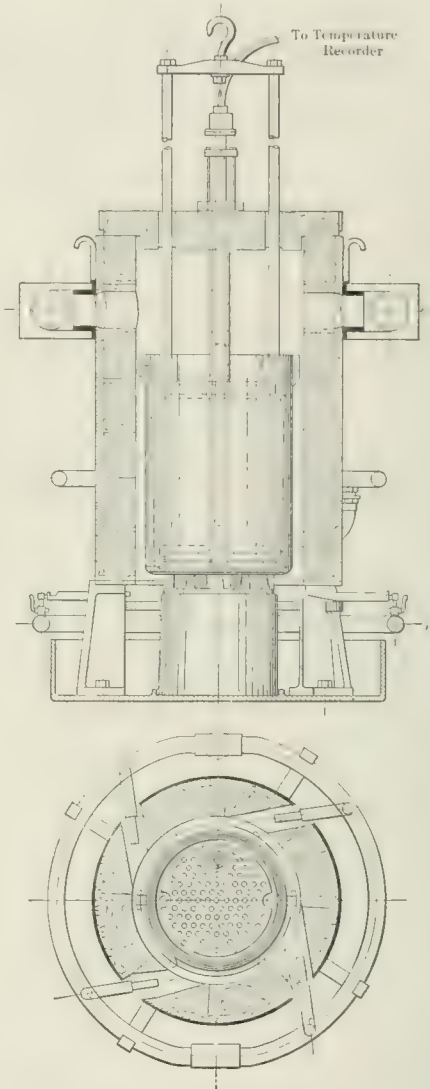
the change point, the hardness diminishes as one increases the quenching temperature, provided the length of time of heating allows equilibrium to be attained.

3. There is a change toward 880 deg. C. for the tungsten steel and a little higher for the carbon steel. Bars quenched below this temperature show a contraction in length; above it an expansion.

Effect of Prolonged Heating

The influence of the length of time of heating is in general as follows:

1. If the heating is prolonged to two hours at the temperature where the change on heating is only half accom-



Plan and Elevation of the Gas Heated Furnace Used in the Experiments.

lished in one-half hour (732 deg. C.), the change is not completed.

2. At 760 deg. C. a prolonged heating is slightly harmful but does not greatly affect the hardness.

3. Toward 810 deg. C. the hardness of the quenched steel is great if the heating is only for a short time, but it diminishes after a half an hour's heating.

4. Prolonged heating at 880 deg. C. is very harmful. This is proved by the experiments given; but the author has found that a short heating, not over 7½ min., and then quenching, gives a particularly hard steel. Tables of tests are then given on quenching in salt water at temperatures rising from 5 to 51 deg. C. They show that the hardness of the steel diminishes as the temperature of the bath increases.

Effect of Preliminary Heating

Experiments were then made to study the effect of a preliminary heating and cooling in sand, before heating and quenching. The hardness of the tungsten steels quenched at 760 deg. C. is gradually lowered as the preliminary heating temperature rises from 700 deg. to 940 deg. C., but the hardness increases if the heating at 700 deg. is prolonged. The next series of experiments was

made with the two furnaces at different temperatures, heating the steel for a short and varying time in one, transferring to the other and then quenching. Very good results were obtained by a 2 min. heating in No. 1 furnace, at 880 deg. to 884 deg. C., followed by a 2 min. heating in No. 2 furnace at 720 deg. and then quenching. If the first furnace is hot enough it is easy to find the temperature at which to hold the second one, and the times of heating, so that the steel when quenched will have the same length as before treatment.

Careful tests showed that the tungsten steel heated for 15 min. toward 860 deg. C. and quenched in oil is harder than the carbon steel treated in the same way.

Limits of Quenching Temperature

The author's general conclusions are that the steel may be quenched over an interval of about 120 deg. of temperature and still show a good fracture. The lower limit of this interval is closely defined, but the upper limit is rather hard to determine. It can be said that quenching from a temperature up to 150 deg. above the arrest on heating does not appear to be harmful, judging by the fracture. This allows a safe margin for the ordinary workmen for ordinary tools, when judging by the fracture. The results obtained, however, conclusively show that this procedure will not give the best results, for small variations of temperature or of preliminary treatment seriously affect the final results.

It is true that most tool steels give good enough service if the quenching has been made in the interval of 120 to 150 deg., but there still remain many cases where it is important to obtain the best possible results.

G. B. W.

The Calculation of Air Furnace Dimensions

Stahl und Eisen, Vol. 30, No. 36, contains two interesting articles on the above subject, one by Professor Oann, of Clausthal, and another by Engineer E. A. Schott. The latter is more elaborate and deals specially with muffle ovens for enameling iron ware.

The use of the air furnace for casting purposes dates back to the eighteenth century. (Cumberland, England, 1765). The cupola came later. The air furnace is particularly useful for melting large pieces, such as broken rolls, etc. Such furnaces run from 5 to 45 tons capacity. The best of bituminous coal with non-caking ash, to get a long flame, is essential. There are three styles of furnace in general use. The Staffordshire has the melting chamber contracted just as its joins the stack. The German furnace has the greatest depth of bath right under the stack, and tapping is done from that point. Finally is the American arrangement, with ample combustion space, and tapping from the side near the bridge wall, following the English method somewhat in this respect. Unquestionably the American style is best, as it allows the removal of the entire end of the furnace for charging purposes.

Apart from the proper dimensions of the hearth for a given required tonnage, the distance between the roof and the surface of the bath of metal is one of the most important points to be considered. This is also the case in the open hearth furnace. In the actual operation of the air furnace, the first effect is the simple transfer of the heat of the flame into the cold charge. Iron being a good conductor, this goes on for some time, the furnace remaining cold. Gradually, however, the walls of the furnace acquire heat also, and as the conductivity of the fire brick is six times as great at 1600 deg. C. as it is at 100 deg. C., even though brick is a poorer conductor than iron, there is a large quantity of heat stored up in the walls of the furnace, which, being hotter than the iron, radiates heat out into it. As soon as this takes place there is a rapid heating up of the metal charge and the iron melts. Hence also the name "reverberatory" furnace. In the course of time during the melt the brick work will take up only just as much heat as it gives off, and then the furnace works slow, the quantity in question being that which the brick may take up in consequence of its degree of conductivity. If, therefore, the hot gases are made to pass only just as fast as the brickwork can take up the heat, the maximum of economy will have been effected.

To get at this point, it will be well to consider the number of seconds a given quantity of gas will remain in the furnace. For instance, if the melting chamber con-

tains, say, 105 cu. ft., and 35 cu. ft. of gases are available per second, then these gases remain in the furnace three seconds. Without calculating these volumes at the high temperatures existing in the furnace during operations, but taking the figures at freezing point, the following table has been constructed by Mr. Schott in comparing the several furnaces enumerated below:

Furnace No.....	1	2	3	4	5	6
Tonnage	6	5	3	10	10	5
Per cent. coal used.....	40	32	40	45	30	40
Time, heating up to tap, hr.	12	10	8	20	9	12
Coal per hour, lb.....	1,027	880	825	1,236	1,393	880
Cu. ft. per sec. of gases (allowing 100% for air excess.)	77.7	66.4	62.5	96.0	136.6	66.4
Combustion space above bath, cu. ft.....	132.0	172.6	137.0	252.4	528.0	164.5
Gases remain in furnace, sec.	1.70	2.72	2.30	2.96	3.60	2.50

Nos. 1, 2, 3, 4 and 6 are German air furnaces and No. 5 is American. In a foot note, the editor of *Stahl und Eisen* takes exception to the 100 per cent. excess of air allowed for combustion, as is the case with boiler practice. It would be impossible to get the exceedingly high temperatures required in the air furnace were such an amount allowed to enter. A 30 per cent. air excess would be more nearly correct.

The calculation of the hearth is as follows: The surface should be 5 to 10 sq. ft. for every ton of metal charged, making it 5 sq. ft. for the largest sizes (15 to 45 tons) and 10 sq. ft. for the smallest furnaces (below 7½ tons). The width of the furnace should range between 4 and 7½ ft., according to the tonnage. The length of hearth can be figured out from the above. An unobstructed passage of the gases through the furnace up to the stack flue is desirable, as there are many unburned gases passing over the bridge wall which will be utilized in the combustion space if ample enough.

R. M.

British Pig Iron Production in 1910

The statistics of the British Iron Trade Association show that the production of pig iron in the United Kingdom in 1910 was 10,216,745 gross tons, as against 9,664,287 tons in 1909, 9,289,840 tons in 1908, 9,923,856 tons in 1907, and 10,149,388 tons in 1906. The output for 1910 makes a new record in British pig iron production for a calendar year, though for the 12 months ending June 30, 1907, the total was 10,438,976 tons. The output of basic iron in 1910 was 426,000 tons more than in 1909, while that of hematite iron was 330,000 tons larger. The falling off in forge and foundry iron from 1909 was about 225,000 tons, of which 181,000 tons was foundry iron. The average number of blast furnaces in operation in the year was 335¼, against 319¾ in 1909, 316¼ in 1908 and 366¼ in 1907. The total number of blast furnaces in the United Kingdom on December 31, 1910, was 506. The average production per furnace last year was 30,475 tons.

Paxson Foundry Supplies

The J. W. Paxson Company, Philadelphia, Pa., is completing a new factory building, covering an area of 9000 sq. ft., built of steel and concrete, with a saw-tooth roof, providing excellent lighting facilities. Modern machinery will be installed for manufacturing foundry riddles of steel, brass and galvanized wire. The wire cloth will be specially woven for riddle sifter and window guard purposes. Wire, bristle and bamboo brushes and brooms, for foundry, machine and general cleaning purposes, will also be manufactured. When the plant is completed Farley boiler tube and flue cleaning brushes, foundry bellows and other foundry supplies will be given greater attention than heretofore. The new building is entirely separated from the machine and plate shop, pattern shop and blacksmith shop, in which the Paxson company manufactures its cupolas, ladles, sawblast outfits, tumbling barrels, patterns and pattern making supplies, etc.

The Sharpsville Advertiser, Sharpsville, Pa., has published, in its issue of May 17, the record of the work done by the Sharpsville furnace in 1859, when John J. Spearman assumed charge of it. The account is in great detail and is stated to have been reproduced from a record made in Mr. Spearman's own handwriting at that time. He is now in his 87th year, in vigorous health, and is president of the First National Bank of Sharon.

The National Association of Manufacturers

The proceedings of the first two days of the sixteenth annual convention of the National Association of Manufacturers, held last week at the Waldorf-Astoria, New York, were reported in *The Iron Age* of May 18. The final day, Wednesday, was devoted to a number of matters, including the election of officers.

A. H. Baldwin, chief of the Bureau of Manufactures, Department of Commerce and Labor, made an address in which he urged manufacturers to use the facilities of the bureau in getting information, especially with regard to foreign trade, just as the American farmer looks to the Department of Agriculture. It is only in this way that the bureau can learn how to make its work more efficient and valuable. Ex-Chief Edward F. Croker, of the New York Fire Department, made an able address on the promotion of means for fire prevention.

An address by Prof. Arthur A. Hammerschlag, director of the Carnegie Technical Schools, Pittsburgh, Pa., on "Industrial Education" concluded with the statement that individual employers have tried to dwell on the calamity which has overtaken the country in the loss of the old time apprenticeship system, forgetting that our industrial processes make such a system no longer an all round training; nor can we ever receive it on its same economic and social basis which was the ideal of the ancient guilds of Europe. Expert teaching and true education, tied to the living aspirations of our young men, are destined to produce successors to the old-fashioned mechanics, far better equipped with intelligence to meet the pressure of future demand. The following resolution was adopted:

Resolved, That we favor the establishment in every community of the continuation school, wherein the children of 14 to 18 years of age now employed in the industries and art shall be instructed in the sciences of their respective industry and citizenship.

A resolution was adopted in favor of an international court of arbitral justice for settling disputes among nations. Another resolution adopted was the following:

Resolved, That the association recommends to Congress the passage of a bill like that under consideration in the last Congress, and advocated by President Taft, providing for sufficient postal compensation to establish a swift and regular service in American steamships to the principal countries of South America, and to the ports of Australasia, Japan, China and the Philippines.

The election of officers resulted in the retention of John Kirby, Jr., Dayton Mfg. Company, Dayton, Ohio, as president and of F. H. Stillman, Watson-Stillman Company, New York, as treasurer. The directors are F. H. Stillman and Ludwig Nissen, New York; J. G. Battelle, Columbus, Ohio; C. S. Brantingham, Rockford, Ill.; H. S. Chamberlain, Chattanooga, Tenn.; G. T. Coppins, Boston; John Trix, Detroit; C. C. Hanch, Indianapolis; C. M. Jarvis, New Britain, Conn.; C. L. Langworthy, Philadelphia; H. E. Miles, Racine, Wis.; Daniel Simonds, Fitchburg, Mass.; David M. Parry, Indianapolis; Enos Paulin, Bridgeton, N. J.; C. W. Post, Battle Creek, Mich.; R. S. Hamilton, Providence, R. I.; F. C. Schwedtmann, St. Louis; George D. Selby, Portsmouth, Ohio; Giles H. Stillwell, Syracuse, N. Y., and D. A. Tompkins, Charlotte, N. C. George S. Boudinot was reappointed secretary.

The Banquet.

The annual banquet, on Wednesday evening, was participated in by several hundred persons. Ludwig Nissen presided with ability as toastmaster. Addresses were made by Gen. Harrison Gray Otis of Los Angeles; President Kirby, President Howard Elliott of the Northern Pacific Railroad, Congressman Nye of Minnesota and Judge W. H. Speer of New Jersey. General Otis received an ovation, in recognition of his great fight for industrial freedom. Mrs. Harriett Fisher, manufacturer of anvils, Trenton, N. J., the only woman member of the association, was so enthusiastically called on for a speech that she was obliged to make a few remarks, which were vociferously applauded.

President Elliott's address was a scholarly and convincing presentation of the demand of the railroads for fair play. Among other things he said:

The welfare of the people of this country, of the manufacturers and of all business including the railroad business are interdependent, and in the long run there must be proper relations between them and the government and fair and reasonable treatment of and by each, to

permit that progress in this country which its marvelous resources and intelligent population justify.

In times of big demand the manufacturers can and do increase their unit prices and in poor times they are at liberty to decrease them in order to encourage trade. They can meet competition and take on extra business without cutting the entire scale of prices. In the railroad business, however, an excessive demand not only brings no increase in the unit price, but legislatures and commissions, which have practically taken charge of the management of the railroads, more and more take the view that an increasing demand justifies lower prices, thus reversing the old-fashioned law of supply and demand.

The so-called railroad question has been magnified and much distorted by politicians and doctrinaires. But the railroad business has achieved moderate success not because of legislative interference but in spite of it. The railroad owner by courage and intelligence in adopting advanced methods has been able to improve the railroad system the railroad user had paid in 1910 the same average freight the railroad user had paid in 1910 the same average freight rate as in 1870, he would have paid \$3,092,662,300 more than he did pay; if he had paid the same average rate per passenger mile in 1910 as in 1883, the additional payment would have been \$164,353,800, the two amounts being greater than the entire earnings of all the United States railroads in the last year.

Bailey Sheet Furnace Equipment

The Canton Sheet Steel Company, Canton, Ohio, started production in its new plant about five months ago. During the short time the plant has been operating it has broken all records for output, averaging 102 tons of No. 28 gauge a week per mill, with a conversion cost also claimed to be the lowest on record. This is stated to be largely due to the furnace equipment and the employment of mechanical stokers. The furnaces, which were designed and installed by George J. Hagan, furnace engineer, Pittsburgh, are of the single type. All are fired with American under-feed stokers, delivering uniformly heated material and clean bars with no scale. The fuel consumption of the single or independent furnace averages 450 lb. of slack coal per ton of finished product. The furnace fires are cleaned once every eight hours, and it is worthy of special notice that a remarkably small amount of ash is removed at each cleaning—about one wheelbarrow load. The sheet furnaces are equipped with two stokers each. The power required for the equipment of stokers for the entire plant is only 7 hp.

Orders have recently been placed with Mr. Hagan by the Portsmouth Steel Company, Portsmouth, Ohio, for an equipment of his combination furnaces.

First Ore from the Cuyuna Range.—The first train-load of ore from the first shipping mine on the new Cuyuna range of Minnesota was made recently by the Rogers-Brown Ore Company, owner of the Kennedy mine. The train as it left the mine was appropriately decorated and a banner indicated that its load was the first Cuyuna range shipment. The Rogers-Brown Ore Company has done a vast amount of work at the Kennedy property in the past three years and already has a considerable stock pile of ore. The ore from the Cuyuna range will go to the new dock of the Soo Line on the Superior, Wis., side of St. Louis bay. A considerable stretch of railroad track is still to be constructed, extending to the pier, and this involves the erection of about half a mile of trestle work. The Kennedy is expected to be the only shipper of the Cuyuna range this year. It is now employing a force of 200 men. Underground development thus far has been quite satisfactory.

The country's total exports in April, according to the figures just issued by the Department of Commerce and Labor, were the largest on record for that month, exceeding by \$500,000 the very heavy exports of April, 1907, and those of April, 1910, by \$25,000,000. Imports, on the other hand, were nearly \$14,000,000 less than in April a year ago, and smaller than the April exports in three out of the last four years. The net result of these increased exports and decreased imports was an excess of exports for the month of \$37,876,000, compared with an excess of imports in April, 1910, amounting to \$853,000.

Obituary

NATHANIEL WRIGHT LORD, professor of mineralogy and metallurgy at the Ohio State University, Columbus, Ohio, died at his home in that city May 23, aged 56 years. He was born in Cincinnati. Mr. Lord has been long and prominently known in the technical world. He graduated at the Columbia College School of Mines in 1876; was chemist and engineer of the Monte Grande Gold Mining Company, 1879; chemist in charge of analysis of fertilizers for the Ohio State Board of Agriculture; consulting chemist Ohio Geological Survey; author of "Notes on Metallurgical Analysis," "Iron Manufacture of Ohio," "Natural and Artificial Cements," and numerous reports and papers for technical societies and scientific and technical journals. He was director of the chemical laboratory, United States fuel testing plant, St. Louis Exposition, 1894.

ALFRED B. DUFF, formerly connected with the Duff Patents Company, Pittsburgh, died at his home in that city May 20 from locomotor ataxia, after a long illness. He was born in Loftus, Yorkshire, England, December 16, 1865, and went to Pittsburgh in 1888. He retired from active business about 10 years ago on account of ill health.

A. N. SPENCER, vice-president and general sales manager of the Oliver Machinery Company, Grand Rapids, Mich., died at his home in that city May 18.

W. W. SLY, president and founder of the W. W. Sly Mfg. Company, Cleveland, Ohio, died at his home in that city May 22 of pneumonia.

LEHMAN S. KAHN, secretary and treasurer of the Evansville Stove Works, died at Evansville, Ind., May 16, aged 49 years. He was one of the best known iron founders in the city.

W. C. HEATH, for four years secretary of Spang, Chalfant & Co., Inc., died of heart failure at his home in Pittsburgh, May 23. He leaves a widow and two daughters.

New Publications

The Production of Malleable Castings.—By Richard Moldenke. Cloth bound; pages 132, 6 x 9 in.; illustrations, 35. Published by the Penton Publishing Company, Cleveland, Ohio. Price, \$3.

Dr. Moldenke's experiences in the manufacture of malleable iron castings and his eminent fitness to write on methods used in their production are well known. The secrecy which at one time surrounded the processes of the malleable foundry has given away in the last few years to a willingness to discuss some of their features. The metallurgy of malleable castings is not a closed book, but there has been a great difference between the best and the poorest practice and it is not denied that the tonnage of poor malleable castings has been considerable. The author properly says that many problems of the practice in this line are still unsolved, but he believes that this first comprehensive work on the subject will serve to stimulate interest, not with a view to multiplying establishments but to improving those that exist. It is pretty well known that the number of malleable foundries has increased and in many cases without any addition to the sum of approved information on the process. The author meets the criticism which may be made that such a book gives away the business by suggesting that the man who really knows his business need not be afraid of progress.

It is laid down as a fundamental of the successful manufacture of malleable castings that after the right composition and proper melting have been obtained there must be the application of heat high enough and long enough continued to effect a change in the condition of the carbon present without its necessary removal or diminution. The enormous preponderance of malleable tonnage in the United States and Canada as compared with the rest of the world, the author attributes to two things. The first is the radical difference in machining practice. In England and on the Continent where labor is cheaper than in the United States it is customary to finish machine parts to a much greater extent than in the United States and hence much of the best part of the malleable casting is removed. The poorer, even spongy part of the casting has to stand the service strain and frequently fails, hence the more common use of steel castings. The second reason is found in the progressiveness of the American manu-

facturer. While in Europe comparatively thin sections are made, heavier and thicker work is called for in this country, chills being extensively used to get the metal white as cast. While the capital required to build and operate a malleable castings plant is four times that needed for a gray iron foundry of corresponding tonnage, the work is steady, great numbers of the same piece can be made and under long contracts a good profit can be made in prosperous times.

The author takes up at first the history and development of the malleable foundry industry and then passes to the characteristics of malleable cast iron, its testing and the methods of molding and melting. A chapter is given to the air furnace and another to the open hearth furnace, while a third deals with the use of gas producers in malleable foundries. Then in turn are taken up the questions of mixing the charges and the casting and annealing of malleable castings. The characteristics of malleable fractures are discussed in another chapter and one is devoted to the use of the pyrometer in the annealing room. A very brief final chapter deals with the cost of manufacturing malleable castings.

The author makes the criticism which has also been made of founders operating in other lines, that malleable manufacturers are not as well informed as they might be as to their own costs. Buyers have thus become accustomed to low prices and advances seem very hard to bring about except in times of abounding prosperity.

Dr. Moldenke has added to his other distinctions that of producing not only the first book on malleable castings but one that gives just the information the reader seeks and that is destined for a long time to stand as the authority on this subject.

Hydroelectric Practice.—By H. A. E. C. von Schon. Second edition. Size, 7 x 9½ in.; pages, 383; illustrations, 140. Bound in cloth. Price, \$6.00, net. Published by the J. B. Lippincott Company, Washington Square, Philadelphia, Pa.

This is a revised and enlarged edition of a work which was originally published in 1908. The principal changes made consist of a detailed treatment of the market for electric current developed by a hydro-electric plant, flow discussion, pondage, storage of water, the scope and the equipment of development and the addition of an entirely new section on the operation and the maintenance of the plant. The tables of drainage areas of navigable rivers together with the forms of Government permits and licenses have been taken out since information on these points can be easily obtained from Government publications. No changes have been made in the cost estimates, which would seem to be desirable, as the figures given are based on conditions prevailing in the United States in 1907.

The work is divided into three parts, the first of which is entitled, "Analysis of a Hydro-Electric Project." This is written for the layman and is free from technical treatment. Five chapters are included in this division and treat of such subjects as the market for the current generated in a plant of this character and its value, the manner in which the power output is determined, the feasibility and practicability of the development and a synopsis of the cost and the investment value of such a project. In this part numerous diagrams for determining power of various kinds, flow of water, charges and revenue and approximate quantities required in the construction of the various parts of the project are included. The second part, which deals with the design and equipment of the plant, is intended for the student and the practical man. Five chapters are included in this division, each dealing with some phase of the work. These are arranged in logical sequence commencing with the preliminary work such as surveys and flow measurement and leading through a discussion of the different development programmes, types of dams and power stations and power equipment to a brief generalization in Chapter X on the preparation of plans, estimates, specifications and the engineering control of the construction work. Two chapters comprise Part III, dealing with the questions of operating and maintaining the plant. The first of these treats of the maintenance of all the structures entering into these developments, while in the other chapter the equipment and its operating and maintenance costs are taken up. Included in this latter chapter are tables giving the initial, the maintenance and the operation costs of steam power plants ranging from 50 to 500 hp. divided among the various items which go to make up the total investment.

Iron Ore Manual of the Lake Superior District.—By Rukard Hurd. Flexible leather binding; pages 162, 6 x 9 in. Distributed by F. M. Catlin, St. Paul, Minn. Price, \$7.50, postpaid.

The author is secretary of the Minnesota Tax Commission and his studies of Lake Superior iron ore resources and the values of Lake ores were at first connected with the investigations of that body. It was found that the information which should be embraced in a complete manual of Lake Superior iron ores was widely scattered and the work involved in the preparation of the book was by no means small. The principal questions which the book set out to answer are "What is iron ore worth?" and "How is its value determined?" In his opening pages the author takes up the method of determining prices and base unit values and develops the entire scheme of the producers for adjusting the price to the actual metallurgical value of the ore, taking for his purpose the base prices for 1911. Then follow a brief sketch of the work of the Minnesota Tax Commission in the valuation of iron ore, a chapter on "The Present Value of Iron Ore Royalties," and one on "Prospecting, Mining and Ore Estimating Methods in Minnesota," with special reports on the Mesaba and Cuyuna Ranges. Statistical tables are then given showing shipments by mines in 1910 and shipments by ranges in preceding years, together with rail and lake freights on iron ore; also statistics of production of iron ore and steel in the United States over a period of years. A chapter is given about the geology and mineralogy of the Lake Superior iron districts with some data on the iron ore reserves of the United States. Practically all the latter half of the book is taken up by tables of iron ore values based on the 1911 prices. These are given by ranges and are calculated for each 1-100 of 1 per cent. of iron, natural, between 45 and 61 per cent. for Old Range Vermillion Bessemer and Mesaba Bessemer, and between 45 and 60 per cent for Old Range Vermillion non-Bessemer and Mesaba non-Bessemer.

The author has done painstaking work and has produced a manual that will be of great permanent value.

Chemistry for Beginners.—By Edward Hart, Ph.D. Volume I., fifth edition, revised and enlarged. Bound in cloth. Size, 5 x 6½ in.; pages, 207; illustrations, 78. Price, \$1.00. Published by the Chemical Publishing Company, Easton, Pa.

As the name indicates, the book is intended for use by elementary students, and in preparing the author has endeavored to produce a work which will give information on topics which all educated people should understand. In a large number of text books on this subject written for students, the majority of whom do not become professional chemists, too much material is often included and an attempt has been made to cultivate simplicity of statement and exclude all matter which is not essential in an elementary text book. The book grew out of the needs of the author, who is Professor of Chemistry at Lafayette College, in teaching large classes of beginners.

The more common elements are taken up first with experiments calling attention to their familiar properties, and this followed by notes on the constitution of matter, gases, liquids and solids and the less well-known elements. Electrolysis of the various compounds formed by the different elements is taken up and the latter portion of the book is given over to a discussion of the different metals. In this section of the work the concentration and the roasting of ores, assaying, blast furnace practice and steel manufacture are given more space than is customary in a general beginners' chemistry. Brief instructions are given on the subjects of volumetric analysis and the weighing of substances. One feature of the book which might be improved is the substitution of more descriptive matter regarding the various elements for some of the experiments.

Motion Study.—By Frank B. Gilbreth. Cloth bound; pages 116; 5½ x 8 in., illustrated. Published by the D. Van Nostrand Company, New York. Price, \$2 net.

Few subjects are receiving more general attention from industrial managements than that of efficiency, and many men, in answer to the suggestion of the student and expert, are groping their way rather blindly to accomplish something in this direction in their works and offices. Mr. Gilbreth's volume, while dealing directly with bricklaying for the most part, contains interesting and important analyses, following the idea of the title. Most essential

to him who would undertake the problem of efficiency in a practical manner is the system with which he performs his work. Mr. Gilbreth goes into the details with much minuteness, and his text and illustrations carry along an idea so intimately and thoroughly that an application to other forms of labor should not be difficult. The work contains an introduction from the pen of Robert Thurston Kent.

The Life and Life Work of Charles B. Dudley.—A memorial volume; pages 269, 6¼ x 9½ in. Published by the American Society for Testing Materials. Price, cloth bound, \$2.50; leather bound, \$3.

A volume published as a memorial to the president of a technical society is not common, yet no one who reads this book will have any other feeling than that the engineering world would have missed much had not this permanent record been made of so rare a life. An account has already been given in these columns of the occasion on which most of the tributes given in the book were publicly presented. Much material concerning Dr. Dudley's life work has been added, including the story of his life, written by Prof. Edgar Marburg. Copies of the book can be had by addressing Professor Marburg, the secretary of the American Society for Testing Materials, University of Pennsylvania, Philadelphia.

An Export Assisting Plan.—The Commercial Bureau Company, 50 Church street, New York, has been given the privilege by the Department of State to equip American consulates with the card catalogue index files as compiled by that company. American manufacturers are requested to prepare briefs of their catalogues or printed matter according to card index specifications, these cards to be classified in the card index files under appropriate headings and to be printed in the various commercial languages. Through this medium the American manufacturer may be enabled to reach all the more important consumers of his products throughout the world. The system permits of additions and corrections being sent at regular intervals to the files at each consulate. To make the work comprehensive and valuable, it is essential that the co-operation of manufacturers be secured. The Commercial Bureau Company states that the classification, compilation and distribution of these cards in quantities are to be done without charge to the manufacturer. Full particulars can be secured by addressing the company.

No Steel Plant at Blairsville, Pa.—Reports printed in the Pittsburgh papers last week to the effect that plans are under way for the building of a large steel plant at Blairsville, Pa., 50 miles east of Pittsburgh, in which it was stated that H. C. Frick and W. E. Corey would be interested, are unfounded. So far as can be learned by careful investigation, there is no basis for the report that a steel plant will be built there. It is officially denied that Mr. Corey is connected with any such project.

The Vanadium Mines Company.—W. A. Bonitz, vice-president of the Vanadium Mines Company, Frick Annex, Pittsburgh, states that its mines and oxide plant at Cutter, N. M., have made successful runs. The concentrating mill has been closed to allow extensions and enlargements to be made, which will increase the capacity of the mill from 100 tons to 200 tons per day. Operations will be resumed about July 1. The company's plant at Rankin, Pa., near Pittsburgh, has equipment for treating 1500 lb. of contained vanadium per day.

The Pittsburgh Emery Wheel Company, Park Building, Pittsburgh, Pa., manufacturer of adamite, borundum, corundum and emery wheels and grinding machinery, has just completed at considerable expense the relining of all the kilns in its plant at Rochester, Pa., and the placing of all its equipment in the best possible condition. It has also added considerable additional equipment, which places it in better condition than ever before for improving the quality of its product, as well as increasing its capacity about 25 per cent.

An order in council has been passed by the Canadian government appointing C. C. Schneider, of New York City, a member of the Quebec Bridge Commission of Engineers. Mr. Schneider, formerly president of the American Society of Civil Engineers, succeeds Charles McDonald, who accepted a place on the commission only until the contract should be awarded.

The Langelier Swaging Machine

A swaging machine with a pneumatically operated holder has been developed by the Langelier Mfg. Company, Providence, R. I. In this machine the work is fed into the dies and the opening and the closing of the chuck are effected by compressed air. Fig. 1 shows the holder in position ready for use while Fig. 2 illustrates the holder swung to one side for removing and replacing the dies and inspecting the swaging parts of the ma-

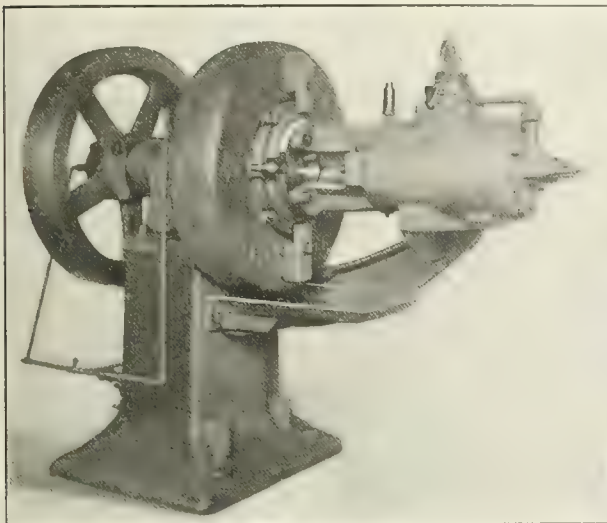


Fig. 1.—The Holder and Position for Use.
The No. 5A4 Swaging Machine with Pneumatically Operated Die

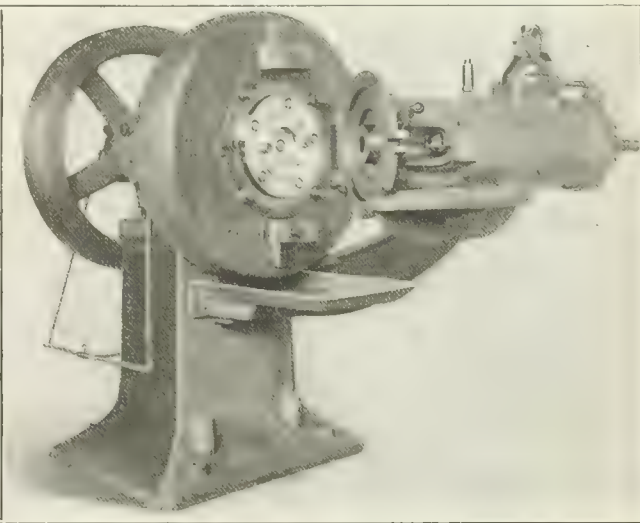


Fig. 2.—The Holder Swung to Inspect the Dies.
Holder. Built by the Langelier Mfg. Company, Providence, R. I.

chine. In Fig. 3 a view of a typical series of operations performed by the machine is given.

The holder consists of a cylinder hinged to the swaging machine cover as is clearly shown in Fig. 2 and supported at the outer end by a rail upon which it rides when swung to one side. The essential part of this holder is a pair of pistons which operate independently of each other. The main or cylinder piston controls the feeding of the work into the dies and its withdrawal while the other or auxiliary one opens and closes the chuck. A special type of triple-acting valve which is mounted on the top of the cylinder and has the air inlet and outlet at the rear controls the movement of both of these pistons. The oscillating part of the valve is so constructed that wear is compensated for and a uniform pressure maintained on its seat. It is operated by a hand and a thumb lever, the former controlling the feeding of the work into the dies and its withdrawal, while the latter regulates

In these last two operations the work was swaged on an arbor located between the dies and the swaging head. The time required for producing this piece of work including the chucking and ejecting of the work was 6 sec.

The Strong Steel Foundry Company.—The management of the Strong Steel Foundry Company, Buffalo, N. Y., maker of acid open-hearth steel castings, has been strengthened by the entrance into the active conduct of its affairs, in connection with O. H. P. Champlin, the president and treasurer, of James E. Keller, secretary. Mr. Keller, although interested in the company from its inception, was not actively engaged in its business management until April 1, but is now devoting his entire time to its service. The company has been fortunate in securing Edward Herms as superintendent of the foundry, succeeding E. C. Strong, recently resigned. Being a chemist and metallurgist of long experience and high standing, Mr. Herms will enable the company to improve the already superior quality of its products and to add thereto the manufacture of nickel, chrome, vanadium, titanium and manganese steel castings. A large amount of new equipment has been installed, placing the plant in a position to increase materially its output and to shorten the time on deliveries. The company contemplates the erection of new buildings in the near future to meet the requirements of its increasing business, plans for which are now under consideration.

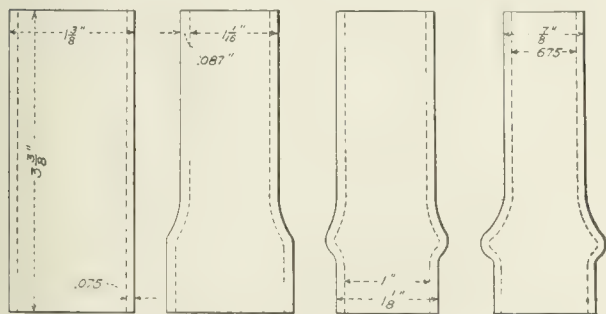


Fig. 3 A Specimen Series of Operations Performed on This Machine.

the closing of the spring chuck. The movement of the main piston, which comes in contact at the extreme outer end of its stroke with a piston valve, automatically releases the chuck, while the trip lever on the end of the cylinder head enables the chuck to be released at any part of its stroke.

An interesting example of some of the work made possible by the use of this machine is given in Fig. 3. The view at the left shows the blank which was a piece of brass tubing 1 3/8 in. in diameter and 3 1/2 in. long and the successive operations are given in order to the right. For

The Jamison Coal & Coke Company, Henry W. Oliver Building, Pittsburgh, reports through W. A. Johnson, general sales agent, that it is operating 70 per cent. of its coke ovens and running its coal mines about 80 to 85 per cent. of capacity. Its new holdings at Underwood and Barrackville, W. Va., have an output of 3500 tons of coal per day, and this will be increased later on.

The Wisconsin Engine Company, Corliss, Wis., has sold through its Pittsburgh office to the Philadelphia Company, Pittsburgh, for installation in one of its stations on the Baltimore & Ohio Railroad, in West Virginia, a 1200-hp. cross-compound pumping engine, with gas cylinder 20 in. in diameter, high-pressure cylinder 26 in., low pressure 48 in. and stroke 60 in. Delivery will be made in June.

Steel Ingot Treatment*

Notes on the Welding Up of Blow-Holes and Cavities

BY J. E. STEAD

In general terms welding may be described as the crystallizing into union of two solid metallic surfaces when they are brought together under suitable conditions. That such is the case is proved by microscopic examination, for, on polishing and etching sections of the united metals, the crystals along the junction are found to be common to each of the original pieces of metal. In perfect welding there is no visible joint, for the line or plane of junction is occupied by crystals, portions of which belong to one piece of metal and portions of the same crystals to the other. When the boundaries of the crystals are coincident with the juxtaposed plane surfaces, it is evidence of non-welding, which is equivalent to saying that unless the crystals become common to the two pieces there is no welding.†

The celebrated "Coffin joint," effected by placing together the fractured ends of a broken bar and heating the junction to a red heat, out of contact with air, was undoubtedly the result of crystallization, and in the general sense was an example of true welding.

The conditions necessary for the welding of two metallic surfaces of iron and steel are:

1. The surfaces must be clean and free from any foreign infusible substance, such as oxide of iron, slag, lime, etc.
2. The metallic surfaces must be in actual contact.
3. Given the conditions in 1 and 2, the higher the temperature the more rapid is the crystallization or welding together of the surfaces placed in juxtaposition; indeed, one often notices that, when a blacksmith allows two pieces of highly heated steel or iron to simply rest on one another, welding at the points of contact is instantaneous. The subsequent hammering brings the whole of the surfaces in contact and incidentally squeezes out the liquid intervening slag, and in this way conditions 1 and 2 are obtained and good welding produced.

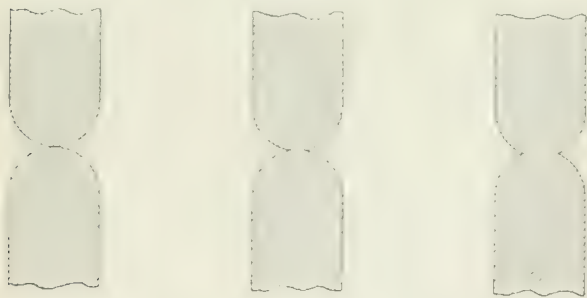


Fig. 1.—Experiments in Welding Round Ended Prisms of Steel.

It is well known that iron and steel will crystallize, or weld together, at temperatures far below the so-called welding point, as has been proved by Coffin and others, but so far as we know systematic trials have not been made with steels of varying and given composition with the object of determining at what temperatures they will actually unite. The experiments which follow were made as a preliminary essay in this direction. The steels selected contained between 0.1 per cent. and 1.40 per cent. carbon.

Experiment Series No. 1

In this series small sections of three different steels in duplicate, containing 0.1, 0.5 and 1.4 per cent. of carbon, having the dimensions of 10 x 10 x 5 mm., were ground down on one of their sides to plane surfaces, polished and placed face to face in a porcelain tube, and were heated in an atmosphere of hydrogen gas for 2 hr. at a temperature of 900 deg. C. After cooling, the steels were

removed and examined; in each case the surfaces had crystallized together so firmly that they could not be easily separated. By using a chisel and hammer they were burst asunder. On examining the pieces it was seen that the metals had crystallized together at a few isolated points, for the surfaces at these positions had a crystalline fracture. All of the samples with 1.4 per cent., 0.5 per cent., and 0.1 per cent. of carbon appeared to be equally welded. In duplicate experiments the welded specimens were sectioned through the two pieces and the surfaces polished and etched. In each case along the junction, in certain spots, the crystals were common to each piece, that is to say, they were continuous from one piece into the other. On heating corresponding pieces to a temperature of 800 deg. C. for 2 hr., they welded together at some points, but the areas welded were not quite so great as in the pieces heated at 900 deg. C.

The reason for the welding only having occurred at certain spots is attributed to the inequality of the surfaces placed together, and that the second condition necessary for perfect welding was absent. There is little doubt that the welding would have been perfect had the surfaces been true planes, or had sufficient pressure been applied during the heating period to bring the whole area of the faces into actual contact.

Experiment Series No. 2

The experiment described above was repeated, but under slightly different conditions, for instead of flat pieces short prisms, cut in duplicate from bars of steel were substituted. They were shaped in a lathe so as to leave one end of each semispherical and the other end flat.

In each experiment the rounded ends of the duplicate pieces were placed so as to touch each other, and were put into a porcelain tube, and kept in contact by gentle pressure. After heating for 2 hr. in hydrogen gas to a temperature of 800 deg. C., the pieces in each class of steel were found to be welded at the points of contact. On breaking them asunder the fractures at the joints were found to be crystalline, and measured about 0.5 mm. across.

In these trials, where the metals were in physical contact, crystallization or welding was complete and perfect.

Further trials conducted at temperatures of 900 deg. C. and 1000 deg. C. respectively yielded similar results, with this difference, however, that with the higher temperatures the areas of the surfaces actually welded were slightly greater than in those heated to 800 deg. C.

It is well known that piled sheets of relatively pure steel, when rolled at temperatures certainly below 900 deg. C., not infrequently stick together at certain points where the steel is free from oxide, and require great force to separate them from each other, and in some cases separation cannot be effected without tearing the sheets. In an extreme case of such sticking, two sheets at the point where they adhered were sectioned, polished and etched, and were examined microscopically, when it was found that the crystals of one sheet passed into the other, evidence of true welding, and this was effected by heating and rolling at a temperature far below that at which welding is considered to be possible with such material.

Experiment Series No. 3

Further trials were made with the round-ended prism of steel, to determine what would follow on heating them when in contact, at a temperature between 1300 and 1400 deg. C. For this purpose a complete series of pieces were placed, rounded ends in contact with each other, inside a wrought-iron tube, and this after hermetically sealing was put into a ladle containing about 4 tons of molten slag.

As it was found afterward that the tube with contents was in an inclined position, it is possible the pieces of steel inside pressed against each other by gravity. The tube was allowed to remain in the slag till cold; the slag ball was broken up and the tube removed. On examination the two pieces of steel containing 1.4 per cent. carbon were found to be porous, and that a liquid phase had

* A paper read before the Iron and Steel Institute, London, England, May 10 and 11, 1911.

† There can be no disputing of this law, or that the skilful microscopist can with absolute certainty determine whether or not steel or iron surfaces are crystallized or welded together, a matter of exceeding importance when considering the question as to whether cavities in steel ingots can or cannot be welded up.

liquated out and become fused on to the side of the tube. No liquation had taken place from the steels of lower carbon. All had become perfectly welded at the rounded ends, and the areas of junction or welding varied between 3 and 5 mm. in diameter. Fig. 1 illustrates what had happened.

The distance between the flat ends of the welded pieces was slightly less than before heating, but the corners of the square or flat ends of the steel with under 1 per cent. carbon were not altered, and remained square and sharp, a proof that they had not approached the melting point, otherwise they would have become rounded by the influence of surface tension.

Experiment Series No. 4

In another trial a bundle of seven round steel bars $\frac{1}{2}$ in. in diameter, tied together with wire, Fig. 2, was dropped into a ladle of molten slag and was allowed to cool with the slag. It was found that the steel, when cold, had become welded at the points of contact, and had coalesced or been drawn together to a considerable degree, a phenomenon suggesting that, had the heating been continued for a sufficient length of time, the bars would have coalesced to such an extent as to make one solid bar. That surface tension was not responsible for this peculiarity was proved by the fact that, in this as in the previous cases, the corners or sawed ends of the bars, were not rounded in the least, and the most delicate stampings and scratches on the outside of the bars were not effaced.

Experiment Series No. 5

In crucible steel works practice it is sometimes the custom to heat the steel to, and forge from, what is called the "wash welding" temperature, and it is assumed that if the material initially contains cavities or blow-holes, they will be welded up. To determine whether larger cavities than blow-holes could be so welded, a series of trials on a practical scale were made by F. M. Parkin, at the Don Steel Works, Sheffield, by the permission of the proprietors, Hobson, Houghton & Co., with the object of determining whether artificially formed pipes or cavities in steel could be welded up by wash-welding and forging, and at what temperature this could be effected.

With this object square bars 8 in. x 2 in. of Swedish Bessemer steel containing 0.15 per cent. of carbon were drilled down one end of each to a depth of 7 in. with a $\frac{1}{2}$ -in. drill, leaving a solid bottom of 1 in. Taper plugs of the same material $1\frac{1}{2}$ in. in length were also prepared. To displace the air from the drill holes, a few drops of petrol were introduced, and afterward the taper plugs of steel were driven forcibly into the open ends.

The closed and "piped" bars were heated to 800 deg. C., and after being removed from the fire were gently flattened under a 12 cwt. hammer, so as to close up the cavities, after which they were heated respectively to 750, 950 and 1150 deg. C. for 30 min., and were forged down at these temperatures into 1 in. square bars. When cold they were nicked at intervals, broken, and examined both by the eye and also by the microscope on cut and polished specimens and by bending cross sections cut across the central axes. In the piece heated at 750 deg. there was no evidence of welding. In the piece heated at 950 deg. welding had occurred at the lower end only, while the bar heated to 1150 deg. was perfectly welded and sound from end to end. A second trial was made with a steel containing 1.40 per cent. of carbon. This was prepared, as described in the previous case, with an artificial pipe, and was heated to between 1050 and 1100 deg. C. It was forged in the manner described above. After

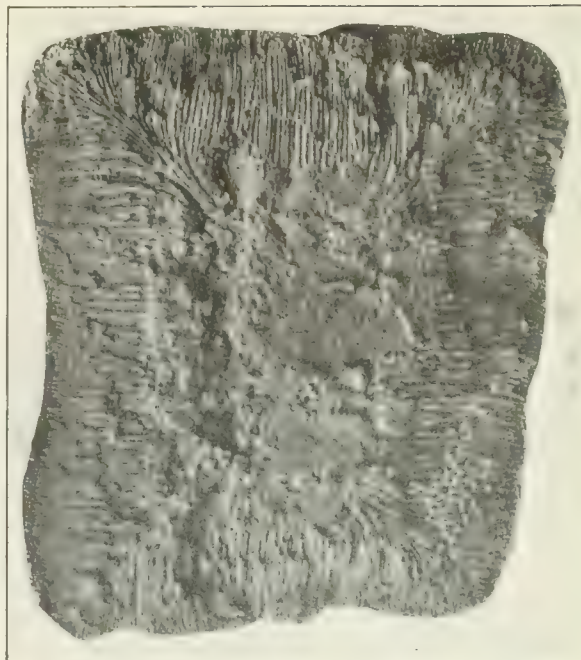


FIG. 1.—Fractured Surface of an Ingot Solidified from Very Mild Steel.

cooling it was found that, except near the upper plugged end, the welding had been satisfactory; there was no trace of unsoundness or hollowness.

Experiment Series No. 6

A third experiment was made with a bar of $2\frac{1}{2}$ -in. square crucible steel, containing 0.9 per cent. of carbon. A central hole was drilled and plugged, and the metal, after heating to a yellow heat, was forged into a $\frac{7}{8}$ -in. octagon bar, and was cut up and forged into chisels, which were put to practical use. The chisels did their work admirably, and there was no indication whatever of unsoundness.

These results prove conclusively that when two metallic surfaces quite free from oxide or any foreign matter such as slag, sulphide of manganese, alumina, etc., are brought together and are forged under the conditions given above at temperatures about 1100 deg. C., they do weld up completely. The italics are introduced to make it clear that the conclusions are based on a definite method of treatment. It has been shown that steels containing between 0.1 and 1.4 per cent. carbon will crystallize together at temperatures of 800 and 900 deg. C., when their plane surfaces are in contact, and are heated for 2 hr. but that little or no welding was effected on heating the artificially piped forged steel for half an hour at 750 and 950 deg. C. and forging afterward.

The great difference between the two results suggests that if the piped pieces, in which central holes were drilled, after the preliminary forging, made to bring the walls of the cavity into actual contact, had been heated for a much longer period, the sides would have crystallized together even before the second forging. It is not certain, however, that the first forging would leave the faces in physical contact.

The author believes there is strong ground for the presumption that if the faces of a closed up pipe are crystallized or welded together at several separate points only, and not completely, forging at relatively low temperatures, say at 750 or 850 deg. C., tends to cause disruption of the primarily united portions, particularly in cases where the steel is rolled to small sections. The reason for this hypothesis is that juxtaposed faces probably do not always flow evenly when the steel is being forged or rolled, and that, if one face flows in advance of the other, disruption of the parts united occurs, due to shearing effect.

It is well known that even in quite sound material it is possible to produce internal disruption by a special rolling process, and, if it can be effected in sound steel, how much more readily must it occur in initially imperfectly welded material.

How Blow-Hole Cavities Are Developed

Professor Howe has given a very characteristic definition of the genesis of blow-holes. He says: "The blow-

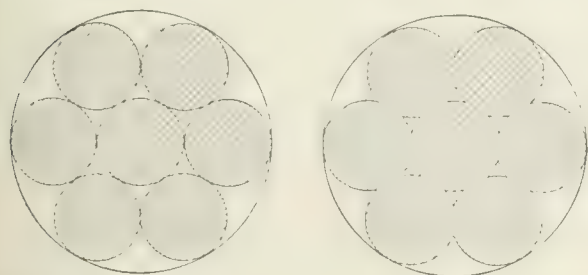


FIG. 2.—Experiments in Welding Round Steel Bars Tied with Wire and Dropped in Molten Slag.

holes represent (a) the progressive concentration in the molten or liquid mother mass of the gases initially present, a concentration carried on to supersaturation, and to the liberation of part of this gas from the supersaturated layers; and perhaps (b) in some cases, such as that of the solidification of steel ingots, the formation of a gas from chemical reaction brought about by fall of temperature, or by passage from the liquid to the solid state. In the case of steel ingots there are indications that carbonic oxide is thus formed during solidification by the union of oxygen and carbon present side by side in the molten metal."

It is well known, and therefore may be referred to briefly here, that if the steel has been in contact with more or less excessively ferruginous slag, previous to being poured, the metal is more or less highly charged with oxide of iron; and that if no metal or metalloid—such as aluminum, silicon, titanium—capable of reducing this oxide is added to the liquid steel on cooling down, the chemical reaction referred to by Professor Howe will follow, and the steel will give off gas and produce honeycombed ingots.

On the other hand, if the slag toward the termination of the finishing is rich in silica and low in oxide of iron, the oxide dissolved in the metal may actually absorb any excess of oxide dissolved by the metal at an earlier stage of the process.

It is possible that an excessively limey slag in the basic process, provided it is coincidentally impoverished in iron oxide, may also act in a similar manner.

Liquid steel, which gives off gases during cooling through the fluid state, always continues to yield gas during the period when the steel is plastic; these bubbles cannot escape, and the cold metal is in consequence always

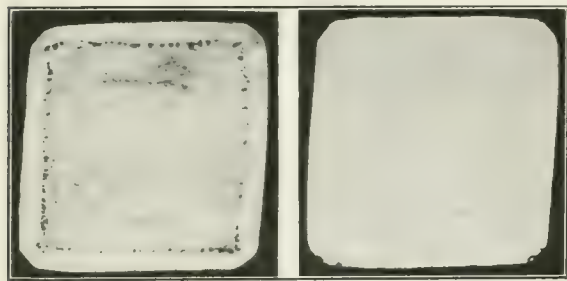


Fig. 4.—Section of a Billet Rolled from a Honeycombed Steel Ingot.

Fig. 5. Section of a Billet Rolled from Some of the Same Liquid Steel Treated with Aluminum.

more or less "honey-combed." In every gaseous steel it is difficult to keep the metal in the molds, for when the upper part of the steel is passing through the plastic stage, the gases continue to be evolved from the still fluid liquid below, and in the semi-solid steel at the top a frothy mass is formed which ascends and flows over the sides of the mold. In such a case it is usual to chill the upper liquid layer, cover it with sand and plate it down; by doing this the gases are prevented from escaping, and must incidentally exert very great internal pressure. Cases are on record where the pressure was so great that, after the steel in the ingot had been plated down, it burst the layer at the top, and lifted the mold itself from its base. Although this ingot when cold was not broken, there can be no doubt that it was extremely honeycombed. Fortunately, another ingot, solidified from very mild steel, was obtained at a later date, and the fractured surface was photographed. This is shown in Fig. 3, from which it will be seen that approximately one-third of the whole mass is occupied by gaseous honeycomb cavities, which radiate from the outside toward the center. The uneven section of the ingot was produced when being broken. The billets rolled from this ingot were naturally much "roked" by longitudinal fissures, which, however, did not penetrate to a depth of more than 1 mm. Below this the blow-holes appeared to have been completely welded up.

The Least and Most Objectionable Positions of Blow-Holes

It is recognized that the blow-holes are in the least objectionable position when they are located well within the external surface of the ingot, and steelmakers endeavor to fix the composition of the steel so that they will occupy that position. The most objectionable position they can occupy is close to the external skin.

Many years ago the author's attention was drawn to some ship plates rolled from ingots of the honeycombed

character just mentioned. The heating of the ingots had been so elevated as to oxidize the thin outer layer of solid steel and melt the scale on the surface, and this had run down and filled the honeycomb cavities, so that when the ingot was rolled the oxide remained imprisoned near the surface; and when cold, and the plates were struck with a hammer, little pieces of oxide jumped out, leaving unseemly pits on the finished plates, which, of course, on that account had to be rejected.

It is impossible to tell exactly how the gases become located in independent centers in steel ingots separated sometimes by considerable masses of steel. When a cork is removed from a bottle containing soda water, it is seen that after the first ebullition small bubbles form at the bottom of the bottle, and as these ascend they become larger and larger due, no doubt, to gas being freed from the liquid and taken up by the primary bubbles through which they pass; but in the case of bubbles which form in a semi-solid mass of steel, and do not move, a different explanation is necessary. They must at first be very small, and afterward develop to larger sizes, and this must be effected by the passage into them of gas from the surrounding plastic, not liquid, steel. It is almost certain that, at the time the bubbles form, the plastic metal consists of a mass of crystallites of purer iron and a liquid rich in carbon, sulphur and phosphorus, and that the primary bubbles form at relatively wide distances apart; and the gases which continue to pass out of solution from the surrounding plastic metal escape from it, and pass into the nearest bubbles, along fine channels which close up again, and in doing so coincidentally force some of the liquid into the cavities. As this must continue for some time—probably until the metal is completely solid—the bubbles gradually increase in size. When the liquid inside the ingot is inclosed in a solid shell of steel, and the gases still continue to be evolved, pressure must be exerted on the plastic mass, and this most probably expresses some more of the liquid, rich in metalloids, into the initially formed blow-holes. Examination of the fractured and cut surfaces of honeycombed ingots has yielded proof that the honeycomb cavities are lined with metal rich in sulphur and phosphorus.

Blow-Holes Contain Both Gas and Concentrations of Metalloids

In the above remarks the author has endeavored to explain what occurs when blow-holes form, and to account for the fact that the blow-holes in all commercial honeycombed ingots contain not only gas but concentrations of the metalloids.

The blow-hole segregations are clearly illustrated by Fig. 4 of a billet rolled from a honeycombed steel ingot, while Fig. 5 was of a billet rolled from a portion of the same liquid steel made free from honeycomb in a separate ingot by the addition of a little aluminum.

It will be seen, then, that where these blow-hole segregations are detected in rolled steel, one may be quite certain that they were at one time coincident with actual cavities, and that as one can thus locate with certainty where they exist by etching the polished steel, it is possible by microscopic examination and by bending the etched pieces to find out whether they have been welded or not, for, if they were not welded, the original faces of the unwelded cavities would at once open out into fissures, and the crystals would not be found common to the side of the blow-holes closed up.

Professor Howe has also made a special examination by the bending method of boiler plates rolled from a honeycombed ingot, and says that "on bending the cut and polished sections double in such a way that any blow-hole traces present ought to gape open like the cards of a bent pack," but as a matter of fact he found only traces where this actually did occur, "which were so short in length as to indicate strongly that a very great degree of welding had occurred," and suggested that these relics of blow-holes tend to show that the blow-hole gases had been reabsorbed by the metal to a very great degree. He then suggested "prolonging the exposure of forged blooms to a temperature above the welding point so as to complete the reabsorption of the gas while the metal is still weldable."

Although the author has examined many specimens of rails, forgings, and plates rolled from honeycombed ingots by bending, he has rarely found that they behaved in the manner described by Professor Howe, unless there existed distinct particles of slag or manganese sulphide,

which would, of course, prevent the metallic surfaces from coming in contact and welding together. That welding up of the blow-hole cavities in ordinary practice is, as a rule, complete and perfect has been proved by microscopic examination of a large number of specimens at the points where blow-hole segregations indicated that small cavities had originally existed.

Piping in Ingots

Piping in steel ingots is always coincident with the complete or partial absence of blow-holes, or evolution of gas from the steel when it is in the plastic state. When gases are liberated in sufficient quantity, piping is impossible.

All steel in cooling toward the point of solidification contracts, and as solidification proceeds from the cold sides of the molds in an inward direction, and when no gases are evolved in the steel as it passes through the plastic state, the liquid contracts and sinks down the center, leaving a pipe or cavity, but if gas is evolved it causes the whole mass of plastic steel to expand, which more or less balances the contraction of the metal still remaining liquid, with the result that no pipe or very little pipe can form, or the volume of plastic steel and the gases together may increase and cause the metal to froth over the top of the mold.

When making commercial structural steel, manufacturers usually aim at having the metal in the condition so that it shall not pipe or that it shall yield sufficient gases to cause the mass to expand as a whole—in other words, so that the volume of gases evolved in the plastic steel is equal to the contraction of the liquid metal.

In cases where the cavities consist of central continuous pipes, long experience has shown that finished rails and forgings made from piped steel ingots are almost invariably unsound in the parts where the pipe existed, and that welding together of the walls of the pipe cannot be depended upon, and, as a result, it is usual to reject the parts of ingots in which there is a central cavity when the object is to obtain perfectly sound finished material.

It is obvious that if the uppermost layers of steel in an ingot could be kept fluid across the whole area or section till the metal from the bottom to an inch below the surface had solidified there would be no piping, and if the steel were of a non-gaseous character there would be no blow-holes. This fact is fully recognized by steel-makers and various methods have been suggested, and some of them adopted, to obtain, as near as practically possible, that condition:

(a) By very slow teeming the steel into the molds, so as to give the portions poured in advance time to contract and even solidify before the molds are filled.

(b) By keeping the uppermost layers liquid by heating with a blow-pipe flame, and, with the same object, pouring liquid steel slag on the surface of the metal.

(c) The surface layers have been superheated by the introduction of a thermite reagent.

(d) By lining the upper parts of the molds with loam or fire-brick.

(e) In the casting of crucible ingots, the introduction of highly heated fire-clay cores, which are placed on the surface of the liquid steel in the mold, and filled with a portion of the steel retained, for that purpose, in the crucible.

(f) By slow teeming into inverted ingot molds, *i. e.*, with the wide ends of the molds uppermost and the small ends down.

Freedom from piping is also effected by compression of the steel in the ingots during its solidification.

Composition of Gas in the Cavities

Although much work has been done by Graham, Parry, Troost and Hautefeuille, Howe, Boudouard, Belloc, Muller, Stead and more recently by Thomas Baker, to determine the composition of the gases occluded in steels, it is not certain that sufficient gas from blisters in steel, or from the honeycomb or closed pipe cavities in ingots, had ever been analyzed before the author was afforded the excellent opportunity of actually collecting, and having analyzed a sufficient quantity of imprisoned gas from a blister in a thick steel plate low in carbon. The analysis of the gas was as follows:

By Volume. Per Cent.	By Volume. Per Cent.
Nitrogen 5.83	Hydrogen 17.17
Carbon dioxide..... 23.00	Methane 3.50
Carbon monoxide..... 50.50	
	Total 100.00

It is scarcely necessary to state that the mixture of gases inclosed in this particular steel may not be typical of what is present in the blow-holes. As a matter of fact, the gas collected was obtained from the central axis of the plate, and must have been inclosed in the pipe cavity, and not in the blow-holes. For comparison, an analysis

of the occluded gases extracted by heating in vacuum by Baker, from a steel containing about 0.9 per cent. carbon, is given herewith. The heating ranged between 519 and 1016 deg. C. Baker found that hydrogen was evolved in preponderating quantity at between 500 and 600 deg.

	Steel Free from Blow-holes. Per Cent.	Steel Containing Blow-holes. Per Cent.
Nitrogen	0.08	0.48
Carbon dioxide.....	1.68	0.87
Carbon monoxide.....	45.53	42.36
Hydrogen	51.99	54.56
Methane	0.72	1.73
Total	100.00	100.00

The peculiar and remarkable feature in the analysis of the gases from the blister in the plate referred to above is the very large proportion of carbon dioxide and methane.

It is not uncommon to find small blisters on black tin-plate sheets, after they have been annealed, but the author has never been able to obtain sufficient of the imprisoned gas for analysis. He has found in one or two cases traces of ferruginous slag in the neighborhood of the blisters, and considers it possible that there might have been chemical action between the oxide and the carbon of the steel, with the production of the carbon monoxide. Whether or not this was the case, or that they represented relatively rare cases where the honeycomb cavities had not been welded, the original gas having been compressed to a thin layer, so as to prevent the sides of the pressed out cavities coming into actual contact, cannot be definitely stated. It is probable, however, that the blisters were originally honeycombs in the ingot, that for some cause welding had not been effected during the rolling, and that the original gas, or that produced by chemical action, exerted sufficient pressure to produce the blisters, when the black sheets were subjected to an annealing process. It is impossible to conceive that gas generated in absolutely sound material, free from internal lamination, could produce lamination and blisters.

One is inclined to favor the view that the blisters correspond to portions only of the original flattened blow-holes, and that the points where the blisters appear are the places where traces of ferruginous slag have been present, which would not only be the means of preventing the surfaces coming into actual contact, but would react on the carbon of the steel and generate carbon monoxide.

The well-known blister steel produced by carburizing Swedish soft iron bars, which always contain more or less rich ferruginous slag, stratified at intervals between the layers of iron, illustrates fully how blisters can be and are actually produced by the generation of gas by the interaction of the oxide and the carbon of the metal. The oxide keeps the metal on each side of it from crystallizing together; the gas is generated at these points and blisters are the result.

On examination of the inside of the blisters, there is no longer any free oxide, a result one would expect, for the oxide no longer exists as such, having been reduced to metallic iron. The author suggests that for a similar reason oxide of iron is not always found in the inside of blisters in thin steel plates or sheets.

It may be noted incidentally that on cementing pure soft steel, which is free from local laminations of included oxide, no blisters appear.

A most instructive experiment suggests itself at this point, namely to forge a blister bar at a low temperature and heat it to a high temperature or pass it again through the cementation furnace, and determine if the blisters appear again in the same places and of the same size. If they do it must be assumed that the gases were only compressed and exerted their pressure when the steel again became plastic and were not absorbed in the steel.

Conclusions

Judging from the evidence advanced, it seems certain that if the blow-holes in steel ingots are subcutaneous and the heating of the metal is sufficiently high, say 1000 deg. C. and above, and the ingots are then rolled or forged they weld up completely unless the cavities themselves contain foreign matter. The wash welding, as practiced in Sheffield, and the heating and rolling of steel for rails and billets effect this.

It is, however, doubtful whether the pipe cavities can be so readily welded. The upper ends of the pipes in ingots are open to the gases of the heating furnace, and

the walls of the cavities become coated with oxide scale, which effectually prevents the metallic surfaces from coming into contact. When, however, the pipe is deep and is bridged over at intervals by diaphragms of solid steel, it is not improbable that welding below these bridges might be effected, provided that the imprisoned gases become forced back into the steel and do not form layers of highly compressed gas between the steel surfaces and so prevent these surfaces from coming into direct contact.

It is a fact observed by the author that the surfaces of the walls of the pipes in commercial ingots containing 0.06 per cent. or more sulphur are rich in manganese sulphide, and this must interfere with the perfect contact of the metallic surfaces, for from a practical point of view manganese sulphide is equivalent to scoria or slag.

Professor Howe's suggestion that the forged steel blooms should be heated for a long time to above the welding point, so as to complete the reabsorption of the gas, is based on two assumptions; first, that the gases of the cavities are capable of being forced, by pressure, into the hot steel and become occluded there; and, second, that what is not so forced into the metal will diffuse into it during prolonged heating at a high temperature.

Like all Professor Howe's contributions to science, this suggestion opens the door to a great field of research. Professor Howe will be the first to admit that if solid steel can have gas forced into it there is a limit to this, and that saturation will in such a case vary according to the pressure. The question at once arises, if the amount of gas pressed into the steel depends on the pressure and this pressure is partially removed, will not the gas, or a portion of it, pass back again into a cavity producing a blister? Again, if the gases are capable of being forced into the steel at high pressure and the steel be only red hot at the termination of the pressing or forging will not heating to a temperature above the welding point make the steel so soft and plastic that the imprisoned and highly compressed gas still unabsorbed will exert its influence and enlarge the chamber where it is located rather than pass into the heated steel? That this has occurred is proved by the blisters which sometimes form on reheating plates rolled from very much piped steel.

As we do not know the quantity of mixed gases or of any gas that can be forced, by pressure, into solid steel, or how much of it will come out again on removal of the pressure, it is evident we must have actual experimental evidence, and Professor Howe's suggestion calls for this. We do know, however, that gases occluded in solid steel at a high temperature and at atmospheric pressure can be removed at that, and even lower temperatures, by reducing the pressure. Presumably it is justifiable to conclude that the amount so removed could be returned to the steel if heated in the gas under pressure.

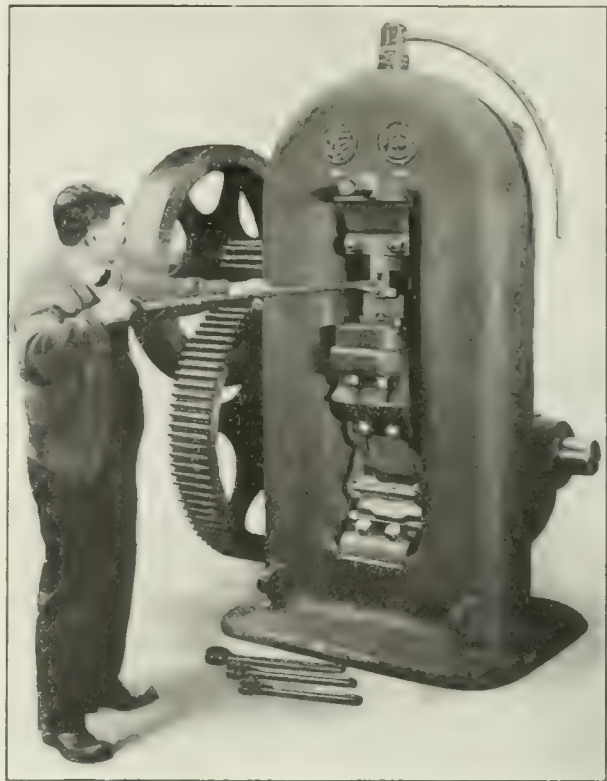
It is hoped that some one, who has the time and opportunity, will endeavor to determine what quality and quantity of gas, solid steel of different compositions is capable of having forced into it at varying temperatures and pressures. It is a question which a Carnegie scholar might try to solve.

A Labor-Saving Staybolt Press

A new type of press for forming square heads on boiler staybolt blanks at one stroke has been built by the Ferracuta Machine Company, Bridgeton, N. J. This tool is equipped with a set of dies so that the head is formed and the blank is cut from the bar at the one stroke. The company to whom this machine was supplied formerly cut the blanks from the bar and subsequently placed them in a slotter to have the ends formed. In this way the rate of production was one per minute while with the new arrangement both operations are performed simultaneously at the rate of 30 per minute. At the time the photograph was taken from which the engraving was reproduced the operator was making $\frac{7}{8}$ -in. staybolt blanks from a steel bar of that diameter.

The press is of compact construction and the frame is a solid casting with but 14 in. between the columns, an arrangement which reduces any springing of the frame while in use to a minimum. The stroke of the press is 2 in. long and the ram is forced upward by the action of steel toggles which are straightened by the 6-in. steel shaft at the back of the press. The forming dies are V-shaped

and the head to which the upper one is attached has a $\frac{1}{2}$ -in. adjustment through the medium of a wedge ad-



A New Press for Forming Staybolt Heads Made by the Ferracuta Machine Company, Bridgeton, N. J.

justment operated by a bolt and a lock nut. This bolt holds the head firmly against the frame and a spring having sufficient tension takes the weight of the head when the wedge adjustment is being operated. The press runs continuously and the ram makes 30 strokes per minute. The 40-in. flywheel operates at a speed of 180 r.p.m. and weighs 1100 lb. The complete weight of the press is over 16,000 lb. and the ram exerts a pressure of 400 tons.

The second local meeting of members and guests of the American Institute of Mining Engineers will be held Friday evening, May 26, in the assembly room of the United Engineering Society Building, 25 West 39th street, New York. Dr. James Douglas will give a lecture illustrated by lantern slides on "The Copper Queen Mine, Bisbee, Arizona." The lecture will be preceded by an informal dinner at 7 o'clock at the Engineers' Club, 32 West 40th street, attended by members and guests.

The Prony Brake.—The well-known general type of power-absorption brake for measuring the output from prime movers, called a prony brake, says the *Electrical World*, is attributed to the celebrated French engineer of that surname. It is just as well, perhaps, that only the surname is applied to the device, because his full name was Gaspard Clair François Marie Riche de Prony, who lived from 1755 to 1839. The prony brake, as applied to measuring the power of motors, has taken a variety of forms in detail. The principal idea running through all of them is that the load torque applied to the machine under test shall be susceptible of adjustment as well as measurement. It is desirable, moreover, that the application of the brake to the motor shall apply no appreciable stresses other than the measured load torque. The product of this torque into the speed of rotation of the motor, in appropriate units, gives immediately the output of the machine in watts absorbed by the brake. Except in the cases of the smallest machines, the power absorbed by the prony brake brings the heat-dissipating power of the apparatus to a severe test and means have to be provided to keep the motor and brake cool.

The Prime Steel Company, Milwaukee, Wis., states that the recent fire at its plant was confined to the roof of its main foundry and that it did not interfere with the operation of the plant.

The Hooper Continuous Pouring Spout

A new device to insure continuous pouring of metal from furnaces and particularly from reverberatory and open-hearth furnaces has been developed by George K. Hooper, and is being handled by the Hooper-Falkenau Engineering Company, 165 Broadway, New York City. The device is intended to overcome the practical troubles and economic disadvantages arising from intermittent pouring from furnaces of this character. By its use the melt from open-hearth steel furnaces can be drawn into a number of ladles without stopping the flow, thus doing away with the necessity for employing very large ladles and slow and heavy cranes. By its use savings in time, temperature and metal are claimed to be effected; while at the same time an increase in the size of the furnace is possible which enables it and the labor and the machinery employed in connection with it to be used at the greatest efficiency. A saving in the amount of metal used and also in cleaning the floors is effected by employing this device, since there is practically no drip and with the reverberatory furnaces it is possible to draw metal from several spouts simultaneously, thus enabling straight or par-

The Orenstein-Arthur Koppel Company

The Orenstein-Arthur Koppel Company, Koppel, Pa., manufacturer of portable and industrial railroads and equipment has completed the erection of new buildings and other developments of its property which have resulted in the doubling of the capacity of the plant. The old erection shop, which was 75 x 250 ft., has been increased by a building 75 x 300 ft. The machine shop has been doubled by an addition 75 x 100 ft. The light car shop has been supplemented by a heavy car shop 75 x 175 ft. The new carpenter shop is 50 x 125 ft., two stories; the tool repair rooms, 50 x 75 ft.; a new tool storage room 50 x 75 ft., while the boiler room and power house have been increased proportionately.

The company has plants in Germany, France, Russia, Spain and Austria. The works at Koppel, which supply the American market, were inadequate for the demand of so rapidly increasing a business, and it became imperative that an extensive plan of expansion be carried out. Ultimately, under plans already perfected, the pres-



A New Device for Continuous Pouring from a Reverberatory Furnace Made by the Hooper-Falkenau Engineering Company, New York City.

allel floor foundries to be advantageously served by mechanical handling appliances.

The continuous pouring device consists of an additional tilting spout located at the end of the regular one and moved back and forth by a lever and rocker arm operated by an air cylinder. Eight of these spouts, the first to be placed on the market, have been in use for more than a year in a large malleable iron foundry producing a specialty. The four furnaces of this plant have a capacity of 45 tons each and have been emptied in approximately 45 min. Without this device, but with the same handling appliances, 3½ hr. was required for the work by actual test. Overhead monorail travelers are used for placing the empty ladles at the spout and removing the filled ones, the engraving showing clearly how the respective channels of the spout move automatically out of the way of the filled ladle, permitting it to be lifted by an overhead traveler or crane and permitting also an empty ladle to be placed in position for filling. The ladles used in this foundry hold 1200 lb. and the advantage of rapidly handling this small size is apparent when the weight of the largest casting poured, 80 lb., is taken into consideration. In this plant only two men, one to each pair of furnaces, are required to operate the tilting spouts. The air passes through a two-way valve which is connected to the cylinders actuating the mechanism of the tilting spouts. In this way the air is admitted to the ends of the cylinders alternately and the metal is poured first from one leg of each spout and then from the other.

ent floor area of nearly 140,000 sq. ft. will be increased to 300,000.

Koppel is a new community which has grown up about the works of the Orenstein-Arthur Koppel Company. It is located on the edge of the Pittsburgh district, and within the so-called Youngstown-Sharon district, and is served by the Pennsylvania and the Pittsburgh & Lake Erie railroads, and is on the route of the proposed Lake Erie and Ohio River ship canal.

Puddlers will receive a reduction of 12½ cents a ton in their wages for May and June. The new rate was determined at the bi-monthly examination of the sales sheets of the Republic Iron & Steel Company and the Western Bar Iron Association in Pittsburgh. The examination showed that the average price of bar iron is on a 1.25 cent card. This entitled puddlers to \$5.62½ a ton, against \$5.75 paid in March and April.

The Ingram-Richardson Mfg. Company, Beaver Falls, Pa., has bought a 300-hp. Buckeye engine, directly connected to a Crocker-Wheeler generator, which will furnish power for a large addition now being built to its plant.

The Pittsburgh Plate Glass Company proposes to build a new plant at Port Mann, British Columbia, having found silica of the best quality and in large quantities in that district.

Cutting Worm Gears with a Fly Cutter

A Recent Development of Schuchardt & Schütte

Hobbing a worm wheel with a straight hob is satisfactory only when the angle of the hob thread is slight as is the case in large diameter single-thread hobs. With an increase in the number of threads and the angle the straight hobs give a rough and unsatisfactory job as high ridges are left on the teeth which cause the worm to wear in spots when in service. The length of the hob is determined by the diameter of the gear blank being cut

compensation for the motion of the hob or the fly cutter as whichever one is being used feeds past the gear blank. These gears are rocked in and out of position. Power for the cutter arbor is provided through a train of gears, one of which is shown at A that drives the hob mandril of the regular head. When this attachment is used the power for the cross feed is supplied by the chain B which controls the vertical feed for the regular cutter head. The only change made is to lengthen this chain so that it passes over the two idlers C. The cross movement of the cutter is controlled by the bevel gears H and I, the former receiving motion from the vertical chain B through a sprocket on its edge. If desired the cross feed can

be controlled by hand. One of the special features of the gear hobber is the arrangement for taking up wear in the shaft D. This shaft is made in two sections, the division being at J. Each of the portions of the shaft has spur gears at the end, and these mesh with a spur idler underneath, the width of which is equal to the combined width of the two gears on the shaft. This arrangement enables the two portions of the shaft to be brought nearer each other to take up wear easily.

An example of the use of a fly cutter with this attachment is clearly illustrated in Fig. 2, which is a reproduction of a photograph taken at the plant of the A. B. See Elevator Company, Jersey City, N. J. The blank being operated on is a spiral worm gear which forms a part of the driving mechanism of the company's elevators and has a pitch diameter of $28\frac{1}{2}$ in. and a face width of 4 in. The 60 teeth of the blank are hobbled in the regular way and the fly cutter is then used to generate the worm path in the sides of the teeth. This path consists of an approximately semi-circular groove in the sides of the teeth and eliminates play between the two gears. This cutter is made in two parts so as to generate the path on the side of two adjacent teeth simultaneously. The use of the fly cutter for this kind of work was suggested by Niles E. Lindstrom, works manager for A. B. See Elevator Com-

pany, when it was not possible to secure the necessary hobs on account of labor troubles. This method of generating the worm path enables a blank of the size shown to be

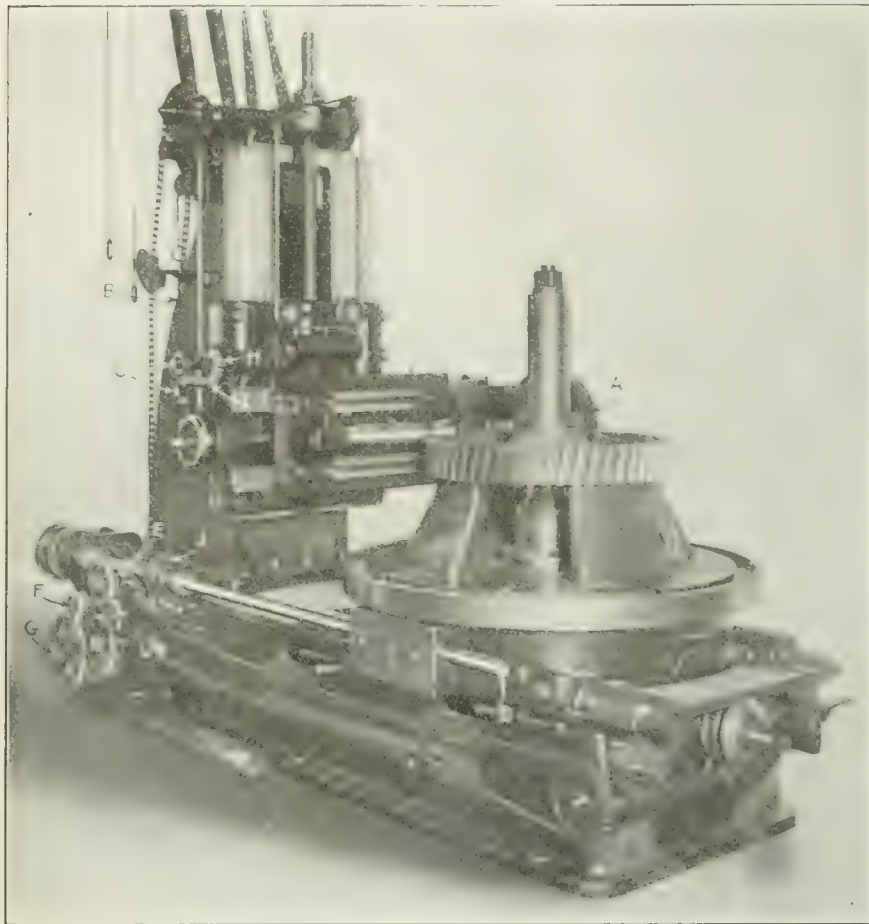


Fig. 1.—Cutting Worm Gears with a Fly Cutter on the No. 4 Standard Gear Hobber. Sold by Schuchardt & Schütte, New York City.

and this distance must at least be the same as the length of the worm. This method of cutting gear blanks is also expensive and a satisfactory solution of the problem is afforded by the use of an ordinary fly cutter. An attachment by which a fly cutter can be mounted on a gear hobber has been designed and placed on the market by Schuchardt & Schütte, West Street Building, New York City. Fig. 1 is a view of the attachment in place on the firm's No. 4 standard gear hobber while Fig. 2 shows a closer view of the fly cutter operating on a 60-tooth blank having a pitch diameter of $28\frac{1}{2}$ in.

The attachment consists of a duplicate cutter head which is provided with cross feed and is designed to employ either a tapered hob or a fly cutter for generating the worm gear. The cutter arbor receives its power from a cone pulley on the back of the machine which drives a vertical shaft in the interior of the column through bevel gearing and a horizontal shaft through spur gears. This horizontal shaft drives the shaft D, Fig. 1, which revolves the table through the gears which are located to the left of the worm E. The feed mechanism which is not used in connection with the attachment is driven from the shaft D through the worm E which meshes with the worm wheel below it and through sprockets produces a movement of the horizontal chain. The gears F and G are used in connection with the attachment only and are driven through gears from the differential in the interior of the machine. This differential gear enables an attachment of this nature to be used and provides the necessary com-

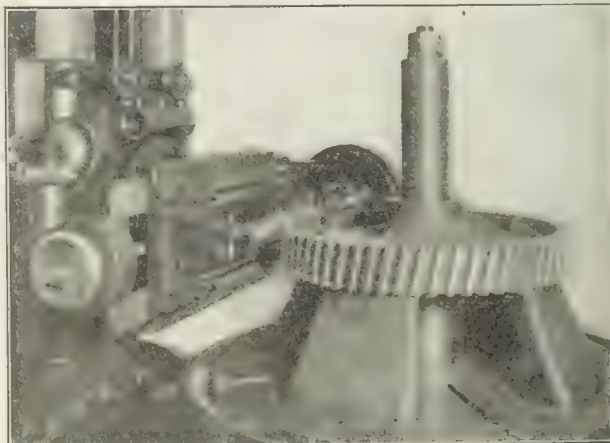


Fig. 2.—View of the Cutter and the Blank.

pletely finished in 14 hr., the time being divided equally between the hobbing of the spiral gear and the generating of the worm path.

Chilled Rolls with Passes Cast In

A patent has recently been granted Alfred I. Crook and assigned to the Philadelphia Roll & Machine Company, Philadelphia, Pa., covering a new method of making chilled rolls with passes cast in. The patent covers a

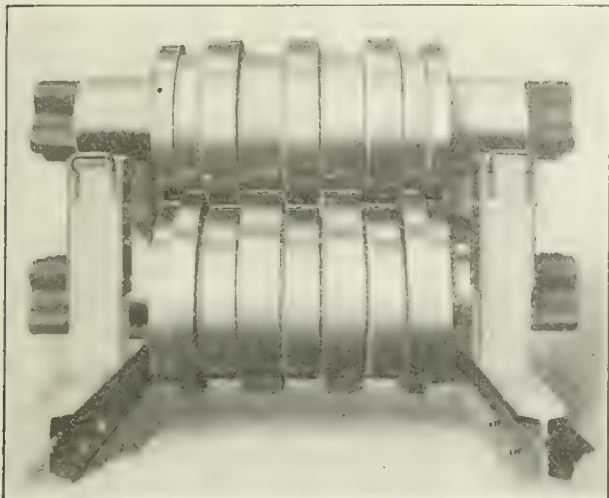


Fig. 1.—Chilled Rolls Made by Philadelphia Roll & Machine Company, Philadelphia, Pa.

radical departure from prevailing practice, but as a large number of rolls have been produced by this method in the year it has been in use by this company, it is felt that its value has been thoroughly demonstrated and it can no longer be considered an experiment.

Some of these rolls are shown in Figs. 1 and 2, while the necessary apparatus is shown in Figs. 3 and 4. Fig.

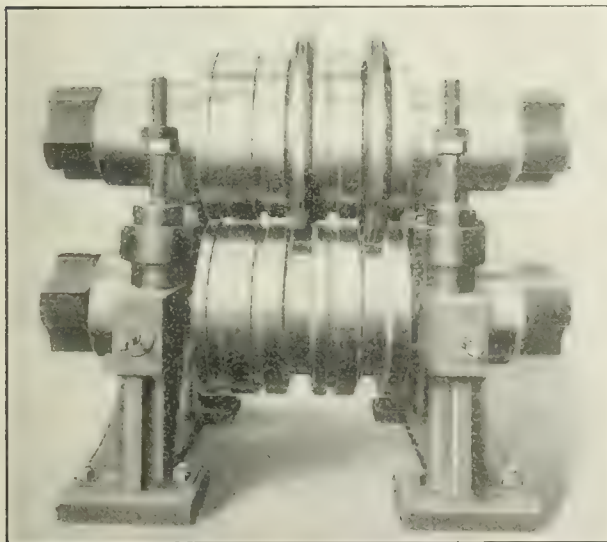


Fig. 2.—Chilled Rolls Made by Philadelphia Roll & Machine Company, Philadelphia, Pa.

3 shows the apparatus used in this method before assembling and shows the separate rings for each pass and the main chill-shell with the upper portion of the mold rammed in it, also the drag lying on its side. Fig. 4 shows the same mold with drag ready to receive the chill and the rings assembled and secured within the main shell.

It is understood that practically all the chilled-pass rolls made previously either have been made by inserting a chill-ring within an ordinary sand mold or have been made in chill molds split or parted vertically to allow their removal from the roll after cooling. The new method in the first place is regarded as ensuring sufficient chill by the fact that temptation to use light chill-rings is avoided and by the fact that the sand with the light rings, being a poor conductor of heat, tends to destroy the desired chilling effect. In the second place the new method does not carry with it the annoyance of the tendency of a

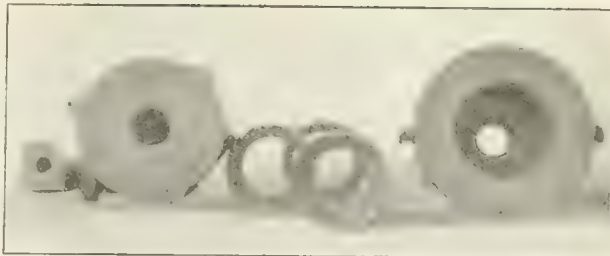


Fig. 3.—Apparatus before Assembling, Showing Rings for Each Pass and Main Chill Shell.

roll to develop a crack longitudinally along the line of parting.

Chill-rings of suitable shape and composition are fitted and temporarily secured within a solid outside shell of a form easily removed intact from the roll after cooling. These rings, which form the passes, are released shortly after the roll is poured and are thus free to change their position within the shell, thereby avoiding all undue resistance to the natural contraction of the cooling metal.

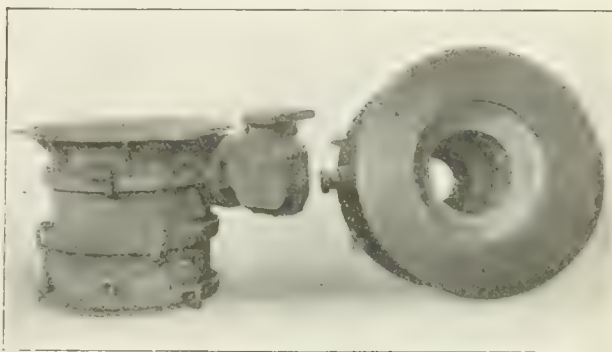


Fig. 4.—The Mold with the Drag Ready for Chilling and the Rings Assembled.

within. This works to prevent internal stresses due to the casting of an irregular body with an unyielding mold. The chill-rings being uniformly in contact with the solid chill-shell, which is heavy and an excellent conductor of heat, it is possible, it is found, to obtain the desired amount of chill upon the passes of the rolls.

Automatic Welding of Hoops by Toledo Welder

The Toledo Electric Welder Company, Cincinnati, Ohio, has brought out an automatic welding machine for welding hoops, buckles and other articles turned out in large quantities. The machine makes 15 to 30 welds per minute, according to the kind and size of stock that is used. In making hoops of No. 5 wire, a boy places the wire hoop in the jaws of the welder which automatically closes on the wire and turns on the current; the jaws are forced together to complete the weld; the stock is released, and the machine set ready to make the next weld. As soon as the weld is made the boy throws the hoop to one side and immediately places another hoop in the jaws of the welder. The welds are alike, each having the same amount of upset. The machine is belt driven, requiring about $\frac{1}{2}$ hp. to operate. The dimensions of the machine are 20 x 24 in.; total height 48 in.

Pratt Institute Exhibition.—The annual exhibition of the students of Pratt Institute, Brooklyn, N. Y., will be held June 1, 2 and 3. This institute is one of the pioneers in the field of industrial education in the United States, and offers a wide range of courses in mechanical, scientific, artistic and domestic subjects. In the school of science and technology, which is the division of the institute especially concerned with the training of young men in industrial and technical lines, the various classes will be at work in the shops and laboratories during the exhibit and thus an excellent opportunity will be given those interested to inspect not only the results of the students' work, but also the methods of instruction and the general facilities for conducting this kind of training.

Calcium Chloride for Drying the Blast

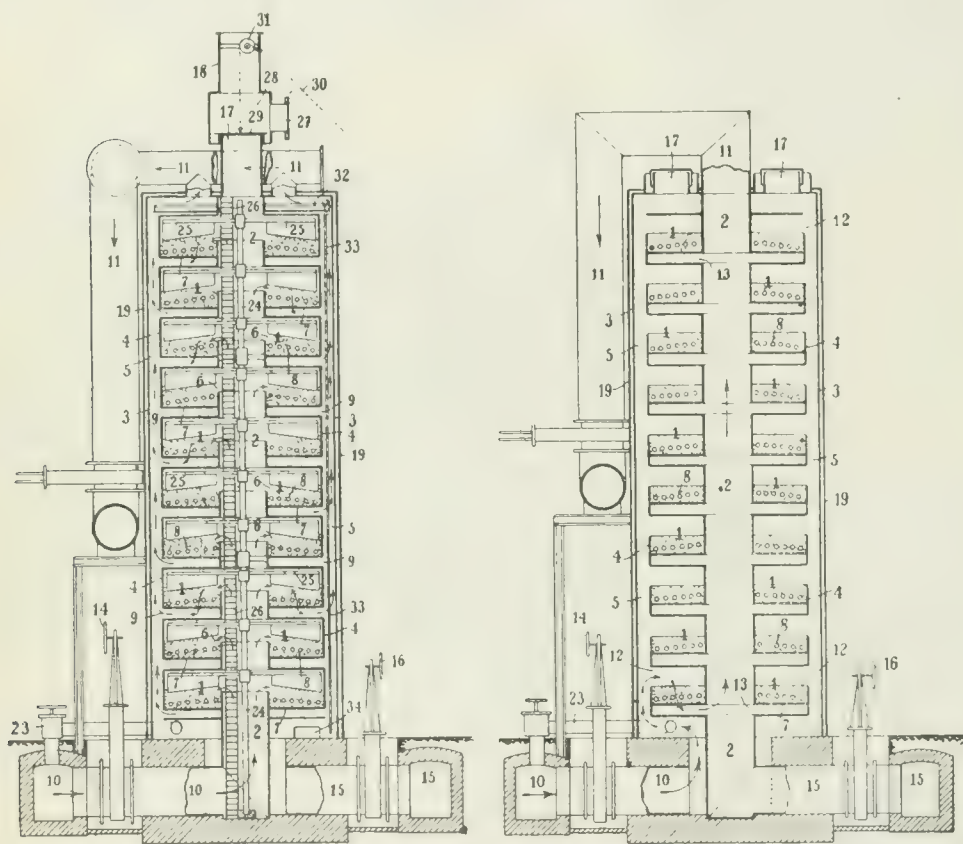
Installation at the Differdange Steel Works, Luxemburg—Emphasis on Low Cost as Compared with Refrigerating Method—The Calcium Chloride Successively Hydrated and Regenerated

The general features of construction and the experiences of operation of a process for the desiccation of air for the blast furnace by the use of calcium chloride are obtained from an installation for a 150-ton blast furnace at the Differdange steel works at Luxemburg, Germany. The plant is especially interesting for the scheme of regenerating the calcium chloride after every period of its useful work in extracting the water vapor in the air, and the large scale of the work and the promising commercial aspect of the process make it an important development in

The hydration of the calcium chloride should be arrested when the outside pellicle of the broken pieces commences to liquefy. If it were continued, the mass of the calcium chloride would be completely melted, and it would be impossible to regenerate it on the spot. Further, the fact of its being liquefied indicates that the calcium chloride has formed a hydrate whose dilution is already very considerable, which dilution renders it unfit for effective desiccation.

At this point it becomes time to regenerate. During the

progress of this regeneration it is necessary gradually to raise the temperature in such a manner as constantly to maintain the hydrates in their solid phase. Suppose, for example, that, after the passage of the air to be dried, the exterior hydrate is, at a given moment, one molecule of calcium chloride to four of water, a hydrate which melts at about 40 deg. (104 deg. F.) Owing to the circulation of the water, which has maintained the temperature of 15 deg. (59 deg. F.), this hydrate has remained solid; if, at the moment of regeneration, the temperature be suddenly raised to above 40 deg., the pellicle corresponding to the above formula melts, breaks down and is wasted. It is necessary, therefore, to proceed progressively, according to a law which has been recognized in practice, and may be deduced in theory, from the curve of the liquid and solid phases of the



Figs. 1 & 2. Vertical Sections of the Two Types of Drying Apparatus Using Calcium Chloride.

blast furnace practice. The theory of the use of calcium chloride as a desiccating agent; a sketch of different attempts to use it on a large scale for industrial operations, and an account of the Differdange plant were given in a paper presented before the meeting of the Iron and Steel Institute in London, May 10 and 11, by Felix A. Daubiné and Eugène V. Roy, Auboué, France, and from this paper has been obtained the following information.

Details of the Process

The details of the process are: A layer of broken calcium chloride, the smaller pieces at the bottom and the larger pieces at the top, rests on a sieve. Within the mass of the calcium chloride, and in its lower part, is submerged a spiral grating, consisting of pipes for the circulation of water. The volume of air to be dried is made to traverse the mass of calcium chloride from top to bottom, the draught being created by a fan. The absorption of the water by the calcium chloride leads to an evolution of heat, and this heat is carried away contemporaneously with its production by the water circulating within the spiral. Without this indispensable precaution the temperature of the mass of calcium chloride would rise, and the chloride mass would cease to act efficiently.

different hydrates of calcium chloride.*

It is necessary also, in the course of this regeneration, to be careful not to exceed the temperature of 235 deg. (455 deg. F.), above which the "tardy" hydrate, one molecule of calcium chloride and one of water (slow in desiccation) is formed. It is thus possible to effect the regeneration of the calcium chloride with sources of heat of comparatively low grade, and thus it is possible to employ, with this object, the waste fumes which occur plentifully in all metallurgical works.

The regeneration of the calcium chloride having been effected by this systematic warming, it is necessary, in order to render it again fit for the complete absorption of water vapor, to cool it completely. This cooling is quickly attained by a rapid circulation of water in the pipe system. When the temperature has returned to that of the average environment, the chloride of calcium has regained all its hygroscopic properties and is capable of desiccating afresh the new volumes of air.

Actual Plant and Its Operations

The problem was to desiccate the whole of the air required for the blowing of a blast furnace of 150 tons per twenty-four hours, in order to realize at this blast furnace the economies described by Mr. Gayley in his experiments of 1904, and in those he has undertaken since.

*Bulletin de la Société de l'Industrie Minière, December, 1909, p. 497.

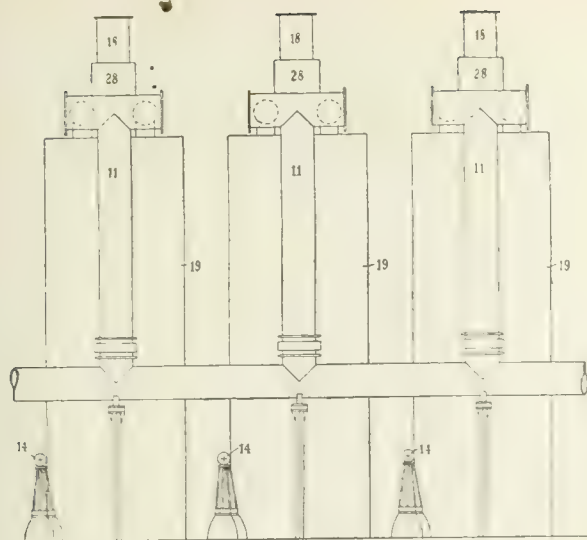
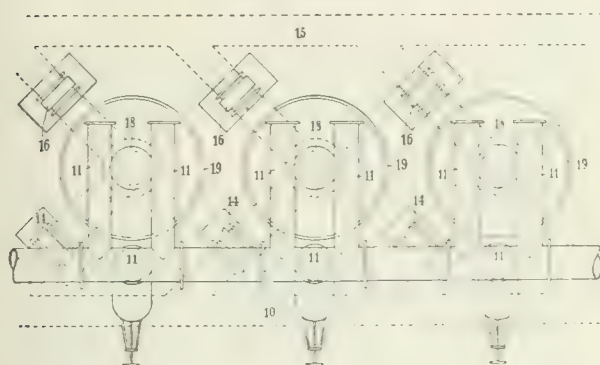


Fig. 3. Elevation.

Fig. 4.—Plan.
Apparatus for Air Drying by Calcium Chloride.

The appliances at the Differdange Works were designed by the firm of Paul Wurth & Co., Luxemburg.

Drawings showing two forms of apparatus are given. In the first design the blast is introduced by a central well, and distributed in layers by means of the openings leading to different superposed reservoirs. On emerging from the latter it is collected in an annular chamber, whence it is led to the place where it is to be utilized. In a second form of appliance, on the contrary, the blast arrives by way of the annular chamber, and is collected in the central well after traversing the layers of chloride of calcium, and is led thence to the place of utilization.

In order to be able to regenerate the chloride of calcium on the spot, the central well (or the annular chamber) is connected with a second pipe, admitting air or hot gases. The arrangement of the fans is such that it is possible, at will, either to pass the air to be dried, or the gases which are to serve for the regeneration, through the apparatus, or else to isolate it completely during the cooling down.

Fig. 1 shows, diagrammatically and in longitudinal section, the first type of design, and Fig. 2 the second type. Figs. 3 and 4 show in elevation and in plan an installation composed of several drying apparatus; while Figs. 5 and 6 show, in longitudinal section and in plan, the details of the spiral cooling arrangement. According to Figs. 1 and 2, the apparatus, which has a cylindrical shape, is composed of a certain number of compartments identical with each other (1), a central shaft (2), a cover (3), which forms, with the external shell (4), a number of compartments, and the annular chamber (5).

Each compartment (1) has a circular inlet orifice (6) and a grid (7), on which the chloride of calcium rests. An outlet (9) is provided below the grid. Toward the end of the desiccation the air is drawn by means of the fan across the main lead (10) into the central shaft (2), and distributed to all the compartments. It traverses the chloride of calcium from above downward, depositing its moisture; it then escapes into the annular chamber and reaches the conduit pipe (11), which takes it to the place of utilization.

As is well known, the chloride of calcium warms during the desiccation, and this must be rectified by the cooling. It is with this object that water is made to circulate in the spirals provided in each compartment. These spirals are arranged to have a certain inclination to provide for their being rapidly emptied. The joints are effected in a special box securing a water-tight separation for the chloride of calcium, with a discharge vent in case the joint becomes defective. The chloride is thus completely protected against such an event occurring.

When the chloride of calcium has absorbed the requisite amount of moisture, the apparatus is cut off from the inlet and outlet of air by the gate valve (14), and communication is made by means of the gate valve (16) with the main (15), which conducts air or warm gases. As the temperature should only be increased gradually, the fan aspirates cold air at the same time as it takes in the gases, to allow of the temperature being regulated. By diminishing the amount of air admitted, and increasing that of the gas, the temperature is gradually raised to 235 deg. (455 deg. F.)

When the calcium chloride has been regenerated, the apparatus is first cooled by means of a cold current of air entering the chamber (5) by the conduit pipe (23), and escaping by the outlet orifice (17), and then water is introduced in the spiral cooling coil until the temperature has been sufficiently lowered. The apparatus is then ready to desiccate the air-blast anew.

In the installation shown in Figs. 3 and 4 and in the half-tone engraving, three apparatus have been assumed to be employed, of which one dries the blast, while in the second the chloride of calcium is being regenerated and the third is undergoing cooling. During the period of the passage of the blast, or at the end of the period of cooling, it is possible to obtain access to the appliance, either by the central shaft by means of the ladder shown in Fig. 1, or to the annular chamber by the ladder (33) running on rails at the top of (32).

In the application of the process at Differdange, which is shown in the half-tone, the conditions required the drying of 30,000 cu. m. (1,060,000 cu. ft.) of air hourly. The apparatus constructed in accordance with the plans possesses the following features:

Total area presented to the passage of the blast, 100 sq. m. (1075 sq. ft.) per apparatus.
Number of compartments, 10.
Depth of the compartments, 2.4 m. (9.5 in.)
Apparent density of the chloride of calcium, 1.0.
Weight of chloride of calcium contained in each apparatus, 24,000 kg. (52,900 lb.)
Weight of the apparatus, 72,000 kg. (158,700 lb.)
Cooling surface of the spirals in each apparatus, 170 sq. m. (1830 sq. ft.)

Results of Calcium Chloride Drying

These appliances have been designed to work in the most unfavorable conditions—that is to say, to remove, during the summer months, 15 g. of moisture per cubic metre of air during a period of four hours (6.5 gr. per cubic foot).

At the time of writing this paper the appliances have been working normally for six weeks; but as the season is the end of winter, and as the moisture in the air is not very large, it has been found unnecessary to make as many reversals as were contemplated. Each apparatus receives the blast for 6 to 8 hours. The air, which contains 6 to 8 g. of moisture (2.6 to 3.5 gr. per cubic foot) before its passage, only contains from 1 to 1.5 g. per cubic metre (0.45 to 0.65 gr. per cubic foot) on emerging from the apparatus, and this figure remains practically constant from the commencement to the conclusion of the period.

Regeneration requires four hours for its completion, and is carried out by means of the waste smoke gases from boilers and from Cowper stoves. These gases, cleaned to the extent of 0.4 g. per cubic metre, pass directly through the mass of chloride. The temperature is regulated at 30 deg. (85 deg. F.) to commence with, and thereafter gradually raised in conformity with a certain ascertained law up to about 200 deg. (400 deg. F.) In the summer the temperature will be carried to 275 deg. (525 deg. F.) Cooling takes three hours.

To compare the system with air drying by the refrigeration process, it is explained substantially that to secure a resultant condition of only 0.65 gr. of water vapor per cubic foot of air, as is accomplished with calcium chloride regeneration and cooling carried only to about 60 deg., it

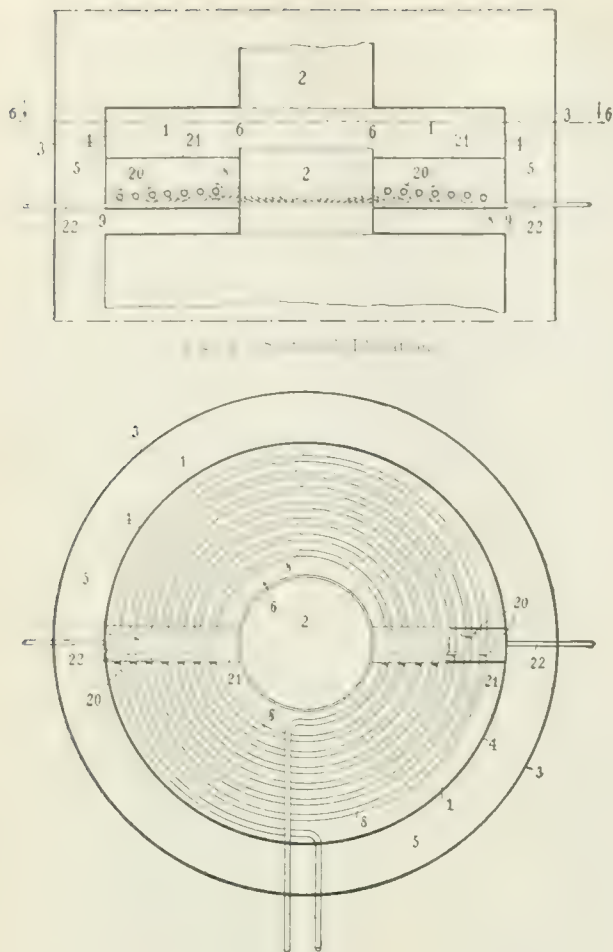


Fig. 6.—Plan.
Spiral Coils in Trays of Calcium Chloride.

is necessary in refrigeration to cool the air as low as to 6 or 7 deg. F. In fact, the authors state that refrigeration, cooling to, say, 23 deg. F. leaves a minimum of 18.2 gr. per pound of dry air, while the use of the calcium chloride, regenerated under the form of one molecule of the chloride to one or two molecules of water, and maintained in sufficient excess at 60 deg. F.,

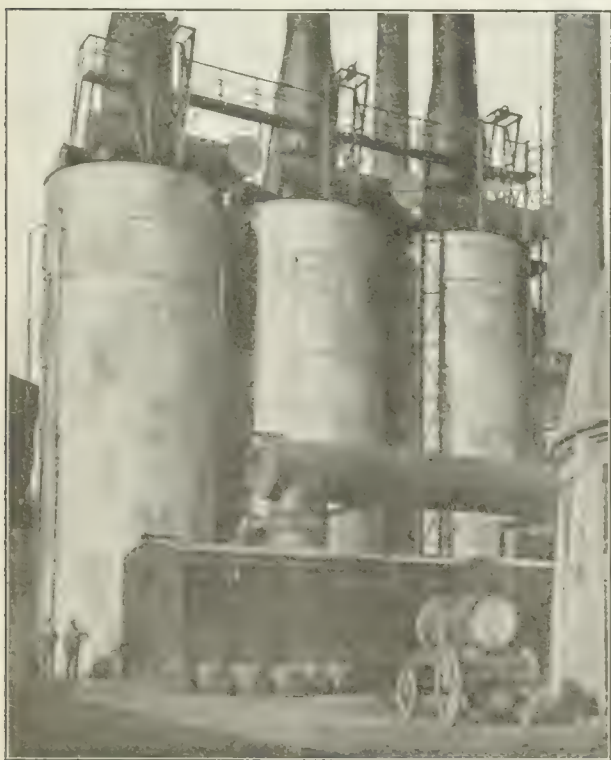


Fig. 7.—Three Air Blast Dryers, Differdange Steel Works, Luxemburg.

allows of a degree of moisture as low as 3.5 gr. per pound of dry air.

During the winter months, during which the refrigerating system is practically inoperative, particularly in Continental localities, chloride of calcium allows of exceedingly low figures being attained—that is, distinctly less than 1 g. per cubic metre of air (0.45 gr. per cubic foot). The installation is too recent for the true value of the economics realized to be stated, but it is now quite established that the manufacture of dry air need present no difficulty whatever.

The installation cost a little less than one-quarter of what would have been the cost of an installation for desiccation by means of refrigerating machines. One man for the day shift and one for the night shift are sufficient to handle the apparatus, which is of the most simple description. The expenses of working are thus greatly reduced.

The authors state, in conclusion, that similar apparatus are under investigation, not only for other metallurgical works, but also with a view to their application in other industries that require drying operations carried out at low temperatures, as, for example, for the desiccation of chemical or pharmaceutical products, india rubber, resins, gums, gelatine, albumen, glue, aniline colors and various organic bodies.

The Sherman Anti-Trust Law Muddle

The following analysis of the situation in which large combinations are placed, as a result of the recent Supreme Court decision in the Standard Oil case, is taken from a statement by the eminent lawyer, James M. Beck:

The Sherman law is not a code of ethics, but the formulation of an economic policy. This policy, whatever it is, cannot be impartially administered by regarding the so-called good trusts with immunity and denying the so-called bad trusts equal rights in combining their energies and resources. The decision just announced necessarily gives a fruitful opportunity for executive caprice and political tyranny, for primarily the executive must determine the sweet reasonableness of each combination, and the hand of arbitrary power is thus placed at the throat of business.

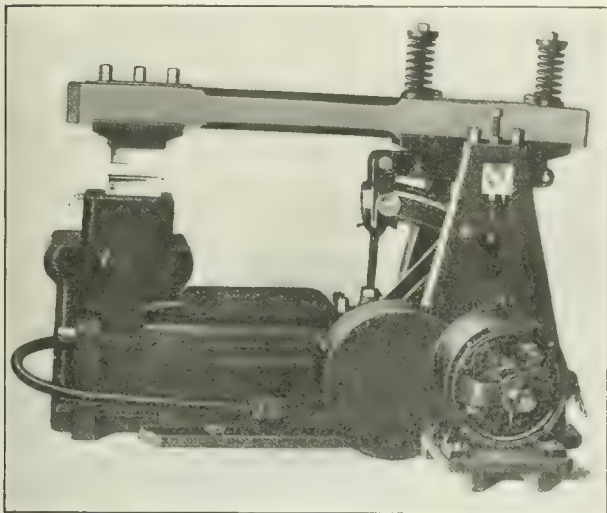
Fortunately for a few years we will have a high-minded executive, who will not willingly abuse such power. But after him, will it be the deluge? In a case decided in 1888, the late Justice Brewer held that if a law made it an offense for a railroad to charge an "unreasonable rate," it would be void for want of certainty, "for no penal law can be sustained unless its mandates are so clearly expressed that any ordinary person can determine in advance what he may and what he may not do under it." He likened such a statute to a section of the Chinese penal code, which punished any one who was guilty of "improper conduct." Under the Sherman anti-trust law, as now interpreted, capital may not be combined to engage in interstate commerce unless the incidental restraint of trade is "reasonable," but is there a living man, whether lawyer or layman, judge or prosecuting officer, who is now able to state under what circumstances the co-operation of capital is "reasonable"? Let us fervently hope that in the American Tobacco case the dead line of the law, which separates the permitted from the inhibited, may be clearly defined, for what the American business man needs is certainty.

Is there not a tendency in this country to confuse realities with word symbols? We use expressions like "restraint of trade" and "reasonable" much as the collector in Nicholas Nickleby spoke of the "unities of the drama," but exactly what the phrases mean no one can explain. To me the situation promises little but further forensic controversy and political agitation. The legal profession will, doubtless, flourish and the engraving companies, which print certificates of stock, will, likewise, work overtime, but will the business interests of the country, after a temporary flourish of enthusiasm, really make much progress through this legal morass? In the meantime Germany and England, in fostering the unification of capital and facilitating economic agencies, are more flourishing than in years, while our nation, with its unequalled natural resources and its energetic and ambitious workers, is floundering in a quagmire of obscure legal phrases.

New Welch Hammer of the Helve Type

A new variable-blow power hammer of the helve type has recently been brought out by the Welch Hammer & Machine Company, 1523 Williamson Building, Cleveland, Ohio, and is shown in the accompanying illustration. It is designed for all kinds of forging work. The cut shows the motor-driven machine, and it is claimed that it is the only power hammer on the market that can be motor driven by a direct-connected motor. The belt-driven machine also made is, it is explained, the only hammer running with a tight belt.

The hammer is simple in construction. Its distinctive feature is the method of transmitting the motion of the eccentric to the helve through the link mechanism by means of which the force of the blow is regulated by the operator. A swinging bracket, which supports and pivots one end of the link segment, is balanced on bronze bushings, which also form the main bearings of the driving shaft. This bracket is connected by means of two short links to the foot treadle. A hardened bearing block, accurately fitted to the slot in the link segment, has its end bearings in the U links, pendant from the beam



Helve Type Hammer with Directly Connected Motor. Built by the Welch Hammer & Machine Company, Cleveland, Ohio.

lever. The short ends of the U links are connected by means of straight links to points in the housings directly in line with the pivot point of the link segment at full stroke.

The pivot pin or dead center of the link segment comes up in the U links in alignment with the center of the sliding block in the segment. The free end of the segment is oscillated by means of an eccentric on the driving shaft and when on dead center no motion is transmitted to the helve.

The foot treadle furnishes the means of stopping, starting and controlling the machine, the throw of the helve and force of the blow being regulated by the amount of pressure applied to the treadle. A slight pressure of the treadle shifts the position of the link with relation to the sliding block and the motion of the link is transmitted to the helve. The stroke or throw of the helve can, therefore, be varied by the operator from an absolutely dead position to the full stroke. The machine runs at a constant speed of about 300 r.p.m. One of the points of excellence claimed for it is its ability to strike light finishing blows at high speed, which is desired on a large class of work.

A balancing mechanism is located between the housings and works to balance the swinging bracket and remove the weight of the helve from the links. The helve is balanced on a pivot shaft and beam lever by means of soil springs on top of the helve. The point is made that as a result the helve vibrates like a spring and strikes a sharp and snappy blow. It is claimed that the machine can work satisfactorily on bars up to 2¼ in. diameter.

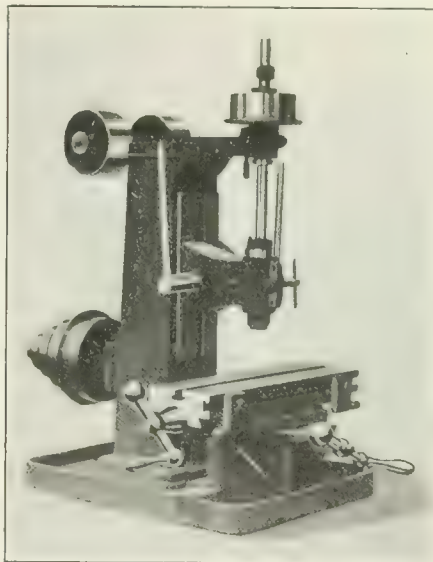
In the picture the machine is shown with the link segment shifted to the position of full stroke. The wheel for the belt drive and the motor and gearing for the motor drive can be applied to either side of the machine and the motor drive can be applied to all sizes and styles of these hammers.

The anvil weighs 1500 lb., or 25 times the weight of the hammer head. The complete machine weighs about 5000 lb. The hammer head is made of cast steel and the dies are tool steel. The links and other small parts subject to shock or stress are steel castings or forgings. The helve is made of seasoned hickory. The floor dimensions of the belt-driven machine is 40 in. x 6 ft. 6 in. and the dimensions of the motor-driven machine are 56 in. x 6 ft. 6 in. The machine is to be made in standard sizes. The company, it is understood, will also make power hammers with guided heads adapted for various classes of work.

Vertical Combination Bench Miller and Drill

A combination vertical bench milling and drilling machine has been built by R. M. Clough, Tolland, Conn. This new tool has a capacity for drilling holes up to a maximum diameter of ½ in. and is intended to be used with ½-in. mills, although larger ones can be used for taking light cuts and heavier cuts can be taken by employing mills of smaller diameter.

The table has a working surface of 16 x 5½ in. and there is a ⅝-in. T-slot through the center. A longitudinal movement of 10 in. and a transverse one of half that extent are provided and the feed screws have micrometer indexes reading in thousandths of an inch and adjustable stop gauges enable the feed to be disengaged at any desired point. The spindle has taper bearings with adjusting nuts for taking up the wear and at the lower end



A Vertical Bench Milling and Drilling Machine Made by R. M. Clough, Tolland, Conn.

there is a No. 7 Brown & Sharpe taper hole. The spindle sleeve has a movement of 4 in. and is operated by a rack and pinion. The lever at the right of the head clamps the spindle in position for milling, while the one at the left controls the 8-in. adjustment of the sliding head on the column.

The machine is driven by a 2-in. belt, the power being secured from a 5-in. pulley on the countershaft and transmitted to a three-step cone pulley on the machine. The weight of the machine including a plane or a swivel vise is 300 lb.

With every nation on earth represented for the first time since its establishment in 1883, the International Union for the Protection of Industrial Property began its fourth conference at Washington, D. C., May 15, to consider many new industrial problems, which have arisen either directly or indirectly from patent and trademark laws. The conference is expected to negotiate many treaties affecting various industrial problems. All of the proceedings are conducted in French and are secret. Delegates to the meeting have plenary powers to draft and sign treaties and agreements in the names of the countries they represent. In nearly every instance the chairman of a delegation is the highest diplomatic officer of his country now in the United States.

Molding Machine with Stripping Plate

Pridmore Rock-over Machine Having Also Universal Flask Rest

A rock-over molding machine possessing the interesting feature of being equipped with a stripping plate attachment has been developed by the firm of Henry E. Pridmore, Nineteenth and Rockwell streets, Chicago, Ill.

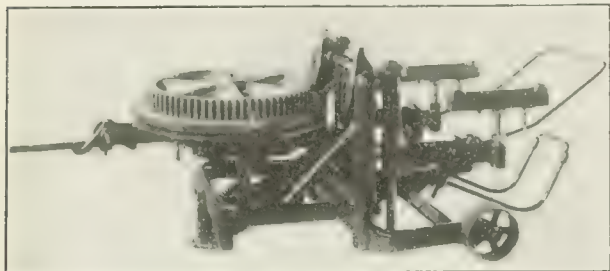


FIG. 1.—Rock-over Molding Machine built by Henry E. Pridmore, Chicago, Ill.

It is believed this is the first rock-over machine of this type and consequently marks a departure in molding-machine practice. The addition of the stripping plate attachment works to increase greatly the output of the foundry, gaining an efficiency not possible with the rock-over machine in itself or with the stripping-plate machine in itself. The machine is also provided with the Pridmore patented universal self-adjusting flask rest, designed to receive bottom boards of all irregular shapes.

The illustration shows one of the Pridmore standard

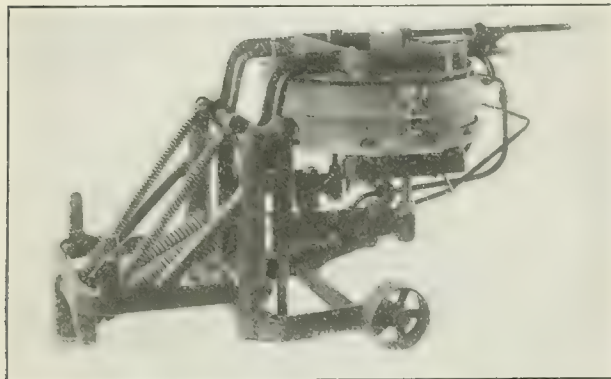


FIG. 2.—Pridmore Molding Machine with Flask Rolled Over Ready to Draw Mold.

29 x 24-in. rock-over machines with 8-in. draw. It is mounted with a gear pattern 25 in. in diameter and 3 in. in face dimension. In Fig. 1 the machine and pattern are ready to receive the flask. In Fig. 2 the flask has been rammed up and rolled over ready to have the pattern withdrawn. The mold is then lowered and the

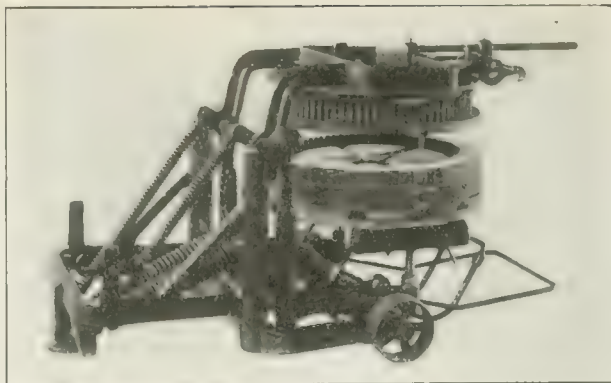


FIG. 3.—The Draw Completed with Stripping Plate Hanging.

stripping plate remains in place doing its work until the draw is completed, as shown in Fig. 3 with the stripping plate hanging. The pattern and stripping plate are then rolled over to the receiving position and the next mold is made.

Attention may be called to the flask rest which is locked in position by pulling the lever which hangs conveniently under the rest. It is explained that the flask rest is dust and sandproof, and has no loose parts to get out of order. Finally it will be noted that there are no gears on the stripping-plate attachment likely to require the rolling over of the machine and flask clamped together. In making gear molds a saving of 25 per cent. in time over the old stripping-plate method is claimed.

The Baker Hammer Flue Cleaner

New Device for Removing Scale from Boiler Tubes

Under a patent recently granted, William J. Baker, 100 West Cayuga street, Oswego, N. Y., is manufacturing a new type of flue cleaner. The principal feature of the cleaner is the use of a tubular frame containing a lever hammer which gives the device its name. Fig. 1 is an elevation and a longitudinal section of the cleaner and Fig. 2 shows it being operated by compressed air, although, if desired hand operation can be resorted to.

The cleaner consists of a tubular frame with an elongated opening, *a*, in one side for receiving and permitting the operation of the hammer lever *b*. This lever is pivoted midway between its ends to opposite sides of the opening and at one end has a hammer head, *c*, and at its opposite end a bearing face, *d*, for engagement with the member *e* which furnishes the rotary motion. A laminated spring, *f*, keeps the hammer end of the lever pressed radially outward while the other end is pressed against the face of the actuating member *e*. The spring consists of a series of flat leaves secured together at one end and to one side of the tubular frame by screws or bolts.

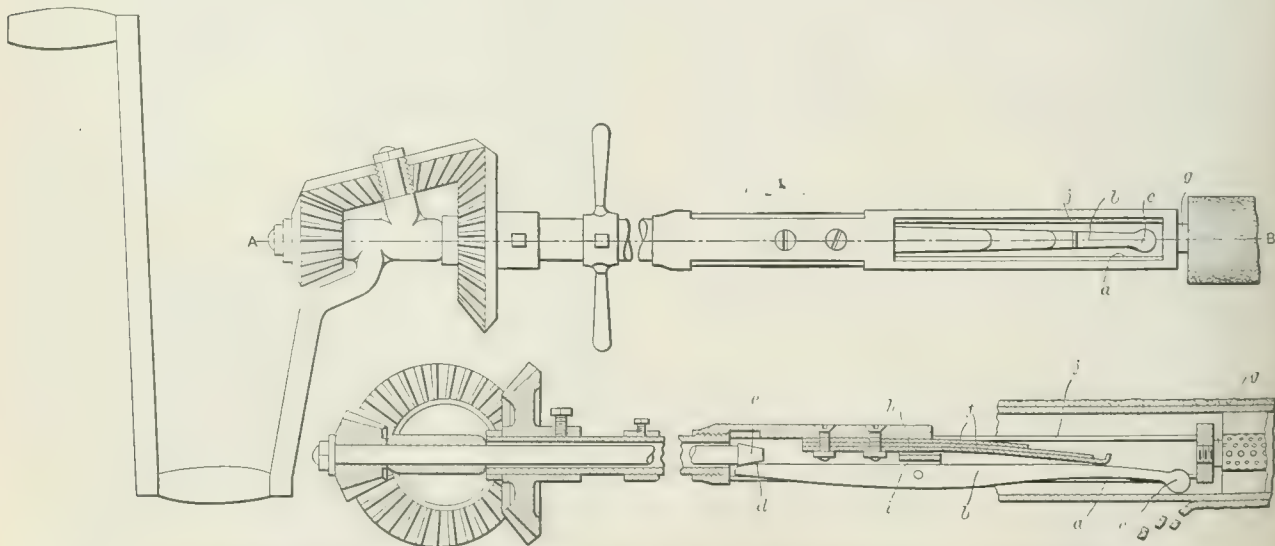


FIG. 1.—Elevation and Longitudinal Section of the Baker Hammer Flue Cleaner Made by W. J. Baker, Oswego, N. Y.

The frame has opposite end heads which as the name indicates are located at opposite ends of the slot. Both heads are internally threaded. The threaded end of a tubular extension of the frame is screwed into the head at the left while the threaded opening in the head at the opposite end is arranged to receive the threaded end of a brush frame *g*. This frame carries a brush which is used for cleaning the interior of the flues at the same time that the operation of the hammer which removes the scale from their exterior. The object of using this brush is to clear away the soot and other matter from the interior of the tube in advance of the hammer head so that the latter may strike directly against the metal. In this way the action of the latter is rendered more effective in removing the scale from the outer surface of the flue since the accumulations of soot or other material on the flue which might act as a cushion for the hammer and prevent the removal of the scale without repeating the operation a number of times at the same point are removed.

The hammer lever has practically the same length as that of the slot in which it plays and is located between the end heads. The hammer head travels in close proximity to the advance end head so that when the tubular frame is placed in the flue, one or both of its end heads can rest against the interior of the tube when the hammer is drawn back preparatory to striking a blow against the inner face of the flue. This arrangement renders the operation of the hammer more effective than would be the case if it were allowed to rest against the wall of the flue when drawn back to its extreme position against the action of the spring *f*. The pressure of this spring is applied to the inner edge of the hammer lever between the point at which it is pivoted and the hammer head *c*, the preferred

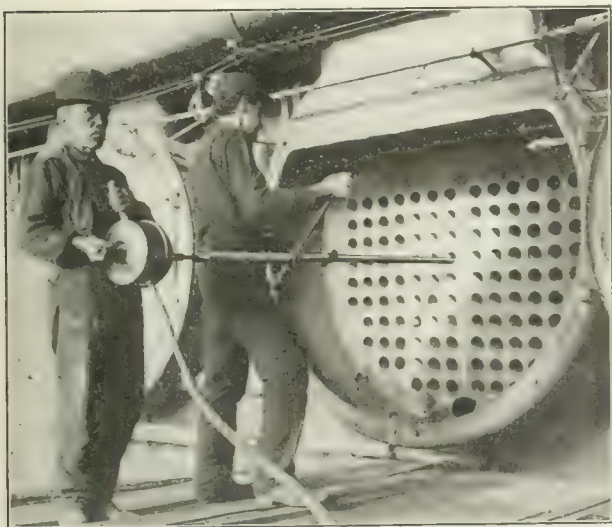


Fig. 2 The Cleaner Being Operated by Compressed Air.

point being near the hammer head so that as much force as possible can be exerted in driving the hammer to its striking position. The opposite end of the spring is secured to the frame behind the point at which the lever is pivoted, thus giving considerable elasticity to the free end of the spring. The parts of the spring immediately in front of the fastening bolts are passed through and guided in a lengthwise slot, *h*, in a transverse partition, *i*, of the tubular frame. This partition extends between the inner face of the spring and the adjacent edge of the lever near the point at which the latter is pivoted to stiffen the sides of the frame and at the same time to relieve the fastening bolts from excessive strain and afford a means for restraining the spring against undue lateral movement. The front portion of one side of the frame diametrically opposite to the opening, has a lengthwise opening, *j*, extending from the advance end head to a point near that at which the lever is pivoted and permitting the lever play at the free end of the spring when the hammer end of the lever is drawn back and the spring retracted.

The tubular extension of the frame which is shown at the left of Fig. 1 can be made of any desired length, the preferred form being a common metal pipe with one or more pieces according to the length of the flue to be

cleaned. The actuating member *e* is made in the form of a double cam which forms part of a rotatable shaft extending through the tubular extension for its entire length. The position of this actuating member and the way in which it makes contact with the bearing face of the adjacent end of the hammer lever *b* is clearly shown in the lower portion of Fig. 1. The power for operating the cleaner by hand is provided by the crank handle at the left of the upper view of Fig. 1 and is transmitted through the system of bevel gearing shown to the actuating member *e*. For operation by compressed air as shown in Fig. 2 the tubular extension of the frame is removed and an air motor attached.

After the boiler is blown off the manhole plate and the front hand hole plate are taken out to dry the tubes thoroughly. After the inside of the tube has been brushed out the machine is inserted in a tube so that the hammer is within $\frac{3}{4}$ in. of the back head and the guard shown in Fig. 2 fastened on the front of the boiler. The handle and the hammer tube are then turned through two or three complete revolutions and the machine drawn out about 3 in. The hammer is then rotated two or three times and the process repeated until the entire length of the tube has been covered.

Seven sizes of cleaner ranging from $2\frac{1}{2}$ to 6 in. in diameter are made. When hand operation is used an ordinary boiler can be cleaned in nine hours, while when compressed air is used this time is reduced very considerably. In both cases two men are reduced, one for the cleaner and one for the guard.

The Standard Screw Company

The Standard Screw Company, manufacturer of machine screws, has issued its report for the year ended March 31, 1911, which compares as follows with the previous year:

	1910-11.	1909-10.
Net income (after all deductions for expenses and interest charges).....	\$375,907	\$414,444
Dividends.....	31,324	74,172
Balance available for dividends.....	\$344,603	\$380,382
Dividends.....	270,000	269,814
Year's surplus.....	\$74,603	\$110,568

The general balance sheet as of March 31, 1911, shows assets as follows: Plant and equipment, \$5,067,970; stock in treasury, \$64,986; interest, etc., paid in advance, \$11,588; product, materials and supplies, \$869,043; accounts and notes receivable, \$393,833; cash, \$136,845; total, \$6,544,265. Liabilities: Preferred stock, \$2,000,000; common stock, \$2,500,000; bonds, \$600,000; notes payable, \$386,000; accounts payable, \$151,895; profit and loss surplus, \$906,370; total, \$6,544,265.

President W. B. Pearson says: "Building operations at Hartford, Detroit and Chicago are completed. A considerable lot of new machinery is installed in the new space, and much of the old machinery has been rearranged, with the result that we are showing greater efficiency than ever in our production."

At the annual meeting of the company W. E. Cooper was elected a director to succeed E. D. Dolliver, deceased. S. W. Kelley was elected treasurer to succeed Mr. Dolliver.

The Builders' Supply Corporation, Indianapolis, Ind., has been caused considerable annoyance by a statement recently published in *The Iron Age* that the Builders' Supply Company had changed its name to the Capital Builders' Supply Company. This has no reference to the Builders' Supply Corporation, which has not changed its name, but continues to conduct its business as jobber and retailer of hardware, mantels and general builders' supplies at 342 East Washington street and 335 East Court street. A. F. Kleinschmidt is president and George C. Pattison is secretary and treasurer.

The Engineers' Appliance Company, Cleveland, has been incorporated with a capital stock of \$20,000, to manufacture the Hydromatic water valve recently placed on the market by the Cleveland Steel Tool Company, and which was described in *The Iron Age* of May 18. The organization of the company will be practically the same as that of the Cleveland Steel Tool Company, and for the present the valves will be made at the plant of the latter company.

Welfare Work

Its Tendencies and Potential Results

BY MAX H. C. BROMBEACHER,*

Of the many excellent papers read at recent trade gatherings and reprinted by *The Iron Age*, none seemed to the writer so interesting as well as important as the paper† read by W. A. Grieves, employment superintendent of the Jeffrey Mfg. Company, Columbus, Ohio, on the subject of "Mutuality." The deep impression made by this paper was due, in the main, to three reasons, one of which was the interesting contents and data contained in it; another was the tendencies which the paper indicated are commencing to obtain a foothold among owners of industrial concerns in respect of treatment of employees; and the third was the inherent significance of these tendencies and the ultimate result of their growth.

In the second paragraph of his paper Mr. Grieves shows that he has a fundamental grasp of his subject when he says, in effect, that we must revert to first principles by working from cause to effect, instead of from effect to cause in the matter of labor troubles; that we have been directing our efforts toward combating undesirable influences and conditions for which we have been to some extent responsible; that we should have been and should be working for the prevention of these undesirable influences and conditions. In his concluding paragraph he shows that the element of personal sympathy and humanity, of sentiment, is a necessary factor in the successful treatment of the matter in hand. If and when the average manufacturer becomes inoculated with the beneficial virus of these basic ideas or principles, then, indeed, will our industrial situation have made a vast step forward on the road to industrial (comparative) peace.

The paper gives some very interesting data in regard to the matter of welfare work at the Jeffrey Mfg. Company's plant. It evidences clearly that the owners are extremely intelligent people in that they recognize that this welfare work, even if viewed only from the angle of enlightened self-interest, is a paying proposition. But this viewpoint will not obscure the fact that the employees are the recipients of care and attention arising very largely from the impulse of personal sympathy and humanity on the part of the owners. It may be a mere coincidence, but it is nevertheless an extremely suggestive fact, that in the days of industrial peace this element of the personal sympathy of and humanity toward the employee by the employer was almost universally in evidence. That the commencement of troubles between the employer and the employed in industrial matters was synchronous with the waning of this element of personal sympathy and humanity on the part of the employer with and toward his employees is another suggestive fact which may be only a coincidence. Be this as it may, it will hardly be denied that the climax of our industrial troubles has been due to the exhibition on the part of employers, as a rule, of a spirit of unrestrained individualism, and the same thing applies to our troubles in respect of large corporations, railroad and otherwise. This spirit of unrestrained individualism evidenced by our railroad and other large corporations, proceeded until it effected a revulsion toward collectivism and legislation in restrain of this tendency has become part of our statute law.

Unrestrained Individualism Causes Greed

In industrial matters, this spirit of unrestrained individualism was evidenced by the ignorant greed which impelled employers to cut piece-work rates whenever an operator overstepped the earning rate per day which the employer had inwardly determined was the limit that a workman ought to be allowed to earn. This was penalizing energy, which is pretty close to an economic crime. These practices were accompanied by inhumanly long hours. When the thing had gone beyond endurance, labor unions were started, and as a pendulum never swings half-way, but always to the other extreme, the flat rate per day was, in effect, made the basis of all collective bargaining. This, of course, is premiumizing inefficiency, hence is an economic fallacy. But we see that

the parent of the flat rate (premiumizing inefficiency) is penalizing efficiency, that is cutting piece-work rates, except as a result of increased equipment or of labor-saving devices. As the employers have and always have had the initiative, they are responsible for the undesirable influences and conditions to which Mr. Grieves refers, and for which he tells them they are responsible to some extent.

But while this combination of enlightened self-interest and the sentiment of personal sympathy and humanity which goes by the name of "welfare work" seems to be a condition precedent to industrial (comparative) peace under modern industrial conditions, it makes quite clear the fact that no system of bonus rewards (efficiency) nor of piece-work rewards under a really intelligent piece-work system can achieve best results unless based upon and accompanied by this welfare work. Neither can it be denied that this combination of welfare work with any system of efficiency bonus rewards or of intelligent piece-work rewards, is at once widely different from unrestrained individualism on the one hand or collectivism on the other. Such a combination is, in effect, a reversion to first principles, that is, to paternalism. The writer is aware that, to the generation born and educated since our civil war, paternalism and collectivism, or, as mostly called socialism, are convertible terms. To these persons anything that is not unrestrainedly individualistic, is socialistic; and as paternalism is certainly not unrestrained individualism, they consider it to be socialism under another name. Their thinking so, however, does not make it so; it does make clear their ignorance of the difference between the two things. As the essence of collectivism or socialism is the equalization of earnings, which is both an economic proposition as well as an economic impossibility, whereas the essence of paternalism is, in effect, a system of government or practice, it will be seen that the difference between the two ideas is vast.

Paternalism in Industrial Matters

Paternalism has been demonstrated to be both possible as well as successful in industrial matters, as well as in matters of government. One need go no further than modern Germany for an example of either kind. As regards matters industrial, the fact is that neither death, disability nor old age has any terrors for the German artisan. He is provided with insurance in event of death, and with indemnity in event of disability or old age, and the things covered by Mr. Grieves' data are included in administration of insurance. Paternalism even comes pretty close to indemnifying him against loss of employment through hazards of fluctuation in business activity. This is effected by the clergy in some districts who organize associations for building houses to rent or sell to artisans. The movement is not confined to any one denomination. Von Ketteler is the Roman Catholic clergyman who is prominent in the movement, and Von Bodelschwingh is the Protestant leader.

That these leaders are both eminently fair as well as practical is evidenced by the regulations regarding loss of employment. They provide that an artisan who is out of employment can retain his house for a given time, even if unable to pay his rent or his instalment, but he must accept any employment the association finds for him. That is, he cannot hold down a chair waiting for the kind of a job he is looking for; on the other hand, the association cannot ask him to become a strike breaker. Right here it is to be remarked that there is a vast difference between the German method of taking care of artisans disabled by old age and the recently installed English method of old age pensions. The latter is pure largess on the part of the government; the former is based upon the employers and the employees both contributing a fixed percentage of the payroll earnings respectively, the government contributing the expense of administration. The German scheme is based on thrift, compulsory thrift perhaps, but who will deny the merits of even compulsory thrift in respect of a man's retention of his self-respect, as compared with the pauperizing effect of largess?

The German System Commended

It is to be hoped that the growth of this paternalistic or welfare movement in our country will result as it seems to have resulted in Germany, that is, as a check to the socialistic or collectivist movement. The last general elections for the Reichstag showed a loss of many

*Practical production engineer.

†See *The Iron Age*, April 13, 1911, pages 908 to 911.

seats, over 40, if not more, by the socialistic party. It is becoming increasingly evident there that the mass of the socialistic party are not really socialists. This applies especially to the socialists in South Germany, whose aims are principally the increase of the paternalistic principle, for instance in the direction of the amelioration of the condition of the rural laborers. These are still, unfortunately, in a relatively backward condition compared with their artisan brethren. The socialists also aim to place a larger share of the burdens of government on the land. At present commerce and indirect taxation carry the major share of the burden.

Real collectivism or socialism—that is, the economic proposition entailed by an attempt to equalize earnings—is, initially, the hall mark of a mental dyspeptic, however well intentioned he may be. It is an impossible proposition so far as its practical carrying out is concerned. The brightest of them, Marx or Lassalle, never was able to respond to Bismarck's insistent demand that they formulate their ideas in some affirmative proposition—some proposition which should embody their ideas of a workable scheme having for its objective the carrying out of their ideas. Notwithstanding their inability to meet this very reasonable demand, they fought his paternalistic propositions from start to finish. Luckily they fought them in vain, and, as said, after a trial of 30 years, Bismarck's paternalistic legislation resulted in a reduction of over 40 in the number of socialistic members elected to the Reichstag at the last general election. Paternalism had been tried, industrially, and not found wanting.

It is the hope of the writer, and of all thoughtful people who have given our industrial situation any careful consideration, that the welfare or paternalistic idea shall have a vigorous growth. They do not believe that labor unionism, as at present led, affords any hope of industrial peace compatible with industrial growth. It has been said that labor unions have come to stay, and, in the sense that disorganized labor is a thing of the past, that is undoubtedly true, but in the sense that organized labor means the success of the closed shop with the flat rate as the keystone of the arch, it is not, let us hope, at all true. There is no conflict, at least no irrepressible conflict, between intelligently organized and intelligently led organized labor and paternalism abroad, hence why should there be here? Germany has found paternalism as applied to industrial problems compatible with an immense growth in her volume of business, accompanied by a great improvement in the standard of living of her artisans and a higher average wage rate. That her standards of education have not fallen goes without saying. It would therefore seem that, looked at from the practical angle, paternalism has made good over there and that the material improvement has not been at the expense of ethical or moral standards of the people at that.

No Loss of Initiative by Paternalism

A great deal is heard about the loss of initiative entailed by the introduction of paternalistic ideas. It seems to the writer that a glance at the data given at the end of Mr. Grieves' article indicates that the value of the initiative lost at the Jeffrey Mfg. Company's works, by reason of its introduction of welfare work, is represented by zero. Certainly, looked at from any angle, the company's operatives and those dependent upon them have every reason to thank God that they lost their initiative. It is a fair inference that a proposition to return them their initiative and take away the welfare work would produce a strike. That there exists any real difference between welfare work and paternalism no one can truthfully say.

It is readily to be seen that, to the operatives of the Jeffrey Mfg. Company, the work results in large savings to them of time (that is, money), not to speak of the saving in the matter of pain and of worry to those dependent upon them. That the work is a dividend-paying proposition to the company alters nothing in respect to these facts as regards the operatives. The system is one form of compulsory thrift as regards the operatives; the German artisan insurance is another form. The concrete value of both these forms of compulsory thrift is so great and so visible to any one who cares to see that talk about loss of personal initiative, except from those whose delight it is to philosophize about things abstract, is distinctly out of place, if they claim to be practical people.

There is another side of this paternalistic work which is seldom referred to, and that is that the output per capita of operatives working under these systems is bound to be greater with the average man than the output per capita where these systems are not in operation. It can hardly be denied that a workman knowing that he is surrounded with every care, and in case of accident provided with expert attention, can and will work in a more contented frame of mind—that is, with less friction—than an artisan not so surrounded, and content is a prerequisite to maximum output per capita. The public press contains a statement made at a trade congress this week that the provisions guarding German artisans against accident are much more ample than they are here or anywhere else; this fact, if followed up, would probably show some more loss of initiative of operatives, as a result of paternalistic care on the part of employers or of governments.

The Check to Socialism

That the introduction of paternalistic methods by the German government in the matter of industrial concerns should result in a diminution of the spread of real socialism does not surprise the writer at all; on the contrary, it is, in his opinion, a natural result and one to be expected. The cause of the growth and spread of real socialism is, in practical life, the swing of the pendulum the other way, the revulsion from the intolerable hardships and injustices which are the inevitable outcome of the application of unrestrained individualism. One naturally looks for the cure of such a state of things in the very opposite of the principles whose application have brought about these hardships, injustices and cruelties; hence the natural disposition to turn to collectivism as the cure-all.

In the last solution, paternalism is practical Christianity, the protection of the weaker, or less intelligent, against the stronger or more intelligent or their stronger of more intelligent fellows. To any one not deluded with the idea of "the equality of man," and to any one who recognizes his duty to his weaker or less intelligent fellow man, paternalism appeals for many reasons, as the intelligent application of the individualistic principle. It does good, yet is not charity, hence does not tend to pauperize its recipient. It is not charity, because it is a dividend-paying proposition, looked at from the employer's angle of vision alone. It is educational, both in respect of theory as well as of fact, hence it has an ethical value as well as a concrete value. It teaches by example, as differentiated from sermonizing or precept, the doctrine of service to one's less strong, or less intelligent, or less fortunate fellow man; and the service takes the form of teaching him how to help himself, how to better withstand contact with unrestrained individualism, if he meets it.

All the improvement in the world has been the result of real education. It follows that existing evils are the result of incomplete education. Recognition of this fact would do much at once to start us right in attacking evils. And so far as an experience extending over years in industrial matters goes, nothing, in the opinion of the writer, is needed so badly as education, real education, for industrial troubles. If there be any form of education more readily absorbable by workers of all classes than the applications of paternalism, or welfare work, it would be a pleasure to have it pointed out. Since the beginning of the world, teaching by example, as differentiated from teaching by precept, has been the kind of teaching which lasted. And no collectivist can fool for one minute, however full he be of the writings of Marx, Lassalle and Bebel, any one who has been shown by paternalistic objective teaching that "there are people who know what is best for him better than he does" and who mean well by him besides, as shown by their actions in concrete shape.

Experience has shown that the collectivist propaganda does not find a soil fertile for the growth of its fallacies, which has been thoroughly plowed with the plow of understanding as regards the "inequalities" of man; which has been cultivated with the seed of obligation in respect of the duty which the brotherhood of man entails upon the stronger and more intelligent of the race, toward their fellows; and which has been watered with the element of personal sympathy and humanity. That manufacturers intelligent beyond the mass of their kind have discovered that cultivating this kind of soil is a paying proposition augurs well for a check to the up-to-now increasing tide of collectivism.

Machine Tool Arrangement*

The Department Plan of Machine Tool Arrangement on the Basis of Equipment

Paper by C. B. Auel,

Assistant Manager of Works, Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa.

It will be found almost invariably that in the original design and lay-out of small and medium-sized manufacturing concerns the tool equipment has been so arranged as to group together operations of a like kind, such as milling, planing, drilling, boring, screw machine work, etc. The reasons for this are:

1. That for each of the principal machining operations there is frequently but a single expert and in order to make the best use of this talent no other scheme is permissible.
 2. The centralizing of machines of a kind tends to decrease the number required for a given output.
- As a result of these there follow logically:
3. Accuracy and speed in workmanship.
 4. Uniformity in methods.
 5. Economy in floor space.
 6. Minimum distribution of power.

Under this method of production a shop may be said to be divided into two portions, "feeder" and "assembly" sections respectively, the feeder sections making the parts from the raw materials and delivering them either to storerooms or to assembly sections where they are assembled into the complete apparatus preparatory to test and shipment. There will, in general, be a number of feeder sections entirely independent of one another, and there may, likewise, be one or more assembly sections. A production, planning or routing department usually determines the manner in which orders are to be brought through, arranges delivery dates, keeps track of the orders as they progress through the shop and exercises general supervision over production.

The Original Westinghouse Arrangement

The East Pittsburgh plant of the Westinghouse Electric & Mfg. Company was operated until about three years ago along lines which may be said to have been departmentalization, partly on a basis of tool equipment as outlined and partly on a basis of product, during which time it met conditions fairly satisfactorily.

However, in any growing manufacturing concern there comes a time when the advantages of the preceding arrangement are more than offset by the difficulties incident to its successful operation. The increase in volume of semifinished parts passing from feeder to assembly sections, with the accompanying increase of clerical and other work and the multiplication of foremen and superintendents concerned in the manufacture of any one class of product, results in delays and increased expenses of various kinds which cannot be overcome, nor can the recurrence of them be prevented.

Perhaps the greatest drawback of such a scheme is the inability to fill orders promptly. This is especially apparent during periods of business depression, when quick delivery is of larger importance than at any other time. The amount of stocks on hand is then usually lowest, and accordingly a larger percentage of apparatus requires to be built from the ground up to fill customers' orders. Under these circumstances it becomes imperative to place so-called "rush," "forfeiture" and other orders of a like nature in a class by themselves and to conduct them personally, as it were, through the shop.

In doing this, though, other orders are relegated to the background, with consequent disastrous results, particularly in the matter of dissatisfaction on the part of the customers from whom such orders are intended. Of course, the greater the volume of these special orders, the greater the ensuing confusion and delay in connection with other orders, so that this method of procedure is not a solution of a difficult problem but simply a makeshift, a temporary expedient, to be abandoned as quickly as some more rational method presents itself.

Another vital difficulty, perhaps equal in importance to that already mentioned, is the matter of divided responsibility, no one individual being primarily responsible for any complete piece or class of apparatus. Such being the case, it is exceedingly difficult even to make an attempt to ameliorate or to improve conditions which are known to need attention, for the reason that there seems to be no proper place at which to commence the betterment work.

As a result of these conditions and without going any more minutely into an analysis of the difficulties, it is reasonable to assume that, in consequence of shipments being delayed and responsibility divided, "work in progress" and stocks, raw and finished, will be high, and such proves to be the case.

Change to Self-Contained Units

Recognizing for the reasons stated that the methods of manufacture were proving inadequate to handle the increasing volume of business, the company spent considerable time in investigating the methods of other large companies in similar lines of business, with the result that it was believed advisable to modify the original scheme in favor of so-called "factory departmentalization"; that is, to divide the plant into a number of separate units, as self-contained as the nature of the work of each would permit. In other words, this means to treat the units like independent factories, as it were, housed together under the same roof for mutually advantageous purposes, yet buying from and selling to one another their various commodities as circumstances seem to make desirable. A scheme of this kind naturally causes a number of duplications of the organization and equipment. While this is so, it does not necessarily involve any material increase in either, since the change is more in the nature of a rearrangement of the existing equipment and organization, with the addition here and there of a few tools which, under the original plan, were used in common by two or more departments. Even this may to some extent be avoided by assigning such tools to the department requiring them most and permitting the other departments to have their work done on requisition.

The Plan Found Very Successful

In introducing this scheme in the East Pittsburgh Works, it was deemed advisable as a precautionary measure to put it into effect in but one department only, further progress along this line to be dependent wholly upon the results obtained in it. This was accordingly done and with very gratifying results almost from the very commencement. It was found, as anticipated, that among other advantages shipments were facilitated and "work in progress" and stock decreased, all to a very marked degree.

Comparing the routine in this particular department under the original and the modified plans it is found that in the original the work was performed by 22 sections located in 13 independent departments; in the plan as modified, the same work is now done by 13 sections in 7 independent departments. But this by no means emphasizes the difference even in the routine, for the reason that under the modified plan authority for an entire line of product is vested in a single individual, who, therefore, is enabled to exercise his discretion as to the raw and partly finished items to be carried. By a judicious selection of these, he has at all times a certain amount of stock on hand and is thus to a large extent not dependent in the matter of deliveries on the other sections, outside of his authority, which supply him with materials.

In consequence of the excellent showing made in the department selected for trial, departmentalization was gradually extended throughout the plant until now the work has been almost completed. Though not yet perfected, some of the details still requiring to be straightened out here and there, the general results have been a confirmation of those obtained in the department in which the scheme was first tried.

Of course, it is hardly practical to carry this departmental idea into all sections; for example, in the pattern

*Two papers read before the National Machine Tool Builders' Association, Atlantic City, N. J., May 19, 1911.

shops and foundries, or in certain other places where either the work or the equipment is very special. Neither has it been deemed wise to include disk grinding or polishing, on account of the deleterious effect of the dust and fumes on other machines in the vicinity, though certain work of this kind is being done in some of the departmentalized sections where facilities for carrying off dust and fumes have been provided.

As at present arranged, there are in the works eight fairly self-contained departments as follows:

1. Railroad, mining and crane motors.
2. Power, for large generators and motors.
3. Control, for railroad and industrial control apparatus.
4. Detail, for switchboards and accessories.
5. Small motor, for small power motors.
6. Transformer.
7. Locomotive.
8. Industrial, for medium sized motors.

Besides these, certain feeder sections still continue as follows: Coils, punchings, blacksmith, cabinet and pattern-making, screw machine, foundries, etc.

With respect to the screw machine section, it may be stated that this has been departmentalized to some extent, though the greater portion, for the manufacture of such parts as are made in large quantities and carried in stock by the central stores, remains unchanged. Regarding the other feeder sections, it is possible that some of them may in due course be departmentalized, without necessarily changing their present geographical location, but simply be assigning in each a certain proportion of the floor space and the tool equipment to each of the already departmentalized units.

The Advantages Secured

The results obtained in the other departments have been, as already stated, but a repetition in greater or less degree of those in the department where the modified plan was first tried out. Summarizing the various advantages they may be said to include:

1. Centralizing of authority in the production of each class of apparatus.
2. Decrease in time required to fill customers' orders.
3. Increase in output in a given period.
4. Decrease in "work in progress" and in stocks.
5. Saving of floor space.
6. Decrease in handling of materials.
7. Decrease in clerical labor.
8. Decrease in indirect expense or overhead burden.
9. Increase in individual initiative.
10. Healthy competition between similar sections and departments.

In the matter of accounting, departmentalization has been carried even further than it has with the manufactured products, for every part of the works, whether a feeder section or a completely departmentalized unit, is now self-contained in this respect, giving a total of 53 such units in all. Their comparatively small size permits the ready compilation of the transactions of the preceding month, so that all inter-sectional and inter-departmental accounts are therefore balanced on a monthly basis. A further advantage of this feature is that each unit has its own percentage of indirect expense or overhead burden, figured on its total productive labor, which percentage is changed from time to time as circumstances seem to warrant. Order costs are compiled by the feeder sections and departments themselves.

It may be stated that it is not the aim to show either a profit or a loss in any of the sections or departments, so that when either of these conditions arises the overhead percentage is altered accordingly. Every month each of the units in the works is provided with a set of charts or curves giving a continuous record of its performance in total productive labor, total expense labor and total expense materials, the expense items being also segregated along various helpful lines, all shown directly in dollars and cents and many as a percentage of total productive labor as well. This percentage is considered as a measure of the expense labor and material efficiency.

Systems of Wage Payment Used

Regarding systems of wage payment, day work, piece work and premium work are all used, in the proportion at the present time of 35, 14 and 51 per cent. respectively.

Time limits and piece work prices are set by duly quali-

fied experts and only after careful consideration of all the factors involved. In determining these a base is first set, which base is assumed as the time required to do the work by the average skilled workman. This becomes the time limit, in the case of premium work; or, from it is figured the piece work price where piece work is used. Upon the completion of each job, the actual time taken is compared by the time clerk with the base time, and if the former is in excess the matter is further investigated. In one of the departments all time slips in each section at the end of each day are totaled twice; first, with reference to base time, and, second, with reference to actual time, the ratio between them being the efficiency of the section as far as productive labor is concerned. This scheme applied to a workman's time slip will likewise give the individual efficiency and was originally so used, it is believed, by Harrington Emerson. It is possible that the scheme may be applied generally in due course.

Departmentalization on the basis of product has likewise been extended so as to include the engineering department and to a somewhat less extent the sales correspondence department; in fact, in certain instances the engineers and the correspondents are located alongside of one another with the result that much of the routine work in connection with orders is facilitated.

In conclusion, it will be appreciated that in what has been said within the limits of this paper only the barest outline has of necessity been given of a few of the present methods of working of the Westinghouse Electric & Mfg. Company from the viewpoint of departmentalization on the basis of product. It is not intended in any sense to convey the idea that this method of operating a large and growing manufacturing concern is the only correct way; but, from the experience of our company, it is quite evident that it is the best method for its particular needs. Nor can any general statement be made as to when it would appear advisable for a similar concern to change over from manufacturing on a basis of tool equipment to manufacturing on a basis of product, as experience alone would seem to be the guide.

Paper by F. C. Kent,

Superintendent Pierce-Great Arrow Company, Buffalo, N. Y.

Inasmuch as the product of some concerns is diversified, and machine tools used for one class of product would not be suitable for the manufacture of another class, this discussion would be applicable only in its entirety to about 80 per cent. of our manufacturing establishments.

My earlier training in the metal work industries has been with the department plan of machine tool arrangement on the basis of production. The transition to an enthusiast of the department plan of machine tool arrangement on the basis of equipment has been gradual. I have been guilty of considerable backsliding, caused usually by listening to some silver tongued systematizer, but after my experience of the last four or five years I can positively say "never again." We have been afflicted with a plague of theories. What we need now is demonstration.

It may be interesting to note that I have had a variety of subjects upon which to try out this proposition; for example, cheap metal specialties, bicycles, motor vehicles, electric locomotives, coal mining machinery and general jobbing and contracting work. The quality of workmanship and material has varied from the roughest to that of the very highest grade. The weight of the finished product ranged from a few pounds to many tons.

Decided Increase in Profits from This Plan

Some of these concerns were very thoroughly organized on the basis of the product plan, but in every case where a change has been made to the basis of equipment there was a decided increase in profits, together with a marked increase in wages of both productive and non-productive labor.

The remark that this is the age of specialization in the machine shop is true, but how many of us comprehend the truth? Manufacturers are just beginning to resolve into first principles the various manufacturing processes of their finished product. They have yet to apply this analysis with exactness to the problems of machine tool efficiency in the manufacture of their product. I believe there is a lack of knowledge of the possibilities

of the most common type of machine tools in every shop; in fact, there is not one shop in ten in which the possibilities of even the engine lathe is thoroughly understood.

Arranging on the Basis of Production.

There is no doubt that development along this line has been retarded by the system of arranging tools on the basis of production. Department superintendents and foremen have had to cover too wide a field; their thoughts and energies have been distracted by the multiplicity of things needing attention every minute of the day. Some of you, who have been shop foremen in the past, must concede that there are a few things that need constant attention regardless of the system you may have devised to relieve you of the clerical and detail work. Furthermore, I believe it to be a physical impossibility for a foreman to produce a well balanced and maximum product with machine tools grouped on the basis of production. A few words from an editorial in the *Motor Age* of March 30 will illustrate this point with respect to the operator. It is as follows:

The arrangement of machinery was not symmetrical. Drills were placed side by side with planers, and planers with lathes, and lathes with grinders. It was discovered that this mixing of operators brought about an unconscious confusion in the mind of the workman. The workman at the lathe might be a master of his job, but his energies were not concentrated on it. One minute he was watching a grinder at his right, the next a drill at his left, with the result that his efficiency was impaired and it was impaired because of distracting environments.

Now, if the operator's mind becomes distracted under such conditions, when he has nothing to think of but his machine and the subject he is machining, what must be the state of mind of the foreman of this department?

Men Have Hobbies

A foreman as well as an operator has his hobby, and if he did not ride it he would not be human. He may be fascinated with the lathe but despise the sight of a grinder. The operations on the lathe will receive his best attention whether the work done on the other types of machines need supervision or not, in spite of the fact that he may be the so-called all-round mechanic. He is more or less a jack-of-all-trades, flitting from one job to another without learning the real possibilities of any of the machines under his charge. These conditions preclude thinking of labor and machine efficiency as applied to his department.

For general supervision the plan of grouping the machines on the basis of production is disastrous in most factories because of the impossibility of effecting a working balance between the various operating departments and of making the production equal in all departments.

The grouping of machine tools on the basis of equipment is the only solution for better and increasing production. This is true because no man becomes an expert in all lines of mechanics. He increases production because he intensifies or specializes along narrow lines.

The foreman who concentrates his energies on one class of machine tools, and is alive to the possibilities of his equipment, has the opportunity of his life for increasing to the highest degree the labor and machine efficiency of his department.

Departmental Supervision

The problem of securing proper departmental supervision becomes less serious under the system of grouping machines according to equipment rather than according to production. I have seen foremen in charge of departments equipped with lathes, drills, grinders, etc., who were unable to get satisfactory results, but when these same men were placed in charge of one special class of work with machines with which they were entirely familiar, they became interested and enthusiastic, with the result that their earning power and efficiency were greatly enhanced.

Nor is it where the human element is concerned that the plan of grouping machines with regard to equipment is superior to the plan of grouping with regard to the product. It has been demonstrated that less permanent investment is needed because less floor space is required. Consequently it admits of a better lighting system and requires fewer lights and less heating apparatus. The saving in pulleys, hangers, shafting, belting, etc., is considerable. Power, labor and supplies for the up-keep of the extra equipment is also saved.

In fact, on several occasions the rearrangement of

machinery to the plan based on equipment has saved the necessity of erecting new buildings to increase production. In one change I recall that 110 hangers and other power transmission equipment in proportion were eliminated. When machines of the same type are grouped together it is possible to discern their production capacity and set an efficiency standard with greater accuracy. It also assists the foremen in selecting the better types of machine tools and in eliminating the poorer types.

Organized on the basis of product, there is a tendency of department foremen to carry a stock of their own jigs, chucks of various sizes, milling machine and lathe arbors, drills, taps, dies and cutters of all sorts which are frequently duplicated in other departments. The diversity of opinion among foremen about high speed steels, emery wheels, etc., is accountable for the great variety of them found in so many manufacturing plants organized on this plan.

This duplication and confusion incident to the handling of small tools and apparent lack of exact knowledge may be obviated by the installation of a central tool storage, equipped with first-class grinding facilities and supervised by a tool specialist. By this method worn tools may be properly ground and kept in perfect condition, ready for use when needed. This arrangement makes possible the standardization of emery wheels, sizes of tool steel and all kinds of shop supplies.

The Arrangement in the Pierce-Arrow Shops

At the Pierce-Arrow Motor Car Company the arrangement of machine tools on the basis of equipment is carried out to a much greater degree of refinement than at most shops operating under this system. All lathes are not only ground to form a department, but they are subdivided into smaller groups according to size, class of work, etc. For instance, one section known as the turret department is divided into groups of automatic chucking machines, automatic screw machines, flat and hexagon, turret lathes and hand screw machines. The larger turret lathes of the Gisholt type and vertical boring tools are not included in this department, but form separate groups. The hand and spur gear cutters form separate groups. The milling machines are classified as vertical, horizontal, Lincoln type and hand groups. The drilling machines are divided into radial, heavy duty, medium and sensitive groups. The grinders are grouped as internal, plain and surface. Supervision is effected by placing an assistant foreman in charge of a subdivision of machines. He is responsible to the foreman who has direct charge of the departmental group. The foreman is under the direct supervision of a general foreman or assistant superintendent, of which there are several. They in turn receive their instructions from the general superintendent.

In our production engineering department, which has been instituted for the purpose of affecting a more closely related shop organization, we have at present a working force of three mechanics and three clerks, the former having been in the employ of the company for a number of years and understand our product thoroughly. The head of the department has served as draftsman, tool designer, head of specification, pattern and material order departments, and is intimately acquainted with the materials used in our product. The second is a pattern maker, designer of special machinery and tools, and is also a machinist. The other is an expert tool maker, former tool room foreman, and has had considerable experience in the manufacture of special machinery.

A suggestion blank pad is to be found on every shop foreman's desk. These blanks are used by the foreman and his men for the purpose of bringing to the attention of this department such changes in manufacturing operations and handling of our product that occur to them from time to time. The suggestions are carefully analyzed by this department and if no objections to their adoption are found by them or by the department superintendent, by whom the suggested changes are finally approved, the changes are made. On the other hand, if the suggested changes are rejected, the reasons therefor are reported to the men who make them.

When new parts for our production are determined upon, this department, with the assistance of the shop foremen interested, carefully analyzes the operations necessary for each part, so as to assist our chief tool draftsman in determining correct working points in making quick acting and economical tools.

New Automatic Tap Fluter

A recent product of the Bickford Machine Company, Greenfield, Mass., is an automatic machine for fluting four taps or reamers simultaneously. The machine is entirely automatic in operation and after the work is placed between the centers the carriage is moved forward and back without any attention and the cutters index at the proper intervals for the different numbers of flutes.

A short spiral gear cut in each spindle and meshing with a spirally fluted cross shaft controls the indexing

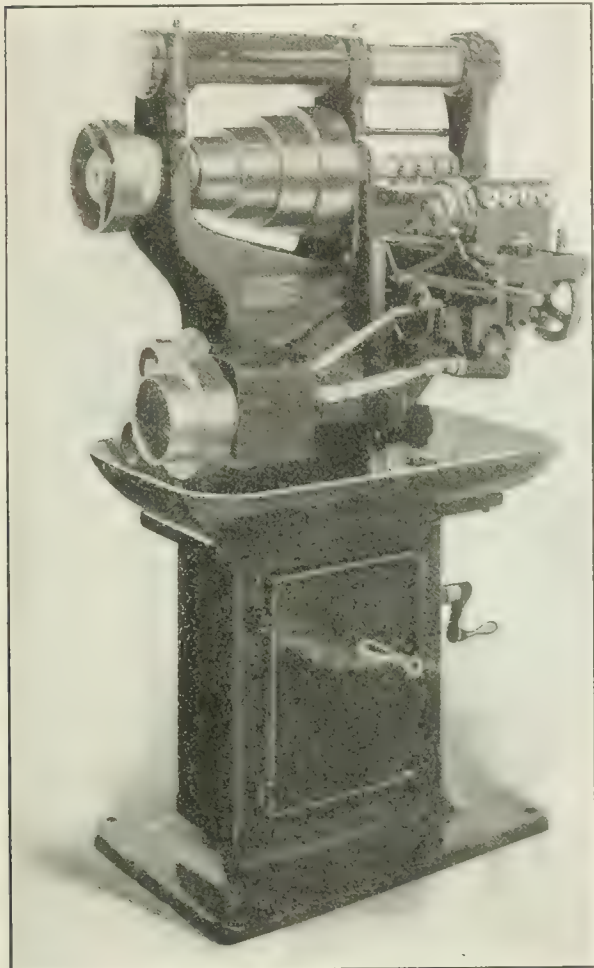
clutch to reverse the direction of the telescope shaft and worm feed to the table. This clutch is controlled by a special device which disengages it from the forward gear and engages it with the reverse gear or vice versa without any knocking or pause while the direction of travel is being changed.

The cutters are supplied with oil from a tank in the base of the machine. The tail block centers are actuated by heavy coil springs and are operated by a specially designed curved lever which does not make it necessary for the operators' hands to be placed near the cutter.

Two sizes of machines are built, one for handling work up to $\frac{1}{2}$ in. in diameter, which is the size illustrated, and the other for fluting tools having a maximum diameter of $1\frac{1}{2}$ in. The smaller of the two machines weighs 1100 lb. while the larger is 700 lb. heavier and in addition has back gears and fixtures for squaring the shank of the tap.

A Reversible Window Ventilating Device

A new and somewhat novel ventilating outfit by which fresh air can be blown into a room or foul air exhausted from it has been brought out by the American Blower Company, Detroit, Mich. The device is intended to be placed in the upper sashes of windows, in transoms or the ends of skylights and includes a $12\frac{1}{2}$ -in. motor-driven Ventura fan which was illustrated in *The Iron Age*, May 18, 1911, a cast-iron housing and a worm-gear reversing



An Automatic Machine for Fluting Four Taps and Reamers Simultaneously. Made by the Bickford Machine Company, Greenfield, Mass.

of the centers. At one end of this cross shaft is an index collar having the required stops for controlling its motion. Power is applied to this cross shaft through a second collar which is connected to the index collar by a ratchet. The second collar is revolved as the carriage advances and a tension is put on the index collar through a pull spring and the ratchet teeth, so that when the carriage returns a special device unlocks the index and the cross shaft is revolved and turns the centers driving the work. A disk on the opposite end of this cross shaft has a number of flat places corresponding with the number of flutes required milled on its circumference. The arrangement of these flat places is such that a stud set in a bar operating the feed just clears them. As the disk turns with the cross shaft, the part of its periphery which is not milled depresses this stud and disengages the feed while if the indexing is only partly completed the portion of the disk between the flat places will stop the movement of the carriage. Another feature of the feed mechanism is a disk carried at the end of the main feed shaft, having stops on its circumference which operate a small universal shaft that in turn shifts the clutch in the feed gear box.

The carriage is arranged so that it will stop if the indexing is not properly done as well as at the completion of the work. A quick return at the rate of 5 to 1 is secured by the use of a gear box and a special device for changing the direction of the table travel. The gear box contains three sets of compound gears and a sliding



An Automatic Machine for Fluting Four Taps and Reamers Simultaneously, Made by the Bickford Machine Company, Greenfield, Mass.

mechanism together with the rod, the bearing and the handle.

The power for operating the motor is secured by screwing a plug into the nearest electric light socket. The employment of an ingenious reversing mechanism enables the air to be discharged straight ahead, directly toward either the ceiling or the floor or at any intermediate angle. In this way it is possible to supply a room with pure fresh air under a slight pressure without subjecting the occupants to a draft. A simple turn of the hand wheel controlling the reversing mechanism changes the fan so that it exhausts foul air from the room.

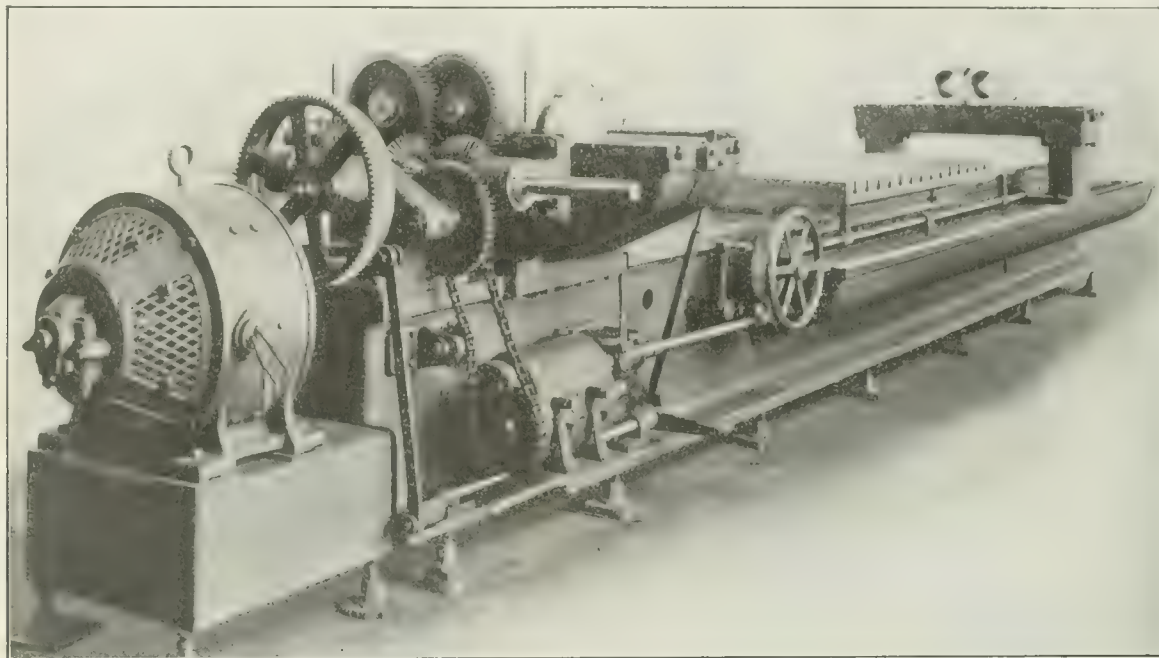
Traction elevators for Chicago's tallest building have been decided on. The building is the Heisen office structure, one story higher than the Blackstone Hotel. There are to be 14 elevators of the overhead traction type, having a speed of 350 ft. per minute and a travel of 250 ft. They are to be equipped with the Ideal interpole motors built by the Ideal Electric & Mfg. Company, Mansfield, Ohio, and are being installed by the H. J. Reedy Company, Cincinnati. Each motor is of 45 hp. capacity and is provided with a speed showing controller, allowing for a rate of travel of 175 and 250 ft. per minute as well the 350 ft. speed without regard to load.

Machine for Boring Engine Valves

To bore the four valve ports in Corliss engine cylinders the Beaman & Smith Company, Providence, R. I., has developed a two-spindle adjustable boring machine. In this way it is possible to bore port holes ranging from 3 to 9 in. in diameter and for any distance up to 6 ft. in length, two at a time, while they can be spaced at distances ranging from $8\frac{3}{4}$ to 37 in. on centers. One of the special features of the machine is the arrangement employed to secure accuracy in boring these very long holes. The boring bars holding the tools are revolved in one position, and the work is fed in either direction past

and transmits power from it to the spindle driving gear. In this way the spindles can be located at any desired distance from $8\frac{3}{4}$ to 37 in. between centers without altering the driving mechanism. A foot lever on the side of the bed near the feed box operates the large brake which is provided for the driving gear.

The Vesta Gas Range & Mfg. Company, recently incorporated, has purchased the plant of the Chattanooga Stove Works at Chattanooga, Tenn., which it has enlarged and equipped thoroughly for the manufacture of gas range, steel ranges and gas cook stoves. The buildings of this plant are constructed of brick. The warehouse and mounting departments occupy a building 60 x 280 ft., four



Beaman & Smith Two Spindle Machine for Boring Valve Ports in Engine Cylinders.

the cutting points, thus eliminating inaccuracies due to the springing of the boring bars.

Four bolts and a driving key in each spindle connect the boring bars to the spindles and the outer support for the former is constructed in the form of a bridge. This support rests upon projecting ways fastened to each side of the bed and has an adjustment of 14 ft. along the line of travel. It is entirely independent of the table and the latter can pass under it. A small lever at the right of the feed box controls the reversal of the feed mechanism. In this way the table can be fed in one direction while the roughing cut is being taken, stopped while new tools are being inserted and the finishing cut taken as the table feeds back. A quick power traverse in either direction which is operated independently of the spindle drive by a small motor on the back of the bed is provided for the table. This traverse is operated by friction clutches controlled by the long lever below the spindle saddle and enables the table to be run back quickly while the bars are not revolving, an arrangement which prevents scoring of the finished bore by the tools.

The table has a travel of 13 ft. 4 in., and working surface measures 36 in. in width and 6 ft. long. A large diameter screw working in a bronze nut feeds the table, ball bearings taking the thrust. The feed for the table is positive and the mechanism, all of which is entirely protected from dirt and chips, consists of a set of gears in a chain-driven feed box and a worm and worm wheel which transmit the power from the gear box to the feed screw. An automatic trip in either direction is furnished for the feed as well as a hand wheel for fine adjustment.

A 10-hp. motor drives the spindles, which run in taper bronze boxes having a take-up for wear, through a reduction gear having a ratio of 36 to 1. To take care of the variation in the distance between the centers of the holes, the power is transmitted from the large driving gear to a shaft running at right angles to a line joining the spindle centers. Each head has a bracket attached to it and carries a bevel gear which slides on this shaft,

and transmits power from it to the spindle driving gear. In this way the spindles can be located at any desired distance from $8\frac{3}{4}$ to 37 in. between centers without altering the driving mechanism. A foot lever on the side of the bed near the feed box operates the large brake which is provided for the driving gear.

The Panama Canal, it is officially stated, is three-fourths completed. It is now seven years since the work began, in which time the removal of material from the line of the canal has amounted to 138,000,000 cu. yd., leaving only 44,000,000 yd. to be excavated. The installation of the gates for the locks on the canal has begun.

It has been brought out by German statistics that agriculture suffers far more from accidents than any other occupation. Of the total number of mishaps resulting in temporary disability, 45 per cent. occur in agriculture, 9 each in iron and steel trades and in building operations, and $8\frac{1}{2}$ per cent. in mining. It is explained that it is natural that the agricultural laborer should be especially subject to accident, for he has to handle teams, machinery, and explosives, and is too much a jack-of-all-trades to be skilled in any one.

A manganese steel tire 2 in. thick, after 19 months' use in crushing grout from fire brick in a 9-ft. dry pan in a clayworking establishment, was found easily good for another year by G. W. Kreisly of the Edgar Allen American Manganese Steel Company, McCormick Building, Chicago, Ill. In a paper before the twenty-fifth annual convention of the National Brick Manufacturers' Association at Louisville, he explained that a car wheel tire 4 in. thick had a wear of only six months, while the manganese tire at the end of the period stated was concaved not more than $\frac{3}{32}$ in. on a 10-in. face.

Corrigan, McKinney & Co. have completed their second blast furnace in Cleveland. This stack will probably not be blown in until market conditions improve.

The Machinery Markets

There are large inquiries for machinery for export in the New York market and the call from the railroads has improved. In other sections of the country business is somewhat quiet. Inquiries have fallen off in Cleveland, but the trade there is bidding on a list of 150 machines for a technical high school. In Cincinnati foreign business is occupying the most attention and domestic buying is of the hand-to-mouth order. More encouraging reports come from Detroit, where the automobile makers are especially busy and are buying generously. Business is uniformly quiet in New England, but an unusual number of factory extensions, which will result in buying in the future have been announced. In Philadelphia the market is irregular and the outlook is not encouraging. The demand is good in San Francisco, but the buying movement there has fallen off somewhat. In Texas business is on the increase and an excellent trade is being done in irrigation machinery, while an unusual number of new enterprises calling for mechanical equipment have come forward. There are prospects of railroad buying in the South, but the general demand there is not very good.

New York

NEW YORK, May 24, 1911.

The New York, Ontario & Western Railroad has about closed out for its large list and there are indications that other railroads will shortly buy. The New York Central Railroad has been renewing its inquiries on a large list which the company sent out last August and against which nothing has been purchased. If this business is closed it will mean an expenditure of about \$75,000. From all accounts some good business will shortly be placed in this country for a large ship building plant in Brazil. A New York firm has been making inquiries for a large amount of equipment, and assurances have been given that American machinery will be given preference. During the last week inquiries from domestic manufacturers increased to a large extent, but judging from the tone of some of them the matter of placing orders will depend largely on future business developments. Foundrymen report that inquiries for machinery castings have increased, but actual business is not very good. Manufacturers seem to show a great interest in prices, but they appear very cautious about placing orders. The demand for some classes of automatic machinery is unusual. Makers of automatic screw machinery, for instance, declare their May business to have increased to such an extent that the month promises to be the best business month of the year. Corliss engine makers also note an increase, but the call for the general line of metal working machinery is not very good. Machine tool builders, as a rule, are working to about 60 per cent. of their manufacturing capacity.

The Oriental Metal Bed Company, Hoboken, N. J., has awarded a general contract for a plant to be erected on Clinton street, between Eighth and Ninth streets, that city. The building will be 60 x 200 ft., four stories. The cost, including the equipment to be installed, will be about \$29,450. The company will move the machinery now in its present plant and some new metal working equipment will be added. All the machinery will be electrically driven.

Armour & Co., 30 Church street, New York, will erect a large by-product plant at Chrome, N. J. The company is planning to build a main structure, 300 x 600 ft., of mill construction, and the plant will be equipped with special machinery for the manufacture of fertilizers. The machinery details are being worked out in the Chicago office.

The Goulds Mfg. Company has completed plans for extensive additions which it will at once make to its plant for the manufacture of pumps at Seneca Falls, N. Y., at a cost of about \$250,000. The new buildings will comprise two machine shops each 150 x 350 ft., one story, and a four-story building, 110 x 250 ft.

The Benedict Mfg. Company, Syracuse, N. Y., manufacturer of portable electric lights, etc., contemplates the erection of a large addition to its plant.

The main building of the extensive lithographing plant to be built by the Huebner-Bleistein Patents Company, Dewey avenue and the New York Central Railroad Belt Line, Buffalo, N. Y., will be 122 x 200 ft., one story, and of brick with concrete floor and roof. Plans are being prepared for a power house and a machine shop, and other buildings will be erected later on the company's site of 12 acres. The general offices of the company are in the Sidway Building, 775 Main street.

The mayor and comptroller of the city of Buffalo have been authorized to issue 20-year bonds for \$300,000 for the purpose of equipping the new water-works pumping station.

The Standard Oil Company is building a one-story steel car repair shop at its Atlas Works, Elk and Babcock streets, and the Buffalo Creek Railroad, Buffalo.

The Buffalo Wire Works Company, Buffalo, is building a four-story and basement fireproof factory and office at 320 and 322 The Terrace, adjoining its present plant. Considerable additional wire-weaving equipment will be provided.

The General Drop Forge Company, Buffalo, is adding to its plant at Elmwood avenue and the Erie Railroad a one-story steel blower house.

A factory for the manufacture of wire products is to be erected at Gouverneur, N. Y., by the Dixon Wire Company, Dixon, Ill. The cost will be about \$75,000.

The Eastern Concrete Steel Company, Buffalo, has received contract from the Commissioner of Public Works, that city, for the construction of two tunnels under the tracks of the New York Central Railroad at the Front avenue pumping station of the water works for discharge mains for new pumps Nos. 3 and 4.

The Universal Fiber Company, Rochester, N. Y., recently incorporated with a capital stock of \$200,000, is having plans prepared for a manufacturing plant to be located at Penn Yan, N. Y. The incorporators are John A. Lewis, president of the Fibre Box Company, Rochester; John R. Taylor and Lyman J. Baskin, Rochester.

The Pennsylvania General Electric Company has plans completed for building No. 14 of its new plant at Erie, Pa. The building will be 75 x 400 ft., five stories, of brick and reinforced concrete.

New England

BOSTON, MASS., May 23, 1911.

The decision in the Standard Oil Company case promises, according to general opinion in New England, to have an excellent effect upon the business situation, because it removes a bugaboo, and also because a principle is established which should relieve most of the larger combinations of liability under the Sherman act. Business has not improved as yet, however, and is pretty uniformly quiet, among the dealers as well as with the manufacturers. Confidence in the future is shown by an unexpectedly large number of announcements of factory extensions. The Boston & Maine Railroad has not yet sent out the machinery list for the Concord shops, nor has it come to a decision on the bids submitted weeks ago for the shops at Lyndonville, Vt.

While the plans of the Artistic Bronze Company for the removal of its works from South Norwalk to Bridgeport, Conn., are not complete, the purpose is to make the change this season, with works in the western part of Bridgeport. The company proposes to manufacture builders' hardware and furniture trimmings on a larger scale. The only machinery which has so far been decided upon and for which the company will be in the market is electric-driven polishing and buffing lathes.

The International Silver Company's plans for the season include the erection of a four-story building, 58 x 122 ft., which will be an addition to Factory H, Meriden, Conn. It will be devoted to the manufacture of the Wm. Rogers Mfg. Company silverware.

The Upson Nut Company, Unionville, Conn., manufacturer of bolts, nuts and carriage hardware, will increase its works by adding a story to a present building, 45 x 185 ft.

The Plume & Atwood Mfg. Company, Waterbury,

THE MACHINERY MARKETS

Conn., is erecting a three-story building, 46 x 117 ft., which will be devoted to a machine shop and storage.

The Terry Steam Turbine Company, Hartford, Conn., will build an addition to its plant 30 x 200 ft. The growth of this business has been very rapid, the present shops having been occupied but a comparatively short time.

The Lee Steam Turbine Company, New Haven, Conn., has been incorporated in Connecticut with capital stock of \$150,000, to manufacture the Lee steam turbine. The incorporators are Henry B. Lee, New London, Conn., and Winthrop G. Bushnell and Samuel C. Morehouse, New Haven.

The Gervais Electric Mfg. Company, Hartford, Conn., has been organized to manufacture electric materials, supplies, light hardware and specialties. C. E. Gervais is the president, E. R. Low secretary, and Marshall I. Smith treasurer. The company is not yet ready to give out details of its manufacturing plans.

The Underwood Typewriter Company, Hartford, Conn., will erect an additional building this season, to be 50 x 200 ft., six stories. This company has increased its works consistently and rapidly for a number of years, and has been a large buyer of machinery and other equipment.

The new plant of the New London Ship & Engine Company, Groton, Conn., is ready for operation, and will immediately begin the manufacture of the engines and other machinery for the boats which the Electric Boat Company will build for the United States Navy.

The United Dry Drug Company, Boston, Mass., has abandoned its purpose to establish a large plant in the West, and instead will erect large additions to the works at Boston. The contract has been let for an eight-story building for the manufacture of confectionery, to contain 112,000 sq. ft. of floor space, of brick, steel, concrete and tile, the purpose being to create an entirely fireproof structure. Another building will add 81,000 sq. ft. of floor space.

The New Haven Pulp & Board Company, New Haven, Conn., will erect a four-story brick and concrete building, 67 x 131 ft.; Cheney Bros., South Manchester, Conn., an addition to their box shop; and the Day-Emerson Shoe Company, Brockton, Mass., a new shoe factory.

Philadelphia

PHILADELPHIA, PA., May 24, 1911.

Transactions in the local market have been on the same irregular basis that has prevailed for some time. Manufacturers and merchants report current orders as being small and the outlook for the immediate future not particularly encouraging; in fact, it is hardly expected that much betterment in the demand for tools will be shown until the general market conditions show improvement, and how soon that will be is difficult to say, although the trade looks forward to a decidedly better buying movement in the early fall. While reports are heard of possible railroad buying in some districts, there is little news of a favorable character from the railroads in this territory; in fact, operations are in some cases restricted, owing to the labor situation. There is considerable business pending in both boilers and engines, usually of the moderate and smaller sizes, and as inquiries are frequently put out about the time plant improvements are begun it is usually some time before the prospective business actually develops into orders. Business in second-hand machinery and tools continues to drag. The smaller manufacturers of special machinery continue fairly busy, but the makers of the larger and heavier types of special equipment, used in railroad shops and general work, find the demand quiet and are not very fully engaged.

The Baltimore & Ohio Railroad has an inquiry out for a valve-seating machine.

W. E. Dyer, engineer, Land Title Building, is taking estimates for a one-story power house, to be built of brick, 40 x 74 ft., at the manufacturing plant of the Belber Trunk & Bag Company, 1641 North Hancock street. The same engineer will also take estimates for the installation of a new boiler and engine equipment for the new plant, but has not fully decided as to the requirements.

The Tabor Mfg. Company, manufacturer of foundry molding machines, which has been operating under a New Jersey charter, is preparing to transfer to a Pennsylvania charter, in order that plans for the

erection of its proposed new plant, to be built near this city, may be concluded. It has arranged the purchase of a tract of about five acres on which the new plant, for which Dodge, Day & Zimmerman, engineers, have prepared preliminary plans, is to be erected. A charter with a capital stock of \$150,000 will be taken out and the capital increased as required for the erection and equipment of the new plant. The company has not decided when it will go ahead with the work of building, but expects to do so in the near future.

Ballenger & Perrot, architects and engineers, have, it is stated, completed plans and specifications and are taking bids for the erection of a large baking plant to be built for the Acme Tea Company at Twenty-fifth and York streets. The plans include a main bakery building, offices and a power house, occupying a plot of ground about 162 x 225 ft. The buildings are to be of reinforced concrete and brick construction.

The Gilbert & Barker Mfg. Company, Springfield, Mass., manufacturer of Springfield gas machines, which has had its local office and demonstrating plant at 124 North Twelfth street, this city, has removed to new quarters in rooms 645 and 647 in the Bourse Building.

Cramp & Co., contractors, have the contract for the erection of the new manufacturing building to be erected at Beach and Palmer streets for the American Can Company, of which previous mention has been made.

The Philadelphia Electric Company has taken title to a plot of ground approximately 37 x 65 ft. at the northwest corner of Sixth and Susquehanna avenue, which, it is stated, will be used as a site for a sub power station.

The Abrasive Material Company, now located at Seventy-second and Upland streets, has acquired property at James and Fraley streets, Bridesburg, this city, and is now taking estimates for the erection of a new plant, including a one and two-story main building 124 x 348 ft., with a wing 68 x 124 ft. and an office building 36 x 43 ft., from plans by Stanford Lewis, architect. The company's present plant has been acquired by the city, it being located on the line of a proposed boulevard. The new plant will have a capacity of at least two-thirds more than its present one, and will be so designed that it can easily be increased. Details of the plant, as well as to its further equipment in the way of power equipment and machinery, have not yet been fully decided upon.

The Atlantic City Railroad Company, Camden, N. J., is taking bids on private plans for the erection of an engine house to be built in that city. It is to be one story, 160 x 65 ft., and constructed of brick. Details are not available.

Joseph F. Hasskarl, acting director, Department of Wharves, Docks and Ferries, Philadelphia, will receive bids until May 26 for furnishing and installing a 6 cu. yd. clam shell bucket on the dredge Schuylkill. Specifications may be obtained at his office, 555 Bourse Building.

Cincinnati

CINCINNATI, OHIO, May 23, 1911.

A local railroad official calls attention to a very significant fact in the movement of freight at the present time, as reflecting the condition of business in almost every manufacturing line. Carload freight has shown a falling off, while less than carload shipments have increased nearly 300 per cent., an indication that only hand-to-mouth buying is being done to fill urgent immediate requirements. This is especially true in the machine tool line, so far as domestic business is concerned, but foreign orders received are more satisfactory. Curtailment in operating expenses is being quietly continued, although the outlook is really brighter than it has been for some time.

Sawmill and woodworking machinery shows considerable improvement. The South continues to furnish its quota of business, but the new betterment reported is from other sections of the country, including especially western territory.

Steam power plant equipment is in a little better demand, but prices have been shaved so close that when bids are called for on the larger units of engines and boilers they are all practically the same figure.

The Hooven, Owens, Rentschler Company, Hamilton, Ohio, is shipping to the city of Peru, Ind., two 16 x 34 x 42 in., cross-compound, Corliss engines, that

THE MACHINERY MARKETS

are to be direct connected to 350-kw. Fort Wayne generators.

Among late orders of the Long & Alstatter Company, Hamilton, Ohio, is one for a large billet shear to cut 4 x 4 in. billets to be shipped to the National Tube Company, Youngstown, Ohio. An order has also just been received from the Japanese government for a large gate shear to be installed in a navy yard.

A company is being formed to erect an ice plant at Fort Thomas, Ky. The new company will be known as the Fort Thomas Ice Company. W. B. George and Harry Stegeman are understood to be the main promoters.

To serve the machine tool interests located at Oakley, Cincinnati suburb, the Baltimore & Ohio Railroad is erecting a large concrete depot at that point.

The Ohio Universal Truck Company has been incorporated at Warren, Ohio, with \$200,000 capital stock. The principal incorporators are George T. Filius, Z. F. Craver, O. R. Grimmesey and W. R. Hostetter.

The municipality of Oxford, Ohio, has definitely decided to erect a large water-works plant.

J. H. Renshaw, dean of the Cincinnati Continuation School, delivered an address before the Chicago Branch, National Metal Trades Association, May 16, on the subject of industrial education in Cincinnati.

In addition to improvements already made at its Cincinnati terminus, the Chesapeake & Ohio Railroad Company has decided to electrify its line from Newport to Melbourne, Ky. At the latter place large repair shops are now nearly completed. A large freight depot will also be built in Newport.

The J. R. Stevens Company, Cincinnati, has been awarded contract for building a large whiskey storage building at Lawrenceburg, Ind., for James Walsh & Co., Cincinnati. The building will be of regular warehouse construction, 100 x 100 ft., ten stories. A good-sized hot-water heating plant will be installed.

It is reported that the Republic Motor Car Company, Hamilton, Ohio, will enlarge its plant, and that some equipment will be purchased at an early date.

The property of the bankrupt Ohio Sterling Company, Dayton, Ohio, will be sold at public sale June 14 at 10 a.m., by W. F. Smith, auctioneer, 716 Reibold Building, Dayton. The property comprises a foundry and an electrical department. The foundry is equipped with a cupola having a melting capacity of 12½ tons per hour and is adapted to making both heavy and light castings. It is complete in every respect, all appliances being modern. The electrical department is equipped with a large number of machine tools. It has designs and patterns for building motors ranging in size from one-sixth to 30 hp. The capacity is at least 100 motors a month. The property will be sold as a whole or separately, according to the preferences of purchasers.

Chicago

CHICAGO, ILL., May 23, 1911.

The most encouraging feature of the Chicago market is the large railroad requirements now before the machinery trade. The past week the Santa Fé gave out a list approximating about \$25,000, which is in addition to the list it has had out for some time and which it is now closing. Other lists of importance issued the past week are that of the Illinois Central Railroad for about \$15,000 worth of machinery and that of the International Harvester Company for a like amount for its Milwaukee Works. A few tools are also being purchased by the Chicago, Rock Island & Pacific Railroad. Recent reports of renewed activity in the automobile industry throughout the West seem to have been well founded. Many of the dealers report a good volume of inquiries, though a very small proportion result in sales.

The Searchlight Gas Company, 1124 Michigan avenue, Chicago, will erect a factory at Omaha, Neb., during the present summer.

The Commercial Electric Motor Mfg. Company, Chicago, has increased its capital stock to \$50,000 for the purpose of making improvements.

The Tri-City Pattern & Machine Company, which has been doing a general pattern and machine business at Moline, Ill., and the Reynolds Machine Company, of the same city, manufacturer of screw driving machines and gear hobbing machines, have been consolidated and will hereafter be known as the Reynolds Pattern & Machine Company. Both lines will be continued and several new machines will be added. The business of the company will be conducted in the building for-

merly occupied by the Tri-City company.

The City Council of Paris, Ill., is considering extensive improvements to its electric light plant.

The Crete Mfg. Company, Crete, Ill., has been incorporated with \$2,000 capital stock to manufacture electric automatic machines.

The Duluth Casket & Undertaking Supplies Company, Duluth, Minn., has awarded a contract for the construction of a new factory building, 50 x 100 ft., which it will equip with modern machinery, estimates for which are now being received.

Duluth, Minn., is having plans and specifications prepared for a municipal lighting plant at an estimated cost of approximately \$700,000. Construction work will not be commenced at the present time, however, as the matter will have to be submitted to a vote of the people.

The Segerstrom Piano Mfg. Company, Minneapolis, Minn., is preparing plans for a factory which it will erect at Menominee, Wis., containing 50,000 sq. ft. of floor space, of brick construction. Two freight elevators and a boiler for heating purposes will be required. All machinery will be operated by individual motors. The building will be equipped with ventilating fans and sprinkling system.

The Everhart-Delaney Company, Oskosh, Wis., recently incorporated with \$150,000 capital stock, has commenced work on the construction of a drop forging plant, 40 x 90 ft., one story, which it expects to have ready for operation about June 15. Charles M. Delaney is president of the company.

The William J. Hess Iron Works, Green Bay, Wis., has been organized to manufacture gasoline engines, boilers, structural iron work and to do general brass and iron foundry work, besides job and repair work of all kinds. The company has taken over an existing plant and will be in the market for boring mills, engine lathes, both new and second-hand, planer and turret lathes, shears, punches and boiler makers, and foundry tools, one 12 or 14-in. Corliss engine and boiler, one 60 to 100-kw., direct-current, 110-volt generator and a number of 5 to 15-hp. motors and air compressors.

The Northwestern Malleable Iron Company, Milwaukee, Wis., is erecting an addition to its plant at a cost of \$40,000.

The new repair shops of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., are now practically completed. The building is of fireproof construction, 180 x 370 ft., two stories.

Plans and specifications for the new factory buildings of the Aluminum Goods Mfg. Company, Manitowoc, Wis., have been completed, and bids for their erection are now being received. The main building will be 47 x 290 ft., three stories, of fireproof construction.

Kadoka, S. D., is planning to install a water-works system at a cost of \$6,700.

The Christopher & Simpson Architectural Iron & Foundry Company, St. Louis, Mo., has purchased land adjoining its plant to provide for future extension.

Homan & Newman, Belton, Mo., will install an electric light plant in the city of Belton.

The Ideal Rotary Hog Feeder Company, Miami, Okla., is erecting a factory, work upon which will be rushed to completion as rapidly as possible.

The Vinita Machine & Mfg. Company, Vinita, Okla., newly incorporated, is erecting a 40 x 60 ft. cement block building with cement floor. It is the expectation of the company that an addition will shortly have to be made, as business in that section of the country is developing rapidly. For the present the repairing of engines, boilers and farm machinery will be conducted, together with pipe cutting, oxy-acetylene welding, etc. The company, however, desires to engage in manufacturing, and will therefore consider propositions from those having articles that can be made in a machine shop. The machinery required has partially been arranged for, and it is expected that the plant will be ready for operation about the middle of July. W. C. Drake is president; H. M. Burroughs, vice-president, and James A. Kenreigh, secretary, treasurer and general manager.

Indianapolis

INDIANAPOLIS, IND., May 23, 1911.

A new foundry and machine shop will be erected during the coming Summer at Aurora, Ind., by the Steadman Foundry & Machine Works, manufacturer of crushing, grinding and mining machinery.

THE MACHINERY MARKETS

The company will be in the market for a complete equipment for both departments.

The La Fayette Electric & Mfg. Company, La Fayette, Ind., incorporated with \$200,000 capital stock, has purchased the plant and equipment of the Sterling Electric Company of that city and will continue the manufacture and sale of all telephones and electrical appliances heretofore manufactured by the Sterling company. The company has also arranged to manufacture an electric brake patented and owned by the Electric Safety Brake Company, Cincinnati, Ohio. No additional buildings are contemplated at the present time, but the company will probably be in the market for new equipment.

The Indiana Rolling Mill Company, New Castle, Ind., advises in regard to the recent fire at its plant that its shovel factory was completely destroyed, with a loss of about \$125,000. Preparations for rebuilding the plant will be commenced immediately.

The S. J. Gardner Foundry & Machine Company, New Albany, Ind., has taken over the plant of S. J. Gardner. Two new buildings have been completed, a foundry 50 x 120 ft. with two cupolas and two five-ton traveling cranes, and a sheet iron and boiler repair shop 60 x 120 ft. A machine shop 50 x 120 ft. was built and equipped a year ago. The company was recently incorporated with \$50,000 capital stock.

Daniel T. Olds, of Bacon, Olds & Co., Indianapolis, which company purchased the Citizen's Heat & Light Company, Elwood, Ind., at receiver's sale, states that the natural gas plant will be remodeled for the furnishing of artificial gas, at a cost of \$100,000.

The Stutz Auto Parts Company, Indianapolis, is building a two-story reinforced concrete addition, costing \$15,000.

The final report of C. A. Ford, receiver for the Atlanta Tinplate Company, Atlanta, Ind., has been made to the Circuit Court at Noblesville, Ind., and approved. It winds up litigation extending over five years. The stockholders received 97 per cent, which is regarded as a good showing.

Martin T. Krueger has been appointed receiver of the Western Launch & Engine Company, Michigan City, Ind., manufacturer of launches and launch engines. The assets are \$50,000, much of it in raw material; the liabilities, \$10,000.

The King Iron Bridge Company, Cleveland, Ohio, secured the contract for a bridge over Big Blue River, between Shelby and Johnson counties, Indiana, for \$10,000.

The William F. Meyers Diamond Saw Company, Bedford, Ind., has been incorporated with \$6,000 capital stock, to manufacture saws for cutting stone. The directors are William F. Meyers, V. A. T. Albright and G. V. Albright.

The Parkhurst Die Casting Machine Company, Anderson, Ind., has been incorporated with \$100,000 capital stock. The directors are L. M. Parkhurst, W. T. Durbin and W. N. Durbin.

The Ideal Concrete Machinery Company, South Bend, Ind., has increased its capital stock by the addition of \$200,000 preferred and \$300,000 common.

The Muncie Electric Lighting Company has been incorporated at Muncie, Ind., with \$1,000,000 capital stock. It is a merger of the lighting companies of Hartford City, Redkey, Dunkirk, Eaton and Muncie. The directors are H. L. Finley, F. P. Hunter, M. B. Smythe, F. W. Drager, A. H. Melton and F. B. Kiel.

The Elkhart Musical Instrument Company, Elkhart, Ind., has been incorporated, with \$10,000 capital stock, to manufacture musical instruments. The directors are W. J. Gronert, W. C. Reid and B. H. Reid.

The S. S. Cox Show Case Company, North Manchester, Ind., has been incorporated with \$65,000 capital stock, to manufacture show cases. The directors are S. S. Cox, A. A. Ulrey, G. L. Shoemaker, George Burdage, J. A. Browne, John Isenbarger and F. S. Gleason.

The Klammer-Goebel Furniture Company, Evansville, Ind., has been incorporated with \$60,000 capital stock, to manufacture furniture. The directors are Oscar Boetticher, Daniel Wedtz, John Kissel, O. A. Klammer and H. W. Goebel. The company is preparing plans for a new factory building.

The Connersville Furniture Company, Connersville, Ind., has increased its capital stock from \$75,000 to \$200,000.

The Broderick Boiler Company, Muncie, Ind., is planning to double the capacity of its plant. It now employs 175 men.

The Staples-Hildebrand Company, South Bend, Ind., has been incorporated with \$100,000 capital stock, to deal in builders supplies. The directors are G. D. Staples, W. M. Hildebrand and C. E. Staples.

The Ward Fence Company, Decatur, Ind., is preparing to build a large addition to its plant, the main building to be 200 ft. long. The company has just completed a very busy season.

The Huntingburg Furniture Company, Huntingburg, Ind., has been incorporated with \$25,000, to manufacture furniture. The directors are E. B. Fish, George D. Brown and H. A. Gabriel.

Cleveland

CLEVELAND, OHIO, May 23, 1911.

The local machinery market has been somewhat quieter the past few days than the previous week. Very few new inquiries came out except for single tools. The trade is apparently being affected somewhat by the unusually hot weather that prevailed for the greater part of the week. Sales were limited almost entirely to small single tools. Dealers will soon have a chance to figure on the machinery requirements for the new West Side Technical High School in Cleveland. This list has been prepared and includes about 100 machine tools, in addition to considerable other equipment. This list, together with that of the American Steel & Wire Company, will do considerable in stirring up some activity in an otherwise rather quiet market. The demand for second-hand machinery is only moderate.

The machine tool list for the West Side Technical High School in Cleveland has been completed and will be sent to the trade in a few days or as soon as complete specifications are prepared on a few of the tools, the sizes of which have not yet been definitely decided upon. The equipment will be purchased shortly for delivery during the fall, when it is expected that the school will be completed. The list is as follows:

Machine Shop Equipment

Two motor-driven direct-current engine lathes.
One tool-room engine lathe with quick change gear mechanism, compound rest, taper attachment, draw-in collets and relieving attachment.
Twenty-four engine lathes, belt feed, compound rests, with taper attachments.
Twenty engine lathes with compound rests.
Seven 10-in. speed lathes.
One turret lathe, 1 1/4-in. spindle.
One universal tool and cutter grinder.
One universal grinder.
Two 20-in. drilling machines, stationary heads, wheel and lever feed.
One 20-in. drilling machine with sliding head band and power feed, automatic stop motion and tapping attachment.
Three sensitive and spindle drill presses.
Two arbor presses.
Two twist drill grinders.
Five 14-in. shapers.
Two plain milling machines with indexing head.
Two universal milling machines, one with universal vertical spindle attachment.
Two tool grinders, wet, two wheel.
Two bench grinders.
Two portable electric center grinders.
Two power hack saws.
One gas furnace.
One planer.

Forge Shop Equipment

Twenty-nine forges.
Twenty-nine anvils.
Twenty-nine anvil blocks.
Two hundred and twenty-two tongs.
Thirty-six hardies.
Fifty-three each top and bottom swedges.
Twenty-five each top and bottom fullers.
Seventy-two hammers.
One power shear.
Twelve sledges.
Four galvanized iron tanks.
One upright drill and counter.
Twelve jaw bench vices.
Thirty-six malleable iron melting ladles.
One adjustable hack saw frame.
One emery wheel stand and counter.
Two emery wheels.
One power hack saw.
One heating furnace.
For the pattern making and cabinet shop 19 wood-working lathes will be required. There will also be purchased a complete foundry equipment for 112 hands. This will include a 24-in. cupola, molding machines, tumbling barrel, etc. In addition to the above list a large number of small tools will be purchased for all of the departments.

The Globe Machine & Stamping Company, Cleveland, has completed one building of its new plant on the west side near the plant of the Standard Welding Company. This building is a steel automobile box factory. It is 100 x 165 ft. and one story. There is a japanning room in connection. The company has started

THE MACHINERY MARKETS

work on its main building, which will be 116 x 250 ft. It will be two stories with a monitor roof. Its construction will be concrete. The two buildings will provide about 55,000 sq. ft. of floor space. The machinery will be driven by motors in the group plan. About 20 motors will be required in 5, 10 and 20 hp. Electricity will be furnished by a commercial company, so that a power plant will not be built.

The Westman Motor Truck Company, Cleveland, recently incorporated with a capital stock of \$200,000, has purchased the plant formerly owned by the Horton Mfg. Company in Painesville, Ohio, and will at once equip it with machinery for the manufacture of motor trucks.

The Graton & Knight Mfg. Company, Worcester, Mass., oak leather tanner and belt maker, has purchased the business and plant of the Republic Belting Company, Prospect avenue and West Third street, Cleveland, which recently went into the hands of a receiver. The purchasers will operate the Cleveland plant as a branch factory. James D. Thompson will be the local manager.

The Board of Trade, Mingo, Ohio, has closed a deal with Cleveland parties, represented by J. V. Kennedy, for the building of a new brass and iron foundry in Deandale, near Mingo. The plant will be operated under the name of the Ohio Valley Brass & Iron Company. It is expected that the erection of the plant will be started shortly and that it will be ready for operation in four months.

The Massillon Wire Basket Company, Massillon, Ohio, has been incorporated with a capital stock of \$25,000 by John E. Johns, C. E. Schworn, Martin B. Schultz, Andrew Reese and G. W. Kratsch.

The Safe Cabinet Company, Marietta, Ohio, will enlarge its plant by the erection of a two-story addition, 64 x 96 ft., and a one-story factory building, 28 x 182 ft. The extensions will enable the company to nearly double its present output. The company has broadened its line of products and is now engaged quite extensively in the manufacture of steel furniture.

The Gasselli Chemical Company, Cleveland, has acquired a site in Canton, Ohio, and will build a branch plant in that city for the manufacture of chemicals.

The Conductor Fitting Company is the name of a new concern in Marietta, Ohio, that has commenced the erection of a plant for the manufacture of conductors and stamped steel fittings. Ben T. Seyler will be the manager.

The Belmont Stamping & Enameling Company, New Philadelphia, Ohio, will enlarge its plant by the erection of a brick and steel addition.

The Wellman Pattern Supply Company, Cleveland, has increased its capital stock from \$30,000 to \$50,000.

Detroit

DETROIT, MICH., May 23, 1911.

The past week has been active in all lines, with the exception of the railroad equipment concerns and stove manufacturers. Automobile orders and trade continues unabated, with more orders on hand than can be taken care of in the next few months. The Buick plant at Flint is experiencing heavy trade, with sufficient orders on file to keep it running all summer. Building is active, with a number of new factories to be built, as well as two office structures.

One of the most important deals brought about in some weeks is the purchase by Schwanbeck Bros. of 12 acres of land in the northeastern part of the city for the erection of a \$200,000 plant. They are manufacturers of showcases, special baking machinery, and knockdown shipping boxes, and are one of the oldest concerns in the city. The manufacturing building will be 62 x 500 ft., four stories, and will be constructed of brick and steel. With it are to be three quick-acting dry kilns, with capacity of 25,000 ft. daily. There will be a separate power plant, to be equipped with a 300-h. p. Corliss engine, also an electric plant, as some of the machinery will be driven by motors. The capital stock will be increased from \$80,000 to \$300,000.

Detroit is to be one of the manufacturing points for the Augustine types of rotary engines. A company is being formed to demonstrate the use of the engine in household duties with a view to securing sufficient capital to erect a suitable plant. Thomas W. Brown has the matter in hand.

The Studebaker Corporation is planning the erection of several new buildings. The matters are in the

hands of the architects, who are letting the first contracts towards the construction work.

The Fisher Body Company, maker of automobile bodies, has plans in the hands of architects for the construction of a new factory addition to care for its increasing business. The plant will cost in the neighborhood of \$10,000.

The Detroit Corrugating Company is a new sheet-iron and metal concern organized this week. The company has filed articles of incorporation with a capital stock of \$25,000.

The Watt Carburetor Company, manufacturer of carburetors for motor vehicles, filed articles of incorporation with the secretary of state last week. The company will start business with a capital stock of \$150,000.

The Holland Rusk Company, Holland, Mich., has increased its capital stock from \$50,000 to \$100,000.

The Durfee Embalming Fluid Company, Grand Rapids, Mich., will build a new plant three times the size of its present four-story building. The company manufactures specialties as well as fluids.

The plant of the Valley City Biscuit Company, Grand Rapids, Mich., was partly burned May 18. The loss will reach close to \$20,000. Practically all the machinery as well as some stock was destroyed.

The woodenware factory recently destroyed at Kalkaska will be re-established at Munising, Mich., by L. W. Beebe, secretary of the company.

The Terrel Equipment Company, Grand Rapids, Mich., suffered the loss of its plant by fire last week. The loss will reach \$50,000, fully insured. The company is building a new plant now, and the fire will no doubt hasten the construction. The machinery item will necessarily be much larger now, owing to the fire.

The Hayes Wheel Company, Jackson, Mich., one of the largest auto wheel concerns in the state, has voted to increase its capital stock from \$30,000 to \$100,000 for the purpose of expansion.

The plant of the Standard Pure Food Company, Owosso, Mich., was burned May 17. The insurance on the stock and machinery is \$25,000.

The taxpayers of Mancelona will vote May 22 on a bond issue of \$8,000 for water works improvements.

The citizens of Three Rivers, Mich., have voted the issuance of bonds for \$40,000 to purchase the Emery Water Power, and install an electric lighting system.

The New England Pie Company, following increases made by other baking concerns of this city, will increase its capital stock from \$50,000 to \$100,000. The added capital will be used to enlarge the plant and purchase more modern baking machinery.

The Green & Wilson elevator at Deckerville, Mich., will be remodeled and its capacity increased to 50,000 bushels.

The saw mill of Fred Nelson, at Maple Ridge, Delta County, Mich., recently burned, will be rebuilt.

The Big Rapids Gas Company, Big Rapids, Mich., is planning extensive improvements in the near future, which will involve the expenditure of about \$10,000.

The Muskegon Steel Castings Company, Muskegon, Mich., has let the contract for the construction of an addition, which is to be completed by July 1. The Toledo Iron & Bridge Works secured the contract for the steel framework.

The Muskegon Crank Shaft Company will remove to Lansing, Mich. The move has been contemplated for some time, and comes as the result of work on the part of the Lansing Business Men's Association. The company will occupy a building owned by the Seager Engine Works.

The Michigan Bow Socket Company filed articles of incorporation with the secretary of State this week. The plant will be located in this city and will be another addition to the many auto accessory industries of this city. The company has a capital stock of \$15,000.

The Huron Paper & Papeterie Company, Ypsilanti, Mich., has increased its capital stock from \$15,000 to \$50,000. The added capital is needed to buy new machinery.

A factory for the manufacture of wood-fibre packing boxes will probably be organized at Niles, Mich. The matter has been hanging fire for nearly two years. The Niles Board of Trade has particulars.

The Farmers' & Gleaners' Elevator Company has been organized at Elkton, Mich., with a capital stock of \$30,000. It is planned to build a large elevator at Elkton.

Representatives of the Commonwealth Power Com-

THE MACHINERY MARKETS

pany, Lansing, Mich., are negotiating for the purchase of the old water-power system at Petreville, near Eaton Rapids. The company plans to tear down the old dam and replace it with a new concrete structure, and will establish one of the most modern water-power systems on the Grand River.

L. H. Shepard, Charlotte, Mich., has under contemplation the erection of a modern cooling and abattoir plant. It is also proposed to erect a building for the manufacture of fertilizer, in connection with the abattoir.

The Antrim Chemical Company, Mancelona, Mich., has been taken over by the Antrim Iron Company, Grand Rapids. The purchaser will enlarge and modernize the plant and continue the business on a larger and much more important scale than under the old management.

There is a movement on foot in Kalamazoo, Mich., to establish a large and modern broom plant to employ about 30 men. The organization is barely under way and particulars are not made public. The promoters can be reached through the Business Men's Association.

A general manufacturing plant has been organized at Flushing, Mich., composed of citizens of the city. The company starts with a capital stock of \$10,000. The Board of Commerce possesses particulars as to the incorporators.

The Mt. Clemens Milling Company, Flushing, Mich., has been incorporated with a capital stock of \$30,000. A good-sized mill will be erected at once.

A new manufacturing concern of considerable importance to the city of Pontiac, Mich., is the F. J. Nice Furnace Company, incorporated this week. The company has a capital stock of \$25,000.

The directors of Packard Motor Car Company, Detroit, Mich., have authorized new construction which will practically triple the capacity of its truck shops. Improvements to the foundry have also been authorized and this department will be increased by the addition of 9695 sq. ft. of floor space. Arrangements have also been made for building an additional floor on each of the two service buildings. The total floor space contemplated in the new construction is 160,295 sq. ft., which added to the present plant will increase the floor space of the plant to 37 acres. The additions will be of brick and reinforced concrete and will be completed as soon as possible. About \$150,000 worth of new equipment will be purchased.

The South

LOUISVILLE, KY., May 23, 1911.

While lethargy is perhaps too strong a word to use in connection with the machinery situation, it is certainly true that the volume of sales has been considerably less than the dealers and manufacturers like to see recorded. There is hardly a line which is showing marked activity, while most of the general divisions are reported dull. There is a good deal of railroad buying in prospect in this territory, and that will help some.

Owing to the growth of the suburban residence idea in this part of the country, there has been a big field created here for complete electric light and water works plants for installation in large country homes. Through the Kentucky Bluegrass there are especially good prospects in this connection.

The Louisville & Nashville Railroad, W. H. Courtney, Louisville, chief engineer, has decided, according to semi-official reports, to double the power installation at its shops at New Decatur, Ala., and a considerable amount of equipment is being purchased. Boilers and electrical apparatus of large capacity will be purchased, it is stated.

The James Supply & Hardware Company, Chattanooga, Tenn., is having an exhibition this week of the marine engines and accessories of Fairbanks, Morse & Co. The exhibition will be held in Nashville next week.

The Axton-Fisher Tobacco Company, Louisville, which has purchased the business of the Crescent Tobacco Company, of Nashville, is planning the erection of a five-story factory and warehouse at Twentieth and Howard streets to take care of its enlarged business. The equipment will be purchased in the near future.

The Mengel Box Company, Louisville, has decided to erect a large factory at Winston-Salem, N. C., for the manufacture of tobacco boxes. The factory is for

the purpose of supplying the plant of the W. R. J. Reynolds Tobacco Company, located at Winston-Salem. A large amount of power and wood-working equipment will be required. T. S. Hamilton, Louisville, is mechanical engineer of the company. Plans have not yet been completed.

The removal of the Alvey-Ferguson Company, Louisville, manufacturer of conveying machinery, to Oakley, O., a suburb of Cincinnati, will be accomplished in August, officers of the company have announced. The company has increased its capital stock from \$50,000 to \$300,000.

The John G. Duncan Company, of Knoxville, Tenn., is asking for prices on a 60-h. p. gasoline engine.

Two 2-ton electric elevators will be installed by the Chattanooga Feed Company, Chattanooga, Tenn. Equipment for a small grain elevator is also to be secured.

J. H. Holmes, Yuma, Tenn., is in the market for machinery for manufacturing cement blocks.

A bond issue of \$40,000 has been approved by the voters of McKenzie, Tenn. The proceeds will be used for the extension of the electric light system.

Equipment will be installed in the plant of the Livingston Light & Power Company, Livingston, Tenn.

The Durham Coal & Iron Company, Chattanooga, Tenn., is planning considerable extensions, and is getting ready to open several new coal mines with a capacity of 1500 tons a day. Seventy-five additional coke ovens are also to be built. Plans for the construction of more iron furnaces have been held up for the time being.

The Knight-Weller Company, Knoxville, Tenn., which has a capital stock of \$2,000,000, has announced ambitious plans for developing water-power sites in Tennessee and North Carolina, and for establishing plants for smelting iron ore by electricity. John C. Knight, Hotel Richmond, Washington, D. C., is interested.

A gasoline engine will be installed in the newspaper plant of G. G. Hyatt, Ducktown, Tenn.

In addition to the present water-power development on the Ocoee River, near Cleveland, Tenn., the East Tennessee Power Company has plans for the construction of a power-house near Ducktown, Tenn., where it is intended to develop 60,000 h. p. A dam, flume, etc., will be constructed following the completion of the present work.

The Lytle Electric Company, Memphis, Tenn., has been incorporated with \$5,000 capital stock by P. W. Lytle, H. P. Woods and others.

George Tomlinson, Winchester, Ky., has purchased a spoke mill at Clay City, Ky., and will install wood-working equipment for the manufacture of hardwood flooring and interior finish.

The Cincinnati Gas Transportation Company, Cincinnati, O., is to build a natural gas plant, including a compressing station, at Maysville, Ky., and has let the contract for the erection of the building.

Considerable improvements are to be made in the plant of the Paducah Gas Company, Paducah, Ky. A tank of 200,000 cu. ft. capacity is to be erected, and the water-gas process will be substituted for the coal-gas method.

The Louisville & Nashville Railroad is planning a considerable expenditure at its shops at Evansville, Ind., which will be used by the Big Four when its extension from Evansville to Mt. Carmel, Ill., is completed. The shops will be greatly enlarged.

Bids will be received by the City of Eufaula, Ala., until June 7 for furnishing equipment for an electric light plant, including boiler, engines, generators, switchboard, transformers, condensers, etc. The engineers for the plant are the W. L. Upton Company, Birmingham.

Morgan City, La., is considering the installation of a water works plant.

Proposals will be received by the Board of Public Works of Nashville, Tenn., until May 30 for the installation of a boiler feed pump. George Beyer is superintendent of water works, and has the specifications in charge.

The Livermore Foundry & Machine Company, Memphis, Tenn., has removed its salesrooms and offices from 91 North Second street to 290 Adams avenue, thus grouping its heavy hardware and supply department with the manufacturing department.

A bond issue of \$65,000, for the purpose of establishing an electric light plant and a water system, will be voted on June 5 at Greeneville, Tenn.

THE MACHINERY MARKETS

Henry Vogt, president of the Henry Vogt Machine Company, of Louisville, is a member of a party of 100 business men of Louisville who are visiting Eastern Kentucky this week for the purpose of establishing closer business relations between Louisville and that section of the State.

The Westinghouse Company has completed the installation of equipment in the hydro-electric plant of the Watauga Power Company, on the Watauga River, near Bristol, Tenn., and the plant is to be put in operation.

The Duck River Power Company, the incorporation of which was recently noted, plans the development of water power at Manchester, Tenn., furnishing lighting service to that town being contemplated.

The new smoke-consumer ordinance adopted by the City Council of Knoxville, Tenn., will become effective June 1.

The city officials of Memphis, Tenn., are considering the establishment of a garbage disposal plant. Address Mayor Crump.

Dyersburg, Tenn., has voted favorably on the proposition to issue \$30,000 of bonds for the purpose of making improvements in the electric light plant.

Eastern Canada

TORONTO, ONT., May 20, 1911.

To keep up its onward sweep the present wave of prosperity in Canada must continue to have the impulse of large capital importations. Great as are the productive operations of the country, the annual returns from them are not yet enough to keep up the pace. It takes much more money than what is yielded by the largest crops, by the greatest output of the mines, and by the returns from the forests, fisheries and other natural industries to keep the country in funds for the industrial activities that are now in progress. In other words, Canada is fixing capital much more rapidly than it is producing capital, and the deficit has to be made up by very large importations of capital brought in by thriving immigrants and as the proceeds of the sale of securities abroad. For a time it looked as if the marketing of the bonds, debentures and shares of Canadian Governments, municipalities and private corporations might be less active than it was. It is now evident that the quantity of money brought in from the outside will show no falling off for some time to come. New undertakings calling for very large applications of capital are being entered upon. Canada's credit keeps up in the British money market, and is attracting funds from France. Nearly every steamship brings over from Europe an agent of some financial house to study investment conditions here and to place large sums on good Canadian security. Altogether, financial conditions are assuring to the conductors of manufacturing industry, and give warrant for confidence on the part of those who have projects of expansion in mind. There is no hesitation in the placing of orders, and the demand for labor increases. At the same time competition is becoming keener. One hears much about salesmanship these days and Canada travellers and house salesmen are credited with holding their own against competitors from the United States, Britain, Germany and elsewhere.

The City Engineer has prepared estimates of the cost of constructing the proposed municipal addition to the street railroad system of Toronto. He places the cost at \$505,000.

The retort plant of the Standard Chemical, Iron & Lumber Company at Sault Ste. Marie, Ont., was destroyed by fire on May 13. Five hundred men are thrown out of employment. This charcoal plant, which the company leased from the Lake Superior Corporation a year ago, has recently been very much improved.

The ratepayers of Aurora, Ont., have voted to confirm the agreement made between the Municipal Corporation and the Positive Clutch & Pulley Works, Ltd.

The Rhodes-Curry Company's mill at Little Forks, N. S., was destroyed by fire on May 16, with a loss of \$25,000. The mill had been recently equipped.

Sir Donald Mann, vice-president of the Canadian Northern Railway Company, whose bonds for the building of the stretch of road between Port Arthur and Montreal have just been guaranteed to the amount of upward of \$35,000,000 by the Dominion Government,

says that the company will at once begin an expenditure of about \$31,000,000 on terminals at the latter city. The work there will include the building of a bridge across the St. Lawrence to connect with the Intercolonial at St. Rosalie. The company has also awarded contracts for the completion of its line, 250 miles in length, between Toronto and Ottawa.

The Canadian United Electric Company, with a capital stock of \$75,000, and head office in Montreal, has been incorporated as a Dominion enterprise.

The Dominion Flour Mills, Ltd., has been incorporated as a Dominion company, with a capital stock of \$1,500,000, and head office in Montreal.

American Machinists, Ltd., with capital stock of \$50,000, and principal place of business at Montreal, has been incorporated as a Dominion company.

The Commercial Engineering Corporation, with a capital stock of \$100,000, and chief place of business to be in Montreal, has been incorporated as a Dominion company.

The Cockshutt Plow Company, Ltd., has been incorporated under Dominion letters patent, with a capital stock of \$15,000,000 to take over the business of the company that has long been operating under the same name in Brantford, Ont. Brantford is still to be the point at which the chief place of business will be located. The charter gives the company authority to manufacture harvesting machinery, engines, boilers, etc., as well as plows. Harry Cockshutt, managing director of the Cockshutt Plow Company, whose business is to be taken over, says that there is no merger of any kind contemplated, and it is said that control of the new company will remain in the hands of the group controlling the old one. It is announced from London, England, that the Western Canada Trust Company will shortly offer \$3,750,000 7 per cent cumulative preferred stock in the Cockshutt Plow Company. It is remarkable how the business of manufacturing farm implements is expanding in Canada. The Massy-Harris Company is increasing its capacity in Toronto and Brantford. The International Harvester Company is enlarging its operations in Hamilton. The Oliver Plow Company is putting up a great plant in that city. The Deere Company is establishing great agricultural implement works in Welland, and now the Cockshutt Plow Company's works in Brantford are to have their capacity immensely increased.

The Tariff Committee of the Canadian Manufacturers' Association advises the Executive Committee of that body that it has received advices to the effect that the conditions of the Government's contract for the building of vessels for the Canadian navy call for the construction of the hulls, the propelling engines and the boilers must be done at works established in this country, and that the materials and machinery used in the building and equipment of these works must also be the product of Canadian industry,—that is, in every case possible, and where impossible, must be produced within the Empire.

The ratepayers of Trenton, Ont., have approved a by-law to grant a fixed assessment to the Canadian Iron Mines Company, a new corporation with a capital stock of \$1,500,000, which is to establish a concentrator plant in the town at a cost of \$100,000. The concentrator is to be operated by electricity supplied by the Seymour Power Company.

The Madison Williams Foundry Company, Lindsay, Ont., has obtained the contract to put in the turbine and pumps for the Smith's Falls waterworks. Among the tenderers were some United States manufacturers.

Work has been begun on the fertilizer plant of Alexander Cross & Sons, Sydney, N. S. The Rhodes-Curry Company have the contract.

The contract for the construction of a bridge over the St. Charles River, to join the city of Quebec and the suburb Limoilou, has been awarded by the corporation of the former municipality to F. Lemoine & Son, Montreal, the price being \$156,200.

The Chatham Malleable Iron & Steel Mfg. Company has begun the construction of its works in Chatham, Ont.

The Lott Lawn Fence Company has begun business in Sarnia, Ont.

The Yale & Towne Mfg. Company, which contemplates establishing at St. Catharines, Ont., an extensive Canadian plant, has received the unanimous endorsement of the St. Catharines Board of Trade favoring exemption from taxes for a term of years and other privileges providing the branch plant is located there.

THE MACHINERY MARKETS

The Russell Motor Car Company, Ltd., is the new name for the Canadian Cycle & Motor Company, Ltd., Toronto. Coincident with the change of name the company increased its capital stock from \$800,000 to \$1,600,000 to provide additional manufacturing and selling facilities.

Western Canada

WINNIPEG, MAN., May 20, 1911.

All Western centers are feeling and showing the stimulus of the great immigration movement, of the large capital expenditures of the railway companies in new construction, and of the promising crop conditions. Eastern manufacturers are putting up large warehouses at distributing points, and a very large business in harvest machinery, outfit, etc., has been booked for later delivery.

Engineers of the Dominion Public Works Department estimate that the construction of the drydock at Esquimaux, B. C., in accordance with the plans of the Bullens of that place—with whom are to be associated Denny Bros., Dumbarton, Scotland—will cost \$2,637,800. The company in which these interests are joined, and to which the government subsidy of 3½ per cent. on the capital cost will be paid for 35 years, is the Esquimaux Paving Dock & Shipbuilding Company.

The Otis Elevator Company, Toronto, has begun the construction of large offices and salesrooms in Vancouver, B. C. The building is to cost \$100,000. A warehouse is also to be built in that city by the Otis Company at a cost of \$50,000.

The Canadian Fairbanks Company, Montreal, maker of scales and weighing machines, is to build a \$250,000 warehouse in Vancouver, B. C., next year.

Last month the Fraser Mills, New Westminster, B. C., cut 10,000,000 ft. of lumber. The lumber business in Canada's Pacific coast mills is of larger volume than it ever was.

The Consolidated Land & Machinery Company, with head offices at Minneapolis, is to open a branch at Edmonton, Alberta.

The East Calgary Corporation, Calgary, Alberta, is about to apply for a charter to build six or eight miles of electric railroad.

It is stated that the firm of Morris & Co., Chicago, of which the Dominion Meat Company is an offshoot, will build a \$1,000,000 packing plant in Calgary, Alberta.

The Cockshutt Plow Company, Brantford, Ont., has applied to the municipal authorities at Regina, Sask., for two blocks for a warehouse site. Goulds, Shapley, Muir & Co., Brantford, Ont., maker of traction engines, pumps, etc., have applied to the same authorities for a warehouse site. The Alaska Bedding Company, Winnipeg, proposes to build a warehouse in Regina. The Dominion Linseed Oil Company, Braden, Ont., has been seeking the same site. The Gus. Peck Company, manufacturer of well-boring machinery, is seeking a warehouse site from the municipal authorities in Regina.

In the Dominion Government's supplementary estimates is an item of \$2,000,000 for the beginning of construction of the Hudson Bay Railway as a government work.

With a capital stock of \$150,000, a company headed by a number of Calgary, Alberta, men has been granted letters of incorporation by the Provincial government in order to erect a nail factory there. Application has been made to the City Council for special privileges and a site. In the personnel of the company are W. E. Davies, John Henry Rue, York Shaw and W. J. Morris. The establishment, for which plans and specifications have been drawn up, will have a capacity of 14 tons per day, and the output will include a full line of nails of various sizes, also builders' hardware, horse-shoes, tacks, brads, etc. The plant will be equipped with automatic machinery. For the present all the raw material will be imported from the East.

The Munro Steel & Wire Works, Winnipeg, will erect a branch factory in Vancouver this year. The plant will be mainly devoted to the manufacturing of wire fencing, by a new machine invented by James Munro.

McGurk & Sutton have started a sheet-metal shop at North Vancouver, B. C.

John M. Fleming, Ottawa, Ontario, inventor of the Fleming grate bars, is organizing a company at Calgary, Alberta, for the manufacture of furnaces, ranges and grate bars.

The capital stock of the Vulcan Iron Works, Ltd., Winnipeg, has been increased to \$500,000.

The contract has been let for the building for the paint factory to be established in St. Boniface, Man., for the Martin-Senour Company, which has factories in Chicago, Boston and Montreal.

The Canada Cement Company, Ltd., Montreal, is preparing to erect a plant in Winnipeg to take care of the company's Western business. Senator Edwards, president of the company, has been in Winnipeg arranging details.

John Scott, a New Brunswick millman, has gone to British Columbia with a portable sawmill outfit which he will establish on the Nechaco River near Fort George. If business warrants he will erect a modern plant next season.

The sawmill of the Doukabour colony at Tarry Siding, on the Kootenay River, B. C., was burned recently, causing a loss of \$16,000. It will be rebuilt at once.

The Penticton Lumber Company, Penticton, B. C., will shortly add a wood pipe and box factory to its new mill at that point.

The British Canadian Lumber Corporation, Ltd., has selected a large site on Lulu Island, within the boundaries of New Westminster, B. C., to erect a sawmill. The plant will be run by electricity, and will be modern in every way. A sash and door factory will also be installed.

The Electric Light Company, South Quappelle, Sask., contemplate erecting a more substantial powerhouse, and also installing gasoline power.

By-laws for the construction of an electric light plant have been carried by the ratepayers of Melville, Sask.

An agreement with James H. Preston for the location of a planing mill at Medicine Hat, Alberta, has been ratified by the council of that city.

McDougal-Jenkins, Ltd., engineers, have purchased the plant of the Albion Iron Works, North Vancouver, B. C. They will erect another shop costing about \$150,000.

The Pacific Coast

SAN FRANCISCO, CAL., May 16, 1911.

The buying movement in machine tools has fallen off to some extent in the last two weeks, and the market at present is rather quiet, though there is still more demand than for some months prior to March.

The moderate demand for heavy tools which was noted a month ago is no longer a feature, and while there is some prospect of large inquiries arising later in the season business at present is limited almost entirely to small items. The demand for general shop equipment is fairly active, but the business is scattered over a large territory. Local shops, aside from those specializing on a few particular lines, have little work on hand, and there is no tendency to anticipate future needs.

Machinery of a general nature is also quiet. Aside from local conditions which tend to delay activity, a feeling of uncertainty regarding the tariff and other national matters is having its effect here, limiting the amount of capital invested in new industrial enterprises.

There is little inquiry for woodworking machinery, as few of the mills are running at full capacity. Some orders are being placed for logging equipment, however, and dealers still anticipate a fair movement in this line. While there is little definite inquiry for large mining outfits, considerable small equipment is being sold, and from the present scale of operations in several California mining districts a good season is expected. Oil well equipment is very quiet, with little prospect of any improvement this season. The most active demand is in connection with agriculture and irrigation work, the various pump, traction engine and implement factories being extremely busy.

At the invitation of the Pacific Coast Machinery Dealers' Association of San Francisco the machinery dealers of the coast met in San Francisco April 20 to 22. The problems facing the machinery dealers of the coast were discussed at this conference and an organization embracing all the machinery houses on the coast was organized. The following officers were elected: President, A. L. Young; A. L. Young Machinery Company, San Francisco; vice-president, Alexander Hamilton, Coldwell Bros., Seattle, Wash.; secretary-treasurer, H. H. Tracy, Tracy Engine Company, San

THE MACHINERY MARKETS

Francisco. The executive committee, having the thorough organization of the Pacific Coast Machinery Dealers' Association in hand, is composed of the following well-known machinery men: Charles Stallman, Pacific Tool & Supply Company; C. A. Berger, Berger & Potter Company, San Francisco; J. M. Arthur, J. M. Arthur & Co., Portland, Ore.; Alexander Hamilton; Mr. Usher, Smith, Booth & Usher Company, Los Angeles, Cal.

The C. L. Best Gas Traction Company is having great success with its traction engines, and its steel casting department, represented here by Chas. P. Bannon, is well occupied with outside work.

The Doak Gas Engine Company has taken the Pacific Coast agency for the Bridgeport line of marine gasoline engines.

Charles C. Moore, president of Charles C. Moore & Co., engineers and machinery dealers, last week formally accepted the presidency of the Panama-Pacific International Exposition Company.

The Acme Brass Foundry Company has been incorporated at Los Angeles, with a capital stock of \$30,000, by F. K. Czerniski, S. F. Margozewitz and N. C. Christensen, Jr.

The Standard Oil Company is erecting several large buildings at its Richmond, Cal., plant, one of which is to be used for a machine shop.

The Atchison Steel Post & Pole Company has been incorporated at Salt Lake City, Utah, with a capital stock of \$1,000,000, by H. E. and M. E. Atchison, F. I. Gunnell and C. H. Valentine.

The supervisors of Los Angeles County, Cal., have accepted the bid of the Bucyrus Company for a steam shovel.

The Baker Machine Company, San Diego, Cal., will shortly erect a new shop building.

J. H. Smith, formerly of Oroville, Cal., expects to start a new machine shop at Eureka, Cal.

According to a report from Honolulu, T. H., the Standard Oil Company is preparing to build a large distributing plant at that city, to handle the business of the islands in that part of the Pacific. In addition to several large steel tanks, a can factory and box factory are mentioned as part of the project.

Plans are being drawn for a two-story office building for the Union Gas Engine Company at its plant in Oakland, Cal. Several other improvements are contemplated. In addition to a large amount of smaller work, this company is building a 200 hp. engine for a steel boat for the Standard Oil Company, the hull of which is being built by the United Engineering Company.

The California Alfalfa Meal Milling Company has let contracts for a large mill at Corona, Cal.

The Northern California Power Company is working on a new development project, involving the increase from 4000 hp. to 7000 hp. capacity of its plant at Kilauea, Cal.

The town of Turlock, Cal., is investigating the expense of installing a municipal gas plant.

The Great Western Power Company has plans about complete for the installation of another unit in its large hydroelectric plant at Las Plumas, Cal., on Feather River. Four units are already in operation.

Frank Gurley, Mesa, Ariz., has placed an order with the United Iron Works, Los Angeles, for a 4-ton cold storage plant.

The California Eucalyptus Company has been negotiating with several towns in southern California for a site on which to erect a hardwood flooring plant, at a proposed expenditure of \$20,000.

The manager of the municipal lighting plant of Pasadena, Cal., states that a new unit and steam engine will soon be needed, the estimated cost being about \$30,000.

Some machinery of special design will probably be required this summer for the California Wine Association's plant at Winehaven, Cal. There has been some talk of putting in a machine cooperage shop, but it is not likely that this will be done.

Herbert E. Law, of San Francisco, whose name was prominently connected with the Western Steel Corporation, is connected with a new corporation, the American Safety Powder Company, with a capital stock of \$5,000,000, which proposes to start a large factory. Antioch, Cal., is mentioned as the proposed location.

The Eastern Sierra Milling Company is preparing to start a new flour mill near Bishop, Cal.

A large ore reduction plant is to be erected this summer at the Arctic mine, near Washington, Cal.

The Llewellyn Iron Works, Los Angeles, has a contract amounting to about \$50,000, for the installation of eight passenger elevators, freight and sidewalk elevators in a building at Fifth and Spring streets, that city.

The Bannon Engineering & Machine Company has taken the agency for the lines of the Climax Hoist Company and the Climax Machine Company, covering the Coast states, Nevada and Mexico.

The city of Oakland, Cal., will probably be in the market soon for a number of machines for street repair work.

Bids will be opened June 5 for a power plant and laundry machinery for the Los Angeles County farm.

The Winnemucca, Nev., Water & Light Company is preparing to erect a new plant, increasing the capacity of both departments.

Texas

AUSTIN, TEXAS, May 20, 1911

The demand for various kinds of machinery in Texas and the Southwest shows an increase. In New Mexico and Arizona a wonderful impetus is being given to the installation of irrigation pumping plants by the discovery that abundant supply of water may be obtained for the purpose by putting down shallow wells in many localities. An unusual briskness in the establishment of manufacturing plants is also noted.

W. P. Carmichael, of the Carmichael Construction Company, St. Louis, Mo., will submit a proposition to the City Commission of Austin for the reconstruction of the dam across the Colorado River and the installation of a hydroelectric plant. Grant Gornaday, president of the Midland Construction Company, Fort Scott, Kan., is also negotiating with the City Commission with the same object in view.

The Arkansas Fertilizer Company, Little Rock, Ark., contemplates establishing a fertilizer factory at some point in Texas.

The Kansas City Structural Steel & Iron Company has concluded the preliminary arrangements for the establishment of iron and steel works, to cost \$200,000, at Houston. The plant will employ about 250 men.

The Darbyshire-Harris Iron & Machine Company will make additions and improvements to its plant at El Paso at a cost of about \$1500.

Kohlberg Bros. have begun the erection of a cigar factory at El Paso to cost \$25,000.

The Commercial Club of Aransas Pass, Texas, is promoting the establishment of a canning factory here. W. H. Emery and others were appointed a committee to have charge of the matter.

The city of Brownsville is installing a water filter plant at a cost of \$20,000. Improvements to the electric light plant are being made. There will also be erected a new slaughter house, bonds having been voted for the purpose.

The City Council of New Braunfels, Texas, has adopted the preliminary plans of the W. K. Palmer Company, Kansas City, Mo., for the construction of a large reinforced concrete dam across the Guadalupe River near here. The proposed dam will be for the purpose of affording the initial power for operating a large hydroelectric plant which the city will install.

Dr. M. M. Scott, who recently purchased the town-site of Owens, near Brownwood, will make extensive improvements to the property, including the installation of public utility plants.

Important improvements are to be made upon the 200,000-acre ranch of Charles P. Taft of Cincinnati, upon which the town of Catarina is situated. Large systems of irrigation will be constructed, public utility plants installed here and large industrial plants established. Plans have also been adopted for the erection of a hotel to cost \$100,000.

The taxpayers, Yorktown, Texas, have voted \$6000 of bonds for extending the distributing system of the water works plant.

W. D. Ellis and associates will erect a broom factory at Berclair, Texas.

The Lake Charette Land & Irrigation Company has been formed with a capital stock of \$250,000 for the purpose of constructing a large system of irrigation near Springer, N. M. It is planned to reclaim about 10,000 acres. The incorporators are Woodford A. Matlock, of Denver, Col.; E. F. Bidwell, of Kinsley, Kan.; Amos L. Bennett, of Nickerson, Kan.; Merrick K. Edwards, of Denver; Charles F. Hortenstein and Charles E. Hartley, of Springer, and Edward Taylor, of Mullinville, Kan.

THE IRON AGE

Established
1855

New York, June 1, 1911

VOL. 87: No. 22

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
I. A. McKeel,	-	-	-	-	First Vice-President
Harold S. Buttenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park 'Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Some Steel Prices Reduced.....	1293
The Competition Rolled and Cast Material.....	1294
A Proposed Machinery Exposition	1295
An Unexpected Addition to the Free List.....	1295
The American Tobacco Decision.....	1296
Steel Prices Reduced.....	1296
American Society for Testing Materials.....	1297
The Iron, Steel & Heavy Hardware Association.....	1297
The American Iron and Steel Institute.....	1297
The Iron and Metal Markets.....	1298
Prices of Finished Iron and Steel f.o.b. Pittsburgh.....	1298
The Steel Corporation Investigation.....	1309
Iron and Industrial Stocks.....	1308
The American Society of Mechanical Engineers.....	1308
Republic Iron & Steel Company Operations.....	1308
Personal	1317
Obituary	1317
The Canadian Wire Rod Trade.....	1317
Coal Analysis by Consumers.....	1317
The Orient Coke Company.....	1317
The Salary Loan Evil.....	1318
Brown & Zortman Machinery Company Fire.....	1318
A Constitutional Compensation Law.....	1319
Titanium in Iron and Steel.....	1322
The Jamieson Coal & Coke Company.....	1324
Distributing Expense Burden.....	1325
Shipments from the Hill Mine.....	1326
A Special Centrifugal Blower.....	1327
The Growth of Cast Iron.....	1327
The Pittsburgh Foundry Conventions.....	1328
Electrically Driven Jarring Machine.....	1338
Exhibit of Roger-Brown & Co.....	1338
Gas Cavities and Shot in Iron Castings.....	1339
Core Bench Jolt Rammer.....	1340
A Swinging Frame Grinding Machine.....	1341
Steel Making Pig Iron in 1910.....	1341
Four New Foundry Machines.....	1342
Briquetting Metal Borings.....	1344
The American Museum of Safety Chartered.....	1346
Oil Fuel Burners in the Foundry.....	1346
The American Society of Engineer Draftsmen.....	1346
The Andrews Side Frame Patent Sustained.....	1347
A Four-Spindle Drilling Machine.....	1347
Manganese and Silicon.....	1348
Progress in Heated Foundry Mixers.....	1349
An Automatic Saw Sharpener.....	1350
Barthold Gerdau Visits this Country.....	1350
Roughing Tool for High-Speed Steel.....	1351
A New Self-Opening Die Head.....	1351
New Bullard Vertical Turret Lathe.....	1352
New Dry Blast Process Tested.....	1354
City Housing Problems to Be Considered.....	1355
The Nelson Valve Company's New Works.....	1356
The American Institute of Mining Engineers to Change Its Name	1361
Semi-Automatic Nut Tapper.....	1362
Customs Decisions.....	1362
The American High Duty Lathe.....	1363
High-Speed Saw with Automatic Stock Feed.....	1364
Jefferson Union Elbows.....	1365
More Burt Filters for the Gary Works.....	1365
An Unusual Stock of Swedish Steel.....	1365
The Machinery Markets	1366

Some Steel Prices Reduced

A Very Orderly Marking Down

No Wild Scramble for Orders

Those who hark back to the happenings of February, 1909, and expect a similar wild scramble for business among steel manufacturers to follow the events of the past week will very probably be disappointed. Conditions differ in many respects from those prevailing two years ago. Prices of steel products have not recently been as high by several dollars a ton as those prevailing in 1909 before the open market was declared. We are emerging gradually but surely from the shadow of disturbing influences outside of the steel trade. The two important anti-trust cases have been decided by the United States Supreme Court and large business interests are freed from that suspense. It is believed that railroad business is banking up by reason of the long period of enforced economy among railroad companies and that within a reasonable time buying in that direction will loosen. Congress cannot remain indefinitely in session with its agitation of the tariff question.

Revision in prices began last Wednesday, May 24, with the announcement by the Republic Iron & Steel Company that it proposed to act independently and would reduce steel bar prices \$3 per ton. The reduction was met by other leading steel bar manufacturers, and on Monday of this week a general meeting of steel manufacturers was held in this city at which prices of some other steel products were reduced for the purpose of adjusting them to some relation with the new steel bar prices. Steel billets and sheet bars were reduced \$2 per ton; structural shapes and plates \$1 per ton; light black and galvanized sheets \$4 per ton; heavy sheets \$2 per ton; no changes were made on wrought pipe, wire and tin plate. It is the opinion of leading steel manufacturers, expressed with force and evident confidence, that these reductions mark the limit of the downward movement in finished steel products.

As frequently happens when reductions are made, the new prices have not stimulated buying, but on the contrary appear to have checked it for the time being. Some contracting for steel bars was done last week by agricultural implement manufacturers and other large consumers, but the total, which is estimated at 100,000 tons, is much short of the quantity which should be under contract at this time. It is believed that at least a week or two must elapse for buyers to become convinced that no lower prices are now to be expected, but more normal buying conditions of business are confidently looked for by that time.

It is interesting to note in this connection that the activity in the pig iron market induced by price concessions on Southern and Virginia irons was short-lived. The recurrence to dullness is attributed by numerous pig iron sellers to the reduction in prices of steel products, which came at a critical moment when negotiations for considerable quantities of iron

were in progress. Pig iron buyers are now holding off to await more settled conditions. Basic pig iron has receded a little further and is now squarely at \$14. Pittsburgh, which is \$13.10 at Valley furnace.

It is somewhat encouraging to note that structural steel contracting was not seriously disturbed by the cut in steel bar prices last week. The volume of business was somewhat better than the average for the past few weeks, and it is stated that contracts which were pending when the steel bar action was announced were signed without hesitation by the parties interested. It is, of course, to be considered that prices on fabricated material have been relatively lower than on other steel products for some time.

Canadian buying in this country is said to have ceased because of the disturbance in steel prices, as consumers on that side of the border are, of course, inclined to take the same view of such occurrences as the domestic trade. Business with Canada has been very good for a long time, and it may be expected to develop greater activity as soon as it is seen that no further reductions occur. Some good business has been done for export by the United States Steel Products Company, which sold 8000 tons of 60-lb. rails to the New South Wales government, and 4000 tons of bridges to the Japanese government.

The copper trade is looking somewhat better, the past week having shown an increased volume of business, principally for exports, at slightly higher prices. Pig tin continues to rise, having now reached a higher price in London than at any time since the extraordinary upward movement in 1906-7.

Competition Between Rolled and Cast Material

It was a matter of frequent remark in the middle nineties that rolled steel was supplanting cast iron at innumerable points, and the inference was that ultimately the proportion of pig iron consumed in making iron castings would be relatively small. Such has not been the outcome. In 1898, a year of very heavy pig-iron production, about 30 per cent. of the total was in foundry grades, while in 1910 the proportion was approximately 25 per cent. These estimates do not take account of pig iron used for puddling purposes, but the tonnage involved in this direction is relatively small, and probably has not changed greatly. The slight decrease in the proportion of foundry iron means merely that, while steel production has grown very rapidly, iron founding has grown slightly less rapidly, for in the twelve years pig-iron production increased by more than 130 per cent.

The reason the expectations mentioned have not been fulfilled is that the field showing the greater progress has changed. In the nineties one of the lines in the iron and steel industry in which the greatest progress was made was that of rolling steel. In 1890 steel-rolling methods were primitive. Steel was being rolled much as iron had been rolled. It was perfectly natural that when steel came to supplant iron it should at first be rolled in a similar manner and with similar equipment. The puddle ball was small and its contents for from homogeneous. There was no possibility of continuous mills proving efficient, because a small ball could not produce a long piece. The rolling was difficult and no method but that of hand labor could cope with the vagaries of the material.

The advent of steel brought about new conditions and advantage was promptly taken of those conditions, whereby during the nineties the cost of rolling was

very greatly reduced. In *The Iron Age* of July 3, 1890, billets were quoted at \$30.50 per gross ton, Pittsburgh, wire rods at \$43 per ton and steel tank plate at 2.75 cents per pound. Steel bars were not quoted at all, but iron bars were quoted at 1.80 cents per pound and iron plates at 2.15 cents. The spreads between semi-finished and finished products were enormous, and it was the progress in rolling methods and equipment in the nineties which reduced them, whereby the average prices in 1898 were as follows: Billets, \$15.20; tank plate, 1.08 cents; steel bars, 0.95 cent; structural shapes, 1.17 cents. The spread between a gross ton of billets and a net ton of finished rolled material in 1890 ranged from perhaps \$15 to \$25; in 1898 the spreads were \$3.80 for bars, \$6.40 for plates and \$8.20 for structural shapes. In recent months the spread has averaged about the same as then.

The large plate mills of the present time appeared in the nineties, there having been no great improvement in the past decade. The continuous merchant bar mill appeared in the late nineties and was greatly improved in the early years of the following decade. The present structural mills were born in the nineties. Altogether that decade belongs largely to the finishing mills, whereby the spread in selling price between crude steel and the finished rolled product was greatly reduced. Quite naturally during that period the rapid decrease in the cost of finished rolled steel invited the extension of its use and prompted predictions that eventually the awkwardly made iron casting would find little vogue when such cheap rolled sections were available and could be adapted to so many purposes.

The art of iron founding made relatively little progress in the nineties, and the iron casting appeared to have little future when its great competitor, the rolled steel section, had made such wonderful progress. At the end of the nineties the production of an iron casting was still an expensive process, and it cost almost twice as much to produce two identical castings as it did to produce one. The position at the time may be illustrated by a prediction made in 1899 by a close observer. He had toured England and the Continent observing the vogue there of the steel casting, and returned to the United States with the conviction that the castings of the future, such tonnage as would be cast at all, would be of steel and not of iron. In 1899 and 1900 the production of steel in the United States exceeded 10,000,000 tons, while the production of steel castings was slightly under 2 per cent. of the total steel made. In 1910 the proportion of steel castings to total steel was slightly under 4 per cent. The prediction, then, was not borne out, but from one viewpoint it was made on a rational basis. The idea evidently was that it cost so much to change the unformed pig iron into an iron casting that one might as well use the much stronger material, steel, to start with. The prediction failed of realization partly because in the past decade the cost of changing the unformed pig iron into the finished casting has been greatly reduced. The weight of a casting cannot be reduced in direct ratio to the increase in tensile strength of the material, because one loses in stiffness; the stresses are not so well borne when the section is smaller.

As the decade of the nineties belonged largely to the operations of rolling steel, so the past decade has belonged largely to the foundry art. Tremendous progress has been made whereby the cost of producing castings in point of time and effort extended has been enormously reduced. Last week's foundry convention at Pittsburgh illustrated the progress of a single year,

but the progress of a decade is simply astonishing, for almost everything the foundry now has is the product of the decade.

The line of demarcation between the cast material and rolled material was not drawn at all twenty years ago; no one knew where it should lie. Ten years later the progress in steel rolling indicated a place where it should be drawn, but wrongly. To-day the two methods of fabrication have been fairly well tried out. Neither has reached perfection, but each has made great progress, and the line between the fields of the two forms of material is not likely to be shifted greatly in the future. The iron casting is here to stay. The steel casting may gain somewhat more rapidly than the iron casting or than rolled material, but every new application of it indicates afresh that it is a means for accomplishing particular results only.

The trends toward the use of certain materials as against other materials are the resultants of numerous forces. One influence of importance making for the permanence of the iron casting is that of the geographical origin of raw material. In the old days iron mills were scattered. Their scrap originated at various points, pig iron was produced over wider areas than now, and then as always nearness to markets was a factor. The day of the iron mill has been passing. Even though the steel plant, whether making castings or rolled product, uses large quantities of scrap, no one usually thinks of locating such a plant near a source of scrap supply, if the point is far from pig iron. The iron foundry is different. Many foundries are held in their present locations because there is a steady supply of scrap to be obtained cheaply, whereas it costs considerably to move it to the great centers of consumption. The old material must be utilized and in many cases the iron foundry furnishes the most desirable means.

A Proposed Machinery Exposition

The magnificent exposition of foundry equipment and machine tools, which was an important feature of the convention of the American Foundrymen's Association at Pittsburgh, last week, has led to a movement for an annual exhibition on a larger scale. Briefly stated, the idea is to bring together under a single roof all classes of equipment which enters into the machine shop as well as the foundry. The plan is merely in its incipency. Complications of meeting places, dependent upon available exhibition space, hotel accommodations and accessibility to the greatest number of interested persons, are yet to be considered. The foundrymen's exhibition is a large nucleus. The commercial success of the exhibitors last week, in the form of orders booked, will doubtless cause next year's exposition at Buffalo to be even larger, perhaps to the limit of hall capacity.

The machine tool builders are becoming more keenly alert to this opportunity. A large percentage of foundries are adjuncts to machine shops and factories, and association members are important buyers of machine tools as well as foundry equipment. The normal growth of the exhibition will undoubtedly be large, even if no attempt be made to create a greater enterprise.

In regard to suitable quarters for a general exposition, as associations increase in sizes they are compelled to confine their meeting places to large centers where accommodations are ample and good. The Master Mechanics and Car Builders afford a striking

illustration of this, for their conventions grew to such proportions that it became necessary to seek one permanent meeting place and Atlantic City was chosen.

In the general discussion of the proposed exposition the suggestion is made that other associations, such as the National Machine Tool Builders, the American Society of Mechanical Engineers and the Master Mechanics and Master Car Builders might be induced to arrange their meetings to be coincident in time and place with the exposition, or for succeeding weeks or days.

Undoubtedly many buyers of machinery who are not members of any association would be attracted by the opportunity to study new types of equipment which, in most cases, would be seen operating under commercial conditions. The tendency would be eventually to cover a still broader field of equipment, including manufacturing tools which enter into factories as distinguished from machine shops. Foreign houses might find it worth while to send representatives, availing themselves of an opportunity which would greatly simplify the quest for new ideas.

The objection may be raised by some of the men interested in directing association affairs that the exhibition would become so important a factor that it would detract from the interest in the meetings. Another criticism is that the exposition would become too large for a proper appreciation of its contents on the part of the visitors. However, there is attraction in any plan which would advance interest in the products of American shops.

An Unexpected Addition to the Free List

Every new tariff act furnishes surprises. Slight changes in phraseology from previous acts may be found to have an important bearing that had been completely overlooked even by those who carefully scrutinize bills and amendments as they are passing through the Ways and Means Committee or through Congress. When the completed act goes into effect, tests are made by importers all along the line, and here and there a loophole is discovered through which some foreign manufactured article can be brought into this country at a much lower rate of duty than had been expected by domestic manufacturers in the same branch of trade. An instance of this kind has just occurred which affects the manufacturers of lawn mowers. The Board of United States General Appraisers has decided that lawn mowers imported into this country from England are free of duty under paragraph 476 of the tariff act of 1909, which reads as follows:

Plows, tooth and disk harrows, harvesters, reapers, agricultural drills and planters, mowers, horserakes, cultivators, threshing machines, and cotton gins 15 per centum ad valorem; provided, that any of the foregoing, when imported from any country, dependency, province or colony which imposes no tax or duty on like articles imported from the United States, shall be imported free of duty.

No distinction is made by the appraisers between the smallest kind of a mower used by a gardener and the largest horse-drawn mowing machines used on farms. The term "mower" is held to apply to all such articles indiscriminately. As England imposes no duty on mowers when imported from this country, it is held that such mowers when imported from England are free. There are likely to be other surprises in the new tariff act as further opportunities develop for testing it.

Beating Down Machinery Prices

In times of keen competition for any business that may be in sight, the process known in the vernacular of salesmen as "sweating the bidders" is frequently employed by purchasing agents when placing large machinery orders. The process consists chiefly of playing one bidder against another in successive interviews, to get the original quotations lowered. An important manufacturer recently inquired for quotations on a machine of a certain type, and on the day the proposals were opened all the companies bidding were represented by their salesmen. The purchasing agent interviewed the salesmen one at a time, and after getting from each what was declared to be his lowest price told him to wait in an anteroom for the decision. Later he recalled a few of them, to whom he impressively said that the contract lay among them and would go to the one who could make the largest reduction in price. There was some hurried telegraphing, and in each case the home office wired a lower figure. The man who secured the contract admitted that his price was ridiculously low and that the job would result in little or no profit to his company.

Such buying methods are clearly reprehensible, and those who resort to sharp practices of this kind commit a serious offense against general business ethics. They lower the tone of commercial dealings. This occurrence brought about spirited price-cutting among sellers of a certain class of machinery and upset their confidence in each other. It would be difficult to suggest a preventive for such cases, but it may be said that the machinery maker who always quotes the lowest figure consistent with his business policy and sticks to it is not bothered by "sweating" tactics. He does not accept business at a sacrifice to keep it away from his competitors.

The American Tobacco Decision

Large Corporations Now Have a Rule of Procedure

The United States Supreme Court handed down its decision in the suit against the American Tobacco Company on Monday. The decision, which clarifies the situation even more than the Standard Oil decision, declares that the company has deliberately and willfully violated the Sherman anti-trust law and orders it to reorganize so as to bring itself within the law. Chief Justice White in discussing the remedy to be applied by the court, said it might be one of two things, either an injunction ordering its dissolution, and prohibiting it from doing any further interstate business; or the appointment of a receiver to take over its vast business and bring it within the law. Both of these remedies he dismissed upon consideration, chiefly because of the danger either would be almost certain to work upon innocent outsiders. Then he delivered the decree of the court, which points out the way in which the organization is to be effected. The decree consists of four points, as follows:

1. That the combination in and of itself as well as each and all of the elements composing it, whether corporate or individual, whether considered collectively or separately, be decreed to be in restraint of trade and an attempt to monopolize and a monopolization within the first and second sections of the anti-trust act.
2. That the court below, in order to give effective force to our decree in this regard, be directed to hear the parties, by evidence or otherwise, as it may be deemed proper, for the purpose of ascertaining and determining upon some plan or method of dissolving the combination and of recreating out of the elements now composing it a new condition which shall be honestly in harmony with and not repugnant to the law.
3. That for the accomplishment of these purposes, tak-

ing into view the difficulty of the situation, a period of six months is allowed from the receipt of our mandate, with leave, however, in the event, in the judgment of the court below, the necessities of the situation require, to extend such period to a further time not to exceed sixty days.

4. That, in the event before the expiration of the period thus fixed a condition of disintegration in harmony with the law is not brought about, either as the consequence of the action of the court in determining an issue on the subject or in accepting a plan agreed upon, it shall be the duty of the court, either by way of an injunction restraining the movement of the products of the combination in the channels of interstate or foreign commerce, or by the appointment of a receiver, to give effect to the requirements of the statute.

Thus the tobacco company gets eight months in which to complete a reorganization under the immediate supervision of the New York circuit court. It has full liberty to devise its own plan, but the plan must be satisfactory to the circuit court before it can be adopted, and the company has warning that if a satisfactory plan is not found within eight months there may be issued an injunction stopping all its interstate business or it may be thrown into the hands of a receiver.

Its new plan must be in full harmony with the law, but the circuit court is there to tell it just how to obtain that harmony. The contention of big business that there was nowhere under the government any agency that could tell it authoritatively what it could do under the law, and what it could not do, finds its answer here. There can be no question that the reorganization of this company will be taken as the model set up by the courts of the form in which big business may proceed without fear of being in violation of the law.

Steel Prices Reduced

The United States Steel Corporation, with its subsidiaries and practically all of the independent steel manufacturers of the country, decided on Monday, says the *New York Times*, to meet the cut in prices made last week by the Republic Iron & Steel Company. The chief product of the Republic Company is bars, and its reduction on that line was met last week by several of the subsidiaries and independents individually, including the Carnegie Steel Company. The trade was allowed to understand that this reduction from \$1.40 per 100 lb. to \$1.25 would be met in taking orders, but Monday's action went beyond that of the Republic Company by including other products than bars in the cut. It did not, however, affect rails, wire or tin plate.

It was at a conference at the Metropolitan Club, New York, that the decision to make this general reduction was reached. A luncheon given by Judge Elbert H. Gary, chairman of the United States Steel Corporation, began there at 1.30 and concluded at 5.30. It was attended by between 50 and 60 steel manufacturers. Judge Gary announced the result of the meeting as follows:

Representatives of the leading manufacturers of finished steel (except the Republic) met at luncheon at the Metropolitan Club to-day and existing conditions were fully discussed. It was the unanimous opinion that co-operation, as heretofore fully explained, should be continued.

Opinions were expressed that recent developments seem to require some changes in prices. Subsidiary companies of the United States Steel Corporation have decided to make adjustments to become effective June 1, and it is believed that these will be generally followed. The commodities affected, with the new prices, are as follows:

- Steel bars (15 cents per 100 lb. off), \$1.25 base.
- Plates and structural shapes (5 cents per 100 lb. off), \$1.35 base.
- Black sheets (20 cents per 100 lb. off), 2 cents per lb. for No. 28 gauge.
- Galvanized sheets, 3 cents per lb. for No. 28 gauge.
- Blue annealed sheets (10 cents per 100 lb. off), 1.50 cents per lb. for No. 10 gauge.
- Steel billets, 4 in. square and larger, \$21 per gross ton.
- Sheet bars, \$22 per gross ton.
- All free on board Pittsburgh, effective June 1, 1911, for shipment prior to Oct. 1.

Judge Gary said that he discussed conditions at length in his address at the meeting, but would add nothing to his formal statement at this time. His speech, he said, would be available for publication as soon as it was transcribed by the stenographers.

American Society for Testing Materials

Programme for the Annual Convention at Atlantic City,
June 27—July 1

The programme for the fourteenth annual meeting of the American Society for Testing Materials, to be held at Hotel Traymore, Atlantic City, N. J., June 27-July 1, is as follows:

FIRST SESSION—TUESDAY, June 27, 3 P. M.

Annual report of the executive committee.
Report of Committee A-3, on standard specifications for cast iron and finished castings. Walter Wood, chairman.
Report of Committee B-1, on standard specifications for hard drawn copper wire. J. A. Capp, chairman.
Report of Committee C-4, on standard specifications and tests for clay and cement sewer pipes. Rudolph Hering, chairman.
Report of Committee C-3, on standard specifications for paving and building brick. D. E. Douty, chairman.
Election of officers.
Miscellaneous business.

SECOND SESSION—TUESDAY, June 27, 8 P. M.

Annual address by the president, American Society for Testing Materials.
The manufacture of pure irons in open-hearth furnaces. Allerton S. Cushman.
Measured strains on engineering structures. James E. Howard.
A study of the heat treatment of some low-carbon nickel steels. Henry Fay and John M. Bierer.
Flue sheet cinders, cause of formation in locomotives. Robert Job.

THIRD SESSION—WEDNESDAY, June 28, 10 A. M.

ON STEEL.

Report of Committee A-1, on standard specifications for steel. William R. Webster, chairman.
Report of Committee A-4, on heat treatment of iron and steel. Henry M. Howe, chairman.
Grain-size, a function of both time and temperature. Henry M. Howe.
On the heat treatment of a nickel steel. Wm. Campbell and H. B. Allen.
A comparison of the properties of an acid and a basic open hearth steel of similar composition. Henry Fay.
Studies on steel tires. Robert Job and Milton L. Hersey.
Ductility in rail steel. P. H. Dudley.
The Afternoon of Wednesday, June 28, will be Reserved for General Recreation.

FOURTH SESSION—WEDNESDAY, June 28, 8 P. M.

ON PRESERVATIVE COATINGS.

Report of Committee D-1, on preservative coatings for structural materials. S. S. Voorhees, chairman.
Report of Committee A-5, on the corrosion of iron and steel. Allerton S. Cushman, chairman.
Further results of the Westinghouse, Church, Kerr & Co. paint tests. C. M. Chapman.
The value of the sulphuric acid corrosion test. C. M. Chapman.
The practical testing of drying and semi-drying paint oils. Henry A. Gardner.
A novel method of detecting resin oil and mineral oil in other oils. A. E. Outerbridge, Jr.

FIFTH SESSION—THURSDAY, JUNE 29, 10 A. M.

ON CEMENT AND CONCRETE.

Practical tests of sand and gravel proposed for use in concrete. Russell S. Greenman.
Some experiments on the incrustation and absorption of concrete. Abel O. Anderson.
The determination of stresses in a reinforced concrete member subject to axial load in flexure. S. Ingberg.
The expansion and contraction of concrete while hardening. Albert T. Goldbeck.
The properties of magnesium cement, mortars and concretes. C. Derleth, Jr., and A. C. Alvarez.
Disintegration of concrete. Alfred H. White.
The effect of high-pressure steam on the crushing strength of concrete. Rudolph J. Wig.

SIXTH SESSION—THURSDAY, JUNE 29, 3 P. M.

ON STEEL.

Report of Committee A-7, on the tempering and testing of steel springs and standard specifications for spring steel. Henry Souther, chairman.
Hardness tests. Bradley Stoughton and J. S. Macgregor.
Hardness in its relation to other physical properties. D. E. Douty.
A comparison of five methods of hardness measurement. D. E. Douty.
The property of hardness in metals and materials. Albert F. Shore.
Strength of steel from structural shapes. E. L. Hancock.
Recent developments in testing of boiler tubes. F. N. Speller.
The Evening of Thursday, June 29, will be Reserved for a Musical Smoker.

SEVENTH SESSION—FRIDAY, JUNE 30, 10 A. M.

ON BITUMENS, ETC.

Report of Committee D-4, on standard tests for road materials. L. W. Page, chairman.
A new consistometer for use in testing bituminous road materials. W. W. Crosby.
Improved instruments for the physical testing of bituminous materials—Paper III. Herbert Abraham.
A proposed method of testing the melting point and softening point of compounds. Henry W. Fisher.
Organic residues from soluble bitumen determinations. Prévost Hubbard and C. S. Reeve.

EIGHTH SESSION—FRIDAY, JUNE 30, 3 P. M.

ON TESTING APPARATUS AND METHODS.

Standard methods for testing sewer pipe and drain tile. A. Marsten.
Report of Committee A-6, on the magnetic testing of iron and steel. Charles W. Burrows, chairman.
A new method of testing the endurance of case-hardened gears and pinions. J. S. Macgregor and Bradley Stoughton.
New types of impact testing machines for determining fragility of metals. T. Y. Olsen.
A new type of autographic transverse testing machine for research testing or regular foundry practice. T. Y. Olsen.

The Evening of Friday, June 30, will be Reserved for Recreation.

NINTH SESSION—SATURDAY, JULY 1, 10 A. M.

MISCELLANEOUS.

The Fritz Engineering Laboratory of Lehigh University. Frank P. McKibben.
The variation of tensile strength with the percentage of carbon in iron carbon alloys. C. R. Jones.
The effect of copper in iron on the acid corrosion test. W. H. Walker.
Recent analyses of tests on structural timbers made by the forest service. McGarvey Cline.
The Brinell ball test applied to wood. W. K. Hatt.
Notes on anti-friction alloys. Wm. Campbell.
Some further experiments upon the absorption, porosity and specific gravity of building brick. D. E. Douty and L. L. Beebe.

The Iron, Steel & Heavy Hardware Association

The second convention of the American Iron, Steel & Heavy Hardware Association was held in Detroit May 24-26. E. P. Sanderson, Boston, the first vice-president, presided in the absence of President E. D. Kimball. E. F. Yarnelle, Mossman, Yarnelle & Co., Ft. Wayne, Ind., was appointed secretary by the executive committee and will devote his entire time to the work of the association, traveling in the interests of the heavy hardware trade.

At the opening session Thursday afternoon George C. McMaster, Mutual Wheel Company, Moline, Ill., read an interesting paper on the relationship of the jobber and manufacturer. He criticised the selling of goods by manufacturers to small dealers who are not jobbers in reality, and urged that manufacturers carefully scrutinize all accounts to ascertain if such customers are rightfully entitled to jobbers' prices. He objected to the manner in which the steel business is handled, saying, "The market price of steel is always public, and anyone that buys a carload gets the same price as the jobber. This is very unfair to the jobber who carries a good stock of steel on hand."

J. A. Gregg, Nicols, Dean & Gregg, St. Paul, Minn., read a paper on the "Effect of the Automobile on the Heavy Hardware Trade and How to Meet It." He pointed out that, in spite of the advent of the automobile, in 1910 there was one horse to every four persons in this country, as against one horse to every six persons in 1900, and that the horseshoe manufacturers report an increase in business amounting to 55 per cent. in these 10 years. At the same time there has been no curtailment in the sale of wagons and buggies.

George E. Enos, Buffalo, presented a paper on "The Position of the Jobber in Regard to Specialty Salesmen," and W. E. Bittenbender one on "The Cost of Doing Business."

Boston was selected as the place for the next meeting, and it was decided to consider San Francisco for the 1915 convention.

These officers were elected: President, E. P. Sanderson, Boston; first vice-president, Charles E. Faeth, Kansas City, Mo.; second vice-president, H. E. Treadway, Dubuque, Iowa; secretary, E. F. Yarnelle, Ft. Wayne, Ind. Executive committee—Charles E. Faeth, Kansas City, Mo., chairman; J. Henry Ruwe, Brooklyn, N. Y.; A. C. Dietrich, Baltimore, Md.; J. A. Gregg, St. Paul, Minn.; C. M. Roehm, Detroit, Mich.; E. W. A. Waterhouse, San Francisco.

The American Iron and Steel Institute

At the meeting of the American Iron and Steel Institute, held in New York City last week, the old board of officers was re-elected, as follows: President, E. H. Gary; first vice-president, Powell Stackhouse; second vice-president, Willis L. King; third vice-president, Charles M. Schwab; treasurer, Edward Bailey; secretary, James T. McCleary. The committee on welfare work reported that it had engaged Dr. Thomas Darlington, for six years health commissioner of New York City, to have immediate charge of this work.

The Ohio Machine Tool Company, Kenton, Ohio, has been purchased by the controlling interests of the Cleveland Punch & Shear Works Company, Cleveland, and C. C. Swift, secretary and treasurer of the latter concern, has located at Kenton and will be in charge of the plant. The familiar line of planers and sharpeners will continue to be manufactured and in addition larger sizes of planers up to 60 in. will be placed on the market in the near future.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.
PIG IRON, Per Gross Ton:

	May 31 1911.	May 24 1911.	Apl. 26 1911.	May 25 1910.
Foundry No. 2, Standard, Phila- delphia	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Valley Furnace	13.75	13.75	13.75	15.00
Foundry No. 2 Southern, Cin- cinnati	13.75	13.75	14.25	14.75
Foundry No. 2, Birmingham, Ala.	10.50	10.50	11.00	11.50
Foundry No. 2 local, at furnace, Chicago*	15.00	15.00	15.00	17.00
Basic, delivered, eastern Pa....	14.50	14.50	15.00	16.25
Basic, Valley furnace.....	13.70	13.25	13.75	15.00
Bessemer, Pittsburgh.....	15.90	15.90	15.90	16.90
Gray forge, Pittsburgh.....	14.15	14.15	14.40	15.90
Lake Superior charcoal, Chicago	17.00	17.00	17.50	18.50

COKE, CONNELLSVILLE,

Per Net Ton, at oven:				
Furnace coke, prompt shipment	1.45	1.45	1.55	1.70
Furnace coke, future delivery..	1.75	1.75	1.75	1.80
Foundry coke, prompt shipment	1.75	1.75	2.00	2.25
Foundry coke, future delivery..	2.00	2.00	2.20	2.40

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	21.00	23.00	23.00	25.50
Forging billets, Pittsburgh.....	26.00	28.00	28.00	31.00
Open hearth billets, Philadelphia	23.40	25.40	25.40	29.00
Wire rods, Pittsburgh.....	29.00	29.00	29.00	32.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.50	14.50	14.25	17.50
Iron rails, Philadelphia.....	16.75	16.75	17.00	20.00
Car wheels, Chicago.....	12.75	12.75	13.25	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	15.00
Heavy steel scrap, Pittsburgh...	13.00	13.00	12.50	15.25
Heavy steel scrap, Chicago....	10.25	10.25	11.50	13.50
Heavy steel scrap, Philadelphia	13.00	13.00	13.00	14.50

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.27	1.27	1.32½	1.52½
Common iron bars, Chicago....	1.20	1.22	1.25	1.47½
Common iron bars, Pittsburgh...	1.25	1.30	1.35	1.55
Steel bars, tidewater, New York	1.41	1.56	1.56	1.61
Steel bars, Pittsburgh.....	1.25	1.40	1.40	1.45
Tank plates, tidewater, New York	1.51	1.56	1.36	1.66
Tank plates, Pittsburgh.....	1.35	1.40	1.40	1.50
Beams, tidewater, New York...	1.51	1.56	1.56	1.66
Beams, Pittsburgh	1.35	1.40	1.40	1.50
Angles, tidewater, New York...	1.51	1.56	1.56	1.66
Angles, Pittsburgh	1.35	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh.	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.20	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.80
Cut nails, Pittsburgh.....	1.60	1.60	1.65	1.80
Barb wire, galvanized, Pittsburgh†	4.10	2.10	2.10	2.10

METALS,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.15	12.37½	12.37½	13.00
Electrolytic copper, New York...	12.25	12.12½	12.12½	12.87½
Spelter, New York.....	5.50	5.50	5.50	5.80
Spelter, St. Louis.....	5.20	5.20	5.30	5.15
Lead, New York.....	4.37½	4.37½	4.42½	4.37½
Lead, St. Louis.....	4.22½	4.22½	4.27½	4.22½
Tin, New York.....	45.50	44.60	42.50	33.25
Antimony, Hallett, New York...	8.95	9.00	9.00	8.12½
Tin plate, 100 lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

* The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.; angles 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c.,

net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; zeeks, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thin nest edge	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3-ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	
TERMS —Net cash 30 days.	

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.45c.; Nos. 9 and 10, 1.55c.; Nos. 11 and 12, 1.60c.; Nos. 13 and 14, 1.65c.; Nos. 15 and 16, 1.75c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Painted roofing sheets, No. 28, \$1.40 per square. Galvanized sheets, No. 28, \$2.55 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	49	43
½ in.....	75	63	71	59
¾ to 1½ in.....	79	69	75	65
2 to 3 in.....	80	70	76	66
Lap Weld.				
2 in.....	76	66	72	62
2½ to 4 in.....	78	68	74	64
4½ to 6 in.....	77	67	73	63
7 to 12 in.....	75	59	71	55
13 to 15 in.....	15½			
Butt Weld, extra strong, plain ends, card weight.	69	59	65	55
½, ¾, 1 in.....	74	68	70	64
1 to 1½ in.....	78	72	74	68
¾ to 1½ in.....	79	73	75	69
2 to 3 in.....				
Lap Weld, extra strong, plain ends, card weight.				
2 in.....	75	69	71	65
2½ to 4 in.....	77	71	73	67
4½ to 6 in.....	76	70	72	66
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.....	64	58	60	54
¾ to 1½ in.....	67	61	63	57
2 to 3 in.....	69	63	65	59

THE IRON AND METAL MARKETS

Lap Weld, double extra strong, plain ends, card weight.			
2 in.	65	59	61 55
2½ to 4 in.	67	61	63 57
4½ to 6 in.	66	60	62 56
7 to 8 in.	59	49	55 45
Plugged and Reamed.			
1 to 1½, 2 to 3 in.	Butt Weld { Will be sold at two (2) points lower basing (higher price) than merchants or card weight pipe. Butt or lap weld, as specified.		
2, 2½ to 4 in.	Lap Weld {		

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1½ to 2½ in.	Steel. 65
2½ in.	67½
2½ to 3½ in.	70
3½ to 4½ in.	72½
5 to 6 in.	65
7 to 13 in.	62½
Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

		Fence Wire, Per 100 Lb.						
		0 to 9	10	11	12 & 12½	13	14	15 16
Annealed	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.50	2.90
Margot and Stone Wire in Bundles, Discount from Standard List.								
Bright and Annealed:								
9 and coarser. ....								.80
10 to 18. ....							.80 and 10	and 10
19 to 26. ....							.80 and 10	and 2½
27 to 36. ....							.80 and 10	and 5
Galvanized:								
9 and coarser. ....							.75 and 10	
10 to 16. ....							.75 and 10	
17 to 26. ....							.72½ and 10	
27 to 36. ....							.72½	
Coppered or Liquor Finished:								
9 and coarser. ....							.75 and 10	
10 to 26. ....							.75 and 10	
27 to 36. ....							.70 and 10	and 5
Tinned:								
6 to 18. ....							.75 and 10	and 10

Pittsburgh

PARK BUILDING, May 31, 1911.—(By Telephone.)

Pig Iron.—The market is very dull and there is no large inquiry. It is not believed that the reduction in prices made on Monday on some forms of finished iron and steel will be reflected in pig iron, prices on which have been low for some time, with possibly the exception of Bessemer, which has simply been held by main strength at \$15, Valley furnace, for some months. The local situation in basic iron is being disturbed by some scrap dealers who are getting such iron in exchange for scrap and then offering the iron in the open market at lower prices than the furnaces will name. There is nothing doing in Bessemer or foundry iron. We quote as follows: Bessemer pig iron, \$15 nominally; malleable Bessemer, \$13.50; basic, \$13.10; No. 2 foundry, \$13.50; gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—The cut of \$2 a ton in prices of billets and sheet bars may possibly stir up some new business, but it is too early yet to determine whether consumers that are not covered by regular contracts will take hold and place orders at the new prices, which are as follows: Bessemer and open-hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1½-in. billets, \$22; forging billets, \$26, base, usual extras for sizes and carbons—all prices, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Whether the lower prices made on Monday at the steel meeting in New York will bring out the long-desired new orders and held up specifications in any large volume remains to be seen, but at the moment this seems doubtful. When the cut of \$3 a ton was made in steel bars by the Republic Iron & Steel Company, May 24, there was no wild scramble on the part of con-

sumers to cover, and, while the leading steel bar interests sold a fair tonnage of steel bars to the implement makers and wagon builders for delivery over the year commencing July 1, it is claimed the actual quantity sold on contracts did not reach 100,000 tons and was probably under that figure. For some months, plain material and plates had been sold by some mills at 1.35c. or below, prices on black and galvanized and also on roofing sheets have been shaded anywhere from \$2 to \$4 a ton, while on open-hearth billets and sheet bars regular prices have been shaded by some mills from \$1.50 to \$2 a ton. It is evidently the determination of the Steel Corporation and the other large steel interests to hold the market if possible, but it is not believed the lower prices will be immediately attractive to consumers. It is understood that on contracts placed for steel bars at 1.25c. a guarantee against decline in price was given to apply on unshipped portions of any contracts. What effect the new prices on finished iron and steel will have on pig iron remains to be seen, but will probably result in still lower prices on basic and Bessemer iron. In the past week basic iron has sold on the basis of \$13.10, Valley, or \$14, Pittsburgh. Bessemer iron is still held nominally by the furnaces at \$15, but there have been no sales in this market at that price for some months. Malleable Bessemer, foundry and gray forge are also weak. For a long time very little new business has been offered in steel billets or sheet bars, and in fact there has not been enough new business to test prices, practically all consumers, large or small, being covered by contracts. It is a notable fact that prices on tin plate, pipe and wire products have not been disturbed. In the case of tin plate, consumers are pretty well covered through third quarter, and some over remainder of the year. In pipe, prices have been regarded as low for a long time, the heavy cut of several years ago of \$12 a ton, only \$2 of which has since been restored, put the price of pipe on a low basis and it was felt that no cut in prices of pipe was necessary. In wire nails, the situation is more easily controlled, and, as buying is pretty well over for the next three of four months, a reduction in price would not have stimulated demand and would have been useless. The scrap trade is showing a little betterment in demand, but coke is dull and neglected with prices ruling low.

Ferromanganese.—Reports are that the Middletown, Ohio, steel interest has bought 3000 tons of foreign 80 per cent. ferro for delivery over second half of the year at about \$36.50, Baltimore. We also quote a sale of two cars, or about 60 tons, to a local consumer for June and July delivery at the same price. We quote 80 per cent. foreign ferro at \$36.50 to \$36.75, Baltimore, with a freight rate of \$1.95 a ton for delivery in the Pittsburgh district.

Ferrosilicon.—A contract is reported to have been closed with a local consumer for upwards of 250 tons of 50 per cent., for delivery over second half at about \$52, Pittsburgh. New inquiry is light, most consumers being covered. We quote 50 per cent. at \$52 to \$53, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—The market is dull and neglected, and we continue to quote best grades of muck bar made from all pig iron at nominally \$28.50 to \$29, Pittsburgh.

Skelp.—A sale of 1500 tons of grooved steel skelp for June and July delivery is reported on the basis of about 1.27½c., Pittsburgh. We quote grooved steel skelp, 1.27½c. to 1.30c.; sheared steel skelp, 1.32½c. to 1.35c.; grooved iron skelp, 1.55c. to 1.60c., and sheared iron skelp, 1.65c. to 1.70c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The dull condition of the wire trade is reflected in wire rods, new inquiry for which is very dull. We quote Bessemer, open-hearth and chain rods at \$29, Pittsburgh, but on a firm offer this price might be shaded.

Steel Rails.—The largest contract for standard sections taken by the Carnegie Steel Company in the past week was one for 2000 tons, but it entered other smaller orders and also some contracts for foreign shipment. The concern also received orders and specifications in the past week for about 3000 tons of light rails. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

THE IRON AND METAL MARKETS

Structural Material.—No important business has been placed in the past week, the trade waiting for the result of the steel meeting held in New York on Monday, at which prices on plain material were reduced \$1 a ton. The cut of \$3 a ton in steel bars last week puts the price on small angles under 3-in. at 1.25c. The John Eichleay, Jr., Company has taken a small asphalt plant, about 100 tons, and a city pumping station about 150 tons. We now quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Plates.—All new orders for plates were held up in the past week, waiting for the action at the steel meeting, at which prices were reduced \$1 a ton. This lower price of 1.35c., is the figure at which plates have been selling by some mills on narrow sizes for some time. No orders for steel cars were placed in the past week, and there is only one important inquiry in the market, this being from the Queen & Crescent, which is taking bids for 1000 steel cars. We quote tank plates ¼ in. and heavier at 1.35c., Pittsburgh.

Sheets.—The sheet trade has been in very unsatisfactory condition for some time, new orders and specifications having been steadily decreasing, while cutting in prices has been more pronounced. The reduction of \$4 a ton in black and galvanized sheets, and \$1 a ton in blue annealed sheets, puts the market at a level of values that it is believed does not allow any further cutting in prices, especially by sheet mills that have to buy their sheet bars. It is hoped the reduction in prices will stimulate new demand, which has been very dull for some time. The new prices on black and galvanized, and also on roofing sheets, are given on a previous page.

Tin Plate.—The present season is always the duller in the tin plate trade of the whole year as regards new buying, but specifications against new contracts from the can makers have been coming in quite freely for the past two or three weeks. No change in prices of tin plate was made at the steel meeting on Monday, as it was realized that the buying season is over and any reduction in prices would not stimulate new demand, but would only disturb present contracts. Most consumers of tin plate are covered into second and third quarters of the year, and in some cases over the entire year. It is estimated that only from 65 to 70 per cent. of tin plate capacity is active at present. We quote 100-lb. coke plates for delivery over balance of the year at \$3.70 per base box f.o.b. Pittsburgh.

Bars.—Last week the Republic Iron & Steel Company announced independently a cut of \$3 a ton in prices of steel bars, or from 1.40c. to 1.25c., base. This price was at once met by the other large steel bar makers, but so far has resulted in only a comparatively small amount of new business being placed, estimated at not over 100,000 tons in all, and on which prices have been guaranteed against decline. It is not believed the implement makers and wagon builders will take hold very vigorously in the matter of placing new contracts until fully assured that the market will not go below 1.25c., which is the situation at present. We quote soft steel bars rolled from billets at 1.25c., and common iron bars at 1.25c. to 1.30c. f.o.b. Pittsburgh. This reduction in price of steel bars will no doubt result in the leading steel bar mills that sign the Amalgamated scale, in asking a lower wage scale for puddling and heating for the year beginning July 1. A conference between the steel and iron bar mills and the Amalgamated Association on the new wage scales is to be held in Cambridge Springs next week.

Shafting.—In view of the reductions in prices on other forms of finished iron and steel, it is probable the makers of shafting will announce a reduction in discounts at an early date. New business is very light, and specifications against contracts are unsatisfactory. The present discounts on cold rolled steel shafting are 57 per cent. off in carloads, and 52 per cent. in less than carloads, delivered in base territory, but these discounts have been more or less shaded for some time.

Spelter.—The market is dull and weak, and very few new orders are being placed. We quote prime grades of Western spelter at 5.17½c., East St. Louis, equal to 5.30c., Pittsburgh.

Hoops and Bands.—There is very little new demand, being only for small lots, and specifications against contracts have been light for some time. Hoop prices are continued on the basis of 1.45c., but band prices have been reduced to 1.25c., base, to conform to the new steel bar price, taking extras as per steel bar card.

Merchant Steel.—New orders and specifications entered by the mills in May showed a decided falling off as compared with April. The lower prices on other finished forms of iron and steel will probably mean a revision of prices to a lower basis on the different grades of merchant steel. Nominal prices in effect are as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—As noted in this report last week, there is a good deal of new inquiry in the market for rivets, but orders were held up waiting the result of the steel meeting in New York on May 29. Regular prices on structural rivets remain at 1.90c., and on boiler rivets at 2c., but actual prices on structural rivets are about 1.75c., and on boiler rivets 1.80c. in large lots, and these prices are sometimes shaded on desirable orders.

Wire Products.—No reductions in prices of wire products were made at the steel meeting, no doubt for the reason that new buying for this season is pretty well over and a reduction in prices would not have stimulated new business, but on the contrary, would have seriously disturbed present contracts on books of the mills on all of which the regular price of \$1.80 on wire nails will be charged on all shipments on and after June 1. New demand for wire and wire nails is very dull, and only for small lots and specifications against contracts continue very unsatisfactory. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—As yet the reduction in prices on other finished forms of iron and steel have not extended to spikes, which remain at \$1.50 base, Pittsburgh, with the usual extras for odd sizes. New demand is light, and there are no large inquiries in the market.

Merchant Pipe.—No reductions in prices on iron and steel pipe were made at the steel meeting, nor was it expected that any lower prices would be made. On February 19, 1909, new discounts on merchant pipe were issued by the leading mills, showing reductions in prices of \$8 to \$12 a ton on the various sizes. So far only \$2 a ton of this reduction has been restored, so that it can be said that prices on pipe are reasonably low, and new demand would not have been stimulated by a further reduction. A fair amount of new business is being placed in merchant pipe right along, and actual orders received by the mills in May show a slight increase over April. No important contracts for line pipe were placed in the past week, but several large jobs are being figured on, one for piping natural gas from the West Virginia gas fields to Detroit, Mich., requiring a very large tonnage of pipe, and which may be placed at any time.

Boiler Tubes.—The boiler tube trade is very dull, new demand being light, and specifications against contracts unsatisfactory. It is stated that discounts on both iron and steel boiler tubes are being more or less shaded.

Coke.—There is no improvement in coke either in demand or prices. Most of the blast furnace interests are covered by contract, while several consumers of furnace coke that are not covered are buying from hand to mouth. The output of coke is being steadily decreased and is now smaller than at any time for the past several years. The output of the Upper and Lower Connellsville regions last week was 273,108 tons, a decrease over the previous week of 5000 tons. We quote standard makes of furnace coke for June shipment at \$1.50 to \$1.55 per net ton at oven, and for delivery over the second half of the year at \$1.75 to \$1.85. We quote standard makes of 72-hour foundry coke at \$1.75 to \$1.90 for June shipment, and from \$2.10 up to \$2.40 to consumers, per net ton at oven, for delivery over the second half of the year. Some makes of both furnace and foundry coke have sold for prompt shipment at somewhat under the above prices.

Iron and Steel Scrap.—The recent flurry in scrap seems to be pretty well over, and new buying has quieted down. The reductions in prices on finished iron and steel products, which may extend also to pig iron, will no doubt be felt in scrap, and will probably prevent for the time being at least any advance in prices. New buying by consumers is light, and no important sales of scrap have been made in the past week. Deal-

THE IRON AND METAL MARKETS

ers are quoting, per gross ton, Pittsburgh, about as follows:

Heavy steel scrap, Steubenville, Follansbee, Sharon Monessen and Pittsburgh delivery.....	\$13.00 to \$13.25
No. 1 foundry cast.....	13.50 to 13.75
No. 2 foundry cast.....	12.50 to 12.75
Bundled sheet scrap, at point of shipment.....	9.75 to 10.00
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	13.50 to 13.75
No. 1 railroad malleable stock.....	12.00 to 12.00
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.50 to 16.75
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
No. 1 bushing scrap.....	12.00 to 12.25
No. 2 bushing scrap.....	8.50 to 8.75
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	9.00 to 9.15
*Machine shop turnings.....	9.15 to 9.25
Old iron rails.....	15.00 to 15.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.25 to 10.50
Stove plate.....	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, May 29, 1911.

Pig Iron.—The recent cut in the price of steel bars has unsettled conditions and some of the pig iron inquiries of last week have been withdrawn. Southern iron is being sold in this district at \$10.50, Birmingham, for No. 2 Southern. Such quotations have become common for third quarter delivery. Buyers are asking for this price on fourth quarter and first quarter deliveries, but there is an indisposition on the part of some furnaces to make such quotation on later deliveries. Under the stimulus of price reductions several sales of Lake Superior charcoal have been made. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace:

Lake Superior charcoal.....	\$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	15.35
Southern coke, No. 2 foundry and No. 2 soft.....	14.85
Southern coke, No. 3.....	14.00
Southern coke, No. 4.....	14.35
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.50
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

Structural Material.—This has been one of the most active years in building structurals in the Chicago territory and the tonnage of steel consumed in such work has been enormous. The Mellers building, Chicago, is the largest letting this week, adding materially to the already enormous tonnage consumed by Chicago buildings this year. The contract for this building was awarded to the Hansell-Elcock Company and the South Halsted Street Iron Works, both of Chicago, and the building will consume 4000 tons of material. Other contracts awarded include the steel work for remodeling Section No. 55, Western Electric Company's building at Hawthorne, Ill., 363 tons, Vierling Steel Company, Chicago; post office building, Roswell, N. M., 104 tons; crane runway for Haskell-Barker Car Company, Michigan City, Ind., 160 tons, let to Lackawanna Bridge Company; producer building for reheating furnaces, Minnesota Steel Company, New Duluth, Minn., 200 tons, let to American Bridge Company; Hamilton Club building, Chicago, 1178 tons, let to Toledo Bridge & Crane Company; bridge to carry pipe line across Nisqually River, Tacoma, Wash., 274 tons, let to American Bridge Company; Escanaba & Lake Superior Railroad Company, bridge, 100 tons; reheating furnace building and billet storage, Minnesota Steel Company, New Duluth, Minn., 550 tons, let to American Bridge Company. We quote plain material from mill at 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Rails and Track Supplies.—Specifications against standing contracts have been very good this week and the leading interest has sold 10,000 tons standard sections. A large tonnage of standard sections is afloat and probably will be closed in the near future. Light rails business is very satisfactory and track supplies are

holding up well. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c., Chicago.

Plates.—Plate mills are running at little less than two-thirds capacity with but a comparatively small amount of business in sight. The Cincinnati, New Orleans & Texas railway has placed an order for 1000 cars with the American Car & Foundry Company. Principal producers are maintaining Chicago mill prices at 1.58c. to 1.63c.; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—Extreme quietness is affecting the entire sheet market. Mills are operating at about 50 per cent. of their capacity, with practically no business booked ahead. There is a further tendency of price weakening, accelerated by the reduction in the price of steel bars. Store sales are extremely quiet, and purchasers of all kinds are very evidently sailing close to the wind. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Stimulated by a reduction in the price of soft steel bars, business has been better in this line. Some buyers had anticipated this reduction and are now placing orders quite freely. The Republic Iron & Steel Company, a strong factor in the bar trade of this territory, was first to make the reduction, but was quickly followed by other mills. We quote as follows: f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.22½c. to 1.27½c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Billets.—Practically all the billet business that is being closed in this market is for carload lots evidently going into immediate consumption. The recent price reduction in some of the finished products has led prospective buyers into the belief that lower figures will soon be named on billets. Most business being closed in this market is at prices ranging from \$28 to \$30.60, base, Chicago, on open hearth forging billets. Lower prices are known to have been made but it is presumed that the billets in such transactions were a little off color. We continue to quote \$25.60, base, Chicago, on re-rolling billets. The leading interest is maintaining its price of \$30.60, base, Chicago on open hearth forging billets.

Wire Products.—Barb and fence wire are leading the list of active items in wire products. The sale of barb wire and woven fencing is holding up remarkably well as the season advances. Mills have gained upon orders until now they are making prompt shipments. Prices are unchanged as follows: Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast-Iron Pipe.—Inquiry for various kinds of cast-iron pipe has been fairly free during the week and specifications against contracts have been good. There has been practically nothing doing in the way of railroad purchases, although numerous needs of this nature are known to exist. Municipal buying has been very satisfactory. Among the principal purchasers were Bay City, Mich., 300 tons; La Crosse, Wis., 1200 tons, and St. Louis, Mo., 3000 tons, this business having been closed by the principal producer. Gas business is very fair for this season. Prices are firm as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—The Chicago scrap market has been extremely quiet. Prices are practically unchanged. The Illinois Central Railroad is out with a new scrap list, approximating 4000 tons, which closes July 1. The reduction in the price of bars is reported to have resulted in desirable business with important agricultural manufacturers, and as the inactivity of the scrap market the past few weeks has been largely due to the lack of business at bar mills, this may be taken as a favorable development. Prices below are for delivery to buyers' works, all freight and transfer charges paid, per gross ton:

THE IRON AND METAL MARKETS

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	12.25 to 12.75
Old steel rails, less than 3 ft.....	11.25 to 11.75
Rerolling rails, standard size.....	3.00 to 3.40
Old car wheels.....	12.75 to 13.25
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.50 to 11.00
Shoveling steel.....	10.00 to 10.50
Steel axle turnings.....	8.50 to 9.00
The following quotations are per net ton:	
Iron angles and splice bars.....	\$12.25 to \$12.75
Iron arch bars and transoms.....	13.50 to 14.00
Steel angle bars.....	10.50 to 11.00
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	10.00 to 10.50
Locomotive tires, smooth.....	17.00 to 17.50
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.75 to 11.25
Stove plate and light cast scrap.....	9.25 to 9.75
Railroad malleable.....	10.25 to 10.75
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, May 30, 1911.

Iron Ore.—Following the sale of 400,000 tons of non-Bessemer ore last week by a Cleveland firm that does not adhere to regular quotations and disposed of this tonnage at slightly below regular prices the market has been extremely quiet. No sales or inquiries for tonnages of any size are reported. The inquiry of the Bethlehem Steel Company has not yet resulted in the placing of any contracts and it hardly seems probable that this company and the lake ore firms will get together on prices. Because of the light demand for ore operations in the Lake Superior district are being curtailed heavily and no work is being done in some of the open pit properties. While a large number of lake boats have not yet been placed in commission, it is believed that there is enough vessel tonnage fitted out to move all of the ore that will be brought down this season. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—One local selling agency reports considerable improvement in the demand for foundry and malleable iron for shipment to Michigan and Indiana points, having during the week made several sales, the largest being for about 1000 tons. These sales were for the last half delivery. The market in this territory continues extremely dull. There is some demand for small lots of foundry iron for spot shipment, but there is practically no buying for last half requirements. Furnaces are adhering to recent quotation of \$13.75 to \$14, Cleveland and Valley furnace, for No. 2 foundry for the last half. There have been no inquiries large enough to test the market, however, since the reduction in ore prices. Southern iron is offered at \$10.50, Birmingham, for prompt shipment, but \$11 is being generally asked for the last half delivery. For early delivery we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Basic	14.00
Northern foundry, No. 2.....	14.25
Gray forge	13.50
Southern foundry, No. 2.....	\$14.85 to 15.10
Jackson Co. silvery, 8 per cent. silicon.....	17.75 to 18.00

Coke.—The only demand is for small lots of foundry grades for prompt shipment. Prices remain stationary. We quote standard Connellsville furnace coke at \$1.45 to \$1.55, per net ton at oven, for prompt shipment, and \$1.75 to \$1.85 for the last half. Connellsville 72-hour foundry coke is quoted at \$1.75 to \$2 for prompt shipment and \$2 to \$2.40 for the last half.

Finished Iron and Steel.—The uncertainty regarding prices that followed the reduction of the price of steel bars last week has caused the temporary holding up of orders for considerable tonnage in nearly all lines, consumers ordering only such material as they actually need immediately. The Republic Iron & Steel Company, which made the price reduction, has taken contracts for a fair tonnage of steel bars in this territory and reports specifications for considerable tonnage on those contracts. This company has been quite active in taking contracts on the 1.25c. basis, these contracts extending to October 1 for jobbers, January 1 for general consumers and to July 1 for the implement trade. Other mill agencies have met the price for immediate

specifications, but some of them have declined to book orders for future delivery at the new price. Makers of hard steel bars have not yet reduced their quotation of 1.20c. on rerolled bars, but they are expected to announce lower prices as soon as soft steel bars are firmly established on a new basis. The uncertain condition of prices has caused the holding off of the placing of the contract for the Y. M. C. A. building in Cleveland, for which bids had been received, and other pending structural work. No new inquiries requiring lots of any size have come out. Some car lot orders for plates are being held up until the market becomes settled. The demand for sheets is quite unsatisfactory and price concessions have become more general. Most of the business is being taken at prices ranging from \$1 to \$2 a ton below the regular quotations. Lower prices on steel bars have not yet affected prices on rivets, which have been very low for some time. Some of the bar iron mills have met the new price on steel bars by reducing their price \$1 a ton to 1.25c. The condition of the bar iron trade has been unsatisfactory for some time, the demand being light with prices \$2 a ton lower than steel. With both on the same price basis makers are not taking a very hopeful view of the situation, and intimate that a further reduction would be impossible without a wage reduction.

Old Material.—The cut in the price of steel has as yet had no effect on local scrap prices. Although the market is weak quotations are unchanged. Dealers do not look for prices to go much lower and feel that the reduction in steel may stir up some activity in the scrap market. The market has been extremely dull during the past week. Mills do not want to buy, and at present prices producers and dealers do not care to sell. Local dealers have large stocks on hand, especially in heavy steel scrap. Local mills are offering \$11 for heavy steel, but none appears to be had at that price. The Wheeling & Lake Erie and the Erie Railroads have lists out, the former to close June 1 and the latter June 2. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.00 to 11.50
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable	10.75 to 11.00
Railroad malleable.....	11.50 to 12.00
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings.....	8.00 to 8.50
No. 1 busheling.....	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate	10.25 to 10.50
Bundled tin scrap.....	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, May 31, 1911.—(By Telegraph.)

Pig Iron.—Compared with conditions existing during April and the early part of May, the closing week of the passing month has probably developed a shade more interest. Consumers, however, appear to be only testing the market for bottom prices and are not serious about covering for last half requirements. Shipments on contracts previously made are not moving so satisfactorily as former reports indicated, and the recent price reduction instead of bringing out more business seems to have temporarily smothered it. Order books show very small tonnages lately booked and the activity reported in other markets is not reflected here. The cut in finished material prices has undoubtedly caused buyers of pig iron to hesitate about placing contracts and just at the moment local agencies do not know what to expect for the immediate future. Reports have circulated that some Southern iron for spot shipment was obtainable as low as \$10.25, but \$10.50, Birmingham, is considered the lowest quotable figure on standard brands of No. 2 foundry and several producers refuse to sell below \$11. However, it is now generally acknowledged that \$10.50 can be done for the remainder of the year with those interests that are quoting that price for immediate shipment. The lower grades are scarce and a small lot of No. 4 foundry brought \$9.75, Birmingham, for August-November shipment. Northern foundry is quiet, and, due to the softening of Southern prices, there is little disposition on

THE IRON AND METAL MARKETS

the part of Hanging Rock producers to meet that competition. A few furnaces are taking on a limited tonnage around \$13.75 for the last half, although \$14 is the regular quotation. Malleable and basic are not in demand. A small lot of Jackson County silvery was taken by an Indiana melter at the regular market price. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.25 to \$14.75
Southern coke, No. 2 foundry.....	13.75 to 14.25
Southern coke, No. 3 foundry.....	13.50 to 13.75
Southern coke, No. 4 foundry.....	13.25 to 13.50
Southern coke, No. 1 soft.....	14.25 to 14.75
Southern coke, No. 2 soft.....	13.75 to 14.25
Southern gray forge.....	13.00 to 13.25
Ohio silvery, 8 per cent. silicon.....	17.45 to 17.70
Lake Superior coke, No. 1.....	15.45
Lake Superior coke, No. 2.....	14.95
Lake Superior coke, No. 3.....	14.45
Basic, Northern.....	15.20 to 15.45
Standard Southern car wheel.....	25.75 to 26.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—There is an inquiry reported from a Southern furnace for about 15,000 tons of 48-hour coke for delivery during the last half of this year. A number of foundries are contracting or feeling the market for prices, but there is a noticeable reduction in the quantity usually bought at this time of the year. Prices are unchanged and furnace coke is quotable between \$1.40 to \$1.65, with a few brands commanding as high as \$1.85 on yearly contracts. The prompt shipment price of foundry coke is around \$1.90 to \$2 per net ton oven in all three fields and \$2.10 to \$2.25 is usually inserted in contracts, although there are a few standard brands that are obtainable as low as \$2 for shipment throughout the next 12 months. No immediate change is anticipated.

Old Material.—Dealers complain about the absence of demand on the part of mill consumers and state that they are not buying any scrap material except when it can be obtained at very advantageous figures. The railroads do not care to accept present offers and as a consequence are selling very little material. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying ra.s., 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Finished Material.—The reduction in the price of steel bars does not seem to have brought out as much new business as was anticipated. The present price of 1.25c. Pittsburgh is said to be strictly maintained, and so far as this market is concerned there are no rumors of any cuts under this figure. Local warehouse quotations have not been changed materially and 1.80c. is asked for steel bars, and structural material is firm at 1.90c. The margin of profit has been so small that dealers cannot afford to accept any lower prices, especially on stocks already acquired at previous market quotations. Local dealers report business as being very quiet, and state their customers are hesitating about placing orders now for anything except immediate requirements, preferring to wait and see if the market will go lower.

Philadelphia

PHILADELPHIA, PA., May 30, 1911.

The question of prices and their future possibilities have been all absorbing topics in the market. Concessions made in Virginia foundry iron prices have resulted in further sales, but as the lower level has not been generally met by other producers consumers are awaiting developments. The reduction in steel bars last week caused considerable interest in the finished material market, but did not stimulate buying to any appreciable extent. Just how low producers will go to get business does not seem to be fully determined. The action of the meeting in New York in meeting the recent cut of the Republic Iron & Steel Company and extending reductions to plates, shapes, billets, sheet bars and sheets was not unexpected, but because of the holiday immediately following the announcement it

will probably be a day or two before the announcement of the various individual manufacturers are given to the trade. In the meantime buyers, while making a few inquiries to test the market, are withholding, if possible, the actual placing of orders. An air of hesitancy is to be noted throughout the trade.

Iron Ore.—Business is at a standstill, although it is understood that negotiations are under way in connection with the exercising of certain options in foreign ore, which were given earlier in the year. Importations at this port during the week ending May 27 included 24,580 tons of Newfoundland, 11,871 tons of Swedish, 5800 tons of Cuban and 5336 tons of Spanish ore.

Pig Iron.—Transactions have again been largely confined to Virginia foundry grades. The leading interest in that district has made further sales in this territory, aggregating several thousand tons, the bulk of which was for early and third quarter delivery at prices equal to \$15.05 to \$15.25, delivered here. Another Virginia producer, who has not been willing to meet the low level made by the Virginia C. I. & C. Co., has sold 1000 tons for delivery extending up to the end of the third quarter at \$12.50, furnace, equal to a spread of \$15.30 to \$15.50, delivered here, according to the route of shipment. What other producers will finally decide to do is still an open question. Those in eastern Pennsylvania have so far not made concessions and contend that they will hold the present level of \$15.50 to \$15.75 for No. 2 X foundry, delivered in this vicinity. The situation has, however, not been very thoroughly tested, as consumers are not in urgent need of iron and are disposed to await some further adjustment of prices before coming into the market. Under the circumstances the movement in eastern Pennsylvania iron has been practically at a standstill. The cast iron pipe makers have not been inquiring very freely for low grade irons, confining purchases to small and cheap odd lots. Forge iron continues inactive and is quoted nominally at \$14.75 to \$15, delivered. No further sales of basic iron have come out. Consumers in the East are pretty well covered as far as immediate and third quarter needs are concerned, but would consider purchases for fourth quarter shipment, for which sellers do not appear to be willing to quote. Negotiations are said to be still pending for a round lot of low phosphorus iron, but outside of small sales at \$21, delivered here, for standard brands no business is reported. The general range of prices for standard brands, for delivery usually running up to the end of the third quarter, in buyers' yards in this district, is about as follows:

Eastern Pennsylvania No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania No. 2 plain.....	15.00 to 15.25
Virginia foundry.....	15.05 to 15.50
Gray forge.....	14.75 to 15.00
Basic.....	14.50 to 15.00
Standard low phosphorus.....	21.00

Ferromanganese.—Buying in this district is practically at a standstill, nominal quotations for 80 per cent. ferro being \$36.50 to \$37, Baltimore.

Billets.—A slight accumulation of orders during the idleness of some of the mills week before last has enabled them to run steadily during the past week. Makers report about the usual run of small orders for prompt shipment, with an absence of any inquiry for any large quantities for extended deliveries. Open hearth rolling billets as a result of the New York meeting are quoted at \$23.40 and ordinary forging billets at \$28.40, delivered here.

Plates.—Makers report a very fair run of orders, particularly for tank, bridge and locomotive work, and mill operations continue on a fairly even basis. No official announcement of price changes has been made in this territory, but with the resumption of business after the holiday all makers will undoubtedly make their quotation on the basis of 1.50c. for ordinary plates, delivered in this vicinity.

Structural Material.—With the general contract for the Fire Association of Philadelphia building placed it is now expected that contracts for the structural steel work will shortly be placed. Fabricators are also looking forward to a considerable quantity of material for a proposed million dollar hotel in Wilmington, Del., in which the Dupont company is said to be interested. A fair volume of moderate lot business is pending, while the demand for plain shapes is about on an even basis. The reduction of \$1 per ton will undoubtedly become effective, making the 1.50c. base for plain shapes, delivered in this vicinity.

Sheets.—The current demand has been somewhat better and the urgency with which buyers ask for de-

THE IRON AND METAL MARKETS

liveries indicates how meagre stocks are being carried. While the demand is still irregular orders have averaged a better aggregate tonnage and mills have been more fully engaged during the past week. Because of the intervening holiday the action of the New York meeting has not been officially ratified, but it is understood a general reduction to the basis of 2.70c. for No. 28 gauge will prevail on all new business for delivery before October.

Bars.—Announced reductions in the price of steel bars by one of the leading independent mills has broken the market for that class of bars. From the recent nominal price 1.55c., delivered here, quotations were cut to 1.40c., delivered, and it is believed that in close competition that price could be still further shaded. While there has been considerable inquiry for the purpose of testing the market no heavy purchases have been reported by consumers in this district. The reduction in the price of steel bars has caused further hesitancy to be shown in the demand for refined iron bars, which are quoted at 1.27c. to 1.35c., delivered here.

Coke.—The market continues quiet. Occasional small lots of foundry coke are moved at unchanged prices. Negotiations are under way for a few fair lots, but the demand is not active. Foundry grades are quoted from \$2 for prompt to \$2.40 at oven for forward delivery. No particular movement in furnace coke is reported. Quotations remain at about \$1.50 at oven for spot and \$1.70 to \$1.80 for forward shipment. The following range is named per net ton for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$3.70 to \$4.05
Foundry coke	4.15 to 4.55
Mountain furnace coke	3.30 to 3.65
Foundry coke	3.75 to 4.15

Old Material.—While the market is sentimentally better the volume of business transacted shows little change and prices remain at about the same level. Heavy steel melters would take round lots of No. 1 melting steel at about the market, but sellers refuse to dispose of any quantity at the present level. Rolling mill grades show little movement and there is almost an entire absence of business special grades. Quotations are largely nominal, the following range about representing sellers' ideas for small lots, delivered in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	14.00 to 14.25*
Low phosphorus heavy melting steel scrap..	16.75 to 17.25
Old steel axles.....	19.25 to 19.75*
Old iron axles.....	24.00 to 24.50*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.50 to 12.75
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery.....	13.00 to 13.50
Railroad wheels.....	11.50 to 12.00
Gate bars, railroad.....	10.50 to 11.00
Stove plate.....	10.00 to 10.50

Birmingham

BIRMINGHAM, ALA., May 29, 1911.

Pig Iron.—No new developments can be reported in the pig iron market, except that there is perhaps a little less inquiry before the trade this week than there was ten days ago, due evidently to the feeling of more or less uncertainty regarding the outcome of the cut in certain lines of steel. It had been generally concluded that with the coming of the month of June and the winding up of the first half year's business there would be a more pronounced disposition to consider the placing of orders for liberal tonnages of pig iron. And it is still felt that if there is developed a degree of stability in steel prices, even at materially lower figures, buying will begin on a good scale in finished lines and that pig iron will feel a corresponding impulse. It is argued that the cut to \$10.50 Birmingham puts pig iron as low as it can well afford to be sold and that the cut in steel bars, for instances, had already been discounted by the pig iron makers. Undoubtedly any cut below \$10.50 Birmingham for No. 2 pig iron would mean a still further decrease in production, and inasmuch as shipments are still going forward at a fair rate from furnace yards it would certainly require a great deal of pressure to shade the figures that have been established

for prompt delivery, as well as last half shipment. There is no change in the labor scales in this district, and if pig iron should decline further it is pretty certain that such course of the market would force a reduction in the price for mining coal, with corresponding shrinkage of the wage scale all along the line. Quotations remain unchanged as follows for second and third quarter shipment,

No. 1 foundry and No. 1 soft.....	\$11.00
No. 2 foundry and No. 2 soft.....	10.50
No. 4 foundry.....	9.75
Gray forge.....	9.50
Standard basic, chill cast.....	10.50
"Off basic".....	10.00
Charcoal carwheel iron.....	22.50

these figures all being per ton of 2240 lb. f.o.b. cars furnace yards.

Cast Iron Pipe.—Few large contracts have been added to the unfilled orders for the past week; still shipments are very good and prices very firmly established. Large shipments are going out daily to New Orleans and to California. There is no increase in stocks, and so long as this satisfactory showing is made there will certainly be no cut in prices. Quotations are per net ton, f.o.b. foundries here, as follows: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., average, \$21, with the usual differential of \$1 more for gas pipe.

Old Material.—Some fair sales appear to have been made during the week just closed, and without any material concession in the scale of values that has obtained for many weeks. Dealers continue to pick up odd lots from the country when offered at bargain figures. As a general proposition it is expected that the summer months will prove rather dull in the local scrap market, this line reflecting to a marked degree the condition of the pig iron market. Quotations remain nominally as follows, per gross ton, f.o.b. car, dealers' yards here:

Old iron axles (light).....	\$14.50 to \$15.00
Old steel axles (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.50
Light cast and stove plate.....	8.00 to 8.50

Coal and Coke.—Considerable interest has been shown the past week in some important contracts that are pending for the next year's coke requirements, particularly in the case of two gas companies that use 48-hour furnace coke, which product has been experiencing very slow sale for some months, owing to the inactivity of the larger percentage of furnace stacks in Alabama. One contract for furnace coke to the extent of 100 tons per day was closed last week, but the exact figures are not available, which leads to the conclusion that an attractive price must have been named the consumer. Some good shipments of foundry coke are going forward regularly from Alabama ovens to the Pacific slope, and on this particular business fair prices are being obtained, as the next competition comes from Virginia and Connellsville ovens, from which points the freight rates are much higher. Coal continues very dull, with prospects of but few large contracts being closed before the fall months, buyers seemingly preferring to cover only from week to week, with the hope of gradually forcing prices down. Meanwhile if the price for mining coal should be cut 5c. per ton this would mean a reduction of say 10c. per ton in the selling price, and this possibility is also having its effect on the matter of closing contracts.

The German Iron Market

BERLIN, May 19.

News from the iron trade for a week has been meagre and what has come in has been mostly of a rather unfavorable nature. The works united in the band-iron convention have this week adopted a price reduction of 2.50 marks against the independent concerns, whose competition has latterly grown sharper. At the meeting which took this action it was mentioned that the market situation for this specialty is in a state of confusion. The gas-pipe association, organized last year by a number of works after the general piping syndicate was dissolved, has this week also gone

THE IRON AND METAL MARKETS

to pieces. It is held in some quarters that this improves the prospects for a reorganization of the old syndicate, notwithstanding the fact that the great Mannesmann Company has announced its intention to remain independent.

From the Saar district a good demand for nearly all forms of iron and steel is reported this week, and all the works there are fully employed. It is admitted, however, that in the case of bars the quoted prices do not correspond to the actual market prices. Reports from other sections of the country indicate that 102 marks is now about the price for bars for home delivery, and 92 to 93 for export. This latter price does not leave a profit to many of the rolling mills not belonging to the great mixed companies.

Indeed, the complaints about unsatisfactory prices, especially for the foreign markets, are growing more general. Works in some sections of the trade are losing money on a part of their export business. This appears to be the case with wire and wire nails. Here, again, it is chiefly the disconnected concerns that are suffering. They buy their wire rods from the union at 130 marks, whereas wire nails can be bought in England at 120 marks. True, the German mills receive a drawback of 20 marks on exported goods, but even so there is a difference of only 10 marks between costs of material and export price—not enough to pay expenses of manufacture and sale. Hence the unattached wire mills have for some time kept aloof from foreign business. It is asserted that even the big mixed concerns, which are still selling wire and wire nails abroad, are doing so at a loss, keeping up their trade in order not to lose their business connections. The only favorable news from the trade this week refers to the state of business in castings, which is reported to be very active. This is especially the case with columns for structural purposes, which have been greatly stimulated by the revival in the building trade. An advance of 2 marks per metric cwt. has been recently made.

News from the Belgian trade this week is again less satisfactory. A further reduction in the export price of basic steel and wrought iron bars from 92s. 6d. to 94s. to 91s. 6d. to 92s. per ton f.o.b. Antwerp has just been made.

The most interesting foreign venture for obtaining ore supplies reported in the German iron trade for some years is that of the great establishment, *Gewerkschaft Deutscher Kaiser*, owned by the Rhenish coal and iron magnate, August Thyssen. He made a contract two years ago for about 2,375,000 tons of Russian ore, to be shipped from Nikolajeff during the next six or eight years. The most highly improved facilities for handling the ores at that port have been in the meantime erected and shipments have already begun.

According to a Russian newspaper the Krupp company, which has for some time operated a small arms factory near Riga, is about to add a cannon factory to its plant.

Buffalo

BUFFALO, N. Y., May 29, 1911.

Pig Iron.—Holiday observance and the restraining effect of the unsettled condition in bar products has combined to exercise a quieting influence on the week's trade; but notwithstanding this a fair amount of business has been done. Inquiry for malleable and foundry irons aggregating about 12,000 tons has been received and the new business booked so far as reported totaled about 7000 tons in all grades, principally for third quarter delivery. Business taken was largely at prices slightly under schedules previously ruling. The inquiries received included several of pretty good sized tonnages from New England and New York state points for malleable and foundry grades; one from a Troy concern for 1000 tons foundry grades and one from Connecticut for a large tonnage of malleable. The belief is gaining ground that orders from railway sources will come in more freely after July 1. A serious break in the Erie Canal east of Rochester is holding back canal shipment of pig iron, as repairs to the break will require until July 15 for completion. For second and third quarter delivery we quote as follows, f.o.b. Buffalo:

No. 1X foundry.....	\$14.00 to \$14.50
No. 2X foundry.....	13.75 to 14.00
No. 2 plain.....	13.50 to 13.75
No. 3 foundry.....	13.25 to 13.50
Gray forge.....	13.00 to 13.25
Malleable.....	13.75 to 14.25
Basic.....	14.00 to 14.75
Charcoal.....	16.50 to 17.25

Finished Iron and Steel.—All agencies are meeting the 1.25c. price on steel bars and all material on the bar card made by the Republic Iron & Steel Company, but the cut made by that company has not apparently had a stimulating effect in inducing placement of new business, producing instead a feeling of uncertainty and uneasiness which retards placement in other lines. No change has been made in the price of plates and structural shapes, but during the last day or two many quotations have been held open awaiting the outcome of the meeting of the steel makers, which is being held in New York to-day. The Canadian export trade, which has been of good volume in bar products, has halted to some extent in the last few days, owing to the price situation. In structural material some jobs about to be placed have been held up temporarily. Some of the general contractors on the Erie Canal construction contracts are receiving figures for subcontracts for the steel work required. Bids are soon to be received for the third building of the new lithographing plant of the Huebner-Bleistein Patents Company, Buffalo, requiring a considerable tonnage. The Lackawanna Bridge Company was low bidder last week for the 17-story office building of the Buffalo General Electric Company, but the contract has not yet been awarded.

Old Material.—The market continues very dull and the only transactions noted are by dealers who are taking on some stocks where obtainable at bargain prices. Consumers are still holding off on new purchases, apparently having sufficient stock on hand to meet present and immediate future requirements. Prices remain the same as for the past week or two. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery cast scrap..	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	13.00 to 13.50
Railroad malleable.....	11.00 to 11.50
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pig.....	6.00 to 6.25
Wrought iron and soft steel turnings.....	6.25 to 6.75
Clean cast forgings.....	6.00 to 6.25

San Francisco

SAN FRANCISCO, May 23, 1911.

The demand for finished products is still confined to narrow limits, conditions in general remaining about the same as for some time past. Local interests have little hope of any marked improvement during the summer, though inquiries are gradually increasing in some lines. The principal purchases of late have been for large development projects, and a number of large orders of this nature are still in prospect, though many large consumers are limiting their purchases as closely as possible, and the small trade is very slow to revive. Merchants are carrying large supplies, which, in view of the continued dullness, are becoming burdensome. A fair tonnage of structural material has been placed recently and several important deals are pending. The movement of cast iron pipe is satisfactory and there is some prospect of an increasing demand for plates.

Bars.—Local merchants have been carrying heavy stocks since the first of the year, and while a little more demand is noted in a small way the material is not moving off as fast as is desired. Apparently some of the larger consumers who have formerly patronized the jobbers are buying direct from the mills, though in any case the quantities taken are below normal. Few orders are being placed for foreign material, though a considerable tonnage is arriving from time to time on old orders. Reinforcing material is a prominent feature of the market and a well sustained demand is expected in this line. Aside from the requirements of local buildings, which will be of considerable importance, the Spring Valley Water Company will require a large amount of material for a concrete dam in Alameda county. The market is still rather easy, and while quotations remain at 2.00c. for steel and 1.90c. for iron concessions are obtained with little difficulty.

Structural Material.—The lowest bid on steel work for the Oakland City Hall was that of the Judson Mfg. Company of that city, the McClintic-Marshall Construction Company being second. Bids for the entire structure were largely in excess of the amount available and may have to be refigured, though no definite announcement to this effect has been made. An award on the Masonic Temple in this city is expected early next month. Aside from these jobs, considerable

THE IRON AND METAL MARKETS

small work has been let recently, and with a fair demand in other cities the total tonnage booked for Coast delivery is fairly large. A tendency to erect buildings of a more permanent nature is noted in the smaller towns, giving rise to numerous small inquiries. Many Eastern fabricators are now looking for work in this market and are getting a fair tonnage through the country, though in San Francisco local shops are taking most of the business. The building for the Bankers' Investment Company, one of the largest of the new projects here, will be up for figuring shortly, and figures are being taken on the San Francisco Investment Corporation's building at Sutter and Montgomery streets, requiring about 300 tons. The McClintic-Marshall Construction Company has taken a 60-ton job at Klamath Falls, Ore. The Finch Jail Building Company has taken a contract for steel work and cells in a jail at Susanville, Cal. Dyer Bros. have taken a small job for E. Blanique on Geary street, near Taylor, this city. The time allowed for figuring on the new Southern Pacific station at Sixteenth street, Oakland, has been extended to next month.

Rails.—The movement of both light and standard rails is rather small at the moment, though some business is coming from street railroad and interurban lines in various parts of the State, and inquiries for a very fair tonnage are in prospect. About a dozen interurban prospects are under consideration in California, and while the majority seem to lack financial support a few are likely to be carried out in the near future. The Clear Lake Railroad Company is a new concern incorporated at \$500,000, to build a line from Hopland to Lakeport, Cal. A new street road is projected at Marysville, Cal., and it is reported that the Southern Pacific will soon start work on its suburban lines near San Jose, Cal. The Pennsylvania Steel Company has taken a new contract for special work on the local Geary street road, amounting to \$45,713. The Spring Valley Water Company has signed a contract for about 1500 hp. of electric current for traction between the Southern Pacific line and the Calaveras dam site, about 8 miles, and will soon be in the market for the rails.

Sheets.—Several of the local merchants are in the market in a small way, and the general jobbing movement is rather more active than last month, though on the whole business is still quiet.

Plates.—No transactions of great importance have been closed recently, though there are several substantial inquiries in prospect for the near future. Small tanks are in quite active demand, and a number of new gas plants are projected for towns in northern California and Oregon. A large tonnage will probably be required by the Standard Oil Company within the next few months. This company is preparing to put up some new storage tanks at Antioch, Cal., and has received bids on a number of tools for plate work, supposedly in connection with a large refining plant to be erected near Los Angeles. Comparatively little business is coming from other oil interests at present. The city of Los Angeles will take bids May 26 for 4300 tons of siphons.

Merchant Pipe.—The jobbing movement is still below normal, and while merchants are coming into the market to some extent the tonnage required is small. Considerable steel pipe is being taken for water works and several new gas projects are using high-pressure steel pipe instead of cast iron, but the total tonnage for such purposes makes a poor showing as compared with the oil pipe business of the last few years. The oil interests are now keeping out of the market almost entirely, many wells which were started a few months ago being practically abandoned.

Cast Iron Pipe.—Aside from an order for 1500 tons placed by the city of Portland, Ore., no business has resulted from the more important inquiries on the Coast, the opening of bids on 8000 tons for San Diego having been postponed to May 29. The Union Water Company, Alameda, Cal., is figuring on a lot of pipe, but is not yet ready to place its order. The movement, however, is fairly active in a small way, many water and gas companies on the Coast being in the market. The city of San Francisco will soon be ready to receive 1000 tons more for its fire protection system. A lot of special castings, 42 and 60-in. diameter, will soon be required for the intake and release of the Mare Island, Cal., drydock.

Pig Iron.—The requirements of the foundry trade here have remained at a low level for many months, and there is no present indication of improvement. Prices on foreign foundry iron are very irregular and

hardly worth quoting. Southern foundry iron is nominally valued at \$21 and very little foreign material of similar grade can be sold above this figure.

Old Material.—Prices appear to have reached their lowest level for the time being as the principal offerings are now controlled by dealers and there is no particular pressure to sell. The demand is still limited, but conditions are favorable for a more active movement within the next few months. Prices are quoted as follows: Cast iron scrap, per gross ton, \$16; steel melting scrap, per gross ton, \$10.50 to \$11; wrought scrap, per net ton, \$11 to \$15; rerolling rails, per net ton, \$11.

St. Louis

ST. LOUIS, Mo., May 29, 1911.

The market here shows more of a waiting disposition than anything else in all branches. The dullness is not of a character to indicate any material concessions in prices, but rather is a reflection of the summer dullness which may rationally be expected to have an effect about this time. Basically there is really a good feeling in that better conditions are expected to materialize before very long as a consequence of the very apparent evidence that there is no tangible foundation for a pessimistic view of the future.

Pig Iron.—This market is rather unsettled, as buyers are very evidently inclined to await the outcome of the present situation in the finished steel market. It is seemingly drifting here, as elsewhere, and consequently quiet. While there are no inquiries of importance at present there is nevertheless an anticipation of a buying movement within the next week or ten days. Some buyers make the assertion that they can get Birmingham No. 2, shipment the balance of the year, at \$10.50, but most of the furnacemen say that \$11 is still the price to be reckoned with. There have been perhaps a few more requisitions during the last few days than was the case a week ago, but as a whole they have been about on the same level as for the past three or four months. The price shows no change and the total sales for the week may be regarded as practically negligible so far as making a market is concerned. The figure for No. 2 Northern foundry iron shows no change from the \$14 last quoted with \$14.50 as the top, either for shipment to July 1 or last half, Ironton, Ohio, basis. For malleable Bessemer the same figures apply for the corresponding deliveries.

Coke.—The comparative lack of inquiry for coke for prompt shipment the past week has left the market quotations somewhat lifeless, but there have been no concessions from the figures given hitherto, namely \$2 to \$2.50 per net ton, at the oven, for 72-hour selected foundry, Connellsville or Stonega. One feature of the week, however, has been the development of a great deal of inquiry for prices for the second half of the year and some for the full year to July 1, 1912, evidencing a growing tendency to make the annual contracts on the basis of the June prices, which are always the lowest of the year.

Finished Iron and Steel.—The developments in the demand for structural steel seemingly indicate a disposition on the part of the buyers, because of the recent developments in the steel bar market, to draw out of the market. While this has been the case for several days, nevertheless the fact that they have considerable work on hand leaves little doubt that it will not be long until they are again placing orders in the market. Certainly they will as soon as the situation is settled. The Westlake Construction Company closed contracts the past week for the structural steel for the General Hospital at Cincinnati, between 600 and 700 tons. Of plates it can only be said that the market is unsteady, with no change in prices. In bars the reduced price recently made has been received with varied comment and it has been in effect such a short time that it is impossible to anticipate what action the market will take. Buyers generally are only purchasing for immediate wants and contracts will hardly be placed until the market is more settled. There have been several inquiries in the market for a fair tonnage of standard rails, the Missouri Pacific asking for figures on 40,000 tons for delivery during the summer months. Track fastenings are in fair demand and prices are firm. In light rails the demand has slackened somewhat, due to the approaching summer tendencies. A number of Illinois mines, however, are equipping with electric haulage which represents about the only demand of the present time.

THE IRON AND METAL MARKETS

Old Material.—Scrap iron is very dull at present and dealers do not anticipate anything good in the near future. The trade is simply awaiting developments and there is only a speculative trading. There are no consumers except at prices too low to enable the closing of sales, and as a rule there is a disposition to refrain from buying because the agitation in the steel market justifies apparently the playing of a waiting game. The Missouri Pacific list out to-day approximates 2000 tons. Those from the other railroads will follow later in the week, but there is no forecast as to their amount. The dealers' prices, per gross ton, f.o.b. St. Louis, are as follows:

Old steel rails, less than 3 feet.....	\$12.50 to \$13.00
Old steel rails, 3 feet.....	11.25 to 11.75
Old steel rails, 3 feet.....	10.25 to 10.75
Old steel rails, 3 feet.....	23.00 to 23.50
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75

The following quotations are per net ton:

Iron fish plates.....	\$10.25 to \$10.75
Iron car axles.....	17.50 to 18.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	10.25 to 10.75
No. 2 railroad wrought.....	9.25 to 9.75
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	8.50 to 9.00
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers, cut to sheets and rings.....	7.25 to 7.75
No. 1 cast scrap.....	9.50 to 10.00
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	7.00 to 7.50
Agricultural malleable.....	7.25 to 7.75
Pipes and flues.....	7.25 to 7.75
Railroad sheet and tank scrap.....	7.25 to 7.75
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	6.00 to 6.50

New York

NEW YORK, May 31, 1911

Pig Iron.—The activity induced by price concessions on Virginia and Southern iron was short lived. The market has fallen back into its previous apathetic condition, with very little inquiry and few transactions. The only business now being done is by the persistent drumming of consumers and does not come through the manifestation of much interest on their part for either prompt shipment or forward delivery. Northern iron at tidewater is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.75 to \$15. For Southern No. 1 foundry we quote \$15.25 to \$15.75; No. 2, \$14.75 to \$15.25.

Finished Iron and Steel.—The effect on the buyer of the reduction in prices in steel bars, plates, structural material and sheets cannot yet be gauged. The initial cut brought about an immediate waiting policy to ascertain if it would be met generally and the week's business has been decidedly dull. It is expected that a week or two will show if the buyer agrees with the manufacturer that the bottom has been reached. The condition of affairs is disagreeable, particularly in respect to structural contracts, as every buyer wants to attach strings to the contract and get advantage of possible low prices not even dreamed of at the time of closing. The really big structural work pending has not yet been settled and the coming week ought to record the placing of a good volume of business. The American Bridge Company obtained a great deal of May's business, aggregating probably 50,000 to 60,000 tons, and of late awards reported it has the 2000-ton Riggs theater and office building, Washington, D. C.; the 1000-ton piershed job in Brooklyn, N. Y., and a 1100-ton building at Chrome, N. J., for Armour & Co. Quotations are: Plain structural material and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.40c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—Yonkers, N. Y., will open bids June 5 for 1205 tons of 30-in. water pipe. The contract for the Bronx pipe laying, on which bids were opened May 25, involving 8900 tons, was awarded to the Hanover Contracting Company, and that for Queens, 1580 tons, to Peace Brothers, the contractors buying the pipe. The leading interest was the successful bidder on 2750 tons of water pipe for the Metropolitan Water and Sewerage Board, Boston, Mass., on which bids were opened May 22, at \$21.00 delivered. The bids on this contract ranged as high as \$24. Private buyers are now doing very little, so that the market is decidedly quiet. Carload lots of 6 in. continue to be quoted at \$21 to \$22 per net ton, tidewater.

Old Material.—The volume of business is small.

transactions being few and confined to small lots. Probably the best sale of the week was 500 tons of wrought pipe. The larger dealers report that it is becoming more difficult to secure material, as holders are reluctant to part with scrap at the current low prices. Quotations are practically nominal, as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	12.00 to 12.25
Railroad car axles.....	22.00 to 22.50
Standard heavy iron car axles.....	17.25 to 17.75
Old steel car axles.....	12.50 to 13.00
No. 1 railroad wrought.....	10.25 to 10.75
Wrought steel track scrap.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.00 to 10.50
No. 1 and yard wrought.....	4.25 to 4.75
Light iron.....	5.25 to 5.75
Cast borings.....	6.25 to 6.75
Wrought borings.....	10.00 to 10.50
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast scrap.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

Metal Market

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.	Electrolytic, New York.	Tin, New York.	Lead, New York.	Spelter, New York.	St. Louis.	St. Louis.
May	Lake.	lytic.	New York.	New York.	New York.	New York.	St. Louis.
25	12.37 1/2	12.37 1/2	44.20	4.37 1/2	4.22 1/2	5.50	5.20
26	12.40	12.15	44.10	4.37 1/2	4.22 1/2	5.50	5.20
27	12.45	12.25	44.10	4.37 1/2	4.22 1/2	5.50	5.20
28	12.45	12.25	44.10	4.37 1/2	4.22 1/2	5.50	5.20
31	12.45	12.25	44.10	4.37 1/2	4.22 1/2	5.50	5.20

Pig tin has reached a higher price in London than at any time since the corner of 1906-7. Good sales of copper have been made for export and the price on electrolytic has advanced 1/8c. Lead is weaker. Spelter is somewhat firmer.

Copper.—While good sales of copper have been made for export, the domestic demand is dull. Nevertheless, prices have steadily advanced during the week, and sellers as a rule are holding electrolytic at 12.25c., and lake at 12.45c. The demand for casting copper for domestic consumption has improved, and it is held at from 12.15c. to 12.20c. Domestic consumers are holding off, and the tone of their inquiries indicates that they would be willing to buy at about 1/8c. lower than the present market. Many of them are looking forward to the forthcoming report of the Copper Producers' Association in the expectation that the May statistics will show smaller domestic deliveries. Sellers, on the other hand, point to the excellent export business. With only to-day's delivery to account for, the exports of copper so far this month amounted to 25,725 tons, and the London market is decidedly firm. It was reported this morning that electrolytic copper is selling there at the equivalent of 12.86c., New York. The London price of standard copper for export delivery this morning is £55 7s. 6d., and for futures £56.

Pig Tin.—The London market on spot tin is clearly at the mercy of the syndicate operators who have pushed the price up to £208 10s., the highest figure asked since the memorable corner of 1906-7. The price of futures has advanced to £190, and sellers there are scrambling to cover their needs for July and August at that figure. The market here has not advanced in keeping with the London market, but this morning pig tin could not be had for immediate delivery for less than 45.50c. The situation here is better than in London, as the monthly statistics to be issued tomorrow by the New York Metal Exchange will show the deliveries for the month large, amounting to 3400 tons, but the stocks on hand are plentiful for immediate needs. It is figured that there are 2040 tons of tin available. This includes the tin now at landing. New York houses, with London connections, are informed that a determined attempt is being made there to put in effect a standard contract for tin similar to that used in the copper trade. At present London tin contracts are based on deliveries of Straits pig, and dealers there outside of the syndicate are insisting on the introduction of the standard contract to take in all the grades of tin and allow fixed reductions when impure grades are delivered under the standard contract. This will do away with the possibility of future corners in Straits pig affecting the market so seriously. At present, of the 100,000 tons of tin produced annually, 50,000 tons come from the Straits settlements. Very little local trading was done during the week, and most of the business was between dealers who were covering their future needs.

Tin Plates.—Quotations on foreign tin plates have advanced in keeping with the soaring price of pig tin and plates at Swansea, Wales, are now bringing 13s. 7½d, which is 1½d more than the price of a week ago. Inquiries for domestic tin plates have increased, but many of them, it is thought, have been prompted by curiosity, as buyers seem to think that tin plate prices will be reduced in keeping with the general lowering of steel prices. Quotations at present are firm in New York, and \$3.94 is asked for 100-lb. coke plates.

Lead.—Lead is very weak in St. Louis, and while 4.22½c. is invariably asked there, it is declared this morning that that quotation is being shaded by some outside sellers. The demand is light, and the New York market is fairly firm at around 4.37½c.

Spelter.—Spelter appears slightly stronger, but consumers are showing but little interest. It is evident that some dealers are making liberal reductions under the usually quoted market price, which is 5.20c., St. Louis, and 5.50c., New York. Spelter can be bought in New York for prompt shipment from the West at 5.40c.

Antimony.—The antimony market is dull, and there are offers to sell Hungarian grades at around 7.75c. Hallett's is weaker at 8.95c., and Cookson's is firm at 9.50c.

Old Metals.—The market is practically lifeless. What business is done is at unchanged selling prices as follows, New York

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and white.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Chicago

MAY 31.—Copper has advanced a few points, but there is no noticeable improvement in the demand. Tin is very excitable and is quoted at 45c. Spelter and lead continue quiet with prices firm. We quote Chicago prices as follows: Casting copper, 12.45c.; lake, 12.60c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 45c.; small lots, 46.50c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12c.; copper bottoms, 10c.; copper clips, 11¾c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin pipe, 36c.

Iron and Industrial Stocks

NEW YORK, May 31, 1911.

The stock market has held its own remarkably well, considering the generally quiet condition of trade and the somewhat disturbing conditions of the week. The investigation of the United States Steel Corporation by a committee of the House of Representatives does not seem to have seriously affected the stocks of that corporation. A sharp advance occurred in General Electric and Westinghouse Electric. The range of prices on active iron and industrial stocks from Wednesday of last week to Monday of this week, Tuesday being a holiday, was as follows:

Allis-Chalm., com..	8 - 9¾	Railway Spr., com..	35 - 35¾
Allis-Chalm., pref..	29¼ - 33¾	Railway Spr., pref..	102 - 102¾
Beth. Steel, com....	32¼ - 33¾	Republic, com.....	29¼ - 31¾
Beth. Steel, pref....	61¾ - 63¾	Republic, pref.....	93 - 95
Can., com.....	12 - 12¾	Stess, com.....	51¼ - 51½
Can., pref.....	87½ - 88¼	Pipe, com.....	17¼ - 18
Car & Fdry, com....	55 - 56	Pipe, pref.....	57¾ - 58
Colorado Fuel.....	33 - 34	U. S. Steel, com....	77¾ - 79¾
General Electric....	159¼ - 168¾	U. S. Steel, pref....	118½ - 119½
Gr. N. ore cert.....	61¾ - 62¼	Westinghouse Elec....	73 - 79
Int. Harv., com....	125½ - 127	Va. L. C. & C.....	62
Int. Harv., pr.....	126	Am. Ship, com.....	65 - 66
Int. Pump, com....	39¾ - 40¼	Chi. Pneu. Tool....	51¼ - 52
Int. Pump, pref....	88 - 90	Cambria Steel.....	44 - 46
Locomotive, com....	41 - 42¼	Lake Sup. Corp.....	28¾
Locomotive, pref....	108¼ - 108½	Warwick.....	10 - 10¼
Nat. En. & St., com..	16¾	Crucible St., com....	13¼ - 13½
Pittsburgh Steel, pref..	81¾ - 82¾	Crucible St., pref....	81¾ - 82¾
Pressed St., com....	35 - 35½	Harb. Walk. Ref., com..	45
Pressed St., pref.....	101	Harb. Wk. Rf., pref.	96½ - 101

The Jones & Laughlin Steel Company has placed with Blair & Co., New York, and the First Trust and Savings Bank of Chicago an issue of \$10,000,000 of its 5 per cent. bonds. The same banking interests were the purchasers of the \$15,000,000 of 5 per cent. bonds

issued by the company about two years ago. It is stated that the new issue will provide funds for a continuance of the company's expansion in productive capacity.

Dividends.

The Railway Steel Spring Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable June 20.

The Westinghouse Electric & Mfg. Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable July 15.

The American Can Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable July 1.

The American Society of Mechanical Engineers

PITTSBURGH, PA., May 31, 1911.—(By Telegraph).—

The opening night of the convention of the American Society of Mechanical Engineers, Tuesday, indicated that the meetings now being held here will be among the most successful in the history of the society. The registration Tuesday evening had reached 370, which means that the final attendance will considerably exceed 500 and will be probably the largest which has ever been had at a spring meeting.

To a great extent this is due to an unusually attractive programme of papers. Further it is an attestation to the wisdom of grouping the papers by subject. In this instance there will be a cement works session, a machine shop session, a gas power session, and a miscellaneous session. Equally responsible for the large attendance is the selection of a city centrally located and abounding in industries of interest as objectives for excursions, the steel works leading, closely followed by the large cement works.

A feature of the informal reception opening the convention Tuesday evening was the presentation of an engrossed testimonial to the President, Col. E. D. Meier, in commemoration of his 70th birthday anniversary, and in appreciation of his distinguished career in military service and in engineering. On behalf of the committee in whose hands the testimonial was placed, C. J. H. Woodbury, the secretary, made the presentation concluding with the request that Colonel Meier give sittings to an artist for his portrait.

H. R. C.

Republic Iron & Steel Company Operations.—The new No. 4 blast furnace of the Republic Iron & Steel Company at Haselton, Ohio, is about finished and will go in blast early next week. The blowing engines have been turned over and the furnace is about ready to start. This gives the company five blast furnaces in the Youngstown district. It is the intention to blow out No. 2 furnace at Haselton for relining and repairs as soon as No. 4 stack is started. Orders were issued in Pittsburgh on Monday to start up four of the eight new 60-ton open-hearth furnaces of the company at Haselton, and they will probably start about June 10. The other four open-hearth furnaces will not be started until conditions in the steel trade improve.

The Longdale Iron Company, Longdale, Va., which blew out its second furnace in May, now has both its furnaces out of blast and does not intend to resume operations again. The No. 1 furnace—called the Lucy Selina—was built in 1827 as a charcoal furnace and was the oldest iron furnace in Virginia. It was rebuilt as a coke stack in 1867 and later was further remodeled and enlarged. Furnace No. 2 was first blown in in February, 1881, and enlarged in 1890. The product was chiefly basic pig iron cast in chills, and the rated annual capacity is put at 40,000 tons. Longdale was the first merchant furnace in the United States to make basic pig iron.

W. N. Kratzer & Co., structural steel fabricators, Pittsburgh, have received a contract for the structural steel to be used in a high school building at Titusville, Pa.; bear traps for Ohio River dam No. 26; power house and small bridge for the Union Carbide Company, Niagara Falls, N. Y.; steel tank tower for the Meadow River Lumber Company, Rainelle, W. Va., and an extension to the Union Depot, Baltimore, Md.

The Steel Corporation Investigation

Some of the Testimony of John W. Gates

WASHINGTON, D. C., May 29, 1911.—For more than four hours on Saturday John W. Gates testified before the special investigating committee of the House of Representatives that has been appointed to investigate the operations of the United States Steel Corporation, and especially the merger of the Tennessee Coal, Iron & Railroad Company with the Steel Corporation.

Throughout the hearing Mr. Gates dealt elaborately with the details of the organization of the corporation in 1900 and 1901, with the initial proceedings of which he claimed to have had an important part. Mr. Gates also gave what he claimed to known and also more or less hearsay and opinion regarding the acquisition by the Steel Corporation of the stock in the Tennessee Coal, Iron & Railroad Company, and the causes which lead up to that acquisition.

Throughout the hearing Mr. Gates was interrogated on practically every point with reference to the organization of the Steel Corporation and the acquisition of the different properties and corporations which were merged with that corporation, down to and including the securing of the control of the stock in the Tennessee company. The interrogations were propounded by Representative Stanley, of Kentucky, the author of the resolution providing for the investigation. Questions were also propounded by Representatives Bartlett, of Georgia; McGillicuddy, of Maine; Beall, of Texas, and Young, of Michigan.

The principal features of Mr. Gates' testimony related to the differences of opinion which he entertained from those of his co-stockholders in the Tennessee company regarding the feasibility of the sale and the price agreed upon by way of exchange of Steel Corporation bonds for the stock of the Tennessee company. Although he did not specifically say so, it was evident from his testimony that Mr. Gates did not agree with the popular conception that has obtained as a result of expressions made in federal official circles at the time and since the acquiring of the Tennessee company by the Steel Corporation, that this merger was necessitated on account of panic conditions prevailing in the autumn of 1907, and he emphasized this by repeated references to the fact that little, if any, money passed in the transaction. He called attention, however, to the large amount of Tennessee company stock which was held as collateral by a leading bank and trust company in New York, to which organization the complaint had been made by the clearing house of New York that the institution carried too large a percentage of Tennessee company's stock as collateral security for its outstanding loan.

Another feature of Mr. Gates' testimony was his description of the intimate details connected with the organization of the Steel Corporation and his rather sharp and sarcastic comments upon the shrewdness of Mr. Carnegie in so manipulating the affairs of his steel industry as to bring about a sale to the newly-organized Steel Corporation at vastly greater compensation than Mr. Carnegie had suggested a willingness to sell for a short time previous to the final culmination of the transaction which resulted in a transfer of the Carnegie interests to the corporation.

A large part of the hearing was devoted to inquiries by Chairman Stanley, directed to Mr. Gates upon hypothetical cases which sought to elicit from Mr. Gates an expression of opinion as to whether the gigantic consolidations of iron, steel and allied corporations had been beneficial to the trade and to the consuming public. For the most part Mr. Gates declined to make specific and direct answers to these questions, which he declared to be hypothetical and which could not be answered without precise knowledge as to what conditions would be at a given time if the great combinations in the iron and steel industry had not been effected. Mr. Gates was very specific in his declaration that, according to his view of the matter, the deal by which the Steel Corporation acquired the Tennessee company's stock was a big bargain for the corporation, and that those who parted with their stock had not realized a fair profit upon the investments they had made, considering

the time and labor that had been expended in developing the Tennessee company.

The testimony of Mr. Gates before the committee was in part as follows:

Tennessee Coal, Iron & Railroad Syndicate

The Chairman: Were you ever interested in any way in what was once known as the Tennessee Coal, Iron & Railroad Company?

Mr. Gates: I was a stockholder and director and member of the executive committee. A syndicate was formed during my absence in Texas, in November or December, 1904 or 1905, which acquired a controlling interest in the Tennessee Coal, Iron & Railroad Company. The syndicate was managed by Grant B. Schley, of Moore & Schley, and Charles S. Guthrie, then president of the Republic Iron & Steel Company. They acquired through purchase in the open market, some possibly by private sale and purchase, a large majority of the shares of stock of the Tennessee Coal, Iron & Railroad Company. They telegraphed me what they had done and I acquiesced in their action and took a proportionate amount of the total stock purchased, which my recollection is was in the neighborhood of 200,000 shares. There were some ten or twelve and perhaps fifteen men interested in what was known as the Tennessee Iron & Coal Syndicate. Under the terms of the syndicate agreement the managers of the syndicate, Mr. Schley and Mr. Guthrie, had a right to sell the stock without asking any questions, provided they sold it at a profit, but they could not sell the stock at a loss without the consent of all the syndicate members. Mr. Guthrie passed away a few months later, and L. C. Hanna, of Cleveland, Ohio, was elected as the associate syndicate manager with Mr. Schley. Mr. Hanna is a brother of the late Senator Hanna. We proceeded to operate and improve the company as fast as we could, consistent with good business judgment, and I sailed for Europe in July, 1906.

The Chairman: You speak of improving this property.

Mr. Gates: Perhaps it was 1907. We went to Europe in July and we returned from Europe on November 6 or 7. When we returned to America this country was in the throes of a panic, and I picked up a newspaper in the morning before we got off the ship and saw that the stock of the Tennessee Coal, Iron & Railroad Company had been sold to the United States Steel Corporation.

Mr. Bartlett: Did you give the date of your return?

Mr. Gates: November 6, 1907, I think it was; I will not be positive as to dates, but I know it was a legal holiday and that there was an election the day I returned.

Mr. Bartlett: You may fix it by this. The letter of the President to the Attorney General is dated Nov. 4, 1907.

Negotiations for Change of Control

Mr. Gates: On my arrival at the Plaza Hotel I found a note from Mr. Schley, who had an office then and has one now at 747 Fifth avenue, between Fifty-seventh and Fifty-eighth streets, asking me if I would not please come over to his office at once. I probably got there either about eleven or twelve o'clock, and I found negotiations pending between Mr. Frick, Judge Gary and Mr. Morgan on one side, and Mr. Schley, Mr. Hanna and associates on the other side, and I was told that they were all at Mr. Morgan's residence. Judge Gary, Mr. Morgan and Mr. Frick were trying to acquire this block of stock, which was the control by a very large majority.

Various telephonic conferences occurred between Mr. Morgan's residence and Moore & Schley's office on Fifth avenue. Judge Gary, Mr. Morgan and Mr. Frick were trying to acquire this stock, as I remember it, by an exchange of an equal amount of what was known as United States Steel second 5's. In other words, for each ten shares of the Tennessee Coal, Iron & Railroad stock they were to get one of the second mortgage bonds of the United States Steel Corporation. I said to Mr. Morgan I thought that was not enough, and I was not willing to trade on that basis. So after three, four or five hours of telephoning backward and forward we made a trade with them on the basis, as I remember it, of about 119¾ per cent. of United States Steel sinking bonds 5, as they are known, for Tennessee stock.

Under the terms of the trade we were to tender our resignations as directors in a body, and the United States Steel Corporation were to elect such men as they selected to succeed us. We were to meet, I think, the following morning at the office of the Tennessee Coal, Iron & Railroad Company, at the Realty Building, 115 Broadway, at

eleven o'clock. We met at the appointed hour, and I said to Judge Gary, "You are simply buying a majority of this stock and taking the resignations of the board of directors."

Mr. Bartlett: Judge Gary was chairman of the board of directors of the United States Steel Corporation?

Mr. Gates: He was the chairman of the board of directors of the United States Steel Corporation, and Mr. Corey was its president, and he was also there. He said to us: "We do not care anything about the minority." "Well," I said, "we do care about having the minority treated exactly the same as the majority, and we will not turn over this stock unless you pass a resolution and give us a copy of it agreeing to pay all of the minority stockholders the same price for their securities as you pay the majority stockholders." After some discussion a resolution was passed and a copy handed to us, agreeing to take care of the minority stockholders on the same basis and at the same price and terms that the majority stockholders were taken care of. That is about all I can tell you about the Tennessee Coal, Iron & Railroad proposition.

Mr. McGillicuddy: Who owned the majority stock?

Mr. Gates: I stated earlier that the majority of the stock was bought by a syndicate. Col. Oliver Payne was in that syndicate and, I think, J. B. Duke and E. J. Berwind.

Mr. Bartlett: O. H. Payne, L. C. Hanna, G. B. Schley, J. B. Duke, E. J. Berwind, J. W. Gates, A. N. Brady, G. A. Kessler, O. Thorne, E. W. Oglebay, H. S. Black, F. D. Stout, J. W. Simpson, G. W. French, S. G. Cooper and J. A. Topping. Is that correct?

Mr. Gates: I think that is a correct statement of the syndicate.

The Chairman: Do you recall the shares that they held of this stock?

Mr. Gates: There were varying amounts.

The Chairman: I do not mean the separate amounts, but the combined amount.

Mr. Gates: I think there was in the neighborhood of 200,000 shares, perhaps more. In the original participation I think Payne, Kessler, Berwind, Schley, Duke and myself each had 18,000 shares. The others were divided up in smaller denominations; some had 3000, some had 5000 and some had 9000.

The Chairman: You spoke of exchanging the bonds or the stock of the Tennessee Coal, Iron & Railroad Company for the second mortgage bonds of the United States Steel Corporation?

Mr. Gates: Yes, sir.

The Chairman: Which security had the greater basis of tangible value behind it, the stock or bonds of the Tennessee Coal, Iron & Railroad Company or the second mortgage bonds of the Steel Corporation, for which they were exchanged?

Mr. Jones: That, if you please, is a question of opinion, and my understanding is that you are after the facts here, but I have no objection to Mr. Gates stating his opinion, if he so desires.

The Chairman: I will not insist upon Mr. Gates giving an answer to that question, but I think his opinion would have great weight before this committee.

Value of Tennessee Coal & Iron Stock

Mr. Gates: I can only give you an answer by telling you what the quotations on the New York Stock Exchange were for each of the securities at the time of the exchange. I think the Tennessee Coal, Iron & Railroad stock was selling at somewhere between \$120 and \$160 per share at that time, and the United States Steel sinking fund seconds were selling between \$80 and \$85.

Mr. Bartlett: The prices of securities of that sort are generally controlled by what is behind them; I do not mean the speculative price, but the price on the market, rather the difference in the value of the property that is behind it?

Mr. Gates: That is supposed to be the fact, but I do not know that it always is.

The Chairman: What I had in mind was this, this was in time of stress, panic, and collateral very often is measured by what you can get on it under an execution, as we say, a forced sale of tangible property, that can be reached by virtue of foreclosing the bonds or putting up the property behind the stock. Now, which one of those two securities had the greater amount of tangible, unencumbered property behind it, the stock or bonds of the Tennessee Coal, Iron & Railroad Company or the second mortgage bonds of the United States Steel Corporation?

Mr. Young: Those exchanged or the whole of the stock?

The Chairman: Those for which the exchange was made.

Mr. Gates: The second mortgage bonds of the United States Steel Corporation are practically a promise to pay. I do not think there is any particular security behind them except the preferred shares of the Steel Corporation itself. The stock of the Tennessee Coal, Iron & Railroad Company

represented the total equity in the property of the Tennessee Coal, Iron & Railroad Company over and above its bonded indebtedness.

The Chairman: What property had you there, what kind of property, the stock; what amount of ore was available at that time?

Mr. Gates: Well, I do not think anyone could testify correctly to-day as to the amount of ore owned by the Tennessee Coal, Iron & Railroad Company. It would take a year to correctly measure up the amount of ore we had. We always estimated that we had not less than 300,000,000 tons, and we might have 500,000,000 to 700,000,000 tons of iron ore in the Tennessee Coal, Iron & Railroad Company property. The coal acreage was enormous. Unless I saw a statement of the Tennessee Coal, Iron & Railroad Company I could not give anything like any approximate statement of the coal. If you will let me see that statement I am willing to testify whether I think that statement is fairly correct.

The Chairman: I believe you estimated your acreage, the tonnage of coal, to be something like 1,400,000,000 tons of coal?

Mr. Gates: Well, Mr. Chairman, I could so easily make a mistake of 500,000 tons that I should prefer to look at the statement. I had a voice in drawing up that statement, and I know I thought it was correct at the time I assisted in drawing it up.

The Chairman: How are the coal, iron ore and limestone located with reference to the convenience for assembling your ores. Were they separated by any great distances or were they close together?

Mr. Gates: I think that in the Birmingham district it is possible to assemble a ton of material and make a ton of pig iron cheaper than at any other place in the world.

The Chairman: I think Mr. Schwab made the same statement before the Ways and Means Committee. I want to call your attention to this statement. It has been estimated that you could make a ton of steel rails or convert the iron ore at \$2 or \$3 less cost per ton. I think Mr. Schwab makes it \$4 a ton.

Mr. Gates: A ton of pig iron, under the most modern practice in what is known as the Birmingham district, can be produced to-day for less than \$9 a ton. There is no other part of the United States that I am acquainted with where it can be produced at less than \$11 a ton, based on the freight rates for assembling the raw material.

The Chairman: This company seems to show some improvement in its property by the character of betterments made in the years 1906 and 1907, before its absorption by the United States Steel Corporation. Do you remember what improvements were made on that property at that time?

Mr. Gates: We spent money as fast as we could and do it intelligently. I think we spent during the time we had the property somewhere between \$6,000,000 and \$8,000,000.

The Chairman: For what was that money spent?

Mr. Gates: Everything you can think of to improve a steel plant or a blast furnace or a coke oven or a coal mine or a dolomite quarry.

The Chairman: Now, what were you doing, getting any business in the way of orders for converting this ore into rails and the like of that?

Mr. Gates: We had just taken a very large order for rails, I think, 150,000 tons of rails from E. H. Harriman, at \$2 per ton advance over the price of Bessemer steel rails.

Mr. Beall: What kind of a rail were you making?

Mr. Gates: We were making a Bessemer open-hearth rail. We took the contract, I think, for the Southern Pacific and the Union Pacific roads for an open-hearth rail. Whether they were actually making the rails at the time the company was taken over by the corporation I do not remember, but we were preparing to make the open-hearth rail and had sold 150,000 tons.

The Chairman: What was the reason for this excess in the price of your rail over the Bessemer rail?

Mr. Gates: We thought it was a better rail and we convinced Mr. Harriman.

The Chairman: Did you get orders from any other concern?

Mr. Gates: The Harriman order was a large order and it would take several months to fill it. We had some small orders, but that practically put us out of the market.

Mr. Beall: Was the United States Steel Corporation in a position to make that character of rail at that time?

Mr. Gates: They had open-hearth plants in the north, but I do not think they had made for the commercial market any open-hearth rails; they might have made a few trials.

Mr. Young: Had you made any before that time?

Mr. Gates: Yes, sir.

Mr. Young: To any great extent?

Mr. Gates: Yes; we had made a good many thousand tons, but we were putting in a new and improved mill to

make the rails cheaper; they were costing more than they should have cost.

The Chairman: Was there any other concern in the United States, Mr. Gates, or in America, that was situated with reference to its raw material, the natural resources, as favorably as the Tennessee Coal, Iron & Railroad Company, with the possible exception of the United States Steel Corporation, at the time it acquired this company?

Mr. Gates: The Republic Iron & Steel Company was as favorably situated with its Birmingham plant, but it was making only pig iron, but the Republic Iron & Steel Company can make just as cheap steel by the expenditure of money as the Tennessee Coal, Iron & Railroad Company was making. Their situation is practically identical with the Tennessee Coal, Iron & Railroad Company.

No Money Transfer in Change of Control

The Chairman: It has been stated on rather high authority that at the time the Tennessee Coal, Iron & Railroad Company was acquired there was a certain business firm, the name of which is not given, which would undoubtedly have failed in New York if help had not been given it, and it is alleged that a branch of this business firm had among its assets a majority of the securities of the Tennessee Coal, Iron & Railroad Company, and that an application had been made to the United States Steel Corporation to purchase this stock, in order to save a financial institution in the State of New York and avert a panic. Do you know anything about such a situation in New York on election day when you landed?

Mr. Gates: My answer is that in the exchange of these securities there was not a dollar changed hands.

The Chairman: And no bank received any additional assistance by virtue of the absorption of this concern?

Mr. Gates: I think not.

The Chairman: Did any member of the Tennessee Coal, Iron & Railroad Company make any application to the United States Steel Corporation to accept a comparatively worthless property in order to save the country?

Mr. Gates: I do not think I could answer that. I think that question is a little bit facetious, if you will excuse me.

The Chairman: I want to know who flew that alleged signal of distress from the Tennessee Coal, Iron & Railroad Company, notwithstanding this condition of affairs which you have described.

Mr. Gates: There are a great many underground wires in New York. We have a clearing house association. I was told that a certain bank or trust company applied to the clearing house association for assistance, that a committee was appointed by the clearing house association to examine their assets, and that in the examination of their assets they discovered that several million dollars of their loans in collateral were on the stock of the Tennessee Coal, Iron & Railroad Company, and that they reported back to the committee that there were too many dollars loaned on Tennessee Coal, Iron & Railroad stock. I am giving you now what bankers have told me, and what persons in this deal have told me, not what I know of my own personal knowledge. That as a result of this investigation a gentleman was invited to Mr. Morgan's house, and Mr. Morgan suggested to relieve the congestion that the Steel Corporation might acquire the Tennessee Coal, Iron & Railroad Company. This is hearsay evidence.

The Chairman: It has been stated by a certain distinguished official of this government—I will not give my authority—that on Nov. 4, 1907, Judge Gary and Mr. Frick informed him that as a mere business transaction they did not care to purchase the stock, and under ordinary circumstances they would not consider purchasing the stock because but little benefit would come to the Steel Corporation from the purchase, that they were aware that the purchase would be used as a handle for attack upon them on the ground that they were striving to secure a monopoly of the business and prevent competition—not that this would represent what could be honestly said, but what might be recklessly, and untruthfully said. Do you know or have you heard by rumor or otherwise of any appeal to the tender sensibilities of the purchasers of this concern to take it on account of the conditions mentioned in this communication?

Early Offers for Tennessee Coal & Iron Stock

Mr. Gates: I think Mr. Morgan offered Mr. Kessler, who was one of the men in this syndicate, \$150 a share for his stock, conditioned upon the corporation ratifying the trade.

The Chairman: What did you actually get for your stock?

Mr. Gates: Well, that is a hypothetical question. We got 119¾ per cent. of second mortgage steel bonds that are now worth 108, worth then 80 and 85.

The Chairman: What were the second mortgage bonds worth at the time you were offered \$160 for your stock?

Mr. Gates: I was never offered \$160 for my stock.

The Chairman: At the time the offer was made?

Mr. Gates: Mr. Kessler told me that Mr. Morgan said he would give \$150, if his colleagues would agree to it, in the Steel Corporation. They did not agree to it at that time.

Mr. Beall: Just for Mr. Kessler's stock or the stock of the syndicate?

Mr. Gates: The entire syndicate's stock. Mr. Kessler had a large block of stock, and when this syndicate went to acquire if they discovered that Kessler was a factor in the Tennessee Coal, Iron & Railroad situation, and so they took him in. I do not know this to be true. Kessler made that statement.

The Chairman: In your opinion, Mr. Gates, what per cent. of the actual value of the Tennessee Coal, Iron & Railroad Company did the Tennessee Coal, Iron & Railroad Company receive at the time of this sale under the conditions you have mentioned?

Mr. Gates: That is purely a matter of opinion and I would hardly care to reply to it directly. If they sold their bonds, the bonds went as low as 78, they got less than par. If they held them until they got 106 or 108, they got 120 or 125 for their stock. I think my stock cost in the neighborhood of 105. I took the original amount of 18,000 shares at about 108 or 112, and then we put in effect several million dollars of the stock on which we declared a 4 per cent. dividend.

The Chairman: I was referring to a reported interview which appeared in the hearings before the Senate Committee, in which you are reported as saying: "As to the purchase of the Tennessee Coal, Iron & Railroad Company by the United States Steel Corporation, the steel men got the best property in the country, and at a bargain price. I regard it as a sacrifice of stock worth a great deal more than the purchase price. I did not want to sell my stock, but had to follow the crowd. Had Tennessee stock been thrown on the market I would have been better off, as I could have increased my holdings at a low price." The iron ore and coal deposits of the Tennessee company are worth many times more than the entire cost of the property to the Steel Corporation."

Mr. Gates: That I would be willing to make an affidavit to to-day, in my opinion; it is purely an opinion.

The Chairman: It has been stated on very high authority, Mr. Gates, and this statement was made by an official of this Government to another official, they are referring now to Mr. Gary and to Mr. Frick: They further inform me that as a matter of fact the policy of the company has been to decline to acquire more than 60 per cent. of the steel properties, and that this purpose has been persevered in for several years past, with the object of preventing these accusations, and as a matter of fact their proportion of steel properties has slightly decreased, so that it is below this 60 per cent.; the acquisition of the property in question will not raise it above 60 per cent.

Mr. Jones: At what time was that statement made?

The Chairman: Nov. 4, three or four days before the election. Prior to the time your properties were actually sold, were any efforts made other than those you have mentioned by the United States Steel Corporation to acquire this property?

Mr. Gates: Not that I know of.

The Chairman: Do you know whether it had been the desire or purpose of the corporation to get hold of this property, if an opportune occasion ever offered, for several years prior to that time?

Mr. Gates: That is hardly a fair question. I cannot tell what was in the minds of the corporation.

The Chairman: I am asking for an opinion as to what efforts had been made to purchase this property of which you are aware, or propositions like the proposition you spoke of, 150 for the stock, if a proposition had been made. A farmer knows whether some one wants to buy his horse by the way people talk to him, and I presume it would be the same way with a property of this kind, that if you wanted to get hold of it there would be somebody actively at work.

Mr. Gates: They had a large brokerage house in which some of the prominent members of the corporation do a great deal of business approach my son probably a year before, and he said he could handle the property at a satisfactory price if we gave him an option. In that talk he intimated it was for the corporation, but I do not know whether it was or was not.

The Effort to Avoid a Panic

The Chairman: This statement is further made as to these gentlemen, Mr. Frick and Judge Gary, made by one official of the Government to another: "But they feel that it is immensely to their interest, as to the interest of every responsible business man, to try to prevent a panic and general industrial smashup at this time, and they are willing to go into this transaction, which they would not other-

wise go into, because it seems the opinion of those best fitted to express judgment in New York that it will be an important factor in preventing a break that might be ruinous, and that this has been urged upon them by the combination of the most responsible bankers in New York who are now thus engaged in endeavoring to save the situation." Did this combination of bankers of which Mr. Morgan is the reputed head lose greatly by that panic?

Mr. Jones: That is again asking for Mr. Gates' opinion.

The Chairman: Mr. Gates has an opinion about that, for they allege here that these bankers took over this property to save the situation at a great sacrifice, that they saved properties worth several millions of dollars. I thought he would know something of the loss they made by virtue of this patriotic effort to save the situation, but I want to know the whole truth both in favor of the Steel Corporation and against it, and both in favor of the bankers and against them?

Mr. Gates: I never heard any rumor about the danger of Mr. Morgan making an assignment. I do not know whether he made money or lost it.

The Chairman: Did the sale of this concern have any effect, could it have had any effect, upon the stress at that time other than the stress upon one or two individuals in the Tennessee Coal, Iron & Railroad Company?

Mr. Gates: There was not a dollar changed hands; it was simply a shifting of securities, a shifting of collaterals.

Mr. Bartlett: It did not add a dollar to the circulation in New York?

Mr. Gates: It did not add or detract a dollar from the situation.

The Chairman: I believe Mr. Schley, who makes a statement in the Senate report, is sick now and not able to be here?

Mr. Gates: Yes, sir.

The Chairman: As I gather from the published report of Mr. Schley, this was a forced sale, that he was squeezed on the street. To what extent was this sale forced, and, if you know anything about who did the forcing, I wish you would let me know.

Mr. Gates: I regarded it as a forced sale. I had no accounts myself with Moore & Schley's office. He was not borrowing any money for me on any securities that he was holding as agent for me; I had no account with him. I had taken up my securities at the time the transaction took place. My surmise would be that the finding of a large amount of Tennessee Coal & Iron as collateral in one of the banks or trust companies had to do with the forced sale.

The Chairman: Did Mr. Morgan have any decided influence over the attitude of this bank and trust company toward the Tennessee Coal, Iron & Railroad Company stock?

Mr. Gates: I do not know. It is pretty hard to tell where a man's influence starts or ends on Wall Street.

Tennessee Coal & Iron Sold at Bargain

Mr. McGillicuddy: At the time this deal was consummated, in November, 1907, whereby the stock of the Tennessee Coal & Iron Works was transferred in exchange for the steel seconds, what, in your opinion, was the total value of the property of the Tennessee Coal, Iron & Railroad Company Works?

Mr. Gates: My opinion is that it was bought at a bargain sale; it was a forced sale on the part of the owners of the Tennessee.

Mr. McGillicuddy: Would you give us your opinion as to its total value, approximately?

Mr. Gates: At the time Kessler reported to me an offer of \$150 from Morgan, I will say I did not think that was enough for the property.

Mr. McGillicuddy: Can you not give us your opinion as to what its fair market value would be?

Mr. Gates: No, because I might be very widely wrong. To give you an idea, the Tennessee Coal, Iron & Railroad Company owns what is known as Red Mountain, which has an immense body of ore with tunnels and shafts going into it, but not through it. If that ore should pinch out, if the drills would show that the ore did not go greater than a certain depth, I might be mistaken. You are asking me to give you an approximate idea when it is almost impossible to form that without complete drill statistics.

Mr. McGillicuddy: So far as the property was disclosed at that time it must have had in your mind some value?

Mr. Gates: The answer is, I was willing to pay \$108, \$109 or \$110 a share for it, long before this, and was not willing to take \$150.

Mr. McGillicuddy: What would you have been willing to take at that time?

Mr. Gates: I did not want to set a price on mine.

Mr. Young: Mr. Gates, how many shares of stock were there in the Tennessee Coal, Iron & Railroad Company?

Mr. Gates: I should say 200,000 or 300,000.

Mr. Young: The par value of the stock was \$100 a share?

Mr. Gates: Yes, sir.

Mr. Young: What properties did it own?

Mr. Gates: Iron ore, magnetite, coal, coke, coke ovens, blast furnaces, limestone quarries, rolling mills and so forth.

Mr. Young: Did it own any railroads?

Mr. Gates: Yes; they were interested in a railroad, the Birmingham Southern, I think. It ran from Birmingham to the mines, and the steel plants, and perhaps to some of the coke operations. Mr. Jones tells me a total of nearly one hundred miles.

Mr. Young: The road was built for the purpose of handling the raw material, the product of the Tennessee Coal, Iron & Railroad Company?

Mr. Gates: Yes, sir. We did commercial work for everybody; we published a tariff, I think, but the main business was the business of the T. C. I.

Mr. Young: I understood you to say that this was a forced sale?

Mr. Gates: I regarded it as a forced sale. I did not have to sell my stock. Under the agreement, as I recollect it, Schley and Hanna had a right to dispose of the stock if at a profit, but they had no right to dispose of the stock at a loss.

Mr. Young: Was it sold at a loss?

Mr. Gates: Considering the money and the time we spent in it, I think we lost money. I did a great deal of work in it, without money and without price, and all the rest of them did.

Mr. Young: Did you get as much for it as you paid for it?

Mr. Gates: There you come back to the question of what sinking fund bonds were worth.

Mr. Young: Assuming they were worth what they sold for in the market at the time?

Mr. Gates: We lost money.

Mr. Young: About how much per share?

Mr. Gates: I would say \$10 or \$15 a share at that time I think the bonds sold down to 78.

Mr. Young: When the panic had eased up, I suppose these bonds, like other securities, went up?

Mr. Gates: Yes, sir.

Mr. Young: And it was true also, was it not, that during the panic the stock of the Tennessee Coal, Iron & Railroad Company greatly depreciated because of the situation?

Mr. Gates: Well, I think the stock of the Tennessee Coal, Iron & Railroad Company, if it had not been unduly depressed, would not have gone down much, because it was held by a syndicate of men who we all thought could go through any panic and carry their securities.

Mr. Young: Unless you were mistaken about that, why did they not carry it through instead of selling it at a loss?

Mr. Gates: They discovered a lot of it up as collateral in the Trust Company of America. Mr. Thorne was one of the syndicate. The bank is solvent, strong, and the stock selling at \$300 or \$400 a share.

Mr. Young: But you say this bank had made application to the clearing house for help?

Mr. Gates: There was a run on them then by the brokers.

Mr. Young: They needed ready money?

Mr. Gates: They needed \$10,000,000 of ready money, and they asked the clearing house banks for the money, so the president of the trust company told me. I was a shareholder.

Mr. Young: Do you know whether they got the money?

Mr. Gates: Yes, sir, they got it.

Mr. Young: And do you know from whom they got it?

Mr. Gates: I think the syndicate was made up in Morgan's office. At least, I was in the bank, and I heard Mr. Thorne, the president, talking over the 'phone. I do not know it from personal knowledge, but when he shut off the 'phone he turned to me—he is a friend of mine—and said, "That was George Perkins I was talking to."

Mr. Young: And then do I understand the situation to be this, that Mr. Morgan was willing to come to the relief of this bank provided he could get this stock?

Mr. Gates: Not of my personal knowledge.

Mr. Young: You had no knowledge on the subject?

Mr. Gates: No, nothing definite.

Mr. Young: As to this offer made to Mr. Kessler, if I understood you correctly, the statement was made that Mr. Morgan had said to Mr. Kessler that if his associates would agree to it he would take the control of the stock of the Tennessee Coal, Iron & Railroad Company at \$150-a share?

Mr. Gates: I had best state the way this came about. Mr. Kessler, knowing that I had originally 18,000 shares in the syndicate, and that I had put up my percentage of assessments for doing new work, which brought my total of securities up to 22,000 to 24,000 shares, asked if I would

agree to a trade on that basis with Morgan, and I told him no. My understanding was that Mr. Morgan said it would have to be ratified by Gary and Frick; that is, they would have to agree to it, or there would be no trade. I do not know whether Kessler went to every member of the syndicate or not. As far as I know there was nothing came of it.

Mr. Young: What was the Tennessee Coal, Iron & Railroad stock quoted at in the market at the time this offer or proposition was being considered?

Mr. Gates: I think it was quoted about \$150 to \$160. I think it a fair statement to say that the day before Gary and Frick went to see Roosevelt, if a man had gone in the market and tried to buy 2500 shares of stock of the Tennessee Coal, Iron & Railroad Company he would have probably had to pay \$150 a share average. On the other hand, if he had tried to sell 2500 shares of the Tennessee Coal, Iron & Railroad he might have been obliged to sell it at \$110 or \$115 average. There was probably no floating stock, it was so closely held by the people who had bought it for investment. There was practically no stock in the hands of brokers.

Mr. Young: On the other hand, there was no money with which to make new investments available in New York during the panic, was there, at that time?

Mr. Gates: It was pretty hard to get.

Mr. Young: You stated that, in your opinion, pig iron could be made at Birmingham at \$9; does that relate to this time, or the time when this transaction took place, when the property was sold?

Mr. Gates: The Republic is making it for that to-day.

The Ore Question

Mr. Young: What did the ore you were using run in metallic iron?

Mr. Gates: It varied between 35 and 44 per cent. If using Red Mountain ore, which was the large body owned by the T. C. I., I would say the average would be 38 or 39. If using a brown ore, it might run up to 44 or 48.

Mr. Young: Was the cost in assembling this higher grade brown ore greater per ton than of assembling the Red Mountain ore?

Mr. Gates: Yes, sir, because it lay in more scattered districts. As to mining cost, if you strike a pocket with 10,000 tons of brown ore you can take it out very cheaply. If you only had 100 tons it would cost you a lot of money. But the Red Mountain ore is a steady mining proposition. You can figure about what your cost will be.

Mr. Young: In practice, how much iron ore did it take in the furnace to make a ton of pig iron? About two and a half on the average?

Mr. Gates: Approximately that, I think.

Mr. Young: What is the character of the coal that you have there?

Mr. Gates: We have got all kinds of coal, the same as all kinds of ore. The best coal down there is what is known as the Pratt seam. It is a high grade coke coal, the best in the South. It is not so good as the Northern coking coal, the Pennsylvania coal. If you wash the sulphur out of it it is just as good as Connellsville.

Mr. Young: How does this ore run in phosphorus there at Birmingham?

Mr. Gates: It is all a non-Bessemer ore. There is no Bessemer ore in the South that I know of.

Mr. Young: The iron ores in the Lake Superior region run considerably higher in iron, do they not; those that are used commercially?

Mr. Gates: They usually do. I think this year the scale is $51\frac{1}{2}$ metallic iron, or 51.

Mr. Young: Many of them run to 56, do they not?

Mr. Gates: Yes, and many of them to 46.

Mr. Young: Not a very large proportion that is being now used?

Mr. Gates: They treat it. We are mining ore in Canada that lies, in its natural state, 40, and we sweeten it up and ship it 54 or 55; but we have to sort it.

Constitution of Tennessee Coal, Iron & Railroad Company

Mr. Young: Is the Tennessee Coal, Iron & Railroad Company a holding company?

Mr. Gates: It owns its own properties. I think it has few subsidiary corporations.

Mr. Jones: The Birmingham Southern Railroad is one.

Mr. Young: Are there any subsidiary companies that own coal or iron ore lands?

Mr. Gates: There may be some in which we own an undivided interest, or a three-fourths interest, or a one-fourth interest. I cannot tell you without going through this. Take the Potter Ore Company, of which the Republic and ourselves jointly guaranteed a bond issue. That is a separate company, but it is operated for the benefit of the Tennessee Coal, Iron & Railroad Company and the Republic Iron & Steel Company, and both are joint guarantors on the bonds.

Mr. Young: Do you know what proportion of the stock of the Tennessee Coal, Iron & Railroad Company is now owned by the United States Steel Corporation?

Mr. Gates: Practically all of it, I think.

Mr. Young: Only a few outstanding shares?

Mr. Gates: There might be a few shares of preferred outstanding; I think probably there are. There are usually a few people who try to get a fancy price for their last few shares.

Mr. Young: You are now operating the Republic Iron & Steel Company in the Birmingham region?

Mr. Gates: We have three furnaces down there and a thousand coke ovens.

Mr. Young: Are the conditions for the manufacture of pig iron by the Republic Iron & Steel Company of Birmingham as good as the facilities for the manufacture of pig iron by the Tennessee Coal, Iron & Railroad Company?

Mr. Gates: I think they are practically alike.

Mr. Young: And have you large properties belonging to the Republic Iron & Steel Company at Birmingham?

Mr. Gates: We have an investment down there of \$10,000,000 or \$12,000,000. You might look at it as small.

Mr. Young: Have you any estimate of the ore that you own, the number of tons of ore?

Mr. Gates: I thought you were investigating the United States Steel. I do not believe I would care to answer that question. I think we are making iron as cheaply as the Tennessee Coal, Iron & Railroad Company.

Mr. Young: Do you know anything about the extent of the Schloss-Sheffield and the Woodward properties in a general way?

Mr. Gates: Yes; in a general way. I look at their statements pretty carefully, and the maps of their iron ore and coal, and try to find out all I can about it. The Schloss-Sheffield have about 125,000 tons of pig iron piled up down there.

Mr. Young: That they cannot sell?

Mr. Gates: They have not sold it; at least, they have that much there. It was 132,000 at the last report we had.

The Chairman: Going back to the original transaction, the Trust Company of America needed \$10,000,000. They had a great number of securities of the Tennessee Coal, Iron & Railroad Company held as collateral. They consented to transfer that collateral from the Tennessee Coal, Iron & Railroad Company to the United States Steel Corporation in an exchange of stock?

Mr. Gates: You are mixed. Mr. Thorne, the president of the company—I happened to be a stockholder at that time in the trust company—told me that he applied to the clearing house for \$10,000,000, and that the clearing house committee sent over a committee to examine the assets under his loans, and that they claimed to him that he had too much Tennessee Coal & Iron. Mr. Thorne was in this syndicate that bought the property. The trade was made by L. C. Hanna and Grant B. Schley, not by Mr. Thorne or by the Trust Company of America.

The Chairman: I have gathered that the bank could not get the money until there was a transfer made of this stock from one company to another. Is that true?

Mr. Gates: I do not know about that. The Trust Company of America, I think, paid out over \$56,000,000. The run started on them before I left France, starting in October, and it continued long after they got their ten million dollars. I think it continued until probably January before it stopped—December, anyway.

The Price of Rails

The Chairman: You were speaking of the facility for assembling ores of the Tennessee Coal, Iron & Railroad Company, and of getting an extra price for rails. If you had continued in business there, and had perfected your rail plant, with your facilities for assembling ore, and with the demand for open hearth rails, could the United States Steel Corporation or any other concern have dictated the price of rails to you or to your concern?

Mr. Gates: My opinion would be that we would have been in the saddle in that territory. But where it is a question of rail transportation, \$2 or \$3 a ton, we might have been at a disadvantage. But in that immediate territory we would have had the advantage.

The Chairman: What is the price of steel rails now; what are they quoted at?

Mr. Gates: I think open hearth rails are quoted at \$29 and \$30, and the Bessemer \$28.

The Chairman: How long has that price remained unchanged, if it has remained unchanged?

Mr. Gates: Before the Sherman anti-trust law took effect there was a rail pool, away back in 1884, '85 or '86, and that rail pool established a price on rails at that time. I think, of about \$35. The price has varied between \$35 and \$15. The time the pool was knocked out, years ago, there was a fight, and then they would get back together. Then the Sherman anti-trust act rather stopped this pool.

ing business and the price of rails has been nominally, I think, about \$28 for most of the time for ten or twelve years.

The Chairman: You have not any idea what per cent. of the rails are made by the United States Steel Corporation?

Mr. Gates: No, I have not.

The Chairman: You spoke of the price of rails having fluctuated.

Mr. Gates: Not much in twelve years.

The Chairman: Prior to the last twelve years they fluctuated, as you said, running from \$16 or \$17 up.

Mr. Gates: I was at the head of the Illinois Steel Company for several years, and during that time we had a rail fight. The price was \$23 one day, the next day it was \$18, and the next day it was \$15.

The Chairman: To what do you attribute this sudden stability in the price of rails for the last ten years?

Mr. Gates: I am not a rail maker, and am not competent to answer that question.

Handling Lake Superior Ores

The Chairman: Do you know what distance Lake Superior ores are brought, and over what lines?

Mr. Gates: I think the average haul is from 30 to 100 miles, in Minnesota, and that ore is hauled by three railroads, the Eastern Minnesota, which is owned by the Great Northern; the Duluth & Iron Range, and the Duluth, Missabe & Northern, these two owned by the Steel Corporation.

Mr. Bartlett: You spoke about the Great Northern owning ore in that range. Is it not a fact that the Steel Corporation has entered into a contract with the Great Northern Railroad to purchase all their ore for years? And, while the Northern Railroad owns them, the United States Steel Corporation controls the output, and will for years; is not that a fact?

Mr. Gates: No, sir, that is not a fact. The Minnesota Eastern Railway is owned by the Great Northern Railroad. The Great Northern Ore Company has sold its ore to the United States Steel Corporation. But it does not necessarily mean that that ore is to be moved over the corporation's railroad. Most of the ore acquired by the steel corporation from the Great Northern Ore Company lies contiguous to the Eastern Minnesota Railroad, and that ore has been sold, as Mr. Hill informs me, at a price f. o. b. boats Lake Superior ports, and the freight rate gets no bigger. Any ore hauled over the Duluth & Iron Range, or the Duluth, Missabe & Northern pays an 80-cent freight rate.

Mr. Young: Do you know anything about the terms of that contract, whether it is a direct sale, or somewhat in the nature of a lease which can be thrown up?

Mr. Gates: I think it could have been thrown up up to a certain time, but I think that time has expired. I think it is now a lease in perpetuity.

The Chairman: You spoke of an 80 cent freight rate. What is the distance of that haul?

Mr. Gates: Seventy to 100 miles, I think.

The Chairman: What do they charge you a ton to haul that iron a mile?

Mr. Gates: It is about a cent a ton a mile. Coal and coke and ore, I think, are in about the same class. Ore can be handled more cheaply. Ore is generally handled in what they call hopper-bottom cars containing fifty tons or more. That ore is dropped into the car from the chute, and the car is unloaded by running it out on the trestle and dropping out the bottom. Coke is put into the cars, and if it is in box cars, they have to board up the sides, and they have to do it by hand, so it costs a good deal more money to load it and a good deal more money to unload it.

The Chairman: Is not coke carried over a good many of those roads in this country at 3 mills per ton mile?

Mr. Gates: I think so; I think it has been carried at less than 3 mills.

Early Wire Mill Consolidations

The Chairman: Mr. Gates, you were connected at one time with the Consolidated Steel & Wire Company of Illinois, were you not?

Mr. Gates: Yes, as general manager, director and member of the executive committee. It was formed in 1892 or 1893, I guess. It had no bonded debt. I think it had about four million capital issued. We were young and ambitious, and as fast as we got a little money we bought another property.

The Chairman: What other property?

Mr. Gates: Forty or fifty, I should say, one by one, beginning with the Washburn & Worcester Wire Company, in Worcester, Mass., and extending to San Francisco. They were not necessarily acquired by the Consolidated. Most of them were acquired by I. L. Elwood, recently deceased, and myself; but they were amalgamated

eventually into the American Steel & Wire Company.

The first wire corporation I was interested in was the Southern Wire Company, about 1880, in St. Louis. Then we acquired the St. Louis Wire Mill Company, and we built a concern near Pittsburgh called the Braddock Wire Company. We operated those concerns separately in the early eighties. Later on we acquired a controlling interest in the Lambert & Sheffield Wire Fence Company, Joliet, Ill., and one or two other companies, and then we formed the Consolidated Steel & Wire Company of Illinois.

The Chairman: What was the value of that property?

Mr. Gates: The Consolidated Steel & Wire Company went into the American Steel & Wire Company of Illinois at about \$200 a share, perhaps a little less. The American Steel & Wire Company of Illinois was merged into the American Steel & Wire Company of New Jersey, which took over all the companies. Those companies in the meantime were generally purchased by Mr. Elwood and myself for cash and turned in at what we paid for them. We never attempted to make a dollar out of any purchase, directly or indirectly.

The Chairman: The American Steel & Wire Company was capitalized at what?

Mr. Gates: \$40,000,000 preferred and \$50,000,000 common. At the time of its first consolidation the American Steel & Wire Company of Illinois, which was afterwards turned into the American Steel & Wire Company of New Jersey, was capitalized at \$24,000,000.

The Chairman: Speaking approximately, do you remember what was the average price of barb wire, the kind used by the farmers as fencing, for the three years preceding the formation of the Consolidated Company?

Mr. Gates: I cannot keep those prices in my head. I started selling barb wire in 1874 at 20 cents a pound. We sold the same class of wire later at 1.7 cents a hundred. There is the price, between \$400 a ton and \$34.

The Chairman: What was the effect on the price of wire nails, and the other products in the American Steel & Wire Company? Was there any variation in price after its formation, immediately succeeding the formation of the American Steel & Wire Company, just prior to its sale to the United States Steel Corporation?

Mr. Gates: I do not believe there was much change. We tried to run the mills we could operate the most economically, and shut down those that were the most expensive; and I do not think we particularly advanced the price. That is my recollection. Two-fifths of the properties were probably dismantled, shut down and eventually dismantled, or concentrated. The machinery had been moved to our other plants; the machinery was not wasted.

Mr. Bartlett: Employees in Boston or in California when the plants were dismantled did not follow up and get employment at these consolidated plants?

Mr. Gates: Not all of them, but it is safe to say that about 90 per cent. of the wire workers would follow the plants, the skilled men.

The Chairman: What was the approximate cost per ton for barbed wire such as is used for fencing in 1900, do you know? I do not ask to the cent, but approximately.

Mr. Gates: They were making today probably 10 or 15 per cent. on their output. If you get the selling price and take 10 or 15 per cent. off you will get about the cost price.

The Chairman: What was the basis of exchange of stocks between the American Steel & Wire Company and those of the United States Steel Corporation at the time the corporation took over the American Steel & Wire Company?

Mr. Gates: I think we got \$46,800,000 of United States Steel preferred for the \$40,000,000 of Steel Wire preferred; and between \$50,000,000 and \$60,000,000 of common, perhaps a little over \$60,000,000, for the \$50,000,000 common. And yet the Steel & Wire Company went into the United States Steel Corporation at a comparatively lower figure than any other concern.

The Chairman: What percentage of the business did the American Steel & Wire Company own at the time it was acquired by the United States Steel Corporation?

Mr. Gates: I should think we owned 75 to 85 per cent. of the business in wire and its products.

The Chairman: Did the United States Steel Corporation acquire any other properties producing similar products to yours at the time it acquired your property?

Mr. Gates: They acquired later the Union Steel Company, Pittsburgh, which was owned by Mr. Frick and the Mellens, largely, as I understood, I think \$45,000,000. That was a wire plant.

Mr. Young: Was that later than the organization of yours?

Mr. Gates: Yes. Several years later.

Formation of United States Steel Corporation

The Chairman: The United States Steel Corporation

was really formed by the merging of nine separate concerns, was it not, Mr. Gates?

Mr. Gates: I do not remember whether there were nine or what they were. There was the Carnegie Steel Company—let me explain. The Federal Steel Company was a holding company. The Federal Steel Company owned the capital stock of the Minnesota Iron Company. The Minnesota Iron Company, in turn, owned the Duluth & Iron Range Railroad. They owned the Loraine Steel Company, of Loraine, Ohio, and the Illinois Steel Company, of Chicago. So that in the turn-in of the Federal Steel Corporation into the United States Steel they really got three separate and distinct corporations, good-sized ones. Then the Carnegie would be four, the National would be five, and the Hoop would be six, the Tin Plate would be seven, the Wire would be eight, the Tennessee Coal & Iron would be nine, the American Sheet Steel would be ten, the American Bridge would be eleven. There were eleven or twelve concerns. The National Tube would be twelve.

Mr. Young: The Illinois Steel Company itself was formed by a consolidation of a number of other companies, was it not?

Mr. Gates: The Illinois Steel Company was formed by an amalgamation of the North Chicago, the South Chicago, the Union, the Joliet and the building of the New South works.

Mr. Young: Did it take in that Milwaukee property?

Mr. Gates: That is the North Chicago Rolling Mill. They had two plants, one at North Chicago and one at Bayview, or South Milwaukee.

Mr. Young: That was really the beginning of the consolidation in the steel business, was it not?

Mr. Gates: I think so, yes. That was about 1888 or 1889.

Mr. Young: Then the next step was the formation of the Federal Steel and the acquisition by it of the Minnesota Iron Company and the Loraine, in addition to the Illinois, was it not?

Mr. Gates: Yes. That came about in this way: Many of the stockholders of the Minnesota Iron Company were stockholders in the Illinois Steel.

Mr. Gates: I thought I saw evidence of an attempt to push up the price of ore, so I went out and acquired some ore properties for the Illinois Steel, which made rather hard feeling between the directors of the two corporations, and resulted in the amalgamation.

Mr. Young: You were connected with the Illinois Steel at that time?

Mr. Gates: Yes, sir.

The Chairman: The companies to which I referred as merged at the time of the formation of the United States Steel Corporation, are the Carnegie Company, the Federal Steel Company, the National Tube Company, the American Bridge Company, the Lake Superior Consolidated Mines, the American Steel & Wire Company, the National Steel Company, the American Steel & Hoop Company, the American Tin Plate Company, and the American Sheet Steel Company. Were there any other companies?

Mr. Gates: No, I think that was all. But there was the Pittsburgh Steamship Company and the American Steamship Company—two lines of steamers on the lakes.

The Chairman: Were they independent concerns, not identified with any of the companies I have named?

Mr. Gates: The American Steamship Company was a concern which I built and had been president of from its start. I think we had 12 ships. The Pittsburgh Steamship Company was built by Henry W. Oliver and Mr. Carnegie and Mr. Frick, and that crowd. It was a pretty important concern. Then there was the Elgin, Joliet and Eastern Railroad; the Chicago, Lake Shore & Eastern Railroad; the Union Railroad; the Duluth Iron & Range; H. C. Frick Coke Company.

The Chairman: Before these carriers were taken over by the United States Steel Corporation were they competing railroads?

Mr. Gates: Yes.

The Chairman: Are they owned absolutely now by the United States Steel Corporation, as part of its property?

Mr. Gates: Yes.

The Chairman: Are they still engaged as common carriers?

Mr. Gates: Yes; they are common carriers.

The Transactions with Mr. Carnegie

The Chairman: Do you know how long negotiations were pending before your companies, the Carnegie Company and the rest of them, became merged in what is now known as the United States Steel Corporation?

Mr. Gates: Well, to go back and give you the history, the price of finished steel became very badly demoralized in 1896 or 1897, and at that time I think Mr. Frick, Judge W. H. Moore, of New York, and one or two colleagues conceived the idea of getting an option from Carnegie

on the Carnegie Steel Company. This was before the formation of the United States Steel. They paid Mr. Carnegie \$1,000,000 in cash for that option; but the demoralization became so great in the iron and steel business that it was not possible for Mr. Frick, Judge Moore and colleagues to put it through, and they had to forfeit that \$1,000,000.

The Chairman: What was the amount of the option?

Mr. Gates: I think it was \$160,000,000. Then came the Loraine and Federal. The Federal Steel Company was formed by the acquisition of the Loraine and the E. J. & E. Railroad, which was owned by Morgan and friends and the Minnesota Iron and Illinois Steel; and they became the Federal Steel Company. The Federal Steel Company was formed in 1898, and in 1901 became part of the United States Steel.

The Chairman: Prices became stable, or at least more stable, along about 1896 to 1897, did they not?

Mr. Gates: I think they got worse at that time. Along about 1898 or 1899 they got better. In 1901 they were very good.

The Chairman: The United States Steel Corporation was formed about 1901, was it not?

Mr. Gates: It started in 1900 and finished in 1901.

The Chairman: At that time was there any danger of a second demoralization in prices on account of the attitude of Mr. Carnegie toward the rest of these concerns? I believe up to that time a great many of them had been getting certain products from him, and manufacturing certain products themselves. In other words, along in 1898 or 1899 the Federal Steel Company had its orbit or its scope of activities pretty well defined, did it not, and the other companies in the same way. Each had its own sphere of operations? They did not impinge one upon the other to any great extent?

Mr. Gates: Well, I would have to explain by making a statement. Mr. Morgan along about 1899 or 1900 organized the National Tube Company, by the acquisition of the stock of the National Tube Company just out of Pittsburgh, and the Riverside Steel Company, near Wheeling, and two or three more tube concerns; and they were making a good deal of money in the manufacture of tubes. Mr. Carnegie took it into his head that he would build a railroad from Lake Erie points—from some point on Lake Erie to his various works around Pittsburgh—and that he would also build a tube works; and he proposed to build this tube works, if my memory serves me aright, at Ashtabula, Ohio, where a great deal of the ore is unloaded. James J. Hill and Mr. Morgan had dined together and Mr. Morgan had expressed to Mr. Hill the fear that if Carnegie went into the building of railroads he would demoralize the entire railroad situation as he had demoralized the steel situation; and that if he built a tube works at Ashtabula it would result in a demoralization of the prices of tubes. Mr. Morgan had just put the National Tube Company together. Mr. Hill suggested to Mr. Morgan that he talk to me. Mr. Morgan said that we were not very friendly, and he asked Mr. Hill to come over to see me, and see if I would meet him. I had a talk with Morgan, and he asked me how I would suggest we could stop Carnegie from building this railroad and building this tube works; and I told him in my opinion there was only one man to talk to that had any influence with Mr. Carnegie, and that was Charles Schwab. He wanted to call in Frick. I called Mr. Schwab up in Philadelphia, and he dined with me at the Manhattan Club, and we went up to Mr. Morgan's house about nine o'clock in the evening. We discussed the possibility of pouring oil on the troubled waters and saving the situation. I think Mr. Schwab and I stayed there until about six o'clock the next morning. When we left a tentative plan had been drawn up for the purpose of getting the various corporations into one concern.

The Chairman: I do not want to interrupt you, but the one concern to which you referred was the embryonic United States Steel Corporation?

Mr. Gates: The United States Steel Company. Judge Moore and Mr. Frick felt very sore over the \$1,000,000 that they had paid to Carnegie, for which they got nothing. Schwab stated that Mr. Carnegie would agree to anything he would suggest. He pulled a letter out of his pocket and showed it to Morgan and me, showing that he had a contract with Carnegie to pay him \$1,000,000 a year for five years. We went on and laid out the plan of the United States Steel Corporation without consultation with Frick, who was a large owner.

Judge Moore got hold of Carnegie, I was told, and said to Carnegie: "If you are going to take bonds in payment of your property, make these bonds cover the National Steel Company as well as your own." Now Mr. Carnegie demanded that of Morgan, and it enabled the National Steel Company, in my opinion, to get \$50,000,000 more for their property than it was worth, because Carnegie would not turn his over unless they had a mort-

gage on the National, and the rest of us had to suffer. That is about the history of the United States Steel.

The Chairman: How long was it from the time you got started until this industrial accouchement actually occurred?

Mr. Gates: It was sixty days, I should say, or less—maybe forty days. We worked pretty fast. I think they drew up the articles of incorporation for the United States Steel Corporation originally for \$10,000, and then they gradually extended it as necessity arose. As each concern came in they would increase a few million or hundred million.

The Chairman: Mr. Carnegie, I believe, got \$320,000,000 in bonds, did he not, for his property—for the Carnegie Company?

Mr. Gates: He got \$320,000,000 for what he had offered at \$100,000,000 or \$160,000,000 the year before, and got \$1,000,000 forfeit.

The Chairman: Do you remember the suit between Frick and the Carnegie Company?

Mr. Gates: Very well.

The Chairman: Is that the same property that was mentioned in that answer, that sworn reply, as being worth, according to book values, about \$76,000,000?

Mr. Gates: I think that is the same.

The Chairman: The same property that was sold for \$320,000,000 in bonds?

Mr. Gates: It was \$320,000,000 for Mr. Carnegie's interest. It was nowhere near a hundred per cent. interest. I think the basis of the Carnegie Steel Company was in the neighborhood of \$500,000,000.

The Chairman: Do you own any of the common stock of the United States Steel Corporation?

Mr. Gates: Yes, sir.

The Chairman: Do you consider that there is any real, tangible value behind the common stock?

Mr. Gates: I decline to answer.

Side Lights on Cost of Steel Production

The Chairman: What was the effect of the formation of this concern as to the competition between its component parts? Was there any competition between them after that possible?

Mr. Gates: I would not think there would be. I have never heard of any.

Mr. Bartlett: I was going to ask you whether or not, about the time of the consolidation, steel rails were not about \$17.50 a ton, and after the consolidation they went to \$28 a ton?

Mr. Gates: The price of steel rails in 1900, if my memory serves me aright, was about \$28, and they are \$28 to-day.

The Chairman: Were steel rails ever made in this country at a cost of, say, from \$12 to \$13 a ton?

Mr. Gates: Yes; I think Carnegie and the Illinois Steel Company made rails at approximately \$13, or less. They made that based on a very low labor cost, on very low prices for iron ore; they made it based on \$1.90 for iron ore delivered at South Chicago which to-day is selling for \$4 and \$4.50. They made it on 85 or 87½-cent coke which is to-day selling at \$1.50 to \$1.60. So that you must not attempt to confuse the prices of to-day with the prices along in 1896 or 1897, when everything was in a thoroughly demoralized condition. At that time the labor of the sailor gang around the mill, which is the roughest about labor, was about 9 cents an hour. To-day it is about 18 or 20 cents an hour.

Mr. Young: Do you know what the cost of the labor was of the men in the Lake Superior district where you were getting that cheap ore?

Mr. Gates: About 40 per cent. of what it is now, I would say.

The Chairman: Has there been any marked improvement in plant and machinery—plant and apparatus necessary for the manufacture of rails—between that time and this? I refer to the capacity of the furnaces, and the like.

Mr. Gates: Yes; there are improvements every year, and probably will for many years to come. Some years the improvements cut off quite an amount per ton. Some years they cut off only a few cents. In 1896, 1897, and 1898 we had one blast furnace at Chicago, No. 7, I think, which made somewhere from 500,000 to 800,000 tons of pig iron without relining, running two or three years. No. 6 or No. 5, adjoining it, probably had to be relined half a dozen times during that time. There is a good deal of luck in running blast furnaces, as well as science. I do not know of any marked improvement in blast furnace practice in ten years—not a marked improvement. There has been a little.

Transportation from the upper lake ports is the same to-day as it was fifteen years ago—80 cents on the ton; so you cannot say that there is an improvement there, because the cost of transporting is the same. Twelve years

ago, I think, we decided to build four boats for lake transportation of ore: The James J. Hill, the William Edensor, the I. L. Ellwood, and the J. W. Gates. We built those boats about 500 ft. on the waterline, and 31 or 32 ft. in the molded hold to carry about 9,000 to 10,000 tons of ore. The old people on the lakes told us that we had built such large boats that we never could operate them successfully. Now they are building boats 610 ft. in length, which will carry 20 to 30 per cent. more ore than those that we built 12 years ago. Of course the larger you get the unit the cheaper you can transport everything.

The Chairman: There has been a general reduction, not in the price to the man who has to use these things, but a general reduction in the actual cost of transportation from the ore beds to your furnaces, has there not?

Mr. Gates: Everything except labor, which has gone up about 75 to 100 per cent.

The Chairman: Have the improvements in methods of manufacture and in the facilities for transportation compensated you for the increased labor cost?

Mr. Gates: No, sir. We cannot produce a ton of pig iron to-day within \$2 or \$3 a ton as low as we could back in the nineties. I think they produced a ton of pig iron at Birmingham at \$6 a ton. They cannot do it to-day at approximately better than \$9.

The Chairman: Would you say it costs you \$3 more to produce a ton of steel rails now than it did in 1890?

Mr. Gates: From \$3 to \$8 more. Labor has entered enormously into the cost.

Mr. McGillicuddy: Is it true that in this development from year to year your labor has become more productive and efficient?

Mr. Gates: Scientific labor generally improves from year to year, but common labor has not changed much.

Mr. McGillicuddy: What is the cause of the increase in the cost of labor?

Mr. Gates: Well, I do not think we get as good labor to-day at the mills as we did 10 or 20 years ago. We get more of the foreign element.

Mr. McGillicuddy: You say you do not get as good labor to-day, and not as productive, and you are paying more for it?

Mr. Gates: I should say 70 per cent.

Mr. McGillicuddy: What is the cause of that increase?

Mr. Gates: I do not believe I want to answer that.

The Chairman: Mr. Gates, I want to call your attention to an article that appeared a short time ago, by Mr. Berglund, in his History of the United States Steel Corporation. He says, speaking of the consolidation of these various concerns, into the United States Steel Corporation, and other allied concerns: "That the consolidations of the time were a factor influencing prices can be seen in the cases of the American Tin Plate and the American Steel and Wire Companies. These companies had something of a monopoly of the market in their respective lines; and this monopoly was reflected in the prices of the period. Shortly after the organization of the American Tin Plate Company, in December, 1898, the price of coke tin plate (14 x 20 in.) was raised from \$2.70 per 100-lb. box to \$3 at mill. Quotations in the leading centers of trade in the northeastern part of the country were upward of \$3.20 per 100-lb. box. During February, 1899, the average price was \$3.55. By the end of the year it was \$4.84, and it remained at this figure during a large part of the following year. In like manner, after the organization of the American Steel & Wire Company, there was a great rise in prices. Wire rods which sold for \$20 to \$22.50 per ton in 1898 were quoted at steadily increasing prices during 1899. By January, 1900, the price had reached \$50 per ton. Wire nails, which had been quoted at \$1.40 to \$1.50 per 100-lb. keg in 1898, were steadily raised in price during 1899 until they were quoted at \$3.20 in the early months of 1900—a higher figure than that reached under the regime of the notorious wire-nail association of 1895 and 1896." Now, to what do you attribute that sudden rise? Is that statement of the oscillation of prices by Professor Berglund correct, approximately?

Mr. Gates: I do not remember anything like the details. Nails went up along in 1895 or 1896 to about \$3, under some kind of manipulation, and then I think they went up to about \$3 again; but I do not remember what the facts were.

The Chairman: That was due, I presume, in great measure to the facility enjoyed by these associated concerns in coming to a price and in holding it there?

Mr. Gates: Well, I assume a good many of the smaller manufacturers got scared when they saw the big concern and they came in and sold out at any figure they could get, fearing that they were going to be wiped out; and the contrary thing happened and the prices went up instead of down. I do not remember, but I am giving you my offhand theory.

Personal

A. I. Findley, editor of *The Iron Age*, sailed for Europe May 27, to be gone two months.

O. J. Abell succeeds Roy F. Soule as Western editor of *The Iron Age*, with headquarters at Chicago. Mr. Abell is not new to duties of this kind, as he has had long experience in a similar capacity with another journal. Mr. Soule continues his connection with the David Williams Company in another branch of its business.

W. J. Linton, who for the past six years represented Wickes Brothers as their Philadelphia branch manager and more recently as their engineering salesman for power plant equipment in New York City, has severed his connection with that firm and has opened an office at 136 Liberty street, New York, as manufacturers' agent and dealer in new and second hand steam and electric power plant equipment, air compressors, hoisting engines and modern machine tools.

Charles E. Taylor, who was formerly in the engineering department of the American Telegraph & Telephone Company, has joined the New York selling force of the National-Acme Mfg. Company, Cleveland, Ohio.

William Jaeger, New York manager for the German machinery selling house of Alfred H. Schutte, sailed May 26 for Europe, to be absent about four weeks.

J. D. Lyon, formerly manager at Cincinnati, Ohio, of the Westinghouse Machine Company, has resigned to accept a position as manager of the commercial department of the Union Gas & Electric Company, Cincinnati. He had been connected with the Westinghouse Machine Company at Pittsburgh, Pa., and at Atlanta, Ga.

Andrew Carnegie sailed for Europe May 24 on the Oceanic.

Geo. E. Day, secretary and general sales manager of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has returned from an extended stay at Pasadena, Cal.

F. A. Ogden, general freight agent of the Jones & Laughlin Steel Company, Pittsburgh, will be elected president of the Traffic Club of Pittsburgh at its annual meeting to be held early in June. Mr. Ogden has received a unanimous nomination for the office.

Obituary

J. F. KISSICK, for more than a quarter of a century in charge of the foundry department of the Columbus Iron Works, Columbus, Ga., died May 11, aged 64 years. The works closed as a tribute to his memory on the day of the funeral. He was a native of Pennsylvania, and it is interesting to know that his mother, who resides in Philadelphia, has attained the great age of 103 years and is reported to be in good health at this time.

AUGUSTUS WESSEL, Cincinnati, Ohio, died May 25, aged 79 years. He was president of the Cincinnati Railway Supply Company and had been connected with the iron and steel business for a number of years. He was a director of the Ohio Valley National Bank when that institution was absorbed by the First National Bank and was a member of a number of different Cincinnati clubs. He leaves a widow, two sons and one daughter.

A. FRED HAMNETT, Boston, Mass., for 18 years local manager for Frank D. Moffat & Co., New York, died May 23. He was born in Malden, Mass., in 1864. He began his business career as a boy, and became widely known in the iron and steel trade of New England. He leaves a widow.

The Canadian Wire Rod Trade.—At the annual meeting of the Dominion Steel Corporation held in Montreal May 19, President Plummer said in part: "While we will lose considerable by the suspension of the bounties on wire rods, we will not lose anything like as much as the bounty. We will sell more pig iron than we are doing at the present time and will engage more extensively in the manufacture of rails and other products. In addition, we are installing machinery and building plants for the manufacture of wire and nails, which will equalize matters. Notwithstanding this, he added, part of the plant now used in the manufacture of wire rods will be closed down, as the company, without a bounty, cannot compete with British and United States manufacturers in the sale of rods to Canadian users.

Coal Analysis by Consumers.—That coal analysis by the large public service corporations is a detail of plant management of potential annoying proportions is indicated in the methods which have perforce been developed by the Edison Electric Illuminating Company, Boston, Mass. For coal shipments of 750 tons and less, a selection for sampling of about 1000 lb. is made, and for larger shipments correspondingly larger samples are taken, amounting to perhaps 3000 lb. for shipments of 4500 or 5500 tons. The subdivision of the samples for ascertaining the heating value of the coal is made in a usual way. Analyses are also made to determine the sulphur content of the fuel as an indication of the presence of elements likely to cause clinkering. Instead of a two days' determination, commonly regarded as necessary, the residue in the calorimeter is washed into a measured volume of water and barium chloride is added, precipitating insolubles and forming a solution of barium sulphate, which in a special apparatus gives a direct reading of the amount of sulphur present.

The Orient Coke Company.—Stockholders of the Orient Coke Company held their annual meeting in Uniontown, Pa., May 25, at which former directors were elected for the ensuing year as follows: Julian Kennedy, Pittsburgh; Robert Bentley, T. F. Woodman and David Davis, Youngstown, Ohio; Reid Kennedy, Homestead; Joseph W. Kennedy, Pittsburgh, and O. W. Kennedy, Uniontown. Mr. Bentley is president and Mr. Davis is secretary of the Ohio Iron & Steel Company, operating Mary furnace at Lowellville, Ohio. At a later meeting of the board, the following officers were re-elected: Julian Kennedy, president; Robert Bentley, vice-president; Reid Kennedy, secretary and treasurer; R. M. Fry, assistant secretary and treasurer, and O. W. Kennedy, general superintendent. The Orient Coke Company has been very successful since its organization, a quarterly dividend having been paid regularly since operations began. The company has 480 coke ovens, of which 260 are in blast.

The machinists' strike in New York and Hudson County, N. J., for an eight-hour day, which was declared May 1, has developed into a stubborn contest. While many of the 16,000 men who went out at the order of the union leaders have drifted back to the shops, the picketing has become more vigorous, and the special policemen in the employ of the companies affected are more in evidence. Of the 100 shops affected, 40 are now operating on full time. All of the manufactories operated by members of the National Metal Trades Association are in operation except one, and that plant is closed down through the choice of the owner who is moving his shop from New York to the Bush Terminal at South Brooklyn. Other manufacturers, who have equipment enough made to supply the existing demand, have chosen to keep their places closed for the time being.

The Art Brass & Fixture Mfg. Company has been organized with Pittsburgh capital to take over the plant of the Star Enameling & Stamping Company at McKees Rocks, Pittsburgh, in which a foundry and brass working plant will be established. The company is capitalized at \$100,000 and has applied for a charter and is installing machinery and altering the plant with a view to beginning operations July 1. L. M. Fluhart, of Conneaut, Ohio, is president and will manage the plant. L. R. Jefford of the Union Trust Company is secretary and treasurer.

The Crescent Forgings Company, Hulton, Pa., near Pittsburgh, manufacturer of Cresco pipe wrenches, drop forgings, etc., has purchased the business of the G. R. Lang Company, Meadville, Pa., maker of patented tool holders, and is arranging to move the machinery required in their manufacture to its own plant, where it proposes to make this specialty in larger quantities than heretofore. G. R. Lang will be the sales representative for the Crescent Forgings Company in this new department.

To take care properly of its rapidly increasing concrete mixer business, the Standard Scale & Supply Company, Pittsburgh, Pa., manufacturer of the Eclipse concrete mixer, has found it necessary to increase the size of its large plant at Beaver Falls, Pa., by the addition of a steel fire proof building 70 by 80 ft., for which the machinery has already been purchased and installed.

The Salary Loan Evil

In the campaign to improve loaning conditions to clerks and other wage earners in cities, the conference on the "loan shark" evil, held in New York City May 18 under the joint auspices of the Russell Sage Foundation and the Merchants' Association of New York, was a marked success. It has enlisted the interest and support of large employers of labor, of whom about 75, the number invited, attended in person or were represented. The conference was presided over by Henry R. Towne, president of the Merchants' Association of New York. The various phases of the salary loan problem were ably discussed in brief addresses. The thorough consideration given the subject is indicated by the following programme of the conference:

"The Salary Loan Problem—Its Extent and Effects." A. H. Ham, agent Russell Sage Foundation.

"The Present Legal Situation." Walter S. Heilborn, Gallert & Heilborn.

"Attitude of Employers Toward Assignment of Wages." Isidor Straus, R. H. Macy & Co. C. D. Meneely, Vice-president and Treasurer Brooklyn Rapid Transit Company. Jacob Gimbel, Gimbel Brothers.

"Legislative Regulation." Ansley Wilcox.

"Co-operative Loan Associations—The Salary Loan Remedy." Pierre Jay, Vice-President Bank of Manhattan Company. Edward E. Pratt, New York School of Philanthropy.

After the addresses a general discussion ensued, which was followed by the unanimous adoption of four resolutions embodying the following recommendations:

1. That employers rescind rules of discharge in order to assist employees in resisting unreasonable interest charges and deprive money lenders of the power of extortion.

2. That all employers disregard claims filed by money lenders against the wages of employees not in direct compliance with law, the employers to interest themselves in assisting employees involved with loan sharks.

3. That in self interest as well as for the benefit of their employees all large employers of labor encourage and assist in the creation of co-operative savings and loan associations in their respective establishments.

4. That laws be enacted which will allow a reasonable rate of interest on all small loans and provide for the licensing of money lenders and the efficient supervision and control of such licenses, preferably under the supervision of the State Banking Department.

Brown & Zortman Machinery Company Fire.—Last week the warehouse of the Brown & Zortman Machinery Company on Liberty avenue, Pittsburgh, was badly damaged by fire, but the company advises that it is doing business as usual and that the fire will not interfere with shipments. The loss was fully covered by insurance. For the next few months the business will be located at 2835 Smallman street, Pittsburgh. The company desires the trade to understand that there will be no delay in shipments, but that orders will be taken care of promptly as usual.

Improvements recently completed or now under way by the National Brake & Electric Company, Milwaukee, Wis., include a 200-ft. addition to the steel foundry, a 200-ft. addition to the machine shop, a 100-ft. concrete testing house and a new blacksmith shop and carpenter shop. The equipment installed in these additions includes a 106-ft. span gantry crane and about \$100,000 worth of machine tools. These improvements were necessitated by the rapidly increasing demand for the gasoline locomotive which the company is building and which is becoming very popular in coal and iron mines, lumber camps and industrial plants.

On June 1 the Sprague Electric Company merges with the General Electric Company, Schenectady, N. Y. Its business will be conducted under the name of Sprague Electric Works of General Electric Company. The manufacture and sale of the lines of apparatus and supplies heretofore exploited by the Sprague company will be continued under the same organization, with D. C. Durland in responsible charge as general manager. All correspondence should be sent to the Sprague Electric Works at the same address as in the past. Bills and statements will be rendered from the Sprague Electric Works, 527 West Thirty-fourth street, New York, where all remittances should be made.

The Society of Automobile Engineers announces that at its summer meeting at Dayton, Ohio, beginning June 15, papers will be presented on the following subjects: "The Question of Long versus Short Stroke Motors," by Justus B. Entz; "Long Addendum Gears," by E. W. Weaver; "Elements of Ball and Roller Bearing Design," by Arnold C. Koenig; "Worm Gears and Wheels," by E. R. Whitney; "Rotary Valve Gasoline Motors," by C. E. Mead; "Oversize Standards for Pistons and Rings," by James N. Heald; "Some Points on the Design of Aluminum Castings," by H. W. Gillett.

Orders for considerable equipment have recently been placed by the Pennsylvania Railroad Company to be built at its shops at Altoona, Pa. Included in these contracts are 12 shifting locomotives, 52 freight locomotives, 13 passenger locomotives, 55 passenger cars, 10 passenger and baggage cars and 16 passenger, baggage and postal cars, the last named being for the West Jersey & Seashore Railroad electric service.

The Lake Superior Iron & Chemical Company, Detroit, Mich., will erect a new chemical plant at Manistique, Mich. The old plant at that place has been dismantled and shipped to Elk Rapids and Ashland, Mich. The new buildings will be constructed of steel and concrete. The chemical building will be 87 x 187 ft. and the retort building 160 x 400 ft. The improvements will cost \$250,000 and will change the company's methods of making charcoal from kiln to retort system.

The St. Lawrence Bridge Company, Montreal, to which the contract for the superstructure of the Quebec Bridge was awarded, is now arranging for the establishment of an assembling plant at the bridge site near Quebec.

Greenlee Bros. & Co., wood working machinery and tools, have transferred their general machinery sales office from Chicago to Rockford, Ill., owing to the fact that their entire plant is now being operated in Rockford, and all manufacturing by them in Chicago has ceased.

The Ellwood City Forge Company, Ellwood City, Pa., has increased its capital stock from \$25,000 to \$100,000 and will make some large additions to its plant.

Notices have been posted at all the coke plants of the H. C. Frick Coke Company in the McConnellsville region, effective at once, that firemen, pumpers and compressor, fan and dynamo men will be required to work only six days per week in the future. The order applies to about 500 men.

The Ohio Valley Brass & Iron Company, a new incorporation, proposes to build a plant at Mingo Junction, Ohio, to make brass and iron castings.

The Hamburg-American Steamship Company, it is announced, has given orders for the construction of a sister ship to the mammoth turbine steamer *Imperator*, now building. The vessel will be 890 ft. long and will be placed in the New York Service.

P. J. McArdle, president of the Amalgamated Association of Iron, Steel and Tin Workers, and James H. Nutt, secretary of the Western Bar Association, have agreed upon June 6 as the time for the conference at Cambridge Springs, Pa., to fix the bar iron scale.

F. B. Swindle, Racine, Wis., has built and equipped a factory and will engage in the manufacture of farm and marine gas engines.

The Forter-Miller Engineering Company, Hartje Building, Pittsburgh, Pa., is completing the erection of three continuous heating furnaces of 100 tons capacity each for Dilworth, Porter & Co., Ltd., Pittsburgh.

A Constitutional Compensation Law

A Discussion of Feasible Methods of Attacking the Problem to Produce an Equitable Statute Which Will Stand the Test of the Courts

BY FRANK F. DRESSER, WORCESTER, MASS.*

The last four years have seen the opening and closing of the debate upon the justice of our present system of law governing industrial accidents, and it is no longer questioned that, to use the words of any one of the dozen commissions that have lately been investigating this subject, our present system is wasteful, slow, unjust, inapplicable to modern industrial conditions and provocative of ill feeling between employer and employee. The query now is what system shall replace it?

If one were to phrase shortly the desire of the employee it might be that injuries should be treated as a necessary incident of work, that when they happen relief should come speedily while the need of relief is pressing, should come certainly and without diminution by costs of collection, and that, in the adjustment of such matters, the employee might deal directly with his employer. And if one were to state the feeling of the average employer, it might be that the interruption of business by investigations and trials and the gamble of uncertain verdicts should be avoided, and that, if he has to pay for injuries, the payments may be as definite and computable as possible so that this expense can be treated, as it never has been, as a cost of production, capable of reduction by good management and of recoupment in the price of his products.

The community as a whole is interested in a system which will tend to prevent the injured workman or his family from becoming a charge on the charities of the community, which will improve the relations between employer and employee and, above all, will conserve, the worker and thereby increase our prosperity.

The ends desired are so nearly the same and are so advantageous to all concerned that it would seem strange if a workable and satisfactory solution could not be reached.

Accidents Are Inevitable

However safely a business, whether of the hazardous class or not, may be conducted by the installation of approved safety devices, by safer methods of work, and especially by the training of the employee to do his work in a skillful and safe manner, it will always be true that the speed and powerful agencies of modern industry will cause accidents and that the individual will never be able to work without fatigue, or momentary forgetfulness or recklessness, and thereby bring injury upon himself. This "contributory negligence" is as much a part of the conduct of business, and, in a practical sense, as unavoidable, as any other of its incidental risks.

Roughly, barely 12 per cent of work accidents are due to the fault of the employer or of some representative for whose acts he is responsible and for which the employee may recover at law. Probably 55 per cent. are due to the inevitable risks of the business, 25 per cent. to the frequently forgivable fault of the employee, and the remaining 8 per cent to fellow-servants or other causes for none of which can there be recovery; yet the loss occasioned by one cause is as great as by another and the employee's need of relief is as great. Yet now but one in perhaps 18 receives any payment whatever, and the payments are usually small and obtained only after delay and expense.

To-day out of every \$100 of premium paid to an insurance company about \$50 is used by it in expenses of investigation, litigation, administration and in dividends, and of the remaining \$50 paid over to the injured person about one-half is again lost in his own expenses of doctors and lawyers. Even where a business carries its own risks the waste is not much less. Every accident must be investigated and legal and medical advice sought by both parties.

Such a condition is inevitable where the basis of recovery rests not on the fact of injury in the course of

employment simply, but on the determination whether the injury was due to the fault of the employer or of some representative. To determine that issue requires skillful investigation by both parties into the circumstances of the accident and it can only be finally decided by a trial with its attendant delay and cost. The chances of such a trial are largely in favor of the employer, yet there is always the possibility of a verdict of a jury which may seriously embarrass him. Under such a system the smaller or less stable employer is forced to insure, for he can never tell when an accident will occur or what it will cost, and insurance is his only means of protection.

The Uncertainty of Accident Cost

This uncertainty of accident cost is crushing to the employee, but it is almost as bad for the employer. The employer may think that his accident costs are now certain, that he pays his insurance premium and that is all. But this happens in practice not to be all. He gives something in charity to help out the employee to whom the insurance company is not required to pay anything; he finds that some condition of his policy has been violated and the company disclaims or the accident exceeds the policy limit and he contributes to its settlement. He forgets, too, the interruption of business by the investigation of the causes of the accident and the loss of time of his employees when the case is tried. He bears, too, his share of the loss to the community through the disabling of trained workers and the expenses of courts and charities.

Nor does the present system tend to prevent accidents. The very uncertainty of cost leads the employer to gamble on the question of his liability; it seems easier to cure or escape than to prevent. Too often the employer having paid his insurance premium dismisses the matter of accidents from his mind and devotes his energies to the other elements of his business. Accident cost is not commonly treated as a cost of production.

It no longer needs a Pittsburgh Survey to prove the inevitableness of work accidents and the loss to employer, employee and community caused by them. Yet hazardous and non-hazardous businesses must be conducted, and the employer must venture his capital and the worker his life and limb in them.

There can be little dispute that a system which shall equate these necessary losses so that the community, which has the ultimate benefit of successful industry, shall bear the burden of them, and not, as now, cast them upon that portion of the community which is least able to bear or recoup them, is a result devoutly to be desired. It is noteworthy that, while there are doubtless many other reasons, yet the great industrial advance of Germany happens to coincide with its adoption of a theory of distributing the losses of work accidents without regard to whether they are caused by fault or not.

The Four Classes of Remedies

The remedies proposed fall into four classes.

1. The enactment of a compensation act, so-called, whereby an employer in addition to the existing remedies at common law, or under the statutes where recovery is based on fault, is also required to pay specified relief when an accident occurs regardless of fault. This was the statute enacted in New York, applied, however, only to certain hazardous businesses, and is in substance the English theory. This statute has lately been held unconstitutional by the New York Court of Appeals.

2. The enactment of a compensation act whereby existing common law and statutory remedies are repealed and the employer is required to pay specified relief whenever an accident occurs regardless of fault and is subject to no other liability. This theory, which has nowhere as yet been adopted, is proposed either as to all employers and employees, or as to distinctly hazardous occupations only, or as to occupations where more than five or six persons are regularly employed.

*Author of "Employer's Liability Acts and the Assumption of Risks."

3. The enactment of a compensation act which repeals certain existing common law and statutory defenses of the master, such as the fellow servant defense, modifies in the employee's favor the contributory negligence and assumption of risk defenses, and provides that thereafter every employment shall be construed to be made under, and with reference to, a compensation plan establishing specified relief whenever an accident occurs regardless of fault. The statute also provides that the employer shall not be otherwise liable unless he elects in a specified manner not to come within the compensation statute, or unless the employee at the time of hiring shall elect not to come under it. The expectation being that if an employer does not elect to come under the plan he will have practically no chance successfully to defend against a suit for unlimited damages, and consequently will wish to accept the statute, while an employee will be likely to desire to come under it and if he does not he may not be employed. Such a statute has lately been passed in New Jersey.

4. The last theory is the establishment of an insurance fund managed by the state to which employers in certain hazardous industries are required to pay premiums proportional to the risk of their business, and from which specified relief is to be paid to injured workmen; and an employer who has paid the requisite sums into this fund is subject to no other liability. The adjustment of disputes is committed to state officials. The most thoroughgoing statute along this line is the one lately passed by the State of Washington. It follows in substance the Continental insurance plan.

Avoiding Constitutional Difficulties

These four general theories are exemplified in infinite variety in many bills now pending in the several legislatures. The second and third theories are directed to the same end, but the second does directly what the third, the New Jersey statute, does indirectly. This indirection has been adopted to avoid certain real or assumed constitutional difficulties and seems to accomplish that purpose. However, this very indirection leaves a loop-hole whereby, in some circumstances, the statute may fail in practice.

The state insurance plan, of which the Washington statute is a type, commits the state to a leap in the dark so far as expense is concerned, and to that degree, until more careful data are obtained, seems a hazardous financial experiment. It has the further defect of being open not only to all the constitutional objections that are urged against the other theories, but to the grave doubt whether the state may legally embark, even to a limited extent, in the insurance business.

If the new system of law is so framed as still to permit both a liability founded as now on fault with recovery by trial of unlimited damages, and also to require certain and definite payments for injuries regardless of fault, which is the English theory and the theory of the recent New York statute, almost all the evils of the present system will be perpetuated.

It is true that the injured person under such a scheme is certain of some relief, and to that extent it seems beneficial, but the gambling instinct is strong and the ambulance chaser dies hard, and the employee would be apt to take advice whether his best chance was to sue at common law for unlimited damages, or under the employer's liability act with a greater chance of recovery for limited damages, or under the compensation act for the small but certain relief; and in any case take the risk of his decision and the expense incurred by it. Employers can never tell when an accident happens what course will be pursued. They must continue, therefore, to take all the precautions and incur all the expense which they do at present, and that means that most employers must still insure against these uncertainties and pay largely increased premiums to cover these several contingencies. There is little likelihood that such a system will tend to prevent accidents.

The English experience seems to show that the waste and evils of the present system have not been eliminated, and the New York statute in the short time it was effective had a similar result.

Abandoning the Theory of Fault

If, on the other hand, the theory of fault as the only basis, or one of the bases, for recovery can be abandoned and the principle recognized that modern industry, however safely it may be carried on, inevitably causes personal injuries, the losses of which neither employer nor employee, who are bound in their different spheres to meet these

perils, can wholly avoid, and that consequently these losses should be treated as a necessary part of the manufacturing cost, the desirable ends can be very nearly approximated.

So soon as it is found that the occurrence of an injury causes certain definite expense to the employer which he can no longer escape by his time-honored defenses or postpone by the gamble of a trial, he will bring to the reduction of these accident costs the same acumen that has led him to systematize and reduce his costs of manufacture; and the result must be that the plant, which, compared with others of its class, has the lowest accident cost will be apt to show the greater profit, not only because of this saving but because, by the reduction in the number of accidents, the manufacturing processes are less interrupted and skilled workmen are preserved instead of disabled.

With the removal of the uncertainty as to his liability, an employer will shortly be able to forecast how many of his men are likely to be hurt each year, the average seriousness and the cost. A mill employing 3,000 hands can now without much difficulty discover from its accident reports for four or five years the yearly average, and to a large degree the yearly cost of its injuries under the scheduled payments of any of the proposed compensation acts where specified payments are made the exclusive remedy. A mill employing 50 hands cannot from its own records get data which would be of much value, though several mills in the same line of business may do so. But such accident cost cannot be determined by any mill where the compensation scheme is not an exclusive remedy, and the injured person has also a right to proceed under existing remedies grounded on fault for the recovery of such sums as a jury may see fit to give.

The Question of Insurance

With an accident cost capable of reasonable computation an employer is in a position to decide whether he will carry his own risk, or join with others of a similar business in a mutual insurance company, or insure in the present stock companies which under such conditions would be able to carry on their business with much less than the present necessary waste. If at any time a plan of state insurance should be found practical and legal it could easily be grafted on to this system.

The advantage to the employer of making his accident costs as definite and computable as possible seems to be obvious. It is equally advantageous to the employee. It is true that it may happen that a worker is injured \$10,000 worth and under such a plan he can receive but the fixed limit of \$3,000, say, or he may be hurt, and, getting well within the usually provided waiting period of two weeks, receive nothing. But the former case is but a fraction of a per cent. of all injuries, and in the latter case he almost invariably gets nothing now. In return, however, for yielding these slight opportunities he will be certain to obtain definite and immediate relief without cost for every serious injury, no matter how caused. Of course disputes cannot be wholly eliminated. The parties will not always agree as to the seriousness of the injuries or the proportion of the statutory relief to be paid. But disputes on the issue of liability will be practically removed and such differences as there are can be quickly and inexpensively determined.

For these reasons it is believed that the greatest practical benefit to all parties lies in the second of the four theories above stated—that of doing away entirely with all existing remedies and establishing in their place a single compulsory relief plan. The New York statute, a relief plan concurrent with existing remedies, offered very slight, if any, advantage over the present system. It remains to consider whether a single compulsory relief plan is constitutional.

Constitutional Amendment Unnecessary

The decision of the New York Court of Appeals holding the New York statute unconstitutional, and therefore closing the door on that theory, does not necessarily mean that all other theories are also unconstitutional or that those who have at heart some new scheme of things must hasten to tinker the constitution. In spite of the almost universal criticism of this decision, the actual holding of the court, though perhaps not everything said by the judge in the course of the opinion, seems right, and, for the reasons already given, wise from a practical standpoint.

No one doubts that it is entirely competent for the legislature to modify or abolish the "fellow servant rule;" to

modify and in some respects, certainly, to abolish the doctrine of assumption of risk; to shift the burden of proving contributory negligence, or to put in its place, as the federal statute relating to interstate railroads has done, the doctrine of comparative negligence. The Court of Appeals so held; but further the court held that when the legislature attempted to make one carrying on a lawful business pay to a person injured in that business compensation where neither the master nor his representative was guilty of any fault whatever this was a taking of the master's property "without due process of law" just as if it compelled him to pay another's debts. This decision holds that such a statute, however desirable it may be, does not come within the "police power" of the state, which frequently takes a man's property without compensation, because the statute "does nothing to conserve the health, safety or morals of the employees and it imposes upon the employer no new or affirmative duties or responsibilities in the conduct of his business" which are the only grounds upon which the police power may be invoked; and "its sole purpose is to make him liable for injuries which may be sustained wholly without his fault and solely through the fault of the employee." The court further holds that such a statute "does not affect the status of employment at all, but writes into the contract between the employer and employee without the consent of the former a liability on his part which never existed before and to which he is permitted to interpose practically no defense."

It may well be that, viewed in the light of the public policy of the State of New York defining the law governing industrial accidents, this statute was not a proper exercise of the police power, and did not properly affect the status of employer and employee, and was therefore an arbitrary taking of property without due process of law.

Industrial Evolution and the Law

The law under which we live, whether it be the common law or the statutory law yearly enacted by our legislatures, is but the declaration of the policy of the commonwealth as it is viewed from time to time. Chief Justice Shaw, who first clearly defined the principles of the common law relating to industrial accidents, said that "the rule resulted from considerations as well of justice as of policy," and that "it is competent for courts of justice to regard considerations of policy and general convenience, and to draw from them such rules as will, in their practical application, best promote the safety and security of all parties concerned." The common law of the sixteenth century is not the common law of the twentieth. It has been altered constantly by custom, by declaration of judges, as well as by statutes, to meet changing conditions.

As the industrial conditions with reference to which the chief justice was speaking have so radically changed, it may well be that the law should change with them. But the change must not be arbitrary or inconsistent with sound policy. In New York it had been, and after the passage of this statute it continued to be, the policy of the state that an employer should be answerable in damages when he or certain of his representatives, through fault, injured an employee, and that the damages should be compensation, that is, make good the loss sustained. And then, retaining this theory of liability based on fault and compensatory damages, the state, by its new statute, said that the employer should be liable in any event to pay something to his injured employee regardless of fault, and this payment, because it is specified, does not pretend to be compensation.

Here are two inconsistent policies, for, if fault is retained as a basis of liability, a requirement also to pay where there is no fault is simply compelling a gift, and if an injured person in some cases may receive compensatory damages he should in all. The incidents of the status of employer and employee are therefore arbitrarily and inconsistently affected. Nor can these payments fairly be regarded as a tax or fee or penalty for carrying on a dangerous business, first, because only one of the parties concerned in conducting the business, the employer, is required to pay them; while the employee, who is equally concerned in conducting such a business, and whose acts in it are largely responsible for the losses, is required to yield nothing and is given not only all the rights he had before the passage of the statute but rights new and beneficial to him; and, second, because the injured employee himself is given the power to decide whether he will claim compensatory damages or claim the statutory relief. As the statutory payments must be construed, therefore, as

based upon the compensation rather than the penalty idea, the statute does not directly tend to the preservation of the public health, safety or morals, though that may be its incidental effect, and consequently it does not come within the police power of the state

Safeguarding Public Rights

But suppose the statute had proceeded upon a different theory. Suppose that it were shown that modern industry inevitably caused personal injuries, the great majority of which were not referable to fault at all, and the loss of which was borne inequitably to the detriment of the community, and that he who chose to engage in modern industry whether as employer or as employee thereby necessarily set in motion the risks which caused this loss. It would not then be an unusual exhibition of the police power of the state to say that such a use of property or personal rights causing such demonstrable losses should be restricted or regulated. Many a lawful occupation is so regulated. The manufacture of liquors, the practice of medicine, the erection of buildings, the peddling of goods, the hours or conditions of employment, are a few of a hundred examples. If the legislature should deem that a wise regulation of such a business were to require that an accident happening in the course of it, however caused, should bear a certain definite penalty; that the employer should pay part of the penalty in money, and the employee should pay part of it in suffering and lost time and yielding any right to claim compensation; that the employer should in no way be able to avoid paying his part and that the employee should in no way be able to get more—then both parties would be penalized for setting in motion these risks and the risks would be apt to be diminished and the losses caused by them more evenly distributed. Here is a tax, or fee, or penalty, whatever it may be called, for so using one's property, whether such property be money or limb or liberty, as to injure others, and the idea of compensation is entirely eliminated. The payments are not indemnity to an individual for a loss suffered, but a penalty payable to the community for allowing an accident to occur; and this character is not changed because the legislature thinks best to require them to be paid to the injured worker rather than to the state. The purpose of such a statute is the protection of public rather than individual rights. There is nothing in the actual decision of the New York Court of Appeals which renders a statute based on such a theory an improper exercise of the police power.

Or there is another path. The present rights and obligations of the relation of employer and employee exist through no express or implied contract between them, but because the parties have seen fit to enter a certain relation or status to which the policy of the law has annexed certain incidents without their knowledge and irrespective of their desires or control.

The Impossible Contract

It is as impossible for an employer to contract with his employee that he will or will not be responsible for the negligence of all his servants, or for the risks of his business, as it is for a man and woman about to marry to contract that their marriage shall continue but a year. The policy of the law determines the incidents of this status, not the express or implied contract of the parties. "Considerations of policy and general convenience" speaking through the common or statute law are constantly regulating the future relations of persons, and prescribing the incidents of such relations into which persons may or may not thereafter choose to enter. A carrier of goods is made an insurer, a carrier of passengers is made subject to the highest degree of care, but both, with reference to their servants, are subject only to ordinary care. One who collects dangerous substances on his premises may be an insurer, or one who runs a locomotive be liable for fire communicated from it without his fault. So the policy of the law may deny recovery for real injuries, as the common law denied civil liability for causing death, or may determine what shall be a legal "loss." Such regulations deal with future conditions and relations, not with existing ones, and are not a taking of property, for there is no property to be taken. It would hardly be contended that when the common law incidents of the marriage relation in the eighteenth century, the right of a husband to chastise his wife, to reduce her property to possession and expend it, and the like, were altered by statute, so that thereafter a husband did not have such rights, his property

was taken without due process of law and the statutes were unconstitutional.

Yet the policy which lays down these rules of future conduct either through the common law or statutory enactment must be reasonable and consistent. A statute which provided that a carrier of passengers must exercise the highest degree of care, but that if the passenger could not prove a failure to exercise such care the carrier must pay him something anyway, would be thought arbitrary and unreasonable, though if it changed the present policy and made the carrier an insurer it would probably not be so considered.

If the conditions of industry in 1840 which dictated the common law governing the status of employer and employee have changed, if in the old days the majority of accidents were caused by fault and if now the majority of accidents are caused without fault and are unavoidable, it is quite possible that sound policy should dictate new rules regarding them, and if that policy should do away with remedies applicable only to the old conditions and in their place establish remedies applicable to the new, it might not be unreasonable.

The Seaman and His Vessel

The New York court in explaining certain peculiar incidents of the status of seamen and vessel, whereby to some extent liability is imposed on the vessel regardless of fault, uses these words, which seem entirely applicable to the conditions of modern industry: "The contracts and services of seamen are exceptional in character. He is in effect a co-adventurer with the master and shares in the risks of shipwreck and capture or from losing his wages by casualties which do not affect workmen on land. For this and many obvious reasons the maritime law has wisely and benevolently built up peculiar rights and privileges for the protection of the seaman which are not cognizable in the common law. When he is sick or injured he is entitled to be cared for at the expense of the ship * * * that is a right given to seamen and a duty enjoined upon the master by the plainest dictates of justice which arises out of the necessities of the case. * * * Courts have always regarded seamen as irresponsible to a degree which makes them incapable to fully protect their own rights." Surely to-day employer and workman are co-adventurers in the inevitable and undeniable risks of modern industry, and the chance of harm is greater and as sure from the mechanical forces which employer and workman have conjured up as a means of earning their joint livelihood, as from the perils of wind and wave. Against such risks the workman can no longer guard, and injury means disaster to him.

The court saw no analogy here; nor, in the public policy of the state retaining as described above its inconsistent theories of liability, is there any analogy. But another court, or perhaps the New York court itself, might well say when a definite and consistent policy is presented whereby the theory of compensation and liability based on fault are removed and the parties, free to enter an industry, as co-adventurers in the industrial perils, divide the losses fairly between them, that such a law is not a taking of property and is within the power of the state to enact.

Troublesome Matters to Overcome

Of course these are merely general principles, and there are many troublesome matters of scope, machinery and special constitutional provisions, as for example the right of trial by jury, that must be considered. The point to be made is that the decision of the New York Court of Appeals is not necessarily discouraging to those who desire a change, that the door which has been closed is one which would have perpetuated most of the present evils and have been of no general advantage, and that other and better ways are still open.

It is strange that, in a matter so nearly affecting business prosperity, the several commissions should have received so little help from employers. That this legislation is indorsed by "labor" does not necessarily mean that it is bad, or if indorsed by social workers and economists that it is impractical. A theory that in one form or another has been adopted by almost every civilized nation except the United States cannot well be out of accord with principles of natural justice or a blight on the prosperity of the country. The business man who approaches this question with a broad outlook can tell better than any theorist what scheme is just and practical and to the working out of any plan his help is essential.

Titanium in Iron and Steel

Further Results of the Use of the Alloy Brought Out Before the American Foundrymen's Association

Papers presented by Charles V. Slocum, Pittsburgh, at last week's convention of the American Foundrymen's Association, one on "Titanium in Iron," the other on "Titanium in Steel," brought out some interesting details of the use of the alloy, including those evolved in the experience of several manufacturers and investigators. Mr. Slocum said, in part:

Titanium in Iron

In a letter dated April 5, 1911, the writer was advised by Asa W. Whitney, metallurgist of the Enterprise Foundry & Machine Company, Bristol, Va., that he had made a number of careful trials of titanium in hard or chilling iron. He finds that 0.1 to 0.2 per cent. of the alloy is usually all that is necessary to make otherwise viscous, high chilling mixtures come from the cupola close grained and pour from the ladle as freely as iron carrying half as much chill and of more open grade. The iron pours well to the last and gives clean solid castings. "I find," Mr. Whitney says, "that I am able to compensate for the cost of the titanium with less manganese and a trifle less silicon."

To foundrymen the fact that the metal remains hot longer than untreated iron is a matter of much importance for certain classes of work, since the greater fluidity means that the iron will settle more slowly in the mold, and thus give time for the gases to escape and more time for the iron to fill every smallest outline of the mold without pulling away from the main body of the casting. These features of good foundry practice are some of the ones which are often overlooked, and a high percentage of bad work results.

BENEFITS FROM USING LARGER PERCENTAGES.

Now in relation to the benefits to be expected from using larger proportions of alloy, I maintain that a great deal of undue importance is often attributed to an increase in transverse and tensile strength. This may be necessary for certain government work and for some few castings which must resist unusual stresses in service, and for such it is necessary to use at least one per cent. of titanium alloy.

My contention is, however, that such a percentage is not only a serious increase in cost per ton of product for ordinary castings, but in all the practical uses to which most castings are subjected no special increase of strength is required, although an improvement in quality may be absolutely necessary. We have in mind a recent case where the castings in a certain foundry were stronger than necessary, were well made and were satisfactory to the foundry superintendent and to his customers, but when he tried the small quantity of alloy usually recommended for such cases merely for the purpose of improving the fluidity of the molten metal and the density, machining quality and durability of the casting, he found that the machine shop of one of the great railroad companies which turned up the castings reported that these treated specimens (piston rings) were closer grained, were more like steel and were more desirable for their purpose. Yet of the four test bars cast one of untreated iron was strongest in transverse strength.

On the other hand, a large manufacturer of my acquaintance having a 10-ton casting to make, and being anxious to have no failure in so important a job, added one per cent. of titanium alloy and secured a splendid casting which may have cost him \$25 extra for all the alloy used, but which made a sure thing of a single part of the machine worth at least \$400, even without including the machining.

THE POOREST MIX OF SCRAP GREATLY IMPROVED.

In a recent trial of titanium alloy in the cupola with a mixture of burnt iron, stove plate, etc., in a large foundry in the Pittsburgh district, the rather large percentage (for iron) of one-half of one per cent. of alloy was used, together with one-half of 1 per cent. of ferromanganese of the usual 80 per cent. grade. This trial demonstrated the interesting fact that the poorest mix which can be imagined, perhaps, may be brought to good normal No. 1

iron by this method. The average of all the test bars, of which there were 10, was 3,100 lb. breaking strain and an average deflection of 0.146 in.

One of the best known foundries in Columbus, Ohio, uses, for certain purposes, a cheap mixture which analyzes about as follows:

Silicon	1.60
Sulphur	0.11
Phosphorus	0.55
Manganese	0.50

One-fourth of one per cent. of titanium alloy was added in the cupola and the foundry foreman reported immediate benefit in the fluidity of the metal and in the distinct improvement to the castings. This rejuvenation of the iron, so to speak, involved an extra cost of 62½ cents per net ton of metal treated, and was more than repaid in the reduction in bad work without regard to the benefit to the iron. Castings from this iron, with fine grain and good metal, were made which were only 5/16 in. by ¼ in. section.

Titanium in Steel Castings

In the mills of one of the most scientific steel makers in the United States, steel castings are required of the following specifications:

Elastic limit.....	45,000 lb. per sq. in.
Tensile strength.....	85,000 lb. per sq. in.
Elongation after rupture.....	12 per cent.
Contraction of area.....	18 per cent.

"These specifications have been met and the necessity for numerous heat treatments have been avoided by the use of eight pounds of titanium alloy per ton of metal (=0.4 of alloy or 0.04 Ti) added in the ladle. No aluminum was used."

These parties write as follows:

"Comparing the results of the tests made upon specimens after the first anneal, of the last 15 heats in which ferrotitanium was used, with those of the last 15 previous heats in which it was not used, it appears that the mean tensile strength was increased from 81,633 lb. per sq. in. to 91,533 lb. per sq. in.; that the mean elastic limit was increased from 47,233 lb. per sq. in. to 50,000 lb. per sq. in.; that the mean elongation was increased from 15.1 per cent. to 19.2 per cent., and that the mean contraction of area was increased from 18.9 per cent. to 24.3 per cent."

In a letter dated April 12, 1911, J. H. F. Dixon, general manager of the Keystone Steel Casting Company, Chester, Pa., makes the following comment on the use of titanium alloy in the company's steel castings:

"The added cost of the production of our metal by the use of this alloy is so slight that we are prepared to furnish genuine crucible castings, titanium treated, at the same schedule of prices which apply to our carbon steel. We strongly recommend the use of steel so treated for automobile work, where the castings are subject to unusual shocks and where uniformity of the material is absolutely essential."

BENEFICIAL EFFECTS IN WELDING.

In a letter dated April 8, 1911, Prof. Enrique Touceda of the Rensselaer Polytechnic Institute writes as follows:

"The beneficent results of the (titanium) addition can best be illustrated as follows: It is difficult to make a good weld with plain steel because, on heating the two parts to be welded, the surface of the metal oxidizes and this oxide prevents the two metallic parts from coming in close contact when being hammered for welding.

"In the case of steel, if sand or borax or some similarly acid material be sprinkled on the parts to be welded, the silica of the sand will unite with the iron oxide, forming silicate of iron. This silicate of iron, unlike the iron oxide, melts at a low temperature, is not viscous, and when the two pieces of steel are struck for welding, the fluid slag of the iron silicate is forced out and the two clean surfaces are brought intimately together and a good weld results.

"Let us now consider the two surfaces referred to as if they were the sides of two large crystals, in order to draw the analogy.

"All steel is composed of an aggregation of crystalline masses, each crystal having a definite boundary, and each crystal being welded, so to speak, with or into its adjacent ones. It is a well-known fact that the impurities in all metals and alloys tend to segregate at the boundaries, which fact well explains the damage done by certain additions, such as bismuth to copper, etc. The beneficent action of titanium is due to the fact that it makes more intimate the contact between the crystals in the steel, thereby making the cohesion more perfect. It is known that the occluded gases segregate to the boundary of the crystals also, and the uniting of the titanium with the occluded nitrogen makes more perfect the union of the crystals to each other.

"It is manifest, therefore, that the improvement will not be fully shown in the usual tension tests, as these tests have to do with stresses that are equally applied in the same direction, and such tests do not tend to act on the crystals eccentrically. On the other hand, in the Landgraf-Turner machine, the tendency is for the boundary of the crystal to open up, first on one side, and then on the other, and at one instant the very edge of the united crystals are receiving the entire load so long as distortion continues, while the reverse action takes place when the test bar is hit on the other side. It is in this kind of testing that the worth of the bond between the crystals is shown, and this explains why these tests show better with the titanium treated than with the untreated specimens."

Titanium for Malleable Iron

A paper on titanium for malleable iron read by C. H. Gale, of the Pressed Steel Car Company, Pittsburgh, was substantially in full as follows:

In order to learn what good might result from ferrotitanium if added to malleable iron, the writer made a series of tests which he begs to contribute as part of the investigations of the American Foundrymen's Association. The first series of tests were made with ferrotitanium additions to the ladle. The alloy was supposed to contain about 10 per cent. titanium; in reality, however, it ran higher, or about 17 per cent. As this condition resulted in an increased difficulty in melting the alloy, particularly where the larger quantities were used, considerably less of the alloy was actually taken up than the calculated quantities would indicate. It must further be remembered that in comparing tests with titanium in molten gray iron and malleable that the latter, while appearing intensely hot, may in reality be of a lower temperature than an ordinary foundry melt.

In the tests three hand ladles containing about 40 lb. of iron each were taken from the very early part of a 15-ton heat made in the open hearth furnace, the heat being the second one of that day. The first ladle was held without any titanium alloy addition. To the second ladle there was added sufficient alloy to introduce 0.125 titanium into the iron. To the third ladle double this amount was added. After stirring the second and third ladles to get as much as possible of the alloy in solution, the contents of the three ladles was poured into three molds. It will be noted that the third ladle was the coldest of the three. In consequence of this it was not surprising that the heavy sprue in this case was nearly gray in fracture, the second mottled and the first dead white. The analysis of the metal was as follows: Sil., 0.66; sul., 0.046; phos., 0.175; mang., 0.36; C. C., 2.66; graphite, trace. None of the bars to which titanium had been added showed the slightest trace of this element on analysis. While the sprues indicated the precipitation of graphite as the titanium additions arose, the bars themselves should not have done so for the analysis given.

A second set of ladles treated in exactly the same manner was taken from near the end of the heat and gave the same indications.

Each mold contained two test bars, one round bar for tensile tests, varying from 0.614 to 0.637 in. in diameter for the lot cast, this dimension being at the middle of the bar where the diameter was the smallest. With this bar was cast another one for transverse tests ½ x 1 in. in section and 14 in. long. All bars were carefully marked so that they could be readily traced in the tests. The tensile tests were made on a 100,000-lb. testing machine at the foundry where these tests were carried out. The transverse tests were made by Dr. R. Moldenke on the

5000-lb. transverse machine at Castle Elsinore, N. J. The following are the results:

Average of Tensile Tests of Malleable Iron with Titanium Treatment

Ultimate Strength Lb. per Sq. In.	First Part of Heat	Titanium Added.
	Elongation in 2 in. Per Cent.	
49,717	6	None
46,481	3.4	0.125
42,800	2.9	0.250
<i>Last Part of Heat</i>		
48,368	6.2	None
43,452	2.3	0.125
45,294	3.1	0.250

The considerable cooling of the metal by the alloy addition in the ladle practically spoiled the test bars with high titanium additions, the metal not being able to clear itself from slag and dirt. Yet it was noticed that even with a bar flawed to one quarter of its cross section, an astonishingly high ultimate stretch was attained. Similarly the presence of dirt and flaws affected the elongation, actually cutting this off abruptly. Hence the figures are quite low.

Considering the above, definite conclusion cannot be drawn from the tensile test results so far as the action of titanium on malleable is concerned. Further, a glance at the figures obtained for the regular metal without titanium additions show the improbability of serious oxidization influences that could have been corrected by the titanium additions. Trying this with cupola metal would have been another story.

The transverse tests gave the following results:

Average Results of Transverse Tests

Broke, Lb. per Sq. In.	First Part of Heat	Titanium Added.
	Deflection in Inches.	
*1,380	1.80 plus	0.125
1,270	1.62	"
*1,370	1.80 plus	"
Average 1,315	Average 1.74	
1,142	0.83	None
1,162	0.72	0.250
<i>Last Part of Heat</i>		
1,213	1.24	None
1,260	1.40	0.125
*1,320	1.80 plus	"
1,290	1.68	"
Average 1,290	Average 1.62	
1,030	0.58	0.250
*1,310	1.80 plus	"
1,340	1.32	"
Average 1,227	Average 1.23	

*Beyond the range of the machine, so far as deflection was concerned. The test pieces in these cases were not broken, and might have shown some increase in the figures given for the breaking strength had the bending been carried further on.

The next series of tests was to observe the effects of titanium in "malleable" when added to the bath of molten metal. The alloy was added after the charge had melted down and the slag had been skimmed; that is, about 30 to 45 min. before tapping the 10-ton afternoon heat of an open hearth furnace. The bars cast gave the results herewith recorded.

Tensile Tests of Malleable Iron

Date.	Elongation		Titanium Added.	Remarks.
	Ultimate Strength, Lb. per Sq. In.	in 2 In. Per Cent.		
Feb. 7	58,558	6.2	None	First of Heat
"	55,534	7.1	"	"
"	55,884	4.7	"	Last of Heat
"	43,666	3.9	"	"
Feb. 8	54,761	6.2	None	First of Heat
"	44,841	3.1	"	"
"	53,835	6.2	"	Last of Heat
"	54,135	4.7	"	"
Feb. 9	58,160	9.3	0.03	First of Heat
"	54,233	6.2	"	"
"	57,755	10.9	"	Last of Heat
"	48,272	3.1	"	"
Feb. 10	52,333	4.7	0.03	First of Heat
"	57,518	7.8	"	"
"	58,479	4.7	"	Last of Heat
"	55,802	2.3	"	"
Feb. 12	56,717	6.2	0.03	First of Heat
"	59,141	4.7	"	"
"	56,468	3.9	"	Last of Heat
"	59,801	7.8	"	"
Feb. 14	50,855	10.9	0.03	First of Heat
"	52,574	9.3	"	"
"	53,509	3.9	"	Last of Heat
"	56,996	7.8	"	"
Feb. 15	48,770	6.2	0.06	First of Heat
"	53,866	2.3	"	"
"	49,679	4.7	"	Last of Heat
"	49,377	3.9	"	"
Feb. 16	*42,456	1.5	0.06	First of Heat
"	50,133	4.7	"	"
"	59,933	4.7	"	Last of Heat
"	59,797	6.2	"	"
Feb. 17	63,443	7.8	0.06	First of Heat
"	50,352	3.1	"	"
"	57,397	9.3	"	Last of Heat
"	*45,379	1.5	"	"

*Flawed.

Transverse Tests of Malleable Iron

Date.	Broke, Lb. per Sq. In.	Deflection in In.	Titanium Added.	Remarks.
Feb. 7	1,175	1.62	None	First of Heat
"	1,150	1.58	"	"
"	1,050	1.51	"	Last of Heat
"	1,050	1.42	"	"
Feb. 8	1,020	1.58	None	First of Heat
"	1,050	0.89	"	"
"	1,005	1.32	"	Last of Heat
"	925	1.03	"	"
Feb. 9	1,070	1.10	None	First of Heat
"	1,275	1.32	"	"
"	1,030	1.30	"	Last of Heat
"	1,030	1.30	"	"
Feb. 10	1,100	1.61	0.03	First of Heat
"	1,070	1.07	"	"
"	1,170	1.32	"	Last of Heat
"	1,130	1.53	"	"
Feb. 12	1,110	1.15	0.03	First of Heat
"	1,330	1.75	"	"
"	*1,275	1.80	"	Last of Heat
"	1,030	1.30	"	Last of Heat
Feb. 14	1,110	1.30	0.03	First of Heat
"	1,120	1.32	"	"
"	1,130	0.82	"	Last of Heat
"	1,290	1.57	"	"
Feb. 15	1,180	1.70	0.06	First of Heat
"	1,160	1.80	"	"
"	1,220	1.20	"	Last of Heat
"	1,105	1.59	"	"
Feb. 16	1,240	1.60	0.06	First of Heat
"	*1,200	1.80	"	"
"	1,190	1.17	"	Last of Heat
"	1,170	1.35	"	"
Feb. 17	*1,180	1.80	0.06	First of Heat
"	1,130	1.15	"	"
"	1,090	1.32	"	Last of Heat
"	*1,240	1.80	"	"

*Beyond range of machine for deflection. Test bars not broken and might have shown increase in breaking strength had it been possible to carry on the test further.

The percentage of titanium added to the second series of tests was much less than in the first. Here also no titanium remained in the metal of the heat.

Both series plainly show improvement in the metal as indicated by the transverse test. Unquestionably the undue cooling of the metal by the alloy additions in the ladle militated against soundness on the part of the bars, particularly for the tensile test—the bars being round—and hence the results obtained should not be taken too seriously. In the case of the transverse bars, however, they are somewhat different, for in the actual test the strain is principally on the outer fiber of a flat bar and this portion of the bar is usually pretty sound. The excellent bending results obtained in spite of the interior shrinkage due to cold metal in the first series of bars gave a more reliable clue to what is going on.

The one interesting point lies in the action on the heavier section where graphite was thrown out. Undoubtedly the cooling action had much to do with this.

Titanium, however, as well as aluminum, when used in comparatively large quantities for purifying effects, has the effect of allowing graphite to separate out easier and doubtless (for the titanium as well as aluminum disappears completely in the dioxidation). Here again we see the difference between charcoal and coke for malleable practice. The silicon in charcoal iron charges for malleable ought to be lower than for coke irons, otherwise for the same section the metal would come out "lower." It would seem that the use of titanium in malleable would be particularly advantageous for the heavier classes of work in allowing the silicon to run much lower and in doing this safely give good, soft, strong castings.

The Jamieson Coal & Coke Company.—This company, whose office is in the Oliver Building, Pittsburgh, has recently made returns to the Department of Internal Affairs, Pennsylvania, showing its summary of pay-rolls for the year 1910 to have been as follows:

	Number Employed.	Number of Days.	Total Wages.	Average for Year.	Average Per Day.
Miners	989	306	\$773,004.96	\$781.60	\$2.55
Mine laborers...	664	306	439,695.05	662.19	2.16
Coke laborers...	516	284	287,242.09	556.67	1.96
Total	2,169	....	\$1,499,943.10	\$691.54	\$2.30

The average number of men at work daily ranged from 2524, the maximum, in February, to 1872, the minimum, in July. The actual cash paid on pay-rolls ranged from \$51,590.38, March 1 to 15, to \$38,567.34, July 1 to 15. The company is now operating about 70 per cent. of its coke ovens and about 80 to 85 per cent. of its coal mining capacity.

The Hope Engineering & Supply Company has opened offices in the Farmers' Bank Building, Pittsburgh, as consulting and contracting engineer in natural gas. Alfred J. Diescher is engineer for the new company.

Distributing Expense Burden*

The Analysis Based Upon the Capacity to Produce, Not Upon the Cost of Production

BY A. HAMILTON CHURCH.†

The salient feature in machine shop activity, the end toward which it is created and maintained, is the getting of work past the tool point. However numerous and complex the subsidiary activities, they all of them serve or should serve to this end and no other. From this definition as a starting point we may develop our first general proposition, namely, that every legitimate expense in a machine shop is incurred for the purpose of getting the work up to, under, or away from the tool point, in one way or another.

One class of this expenditure is easily understood and mastered. The cost of the machine operator's labor—and his labor is at the tool point—is in most cases a perfectly straightforward problem, and is handled most successfully by existing cost methods. All the remainder, however, amounting to anything from 100 to 200 per cent of direct operative labor, is usually jumbled together into a common fund termed expense burden.

Now, while we persist in regarding this great mass of expense simply in the light of a lot of figures to be tabulated, analysed, twisted and tortured in various ways, we may succeed in finding out a number of curious facts worthy of being put on exhibition in a museum, but we shall never get anywhere near knowing the very thing we ought to know—what is the operation cost per hour of each of our machines? We may figure our consumption of coal in terms of pounds weight of product, or ascertain the amount of lubricating oil used and its relation to each \$100 of wages paid to a few decimal points, and I have known things done in an elaborately useless way almost as absurd as this, or we may do what is quite common practice and figure our expense burden as so much per cent of our directly productive wages.

Manufacturing Analysis

The first, and in many ways the most important, discovery that results from an analysis of manufacturing activities is that every manufacturer does a good many things besides manufacture. Some of these he does from necessity, others he does from choice, or because he sees a distinct economic advantage in doing them for himself. Stated in more abstract language, actual production is the last organization in a chain of state but separate organizations.

In order to manufacture economically, most manufacturers (and we may say all large manufacturers without exception) take on a number of non-manufacturing functions, some of which are preliminary to production, such as that of landowner, landlord, or power supplier, and some of which are concurrent with but subsidiary to production, as, for example, storekeeping, and costkeeping. The first three of these are entirely separable and as a matter of practice are not always exercised by the manufacturer; the last two are, of necessity, always exercised by him without recourse to outside aid.

Now, every one who has given any consideration to the question of expense burden is aware that one of its most prominent characteristics is that it does not rise and fall proportionally with the volume of work in the shops. You pay for labor as and when you require it, but you have to foot the bills for expense burden whether you require it or not. If, therefore, you treat burden as an item of cost, you introduce a fluctuating element which very soon ceases to have any valuable significance when work is not steady in the shops. This is largely because the analysis of facts, the division of the functions of the organized factory into manufacturing and non-manufacturing functions, has been overlooked, and consequently the true meaning of expense burden has been missed. I will try to express what I believe to be its true meaning in a single phrase:

What Expense Burden Represents

Expense burden represents, not the cost of production, but the cost of capacity to produce. It follows that, when this capacity is not fully utilized, the cost of the resulting

inefficiency or waste of resources must be kept separate from production costs proper. Under any averaging or percentage system of handling expense burden, this essential and fundamental separation cannot possibly be made.

I will now carry the definition one stage further by saying that expense burden represents, in the main, the aggregate cost of the non-manufacturing functions exercised by the manufacturer, and that the true solution of the problem lies in our ceasing to think of expense burden as a whole, but in turning our attention to the various non-manufacturing services and observing their relation to capacity to produce and then to actual production.

The essence of this principle consists in carefully disentangling all the different items of non-manufacturing services and in observing how each of them, taken separately, bears on capacity to produce, first by departments and then by individual machines. About the simplest case is that of a rented building, the rent of which is obviously easily reducible to an annual rent per square foot of available shop space, and this is charged up to the machine according to the space the latter occupies. Now where the land and the buildings are owned by the manufacturer all the expense and outgoings on the property are kept by themselves and commuted into a rent exactly as if the property was rented from an outsider. They are not thrown into a general collection of similar charges and called expense burden. The exact bearing of that particular non-manufacturing function called property-owning on capacity to produce, is ascertained just as it would be ascertained if the property were rented from an outsider, all the group of expenses belonging to it are segregated and merged in an annual rent. Further, it has been found to be quite as easy to segregate all the other indirect or non-manufacturing services and reduce them to rents chargeable for such services, instead of throwing them into a general expense burden fund.

Charging Up Indirect Services

When all such indirect services have been segregated and reduced to rents these are charged first against departments and then against individual machines on various bases of location. The total charge standing against each machine is then divided by the number of working hours in a month or year, and so an hourly rent for the use of that machine is determined.

When all such rents for indirect services have been determined and given an outlet on to jobs in the form of machine rents a further and most important principle of my method comes into play. The capacity to produce may not always be utilized to the full. In the case of a given machine having a rent of 25 cents per hour, whatever work is done at it is charged at 25 cents an hour, whether the shop be full or slack. That is to say, that on this method, alone among expense burden methods, production cost is unaffected by conditions in the shop. You must not punish the job because part of your capacity to produce is being wasted. You have only used 25 cents' worth of the capacity to produce which that particular machine possesses, and that is all the job should be charged with.

What, then, becomes of the idle time? This idle time represents wasted capacity to produce, first, of the machines individually; second, of the machines collectively in departments; and, third, of the plant as a whole. In practice the total of idle time by departments is the significant figure. The total of this idle time is ascertained and expressed as a supplementary rate or percentage on the monthly total of machine rents already charged to jobs. You may think that here we get back to a percentage after all. So we do. But consider what this percentage is. It is the ratio of wasted to utilized resources; something quite new and very important to know.

This supplementary rate may or may not be charged to individual jobs, as preferred. Personally, I do not think that there is any great use in doing so as long as the ratio is determined and made known month by month. For it represents waste, and nothing else, and has no real connection with particular jobs at all. If you do charge it up, then you have costs of direct labor, cost of indirect services as expressed in machine rents, and a third figure which gives you a more or less arbitrary allotment of the total waste. But I prefer to consider such waste as

*Condensed from a paper presented before the National Machine Tool Builders' Association, Atlantic City, N. J., May 18, 1911.

†Consulting Industrial Engineer, Boston, Mass.

a separate job, and a very bad job, and keep it as a separate item in the shop accounts. For the sake of "rounding off" the costs it is sometimes distributed, but I regard this as a concession to the old idea of getting rid of figures by distributing them somewhere and somehow, regardless of whether the result has any true significance or not. In my idea, waste is waste, and when you have separated it out face it squarely and admit that it is none the less waste if you arbitrarily spread it over jobs. I allow that this is sometimes an uncomfortable thing to have to do.

The Summing Up

To sum up, I will briefly enumerate the principal elements of this method of ascertaining true costs of production separated from wasted capacity to produce.

1. Instead of throwing all indirect expenses together into a common fund of burden, and then elaborately analyzing them in the despairing effort to make something significant out of them, we segregate and keep separate the cost of all non-manufacturing services.

2. Having segregated each group of expenses, we determine the rent charge that must be made for it, precisely as the owner of a terrace of houses settles what rent he will charge individual tenants. But, of course, in the case of these service rents there is no item of net profit included.

3. Each department is charged up with its due share of each of these service rents.

4. The share of individual machines in each of these different service rents is ascertained.

Finally, at the end of this process each machine will have been found to be charged with a number of annual rent charges, which represent the annual cost of that machine's capacity to produce. These separate items are then aggregated and commuted into an hourly machine rent which is charged against all work done at that machine.

This completes the cycle of true costs. The residue which is left over, because idle machines have not charged the whole of their "capacity to produce" on to jobs, is collected together monthly, and represents waste pure and simple, or, as the fashionable term of the day expresses it, it represents "inefficiency." Whether you spread it over jobs or not is not a question of principle, but a matter to be determined by bookkeeping considerations which have nothing to do with costs proper.

Shipments from the Hill Mine

A Large Output for 1911—Concentration at Coleraine

MARQUETTE, Mich., May 20.—The United States Steel Corporation's big concentrating plant at Coleraine, western Mesaba iron range, will be operated practically to its capacity the present season. This washery is designed to separate ore from its sandy or shaly impurities, and with five units installed and in commission it is capable of handling 10,000 tons of material a day of 20 hours. Provision has been made for seven additional units, but except that the steel framework for these is in place their construction has been deferred to a later date. The plant will treat in the neighborhood of 2,000,000 tons of sandy ores this season. Considerable of this product will come from the Hill mine at Marble. The Hill contains probably more than 60,000,000 tons of ore and it is being developed on an extensive scale. It is open-pit property. It entered the shipping list only last season, and yet before navigation had ended in the fall it had forwarded 800,000 tons of ore. That outgo will be better than doubled this season. Indeed, it is expected the shipments will approximate 2,000,000 tons. Stripping the overburden is a work carried on day and night, and it will be continued throughout the year, along with the mining operations. At the present time eight steam shovels and 15 locomotives are in commission. The bulk of the ore is of a grade that can be forwarded directly to the shipping port. The rest must first be sent to the big washery at Coleraine for treatment. To care for this ore the Steel Corporation's Duluth, Missabe & Northern railroad has been laying additional

tracks into the mine. The Great Northern has had a large force of men engaged in similar work.

At Other Minnesota Properties

A new shipper on the Mesaba this year will be the Leonidas mine, a property which the Steel Corporation is opening in the Eveleth district. Stripping was conducted throughout the winter and latterly it has been prosecuted even more vigorously, additional engines and crews having been put to work. A portion of the Leonidas deposit extends to a considerably greater depth than ordinarily is the case on the Mesaba, and for the purpose of mining this ore a shaft is being sunk. This will be carried down 625 ft. and it already has penetrated two-thirds of that distance. Another new mine in this field is the Virginia property of Pickands, Mather & Co. The Virginia began shipments last year and closed the season with a record of 300,000 tons. The output this year will considerably exceed that tonnage.

The Buhl district contains a number of prospective mines. One of these, the Sharon, a mile to the east, is to be opened as a steam shovel producer and it is the understanding the work will be commenced within a short time. A valuable tract in possession of the Steel Corporation is the Culver property. The Culver will be an open pit, but the date of its development is indefinite. An 80-acre tract lying between the Whiteside and Woodbridge mines is controlled by H. L. Bartlett and others of Virginia, Minn. Its value has been proved by exploration and development work is now in progress. Within the limits of the town and near the Great Northern depot, the Iron Mountain Mining Company is conducting exploratory operations. Ore has been encountered and there are excellent grounds for the belief that the deposit is of liberal proportions. Further west on the range, at Nashwauk, the Steel Corporation is the holder of eighty acres adjoining the Cleveland Cliffs Iron Company's Crosby mine. Engineers have been at work there the past fortnight or more engaged in making surveys, and it is reported the development of the property is to be undertaken this season.

The Cuyuna range, the first ore from which is about to be sent out, will have only one shipping mine this season. This will be the Kennedy property of the Rogers-Brown interests. However, a number of properties are in course of development and will commence shipments a year hence. Others are being explored. Most of the activity is in the vicinity of Crosby. This village is growing steadily, as are other communities within the iron-bearing zone, and there is great confidence that the region has a bright future before it. The ore traffic will be handled by the Soo Line, and with its new dock at the head of Lake Superior the railroad is ready for it. The pier is 600 ft. long and 78 ft. high. It contains 100 storage pockets, 50 on each side. The dock is comparatively small, but eventually, as the traffic increases, it will be made materially larger. The railroad company has 1,800 ft. of space from the end of the pier to the harbor line and thus has room to triple the capacity of the dock at any time greater shipping facilities are needed.

The Section Thirty mine, the first property developed on the Vermilion range since the Savoy and the Sibley were opened in 1888, will send out approximately a quarter of a million tons this season, it is expected. It joined the ranks of the shippers last year, with an output of 50,000 tons.

On the Old Ranges

The Iron River field at the western end of the Menominee range has been entered by still another concern of prominence in the iron trade. This is the Wickwire Steel Company of Buffalo. With it added to the list no less than 16 operators of similar kind are now interested in the Iron River country. The Wickwire Company has taken an option on an 80-acre tract in Section 14, 43-35, known as the Purcell property, and has already given a contract to the Cole & McDonald Development Company to explore the land with diamond drills. The Purcell lies in the same locality as the Mineral Mining Company's James mine and the New York State Steel Company's Goodman and Gleason tracts, all of which have been proved to be valuable. There is little question that the land contains ore. The Wickwire Company is understood to be contemplating the exploration of still other properties in the Iron River district. Deals are pending, also, involving the entry of the field by other new interests.

A Special Centrifugal Blower

The use of the air blast for blowing scale from dies is becoming more general. A pressure of from 12 to 14 ounces is ordinarily employed, but where the dies are deep cut as is the case with a large proportion of those used in the manufacture of motor cars, a higher pressure must of necessity be maintained. A recent development of the American Blower Company, Detroit, Mich., is a special centrifugal blower which is designed to produce pres-

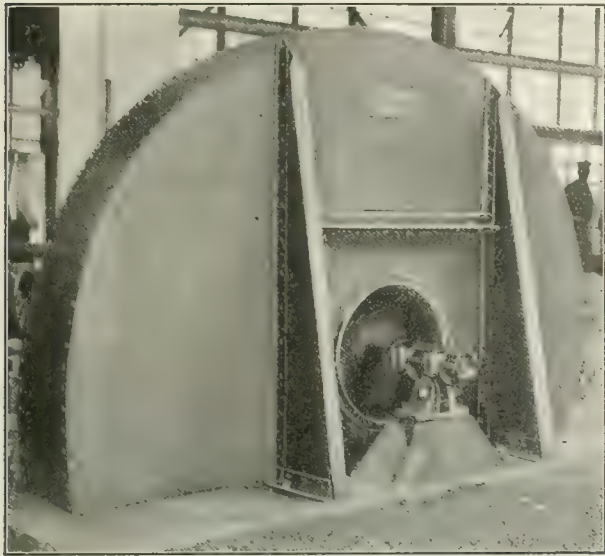


Fig. 1.—A New High Efficiency High-Pressure Blower Built by the American Blower Company, Detroit, Mich.

ures as high as 24 ounces per square inch. Although this high pressure renders the blower especially adaptable for service in connection with deep cut dies, it nevertheless can be installed in connection with standard speed electric motors to which it is directly connected. Fig. 1 is a view of one of these blowers and Fig. 2 shows an installation where the blower furnishes the air blast to oil-burning furnaces.

A scale-blowing rig for use with deep dies has recently been installed by the Packard Motor Car Company, Detroit, Mich. The blower forming a part of the outfit is a special high-presure machine of the type shown in Fig. 1. The wheel is 82 in. in diameter and a pressure



Fig. 2.—The Blower Installed to Supply the Air Blast to Oil Furnaces.

of 22 ounces is regularly maintained in a system comprising 24 deflecting pipes which have an aggregate free area of 34 sq. in. and 54 3/4-in. nozzles for blowing the scale from the dies. The velocity at which the air issues from the latter is 24,000 ft. per minute. A 50-hp. direct current motor operating at a speed of 950 r.p.m. drives the blower through a flexible strap coupling. When all the nozzles and the deflecting pipes are in service the load upon the motor is slightly less than its full rating.

Ordinarily an air compressor might be purchased to supply the blast required in this class of work, but in this particular instance the use of a special type of high efficiency high-pressure blower has not only reduced the initial cost by approximately 50 per cent. but at the same time is effecting savings in both the operating and the maintenance costs. Other uses to which the new blower can be adapted are the furnishing of air blast to oil-fired furnaces as illustrated in Fig. 2 and also for forge and cupola service.

The Growth of Cast Iron

Prof. H. C. H. Carpenter, professor of metallurgy, Victoria University, Manchester, England, presented an interesting paper before the Iron and Steel Institute, at its meeting in London, England, May 10 and 11, on the influence on the growth of cast iron of sulphur, phosphorus and manganese. The paper was supplementary to one published by Professor Carpenter and Professor Rugan on the influence of carbon, silicon and gases dissolved in the iron and those penetrating from outside, which paper was published in the Journal of the Iron and Steel Institute, 1909. A summary of the investigation as to sulphur, phosphorus and manganese follows:

Phosphorus tends to diminish growth. If 0.3 per cent. is present, growth is lessened by about 3 per cent. Higher percentages tend to diminish growth still more.

Sulphur is never present in commercial cast iron in sufficient quantity to have more than a small influence on growth, which is, however, in the direction of retardation.

Manganese retards the rate of growth in all cases, and diminishes the absolute amount in the majority of cases.

Dissolved gases have no influence on the growth of an iron containing more than 3 per cent. of silicon; between 1.75 and 3.0 per cent. of this element, they may cause a growth of from 1 to 2 per cent. Their influence is most potent when silicon does not exceed 1 per cent., and in such cases they may be responsible for a growth of at least 10 per cent.

The simplest and most rapid test for forming an opinion as to the growth that is liable to take place in any particular gray iron is to estimate the silicon, and then read off the approximate growth.

Silicon Per Cent.	Approximate Growth Per Cent.	Silicon Per Cent.	Approximate Growth Per Cent.
1.00	15.0	2.50	31.0
1.25	18.5	2.75	32.5
1.50	21.5	3.00	34.0
1.75	24.5	3.25	35.5
2.00	27.0	3.50	37.0
2.25	29.0		

Alloys containing from 2.25 to 2.40 per cent. of carbon, 0.40 to 0.48 per cent. of silicon, and varying quantities of manganese, showed the following growths after 151 heats:

Manganese Per Cent.	Growth Per Cent.
0.510	7.49
0.735	6.06
0.935	3.09

An alloy containing 2.66 per cent. of carbon, 0.587 per cent. of silicon, and 1.64 per cent. of manganese showed no signs of growth after 150 heats, but, on the contrary, a slight contraction, namely, about 0.13 per cent.

It is a tough material, and its mechanical properties were improved by this treatment.

It begins to freeze at about 1346 deg. C.

It appears to be a suitable material for annealing ovens, rolls, grate bars and the grids of muffle furnaces, whose growth when in the form of gray iron is so objectionable a feature. Probably it could be used for ingot molds in an iron foundry without cracking.

From the point of view of minimum growth and non-cracking, the most suitable material for ingot molds into which molten steel is cast appears to be a very mild steel.

The population of London, England, by the census just completed, is 7,252,963, against 6,581,402 in 1901.

The Pittsburgh Foundry Conventions

Coincident Meetings of the American Foundrymen's, American Brass Founders' and American Foundry Foremen's Associations and Exhibition of the Foundry & Machine Exhibition Company

The exhibition of foundry machinery and supplies was again undeniably the central feature of the foundrymen's meetings at Pittsburgh, Pa., May 23 to 26. This statement is not to be taken as depreciating the value and influence of the formal sessions for the presentation of papers, as the number and quality of the papers were admittedly high, but the technical contributions are recognized as permanent and do not need to have the immediate attention that the instructive and informing details of the exhibits do. It is undoubtedly the fact that the exhibition was the largest given over to the interests of the foundry that the world has ever known. Some 500 tons of machinery, it is estimated, were brought to the exposition halls, and it is believed that the cost of bringing and displaying the material aggregated close to \$200,000. Besides the size of the affair, the use of the buildings of the Western Pennsylvania Exposition Society, including accommodations of the association meetings, added much to the convenience and satisfaction of the convention, and large sales, of interest incidentally to the commercial world at this time, were made by the exhibitors. The associations served to mark again the remarkable progress being made in foundry practice, and the foundrymen's sessions were conspicuous for the attention given to steel casting problems. Finally, the smoothness with which the different meetings and entertainment provisions articulated with one another reflected no inconsiderable advance thought on the part of the association officers and the Pittsburgh Foundrymen's Association.

In last week's issue were reported the opening ceremonies and substantially all the deliberations of Tuesday's meetings, May 23, of the associated foundrymen's annual convention. The joint session held on Tuesday morning had much to do with what may be called

Efficiency in the Foundry

Ellsworth M. Taylor's paper on "Production Costs—A Factor in Scientific Management" accepted a hypothetical condition prevailing in a jobbing foundry, and from that hypothesis proceeded to describe the method of arriving at actual cost of an individual casting. He strongly emphasized the conclusion that the greatest commercial weakness of the foundry industry to-day was the lack of appreciation of sound business methods. "And when I say this, I mean primarily sound cost methods, because sound cost methods are to a manufacturing business what a man's heart is to his body."

The paper by C. E. Knoepfel, New York City, on "The Efficiency Movement in the Foundry," read by title, argued for a closer co-operation between the executive officers and the works to the end that the seemingly illogical condition of higher wages and lower costs might be secured. He discussed in this connection the conservation of human effort.

"Why Cost Systems Fail" by S. E. Nold, Alliance, Ohio, also emphasized the necessity of close co-operation in the office and the plant.

Cupola Charges

"Cupola Melting Practice" by P. Munnoch, taking up the problem from the British standpoint, was read by title. The paper by R. H. Palmer, Salem, Ohio, also on "Cupola Practice," aroused a lot of attention because of an inquiry by Mr. Walker in regard to the variation in ratios mentioned by Mr. Palmer, who spoke of a difference of from 5 to 1 and 10 to 1. Mr. Palmer replied that he ought to have said this variation depended to a considerable extent on the size of the cupola. He also said that the matter of economy was influenced by the demand for iron of the different grades required for the several purposes in his business, as between the small parts and the engine beds and flywheels. He used large charges of coke between the charges of iron in order more definitely to separate these grades of metal. If it were not for this separation by the coke, the two grades of the metal insensibly went into the other. This statement brought out an inquiry as to whether the practice did not raise the height of the charge above the bed, to which Mr. Palmer replied that it did, but he preferred the higher bed.

Major Speer then inquired if the atmospheric conditions

had any effect upon the melting of the iron, to which Mr. Palmer answered that it undoubtedly had; that he preferred a damp day as being the most favorable for the melt. This brought up a question by Mr. Ryan, who wanted to know if the difference in the melting practice under those conditions was not due rather to the effect of the atmosphere upon the belt that drove the blower, giving it a tighter grip. Mr. Palmer replied that his blower was direct connected, and was of the opinion that it did not make any difference one way or the other.

Dr. Moldenke stated that in his judgment and experience it did not matter whether the cupola was large or small; the tuyeres high or low; that the main consideration was to have the iron in 8 to 10 min. and to use small charges. Eight out of 10 foundrymen, he said, did not know how to make iron. He told of a late visit to a foundry melting 50 tons, where he found that the first charge was 8000 lb. and the following charges 2000 lb. He advocated making the charges uniform, 2000 lb., and no further trouble was experienced.

Briquetting Metal Borings

Dr. Moldenke's paper on "The Briquetting of Metal Borings," which was illustrated with lantern slides, proved a most interesting feature of the session. The slides showed interior and exterior views of plants in Germany making briquettes, also the machinery and process of manufacture. In answer to an inquiry as to the cost of making briquettes, Dr. Moldenke replied that it was difficult to give this because the different processes were patented. He added that the cost of producing the briquettes shown in the slides was 60 cents per ton, including overhead charges, interest on investment, etc. The cost of installing one of the plants was estimated at \$35,000. He added that there were ten plants in Europe manufacturing briquetted metal borings and that the briquettes were sold on an equality with pig iron.

He stated that if all briquettes were charged into the cupola, there would be a melting loss of 8 per cent., though with good management this might be reduced to 6 per cent.; but if with only 15 per cent. briquettes, the melting loss would be only 3½ per cent. The silicon, he added, and the total carbon would go down with the use of briquettes while the sulphur went up. In charging steel briquettes in open-hearth furnaces, a saving of 20 to 30 min. was made in getting the heat. He mentioned that the use of briquettes in cylinder work was very satisfactory, securing a close grain in the iron, fine wear and excellent finish.

The paper by George R. Brandon, of the Whiting Foundry Equipment Company, Harvey, Ill., on the "Me-

chanical Charging of Cupola," described the latest charging machines made by this company. The paper was illustrated by lantern slides which showed the various methods of charging cupolas by machine. Dr. Moldenke called attention to the fact that in using these machines it frequently happened that the charge in the cupola was uneven, because the coke and iron all went to one side of the cupola. He described a rather interesting method of cupola charging which he had witnessed in a southern foundry. In this plant the charges were loaded into a bucket with a drop bottom which was drawn into the cupola and the charge dropped and as a result the bed of the cupola was always even.

Mr. Brandon stated that the drawback mentioned by Dr. Moldenke in the use of charging machines could be easily overcome by the manipulation of the air controlling the charging machine. It was within the power of the operator to give the charge any impetus desired, which resulted in spreading the contents evenly.

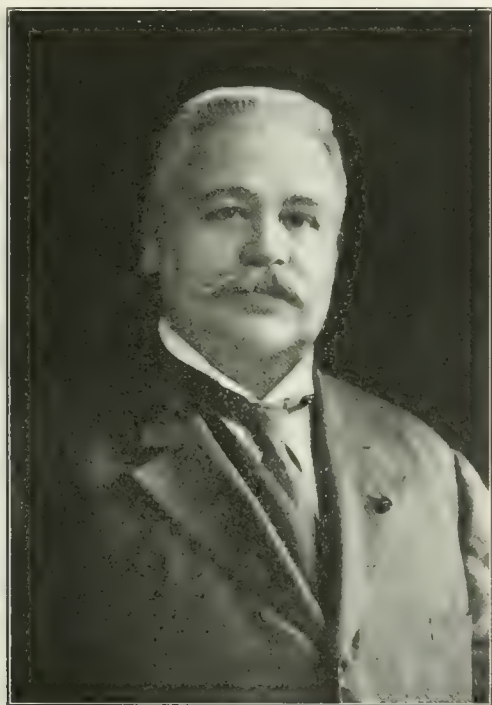
A paper by J. B. Nau, New York City, entitled "Progress in Heated Foundry Mixers," was read by title, as was also the paper by John M. Perkins of St. Louis, on "Defective Castings."

E. H. Mumford, in presenting his paper, "Molding Machine Practice," suggested that a commission or board of experts on molding machines ought to be appointed to select the best machines for the various classes of work

the fine grains desirable. One phenomenon he mentioned was that if the casting were left a little too long in the mold, it was chilled, while if it were removed to exposure to an atmosphere of 40 or 50 deg., no chill resulted. The casting has to be taken out before contraction has taken place and it has to be bumped out, as Mr. Custer expressed it. In referring to blow holes he emphasized that iron high in manganese and sulphur was of course especially given to developing blow holes, and a cure for the blow-hole question generally was to provide a trap in the gate. Manganese is to the permanent mold, he said, what high sulphur is to the sand casting.

Numerous practical details of foundry operation, giving useful hints regarding what are sometimes regarded as the little and insignificant things, were discussed in an interesting paper by Benj. D. Fuller, Cleveland, Ohio, entitled, "A View of the Foundry at Close Range."

A paper on "Coremaking and Core Machines" was read by Archie M. Loudon, Elmira, N. Y. "Of late years," he said, "we have had the benefit of several ingenious machines enabling us to produce cores at a fraction of the cost of hand-made ones of the same character. The latest development," the author added, "is a power ramming roll-over core machine, practically an automatic core-maker, turning out work of almost any size and shape, up to 18 in. width and 32 in. length, by 12 in. depth, with the option of using smaller cores by duplicate boxes at one



JOSEPH T. SPEER.

Re-elected President, American Foundrymen's Association.

for which they were designed and to adopt them as standard. He also added that he thought the future development in molding machine practice would be in the handling of the molds rather than in the making of molds.

A paper by John Alexander, Philadelphia, Pa., on "Machine versus Hand Molding," was read by title.

Permanent Molds

A paper which engaged much interest was read during the Wednesday morning session, on "The Permanent Mold," by Edgar A. Custer, Philadelphia, Pa. Comprehensive treatment of the paper will have to be deferred at this writing, but the author emphasized the desirable physical characteristics acquired by castings made in permanent molds, the continuous operation possible, the large output per unit of space, the practicability of employing even inexperienced operatives and the low unit cost per pound of casting.

In the discussion Mr. Custer explained that he did not like hot iron and that bulk is desired in the mold to absorb the heat instantly if that were possible. The casting is removed when, say, there is an exterior solidification or skin 2 or 3 in. thick; then the hot interior in the attempt to swell will as a result of the internal pressure develop



DR. RICHARD MOLDENKE.

Re-elected Secretary, American Foundrymen's Association.

operation. The cost of making cores with this machine is anywhere from one-fifth to one-tenth that of making these cores by hand."

The recovery of the "Waste Sands of the Foundry" was described in a paper by S. A. Capron, Westfield, Mass., presented in abstract. The author called attention to core-sand washing machines as a practical means of securing economy by cleaning waste core sand and returning a large part of it as a new supply.

The washed sand is free from all objectionable substances and satisfactory for use. Not over 20 per cent. of new sand is required to keep the total amount at the same quantity. These machines involve a water process like that of the cinder mill, familiar in modern foundry practice. It is based on the natural separation of sharp sand from any foreign substances, which occurs quite generally in any slowly moving current of water. In the operation 15 or 20 cu. yd. of waste material can be handled in 10 hours. The production of perfect core-sand from this amount will vary from 80 per cent. to 90 per cent. The balance is recovered in the settling basin, and brings the total available sand up to about 95 per cent. By washing worn molding sand it has been found possible to separate 25 per cent. of good core-sand from the fine grade of Albany stove plate.

Core-sand washing machining machines should run slowly, turning 9 to 15 times in a minute according to the grade of sand and requiring about 3 hp. for this at these speeds. The water used is about 10 cu. ft. to 1 cu. yd. of waste handled, and an arrangement could easily be perfected whereby the water could be used over again if it were an item.

Pyrometry

An address was made by Dr. S. H. Stupakoff, Pittsburgh, on the selection and use of pyrometers. He described the various types of pyrometers on the market, including that employing silica or quartz terminals and making unnecessary the use of the brittle porcelain covering commonly a feature of thermal electric high-temperature indicating apparatus. The other forms of apparatus referred to were: the water pyrometer, such as has been used in steam boiler trials, involving the use of some incombustible of known weight and specific heat which is plunged into a pail of water or other and better form of calorimeter; clay cones such as are in regular use in potteries; electric resistance pyrometers, which he emphasized should not be used for temperatures over 1500 deg. F., as platinum for instance, undergoes a change of resistance when it is over exposed to high temperature; the optical method of closely estimating the temperature, which, however, brings in the question of personal error, and the radiation pyrometer, which is not calculated to give strictly accurate readings when the heat has a chance to be dissipated in part by convection, as would be the case in a temperature measurement in the open air, and which requires perhaps a minute or two for focussing satisfactorily the radiant heat.

It is proper for *The Iron Age* here to add that the Bristol Company, Waterbury, Conn., is about to introduce a pyrometer especially adapted to temperature indication of molten metal. It employs two graphite pencils, slightly differing from each other, 4 or 5 in. long and about $\frac{1}{4}$ in. in diameter. These are mutually insulated and the electric circuit for the thermal electric impulse is closed through the molten metal itself. For such slow disintegration or destruction of the graphite as may take place, new pencils may be inserted. The material into which the graphite is screwed has been selected so that other thermo-electric action likely to be set up is compensated.

The Electric Furnace

A short paper, mentioning that the electric furnace was capable of improving the quality of foundry iron, was presented by Dr. P. Heroult, New York City, in part as follows:

The main feature of what is called strong iron is the low content of sulphur. The removal of sulphur is one of the easiest and most effective operations that can be performed in the electric furnace. It consists simply in pouring into the furnace a charge of molten pig iron, if possible direct from the blast furnace; if not, from a cupola or other melting apparatus, then heating the metal under a basic slag which does not have to be scraped or removed except when it is teemed into a ladle with the metal ready for pouring. The contents in carbon, silicon, manganese and phosphorus are not affected by this operation unless this be desired. Common bessemer iron worth anywhere from \$10-\$14 per ton can be changed into strong iron, charcoal iron, car-wheel iron, or so-called cold-blast charcoal iron for a cost of about \$1 per ton.

Open Hearth Steel Foundry Practice

A paper was read by Walter MacGreggor, of the American Steel Foundries, Chicago. It gave a comprehensive lot of figures on the proportions and design of the small open hearth furnace for steel castings, using oil burners.

A paper on open hearth steel foundry practice was read from manuscript by R. E. Bull, Granite City, Ill. It explained that with the basic process 450 heats could be run with only incidental attention for upkeep while with the acid furnace 600 heats were possible under the same conditions. The author felt that oil burners were often not given the proper atomization and the use of oil meters, he asserted, would do much to encourage the use of economical burners. He advocated the use of recording thermometers and pressure gauges to obtain and maintain the best conditions. For superior castings he championed the basic furnace and claimed better results with the copeless molds. He considered that the shrinkage of steel castings did not augur well for the use of permanent molds. He regarded the fuel oil flame as more economical and satis-

factory for core ovens than coke. He placed the annealing temperature at 800 deg. Centigrade (1475 deg. F.) The loss in bad castings, he said, was 4 per cent. for daylight operation only and 6 per cent. with day and night operation. He exhibited a sample heat report diagram giving details of every heat, and these he regarded as very helpful auxiliaries. He mentioned that the deleterious effect of slag resting on the metal was met by the use of thermit with silicon. As little as 2 in. of slag on the ladle did not, he said, produce any harm, but 5 or 6 in. did. He has also experimented with carbo, using 20 lb. in a 25 ton ladle; the addition of carbon did not exceed one or two points. The material, he stated, is 93 to 95 per cent. carbon and a product of refined petroleum sometimes known as petroleum coke.

Converter Steel Castings

The manufacture and annealing of converter steel castings were discussed in an extemporaneous address by Bradley Stoughton, New York. He regarded annealing as not always necessary, but it helped, he admitted, to secure the best grains and added to the strength and ductility of the metal. He regarded the pyrometer and microscope both as important apparatus in annealing work. The following covers in brief some of the features of the address:

Ingotism, caused by casting too hot or cooling too slowly, is not always obliterated by heat treatment.



H. D. MILES,
Vice-President, American Foundrymen's Association.

The coarse grains will persist. Double annealing is necessary. The second treatment is necessary at a point just above the critical temperature. With slow cooling between 1600 and 1200 deg. F., the crystals will be thick. The aim is to cool the steel rapidly through the critical range. Sagger cones are valuable in ascertaining the correct temperature conditions. A horse-shoe magnet may also be employed. There is a loss of power of attraction by the magnet at a temperature below which the rapid cooling is to be stopped. Silicon in the pig iron varies tremendously. It is better at $1\frac{1}{4}$ or $1\frac{1}{2}$ per cent. going to the converter. It causes waste as it produces slag—silica and oxide of iron largely. It increases the length of blow and therefore entails a loss and the silicon oxide represents heat that is wasted. Three blows an hour he recommended for the converter. A converter for castings averaging over 100 lb. cannot compete with the open-hearth plant. It can make smaller castings to better advantage. Its product ought to get better prices. Money loss can be withstood in view of the large tonnage. Open-hearth furnace operators seldom know what it costs to make small castings. Converter founders have as a rule insufficient capital. They are prone to rush into the business owing to the low initial cost relatively of the plant. Open hearth and converter foundries ought to

divide business on the basis of the size of the castings. Basic open-hearth furnaces, to make small castings, must work under high temperature and this, with attending large slag production, brings about the trouble experienced with slag.

A paper was read by Charles V. Slocum, Pittsburgh, on "Titanium in Steel Castings." It will be found reviewed at some length in this issue.

A lantern slide discussion of the practicability of the electric induction furnace for making steel castings was presented by C. H. von Baur, New York City. He described the installation and cost of operation of furnaces of the "Röchling-Rodenhauser type and called attention to the fact that it allowed for regulating the chemical constituency of the metal independently of its temperature. The cheapest steel scrap, he added, can be made into quality steel at low cost.

An important contribution to the study of the microscopic structure of iron and steel was made by Prof. William Campbell, New York City, who employed lantern slides for illustration.

Vanadium in Castings

A paper was read on the Thursday morning session of the American Foundrymen's Association by G. L. Norris, American Vanadium Company, Pittsburgh, Pa., on "Vanadium in Iron and Steel Castings." Emphasis was placed on the fact that vanadium was not a cure-all for the ills to which cast material is heir and while it is a scavenger, it is an expensive one. Its chief value is regarded as making a fine grain material, tough and workable, with the graphite well distributed and specially adapted to cylinder castings and the like. Dr. Moldenke had found that the strength of white castings was increased three times when vanadium remained in the iron, testing without and with at 1000 and 3300 lb., respectively. It was also brought out in the discussion that while added strength was a result of the use of vanadium, the wearing qualities yet remained to be determined, awaiting the lapse of sufficient time to give a proper indication.

A comprehensive paper illustrating by means of lantern slides the wide scope and the possibilities of the application of electric motors for driving machinery in the foundry was read by Brent Wiley, Pittsburgh.

A New Blower for Cupola Use

A new blower for cupola use was brought to the attention of the convention through a paper illustrated with

vanes form passages around the periphery of the wheel through which air thrown by the centrifugal action is slowed down and the velocity head transformed to a pressure head suitable for use in cupola work. The author showed a six-stage blower built on the same type directly connected to a steam turbine for use in blast furnace work. He claimed that there was extreme steadiness of air pressure produced by the centrifugal blower. He explained also that the machine had only two bearings, both automatically lubricated, and the large clearance of the rotating element allowed for direct connection to the electric motor. With regard to the usual assumption that 30,000 cu. ft. of air are required for 1 ton of iron, he asserted that actually the amount of air is no more than 24,000 cu. ft., and he felt the reason the higher figure had so wide acceptance was that it was the result of the calculation of the output of the commonly used cupola blowers based on displacement alone.



L. W. OLSON.

President, American Brass Founders' Association.

lantern photographs presented by R. H. Rice, of the General Electric Company, Schenectady, N. Y. It is a centrifugal air compressor, in the words of the author, and in-



W. M. CORSE.

Re-elected Secretary American Brass Founders' Association.

A Treatise on Pattern Making

An extended paper on pattern making and pattern equipment was read by W. S. Giele, of the Harrison Safety Boiler Works, Philadelphia. It is a valuable collection of data obtained from manufacturers in widely differing industries and relating to the pattern department, and it is practically a treatise on the best in pattern shop practice. Among other things, the author emphasizes that the capable workman can work much faster with his head than with his hands and his skill and manual dexterity are applied to the best advantage when devoted to the intelligent handling of mechanical equipment specially adapted to patternmaking.

What may be styled a companion paper to that of Prof. Campbell was presented at the close of the Thursday morning session by W. P. Putnam, Detroit Testing Laboratory, Detroit, Mich., entitled "The Physical and Chemical Characteristics of Malleable Iron." Lantern photographs were used to show the effect of annealing. The author asserted that the average foundry over anneals, but admitted that errors in casting were sometimes overcome by annealing. He showed records indicating the presence of more graphite carbon at the bottom than at the top of the annealing pots. One specimen of malleable iron he had found to give over 21 per cent. elongation with 15 per cent. reduction in area and had a tensile strength of 53,283 lb. per square inch and an elastic limit

lantern photographs presented by R. H. Rice, of the General Electric Company, Schenectady, N. Y. It is a centrifugal air compressor, in the words of the author, and in-

of 37,195 lb. In another specimen on heating above the critical temperature, a condition of 0.83 graphitic carbon was chargeable to 0.60 combined carbon and 0.23 graphic carbon.

The last session of the meeting, on Friday morning, was introduced with the reading by Thomas D. West, of his paper on "Gas Cavities, Shot and Chilled Iron in Iron Castings." This is reviewed at length elsewhere in this issue. Charles V. Slocum considered the paper as the clearest exposition he ever read of the cause of cold shot and regarded it as a valuable addition to the literature of the foundry.

Titanium in Malleable Iron

A paper on "Titanium in Malleable Iron" was read by C. H. Gale, Pressed Steel Car Company, Pittsburgh. He described the results of tests made with bars given in some cases $\frac{1}{8}$ per cent. of titanium, in some others $\frac{1}{4}$ per cent. of the titanium alloy, and in others none at all. Tests for the tensile strength and for elongation did not show any advantage with the addition of the alloy. For example, the untreated specimens showed about 47,000 lb. per square inch tensile strength, those with 0.125 per cent. alloy showed 44,000 lb. tensile strength and those with 0.25 per cent. showed about 43,000 lb. tensile strength. The elongation for the three cases were on the average 6, 3 and 2 per cent., respectively. Transverse tests were quite different. Where the untreated specimens fractured at 1180 lb. between 12-in. supports, the transverse tests for the smaller amount of the alloy in some cases extended beyond the range of the testing machine. Later investigation covered the addition of a less amount of titanium, in one case 0.03 per cent. and in another case 0.06 per cent. In these specimens no titanium remained in the bars. Titanium, when used in large quantities for purification, allows the graphite to separate and allows the silicon to run low and gives good soft castings and such he felt was the value of titanium in malleable iron.

W. D. Alexander, of the Albany Malleable Iron Company, Albany, N. Y., mentioned briefly an extended series of tests he was conducting along the same line. He found that when, for example, the amount of the alloy was about 0.47, there was an advantage in favor of the treated metal, but when there was 1 per cent. and so on up to 1.75 per cent., the results were in favor of the untreated specimens. He has now under investigation, test pieces with 0.4 to 0.6 per cent. titanium alloy. He believes that the benefit will show in favor of large castings.

New Officers and Place of Next Meeting

The election of officers of the American Foundrymen's Association occurred on the Friday morning session. In the Thursday morning session, President Speer had appointed the following committee on nominations: W. H. McFadden, Pittsburgh, chairman; L. L. Anthes, Anthes Foundry Company, Toronto; A. T. Waterfall, Russell Wheel & Foundry Company, Detroit; E. H. Mumford, Mumford Molding Machine Company, New York, and A. E. Howell, Phillips & Butorff Mfg. Company, Nashville, Tenn. At the same time he appointed as auditing committee: William Yagle, Lawrence Iron & Steel Foundry Company, Pittsburgh, and W. A. Bole, Westinghouse Machine Company, Pittsburgh.

The report of the nominating committee was unanimously adopted and the following are the officers:

President, Major J. T. Speer, Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, Pa.

Vice-President, first district, F. B. Farnsworth, New Haven, Conn.

Vice-President, second district, W. D. Miles, Buffalo Foundry & Machine Company, Buffalo, N. Y.

Vice-President, third district, Walter Wood, R. D. Wood & Co., Philadelphia, Pa.

Vice-President, fourth district, Alfred E. Howell, Phillips & Butorff Mfg. Company, Nashville, Tenn.

Vice-President, fifth district, R. E. Bull, Granite City, Ill.

Vice-President, sixth district, T. W. Sheriff, Sheriff Mfg. Company, Milwaukee, Wis.

Vice-President, seventh district, D. R. Lombard, Lombard Iron Works & Supply Company, Augusta, Ga.

Vice-President, eighth district, S. B. Chadsey, Massey-Harris Company, Toronto, Ont.

Chairman McFadden explained that he had purposely omitted the nomination for the secretary-treasurer, and forthwith paid a graceful tribute to Dr. Richard Moldenke and offered his name in nomination for the office of secretary and treasurer. Dr. Moldenke, in a short, happy speech succeeding his unanimous election, referred to the fact that he was now entering on the eleventh term.

On motion of Mr. Howell, the constitution was amended to allow for a permanent standing advisory committee by constituting the past presidents as such a committee and ex-officio members of the executive committee.

On motion of J. S. Seaman, who was later introduced for an address, as the father of the association, Buffalo, N. Y., was selected as the place for the next meeting.

Closing Felicitations

A resolution offered by L. L. Anthes, Toronto, was adopted expressing appreciation of the efforts of the officers of the association and of the officers of the Pittsburgh Foundrymen's Association in so successfully conducting the convention. The resolution also incorporated extended reference to the activities of Dr. Moldenke, who, as Mr. Anthes expressed it, has probably done more than



N. K. B. PATCH.

Retiring President, American Brass Founders' Association.

any one else in the world for the development of scientific foundry practice. It also paid special attention to the efforts of H. E. Field, Pittsburgh, who, as chairman of the committee on papers, helped materially in making it the banner convention, and who succeeded in arousing the conspicuous interest of the steel foundries. Special attention in the resolution of thanks was paid to the plant visitation committee and to the manufacturers who had opened their doors to the visitors.

On motion of W. P. Putnam, the convention decided to appoint a committee to work with committees of the American Society of Automobile Engineers and the American Brass Founders' Association on the matter of uniform report cards on tests of material.

There were a number of papers which had to be read by title only, owing to lack of time for discussion. They included "Foundry Construction," by George K. Hooper, New York City; "The Equipment of Air Furnaces Using Oil as Fuel," by N. W. Best, New York City; "Manganese and Silicon in the Foundry," by A. E. Outerbridge, Jr., Philadelphia, and "The Foundry Foremen's Educational Movement," by D. O. Wilson, Newark, N. J.

The Brass Founders' Sessions

In the absence of President Batch, of the American Brass Founders' Association, who was unable to attend the convention this year, the chair was occupied by L. W. Olsen, Mansfield, Ohio. The first paper presented was on "The Analysis of Manganese Bronze," by J. R. Huber, Buffalo, N. Y. Mr. Olsen, in discussion, asked to what extent the analysis of manganese bronze could be taken as an index of its physical character. Mr. Huber replied that it was possible to form a table by means of which the physical qualities of the metal could be determined by its chemical composition. Mr. Webster then explained that the physical qualities of manganese bronze varied greatly with the different percentages of copper; also that variations in the content of tin and iron greatly influence the quality of the metal; and that, in consequence, the chemical composition can be taken as an index of quality only when all conditions are the same in making the bronze.

In replying to a question of the effect of rapid cooling on manganese bronze, Mr. Corse said some people believed a difference of 50 per cent. in strength existed between chill and sand castings, which was erroneous. The tensile strength of a chill casting might be 80,000 lb. per square inch, as against 75,000 lb. from the same alloy cast in sand.



C. E. HOYT.

Secretary, Foundry & Machine Exhibition Company.

Melting Ratios in Brass Foundries

"The Corrosion of Brass Foundry Products," by William Vaughan, Boston, Mass., was the next paper presented, and this was followed by the paper "Efficiencies of Furnaces," by Dr. J. W. Richards, South Bethlehem, Pa. Summarized briefly, the paper applied itself to the ratio of fuel to output, and gave a number of examples. In requesting information relative to the melting ratios of brass furnaces, Mr. Webster stated that in using anthracite coal the ratio was from $2\frac{1}{2}$ to 3 lb. of metal melted per pound of fuel.

Mr. Corse stated that with coke, the average was 45 lb. of fuel to 100 lb. of metal. Mr. McKimmon stated that in a Steele-Harvey furnace he had melted 900,000 lb. of bronze for light castings at an average consumption of $3\frac{3}{4}$ gal. of oil per 100 lb. of metal. The metal charged was $\frac{1}{9}$ th borings, and the loss in melting and subsequent grinding was 4.6 per cent. The cost of the oil averaged 18 cents for $4\frac{1}{2}$ gal. It was stated also in the discussion that the fuel consumption in a Charlier furnace averaged 3 gals. of oil per 100 lb. of metal.

N. K. B. Patch, Lumen Bearing Company, Toronto, Ont., president, was in the chair for the Wednesday ses-

sion. A committee was appointed to nominate officers for the association for the coming year, as follows: H. B. Webster, chairman; J. L. Jones, W. L. Abate, J. G. Kasjens, and F. W. Reidenbach.

A paper was read by H. W. Gillett, Aluminum Castings Company, Toronto, Ont., entitled "The Pyrometer and the Aluminum Foundry," and elicited considerable discussion.

A paper was presented by C. Powell Karr, Walworth Mfg. Co., South Boston, Mass., entitled "Pouring and Melting Points of Some High-Grade Bronzes." There was also considerable discussion on this paper.

Secretary Corse announced that the joint sessions of the American Brass Founders' Association and the American Foundrymen's Association were found to be unsatisfactory for the reason that so many papers were to be read at the sessions of the latter organization there was not time properly to present the papers and have the desired discussion by members of the American Brass Founders' Association. For this reason the paper originally scheduled to be read in joint session on Thursday morning by E. A. Barnes, Fort Wayne Electric Works, Fort Wayne, Ind., was read at the Wednesday afternoon meeting. This paper was entitled, "Non-Ferrous Foundry Economics and Refinements." Mr. Barnes showed photographs of a number of new machines recently added to the foundry of his company, and stated that by reason of the many conveniences afforded, they were able to get employees of the very highest ability.

The Friday morning session of the American Brass Founders' Association was devoted to papers by Prof. S. W. Parr, of the University of Illinois, on "The Determination of Nickel in Alloy;" and the paper by Jesse L. Jones on "The Effect of Repeated Melting on Manganese Bronze."

The result of the election of officers is as follows:

President, L. W. Olson, Ohio Brass Company, Mansfield, Ohio.

Secretary, W. M. Corse, Lumen Bearing Company, Buffalo, N. Y.

Vice-Presidents: New Jersey district, John F. Thompson, Orford Copper Company; New York district, R. T. Roberts, National Brass & Copper Tube Company, Hastings-on-Hudson, N. Y.; New England district, P. T. Augenbraun, Yale & Towne Mfg. Company, Stamford, Conn.; Pennsylvania district, G. H. Clamer, Ajax Metal Company, Philadelphia, Pa.; Illinois district, Philip Mueller, H. Mueller Mfg. Company, Decatur, Ill.; Chicago and Northwest, R. C. Faunt, Faunt Brothers, Chicago; Michigan, Ohio and Indiana, H. W. Gillett, Aluminum Casting Company, Detroit; Virginia and the Southwest, John C. Sharp, Sharp Brass Works, Chattanooga, Tenn.; Ontario and the Western Provinces, N. K. B. Patch, Lumen Bearing Company, Toronto, Ont.; Quebec and the Maritime Provinces, R. R. Mitchell, Robert Mitchell Company, Ltd., Montreal, Que.

The Associated Foundry Foremen

At the annual meeting of the Associated Foundry Foremen, held contemporaneously with the other foundrymen's meetings, the following officers were elected:

President, Robert B. Thompson, Buffalo-Pitts Company, Buffalo, N. Y.

Vice-President, Wm. H. Woods, Pennsylvania Railroad, Altoona, Pa.

Secretary, Hugh McPhee, Tarrytown, N. Y.

A banquet was tendered the visiting foundry foremen by the Pittsburgh Foundry Foremen's Association at the Fort Pitt Hotel Wednesday evening. Professor C. B. Connelly, of the Carnegie Technical Schools, presided as toastmaster. The address of welcome was delivered by W. H. Wood, president of the Pittsburgh Association and replied to by Robert Thompson of Buffalo, president of the Associated Foundry Foremen.

Secretary Hugh McPhee, of the Associated Foundry Foremen, told of the progress of the association during the year, saying that the Pittsburgh Association, although but one year old, was now numerically stronger than any of the other branches and urged upon local members the benefits to be derived from attendance at meetings and close attention to the educational papers presented.

Major Speer, president, and Dr. Moldenke, secretary of the American Foundrymen's Association, spoke of the

work and aim of their association, and Secretary Tracy, of the Buffalo Chamber of Commerce, extended a cordial welcome for the Allied Conventions in their city in 1912.

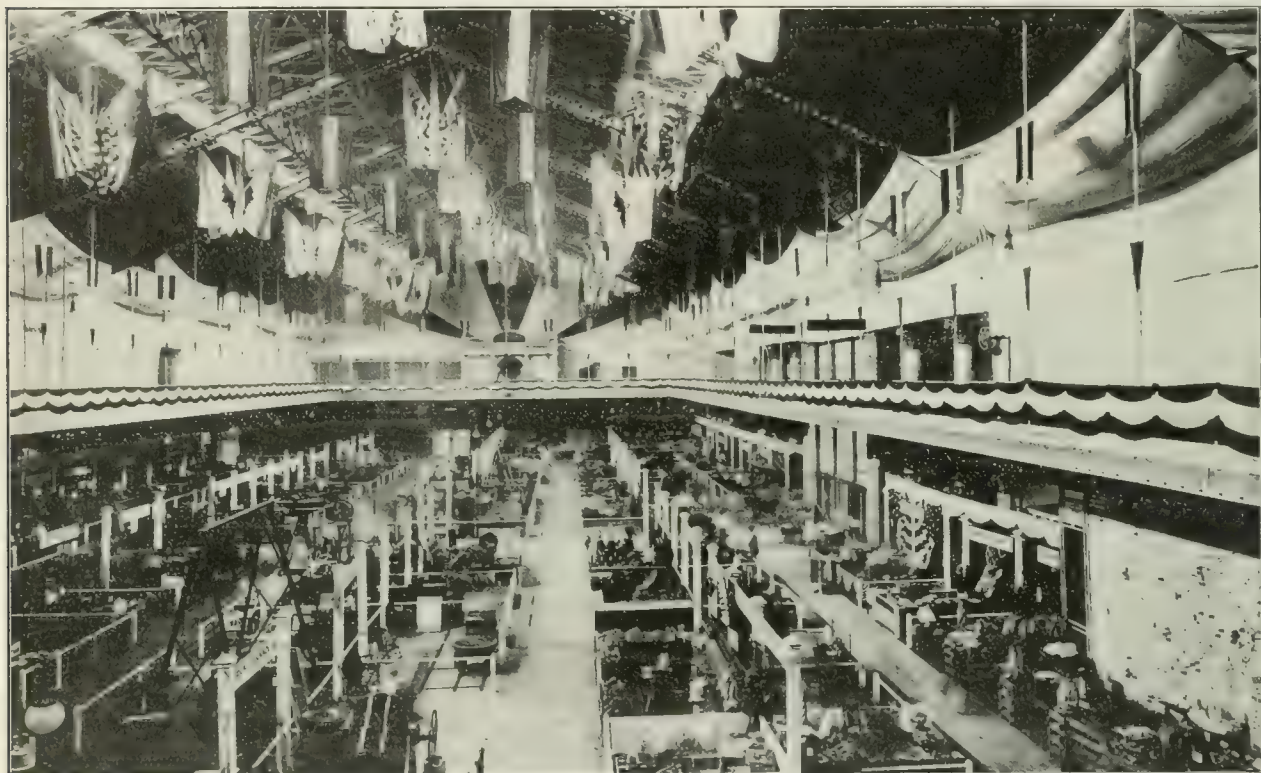
Director A. A. Hammerschlag, of the Carnegie Technical Schools, spoke of the work undertaken by that institution to assist the foundry industry and urged the foundry foremen to change their methods of producing first class apprentices by giving them the benefit of the technical and practical education offered by the school and assist those growing up in the foundry business in their aspiration for higher education. He urged up those present to welcome the installation of labor-saving devices and said that it was a mistake to endeavor to double tonnage production at the same relative tonnage cost as at present but that the progressive foundryman and his foreman should bend their efforts to produce a product that would double the value of present tonnage.

Rev. J. Leonard Levy urged the co-operation of those present, together with their employees, along the lines of

years ago by Westinghouse interests at Trafford City, a few miles farther on Turtle Creek, along which the name Westinghouse is displayed on industrial establishments of international importance.

At the Carnegie Steel Company's plant were seen the operation of open hearth steel furnaces, the rolling of ingots into plate, the making of slabs, blooms and billets from ingots taken from soaking pits and the rolling of structural shapes, as well as the armor plate department where steel plate as thick as 18 in. for use at the Panama Canal was being treated.

Some opportunity was also given to witness the casting of steel ingots and of course great interest was taken in the electric traveling charging machines for the open hearth furnaces. The crowds were wont to linger so long to watch the pyrotechnics and listen to the detonation of the tossed-about ingots and billets that the works police force performed a necessary service in helping keep up the time schedule planned.



View in the Main Hall of the Exhibition of Foundry Machinery and Supplies at Pittsburgh.

securing state and national boards of conciliation to eliminate labor strife, pointing out the benefit of such boards in the Dominion of Canada, where, last year, there were but 71 strikes as against 6,000 in the State of New York and 7,100 in Pennsylvania, during 1910.

Plant Visitation and Social Affairs

One of the especially enjoyable and instructive phases of the allied foundrymen's meetings was the trip made on Thursday afternoon to the works of the Westinghouse Air Brake Company at Wildmerding, Pa., to the Homestead works of the Carnegie Steel Company and to the plant of the Mesta Machine Company at West Homestead, Pa. A long special train was needed to accommodate the large number participating. The visit to the Westinghouse foundry was chiefly to view the operation of the continuous pouring plant. The daily capacity of the foundry is approximately 300 tons. The main foundry is equipped with four molding tables, each about 250 ft. long and moving around an oval track. Two of these tables move continuously and are used for small castings such as one man can handle readily. The other two tables are for heavy work and move forward only as each lot of molds is finished. The cupola is located at one end and inside of the oval track.

In the Westinghouse Air Brake foundries were also seen a number of Tropenas converters at work and also the practice followed in core making. The plant is not to be confounded with the modern foundry opened a few

Interests at the model Mesta Machine Works centered in a large casting requiring metal from three furnaces and the casting of the half of a 20-ft. blowing engine wheel, weighing, for the half, 28,000 lb. The large casting was 39 ft. 4 in. long, 52 in. in diameter, had 8-in. walls and weighed 185,000 lb. For cutting the steel risers an equipment of the oxy-acetylene blow pipe has been provided by the Linde Air Products Company, Buffalo, N. Y.

The Mesta machine plant has been described in these columns. Its attractive buildings harmonious to their purpose and the neatly kept factory yards came in for much favorable comment.

The entertainment arrangements also included automobile drives for the ladies, a vaudeville performance of remarkable merit, on Thursday evening, ticket to a National League base-ball game at the celebrated million dollar Forbes Field on Friday afternoon, and a notable subscription banquet at the Fort Pitt Hotel on Friday night.

The Exhibits

The success of the exposition was demonstrated by the large attendance, the large number of machines sold on the floor of the exhibitors' booths, and the number of firms represented with floor space. The total number of exhibits at Pittsburgh was 118, as compared with 83 at Detroit and 68 at Cincinnati. Sixty-five of the 118 exhibits showed machinery and foundry appliances in actual operation under conditions similar to those of a working

foundry. The total cost of the convention to exhibitors was close to \$250,000, this representing the freight expense on 500 tons of equipment to and from the convention, floor space in the exhibition halls and the salaries of salesmen and other employees.

A pleasing feature of the entire exhibition was the fact that a considerable proportion of the equipment shown was sold in the first four days. Several of the concerns represented found it necessary to telegraph home for additional help and more equipment. C. E. Hoyt, secretary of the Foundry & Machine Exhibition Company, and F. N. Perkins, chairman of the executive committee, received, during the last two days of the convention, inquiries from a large number of interested concerns who were not represented at this convention requesting that spaces be reserved for them at Buffalo. The attendance was somewhat greater than at the Detroit convention and represented a better interest, those attending numbering the substantial and purchasing end of foundries and machine shops and not as large a number of uninterested visitors. On Saturday afternoon and evening the foundries and machine shops in and about the Pittsburgh district sent

Jonathan Bartley Crucible Company, Trenton, N. J.:—Crucibles, retorts, stoppers and a variety of graphite specialties. Represented by Samuel H. Dougherty, Lee T. Ward, Herbert D. Cole and Lewis L. Lawton, secretary.

Berkshire Mfg. Company, Cleveland, Ohio:—Hand squeezing and pattern drawing molding machines, plain squeezers and automatic molding machines; also a full line of snap flasks, iron flasks, etc. Represented by R. H. York, J. N. Battenfeld and C. F. Battenfeld.

Charles H. Besly & Company, Chicago, Ill.:—Besly's pattern makers' disc grinder for wood and Besly direct connected motor-driven grinder for metal, Helmet pressed-steel ring wheel chucks, geared lever feed tables, rotary fixture, Helmet temper taps, Helmet oil, Helmet spiral circles, Helmet cement and Helmet glue. Represented by Charles A. Knill, Wm. H. Allen, Edward P. Welles and John Miller, Jr.

S. Birkenstein & Son, Chicago, Ill.:—Brass foundry's alloys. Represented by E. E. Berliner, H. Birkenstein, J. B. Nieman and Lee Kahn.

George F. Blake Mfg. Company, East Cambridge, Mass.:—Two sizes core wiring straightening machines, dustproof, enclosed frame, splash lubricated air compressors, pneumatic sand riddles. Represented by Frederick H. Thatcher, Pittsburgh sales manager; A. F. Murray, Frank Goodman, W. B. Stamford and R. L. Radcliffe.

Blystone Mfg. Company, Cambridge Springs, Pa.:—Blystone core sand mixers. Represented by P. L. Blystone, J. F. Mather, J. A. Bolad and W. E. Wright.

Brown Specialty Machinery Company, Chicago, Ill.:—Hammer core machine and style C hammer core machine. Represented by Elmer A. Rich, Jr., and John Laycock.

A. Buch's Sons Company, Elizabethtown, Pa.:—Combination jar and squeeze molding machines, patented aluminum snap flasks, square



Part of the Exhibit of Foundry Machinery and Supplies in Machinery Hall, Pittsburgh.

several thousand of their employees to see the exhibition, these being unable to attend during the week.

LIST OF EXHIBITORS.

The Adams Company, Dubuque, Iowa:—Molding machines, squeezers, snap flasks, pneumatic rappers, spruce cutters, grinding stands, milling machines, automatic gear hobbing machines. Represented by C. E. Reich, W. J. Spensley, John Nicol, Ignatius Schweitering, John Berringer, Anton Haas, L. E. Marceau and Glenn Muffly, sales manager.

Albany Sand & Supply Company, Albany, N. Y.:—Samples of selected grades of sand for brass, aluminum and stove plate castings. Represented by L. Murray, manager; Chas. H. Bird and Arthur T. Palmer.

American Metal Market Company, New York, N. Y., and Pittsburgh, Pa.:—Represented by B. F. V. Luty.

American Vanadium Company, Pittsburgh, Pa.:—Vanadium cast steel and cast iron specimens. Represented by J. J. Flannery, president; Geo. L. Norris, Met. Engr.; C. L. Hastings and W. J. Bird.

Arcade Manufacturing Company, Freeport, Ill.:—Norcross jarring machines, modern molding machines, Arcade squeezers, Arcade Rotary sand sifter, perfect match plate hinge and the modern automatic molding machine with sand elevator and dropper. Represented by E. H. Morgan, Chas. Morgan, L. L. Munn, F. N. Perkins, R. M. Burton, W. C. Norcross, Henry Tscherning, G. D. Dolfey, Aug. Christen, John Ludolph, Joe Stevens and H. Damman.

Atlas Car & Manufacturing Company, Cleveland, Ohio:—Storage battery locomotive, new type sand blast car, portable track and side-dump sand car. Represented by R. S. Richards.

Baird & West, Detroit, Mich.:—Solvay foundry coke; joint exhibit with Pickands, Brown & Company.

and tapered, patented steel flask bars, Buch's pattern cement, bottom boards, cast iron casings, cast iron flasks for the gravity machine with bottom boards and bars, special pouring ladle with bail. Represented by R. S. Buch and George E. Bates.

Buckeye Products Company, Cincinnati, Ohio:—Parting compounds, binders, blackings, brass fluxes and core compounds. Represented by Charles A. Goehring and Edward Leisl.

Burroughs Adding Machine Company, Detroit, Mich.:—Burroughs adding machines. Represented by Ward Gavett and H. F. Happer.

Canadian Foundryman, Toronto, Canada:—Represented by H. V. Tyrrell.

Carborundum Company, Niagara Falls, N. Y.:—Carborundum and Aloxit grinding wheels, Carborundum fire sand and Carborundum rubbing bricks. Represented by George R. Rayner, W. W. Sanderson, O. C. Dobson, Anthony Dobson, J. P. McCann, C. D. Sargent and H. A. Eaton.

Castings, Cleveland, Ohio:—Represented by R. I. Clegg, H. M. Lane, G. H. Gardner, C. G. Kisner, S. R. Lewis and S. G. Krake.

Chicago Pneumatic Tool Company, Chicago, Ill.:—Franklin type GCB compound belt driven air compressors, improved Keller sand rammers, Tripod sand sifter, pneumatic geared wire rope hoists, Boyer-Keller chipping hammers, electric grinder, side spindle electric drill, Little Giant pneumatic grinder and castings cleaner, Chicago universal hose coupling. Represented by H. S. Hunter, F. J. May, D. F. Geissinger, E. N. Zwing and W. C. Walker.

Chisholm & Moore Mfg. Company, Cleveland, Ohio:—Chain hoists, trolleys, hand-power traveling cranes and malleable castings. Represented by the Machinists' Supply Company.

Clayton Air Compressor Works, East Cambridge, Mass.:—See George F. Blake Mfg. Company.

Cleveland Pneumatic Tool Company, Cleveland, Ohio:—Sand rammers, riving and chipping hammers, air drills, emery grinder and air hose couplings. Represented by H. S. Covey, sales manager; A. Scott and J. T. Graves.

General Electric Company, Schenectady, N. Y.

Goldschmidt Thermit Company, New York, N. Y.:—Full line of metals produced free from carbon, heating Thermit cans, titanium Thermit cans, Thermit welding process and appliances. Represented by Wm. C. Kuntz, E. A. Beck, H. S. Mann and Wm. R. Hulbert.

Gracetown Coke Company, Gracetown, Indiana County, Pa.:—Foundry coke. Represented by C. M. Lingle, general manager.

Graf Molding Device Company, Louisville, Ky.:—Aluminum roll-up match plates, hingeless snap flasks. Represented by T. H. Graf and A. N. Welb.

Hanna Engineering Works, Chicago, Ill.:—Rathbone multiple molding machine, pneumatic shakers, oscillating riddle, riddler, sand blast machines, revolving dumping riddle, mold dryer and Hanna riveter. Represented by W. L. Laib, James T. Lee and F. H. Scantlebury.

Harbison-Walker Refractories Company, Pittsburgh, Pa.:—Ordinary shapes and standard cupola blocks in fire brick. Represented by Hay Walker, J. J. Brooks, Jr., K. Seaver, J. E. Morgan, W. N. McKnight, V. A. Gesey, G. S. Troxell and S. A. Bixler.

Hauck Manufacturing Company, New York City, N. Y.:—Oil burning appliances, including cupola lighters, ladle heaters, core oven and furnace burners, mold dryers, preheating and brazing outfits. Represented by A. E. Hauck, A. P. Link, A. H. Stein and H. E. Giersch.

Hawley Down Draft Furnace Company, Chicago, Ill.:—Metal melting furnaces. Represented by F. O. Bartlett, H. J. Stow, D. J. O'Brien, H. E. Schwartz and C. M. Bleyer.

Herman Pneumatic Machine Company, Zelienople, Pa.:—Herman jar ram stripping plate machine, Herman jarring molding machines with roll-over and pattern drawing device, Herman jarring molding machine known as bumper. Represented by A. M. Frauenheim, M. L. Heyl, Charles Herman, Alfred Herman, Andrew Rodgers and C. E. Pettee.

Herruth Core Oil Company, Chicago, Ill.:—Small electric core oven and Herruth core oil. Represented by George A. Hummelbaugh.

The Hill & Griffith Company, Cincinnati, Ohio:—Represented by John Hill, John Glass, William Oberhelman and Harry Taylor.

Hunter Saw & Machine Company, Pittsburgh, Pa.:—Hunter solid tooth saws, Hunter inserted tooth saws and saw sharpening machines. Represented by F. A. Hunter, J. A. Carrothers and G. W. Agert.

Ideal Furnace Company, Chester, Pa.:—Brass melting furnaces. Represented by P. J. Sweeney.

Ingersoll-Rand Company, New York City, N. Y.:—Twelve-in. stroke NE-1 air compressor, pneumatic chipping, caulking and scaling hammers, pneumatic riveting hammers, sand rammers for bench and floor work, pneumatic motor hoists, pneumatic stationary motors and pneumatic piston and rotary drills. Represented by W. H. Armstrong, W. A. Armstrong, E. P. Mooney, H. E. Metcalf, W. B. Brendlinger, James Moran and J. L. Kelley.

International Molding Machine Company, Chicago, Ill.:—Light and heavy designs of stripping plate machines, turn-over draw machines, core-making machines and squeezers. Represented by Edward A. Pridmore, W. W. Miller and J. W. Dopp.

Interstate Sand Company, Zanesville, Ohio:—Molding sand for iron and steel molding. Represented by L. K. Brown and E. M. Avers.

Iron Age, New York City, New York:—Represented by W. H. Taylor, A. I. Findley, M. C. Robbins, Fritz Frank, D. C. Warren, W. B. Robinson, Robert A. Walker, Adrian Lazare and Geo. H. Griffiths.

James Jiles Company, Pittsburgh, Pa.:—Molding loam and core sand, common loam for open-hearth furnaces, etc. Represented by John W. Jiles and C. I. Kelly.

Keystone Coal & Coke Company, Pittsburgh, Pa.:—Coal and coke. Represented by E. M. Gross, W. F. Elwood and A. F. Syroth.

E. Killing's Molding Machine Works, Davenport, Iowa:—Stripping plate machine, roll-over machine, multiple cylinder plain jarring machine, jarring rock-over machine, two sizes, automatic squeezer. Represented by E. Killing, A. W. Fox, C. P. Aabye and George Heck.

Lawlor Improved Jarring Molding Machine Company, Pittsburgh, Pa.:—Lawlor improved jarring molding machines. Represented by Ralph W. Hills, Robert Sweeney and J. J. Lawlor.

David Lupton's Saws Company, Philadelphia, Pa.:—Lupton steel sash for side walls, Pond continuous sash for monitor and saw-tooth roofs, Lupton rolled steel skylight and photographs and drawings of designs for foundry and forge shops. Represented by Clarke P. Pond, sales manager, and W. C. Scott.

J. S. McCormick Company, Pittsburgh, Pa.:—One 5-ton and one 10-ton McCormick continuous sand screen and mixing machine, model cupola, general foundry supplies and facings. Represented by J. S. McCormick, T. E. Malone, S. R. Costley and R. H. Mills.

McCoy & Brandt, Pittsburgh, Pa.:—Motor starters and controllers manufactured by Allen-Bradley Company, Milwaukee, Wis. Represented by H. E. McCoy.

Metal Industry, New York City, N. Y.:—Magazines, books and pamphlets. Represented by Palmer H. Langdon, Louis J. Krom, George W. Cooper, Thomas A. Trumbour, Edward B. Fritz and F. Wilkes.

Midland Machine Company, Detroit, Mich.:—Hand rammed roll-over molding machines, foot jolt core machines. Represented by George L. Grimes.

Monarch Engineering & Mfg. Company, Baltimore, Md.:—Latest improved furnaces using oil or gas as fuel for melting and heating, Acme core oven, steel foundry ladle, heating equipment, aluminum furnaces, Alls' Eclipse bolt heating furnaces, blowers, etc. Represented by H. D. Harvey and David R. Steele.

Morner & Smith, Dayton, Ohio:—Patterns and aluminum snap flasks. Represented by Louis Morner and Charles D. Smith.

Motch & Merryweather Machinery Company, Cleveland, Pittsburgh, Detroit and Cincinnati:—Representing the Bullard Machine Tool Company, Bridgeport, Conn.; Gould & Erberhardt, Newark, N. J.; Lapointe Machine Tool Company, Hudson, Mass.; Heald Machine Company, Worcester, Mass.; Ransom Mfg. Company, Oshkosh, Wis.; Bullard vertical turret lathe, Gould & Erberhardt shaper, Gould & Erberhardt hobbing machine, Lapointe vertical keyseater, Lapointe broaching machine, Heald American twist drill grinder, Ransom motor driven dry grinder. Represented by E. P. Bullard, F. L. Erberhardt, G. E. Merryweather, E. C. Keener, J. P. Ransom and E. C. Batchelar.

Mott Sand Blast Mfg. Company, Chicago, Ill.:—Sand blast air compressor and painting apparatus. Represented by David Mayer.

Mumford Molding Machine Company, Plainfield, N. J.:—Jolt ramming molding machines, high trunnion squeezers, plain squeezers, split pattern machine, pneumatic hand traveling crane. Represented by E. H. Mumford, Carl Falk, E. M. Huggins, F. W. Hamel and A. J. Goss.

National Core Oil Company, Buffalo, N. Y.:—Cores of samples of various grades of oil. Represented by C. H. Cotton, P. L. Crandall, C. M. Anderson, J. J. McCarty and B. J. Cummins.

Northern Engineering Works, Detroit, Mich.:—Type E electric crane trolley. Joint exhibit with Cutler-Hammer Mfg. Company, Milwaukee, Wis.

Norton Company, Worcester, Mass.:—Grinding wheels, Alundum and Crystolon, abrasive materials, India oil stones, Crystolon sharpening stones, Norton Alundum refractories consisting of small electric furnace parts, cores, tubes, muffles, crucibles, combustion boats, filtering dishes, etc., for laboratory use. Represented by George S. Welker and N. C. Hilton.

S. Obermayer Company, Cincinnati, Ohio:—Branch offices, Chicago, Pittsburgh, St. Louis and Milwaukee. Represented by E. D. Frohmann and S. T. Johnston.

Oliver Machinery Company, Grand Rapids, Mich.:—Pattern and flask making machinery, universal saw benches, band saws, hand joiners, surface planers, wood lathe, speed lathes, pattern makers' bench, universal tool grinders, disc sander, vertical spindle and disc sander, vertical spindle borer and wood trimmers, Oliver universal wood milling machine. Represented by Joseph W. Oliver, A. N. Spencer, George F. Reinhard, A. S. Kurkjian, Walter Mentzer, Arthur Blake and R. A. Smith.

Orenstein-Arthur Koppel Company, Pittsburgh, Pa.:—Steel dump car, platform car, turntable, portable track, all narrow gauge. Represented by B. H. Behrens.

Osborn Manufacturing Company, Cleveland, Ohio:—Plain jolt molding machines, core jarring machines, roll-over rock down molding machines, direct draw roll-over machines, rock-over molding machines, flask stripping machines, stripping plate machines, drop plate squeezing machines, mechanical pattern drawing machines. Represented by H. R. Atwater, F. D. Jacobs, E. T. Doddridge, J. H. Galloway and W. J. Halliday.

Thomas W. Pangborn Company, New York City, N. Y.:—Sand blasting machinery. Represented by J. C. Pangborn and Harry D. Gates.

Pawling & Harnischfeger Company, Milwaukee, Wis.:—Single line grab or clam shell bucket in connection with monorail electric hoist, crane controllers, electric hoists and I-beam trolleys. Represented by George L. Mead and F. P. Breck.

J. W. Paxson Company, Philadelphia, Pa.:—Represented by Howard M. Bougher, W. Scott Thomas, Howard Evans and Ira V. Kremer.

Pickands, Brown & Co., Chicago, Ill.:—Display of Solvay coke. Represented by B. T. Bacon, E. A. Bateman, G. A. T. Long and J. A. Galligan.

Pittsburgh Steel Foundry, Pittsburgh, Pa.:—Cast steel open hearth ladle, cast steel charging box, swinging grinder. Represented by E. R. Williams.

Henry E. Pridmore, Chicago, Ill.:—Stripping plate machines, rock-over drop machines, electrical motor driven jarring machines. Represented by R. E. Turnbull, D. F. Eagan, A. V. Magnuson and Henry A. Pridmore.

Robinson Automatic Machine Company, Detroit, Mich.:—Automatic machines for all kinds of metal polishing. Represented by C. F. Coda.

Rockwell Furnace Company, New York City, N. Y.:—Centric pouring crucible furnace. Represented by F. S. Garrett, W. S. Quigley, A. W. Moyer and S. L. Barnes.

Sand Mixing Machine Company, New York City, N. Y.:—Auto sand mixer. Represented by Wm. A. Heart, Hutton H. Hailey, John Bradley, B. F. Coup and V. E. Minch.

William Sellers & Company, Inc., Philadelphia, Pa.:—Centrifugal sand mixing machine, belt driven and motor driven, drill grinding machine, motor driven, universal tool grinding and shaping machine. Represented by Edward L. Hojjes.

Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.:—Trolley for three motor electric traveling crane with cage, including the controllers, cage controlled electric traveling hoist and back geared electric motor. Represented by Wm. C. Briggs, Henry M. Hallett, G. H. Wood, Chas. W. Ingalls, Norman P. Farrar and Wm. A. Batt.

The W. W. Sly Manufacturing Company, Cleveland, Ohio:—Miniature display of cleaning mills, cinder mill and dust arrester and sand blast equipment and machines. Represented by W. C. Sly, H. J. Norris, G. J. Fanner and H. R. Morse.

J. D. Smith Foundry Supply Company, Cleveland, Ohio:—Represented by F. A. Coleman.

Standard Linseed Company, Cleveland, Ohio:—Samples of core oils in large tubular vases. Represented by N. Weisenberg, A. C. Bernstein and H. G. Tremmel.

Standard Sand & Machine Company, Cleveland, Ohio:—Machinery for treating sands for all kinds of foundry practice. No. 0 and medium size No. 1 or No. 2 mixing, rolling, crushing and blending plant. No. 1 standard batch mixer, steam oil pressure attachment. O batch mixer, one-power adjustable screen, pulverizing disintegrating machine. Represented by H. E. Boughton, J. A. Boughton and E. J. Smith.

Sterling Wheelbarrow Company, West Allis, Wis.:—Rolled steel foundry flasks. Represented by L. R. Smith and John L. Kirk.

Frederic B. Stevens, Detroit, Mich.:—Represented by Frederic B. Stevens.

Tabor Manufacturing Company, Philadelphia, Pa.:—Standard Power squeezing machines, roll-over machines, hand and power, shockless jarring machines, combined jarring and roll-over machines, combined jarring squeezing roll-over machines and Taylor universal tool grinder. Represented by John T. Ramsden, in charge, S. Newbold, C. W. Coleman, J. H. Coleman and C. H. Ellis.

Tate, Jones & Company, Inc., Pittsburgh, Pa.:—Brass crucible furnace, oil pumping, heating and regulating system, oil burners, portable burner for ladle drying and cupola lighting. Represented by R. G. Kirkwood, J. M. Tate, Jr., C. F. France and J. C. Whitfield.

Taylor Instrument Companies, Rochester, N. Y.:—Recording pyrometer, radiation pyrometer and other small instruments. Represented by Ralph C. Schwanz.

United States Graphite Company, Saginaw, Mich.:—Represented by H. C. Woodruff, Frank B. Goddard, Roy A. Corrigan and James G. Drought.

Wadsworth Core Machine & Equipment Company, Akron, Ohio:—Wadsworth improved core making machines, core ovens, sand mixing and compound mills. Represented by George H. Wadsworth.

Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.:—Motors and controllers for direct and alternating current and variable speed work. Represented by B. Wiley, F. H. Herzsch, J. H. Klink, E. M. Wise, W. B. Wilkinson and E. B. Townsend.

Whiting Foundry Equipment Company, Harvey, Ill.:—Standard heavy duty exhaust tumbler with steel plate barrel and lever type door fastener, spur geared crane ladle with standard gear cover, worm geared crane ladle, truck for crane ladle, standard turntable. Represented by G. R. Brandon, C. A. Hardy, A. H. McDougall, R. H. Bourne, T. S. Hammond, J. Hyslop, R. E. Prussing, N. S. Lawrence, G. E. Jones, W. B. Lewis and W. Mayor.

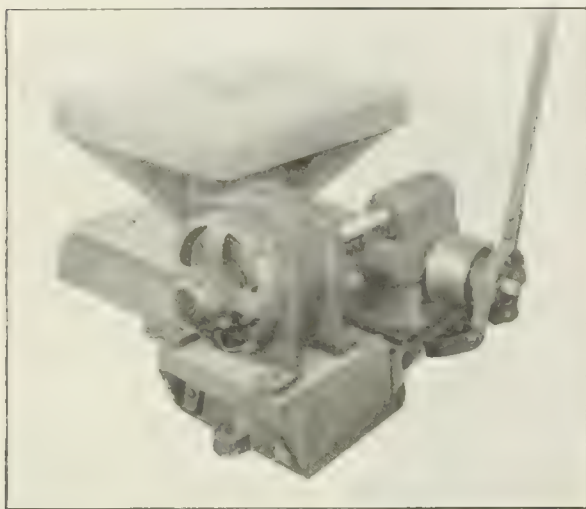
J. B. Wise, Watertown, N. Y.:—M. R. V. brass melting furnaces, tilting type, permanent crucible using coke as fuel. Represented by R. F. Goyno and R. J. Ryan.

Yale & Towne Mfg. Company, New York City, N. Y.:—Hand and electric hoists with trolley running on I-beam. Represented by H. R. Butler, A. W. Patterson, Jr., and T. J. White.

Electrically Driven Jarring Machine

Important Development in Foundry Machinery
Made by Henry E. Pridmore

A decided departure in jarring machine driving has been made by Henry E. Pridmore, Chicago. How far sweeping in importance is the availability for the foundry of a jarring



Electrically Driven Jarring Machine Built by Henry E. Pridmore, Chicago.

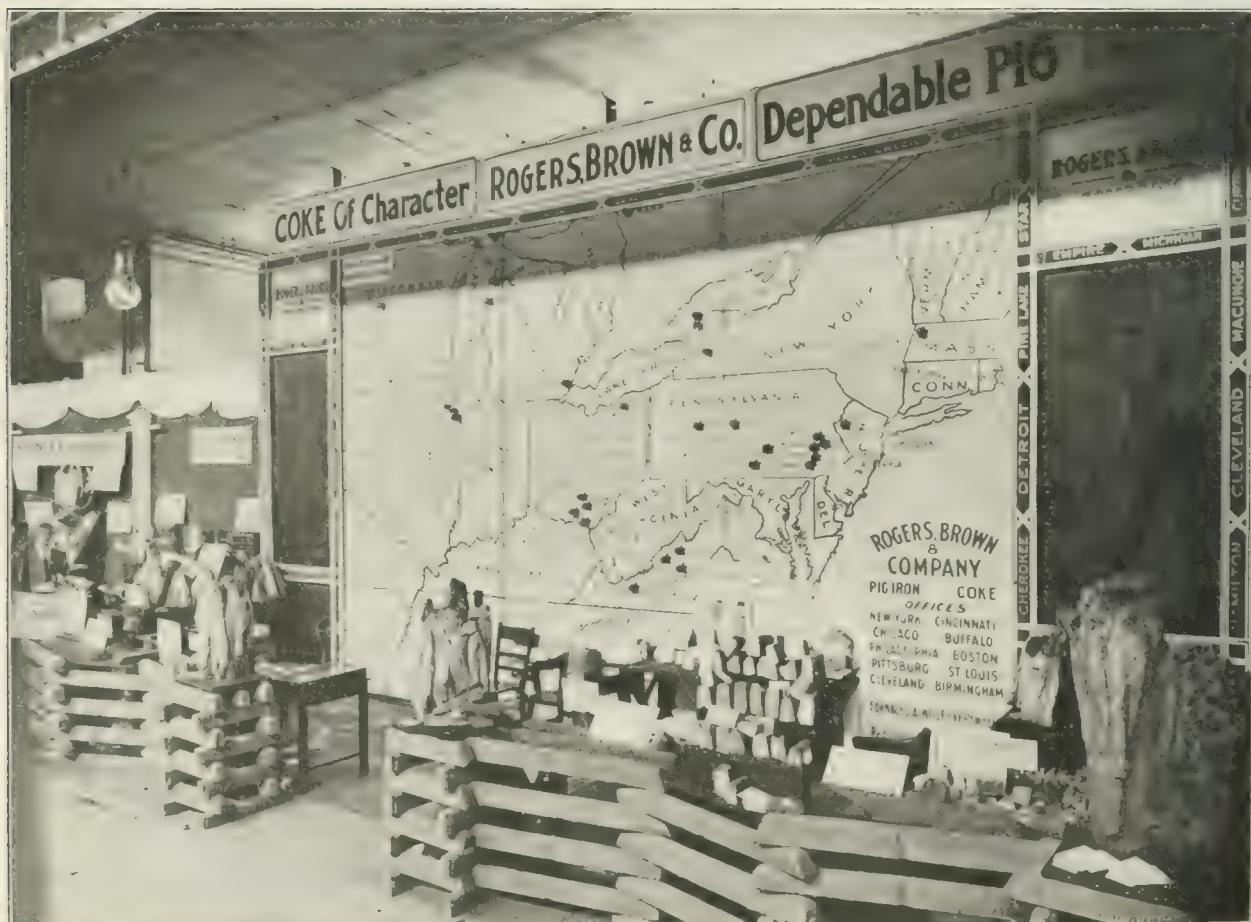
machine which may along with the rest of the machinery be operated by electric motors. *The Iron Age* will not attempt to say, but its promise is very great judging from the reception accorded it in the exhibition booth of the Pridmore firm at the allied foundrymen's convention last week in Pittsburgh. It certainly marks a departure in jarring machine construction, and while it is not possible to give a drawing indicating the method of operation, the following notes and the accompanying halftone engraving

will serve to give a conception of the simple internal arrangements and the reason for the low power requirements.

The machine is set in the usual form of pit for jarring machines. The illustration shows a 3000-lb. machine, which is driven by a $2\frac{1}{2}$ -hp. motor. The motor speed is reduced by means of a worm gear. The driven shaft of the gear carries a cam underneath the table and this has a roller follower forming one end of a bell crank lever pivoted to the inside of the machine frame and attached by pin and links to the under side of the table for lifting it. A friction clutch, the lever handle of which is shown in the cut, allows for the desired convenient starting and stopping of the machine. Large machines are made on the same principle requiring more than one bell crank lever, and it is clear that machines of any desired size can be supplied.

Exhibit of Rogers, Brown & Co.

Rogers, Brown & Co. had an attractive exhibit, consisting of samples of their various pig irons, the main feature of the display being an immense map on which was shown by flashing electric lights the location of their blast furnaces, ten offices and leading coke districts. In front of the space was a pig iron rail fence, with the name Susquehanna Iron cast in each pig. The four posts were surmounted by unusual samples of cokes handled by them, and they also showed samples of imported irons from China, England, Scotland, Sweden and Canada, emphasizing their resources and facilities. The display of charcoal iron in various grades and brands was most complete. The Rosiclaré fluorspar, which they are handling exclusively, was shown in various grades. The large oil painting of "The Foundryman" which was shown in their display was further used on the cover of the programme for the vaudeville performance on Thursday evening given by the Foundry & Machine Exhibition in the Auditorium. Representatives present during the convention were H. B. B. Yergason, in charge; F. W. Bauer, Cincinnati; J. R. Darragh, Thomas A. Wilson, W. P. Cheney, J. R. Morehead, H. S. Philson, Pittsburgh; R. W. Clark, O. Arlt, New York; G. R. Sullivan, H. C. Thomson, Philadelphia; F. E. Fitts, C. A. Wyatt, Boston; G. M. Butler, Chicago; Sterling Hubbard, Cleveland, and W. G. Ireland.



Electrically Lighted Map of Ore and Coke Properties of Rogers, Brown & Co.

Gas Cavities and Shot in Iron Castings

An Investigation of Defects Causing Hard Spots and Blowholes—Nearly All Traceable to the Mold

In an interesting paper presented at the Pittsburgh convention of the American Foundrymen's Association May 26, Thomas D. West presented some of the results of his investigations into the causes of gas cavities, shot and chilled iron in castings. Some months ago Mr. West solicited from the foundrymen in the United States samples of iron castings showing globules in gas cavities solidly encased shot iron, hard streaks or spots, and white areas inside of gray or soft iron. Those sending samples were asked to give details of mixtures, with analysis of the casting and the defects; also data concerning the method of molding and the condition of metal at pouring.

Responses were received from a number of foundrymen, and in the early part of the paper the writer refers to a letter from a Massachusetts firm and one from a large foundry in New Jersey. The first-named firm had thought that the trouble with shot iron was due to chilled or hard bits of metal going into the cupola and not being properly melted. However, it was found that by putting particles of "shot" in the ladles and pouring castings from them there were no bad results. The hard materials were also put in the mold and the iron poured in on top of them, but with the same result—no shot. Other deliberate attempts to produce shot were unsuccessful, and Mr. West's correspondent was still in the dark as to the cause of the defects. In the New Jersey case it was thought that some of the hard iron stars used for cleaning got mixed with sprues and scrap, but this proved incorrect. The author says that the two experiences set

unless they rose to be embedded in the middle portion of the casting.

The author considers that shot may be formed by the metal from the ladle striking the sides of a pouring basin or a gate. Also by falling on a flat bottom inlet gate, as at E, Fig. 2. It is best that all pouring gates have more or less of a well, as at H, Fig. 2, so that the first tapplings from the ladle may not be spattered and create shot. From the instant the falling metal strikes the bottom of a gate there should be a steady and unbroken stream rapidly filling the pouring gate. Dampness due

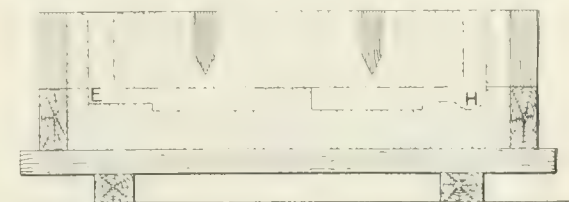


Fig. 2.—Flat Bottom Gate and Gate with Well.

to the free use of a swab or to set sand may also create shot which will be carried into other sections of the mold.

An illustration of globules in gas cavities and blowholes is given in Fig. 3. These the author attributes to the creation of gas or steam which cannot be liberated. Excessive gas may come directly from the metal or wholly from defects in cooling or pouring. There may also be improperly tempered sand, too hard ramming, improper venting and bad cores.

Globules when suspended from the roof of a cavity as at B, Fig. 3, may be considered evidences of defective making, gating or pouring of the mold. The form of adhesion is due to the upper body of the mold being more fluid than the lower. Gas cavities may be due to causes inherent in both the mold and the metal. The bubbling or boiling of the mold might throw off small buttons of metal that would fall back oxidized into rising metal in the mold, and these buttons or shot by reason of their oxidation and the gathering of dross could create a gas, producing companion cavities to those due to the steam or confined gases of the mold trying to escape, but being imprisoned in the metal, as in Fig. 4. The author in more than 40 years' experience as a molder and shop manager has found little ground for believing that sulphur or phosphorus form blowholes in gray iron castings. He had always found that changes in the method of molding

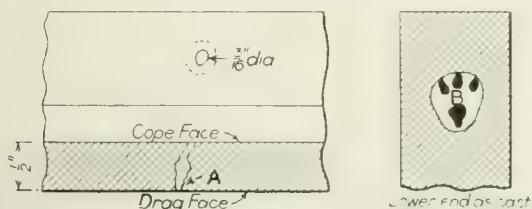


Fig. 1.—Embedded Shot Which Caused a Blowhole. Fig. 3.—Globules on Roof of Cavity.

aside the belief held by many that chilled or hard particles going into the cupola produce shot, streaks or spots in castings.

Embedded Shot Giving Off Gas

About as interesting a sample as Mr. West received was one which had a small button or shot loosely embedded within the drag face of its surface. Fig. 1 shows the crease made by the tool in being turned to one side when it struck the hard spot; also indentations made by removing the hard shot from the planed face of the casting. A small blow-hole led directly from the top of the shot shown at A to the cope face. It was evident that the shot gave off a gas that escaped from the molten metal to the sand surface of the cope, but not fast enough to prevent the creation of a blowhole. The shot was not large enough to permit of the complete analysis that would no doubt have thrown light on the problem.

Several samples of soft iron castings were received containing solidly encased small bodies of strictly white iron. These were very closely united with the gray iron. Some shot iron was received which had been taken from a cupola spout after the bottom was tapped. Some of it was placed in the bottom of an open sand mold in which castings about $\frac{3}{8}$ inch thick were made. The shot were placed on the bottom face of the mold at the end farthest from the pouring gate. An examination of the casting showed the shot in their original position and not united to the body of the casting. Mr. West concludes that unless the shot are up to a very high red heat, or near the fusing point (as is possible in many cases when they are formed in pouring a mold), casting metal under $\frac{3}{8}$ in. thick would have little effect in melting them,

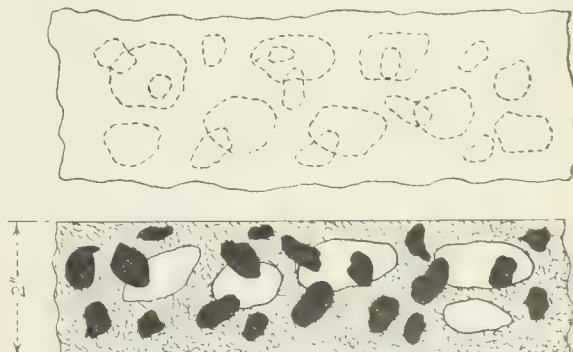


Fig. 4.—Defects in Retort Casting.

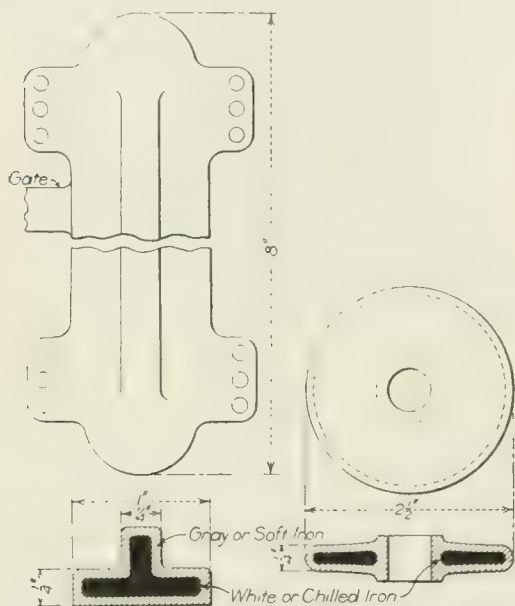
stopped blowholes in gray iron work. With chilling iron, sulphur and phosphorus might cause blowholes.

Experiences in British Foundries

Several pages of the paper are devoted to quotations from a letter the author had received from P. Munnoch, of the British Foundrymen's Association. Mr. Munnoch's first experience was with gray shot inclosed in small castings. Analysis showed that some of these were splashes of metal at the beginning of pouring, while others were

enclosures in the interior of the casting after the greater part of the metal had solidified. The analysis of the latter appeared similar to that of metal drops squeezed out of phosphoric pig iron after the metal had solidified. J. E. Stead was of opinion that blowholes were first formed and these afterwards became filled with the highly phosphoric lique.

Some large cylinder heads for blowing engines supplied Mr. Munnoch with interesting specimens, pieces several ounces in weight being obtained. In some cases small shot were partly enclosed by larger masses, and these, together with the difference in composition, showed that the metal had not all entered the cavity at the same time, but at different periods of solidification. Generally the formation of shot holes and shot is most noticed in iron subjected to oxidizing conditions during melting.



Figs. 5 and 6.—Castings Which Showed Inside Chill.

Mr. Munnoch cited the case of the first metal from the cupola running cold, particularly when softer varieties of iron are being melted. If this is caught in a ladle and allowed to solidify it often presents the appearance of a spongy mass full of shot, the holes and shot being coated with oxide and graphite. Should some of these be left in the bottom of the ladle and hot iron be poured over them a boiling action follows, and if the iron is poured into a mold the castings will contain many shot holes.

Character of Metal Not Responsible

Mr. West considers that the causes of the buttons, shot and blowholes cited by Mr. Munnoch lay in the mold, and that the character of the metal used had practically nothing to do with producing them. Referring to the large specimens of shot Mr. Munnoch obtained, the author suggests that blowing molds could produce them. Metal is often blown out three or four feet, and in coming down large globules or buttons can be formed, he says, by bits of iron lodging on flat planes, projecting portions or flanges of the mold, or by falling back directly into the bath of dull rising metal. The buttons would naturally create gas cavities. Two kinds of gas cavities were to be distinguished in the cases Mr. Munnoch reported—those formed by the gas created by embedded shot and those due to the gases of the mold or cores. One unexplained feature was the difference in chemical composition of two buttons Mr. Munnoch found in the same cavity.

From Cincinnati the author received a report on a large retort casting which had been rejected because of many cavities, with large buttons mixed with dross in the cope section. The sample is shown in Fig. 4. The defects in this case Mr. West considered to be due to bad gating. The metal rushing into the mold cut into some green sand fronting the gate and on directly striking the face of the mold would spatter. Particles fell back in partly solidified bodies, some of which lodged on the top of the slag caused by the cutting action. On rising these buttons were imprisoned against a horizontal plane and held there by solidification of the metal.

A New York State foundry superintendent reported a case of bad castings due, as he believed, to shot formed

ly the air in the mold. The metal was carried some distance before pouring and was not hot enough to remelt the shot.

The author does not wish to convey the idea that there can be no defects due to gases emanating directly from some irons, as suggested by Mr. Munnoch, but he believes oxidation in melting is preventable, just as are improper methods of molding. If metal which is seen to be dangerously loaded with oxide of iron as it comes from the cupola has to be used, it should only go into the roughest castings.

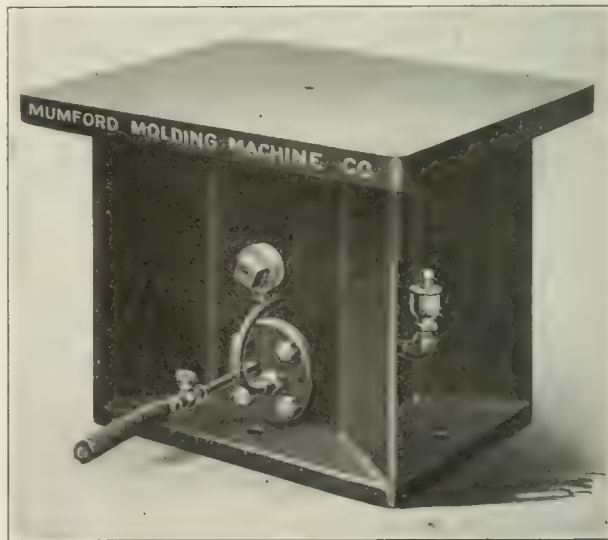
"Inside Chill"

The concluding portion of the paper is devoted to two cases of "inside chill," or white iron inside of gray or soft iron, reported by Walter H. Wiard, chemist for a large foundry firm in Illinois. Such cases are very rare. In Figs. 5 and 6 are shown sections of the two castings reported on by Mr. Wiard. The inside chill extended throughout the entire casting and the demarcation from the soft iron was very sharp and distinct. The explanation, in Mr. West's opinion, is not to be found in the mixture used, nor in the method of melting, and he believes experiments in actually producing such results at will are necessary in order to clear up the cause, which thus far is hidden. He solicits further comment on the subject.

Core Bench Jolt Rammer

Generally jolt ramming machines are associated with very large and deep molds, although their advantages in core shops are beginning to be appreciated. It has well been known that jolt ramming of large cores, even when filled with rods, coke centers, etc., is economical and for deep cores of small dimensions made on the bench, the ramming, including the bedding in of reinforcing rods or wires, can be better and more cheaply done on a small jolt ramming machine. The Mumford Molding Machine Company, Plainfield, N. J., has recently developed a machine of this type which can be placed on a concrete pier, iron or wooden post or mounted on the core bench.

The machine is started and stopped by a knee valve under the bench, an arrangement which leaves the operator with both hands free to manipulate material and core



The New 3-In Core Bench Jolt Rammer Built by the Mumford Molding Machine Company, Plainfield, N. J.

boxes. The valve is constructed to all intents and purposes the same as a valveless plunger and is merely a plug of case-hardened machinery steel having a vertical stroke of 3/16 in. Although this construction is very simple, at the same time it is claimed that the economy in air secured by its use is greater than that of the more elaborate valve mechanisms used on this type of machine.

The size of the table is 15 x 20 in. and the diameter of the plunger is 3-in. Although the rated capacity of the machine is 300 lb. with an 80-lb. air pressure, the advantages when used on small cores where the core boxes, sand and reinforcing material weigh only a few pounds are said to be very great. The complete shipping weight of the machine is 325 lb.

A Swinging Frame Grinding Machine

In steel and malleable iron foundries and crucible steel plants a grinding machine with a swinging frame can be extensively used for grinding fins and pads from castings and also for grinding the finished surfaces of parts such as draw-bars, knuckles, oil boxes and hammer dies. On account of the demand for a machine of this type, the Pittsburgh Emery Wheel Company, Pittsburgh, Pa., has brought out a line of grinders which are not only thoroughly practical and capable of meeting the requirements

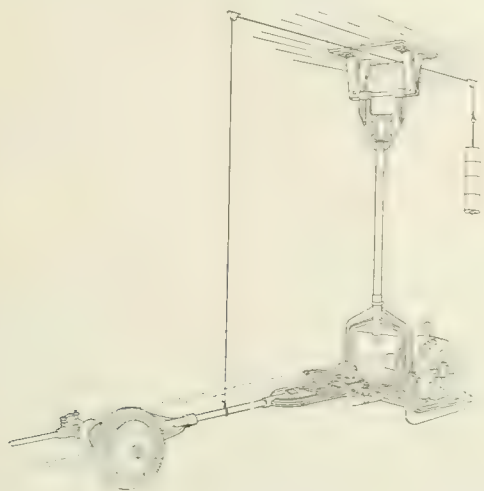


Fig. 1.—A Motor-Driven Swing Frame Emery Wheel Grinder Built by the Pittsburgh Emery Wheel Company, Pittsburgh, Pa.

of the varying conditions, but also embody in their construction some novel features. Two types of machines are built, one for motor drive as illustrated in Fig. 1, and the other for a belt drive from a line shaft as shown in Fig. 2.

A horizontal bar in the top hanger on which the top yoke is mounted provides means for lateral adjustment to keep the belt and the pulleys in alignment and the vertical pipe is threaded and has a nut which controls the tension of the belt. Both of these features, which are covered by patents, are also embodied in the rear horizontal yoke and their use at these two points is said to result in a saving of from 2 to 2½ h.p. in the operation of the machine. The wheel head yoke has a bearing 7 in. long

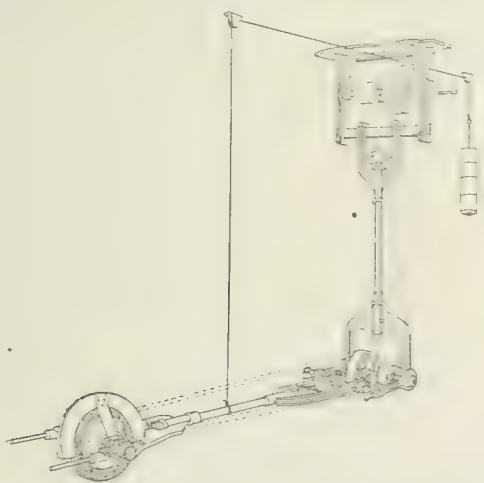


Fig. 2.—The Belt-Driven Center Wheel Type With Hood.

and 2½ in. in diameter and furnished with grease cups.

In the motor-driven machine where the motor is mounted on the bracket at the elbow, as illustrated in Fig. 1, the extreme length of the armature shaft of the driving motor must not exceed 26½ in. This condition is easily met as all the standard types of alternating and direct current motors of the power required, which is 5 to 7½ hp., are made with frames that do not exceed this dimension. The top yoke in the belt-driven machine shown

in Fig. 2 is suspended from a hood cast in the hanger bracket, an arrangement which throws the weight of the entire machine on this bracket instead of on the shaft upon which the pulleys are mounted. This shaft is journaled in bronze bushings in the hanger bracket and the bearing at this point has ample facilities for lubrication.

These machines are built to accommodate wheels having diameters of 13, 20 and 24 in. and face widths of 2 and 2½ in. in all three sizes, while in the 24-in. size there is an additional width of 2¼ in. These machines can be furnished for carrying the wheels with safety steel collars either between the bearings or on the outside of the yoke and all types can be supplied either with or without hoods. Where the hood is used on the machine and the wheel is in the center, the rear end of the hood is attached to a hinge on the yoke while its slides are fastened to the top of the bearing cap. In this way, when it becomes necessary to change either the wheel or the safety collars it is only necessary to remove the bolts in the bearing cap and swing the hood back on its hinge.

Steel Making Pig Iron in 1910

The American Iron and Steel Association publishes the following details of the United States production of steel making pig iron in 1910:

Bessemer and Low Phosphorus

Of the total production of Bessemer and low phosphorus pig iron in Pennsylvania in 1910 the Lehigh and Schuylkill valleys made 164,976 tons, against 142,547 tons in 1909; the Lower Susquehanna Valley made 126,463 tons, against 119,874 tons in 1909; Allegheny County made 2,352,149 tons, against 2,143,009 tons in 1909; the Shenango Valley and the remainder of the state made 1,750,317 tons, against 1,446,176 tons in 1909; total, 4,393,905 tons in Pennsylvania in 1910, against 3,851,606 tons in 1909, a gain of 542,299 tons.

In Ohio the Mahoning Valley produced 1,738,907 tons of Bessemer and low phosphorus pig iron in 1910, against 1,682,839 tons in 1909; the Lake counties, 830,921 tons, against 1,051,329 tons in 1909, and the Hanging Rock bituminous district and other parts of Ohio, 890,908 tons, against 893,878 tons in 1909; total in Ohio in 1910, 3,460,736 tons, against 3,628,046 tons in 1909, a loss of 167,310 tons.

Fourteen states made either Bessemer or low phosphorus pig iron in 1910, against twelve states in 1909 and the same number in 1908.

Basic

The production of basic pig iron in Pennsylvania by districts in 1910 as compared with 1909 was as follows: The Lehigh Valley, 366,132 tons, against 297,007 tons in 1909; Schuylkill and Lower Susquehanna valleys, 754,290 tons, against 606,447 tons in 1909; Allegheny County, 2,807,551 tons, against 3,187,687 tons in 1909; Shenango Valley, 620,658 tons, against 553,206 tons in 1909, and the remainder of the state, 698,434 tons, against 611,898 tons in 1909; total, 5,247,065 tons, against 5,256,245 tons in 1909, a loss of 9180 tons. In Ohio the Mahoning Valley and the Lake counties made 690,941 tons in 1910, against 460,552 tons in 1909, and the Hanging Rock miscellaneous bituminous district made 464,493 tons in 1910, against 385,404 tons in 1909; total, 1,155,434 tons in 1910, against 845,956 tons in 1909, a gain of 309,478 tons.

In 1910 basic pig iron was made by 68 plants in 10 states, as follows: Pennsylvania, 32 plants; Ohio, 15; New York, 5; Virginia, 4; Alabama, 4; New Jersey, 2; Indiana, 2; Illinois, 2; Missouri, 1, and Colorado, 1.

There was a decrease in the production of basic pig iron in 1910 as compared with 1909 in New York, New Jersey, Pennsylvania, Virginia, Missouri and Colorado. The falling off in Allegheny County, Pennsylvania, was especially heavy and amounted to over 380,000 tons. Alabama, Ohio, Indiana and Illinois increased their production of basic pig iron in 1910 as compared with 1909, the increase in Ohio alone amounting to over 309,000 tons.

Railroad Equipment Ordered.—Orders placed by railroads include: Northern Pacific, 500 25-ton freight cars; Missouri, Kansas & Texas, 108 miscellaneous freight cars; Duluth, Winnipeg & Pacific, 500 freight cars; Chicago, Burlington & Quincy, 1000 gondola and 500 refrigerator cars.

Four New Foundry Machines

Recent Products of the Osborn Mfg. Company

Important additions to its line of foundry equipment have been recently made by the Osborn Mfg. Company, Cleveland, Ohio. These consist of four new machines, a roll-over rock-down molding machine, a portable pattern drawing device, a drop plate squeezer and a no-lift jarring machine. The successive stages in the operation of the first are shown in Figs. 1 to 6 inclusive. Figs. 7, 8 and 9 illustrate the use of the pattern drawing device while views of the drop plate squeezer and the no-lift jarring machine are given in Figs. 10 and 11 respectively.

The Roll-Over Molding Machine

This machine, a general view of which is given in Fig. 1, possesses a number of new features and is designed for convenience in operation and to reduce the labor cost to a minimum. The pattern plate is mounted on a swinging table and the flask is placed thereon and rammed in the same way as in an ordinary molding machine as shown in Fig. 2. After the bottom board is placed on and clamped

the floor, a true pattern draw is assured without the aid of any leveling device. An important feature is that the pattern is drawn from the mold before the clamps are removed from the flask.

After the mold, a view of which is given in Fig. 6, has been rolled over on its trunnions it is held in position by an automatic locking device while it is being lowered to the floor. The pattern drawing frame has an opening in the center for making deep green sand cores.

The machine is made in three sizes, each having a pattern draw of 10 in., for handling flasks measuring from 26 x 30 in. to 30 x 48 in., with a depth of 6 to 15 in. The sizes given are for iron flasks, which are slightly larger than the wooden ones used.

Pattern Drawing Devices

The Osborn portable pattern drawing machine has been designed to be used in connection with the drawing of patterns on large, heavy work, especially such as is rammed

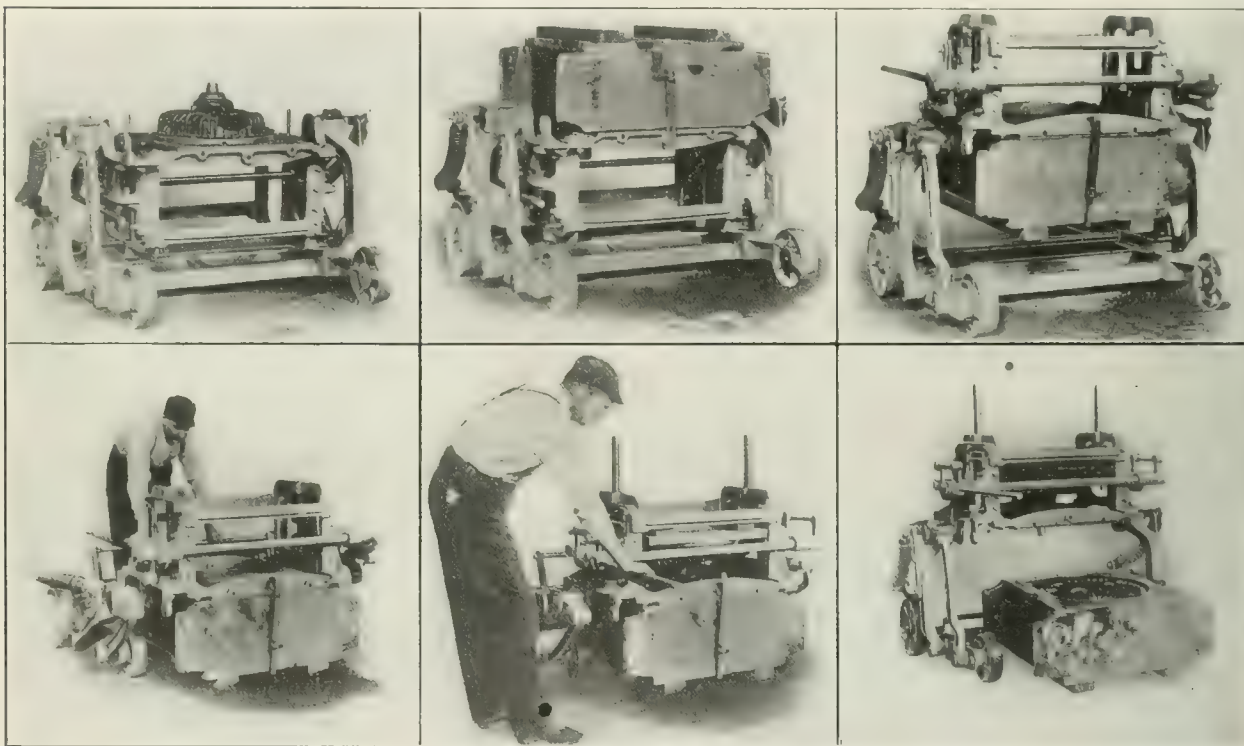


Fig. 1.—The Machine Ready for Ramming.

Fig. 4.—Rocking the Flask to the Floor.

Fig. 2.—The Flask Rammed.

Fig. 5.—Drawing the Pattern.

Fig. 3.—The Flask Rolled Over.

Fig. 6.—The Finished Mold.

Successive Stages in the Operation of a New Roll-Over, Rock-Down Molding Machine Built by the Osborn Mfg. Company, Cleveland, Ohio

in position the mold is rolled over easily by one man. A view of the machine with the flask rolled over is given in Fig. 3. The mold is hung in such a way in the machine that it is slightly top heavy when the flask is filled and the board clamped in position, an arrangement which lessens the labor of the operator in rolling it over.

The ramming position of the flask is low, which reduces the labor of shoveling the sand and makes the ramming operation easier. The machine is mounted on large wheels having roller bearings, so that it is easy to move it to follow the sand heap or to any other part of the foundry floor. All of the work can be done from one side of the machine, so that the operator can fill and ram the mold, roll it over, rock it down and draw the pattern without any lost motion. It is also so designed that an operator can handle large molds of considerable weight quite easily.

After the mold is rolled over it is rocked down to the floor, this operation being illustrated in Fig. 4, and is placed in the proper pouring position by the machine, a feature which applies to both parts of the mold. The drag requires no handling after being released from the machine. As the pattern is drawn, as shown in Fig. 5, from any position at which the flask rests when it is set down on

on jolt machines. This device makes it possible to draw the mold on the floor where it is to be poured and to secure a smooth even draw whether the flask rests level on the floor or not. A great saving is claimed by securing this accurate draw, the advantages being that it eliminates sticking in the mold, lessens wear on patterns, saves patching of the molds and chipping work on the costing.

The pattern drawing device consists of a frame which sets over the pattern plate and is supported on four posts resting on the rim of the flask. Figs. 7, 8 and 9 show the pattern attached to half of an iron flask, but ordinarily the pattern is attached to a plain plate or match board. The match board is placed in the jolt ramming machine, the flask set upon it and the sand shoveled in and rammed in the usual manner. The sand is then struck off, the bottom board clamped on and the flask rolled over by a roll-over tackle or rigging and swung to the floor. In large work the crane then raises the pattern drawing device and sets it over the pattern plate on the edge of the flask, the four pins passing through the notches in the edge of the plate. A view of the device being lowered is given in Fig. 7.

A set of short cranks are connected to the pattern plate by links and are operated by long levers. In Fig. 8 these

levers are thrown so that they cross each other, the device being set on the mold preparatory to drawing the pattern. In Fig. 9 the levers are thrown out, drawing the links into their uppermost position and raising the pattern plate from the face of the flask. When the pattern is drawn the crane raises the whole device from the mold, the pattern plate is released and returned to the molding machine.

The device is made in five sizes, ranging from 18 in. square to 42 x 72 in. with maximum pattern draw of 6, 8, 10, 12 and 15 in. for the various sizes. In the case illustrated the flask and pattern weighed 1200 lb., but they were easily drawn by two men with this machine without the aid of a crane or hoist.

In addition the company makes a pattern drawing device of a similar type but lighter in construction for drawing work on light molds which is not shown. This machine is light enough to be moved easily by hand and is set over the mold by the workman. He then draws the pattern with less effort than would be necessary if he had to lift it bodily. This is made in a number of sizes with a pattern draw of from 6 to 16 in.

The Drop-plate Squeezer

Fig. 10 illustrates an earlier style of the Osborn drop-plate squeezer, which can also be used as an adjustable flask stripping machine. Its construction is strong, simple and rigid. The squeezer is operated with a powerful lever. The chain connection to the squeezer head shown has been replaced in the newest type by a spring, which throws the head back after the operation. It is claimed that it can handle larger and more difficult work than the

in. in width and having a maximum length of 18 in. and a maximum pattern draw of 6 in.

No-Lift Jarring Machine

The Osborn no-lift jarring machine shown in Fig. 11 is especially designed for use in the core room or on upper

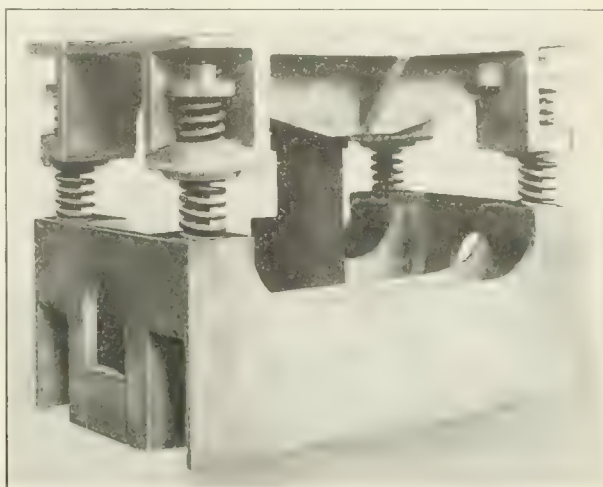


Fig. 11.—The Osborn No-Lift Jarring Machine.

floors. No foundation is required for the machine and as the blow is upward it is claimed that there is no shock to



Fig. 7.—Lowering the Flask on the Pattern.

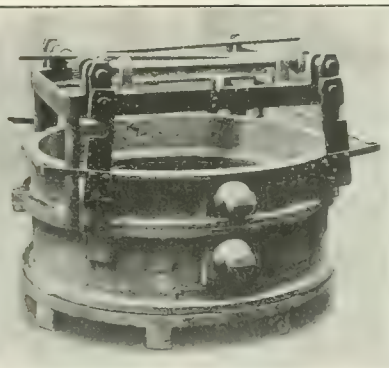


Fig. 8.—Ready to Draw the Pattern.

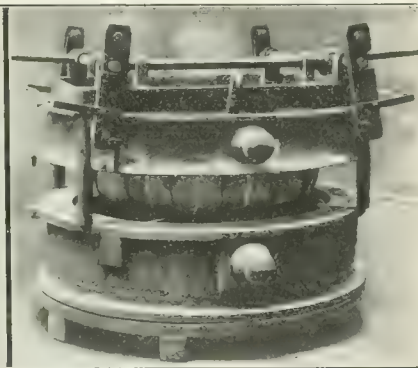


Fig. 9.—The Pattern Drawn From the Mold.
The New Osborn Pattern Drawing Machine in Use.

ordinary squeezer type machine. As an adjustable flask stripper it is similar in construction to the maker's ad-



Fig. 10.—Drawing the Pattern with the Osborn Drop Plate Squeezer Molding Machine.

justable flask stripping machine, which was illustrated in *The Iron Age* March 3, 1910, and takes flasks from 9 to 12

the floor, the force being entirely absorbed in packing the sand. The machine consists of an ordinary molding machine table beneath which is a cylinder in which works a plugger or piston, which strikes a blow on the under side of the table. The table is supported on springs and is ribbed so that the force of the blow is distributed to all parts of the mold and draws the sand down uniformly to the pattern or into the core box. The machine requires only a 1/4-in. inlet for air and has a 4-in. cylinder and a specially designed self-contained valve. The table has a working surface of 24 x 36 in., and the machine will jar molds up to 1000 lb. in weight.

The Milwaukee Car Plant Transferred.—At a recent meeting of the stockholders of the Milwaukee Refrigerator Transit Company, Milwaukee, Wis., its capital stock was increased from \$150,000 to \$400,000 and its name changed to the Milwaukee Transit & Car Company. The change in name was for the purpose of absorbing the Milwaukee Car Mfg. Company, whose plant and properties of all kinds were taken over by the former company on April 25. The new company assumed all contracts, liabilities, etc., of both the former companies. The transaction gives the new company a first-class car shop, fully equipped for the building of new cars and the repairing of old ones. A number of improvements are contemplated, but will in all probability be held up until such time as the situation with the railroads becomes a little more encouraging. The company will manufacture and repair cars for both its own and other companies. The following equipment has been purchased and is now being installed: One 250-h.p. Sterling boiler, one 95-lb. Berlin planer and matcher, one Fay & Egan car tenoning machine, one Bentel & Margedant railway cut-off saw and one Ferguson bolt furnace.

Briquetting Metal Borings*

Compressing Metallic Waste Under Pressure, Without Binding Material, Into Substantially Solid Shapes Ready for Melting

BY DR. RICHARD MOLDENKE, WATCHUNG, N. J.

One of the latest developments in the metal industry in connection with the utilization of metallic waste is the process of briquetting it under enormous pressure, without the use of a binding medium. The process was originated by Arpad Ronay, of Buda Pesth, who conceived the idea of imitating nature as closely as possible in the production of rock deposits. That is to say, he combined extreme pressure with a sufficiency of time to allow individual particles to get close together, excluding thereby spaces filled with air or water, which under pressure would tend to weaken the bond. This is exactly what happens in nature in the formation of deposits, the very fine particles of disintegrated minerals settling down slowly and into close contact, to be later on compressed into stone by the weight of superposed layers.

Success of the Process

When metal particles, as well as ores or other fine materials, are subjected to the ordinary rapid and heavy pressures enough air is entrained to give trouble when the briquettes are heated up. The air expands, causing the breaking up of the briquette with consequent excessive loss and troubles incident to the use of the fine material untreated. Ronay's results were surprising in that the briquettes were perfectly inert so far as their integrity was concerned, and the ores were reduced like regular lump ore, and metal briquettes melted like pig iron. It is this treatment that forms the basis of the patent protection.

When the writer was first asked to investigate the process professionally at the instance of American interests, before going to Europe to do so, he took one of the German briquette made of cast borings, and melted it in his cupola, leaving the breast open so that by means of an iron bar contact could be had with the briquette from time to time, as it melted. It was found that the lump of briquetted borings melted just as a piece of pig iron would, holding its shape until the final softening and dropping to the bottom.

A visit to the several briquetting installations in Europe existing at the time showed the briquetting industry to be in a flourishing condition, and since that time more plants have been added, making ten in number at this writing. There are two in Berlin, one each in Chemnitz, Stolberg, Cassel and one at the Imperial Navy Yard at Kiel. Then there are plants in Vienna, Buda Besth, Milan and at Winterthuer, Switzerland. In this country the Ronay process for handling metal waste is operated by the Metal Briquetting Company, New York City.

*From a paper read before the American Foundrymen's Association, Pittsburg, May 23.

The Method of Briquetting

In general the process may be described as follows: Cast iron, steel, brass, bronze, aluminum, copper chips, borings, filings and metallic slimes after drying, and for that matter sawdust, coal graphite, salt, ore, flue dust, &c., go to a hopper above the press proper. In the case of borings, it is first necessary to allow these to pass by an exhaust fan, to remove dust and dirt (also taking the very fine graphite away.) Incidentally where there has been some slight rusting of the borings, the rubbing of the particles upon each other during transit, loosens the rust and this is drawn away by the exhaust, thereby greatly improving the quality of the briquette, as rust is never a good thing to go into the cupola.

Steel turnings pass through a set of disintegrating rolls to reduce bulk. After cleaning the borings by exhausting the dirt and sweepings, they pass over an electromagnetic separator to remove brass from iron. The cleaned and separated borings then pass into the feed hopper of the press.

The borings flow by gravity into the hopper of the press, then into the die, and as the plunger descends receive their first compression. The air passes out as the borings go together, the separate particles curl into each other, and the partially completed briquette, in the die, passes on carried by the revolving press table to the next stop where plungers below and above apply pressure up to 35,000 lb. per square inch. The die containing the briquette is free to move up or down at this point, giving the compressed material within freedom to adjust itself to an evenly distributed force.

On the withdrawal of the plungers, the re-

volving table makes another movement, placing the with the finished briquette within (slightly conical in shape) under another plunger, which forces the briquette out and upon a band to take it away from the machine. All these movements are entirely automatic, the valve regulation being perfect, one man looking after the operation of the press itself, another taking the briquettes away, while a third sees that the hoppers are properly fed from borings received at the plant. A foreman machinist looks after the general operations, the pumps, accumulator and intensifying units.

It may be interesting to state that the briquettes after leaving the press become quite hot, so that any oil originally in the borings, and that applied to the die before filling either by a swab in hands of the man at the press or automatically, does some smoking. Moisture present also disappears in a short while, the heat, however, not being sufficient to prevent the hand from resting on the briquettes for a moment.

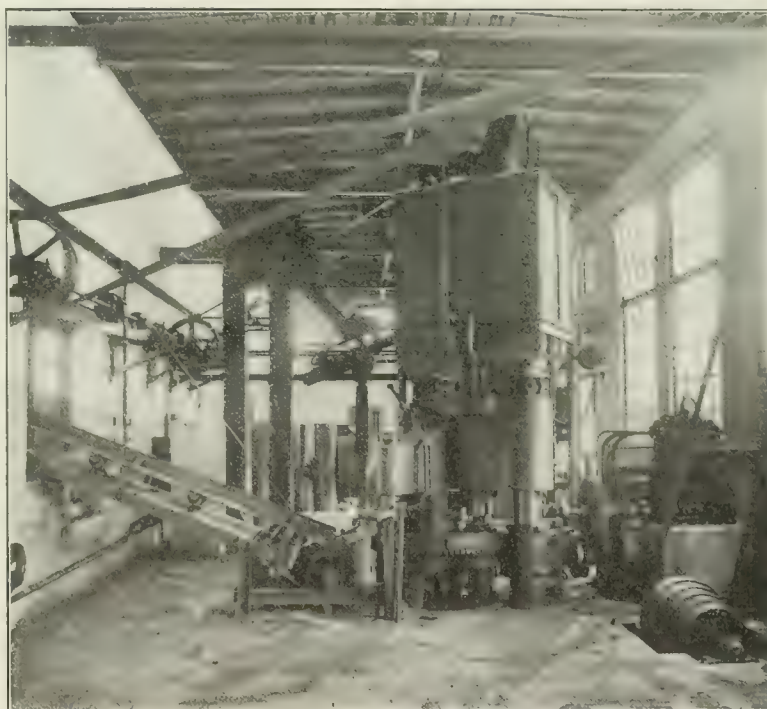


Fig. 1.—Interior of the Chemnitz Briquetting Plant.

One press with a capacity of $1\frac{1}{2}$ tons an hour, and hence one of the small sizes, has been running regularly for several years, and beyond the renewal of the cast iron dies every three months or so has required no repairs. An intensifier is employed to bring the water pressure of the very heavy pumps up to that of some 35,000 lb. per square inch, as required for the work in hand. The larger cylinder of the intensifier is below the floor line. Two pumps develop the necessary primary pressures. An accumulator serves to insure even working and rapid action.

Cast iron briquettes $6\frac{1}{4}$ in. in diameter and 7 in. high, weighing 38 lb. each, are formed. Fig. 2 shows a pile of wrought iron chip briquettes, of a shape no longer used. The round briquettes—the present form—are seen at the right.

The Chemnitz plant has been removed into a new building. It has bins extending outside through the building wall for unloading shipments of borings separately, so that the product of a works may not be mixed together with that of another establishment. A loading conveyer carries the briquettes from the press automatically on cars, without any handling whatever. Fig. 1 shows the interior of the plant with one of the new large presses installed—the old one from the other plant not having been placed at the time the picture was taken, being too busy to move until the new press cared for its daily burden. This new press is of 6 tons per hour capacity and automatic in every particular, thus reducing the cost of briquetting—including overhead charges, interest, labor and all—exclusive of royalty, however—to about 50 cents a ton. The cost of such a large press, with conveying apparatus and all accessories, is about \$325,000, which shows to what perfection the process has been brought in Europe in the short time the matter has been before the iron industry.

Fig. 3 shows two molds and one plunger end belonging to a 5 ton per hour press.

The perfecting of these presses has cost probably \$200,000 and the unremitting attention of several years. The cast borings briquettes are so uniform in weight that counting them while charging is sufficient for all purposes. They can be handled just like pig iron. In fact they have been piled twice as high, transported everywhere in open or covered cars, without any damage whatever, and when charged into the cupola melt without disintegrating.

A briquette of wrought iron borings has been heated up and put under the hammer, turning out a very serviceable drop forging.

Use of Borings in the Cupola

The use of borings in the cupola is an affair probably as old as the cupola itself. Until very recent times, however, but little of value has resulted in this direction. Whitney and Outerbridge were the first to give results to the public, and in the days of high priced iron boxing up the borings in wooden containers answered fairly well. Then again, in the anthracite region it was a common thing to use old powder cans, nearly filled up with borings, the tops beated down and the canisters charged into the cupola. Latterly an adaptation of this with the novel feature of continuous tubes filled with the borings has met with considerable success when carefully handled. All these methods, however, may be described as "fussy" even if effective, one works using all the old cans that could be obtained until the supply gave out. With the briquetting method, however, which, aside from the royalty question, is the cheapest of them all, a new era was commenced, for the melting loss was reduced to a minimum, no apparatus was needed after the material left the press room, and the ordinary conduct of the foundry was in no way disturbed.

On the question of cupola practice, therefore, the use of briquettes simply parallels the use of pig iron and heavy scrap, and inasmuch as the briquettes, in spite of the enormous pressure, are not fully as solid as pig iron, they melt somewhat easier and faster than it, and from their handy shape and weight form an ideal cupola charging and melting material.

Whereas borings when charged directly into the cupola lose all the way up to 50 per cent. of their weight, besides ruining the product; when they are boxed, canned or melted in tubes the melting loss is not excessive, varying between 8 and 12 per cent., the danger always remaining that the cans or tubes will open and by discharging the loose borings over the coke bed ruin everything that follows until they are burned or melted and washed out.

In the case of briquettes, as in every other melting

tests made to get figures on a process, much depends upon how the melting is done. For instance, in melting straight pig iron with small precautions to get the very best melting practice, the melting loss may amount to 3 per cent. and even over. Where, however, these precautions are taken repeated tests have made this loss about 1 per cent., and in the case of sandless pig as low as 0.3 per cent.—some carbon having probably been taken up during the melt. Hence also in the case of running straight heats of briquettes the melting loss with practice that gave 2.5 to 3 per cent. loss for straight pig iron gave 8 to 10 per cent. for the briquette loss. With careful practice, however, there is no difficulty in getting this down to 6 per cent.

As, however, no one would think of running a straight heat of briquettes for daily practice, but charge all the way from 10 to 80 per cent. of these articles, the rest being pig iron and scrap, the melting loss of the heat will be about the normal one. In the case of a heat made with 80 per cent. briquettes and 20 per cent. pig iron, the actual melting loss was only 3.5 per cent, showing either more careful practice or else that the comparatively heavy pig iron held the temperatures in the cupola more sharply localized, doing the melting where wanted without oxidizing what was above.

There are some metallurgical changes in melting borings, whether loose or briquetted, which must be reckoned with. In melting a material which has such an enormous surface for a given weight and which even when com-



Fig. 2.—Wrought-Iron Chip Briquettes As Made By Metal Briquetting Company, New York City.

pressed practically solid to remove the disadvantages of the disproportion in question can still be permeated by gases to some extent when expanded by heat certain changes necessarily take place. The silicon will be lowered considerably more than is the case ordinarily; similarly the total carbon, while the sulphur taken up is about double the ordinary increase. This, of course, is particularly noticeable only when an entire heat of briquettes is to be reckoned with. Under ordinary conditions with part briquettes only there is little difference noticeable, and for such work as cylinders of gas and steam engines, ammonia castings and the like, there is a marked improvement on

the part of the castings produced. This may be understood more readily by remembering the fact that a reduction in the total carbon and silicon corresponds to a steel addition to the charge. The slight increase in sulphur means a structure more finely granular, and hence a better wearing surface for cylinder work.

Inasmuch as the large locomotive works of the Continent are adopting the use of briquettes, and when proper melting practice prevails, the castings made are perfectly sound and free from blow and pin holes, it is evident that the use of borings in the way described is not a detriment. In fact, strange as it may seem, in Germany these briquettes are actually sold at pig iron prices, and at the Borsig works, for instance, the regular charges for steam and gas engine cylinders, and other engine parts; refrigerating machinery (ammonia and sulphurous acid); hydraulic machinery and air compressors; superheated steam and steam turbine apparatus; contain 40 per cent. of briquettes.

Perhaps one of the most interesting applications of the briquetting process lies in the ability to mix steel with cast borings. Here is a most excellent way of charging steel into the cupola without burning up a portion of it before melting. The contact of a low carbon with a high carbon material means the melting down of this combination with an average carbon content. In place, therefore, of adding 40 per cent. steel scrap to the charge and in melting get perhaps a reduction in carbon in the castings corresponding to half of this as a result, either much less steel need be added to the borings for briquetting, or if the full amount is added, a much stronger metal is obtained. A founder can therefore not only utilize any steel scrap he may produce efficiently, but actually order or make his briquettes with just the proportion of scrap he wants in them.



Fig. 3—Molds and Plugger Used in the Rong Process.

In the case of all steel briquettes it may be said that for air or open hearth furnace work these excel the regular heavy steel scrap in point of working. No only do they melt faster, thereby shortening the heat considerably, but from the uniform size and shape they pile nicely in the furnace, allowing a better circulation of the gases to melt them than can ever be obtained by irregular and large scrap pieces.

The briquetting of brass, bronze, aluminum, white metal and other metals has not been touched upon, but it may be said that with these the melting losses are the same as the solid metal when melted, for in the case of all the softer metals and alloys they are pressed together so closely that they are for all practical purposes sound pieces of metal. The finer the scrap the better the briquette, and hence a magnificent field has been opened for the economical recovery of the expensive metals in the foundry.

The near future will see a rapid development of the art in this country, and it is expected that other metallurgical reactions, such as de-sulphurization of iron, recarburizing

metals and other desirable processes will be presented to the metal industry through the agency of this new briquetting process under enormous pressures and proper time conditions.

The American Museum of Safety Chartered

The great bound with which the questions of accident prevention and workmen's compensation have sprung into prominence has made the American Museum of Safety the center of public interest. A special charter has just been granted it by the Legislature of the State of New York, thus putting it in the same class with the Metropolitan Museum of Art and the Museum of Natural History, in New York City. Among the trustees are E. H. Gary, Philip T. Dodge, James Speyer, Thomas Lynch, Arthur Williams, Edson S. Lott, Frederick L. Hoffman, George F. Kunz, Charles Kirchhoff, T. C. Martin, Charles A. Doremus, Louis L. Seaman, Frederick L. Hoffman and William H. Tolman.

The exhibits at the museum, in the Engineering Societies' Building, 29 West Thirty-ninth street, New York, include protective devices for the safeguarding of human life in almost every field of labor, from the turning of a grindstone to the moving of a freight train. The collections are of intense interest even to the ordinary observer, but of incalculable value to the manufacturer, for, at present, annually, in the United States, over 500,000 men are wiped out from the ranks of the wage earners.

Oil Fuel Burners in the Foundry

The oil fuel burners, manufactured by the Hauck Mfg. Company, New York, have been given a very extended application for foundry uses. In cupola lighting the flame is directed by compressed air against the coke bed, producing immediate ignition without injury to the lining. It is a useful adjunct in ladle drying, for which purpose it is arranged with a heating pipe extending into the ladle, the result being uniform heating to the required degree. The burner is employed in repairing defective parts, pre-heating them, if necessary, to the melting degree, a function which is also extensively used with various processes of welding. The burners have replaced old time methods of skin-drying molds, and are useful for baking molds in connection with specially constructed, sheet-iron boxes lined with asbestos.

The American Society of Engineer Draftsmen.—This society held its regular monthly meeting at its rooms, 116 Nassau street, New York, May 17. The committee appointed to investigate the bills for licensing engineers, now before the Assembly of the State of New York, reported that the McGrath bill appeared to be framed with a view to assist the man who is working his way up from the bottom rung. Letters were read from members resident in various States and Canada, defining local progress in the direction of licensing. Half of these letters opposed the principle of licensing, while the remainder favored it either wholly or in part. D. W. G. Eliot, of the topographical bureau of the city of New York, a sponsor of the McGrath Bill, addressed the meeting, showing the advantages claimed by his measure in a strikingly able and lucid manner, subsequently answering many questions put to him by those particularly interested.

The Massachusetts Institute of Technology has received a gift of \$500,000 from T. Coleman Du Pont, and is made residuary legatee under the will of Mrs. Emma Rogers, widow of William B. Rogers, first president and founder of the institute. The State of Massachusetts has appropriated for the school \$1,000,000, to be paid in 10 annual instalments of \$100,000. The Du Pont gift is to be used either for a new scientific building and its equipment or for a new site for the institute. Another gift just announced is a scholarship fund of \$600,000 under the will of F. B. Green.

The Conshohocken Iron & Steel Company, Conshohocken, Pa., has purchased the two old blast furnaces of the New Jersey Zinc Company, near Newark, N. J., and is dismantling them. The purchasing company did considerable work of this character under the direction of Alexander Hamilton, who has had a large experience in that line.

The Andrews Side Frame Patent Sustained.—Judge Kohlsaat, in the circuit court for the northern district of Illinois, entered a decree May 11 sustaining the Hardie patent, which covers the Andrews side frame, and holding that the Wolff truck frame manufactured under the Harrington patent by the Scullin-Gallagher Iron & Steel Company was an infringement.

A Four-Spindle Drilling Machine

The Sibley Machine Tool Company, South Bend, Ind., has recently placed on the market a four-spindle drilling machine to which the trade name Hi-speed has been given. This machine is of the all geared type and an effort has been made in designing it to combine all the features which

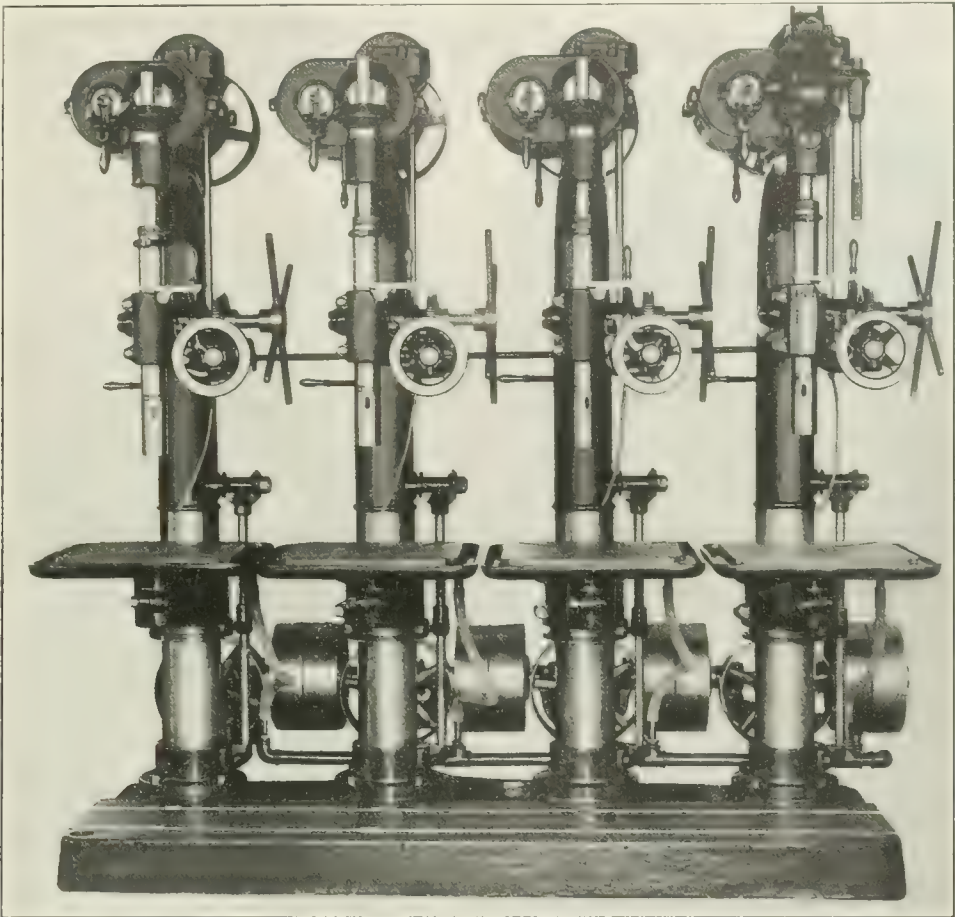
shafts. After it has been used, the lubricant returns to this tank through drains on each table.

The following table gives the principal dimensions and specifications of the machine:

Distance between centers, in	20 •
Swing, in	22
Number of spindle speeds	8
Minimum spindle speed, r.p.m.	99
Maximum spindle speed, r.p.m.	600
Overall height, in	80
Floor space, in	48 x 77
Weight, lb.	4500

In addition to the four-spindle type of drilling machine illustrated this company also builds two and three spindle machines which embody the same features in their construction.

The Detroit Steel Casting Company, Detroit, Mich., held



A New Four Spindle Drilling Machine With Independent Spindle Drive Built by the Sibley Machine Tool Company, South Bend, Ind.

would add to operating convenience and effectiveness without undue complication of the mechanism.

The general construction of this machine follows that of the maker's standard line, which possesses the distinctive features of a very direct drive and the elimination of all parts which are not absolutely essential. The spindles are entirely independent of each other in operation. A separate quarter-turn countershaft is provided for each spindle instead of employing a single clutch for each, this arrangement being selected as it enables the full power transmitted by the driving belt to be delivered to all of the spindles and the trouble incident to the use of friction clutches is eliminated. The gear case is located on top of the column and the machine can be started and stopped and the speed and the feed varied and the spindle returned without making it necessary for the operator to go to the back or even to the side of the machine to make any of the ordinary adjustments.

Four individual square tables are furnished, which are placed so close together that they can be used as a single table for the whole machine or any separate one can be raised or lowered to accommodate different sizes of jigs. The fourth spindle is equipped with builder's standard geared tapping attachment. All of the four spindles are supplied with lubricant which is pumped from a central tank by a gear pump driven from one of the counter-

its annual meeting May 11. The reports of the officers showed that the year which had just closed had been an unusually prosperous one and that while business is now quiet the prospects for the coming year are considered good. The following officers were elected: J. S. Newberry, president; S. W. Utley, vice-president and general manager; W. S. Allen, secretary; F. P. Smith, treasurer; J. P. Warren, assistant treasurer.

The George M. Newhall Engineering Company, Philadelphia, Pa., has opened an office at 50 Church street, New York City, where the several lines of that company, together with the line of the Industrial Works, Bay City, Mich., will be represented. The new office has taken as its initial order for the Industrial Works two 100-ton wrecking cranes and one 12-ton locomotive magnet for the Seaboard Air Line Railway.

The Wm. Cramp & Sons & Engine Building Company, Philadelphia, Pa., launched successfully May 25 the battleship Wyoming, building for the United States. This vessel is one of the largest and is to be one of the heaviest armored ships in the navy.

The Fort Pitt Steel Casting Company, McKeesport, Pa., maker of small steel castings, is enlarging its power building and installing a 100-h.p. engine and generator.

Manganese and Silicon*

Their Use in Foundry Practice—The Future of Car Wheels—Silicon for Softening Cast-Iron

BY ALEXANDER F. O. TERRIDGE, JR., PHILADELPHIA.

Manganese acts in two different and opposite ways in cast iron. When alloyed therewith in the cupola in considerable quantity, say 2 per cent. or over, it has a chilling and hardening effect, producing what I have termed a spurious chill of coarse crystalline nature, in contradistinction to the normal chill in a good car wheel which has a fine and closely interwoven crystalline structure.

When the alloy called ferromanganese is added in a ladle of molten car wheel iron in the small quantity given (1 lb. of alloy, containing about 80 per cent manganese, in 600 lb. of iron), it acts not as an additional contribution of 0.133 per cent. manganese to the metal in the ladle, but

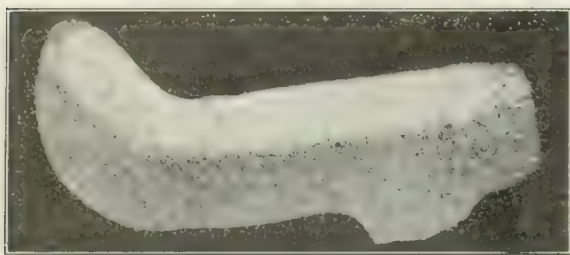


Fig. 1.—Section of 1.33 lb. Car Wheel Cut From Treated Iron, Showing Fine White Crystals and Dark Gray.

simply as a deoxidizing and desulphurizing flux, cleansing the metal from impurities, softening it and greatly increasing the ductility and strength without injuring the chilled tread of the wheel.

The fact that ferromanganese was found to be so beneficial in car wheel practice soon led others to exploiting the alloy for general foundry purposes, but the conditions are here entirely different and in most cases this alloy is not only of no benefit, but is actually detrimental to foundry irons. I have already explained that it changes a large portion of the combined carbon in car wheel (or chilled roll) iron into graphitic form, but this remarkable effect cannot take place in ordinary foundry iron which contains usually scarcely more than a trace of combined carbon. The ignorant and improper use of ferromanganese in general foundries is sure to lead to disappointments.

Ferromanganese in Car Wheels

When we consider the greatly increased weight upon the wheels, together with increased average speed of freight trains and far more severe action of the brakes in recent years, it is truly wonderful that the chilled cast iron car wheel should still be able to maintain its foremost place, notwithstanding the improvements made in steel wheels and great reduction in cost of their manufacture. The steel wheel will, in time, I believe, supersede the cheaper cast iron wheel for the severest freight service, but the day is far distant when the chilled wheel will no longer meet the general requirements for rolling stock except for locomotives and passenger cars, and it is my firm conviction that as long as cast iron wheels are manufactured, the use of a small amount of ferromanganese, added in the ladle a moment before pouring, will continue to be a standard practice, for it has long since passed the experimental stage, and the recent attempt to create an impression that the introduction in the ladle of a minute quantity of manganese in the form of ferromanganese (less in amount than the natural variation found in good car wheels made by different manufacturers, or even by the same makers), produces an objectionable manganese chill, will fail to make any impression on intelligent persons who understand the subject and have practical experience in the business.

The foundryman should understand clearly from what has gone before that ferromanganese and ferrosilicon possess entirely different functions in cast iron and should not be used indiscriminately or in conjunction. Ferromanganese is best adapted to the treatment of high chilling iron for car wheels or chilled rolls, or other chilled

castings where the proportion of combined carbon is large.

Ferrosilicon is best adapted to treatment of foundry iron when from any cause it is hard and brittle, since it possesses the peculiar property of softening and at the

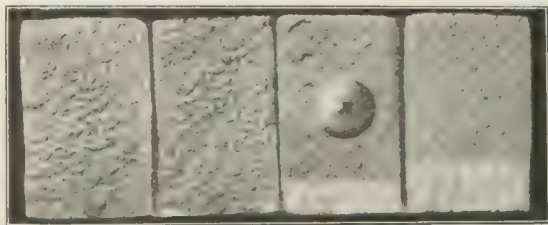


Fig. 2.—Four Specimens of Pig Iron Containing Silicon, Cast in Green Sand Molds Against a Chill Block On One Face.

same time strengthening such iron. It also enables the founder to vary the grade of iron in individual ladles to suit individual castings or groups of castings. It gives the founder control of his iron after it has been withdrawn from the source of melting, a matter of great importance and value, and it enables him to use cheaper grades of iron.

Finally, I wish to say that neither ferromanganese nor ferrosilicon can be regarded as universal panaceas, as some unscrupulous salesmen would have the foundryman believe, and, while each in its proper place is of great value, they must, like all other good things, be used intelligently, and if impure adulterated materials are employed they will not only prove to be of no benefit but may be absolutely harmful.

The Influence of Silicon

The influence of silicon in softening pig iron and reducing its chilling property is clearly shown in Fig. 2. Four test pieces were cast in green sand molds, one face in each being formed with an iron block. The only important difference in composition between the specimens is in the amount of silicon in each. The one on the left contained 0.7 per cent. silicon, the one showing a hole where a drill had been used to obtain borings for analysis contained about 0.8 per cent. silicon. The next contained a trifle over 1 per cent. silicon, and the specimen on the right nearly 2 per cent. silicon. In this case mere "skin chill" is noticeable on the upper face against the chill block. The remarkable effect of cooling gray iron very suddenly is shown in Fig. 3. Here the molds are heavy iron chill cups; some are ½-in. section, others 1-in. section, others about ¾-in. round section. All of these specimens are absolutely white iron. Samples of the same iron poured in green sand molds of about the same size were all perfectly gray in fracture. It will be observed that the white iron crystals always form at right angles to the chilling surface of the molds, presenting an appearance resembling spokes of a wheel in those of round section, and showing a cross at

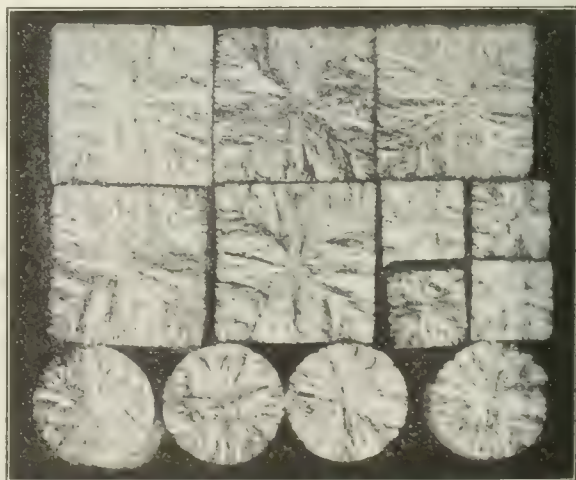


Fig. 3.—Specimens of Gray Iron Cast in Heavy Iron Chill Cups.

the nodal lines, or points where the crystals meet, in the specimens of square section. The lines of demarcation are as sharply defined as though scribed with a tool on solid metal, and it is possible, in some cases, to split the specimens lengthwise along these lines. The specific gravity of the gray iron is about 7.2, while that of the white iron is

*Delivered at Convention of the American Foundrymen's Association, May 23-26, 1911.

nearly 8. There is, however, an appreciable difference in density of different specimens of white iron just as there is a well-known difference in density of different specimens of gray iron. There is also a marked difference in hardness of white iron crystals.

Progress in Heated Foundry Mixers*

BY J. B. NAU, NEW YORK.

At the meeting of the American Foundrymen's Association, held in New York in June, 1905, the writer recommended the use of a heated mixer as an intermediary receptacle placed between the blast furnace and the foundry, into which iron from the blast furnace could be poured, kept liquid for any desired length of time, and its quality corrected by suitable additions of either liquid or solid pig iron, or by additions of wrought scrap, should it be desired to obtain a metal with lower carbon contents. From this mixer the metal was to be withdrawn whenever needed in the foundry. Its use was more especially recommended in pipe foundries. Since then some progress has been made in that direction, but less in this country than in Germany, where foundry mixers are said now to be introduced in different places and where, up to the present at least, their use is particularly advocated wherever possible as a valuable addition to cast-iron pipe foundries.

The writer knows of one pipe plant of modern design, which he had an opportunity to visit in Europe in 1905, and which, for lack of capital, was not in operation at the time. It has since been bought up by a blast furnace plant, located at a distance of some two miles and will be put in operation as soon as a suitable mixer is put up at the pipe plant, to which the liquid iron from the two blast furnaces will be delivered.

Like all modern mixers used in steelworks, foundry mixers are usually in the shape of open hearth tilting furnaces, either enclosed in a round iron shell or preferably in the more modern ones with the top of the roof exposed to the open air, for the purpose of keeping it cool and making it more durable. Their heating is mostly done by producer gas and even in some cases by blast furnace gas. One regeneration is deemed sufficient for obtaining a good steady temperature. In some cases even, where sufficient proximity allows it, heated air from the blast furnace hot blast stoves is recommended, so as to avoid regenerators.

In this country there is at least one foundry mixer in use in a well-known Western plant, where for about two years now 250 tons of mostly very heavy castings are made every day in a ten-hour shift, with direct iron from the blast furnaces suitably mixed in a 100-ton mixer before pouring it into molds. The mixer, without regenerators, is of the tilting style, brick lined, oil heated, and as the castings poured from the mixer irons are very heavy and the temperature of the iron at the moment of pouring into the mixer is high enough for the foundry operations, only a small amount of oil is used for heating purposes.

The silicon content varies within the extreme limits of 1.25 and 1.75 per cent., while the sulphur is generally kept between 0.06 and 0.035 per cent. The latitude in the silicon content makes it possible to do away with any additions of pig or scrap or other suitable alloys, which additions would otherwise be necessary to correct the quality of the iron.

Direct iron from the blast furnace is brought up in 30-ton ladles and the choice of the iron to be taken to the mixer is left to the care of a man trained especially for this purpose.

Where Small Castings Are Made

The question of the use of a foundry mixer becomes more complicated, where the iron is destined to be used for small castings, and has to be at a necessarily higher temperature, where the silicon content is allowed to vary only within narrow limits, and where it is desirable to carry the same silicon content throughout. Under such conditions outside additions of a suitable kind will have to be made to bring the metal to what might be called a standard analysis. When, furthermore, the nature of the foundry work is such as to make it unavoidable to keep the liquid metal in the mixer exposed for hours to the action of the flame, some further precautions will have to

be taken to prevent the gradual desiliconizing of the foundry iron under the action of the flame as well as the slag that may form during the operation. In this respect the operations in the foundry mixer will differ entirely from the operations carried out today in the mixer used in connection with open hearth furnaces. In this mixer partial refining of the metal is contemplated and fostered. In the foundry mixer, on the contrary, desiliconizing must be avoided.

Formation of Non-Refining Slag

From the treatment of liquid foundry iron in a furnace, where the writer took precautions against refining of the metal from the first moment on, it was proved that with the formation of a thin layer of slag of a non-refining nature on top of the liquid bath of metal, foundry iron can be kept exposed to the action of a flame at a high temperature for an indefinite length of time without in any way changing the silicon content of the metal and without deteriorating it in the least. In this respect the writer ventures to state his belief that the metal will rather improve in quality.

Iron running from the blast furnace into a ladle will naturally lose through oxidation some hundredths of 1 per cent. of its silicon content. With only ordinary precautions this loss can be kept well within 0.10 per cent. of that element, or not more than will naturally take place with iron running from the blast furnace into the pig iron molds. During its transfer from the blast furnace, some of the sulphur and manganese will be eliminated by mutual reaction, the resulting product finding its way into the slag, where together with the silica and some FeO formed, and some other impurities, it will constitute a thin protective slag covering, preventing any further outside oxidation. Pouring the metal from the ladle into the furnace above the slag will form a protective cover over the metal bath in the furnace.

It is not enough, however, to interpose such a layer of slag between the metal and the flame, but it is further necessary to make and maintain the slag of a non-refining nature; otherwise the slag itself would desiliconize the metal much more than an oxidizing flame could do it. Such a slag can easily be obtained with the application of some very elementary precautions that can easily be carried out and that have for their purpose the formation of a slag low in refining elements.

The non-refining slag that the writer produced in the first three heats made in the treatment of more than 80,000 lb. of foundry iron amounted to less than 500 lb., and had in its composition:

SiO ₂	=	56,720	
FeO	=	3,605	= 2,805 Fe
Al ₂ O ₃	=	13,140	
MnO	=	6,700	
		<hr/>	
		80,165	

The balance was undetermined.

Assuming that half of the Si of the slag is derived from the iron and the other half from the refractory lining, which was only very slightly attacked, it will be found that only 0.08 per cent. of the silicon was eliminated and this happened mostly in the ladle.

An examination of the analysis of the slag will show that only about 120 lb. of its weight can possibly come from the iron, corresponding to 0.15 per cent. in weight of the 80,000 lb. of iron treated as against 4.5 per cent. = 3,600 lb. loss that would have happened in the cupola.

The sulphur and manganese content of the iron from the mixer are less than the corresponding contents of the iron from the blast furnace. The silicon may be made any desired amount with suitable additions and once the amount is established it can be maintained without variation for any length of time from the beginning to the end of the cast. But if the iron in the furnace is left exposed to the refining action of the flame and the slag, without taking any precautions against refining, slow desiliconizing, that in a special case corresponded to about 0.10 per cent. elimination of that element per hour, will take place. With the necessary precautions against desiliconizing, it was found that an iron with 1.90 per cent. Si at the moment of pouring the metal in the furnace, contained 1.86 per cent. of that element after 19 hours of exposure to the hot flame.

By additions of ferro-silicon, the silicon was sought to be increased to 2.30 per cent. while it actually reached 2.28 per cent., at which figure it was maintained to the

*A paper read before the Pittsburgh convention of the American Foundrymen's Association, May 23-26.

end of the cast 28 hours after the iron was poured into the furnace.

Advantages of the Mixer

The new figures thus submitted show sufficiently what the application of the mixer to the foundry will do for the latter. The advantages derived from the use of the mixer therefore comprise the complete avoidance of the loss of silicon and furthermore a very notable reduction of the sulphur content with a correspondingly slight reduction of manganese from the iron. With some 0.5 to 0.8 of manganese in the iron the sulphur will be reduced by some 10 per cent. to 25 per cent. of its original content, even if the iron coming from the blast furnace contains only 0.03 sulphur or less. Mechanical tests made with the iron from the mixer also show an increase of about 40 per cent. over what the same iron after its remelting in the cupola would show.

The mixer, therefore, greatly improves the quality of an iron that by its treatment in either the cupola or the air furnace would be deteriorated within varying degrees. Owing to this characteristic the mixer will find its place in other foundries than those of large and heavy castings and of large tonnage. Wherever the quality of the castings to be obtained overshadows to a sufficient degree their price, the mixer can be built in very small units.

In nearly every case where direct metal from the blast furnace is available the mixer can easily take the place of an air furnace. Air furnace metal costs on an average $\frac{1}{2}$ cent a lb. more than cupola melted metal. While in some cases mixer metal might cost more than cupola melted metal it would nearly invariably cost less than air furnace metal, and metal for metal it would be of superior quality to the air furnace product. For instance, rolls that today are cast from air furnace metal could be made more cheaply and of better quality from mixer metal.

An Automatic Saw Sharpener

The automatic saw sharpener shown in the half tone is designed by its builder, the Nutter & Barnes Company, Boston, Mass., with the special feature that it will back off and form a Brown & Sharpe patent relieved tooth at one setting in the time required for plain gumming. The four different operations necessary in forming one relieved tooth are performed by cams and gears at each advance of the main gumming wheel, at the rate of 40 to 50 teeth per minute, varying according to the diameter of the saw. The automatic indexing is from a 12-in. disk having teeth equal in number to those of the saw. The machine will also

sharpen the face and form the gullet of a plain straight tooth.

The function of the gumming wheel is to gum, sharpen the face, back off and regulate the two lengths of saw teeth, the narrow, alternating teeth being $1/64$ in. longer than the full width teeth. The two 4-in. straight narrow grinding wheels bevel and form the clearance on the bevel of the alternate bevel teeth, the proper clearance being given as the wheels are gradually withdrawn and the saw starts to revolve. In the same manner full width teeth receive their backing off from the corner of the beveled wheel, as the teeth are revolved past it.

The variation called for in backing off the teeth is obtained from an adjustable feed cam, in which are holes located to receive an index pin in an arm on the cam shaft. Each hole is marked for the different number of teeth in saws of various diameters.

The machines are built in two sizes, one taking saws from 12 to 20 in. in diameter, the other saws from 12 to 36 in. in diameter.

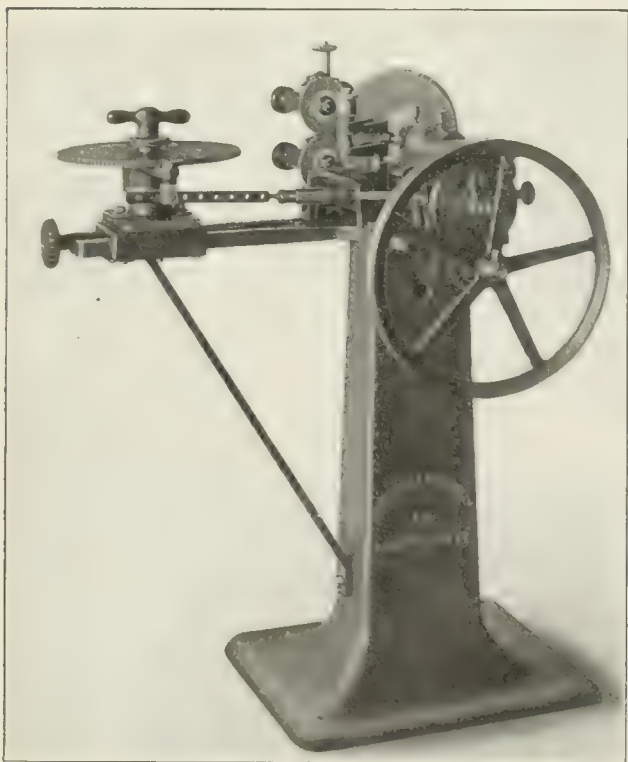
Barthold Gerdau Visits This Country

Barthold Gerdau, a noted mechanical engineer of Dueseldorf, Germany, arrived in Pittsburgh a few days ago. He and Dr. Franz Haniel, of the firm of Haniel & Lueg, Duesseldorf, came over on the invitation of George Mesta, president of the Mesta Machine Company, to attend the spring meeting of the American Society of Mechanical Engineers in Pittsburgh this week. Mr. Gerdau will read a paper at the morning session of the meeting on Friday, June 2, on "Power Forging, with Special Reference to Steam Hydraulic Forging Presses." He has brought with him a number of lantern slides for use in illustrating his paper, which will show forging operations in the Krupp Works and other large forging plants in Europe. This paper and the illustrations will be of great interest to engineers in this country, as the forging press will soon displace the steam hammer here as they have already done in Europe.

Mr. Gerdau received his education in some of the best technical schools in Germany. After completing his education he went to England, where he was connected with the building of the steel works of Bolckow, Vaughn & Co., Middlesbrough. After leaving there he spent some time in Belgium and France. At the present time he is chief engineer and managing director of the firm of Haniel & Lueg, which since then has done some very important government work in Germany, including the hydraulic central power station in the free port of Hamburg. Mr. Gerdau also designed the large hydraulic swing bridges over the North Baltic Canal, as well as the renowned ship lift in the Dortmund-Ems Canal near Henrichenburg, which was an undertaking of very great importance. The German Government bestowed upon Mr. Gerdau, in recognition of his great achievements, the Order of the Crown and the Order of the Red Eagle. Mr. Gerdau also designed the steam hydraulic quick-acting forging press, now known as the Haniel & Lueg system, which has been adopted by the Krupp Works and by most of the other large forging plants in Europe.

The Mesta Machine Company has recently arranged with Haniel & Lueg for the exclusive right of building these steam-hydraulic forging presses for the United States and Canada. It has just built and put into operation a 200-ton and an 800-ton press of this type in its own plant at West Homestead, Pa. These presses will be in operation on Friday afternoon, June 2, when the American Society of Mechanical Engineers and the Engineers' Society of Western Pennsylvania will visit the Mesta plant.

The suit for infringement brought by the National-Acme Mfg. Company, Cleveland, Ohio, against the Universal Machine Screw Company, Hartford, Conn., has been settled out of court on the payment of royalties for past infringement and the expenses of the action by the Universal Company to the National-Acme Company. A non-exclusive license has been issued to the Universal Machine Screw Company under which it may continue to build, use and sell multiple-spindle screw machines embodying the subject matter of the letters patent which have been infringed, in consideration of the payment of a royalty on all machines so built to the National-Acme Mfg. Company.



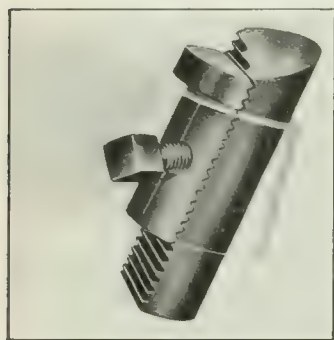
The Nutter & Barnes Company's Automatic Saw Sharpener for B. & S. Patent Relieved Teeth.

Roughing Tool for High-Speed Steel

A Red-E Product Designed to Eliminate a Tool Dressing Outfit

A notable development has been made in the matter of high speed and fast feeding in metal cutting, in connection with metal working machinery, by the Ready Tool Company, Bridgeport, Conn., in the production of what is known as its Red-E roughing tool, style R, for giving to the machine tool operator the cutting contour and cutting angles generally acknowledged to be essential features in the successful use of high speed steel. An idea of the tool may be gained from the accompanying illustration. From one standpoint it may be regarded as a signal help in the effort which has been apparent for some time to maintain the production of tool holders capable of meeting the increased efficiency of machines.

It appears that the tool has been designed along the line of the standards established by Fred W. Taylor and



The New Style R, Red-E Tool.

in the adaptation of the idea incorporated in the Red-E tool, the assistance of one of the associates of Mr. Taylor was secured. In short, to have the bar of tool steel, shown as a feature of the round nose roughing tool, possess the proper contour and remain capable of being quickly set in the holder in such a way that the pressure at the cutting edge would be properly transmitted through the holder, is not as simple as one would imagine at first glance. The tool had to be designed so that the resultant pressure of the work could be carried downward through the cutter and dog to the base of the tool in order to secure a rigid appliance, free from chattering. The idea behind the tool is of course the aim to secure the economical advantages of a tool holder without requiring high priced blacksmith treatment and tool dressing, and without requiring an equipment of apparatus so commonly provided in the case of high speed tools.

Among points on which emphasis is placed is the fact that one grind only is necessary to maintain the correct cutting contour and the correct angles. By flat surfaces on parts of the tool steel bar the grinder operator soon gets proficient in getting the proper angle without the use of a templet, and at the same time the proper side and front clearance are automatically maintained, and claim is made of abundant mass of steel to dissipate the heat satisfactorily.

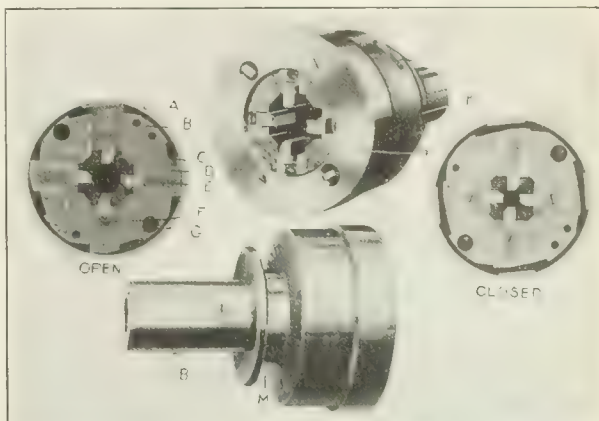
It is assumed in the foregoing that the increased amount of work which can be enjoyed with the same power consumption by the use of the Taylor angles is admitted. Oftentimes the individual lathe hand, when allowed to grind his own tool, is apt to get a speed and feed less than if the Taylor standards are used. In short, the company feels that it has combined in the tool the three factors necessary to produce the best metal cutting tool: shape of cutting edge, proper cutting angles and proper treatment of high speed steel.

A New Self-Opening Die Head

A new type of die head, the construction of which embodies radical departures from previous designs, has been developed by the National-Acme Mfg. Company, Cleveland, Ohio. It was developed primarily for use on the maker's Acme automatic multiple spindle screw machines and others with revolving threading devices as the result of a series of experiments covering a period of more than two years. During that time all of the standard types and others embodying departures from this construction were investigated. As the die is designed especially for use on machines where the threading spindle is revolved, it can be operated while the latter is in motion.

As is shown by the engraving, this design of die requires an exceptionally small number of parts as compared

with other types, and the arrangement of these is such that the die can be easily taken apart and reassembled. This, however, is seldom necessary, as the cap H covering the head prevents chips from entering the working parts and the arrangement of the internal parts in the head provides plenty of room between them, with the exception of the



The New Self-Opening Die Made by the National-Acme Mfg. Company, Cleveland, Ohio.

cam pieces and the surfaces they bear upon. In this way any grit which may be carried by the oil and other foreign substances into the die can work out into the clear spaces and then out of the head through holes left for this purpose in the sides of the head.

Referring to the engraving, which shows the various parts of the die, A is the body holding the working parts and B the head containing the chaser blocks. The cam operating block is indicated by C and the chaser block and the chaser by D and E respectively. The former has an adjusting cam milled on the rear end and the latter can be removed by loosening the screw F. The body and the head are held together by screws, G. The adjusting screw K is provided with micrometer graduations, J, and the shoe is closed by the groove M.

The chasers E can be removed from the jaws without displacing any of the other parts, and their design is such that a practically perfect thread can be cut without employing a follow-up cam. The cam arrangement on the chaser blocks D provides a very liberal adjustment for size which is controlled by a screw, K, having a very fine pitch and plainly marked micrometer graduations, J. The jaws which hold the chasers and the cam surfaces controlling the closing of the die are hardened and ground. They also have a very wide bearing on the cam surface and are thus held firmly in position when the die is closed. The parts upon which the adjustment of the dies or the operation of the closing cams depend are free from springs.

All the parts of the die are made interchangeable, an arrangement which facilitates reassembling or the replacement of worn or broken parts and all the points subject to wear, such as the cam surfaces, &c., are hardened and ground. If it should become necessary to take the die apart for cleaning, this can be easily done by removing the cap H from the front face of the die and then washing in the oil or other cleansing compound. In this way the die is thoroughly cleaned without removing any other parts.

It is reported that the Keystone Furnace Construction Company, Fulton Building, Pittsburgh, Pa., is interested in the organization of a corporation to take over the Niles Boiler Works at Niles, Ohio, in which it will manufacture its own cooling devices. The Keystone Company has met with great success in its Knox patented water cooled ports, doors and door frames for open-hearth furnaces, and in addition to these products will manufacture a general line of pressed and welded steel specialties.

A further step in the reorganization plans of the Baldwin Locomotive Works, Philadelphia, is the announcement that application will soon be made for a new charter, under Pennsylvania laws. It is said that the new corporation will be known as the Philadelphia Locomotive Works. The company has received orders for twenty 10-wheel freight engines for export to Australia, but officials state that the outlook for business is still rather unsatisfactory.

New Bullard Vertical Turret Lathe

The Maxi-Mill Type, Which Contains a Number of Important Developments—An Interesting and Comprehensive Lubricating System

The vertical turret lathe, shown in the illustrations, is the 42-in. Maxi-Mill type of its builder, the Bullard Machine Tool Company, Bridgeport, Conn. The machine has one swivel turret head and one non-swiveling side turret head. Its capacity is 44 in. in diameter, 32 in. in height under

The table is driven through planed beveled gearing, having a special tooth form, which has a rotative effect only. The company's experience extending over a period of years has demonstrated to its satisfaction that the beveled drive is superior to the spur drive, noticeably in the

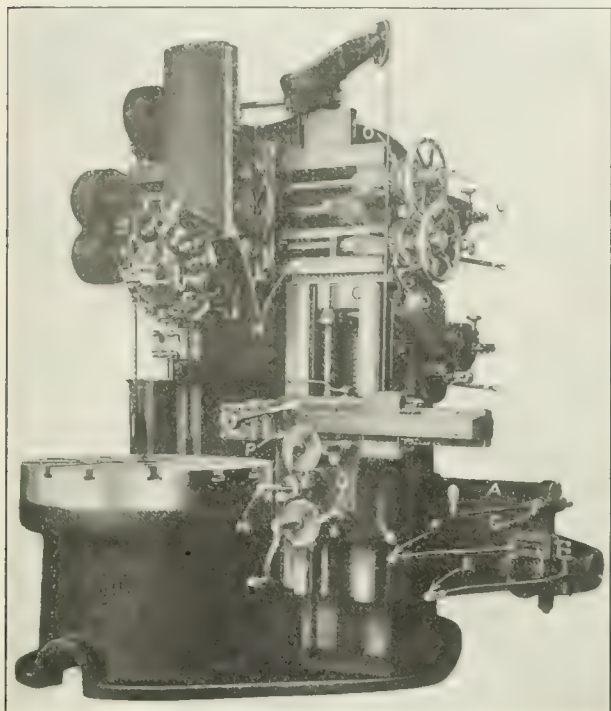


Fig. 1.—The Maxi-Mill Type of 42-In. Vertical Turret Lathe Built by the Bullard Machine Tool Company, Bridgeport, Conn.

cross-rail, and 42 in. under turret face, the maximum distance from the table to the turret face being 43 in. It marks another step in the development of the company's very interesting line of vertical lathes. The effort of the designer has been to secure a machine tool having extreme power, continued accuracy, great rigidity, convenience of

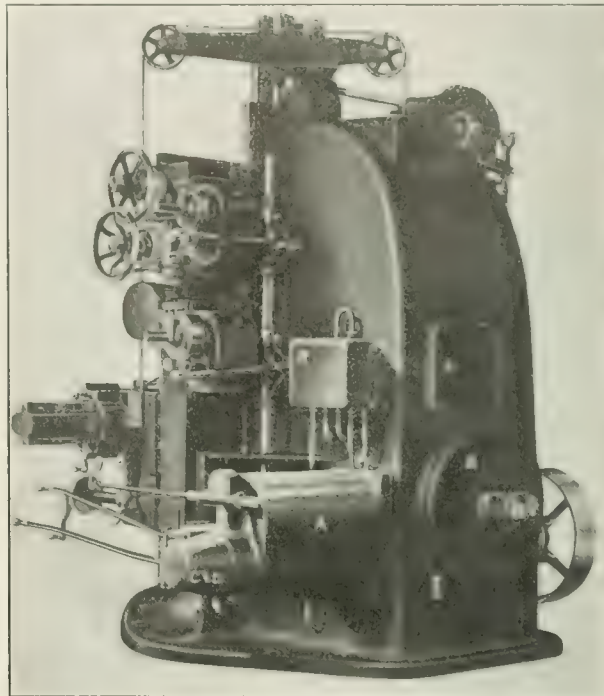


Fig. 2.—Rear View of the Lathe.

smoothness of the cut and the absence of chatter and tooth marks. The table spindle is of the standard Bullard type, having angular thrust bearings of large diameter, the side strains being absorbed by vertical cylindrical bearings, as shown in Fig. 5. The table spindle journals are of cast-iron, scraped to create a bearing on the spindles. No adjustment is required, and therefore none is provided. The entire spindle is immersed in oil.

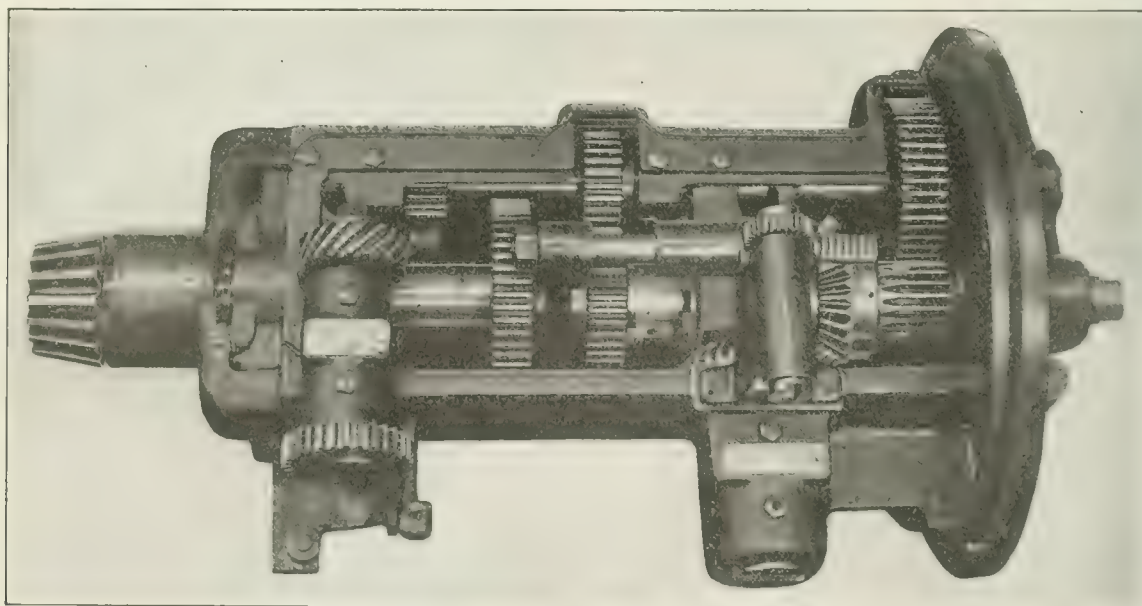


Fig. 3.—One of the Speed Changing Clutches

operation, absolute safety of the operator and a minimum cost of maintenance. There are 12 changes of table speeds and 8 positive and independent feed changes for each head.

The Lubricating System

The designer has created a very interesting system for lubricating the table spindle, as will be noticed in Figs. 5 and 6, and in fact throughout the machine.

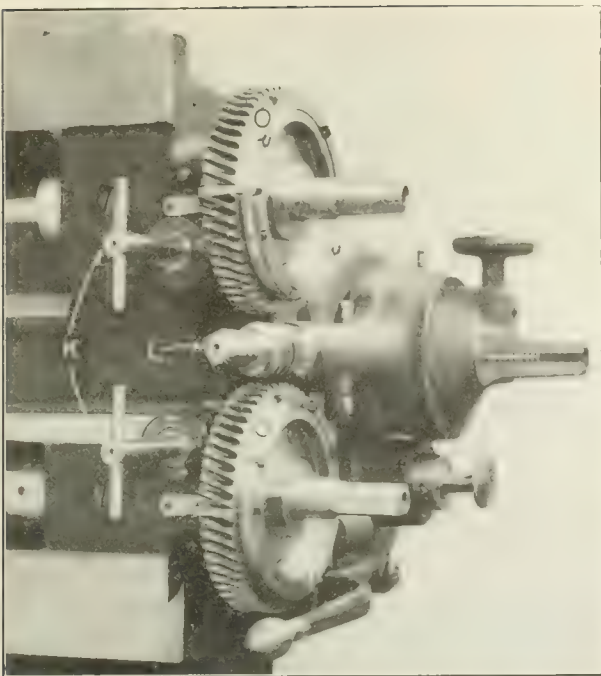


Fig. 4.—The Micrometer Stops and Observation Dials Used in Duplicate Work

The company started with these axioms: Power efficiency is increased through the reduction of frictional loss in gears and bearings; cost of maintenance is reduced by the elimination of wear; productive time is increased by thus utilizing the time ordinarily required for the daily filling of numerous oil holes and cups; the manufacturer is insured against loss of productive time, interest on investment, derangement of manufacturing schedule and the cost of repairing a ruined bearing due to the operator's oversight of an oil cup.

To accomplish these results the base of the machine forms an oil reservoir to which all of the oil is returned after passing through the various bearings and gear boxes. Submerged therein and direct-connected to the main driving shaft is a gear pump which delivers the oil to a distributing reservoir, R, Fig. 2, located on the outside of the column at such a height as to insure sufficient head for the free flow of oil through the ducts leading therefrom to the bearings and individual reservoirs in which the gears revolve, the excess oil pumped to the distributor being returned to the pump by an overflow pipe. Feed-change brackets, power traverse-brackets, and rail-raising bracket, having a variable relation to the column, form self-contained reservoirs in which the level of oil must be maintained. Oil level indicators at all points are provided in order that the proper amount of lubricant may be maintained. All other bearings are oiled through self-closing oilers, which also indicate the parts requiring this attention.

In the oil sights in the ducts the free flow of oil is clearly indicated in two ways, by the size of the oil column passing the opening if the pipe is clear and by the overflowing at the opening if the pipe becomes stopped up, a construction shown in Fig. 6.

In Fig. 5 the method of lubricating the table spindle is shown in detail, together with the lubrication of the table driving gear and pinion. A spiral groove seen at *a* serves to lift the oil from the base as the spindle revolves. When the table is at rest the oil takes the direction as designated by the arrows. At *c* are the grooves in the spindle seat. Oil chains are used in all the bearings and also right and left spiral grooves in the shaft, as indicated at *d*. The flow of oil to the bearings is 0.02 qt. per square inch per minute, or 1 qt. to 50 sq. in. of projected bearing area.

The Machine in Detail

With the single driving pulley running at 360 r.p.m., the 12 table speeds range from 3.1 to 60 r.p.m. The speed changes are obtained from two systems of selective sliding gears and positive clutches, the location of which is shown at *A* and *B*, Figs. 1 and 2. Only the gears transmitting power are in mesh, no power being consumed by idle running gears. A multiple or disk clutch, *C*, Fig. 2, which is

easily adjustable, is interposed between the main driving shaft and the primary speed change mechanism. As the members run at a constant speed, the efficiency does not vary. The brake, *D*, is integral with the driven member of the disk clutch, and, running at constant speed, has a constant braking value, regardless of the table speed. The clutch and the brake are operated by one lever, *E*, Fig. 1, and the engagement of one disengages the other. Any one of the four primary speeds may be engaged by the lever *F* and the secondary speed changes by the lever *G*. The controlling levers are interlocking. The clutch must be released and the brake engaged before a speed change can be made and a complete engagement of gears for any speed is necessary before the brake can be released and the clutch re-engaged. This system does not interfere with rapid manipulation, but serves as an absolute safeguard against breakage due to the carelessness of the operator.

It will be noted that all operating levers and handles are located to give a centralized control. The number of table revolutions per minute may be ascertained from the direct reading indicator, *I*, incorporated in the interlocking device.

The two heads are entirely independent in movement, both as to direction and amount of feed. They can be operated jointly on work of small diameter without interference. The vertical head may be rapidly moved in all directions by power independent of the feed works or table drive. The vertical and the cross motions in either direction may be engaged singly or simultaneously, the operating mechanism being independent. A safety device is provided to prevent damage resulting from carelessness. The feed works of each head has eight changes ranging from $1/96$ to $1/8$ in. in all directions. The changes are obtained by turning a knurled wheel, the amount of feed per revolution being indicated on a direct reading index plate on each feed box. The feed of the main head is engaged and disengaged, or a change made from vertical to cross feed, or vice versa, by engaging the centrally located drop worm *L*, Fig. 4, with worm gears on the end of the feed rod and the feed screw. The feed of the side head is similarly controlled by the movement of the plunger lever *M*, Fig. 1, located in the side head saddle. The friction gearing is operated by the lever *K*, controlling a rod extending through a hole in the feed screw and rod.

A graduated scale is attached to the main turret slide and another to the tool slide of the side head, as shown at *N*, the purpose being to assist in the setting of tools. Index dials, *O*, graduated to 0.001 in. are mounted on the feed rods of both main and side heads. These dials are of large diameter and the graduations are therefore widely spaced and easily readable. Observation stops, bearing numbers to correspond with those on the faces of the turrets, are adjustably mounted on graduated scales and micrometer dials, *P*, form an invaluable adjunct in the duplication of sizes.

The rod and screw of the main head revolve rapidly when the power transversed mechanism is engaged. Crank handles have been supplanted by hand wheels, *Q*, mounted on sleeves secured to the rod and screw. The wheels are free to make a partial revolution on the sleeve before becoming engaged therewith, the engagement imparting a

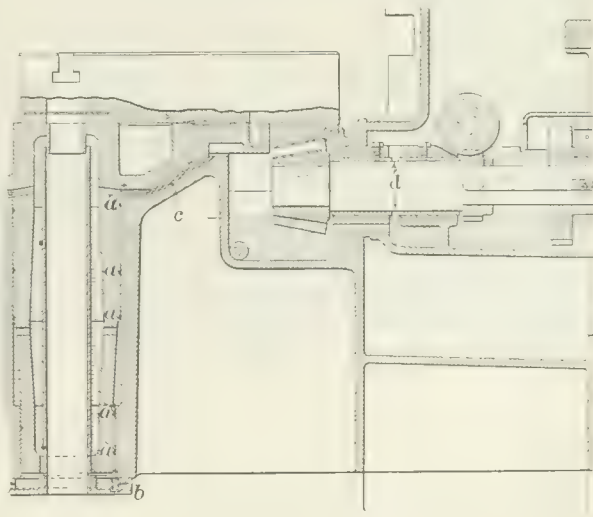


Fig. 5.—Constructional Details of Table Spindle.

hammer action similar to a tap of the hand on the end of a crank handle. The finest adjustment of tools is made possible by this arrangement.

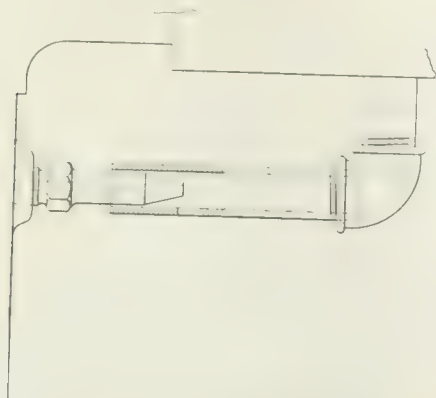


Fig. 6. — On the Signat Levers

A thread cutting attachment for the vertical head can be furnished, arranged for 11 changes, ranging from 2 to 16 threads per inch. This mechanism is arranged so that

the power rapid traverse may be used in returning the slide and the thread cutting feed may again be engaged without splitting the thread.

An accurate center stop is provided for the main head, designed to permit the latter to be carried 3 in. beyond the center. The head will face 44 in. and has a vertical movement of 27 in. Its turret is 16 in. in diameter with five faces, the holes of which are $2\frac{3}{4}$ in. in diameter. Being set on an angle, it will swing large tools clear of the slide. The turret is revolved by the lever J, one turn for each face. The side head has a vertical movement of 28 in. and a horizontal movement of 21 in. The maximum distance from the table to the under side of the cross slide is 25 in. A four-face turret tool holder on the side head obviates the necessity of a constant change of tools. Tool steel $1\frac{1}{2} \times 1\frac{1}{4}$ in. may be used.

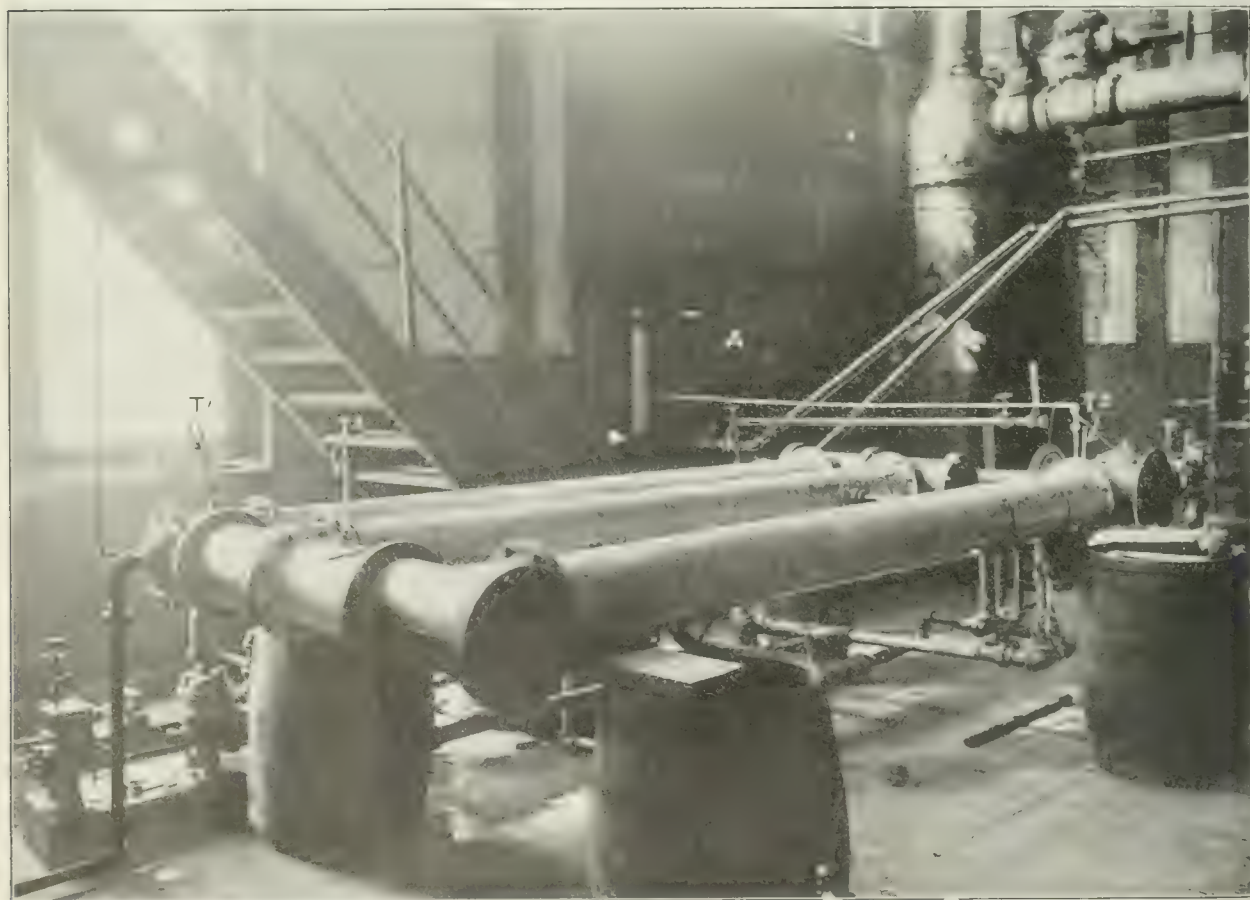
The lathe is of massive construction throughout, its net weight on the floor being 18,500 lb. Great pains have been taken in developing this type in the selection of materials from which the various parts are manufactured. The machine is easily adapted to an electric drive. A 10-hp. constant speed motor having a speed not exceeding 1200 r.p.m. may be mounted on a bracket at the rear of the machine and connected with the driving pulley by a belt. The floor space required is 85 in. wide, 93 in. deep and the overall height is $121\frac{1}{2}$ in.

New Dry Blast Process Tested

System Employing River Water and Refrigerated Water Sprays After Compression

An important development in the use of the dry blast for blast furnace operation, bringing about a large reduction in the first cost of the apparatus and also in the cost of operation has been made by John B. Miles, civil

The process, in brief, involves cooling the air after it leaves the blowing engine. This is done by sprays of water in two stages. In the first stage, river or lake water is used and in the second, refrigerated water. By treating



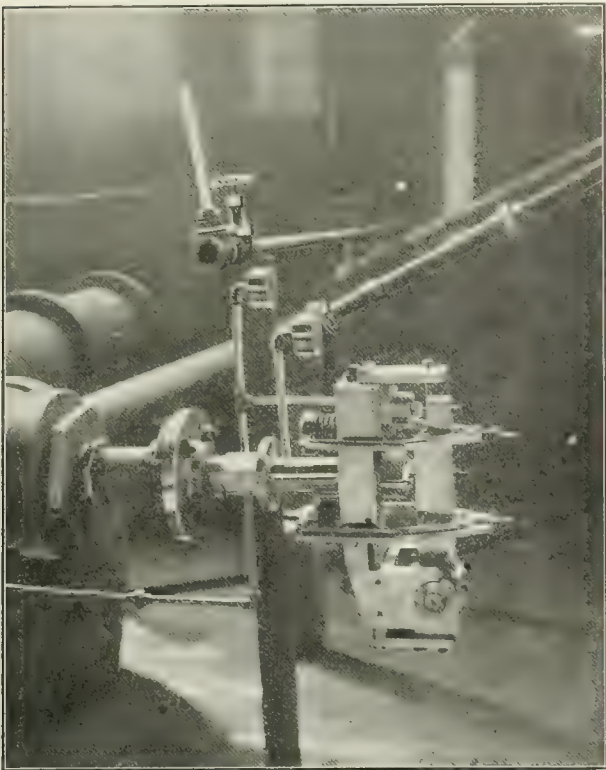
Apparatus Used for Testing Miles Process for Drying Air.

engineer, Real Estate Trust Building, Philadelphia, Pa. Extended tests made to prove the fulfillment of the object of the process bespeak success for the first installation, in connection with a blast furnace which, it is expected, will be in operation in the late summer.

the air after compression instead of before compression, it is not necessary to cool it to such a low temperature as in the latter case, in order to reduce the moisture to the same content. Inasmuch as natural water may be used in removing the heat of compression, the necessary capa-

city of the refrigerating apparatus is much less than when cooling before compression is employed. That cooling to a higher temperature is possible for the same result is due to the fact that a cubic foot of space can contain the same maximum of moisture at a certain temperature, no matter what the pressure may be.

As a result of cooling after compression, when the blast pressure is, say, 10 lb. per sq. in., the amount of moisture can, it is stated, be reduced to the equivalent of 1.38 grains per cubic foot of free air, when water is used



Device for Regulating the Amount of Drying.

in the sprays of the second stage. If brine is used in the second stage, the temperature of the brine can, of course, be carried below that of refrigerated water and the moisture can be eliminated to a greater extent.

The use of sprays of water, of course, does away with the large amount of piping needed in dry blast systems in which the air is passed over pipe coils containing the refrigerating medium, and this, of course, means a reduction in first costs, estimated by Mr. Miles at one-half to two-thirds the cost of the ordinary dry blast plant. The application of the cooling effect to the air after compression reduces, as explained, the horse-power requirements of the plant, and this is of importance particularly where the furnaces are operated in connection with a steel plant as then any surplus steam doubtless will be utilized by the engines of the steel plant.

The accompanying reproduction of photographs of the testing plant will assist in giving an idea of the process. One of these shows the testing plant as a whole and the other shows the regulating device. The hot compressed air enters the test apparatus from the small pipe at the left and passes in succession through the three large pipes. In each of the large pipes are sprays of water and in each is an eliminator for removing the extrained moisture. The cooled air leaves the cooling pipe in a small pipe at the right side of the picture, while the water used for cooling is drained from the bottom of the pipes. The small pipe carrying the out-f wing cooled supply of compressed air is hung underneath a steam line, so that, for the purposes of the test, the temperature of the air may be raised to evaporate any entrained moisture which might still remain in the air. If such water were not evaporated, the presence of it might not be indicated by the dry and wet bulb thermometers employed for the determination of the moisture remaining in the treated air. The pair of thermometers near the right side of the picture are the wet and dry bulb thermometers, placed so that at pleasure

the cooled air may be discharged across them. A gate valve marked A is used to control the pressure of the air in the cooling pipe as may be desired for the purposes of the test.

A differential gauge, mounted on the door, has shown that the loss of air pressure in passing through the apparatus, is small.

The regulating device is an invention patented by Messrs. Lyle & Murphy and is designed to control the temperature of the water by means of a mixing valve so that the temperature of the air as it leaves the apparatus shall have a definite relation to the pressure of the air. On this basis the moisture content per pound of the dried air is kept constant. Mr. Miles states that remarkable accuracy has been shown by this device, and he considers himself fortunate in having found so satisfactory an apparatus to give the temperature control which is an essential feature of his process.

The accompanying table of figures taken in a test on May 2, will be illuminating with regard to the efficacy of the process and the control. In column 1 are given the times of observations, which, it will be noticed, were taken substantially at 5 min. intervals. In column 2 is given the pressure of the air in the piping. Columns 3, 4 and 5 give the temperatures of the entering, intermediate and leaving air, taken by the thermometers shown in the photograph.

Test of Dried Blast Process Cooling Air After Compression.

1	2	3	4	5	6	7	8	9
Time.	Pressure Air.	T1	T2	T3	Grains, per cu. ft.	T4	T5	Grains, per cu. ft.
2.00								
2.15	23.75	148	62	53	1.8	51.2	72.2	1.63
2.20	23	145	62	53	1.82	51.2	72.4	1.62
2.25	23.25	138	62	52	1.78	51.6	72.6	1.70
2.30	21	130	58	51	1.8	51.2	73	1.57
2.37	21	128	57	51	1.8	51.4	73.4	1.61
2.42	19	..	..	50.5	1.82	51.5	72.8	1.70
2.45	19.25	128	53.5	49.5	1.78	50.8	73	1.53
2.50	19.75	..	..	49.5	1.77	51.5	72.6	1.71
2.57	20.25	124	54	50.75	1.82	51.2	72	1.70
2.56	20.5	..	..	51.5	1.84	51.1	71.6	1.70
3.00	20.25	122	53	50	1.78	50.2	71	1.55
3.03	20	..	..	50.5	1.8	50.6	70.6	1.7
3.8	20.5	120	54	51.5	1.85	51	70.4	1.85

It will be noted that under the influence of the controlling device temperature T5 changes automatically to meet the changes of pressure in column 2.

In column 6 are given the grains of moisture per cubic foot, as of free air, at 28 deg., corresponding to 1¼ grains per cubic foot, at which the controlling device was set, calculated from the pressures in column 2 and temperatures in column 5.

Columns 7, 8 and 9 give the wet and dry bulb and the moisture content of the air after it has left the apparatus. In general, these observed moisture contents are less than the calculated, of column 6, as they should be since the calculations are made for 28 degree air, while the air where the observed contents were gotten is above 70 deg. The close control is indicated by the readings of column 6 which give more accurately the moisture content than do those of column 9, since the latter are dependent upon the readings of the dry and wet bulb thermometers which are rarely continuously consistent.

It should be added that Mr. Miles has been authorized by James Gayley to install in the United States the process under the Gaylet patents and his own.

City Housing Problems to Be Considered.—In response to a wide demand, the National Housing Association will hold the first national conference on housing in America in New York, June 3, 5 and 6. The discussions will be of much interest, as is evidenced by the following subjects, which are a few of those to be considered: "Problems of the Small House," "Sanitary Inspection," "Housing Reform Through Legislation," "Best Types of Small Houses," "City Planning." So many speakers, coming from so many states, near and remote, will take part in leading the discussions that the conference will be practically a national one. The sessions will be held in the assembly hall of the United Charities Building, 105 East Twenty-second street (corner of Fourth avenue), New York, and all persons interested in housing reform are invited to attend.

The Nelson Valve Company's New Works

An Ultra-Modern Plant for the Manufacture of Large and Small Valves of Iron, Steel and Bronze

The new works of the Nelson Valve Company, Philadelphia, Pa., afford a striking example of the advances which are being made each year in machine shop and foundry design. The illustrations reveal many interesting details of modern equipment and construction.

The plant is located at Nelson Station, in Wyndmoor,

With the exception of the gray iron foundry and a few minor buildings everything is new. The 15 acres of ground will provide opportunity for other expansion in the future.

The Nelson Valve Company manufactures steel, bronze and iron valves of various types, including gate, globe,

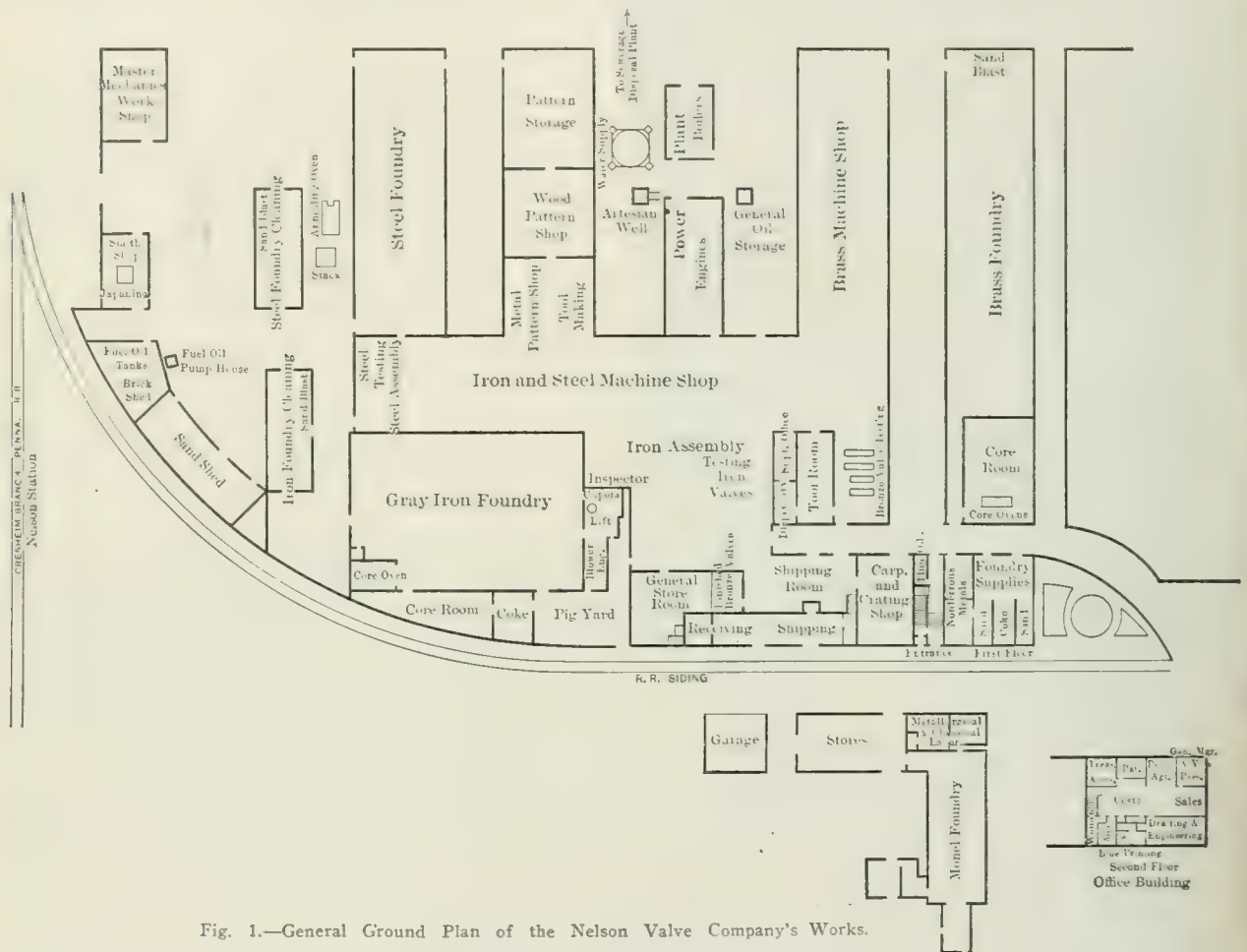


Fig. 1.—General Ground Plan of the Nelson Valve Company's Works.

near Chestnut Hill, on the Cresheim branch of the Pennsylvania Railroad. The original works were established on the same site in 1896. Increased business compelled additions from time to time, which repeatedly were found inadequate, and it was finally decided to erect an extensive fireproof plant providing not only a multiplied capacity but also an open hearth steel foundry for the superheated steam valve department. Construction began about two years ago and now represents a total area of 110,556 sq. ft.

angle and check valves, for water, air and steam. They are designed for all pressures and temperatures, in sizes from $\frac{1}{8}$ in. in bronze to 36 in. diameter in iron or steel. The new buildings are of concrete and steel construction, with roofs of concrete slabs covered with the American Cement & Tile Company's Bonanza tile. The fireproofing



Fig. 2.—The Steel Foundry. Showing Details of Construction.

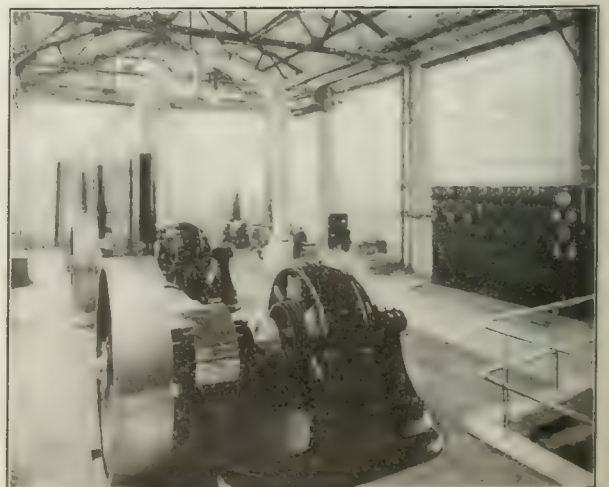
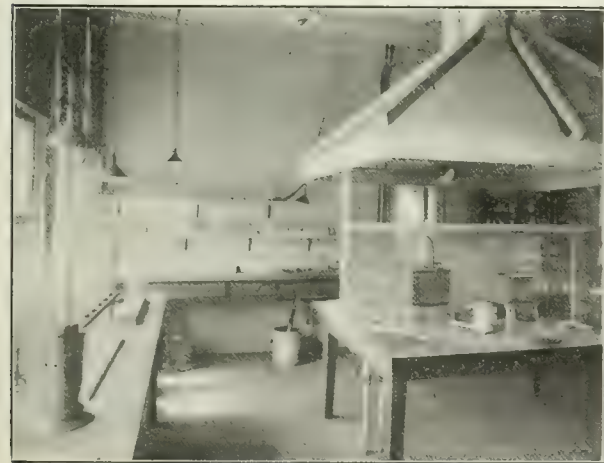


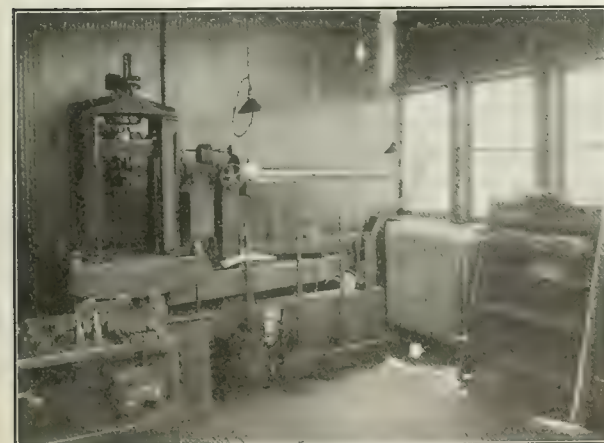


Fig. 4.—The Non-Ferrous Metal Storage.

is complete. Much attention has been given to the natural lighting and ventilation of the buildings, the windows totaling 40,000 sq. ft. An average of 49 per cent of the side wall space is of glass, with all exposed portions of wired glass. The windows, including the roof lanterns, are set in Detroit-Fenestra patented steel sash, furnished by the Detroit Steel Products Company, Detroit, Mich. The open sections which will provide ventilation are operated by Hitchins & Co.'s and Lord & Burnham's opening devices. In places where additional overhead day light is required, as at the junction of two roofs, where side wall



The Chemical Laboratory.



The Testing Machine.

windows are not available, wired glass skylights, 13 x 24 in., are let into the concrete slabs.

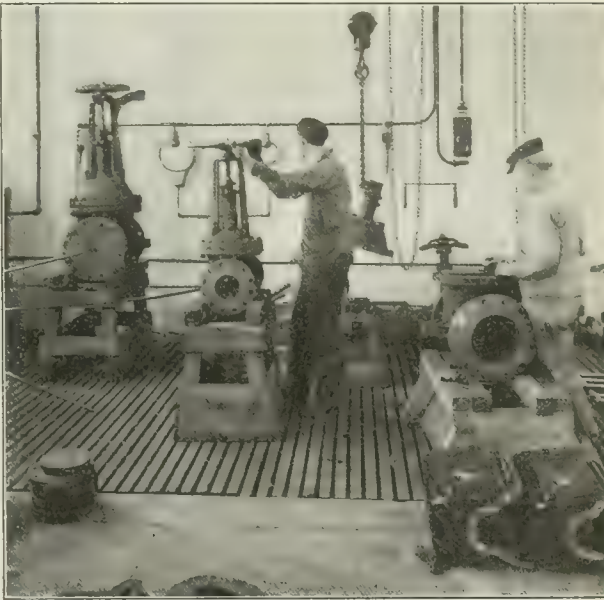
The arrangement of the plant is shown in the accompanying ground plan, Fig. 1. The general construction of the buildings consists of steel frame and reinforced concrete. The principal structures are 20 ft. high at the top of the side walls and 40 ft. at the peak of the roof. The roofs are carried by steel trusses. The tiles, which are reinforced with woven wire, are 24 in. wide by 48 in. long and 1 in. thick, a ridge lapping over one side. They are treated especially to make them impervious to moisture.

This type of construction is more clearly shown in Fig. 2, which is a view of the exterior of the new steel foundry. The skylights let into the roof of the adjoining shop will be noted where the foundry joins that building. The relative proportion of the steel window area to the side wall space and the general ventilating scheme in connection with the windows are graphically revealed. The same general plan is followed in practically all the other buildings. The plant was designed by Carlisle Mason, and George K. Hooper was the architect.

The Power Plant

The power house, located practically in the centre of the plant, is of concrete, 32 by 72 ft. This building, Fig. 3, houses three General Electric 250 volt direct current generators, directly connected with centre crank Ideal engines. An air compressor installation supplies compressed air to all parts of the plant. Hydraulic pressure pumps, feed water heaters and other appliances are located in a pit in this building. The extensive electric switchboard is shown at the right of the generators. The steam plant is at the rear of the power plant and is now being augmented with 500 h. p. additional boiler capacity. The machinery throughout the plant is belt driven from line shafts, each with its own motor, which transmits power through a Morse silent chain.

Convenience as well as economy in handling raw mate-



The Valve Testing Room.



The Metallurgical Laboratory.



Fig. 6. The Bronze Foundry Core Room.

rials for use in the various departments of the plant has been given close attention. Storage bins are located at one end of the plant, which are filled direct from a railroad siding extending along its length. The bins are conveniently located for easy access to the different departments. In the majority of instances the bins are under cover. The coke bin has a capacity of 60 tons, while the sand bins store 100 tons each.

In Fig. 4 are shown the storage facilities for non-ferrous metals. Here the charges for the bronze melting furnaces are mixed and conveyed by trucks to the melting department. The storage capacity is 500,000 lb. of metal, large stocks of copper, tin, spelter and lead being maintained. Steel bins for the storage of scrap from the company's own foundry are also located in this department.

All materials used in the manufacture of valves by the company are carefully analyzed and tested. A chemical and microscopical laboratory, equipped with apparatus of the latest type, has been installed, while a physical laboratory, containing a Riehle 100,000-lb. testing machine, determines the physical character of the metals. The laboratory has become an absolute necessity owing to the increased practice of chemical and physical specifications in connection with the various types of valves. Fig. 5 gives several views in this department.

The pattern-making department is an important one.

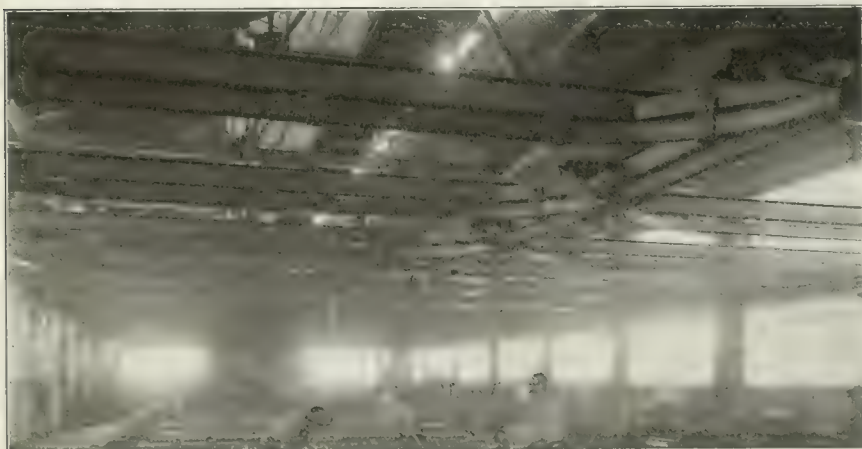


Fig. 8.—The Overhead Tramway System.

The wood pattern shop measures 48x48 ft., is lighted from the exterior by full side wall steel sash, wired glass

windows and by the roof lanterns. It is divided by fireproof partitions from the metal pattern and tool-making departments and that for pattern storage. All master patterns are made of mahogany. Adjoining the wood pattern shop are the metal pattern and tool-making departments. In the latter are located the precision tools. In addition to the machine work on metal patterns various tools for the company's use in the machine shops are made in this department, particular accuracy being required in order to have the various valve parts not only perfectly accurate, but also interchangeable. At the opposite end of the pattern shop is the pattern storage which occupies a portion of the building, covering 48x64 ft. Here the master patterns and others are stored on special adjustable steel racks, manufactured by Merritt & Co., Camden, N. J. Each rack is 42 ft. long, 6 ft. wide and 17 ft. 6 in. high. The shelves are 3 ft. by 4 ft. 8 in. and are easily adjusted to any height by means of a supporting device let into sockets which are spaced a few inches apart in the upright tubular frames. The high shelves are reached from a rolling ladder. The wide expanse of windows renders this department extremely light, a feature unusual in general pattern storage practice.

The Bronze Foundry

The general layout of the bronze foundry, which covers a total floor space of 9813 sq. ft., embraces the core mak-



Fig. 7. Interior of the Bronze Foundry.

ing, melting, molding and cleaning departments. The core making department, Fig. 6, is located at one end, occupying a space of 36x56 ft. Here the cores for the bronze foundry are made under a piece work system, girls

being extensively used for this task. All the tables and stools are of steel and may be moved to any position. Steel racks for drying and storing cores are provided, with a capacity of from 1500 to 1600 trays. A battery of four Millet core ovens is used for baking the cores, while a supplementary oven at the rear of these anneals the crucibles for the bronze melting furnaces. The crucibles are given a preliminary seasoning by storage over the ovens, where the waste heat serves to remove some of the contained moisture. A Hanna core-making machine is employed for making certain classes of cores, while a Gregg wire cutting machine cuts the wire required for the cores.

Sand for the manufacture of the cores is carried by means of trucks from nearby bins.

The melting department, Fig. 7, includes a battery of six M. R. V. tilting furnaces, installed by J. B. Wise, Watertown, N. Y. Coke is used as fuel and artificial draft is supplied by a Sturtevant blower. The fumes are carried through hoods to a natural draft ventilator in the roof. The metal is fed to the crucibles through hoppers on the furnaces. The total melting capacity of the battery is 40,000 lb. per day, on double turn. The metal is carried from the furnaces in ladles which have been preheated in an oil fuel heating furnace, and is then carried by means of an extensive system of overhead tramways, Fig. 8, installed by the Coburn Trolley Track Mfg. Company, Holyoke, Mass., to various parts of the molding floor. In this foundry Berkshire automatic and Mumford and Tabor split pattern power squeezer molding machines are used in addition to the usual bench work. The entire floor of the foundry is of concrete, specially laid for heavy service. On the molding floors steel angle irons, $2\frac{1}{4}$ by $2\frac{1}{4}$ in., are laid across the



Fig. 9.—The Bronze Machine Shop.

floors, on which one end of the molds is set to give them the proper angle for pouring.



Fig. 11.—Interior of the Steel Foundry.

At the rear of the foundry is a sand blast cleaning and assorting room, where the castings, after being inspected,

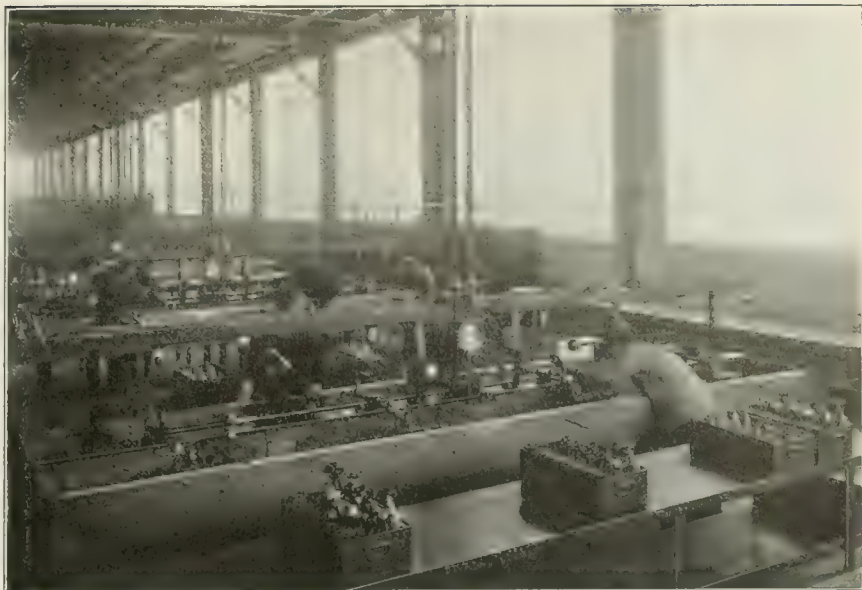


Fig. 10.—The Bronze Valve Testing Department.

are placed, according to size and character, in steel tote boxes which are carried by trucks to the bronze machine department, Fig. 9. Here the different parts, such as bonnets, bodies, etc., are delivered to the various machine tools. The equipment is made up largely of small turret and automatic machines, which are fitted with air controlled chucks that grip and release the work without the stopping of the machines, except for certain operations. All the belts on the machines in this department are equipped with a quick change pneumatic belt shifter, which greatly facilitates the work of the operator. Between each pair of machines, which are arranged in five rows extending the length of the shop, is a movable steel screen, which intercepts flying chips.

Methods of Handling the Work

After the parts are finished they are carried in tote boxes on trucks to a steel storage rack, where they are kept as stock, each box being labeled to designate the contents, which are also systematically grouped in the racks. The racks have a storage capacity of 1250 boxes. Adjacent to the racks is the assembling department, where the work of assembling the bronze valves is done. Pneumatic vises are used for this work. Here also are counted the valves and parts, an automatic weighing and counting machine being used. In this department is a magnetic separating machine, requiring little attention, which separates the bronze chips from other material, the clean metal being used as scrap in the melting furnaces.

After inspection the valves go to the bronze valve testing department, Fig. 10, where every valve is tested, each being subjected to a hydrostatic pressure of more than twice the rated pressure resistance. Locked recording gauges show the pressure on the various testing tanks, which insures a constant pressure and reaches a maximum of 1000 lb. to the square inch for certain classes of valves. Both sides of the closed valve, as well as the valve bonnet, are tested and any weak point or defect is brought out. The testing tanks, as well as the racks for storing tested valves, are of sheet steel. After testing, the bronze valves are stamped with the inspector's initial, wrapped in anti-tarnish tissue paper, then in heavy wrappers and are

stamped with the inspector's initial, wrapped in anti-tarnish tissue paper, then in heavy wrappers and are

labeled and stored in steel bins, which, for this class of work, provide storage of 1820 lb. of bronze valves to each bin. The floor space occupied by this group of departments aggregates 13,000 sq. ft.

The Gray Iron Foundry

The one remaining main structure of the old plant, the gray iron foundry, is of partly steel covered frame, partly brick, 96 x 132 ft. The raw material supply is from storage bins located along the adjacent railroad track. Pig iron and scrap are supplied to the cupola and sand to the molding floors by industrial railway. A steel jib crane



Fig. 12.—A Special Annealing Oven.

serves the main foundry floor, on which the heavy floor work is done. In a bay, on the side, molding machines are located, including Mumford and Tabor split $\frac{1}{4}$ pattern power ramming machines, together with Herman and Pridmore machines, all served by three one-ton overhead electric hoist, hand power traveling cranes. A Whiting cupola furnishes the metal for this foundry. The core making department is located adjacent to the foundry building.

The Steel Foundry

The steel foundry, Figs. 1, 2 and 11, occupies a floor space of 6912 sq. ft., the building being 48 x 144 ft. in general dimensions. A four-ton acid open hearth furnace, using oil fuel, is located at one end of the building and adjacent to it are the ovens for drying the molds. Industrial railways, operating over floor scales, serve for the carrying and weighing of raw materials going from the storage sheds to the open hearth furnace. Steel castings for valves up to 36 in. in diameter are made here. A five-ton Case electric crane serves the molding floor and is used as well for pouring the steel. In addition to the opening sash in the side windows, of which there are two rows, ventilation is obtained by opening the windows in the lantern of the roof.

After being knocked out the castings are transferred to the chipping and cleaning room, a building 24 by 66 ft., adjacent to the factory. Here are cold saw cutting-off machines, shapers, power hack saws and pneumatic chipping hammers, where the heads, gates, fins and sand are removed from the castings. A small hand power jib crane serves the various tools and facilitates the handling of the castings. An annealing oven with a removable top, Fig. 12, using oil fuel, which is located in the open air between the steel foundry and the cleaning room, is used for the further heat treatment of the steel valve parts. It is served by an overhead electric lift.

The General Machine Shop

While the absence of woodwork is noticeable in all the departments of the plant, it is particularly so in the general iron and steel machine shop, which covers a total space of 12,220 sq. ft. The assortment of tools includes almost the entire range of metal working machinery in varied sizes. The grouping facilitates the work to be performed.

All the machines are belt-driven from an overhead line shaft, which is carried on adjustable iron plates, fastened to channel irons, that are bolted to the roof girders. There are three main lines of shafting each,

driven by a General Electric motor with Morse silent chain drive. Each line of shafting is connected at the centre by a friction clutch, so that any one of the individual sections of the shop may be operated or stopped independent of the others. An overhead iron walkway provides easy access to any portion of the overhead power equipment.

For handling material in this shop two 2-ton overhead electric traveling cranes of 14 ft. span have access to the machines which operate on the heavier classes of work. Hand power jib cranes handle the lighter castings. As some portions of the machine shop are not adequately lighted by the usual side windows, additional illumination is obtained from skylights and by inserting wired glass into the concrete roof slabs, as previously described. In this department the workmen's tool benches are of steel, with locked steel drawers, each man having his individual key, differing from all the others, but a master key remains in the possession of the foreman. An industrial railway system brings castings from both the gray iron and steel foundries. Ball-bearing trucks are also used to carry the smaller class of work from one point to another. Tool room facilities are provided in a space adjacent to both the bronze and general machine shops, the department following the usual plan of arrangement and equipment.

Adjoining the machine shop is the department for assembling and testing the larger valves, Fig. 13. As no side light was available, the extreme brightness from the overhead skylights and wire glass inserts in the roof is worthy of note. After assembling and inspection, the larger valves are given the same rigid tests as are the smaller, the hydrostatic pressure being run up to 1000 lb. when the working pressure is but 400 lb. Special arrangements for testing steel valves are provided. They must in some cases withstand a working pressure as well as a superheated steam temperature and are tested considerably above their rating to insure a full factor of safety. After having been thoroughly inspected and tested the valves are taken to the store room and thence to the shipping room. The shipping platform, which is reached by an elevator, is at the level of the floors of steam railroad cars.

An interesting task in connection with the japing of the hand wheels of the larger valves is performed in a separate building. The wheels, after being dipped and air dried, are placed in special ovens for baking the japan, one of which is shown in Fig. 14. These ovens have three doors, swung on a central pivot, each being a single steel sheet, 54 by 96 in., on each side of which are racks on which the hand wheels are hung. The simple revolution of the steel door bring the green wheels into the fire chamber and the baked wheels to the outside, where the



Fig. 13.—Assembling and Testing Large Valves.

latter are cooled in the open air and readily removed. Oil fuel is used in these ovens.

While the system of day lighting of all departments of the plant by side wall windows is elaborate, that for night lighting has not been overlooked. In the main portions of the mechanical plant, flaming arc lamps, particularly those of the Adams Bagnall and General Electric types, are used. In certain portions where this style of

lighting is not adaptable incandescent electric lamps in sufficient number and power provide illumination.

In addition to insuring mechanical facilities of the most modern character in its various departments, the Nelson Valve Company has not overlooked the comforts of its employees. Approved toilet arrangements have been provided in each department, while sanitary drinking fountains provide water. A sewage disposal plant, with a capacity of 15,000 gal. in 24 hours, has been built to take care of the sewage from the plant.

An emergency hospital and dispensary, Fig. 15, in charge of a competent physician, who is in daily attendance, attends to slight wounds and injuries and gives medical treatment to employees. All treatment is free.

The various buildings of the plant are heated by hot air drawn from the outside atmosphere, passed over steam coils and forced through a main trunk line of galvanized iron pipe 42 in. in diameter, located in the centre of each building and bay at the height of the side walls. The pipe is reduced at distant points to 12 in. in diameter. A constant circulation of pure warm air is maintained in winter, while in hot weather the system is used for the circulation of air at ordinary temperature, maintaining a normal supply of fresh air.

As a means of fire protection, notwithstanding the fact that the buildings are for the most part thoroughly fire-proof, a water tank 80 ft. high, with a capacity of 25,000 gal. and with distributing mains through the different parts of the works, is an additional safeguard. The local fire department of Wyndmoor is located about 300 ft. from the plant.

The employees on the rolls of the company now number from 450 to 500.

The office is located on the second floor of a building at the northern corner of the plant, easy of access to the railroad station and on the main street. Here are the headquarters of the officers of the company, the general offices, purchasing, patent and drawing and engineering departments, all in commodious quarters. In the latter department a mammoth blackboard is used on which full size drawings of the larger valves can be laid out in exact detail. An electric blue print room is an adjunct of this department. In the general manager's office is located a

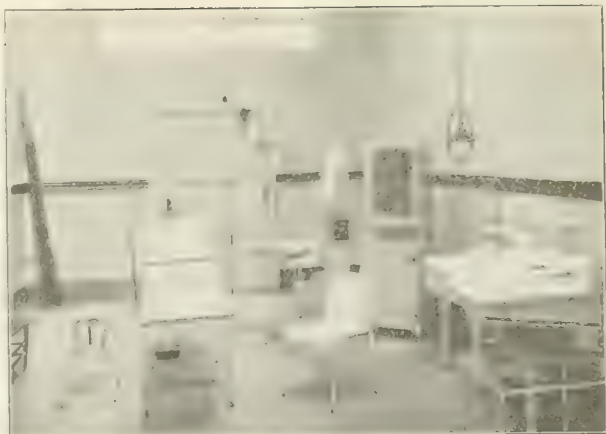


Fig. 15.—The Emergency Hospital.

Hahl pneumatic master clock controlling all the clocks in the plant. Loose leaf and card record systems are used extensively in the conduct of the company's business, while a modified system of scientific shop management has been adopted to serve the needs of certain departmental work. The employees' entrance and paymaster's office are directly below the general office. Every workman records his ingoing and outgoing time by recording clocks and proceeds to the main court at the rear of the office building, from which access to all departments of the plant is to be had.

The American Institute of Mining Engineers to Change Its Name

The council and the board of directors of the American Institute of Mining Engineers have decided to recommend a change of its name to "American Institute of Mining and Metallurgy." This proposal will be submitted to the entire membership for ballot. The idea in making the change is that the proposed name more broadly represents what the organization stands for, the present name being to a large extent a misnomer.

The council and board of directors have also decided to commit the Institute to the policy of establishing local sections, in order to afford means for frequent meetings in many parts of the United States. Applications for the organization of local sections have already been received from members in San Francisco and in New York, and the formation of sections at those places has been authorized.

"Manganese Steel and Its Application in the Ceramic Industries" was the subject of a paper read before the twenty-fifth annual convention of the National Brick Manufacturers' Association at Louisville, Ky., by G. W. Kneisley of the Edgar Allen American Manganese Steel Company, McCormick Bldg., Chicago, Ill. The paper has been reprinted in handy form and can probably be had on application to the company's general offices or the Eastern sales office, New Castle, Del. It reviews the development of the use of ferro-manganese and discusses the experience with manganese gears, crushing rolls and the like in clay-working machinery.

The United States Naval Experimental Station at Annapolis has requested the George M. Newhall Engineering Company, 136 South Fourth street, Philadelphia, Pa., to furnish its high and low pressure Vance steam traps for a series of tests. The Boston & Maine Railroad is also making a test with a high pressure Vance steam trap to work under superheat. The outcome of this test is being watched with interest by the engineering profession. The company has further been requested to furnish one of its Vance steam traps for demonstration before the classes at Annapolis Academy.

Frank Samuel, Philadelphia, Pa., has purchased the rolling mill equipment of the late Bristol Iron & Steel Company, Bristol, Pa., and will offer it for sale, dismantling the plant.

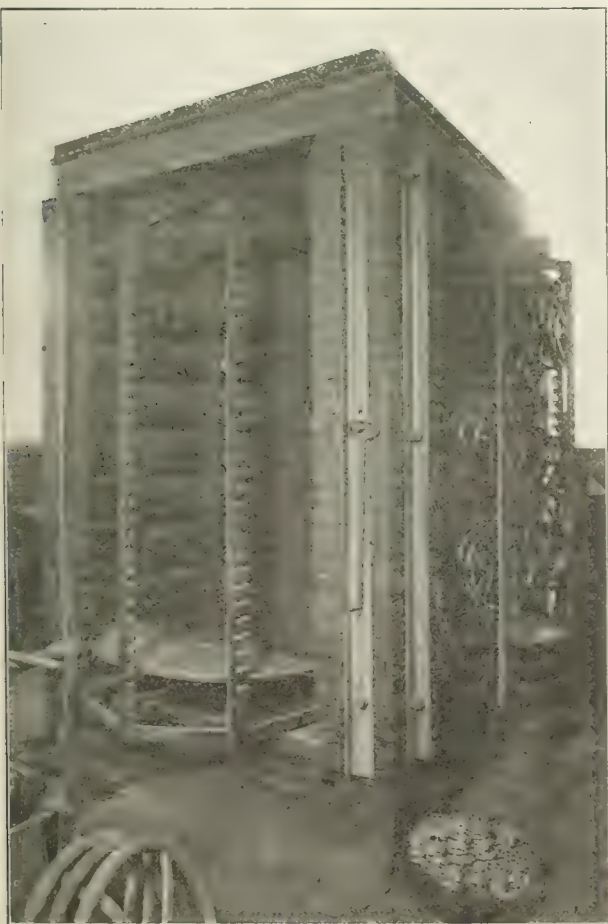
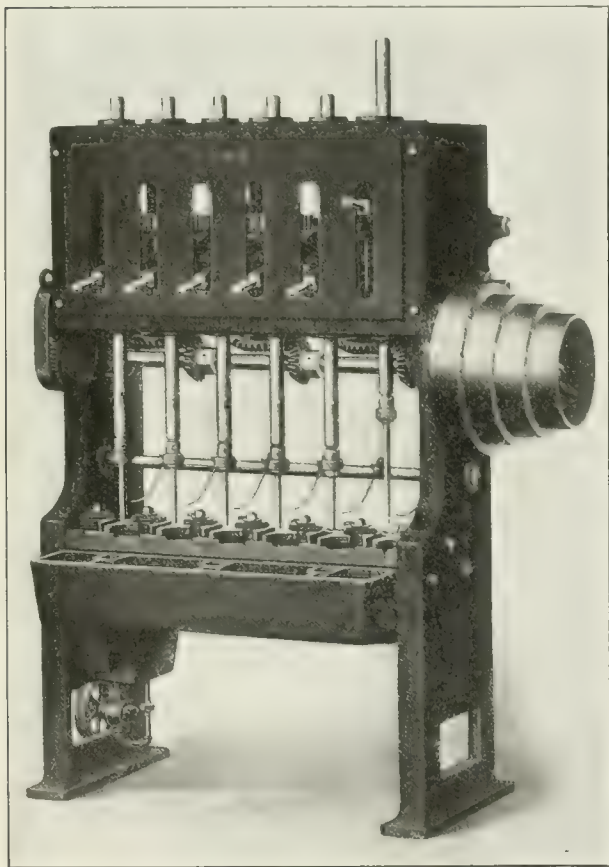


Fig. 14.—A Special Oven for Baking Japan.

Semi-Automatic Nut Tapper

A new design of semi-automatic nut tapping machine has been recently placed on the market by the National Machinery Company, Tiffin, Ohio. Some of the special features of the new machine are the ability to tap rough hot pressed nuts as rapidly as cold punched ones, an increased output due to the automatic raising and lowering of the tap spindles and long life of the taps.

It is claimed that in this new machine the objections frequently raised against an entirely automatic tapper on account of the hot pressed nuts sticking because of small burrs has been entirely overcome. The taps are raised and lowered automatically by six three-step cams carried on a horizontal shaft in the rear of the spindle housing, and the number of revolutions of the tap spindles for raising and lowering can be varied to correspond with the number of threads on the tap being used. In this way the non-productive tapping, time that is the interval in which the tap is running idle in the nut after the operation has been com-



A New Semi-Automatic Nut Tapper Built by the National Machinery Company, Tiffin, Ohio.

pleted, is eliminated and in this way it is possible to secure outputs ranging from 60 to 80 per cent. more than are possible on a tapper of the foot-lever type. This arrangement causes the machine to set the pace for feeding and the operator, it is stated, is not as easily fatigued as when operating a foot-lever tapper where a treadle has to be pressed for each operation. In this way he can keep pace easily with the machine throughout the entire day. The cam for raising and lowering the spindles engages with hardened steel rolls carried in the spindle levers. The horizontal cam shaft on which these cams are mounted shifts laterally to engage the various cam faces, and this arrangement enables the time during which the cam is kept idle in the raised position to be altered to meet the needs of the operator for feeding the machine and emptying the taps. The speed variation of the tap spindles to correspond to the number of threads on the tap employed is secured through a quick change speed box on the cam shaft which is operated by a single lever.

As compared with the foot-lever tapper longer tap life is secured. This is made possible by the cam movement which causes the tap to be lowered gradually instead of dropping into the hole with the weight of the spindle back

of it, which is the common arrangement of the foot-operated machine and causes the tap to bind and frequently break or have the threads stripped off. The equipment of the machine includes an automatic socket whereby the tap can be removed or inserted while the machine is running and the tap automatically ejected when the shank becomes filled with tapped nuts.

Two sizes of tapper are built, one with six spindles for tapping 1-in. nuts and the other which can tap 1½-in. nuts with ten spindles.

Customs Decisions

Lawn Mowers

The importation into this country of lawn mowers from England is likely to be given added impetus under the present tariff by a decision just handed down by the Board of United States General Appraisers. The decision holds that lawn mowers are more aptly described as "mowers," under paragraph 476 of the tariff act of 1909, than as "manufactured articles of metal not specially provided for" under paragraph 199. It is held by the board that the term "mowers" is used in the act to designate the implement used by gardeners as well as the large machine used by grain harvesters.

The result of this view of the law is to grant free entry to lawn mowers imported from England. The government's contention was for duty at the rate of 45 per cent. C. H. Langley and Patterson, Wyld & Co., the importers, alleged free entry for the machines by virtue of the proviso to paragraph 476, which exempts from duty mowers when imported from any country imposing no tax or duty on like articles imported from the United States. Counsel for the government insisted at the hearings that the provisions of paragraph 476 apply only to articles in the nature of agricultural implements, and that as the articles before the board are used by gardeners on lawns and not in husbandry, they are to be excluded from paragraph 476, not being of the character of the machines as therein provided. It was not disputed that the mowers in controversy are of English origin, and that England, the country from which they are imported, imposes no tax or duty on such mowers from this country.

General Appraiser Fischer, who writes the decision for the board, says that the only question that must be decided is whether the term "mowers" is used to designate the smallest kind of a mower used by gardeners as well as the large machine used by grain harvesters for cutting grain or clover. He reaches the conclusion that both varieties are known as "mowers" and are such in common parlance. After quoting the dictionaries, the decision says: "It would appear, therefore, if only such mowers as are agricultural implements are included within the meaning of the term mowers as used in paragraph 476, the lawn mower would still be within that class according to the lexicographical meaning of the terms as quoted. But we believe that the question goes beyond this, and that the provision reading 'mowers' without words of limitation includes all kinds of mowers, whether for use on the farm, garden or lawn. The protests are accordingly sustained."

Engravers' Printing Presses

The board, in sustaining a protest filed by Lunham & Moore, has decided that presses used in printing from engraved plates or dies are properly entitled to classification as "printing presses" with duty at the rate of 30 per cent. The government alleged that the presses in question are not the kind contemplated in the provision for "printing presses." Classification was therefore imposed as "manufactures of metal not specially provided for," with duty at 45 per cent. on the value. In reversing the government, General Appraiser Fischer says that the proof offered shows that the importers' claim in these cases is well founded. The presses perform the ordinary work of printing with ink from dies and plates.

Henry Braun & Co., Pittsburgh, dealers in iron and steel scrap, have purchased the plant of the Keystone Axle Company, Beaver Falls, Pa., built some years ago for rolling car axles, but which has been idle for some time, and will remove the equipment to Pittsburgh.

The American High Duty Lathe

A New Type with Interesting Features—The Various Styles of Heads Include an Electric Driven All Geared Design

The 30-in. high duty engine lathes, shown in the illustrations, are a new design brought out by the American Tool Works Company, Cincinnati, Ohio. The machine is built with several styles of heads, namely, the 12-speed, patented geared head for belt or motor drive; the 12-speed

wide range of work. The step diameters are large, and the face wide, providing ample belt contact. A triple geared headstock, illustrated in Fig. 3, gives 12 spindle speeds and transmits great power. The cone pulley has four steps with 5 5/16-in. faces of large diameter. The

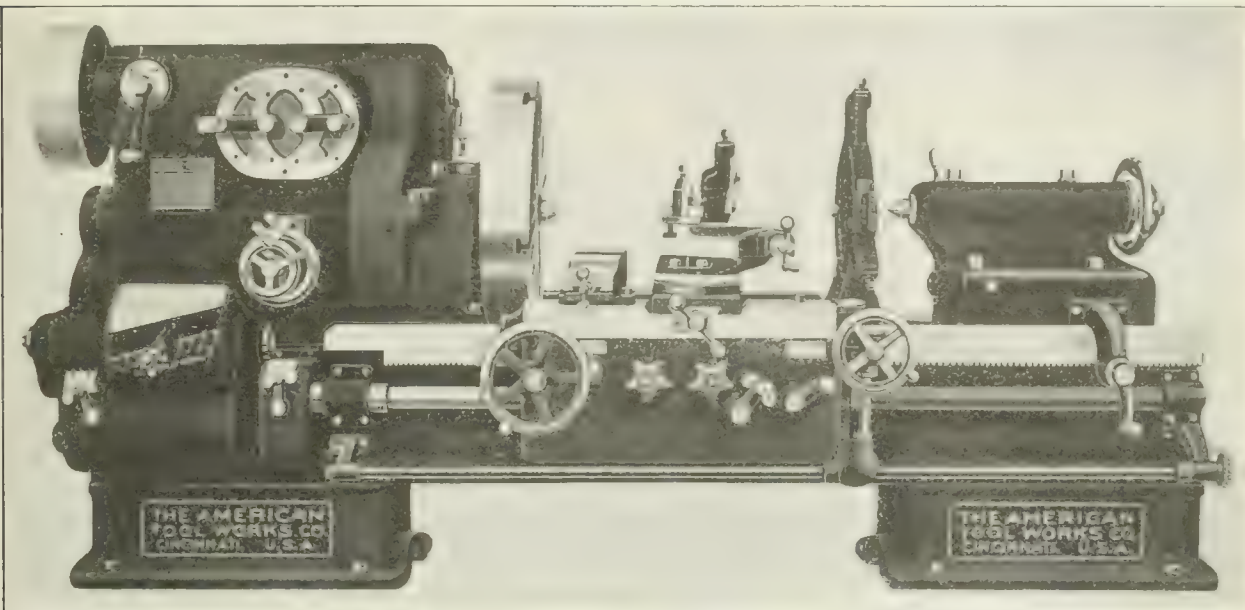


Fig. 1. The 30 In. High-Duty Lathe with Belt Drive and 12-Speed Head Built by the American Tool Works Company, Cincinnati.

triple geared head, cone pulley drive; 9-speed, double back geared head; and the 8-speed, single back geared, cone pulley drive. The quick change gear mechanism is of a new construction.

The machine is massive in design, to withstand the strains imposed by its great power.

A feature of the patented head is the method of motor application, by which a belt-driven geared head lathe can be converted into a motor drive, after its installation, by simply applying a motor on the top of the head, which is a flat surface, as shown in Fig. 2. Three gears only are required in connecting the armature and the main driving shaft. A constant speed motor, of either the direct or alternating current type, is used. The 12 fundamental spindle speeds range from 6 to 275, the number of gears required to accomplish this having been reduced to 14, with a maximum gear ratio of 56-6 to 1. The motor is under constant control through the controller hand wheel, located on the right end of the carriage, a dial indicating the speed. The speed changes are made from the lever and hand-wheel on the front of the headstock. The motor speed can be comparatively high, from 1,000 to 1,200 r. p. m., which, of course, keeps down the size and the initial cost.

A powerful but sensitive friction clutch is placed on the driving gear for starting, stopping or slightly moving the gears in the head, to facilitate speed changes without shock to the mechanism or interference with the motor speed. The size of the motor may be varied according to the nature of the work to be handled. If the lathe is to stand up to continuous hard work, from 7½ to 15 hp. is recommended.

In cutting the steel tumbler gears, Brown & Sharpe 20-deg. involute cutters are used, which produce a tooth pointed at the top and unusually wide at the base. This form is deemed excellent practice in tumbler gear mechanism, as it greatly facilitates the meshing of the gears when running at high speed and eliminates the tendency of the gears to ride.

The double, back geared headstock shown in Fig. 5 has nine spindle speeds: Three direct, three reduced and three double reduced speeds, covering the demands of a

large degree of belt contact combines with the extra high gear ratios to secure power for any work within the range of the machine. The triple gears are of the slip gear type and are readily engaged by a rack and pinion at the front of the head through the manipulation of the hand wheel, which also automatically engages the direct drive to the spindle when the face plate pinion is withdrawn. The internal gear is planed integral with the

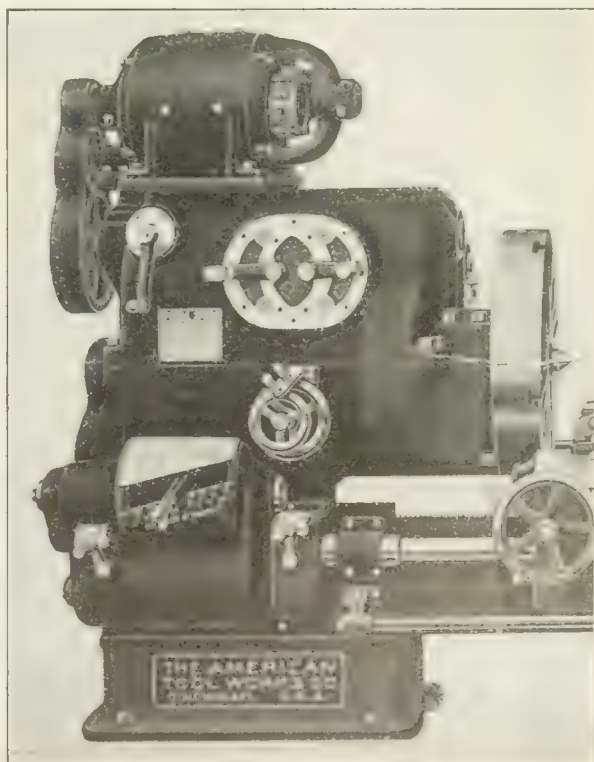


Fig. 12.—The 12-Speed Head Lathe with Motor Drive.

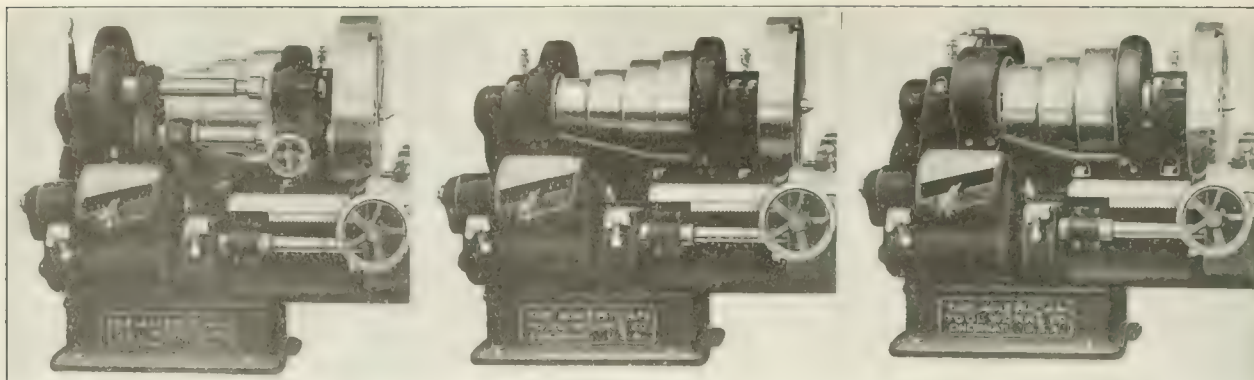


Fig. 3—The Four Step Cone Pulley Triple Geared Head.

Fig. 4—The Four Step Cone Pulley Single Back Geared Head.

Fig. 5—The Three Step Cone Pulley Double Back Geared Head.

Various Types of Heads with which These Lathes Can Be Equipped.

face plate and the pinion is cut solid with the shaft. All the driving gears are of coarse pitch with wide faces.

The single back geared headstock, Fig. 4, has eight spindle speeds, and is designed for a medium class of work. There are four direct speeds and four reduced spindle speeds. In all the heads the shafts are of high grade steel, accurately ground and the bearings are bushed with phosphor bronze. The spindle bearings have sight feed oilers.

The two sizes are essentially alike excepting in their swing, the specifications being practically identical. The 30-in. swings $32\frac{1}{2}$ in. over the wings of the carriage, and $22\frac{3}{4}$ in. over the carriage bridge. The 36-in. swings $36\frac{1}{2}$ in. over the wings of the carriage and $28\frac{3}{4}$ in. over the carriage bridge. The reduction in the number of running parts increases the efficiency of the drive, and this, coupled with the system of lubrication, delivers a high percentage of power to the tool.

Among the characteristics of the quick change gear mechanism is the use of all steel gears. A practically unlimited range of changes for feeding and screw cutting is provided, 48 standard changes being shown on the index plate, listing threads from $\frac{1}{2}$ to 28 per inch, including $11\frac{1}{2}$ pipe threads, and feeds from 5 to 280 cuts per inch. The quick change unit furnishes 32 fundamental changes, which combine with an auxiliary quadrant and a pair of compound gears on the end of the bed. This arrangement makes it possible to obtain easily special threads and feeds. Metric pitches are obtained through the English lead screw and transposing gears. The rate of feed is 10 times the number of threads at the same setting. The feed box is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on the front of the bed with two levers and a steel sliding tumbler, the latter working in conjunction with a cone of eight steel gears.

The carriage of the machine is very heavy, particularly in the bridge, which is especially deep, due to the double V bed. It has full continuous bearings of 44 in. on the V's. It is gibbed its full length on the back, and a clamp is provided on each end at the front, that at the right being used for binding to the bed. The lead screw is $2\frac{1}{4}$ in. in diameter and is chased 1 thread per inch, permitting the engagement of half-nuts at any point, without the use of the thread dial, except when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe master screw. The tail-stock is of the quadruple clamping stud type with back bolts running to the top of the barrel for convenience in clamping, and is further secured against movement by a pawl dropped into a rack cast into the center of the bed, an especially valuable feature when heavy work is being done. The pawl may be lifted out of engagement by a pull-rod at the end of the tail-stock.

The specifications are as follows:

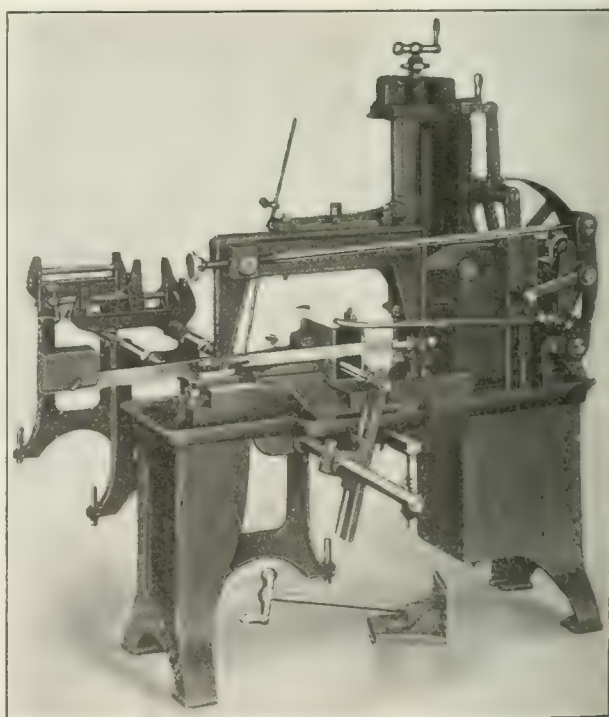
Standard length of bed, ft.	10
Distance between centers with tailstock flush geared head, in.	51
Distance between centers with tailstock flush cone pulley head, in.	45
Diameter of hole through spindle, in.	$2\frac{9}{16}$
Section of tool steel used, in.	$1\frac{1}{2} \times 2$
Morse taper of centers.	No. 5
Feed to top side of compound rest, in.	$9\frac{1}{2}$
Diameter of driving pulley geared head, in.	18
Speed of driving pulley geared head, r.p.m.	340
Width of driving belt geared head, in.	6
Width of driving belt cone pulley head, in.	$5\frac{1}{4}$
Diameter of smallest cone pulley step, in.	$10\frac{5}{16}$
Diameter of largest cone pulley step, in.	$20\frac{1}{4}$

The equipment regularly furnished includes compound

steady, follow and full swing rests; a thread dial, a countershaft for the belt-driven tools and a full set of wrenches. At a slight extra cost the following additional equipment can be supplied: An improved taper attachment turret on the carriage, turret on shears, turret tool post, headstocks of the patented geared type for belt and motor drive, triple geared and double back geared headstocks and extra gears and index plates for special fine, coarse and metric threads.

High-Speed Saw with Automatic Stock Feed

A new size of automatic high speed saw known as the Marvel No. 5 has been placed on the market by the Armstrong-Blum Mfg. Company, 339-357 North Francisco avenue, Chicago, Ill. As compared with No. 2 saw, which was illustrated in *The Iron Age* April 15, 1909, this new size is heavier, operates at a higher speed and is provided with an automatic feed for the stock. It marks the development of this type of saw into an up-to-date machine tool



The Marvel No. 5 High-Speed Saw with Automatic Stock Feed
Made by the Armstrong-Blum Mfg. Company, Chicago, Ill.

and is especially useful where a number of duplicate pieces have to be cut. For this particular class of work it is claimed that the saw will do the work of approximately ten of ordinary type and at the same time effect considerable savings in the amount of time and labor required while the work is very accurate.

With the automatic stock feed, the bar is fed forward automatically after the piece has been cut and a new cut started without stopping. The bar is clamped in the traveling vice, which travels along a double track of $1\frac{1}{2}$ in. round

steel shafting at the back of the machine. When the piece has been cut off, the saw frame is raised and the chuck opened. The traveling vise which carries the end of the bar is drawn forward by the automatic stock feed until the end of the bar bears against the gauge, which is mounted on the left vise track. This contact closes the vise and starts the saw frame down and a new cut is taken. This operation is continued until the entire bar is cut, when the machine automatically stops.

The saw frame always moves in a horizontal position and is actuated by a crank lever which imparts a smooth even cutting stroke to the blade and returns it at an accelerated speed. The saw operates on the draw cut principle, cutting as it is drawn forward and being lifted clear of the cut on the return stroke. A friction disk at the top of the screw enables any desired pressure on the saw blade to be secured during the cutting stroke. A right and left hand screw on the connecting rod which can be operated while the saw is running controls the position of the saw frame and enables the entire blade to be used up by shifting the frame. A shifting bolt in the crank also enables the stroke to be varied from 4 to 6½ in., while for varying the depth of the cut two adjustable dogs are provided. These are located in a slot in the saddle at the back of the machine and are readily accessible.

The chuck which grips the stock is of ample proportions, jaws extending out flush with the saw blade. A movement of 8 in. is available for feeding the stock and the chuck will swivel to either side for cutting at an angle. Cooling compound is forced against the blade while cutting in a steady stream by a plunger pump with ball valves and overflow tank. The pump is immersed in the bottom of the large storage tank and together with all connections can be removed in about 5 min. by taking out two cap screws from the outer wall of the tank. The machine has a capacity for cutting stock 6 in. square. In a series of tests recently made a ½-in. bar of round steel was cut in 45 sec., a 2-in. bar in 2 min. 20 sec., a 3-in. bar in 5 min., a 4-in. one in 7 min. 45 sec., a 5-in. bar in 13 min. and a piece of 6-in. round stock in 24 min.

The saw is driven by a belt and operates at a speed of 130 r.p.m. The net weight of the machine is 365 lb. and the crated shipment weight 650 lb., exclusive of the track for the vise.

Jefferson Union Elbows

For use where a union is required near an elbow, the Jefferson Union Company, Lexington, Mass., has recently placed on the market a combination union and elbow. In their construction the features of the maker's straight and swing unions which were illustrated in *The Iron Age* April 28 and September 1, 1910, respectively, are embodied. These fittings are made in all of the standard pipe sizes with 90 and 45 deg. elbows. Their use does away with gaskets and two or three pipe joints and three or four fittings together with a saving in both labor and expense. Both internally and externally threaded elbows can be

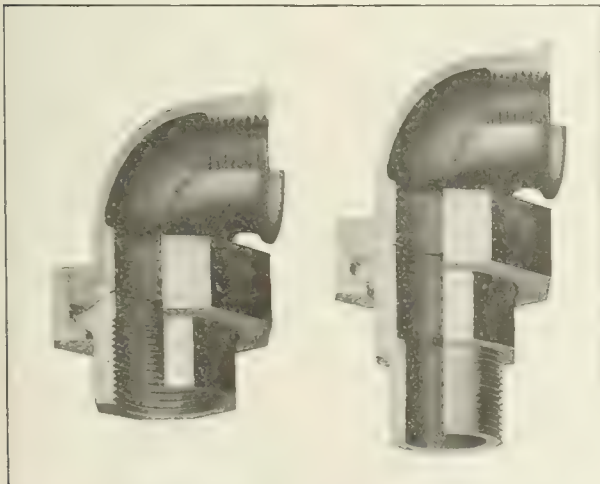


Fig. 1—The Elbow With Internal Threads. Fig. 2—The Elbow with External Threads. Two Types of 90-Deg. Jefferson Union Elbows. Made by the Jefferson Union Company, Lexington, Mass.

supplied, the former being illustrated in Fig. 1 and the latter in Fig. 2.

It is not necessary to have the pipe and the elbow in exact alignment, a feature which is made possible by the construction of the union. This has the standard Jefferson ground spherical brass-to-iron joint, which is not corrodible and makes a tight joint without the use of a gasket. There is also a large amount of play between the nut of the union and the swivel end, which makes the former easy to apply even when the alignment is not exact. The construction of the nut and its adjustment to the swivel and the brass seat ring are two features peculiar to the Jefferson line of unions. Two of the special features of this seat ring are that it is turned from seamless tubing, which renders it free from blow holes and imperfections, and it is also set in a recess away from the runway of the pipe with an iron wall on each side, an arrangement which prevents any possibility of loosening on account of the difference in the expansion and the contraction of the iron and the brass.

Malleable iron is employed for the pipe ends, which are threaded with Briggs standard taper pipe threads. In this way there is no danger of the pipe ends stretching, and the use of a standard taper thread insures a tight joint throughout its entire length. The nut threads are made coarse to permit rapid adjustment and as they are coated with graphite, both for lubrication and as a preventive of corrosion, the union can always be easily disconnected after it has been in use.

More Burt Filters for the Gary Works

The Burt Mfg. Company, Akron, Ohio, claiming to be the largest manufacturer of oil filters in the world, has just received another order from the United States Steel Corporation for two filters of what the company terms its Gary unit type, as this particular type of filter was first installed in the plant of the United States Steel Corporation at Gary, Ind. When these last two filters are in operation, a grand total of 14 will be in use in the plant. They are used in connection with the flush system of lubrication, and each filter in cleaning 2,000 gall. of oil per hour, or 28,000 gall. per hour for the 14, making this oiling system the largest installation in the United States. The outside sheets of the filters are made of No. 10 gauge iron, riveted and caulked, and the inside construction of No. 16 gauge, making them strong and durable. All fittings are extra heavy, and are screwed into heavy brass flanges. The filters are so constructed that any number can be operated as one, and additional filters can be attached without changing any connections. The first order received from these parties called for 5 units, and after six months' trial they duplicated the order. Later on they ordered two more, and with the two just ordered make a grand total of 14.

An Unusual Stock of Swedish Steel

The Swedish Iron & Steel Corporation, 12 Platt street, New York, which has been in business since February of 1908, has gathered together what is thought to be the largest stock and the widest variety of sizes of tool steel ever collected by one selling organization. The company has established warehouses in the Bush Terminal at South Brooklyn and its stock list shows fully 800 sizes of Swedish tool steel aggregating 4000 tons. George P. Toby, president of the company, recently made two trips to Sweden to arrange for extensive shipments and he was assured that the company's stocks are more complete than even those carried by regular manufacturers of Swedish steel. The company makes a specialty of marketing the Sisco Acorn grade, which is especially adaptable for battering or edge work. In addition to carrying a large stock in the Bush Terminal warehouse the company has extensive warehousing facilities in New Orleans, La.

The American office of H. Koppers, located at Joliet, Ill., announces another coke oven contract. This has been closed with the Coal Products Mfg. Company, Chicago, for 35 Koppers improved combination coke and gas ovens. The plant will be erected near Joliet, and the surplus will be sold to the United Gas & Electric Company, Aurora, Ill. The coke will be sold for foundry and furnace consumption as well as for domestic purposes.

The Machinery Markets

A gradual improvement in the demand for machinery is noticeable in most selling centers. The trade generally is interested in the announcement that the Sprague Electric Company, New York, is to be merged with the General Electric Company, Schenectady, N. Y., under the name of the Sprague Electric Works of the General Electric Company. Both inquiries and orders have increased materially in the New York market and the business is widely scattered. New England machinery men are interested in the announcement that the purchasing for the Boston & Albany Railroad will be done from Boston in the future. Heretofore it has been handled by the New York Central Railroad. Railroad business is attracting attention in Chicago where the Illinois Central has made purchases against the list recently sent out, amounting to \$40,000, and the leading harvesting machinery interest is buying extensively. An increased demand for wood-working machinery exists in Cincinnati and inquiries for all kinds of metal-working machinery are coming out in better volume. The local business is light in Cleveland, but there are indications of heavy future buying of machine tools for foreign accounts. The demand on the Pacific Coast is well sustained. Prospects of a good cotton crop have developed an increased call for cotton ginning and compressing machinery in Texas and the general market there has taken on a healthy tone. Reports from Baltimore and Philadelphia are not so encouraging, although a better demand for small tools has developed in the latter market.

New York

NEW YORK, May 31, 1911.

While there is an absence of large lists in the New York market, the volume of inquiries has increased very materially during the last week and business has picked up noticeably. At least two New York machine tool selling houses did a better week's business than in any other week of the previous two months. Most of the trading was in the nature of small orders for groups of five or less tools. Machine sellers in general report conditions more encouraging, and a very excellent demand has developed for contracting equipment. The Board of Water Supply of the city of New York awarded contracts last Friday for the building of two sections of the Catskill deep pressure water tunnel, which will call for the use of large amounts of contracting equipment, air compressors, pump machinery and the like. The first section of the contract, from Yonkers to Burnside avenue, was given to the Mason & Hanger Company for \$3,709,372, and a contract for the fourth section, from Union Square to Fore Green Park, was awarded to the Holbrook, Cabot & Rolling Corporation, whose bid was \$5,272,435. Both companies have established offices at the scene of their contracting operations.

While the Cuban and West Indian sugar mill operators are not buying as much machinery this spring as they usually purchase there are some good inquiries out for equipment for delivery in Cuba. Among the large sugar mill enterprises are those of the Conchita Sugar Mill at Allacranes, Matanzas Province, which will rehabilitate three mills that are now idle and make further extensions, and that of the Santa Teresa Sugar Mill at Siticito at Santa Clara Province, which will make extensive machinery additions.

The Ellis Motor Car Company is planning for the erection of an automobile garage and repair shop at Central avenue and Second street, Newark, N. J., which will be 68 x 237 ft., two stories. It is estimated that the building and equipment will cost \$50,000.

The Pfaltzgraff Pottery Company, York, Pa., desires a second hand steel tank to hold fuel oil. The company will buy a tank of 20,000 gal. capacity or two tanks of 10,000 gal. each.

A fire, May 25, which destroyed several buildings included the plant of the Theodore Schulz Sash & Door Company, 469 Pacific avenue, Jersey City, N. J. The building and its wood working equipment are believed to be beyond repair.

The Rubber & Celluloid Harness & Trimming Company, 54-56 Ferry street, Newark, N. J., will shortly consider the machinery requirements for a five-story addition to its plant now in course of erection. The addition will be 40 x 70 ft. and of brick and reinforced concrete construction. In addition to installing special machinery the company will purchase power equipment to generate from 225 to 250 hp. An electrical unit will probably be installed.

There are inquiries in this market for power plant equipment to be installed by the Jessup & Moore Paper Company, Wilmington, Del. The company is erecting a large new plant and its inquiries indicate that power equipment to generate about 400 hp. will be installed.

James C. Kuhn, candy manufacturer, 78 Carmine street, New York, has had plans prepared by Hunt & Wiseman, architects, 104 West Forty-second street, for a factory building, 50 x 90 ft., six stories and of mill construction, to be erected at 16 and 18 Clark street.

The plant will be equipped with the most modern appliances, consisting of boilers, elevators, etc. A list of the equipment has not been completed, but will soon be prepared.

The U. S. Expansion Bolt Company has been incorporated with \$10,000 capital stock, to manufacture a patent expansion bolt and a line of general hardware. The company has not yet decided as to whether it will erect a factory or have its product made by contract. Frank L. Clute, 100 Broadway, New York, has the company's affairs in hand.

The Crandall Packing Company, Palmyra, N. Y., whose plant was reported as having been destroyed by fire, states that the damage was not as great as was at first supposed. The company has nearly all of its machinery again in operation and is filling orders with practically no delay.

James Knox Taylor, supervising architect, Treasury Department, Washington, D. C., will open bids June 12 for furnishing and installing electrically-driven pumps in the United States post office and court house, New York City.

The Mahoney Boiler & Radiator Company, Green Island, N. Y., recently incorporated with a capital stock of \$75,000, has purchased a factory at Green Island, which it will enlarge and equip. The machinery equipment of the new company's predecessor at Troy will be removed to the Green Island plant and installed together with considerable new machinery. In addition to the manufacture of boilers and radiators the company will make special heaters of large size for public buildings, and coopers' generators; also coal, gas and oil ranges. The incorporators are: Albert C. Mahoney and George H. Sandholt, Green Island, and George L. Tobin, Coeymans, N. Y.

The B. W. Snow Company has been incorporated at Syracuse, N. Y., with a capital stock of \$25,000, for the manufacture of automobile parts and the operation of a general contract machine shop. The incorporators are: J. E. Snow, W. A. Snow and L. S. Chapman.

The Quale Company, 19 Chapel street, Albany, N. Y., is receiving bids for a brick and concrete mill building, 176 x 200 ft., one-story, which it will erect on North Broadway, that city.

The new plant of the Spaulding Bros. Mfg. Company, North Rochester, N. H., manufacturers of electrical insulating material made from wood fibre, is to be located in Tonawanda, N. Y., on a site of 18 acres at Gibson and Wheeler streets and the New York Central Railroad, with a switch to the Niagara River, where a plant covering 11 acres to cost with equipment, approximately \$500,000, is to be erected. The Niagara Power Company's transmission line borders the property on the southwest. A term contract for the use of large quantities of water has been completed with the city of Tonawanda.

The Pratt & Lambert Company, Buffalo, is building a four-story brick addition to its varnish works at Tonawanda street and the New York Central Railroad.

The Eastern Motor Sales Company has been incorporated at Albany with a capital stock of \$300,000, to manufacture and sell automobiles, motors, engines, machinery, etc. The incorporators are: E. P. Boland and C. V. Collins, of Troy, and H. M. Caswell, of Malden-on-Hudson.

The shops of the Erie Railroad, at Hornell, N. Y., are to be enlarged at a cost of about \$60,000. F. A.

THE MACHINERY MARKETS

Howard, assistant manager of bridge and building—New York City, is in charge of the work.

The Dunn Ink Works, Buffalo, has acquired the two-story factory property, 50 x 140 ft., at 1543-1551 Niagara street, that city, and will refit and equip it for its growing business. Considerable new machinery will be installed.

New England

BOSTON, MASS., May 26, 1911.

The Boston machine tool and supply dealers appear to be having a varying experience. To quote one man prominent in the trade: "We can see a decided change in business since the decision of the Supreme Court in the Standard Oil case, but our business has been gradually improving since the first of the year, although some sections are still very dull. The business for this month represented by actual shipments and charges will be up to and perhaps more than the average of last year. The first four months of this year show 80 per cent. of the average of last year. We have been having a good average business right along in New England. Nearly all of it has come to us in small orders, mostly single machines. We are really surprised at the amount of business that is going into our books every week, as general business seems to be extremely quiet. Nearly all of our customers who are depending upon railroad business are extremely dull. I would not be surprised if general business revives all over the country in spite of the fact that the railroads are holding up a lot of business and only ordering from hand to mouth. It would be quite interesting to see the country go through an era of prosperity without any help from the railroads."

Another large house gives this view of the situation: "Regarding the trade in general our business has been about the average, though I am inclined to believe that there is a slight falling off if anything. Orders have not increased any in size, either in the machinery or supply line, most all of the goods going out being in small quantities, and in the machinery line in the smaller sized machines. We have felt that the Supreme Court decisions would clear the atmosphere somewhat and cause a slight stimulation in trade, and are still inclined to believe that the month of June will show up pretty fairly well, though there seems to be a good deal of pessimistic talk just at the present moment. The machinery trade in general seems to be rather quiet and we know of no large lots which are wanted in the immediate future, although a few fair-sized memorandums covering future wants have shown up in the market."

The Underwood Typewriter Company, Hartford, Conn., states that the proposed new building, mentioned last week, will be used for general manufacturing. As the structure will be a large one, 50 x 200 ft. six stories, the requirements for equipment should be large.

An official statement of the United Shoe Machinery Company, Beverly, Mass., includes the announcement that this season's shop expansion will approximate four acres of floor space.

Projected additions to general manufacturing works include the following: Samuel Hathaway, New Bedford, Mass., paint factory, 100 x 200 ft., two stories; Hamilton Mfg. Company, Lowell, Mass., cotton goods mill building, 150 x 300 ft., four stories; Plainfield Mills Corporation, Plainfield, Conn., mill, 950 ft. long, of which 490 ft. is to be three stories, the remainder one story, to cost \$600,000; Boston Duck Company, Bondsville, Mass., addition 40 x 100 ft.; Aldrich Bros., Moosup, Conn., weave shed, 150 x 192 ft.

The Crescent Mfg. Company has been organized at Bristol, Conn., to manufacture light hardware. C. G. Garrigus, president and treasurer of the C. G. Garrigus Machine Company, is president of the new corporation; G. O. Hodge, vice-president; F. R. Graves, secretary; W. L. Barrett, treasurer; T. H. Hewitt, Waterbury, Conn., and W. L. Barrett, Bristol, are the other directors. The details of the product are not yet available, but it will be manufactured by machinery built by the C. G. Garrigus Machine Company. The business will be started on a small and conservative scale.

The official announcement is made that the Boston office will do all the purchasing for the Boston & Albany Railroad, following the plan of management adopted in connection with the joint operation of the line by the New York Central and the New York, New Haven & Hartford.

Philadelphia

PHILADELPHIA, PA., May 27, 1911.

While there have been no important changes in general conditions in the local machinery market, merchants in a few instances report a trifle better volume of business closed in small tool propositions. The major portion of the orders have been for single tools and represent business which has been under negotiation for some little time. New inquiries of any consequence are still reported as being rather light. A more hopeful feeling is expressed, however, by some of the manufacturers, particularly those making special tools and equipment, a few of whom have had a somewhat better run of orders. Not many, however, are operating plants at full capacity and it will take a considerable volume of new business to bring them up to normal. There is still an absence of any railroad buying in this territory, although the trade sees encouragement in the better prospects from buyers of that class, from reports coming from the West. Makers of the usual standard lines of machine tools still report business as dragging. In the second-hand machinery market a trifle better business has been reported, owing largely to the fact that some tools of modern design have been offered. In the boiler and engine trade a fair demand for power equipment of moderate horsepower is noted, but business closes slowly and few plants in this district are very busy.

The foundry trade shows no improvement, the demand for machinery castings, both in iron and steel, being light and the general demand irregular. Makers of crucible steel castings for automobile work are, however, pretty fully engaged.

Local builders are figuring on a three-story steel and concrete power house, 115 ft. square, to be built in Charleston, S. C., for the Charleston Consolidated Gas Company, one of the subsidiaries of the United Gas Improvement Company.

Purchases of additional property at Richmond and Cumberland streets, by the William Cramp & Sons Ship & Engine Building Company, adjoining its present plant, are understood to be for the purpose of making an addition to its machine shop. Particulars are not available.

Plans are being prepared by the William Steele & Sons Company for a five-story restaurant and office building to be erected at the southeast corner of Eleventh and Ludlow streets. The building is to be of reinforced concrete and modernly equipped.

The Hilles & Jones Company, Wilmington, Del., notes an improvement in the demand for punches, shears, bending rolls, roller levelers and plate-straightening machines. Recent orders have been largely for single tools, although one recently received included seven shears for one of the constituent companies of the United States Steel Corporation.

The Elwood Ivins Tube Works, Oak Lane, this city, is operating its plant with full force and on full time, with order books in comparatively good shape. This company is increasing its facilities in the way of machinery and has built an additional annealing furnace, increasing thereby its productive capacity. It has also recently succeeded in making seamless tool steel tubing, high in carbon, the use of which overcomes the necessity of boring out solid steel rods for various purposes, as heretofore done.

The Royersford Foundry & Machine Company, Royersford, Pa., reports a very fair demand for its Sells roller-bearing shaft hanger. In its other power transmission lines business has recently picked up a little, but in heavy punch and shear machines the demand is light. Business in general has been below normal, but improving conditions are now expected.

The Frick Company, Waynesboro, Pa., has recently added to its line of ice and refrigerating machinery a new horizontal double-acting ammonia compressor, which it is now prepared to supply in sizes ranging down from 65 tons capacity. Its general sales are about 5 per cent. ahead of the same period last year, or about an average business as based on that for the past five or six years.

The Manheim Belting & Mfg. Company, Manheim, Pa., has been incorporated with a capital stock of \$150,000, and will engage in the manufacture of belting at that location. A factory building, 136 x 176 ft., will be erected. Charles Bond, Philadelphia, is president; G. S. Dana, vice-president; M. M. Pfautz, secretary, and M. G. Hess, treasurer of the new company. The special machinery for the manufacture of the belting has been provided for, but the company will be in the

THE MACHINERY MARKETS

market for about 200-hp. boiler capacity and an engine of 100 to 150 hp.

The Ferracute Machine Co., Bridgeton, N. J., advises that there has been a gratifying increase in its aggregate business each month in the past year. Its plant is being again operated at full capacity. The foreign demand has continued good and is now showing an increase, particularly in the line of high-speed armature disk notchers, a number of which have been shipped to European manufacturers of electrical goods. The use of sheet-steel stampings in automobile work has resulted in increased orders from automobile makers for presses for that class of work, one lot of 13 being furnished a prominent maker in Detroit, for pressures ranging from 8 to 1000 tons.

The R. S. Newbold & Son Company, Norristown, Pa., finds business somewhat better than it was several months ago. Recent shipments include a heavy bar shear, of about 80 tons; a 28-in. plate mill for the Allegheny Steel Company, and several stacks, 6 to 8 ft. in diameter, and from 100 to 175 ft. long, together with a considerable quantity of gas and air piping for various plants in the Schuylkill Valley district. Among orders recently taken may be mentioned a 42-in. plate shear and a rotary shear, to cut 1-in. plates, for the Logan Iron & Steel Company; four straightening machines for the Indiana Steel Company, and complete furnace tops for the West End Furnace Company, Roanoke, Va.; the Colonial Iron Company and the Warwick Iron & Steel Company. Six washer-punching machines of the Mason type are also being built for various concerns.

The Ebensburg Coal Company, Colver, Pa., will, in connection with the development of its coal properties, build an electric power plant for the purpose of supplying power to its mines and light to the town of Colver. The plant will ultimately have a capacity of 3600 hp. B. Dawson Coleman, Lebanon, Pa., is the president of the company, and Frank C. Roberts & Co., Philadelphia, are the engineers for the power plant.

Baltimore

BALTIMORE, MD., May 29, 1911.

General market conditions in the iron, steel, machinery and allied industrial trades have shown a further slowing down in the past month. While here and there slight betterments may be noted, activity at the majority of industrial plants is less pronounced than during April. In the metal-working machinery lines, particularly as far as new tools are concerned, the demand has been light. This, in a considerable degree, has been due to offerings of second-hand equipment, particularly the extensive line of modern tools offered by Freidenwald Brothers, which concern has recently retired from active business. In wood-working tools buying has been somewhat more active. In the heating and ventilating lines some fair business has been placed, a good volume of new work is being figured on and plans are on engineers' boards for considerable further work. Practically all contractors in this class of work are well engaged. The demand for engines and boilers keeps up quite actively, but requirements run to the small capacities and do not close up very satisfactorily. Machinery and machine shop supplies are not very active, purchases in the majority of instances being small. Contractors' equipment has been a trifle more active, owing to the increased amount of work which has been done in the way of road building in this vicinity.

Special machine tool and machinery builders report a fairly good volume of business, but the few builders of tools of the more standard type still find the demand very irregular. Several very fair propositions in building construction work have developed. Recent contracts of this character have been principally for reinforced concrete and slow-burning mill construction. With few exceptions, fabricators of structural material are not very actively engaged and new work appears to be developing more slowly. Prices of fabricated work continue low. The new tower-building contract for the Maryland Casualty Company, requiring some 1100 tons of structural material, has been awarded to Dietrich Brothers, who also have the contract for the structural work for the Baltimore Bargain House. Municipal contracts during the month have been unimportant, as far as the general iron, steel or machinery trade is concerned. Local foundries report business as being of an unsatisfactory nature.

Cumberland, Md., at a municipal election on May 16,

decided favorably on the issuance of bonds to the amount of \$500,000, for the purpose of providing for a new water works. James H. Fuertes, New York, will, it is understood, be engineer in charge of constructing the new water plant.

The Frederick Railway Company has made application to the Public Service Commission to extend its tracks in Frederick City, Md., and to issue bonds amounting to \$150,000, to cover this and other proposed improvements.

Engineers are figuring on furnishing and installing the heating, power and ventilating plant for the Woodward Building, Washington, D. C.

Bids for the construction of the Norfolk Terminal Station, Norfolk, Va., received several weeks ago, have not yet been opened, while the opening of those for the construction of the Riggs Hotel and Theatre, Washington D. C., have been held up temporarily.

The Ellicott Machine Company has booked several fair orders for its line of dredging equipment in the past few weeks and is more fully engaged. Inquiries for some more extensive dredging outfits are being figured on.

The sale of the old ice manufacturing plant of the Atlantic Ice Company, 7, 9, 11, 13 South Frederick street, to the Independent Ice Company is reported. It is stated that the plant will be overhauled, re-equipped and operations started at an early date.

The general contract for the erection of the new Scottish Rite Temple, Washington, D. C., has been awarded to Norcross Brothers, Worcester, Mass. Sub-bids, it is understood, have not yet been let.

John B. Adt has taken a number of orders for special machinery for tobacco working, both from foreign and domestic customers. Several large elevator installations, as well as further special machinery, are being estimated on. This plant is operating at full capacity and has sufficient work on hand to keep it so engaged for some time ahead.

Work is about to be started on the new building for the Coca Cola Company at Pratt and Concord streets. Plans call for an eight-story brick and stone structure, to cost complete several hundred thousand dollars. Arthur Tuft is the architect and builder. Contracting engineers are now figuring on the power and heating plant.

The Crook-Kries Company has completed its contract for the heating and ventilating work on the United States Fidelity Building, and practically completed that for the Fidelity & Deposit Company Building. Recent orders for heating and ventilating work have been of moderate size, sufficient, however, to keep all departments fully engaged. Considerable new work is in sight and the estimating department is operating at top capacity. Fair orders for engine and boiler installations of moderate horsepower have recently been taken by this company.

The Maryland Steel Company is reported to have received a contract for a large seagoing steel tugboat, for the Spanish-American Iron Company, for use in Cuban waters. This company has just laid the keels for two self-propelling oil barges, to be built for the government. These vessels will be 165 ft. long and 25 ft. beam, and have a cargo capacity of 153,400 gal. of oil.

The Baltimore Retort & Fire Brick Company, which has not been very actively engaged recently, is now busy on work for delivery during next month. This company has taken orders for considerable work in connection with gas plant installations. A contract for a new Dutch oven, to be installed at the plant of the Baltimore County Water & Electric Company, has also been recently booked. The general demand for fire clay products, however, is not particularly active.

Wallace Stebbins & Sons have been awarded the contract for the steam-heating work, including piping and radiation, for the Maryland Tuberculosis Sanitarium, at Sabillasville, Md. This firm reports a good demand for power plants of small and moderate size, although trade in general supplies and fittings continues rather irregular. General business in May was about up to the average.

The Chesapeake Iron Works has been fairly busy. Among recent contracts taken were those for the Woodward Apartment, Washington, D. C.; the Murchison Warehouse, Wilmington, N. C., requiring 100 tons of structural and ornamental iron work, and the Casey Building in this city. This company's plant continues fairly busy on work in hand, and its estimating department is figuring on a fair amount of small and moderate-sized specifications.

THE MACHINERY MARKETS

The New York Central Iron Company, now located at Geneva, N. Y., will erect a new plant at Hagerstown, Md., where it has acquired some 15 acres of land. Plans and specifications are now being prepared for the buildings to be erected, which will be one-story high and aggregate somewhere in the neighborhood of 30,000 sq. ft. of floor space. The buildings are to be of structural steel, with side walls largely of glass. The equipment for the new plant has not yet been determined upon. C. E. Williams is secretary of the company.

The Baltimore Bridge Company has received the contract to furnish the structural steel work for the Army and Navy Club, Washington, D. C., and has also received further orders from the Republic Finance Company for its Portland cement plant, at Union Bridge, Md., the latter order including a bridge extending from the crusher mill to the stock house, and floor and track work in the crusher building. This concern is busy on orders in hand. Work for export and moderate inquiries for domestic work are being figured on.

The T. C. Bashor Company, while finding new business somewhat lighter in May, has been quite busy in all departments and has considerable new work in sight. The past month has been one of heavy deliveries, both in boilers, tanks and general equipment. A moderate amount of engineering work has been taken, including some large piping work for the new Highlandtown plant of the Crown Cork & Seal Company. A number of power installations are being estimated upon, both for heating and general power stations.

Dietrich Brothers have been awarded the contract for the erection of the structural work, about 1100 tons, for the new tower building to be erected for the Maryland Casualty Company, at Baltimore and North streets. Considerable ornamental iron work is also to be furnished. The tower of the building will be the highest in the city. A number of smaller orders have been taken, including the Maryland School for the Blind, in Baltimore County, and for a court house at Chowan, N. C. All departments of this company's plant are actively engaged, although work has not been as plentiful in ornamental work as it was some months ago.

While considerable municipal business is offered for estimate, little work of particular interest to the trade has come out. On May 18 the Highway Commission received bids for furnishing and erecting a Strauss trunion bascule bridge on Eastern avenue over Back River, but awards have not been announced. On May 31 bids will be opened by the Board of Awards for constructing the Junction sewer, at the sewage pumping station, which includes the furnishing of 40,000 lb. of concrete-reinforcing steel. On May 24 the same commission received bids for the construction of an office and laboratory building at the Back River sewage disposal works, but awards have not yet been announced.

Plans are progressing favorably for the erection of the new manufacturing building to be known as the Beehive. With subscriptions complete, the option on the site at Preston and Clifton streets has been taken up and plans for the transfer of the property are being made. P. O. Keilholtz, engineer, is now engaged on final plans and specifications, and bids will be asked at an early date. The building is to be the most modern of the so-called beehive type of manufacturing buildings.

Cleveland

CLEVELAND, OHIO, May 29, 1911.

The demand for steam engines and boilers in this territory is quite active. Sales agents are getting a good volume of orders and considerable business is in prospect. Builders of planers and boring machines report an improvement in inquiries, which are fairly plentiful, but orders are very slow in coming out. Encouraging reports are made regarding the condition of the foreign trade in machine tools, which has improved considerably.

Business with the local machinery houses continues rather light with little indication of much improvement in the near future. Their May volume of orders will aggregate about the same as during April. Sales are confined mostly to small tools for repair shops. There is some demand from steel plants and tire-making plants, and an occasional order from an automobile manufacturer. Few tools, however, are being bought by large manufacturing plants. Railroads continue to hold off so that there is very little business from that source in this territory. Some tool builders that have

kept their plants running at about full capacity making machines for stock have now accumulated good-sized stocks.

There is more second-hand machinery on the market than for some time. The demand for second-hand tools is not active.

The K. W. Ignition Company, Cleveland, has let a contract for the erection of a new plant to the Hunkin-Conkey Construction Company, Cleveland. The plant will be located at East Thirtieth street and Chester avenue. It will be 75 x 165 ft., four stories of steel and reinforced concrete. The company expects to be in its new quarters in five months. Considerable machinery will be needed to equip the plant, including drilling machines, screw machines and lathes. Elevators will also be required. The company has already placed orders for its power equipment.

Plans for the new plant to be erected by the Taylor & Boggis Foundry Company, Cleveland, have been completed by the Cleveland Engineering Company. The plant will include a foundry, 112 x 420 ft., a builders' hardware manufacturing department, 111 x 270 ft., a pattern storage building, 50 x 200 ft., and an office building, 51 x 135 ft. The office building will be two stories, the other buildings one story. They will be of steel and mill construction.

The Cleveland office of the Erie City Iron Works, Erie, Pa., reports the receipt recently of the following orders: Two 20 x 27-in., direct-connected, four-valve, simple engines for Corrigan, McKinney & Company, at Scottdale, Pa.; three 150-hp. Scotch marine engines for W. S. Weiant & Sons, Newark, Ohio; one 200-hp. boiler for the Barnesville Gas & Electric Company, Barnesville, Ohio; one 14 x 14-in. high-speed engine for the W. S. George Pottery Company, East Palestine, Ohio; one 300-hp. water-tube boilers for the George H. Gynn Brick Company, Cleveland, Ohio; two 250-hp. water-tube boilers for the St. Louis plant of the National Electric Lamp Company; two 72-in. x 18-ft. tubular boilers for the Saxton China Company, Sebring, Ohio; two 250-hp. horizontal water-tube boilers for the Cleveland plant of the Standard Oil Company; two 258-hp. vertical water-tube boilers for the Tuscarawas County Electric Light & Power Company, New Philadelphia, Ohio, and one 150-hp. tubular boiler for the Walsh Paper Company, Cuyahoga Falls, Ohio.

M. T. Silver & Co. and the Sunshine Cloak & Suit Company, Cleveland, will erect a new garment factory on Superior avenue near Twenty-fourth street. It will be 175 x 290 ft. and three stories. Each company will occupy one-half of the building but there will be a joint power plant. J. Milton Dyer is the architect.

The Willys-Overland Automobile Company, Toledo, Ohio, has let a contract to W. E. Wood, Detroit, Mich., for a large addition to its plant, work on which will be started at once. The new building will be of reinforced concrete, 300 x 400 ft. and five stories.

The Binns-Down Mfg. Company, Canton, Ohio, has been incorporated with a capital stock of \$10,000 to manufacture metal and wooden novelties. James R. Binns, Elmer E. Downs and others are the incorporators.

The Baker Motor Vehicle Company, Cleveland, will enlarge its plant by the erection of an addition, 40 x 100 ft.

The Urschell Mfg. Company, Toledo, Ohio, is planning to enlarge its capacity and has made a proposition to move to Bowling Green, Ohio, and take over the plant of the Standard Machinery Company in that city and erect new buildings. The Urschell company makes among other products marine engines and nut and bolt machinery.

The Ashland Steel Range & Mfg. Company, Ashland, Ohio, shipped a carload of concrete mixers to Sidney, Australia, recently, and has just received a duplicate order for a carload of ten machines.

The Galion Iron Works Company, Galion, Ohio, has increased its capital stock from \$100,000 to \$150,000.

The foundry of the Ashland Foundry & Machine Company, Ashland, Ohio, was destroyed by fire May 22 causing a loss of about \$8,000. The company will probably rebuild its plant.

The Lundgren Aeroplane Company, Youngstown, Ohio, has elected C. H. Dunn president and L. B. Burger secretary and treasurer. The company is now considering a site for a plant.

The Otis Lithograph Company, Cleveland, will erect a new plant. It will be 125 x 300 ft., one story and of reinforced concrete construction.

The Kelley Boiler Company, Wellsville, Ohio, has

THE MACHINERY MARKETS

been incorporated with a capital stock of \$20,000 by W. H. Kelley, S. G. Davis, A. A. Weigel, E. S. Noble and M. T. Abbott.

With a capital stock of \$25,000 the Cleveland Auto Starter Company, Cleveland, Ohio, has been incorporated by E. A. Curtis, R. R. Crezin, M. R. Moffatt and V. M. Loika.

Cincinnati

CINCINNATI, OHIO, May 29, 1911.

Local manufacturers of engineering supplies, as well as those turning out plumbing goods are very busy. There is a decided improvement in the demand for woodworking machinery, and recently the railroads have bought considerable equipment of this kind.

Machine tool builders make somewhat conflicting reports, but they all state the outlook is some brighter, and few are receiving enough orders from the general trade to keep them running on full time without adding largely to their stocks. Inquiries and orders received are fairly evenly distributed between the different kinds of machine tools, with the exception of the larger sized planers, which is probably due to the absence of railroad buying, although an improvement in the demand from this source for other kinds of machinery, would indicate that the railroads may come into the market as large purchasers of machine tools before the year is completed.

The Ohio Metals Treatment Company is a new Cincinnati incorporation, with \$200,000 capital stock. The incorporators are W. T. Judkins, D. Lamon, Thomas S. Baen, Robert M. Fishback and E. J. Babbitt. The company owns a patented process for hardening and toughening metals, and has leased part of the old Victor Safe Company's plant at Ninth street and Broadway, that will be used for demonstrating purposes.

The American Tool Works Company, Cincinnati, has found it necessary to extend its facilities by converting part of a nearby building, formerly used for warehouse purposes, into a manufacturing branch.

The M. Werk Company, Cincinnati, soap manufacturer, has acquired a building site near Ivorydale, Cincinnati suburb, on which will be erected several concrete buildings. In addition to the large amount of special machinery that will be required, there will be a power plant, including electric lighting equipment. The name of the architect will be announced within the next few days.

The General Foundry Company, Warren, Ohio, has increased its capital stock from \$58,000 to \$125,000.

The new power plant, and other new buildings being constructed at the University of Cincinnati, are now under cover, and the machinery is being installed. The power plant will be in operation before July 1.

Among nearby contracts recently let, that will require a large quantity of structural steel material, is one for a nine-story office building to be erected at Portsmouth, Ohio, for the First National Bank at that place. The Roche-Bruner Building Company, Johnston Building, Cincinnati, has this contract in charge.

The Tampa Iron & Foundry Company, Tampa, Fla., recently organized, has placed orders for a large quantity of its equipment with Cincinnati firms. The John Steptoe Shaper Company is shipping the new company several of its shapers and the Rahn-Lamon Company a number of gap lathes.

The Waterproof Paper & Board Company, Cincinnati, has decided to erect a paper mill at some point near Cincinnati, probably at Hamilton. Only preliminary building plans have been made up. In addition to paper mill machinery, a large power plant will be required.

The Ohio Electric Car Company, Toledo, Ohio, has increased its capital stock from \$150,000 to \$250,000. It has not yet been announced as to whether this change means any increase in present facilities.

The city of Cincinnati will soon require several large steel tanks to contain a total of 2,500,000 gal. of water, to be erected at the Mt. Auburn station.

Contract for the new general hospital in Cincinnati, recently mentioned, has been awarded to the Westlake Construction Company, St. Louis. There will be 16 large buildings, and preliminary work will commence within the next 30 days.

Bids for a lock and dam to be constructed on the Kentucky River, near Heidelberg, Ky., were opened in Cincinnati May 25 by Major John C. Oakes, engineer in charge. The lowest bid was over \$350,000, but the contract has not yet been formally awarded. A large

quantity of cement and reinforcing bars will be required by the contractor.

The Tiffin Wrench Company is a new incorporation at Tiffin, Ohio, with \$5,000 capital stock. The incorporators are: C. F. Nighswander, George W. Nichter, H. W. Yeager, J. J. Flick, W. H. Kildore and John C. Loomis.

The Union Gas & Electric Company, Cincinnati, has decided to erect a large substation in the business district. The estimated cost of the station, with its equipment, is placed at \$200,000.

The J. W. Curry Company, Cincinnati, manufacturer of waterproof driving belting, will erect a two-story addition to its plant on Cummings street. All equipment has been purchased.

Contract for the erection of the Franklin Paper Company's plant at Franklin, Ohio, has been awarded to the United States Roof Company, Middletown, Ohio. Work on the foundations will be commenced within a few days.

Detroit

DETROIT, MICH., May 29, 1911.

There appears to be little or no change in market conditions, manufacturers being well pleased with trade. The automobile demand continues excellent, which in turn brings about prosperous conditions with the auto accessories men. Railroad equipment concerns are very quiet, one large company having made a reduction in its working force of 75 per cent. and another having turned the bulk of its foundry work over to the manufacture of structural iron. However, the late bond issues by several railroads of this and neighboring states for improvements are expected to inject some life in this branch.

Architects are taking figures on an addition to the plant of the Timken-Detroit Axle Company of this city. The building is to be fitted with trackage and will be used to store steel.

The Grabowsky Power Wagon Company of this city has increased its capital stock from \$50,000 to \$1,000,000. The funds will be used in increasing the capacity of the plant, it being the plan to double its output. Max Grabowsky is president of the company.

A new company was incorporated this week under the name of the C. K. Davis Mfg. Company. The company has a capital stock of \$25,000 and will locate in this city. C. K. Davis is behind the enterprise.

An important financial combination was effected this week when the five Hupp corporations of this city were consolidated with a capital stock of \$700,000, of which \$400,000 is paid in. The companies entering this merger are the Hupp-Yeats Electric Car Company, Hupp-Turner Machine Company, Hupp-James-Geyman Foundry Company, Hupp-Johnson Foundry Company and Robert C. Hupp Sales Company. The plants of the company occupy about 60 acres.

The Michigan Vacuum Cleaner Company has filed articles of incorporation with a capital stock of \$8,000. The company will make a low priced machine of powerful suction. Among the stockholders are L. C. Wilson and John Fry, both of this city.

The Tilden Saw Company has made an important increase in its capital stock, raising the amount from \$60,000 to \$100,000. The increase will allow enlargements and will increase the plant capacity. The principal stockholders are C. H. Tilden and George M. Tilden.

The officers of the Detroit Shock Absorbing Company are preparing to increase the company's capital stock from \$50,000 to \$150,000. They plan to secure a factory or build a plant for the manufacture of the auto accessory it controls.

The Detroit Wire Bound Box Company has reduced its capital stock from \$75,000 to \$50,000.

The shingle mill at New Dalton, Mich., belonging to E. S. Harris was burned this week. The plant was carrying only \$8000 insurance at the time. The mill will be rebuilt.

Elaborate additions to the plant of the Kalamazoo Bread Company are being planned. Two new additions will be erected and the most modern bread making machinery will be added to the equipment. A \$10,000 bond issue will care for the improvement. Alderman Chidester is the owner of the plant.

The Flanders Mfg. Company, Pontiac, Mich., is making plans for a record output in motorcycles. A new plant will be erected in the course of a few weeks for

THE MACHINERY MARKETS

the manufacture of electric cars. The company intends with the new addition to make 3000 electrics as an annual output.

The City Council of Lansing, Mich., has voted to appropriate sufficient funds for the purchase of a plant for the making of pavement. The purchase of the plant is left with the committee on streets.

The Burrough & Blood Company, Marshall, Mich., maker of vehicles, as the result of a cash inducement to remain in the city, will build a new plant to care for their increasing business. Charlotte, Mich., made a strong bid for the plant.

The Holland Furnace Company, Holland, Mich., will add a new department to its plant which will double its capacity. The new department will be in a tin shop and metal works for the making of dustless ash cans and garbage pails.

The Alert Pipe & Supply Company, Bay City, Mich., has taken out a building permit for the construction of a steel covered building 25 x 65 ft.

The Hardware Supply Company, Grand Rapids, Mich., has filed a trust mortgage securing a loan for \$10,000, which the company desires for the purchase of machinery.

Toledo capitalists are planning the location of a canning factory at Eaton Rapids, Mich., making use of about 2000 acres of bog land, which will be used for truck gardening. Particulars can be had from the Business Men's Association.

The east mill of the Bogardus Lumber Company at Peelston, Mich., was destroyed by fire recently. The loss to the machinery and plant will reach \$10,000, fully covered by insurance.

Burrows & Wells, architects of this city, are preparing plans for the erection of a large factory building at Tecumseh. The plant is being built for P. W. A. Fitzsimmons, who can furnish particulars.

The Union City Roller Mills has passed into the hands of the Randall Bros., who will remodel it into an up-to-date flour manufacturing plant, erecting an elevator of 20,000-bushel capacity and installing new machinery and equipment. Earl W. Randall, Tekonsha, Mich., and Ray E. Randall, Plymouth, Ind., constitute the new firm.

The Barnes-Baker Mfg. Company, St. Joseph, Mich., will move to Holland, Mich., where it is planned to erect a suitable plant. The company was only recently incorporated. The company has a capital stock of \$40,000, of which \$10,000 is to be subscribed by citizens of Holland.

The city of Muskegon is planning to spend \$360,000 for water works improvements, including a new plant. The proposition is yet to be voted upon.

Secretary Halsey of the Pontiac Commercial Association writes that the city is almost certain to land a big auto accessory company of Blissfield, Mass. The concern has a capital stock of \$50,000 and is desirous of locating nearer the motor car manufacturing center.

The Wilson Packing Company, Jackson, Mich., will build a large addition to its plant this summer, to care for its increasing business. It will also build a salting plant at Grass Lake.

Formal notice has been given that the Escanaba Mfg. Company, Escanaba, Mich., is to greatly enlarge its present plant. T. M. Judson, superintendent of the company, states that ground has been secured for the erection of a new building.

Chicago

CHICAGO, ILL., May 29, 1911.

A fair amount of railroad business has been placed during the past week. Western roads are undoubtedly aware of the condition existing in many of their antiquated shops and it is hoped this slight tendency to improve conditions will be contagious. The Illinois Central Railroad has purchased between \$12,000 and \$15,000 worth of machine tools in this market. The three lists of the Northwestern which have been pending for some weeks have also been closed, the transaction amounting to about \$40,000. The Illinois Central is out with a preliminary list approximating about \$25,000 and an appropriation to cover these needs will probably follow as soon as approximates of the amount of purchase can be obtained. The big deal of the American Steel & Wire Company is still pending. The leading harvester interest is in the market for between \$10,000 and \$12,000 worth of machine tools for its Milwaukee works and for about \$3,000 for the Deering plant in Chicago. Buying tendency seems to have

changed from cheap and second-hand tools to the very best money can purchase. Many prospective buyers are even showing a perfect willingness to await delayed deliveries in order to secure top-notch material. This indicates just a moderate volume of business, as it has been the history of the machine tool trade that when business was rushing, cheap or second-hand tools were in demand because quick deliveries of goods of this nature were almost certain. On the other hand, when business was extremely quiet this class of machine tools were in demand because of forced temporary economy. The present condition of trade may be taken as an indication of an approach to normal business conditions.

The National Stamping & Electric Works has removed its business from 216-220 South Jefferson street to 410-426 Clinton street, Chicago. The company has installed considerable new equipment and will continue to manufacture specialties as in the past.

Webster City, Iowa, will lay about two miles of water mains during the present summer.

The Park Dam Company, Eldora, Iowa, which owns two sites on the Iowa River, one at Eldora and the other at Steamboat Rock, is at present engaged in the construction of a power plant at the former location, having completed a concrete dam at that point last fall. A plant will be installed at Steamboat Rock as soon as the one now under construction is completed. Equipment for the plant at Eldora has been purchased, but the necessary equipment for the second plant will not be purchased until a later date.

The question of installing an electric light plant at Kimball, Neb., is under consideration. Of the \$280,000 worth of Kimball irrigation bonds recently issued \$240,000 have been sold and construction work will be commenced as soon as the remaining \$40,000 have been disposed of.

The South

LOUISVILLE, KY., May 29, 1911.

The demand for machinery continues quiet, conditions being little changed as compared with the weeks preceding. Not as much business appears to be in the market. Power equipment is rather dull, while machine tools and other general lines are also quiet. Pumps are more active. Quarry equipment remains in only fair demand.

Henry H. Martin, who resigned as vice-president and general manager of Grainger & Co., structural iron manufacturers, several months ago, has announced that he will go into the foundry business. A contract will be let at once for the erection of a building, 36 x 100 ft., at Cabell and Franklin streets, Louisville; the plant will begin operations in July, it is hoped. It will have an initial capacity of about five tons a day. Gray iron castings will be made, and furnace castings will be featured.

B. F. Avery & Sons, plow manufacturers, are planning to increase the capacity and rearrange their foundry and forging departments. Members of the company state, however, that no new equipment will be required.

The Henry Vogt Machine Company, Louisville, is in the market for a 21 x 12-in. vertical milling machine. This is in addition to an 800-lb. steam hammer, on which it asked prices several weeks ago.

The Lanham Hardwood Flooring Company, Louisville, which recently increased its capital stock from \$30,000 to \$50,000, has announced that it will erect a power plant. Its equipment is operated by electric drive, the power heretofore having been secured from a local central station. It will hereafter manufacture its own current, and will install a 150-hp. boiler and engine.

The Kentucky Traction & Terminal Company, which was organized at Lexington with \$2,500,000 capital stock for the purpose of taking over a number of Bluegrass traction properties, has purchased two acres of land on Limestone street, Lexington, which will be used as the site of its new \$500,000 power house. Plans are practically completed for the new power house, and contracts for the equipment will be let within the next six weeks. Address the general manager, I. L. Oppenheimer.

The Louisville & Nashville Railroad, with general offices in Louisville, will locate the division shops for the new Lexington & Eastern extension, which it is building at Jackson, Ky. The shops will be among the largest in the State.

The Jeffrey Mfg. Company, Columbus, Ohio, has

THE MACHINERY MARKETS

secured the contract for the installation of a coal tipple for the Asher Coal Company, at Wasioto, Ky.

The Allburn Coal & Coke Company, Allburn, Ky., which was recently incorporated with \$25,000 capital stock, has taken over part of the holdings of the Pike Collieries Company, and will develop it. Some equipment will be required a little later.

Proposals will be received by the Kentucky Board of Control of Charitable Institutions, Albert Scott, president, until June 6, for the equipment of three water-tube boilers with stokers of the underfeed plunger type. Address proposals to Central Kentucky Asylum for the Insane, Lakeland, Ky.

Isadore Katzenberger, New York, has announced that an office building of 25 stories will be erected at Madison and Main streets, in Memphis, Tenn.

The Dixie Clay Products Company has been organized at Chattanooga, Tenn., with \$100,000 capital stock, for the establishment of a clay-working plant. John S. Spence is president, Alvin L. Spears, vice-president, and J. W. Abel, treasurer. The plant is to be located at Graysville, Tenn., and roofing tile, faced brick, etc., will be manufactured. Clay-working machinery will be installed at once.

The plans for an electric-light plant at Pulaski, Tenn., have about been matured. H. M. Grigsby is in charge of the project.

A laundry is to be established at Franklin, Tenn., by the Harpeth Electric Light & Power Company.

Mills & Lupton, dealers in machinery and mill supplies, Chattanooga, Tenn., who are now located at 320 Carter street, will soon occupy a new building, which is being erected for them by the Stone Fort Land Company. Electric elevators are to be installed in the structure, which will have 35,000 sq. ft. of floor space.

J. S. Rawlings, Carrollton, Ky., is planning the establishment of a refrigerating plant at Tullahoma, Tenn.

C. I. Tune has had plans drawn for a garage and automobile repair plant to be erected at Chattanooga, Tenn.

The Jerome P. Parker-Harris Company, Memphis, Tenn., will erect a garage and automobile repair plant to cost \$40,000. A site 74 x 130 ft. has been secured.

P. Whitaker & Son have made plans for an ice cream factory to be built at Columbia, Tenn., and will be in the market for refrigerating and power equipment.

R. C. Houston, Memphis, Tenn., is asking for prices on a cross-compound engine and gasoline engine; an electric generator and several pumps of varying capacities.

The Modern Electric Light & Power Company, Mansfield, Ark., has been incorporated with \$100,000 capital stock. C. E. Brice, president; N. Hudson, vice-president, and G. E. Gilmore, secretary.

A company is being organized at Tuscaloosa, Ala., for the purpose of establishing a gas plant. Natural gas may be piped in. L. H. Maxwell, W. H. Railford and G. B. Martin are among those interested.

The Lowe Mfg. Company is installing a dyeing plant with a capacity of 4000 lb. in its cotton mill at Huntsville, Ala.

The Mobile Pure Cane Syrup & Farming Company, Mobile, Ala., has been organized with \$24,000 capital stock for the manufacture of cane syrups. An interesting feature is that the company will grow a considerable acreage of cane for use in the plant. Machinery for the latter is to be installed in the near future.

A company is being organized at DeQueen, Ark., for the manufacture of cement. A plant with a daily capacity of 3000 barrels is projected.

The Little Rock, Ark., Railway & Electric Company will install a new intake and condensing system in its power plant in the next few months. Address D. A. Hegarty, general manager.

D. M. Farson & Company, Chicago, Ill., are reported to be considering the establishment of a \$6,000 electric light plant at Oneonta, Ala.

The plant of the Fayetteville Electric Light & Power Company, Fayetteville, Ark., will be greatly enlarged, according to plans which have been announced. An expenditure of \$20,000 in connection with new machinery has been provided for.

If the plans of W. L. Eryes, superintendent of the electric light plant and water system of Lafayette, La., are carried out, changes in the machinery providing

for alternating instead of direct current will be made. The estimated cost of the new installations is \$40,000.

A power house is to be erected at New Iberia, La., by the Southwestern Traction & Power Company, of which F. W. Crosby, New Orleans, is president.

The Geneva Plow Mfg. Company has been organized at Geneva, Ala., for the manufacture of plows and other farm implements. A. L. Campbell, W. A. Pledger and others are interested.

Two pumps, having a capacity of 1500 and 700 gal. a minute, respectively, will be installed in the water-works of Biloxi, Miss., if the bond issue of \$70,000, to be voted on June 27, is approved.

The city of McKenzie, Tenn., will open bids July 1 for constructing an electric light plant. C. H. Jenks, St. Louis, Mo., is the engineer in charge.

The city of Edgefield, S. C., has voted the issuance of \$15,000 in bonds for the construction of an electric light plant. Specifications can be had from the Mayor.

Quotations on boilers are being asked by Matthews & Fry, Helena, Ark.

The Tuscaloosa, Ala., Iron Works will have its foundry and machine shop in operation by June 1. It will also manufacture tramcars for use in logging operations.

Large improvements in the mill of the Farmers' Cotton Oil Company, Huntsville, Ala., are to be made this summer, it is announced. New machinery costing \$25,000 will be installed.

St. Louis

St. Louis, Mo., May 27, 1911.

The Donovan Iron & Supply Company will enlarge its plant by removal to the old site of the John Nooter Boiler Works Company, 812-816 N. First street, which it has acquired together with adjoining vacant land on which its machine shop will be built.

The Gregory DeHart Cushion Steel Spring Tire Company is to establish a plant here for the manufacture of steel-spring tires for automobiles and motorcycles. It is a new company whose product has been undergoing tests before establishing a complete plant.

The Christopher & Simpson Architectural Iron & Foundry Company has completed arrangements for the construction and thorough equipment of a new bridge shop adjoining the present plant. The outlay will exceed \$50,000.

The Fulton Iron Works has bought a site and will build a \$300,000 plant on the western part of this city, removing from its present site near the river front. The company has increased its capital from \$250,000 to \$400,000.

The Wrought Iron Range Company is completing plans for removal from the center of the city to a site in the western suburbs where a much larger and more complete plant will be built and equipped.

The Hoffman-Pollhans Clock Mfg. Company has been incorporated here and will build a plant for the manufacture of a specially designed time keeper.

The Globe Heating and Engineering Company has been incorporated in St. Louis for the manufacture and installation of heating plants, vacuum ventilation systems, etc.

The Star Disc Machine Company has been incorporated at Kansas City, Mo., for the manufacture of patented devices and will install machinery in a building leased for its plant.

The contract for boilers to be used in the heating and lighting plant of the new city hall, municipal courts building and jail has been let at \$26,000 to the Toledo-Flanner Company, Toledo, Ohio.

The Kimball Lumber Mfg. Company, St. Louis, with \$500,000 capital, has been incorporated to engage in a lumber mill and manufacturing business, the first board of directors being Phin Kimball, LoArk, Iowa; M. J. D. Rast, Frederick Vierling and Fred A. Gissler, St. Louis.

The Weber Mfg. Company, St. Louis, has been incorporated by R. A. Shotwell, F. C. Shotwell and J. C. Banks to do a general sheet metal, heating and metal roofing business.

The David Ranken Jr. School of Mechanical Trades is to more than double its present capacity by the erection of a new building which is to be very completely equipped with machinery for the use of the students whose numbers have already exceeded the capacity of the building erected two years ago. The school has an endowment of about \$3,000,000.

THE MACHINERY MARKETS

William J. Hayes, president of the Haynes Langenberg Mfg. Company, manufacturer of furnaces, etc., denies that his company had any part in the merger of furnace manufacturing companies reported from Chicago the past week. Mr. B. B. Culver, of the Home Comfort Wrought Iron Range Company also said that his company had nothing to do with the new organization. Both gentlemen said that they had been approached by the promoters of the merger, but had declined participation.

A committee of citizens of St. Joseph, Mo., has been appointed by the Mayor to investigate the city electric light plant and to confer with the Mayor and Council in regard to extending its capacity.

The King Foundry Company has completed a new foundry building at St. Joseph, Mo., into which it is moving its present equipment from Nebraska City.

Western Canada

WINNIPEG, MAN., May 26, 1911.

The immigrants coming into Canada in such large numbers this year are nearly all locating in the west. They have good buying power, and add greatly to the market importance of the Western provinces. Large quantities of manufactured goods that would either not have been produced in Canada at all or would have had to be exported are being sold to immigrants, who are also contributing to the purchase of imports.

It is reported from Vancouver, B. C., that an English company will shortly be incorporated with a capital stock of \$20,000,000 to build and operate works at Pitt Meadows, opposite Coquitlam, B. C. Blast furnaces and open-hearth steel furnaces and rolling mills are to be started. William Owen, M. E., from London, England, is named as the initiator of the project. He has been in Vancouver for some weeks. The company will, it is said, be an English one registered in Canada. It is further stated that the plant and machinery will be brought from Europe.

The \$3,000,000 issue of bonds recently offered in London by the B. C. Electric Company, Vancouver, B. C., was over subscribed.

Plans for the enlargement of the Empress Hotel, at Victoria, B. C., have been prepared by the Canadian Pacific Railway Company, the cost to be \$200,000.

A nine-months' extension of time has been granted to the Western Canada Power Company, Vancouver, B. C.; one turbine is now on the way from Europe.

An additional 10,500 hp. is being added to the Lake Buntzen generating plant of the British Columbia Electric Railway, Vancouver, B. C. Contracts for the installation of the generator, water wheel and pipe line have been let as follows: The Canadian General Electric Company received the contract for the generator; McDougall & Company, the contract for a Dobie water wheel.

The City Council of Victoria, B. C., is calling for tenders for 300 electric-light standards.

An American syndicate, in which F. C. Adams, Portland, Ore., and Charles A. Barnum, Revelstoke, B. C., are interested, has acquired a vast tract of timber land in the interior of British Columbia. It is the reported intention of the syndicate to build large pulp and paper mills in Revelstoke, and a large sawmill at Big Eddy, near Revelstoke, and to install a power plant that will serve both industries. It is stated that \$2,000,000 will be spent in these plants.

Turbines are being installed at the dam the Canadian Pacific Railway Company is building at Bassano, Alberta.

The Industrial Sites Committee, Calgary, Ont., has purchased 97 acres of land for factory locations.

The City Council of Edmonton, Alberta, is considering a proposal to establish a municipal gas plant.

Cardston, Alberta, is considering the question of installing municipal water works.

Up to June 13, sealed tenders will be received by the Mayor of Prince Albert, Sask., for the construction of dam and headworks and canal and power station foundations of a hydroelectric power plant the city is to have at La Colle Falls, 25 miles distant.

The Dominion Government will call for tenders next month for the construction of the first 120 miles of its Hudson Bay Railway.

The ratepayers of Fort William, Ont., have approved the by-law to bonus the Superior Rolling Mills Company, in which H. S. Holt, C. R. Hosmer and other Montreal capitalists are interested. Work is to be begun at once on the plant.

Eastern Canada

TORONTO, ONT., May 27, 1911.

In his address at the annual meeting of the Imperial Bank of Canada, held in Toronto May 25, the president of that institution, whose operations are of national scope, said that the bank had just received reports from about 100 manufacturing points in the country, all to the effect that business was exceedingly active and healthy. He added, "Everywhere prosperity reigns." This testimony of one of the most responsible and careful bankers in the country is in agreement with every other evidence on the point. According to the estimate of William Whyte, vice-president of the Canadian Pacific Railway Company, and manager of the lines west of the Great Lakes, the wheat crop of the prairie provinces promises to yield about 200,000,000 bushels, which is 100 per cent. more than the yield of last year, when drought did great havoc. It is safe to say that the manufacturing industries of the country as a whole were never busier than they are now. Money will be pouring into the country this year. The lowering of steel prices across the line will, it is believed, rather stimulate than check business here. The material is needed, whatever the price and large consumers cannot afford to hold off the market in the hope that a waiting game will bring prices still further down.

It is recognized that there is too much speculation in real estate, and that money tied up in such speculation is much needed for the financing of live business. This is particularly felt in some of the Western cities. There are expectations of an early general election. The announcement of new Government projects such as the beginning of construction of the Hudson Bay Railroad is taken as an indication of a coming appeal to the country. It would appear too as if the Government could not put off an appeal very long, as the opposition is in a position to force its hand by obstruction of supply, resistance to the Knox-Fielding reciprocity pact and contention over any redistribution bill that may be introduced. A general election would not greatly moderate the present trade activity, as the main issue affecting trade would be reciprocity, and that cannot be made to look much more forbidding to trade than it has been made to appear for the first four months, during which trade has gone on increasing.

The town clerk of Tavistock, Ont., will receive up to June 14, tenders for approximately 2250 ft. of 8-in., 2550 ft. of 6-in. and 2100 ft. of 4-in. cast-iron water pipe, about 7 tons of special castings, about 16 hydrants, valves, etc. and a steel elevated tank.

Contracts have been let for the construction of the Chatham Malleable Iron & Steel Company's buildings at Chatham, Ont.

The Preston Car & Coach Company, Preston, Ont., will enlarge its plant.

The Morrow Screw Company, Ingersoll, Ont., proposes to extend its plant at an estimated expenditure of \$150,000.

The McClary Mfg. Company, London, Ont., is building an extension to its plant.

The board of control of Toronto has awarded to the Canada Foundry Company, Toronto, the contract to make the 72-in. pipe for a water-works intake, at \$62,125. Tenders were also received from the Drummond-McCall Company, Montreal; the Marine Signal Company, the Polson Iron Works Company, and the John Inglis Company, Toronto.

The town of Brockville, Ont., has awarded a contract to Laurie & Lamb, Montreal, for a 450-hp. Bellis & Morrow engine with condenser; and a contract to Kilmer, Pullen & Burnham, Toronto, for a 300-kw. directly connected generator. This will complete the equipment of Brockville's municipal power station.

The Canadian Metal Seal Company has been incorporated in Ottawa with a capital stock of \$300,000, its head office to be in Montreal. It will manufacture metal seals, nozzles, powder cans, etc.

The Ogilvie Flour Mills Company's plant at Seaforth, Ont., is to be equipped with electrical machinery.

William McVittie has begun the construction of a power plant at the Water Fall, six miles below Wahnapitae, Ont. It is said that the Mond Nickel Company will use some of the power at its new plant at Romford, Ont.

The penstocks, water wheels, generators and other equipment required for Price Bros. Company's new pulp mills at Jonquiere, Que., will be purchased by R. S. Kelsch, consulting engineer, Montreal.

THE MACHINERY MARKETS

The town of Campbellford, Ont., has placed an order with the Canadian General Electric Company, Peterborough, Ont., for a gas producer generating plant of the following description: Two Premier gas engines of 172 and 344 hp., and two gas producers. These to be used with one 100 and one 200 kw. a.c. belted generator, 3-phase, 60-cycle and 2300 volts. The plant has to be delivered and in running order by September 1.

The plant of the Canadian Locomotive Works Company, Kingston, Ont., has been purchased for an English syndicate, made up of engineers and capitalists. It is said to be the purpose of the new owners to increase the capital stock of the company to \$5,000,000 and double the capacity of the works.

The E. & T. Fairbanks Company, Sherbrooke, Ont., has built a three-story factory to be used in the manufacture of the scales contracted for by the Montreal Harbor Board.

Ross & Holgate, Montreal, have let the contracts for the building of a hydroelectric plant at Porcupine, Ont., for E. A. Walberg. The electric machinery is to be supplied by the Canadian Westinghouse Company, Hamilton, Ont., and two 3500-hp. turbines will be furnished by S. Morgan Smith Company, York, Pa.

The ratepayers of Galt, Ont., have ratified a by-law authorizing the Town Council to expend \$25,000 upon extensions of the municipal hydroelectric system.

The Canada Iron Corporation, Montreal, has under construction at its iron mines near Tarbrook, N. S., a washing plant that will cost \$75,000.

The Dominion Bridge Company, Montreal, is preparing to close Second and Third avenues at Lachine, Que., for the purpose of extending its shops and yard.

The Montreal Light, Heat & Power Company will lay 450,000 ft. of electric cable duct in Montreal this summer. The power cable to be used will be supplied by the Canadian-British Cable Company, Montreal, the price being about \$100,000.

The Wayagamack Pulp & Paper Company, Three Rivers, Que., has placed an order with the Lancashire Dynamo & Motor Company for the equipment of the new pulp and paper mill at Three Rivers. The order includes 44 motors from 400 hp. down, with starting equipment therefor. The switch gear is to be manufactured by Eckstein, Heap & Co., Manchester, England.

The Hydro-Electric Commission of Ontario is negotiating for the purchase of the Chats Falls water power on the Ottawa River from its private owner, the intention of the commission being to develop power there as a center from which to distribute to towns and cities in that part of Ontario. It is understood that \$50,000 has been offered, and that twice that amount has been asked, for the property.

L. N. Senecal, secretary of the Water Works Commission, Montreal, will receive tenders to June 29 for the installing of pumping machinery, blower and cranes of the municipal filtration plant.

The City Council of Montreal has authorized tenders to be called for for building sidewalks at a cost of about \$500,000; for water mains, \$677,000; for sewers, \$616,000, and for other public improvements, \$720,000.

The Canadian General Development Company, Montreal, has begun work on the central generating station of the Acadia Coal Company's electrical power plant at Stellarton, N. S. Two units of 1500 kw. each are being installed by the Canadian General Electric Company, Peterborough, Ont., and the Allgemeine Gesellschaft. The generators will be connected with steam turbines. Babcock & Wilcox, Montreal, have the contract for installing boilers, stokers and a coal and ash-handling plant. Contracts are to be placed soon for two electrically driven hoisting engines in the Acadia Coal Company's mines. Compressors, fans, pumps and other machinery are to be operated by electricity. The power plant and machinery equipment thus being put in at the company's mines will cost about \$400,000. The work is to be completed before the end of the year.

The Imperial Mfg. Company, Warren, Pa., manufacturers of saddlery, hardware and patented specialties, will establish its Canadian branch plant at Welland, Ont. A site has been purchased at Patterson avenue and Major street and construction of a factory building will be commenced at once.

The Garden City Paper Mills, Ltd., has been incorporated with a capital stock of \$100,000. It is to carry on a paper manufacturing business in St. Catharines, Ont.

The Pacific Coast

PORTLAND, ORE., MAY 23, 1911

The demand for machinery in general is well sustained, though no material increase is noted. Metal-working tools are rather quiet. No inquiries of any great importance are coming out at present, and the demand is limited, for the most part, to small articles. The movement of general shop equipment is very fair, however, in the aggregate, and the outlook is very favorable for this class of business. A somewhat similar condition prevails in other lines of machinery. Aside from a few large hydroelectric projects in various parts of the coast there are few propositions in sight which call for much heavy equipment, but the quietness in this line is offset by an active demand for small machinery of many descriptions.

No great development of the lumber industry of this territory appears likely for this year. The market has been dull since the first of the year, and a movement is now under way to curtail the output of all the mills in the north coast district. A few of the sawmills are making improvements with a view to efficiency and economy, and with the approach of the fruit season many box factories are increasing their equipment, and a few new ones are being installed, but aside from this woodworking machinery is quiet. Several of the Puget Sound shops are still busy on mining machinery, and a good volume of marine work is under way, though the latter consists largely of repair work. Dredging operations in this vicinity call for considerable machinery, and some orders for quarry equipment are coming out.

Portland firms have been invited to bid on the construction of a suction dredge for the Standard American Dredging Company, San Francisco.

A. G. Pace, Seattle, Wash., has patents on a new gas engine, manufactured by the Moran Company, of that city. The engine is designed to use crude petroleum.

The Willamette Iron & Steel Works is completing the installation of pumping machinery in an 18-in. suction dredge for the Spokane, Portland & Seattle Railway.

A proposition has been made to the East Side Business Men's Club, this city, with a view to the establishment of an automobile factory.

The Island Transportation Company, Seattle, Wash., is having plans drawn for a new steamer, to cost about \$50,000.

The Moran Company, Seattle, Wash., has the contract for installing an oil-burning outfit in the Canadian steamer Princess Adelaide.

The Grangeville, Idaho, Light & Power Company is considering the installation of a new plant.

The Inland Empire Biscuit Company, Spokane, Wash., is preparing to remodel its engine-room and install a new heating system.

The Los Angeles Basket Company, Los Angeles, Cal., is putting in a large plant at Vashon, Wash. A number of resaws and a lot of basket and veneer machinery will be installed.

The Empire State Mfg. Company has been incorporated at Spokane, Wash., with a capital stock of \$200,000, by C. A. Bassett, E. J. Peterson and others, for the manufacture of a floor-scraping device.

Arrangements are being made for the installation of a large pumping plant, near Nyssa, Ore., for the irrigation of 5000 acres.

The Lewiston-Clarkston Improvement Company is preparing to make a number of improvements in its power plant at Catello, Idaho.

The town of Payette, Idaho, is considering the installation of a lot of pumping machinery.

It is reported that the E. K. Wood Lumber Company will erect a lumber mill with a capacity of about 250,000 ft. per day at Anacortes, Wash.

The Sedro Veneer Factory, Sedro-Woolley, Wash., is planning a number of improvements, including the installation of a large hydraulic press.

New bids will be received June 14 for installing an oil-burning outfit on the government dredge Clatsop, at this city.

Representatives of the Olympic Portland Cement Company, which is preparing to erect a large plant at Bellingham, Wash., are now in the East making arrangements for the delivery of machinery. Alexander Baillie, Seattle, Wash., is handling the details of the project.

The D. J. Wilson Company is preparing to erect a box factory at Lewiston, Idaho.

THE MACHINERY MARKETS

Texas

AUSTIN, TEXAS, May 27, 1911.

The unusually good prospects for a large cotton crop are causing a heavy demand for ginning and compress machinery. Besides the many new ginning plants that have been ordered and are being installed, a great deal of work is being done in the way of improving existing plants. Some of them are being enlarged and new machinery is being placed in others. There is a noticeable improvement in machinery trade in other lines. The general crop prospects over the State could hardly be improved upon.

The Walsh Farmers' Union Gin & Milling Company has been formed at Walsh. The incorporators are W. G. May, H. C. Bennett and S. Lester.

O. Q. Rasmussen, Stoughton, Wis., will establish a plant at Dallas for the manufacture of fertilizers.

The Francis Light & Power Company has been formed at Francis, with a capital stock of \$10,000. The incorporators are A. L. Mullergren and W. J. Donathan of Poteau, and W. P. Chism, Albert Goetter and W. L. Shaffer of Francis.

The City Council of Corpus Christi has under consideration plans for the improvement and enlargement of the water supply system of the town. The damming of the Nueces River in order to provide an ample storage supply and piping of the water several miles into the city may be decided upon.

Harry Lands, New Braunfels, will install a cotton gin at Crown.

The Theodore Shade Air Brake Company has been formed at San Antonio for the purpose of erecting a factory for the manufacture of air brakes. W. E. Milligan is president; L. L. Daniel, vice-president; A. P. Villaret, secretary-treasurer.

The City Council of West has taken preliminary steps toward constructing a system of sewers. Bonds will be issued for the purpose.

O. O. Love will install a cotton gin at Dickens. The plant will be finished in time for this season's cotton crop.

S. B. Guines, Calvert, Texas, will install a modern cotton gin at Franklin to cost about \$10,000.

The Portland Development Company has been formed at Portland with a capital stock of \$60,000 for the purpose of installing systems of public utilities and making other improvements to the town. The incorporators are John G. Willacy, J. M. Eskridge and E. C. Wessendorff.

M. A. Joy, Terrell, Texas, has been granted a franchise by the City Council of that city for the construction of a sewer system and disposal plant at Sweetwater.

The Collegeport Canal Company is extending its irrigation and drainage system near Collegeport.

Mayor E. W. Brown is enlarging his irrigation pumping plant on Cow Bayou near Orange. He is installing a 90-hp. gasoline engine.

George Muennink and associates will install an ice factory at Hondo.

F. C. Henery of San Saba and associates will erect a cotton compress there to cost about \$20,000. New York men are interested in the project.

The Texas Bithulithic Company, Dallas, will install a branch plant at Austin for manufacturing paving material.

W. B. Walker & Sons will install a cold-storage plant at Austin to cost about \$75,000.

The municipal water works system at Mt. Pleasant will be improved by the installation of a new pumping plant.

The capacity of the cotton gin of the John Miesch Gin Company, Clarksville, will be doubled.

W. B. Tuttle will install a system of irrigation and a pumping plant on a tract of land 8 miles south of San Antonio.

It is reported that the shops of the International & Great Northern Railroad at Taylor will be enlarged. Considerable new machinery will be installed. The general offices of the company are at Palestine.

The Great Western Power Company has begun the preliminary work toward the installation of a large hydroelectric plant near Tucson, Ariz. A road is now being constructed to the site of the proposed dam. The latter structure will be 360 ft. high and will form a storage reservoir for an enormous supply of water for operating the hydroelectric plant.

The Homesteaders' Association of Melrose, N. M., estimate that more than 100 irrigation pumping plants

will be installed in this section this year. The association has ordered a 20-hp. engine and a 6-in. pump to test the wells that its members are putting down.

The recent adoption in the section around Estancia, N. M., of irrigating from shallow wells is causing a big demand for pumping plants. Many wells have already been put down and pumps installed. Preparations are being made to test twelve new wells and if the water supply is found sufficient pumps will be installed.

A fund of \$5000 is being raised by popular subscription at Douglas, Ariz., to put down a number of wells in the Sulphur Springs Valley with the view of developing a water supply for irrigation purposes.

The Los Indios Irrigated Land Company has been organized at San Benito, with a capital stock of \$10,000. The incorporators are J. C. Miller, J. George Bowyer and M. W. Jones.

The Pioneer Smelter Company is arranging to erect a large reduction plant near Tucson, Ariz.

The American-Aldosora Mining Company will install a reduction plant at its mines near El Tigre, State of Sonora, Mexico. Evan Lee Curley, St. Louis, Mo., is president.

The Chamber of Commerce of Houston is negotiating for the removal to that city of a structural iron works, the name of which has not yet been made public.

Government Purchases

WASHINGTON, D. C., May 31, 1911.

The commanding officer of the Rock Island Arsenal, Ill., will open separate bids June 6 for furnishing and delivering one Bickford radial drill, 3½ ft. arm; one Lucas power forcing press, No. 1, 15 tons capacity, equipped with pressure gauge and countershaft complete; one Pratt & Whitney spline milling machine complete; one 36-in. heavy high duty drill; three universal shaping machines; one induction motor, under circular No. 302, and one Cincinnati variable speed planer.

The depot quartermaster, Grays Ferry Road, Philadelphia, Pa., will open bids June 9 for furnishing and erecting one 200 hp. water-tube boiler.

M. Gray Zalinski, depot quartermaster, Army Building, Whitehall street, New York, will open bids June 15 for furnishing and installing six pumps and accessories at Fort Mills, P. I.

The office of the commanding officer, Frankford Arsenal, Philadelphia, Pa., will open bids until June 5 for furnishing and installing one 1-ton electric traveling crane at the Frankford Arsenal.

The office of the Commissioners of the District of Columbia, Washington, D. C., will open bids until June 5 for furnishing and installing complete in the McKinley Manual Training School one double-beam hand-power geared traveling crane of 4000 lb. capacity.

The Paymaster General, Navy Department, Washington, will open bids June 6 for furnishing one boring, drilling and milling machine at Mare Island, Cal.

The Department of the Interior, Washington, D. C., opened bids May 19 for installing a coal bunker and coal-handling machinery in the Freedman's Hospital, as follows: Charles A. Barker, Washington, \$15,445; Boyle Robertson Construction Company, Washington, \$18,235; John W. Danforth Company, Washington, \$14,542; J. M. Dodge Company, Philadelphia, Pa., \$21,070; Stoddard Repair Company, New York, \$15,950; Guarantee Construction Company, New York, \$21,974; R. H. Bowmont Company, Philadelphia, Pa., \$16,084.

The constructing quartermaster, Fort Caswell, N. C., opened bids April 27 for furnishing two 53 hp. single valve engines as follows: Valley Iron Works, Williamsport, Pa., \$1,513; A. D. Granger Company, New York, \$1,643; Ball Engine Company, Erie, Pa., \$3,170 and \$2,232; Harrisburg Foundry & Machine Work, Harrisburg, Pa., \$3,155; Skinner Engine Company, Erie, Pa., \$2,035; Ames Iron Works, Baltimore, Md., \$2,666 and \$2,424; Gibbs Machinery Company, \$2,015; Shepherd Engineering Company, Williamsport, Pa., \$3,207.36.

The Bureau of Yards and Dock, Navy Department, Washington, opened bids May 13 for electric lighting machinery and accessories at the Marine Corps Rifle Range, Winthrop, Md., as follows: Western Electric Company, New York, \$1,008; Fairbanks Company, Baltimore, Md., \$2,761.25; Fairbanks, Morse & Co., New York, \$3,793; Dieh Mfg. Company, Philadelphia, Pa., \$490 part; National Electrical Supply Company, Washington, D. C., \$3,707.

The following quotations are for small lots. New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

THE IRON AGE

Established
1855

New York, June 8, 1911

VOL. 87: No. 23

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
I. A. Mekeel,	-	-	-	-	First Vice-President
Harold S. Buttenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

The Application of the Anti Trust Decisions.....	1378
Record Iron and Steel Exports.....	1378
Intensive Production.....	1379
Higher Machine Tool Prices.....	1380
The Steel Corporation Buys Coal Lands.....	1380
Personal	1381
Obituary	1381
Pig Iron Production.....	1382
The Iron and Metal Markets.....	1384 to 1394
Efficiency in the Foundry.....	1395
Lake Superior Mining Conditions.....	1396
Utilizing Blast Furnace Wastes.....	1397
Welfare Work of Electric Lighting Companies.....	1398
Vanadium in Cast Iron.....	1398
The American Sheet & Tin Plate Company Starts Gary Plant..	1399
Standards for Various Kinds of Pig Iron.....	1400
Iron and Steel Exports and Imports.....	1401
Experience with Permanent Molds.....	1402
The Steel Corporation Investigation.....	1404
E. H. Gary on Co-operation.....	1408
Mechanical Engineers' Meeting.....	1411
The Corrosion of Iron.....	1417
Automatic Temperature Controlling Instrument.....	1418
Russian Pig Iron Soaring.....	1421
By-Product Coke Ovens in America.....	1422
Handling Sand in the Foundry.....	1423
The Detroit Industrial Exposition.....	1423
An American Sheet & Tin Plate Company Announcement.....	1423
Combined Jarring and Squeezer Molding Machine.....	1424
Combination Turret Lathe.....	1424
The Brown-Ketchum Iron Works Receivership.....	1425
Mechanical Charging of Cupolas.....	1426
A Self-Contained Vertical Sump Pump.....	1429
A Study of the Blast Furnace.....	1429
Fewer Freight Cars Idle.....	1429
Raising the Battleship Maine.....	1430
New Liquid Weigher.....	1432
The Vitrolite Company's Improvements.....	1432
American Vanadium Facts.....	1432
A Heavy Pattern Drill Press.....	1433
The Joliet Rolling Mill Company.....	1433
Railroad Equipment Orders.....	1433
The Machinery Markets.....	1434
Trade Publications	1443

Pig Iron Production Shrinks

Better Demand for Steel Bars

Some Rail Orders Coming Out

Our reports from blast furnaces, covering operations in the month of May, show a further reduction in the output of pig iron. The restriction of operations thus continues. Our figures show that the total make of coke and anthracite pig iron in May was 1,893,456 gross tons, or 61,079 tons a day, against 2,065,086 tons in April, or 68,836 tons a day. Quite a number of furnaces were blown out during the month, but some of these merely went out for repairs and may be expected to be in operation shortly. Several furnaces connected with steel plants were blown in, indicating that the production of pig iron for steelmaking may slightly increase. The number of furnaces in operation June 1 was 203, against 212 on May 1. The United States Steel Corporation had in operation at the beginning of this month 63½ per cent. of its blast furnace capacity. This is about the rate of production which has prevailed for some time, indicating uniformity in the operations of the corporation's works as a whole, this being accompanied by no accumulation of stocks of pig iron.

Manufacturers of cold-rolled steel shafting have followed the example of the makers of steel bars, reducing their discounts to 60 per cent. off in carloads and 55 per cent. off in smaller lots, delivered in base territory. Makers of boiler and structural rivets have also lowered their prices to correspond with steel bar prices.

The steel bar trade shows some improvement as a result of the recent reduction in prices. A considerable tonnage of steel bars was placed last week with the leading manufacturers on the new basis by agricultural implement makers and other large consumers who contract at this time for their supply for the twelve months beginning July 1.

Other lines in which price reductions were made do not show much improvement in business, yet the week has not been a bad one. Among orders placed for new projects involving structural material were 6000 tons for a department store at Newark, N. J.; 1200 tons for the new building of the American Express Company, New York; 2400 tons for the by-product coke oven plant at South Bethlehem, Pa.; 5932 tons for the Otis Bank Building, Chicago. The fabricating contract for the Hotel Statler, Cleveland, 4000 tons, has at length been placed.

Rail orders are somewhat better. The Baltimore & Ohio Railroad has bought 23,050 tons, taking 13,050 tons from the several mills of the United States Steel Corporation, 7500 tons from the Cambria Steel Com-

pany, and 2500 tons from the Bethlehem Steel Company. The Missouri Pacific-Iron Mountain system has bought 25,000 tons from the Colorado Fuel & Iron Company for delivery within two months, and a further purchase of 25,000 tons is under consideration. Other important rail inquiries are in the market, including one from the Harriman system for 40,000 tons.

The American Sheet & Tin Plate Company has completed part of its new large plant at Gary, Ind., and satisfactory test runs have been made.

Among new business now coming up is the requirement of steel plates for the ten new torpedo boats, amounting to 5000 tons. The two new revenue cutters will take 2000 tons. A large steel company at Pittsburgh is the low bidder on 4000 tons of plates and 1500 tons of shapes for the collier Jupiter, to be built at the Mare Island Navy Yard. The Williamsburg Bridge, New York, will require 4000 tons of steel for reinforcement and for tower construction. Bids are now in for the great Hell Gate Bridge, New York.

The pig iron market shows little change in demand as prices are not as firm as they should be, and under such conditions consumers naturally wait for developments. The production is now so much under the rate of three months ago that it must be close to if not under the consumption. In the last half of May stocks of pig iron at independent furnaces in western Pennsylvania decreased 13,000 tons.

An event of great importance is the advance of pig tin in London to the highest price ever known. It is within $\frac{3}{4}$ c. per lb. of the highest price ever reached in New York.

The Application of the Anti-Trust Decisions

The Supreme Court decisions in the Standard Oil and American Tobacco cases show clearly that the mere bigness of a corporation is not in itself to be considered a violation of the Sherman anti-trust act. This is an important point upon which the judgment of the public appears to have been at fault. The Sherman anti-trust act grew out of the fear that industrial and commercial organizations were being formed by agreement among competitors which would completely control their respective branches of business and that the consumer would then be forced to pay exorbitant prices or be limited to but one source of supply for a necessity. The Sherman law was enacted expressly to check such a disposition among business interests and it did so to some extent. So much respect was paid to it by those who felt absolutely impelled to reduce competition in their lines that they turned from merely making trade agreements to the formation of large corporations which absorbed as many competing concerns as was possible or desirable. Greater corporations were thus created after the enactment of the Sherman law than had been in existence or even dreamed of prior thereto. These corporations the public has regarded as trusts indiscriminately and as violators of the law because of their great size.

The Supreme Court has shown by these decisions that a big corporation stands or falls according to its methods. The two corporations ordered to be dissolved or reorganized have been found guilty of improper actions, of conducting their business in a manner which constitutes a violation of the spirit of the Sherman law. The question which concerns quite a number of large corporations in the various trades

with which *The Iron Age* is identified is how they shall conduct their business so that they may not fall under the ban of the law as have the Standard Oil and American Tobacco companies. Announcements have come from Washington that while the Department of Justice will not conduct a crusade against large corporations it proposes to continue its activity in endeavoring to punish all corporations and their officers who appear to be violating the law. The way seems clear, in the light of the decisions, for large corporations to avoid subjecting themselves to the pains and penalties of the law and even to clear themselves from any unpleasant attention by the Department of Justice. This is to conduct their business with a wholesome respect for the law and not with any attempt to evade it.

The Sherman anti-trust act is evidently here to stay. Neither its enemies nor its friends are likely to be able to amend or reconstruct it. It has been interpreted by the highest court in such a way that no violator is financially so strong or politically so powerful as to be able to avoid it, while the way has been pointed out for great interests to proceed in the conduct of their business without harassing attention from the officers of the law. It is therefore the plain duty of every large interest to conduct its business in the straight and narrow path.

Record Iron and Steel Exports

New records are being made in all the general classes of iron and steel exports. The sharp increase which has recently occurred in exports of the tonnage lines of iron and steel is generally appreciated, but it is not so widely known that in agricultural implements and general machinery new records are also being made. The increase in the tonnage lines is lightly ascribed to the efforts of the United States Steel Corporation, and the inference is probably sometimes drawn that were it not for its position and policy no special development in the matter of exports would be observed at this time. When it is perceived that exports of other iron and steel products are this year exceeding previous records by approximately one-fourth, it becomes apparent that, whatever may be the particular influence in the case of the tonnage products, the movement toward heavier exports is general.

Before considering the machinery and other fabricated lines a glance may be taken at the tonnage lines. In the following table are shown the exports of the tonnage lines for the past seven years, since prior to 1904 the exports were, as a rule, much lighter, until then being made up chiefly of pig iron and unfinished steel. To the seven years has been added an estimate for 1911, based on the four months so far reported. The figures cover scrap, pig iron, unfinished steel and finished rolled steel such as structural material, plates, bars, sheets and pipe, together with wire, nails, etc.

Iron and Steel Exports, Gross Tons	
1904.....	1,167,710
1905.....	1,010,255
1906.....	1,325,740
1907.....	1,301,979
1908.....	964,266
1909.....	1,239,708
1910.....	1,535,693
1911.....	2,240,000*

*Three times the total for the four months reported.

The exports in the first four months of this year were one-half greater than the average rate of last year, and more than double the average in 1904 and 1905. The actual exports in the four months of this year were as follows:

	Gross tons.		Gross tons.
January	152,140	March	215,667
February	150,702	April	227,832

For several years prior to 1910 the exports averaged approximately 100,000 tons per month, the exports in 1910 averaging 125,000 tons a month, so that the sharp increase in recent months is readily apparent. The April exports were approximately 125 per cent. in excess of the average prior to last year.

The declared value of the above tonnage exports has been as follows:

1904.....\$42,551,109	1908.....\$43,397,323
1905.....42,104,348	1909.....50,783,138
1906.....52,215,089	1910.....63,276,714
1907.....60,046,221	
January, 1911..\$6,243,064	March, 1911....\$7,443,241
February, 1911. 5,845,972	April, 1911..... 8,696,136

The monthly average prior to 1910 was a trifle over \$4,000,000, while the April exports were slightly more than double this, indicating that there has been nearly as great an increase in value as there has been in tonnage. The total for the four months of this year was \$28,228,413, or at the rate of \$85,000,000 a year, indicating a large gain over any previous year. If there has been any considerable decrease in the unit value of the lines exported, this has been fully compensated by the exports being made up more largely of the more finished products.

The value of the other products classed in the government returns as "iron and steel" but outside of the tonnage lines just referred to, and made up of hardware, cutlery, machinery and parts of machinery, etc., has been as follows:

1904.....\$86,002,504	1908.....\$107,715,791
1905.....100,824,165	1909.....106,897,193
1906.....120,340,499	1910.....137,995,189
1907.....137,020,560	
January, 1911..\$12,496,897	March, 1911....\$15,148,607
February, 1911 12,844,820	April, 1911.... 16,220,920

These exports have fluctuated widely, but as 1907 and 1910 showed substantially the same total, while intermediate or preceding years showed smaller totals, it may be inferred that there has not recently been a definite tendency toward an increase, but whereas the monthly average in the two record years, 1907 and 1910, was \$11,500,000, January and February last showed a gain of 10 per cent. over this average, March a gain of 30 per cent. and April a gain of more than 40 per cent.

In agricultural implements, which the government returns do not classify as iron and steel, but which are distinctly an iron and steel proposition, exports have been at record rates this year. Inasmuch as these are more or less seasonable goods it might be misleading to compare the results of the first four months of this year directly with the averages of preceding years, and a comparison will therefore be made to show that last year was a record year, another comparison then showing that the first four months of this year have greatly surpassed the record of the corresponding months of last year. Exports of agricultural implements have been as follows in the past seven years:

1904.....\$21,654,892	1908.....\$25,264,939
1905.....22,124,312	1909.....27,327,428
1906.....24,744,762	1910.....31,291,351
1907.....25,597,272	

Thus the value of agricultural implement exports last year exceeded the best previous year by nearly 15 per cent. and the average of the preceding five years by more than 30 per cent. Exports in the first four months of this year compare with these in the same months of last year as follows:

	1910.	1911.
January	\$3,230,249	\$4,208,316
February	3,728,778	3,537,036
March	3,769,847	4,890,047
April	3,034,348	5,476,750
Four months.....	\$13,763,222	\$18,112,149

The increase from the four months of last year to the four months of this is 32 per cent., and on this basis it may be inferred that the exports this year have been at a rate of 70 per cent. in excess of the rate in the five years 1904-8 inclusive.

Thus there is this year a large increase in exports of the three lines, tonnage commodities, machinery, etc., and agricultural implements. In a nutshell, the exports of these three lines in the four months of this year have been at the rate of \$310,000,000 a year, over 30 per cent. in excess of the exports in 1910, and more than 50 per cent. in excess of the exports in the few years preceding 1910.

Exports of all merchandise have not been increasing this year, the total exports being valued as follows:

January	\$197,000,111	March	\$188,670,556
February	175,945,805	April	158,008,093

The exports of iron and steel products, including agricultural implements, amounted in April to \$30,393,806, or 19.2 per cent. of the total exports. This is really an excellent record. While there has been much advice given recently that this country "must get on an export basis" it appears that without making any particular effort to change fundamental conditions the producers of iron and steel, and the domestic manufacturers using these products, have been getting more on an export basis by the simple process of selling more export goods.

Intensive Production

It is a matter of pride with many firms to be able to boast that there is not a single article in their line which they are not prepared to manufacture. "Orders! More orders!" they cry, and the salesmen with such exhortations ringing in their ears are led into believing that increased volume of business at any cost is what is most desired by their employers. Accordingly, any good sized order is considered acceptable, provided the selling price has not been cut ruinously, with the result that the list of articles manufactured by the firm swells enormously, the works become crowded with both new and obsolete tools, and the "new machinery account" attains astonishing proportions. The practice is considered very good business by many firms who have proved themselves quite successful.

Here and there, however, an establishment is to be found which appears to hold an entirely different opinion as to the wisdom of manufacturing on such a wide scope. Such firms are like the medical specialist of modern times; all his energies have been expended and plans laid with the attainment of a highly developed equipment for one specific line as the one aim and purpose. Not a little shrewdness and boldness is demanded in the choice of such a business policy: shrewdness, because the wisdom of the thing has been seen in advance of competitors; boldness, because of the risk to be taken, the putting of all the eggs in one basket. Many will question the wisdom of taking the risk. Our world is made up of both radicals and conservatives—of "the pushers and the pushed"—and there will be few who will deny that progress is other than the fruit of the radical mind brought to maturity under the calm eye of the conservative. Where once we walked, now we ride—and fly.

A firm can be cited which ten years ago, employing several hundred hands, took orders for anything from wood screws to lamp burners, just as do a thousand other firms today. A change in the personnel of

its management was responsible for a change in policy from one extreme to the other. This new policy called for specializing, and specializing on those things which would mean the greatest returns on money invested. A study of its market showed what those things were. Machinery was then built and processes were devised to cut production costs and to intensify the production of these few widely used articles. As machine business was then secured as would keep the shop running to its fullest capacity and at a handsome profit. It is, however, more necessary with intensive, specialized production to keep ahead of all competitors in the matter of low production costs. To succeed permanently, such a manufacturer must be among the best at the game. But the game is well worth the candle.

Neither a long nor a vehement argument is needed to convince one that it is not the number of orders, not the volume of business, alone that counts. Every bit of business taken at a meager profit may mean the tying up of productive machinery at the expense of other business which would bring a more generous profit. Although the former may not mean an actual loss, it certainly means less profits at the year's end; whereas, with a firm whose plant is run on the specialized output plan, preference is given to that business which is known to bring maximum returns. The trained skill of the entire productive force is then concentrated in the endeavor to make that return greater day by day.

Higher Machine Tool Prices

The reports of the past two months that the price of machine tools was to drop were without foundation in fact. The tendency will be upward rather than downward, and when the revival of business comes prices will be increased very materially, according to the plans of the builders. Conditions justify this action.

Machinery lists are as they were at the high point of production four or five years ago. In some cases they are higher. The prices were created under the influences of prosperous business. At that time each manufacturer sought to put his business on a normal money-making basis. This had until then been impossible because of the bitterness of competition which had existed before the National Machine Tool Builders' Association had brought the manufacturers together periodically for the purpose of talking over their differences and softening asperities. Competition was led into legitimate channels. As a consequence of the new relationship in the trade even the influence of a complete reaction from good to bad times failed to bring with it the cutting of prices, except in somewhat isolated cases. Relations within the trade have not been seriously strained. The occasional announcement of an advance in prices by individual manufacturers has served to stiffen the situation.

Machine tool prices should be higher, if the manufacturer is to retain the margin of profit which was established in 1906-1907. Since then machinery has been much improved. Competition has impelled the addition of fixtures and appurtenances which make equipment more convenient of operation, besides giving it a larger scope of usefulness. Modern methods of manufacture have brought heavier construction in machinery. The cost of labor is no less, materials are but slightly lower and overhead charges are not

shrinking. Consequently an advance in prices will follow a revival of trade.

The Steel Corporation Buys Coal Lands

An important deal has about been closed whereby the United States Steel Corporation, through the H. C. Frick Coke Company, secures some 8,000 acres of coking coal land and 956 coke ovens belonging to the Pittsburgh Coal Company, the coke ovens having been operated under the name of the Colonial Coke Company. The Steel Corporation has also secured about 8,000 acres of coking coal lands formerly operated by the Monongahela River Consolidated Coal & Coke Company. It is said to have paid about \$1750 per acre for the 8,000 acres bought from the Pittsburgh Coal Company, this price also including the 956 coke ovens; and is reported to have paid about \$900 per acre for the 9,000 acres bought from the Monongahela River Company. The properties are to be paid for in 35-year 5 per cent. bonds. The transaction will remove the Colonial Coke Company as a seller of coke in the open market. This company has been operating its ovens practically full for some months, and has been selling its surplus furnace coke in the open market at relatively low prices. The growing scarcity of good coal lands in the Pittsburgh district is given as the reason of the purchase. The Pittsburgh Coal Company will still have about 150,000 acres of good coal lands in the Pittsburgh district.

On Monday next the Pittsburgh offices of the McClintic-Marshall Construction Company, steel fabricator, will be removed from the Park Building to rooms 1218-1224, inclusive, Oliver Building, Smithfield street. On the same date the contracting and treasury departments will also be removed from Rankin, Pa., where the company operates a large plant, to the new offices in the Oliver Building.

The machine shops of the Caledonia Railway Company, St. Rollox, Scotland, are lighted by an installation of compressed gas, 112,000 candle-power being required. A pressure of 54 in. of water is obtained by rotary compressors. The inverted lamps vary from 60 to 1500 candle-power per single burner, and are said to have an efficiency of 60 candle-power per cubic foot of gas, a result due not only to the high pressure, but also to a pre-heating device by which the gas and air mixture is warmed before entering the burner.

The Pittsburgh Piping & Equipment Company, Thirty-fourth and Smallman streets, Pittsburgh, is now shipping the material required for piping up the new two blast furnaces of the Iroquois Iron Company, South Chicago, Ill., consisting of 20-in. cast iron pipe for underground work, cast steel valves and fittings, and steam exhaust and riveted steel piping up to 72-in. diameter, with all connections to the blowers. The material and workmanship were specified to be of the highest grade. This company also recently completed a high-pressure piping installation of 2000 hp. in a cement plant in Tennessee.

The American Lead Company has moved its general offices from 3112 Penn avenue, Pittsburgh, where its plant still remains, to 508-509 Diamond Bank Building. This company makes lead, tin and chemical pipe, wire solder, art glass lead, lead drum traps, the American lead trap with reinforced vents and drains, etc., and is now operating its plant day and night.

The Pittsburgh White Metal Company, 3112 Penn avenue, Pittsburgh, manufacturer of babbitt and anti-friction metals, making a specialty of babbitt for armature bearings, has removed its offices to rooms 508-509 Diamond Bank Building, Pittsburgh. It is operating its plant to good capacity.

The Strauss Bascul Bridge Company, 901 Fort Dearborn Building, Chicago, Ill., has been awarded the contract for the construction of a 235-ft. single leaf double track bridge over the Calumet River at South Chicago, Ill., for the Baltimore & Ohio Railroad. The city of Quebec, Canada, has also placed an order for a 150-ft. single leaf highway bridge over the St. Charles River.

Personal

W. R. Anderson has resigned as general manager of the Anderson Forge & Machine Company, Detroit, Mich., taking effect June 1. He has been connected with the company since its organization as manager. W. T. Howell, who for the past two years and a half has been connected with the company in the capacity of general superintendent, has been promoted to the position of general manager. Mr. Anderson retains his interest in the company and will remain on the board of directors. He is not prepared to make public his plans for the future, but will take a vacation of about a month.

Fred McFawn has severed his connection with the Watrous Mfg. Company and associated himself with the Stanley Works, New Britain, Conn., traveling from the Western office, 73 Lake street, Chicago, and paying special attention to steel stampings.

Horst Peltz, general manager of the German Garbe Boiler Works, is now in this country to arrange for the manufacture of the Garbe boiler in the United States. He makes his headquarters with the Wiener Machinery Company, 50 Church street, New York City.

Edward G. Elcock, president of the Hansell-Elcock Company, structural steel fabricator, Chicago, and Mrs. Elcock were the victims of an automobile accident last week. While on their way to the Indianapolis Decoration Day races their car was wrecked, Mrs. Elcock being seriously injured internally and Mr. Elcock breaking his arm. They are now at a Chicago hospital.

The recent death of Alexander E. Brown, founder, president and general manager of the Brown Hoisting Machinery Company, Cleveland, Ohio, has resulted in several changes in the officers of that company. Harvey H. Brown, formerly vice-president and treasurer, and a brother of Alexander E. Brown, has been elected president. Alexander C. Brown, son of the former president, has been made vice-president. George C. Wing remains secretary. Charles T. Pratt, formerly assistant treasurer, becomes treasurer. Richard B. Sheridan has been made general manager.

The Penn Steel Castings & Machine Company, Chester, Pa., at a meeting of the board of directors held May 12, elected Walter S. Bickley president, succeeding Mortimer H. Bickley, deceased.

George K. Hamfeldt has resigned as general manager of the blast furnace department and as consulting engineer of Les Petits Fils de F. de Wendel & Cie., of Germany, effective July 1. He was for a number of years connected with the Carnegie Steel Company and later, as general manager of the Midland Steel Company, Pittsburgh, Pa., built its plant at Midland, Pa.

C. P. Craine, who has represented the Buhl Sons Company, Detroit, Mich., in the Michigan territory for a number of years, has become connected with the Pittsburgh Shafting Company, Detroit, and now represents the latter company in the same territory.

Albert A. Bialas, formerly with the Midland Steel Company and later a salesman for the S. Jarvis Adams Company, Pittsburgh and Midland, Pa., will hereafter be associated with the Columbia Steel & Shafting Company as special sales representative. The Columbia Steel & Shafting Company's general offices are in the Empire Building, Pittsburgh, Pa.

J. Friedenstein, director of William Cooke & Co., Ltd., Sheffield, England, whose American representatives are John Helmuth & Co., 30 Church street, New York, is at present at the Hotel Astor, New York. Mr. Friedenstein, who manages the foreign and colonial business for his company, is en route around the world looking after the interests of his company in this country, Australia, New Zealand and South Africa.

J. B. Shacklock, senior member of the firm of H. E. Shacklock, Ltd., manufacturer of stoves and ranges, Dunedin, New Zealand, accompanied by his son, H. A. Shacklock, and the Rev. D. J. Murray, are making a tour of the United States, en route for England. Mr. Shacklock is visiting the plants of the various manufacturers of foundry and machine shop equipment with the object of improving the efficiency of his own works. Mail addressed to 64 Parker street, Derby, England, will reach him before his return home.

W. H. Hegmann, 911 Oliver Building, Pittsburgh, Pa.,

has accepted the agency for western Pennsylvania of John Hy. Andrew & Co., Ltd., Sheffield, England, on high-grade high-speed and carbon steels, which are known as Toledo (Sheffield) tool steels. Mr. Hegmann has had some twenty-four years of tool steel mill experience in the Pittsburgh district with the Crescent Steel Company and Firth-Sterling Steel Company as superintendent.

F. G. Haldy, formerly superintendent of the door check and hoist departments of the Yale & Towne Mfg. Company, Stamford, Conn., has accepted the position of superintendent of the Whitlock Coil Pipe Company, Hartford, Conn.

Phillips Isham, of Nash, Isham & Co., pig-iron merchants, New York, has gone on an extended Western trip, including California and Alaska.

W. L. Saunders, president of the Ingersoll-Rand Company, 11 Broadway, New York, has been elected a director of the International Harvester Company.

B. S. Harrison, London, England, representing Sota & Aznar, producers of Spanish iron ore, who has been in this country since May 13, returned to England June 3.

H. A. Berg has resigned as superintendent of the blast furnace of the Midland Steel Company, Midland, Pa., effective June 1. This plant is now owned by the Pittsburgh Crucible Steel Company, an identified interest of the Crucible Steel Company of America.

Obituary

JOHN J. SPEARMAN, Sharon, Pa., died May 31, aged 87 years. He was a manufacturer of pig iron for the greater part of his life. Born at McKee's Gap, Blair County, Pa., his first employment was at blast furnaces in that vicinity. In January, 1847, he was placed in charge of Schoenberger, Agnew & Co.'s furnace at Sharon. In 1853 he purchased the Mazeppa furnace near Mercer, Pa., which he operated until 1859, when he became manager of the furnace at Sharpsville, Pa., owned by James Pierce, retiring from that position in 1862 to become manager for James Wood & Sons, Wheatland, Pa., and subsequently securing an interest in the firm. In 1872 he organized the Spearman Iron Company, Sharpsville, Pa., and managed that company until its property was taken over some years ago by the Shenango Furnace Company. At the time of his death he was president of the First National Bank, Sharon, Pa., and had held that position for 39 years.

JAY H. KEYES, recently retired from the presidency of the Standard Wheel Company, with plants at Indianapolis and Terre Haute, Ind., died May 26 at Terre Haute, aged 52 years.

JOHN D. HOOKER, who resigned from the vice-presidency of the Baker Iron Works, Los Angeles, Cal., last year, died at his home in that city May 24, aged 75 years. Since retiring from active business he had been engaged in philanthropic and scientific work.

SIMON PERKINS, Sharon, Pa., a retired pig iron manufacturer, died May 27, aged 72 years. He was largely interested in local manufacturing, railroad and banking operations. He leaves four children.

"The Spontaneous Combustion of Coal with special Reference to Bituminous Coals of the Illinois Type," by S. W. Parr and F. W. Kressmann, has just been issued as Bulletin No. 46 of the engineering experiment station of the University of Illinois. The bulletin describes a series of experiments directed toward the determination of the fundamental causes underlying the spontaneous combustion of coal. These causes may be summarized as follows: 1. External sources of heat, such as contact with steam pipes, hot walls, and the impact of large masses in the process of unloading, height of the piles, etc. 2. Fineness of divisions. 3. Moisture. 4. Activity of oxidizable compounds, such as iron pyrites. A historical review of the literature upon the spontaneous combustion of coal is given in the appendix. Copies of this bulletin may be obtained gratis upon application to W. F. M. Goss, Director of the engineering experiment station, University of Illinois, Urbana, Ill.

Thomas A. Edison announces that he has perfected a storage battery for motor cars or vehicles of any kind which can be recharged in three or four minutes and will have a life of 50 or 60 miles. He states that it is so small and light that it can be put into a suit case.

Pig Iron Production

May Shows a Further Heavy Decline

Active Capacity Reduced June 1

The output of pig iron in the 31 days of May fell much below the production in the 30 days of April. The total make of coke and anthracite pig iron in May was 1,893,456 gross tons, or 61,079 tons a day, against 2,065,086 tons in April, or 68,836 tons a day. Thus the indications at the beginning of May of a continuation of the decline in production were realized. It is not so clear that the decline in output will continue, as the furnaces connected with steel plants are becoming a little more active than in May.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with April, 1910, is as follows:

	Steel Works.	Merchant.	Total.
April, 1910	55,665	27,129	82,792
May	52,235	24,867	77,102
June	51,637	23,879	75,516
July	47,183	22,122	69,305
August	46,534	21,429	67,963
September	47,007	21,536	68,542
October	45,794	21,726	67,520
November	41,427	22,232	63,659
December	35,909	21,440	57,349
January, 1911	36,401	20,351	56,752
February	42,349	21,741	64,090
March	48,970	21,066	70,036
April	47,805	21,031	68,836
May	42,270	18,809	61,079

May Output by Districts

The table below gives the production of all coke and anthracite furnaces in May and the four months preceding:

Monthly Pig Iron Production Gross Tons.

	January. (31 days)	February. (28 days)	March. (31 days)	April. (30 days)	May. (31 days)
New York.....	136,519	131,238	157,624	139,674	130,927
New Jersey.....	12,627	6,006	5,869	5,150	9,788
Lehigh Valley.....	68,324	56,367	69,263	78,182	79,731
Schuylkill Valley....	60,592	57,321	67,634	55,305	46,827
Lower Susquehanna and Lebanon Val.	43,942	42,729	46,980	44,537	44,179
Pittsburgh district..	409,698	424,517	531,521	488,447	422,000
Shenango Valley....	82,922	86,908	109,799	109,239	88,170
West. Penn.....	94,118	96,616	120,464	100,593	61,892
Maryland, Virginia and Kentucky....	56,424	57,759	61,628	60,978	53,271
Wheeling district...	77,715	95,571	135,775	119,489	115,213
Mahoning Valley...	174,318	201,624	203,006	189,822	187,748
Central and North. Ohio	127,579	144,806	170,914	161,742	152,909
Hocking Valley... Hanging Rock and S.W. Ohio	33,253	32,396	35,173	27,084	27,185
Mich., Minn., Mo., Wis., Col., Wash.	60,941	61,406	69,741	76,379	71,938
Chicago district....	165,826	155,498	213,638	236,550	238,424
Alabama	128,188	118,594	143,751	149,737	134,386
Tenn., Georgia and Texas	26,340	25,153	28,331	22,178	28,868
Total	1,759,326	1,794,509	2,171,111	2,065,086	1,893,456

The furnaces blown out in May included one Swede in the Schuylkill Valley; Sheridan in the Lebanon Valley; one Lucy in the Pittsburgh district; Atlantic, Hall and one New Castle in the Shenango Valley; Pulaski and Ivanhoe (banked) in Virginia; Norton in Kentucky; Belmont in West Virginia; one Ohio at Youngstown; Star in the Hanging Rock region; two Mayville in Wisconsin and one Ensley in Alabama. Quite a number of these furnaces, however, were simply blown out for repairs, and they may be expected to be blown in when repairs are completed. The furnaces blown in in May comprised one Eliza in the Pittsburgh district; three Cambria at Johnstown, Pa.; Buena Vista in Virginia, and one Illinois at South Chicago.

Capacity in Blast June 1 and May 1

The following table shows the daily capacity of furnaces in blast June 1 and May 1:

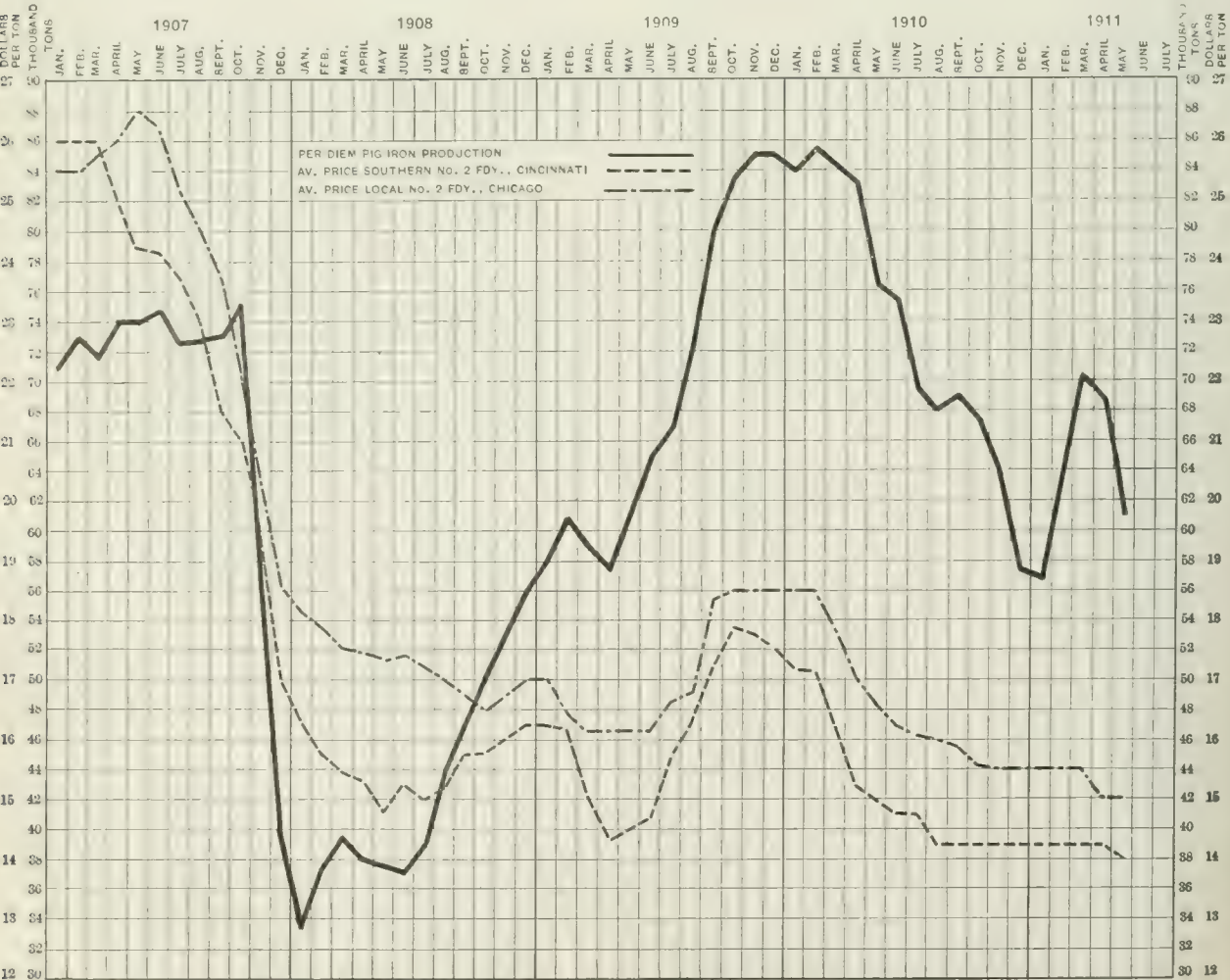


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to May 1, 1911. Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace.

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

	1907.	1908.	1909.	1910.	1911.
January	71,149	33,718	57,975	84,148	56,752
February	73,038	37,163	60,976	85,616	64,090
March	71,821	39,619	59,232	84,459	70,036
April	73,885	38,289	57,962	82,792	68,836
May	74,048	37,603	60,753	77,102	61,047
June	74,486	36,444	64,656	75,516	.....
July	72,763	39,287	67,793	69,305	.....
August	71,394	43,851	72,546	67,963	.....
September	72,783	47,300	79,507	68,476	.....
October	75,386	50,554	83,856	67,520	.....
November	60,937	52,595	84,917	63,689	.....
December	39,815	56,158	85,022	57,349	.....

	1907.		1908.		1909.		1910.	
	Sou. No. 2,	Loc. No. 2,	Sou. No. 2,	Loc. No. 2,	Sou. No. 2,	Loc. No. 2,	Sou. No. 2,	Loc. No. 2,
	Cin.	Chi.	Cin.	Chi.	Cin.	Chi.	Cin.	Chi.
Jan.	26.00	25.50	16.15	18.10	16.26	17.00	17.25	18.50
Feb.	26.00	25.50	15.75	17.81	16.13	16.40	17.06	18.50
March	26.00	25.75	15.50	17.50	15.05	16.15	16.30	17.80
April	25.06	26.00	15.20	17.38	14.25	16.15	15.37	17.00
May	24.25	26.50	14.75	17.28	14.50	16.15	15.00	16.56
June	24.10	26.25	15.25	17.38	14.70	16.15	14.85	16.25
July	23.85	25.20	15.00	17.20	15.75	16.65	14.75	16.06
Aug.	23.00	24.50	15.25	17.00	16.38	16.78	14.31	16.00
Sept.	21.50	23.75	15.65	16.70	17.35	18.35	14.25	15.90
Oct.	20.95	22.10	15.75	16.50	17.88	18.50	14.25	15.56
Nov.	19.50	20.31	16.00	16.75	17.75	18.50	14.25	15.50
Dec.	17.00	18.55	16.25	17.00	17.45	18.50	14.25	15.50
Jan., 1911,	14.25,	15.00;	Feb., 14.25,	15.00;	March, 14.25,	15.00		
April, 14.25.	15.00;	May, 14.00.	15.00.					

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production":

—Fig.—Total production.			Spiegeleisen and terronangese.	
	1909.	1910.	1911.	1910. 1911.
January	1,117,823	1,773,201	1,128,448	19,538 8,360
February	1,073,363	1,620,539	1,185,782	21,396 12,821
March	1,140,553	1,739,212	1,518,063	25,591 11,784
April	1,093,092	1,669,898	1,434,142	22,304 10,657
May	1,256,448	1,619,283	1,310,378	26,529 13,641
June	1,365,527	1,459,112	.....	27,680
July	1,508,762	1,462,689	.....	22,924
August	1,591,991	1,442,572	.....	25,756
September	1,660,839	1,410,221	.....	15,151
October	1,769,094	1,419,624	.....	8,500
November	1,689,994	1,242,804	.....	9,032
December	1,768,799	1,113,174	.....	12,178

The International Master Boilermakers, Association held its fifth annual convention at Omaha, Neb., May 23 to 25, with 300 members in attendance, representing half of the total membership. The president, A. N. Lucas, Milwaukee, in his opening address, urged a liberal policy in the education of apprentices arguing that it is most profitable to a railroad to develop its own boilermakers and other mechanics. This subject was the chief topic of discussion of the convention. F. W. Thomas, of the Santa Fe Railroad; C. W. Cross, supervisor of apprenticeship of the New York Central Lines, and others went into this most important question. J. D. Farasey, Cleveland, spoke for the American Boiler Manufacturers' Association.

made to roll them out. As a general rule the members was using steel for safe ends, even on iron tubes, though Swedish iron was also used. For the tube themselves the seamless steel was preferred, both for the service it would render and the ease of welding. As for the difficulty of welding steel, every member who took part in the discussion disclaimed having had any trouble whatever. As for pitting, it was generally conceded that steel tubes pit to a greater extent than iron, and yet a case was cited of a test on the Chicago & Northwestern where a boiler had been fitted with a half set each of steel and iron tubes, and that of these six steel and 49 iron tubes had been scrapped for pitting. On another boiler on the same road just the reverse had occurred.

The time and place of the next meeting were left to the executive board.

Officers were elected as follows: President, George W. Bennett, Albany, N. Y.; first vice-president, J. W. Kelly, Oak Park, Ill.; second vice-president, M. O'Connor, Missouri Valley, Iowa; third vice-president, Thomas W. Lowe, Winnipeg, Manitoba; fourth vice-president, J. T. Johnson, Los Angeles, Cal.; fifth vice-president, Andrew Green, Indianapolis, Ind.; secretary, Harry D. Vought, New York City; treasurer, Frank Gray, Bloomington, Ill.; executive board, Charles Hempel, Omaha.

The Boilermakers' Supply Men's Association had its annual meeting during the week, and elected W. H. S. Bateman, Philadelphia, president; C. A. Caskaden, Chicago, vice-president, and George Slate, New York, secretary-treasurer.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

	At date, one week, one month and one year previous.	June 7 1911.	May 31 1911.	May 3 1911.	June 1 1910.
PIG IRON, Per Gross Ton:					
Foundry No. 2, standard, Philadelphia.....	\$15.00	\$15.50	\$15.50	\$17.00	
Foundry No. 2, Valley furnace.....	13.75	13.75	13.75	15.00	
Foundry No. 2, Southern, Cincinnati.....	13.75	13.75	14.25	14.75	
Foundry No. 2, Birmingham, Ala.....	10.50	10.50	11.00	11.50	
Foundry No. 2 local, at furnace, Chicago*.....	15.00	15.00	15.00	16.75	
Basic, delivered, eastern Pa.....	14.50	14.50	15.00	16.25	
Basic, Valley furnace.....	13.10	13.10	13.60	15.00	
Bessemer, Pittsburgh.....	15.90	15.90	15.90	16.90	
Gray forge, Pittsburgh.....	14.15	14.15	14.40	15.40	
Lake Superior charcoal, Chicago.....	17.00	17.00	17.50	18.50	

COKE, CONNELLSVILLE.

Per Net Ton, at Oven:				
Furnace coke, prompt shipment.....	1.45	1.45	1.55	1.70
Furnace coke, future delivery.....	1.70	1.75	1.75	1.80
Foundry coke, prompt shipment.....	1.75	1.75	1.90	2.15
Foundry coke, future delivery.....	2.00	2.00	2.15	2.25

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh.....	21.00	21.00	23.00	25.50
Forging billets, Pittsburgh.....	26.00	26.00	28.00	31.00
Open hearth billets, Philadelphia.....	23.40	23.40	25.40	29.00
Wire rods, Pittsburgh.....	29.00	29.00	29.00	31.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.00	14.50	14.25	17.00
Iron rails, Philadelphia.....	16.75	16.75	16.75	20.00
Car wheels, Chicago.....	12.50	12.75	13.25	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	15.00
Heavy steel scrap, Pittsburgh.....	13.00	13.00	12.50	15.00
Heavy steel scrap, Chicago.....	10.25	10.25	11.50	13.50
Heavy steel scrap, Philadelphia.....	13.00	13.00	13.00	14.50

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill.....	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.....	1.27½	1.27	1.32½	1.52½
Common iron bars, Chicago.....	1.20	1.20	1.25	1.47½
Common iron bars, Pittsburgh.....	1.25	1.25	1.32½	1.55
Steel bars, tidewater, New York.....	1.41	1.41	1.56	1.61
Steel bars, Pittsburgh.....	1.25	1.25	1.40	1.45
Tank plates, tidewater, New York.....	1.51	1.51	1.56	1.66
Tank plates, Pittsburgh.....	1.35	1.35	1.40	1.50
Beams, tidewater, New York.....	1.51	1.51	1.56	1.66
Beams, Pittsburgh.....	1.35	1.35	1.40	1.50
Angles, tidewater, New York.....	1.51	1.51	1.56	1.66
Angles, Pittsburgh.....	1.35	1.35	1.40	1.50
Skelp, grooved steel, Pittsburgh.....	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.....	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.00	2.00	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.80
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.75
Bark wire, galv., Pittsburgh.....	2.10	2.10	2.10	2.10

METALS.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.45	12.45	12.30	13.00
Electrolytic copper, New York.....	12.25	12.25	12.10	12.75
Spelter, New York.....	5.55	5.50	5.50	5.30
Spelter, St. Louis.....	5.25	5.20	5.30	5.15
Lead, New York.....	4.37½	4.37½	4.42½	4.37½
Lead, St. Louis.....	4.22½	4.22½	4.27½	4.22½
Tin, New York.....	48.25	45.50	42.00	32.90
Antimony, Hallett, New York.....	8.75	8.95	9.00	8.12½
Tin plate, 100 lb. box, New York.....	\$3.94	\$3.94	\$3.94	\$3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†These prices are for largest lots to jobbers.

1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¾-in. plates. Plates are 72 in. wide must be ordered ¾-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3-ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Width over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over

TERMS—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. Painted roofing sheets, No. 28, \$1.40 per square. Galvanized sheets, No. 28, \$2.55 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.; angles 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; zees, 3 in. and up,

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	49	43
½ in.....	75	63	71	59
¾ to 1½ in.....	79	69	75	65
2 to 3 in.....	80	70	76	66
Lap Weld.				
2 in.....	76	66	72	62
2½ to 4 in.....	78	67	74	64
4½ to 6 in.....	77	67	73	63
7 to 12 in.....	75	59	71	55
13 to 15 in.....	15½	..	..	..
Butt Weld, extra strong, plain ends, card weight.				
1½ in.....	69	59	65	55
1 in.....	74	68	70	64
¾ to 1½ in.....	78	72	74	68
2 to 3 in.....	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.....	75	69	71	65
2½ to 4 in.....	77	71	73	67
4½ to 6 in.....	76	70	72	66
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.....	64	58	60	54
¾ to 1½ in.....	67	61	63	57
2 to 3 in.....	69	63	65	59

THE IRON AND METAL MARKETS

Lap Weld, double extra strong, plain ends, card weight.				
2 in.....	65	59	61	55
2½ to 4 in.....	67	61	63	57
4½ to 6 in.....	66	60	62	56
7 to 8 in.....	59	49	55	45
Plugged and Reamed.				
1 to 1½, 2 to 3 in. Butt Weld	Will be sold at two (2-) points lower basing (higher price) than merchants or card weight pipe, Butt or lap weld, as specified.			
2, 2½ to 4 in.... Lap Weld	The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.			

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1¼ to 2¼ in.....	Steel.	63
2½ in.....		67½
2¾ to 3¼ in.....		70
3½ to 4½ in.....		72½
5 to 6 in.....		65
7 to 13 in.....		62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2½
27 to 36	80 and 10 and 5
Galvanized:	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72½ and 10
27 to 36	72½
Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Pittsburgh

PARK BUILDING, June 7, 1911.—(By Telephone.)

Pig Iron.—The market is stagnant, with not a single inquiry of any importance. The average price of basic pig iron for the month of May, based on actual sales, was \$13.40, Valley furnace, as compared with \$13.75 for April. The average price of Bessemer pig iron for May was \$15, Valley furnace, but this was nominal. The consumption of pig iron in the Pittsburgh district is lighter now than it has been for several months. The Clinton Iron & Steel Company's furnace in this city was blown out last Monday and Rebecca at Kittanning, Pa., will be blown out next week. We quote as follows: Bessemer pig iron, \$15 nominally; malleable Bessemer, \$13.50; basic, \$13.10; No. 2 foundry, \$13.75; gray forge, \$13.25, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—No sales of any importance have been made either of billets or sheet bars, and inquiry is light. Specifications against contracts are falling off, due to the approaching shutdown toward the close of this month of a number of finishing mills for inventory and repairs. Quotations are as follows: Bessemer and open-hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1½-in. billets, \$22; forging billets, \$26, base, usual extras for sizes and carbons—all prices being f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

Shafting.—Prices on cold-rolled steel shafting have been reduced to 60 per cent. in carloads and 55 per cent. in smaller lots, delivered in base territory.

(By Mail)

As yet the lower prices on the important lines of finished iron and steel that went into effect on June 1 have not resulted in any increase in new demand from consumers, with the possible exception of steel bars, of which a considerable tonnage has been booked the past week by the leading steel bar makers at the official price of 1.25c. It is the general opinion that conditions in the

iron and steel trades will continue dull over the next three months, but material improvement is looked for about September, and it is believed that the last three or four months of the year will be fairly active. The pig iron market continues very dull, with prices about stationary and it is not believed that much further decline will take place. The reduction in prices of \$2 a ton in billets and sheet bars has not brought about any new inquiry nor do shipments against contracts show any betterment. The coke and scrap trades continue quiet, with very low prices ruling and not much new inquiry.

Ferromanganese.—An inquiry is reported in the market for 1500 tons, 250 tons a month over the last six months of the year, which will probably be closed at about \$36.50, Baltimore. Nearly all consumers are covered for the remainder of this year and new inquiry is light. We quote 80 per cent. foreign ferro at \$36.50 to \$36.75, Baltimore, with a freight rate of \$1.95 a ton for delivery in the Pittsburgh district.

Ferrosilicon.—Prices are weak and 50 per cent. ferrosilicon is selling at the lowest prices reached in a long time. We quote 50 per cent. at \$52 to \$53, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—In the absence of sales we continue to quote best grades of muck bar made from all pig iron at nominally \$28.50 to \$29, Pittsburgh.

Skelp.—We do not hear of any new sales in the past week and prices are only fairly strong, consumers looking for lower figures in view of the lower prices recently made on other forms of finished steel. We quote grooved steel skelp, 1.27½c. to 1.30c.; sheared steel skelp, 1.32½c. to 1.35c.; grooved iron skelp, 1.55c. to 1.60c., and sheared iron skelp, 1.65c. to 1.70c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—New inquiry for wire rods is very light and only for small lots. In fact very few rods are sold in the open market, most consumers making their own supply. We quote Bessemer, open hearth and chain rods at \$29 f.o.b., Pittsburgh.

Steel Rails.—On Monday the Baltimore & Ohio Railroad placed an order for 23,050 tons of standard sections, of which 13,050 tons was placed with the United States Steel Corporation, 5000 tons to be rolled by the Carnegie Steel Company at Bessemer and 8050 tons at South Chicago. The Cambria Steel Company gets 7500 and the Bethlehem Steel Company 2500 tons. The rails are to be 90 and 100 lbs. to the yard, except 1100 tons, which are of lighter sections. Three or four other large inquiries for rails are reported in the market, including one from the Harriman system for 40,000 tons. In the past week the Carnegie Steel Company sold about 2500 tons of light rails on new orders and received specifications for upward of 1000 tons. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—Bids have gone in on about 36,000 tons of material for the Hell Gate bridge of the Pennsylvania Railroad, the bidders being the American Bridge Company and the McClintic-Marshall Construction Company. The American Bridge Company has taken 4000 tons for the Hotel Statler, Cleveland. Reports are that very low prices continue to be made on new contracts, and it is insisted that in some cases the plain material must certainly have been figured on a lesser basis than 1.35c., Pittsburgh. We quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Plates.—Some car orders have been placed the past week and others are expected to be given out in the near future. The Canadian Pacific has placed orders for 400 steel underframe box cars and 500 steel gondolas with the Pressed Steel Car Company and also 500 steel gondolas with the American Car & Foundry Company. The Pennsylvania Railroad has placed an order with the Pressed Steel Car Company for 41 steel passenger cars, and an order for 20 steel baggage cars with the American Car & Foundry Company. The general demand for plates from boiler shops and other consumers continues quiet, the recent reduction of \$1 a ton not having stimulated business to any extent. We quote tank plate ¼ in. and heavier at 1.35c., Pittsburgh.

THE IRON AND METAL MARKETS

Sheets.—The lowering of prices on black and galvanized sheets has not improved the demand to any extent but the belief is that it will do so in the near future. Specifications against contracts are not very satisfactory. This week the American Sheet & Tin Plate Company is operating 53 per cent. of its sheet mill capacity and the independent sheet mills are running at about the same rate. The new prices in effect from June 1, on black and galvanized sheets, and also on roofing sheets, are given on a previous page.

Tin Plate.—This week the American Sheet & Tin Plate Company is operating 63 per cent. of its hot tin mill capacity and the outside tin plate mills are running at about the same rate. New demand for tin plate is dull, as always at this season of the year, but specifications from the can makers have been coming in quite freely for some time, and between June 15 and July 1 the specifications for September requirements are expected to be quite heavy. We quote 100-lb. coke plates at \$3.70 per base box f.o.b. Pittsburgh.

Bars.—The recent reduction in prices of steel bars has brought out some new demand. The large makers of steel bars, such as the Carnegie Steel Company, Jones & Laughlin Steel Company and Republic Iron & Steel Company, reporting that they have taken considerable new tonnage the past week from the implemented trade for shipment over the year beginning July 1. Today (June 6) a conference opens at Cambridge Springs, Pa., between the Western Bar Iron Association and the Amalgamated Association, at which the puddling and finishing scales will come up for settlement. It is believed these scales will be settled this year without serious trouble, but several conferences may be necessary before an agreement is reached. New demand for iron bars is quiet and prices are weak. We quote steel bars at 1.25c. and common iron bars at 1.25c. to 1.30c., f.o.b. Pittsburgh.

Shafting.—New demand continues quiet and is still confined to small lots to cover actual needs, while specifications against contracts are unsatisfactory and have been for some time. Regular discounts on cold rolled steel shafting are 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory, but these prices are being shaded on desirable orders.

Spelter.—A sale of 500 tons of prime grades of Western spelter for October shipment is reported on the basis of about 5.17½c., East St. Louis, equal to 5.30c., Pittsburgh. We quote prime grades at this price.

Hoops and Bands.—New orders continue light and specifications against contracts are unsatisfactory. Hoop prices are continued on the basis of 1.45c., but band prices have been reduced to 1.25c., base, to conform to the new steel bar price, taking extras as per steel bar card.

Merchant Steel.—Conditions in this trade are quiet, the new demand being light and only for small lots, while specifications against contracts have been very unsatisfactory to the mills for some time. Nominal prices, which, however, are being shaded, are as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—There is a fair amount of inquiry, but the consumers are very slow in placing orders because of the reductions in prices on other forms of finished iron and steel, believing that still lower prices on both structural and boiler rivets may result. We quote structural rivets at 1.75c. and boiler rivets at 1.80c. to 1.85c., f.o.b. Pittsburgh.

Wire Products.—The new demand for wire and wire nails both from jobbers and retailers is still confined to small lots to cover actual needs, while specifications against contracts are being held up. New trade in wire products is practically over until fall business opens up. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—No large inquiries are in the market, the demand being confined to small lots to cover actual needs. The railroads are not specifying very freely on contracts placed some time ago. We quote railroad spikes in standard sizes at \$1.50 base, Pittsburgh, with the usual extras for odd sizes.

Merchant Pipe.—The only inquiry of note for line pipe is one for a West Virginia gas company for 30 miles of 12-in. which may possibly be placed this week. A readjustment has been made in prices on oil country goods to conform to the change in prices on merchant pipe made on October 1, 1910, slight reductions being made on some sizes. Some new business in merchant pipe is being placed with the mills, but jobbers and retailers are still inclined to take in only such quantities as are absolutely required to meet current needs. It is stated that discounts on iron and steel pipe printed on a previous page are being maintained.

Boiler Tubes.—There is no improvement in the demand for boiler tubes, consumers not covered by contracts placing only small orders to care for actual needs, while specifications against contracts are only fair. Prices on both iron and steel boiler tubes continue very unsatisfactory and are more or less shaded.

Coke.—There are no large inquiries in the market for furnace coke, but the American Locomotive Company has an inquiry out for its entire supply of foundry coke for the year beginning July 1, which will amount to 18,000 to 20,000 tons if the concern operates its works full time. The American Steel Foundries is also in the market for 10,000 to 12,000 tons of foundry coke for shipment over the last half of the year. We quote standard makes of furnace coke for June shipment at \$1.45 to \$1.50 per net ton at oven, and for delivery over second half of the year at \$1.70 to \$1.75 at oven. We quote standard makes of 72-hour foundry coke for spot shipment at \$1.75 to \$1.85, and for second half of the year at \$2 to \$2.40 per net ton at oven, some producers refusing to sell at a lower price than \$2.40. The output of coke in the upper and lower Connellsville regions is steadily decreasing, the output for last week having been about 270,000 tons, a decrease over the previous week of about 5000 tons, and the lowest output of any one month for several years.

Iron and Steel Scrap.—On July 1 a number of important consumers of scrap will close down their plants for inventory and repairs, and will therefore take in as little as possible this month. The Pennsylvania Railroad list came out on Monday with upward of 20,000 tons. The list is heavier than usual, owing to the fact that a good deal of the scrap offered in the May list was not sold because of the low prices offered by dealers. The heavy steel scrap of the Pennsylvania Lines West was sold to a local dealer last week at the reported price of about \$13 at various points on the line. Prices on heavy steel scrap seem to be firm, in spite of the fact that buying is very light. There have been no important sales during the week. Dealers are quoting, per gross ton, Pittsburgh, about as follows:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$13.00
No. 1 foundry cast.....	\$13.50 to 13.75
No. 2 foundry cast.....	12.50 to 12.75
Bundled sheet scrap, at point of shipment..	10.25 to 10.50
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	13.50 to 13.75
No. 1 railroad malleable stock.....	12.00
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.50 to 16.75
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 busheling scrap.....	12.00 to 12.25
No. 2 busheling scrap.....	8.50 to 8.75
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	8.75 to 9.00
*Machine shop turnings.....	9.15 to 9.25
Old iron rails.....	15.00 to 15.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.25
Stove plate.....	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Cincinnati

CINCINNATI, OHIO, June 7, 1911.—(By Telegraph.)

Pig Iron.—The settling of prices has brought out a few more inquiries and orders, but the present interest taken in the market is considered largely of a speculative nature. For last-half shipment a central Ohio consumer wants 1000 tons of foundry iron about equally divided between Northern and Southern brands. A central Indiana melter is inquiring for 500 tons of No. 2, Southern, and a nearby manufacturer is in the market for 400 tons of Northern foundry. From Detroit is an inquiry for 500 tons of low phosphorus iron for prompt shipment. Sales include about 3500 tons of No. 2 Southern foundry to Northwestern melters at \$10.50, Birmingham, July-December delivery. Several smaller lots were also booked for this same

THE IRON AND METAL MARKETS

shipment and price. Quotations of the lower grades are evidently seeking the usual level and for the third quarter a local agency took on 500 tons of No. 4 Southern foundry on the basis of \$10.50 at furnace for No. 2 Northern. No. 2 foundry is fairly settled at \$13.50, Ironton, and a number of small sales have been made on this basis for delivery throughout the year. Northern furnaces, however, are generally unwilling to contract for any large tonnages at this quotation, and several are making preparations to shut down. Malleable is very quiet and quotable around \$13.75 at furnace for this year's delivery. Belfont furnace, Ironton, damaged by storm June 4, closed for repairs; and will probably stay out indefinitely. Norton furnace, Ashland, which has been out two weeks, will blow in again about July 1. Marting Iron & Steel Company's furnace, Ironton, will bank for relining this week. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft....	\$14.25 to \$14.75
Southern coke, No. 2 foundry and 2 soft....	13.75 to 14.25
Southern coke, No. 3 foundry.....	13.50 to 13.75
Southern coke, No. 4 foundry.....	13.00 to 13.25
Southern gray forge.....	12.50 to 13.00
Ohio silvery, 8 per cent. silicon.....	17.45 to 17.70
Lake Superior coke, No. 1.....	15.45
Lake Superior coke, No. 2.....	14.95
Lake Superior coke, No. 3.....	14.45
Basic Northern.....	15.20 to 15.45
Standard Southern car wheel.....	25.75 to 26.25
Lake Superior car wheel.....	19.50

(By Mail)

Coke.—Quite a number of foundry coke contracts that are expiring have been renewed for a supply to be furnished during the remainder of the year and a still larger percentage of foundrymen are taking advantage of the present prices to contract for an entire 12 months' requirements. It is noticeable, however, that quantities usually specified are generally reduced, and consumers are further fortifying themselves against being compelled to specify against their contracts during the next two or three months. Prices on 72-hr. foundry coke range all the way from \$2 to \$2.40 per net ton, at oven, in all three fields, and it is understood that a few brands are available for last half delivery around the first-named figure. Furnace coke is very quiet, and while there are two small inquiries out, totaling about 10,000 tons, for shipment the next six months, these are offset by many requests to discontinue shipments on contracts already made. Prices remain around \$1.40 to \$1.45 per net ton, at oven, for spot shipment coke and from \$1.45 to \$1.70 on future contract business.

Finished Material.—The reduction in the price of steel bars is reported to have brought out a little more business in that particular line, but the lowering of quotations of other finished steel products appears to have stifled mill orders. Local warehouses report an indifferent attitude on the part of buyers, who are only filling for immediate requirements. The warehouse price on steel bars has been reduced from 1.80c. to 1.70c. and on No. 10 blue annealed sheets from 2.10c. to 2c., with corresponding reductions on other gauges. Railroad track material shows a little improvement. Hoops and bands are also holding up remarkably well, if present conditions are taken into consideration.

Old Material.—It is difficult to give the exact market situation. The majority of dealers are waiting to see what pig iron will do, and sellers of scrap material are using the same tactics. The small lots changing hands now are conceded to be at prices below the regular quotations, but the volume of business transacted is too small on which to base any change in present figures. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Chicago

FISHER BUILDING, June 7, 1911.—(By Telegraph.)

It is to be presumed that the failure of buying interests, particularly users of bars, to respond to the reductions in prices comes as a surprise and a disappointment. It is hardly to be believed that lower prices were

put into effect with no particular object in view. It is generally accepted here that only a small tonnage of steel bars has been placed under contract for this season. There seems to be but one objection, namely, that the now current price, in view of the general situation, does not furnish an occasion upon which bar users feel secure in basing their year's campaign in other lines of finished steel products. The effect of the reductions seems to have been far from conclusive, and the character of buying for immediate requirements only remains unchanged.

Pig Iron.—Transactions of the past week were limited to requirements for immediate use. Those melters who have been or are buying iron because they consider it low in price still have this iron in their yards. The price of Southern iron continues to be quoted at \$10.50 Birmingham, for No. 2 and \$15 f.o.b. furnace is quoted for local Northern iron. It appears probable that the Southern price is more easily assailable than that of Northern iron, and the opinion is expressed that an attractive offer of tonnage would not go begging at somewhat lower prices than the prevailing quotations. It is estimated that the entire business placed during the past week in this territory would not exceed 10,000 tons. The continuation of the present dullness is not unlikely to result in a further curtailment of production by some of the local furnaces. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace:

Lake Superior charcoal.....	\$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	15.35
Southern coke, No. 2 foundry and No. 2 soft.....	14.85
Southern coke, No. 3.....	14.60
Southern coke, No. 4.....	14.35
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.50
Jackson Co. and Kentucky silvery 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

(By Mail.)

Structural Material.—The principal letting of the week in structural material was the placing of 5932 tons for the Otis Bank Building at LaSalle and Madison streets, in this city, with the American Bridge Company. This interest also closed a contract for 665 tons of material for ore dock spouts for an extension of No. 1 dock of the Duluth & Iron Range Railroad at Two Harbors, Minn. The steel for the Tribune Building, Terre Haute, Ind., 380 tons, will be furnished by the Decatur Bridge Company. The Otis Building tonnage brings up the total of structural steel for Chicago buildings now in process of erection to approximately 60,000 tons, and the future building now in prospect promises further tonnage of almost equal amount. Belief is expressed that the point of lowest prices for fabricated material is past for this market and it is predicted that the present level, which is in the neighborhood of \$40 a ton, will rise to about \$44. The probabilities in this connection appear to depend somewhat on the class of work, it being likely that the lowest prices will be made on light work which will bring into competition the smaller shops and upon the heavy work which is particularly desirable tonnage. We quote plain material from mill at 1.53c. to 1.58c., Chicago; from store, 1.75c.

Rails and Track Supplies.—In a scattering way the specifications and orders from the railroads the past week have been well maintained. The largest interest reports an aggregate of standard section rails ordered in the neighborhood of 10,000 tons, accompanied by moderate requirements of spikes, bolts and tie plates. There are those who believe they see in financial arrangements and general attitude a disposition on the part of some of the railroads to prepare for larger buying. This may be in anticipation of the closing of the fiscal year July 1. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c., Chicago.

Sheets.—To the sheet mill capacity of the West the new mill of the American Sheet & Tin Plate Company at Gary was added during the past week. It will shortly be in a position to furnish both black and galvanized sheets. The Western market has as yet failed to respond to the reduction in sheet prices. If anything, less

THE IRON AND METAL MARKETS

activity has prevailed. From the standpoint of the producer the now existing prices are as low as the cost of making quality sheets will permit. The buyer carries with him the memory of reductions in the past and apparently is content to let necessity govern the volume of his purchases. Chicago prices are as follows: Car-load lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

Plates.—A livelier interest is reported in plates, but with the exception of certain inquiries for small tonnages buying is confined to immediate requirements. While sales at the new prices are nominally limited to October 1 it is believed that deliveries up to January 1 can be arranged on the same basis. There is no conspicuous evidence that buyers lack confidence in the stability of plate prices following a reduction of only \$1 a ton, but at the same time the immediate desirability of purchasing on the present basis is not reflected in their attitude. The market apparently is not impressed with the new prices as an "opportunity." Chicago quotations for mill shipment are 1.53c. to 1.58c. and from store 1.75c.

Bars.—Developments subsequent to the reduction in the price of bars seem to indicate that there was no large volume of business arranged for closing at the new basis. The tonnage that has been placed thus far is considerably less than that usually on the order books at this time. The manufacturing schedules of most of the agricultural implement manufacturers are reported to be considerably below normal, and until the prospect for business during the coming year becomes more clearly defined these interests appear to be content to move slowly. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Billets.—The movement of billets in this territory normally is limited to comparatively few forging interests, and in the current lack of business is the more restricted. Forging billets are nominally quoted at \$28.60, Chicago, and such sales as are reported indicate adherence to this price. Re-rolling billets we quote at \$23.60, Chicago.

Wire Products.—Sustained by a continued demand for woven wire fence the trade in wire products is holding up in what is ordinarily a dull season in good volume. Diminished activity in building operations has been followed by some dullness in wire nails. The movement of barb wire is also quiet. Stocks in the hands of merchants are small, but it is not admitted that this may indicate a lack of confidence in the stability of present prices, which remain unchanged. Jobbers' car-load prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—In contrast with the general dullness the leading cast iron pipe interest continues exceedingly busy, with tonnages secured early in the year from Milwaukee, Chicago, Minneapolis and Portland, Ore. The requirements of San Diego, Cal., to the amount of 7500 tons in sizes from 8 to 36 in., will probably be formally placed with the United States Cast Iron Pipe & Foundry Company, which is the low bidder. The 600 tons of pipe at Mandan, N. D., has not been placed, all bids being rejected. Contracts for 250 to 300 tons of pipe for Leone, Iowa, and 500 tons for Basin, Wyo., are to be placed this week. The well filled condition of the shops of the leading interest is conducive to firmness in prices, but not to the extent of requiring advances in quotations. We continue to quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—The only transactions of interest in the old material market are those involving the sale of scrap by the railroads, and dealers are fairly active in absorbing this material. The Chicago, Rock Island & Pacific Railroad is selling a small list, of which the principal item is 500 tons of No. 1 steel rails, together with a small quantity of iron axles and No. 1 cast. The St. Louis & San Francisco is offering two scrap locomotives. A list of about 200 tons from the Baltimore & Ohio will be closed June 8. The Lake Shore & Michigan Southern is asking for bids on about 33 cars of mixed material. At present levels yard sales are impos-

sible without loss to the dealer. At the same time manufacturers converting scrap into finished products feel that old material prices are still relatively too high. We revise prices and quote below for delivery to buyers' works, all freight and transfer charges paid, per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, re-rolling.....	12.00 to 12.25
Old steel rails, less than 3 ft.....	11.00 to 11.50
Relaying rails, standard sections, subject to inspection	23.00 to 24.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75
Shoveling steel.....	9.25 to 10.25
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.25 to \$12.75
Iron arch bars and transoms.....	13.50 to 14.00
Steel angle bars.....	12.25 to 10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	9.50 to 10.00
Locomotive tires, smooth.....	16.25 to 16.75
Machine shop turnings.....	6.25 to 6.75
Cast and mixed castings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.50 to 11.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	10.25 to 10.75
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, June 6, 1911.

Iron Ore.—Ore shipments in May were larger than had been expected in view of the condition of the market. The total movement during the month was 3,684,819 tons. Shipments down the lakes from the opening of navigation until June 1 were 4,016,464 tons, as compared with 7,601,665 tons during the same period in 1910. Last year, however, the early movement was very heavy. The ore market is lifeless, there being no sales or inquiries for lots of any size. Conditions in the lake trade have improved somewhat during the past few days as the result of the chartering of some wild tonnage by the Pittsburgh Steamship Company. Stock piles at some of the mines have become larger than desired and it is probable that operation of some properties will be further curtailed. The cut in steel prices is not expected to stimulate the demand for ore unless lower prices cause an improvement in the demand for steel. We quote prices as follows: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old Range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The sale of 5000 tons of basic has been made by a local agency for shipment from a Detroit furnace to Chicago. Outside of this transaction the market continues very dull. There is no inquiry in this territory for lots of any size in any grade. Some of the inquiries for small lots of foundry iron that have come out during the past few weeks have not resulted in the placing of orders. A large share of the foundries have bought no iron for the last half but in most cases these will have enough iron left over to last them a month or more into the last half. It is estimated that foundries are now running in this territory at about 60 per cent. of their full capacity. Prices on foundry grades are more or less nominal. Some producers now express their willingness to make contracts for delivery through the last half at the same price as for prompt shipment. Southern iron is now quite generally quoted at \$10.50, Birmingham, for No. 2 for delivery through the entire year. For prompt shipment and the last half we quote delivered, Cleveland, as follows:

Bessemer	\$15.90
Basic	14.00
Northern foundry, No. 2.....	14.25
Gray forge	13.50
Southern foundry, No. 2.....	\$14.85 to 15.35
Jackson Co. silvery, 8%, silicon.....	\$17.75 to 18.00

Coke.—The market is extremely dull. A few contracts for foundry grades are being closed and there is a small volume of spot business. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton, at oven, for prompt shipment, and \$1.75 to \$1.80 for the last half. Connellsville 72-hr. foundry coke is held at \$1.90 to \$2 for prompt shipment and \$2 to \$2.40 for the last half.

Finished Iron and Steel.—No increase in the demand for finished lines has as yet resulted from the

THE IRON AND METAL MARKETS

cut in prices. The market is in a very unsettled state. Buyers feel that further reductions in prices will come shortly and are ordering only such material as they need immediately. The new price of 1.25c., Pittsburgh, on steel bars has already been shaded \$1 a ton in this market, but this concession as yet does not appear to be very general. Considerable excitement was aroused among the trade during the week by the action of one selling agency in making a one-day quotation on steel bars to consumers at 1.20c. for delivery during the remainder of the year, this price being offered for acceptance only during the one day. This price has resulted in the demand by some of the buyers who had quite recently placed contracts on the 1.25c. basis that their contracts be readjusted to the new price for the remainder of the year. There is an inquiry out for 1700 tons of soft steel reinforcing bars for a plant to be built by the Larkin Company in Buffalo. Another bar inquiry is for 400 tons from the Great Lakes Dredge & Dock Company for delivery after October 1. Makers of hard steel bars are not yet making general price quotations, but are waiting until prices on soft steel bars become more settled. Prices on hard steel, however, will be reduced to about \$2 a ton below soft steel. Structural material appears firm at 1.35c., Pittsburgh, but work requiring tonnage of any size is being held up until buyers become satisfied that the bottom has been reached. The demand for plates is very light and there are no reports yet of price shading. The Great Lakes Engineering Works, Detroit, has taken the contract for two ocean steamers for the Atlantic coast trade, each 261 ft. long. The plates and shapes will be furnished by the Cambria Steel Company. The large cut in sheet prices has stimulated the demand somewhat, buyers feeling that prices will go no lower. The reduction in steel bars has been followed by a reduction of \$1 to \$2 a ton on rivets. Structural rivets are now quoted at 1.65c., Pittsburgh, and boiler rivets 1.75c. The demand for iron bars is light. The general quotation is 1.25c. at mill. The Union Rolling Mill Company and the Empire Rolling Mill Company, Cleveland, will close down their plants July 1 for an indefinite period.

Old Material.—The scrap market is extremely dull. Prices are nominally unchanged. Although the market is weak there has not been enough business since the cut in steel prices to warrant any change in the quotations made before the reduction in finished lines. Local consumers are offering \$11 for heavy steel scrap, but \$11.50 appears to be the minimum price that will be accepted by dealers. Some consumers are holding back on shipments on contract. The local bar iron mills will close down shortly and this will further curtail the demand. The Pennsylvania Railroad has a large list out, on which it will receive bids June 13. The Lake Shore Railroad will close this week on a small list. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.00 to 11.50
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	10.75 to 11.00
Railroad malleable.....	11.50 to 12.00
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings.....	8.00 to 8.50
No. 1 busheling.....	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate.....	10.25 to 10.50
Bundled tin scrap.....	11.00 to 11.50

St. Louis

ST. LOUIS, Mo., June 5, 1911.

The market continues quiet in all branches, though there is a steady consumption under way that is at least gratifying in its evidence that there is no occasion to look for any marked decrease in prices. There is a feeling that the next two or three weeks will see an improvement; hence with the dullness there is no discouragement apparent.

Pig Iron.—The consumption of pig iron continues quite regular, and, though the large users are not running to capacity, the agricultural, stove foundry and other consumers are utilizing a good quantity. From this viewpoint there is really a better demand than there has been in recent weeks, and, while sellers are largely influenced by bear talk, there is, as

a matter of fact, a very fair total of business moving, all things considered. One purchase for the week aggregated 2500 tons of different grades of Southern, while another smaller consumer took 500 tons of basic for steel foundry use. The market for pig iron continues to cling around \$10.50 to \$11 for No. 2, Birmingham, the former figures not being altogether unanimously held by the furnacemen. There has been nothing in the requisitions to show an immediate probability of a firmer or higher market, but there is a feeling that it is not far off. There has been no change in No. 2 Northern foundry iron, which continues at \$14 to \$14.50, either for shipment to July or last half, Iron-ton, Ohio, basis. The same figures apply for malleable Bessemer. As indicative of the general requisition for pig iron by other than the larger consumers may be quoted the statement of the largest agricultural implement factory here, that May's business was the largest in many years for the same period. Buyers, however, still show little active interest, only being concerned with current needs.

Coke.—There is a greater activity in the inquiry for foundry coke, but the consumption remains about unchanged. The inquiry is largely for last-half delivery, and some for delivery to July 1, 1912. The quotations are: \$2 to \$2.50 per net ton at oven for 72-hour selected foundry, Connellsville or Stonega. No contracts have been made as yet of any size, nor is it expected that there will be until later in the month.

Finished Iron and Steel.—The tonnage in structural steel continues very light, due to the still unsettled condition of the market as a whole. Indications lead, however, to the belief that there will be orders placed for a considerable tonnage within the next ten days or two weeks, the price holding firm on the new basis of 1.35c., Pittsburgh. A number of contractors have considerable work nearing the stage when they must have the steel, and they will not be able to remain out of the market much longer. Plates are dull, with no change in prices. In bars there have been increased specifications, but the difference in favor of iron at the present moment has been sufficiently attractive to warrant considerable tonnage being ordered instead of steel. The demand from the agricultural plants is fairly active. In rails the Kansas City Southern contracted for 14,000 tons, dividing the order between the Illinois Steel Company and the Pennsylvania Steel Company. A smaller line placed an order for 750 tons with the Illinois Steel Company, and still another, in Oklahoma, for 500 tons. The additional tonnage of the Missouri Pacific, to follow the order for 25,000 tons given the Colorado Fuel & Iron Company, has not been placed yet. In light rails the demand of the coal mining companies has slackened somewhat, but a number of lumber firms have contracted for a very nice tonnage during the week. Track fastenings are in fair demand, and the prices are firm.

Old Material.—Scrap continues dull, and nothing is expected to develop of particular interest in the near future. The speculative disposition continues, and consumers are making their propositions too low to enable the closing of any deals of consequence. There is, perhaps, a little weaker feeling in the market, but it has not affected prices as yet. The Frisco list shows a total of about 1600 tons. There is a little better demand for steel, largely because the dealers are short, but the difference is so slight as yet as to make no change in the figures. The dealers' prices, per gross ton f.o.b. St. Louis, are as follows:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	11.25 to 11.75
Old steel rails, less than 3 ft.....	10.25 to 10.75
Relaying rails, standard section, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards cut apart.....	10.25 to 10.75

The following quotations are per net ton:

Iron fish plates.....	\$10.25 to \$10.75
Iron car axles.....	17.50 to 18.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	10.25 to 10.75
No. 2 railroad wrought.....	9.25 to 9.75
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	8.50 to 9.00
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers, cut to sheets and rings.....	7.25 to 7.75
No. 1 cast scrap.....	9.50 to 10.00
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	8.00 to 8.50
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	7.25 to 7.75
Railroad sheet and tank scrap.....	7.25 to 7.75
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	6.00 to 6.50

THE IRON AND METAL MARKETS

Buffalo

BUFFALO, N. Y., June 6, 1911.

Pig Iron.—Very little new business has been in evidence during the current week, active negotiations having been checked by the unsettled price conditions in finished products. Most consumers are manifesting no special interest in the market, although a large number of important users have not yet covered for their second half requirements, apparently planning in some instances to run for awhile on stock left over from the first half. Quite a number of inquiries received during the past two weeks are still held open and a large majority of buyers appear to be waiting to determine whether rock bottom has been reached in prices. One or two fair-sized orders for malleable have been placed; but foundry grade placements for the week have consisted almost entirely of small tonnages. We make no change in the price schedule from last week as it closely approximates the present price situation. The variation in price between grades is more theoretical than actual. Each order of any size is handled on its own merits, regardless of grade classification. For current and third quarter delivery we quote as follows, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.00 to \$14.50
No. 2 X foundry.....	13.75 to 14.00
No. 2 plain.....	13.50 to 13.75
No. 3 foundry.....	13.25 to 13.50
Gray forge	13.00 to 13.25
Malleable	13.75 to 14.25
Basic	14.00 to 14.75
Charcoal	16.50 to 17.25

Finished Iron and Steel.—The lower prices established for finished products have caused good inquiry especially on sheets and bars, with some bar tonnage placed and considerable tonnages still pending. Sheet users seem to appreciate that the lower prices quoted on sheets represent the bottom and are inclined to negotiate for their third and fourth quarter deliveries. So far as can be determined \$1.25 represents the market on bars; although one consumer who was in the market for a large tonnage for prompt specification claims to have bought at a somewhat better price. Plates and shapes are held at 1.35c. but placement for the week has been small. Prices on wire products are being maintained at 1.80c. Pittsburgh; and cold rolled material is held at 60 off for carloads and 55 off for less than carloads. An order is now pending for about 1500 tons of steel bars for concrete reinforcement and an equivalent quantity of girders and plates for the 10-story warehouse to be erected by the Larkin Company, soap makers, this city.

The Buffalo Structural Steel Company has been awarded the contract for 375 tons of structural material for the third building of the extensive lithographing plant now under construction for the Huebner-Bleistein Patents Company, Buffalo. The Buffalo Structural Steel Company has also taken the contract for the structural steel for the Isaac Rosenbloom building, Syracuse, comprising 175 tons. The American Bridge Company has closed a contract with the Eastman Kodak Company, Rochester, for the fabrication and erection of steel for its factory building No. 43, requiring about 300 tons. Bids on revised plans for the Hutchinson High School, Buffalo, will be received next week; also bids for the remodeling of the Broadway Arsenal to a City convention hall and exposition building, Buffalo, requiring considerable steel.

Old Material.—The market is practically at a standstill, with very little material changing hands; consumers holding back awaiting the developments which may result from the recent cut in prices of finished materials. Dealers are taking no apparent interest in the market, there being no incentive for them to increase their stocks under the existing status. We quote as follows per gross ton f.o.b. Buffalo, the prices shown being almost entirely nominal:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery cast scrap....	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable	11.00 to 11.50
Boiler plate	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe	9.60 to 9.25
Wrought iron and soft steel turnings.....	6.25 to 6.75
Clean cast forgings.....	6.00 to 6.25

The German Iron Market

BERLIN, May 25, 1911.—Little news, and none that is good—that is about a summing up of the information from the iron trade this week. The situation, however, is evidently growing less satisfactory. Prices are giving way, where not rigidly controlled by trade combinations. This week the Steel Works Union has voted to begin taking foreign orders in structural shapes for the September quarter at unchanged prices; and the Wire-Rod Association yesterday declared general business open for the same quarter without change in prices.

The least satisfactory section of the trade remains the bar market. The Bourse has this week been depressed by a pessimistic report on this specialty, which represents prices as steadily falling, with consumers still holding back in expectation of even lower prices. It is further represented that the amount of work on hand with the various mills is dwindling rapidly. They are compelled to use some pressure to induce customers to send in their specifications on material already ordered; and in such cases still further concessions on prices are often made. It is now possible to buy basic steel cars at 98 to 100 marks for home delivery; while export orders are taken at from 92 to 95 marks, as against 95 to 97.50 a month ago.

Export Trade Continues to Suffer

The export trade continues to suffer from sharp Belgian competition. Mills beyond the western frontier are very short on orders and are compelled to make big concessions in prices to get foreign business; and the German mills are obliged to follow suit. In this state of the trade foreign buyers are in no hurry to place orders, whether in Germany or Belgium, since they see that they are masters of the situation, with prices moving in their favor.

It may be remarked here, too, that the general market situation in Belgium continues to weaken. This week the news from there is considerably worse than hitherto. All forms of steel material for further manufacture have again fallen 2 to 3s. a ton for export. Billets, free on board at Antwerp, now command 76 to 80s.; muck bars 77 to 79s.; while heavy plates of basic steel have fallen about 1s., to 112—113s.

The Steel Works Union Report

Yesterday the Steel Works Union gave out its regular monthly review of the trade situation. It is very brief and rather less cheerful than previous reports. Home business in semi-manufactured materials, it is said, remains satisfactory both in the amount of orders on the books and in the arrival of specifications on order. The foreign market for such steel continues to grow quieter, and the union surmises that this is due chiefly to the situation in the United States. Foreign orders for heavy steel rails continue to come in as previously, and some of these are for large quantities; but the Imperial railroads—those, namely, of Alsace-Lorraine—have ordered 40 per cent. less even than the reduced amounts taken last year. Grooved rails continue in good demand from both home and foreign buyers, and this is also the case with rails for mines, though prices are depressed under foreign competition. The revival of business in structural shapes is maintained. Calls for delivery of this class of steel on foreign orders are satisfactory. New business is harder to get in England, but, on the other hand, there is a pretty good demand for Scandinavian countries, Holland, Switzerland, the Balkan countries, and Japan.

Pig Iron Trade Slightly Better

It is reported that a slight improvement has come over the pig iron trade, due to the better prospects for the completion of a national organization of the trade, which causes consumers to show increased willingness to place contracts, as they look for somewhat higher prices under a general organization. Since the arrangement of terms with the Siegerland furnaces the Essen Syndicate appears not to have made further progress with its efforts to bring the Luxemburg-Lorraine producers to terms. Negotiations will be continued next week. Another complication has arisen for the syndicate, however, by the demand of the great Gutehoffnungs-Hutte for an increase of 50 per cent. in its allotments. It is feared that this may prove a serious obstacle in the way of completing the organization. There is even talk in the press to the

THE IRON AND METAL MARKETS

effect that the concern in question will give notice of its withdrawal from the syndicate as a means to force through its claim; but it is not seriously believed that this result will follow. The Essen Syndicate has recently begun taking orders for 1912 delivery in certain sections of the home market where English iron was being offered at cheaper prices by dealers.

Birmingham

BIRMINGHAM, ALA., June 5, 1911.

Pig Iron.—The trading in this market the past week was very light, despite the low level of prices, and the volume of inquiry received was considerably smaller than for the week previous. The most significant transaction recorded involved a lot of 2000 tons of No. 2 foundry for shipment over the remainder of this year, which was sold at \$10.50, Birmingham. A lot of 500 tons of No. 3 foundry for shipment within three months brought \$10, Birmingham, and 300 tons of analysis iron for prompt shipment was sold at \$11, Birmingham. Carload lots of high manganese iron have sold at from \$11.50 to \$12, but the aggregate of such sales was very small. There has been some demand for gray forge and mottled grades and the quotations submitted have covered a comparatively wide range. It is not believed, however, that forge can be had at a lower figure than \$9.50, or at a differential of 50c. per ton on an \$11, Birmingham, basis. A small lot of mottled is available at \$9, or at a differential of 50c per ton. on the price for forge. As to whether or not a basis of \$10.50, Birmingham, would be shaded for the higher grades when spot shipments were offered, a definite statement is not warranted. There is some disposition on the part of the best authorities to believe that \$10.25, Birmingham, would be accepted for a round tonnage of No. 2 foundry and \$9.75 per ton for No. 3, provided that immediate shipment could be made, but as the stock reports for June 1 are not yet available, such a belief cannot be strengthened by referring to the aggregate accumulation of those grades. It is understood that the reports when in hand will show a substantial increase in the aggregate accumulation in May, notwithstanding the fairly satisfactory rate of shipment during that month. The movement from furnace yards has been considerably reduced since June 1 as a result of the suspension of operations at large foundries, and from present indications, a further curtailment of foundry operations will soon be made. The production of foundry iron in this State on June 1 was represented by 14 active stacks, with three additional stacks producing basic iron and two stacks on charcoal. We continue the quotations of last week, although the market is generally considered very weak without indications of an early improvement.

No. 1 foundry and No. 1 soft.....	\$11.00
No. 2 foundry and No. 2 soft.....	10.50
No. 3 foundry.....	10.00
No. 4 foundry.....	9.75
Gray forge.....	9.50
Mottled.....	9.25
Standard basic, chill cast.....	10.50
"Off basic".....	10.00
Charcoal carwheel iron.....	22.50

Cast Iron Pipe.—An aggregate of some 7000 tons of water pipe for requirement in the city of San Diego, Cal., was placed the past week, but the details of the transactions are not made public so far. Otherwise, the buying has been on a small scale and for maintenance work only. The rate of production continues below normal and in no case has stock accumulated to any appreciable extent. Several large contracts will be placed after satisfactory financial arrangements have been made, and the tonnage still on order books unshipped will take steady operation at all of the large plants. Water pipe quotations are considered nominal, but we continue to quote as follows, per net ton, f.o.b. cars here, as follows: 4 to 6-in., \$22.50; 8 to 12-in., \$22; over 12-in., average \$21, with \$1 per ton extra for gas pipe.

Old Material.—Dealers are adding to their stocks whenever bargain lots are offered, and after the same method of buying the movement to consumers continues at a fair rate. The prices received in transactions effected the past week indicate that a general revision has been made, but in view of the unsteadiness in the pig iron market the revised prices are quoted only nominally. We revise dealers' asking prices and quote as follows, per gross ton, f.o.b. cars here:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

Philadelphia

PHILADELPHIA, PA., June 6, 1911.

While business drags in practically all grades of crude and finished materials the excitement attending recent reductions in prices is gradually becoming less pronounced. Considerable hesitancy is still shown, however, in the placing of any important new contracts, although in instances specifications based on the new prices have been somewhat larger. Pig iron buying has been less active, although some Eastern producers are willing to make concessions from recent quotations for foundry grades on desirable business. At the present price levels Southern iron is becoming more of a factor in this market. Further business in steel making grades is reported, particularly in low phosphorus iron, prices for which are slightly lower. The demand for finished materials is not very active, although specifications based on the new prices are in instances reported as coming out more freely. Consumers are awaiting developments and believe that the present concessions will not be sufficient to induce any marked increase in buying. The old material market shows no marked change.

Iron Ore.—Sales of several cargoes of Spanish low phosphorus ore to an Eastern furnace are reported. The general ore market, however, continues extremely dull. Reports are heard of some price readjustments on Spanish ores, but sellers find it difficult to meet buyers' ideas, owing to the upward tendency of ocean freights. Importations in the week ended June 3 included 12,318 tons of Swedish, 5000 tons of Spanish, 1000 tons of Newfoundland, 4850 tons of Cuban and 2500 tons of Mediterranean ore.

Pig Iron.—The buying movement which attended the reduction in prices of Virginia foundry grades has largely subsided. There is still some little Virginia iron being contracted for, but principally in small lots for prompt and third quarter delivery, at both \$12.25 and \$12.50, furnace. The leading producer states, however, that it is believed that the quantity it desired to sell at the present low prices will be reached within the next ten days, when it will withdraw from the market. Eastern Pennsylvania foundry grades have not been in very active demand, while some producers are willing to make some concession they are not disposed to meet the low level named by some of the Virginia makers. Others still stand flatly at the higher prices recently prevailing, but are practically out of the market. Southern foundry at the present minimum basis of \$10.50, Birmingham, for No. 2 is becoming more of a factor in the Eastern markets, particularly where rail and water freights are available, and on lower grades prices in a number of cases are now below the comparative range for eastern Pennsylvania irons. Very little inquiry covering any large quantities of foundry iron have developed in this vicinity. The Baldwin Locomotive Works has been in the market for 1500 tons of foundry forge, while one of the Delaware River pipe makers has been inquiring for 4000 tons of low grade iron, against which Southern iron will no doubt be taken. The general run of smaller consumers are not coming into the market very freely, as they appear to be satisfied to await further developments, the business closed being largely confined to small prompt lots, standard brands of eastern Pennsylvania No. 2 X foundry being available at prices ranging from \$15.25 to \$15.50, delivered, in this vicinity. There is practically an entire absence of any demand for forge iron from the rolling mills, and while no basis has been fixed by recent transactions the market is nominally quoted at \$14.50 to \$14.75, delivered, at which prices some sellers would be willing to take on business. Low phosphorus iron has shown a somewhat better movement, sales aggregating a fair quantity have been recently made, while inquiry for several thousand tons for an Eastern consumer is pending. Prices show a slight recession and standard low phosphorus is now quotable at \$20.50 to \$20.75, while brands not quite up to standard analysis might be had at slightly lower figures. Inquiry for ba-

THE IRON AND METAL MARKETS

sic iron for fourth quarter delivery has recently been before the trade and while no definite information is available it is believed that some business of this character has been put through. The following range of prices is named for standard brands, delivered in buyers' yards in this vicinity, shipment extending up to the end of the third quarter:

Eastern Pennsylvania No. 2 X foundry.....	\$15.25 to \$15.50
Eastern Pennsylvania No. 2 plain.....	15.00 to 15.25
Virginia foundry	15.05 to 15.50
Gray, best.....	14.50 to 14.75
Best.....	13.50 to 15.00
Standard low phosphorus.....	20.50 to 20.75

Ferromanganese.—There is still an absence of any demand from consumers in this vicinity. Sellers report some inquiry from the West, but the demand generally drags. Quotations are to a large extent nominal, being named at \$36.50, Baltimore.

Billets.—Reduced prices have not resulted as yet in any pronounced improvement in the demand. Specifications on old contracts are developing somewhat better. Mills in this district continue to operate irregularly, and, while buyers occasionally make inquiries for the purpose of testing the market, very little new business is being placed. Open hearth rolling billets are quoted at \$23.40 and ordinary forging billets \$28.40, delivered in this vicinity.

Plates.—A moderate volume of miscellaneous business continues to be placed. Inquiry shows a slight improvement, and while largely confined to small lots, an occasional one for a good quantity comes out. Of the latter class one for 4000 tons of plates for gas holders on the Pacific coast is to be noted, for which delivery prices remain at the old basis, not being affected, it is stated, by the recent reductions. Specifications on old contracts have been somewhat heavier since the first of the month, when the new basis of prices became effective, particularly for bridge and locomotive work. All makers in this district are quoting the new basis, 1.50c., delivery here, for ordinary heavy steel plates.

Structural Material.—The demand does not show any betterment. Several new propositions are in sight in this city, including a school building, which will require about 2500 tons, and a new branch Y. M. C. A. building. A number of small buildings are also being figured on, but develop slowly. Several fair-sized contracts for fabricated work in the New York district have been taken by producers in this territory, including one of 1200 and another of 3000 tons, taken by the Eastern Steel Company. The demand for plain shapes continues irregular. The new price basis, 1.50c. minimum, delivered here; now appears to be firmly established for plain shapes.

Sheets.—Irregularity still characterizes the demand, which is confined to a large degree to small prompt lots. Price concessions have not resulted in any larger volume of business, although some inquiry has resulted, but consumers are still disinclined to place orders for anything beyond near future needs. Mills in this district continue fairly active, but have little forward business on their books. The following range of prices is now quoted by Eastern makers, f.o.b. mill, for moderate lots for early shipment: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.50c.; No. 27, 2.60c.; No. 28, 2.80c.

Bars.—The market is still unsettled. The recent reduction in the price of steel bars has resulted in a pretty general withholding of business, the trade waiting to see if actual bottom had been reached. While the reduction in steel bars has not affected the price of refined iron bars, transactions in the latter have also been extremely light. Prices of both steel and iron bars now appear to be well held, the former at 1.40c., and the latter at 1.27½c. to 1.35c., delivered here.

Coke.—A somewhat better movement in foundry coke is to be noted, buyers in instances taking 1000 ton lots for delivery over the remainder of the year, and also for a full twelve months, at \$2.10 to \$2.25 at oven. There has also been more selling of prompt coke at prices ranging from \$1.90 to \$2.10 at oven. The United States Government has an inquiry out for an additional lot of 2000 tons of foundry coke for delivery over twelve months. Very little business has been done in furnace coke, and prices are practically unchanged. The following range of prices per net ton is named for deliveries in this vicinity:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke	4.10 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke	3.70 to 4.15

Old Material.—Consumers show little interest in the market, and the major portion of recent transactions have been between dealers. Railroad lists now out in this district show but a medium amount of old material offered. Very little movement in heavy melting steel is to be noted; one transaction, involving 1000 tons, partly rails, was taken by one of the steel mills at \$13.25, delivered. Small lots are available at \$13, but no seller is willing to dispose of any quantity at quoted prices. The market in the rolling mill grades is particularly quiet. Prices are largely nominal, owing to the lack of sales, but are believed to be pretty close to the bottom. Sellers' ideas for small lots delivered in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton, being named as follows:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	14.00 to 14.25*
Low phosphorus heavy melting steel scrap..	16.75 to 17.25
Old steel axles.....	19.25 to 19.75*
Old iron axles.....	24.00 to 24.50*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.00 to 12.50
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast	13.00 to 13.50
Railroad malleable.....	11.50 to 12.00
Grate bars, railroad.....	10.50 to 11.00
Stove plate.....	10.00 to 10.50

*Nominal.

New York

NEW YORK, June 7, 1911.

Pig Iron.—Inquiries are light and transactions are few. Occasionally a fair-sized quantity is sold, but generally this means the closing up of negotiations which have been proceeding for some time. Among the sales thus made was one of 2000 tons of charcoal pig iron. Consumers in this locality have either covered their requirements as far as they care to go or content themselves with purchasing small lots to meet their immediate necessities. Southern pig iron is now quoted at prices enabling it to compete with Northern iron in this vicinity. Northern iron at tide-water is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2X, \$15.25 to \$15.50; No. 2 plain, \$14.75 to \$15. Southern No. 1 foundry is quoted at \$15.25 to \$15.75; No. 2, \$14.75 to \$15.25.

Finished Iron and Steel.—The week has been very dull. Sentiment regarding the immediate future is mixed. Purchases have been for immediate wants. The general opinion is that present conditions will continue without much change for a number of weeks. One advantage claimed for the publicity given to the recent cut is the focusing of the attention of the general public on the timeliness of settling,*at this time, impending projects. Local business in plates is still affected adversely by the boiler makers' strike, but the mills seem to be able to continue working at nearly 70 per cent. capacity. Bar iron is dull, but hardly weak, some good orders being reported at fair prices. There is little to report in new business of large size. Some 5000 tons of plates for 10 torpedo boats are wanted by the navy and 2000 tons for two revenue cutters to be built by the Newport News Shipbuilding & Drydock Company. Some of the recent bidding includes 400 tons for a railroad station at Newark, N. J.; 600 tons for a hotel at Richmond, Va.; 2500 tons for a high school at Philadelphia, and 700 tons for a textile mill at Chicopee, Mass. The Carnegie Steel Company is low bidder for 4000 tons of plates and 1500 tons of shapes for the United States collier Jupiter being built at the Mare Island Navy Yard. The 4000 tons of reinforcement and tower construction of the Williamsburg Bridge, New York, is expected to go to the Snare & Triest Company, New York, the lowest bidder. The 6000-ton Bamberger department store job in Newark, N. J., has by this time probably been given to the Hay Foundry & Iron Works, New York. The Eastern Steel Company has been awarded the 1200-ton American Express building at Eleventh avenue and Thirty-second street, New York, and L. F. Shoemaker & Company have the 2400 tons of structural work in connection with the coke oven plant of the Didier-March Company at South Bethlehem for the Bethlehem Steel Company. The 1800 tons for the Jarmulowski bank and loft building have been given to the Radley Steel Con-

THE IRON AND METAL MARKETS

struction Company. Quotations are: Plain structural material and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.40c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

Cast Iron Pipe.—Bids were opened June 5 for 1205 tons of 30-in. water pipe by the city of Yonkers, N. Y. The lowest bidder was an eastern Pennsylvania company which named \$21.35 per net ton, delivered. No public lettings of importance are in sight in this immediate locality. The general market continues very quiet. Carload lots of 6 in. are quoted at \$21 to \$22 per net ton, tidewater.

Old Material.—Dealers report no indications of an early resumption of activity. The transactions of the week are confined to small lots. An inquiry is out for a few thousand tons of heavy melting steel scrap, but the price offered is below the terms that would be accepted by yardmen who are not disposed to part with their stock, except at rather higher figures than are now ruling. The demand for cast scrap is light, and only for small quantities. Quotations are about as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Re-rolling rails.....	12.00 to 12.25
Standard hammered iron car axles.....	22.00 to 22.50
Old steel car axles.....	17.25 to 17.75
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.25 to 4.75
Cast borings.....	5.25 to 5.75
Wrought turnings.....	6.25 to 6.75
Wrought pipe.....	10.00 to 10.50
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

Metal Market

NEW YORK, JUNE 7, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.
Copper, New York.

	Lake.	Electro.		Tin.		Lead.		Spelter.	
		lytic.	New York.	York.	St. Louis.	York.	St. Louis.	York.	St. Louis.
June 1.....	12.45	12.25	46.30	4.37½	4.22½	5.50	5.20	5.50	5.20
2.....	12.45	12.25	46.65	4.37½	4.22½	5.50	5.20	5.50	5.20
3.....	12.45	12.25	47.00	4.37½	4.22½	5.50	5.20	5.50	5.20
4.....	12.45	12.25	47.50	4.37½	4.22½	5.50	5.20	5.50	5.20
5.....	12.45	12.25	48.00	4.37½	4.22½	5.50	5.22½	5.50	5.22½
7.....	12.45	12.25	48.25	4.37½	4.22½	5.55	5.25		

Pig Tin reached a record price in London yesterday and in this market this morning it was within ¾c. of the highest price ever paid here. Copper is firm and excellent sales have been made for export. Lead is somewhat stronger. Inquiries for large lots of spelter have advanced that market slightly. Antimony is much weaker.

Copper.—The copper market is firmer on the strength of good exports and a large consumption in Europe. The foreign market is the salvation of the copper situation, as just now the deliveries into consumption here are not large. Some fairly good business was done during the week, but the largest consumers show no great interest in the situation. The United Metals Selling Company is making the market just now and its price is 12.45c. for lake and 12.25c. for electrolytic. Some big selling interests are demanding more and many predict a higher market within the next few weeks. A heavy business is being done in London in copper, and from private reports received in this country the trading is legitimate, as the copper is going into consumption. The speculative element in London seems to be letting copper alone at present. This morning that market was firm and steady at £55 10s. for spot and £56 1s. 3d. for futures. The exports of copper so far this month have been 4981 tons, which is heavy for six days' shipping. L. Vogelstein & Co. give the following figures on German consumption of foreign copper for the months January-April, 1911: Imports of copper, 57,849 tons; exports of copper, 2654 tons; consumption of copper, 55,195 tons, as compared with consumption during the same period in 1910 of 54,663 tons. Of the above quantity 50,261 tons were imported from the United States.

Pig Tin.—Spot tin is bringing the highest price on record in London and wild excitement prevailed in that market yesterday and to-day as the immediate supplies are closely cornered and traders are scrambling for the

few lots offered for sale. Yesterday the London market went up to £220 for spot, and the only time that that price has been approached was on May 14, 1906, when tin for prompt delivery sold for £215. Regardless of the high price made yesterday only 140 tons of metal changed hands. In this market conditions have completely reversed during the week. Seven days ago the American market was thought to be in a state of fair security from a corner as far as the immediate supplies were concerned and tin was being sold at below the import parity. It leaked out yesterday, however, that 250 tons of tin were sent to Europe on Saturday and prices here advanced sharply in consequence. Consumers entered the market and bought to cover their needs for the next month. Most of them purchased sparingly but the volume of trading was good. The market just now is uneasy as present conditions may be continued indefinitely in spite of the fact that tin consumers' needs are small at present. The New York market has now gone beyond the price where it can be imported at a profit and this may stop the re-exporting of tin to London. On the other hand, none but those in control of the London market can tell where prices will go there, and some speculative mortals may see fit to export tin on the chance that the foreign market will advance further. This morning the London market was slightly easier at £215 for spot and £193 15s. for futures, while the market here was 48.25c. and showed signs of advancing. The arrivals of tin in this country so far this month have been 380 tons and there are 1003 tons afloat, all of which will be in port before the month is out.

Tin Plates.—The foreign tin plate market has advanced in keeping with the high price made by the pig tin syndicate, which is in charge of the London market, and to-day tin plates at Swansea, Wales, were selling at 13s. 9d., which is an advance of 5d. in two weeks. This price makes it almost prohibitive to buy tin plates for re-export, and there is a likelihood that domestic plates will be utilized by people who usually purchase for re-export if the foreign market continues high. At present the domestic demand is quiet and quotations are firm in New York with 100 coke plates selling at \$3.94.

Lead.—Lead is somewhat firmer, but the demand is light, and consumers are only buying where concessions are made. The New York market is quoted at 4.37½c., and the St. Louis market at 4.22½c.

Spelter.—Some inquiries for large amounts of spelter have appeared in this market and in St. Louis, and on the strength of this quotations have advanced five points. Spelter is now bringing 5.25c. in St. Louis, and 5.50c. in New York for spot. It can be bought in this market, however, for prompt shipment from the West at from 5.42½c. to 5.45c.

Antimony.—Offers to sell Hungarian and Chinese grades of antimony at low prices have broken the syndicate's hold on the antimony market, and quotations on Cookson's and Hallett's have fallen off. There is not much buying and consumers are giving preference to the cheaper grades. Hallett's is now 8.75c., and Cookson's is down to 9c. The drop in the price of Cookson's amounts to ½c. within a week. Hungarian grades are offered at fair prices from 7.50c.

Old Metals.—The market remains unchanged both as to condition and selling prices, the latter being as follows, New York:

Cents	
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

Chicago

JUNE 6.—Except for a slightly stronger tone in the copper market, the past week offers little of change with reference to metals. No large volume of business is reported and prices are approximately at the same level as a week ago with some slight variations attending upon the character of the order. We quote Chicago prices as follows: Casting copper, 12.45c.; lake, 12.60c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 47½c.; small

THE IRON AND METAL MARKETS

lots, 49c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12c.; copper bottoms, 10c.; copper clips, 11¼c.; red brass, 10¼c.; yellow brass, 9c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin pipe, 36c.

St. Louis

JUNE 5.—Lead shows little feature, the quotations here being 4.22½c., East St. Louis. In spelter there is a slight drop, the figure being 5.20c., East St. Louis. Zinc ore so far shows no change from last week's figure of \$37 to \$39 for 60 per cent. f.o.b. Joplin. Tin is up with other markets, 47c. being the price. Antimony is weak, but without change. On old metals the quotations are: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3.25c.; pewter, 20c.; tin foil, 28c.; tea lead, 3c., all for less than carload lots.

Notes on Prices

Rope.—The demand apparently keeps up to the recent level, with no desire on the part of buyers to purchase beyond nearby requirements. The hard fiber market is firm with a slight advance in sisal fiber, while manila fiber is reported as steady. There is more or less variation from regular prices in the lower grades of rope. The following quotations represent regular prices to the retail trade in the Eastern market for rope, 7/16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½ to 9c. per lb.; second grade manila, 7½ to 8c. per lb.; hardware grade manila, 7 to 7½c. per lb.; pure sisal of the highest grade, 6¼c. per lb.; second grade, 6c. per lb.; rove jute rope, ¼ in. and up, No. 1, 6½c. to 7c. per lb.; No. 2, 6c. per lb.

Linseed Oil.—The paint business shows some improvement, there being a fair demand for small lots. Carloads are quoted on the basis of raw oil at 87c., and it has been intimated that 10-bbl. lots could be obtained from some sellers at the same figure. The following are New York prices in 5-bbl. lots or more:

	Cents.
State, raw	89
City, raw	90
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—Since turpentine prices have declined the demand has increased for small lots generally, although some buyers are placing orders for larger quantities. The view of market conditions taken by some is that prices will go still lower, as receipts of turpentine at Southern points are large and stocks are accumulating, although exporters have been buying large quantities. New York turpentine quotations are as follows:

	Cents.
In oil barrels.....	57½
In machine barrels.....	58
Less than 5-bbl. lots, ¼ cent advance per gallon.	

The buying of rosins is generally restricted to nearby requirements. On the basis of 280 lb. to the barrel common to good is quoted at \$6.65 and grade D, \$7.15 in the New York market.

"A Decade in United States Steel" is the title of a booklet, published by Dow, Jones & Co., publishers of The Wall Street Journal, 44 Broad street, New York. Its purpose is to give the shareholders of the United States Steel Corporation, as well as investors, an insight into its general operations and what has been accomplished by this great industrial organization in the last ten years. The author has gone into the subject in much detail in the effort to point out the uses to which earnings have been put; actual assets added to the property after sinking and depreciation fund charges have been deducted, the extent to which the corporation has safeguarded its shareholders; additional security placed behind the capital stock and bonds, and other developments. The volume contains 45 pages, and is sold at 25 cents per copy.

Iron and Industrial Stocks

NEW YORK, June 7, 1911.

Prices of securities continued their upward movement until Tuesday, when some reaction occurred. There seem to be few exceptions to the general strength in iron and industrial stocks, on which the range of prices from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalm., com....	9 - 9¼	Pressed St., pref....	99 - 100¾
Allis-Chalm., pref....	32 - 33¼	Railway Sp., com....	34¼ - 37¼
Beth. Steel, com....	32¾ - 33¾	Railway Sp., pref....	101¾ - 102
Beth. Steel, pref....	62¼ - 64¼	Republic, com....	29¼ - 31
Can., com....	11¼ - 12¼	Republic, pref....	93¼ - 96
Can., pref....	86 - 88½	Sloss, com....	49¼ - 50
Car & Fdry., com....	54 - 59	Pipe, com....	17½ - 18
Car & Fdry., pref....	119¼ - 121	Pipe, pref....	58¾ - 59¾
Steel Foundries....	41 - 43	U. S. Steel, com....	75½ - 78½
Colorado Fuel....	32¾ - 34¾	U. S. Steel, pref....	118 - 119½
General Electric....	163 - 166½	Westinghouse Elec....	75 - 78
Gr. N. ore cert....	60½ - 63½	Va. I. C. & C....	68½ - 70½
Int. Harv., com....	124½ - 126½	Am. Ship, com....	67 - 72¼
Int. Harv., pref....	125 - 127½	Chi. Pneu. Tool....	51½ - 53
Int. Pump, com....	40 - 42½	Cambria Steel....	44 - 45¼
Int. Pump, pref....	88¼ - 89¾	Lake Sup. Corp....	27½ - 28½
Locomotive, com....	40 - 42	Pa. Steel, pref....	106½ - 107½
Locomotive, pref....	108¾ - 109¾	Warwick	10
Nat. En. & St., com....	17	Crucible St., com....	13¾ - 14
Pittsburgh St., pref....	103¾ - 105	Crucible St., pref....	81¼ - 84
Pressed St., com....	34¾ - 37¼	Harb. Walk Ref., com....	45

The Sharon Steel Company, Sharon, Pa., which was absorbed some years ago by the United States Steel Corporation, has paid off and retired the whole of the outstanding issue of collateral trust and mortgage 5 per cent. 40-year gold bonds, amounting to \$60,000. They are dated June 1, 1901, and would have been payable June 1, 1941.

Dividends

The American Car & Foundry Company has declared the regular quarterly dividends of 1¼ per cent. on the preferred and ½ of 1 per cent. on the common stock, payable July 1.

The Ingersoll-Rand Company has declared a semi-annual dividend of 3 per cent. on the preferred stock, payable July 1.

The Standard Coupler Company has declared a semi-annual dividend of 2 per cent. on the common, and 4 per cent. on the preferred, payable June 30.

A novel and interesting demonstration car is on its way to the Atlantic City convention of the Master Car Builders and Master Mechanics. This car contains an upright boiler arranged for using oil fuel and a large oil-fired forging furnace, designed and built by Tate, Jones & Co., Inc., Pittsburgh, with one of the new steam hydraulic forge presses built by the United Engineering & Forging Company. This car will be placed next to the board walk on Mississippi avenue, and it will be in operation daily during the convention making forgings. After the convention it will be taken to different places for demonstrating the value of this type of forge press and furnace.

The Duplex Metals Company, Chester, Pa., announces that its copper-clad steel wire is now manufactured in four grades as follows: 47 per cent. grade, conductivity 44 to 50 per cent., bare wire, 13 cents base; 40 per cent. grade, conductivity 35 to 45 per cent., bare and weatherproof wire, 12½ cents base; 30 per cent. grade, conductivity 25 to 35 per cent., bare wire, 11 cents base; mechanical grade, guaranteed rustless, bare wire, 11 cents base.

The Department of Public Safety, Philadelphia, will receive bids until June 13 for the construction of a flush deck fire and police boat, specifications for which are to be had at the Bureau of City Ice Boats and Dredges, Race street wharf, Delaware River; and for a new crank shaft for engine No. 3, power plant, City Hall, specifications for which may be had on application to the Electrical Bureau, City Hall.

Advices from San Francisco state that on June 3 the creditors of Henshaw, Buckley & Co., machinery dealers, filed a petition against the firm in involuntary bankruptcy. The liabilities are placed at \$500,000. Action was begun to stay an execution secured by Los Angeles creditors, and the court issued an order restraining all levies on the firm's property.

Efficiency in the Foundry*

A Discussion of the Movement in Its Various Aspects in the Manufacture of Castings

BY C. E. KNOEPPPEL, NEW YORK CITY.

The foundry business, the same as any other business, should be based on mutualism. The executive wants low costs, the men employed want higher wages, and there is no reason why both should not realize their desires. If either ignores the interests of the other, both lose out. The aim, therefore, of scientific management, or whatever you choose to call it, is to bring about this seemingly illogical condition of higher wages and lower costs, through finding the best ways of doing things, and properly adjusting the various relations to the end that the proposition may be in the best possible working condition. If you will think of this doctrine of efficiency in this sense, the possibilities will no doubt appeal to you.

The executive wants results, but he is unable to give more than a general idea as regards what he desires accomplished, so that it is up to his manager to reduce this idea into elements and factors, which he does as well as he can. The foremen are told that they must produce, and depending upon their ability they do as well as is possible in giving out the work, bettering conditions, stipulating how much they want produced, advising the men, etc. The men who finally get and make the work use their ability to a great extent in their own way. If they are not working fast enough or make their work incorrectly, it is not noticed except as the foreman in the travels around the shop happens to observe what is going on, in which case the men receive criticism or advice, as the case may be.

An Inherent Weakness

Because the conditions are often as outlined, it is not strange that through this shifted responsibility more is not accomplished. Men cannot advise themselves, and if the matter of equivalency as to time, number per day, and quality of product are left in a measure to them, or to a hasty observation by the foreman, it follows that because each man through his training is in a sense a law unto himself, the practice is anything but standard. To reverse the order of things, to build from the bottom upward, requires a constructive type of organization that erects on a firm foundation and in a scientific manner a structure that will consider the various elements entering into making the enterprise successful.

Here is a prime consideration—scientific study of the man. In the foundry the work is largely a matter of motion—shoveling, ramming, slicking the mold, making cores, coring, finishing, closing, weighing, pouring, etc. Considered in this light, there are wonderful possibilities ahead of your industry in this particular field. Little, if any, study has been given to motions, trips, extra handling, etc., to determine the best a man can do, day in and day out, without injury to his health, for it should be remembered that scientific management does not mean slave driving.

The psychological side of the man is beginning to receive its share of attention, and again, as regards your industry, there is a productive field awaiting development. We are all more or less governed by self-interest, and as every man possesses such faculties as initiative, imagination, energy, interest and concentration, any appeal to this self-interest awakens each faculty and more is accomplished as a result. Those among you who have made the greatest successes have been inspired primarily by self-interest. You called your imagination into play, dreamed of future successes, drew up mental plans which you desired to carry out, which aroused your interest to such an extent that your whole aim and purpose was centered upon what you had planned mentally. Depending upon your interest and concentration, your faculty of initiative forced you to get up and do, and your energy carried you through to success. These same qualities exist in every man. To what extent have they been developed in those under you? If, in addition, we consider that there is such a thing as a "second wind" in a mental as well as physical

sense, the development of this side of a man's make-up is worth while undertaking.

Study of the Man and the Work

In studying men, then, we must analyze what they do and how they do it, eliminate the unnecessary, instruct them how to do the necessary, inspire them with new and fresh interests, furnish them the incentive to use their heads and hands to better advantage, and you can get results from them which will be surprising as well as profitable.

The task is not completed, however, by just studying the man, for there must be a knowledge of what he has to do, as well as how he is to do it. The foreman can hand a molder a pattern; the molder can have a flask brought in; he can make and pour the mold, but he assumes a greater responsibility than is really his. Study will soon demonstrate that there is the unnecessary in the operations that go to make a job, just the same as there is the unnecessary in the work of the man. If the molder goes for gagers, and then in setting them takes longer than is necessary, you have a double inefficiency, so that in studying the work the operation of going for gagers would be eliminated, for the very good reason that a concern does not get productive capacity out of a molder when he is doing something that can be done for him by those less skillful and at less expense. This illustration holds as regards other items, such as mixing facing, going for nails, chucking or tightening flasks, and a number of other details that a study will reveal as existing to a degree in almost every foundry. Eliminate these unnecessary features, and you can standardize the operations; you can plan more intelligently, and you can put the responsibility for making a good mold squarely up to the man and not a responsibility that is likely to be detrimental to his interests, through furnishing him with tools and rigging that may not be best for the job in question, making him wait unnecessarily, etc.

After you have studied the work, separated the productive elements from those which are merely preparatory operations, it is then up to the management to assume full responsibility for bringing these conditions to the highest degree of efficiency. The molder, in a broader sense, is only the medium between the finished casting and what he is given to work with, as well as the conditions under which he works. We are all familiar with what he uses in his daily work, and as a molder can work efficiently only when he can use to advantage such items as patterns, cores, flasks, sands, nails, tools, etc., it would certainly pay to have this end of the work at its best. In a brief way the conditions capable of study and betterment are:

1. Foundry orders—knowledge of and their following up.
2. Storage and handling of materials, supplies, etc.
3. Selection of patterns, sweeps and core boxes.
4. Repairing and altering the above.
5. Selection of flasks.
6. Repairing and altering the above.
7. Flask storage, piling, etc.
8. Removal of castings, gagers, rods, etc., from the sand.
9. Tempering of molding sand for use by molders.
10. Mixing of facing sand.
11. Shop carrying arrangements.
12. Supplying the molders with facilities.
13. Furnishing the molder with proper tools.
14. Crane facilities.
15. Arrangements as regards the general shop labor.

Faulty Dispatching

One of the reasons for inefficiency in industrial endeavor is a lack of, or faulty, planning, or dispatching, as it has been properly termed, the assumption of which is—no work is ready until everything is, or will be ready for the work. If the molder has to wait for a job, or pattern, or flask, or his cores, or to have new bars placed in his cope, faulty planning is responsible for inefficiency, which taxes the work with more than it should cost.

If dispatching is placed at the service of the men as regards jobs, patterns, flasks, cores, rigging, special features, conditions, the night work, supplies, crane service, tools and equipment, shop labor, etc., it would be but a short time before gains due to this one feature of the work would be such as to convince you beyond any possibility of questioning as regards the merit of efficient dispatching.

With dispatching so arranged to eliminate waits and delays; with conditions in the best possible state for working to advantage; with the work standardized both as to pro-

*Presented before the American Foundrymen's Association, Pittsburgh, May 24, 1911.

ductive operations and as to time in which they should be done; with the men under proper direction giving their best energies, who is there unwilling to divide with them a share of the gain due to the elimination of waste and unnecessary effort? This would stimulate them, awaken a self-interest, and they would not only willingly assume their legitimate responsibility, but co-operate with you in turning out more.

This reward would be based upon individual merit according to the efficiency of each man, as shown by the relation existing between the time actually taken by him and what he should have taken on work that had previously been studied and standardized. In addition, rewards would be entirely distinct from wages, so that the men would have everything to gain and nothing to lose; in fact, the more a man could earn the better, for this would mean a higher efficiency, which stands for a low cost.

Lake Superior Mining Conditions

Activity in Acquiring New Mines and in Making Explorations

DULUTH, June 3, 1911.—As yet there is no improvement in mining conditions on Lake Superior. Last year the Duluth, Missabe & Northern Railroad handled about 13,500,000 tons of ore to Duluth; its schedule for this year is not much more than half of that amount, or 7,500,000 tons. The Duluth & Iron Range is cut in about the same proportion. On the other hand, the Great Northern's schedule is increased somewhat, and is in the neighborhood of 9,500,000 tons. According to the present figures there will be shipped from the Minnesota ranges not to exceed 22,500,000 tons, which is to be compared with 30,500,000 tons for the preceding year. This is in spite of the fact that the new Cuyuna range commenced shipments this season, and diminishes, by just so much more, the totals of the two older districts. To be sure the Cuyuna's output this year will be very small, probably not in excess of 250,000 tons, if so much. But the general feeling is one of hope, and it is expected that the year will be an accelerating one, and many feel that the fall will show everything busy and a demand for heavy shipments.

Lake shipping interests are suffering materially. Of the many independent fleets a few have not outfitted a single ship, others have a moiety of their vessels running. One large independent interest, with seventeen large ships, had but two in commission to May 20; it is now outfitting others, and will have a good part of its boats running in June. The coal business is heavy, and crop prospects are unsurpassed, but coal is brought up the Lakes as a sort of by-product, and grain is now but a trifling factor at best in the point of tonnage.

Why Leased Mines Are Worked to the Limit

Naturally, mines are running under check. On the Marquette range the Lake Superior Iron Company has cut down its time to four days per week, without any reduction in the number of men employed, and many other properties have reduced. On the Vermillion range the Steel Corporation mines will move as little ore as possible, while on the Mesaba a number of the large properties are idle. In these cases, however, the reductions are not entirely the result of dullness, but combined with other reasons, as, for instance, the requirements of the corporation for heavy minimum shipments out of leased mines, the leases on some of which are drawing to expiration.

There is such a tremendous gross amount of ore to be produced to fill minimum requirements on long time leases, and so much on leases that have but a few years to run, that all mines owned in fee will be conserved, not only now, but for some time to come. It is admitted by those knowing conditions that any leases about to expire will be renewed only at a royalty rate far higher than has been paid in the past. In this event it is the policy of the lessees, whether they be the Steel Corporation or others, to mine as much as possible at the present rates, and take as great advantage of the situation as possible. In this connection there are to be considered the questions of equipment and advance development. The greater the tonnage this is spread over, the lower will be the cost

of production, and for this reason it is necessary to clean out as much ore as possible before leases expire.

Activity in Acquiring New Mines

The activity in Lake Superior mining operations of a number of the independent steel makers has been somewhat overlooked. Such concerns as M. A. Hanna & Co., Jones & Laughlin Steel Company, Rogers, Brown & Co., Inland Steel Company, Pickands, Mather & Co., Shenango Furnace Company, Republic Iron & Steel Company and some others have been very active in the acquirement of mines and in the development of new properties. Most of them have been quite recent in this work, though Pickands, Mather & Co. and the Republic Iron & Steel Company, having been fairly well fortified with mines some time ago, have not been so anxious for more.

M. A. Hanna & Co., for example, have added an average of four or five new mines a year for several years, and are still exploring. They are scattered over the various districts, especially on the western Mesaba and in the Iron River section of the Menominee. While many of their mines are comparatively small, as tonnages now go, they have amassed a very important aggregate of various grades, and have placed themselves in an exceptionally well entrenched position.

The Jones & Laughlin Steel Company now has a total of ten operating mines, of which three are in Ishpeming and the rest on the Mesaba. The company recently bought the fee of the Nassau mine, at Hibbing, which had been under lease to M. A. Hanna & Co., but that had never been operated. It adjoins a Jones & Laughlin property that is now active, and the two can be operated as one with much economy. The company is exploring on the Menominee.

Rogers, Brown & Co. have of late been more interested in developing the Cuyuna than other districts, and have several good mines there, notable among which is the new Meacham, on which a large working shaft is being sunk. This is a deep and large deposit of high grade ore, considerable of it of Bessemer grade. It contains 15,000,000 tons, and is owned in fee by the Pine Tree Lumber company, a Weyerhaeuser timber interest. The Inland Steel Company has several properties, among which are Menominee, Mesaba and Cuyuna range lands.

Initial shipments from the Cuyuna were made last month from the Kennedy mine, owned by Rogers, Brown & Co. It is not unlikely that the grade of this shipment will be disappointing, as the ore was taken from development and is much mixed. Still, there will be no little interest in results, if they can be learned. In general, affairs on the Cuyuna are somewhat quiet, and are confined almost completely to a section in the immediate neighborhood of the west side of Rabbit Lake and in towns 46 and 47, range 29. Some ore of very high grade has been found in the lower part of town 136, range 26, north of and within half a mile of the Mississippi River, and a deep hole is to be drilled there to test the formation at 1000 ft. or more. This is, so far as I know, the only find of good ore north of the Mississippi on that range.

Activity in Explorations

There is a surprising amount of activity, considering general conditions, in explorations. This is not alone in old and well-known fields, but at other points. Work is under way on a considerable scale at various points of the Atikokan range; and while there is not yet much actual drilling, preliminaries are shaping themselves for that. The same is true of a certain region on the western side of Itasca County, Minn., far north of the Mesaba range. It has been found that there are various well defined lines of attraction in that vicinity. Near the little station of Beechwood, eight miles west of Iron River, Menominee range, there is an attractive situation, and it is to be drilled. Exploration on the Vermillion continues as for some time past, with one or two additional operators in the field. At the Camp property of the Vermillion & Mesaba Iron Company a testpit is now some 45 ft. in high grade hard ore that shows all the earmarks of Vermillion ore. Elsewhere, so far as is learned, conditions remain as they were some weeks ago.

At Crystal Falls a new shaft is being sunk at the Bristol mine by Oglebay, Norton & Co., and there is to be a large product this year. This shaft is steel construction, wood lathed, and with one exception, that of the new Maas shaft at Negaunee, is the most pretentious operation of the kind now under way on Lake Superior. D. E. W.

Utilizing Blast Furnace Wastes *

Enormous Economies in Power from Gases, Portland Cement from Slag and the Saving of Ore Dust

BY EDWARD M. HAGAR.†

Until the last decade practically the only utilization of the wastes or by-products of a blast furnace was the use of a portion of the waste gases to raise the temperature of the incoming blast through heating the brick work in hot stoves, and in some cases a small portion of the power value of the gases was obtained by burning them under boilers to generate steam for driving the blowing engines.

At the present time the calorific value of the waste gases is being utilized directly in gas engines for blowing purposes and for generation of electric power; a considerable portion of the slag is used in the manufacture of Portland cement, and the flue dust, consisting of the finest ore and coke particles, is being collected and converted so as to be rechargeable into the furnaces. The aggregate saving of profits resulting from these three developments is a matter of millions of dollars per annum, and in a modern blast furnace plant it would almost seem that pig-iron was the by-product; and, indeed, the investment in the equipment to utilize these former wastes exceeds that of the blast furnace itself.

The writer in his work has come in contact with these evolutions, with plants in operation or under construction, of a capacity to produce 12,000,000 barrels of Portland cement per annum from slag and limestone, using over 1,300,000 tons of slag in a year, these plants being driven entirely by electric current generated by gas engines directly from the waste blast furnace gases, the power requirements being 40,000 hp for 24 hours every working day. In one of the cement plants the first commercial method for reclaiming flue dust was discovered.

The United States Steel Corporation, of which the Universal Portland Cement Company is a subsidiary, has already installed 250,000 hp gas blowing and gas electric units, which, it can easily be figured, displaces or saves the consumption of approximately 1,000,000 tons of coal per annum as compared with the old-fashioned method.

Utilizing the Ore Dust

With the modern high blast pressures and the use of fine Mesaba ore the finest of the particles together with the coke dust are blown out through the top of the furnaces and are caught in the flues, dust catchers and gas washers. The iron ore in this dust amounts to fully 3 per cent. of the total ore charged, which aggregates the large amount of approximately 1,250,000 tons per annum in this country. Until within a few years this dust has been thrown away or used as filling, although containing about 40 per cent. metallic iron. For many years efforts were made to use this material by compressing it into briquettes, but the cost of the operation, together with the fact that the briquettes disintegrated and the dust was again blown out, led to an abandonment of the briquetting plants.

The first commercially successful method of utilizing the dust was discovered by passing the material through the cement kilns at South Chicago. Experiments showed that with the proper heat treatment the coke dust could be burned off and the iron ore conglomerated into nodules or nuggets averaging over 60 per cent. iron content. These nodules when fed to the blast furnace were easily and completely reduced. The fact that the sinter of the flue dust contains such a high percentage of iron and that all of the sinter is reduced, together with its physical shape assisting the steady movement of the charge downward in the blast furnace, thereby preventing so-called slips, makes the sinter more valuable per ton than any ore. It was necessary to derive mechanical means for preventing the accumulation of the sinter on the walls of the kiln. Plants have been in operation for some years using this process, with endless chains carrying scrapers constantly passing forward through the kiln and cooled in water on their return outside of the kiln. Recently other methods of utilizing dust have been devised which may prove successful commercially, and the indications are that within a short time the greater portion of this former waste will be prevented.

The Growth of the Portland Cement Industry

The development of the Portland cement industry in this country and the extension of its uses have been marvelous. The following table shows the remarkable increase in the production of Portland cement in the United States every year since 1895, when this country first reached the production of approximately 1,000,000 barrels:

Year.	Production of Portland Cement in U. S. Barrels.	Production of Universal Portland Cement. Barrels.	Percentage of Universal to the Total.
1895	990,324	.....	.....
1896	1,543,023	.....	.....
1897	2,677,775	.....	.....
1898	3,692,284	.....	.....
1899	5,652,366	.....	.....
1900	8,482,020	32,443	1.39
1901	12,711,225	164,316	1.29
1902	17,230,644	318,710	1.85
1903	22,342,973	462,930	2.08
1904	26,505,881	473,294	1.78
1905	35,264,812	1,735,343	4.92
1906	46,463,424	2,076,000	4.55
1907	48,785,390	2,129,000	4.36
1908	51,072,612	4,535,000	8.89
1909	62,508,461	5,786,000	9.27
1910	73,500,000*	7,001,500	9.52

*Government estimate.

It may be of interest to note the increasing percentage of the total American production shown by Universal Portland cement, which is the only Portland cement manufactured in this country using slag as one of the raw materials. With the new plant now approaching completion, the aggregate production of Universal Portland cement in the Chicago and Pittsburgh districts will amount to over one-eighth of the country's total. Expressed in weight, the output of the finished product will be over 2,000,000 gross tons per annum. Our plants in the Chicago district will consume all the available slag that is suitable for the purpose from an aggregate of 19 blast furnaces in the South Chicago Works of the Illinois Steel Company and in the Gary Works of the Indiana Steel Company.

Comparing the pig-iron production and Portland cement production of this country in figures of gross tons, the percentage of Portland cement to pig-iron in 1890 was 0.006 per cent., in 1900 10.3 per cent. and in 1910 47 per cent. The continuation of any such relative growth would mean that before 1920 the tonnage of Portland cement would considerably exceed that of pig-iron. I would hesitate, however, to predict that such would be the case.

Portland cement is defined by the United States Government as the product obtained from the heating or calcining up to incipient fusion of intimate mixtures, either natural or artificial, of argillaceous with calcareous substances, the calcined product to contain at least one and seven-tenths times as much of lime, by weight, as of the materials which give the lime its hydraulic properties, and to be finely pulverized after said calcination, and thereafter additions or substitutions for the purpose only of regulating certain properties of technical importance to be allowable to not exceeding 2 per cent of the calcined product.

From this definition it will be seen that the raw material for Portland cement is not limited to any particular form of material. It may be made from any combination of materials that together furnish the proper elements. In this country Portland cement is manufactured from a number of raw materials, which, with a few exceptions, may be classed under four heads: 1. Argillaceous limestone (cement rock) and pure limestone; 2. clay or shale and limestone; 3. clay or shale and marl; 4. slag and limestone. In all cases the raw mixture is a combination of some form of clay and some form of lime, and in the first and fourth classifications the clay materials contain some lime. This simply reduces the proportion of lime material necessary for a proper mixture.

The Method of Manufacture

In the manufacture of Portland cement from slag and limestone the molten slag flowing from the furnaces is granulated by a stream of water, loaded into cars and transported to the cement plants, where it is dried in rotary driers, and receives the first grinding it is then mixed in automatic weighing machines, with the proper proportion of ground and dried calcite limestone. These are then ground together and burnt to a hard clinker at a temperature of nearly 3000 degrees Fahrenheit in rotary kilns, using pulverized coal for fuel.

This clinker, after seasoning, is crushed and ground and mixed with a small percentage of gypsum to regulate the setting time. The cement is ground to such fineness

*From a paper read before the Congress of Technology, Boston, Mass., April 11, 1911.

†President Universal Portland Cement Company, Chicago.

that 96 per cent. passes through a sieve having 10,000 meshes, and 80 per cent. passes a sieve with 40,000 meshes to the square in. It is then conveyed to the stock house for storage prior to shipment.

It is necessary to use as a flux in furnaces supplying slag for cement manufacture a pure calcite limestone. The limestone burnt with the slag must also be a pure calcite stone. It is also essential that the ores be of a uniform and proper character. Inasmuch as Lake Superior ores are noted for their remarkable uniformity of analysis, the resultant slag obtained from the use of these ores and a pure calcite limestone is more uniform in its analysis than any form of natural clay deposit used in the manufacture of Portland cement, and the variation in the proportions of the two raw materials used in the manufacture is less than those of any other materials mentioned above. In addition, the opportunity for analysis and selection of the proper ingredients through the use of an artificial material is a great advantage as compared with the necessitous use of natural materials just as they are found with their variations in analysis at different depths. In the intense heat of the kiln, under the influence of the oxidizing flame, any sulphides in the slag are completely burned out.

The rotary kiln commonly used 10 years ago was 60 ft. long and 6 ft. in diameter. This has gradually been increased in length and diameter until the modern kiln is 140 to 150 ft. long and 8 to 10 ft. in diameter, and there are a few even larger kilns in use. Kilns are usually set at an incline of $\frac{3}{4}$ in. to the foot. With the lining and contents the modern kiln weighs 150 tons, and in revolving upon two bearings presents interesting constructional features.

The method of manufacture described is the standard method of manufacturing Portland cement from natural deposits, and the finished product differs in no way from other Portland cements in chemical analysis, fineness, specific gravity, color, nor in the operation in practical work. It has no peculiarities whatever and has no limitations to its applications. There is no difference, from the chemist's point of view, between the manufacture of Portland cement from natural deposits, such as limestone and clay or shale, and its manufacture from limestone and slag. Slag is really a mixture of the clay from the ore with the lime content of the stone used as a flux in the furnace.

Our method of manufacture of Universal Portland cement does not embody any real invention, nor is it based on any patents. It is simply an adaptation to an artificial raw material of the regular Portland cement process formerly applied only to natural deposits.

True Portland cement, in which slag is used as one of the raw materials, should not be confused with Puzzolan or so-called slag cements, which are simply mechanical mixtures of slag and slaked lime ground together without burning. Such cements are suitable only for use under ground and in moist locations. The manufacture of Puzzolan cements in this country has practically been abandoned.

Welfare Work of Electric Lighting Companies.—

The National Electric Light Association at its annual convention in New York City last week adopted the report of its special committee favoring profit sharing with employees, old age pensions, accident and life insurance, death benefits and employees' savings and investment funds. This report was referred to at some length in *The Iron Age* of April 20, 1911, on page 973. In that article the names of the members of the committee were given. The report was adopted after a brief discussion, without a dissenting vote. It was presented by Samuel Insull, president of the Commonwealth Edison Company, Chicago, who stated that the scheme had been put into practice in some of the great electric lighting plants to test it, and the result was highly satisfactory.

J. K. Dimmick & Co., Philadelphia, are discontinuing their general Western selling office at Cincinnati and will transfer it to Cleveland, Ohio, as more advantageous for a large and increasing lake business. Charles E. Pool, who has been the sales agent at Cincinnati, will have charge of the Cleveland office, to be located at 1242 Rockefeller Building, from which he will sell their Stonerite, New River smokeless coal, Fairmont coal and Connellsville coke.

Vanadium in Cast Iron*

BY GEORGE L. NORRIS.†

The use of vanadium in gray iron castings has been limited when compared with its use in steel castings, although the past year has shown a marked increase, and its use in certain classes of castings has become well established. In the case of steel, we have a refined metal with certain physical properties not possessed by cast iron, and susceptible of improvement by heat treatment. In the case of cast iron we have a material that has undergone very little or no refinement, and is only slightly different from the crude pig iron from which it was produced. Its only metallurgical treatment is usually a simple melting operation with or without scrap cast iron and steel.

Undoubtedly the greater portion of the iron castings made to-day are satisfactory, so far as the quality of the iron is concerned, to meet the requirements for which they were designed, although a large percentage could with advantage, be greatly improved in quality.

Cost of Castings Must Not Be Greatly Increased

We have then, in the case of cast iron, a material, the cost of producing which from the crude pig iron has been slight. The price at which iron castings in general are sold precludes the use of any alloy for affecting the quality of the material that will increase the cost materially, excepting in the case of certain classes of castings where unusual strength or some special quality in the iron is desired. In such cases even a very material increase in the cost of the castings is readily accepted.

In the case of vanadium we are dealing with a metal of fairly high price and its use in the manufacture of cast iron naturally will be confined to the classes of work that can stand a material increase in cost in return for the special qualities obtained. The addition of 1/10 per cent. of vanadium to cast iron at the present price of \$5 per lb. means an increase of $\frac{1}{2}$ cent a pound for the iron in the ladle, and necessitates an increase in selling price of $\frac{3}{4}$ cent to 1 cent a pound at least to cover losses due to scrap, gates, sprues, etc.

I am mentioning these points not for the purpose of discouraging the use of vanadium in cast iron, but because we have frequent inquiries which show that they are not thoroughly understood. Some of these inquiries indicate a belief that vanadium is a panacea for all foundry troubles including cold melted iron. Vanadium has been applied to cast iron with great success for certain purposes and the results obtained indicate its effective application in other lines.

Vanadium Adds Strength

While vanadium has a strong affinity for oxygen and nitrogen and is partly used up by combining with these elements, the primary purpose of adding vanadium to cast iron is not the removal of oxygen and nitrogen. The removal of oxygen can be effected sufficiently well by cheaper means and as the injurious effect of small amounts of nitrogen on a refined metal, such as steel, is still an open question, the harmfulness of this element on a metallurgically crude metal like cast iron is open to still greater doubt. The object of the use of vanadium in cast iron, then, is to give certain qualities to the iron, and to do this the vanadium must enter into the cast iron as a component part.

Vanadium increases the strength of the cast iron to which it is added from 10 to 25 per cent., depending, of course, upon the initial strength of the iron. This increase of strength is due directly to the intensifying effect of the vanadium on the metals present in the cast iron alloy, such as silicon and manganese, and also by combination with the chemically combined carbon.

It exercises a very strong effect on the grain of the iron, causing a more even distribution of the graphite with consequent greater freedom from both hard and porous spots. This effect is very apparent, vanadium cast iron fractures showing a finer and more uniform grain. In the case of chilled iron, vanadium produces a deeper, stronger and tougher chill, and one less liable to spall or flake. This

*Paper presented before the American Foundrymen's Association, Pittsburgh, May 24, 1911.

†Mr. Norris is engineer of tests of the American Vanadium Company, Pittsburgh.

chill, however, is not so hard apparently as the more brittle chill of ordinary chilling iron, and can be filed and machined more readily.

Vanadium also gives an element of toughness to cast iron, which is very apparent in machining the castings. This toughening effect together with the uniform fineness of grain or texture due to even distribution of graphite in small flakes makes vanadium cast iron very superior for such purposes as gas and steam-engine cylinders, valve and piston bushings, piston rings, glass bottle molds, gears, castings to withstand heat and internal pressures of fluids and gases without leakage.

How Engine Cylinders Have Been Improved

Three or four years ago the New York Central Lines equipped one of its locomotives with a pair of vanadium cast iron cylinders. The performance of this pair of cylinders over a test period of about two years was so satisfactory that 500 or more locomotives on these lines are now equipped with vanadium cylinders. The test of the original pair demonstrated that over twice the normal mileage of ordinary cast-iron cylinders could be obtained from vanadium cylinders before reboring. The loss in casting these cylinders was extremely low, no cylinders being scrapped at all for the first 183 locomotives ordered. The same sort of results have been reported by a builder of large gasoline engines for marine use. In this particular case the number of cylinders formerly lost when tested after machining was excessive, due to porousness of certain sections. Piston rings and cylinder and valve bushings of vanadium cast iron have been thoroughly tried out and adopted by a number of leading railroads on account of the greatly increased length of service obtained.

A very interesting application of vanadium has been for glass bottle molds. These, as you are well aware, are chill castings, and are usually covered with engraving. The iron has to be clean, close and uniform in grain, machineable, and take a good polish. The first vanadium cast iron bottle molds were made a little over a year ago and proved not only to have a longer life but it was found possible to increase the speed of the bottle machines as the glass did not appear to stick to these molds to any extent. This can be readily accounted for by the uniformity of the grain and freedom from mottled spots.

Chilled Rolls

One of the first applications of vanadium to cast iron was in chilled iron rolls for sheet mills. A number of these were made and gave excellent results, some of them showing 50 per cent. greater tonnage with one half the dressing against the regular chilled roll. The question of cost, however, entered in here in an unusual manner. Fully 65 to 70 per cent. of the roll breakages are due to accidental causes, and no amount of vanadium would insure, for instance, against a roller letting a pair of tongs pass through the rolls.

We have had opportunity from time to time to make comparative tests of the strength of cast iron with and without vanadium, extending over a considerable period, and believe that these comparisons are more nearly representative than single tests as they represent average conditions.

The following tests are the average for ten consecutive days' work on locomotive cylinders. The transverse tests were made on bars 1 in. square, 12 in. between supports: the bars were machined all over and consequently were absolutely comparable, which is not always the case with bars only brushed or cleaned.

	Transverse.	Tensile.
Plain cast iron.....	2,130 lb.	24,225 lb.
Vanadium cast iron.....	2,318 lb.	28,728 lb.

This iron has stood 750 lb. water pressure for sections 3/4 in. thick. The average chemical analysis of this iron is about as follows:

Combined carbon	0.50
Silicon	1.50
Manganese	0.45
Phosphorus	0.60
Sulphur	0.095

The following tests were supposed to be from iron from the same ladle, before and after adding vanadium, but the chemical analysis shows that such could not have been the case. The difference in composition, however, so far

as it influences the physical qualities of the iron are all in favor of the iron without vanadium. In addition to the bars for tensile test, chill blocks were cast to show the effect of vanadium on the depth of the chill.

Chemical Composition	Without Vanadium.	With Vanadium.
Graphitic carbon	2.34	2.48
Combined carbon	0.71	0.71
Silicon	1.83	2.21
Manganese	0.43	0.424
Phosphorus	0.508	0.546
Sulphur	0.102	0.071
Vanadium	—	0.056

Physical Tests.	Without vanadium.	With vanadium.
Tensile strength	34,560	35,600
Depth of chill.....	no white chill	1/16 inch white chill
Size of chill test block 4 1/2 inch square by 1 1/2 inch thick		

The difference in machining quality of the two irons was decidedly in favor of the vanadium iron. I need hardly mention that the cast iron treated with vanadium should be at least approximately of the proper composition for the particular class of work to which it is intended.

The usual amount of vanadium added to cast iron is 1/10 per cent. for cupola melted iron, equivalent to about 5 oz. of ferrovanadium for each 100 lb. Some foundries advocate the use of a higher percentage, up to 15 per cent., which is about as much as can be conveniently added in the ladle. As low a percentage as .05 per cent. will produce distinctive effects. Owing to the high melting point of vanadium and the limited reserve heat available in a ladle of iron, it is advisable to use the alloy in a finely crushed condition, or even powdered, when the amount of iron treated is small, and to use an alloy of low melting point. The iron should be tapped out as hot as possible and a ladle used that has just been emptied in order to conserve as much heat as possible. After the bottom of the ladle is covered with a few inches of iron, the finely crushed or powdered ferrovanadium is added by sprinkling on the stream as it flows down the spout to the ladle; in this way advantage is taken of all the available heat and also of the mixing effect of the stream as it strikes the iron in the ladle. After the vanadium is added the contents of the ladle should be well stirred and allowed to stand a few moments in order to insure thorough incorporation and complete reaction.

In the case of the higher grade air furnace iron, with its reserve of available furnace heat, the procedure is very simple; after the charge is melted and 15 to 20 minutes before tapping, the ferrovanadium is added and the bath well stirred or rabbled. The addition of 0.18 per cent. to 0.2 per cent. vanadium is recommended in this case, equivalent to 10 oz. to 11 oz. of 35 per cent. ferrovanadium per 100 lb. of metal.

The American Vanadium Company has lately developed a ferrovanadium containing about 30 per cent. to 35 per cent. vanadium, 10 per cent. to 15 per cent. silicon, 5 per cent. to 10 per cent. manganese and 2 per cent. to 5 per cent. aluminum, which melts and dissolves readily in molten cast iron, and has been giving very satisfactory results. In distinction from the standard low silicon American ferrovanadium we have called this new alloy Masvan.

The American Sheet & Tin Plate Company Starts Gary Plant

No. 1 mill of the Gary plant of the American Sheet & Tin Plate Company was placed in operation June 1. While this was in the nature of a test run, it is expected that practically continuous operation of the plant will follow. As at present completed, blue annealed sheets only can be rolled. Galvanizing pots, however, will be completed in the very near future. The heating, reheating and annealing furnaces are already in service, slabs being obtained from the Gary steel mill. The roughing, finishing and shearing operations of the first mill are also completed and ready for continuous operation. That part of No. 1 power house now under construction for the Indiana Steel Company from which current will be drawn for the sheet mill is rapidly nearing completion. President E. W. Pargny of the American Sheet & Tin Plate Company, and other officials were present at the initial trial of the mill.

Standards for the Various Kinds of Pig Iron

How Specifications Have Been Developed Out of Changes in Steel Works and Malleable Practice

BY FLETCHER COLLINS, PITTSBURGH.

In standard Bessemer pig iron silicon is 1 to 2 per cent, phosphorus 0.10 per cent or under, sulphur 0.05 per cent or under. In the central section (Pittsburgh and the Mahoning and Shenango valleys) it is sold per ton of 2268 lb. if sand cast and 2240 lb. if chill cast. The sand cast iron is often sold broken, and a charge of 25c. is made for breaking, but it is usually sold unbroken. In the East and West it is always sold per ton of 2240 lb. The ton of 2268 lb. is gradually being supplanted by the ton of 2240 lb. in sand cast Bessemer, as well as in all other classes of pig iron. Standard Bessemer pig iron is used chiefly in the acid Bessemer and the acid open hearth steel processes, and the principal condition in its composition differentiating it from other standard irons is that phosphorus must be low—0.10 per cent or under. Since by the acid process the carbon, manganese and silicon in the melt are lowered and a certain amount of iron is also lost, the same amount of phosphorus and sulphur being contained in a smaller amount of iron will show a slightly higher percentage than in the original mix. Therefore the phosphorus and sulphur must necessarily be low in the original mix in order that the finished product may be suitable. Sulphur is generally a harmful element in iron and steel, and the less of it there is in almost all irons the better the resultant product. In the acid open hearth process standard Bessemer pig iron, standard low phosphorous pig iron, and low phosphorous or basic scrap are used, while in the acid Bessemer process the use of low phosphorous pig iron is omitted. In this latter process often Bessemer pig iron is used alone, but a small amount of steel scrap, low phosphorus when available, may be added when the heat is blowing too hot, so as to cool it down. However, low phosphorous scrap is rarely bought especially for use in the acid Bessemer process. In rails and other products of this process the extreme lowness of phosphorus is not required.

In the "baby" Bessemer process where steel castings are produced and where it is necessary to have a casting very low in the element of phosphorus, where also the loss is greater and the initial phosphorus must therefore have a still lower percentage, low phosphorous pig iron is used and Bessemer pig iron is not used. In this process the scrap used consists of gates, necks, etc., usually made in former heats in the same furnace, and which amount to 25 to 50 per cent of the entire heat. Consequently the iron used must be high in silicon in order to give sufficient heat, as there is very little silicon in scrap and the principal source of heat is obtained from the combustion of the silicon.

In the acid open hearth process iron ore which contains a large amount of oxygen in the form of oxides is generally added to the melt and helps to oxidize or burn out the carbon not required in the bath. Indeed, the burning out or lowering of the carbon is the principal action in producing steel in these processes. A certain amount of iron is also absorbed by the slag, and when iron ore is used this iron comes from the ore, instead of from the metallic bath, as it would if iron ore were not used. As can be readily seen, the use of iron ore in the open hearth process is a most valuable one. As the impurities in the bath are largely oxidized by the oxygen of the ore, a certain amount of iron from the ore may be reduced and enter the metallic bath, and by this means the amount of steel produced may even exceed the amount of metal charged.

In the acid Bessemer and baby Bessemer processes the air which is blown through the bath or over the bath oxidizes the carbon without the use of iron ore. When certain of the elements are brought below the percentage desired in the finished steel they are restored by making suitable additions. These additions—ferromanganese, ferrosilicon, spiegeleisen, etc.—also have the distinctly beneficial effect of deoxidizing the steel and thus rendering it free from oxygen blowholes.

Standard Bessemer pig iron is also used in the manufacture of ingot molds. When a mill requiring a low-phosphorous content in its scrap is a user of ingot molds it usually specifies that the molds shall be made of Bessemer pig iron, so that when the molds become useless as molds they can be broken up and used as scrap.

For Low Phosphorus Pig Iron

Silicon 1 per cent to 2 per cent, phosphorus 0.035 per cent or under, sulphur 0.035 per cent or under, in the Central and Western sections, and sulphur and phosphorus 0.03 per cent and under in the eastern Pennsylvania district, while in England the standard analysis for sulphur and phosphorus is 0.035 per cent, with silicon up to 2.25 per cent. One furnace in Ohio sells as standard an iron with phosphorus 0.04 or under. It is always sold per ton of 2240 lb. Standard low-phosphorous pig iron is used in the baby Bessemer and acid open hearth steel processes, which have been briefly discussed under standard Bessemer pig iron. Usually steel casting plants with baby Bessemer converters require a high-silicon low-phosphorous pig iron.

For Basic Pig Iron

Silicon 1 per cent or under, sulphur 0.05 per cent or under, phosphorus 0.50 per cent or under in the Central and Western sections, while in the Southern and Eastern sections the phosphorus is allowed to run as high as 1 per cent. The original standard of phosphorus in standard basic iron was 1 per cent or under, but owing to the lower phosphorous content in Lake Superior non-Bessemer ores furnaces which smelt these ores make a basic iron analyzing as low as 0.20 per cent in phosphorus, and indeed some furnaces invariably guarantee 0.40 per cent or under in their basic iron contracts. Standard basic pig iron is always cast in chills and sold per ton of 2240 lb. It is used in producing steel in the basic open hearth furnace. The principal condition in the analysis is that the silicon be low—1 per cent or under. The reason for the wide use of the basic process is very apparent, as in this process basic pig iron, made from non-Bessemer ore, and for this reason about \$1 per ton cheaper than Bessemer iron, and steel scrap of almost any composition are used. The cost of producing basic steel is therefore less than that of acid steel. Whereas carbon, silicon and manganese are readily oxidized and pass into the slag by the action of the heat in the basic as well as the acid process, phosphorus does not diminish in the acid and is gotten rid of in the basic process by the use of limestone. Unless the phosphoric acid which is set free in both processes is combined with some stable base it is reduced and re-enters the metallic bath. Limestone, being a very strong base, is therefore used in the basic process and it absorbs the phosphoric acid which has been produced by the action of the heat, and thus renders the steel practically free from the objectionable element, phosphorus. Or the phosphoric acid will be reduced to phosphorus, which will re-enter the metallic bath unless some stronger and more stable base is present than the iron. Lime, being a stronger and more stable base than iron, is a necessary addition. The elimination of sulphur is very uncertain. In some cases a small amount may be removed, while in others the percentage may be increased. As silicon which becomes oxidized to silica also combines with the bases in the slag, it will prevent a certain amount of the lime from combining with the phosphorus, and for this reason it will be readily appreciated why its content in the pig iron should be kept down as low as possible, as otherwise an additional amount of lime will have to be charged. A certain amount of sand (silica) is always attached to the surface of a pig cast in sand. The advantage of avoiding this and employing chill (iron) molds is evident. Basic steel is usually much lower in phosphorus than acid steel, the standard specification being 0.05 per cent or under, while

in acid open hearth steel it is somewhat higher, and in Bessemer 0.1 per cent.

The advantage of the basic process and the reason for its wide employment, therefore, is that it enables a cheaper grade of stock—that is, containing greater amounts of impurities—to be employed, in turn eliminating the impurities and producing a fine grade of steel. The desired composition of the steel is effected by making additions similar to those in the acid process. Where an acid and a basic steel have the same composition the former may give slightly higher tensile tests, but the basic ordinarily has less phosphorus than the acid, and as this element is likely to become segregated and is one of the principal causes of brittleness (cold shortness) the reason for the use of the basic material is apparent. For some purposes, however, the acid steel is preferred. Iron ore is added in the basic process as in the acid process, and for similar reasons. There are no basic Bessemer converters in this country. At one time this process was attempted in Pennsylvania and eastern New York, but pig iron analyzing over about 2 per cent phosphorus is necessary, and the difficulties of obtaining this, combined with the increased cost of operating as compared with the acid Bessemer process, showed it to be commercially impracticable. It is, however, employed abroad, chiefly in Germany and to some extent in England. In England the iron used analyzes as follows: silicon, 0.50 per cent; phosphorus, 2.50 per cent; sulphur, up to 0.20 per cent. In Germany the sulphur usually analyzes somewhat lower and the silicon higher. The phosphorus is desired high in order to supply sufficient heat when no carbon or silicon is left. The period when the phosphorus is oxidized is called the "afterblow."

For Malleable Bessemer Pig Iron

Silicon, 0.75 per cent to 1.75 per cent; phosphorus, 0.20 per cent or under; sulphur, 0.50 per cent or under. There is usually a more exact silicon specification in inquiries and purchases of malleable iron, and users generally like manganese 0.60 per cent to 0.80 per cent, and so specify in their inquiries, but some require manganese 0.40 per cent to 0.60 per cent, and occasionally 1 per cent to 1.35 per cent is desired. It is produced in sand cast pigs as well as chill cast, and is sold in tons of 2240 lb. except by a few furnaces in the Shenango and Mahoning valleys, which sell 2268 lb. Sand cast pigs are sometimes sold broken and sometimes unbroken. With regard to the finished malleable casting, it is usually not altogether desirable to have a very high tensile strength, but rather a high transverse strength and particularly a good deflection. This means that a soft ductile metal which adjusts itself to these conditions more readily than any other must be used. The malleable process consists in casting the metal so that practically all the carbon shall be in the combined condition, the fracture being white. The castings are next annealed (heated) at a given temperature, at which the combined carbon is converted into an amorphous uncombined condition, entirely different from the condition of the graphitic carbon of the gray iron casting. In the case of malleable castings the carbon occurs in nearly spherical spots or globules which do not interfere to nearly the same extent with the continuity of the metal as the graphite of the gray iron casting. The reason for the greater strength and better quality of malleable castings over gray iron castings is found in this condition of the carbon. In gray iron castings nearly all of the carbon exists as graphite, which occurs in thin plates, breaking up the continuity of the mass, these plates forming cleavage planes, or planes of weakness, along which the iron is readily broken, as the graphite itself possesses no strength or ductility. Furthermore, a certain amount of the carbon in the malleable casting is removed by oxidation, particularly at or near the surface. As a high percentage of phosphorus would naturally tend to make the casting brittle, which would defeat the whole object of the process, the phosphorus must necessarily be low. On the other hand, Bessemer iron costs about 50c. more than malleable Bessemer, and as the phosphorus is not required as low as 0.10 per cent, to accomplish the desired result the standard shown above has been adopted. The silicon also is an important element in the malleable casting. A certain amount of silicon is necessary to assist in converting the combined carbon to the uncombined or amorphous condition during annealing, but if too much

silicon is present some of the carbon will separate out as graphite in the cooling of the casting before annealing takes place, which graphite renders the finished casting more or less brittle. The amorphous carbon of the malleable casting does not have this effect, thus constituting the difference between ordinary gray iron and malleable castings as already explained. So in malleable castings the silicon is usually kept down to 0.50 per cent. or 0.85 per cent, depending largely upon their shape and thickness. Malleable Bessemer pig iron has been often called coke malleable, and simply malleable iron, but the accepted term to-day is malleable Bessemer pig iron.

Iron and Steel Exports and Imports

April Makes a Fresh Record in Exports

The April report of the Bureau of Statistics of the Department of Commerce and Labor shows a further important increase in our exports of iron and steel as compared with the figures of the March report, which were the largest in our history up to that time. Our imports were not so large as in the previous month. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, was \$24,917,056 in April, against \$22,591,848 in March, while the value of similar imports was \$2,439,885 in April, against \$2,951,710 in March.

The exports of commodities for which quantities are given totaled 227,832 gross tons in April, against 215,667 tons in March and 117,410 tons in April, 1910. The details of the exports of such commodities for April and for ten months of the fiscal year ended with April are as follows, compared with corresponding periods of the previous year:

Exports of Iron and Steel

Commodities.	April		Ten months ended April	
	1911. Gross tons.	1910. Gross tons.	1911. Gross tons.	1910. Gross tons.
Pig iron	12,188	11,757	138,750	63,103
Scrap	2,673	1,764	43,032	10,821
Bar iron	1,521	1,749	15,219	12,587
Wire rods	1,651	4,562	14,805	20,608
Steel bars	9,239	7,227	100,104	72,861
Billets, ingots and blooms...	27,417	168	146,198	49,133
Steel rails	54,182	19,732	322,257	308,670
Iron sheets and plates...	9,952	8,905	84,157	79,059
Steel sheets and plates...	23,480	14,101	163,672	115,653
Tin andterne plates.....	6,125	1,339	22,487	9,457
Structural iron and steel...	19,426	15,441	137,881	88,722
Barb wire	6,782	7,128	67,484	60,504
All other wire	14,687	8,032	89,994	64,776
Wire nails	6,288	3,895	43,637	29,097
Cut nails	695	535	8,374	7,418
All other nails, including tacks	1,764	433	10,149	6,480
Pipe and fittings.....	22,762	10,642	149,507	137,477
Totals.....	227,832	117,410	1,267,747	1,136,426

The imports of commodities for which quantities are given totaled 22,390 gross tons in April, as compared with 23,533 tons in March and 47,697 tons in April, 1910. The details of such imports for April and for ten months of the fiscal year ended with April, as compared with the corresponding periods of the previous year, are as follows:

Imports of Iron and Steel

Commodities.	April		Ten months ended April	
	1911. Gross tons.	1910. Gross tons.	1911. Gross tons.	1910. Gross tons.
Pig iron	15,730	24,034	174,822	202,201
Scrap	1,591	4,255	21,595	113,117
Bar iron	1,236	4,967	24,650	28,658
Billets, bars and steel forms, n.e.s.	1,649	5,308	34,163	30,912
Sheets and plates.....	215	1,422	3,257	5,964
Tin andterne plates.....	547	5,619	38,675	56,466
Wire rods	1,422	2,092	15,400	11,866
Totals.....	22,390	47,697	312,562	446,184

The imports of iron ore in April were 133,900 gross tons, against 134,785 tons in March and 206,135 tons in the month of April, 1910. The total importations of iron ore for ten months of the fiscal year ended with April were 1,797,870 gross tons, against 1,947,428 tons in the corresponding period of 1910. Of the April imports of iron ore 80,995 tons came from Cuba, 28,444 tons from Sweden, 12,430 tons from Newfoundland, 11,973 tons from Spain and 58 tons from Canada and other countries.

The total value of the exports of iron and steel and manufactures thereof, not including ore, for ten months of the fiscal year ended with April was \$189,798,647, against \$144,971,940 in the similar period of 1910.

The total value of the imports of iron and steel and manufactures thereof, exclusive of ore, for ten months of the fiscal year ended with April was \$28,689,754, against \$31,947,937 in the similar period of 1910.

Experience with Permanent Molds*

Characteristics of the Castings—Working with Untrained Men

BY EDGAR A. CUSTER.

To use permanent molds successfully one must abandon all the preconceived ideas as to the behavior of the molten metal and must forget all the theories and the effects that influence and affect molding in sand. The casting the permanent mold produces is an entirely different metal from the same casting when made in sand, even when made from the same iron. The difference is not chemical, but is purely physical. The permanent mold castings differ from the sand castings not only in their physical structure but in their characteristics. A soft, open pig high in graphite carbon becomes a close-grained iron showing no traces of the graphite flakes, but having the same amount of free carbon as existed in the original pig. It is capable of being magnetized and of permanently retaining the magnetism; it can be tempered and hardened precisely the same as a bar of tool steel and when tempered will make a cutting tool equal to the best non-alloy steel. This latter fact is true irrespective as to whether the original pig was high or low in silicon.

There are no spongy spots, and the castings are free from shrinkage strains. The castings can be taken from the mold at a bright red heat and plunged into cold water until cold without showing sign of cracks. High shrinkage does not begin in a permanent mold casting until a very low temperature is reached, 1200 deg. to 1400 deg. F. being the point at which the casting must be removed to prevent shrinkage cracking the undercut parts.

The basis of the permanent mold system is the fact that molten iron does not chill—using the word chill to express white, hard crystals—until after the iron is set, and that this chilling does not begin until after the iron has shrunk to the bulk it occupied in the molten state. Molten iron when poured into a mold first swells until the point at which it begins to set is reached, then the bulk remains at that point for a short space of time while the cooling progresses, and then it shrinks until cold. The interval between the point at which it sets and the point at which chilling begins is long enough to enable the workman to remove the casting from the mold, and in that time it will be sufficiently hard to be handled without fear of distortion or breakage.

The main object of the process is to set the iron as quickly as possible and, when this is done, to remove the casting instantly from the mold. To accomplish instant setting the molds are made of quite large bulk so that they will have large heat capacity. A further object in making the molds of such large bulk is to prevent distortion from the heat action.

Since continuous operation of permanent molds entails continuous melting of iron, this brings us to the foundry conditions that are essential to economical production. These conditions may be classified as follows:

Continuous melting, selection of proper iron, labor-saving appliances, general remarks.

Continuous Melting

It is evident that in order to operate the molds continuously some form of continuous melting must be practiced, and it is also evident that the iron must be melted in comparatively small quantities per hour—else the tonnage melted per day would require a very large number of molds. Small quantities of iron per hour means small cupolas, so the problem becomes one of melting iron continuously and economically in cupolas that will melt 1 to 5 tons per hour. It has been found entirely feasible to operate a cupola 21 in. in diameter inside of lining for 10 hr. a day at an average melting rate of 8 lb. iron to 1 lb. of fuel and to continue this performance from day to day.

It is feasible to run the same cupola for 48 hr., as witnessed by the run noted below, and to have an exceptionally high melting ratio.

We solved the problem of the continuous operation of this small cupola by using a slight excess of limestone and a change in the fuel charge designed to keep the bed hot. This change consisted of substituting large lump anthracite coal for a portion of the coke on each charge and jumping the weights of the iron charges from 250 to 500 lb. The larger charge, of course, carried with it a corresponding increase in fuel which, due to the coal used, retains its life until well below the melting line, thus preserving the life of the bed and keeping the melting zone in the proper place. This change enabled us to keep a continuous stream during a full working day. This was kept up for several weeks until we found by several slight changes in ratios we could drop bottom in the evening with the cupola in such good condition that very little work was required to put it in shape for the next day's run, the general principle being to keep the charges large in the quantity of iron and the draft low in pressure, making sure that the tuyeres are of sufficient area to furnish a surplus of air. When the blast was first turned into the cupola the pressure was kept at 14 ounces of water until the iron began to melt. It was then lowered to 6 ounces and kept there throughout the heat. The flux used was limestone, 15 lb. being charged to each 500 lb. of iron. With this plan no difficulty was experienced in running 10 hr. each day. As an instance of what can be done in the line of continuous melting the following run made by Edgar A. Custer, Jr., at the Tacony Iron Works, is quoted:

"The run proper began at 7 a.m. Monday, August 15, although at 5 a.m. the sand bottom was put in and the customary small quantity of wood lighted. The bed consisted of 140 lb. of coke and 70 lb. of coal. This brought the level about 12 in. above the top tuyeres. The first charge of iron was 300 lb. No. 2 plain pig and 300 lb. stove-plate scrap and foundry gates. The succeeding charges were 35 lb. coke, 15 lb. coal and 500 lb. iron (250 lb. pig and 250 lb. scrap). To this were added 15 lb. limestone. The pressure was obtained from a small rotary fan driven by a motor and regulated by the usual blast gates.

"At 7 a.m. the cupola was tapped out and on the twentieth charge it was found that the iron was too hot for our use. The iron charge was then raised to 600 lb., the fuel remaining at 50 lb. At 6 p.m. the night gang came on, who were relieved at 7 a.m. August 15, at which time there had been used 64 charges, totalling 36,500 lb., or about 1520 lb. per hour at the ratio of 10 lb. of iron to 1 lb. of fuel.

"After 47½ hr. continuous running it became necessary to drain the cupola and drop bottom in order to repair the lining. This consumed 7½ hr., and the cupola was started at once. The second run was almost identical with the first, except the melting was rather slow and sluggish for an hour—probably due to the repair. This second run ended at 2 p.m. Friday August 19, a total of 49½ hr. of continuous running, during which 73,000 lb. of iron were melted with a ratio of 11 lb. of iron to 1 lb. of fuel.

"As a grand total this cupola was operated for 97 hr. out of 103 and melted a total of 144,800 lb., or about 72 tons at a rate of approximately ¾ ton per hour at a fuel ratio of 11 to 1.

"On this run a battery of eight permanent molds was used, and these molds were poured at the rate of one round each 5 min. without showing undue heating. Since then we have run a cupola 42 in. inside lining for 60 hr. at the rate of 7 tons per hour with a melting ratio of 10 to 1. In this case the iron was much higher in silicon and required more fuel to melt."

Selection of Proper Iron

The permanent mold is not a cure-all for foundry ills, and the same care must be exercised in selecting the iron for each line of castings as is the case in any other foundry proposition. The main elements that must be avoided in permanent mold work are manganese and sulphur. High manganese has the effect of making permanent mold castings hard and brittle, in this respect being radically different from its effect in sand castings. High sulphur tends not only to make the castings hard and brittle, but has a decided tendency to form holes in those portions of the

*From a paper read before the American Foundrymen's Association, Pittsburgh, May 14, 1911.

castings that will not permit of the employment of risers. The influence of silicon is very slight when its percentage ranged from 2 to 3 per cent.

The ideal iron for permanent mold work would be as follows: Silicon, 0.0225; sulphur, 0.0004 or under; manganese, 0.0040 or under; phosphorus, 0.0050; total carbon, 0.04.

Labor Saving Appliances

Every effort should be directed toward making the work as easy as possible. The iron should be brought to the molds on easy running trolleys and in ladles so balanced as to require the minimum amount of effort to pour. The molds should be so placed as to allow pouring direct from the trolleys and provision made to protect the men from splashing iron. Conveyors should run beneath the molds to remove the hot castings rapidly from the room. In addition to this each man should be required to do but one operation for each casting made. If there are five distinct operations necessary from the pouring to the closing of the mold, five men should be provided. Under this system, with a battery of ten molds, the time to make a casting is the time necessary for the pourer to fill the mold and move on to the next. With a battery of castings ranging in weight from 10 to 25 lb. this time is about 25 sec. As an evidence of what can be done with a gang well trained and equipped with labor-saving devices, I present a record of one of our batteries where the castings are larger than those usually poured, being principally T's and Y's and averaging 21 lb. each. One gang was timed and counted with the following result:

	Castings produced.	Castings lost.
9 to 10 a. m.....	123	2
10 to 11 a. m.....	119	1
11 a. m. to 12 m.....	146	1

In this work the cores were pulled with air-lifts, and the iron was supplied the gang in ladles hung on trolleys. In some cases where the character of the casting allows, the mold can be designed to allow very rapid work. In a plow-point mold 300 castings have been made in 2 hr. In a mold containing two 2-in. flange unions, over 500 castings have been made in 2 hr.

As the use of permanent molds contemplates the employment of unskilled labor due allowance must be made for the grade of intelligence they possess, and they should be surrounded with every safeguard possible. They should be required to wear substantial foundry shoes and gloves, especially shoes, as the process is carried out on cement floors that tend to scatter carelessly splashed iron. Too much emphasis cannot be laid on subordinating the personal equation by the use of power where possible; every man movement eliminated means a decrease of the probability of bad work. Where but one line of work is made this latter feature becomes a necessity.

General Remarks

The only place where the mold disintegrates is in the runners and gates. The matrix of the mold, never in our experience, shows any sign of wear or crumbling. After we have made from 7000 to 10,000 castings we generally renew the gates by inserting new blocks. The cost of this repair is generally 10 per cent. of the original cost of the mold. We have made 21,000 castings in a single mold, each casting weighing 10 lb., and the matrix today shows the original tool marks. The life of the mold does not depend so much on the number of castings that are poured into it as upon the number of times it is allowed to become cold. Working a mold continuously, day and night, will quadruple the number of castings that may be made before repairs are required.

Each mold is primarily designed to produce 1000 lb. of castings per day, and in our room containing 37 molds there were produced 18 tons of good castings in 10 hr. The floor space required by these molds is 60 x 26 ft., and to produce the same tonnage of the castings in sand a floor space of 450 x 105 ft. would be required. Also to produce the same tonnage in sand the services of 54 expert foundrymen would have been required whose pay would average \$3.50 to \$4.50 each per day.

In April, 1910, a statement was made that this process was not dependent upon skilled labor and that ordinary laborers could be employed upon it without previous experience and get economical results. In order to test this out, on Friday, April 21, we hired 18 men from the street; 16 of them could not speak English and but one of them had ever been in a foundry before. On Friday and Sat-

urday we simply pushed these men around and endeavored to teach them not to be afraid of the molten iron. To the 18 men we added 3 of our more experienced workmen, and on Monday these 21 men were turned over to an outside concern who then assumed entire charge of this portion of the plant. They took account of the number of castings made, the hours of the men and the costs that entered into the production of these castings. There were 37 molds. The average molding cost alone of these castings when made in sand was 6 cents each, figured on a piece work basis. The results of this test follows:

Costing in Permanent Molds with Untrained Workmen.			
	No. hr's work.	No. castings made.	Cost per piece.
Monday	7	896	\$0.023
Tuesday	10	1,419	.021
Wednesday	10	1,767	.0169
Thursday	10	1,972	.0152
Friday	10	2,174	.0138

The cost of these castings when made in sand, for molders' labor alone, was \$9.02 per ton. The molding cost the last day of this test was \$2.14 per ton. To the molding cost of these castings when made in sand must be added tumbling and cleaning and the cost of sand.

There is one more feature that has never been published, and that is the saving in gates that can be accomplished by continuous running. In all cases we find our iron too hot when the cupola is properly run. When this condition arrives the gates are broken from the castings while red hot and are placed in the empty ladles. The iron is then tapped on these gates and the resultant melt is about the right pouring temperature. On the last day of the run above quoted there were made 16½ tons of good castings, and there were remaining 125 lb. of gates.

In referring to the \$8,000,000 increase in value of American exports to Brazil for 1910 over 1909, Vice-Consul General J. J. Slechta, Rio de Janeiro, analyzes metal products as follows: Iron and steel for use in manufacturing, a slight increase; arms and ammunition, \$460,000; automobiles, \$70,000; railway cars, slight gain from the United States, though a large general increase; copper wire and other copper manufactures \$100,000; cutlery, \$110,000; iron wire, \$190,000; nails, screws and heavy construction material in iron and steel, a small increase; electrical machinery and apparatus, \$460,000; locomotives, slight gain; industrial machinery, \$100,000; agricultural machinery, \$120,000.

Present indications point to this year's cotton crop as the largest the country ever has produced, according to government experts. Based on the statistics of condition as given out by the crop reporting board of the Department of Agriculture and on the averages for the previous ten years, the crop will be greater by about 2,500,000 bales than the average, and larger by nearly 400,000 bales than the biggest crop the country ever raised, that of 1904. Providing conditions as favorable as those which have prevailed in the last ten years continue during this season, there should be harvested this year more than 14,000,000 bales.

The Precision Instrument Company, Detroit, Mich., sells its combination recorders through the following agencies, each having its special territory: James H. Herron, Engineers' Building, Cleveland, Ohio; Birger F. Burman, Ferguson Building, Pittsburgh, Pa.; Braun Corporation, 363-371 New High street, Los Angeles, Cal.; Braun-Knecht-Heimen Company, 576-584 Mission street, San Francisco, Cal.; Catton Neill & Co., Honolulu, Hawaiian Islands; William Kemp, 507 Oriel Building, St. Louis, Mo.; Charles S. Buell, 1641 Manadnock Building, Chicago, Ill.; B. L. Ames, 205 Equity Building, Boston, Mass.; R. T. Stafford, 611 White Building, Buffalo, N. Y.

Reports that the Ellwood City Forge Company, Ellwood City, Pa., had increased its capital stock from \$25,000 to \$100,000 and would build large additions to its plant are untrue. It has not increased its capital stock, but at present is installing a double carriage, 36-in. Pond lathe, and will also place some other new machinery in its present building.

The Lockhart Iron & Steel Company, Pittsburgh, has increased its capital stock from \$250,000 to \$1,000,000.

The Steel Corporation Investigation

Some of the Testimony of Chairman E. H. Gary

The most notable contribution to public literature on the subject of the economics of industry and the relation of great combinations to interstate commerce and to the federal government that has been presented in many days was contained in the testimony of E. H. Gary, chairman of the United States Steel Corporation. For two days, Thursday and Friday of last week, he was before the committee, and in a full, free and frank manner met all the questions that were propounded to him by Chairman Stanley and the various members of the investigating committee.

The scope of Judge Gary's testimony, which has not yet been completed, but will be continued this week, covered not only the organization of the Steel Corporation, but many detailed facts connected with the various subsidiary corporations which were merged into the United States Steel Corporation, down to and including the taking over of the Tennessee Coal, Iron & Railroad Company. The activities of the Steel Corporation in all its branches, including the assembling of materials and the manufacture of products, were discussed with all the thoroughness that was called for by the queries propounded to the witness.

Notable Features of Judge Gary's Testimony

Perhaps the most notable features of Judge Gary's testimony were his plain declaration that the Sherman anti-trust law is unsuited to modern business conditions, has no effect and will not prevent great combinations of capital; his announcement that the federal government should take upon itself the duty of controlling prices so far as relates to products which enter into interstate commerce, and his full and free statement regarding the aims and purposes of the absorbing by the Steel Corporation of the Tennessee Company, which, he declared, was for the avowed purpose of avoiding and preventing a serious financial panic.

With reference to the relation of the Steel Corporation to the interstate traffic in iron and steel products, and to the federal government in the operation of the Sherman anti-trust law and other laws which bear upon interstate business and combinations of capital, Judge Gary made the statement to the committee that **there was not a fact connected with the workings of his corporation which would not be presented to Congress if asked for.** He declared that the corporation has nothing to conceal and desires "to stand or fall squarely upon its record." In connection with this statement he informed that committee that for several years his corporation in all its workings has been under the closest scrutiny and inspection by the Bureau of Corporations of the United States government. He asserted that thousands of dollars have been expended by the corporation in preparing facts and evidence for the information of the bureau, and that any testimony which the corporation's officials could give to Congress bearing upon the workings of the organization would be freely and fully given if asked for by the Congressional investigating committee.

Having covered the greater part of one day's hearing with a review of the organization of the Steel Corporation, together with a brief history of each of the subsidiary corporations which were merged in it, Judge Gary next proceeded to give the committee the details of the present workings of the corporation and his opinion regarding the relation of that institution to the assembling of materials, the producing of iron and steel articles and the distribution through interstate commerce of these commodities. In connection with this part of his testimony there arose queries from the committee as to the efficiency of the Sherman anti-trust law in its bearing upon such corporations as the United States Steel Corporation. In this connection the significant part of his statement regarding the Sherman anti-trust law was as follows:

The Sherman act does not now, and never will, prevent the organization of great combinations of capital. It is archaic and unable to deal with modern situations. I believe that we must come to enforced publicity and governmental control of corporations, even to the extent of having federal authorities fix prices.

Steel Rail Prices

In connection with the questions propounded by the members of the committee regarding steel rail prices and prices of metal products generally, including export prices of rails, etc., Judge Gary emphasized his statement regarding the course of prices by declaring that there is at present a general upward tendency in the prices of steel rails. He asserted that the cost of producing steel rails has greatly increased during the last ten years, as "wages have increased, specifications are different and heavy equipment and increased speed of the railroads demand bigger and better rails." He made this statement in connection with the question asked by the committee whether the present prices can be maintained in the face of any limitations imposed by the Sherman law, or through the methods employed by corporations engaged in the steel industry. He asserted that there is such diversity of interest in the steel business that some way must be devised to allow manufacturers to protect themselves against destructive competition that will drive manufacturers out of business, or "else we will all be in chaos." In effect, the statement by Judge Gary was that the time has come when in the interest of the consumers as well as the producers new policies must take the place of destructive competition which demoralizes markets and produces loss and injury to the trade.

There was considerable conflict of opinion shown in the statements of Judge Gary before the committee, compared with the statements made a week ago by John W. Gates, with respect to the absorption of the Tennessee Coal, Iron & Railroad Company by the Steel Corporation. The essence of Mr. Gate's testimony was that the sale of the stock of the Tennessee Company to the Steel Corporation was a forced sale at a price that was below what the stock should have brought, considering alleged relative values of that company's stock and the securities of the Steel Corporation which were transferred in payment therefor. The chief feature of Judge Gary's testimony was a detailed account of precisely what took place, according to his understanding of the matter, in bringing about the absorption of the Tennessee Company. He declared that it was for the purpose of preventing a panic and to save the firm of Moore & Schley, of New York, from possible failure, by reason of the enormous amount of Tennessee Company stock which the banking firms held, the loans on which had been called. In his opinion the sale of the Tennessee Company was not a forced sale, in the sense of a sale at a depreciated price of the stock, but rather that the price paid was even more than the stock was worth, the price being paid on account of the desire on the part of heavy financial interests in New York to prevent the failure of Moore & Schley with attendant financial demoralization and panic.

The Corporation's Advantages

Other interesting features of Judge Gary's testimony included the relation of the Steel Corporation to the fields of ore production and the shipment of ore from those fields to the centers of the steel industry. Many details were brought out regarding the relation of the Steel Corporation to transportation in those fields, and out of the general industrial centers of materials and finished products, and the part which the corporation has in control of certain transportation lines, terminal facilities, etc., was discussed in connection with the question as to the advantages which the corporation enjoys over its competitors in the matter of the control of transportation facilities as well as in the fields of general production.

Judge Gary admitted that in time of stress and falling prices, or price wars, the corporation would have an advantage over its competitors by reason of its control of transportation facilities. In regard to the general advantages of the corporation in matters of production, Judge Gary admitted that the corporation has such advantages, which he said were comprised in "greater capital, greater talent for organization, of large funds in a central bank

and the like, and the subsidiary companies by virtue of this organization do not need half as much money as any one of them would need to operate independently. These companies could not do half of the export business they do to-day if they were segregated. The export situation is one of the dominating causes of the organization of the United States Steel Corporation."

In answer to the question submitted by the committee as to sales of steel rails abroad at lower prices than in the domestic market, Judge Gary said that, to his knowledge, no such sales of from \$2 to \$4 a ton less than the domestic price had been made. He said, however, that the Steel Corporation does not control the price of rails and that they cannot be sold for less than \$28 a ton. He asserted that one reason why steel rails might be sold abroad for as low as \$26 a ton as against the domestic price of \$28 was in pursuance of the policy of "dumping," which he stated is resorted to by the industries of all countries. This, he said, would result in steel rails or like products being sold abroad at cost "so that the steel manufacturer would be able to keep his mills running, reducing the cost of production and keeping together a compact organization," which could not be done if surplus stocks were not disposed of.

As limitations of space this week prevent the publication of a verbatim report of Judge Gary's testimony, we give the following condensation of his history of the events which brought about the absorption of the Tennessee Company by the Steel Corporation:

The Purchase of the Tennessee Company

Judge Gary declared that the purchase of the Tennessee Coal, Iron & Railroad Company was made at the solicitation of Grant B. Schley, of the banking and brokerage firm of Moore & Schley, and his friends to save that firm from going under, and to prevent the financial calamity that would have followed its downfall. The United States Steel Corporation, after repeated urgings, finally stepped in and paid 100 for a stock which the financial managers of the corporation did not consider at the time to be worth more than 65. The difference of 35 points represented what the United States Steel Corporation felt was its duty to pay to avert the threatening panic. In all it turned about \$30,000,000 over to the firm of Moore & Schley, and enabled it to weather the storm.

In October, 1907, Judge Gary said, J. P. Morgan asked him to call at his office and told him that Grant B. Schley was very much in need of money or securities. Mr. Gary conferred with Mr. Schley and the United States Steel Corporation finally accommodated him by loaning him \$1,200,000 of the Steel Corporation's second mortgage bonds, and taking from him as collateral for the loan \$2,000,000 par value of Tennessee Company stock. Mr. Schley also signed an agreement that if the Steel Corporation bonds were not returned by April 23, 1908, ownership of the stock should pass to the United States Steel Corporation. "That was done," said Judge Gary, "entirely as an accommodation to Mr. Schley at his own request, because he said that it was necessary to protect him from financial trouble. That was taking the Tennessee stock on the basis of 60 cents."

Conference at J. P. Morgan's

The next event that led up to the absorption of the Tennessee Company occurred Nov. 2 of the same year, during the panic.

"Bankers of the city of New York," said Judge Gary, "were in session almost night and day. There is no doubt that we were in the throes of a panic that might lead to most disastrous results, including the suspension of a large number of banks and the failure of many people. There could be no doubt that the country was in grave danger of one of the worst financial panics it had ever seen."

This was the situation when Judge Gary was requested by Mr. Morgan to call at his library. He found Lewis Cass Ledyard and Grant B. Schley there. Mr. Ledyard said that the firm of Moore & Schley was in very great financial distress; that it was largely indebted to Mr. Payne, his client, and had a great many securities deposited as collateral for loans in many banks. These banks had called upon Moore & Schley to take up the loans, because the Tennessee stock was not readily salable. Mr. Ledyard said, so Judge Gary testified, that there was apparently no way of preventing the failure of Moore &

Schley unless the Steel Corporation purchased the Tennessee stock. J. P. Morgan, according to Judge Gary, then made this statement to him:

"I don't know whether the United States Steel Corporation can afford to buy this stock, but I will say if it does not or unless some one else furnishes relief no one can say what the result will be in financial circles in this country. The situation is critical. If you can see your way clear to buy no doubt it will help the situation."

"I said to Mr. Morgan," testified Judge Gary, "that I would not think of considering the purchase before going to Washington and taking the matter up with the President and the Department of Justice. He said: 'Why, have they any right to say whether you shall buy or not?' I said: 'No; but there is a financial crisis, and you say that the object is to allay the storm, but if representatives of the Government should find out that we were about to purchase this company and enjoin the transaction on the ground that it would increase our holdings and tend to a monopoly you can see that we would have made the financial conditions very much worse.'"

Mr. Morgan agreed with Judge Gary in this view, and the latter then telephoned for Mr. Frick and asked him to come immediately to the Morgan library. Judge Gary asked Mr. Frick to get ready for the trip to Washington and Mr. Frick replied that the question to consider first was whether the Steel Corporation would purchase the Tennessee Company under any circumstances.

"I had said," testified Judge Gary, "that the stock was not worth more than 65 and Mr. Frick expressed the same opinion. He was very much opposed to the transaction, and it was not until Mr. Morgan personally had explained to him the critical situation confronting the financial world that he gave any encouragement to the suggestion."

Offers of a Large Loan Not Considered Sufficient by the Firm Involved

Judge Gary called a meeting of the finance committee of the Steel Corporation in Mr. Morgan's library and it was finally decided to offer a loan of \$6,000,000 to Moore & Schley, taking the Tennessee stock as a collateral. If that was not acceptable, the Steel Corporation was to offer to buy on a basis of 90 for the stock, payment to be made in bonds of the Steel Corporation. Judge Gary conferred with Mr. Ledyard and the latter replied that the loan of \$6,000,000 would not do. Mr. Ledyard informed him that Oliver H. Payne and one or two others had offered to lend Mr. Schley \$3,000,000, but that this, with the \$6,000,000, making \$9,000,000 in all, would not carry Moore & Schley through.

The possibility of making a loan to Moore & Schley having fallen through, Judge Gary then offered to purchase the stock on a basis of 90, but Ledyard came back to the Morgan library and said that a sale even at 90 would not let Schley out. Another meeting of the finance committee of the Steel Corporation was then called and the figure was raised to 100.

"Mr. Morgan," continued the witness, "did not participate in any respect in the sale or attempt to use his influence. I do not hold a brief for Mr. Morgan, but I make that statement in reply to some of the sensational statements that are apparently based on misrepresentation."

Judge Gary explained that the corporation officers decided to pay for this stock in bonds, because any attempt by them to withdraw \$25,000,000 in cash from the banks of the country or to transfer such an amount from one bank to another would have greatly disturbed banking conditions.

"The United States Steel Corporation," he said, "had about \$75,000,000 in cash in the different banks of the country at the time of the panic. If we had been disposed to take advantage of the financial conditions we could have bought bonds of all descriptions at low prices, but certainly there was no disposition on the part of the United States Steel Corporation or any one connected with it to turn the situation to his financial advantage."

Judge Gary testified that the \$30,000,000 or more required by Moore & Schley probably did not all represent obligations of the firm. The Tennessee stock was owned by a syndicate and had merely been turned over to Grant B. Schley as one of the managers. Members of the committee seemed to be surprised that this large sum of money should be needed by Moore & Schley when the

Tennessee syndicate was composed of men of large wealth. Judge Gary intimated that some members of the syndicate may have insisted that Mr. Schley live up to the syndicate agreement and refused him permission to sell his stock unless all the syndicate holdings were disposed of at the same time.

Referring to the testimony given by John W. Gates, in which he said that he regarded the taking over of the Tennessee Company as a forced sale, Mr. Gary said:

"Mr. Gates says in his testimony that the board of directors passed a resolution that the minority stockholders should have the right to turn in their stock at the same price. I have no recollection of that. If it is true, it would look as though they were rather forcing us to buy than that we were trying to make them sell.

"As a matter of fact, the original memorandum provided that we should take the minority stock at the same price as the other. This was consummated before Mr. Gates returned from Europe. I think he is mistaken in his memory of the facts."

President Roosevelt Called On

Judge Gary then told of his trip to Washington on board a special train with Mr. Frick. They had an appointment with President Roosevelt at 10 o'clock in the morning, but conditions were so critical in New York City that they called at the Executive offices at 9 o'clock, and asked if the President would not make an exception to his rule and see them earlier. Mr. Loeb went over to the White House, where the President was eating breakfast, and returned with Mr. Roosevelt. Judge Gary and Mr. Frick presented the situation to Mr. Roosevelt, and he said that he would like to consult with the Department of Justice. Attorney-General Bonaparte was out of the city, and Mr. Roosevelt summoned Secretary of State Root. The President asked Mr. Root's opinion in regard to the taking over of the Tennessee Company, and Judge Gary said that the then Secretary of State concurred in their views as to its propriety.

Four days after the interview with President Roosevelt Judge Gary recorded what had happened at that interview in a letter to Secretary of State Root. His record of the interview was substantially the same as that which President Roosevelt made public, to the effect that the Steel Corporation had been urged to purchase the Tennessee stock as a means of avoiding a failure, that the corporation did not want the Tennessee property, and that it would be of little benefit to the corporation but that they felt obligated to do everything possible to avert a panic.

"I understood the President to say," said Judge Gary, "that while he would not and could not legally make any binding promise or agreement, he did not hesitate to say from all the circumstances as presented he certainly would not advise against the proposed purchase."

Secretary Root replied in a letter acknowledging the accuracy of Judge Gary's recollection of the interview, and the Gary letter was forwarded by Mr. Root to President Roosevelt, who in turn sent it to the Department of Justice to be recorded.

Judge Gary recalled that President Roosevelt said at that interview that he had no right to tell them whether they could buy the Tennessee stock, and that, as he understood it, Judge Gary and Mr. Frick merely wanted to know what the disposition of the President and of the Department of Justice would be. Judge Gary added that President Roosevelt seemed particularly pleased by the assurance they gave him that the percentage of the Steel Corporation's control over the trade in this country had materially decreased since it was organized. President Roosevelt remarked to them that he did not think that anybody would criticize him for saying that he did not feel like objecting to the purchase.

The Correspondence Made Public

Judge Gary then read to the committee the following letters:

New York, November 7, 1907.

My Dear Mr. Secretary: At the recent interview at the White House between the President and yourself and Mr. Frick and myself, I stated in substance that our corporation had the opportunity of acquiring more than half the capital stock of the Tennessee Coal & Iron Company at a price somewhat in excess of what we believed to be its real value, and that it had been represented that if the purchase should be made it would be a great benefit to financial conditions, and save from failure an important business concern, and that, under the circumstances, Mr. Frick and I had decided to favor

the purchase, unless the President objected, and I further stated that the total production capacity of our companies would not be materially increased by the purchase of the Tennessee Coal & Iron Company, and that the purchase would probably not bring it to more than 60 per cent. of the total steel production in this country, which was about the capacity of our companies at the organization of the Steel Corporation; that our position was opposed to securing a monopoly in our lines or materially increasing our capacity. I understood the President to say that, while he could not make any binding promises, he did not hesitate to say that, from all the circumstances as presented, he would not advise against the purchase.

VERY TRULY,

L. H. GARY.

To the Hon. Elihu Root, Secretary of State.

Washington, D. C., November 11, 1907.

Dear Mr. Gary: I have your letter of November 7, which fully agrees with my recollection of the interview to which you refer, in which you stated to the President the circumstances under which the United States Steel Company had been asked to relieve the financial situation by the purchase of the stock of the Tennessee Coal & Iron Company. I have sent a copy of your letter with this answer to the President with the recommendation that it be transmitted to the Department of Justice for filing there.

Very sincerely,

ELIHU ROOT.

Washington, D. C., November 20, 1907.

Dear Mr. Gary: I enclose a copy of the letter which I have sent to the President, enclosing a copy of your letter of November 7 and a copy of the President's answer. You now have a complete record of what you will be able to find on the files of the Department of Justice, should occasion arise.

Very sincerely,

ELIHU ROOT.

Inclosed were the following copies, first from Mr. Root to the President, dated November 11, 1907, and President Roosevelt's reply:

Dear Mr. President: I transmit herewith a copy of a letter from Mr. Gary, dated November 7, 1907, and received by me on the following day. You will see that it relates to an interview which Mr. Gary had with you last week regarding the purchase of the stock of the Tennessee Coal & Iron Company by the United States Steel Corporation, and I recommend that these papers be sent to the Department of Justice and placed upon the files of that department.

Yours sincerely,

ELIHU ROOT.

November 19, 1907.

Dear Mr. Secretary: I am in receipt of your letter of the 11th inst., with inclosures, and have forwarded them to the attorney-general to be placed on the files of the Department of Justice, together with a copy of this letter. Mr. Gary states the facts as I remember them.

Yours sincerely,

T. ROOSEVELT.

"When you went to the President, did it amount to your obtaining an opinion as to whether the deal was a violation of the law?" asked Mr. Littleton.

"We did reach the conclusion," admitted Judge Gary, "that if we acquired the securities and afterward there should be a proceeding by the Government against us to prevent confirmation of the deal, it would amount to a great outrage.

"And if such proceeding were taken, the company thought it would have a strong defence, did it?" asked Mr. Littleton.

"Well, I should think we would have if Mr. Martin Littleton were defending the case," said Judge Gary.

Judge Gary said he regretted that chairman Stanley of the committee believes "that Mr. Frick and I misrepresented the facts to President Roosevelt," and he wanted to satisfy the committee by facts and figures that there was no misrepresentation.

"I believe every one connected with the United States Steel Corporation cares more for his conduct, reputation, and character than he does for the making or losing of a few dollars," said Judge Gary.

More of the Testimony of John W. Gates

Limitations of space prevented the presentation last week of considerable of the testimony of John W. Gates before the Stanley committee of investigation May 27. Following are some further interesting extracts:

Mr. Beall: Some time ago you said there was a fear that Mr. Carnegie would demoralize the railroad business and the tube works just as he had done the steel business. as I understood it?

Mr. Gates: That was Mr. Morgan's statement.

Mr. Beall: In what way had he demoralized the steel business prior to this consolidation?

Mr. Gates: Well, in those days we used to have a few agreements. The boys would make them and Andy would kick them over.

Mr. Beall: Was Mr. Carnegie among those inclined to break those gentlemen's agreements?

Mr. Gates: I do not know anything about those gentlemen's agreements, but I know that if Frick and I would agree to one thing in the forenoon, as between our two companies, he might tell me in the afternoon that Carnegie would not stand for it. In other words, no one in the Carnegie Steel Company controlled Mr. Carnegie, but he controlled every other man in the corporation.

Mr. Beall: All these agreements had for their general object the regulation of prices, usually, did they not?

Mr. Gates: Well, I do not know that you could say that.

Mr. Beall: Did the agreement attempt to control the amount of the output of each mill?

Mr. Gates: What agreement are you alluding to?

Mr. Beall: I am alluding to the agreement that you mentioned as being made when Carnegie was stirring up trouble.

How Mr. Carnegie Once Sold Rails

Mr. Gates: I would like to tell you a story. Along about 1887 or 1888 a man by the name of Harry Smith was the purchasing agent of the Missouri, Kansas & Texas Railroad. The price of rails at that time, if I forget not, was about \$35 a ton. Mr. Carnegie's concern at that time was a member of a rail pool, and the penalty for cutting the price was enormous. I think it was \$20 or \$25 a ton. Mr. Smith happened to meet a friend of mine, a hardware merchant, at Sedalia, Mo., the agent of another company, and concluded he would buy his rails of him. He went to New York and happened to meet Andy Carnegie, whom he had known many years before, and Andrew cut the price very materially. Charges were preferred against the Carnegie Company. We questioned Mr. Carnegie and he denied everything in a general way. I knew the way he had cut the price. He had cut it by throwing in the track bolts, spikes and angle bars, which amounted to about 15 per cent. or a cut of \$5 a ton. I finally made an open charge, or Mr. Stirling, the vice-president of our company, made it. He admitted all of the charges, but refused to pay any fine.

Mr. Beall: The real cause of complaint against Mr. Carnegie was that he would not abide by the agreement, but would insist on cutting the price?

Mr. Gates: He was like a bull in a china shop. He would get a thing into his head once in a while and go and do absurd things that I really think he did not think much about.

Mr. Beall: Would those absurd things usually result in reducing the price of steel products?

Mr. Gates: It might, or it might advance them. You could not tell what he would do.

Selecting the Business

The Chairman: Mr. Gates, you speak of the advantage of running at as full time as you can, with an unimpeded market, and the right to sell at such prices as you can get. How long has it been since that condition prevailed in the steel industry?

Mr. Gates: Well, as far as I know, the Republic has operated along that line right along. It is very important in an iron or steel rolling mill to select your orders. In other words, the price of ovals and rounds may be practically the same, but the cost of the roll change enhances the cost of making one article or decreases the cost of making another. Therefore, when I say to run unimpeded I mean to select your rolling orders. If you can run practically continuously for 12 or 24 hr. on inch rounds or inch hexagon or octagon, you get a great deal cheaper product. That is what is called, in steel parlance, selecting your business. Now, that always means a lower cost. The price of the extras on iron or steel may be equitable. They are all based on the scale, with an advance over the base price; but the mill that can select its orders, getting the largest amount of orders for one size, always runs and makes stuff the cheapest, and when I said selecting your business I meant selecting the orders you run by. For instance, if you were running on 75-lb. rails, American section, if you could run 30 days on that section, it would be a great saving on account of roll changes.

The Stability of Prices

The Chairman: We will assume that each one of the many producing concerns—manufacturing concerns and not holding concerns—was a separate corporate entity, as they were 20 years ago; say there are 200 concerns engaged in the manufacture of nails or wire or tin plate, and 50 or 60 engaged in the manufacture of rails, and a

like number engaged in the manufacture of girders and structural steel. Now, if each one of those concerns was absolute master of its own business and was not controlled by or dependent upon some superior, some holding company or some financial influence that could dictate the price or the per cent. of its production, if that condition existed would not prices adjust themselves automatically to industrial conditions?

Mr. Gates: It would probably have that tendency, but I cannot say absolutely that it would. It would depend very largely on the supply and demand at the time. I would say that prices would be more erratic than they are now.

The Chairman: And you do not regard that lack of stability in prices as an evil, do you?

Mr. Gates: Well, if you were a merchant and had 10,000 tons of finished steel on hand, and they reduced the price \$10 a ton, you would think it was an evil because you would lose \$100,000.

The Chairman: But I mean, looked at from the standpoint of the whole community?

Mr. Gates: Well, it just depends on the viewpoint. There are two sides to the proposition. The largest owners of steel rails in the United States are the railroads, and when you depreciate the price of steel rails you depreciate the property of the railroads. When you advance the price of steel rails you advance the property of railroads. Now, if a railroad is not in the market to buy any rails in 1911 or 1912, they would naturally like to see prices high; but if they are in the market to buy from 100,000 to 250,000 tons they would like to see the market low; so that it is a good deal like the tariff proposition—it is local, it is individual, and you have got to take and treat each case as it comes along.

Extent of the Open Market

The Chairman: Take other articles of manufacture; in your opinion is it industrially wise to maintain the price at a fixed point, or to allow the price to oscillate with the capacity of the producer to pay, and other conditions?

Mr. Gates: I have been an advocate of open shop for a great many years and am to-day. I do not assume to speak for all my colleagues. By open shop I mean survival of the fittest.

The Chairman: That condition does not exist at the present time, I believe?

Mr. Gates: I do not think it does.

The Chairman: What per cent. of the steel industry is open shop to-day?

Mr. Gates: To-day? I should say 100, except rails. I do not think there is any agreement as to what shall be done in wire fencing or wire nails or woven wire or blooms or billets or ingots or anything else.

Underselling the United States Steel Corporation

The Chairman: Does not the open shop fellow sell at the same price, practically, as the corporation sells at?

Mr. Gates: Not necessarily. I have occasionally bought some of these products in Texas, and I write to the Pittsburgh Wire Company and the Pittsburgh Steel Company and the corporation, and I generally get a lower price from one of the outside concerns. The prices are not the same by any means.

The Chairman: What is the difference of price between these outside concerns and the corporation? Is it material?

Mr. Gates: Oh, yes. I do not know what you call material. I would say 10 cents a keg on nails would be material; 500 kegs of nails in a car would be \$50 difference.

The Chairman: You do not mean to say that the independent manufacturers undersell 5 or 10 cents a keg, say, on nails, the corporation, as a rule, when the corporation has 75 or 80 per cent. of the business?

Mr. Gates: Well, they are very apt to.

The Chairman: How does the corporation hold the business, then, if the other fellow is underselling it 10 cents a keg on nails?

Mr. Gates: The corporation makes a pretty full line of goods, and I do not know that there is such a thing as coercion, but I could see where it would be possible for the corporation's agent to say, "If you do not buy your woven wire fence from me, when you want some electric wire I will make you pay for it," or something that the other fellow does not make. Now, I do not know that that is true, but I can see where they could put the screws to them, so to speak, in certain lines which the other people do not make.

The Pittsburgh Bridge & Iron Works, Rochester, Pa., has decided to establish an office in Pittsburgh, through which all Pittsburgh, Erie and Buffalo work will be handled. The office will be located at 703 Farmers' Bank Building, Pittsburgh, in charge of J. A. McEwen.

E. H. Gary on Co-operation

Remarks at a Luncheon Given to Certain Iron and Steel Manufacturers at the Metropolitan Club, New York, May 29, 1911.

Gentlemen, I thank you from the bottom of my heart for your attendance on this occasion. You have come here at considerable sacrifice to your interests and to your convenience. You have come here pursuant to a well-developed, considerate, affectionate regard for your associates in the iron and steel business. You have been requested to come here for the purpose of testing your intelligence and your grit. You have been requested to meet here for the purpose of inquiring, one of the other, as to whether or not you and your business can be entirely demoralized by the disposition or the action of one individual or a few individuals in the trade.

A Time for Careful Consideration

I believe this is a time when the iron and steel leaders should particularly take account of the existing conditions and carefully consider what course should be pursued in order to protect themselves in the future. There are many questions in which we collectively and individually are interested, aside from the mere question of securing for ourselves a few dollars. Just at this particular time our minds are filled with the late decision of the Supreme Court in the Standard Oil case. The entire public had been waiting most anxiously for that decision in order to determine, as far as possible, upon what foundation the business of this country rested and what it might expect would be proper and allowable concerning the future conduct of business. I have had an impression from the newspaper reports and criticisms that there might be some danger of misinterpretation of the language of the Supreme Court in that case, and if so, that much harm instead of good might result from that decision.

I would not undertake to enter into any legal discussion of the question involved, even if I were capable of doing so, but there is a view of the decision to which I ask your attention. You have read statements made by many different people to the effect that the Supreme Court had modified the Sherman law and had read into that act the word "unreasonable." I am inclined to think even if that were true, to which I do not agree, the adoption of that view and conduct based upon it might result in very great harm to the business interests of the country generally. And I offer, simply for your consideration, this view of the decision: that the Supreme Court, instead of saying that there may be reasonable restriction of trade or reasonable monopolies, intended to say that in the application of the law to the facts in a case there must be reason exercised. In other words, that the Supreme Court has said that there must be a reasonable application of the law to a case in point, rather than that the conduct itself, if in violation of the law, must be unreasonable in order to be a violation.

To make the point a little more clear, let me give you a single, simple illustration: there was a law passed in a foreign state to the effect that it should be unlawful to sell or give away intoxicating liquors. The object of the word "give" was to prevent an evasion of the law, as you may see. In a certain city within the borders of that state a brewer invited some of his friends for dinner. After dinner he and his friends visited the brewery and went into the office. While there he asked some of the men in attendance to bring into the room some beer, which was drunk by all who were present, and some kind—or otherwise—friend immediately commenced prosecution against the brewer for giving away intoxicating liquor. The Supreme Court stated that they thought it would be a most unreasonable application of the law to hold a man guilty under circumstances like that. Therefore, it is very important for the court, in determining whether the Sherman act is applicable to a particular case, to have before it facts which show whether the persons charged have intended to materially restrict trade or have intended to create and exercise a monopoly; and in ascertaining such intent and in passing upon such a case, you will see it is very material to consider what is the conduct of the parties interested or involved, and what is the intention of those parties.

They Suffer Who Pay No Regard to Others

Now why do I bring this up at this time? If the business interests of this country generally should reach the conclusion, by reason of the decision in the Standard Oil case, or the decision which shall be rendered in the Tobacco case, that the Sherman act, so-called, has been overthrown; that it is not of any importance so far as our future conduct is concerned; that we are not obligated to go ahead, on right lines; that we are relieved from the necessity of conducting ourselves in such a way as to evidence a regard for the interests of those with whom we come in contact—with our neighbors, with our customers, with our employees, with the public generally—that we may go on step by step, becoming worse and more unreasonable instead of better; we shall find that as a result and in the long run we will suffer by reason of such an attitude.

And if that is true, then it behooves us, gentlemen, to have in mind, uppermost in our thoughts, the one idea above all others that we should conduct ourselves in such a way as to make it certain we are of some benefit and not injury to all who are influenced by or interested in the result of our business. I consider this most important, gentlemen, and I hope when we find to what policy the Administration in Washington has settled down, for the governing and controlling of the great business interests of this country, that we steel and iron people in this country, instead of being found in opposition to that general policy which is calculated to be of benefit to the people of the country, will line up with the Administration and take a position foremost in the ranks of those who, in a patriotic way, are attempting to do what they can for their fellowmen. I do not care whether it is a federal incorporation act the lawmakers may determine upon, or what it may be, if it is reasonable or if it is determined by the Administration or the lawmakers to be reasonable, let us—occupying a great position in the activities of business life—let us take a leading part in doing our best to bring about an improvement in the conditions which surround us.

I throw this out for your consideration, gentlemen, and I hope you will give it due thought, and I believe that, when the final judgment by the administrators of the law is rendered concerning our part in the business activities of this country, it will be favorable to us if we occupy the high position which I have suggested. Remember, when we are talking about patriots, statesmen, leaders of thought and action in this country, that there is no one in Congress or anywhere else who has any higher duty or greater responsibility or stronger desire to promote the business interests of the people of this country than the men around this table. We do not need the suggestions of anyone in order to make up our minds as to what we will do when these questions of ethics and economics and politics are brought to our attention. We should be the leaders and not the followers.

Substantial Price Reduction Means Lower Wages

Now, then, gentlemen, I should like to suggest another thought which is applicable to the question of prices of our commodities. You know by my frequent and repeated statements that I have never stood for unchanging or unchangeable prices, nor have I ever advocated prices in any line which were unreasonable or too high, taking everything into account. I have never, to my knowledge, opposed the reduction of any price suggested by a majority of the iron and steel makers, after there had been full opportunity for consultation, and generally when any one of the iron and steel makers has, after due deliberation, made up his mind that his prices were too high and ought to be reduced I have not made any opposition in our company to following the lead of that individual; but on the other hand, I have advocated and shall always advocate, so long as I believe I have the right to do it, the stability of prices, the regularity of business conduct on the part of all that is calculated to recognize and advance the interests of all others.

I have urged you to remember and I again call attention to the fact that when you make substantial reductions in your prices, if you reduce to a price that is unfair and unreasonable and you make so small a profit that it does not yield you a fair return on your investment and your risk, you at least place for consideration before everyone the possible necessity of reducing the cost of production, including prominently, if not principally, the wages which you are paying, or may be allowed to pay, to the man or the men in your employ. Do not forget that the laboring men—the employees of the corporations—have more at risk, when these questions are considered of reducing prices below what is reasonable and fair, than the employer, because it is just as natural as it is right and fair that if reasonable profits are prevented and your prices are put down below what they ought to be, then as a matter of necessity you are forced to consider and perhaps decide in favor of a liquidation of the wages of your employees; and you have no right to disregard them and their interests. You have no right to run the risk of being compelled to put their wages below what they ought to be unless you are driven to it, and I hope, under the present circumstances, gentlemen, that whatever may be done, or whatever may happen as a result of present conditions, you will not reduce the wages of your employees until you feel it is an absolute necessity to do so.

We should undertake to place ourselves on a plane much higher than the demagogue or the reformer who attempts to assail us and who pretends to be the champion of the laboring man. We do not need any suggestions from people like that. We know what our duty is, we know what the rights of our employees are, and we feel obligated, and take pleasure in knowing that we are at all times doing all we can for the people in our employ in keeping their wages up and in bettering their condition and keeping them in a position where they may enjoy life. We are the ones to lead in this movement. So, gentlemen, I bring this up because I have read in some of the newspapers that there will undoubtedly soon be a reduction in wages—and we may be forced to it. I shall regret it if we are—but, gentlemen, let us not come to the conclusion of reducing wages until we are compelled to do so. Let us keep them as high as we can just as long as we can.

The Withdrawal of One Company Should Not Affect the Others

Now, we are confronted with a very serious and disagreeable problem. It is not for me to criticise men nor to pass judgment on the motives of men. Whether people who have changed their minds suddenly are actuated by motives of cupidity or motives of necessity is not for me to say. One thing we know that one of the leading iron and steel companies hitherto joining in our councils, learning from us our intentions, our business, our methods, our clients, our customers, everything of benefit and interest for one to know concerning his neighbor, has suddenly, for reasons considered good by those in charge, given notice that for the present at least it is not desirable to co-operate with us. If I believed the reason was that the officials of that company had reached the conclusion they had no right, from the standpoint of law or good morals, to continue, I would be the last one to criticise.

I would not expect to ask anyone to do anything he believed wrong, legally or morally; but on the other hand, gentlemen, if anyone who has been co-operating in a lawful way, not in secret, but under conditions well known and frequently exposed by all of us, suddenly changes his opinion and believes it is for his pecuniary interest for the time being to withdraw from associating with us and declines to give us any information concerning what he is doing or proposes to do, leaving himself free to go to your customers and mine and get the business for himself, regardless of price, and simply for the purpose of filling his mill temporarily and securing for himself a customer who has been your customer or mine, then I do not hesitate to say that, so far as I am concerned, I am perfectly willing to let him stand outside of the circle of intercourse and friendly conversation and open and above-board fair dealing and frankness in expression; but if I have sufficient influence, it shall not in the least affect the relations of all the rest of us.

Whatever we do with reference to prices, whatever we may decide is necessary in order to protect our interests on this occasion and under these circumstances, in my opinion it is highly important for the long future that we

continue our relations of friendship and open and frank expression with reference to what we are doing. Now, I do not know the feeling of the rest of you; I do not know what you are disposed to do. I think that so far as we are concerned we would be largely influenced by the action of others; and while insisting upon the position from which I have never varied, I would not under any circumstances make any agreement, express or implied, direct or indirect, to maintain certain prices, to keep away from customers, to divide territory, to restrict output or to make any agreement of any sort or description with you or any of you, because, as I understand the law, I have no right to do it; yet at the same time, I would do what I have always said I would do, I would tell you and each of you at any time exactly what we were doing; I would give you the names of our customers, I would tell you what prices we were charging, I would give you any information concerning our business, concerning our mills, concerning our clients, concerning ourselves that you wanted to have, so long as you have the same disposition toward me.

Never before in the history of the business of this country, and probably of any country, have the people engaged in one line of industry occupied such a high position as that occupied by the iron and steel people in this country at the present time, and, gentlemen, while you may have read in some newspapers contrary statements made by people who were not interested in your welfare or the welfare of the people of this country generally and who talked from a political standpoint or selfish standpoint, yet you know as well as I that you have secured for yourselves the respect and the admiration of the well-thinking people of this country and of all other countries because of your attitude in these matters.

Friendly Conferences Have Added to the Stability of Business

While it may be true that as a result of your friendly conferences you have added to the stability of business in this country and have therefore been of great benefit to yourselves and to your customers and to your employees, yet, at the same time, in my opinion, taking into account the broader view and the long future of the business, you have done much more for yourselves in reaching this altitude which I have referred to, which, in my opinion, is the highest ever occupied by any men engaged in one line of business, and I believe that is more important to consider at this time than any other question we could take up.

Do not think that I minimize the troubles you are in—the troubles we are all of us in—do not think I am going to ask you to throw your business away or wreck your plants or disregard the rights and interests of your employees or any one else; do not think I overlook the business part of the questions which are involved and which are under discussion at the present time; but the question of mere dollars and cents, of making or losing a few dollars today or to-morrow or the next few months, in my opinion, is of slight consequence as compared with the better and higher things that you have had in mind during the last few years, and so it would please me immensely if you gentlemen, while considering the practical questions which are involved at the present time, should resolve, in your own minds, that so far as you can, so far as you have the lawful right, to stand together or at least to come together in friendly intercourse, not reserving to yourselves any question of information or knowledge you have, dealing in frankness and fairness, avoiding duplicity, avoiding questions of selfishness, dealing in the open, treating one another as friends, not as enemies, standing by and for one another, fighting for one another if necessary; protecting yourself against the man who undertakes to impose upon you and to override you and your interests, placing and keeping toward such a one a united front, not for the purpose or with the view of injuring him or any one else; but for the purpose of protecting yourselves and your interests.

If you have a customer located in some city who has a large stock of goods which he bought from you at a certain price, you have no right to disregard his interests and to unnecessarily reduce the prices to such an extent and in such a way as will force him into bankruptcy. I have already adverted to the consideration you must have for your employees. And so the same is true of the rights and interests of your associates. There is only a certain amount of business; you cannot increase it, you cannot change it.

You can get it away from your friend for a day or a week. Perhaps you can make a contract for a time and get a particular order, but in the long run, on the average, month by month, year by year, you cannot get and keep his business. The man you get to-day he will get from you to-morrow. There is only so much business, and if you have twice as much capacity as the demand, then it follows, as a natural and certain result, that, on the average, you are only going to get fifty per cent. of your capacity in orders. There is no possible way in which you can change that, except temporarily, and there is no reason why you should want to change it.

Confidence in One Another

I am not in a position to dictate to you, gentlemen, and if I were in such a position I certainly would have no disposition to do so. I am willing to stand with and by and for you, and you know, gentlemen, so far as our company is concerned, all share my opinion, that all have the same opinion. There isn't a man here who would not go to the president of our company and give him his pocketbook, and his order book, if necessary, and tell him to do what he pleased with it. You have confidence in him, you know you can trust him, you know he will never deceive you, you know he will never falsify, you know perfectly well he is dependable, and what you know of him he knows of you. Isn't that a splendid thing, that after these years—the last four years particularly—we should have been traveling together year by year, month by month, day by day, instead of ascertaining by this close contact how many tricks there were in each other's disposition, have formed a contrary opinion and have learned to have absolute confidence in one another? Gentlemen, isn't it a splendid thing? Was there ever anything like it before?

Of course if anyone believes that the time of co-operation has passed, if he deliberately and conscientiously reaches the conclusion that he is not serving his company by this disposition to conciliate and co-operate, then certainly no one could object to his saying frankly and boldly what conclusion he has reached, and we could all be governed accordingly; but if, on the other hand, we believe by long experience that, acting as we have and to the extent we have, within the lines of law and within the lines of reason and within the lines of propriety and good morals, we have been doing the best thing; then it seems to me that the first thing for us to decide is that we have no disposition to depart from the course which we have been pursuing; and if you reach that conclusion to-day, gentlemen, then some may have some suggestions of a more practical character to consider with reference to what is necessary, if anything, to be done at the present time, concerning this particular business in question. On the other hand, if it is your opinion that the time for co-operation has gone by or that it should be suspended, then we ought to find that out and we will all go our way, parting as friends, but at the same time separating entirely; which means that we will simply go upon our way, doing our own business in our own way, when, how and where we please.

What Would Happen Without Co-operation

What will be the result practically if we do that? Why, we will say here is a company which has a mill in a certain locality—it is not necessary to name that company, but it has withdrawn from our councils and it is not disposed to co-operate, and it proposes to do business in its own way and to charge such prices as seem to it necessary, in order to get the business it wants; in order to fill its mills. That company goes into a certain locality and finds Mr. King and Mr. McCullough with mills in that locality and it proposes to get the business of their clients and, in the ordinary way it goes to Mr. King's client and says "I want your business, and I will sell you bars at \$1.10 and \$1.05," and Mr. King's client says, "I think I can deal with you; that is pretty low, but I will let you know to-morrow morning," and to-morrow morning or before to-morrow morning Mr. King's client goes to Mr. King and says, "I am offered bars at \$1.05. Do you want to lose that business; do you want to lose me?" and Mr. King says, "Well, no, I don't think so and if a company is offering bars to you at \$1.05, I think I will let you have them." "Well," the man says, "then I think probably I will stick to you. I will let you know to-morrow morning." And he goes to Mr. McCullough and goes through the same thing there and Mr. McCullough says "Is Mr. King offering them at

\$1.05?" "Yes." "If Mr. King has done it I am surprised, but I think I will let you have them at \$1.04. You are Mr. King's client but I want business and I will let you have those bars at \$1.04," and he plays those two against each other as long as he can, but finally he goes back to this first company, which started the trouble, and closes with it at \$1.

In other words, the customer is not playing this one company against all the rest, but he is going to get others in there and they are playing against one another, whereas, if they were in consultation or co-operation, Mr. McCullough, when he received the offer would go to Mr. King and say, "Your customer has been around and says that an outside company will sell at \$1.05," and then Mr. King and Mr. McCullough find out about where they stand and the man has failed to play them against each other; and if they have to deal in such a way as to prevent this outside company from taking the business they at least know what they are doing and they did not have to fight each other.

The point is stated in a rather bungling way, but you gentlemen who are in business from day to day know better than I do how it is done. And if you are in consultation and each knows what the other is doing, you cannot be used against one another. Having full information as to what one another's prices are, you can take care of yourselves against the one company who is entirely outside of your friendly and proper co-operation. That is the point.

Now, I have about finished. I am going to call on one or two others, with a view of developing the question as to whether you think, under all the circumstances, it is better for us to part friends and say, "Let every man take care of himself." If you think, for any reason, it is necessary for it to be done or that it ought to be done, then I hope you will be frank enough to say so, that we may have an understanding. My judgment is entirely to the contrary.

We have not only enjoyed the association with you gentlemen but you have been of great benefit to us. It has been not only a great pleasure, but it has been a great profit and we have made money for ourselves and we have pleased, by our conduct, every one who is interested in us.

Among other things, when demand was great and the capacity was insufficient, we have prevented prices from going higher, which is just as important as to prevent them going too low. One is just exactly as important as the other. I am sure I have never stated an opinion here which I did not believe was in accordance with the opinions of the rest of you—I have never intended to disregard your opinions or go outside of and away from them; I have tried to find out what was in your minds and have acted and talked in accordance with what I believed to be your own wishes and your own conclusions, and I say that we have never stood for unreasonably high prices any more than we are willing to have unreasonably low prices. What we advocate is stability of prices. We know our customers like that. We know it is better for the mills, we know it is better for the employees in every way. That is why I think it is of great importance for each of us to know all the time what the rest are doing.

Enlarged Plant for Goulds Mfg. Company

The Goulds Mfg. Company, Seneca Falls, N. Y., is about to build four large additions to the No. 2 plant, in which will be housed the part of the works known as the No. 1 plant. Part of the No. 1 plant must be torn down to make way for the new Erie Barge Canal. The new buildings will be parallel with the foundry buildings.

A one-story storage building for rough castings is completed. The building is 60 x 240 ft. and of mill construction. Two machine shops, 100 x 300 ft., will parallel the storage building. They will be of steel frame and brick construction and about 70 per cent. of the wall surfaces will be glass. South of the two machine shops a four-story warehouse, 60 x 240 ft., will be built. It will be of reinforced concrete and on the south side there will be a loading platform. The New York Central Railroad is to build two additional switches along the warehouse.

The new buildings will be lighted by tungsten clusters and will be heated and ventilated by the hot-blast system. All the equipment of the machine shops will be motor driven. It is expected that by November 1 the buildings will be ready for use.

Mechanical Engineers' Meeting

Spring Sessions of the American Society of Mechanical Engineers, Pittsburgh, May 30 to June 2

It was conclusively shown by the attendance at the semi-annual meeting of the American Society of Mechanical Engineers, held at Pittsburgh May 30 to June 2, that the members prefer to convene in cities where there are places of engineering interest to visit. A year ago at Atlantic City the papers presented were probably fully as important and valuable as those at this meeting, yet the attendance was less than half as large. In fact, the registration was only 25 less than that of the record-breaking Detroit meeting, which was favored by the coincident meetings of the automobile engineers and on engineering education. Even assuming that the joint meeting in England last summer caused some to forego the Atlantic City meeting, it would not account for so great a disparity in the attendance last year and this year, for it developed that a goodly proportion of the members who went to England had been also to the Atlantic City meeting.

Pittsburgh proved a wise selection for this spring meeting, as it was undoubtedly the importance of its industries and the promise of profit from the excursions that would be arranged to the various works which brought such a large attendance. The local committee deserves the highest credit for the arrangements made to entertain the visitors and obtain admission for them to the different plants, and a very large measure of thanks is due to those connected with the works who extended courtesies to the society members and their guests.

Viewed in the retrospect, the honors for the practically complete success of the meeting should be divided between the local committee, consisting of E. M. Herr, chairman; George Mesta, J. M. Tate, Jr., D. F. Crawford, Chester B. Albree, Morris Knowles and Elmer K. Hiles, secretary, for the elaborate preparations for the excursions and other entertainments and the furnishing of printed matter giving the leading points regarding the places of interest to be seen, and the meetings committee for carefully selecting papers on subjects nicely fitting in with the excursions. The cement works session, Wednesday morning, for example, was followed by an excursion in the afternoon to the works of the Universal Portland Cement Company. Similarly the discussion on large gas power plants at the session of the Gas Power Section was principally based on equipments operating in the local steel works, and the visits to these works was of especially important relation to the papers presented at the steel works session, Friday morning.

The headquarters of the meeting was the Hotel Schenley, and the sessions were held in the Carnegie Institute and the main building of the Carnegie Technical Schools. The usual matters of business were quickly dispensed with at the first professional session, held Wednesday morning in the Carnegie Institute, President E. D. Meier presiding. Secretary Calvin W. Rice then read invitations to hold the next spring meeting in Cleveland, St. Paul and Baltimore. It was requested that the members signify in writing as promptly as possible their preferences, and it was later announced that the Council had decided upon Cleveland.

CEMENT WORKS SECTION

Proceeding to the consideration of the papers prepared for presentation at this session, it was announced that the meetings committee, having decided to try to broaden the scope of the society's activities, had appointed an auxiliary committee to canvass the industries to see what subjects should be taken up. The cement industry was the first to respond; hence this session. Following is an abstract of the first paper:

Some Problems of the Cement Industry

BY WALTER S. LANDIS, SOUTH BETHLEHEM, PA.

Progress and improvement in the cement industry has and will resolve itself into the development of the plant as against the process. The chief features of interest in this plant development are the questions of size of first crushing unit, the fineness of grinding of the raw materials before entering the kiln, the gradual displacement of the wet process by the dry one, better utilization of the fuel in the clinkering of the raw material and the abandonment of the air separator. The older mills must be remodeled along the lines of more economical power distribution and labor requirements to successfully com-

pete with the modern mills, now that profits in cement manufacture have dropped so low.

Instead of presenting his paper the author gave, by means of lantern slides, an illustrated explanation of the machinery used. It was decided to present all of the papers and discuss them in a body, and abstracts of the remaining two follow:

The Edison Roll Crushers

BY W. H. MASON, STEWARTSVILLE, N. J.

The causes leading to the design of the Edison crushing rolls are outlined and a comparison is made of the energy of coal as compared with that of dynamite in breaking up stone in the quarry. A description is given of the method of quarrying now employed in conjunction with Edison roll crushers. These rolls store up kinetic energy for use in crushing and sledging large stones and a comparison is made in this connection of rolls of various sizes. The power required for crushing by this method is shown by tachometer records, from which speed, energy and horse-power curves are plotted. Records are given covering a period of two years of the time lost and the cost of repairs on the crushing plant at the Edison Portland Cement Company. Comparisons are made between the theoretical capacity of these rolls and the actual capacity as shown by tests. Both of these are enormously greater than for the gyratory crushers, and in addition the larger size of the stones which can be handled by the rolls greatly simplifies and cheapens the quarrying operation. A description is given of the crushing plant of the Tomkins Cove Stone Company, which has a capacity of 1000 tons an hour.

Power and Heat Distribution in Cement Mills

BY L. V. GRIFFITHS, CEMENT, DALLAS CO., TEXAS.

A comparison is made in this paper of the methods used and the results obtained in five different cement plants for converting the thermal power of the fuel into productive mechanical work. A brief description is given, both of the power installation and of the mill arrangement; and the relative efficiencies of different raw materials, types of grinding machinery and engineering arrangements are considered. The data are such as to enable comparisons to be made between the same types of machinery, and in most cases the same size and make of machinery, at least in individual departments, if not throughout the entire plant.

Frank B. Gilbreth asked if there is anything to keep cement from setting too quickly and not hurt it, and the reply was made that gypsum can be used. Plaster of paris is put in when cement is manufactured for that very purpose. Too much will cause it to set quicker still. Sugar and calcium chloride are other ingredients that can be put in to retard the setting of cement.

W. R. Dunn stated that waste heat is being used extensively for drying the raw materials and answered a question as to the extent of the loss of material as dust by saying that it is not known. Mr. Landis took exception to this, stating that they do know about the percentage of loss, and H. S. Struckmann reported that 5 to 7 per cent. is lost up dry kiln stacks.

Germany, he advised, is getting around to the wet process to cut down the loss of material. The consequent saving has been found to more than make up for the loss of economy. Now by combining a drying cylinder and a burning cylinder in one long one it has been found that good economy is obtained, and the dust problem is very largely overcome. Mr. Landis stated that the loss of dust

is very often close to 5 per cent. He believes that the Western wet mill gives a higher per cent. of dust than the Eastern dry mill. Mr. Struckmann is convinced that the economy is merely a mechanical problem and that the wet process will cure the dust problem. He agreed that dust does go out of the wet kiln, when that point was raised, but that it is very much less. He believes that coaling should be done with a spray nozzle.

Another speaker suggested re-designing the back of the kiln where dust collects and there is now an opening would reduce the loss of dust. Still another stated that he has had considerable success in catching dust. In testing it out, where they had thought the waste was only 3 or 4 per cent., they found that in reality it is 5 to 5½ per cent. His plant was located near a furniture factory, and they were compelled to do something to reduce the dust disseminating from their works. They found that by spraying water in the bottom of the stack they were very successful in stopping the annoyance their neighbor had experienced.

J. M. Hemstreet, discussing Griffiths' paper, stated that he had had occasion to design some stone crushing machinery and had considered the type of drive. He inspected a number of installations and found that the consensus of opinion was in favor of electric drive. He was surprised to find that Mr. Griffiths regarded the electric drive as not efficient. On this point Mr. Griffiths replied that it was his experience that shaft drive is much cheaper but that electric drive is better for small individual drives.

An English guest asked about our manufacture of blast furnace slag cement. Mr. Kinney replied that his company finds that the Government and many engineers now consider such cement as good as any.

Mr. Landis wanted to know if, considering all the power consumption for pumping, agitating, etc., the wet process is not very much less economical than the dry. Mr. Struckmann replied that experience abroad is a good indication of the contrary, for fuel there is very expensive, and yet the wet process is most in favor.

W. R. Dunn, speaking as one of them, stated that the manufacturers of cement are very glad that the society has taken up the subject of cement manufacture and that they will be very glad to co-operate with the society in any further work that may be done with a view to studying means for improving machinery and processes.

MACHINE SHOP SECTION

At the Wednesday evening session three papers on the manufacture and assembling of small parts were presented. Following are abstracts of these papers:

The Assembly of Small Interchangeable Parts

BY JOHN CALDER, ILION, N. Y.

The direct cost of assembling small interchangeable parts is a comparatively large item in light mechanical engineering and repetition work. Economical production demands that easy assembly be kept in view at all stages from the design of a mechanism and through the tooling and shop processes to the delivery of the unit parts to the assembler. The paper analyzes and illustrates all the elements which should enter into the producer's calculations and outlines the work's organization necessary to secure the rapid and economical production of suitable unit pieces. It describes the results obtained in the assembly of given pieces and illustrates the simple apparatus used and the place that preliminary time and motion study has in assuring that the shop shall, from the first, begin operating upon the assembly of the mechanism under the most economical conditions.

The Process of Assembling a Small and Intricate Machine

BY HALCOLM ELLIS, NEWARK, N. J.

The Ellis adding-typewriter is a combination typewriter and adding machine composed of about 3400 pieces. To secure rapid and economical assembling of such a large number of parts a very elaborate system is necessary. Not only is the machine designed to be assembled in sections, but some of these sections are divided into sub-sections, small groups of assembled parts and individual pieces, all of which are numbered. All the parts are produced by means of carefully made dies, jigs, and fixtures so as to be interchangeable without special fitting. During the manufacture of the various parts a record is kept of the successive operations on each one, so that it is possible to tell at a glance what stage each piece has reached at a given time. The sheet on which these records are kept is called the operation docket.

When a stock of parts has been produced, each section and sub-section is assembled independently by means of assembling charts and photographs of the parts required for each section. Numerous illustrations show the method employed and various stages of the work from the production of the parts to the completed machine.

Quantity Manufacture of Small Devices

BY F. P. CON, WEST LYNN, MASS.

This paper deals with the production of small but not particularly complicated devices. It assumes that the apparatus has been properly designed for economical manufacture, and discusses the organization of the shop. The author considers it essential that change of design, except at stated periods, should be avoided; that the responsibilities of the different assistants should be sharply defined, and should not overlap; that stock handling is of the greatest importance in order to avoid interference with the labor cost, and that the chief function of an organization is to assist the workmen to perform a maximum of work with a minimum of effort. Recognizing and fully believing in scientific management, he contends that an organization should be sufficiently flexible so that ability in whatever form it may be found may be used to advantage, and in no case should the man be sacrificed to the system.

In the course of the discussion the methods used by the Western Electric Company in assembling small telephone parts were brought out. The raw materials and tools are inspected by the production department and are not under the sole control of the purchasing department, as suggested in Mr. Calder's paper. The testing, rate setting and methods department does not have charge of the actual work in process in the shop. No reaming, tapping or bending operations should be done in the assembling department, and the use of the file should be absolutely prohibited.

L. K. Malvern asked if the foremen or leading men who are called into shop conferences give honest and unbiased opinions. Mr. Cox replied that in his experience they do. The employees in the rate setting department are recruited from among the most intelligent workmen in the shop and are paid a high day rate. One speaker asked Mr. Calder to give some data on the difference between the rate in assembling small parts attained by the highly skilled rate setter and the average workman at the bench.

The next paper has already been printed in *The Iron Age*, but for convenience an abstract is given.

Milling Cutters and Their Efficiency

BY A. L. DE LEEUW, CINCINNATI, OHIO.

Observations of present-day practice and a number of experiments point to the fact that better results can be had from milling cutters by increasing the tooth space and depth. A number of cutters constructed along these lines were tested and it was found that they have a number of points in their favor, among which are less consumption of power, a greater amount of work done for one sharpening and a greater number of possible sharpenings per cutter. A change in the form of chip breaker made it possible to use cutters with chip breakers for finishing, as well as for roughing. It was further found advisable to use a special kind of key, here described, for heavy work. Finally, this paper describes a new style of face mill and what is called a helical mill. A number of diagrams are presented showing the relative efficiency of different styles of mills for removing a given amount of metal. In general, attention is called to the possibilities which lie in a more scientific construction of milling cutters and the desirability of discarding our ideas of milling cutters, which are largely based on conditions no longer existing.

John Parker in a written discussion contended that the average machine shop will not purchase milling cutters with wide spaced teeth but demands the standard fine toothed tools. He admitted that the power consumption of cutters with wide spaced teeth is much less than that absorbed by standard cutters, but claimed that the hammering due to the relatively few teeth is very detrimental in a great many cases. The new cutters occasionally push the work bodily out of the vise, and end mills of this design are inclined to work loose in their sockets. He gave details of a large number of tests of both types of cutters on cast iron and steel which showed a saving in power in favor of the new tool of from 14 to 20 per cent. Mr. De Leeuw's statements regarding the tendency of standard cutters to clog with chips were disputed, and tests were mentioned where standard cutters under a feed of 10 in. per min. cutting 0.4 in. deep did not clog. Mr. Par-

ker believed the new cutter more economical in the use of power, but not suitable for general purposes.

A. F. Murray agreed with Mr. De Leeuw's conclusions regarding the possibilities of the new cutter and described several heavy face mill cutters with inserted teeth designed on this principle. He also described some end mill cutters with only six or eight teeth.

W. S. Huson said he favored the use of wide spaced teeth on surface mills, but had not found this type successful in slot milling or gear cutting. He favored the use of cutters with a large number of teeth for accurate gear cutting, although they are more expensive to keep in good order.

Concluding the discussion, Mr. De Leeuw said he did not recommend the new cutters in a sweeping manner, or that all existing cutters should be replaced by the new type, but did believe firmly that cutters with a few rugged wide spaced teeth are better in many cases than the standard design. He pointed out the saving in time in sharpening the new cutters and said they can be ground twice as many times and wear at least twice as long as the old style.

GAS POWER SECTION

Simultaneously with the machine shop session was held a session of the Gas Power Section in the main building of the Carnegie Technical Schools. Prof. R. H. Fernald, chairman of the section, presided, and the meeting was opened with a reading of the report of the installation committee by Secretary George A. Orrok covering the records which it has collected of recent installations of gas power equipment.

Discussion of Large Gas Power Plants

Of direct interest in connection with the excursions arranged for the members of the society by their local committee was the discussion of large gas power plants on the part of those having in charge notable examples of such plants in the Pittsburgh vicinity. The discussion was opened by E. A. Maccoun, superintendent of furnaces of the Edgar Thomson steel works. He first drew attention to the characteristics of the card of the four-cycle engine, particularly the high initial pressure, 300 lb. or more, and the low mean effective pressure, 65 lb. If it should prove that some new cycle is developed for slow combustion, engines will not have to be designed for such high maximum pressures in proportion to comparatively low mean effective pressures. At the Edgar Thomson steel furnaces one blower engine has operated 93 per cent. of the time during an entire year. Another blower engine operated 90 per cent. of the time and an electric engine 85 per cent., which speaks well for the reliability of such engines. The speaker next mentioned some of the changes which were necessary to make their engines operate satisfactorily, for they must run nearly continuously to be economical. Important factors are first cost and an operative cost comparable with that of steam engines. All troubles due to cylinder design have not yet been overcome. Cylinders have a tendency to crack and allow water to leak into them. They must be carefully water jacketed to prevent unequal expansion. The speaker favors steel castings because they allow thinner walls. The cylinders should be in halves and bushed so that the lining may be easily renewed. He considers that 44 in. should be about the minimum diameter for cylinders.

For pistons he stated that cast steel is used the most and that the pistons should be made in parts. A design approaching a sphere gives enormous strength and allows more expansion. The piston should float, so that there is no pressure on the walls of the cylinder except that due to the rings. Piston rods were first made of nickel steel, but open hearth steel he considered as more satisfactory. The cooling water should be introduced and taken out through the ends of the rods, as holes through the sides make excellent places for cracks to start. Fiber rings in connection with piston rod packing should be solid and of sufficient number to reduce the pressure before it reaches the packing proper.

Originally the company had trouble with its cylinder heads, but by changing the design this has now been overcome. One requirement for a satisfactory inlet valve gear is that a reasonable percentage of dirt should not cause excessive wear. Concluding, the speaker compared the advantages of the constant mixture and constant pressure systems and stated that the oil relay governor has been found the most satisfactory.

R. H. Stevens, mechanical engineer, of the Homestead Steel Works, was the next speaker and related the experience at the Carrie furnaces with four blower and five electric engines. In the cleaning plant there are six units. Over 99 per cent. efficiency is obtained in the cleaning, only 0.003 grain of dust per cubic foot remaining in the gas. The gas has from 85 to 90 B.t.u. per cubic foot thermal value. They have been fairly successful in their operation, the engines being ready to run 95 to 98 per cent. of the time, although they only have to run about 90 per cent.

A. N. Diehl, superintendent of furnaces of the Duquesne Steel Works, introduced his remarks by contrasting the thermal values of fuels used in internal combustion engines which range from 1000 B.t.u. for natural gas to 175 B.t.u. for producer gas and 90 B.t.u. for blast furnace gas. The last is ideal for gas engine operation on account of the slow flame propagation and permitting high compression. He next described the nature and characteristics of the gas they obtain and the cleaning apparatus used. It was found that they got the best results with spraying in the scrubbers. A study of the course of the gas in the scrubber led them to design a spraying device to prevent channeling of the gas. The speaker then described in detail the course and treatment of the gas. The engine details were similarly described, including the valves, governor, etc. Their governor was very satisfactory, holding the speed of the electric engine within 2 per cent. and the blower engines within 5 to 6 per cent. The maximum efficiency obtained in these engines was 30.9 per cent. Electric engines developing 3300 kw. gave 4807 b.h.p. and 5641 i.h.p. The engines are started by compressed air. In the last six months of operation the engines have averaged 98.8 per cent. operating time.

A. L. Hoerr, steam and hydraulic engineer, of the National Tube Works, at McKeesport, described their installation and its history. Some of the changes made in their engines were as follows: The piston-cooling water system had telescopic joints substituted for swinging joints; the design of the spark plugs was changed to use a rotary instead of a reciprocating motion; the gearing on the lay shaft was changed from spiral to spur type; the connections between the exhaust valves and the mufflers were equipped with expansion joints; the design of the keepers was changed, and also that of the piston rod packing rings, and a slight change was made in the exhaust chambers. From the operating records of 1910 it was found that engine No. 1 operated 79 per cent. of the time with an average load factor of 81 per cent., and engine No. 2 for 91 per cent. of the time with an average load factor of 79 per cent. After giving some further details the author concluded with the opinion that in this district it is still possible to do better with steam engines than with gas engines.

H. J. Freyn, Illinois Steel Company, commenting on the remarks of the previous speakers, found it difficult to reconcile their apparent doubting that gas engines are as good as steam engines when they all reported engines operating as much as 95 and 98 per cent. of the running time. No prime movers, he stated, could do much better. At Gary recently one-quarter of one per cent. was all the delay charged against gas engines. While in Europe last year Mr. Freyn was surprised to see how excellently gas engines are running there. While our experience with gas engines is relatively short, he believes that we can do as well as is being done in Germany, for example. He mentioned that most of the installations referred to by the previous speakers were made some time ago and in most cases were practically their builders' first attempts. He contrasted with these the Snow engines at South Chicago and some other makers' recent products as examples of what can be done in this country now. Our need, as he sees it, is better workmanship and not so much better design. He considers that foundry practice is better abroad and that this is the reason why they have less cracked cylinders. Foreign builders have not adopted steel cylinders, and the speaker thinks that cast-iron cylinders are entirely suitable when properly made. The rod packing as used in this country he regards as better than that used abroad. Mr. Freyn took exception to the figures which have been circulated in this country as the cost per kilowatt for gas engine installations, regarding them as altogether too high. While the gas engine installation does cost more than a steam turbine or a steam engine installation there is not so great a difference as is com-

monly believed, and he held that the saving in operating expense more than offsets it. Another factor in gas power plants as operated in this country which he considers is superior to that used in Europe is the gas cleaning apparatus. He recently opened an engine which had been running for a very long period and found it in splendid condition, with not a handful of dust or carbon deposit in it. Finally the speaker ventured the prediction that the combination of low pressure steam turbines and gas engines will be found to be very economical.

Mr. Friedlander, who contributed to the discussion, argued that gas engine units of larger capacity should be built. A fair figure for the present cost of gas engines, he held, is \$125 per kw. It is his belief that the speed of gas engines should be increased and that they should be made operable by unskilled labor.

U. S. Bureau of Mines Test

The programme of the evening was concluded by a paper read by C. D. Smith covering the work of the United States Bureau of Mines, Pittsburgh Station, on the prevention of mine accidents and fuel tests. The paper was followed by lantern slide illustrations from photographs, illustrating some of the measures which are taken to safeguard mine employees.

MISCELLANEOUS SESSION

A session was held on Thursday morning in the lecture hall of Carnegie Institute and was opened with the presentation by Prof. Reid T. Stewart of his paper, "Stresses in Tubes." He described an extended investigation which showed that the stresses in the wall of a tube exposed to external fluid pressure are of the same character as those in a column having ends fixed in direction. Using the experimental results obtained for the collapsing pressures of commercial steel tubing, 3 to 12 in. in diameter, he derived equivalent column formulae.

Charles Whiting Baker regarded the offer made by Professor Stewart of presenting to the society a bound volume of the original data on which the present and his former papers were based as marking a departure which could well be imitated more generally, and on his motion a formal vote of thanks was given to Professor Stewart for his acceptable contributions augmenting the paper.

The Purchase of Coal

The purchase of coal, the subject of a paper by Dwight T. Randall, of the Arthur D. Little Laboratory, Boston, was discussed for the author in his absence by Perry Barker, who is associated with Mr. Randall. The contention of the paper was in part as follows:

Most boiler-rooms are now conducted in a manner which permits of considerable saving along two lines. (a) the selection of a coal which is suited to the plant and at the same time is capable of delivering the greatest amount of heat to the boiler for a unit of cost; (b) burning the coal by approved methods to obtain the highest practical efficiency.

The coals which are offered in almost any market very in price and in quality to an extent which justifies a careful study of their character and heating value in order to determine which coal will prove most economical when the equipment, the load conditions and the price are considered. A coal which is entirely satisfactory in one plant may be unsuited to another.

It is possible to burn almost any fuel with reasonably good efficiency provided the furnace is properly designed for the particular fuel to be burned.

Coals which are suitable for any given equipment depend for their value principally upon the B.t.u. and the size of the coal. A thorough study of coals and the variations in their quality has naturally led to the purchase of coal under specifications with a guaranteed analysis, which provide for a definite procedure in case of a variation in the quality of coal delivered.

The author explained at length the methods of obtaining the proper sample of a fuel, discussed the accuracy of sampling and suggested the important items of the proper type of coal specification. Secretary Rice expressed a fear, as a member of the Committee on the Conservation of Natural Resources, that the whole tendency, unwittingly perhaps, was to maintain a market for the best grades of coal, assuming a general rigorous following of the procedure advocated in the paper. Charles Whiting Baker, as a member of the same committee, voiced approval of the attitude of Mr. Rice and suggested the feasibility of wider use of the steam jet blower for the use of

low grade fuels. A reduction in fuel and incidental costs, he added, was good engineering. Dean Goss advised more attention on the part of the coal producers to making the inferior coals a satisfactory marketable commodity, as by briquetting, for example. President Meier said he believed in coal analysis if the coal be taken from a definite locality. Mr. Barker in closing the discussion explained that the paper emphasized the need at the outset to study the kind of coal it is desirable to use. The trouble with the low grade coals, he remarked, is that they have too great variations in constituency.

Pipe Flange Standards

The final step in the matter of standardizing flanges of steam pipes and the like was taken by the society in ordering the schedule to be printed. A telegram was read from Henry B. Gomers, Secretary of the National Association of Master Steam & Hot Water Fitters, stating that that association has accepted the joint committee report on the subject. The action of the society in this case is important, as it never actually goes on record as adopting a thing of the kind but recommends a standard, as was its action in reference to the code for testing steam power boilers, a contribution to mechanical engineering which has given the society a very good reason for existence from the standpoint of the public at large.

The schedule covers standard weight and extra heavy flanged fittings. The tables give in convenient form the leading dimensions for elbows, including the long turn, for tees and crosses and for laterals or Y-branches, and the range of pipe sizes is 1¼ in. to 24 in., inclusive. A few modifications are yet to be made to the schedule, it is understood, and without doubt it will be available shortly in pamphlet form purchasable for a nominal sum like the separate copies of the Society papers. The committee of the American Society of Mechanical Engineers was: Henry G. Stott, superintendent motive power, Interborough Rapid Transit Company, New York; John H. Sparrow, chief engineer, New York Edison Company, New York; William Schwanhauser, chief engineer, International Steam Pump Company, New York; Walter M. McFarland, Babcock & Wilcox Company, New York; Albert C. Ashton, Ashton Valve Company, Boston, Mass. The committee of the National Association of Master Steam and Hot Water Fitters was: William J. Baldwin, Jr., New York; N. Loring Danforth, Buffalo, N. Y.; William T. English, Boston, Mass.; William P. Kirk, Bridgeport, Conn.; Thomas B. Cryer, Newark, N. J.; Edward B. Denny, Newark, N. J.; Charles A. Geoghegan, New York.

Vice-President Goss relieved Colonel Meier as presiding officer for the remainder of the session.

A paper on the "Energy and Pressure Drop in Compound Steam Turbines" was then presented by its author, Prof. Forrest B. Cardullo. He submitted an empirical formula for estimating the quantity of power developed in each stage of such a turbine. The equation is modified so that by its aid the proper pressure drop in each stage may be determined. A graphical solution of the problem was also developed. The methods outlined are applicable, it was stated, to the solution of problems in turbine design when a temperature-entropy table or a total heat-entropy diagram is used. The paper was discussed by Winslow H. Herschel and in writing by Profs. Peabody and W. D. Ennis.

The pressure-temperature relations of saturated steam were discussed in a paper by Prof. Lionel S. Marks, read by title only on the basis that this discussion should advisedly be contributed in writing. The paper mentioned that the pressure-temperature relations of saturated steam are established satisfactorily from 32 deg. F. up to the critical temperature. The values of the pressure have a maximum difference from the best experimental value of about 1/10 of one per cent. in the range from 212 deg. F. to the critical temperature (706.1 deg. F.); below 212 deg. F. the maximum difference is 0.196 per cent. at 50 deg. F., corresponding to a pressure difference of 0.00035 lb. per sq. in.

Pressure Indication for Punching Machinery

The last paper of the Thursday morning session was by Prof. Gardner C. Anthony on a "Pressure-Recording Indicator for Punching Machinery."

The use of an indicator for the direct recording of stresses due to punching boiler plates, under the working

conditions of a boiler shop punch, the author believed to be new. The paper was largely descriptive of a device for obtaining cards from an indicator applied to a pressure cylinder, which enables the operator to obtain results as easily and rapidly as is done in indicating an engine. Cards were taken with the apparatus applied to an Olsen testing machine. The latter was for the purpose of checking certain results and introducing a variety of conditions which it is proposed to investigate.

Although the number of tests so far made is insufficient for conclusive evidence, they have demonstrated the efficiency of the device as a piece of laboratory apparatus which will serve admirably for determining data relating to the following: The maximum pressures for which punching machines should be designed, the point of maximum stress in the punching of plates and other material, the effect on the maximum stress by increasing the clearance between punch and die, the advantages to be derived from the use of shearing punches, and finally, the effect of time on the flow of metal in punching.

Prof. R. C. Carpenter thought the author ought to explain conclusively whether the indicating scheme is sufficiently proof against the loss of leakage of the oil used as the hydraulic medium and whether the sticking of the indicator owing to the medium is safely overcome. Julian Kennedy suggested a horizontal arrangement of the apparatus and the use of a spring and a record of its deflection for obtaining a study of the conditions.

STEEL WORKS SESSION

The Friday morning session was opened with the adoption of a resolution presented by Mr. Baker expressing the thanks of the society and the visiting members for the notable arrangements made for the meeting and the elaborate programme of entertainment.

Furnishing the Furnace Blast

A paper was then read by Richard H. Rice, of the General Electric Company, describing the commercial application of the steam turbo-compressor at the plant of the Empire Iron & Steel Company, Oxford Furnace, N. J.

The details of the installation were given in *The Iron Age* of March 2. With this paper was also read the paper by Prof. W. Trinks, of the Carnegie Institute, on "Reciprocating Blast Furnace Blowing Engines," in order to concentrate discussion.

The paper set forth the causes for the gradual change and progress in reciprocating blowing-engine practice. An elementary study of valve motion was given and the valve gears of present standard American practice were described. It was shown that these engines are successful at the speeds for which they were designed, but that at higher speeds they cannot be used successfully, so that new designs had to be brought out in order to meet the pressing demand for higher speeds and lower first cost. Two American designs described showed that these valve systems, although much superior to the so-called standard gears when used for high speeds, have not yet broken with the idea that smallness of clearance is required for economy, whereas German builders have demonstrated that by the use of multi-ported plate valves large valve areas and economy at high-speed operation can be obtained in spite of large clearance. It was pointed out that the bringing up of the piston speed of the blowing engine to the standard piston speed of the power gas engine or the power steam engine reduced the first cost of the reciprocating blower and that the combination of the high-speed blast-furnace gas engine with a high-speed blower constituted the most economical method for the production of furnace blast.

A written discussion contributed by J. E. Johnson, Jr., Ashland, Wis., was read by F. R. Low. It was in part as follows:

Changes in quantity of air as small as 1 or 2 per cent. are frequently made in the quantity of blast delivered to the furnace as one of the means of controlling its operation, and this makes it obvious that exact control is a very necessary feature. I had the pleasure of seeing the installation of the turbo blower at the Port Henry plant of the Northern Iron Company about a year ago, and the simplicity of the governor is certainly admirable, but is a feature exactly not easy of comprehension to a man without thorough mechanical training, and a prejudice against these machines is likely to exist in the minds of many furnacemen on this account, which will make their introduction slower than they perhaps otherwise might be.

It is a well-accepted fact that the efficiency of the turbine is far higher at low pressure than it is at high.

The result is that the most economical form of steam-driven apparatus is a combined unit in which the steam expands down to about atmospheric pressure in a good reciprocating engine, and is then delivered to a turbine on its way to the condensers.

In spite of their high cost it is notorious among operating men that really reliable blowing engines are exceedingly scarce. The problem of the valves is in itself one of great difficulty. It is almost impossible to get an air inlet valve with sufficient area to allow the cylinder to fill absolutely without heavy loss by suction, and at the same time quick enough to give correct results at the speeds required of modern engines.

The turbo blower, on the other hand, suffers from the disability that it must have stages enough to blow the highest pressure ever required, although this high pressure will not, in ordinary operation, be required 1 per cent. of the time, the normal pressure being perhaps only half as great.

If, therefore, we make a turbo blower to deliver air of a certain nearly constant, moderate pressure, and a blowing cylinder of comparatively small size strong enough to deliver air to the desired maximum pressure, we shall have bettered the conditions of operation of both apparatus, increasing their efficiency and reducing their cost. In other words, the turbo-blower and reciprocating-compressor combined are more efficient than either apparatus alone, exactly as the engine-turbine combination is more economical in the consumption of steam.

A turbo-blower supplying air compressed to 8 lb. to two reciprocating blowing engines would enable them to deliver as much air as three drawing air from the atmosphere, and the efficiencies which are guaranteed in the use of exhaust steam by the builders, combined with the guaranteed efficiency of the turbo, indicate that this can be done at a decided saving in first cost and with an efficiency certainly no lower, probably higher, than that of either unit alone. This does not make any allowance for the possibilities of spray intercooling between the turbo and the reciprocating compressors, which, in ordinary practice, would be good for about 4 per cent. additional saving at a very low cost.

The advantage of maintenance is undoubtedly with the turbo, as compared with reciprocating engines. At the same time the magnitude of the alternations of stress in the reciprocating engines is greatly reduced by delivering to them partly compressed air, and the problem presented by their inlet valve gear, which has given so many bad hours to both furnacemen and engine designers, is practically eliminated by delivering to them denser air under pressure.

It, of course, cannot be denied for a moment that the efficiency of the reciprocating machine as a compressor is far higher than that of the turbo, except for the lowest pressures, while the advantages of positive metering of the air by the reciprocating engine will cause furnacemen to accept the combined apparatus without that hesitation which they feel toward the non-positive turbo.

As long as all conditions remain constant the speed of the turbine will be unchanged, but if the pressure required by the furnace increases a little more steam is admitted to the steam engine by its governor, and this increased quantity of steam speeds up the turbine to a slight extent and so causes it to deliver air compressed to a slightly higher pressure.

Mr. Johnson concluded with expressing the conviction that the introduction of the turbo-compressor marks the beginning of a better era for the mechanical equipment of blast furnaces, but that its best and easiest application will be in conjunction with, rather than in supplanting, piston blowing engines. Incidentally, it may be stated that Mr. Johnson has received a patent lately covering the combination described.

Mr. Rice's paper also received special attention at the hands of C. J. Bacon and H. J. Freyn, of the Illinois Steel Company, South Chicago. Mr. Bacon regarded the shaft efficiency, so to speak, of the reciprocating blowing engine was 75.8 per cent., being the product of 94 per cent., the efficiency of compression, 89 per cent., the efficiency from a volumetric standpoint, and 90.4 per cent., the mechanical efficiency, as against 68 to 70 per cent. for the turbo-compressor. Prof. Cardullo suggested the use of smaller valves on blowing engines—a large number of, say, 3-in. diameter valves of steel plate to overcome the troubles described in Prof. Trinks' paper.

Mr. Freyn referred briefly to numerous interesting figures being obtained for the United States Steel Corporation tending to indicate conclusively the value of gas driven blowing engines. He said, for example, that in a plant of four furnaces of 500 tons' capacity eight blowing engines might be installed, six for use and two for spare, or six turbo-compressors, four for use and two for spare.

The gas blowing engine is in the lead with coal at \$1.80 per long ton, but where coal costs nothing the turbo is ideal. Julian Kennedy and he took issue on submitted comparative figures, but it is felt wise to withhold publication of these until they can be offered with a greater degree of authenticity than is possible under the present circumstances. It was explained also in the discussion that the Westinghouse Machine Company had been doing considerable experimental work in this direction, and the impression was gained that shortly one should expect to receive definite information of a type of blower the pressure-volume characteristics of which indicate a stability calculated to make it an efficient and valuable apparatus, particularly for parallel operation.

The Steam-Hydraulic Forging Press

A paper on power forging, with special reference to steam-hydraulic forging presses, by Berthold Gerdau and George Mesta was read by Mr. Gerdau, who hails from Dusseldorf, Germany, and whose presence added to the interest of his lantern-slide explanation of the paper. The paper compared the forgings produced by hammering

using granulated blast furnace slag obtained from the Bessemer furnaces of the Carnegie Steel Company, and limestone, which is quarried near Butler, Pa. The capacity of the plant is 3,500,000 bbl. per year. The company, a subsidiary of the United States Steel Corporation, also has plants at South Chicago, Ill., and at Buftington, Ind., making a total capacity of 12,000,000 bbl. per year. In the local plant the power is furnished by induction motors supplied with current from the gas power plant at the Carrie furnaces of the Carnegie Steel Company.

Returning to the train the party proceeded to East Pittsburgh, where the works of the

Westinghouse Electric & Mfg. Company and the **Westinghouse Machine Company** were visited. The former employs 14,000 people and has 50 acres of floor space under one roof. The products cover a wide variety of electrical appliances, from heating devices for domestic and commercial use to large electric locomotives, including generators, $\frac{3}{4}$ to 10,000 kw.; motors, 1/100 to 3000 hp., and transformers, 10 to 7,500,000 watts. The Westinghouse Machine Company employs 2150 men and occupies 12 acres of floor space. Its products are steam engines, 5 to



View in the National Works of the National Tube Company, McKeesport, Pa.

with those produced by pressing and illustrated features of various steam-hydraulic presses. The discussion of the paper, like that of others of the papers, had to be cut short and was mainly to the point that in comparing the two general types of forging machines the time factor must enter, that with the hammer the maximum force is exerted at the starting of the work and gradually lessened, while with the press maximum pressure is reached at the end of the period of a given effort of the press. It was felt unjust to compare the two types of forging without taking into account such factors as the composition and temperature of the material being worked.

EXCURSIONS, ENGINEERING AND OTHERWISE

Many of those who arrived before Tuesday evening took advantage of the opportunity of visiting the exhibit of foundry equipment at the Exposition Building, which had been continued beyond the close of the American Foundrymen's convention of the week before so that the engineers might inspect it. The first regular excursion of the convention was that to the

Universal Portland Cement Company's Works at University, Pa. This trip was taken Wednesday afternoon by special train, luncheon being served on the train. Arriving at the works the party was divided into groups and conducted through the plant by guides furnished by the company. This company manufactures Portland cement,

300 hp.; steam turbines, $\frac{3}{4}$ to 15,000 kw.; gas engines, 10 to 4000 hp.; anthracite and bituminous gas producers; Le Blanc jet and barometric condensers, and air pumps; Roney mechanical stokers, and the Melville-McAlpine turbine reduction gear.

National Tube Company.—Thursday afternoon was reserved for a visit to the National Works of the National Tube Company at McKeesport. Special trolley cars carried the visitors over the picturesque hilly country to McKeesport, and after the carefully planned walk through the works, for which a map and guides had been provided, the return journey to Pittsburgh was made on the Monongahela River by a boat on which the ladies were being entertained. The works are a little over a mile in length and cover about 100 acres. Tubular goods, both butt and lap weld, from $\frac{1}{8}$ in. to 30 in. in diameter, are manufactured from the iron ore, the works including four blast furnaces and accessories. The tube and pipe mill building proper is approximately 1600 ft. long and 600 ft. wide, covering 23 acres, and is said to be the largest building in the world under one continuous roof. The accompanying half-tone engraving will give an idea of the structure, but the different furnaces are sufficiently far in the background to make it inconvenient to attempt to explain the steps in the interesting process or to indicate the compact arrangement of the 12 lap-weld furnaces and six butt-weld furnaces in the building.

On Thursday evening was held the formal reception and dance, which took place in the Hotel Schenley.

On Friday afternoon, following the steel works session of Friday morning, a large party went to the Duquesne works of the Carnegie Steel Company, and a still larger party went to the works of the Mesta Machine Company at West Homestead. Special booklets and special transportation facilities were provided for both these trips.

Duquesne Works, Carnegie Steel Company.—The visit to the Duquesne works, with its 181.5 acres of ground area, its 9.31 miles of narrow-gauge and 37.56 miles of standard gauge works' railroads and its six gigantic blast furnaces, was specially interesting in the opportunity to see the blast furnace gas purifying system and the four 3600-hp. blast furnace-gas blowing engines, as well as two 2000-kw. gas-driven electric generating units in one of the power stations. The open-hearth plant, the rolling mills and the merchant bar department were inspected in turn.

Mesta Machine Company.—The visitors to the Mesta works had the advantage of seeing at one and the same time a model industrial establishment, with its steel, brick and concrete fireproof buildings, the steam-hydraulic press for forging work, discussed at the Friday morning session, and a large amount of work of gigantic size being turned out. The principal product of the works is machinery for steel mills, blast furnaces and power plants, including gas and steam engines, air compressors, rolls and gears up to 24 ft. in diameter.

A smoker and entertainment, given by the Engineers' Society of Western Pennsylvania, on Friday evening, at the Union Club in the Frick Building, closed the Pittsburgh meeting. The central feature was a humorous address by George H. Neilson on "A Near History of Crucible Steel." Brief addresses were made by E. M. Herr, chairman of the local committee; Elmer K. Hiles, secretary, and by President Meier and Secretary Rice, of the American Society of Mechanical Engineers, and others.

The entertainment of the ladies was complete. It included visits to institutions of national reputation and extended automobile trips. The boat excursion on the Monongahela River has already been referred to. The ladies' committee was headed by Mrs. Chester B. Albree.

In connection with the gas power section a booklet containing an abridged description of the principal gas power installations in the Pittsburgh district and of the Pittsburgh natural gas supply and government producer experiments was issued. It gave data of permanent value whether the different plants could all be visited or not. In addition to this was prepared a handbook of the meeting, calculated to describe Pittsburgh in points of its historical and engineering attractions. It comprised 56 pages of illustrations and descriptions and maps of Pittsburgh and the Pittsburgh district.

The Corrosion of Iron*

The Influence of Impurities

BY JOHN W. COBB, FARNLEY, LEEDS.

To the working metallurgist iron is not a chemical unit, but declares itself unmistakably a complex in every sample under the microscope. A study of the corrosion of iron may therefore be specially directed to the influence of its various and visible components, with a prospect of obtaining interesting and useful results. The conditions of rusting in any metal fall into the following categories:

1. The initiation of the corrosion of a pure metal, such as a (hypothetically) chemically, physically and electrically homogeneous iron, in a pure and homogeneous medium, such as pure dry air or pure water.

2. The initiation of corrosion of a pure metal in a medium not pure or not homogeneous, such as pure iron in ordinary air, water or both.

3. The initiation of corrosion of an impure metal in a pure medium, such as commercial iron in pure water or pure dry air.

4. The initiation of corrosion of an impure metal in an impure medium, such as commercial iron in ordinary air or water, or both.

In each case another set of conditions arises, not necessarily the same, or even similar, as those of the continuance

of corrosion after initiation. The number of sets of conditions is evidently large, and a complete solution of the problem difficult. Thus the work of W. H. Walker, J. N. Friend and Lambert and Thomson, to mention some of the most recent investigations only, has shown how difficult it is to come to a final conclusion as to whether water without carbon dioxide corrodes iron, although it may be said to be generally admitted now that carefully prepared pure iron and water interact, if at all, to a minimal extent.

The author, who accepts the "electrolytic" views, has limited his inquiry to the influence of the various impurities of commercial iron on corrosion, any constituent other than iron being termed an impurity. For this purpose the very useful "ferroxyl" indicator of Walker and Cushman was employed, and a study was made of the following:

1. The color and electrical effects between iron and separate impurities, such as sulphides, phosphides and silicates.

2. The same effects between iron and steel pieces in electrical communication.

3. The behavior of iron, steel and impurities together and separately in the ferroxyl indicator as disclosed by observation under the microscope.

The indicator was made by neutralizing an aqueous solution of gelatin, which would just set on cooling, with caustic soda, and adding a little potassium ferricyanide and phenolphthalein.

A Summary of Results

The work may be summarized thus:

1. The results are interpreted on the electrolytic theory of corrosion as elaborated by W. H. Walker, Cushman and others. Thus the initiation of the corrosion of iron is regarded as depending on the actual contact of pure iron and a conducting impurity immersed in or connected by an electrolyte, which may be only a thin film. Continuance of corrosion necessitates further the escape or oxidation of the polarizing film of hydrogen, and also that the iron compound formed by initial corrosion on the metallic iron should not be an impervious and non-conducting covering.

2. Pure iron is definitely electro-positive to most of its impurities; that is, a current is found to flow through the liquid from iron to impurity, the iron going into combination with some substance in the liquid, and the impurity remaining undissolved. Among such impurities were found phosphide, sulphide, carbide, oxide and silicate of iron. With carbon (graphite) the effects were particularly marked. All the iron alloys tried (except ferromanganese) were also electro-negative to pure iron.

3. With the sulphide and silicate of manganese little or no current flowed, because both were non-conducting. Manganese and 80 per cent. ferromanganese were found definitely electro-positive to iron, manganese going into solution, while iron remained undissolved.

4. Every piece of commercial iron showed electrical effects with any other, and the effects between portions of the same piece were always sufficient to induce corrosion when the other conditions were satisfied.

5. Microscopic examination disclosed the same general action before noted as occurring between iron and its impurities; the iron went into solution around the impurity. Manganese sulphide on iron went into solution, and the iron also, while with manganese silicate and iron neither was attacked. Manganese and ferromanganese went into solution on iron, which was unattacked, and even preserved.

6. The presence of an impurity determines so many corrosion centers for iron, and so its influence depends more on quality and distribution than quantity; thus a more homogeneous iron, even if chemically less pure, may be more highly resistant to corrosion.

7. Certain rapidly appearing corrosion centers in all irons examined were not visibly related to impurities recognized under the microscope.

That illuminating engineering service is a recognized assistance which those investigating artificial lighting may be expected to look for is indicated by the joint announcement of the Westinghouse Lamp Company, Bloomfield, N. J., and the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., that Norman Macbeth has been placed at the head of a new department for the companies, the illuminating engineering department, for consultation and for issuing plans and specifications for lighting projects.

*Presented to the Iron and Steel Institute, London, May 10-11, 1911.

Automatic Temperature Controlling Instrument

A New Device for Hardening and Annealing Furnaces

BY E. F. LAKE, BAYONNE, N. J.

The natural growth of machinery and machine tools has created a demand for finer and finer work as time progressed. Thus we find to-day that pieces must be made within 0.001 in. of the correct size that some years ago were good enough if they were within 0.03125 in. of size. This difference in the quality of the various parts has resulted in a demand on the hardener for better and closer work.

To get the work closer to size and truer to shape in the hardening room has created a demand for furnaces and instruments with which the work can be done. Where a few years ago the forge fire was considered the only essential for a hardening room, to-day we have muffle, oven, revolving retort, lead and salt baths, hardening, annealing and tempering furnaces; hot plates, etc. These are heated with fuel oil, gas and electricity, and have various kinds of pyrometers or other instruments for measuring, indicating and recording their temperatures.

With all of the improved apparatus, however, it has been difficult heretofore to keep the temperature of the furnace, in which the steels are heated within many degrees of the correct one for hardening. When done it required the constant watching of the valves and the burners by the operator, and a continual turning of them to regulate the heat properly and hold it at the desired temperature. This was usually all one man could do while watching the heat indicated by the pyrometer.

After spending many years investigating, experiment-

correctly was developed. Many have attempted the feat, but the various instruments that have been designed by others have retarded the action of the pyrometer indicator, and consequently destroyed the correctness of its readings. This new instrument has overcome all of the troubles encountered by others by using a mechanism that is very ingenious. Even though it appears complicated and delicate, its design and the principle on which it works are such that the various parts have no cause to wear quickly or get out of order. In no way does it retard the travel of the indicator pointer of the pyrometer, to which it is attached.

In designing this instrument several conditions had to be met. First, it was found that for accurate control it was necessary to have a fire end and pyrometer with which

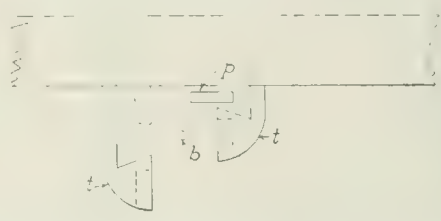


Fig. 2.—Sketch Showing Movement of Arm Extensions.

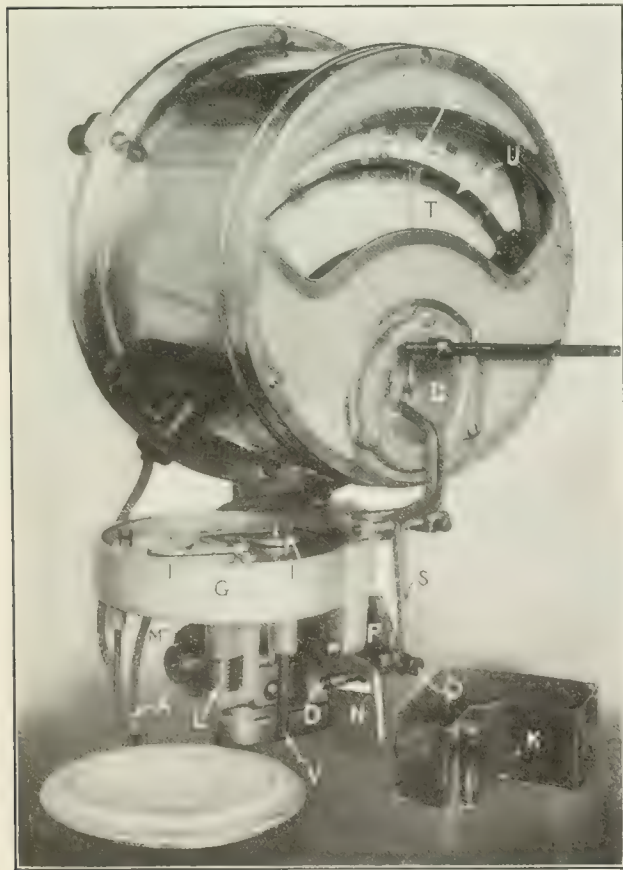


Fig. 1.—The Operating Mechanism Attached to the Pyrometer Indicator.

to indicate the heat. The pointer on the dial must, therefore, be the objective point on which to start the design of the instrument. As this continually travels back and forth with the rise and fall of the temperature inside the furnace, it was rather difficult to devise a way to make it operate a mechanism that was strong enough to open and close the gas and the air valves through which the fuel passes to the burners that supply the heat to the furnace. This must be done to increase and decrease the heat when necessary, and it must be done without retarding the action of the pointer. To retard it would ruin the instrument by making the temperature readings unreliable.

That this has been successfully accomplished will be plainly seen by a close examination of the mechanism of the instrument, which consists of two separate and distinct parts. One of these is attached to the pyrometer indicator, as shown in Fig. 1, and the other to the furnace, as shown in Fig. 5. As it is necessary to have an air supply to run furnaces of this kind, it can easily be piped to the instrument, and with very little cost.

In Fig. 1 the wires shown at A connect the thermocouple or hot end to the pyrometer indicator. By turning the knob B, Fig. 4, the threaded end C, Fig. 1, of the rod is operated and revolves the cup D to make the pointer E point to the temperature at which it is desired to hold the furnace for hardening the work.

Power is obtained to operate the instrument through a current of air that enters from the back of the instrument and passes through the port F, Fig. 3. This enters the chamber G, strikes the blades of the turbine H and causes it to revolve, its speed being controlled by two governors, I. The cover J and the oil pan K were removed in Fig. 1 to show the operating mechanism better. When the air revolves the turbine H, Fig. 3, it also rotates the worm L, which is attached thereto, and this in turn revolves the worm gear M. This moves the piece N in and out as its inner end is fastened to the far end of the shaft on which the worm gear M is located. The piece N forces out the rod O, and this simultaneously turns the two cams P partly over and moves out the rod Q. The two cams are attached to each other, and this movement reverses the action of the arms S: i. e., stops the arm that has been oscillating and sets in motion the opposite one. The rod Q slides back and forth in the opening R and this movement

ing and testing, the American Gas Furnace Company, Elizabeth, N. J., has perfected and placed upon the market an instrument that will automatically control, within 5 deg. either way from the desired temperature the heat of any furnace using gas for fuel. While this statement may appear simple on its face, a great deal of experimental work had to be done before an instrument that would operate

opens and closes ports that allow the current of air to either pass into the atmosphere or into the part of the instrument that is attached to the furnace, Fig. 5. It thus furnishes the power to open and close the gas and the air ports. Of the two arms S, Fig. 3, that ride on the cams P, one is constantly oscillating in and out by its lower end

right arm extension also has the same range of motion and is oscillating in and out of the slot in the indicator dial. When the temperature has risen sufficiently for the indicator pointer *b* to reach the position shown, the right arm extension *t* presses the indicator pointer against the dial, as shown. This trips and throws the cam *p* over to a

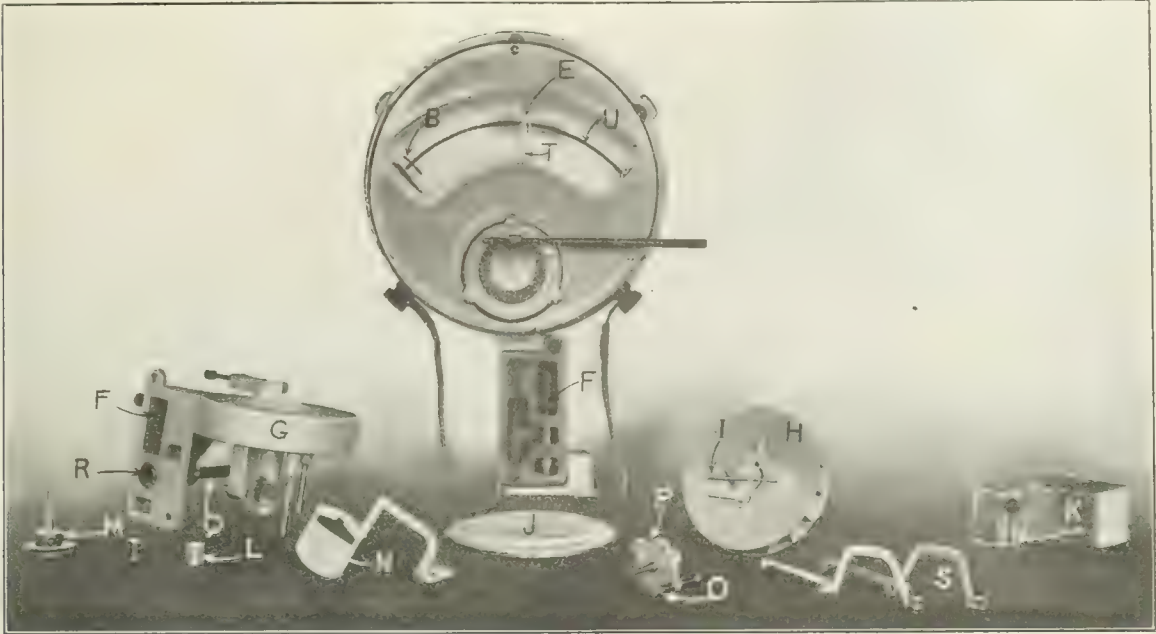


Fig. 3.—View of the Various Parts of the Operating Mechanism.

entering and leaving the depression in its respective cam. When starting the furnace the right-hand arm extension *T* is the one that oscillates in and out of the slot *U* on the indicator dial. The oil pan *K* fits on the pin *F* and covers the worm and worm gear so that these may be kept running in oil by filling the pan *K*.

The Operation of the Instrument

In starting up the furnace the gas and the air valves are turned on full and the temperature starts to rise. The left

different position. The cam then forces the right arm extension out to the stationary position shown by the left arm extension and starts the latter oscillating.

The gripping of the pointer is only momentary, and when the arm extension is thrown back to the stationary position it leaves the pyrometer pointer free to travel to the right and take care of any lag that occurs. This motion also transmits power to the lower part of the apparatus and thus closes the gas and the air ports that supply fuel to the furnace for heating. As the furnace cools the indicator pointer *b* travels backward to record

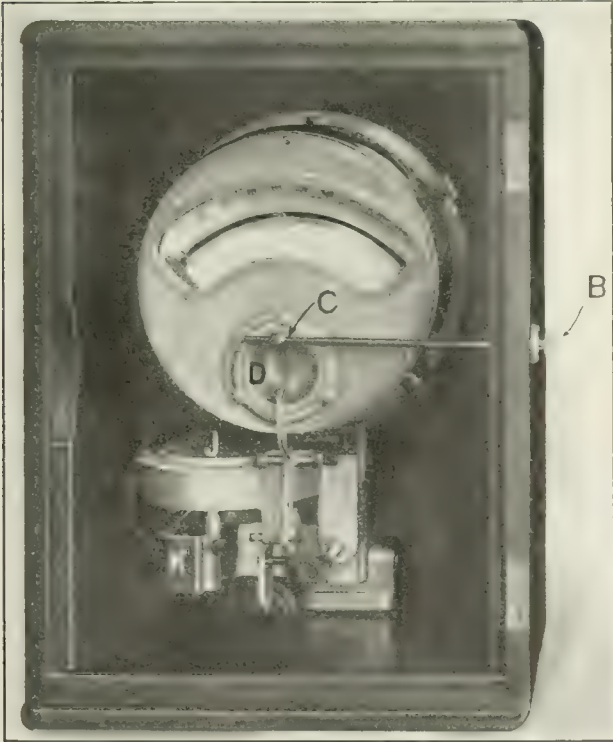


Fig. 4.—The Mechanism Assembled in the Case.



Fig. 5.—The Operating Mechanism Installed in Connection with a Furnace.

arm extension *t* is then stationary in the position shown Fig. 2, which is a view looking down on the instrument from above. When in motion it has the range shown from that position to the one indicated by the dotted line. The

the lower temperatures, and in so doing left arm extension *t* will grip it, trip and move back to the stationary position and the right arm extension *t* will start oscillating.

Thus it will be seen that there is no retardation of the

action of the pyrometer indicator B, Fig. 3, as the arms merely grip it against the dial for an instant and then release it. This instant of gripping throws the switch

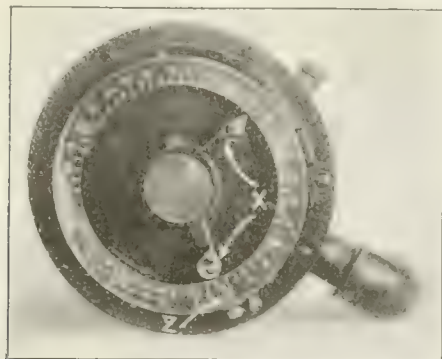


Fig. 6.—The Dial and the Pointers of the Mechanism.

that turns the gas and the air on and off and either reduces the temperature in the furnace or raises it. By this action it is very easy to control the temperature within a range of 10 deg. F. or within 5 deg. either way of the required temperature and maintain the furnace temperature constant at this point throughout the day.

The above described movements of the instrument open and close ports that control an air current that passes from this part of the instrument through a $\frac{1}{4}$ -in. pipe, A', to the lower part shown in Fig. 5. The air coming through this pipe enters a diaphragm located in the casting V and raises a sleeve in the cylinder W. This sleeve contains ports opposite each gas and air inlet, and these are opened when the sleeve raises. When the air current is shut off from above the sleeve drops and the ports are closed. The distances that the ports can be opened and closed are regulated by levers, X. The dial on which these levers move and the levers are best shown in Fig. 6.

These levers merely open or close the space in which the pin Y, Fig. 5, travels by screwing the rings, to which they are attached, up or down on the threaded hub. This pin is attached to the sleeve that operates in the cylinder

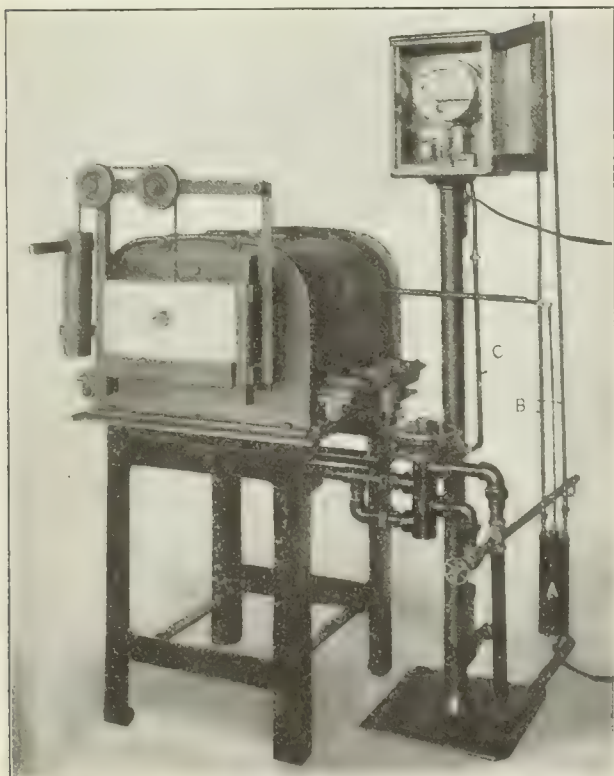


Fig. 7.—The Complete Instrument Connected to a Furnace and Ready to Operate.

W. and contains the ports that shut off or admit the gas and the air. Thus the maximum distance that the ports can be opened is reached when the pin Y strikes the upper

ring and the minimum distance when it strikes the lower one. The position in which these levers X are usually placed when holding a furnace at a hardening temperature of about 1450 deg. is shown by their position in Fig. 6. The pointer Z is merely used to show the position at which the lever on the lower ring was set, so that the furnace may be shut down and started up again the next morning without any experimenting. The lever X that is located at the pointer Z registers the lowest point of the opening of the ports in the sleeve in the cylinder Y, Fig. 5, while the second lever X is turned to register the maximum opening.

In Fig. 7 the complete instrument is shown as it is attached to a furnace that is set up ready to operate. The door of the pyrometer indicator is thrown open to get a better view of the mechanism. This door is provided with a key, and thus the instrument may be set at

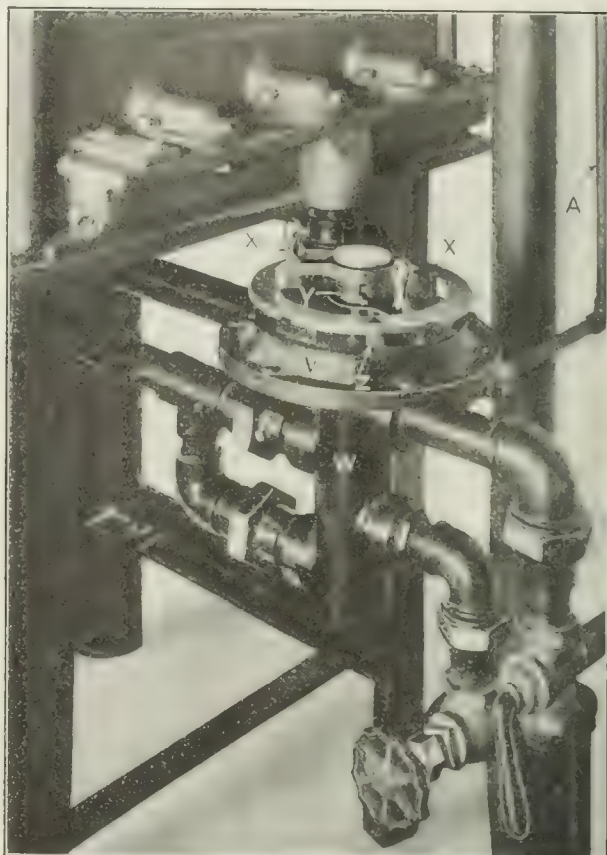


Fig. 8.—Two Instruments in Daily Use for Over Two Years at the Plant of the American Swiss File & Tool Works, Elizabeth, N. J.

any temperature and the door locked so it will not be tampered with or changed until the work being heat-treated in the furnace requires a change. The fire end and the indicator are of the Bristol type of pyrometer. The wires from the fire end are run through the tank A, in which a circulation of cool water is maintained by the pipes B. This cools the wires and prevents any heat from traveling along them from the furnace to the pyrometer indicator and thus give a false reading. The pipe C is the one through which the air travels from the indicator mechanism to the diaphragm to operate the slide valve for gas and air. After the valves have once been opened to supply the furnace and the instrument with the necessary power and fuel it is not necessary to touch them again, as the instrument automatically turns, both the air and the gas, off and on when it is necessary. The only reason, therefore, for touching the globe valves would be for making any necessary repairs.

Results in Service

Before placing these instruments on the market the American Gas Furnace Company placed three in the American Swiss File and Tool Company's plant at Elizabethport, N. J. Two of these have been in daily use for hardening files, and the hardeners say they would not know how to get along without them. It has greatly reduced the losses caused from non-uniformity in the harden-

ing temperatures, and it is possible to obtain a much more uniform product in the run of 1000 dozen files. In this case one man hardens many dozens in a day and a uniform temperature throughout the day is of vital importance, as each file must be the equal of any of the others.

On some of the thinner files it has been found that a variation of 10 deg. in the hardening temperature would cause the file to be thrown out as useless. This is due to the fact that too high a temperature would cause them to be very brittle and break. Owing to their thinness the high temperature would not leave the center as soft as would make it tough enough to withstand the strains put upon it, while too low a temperature would not give the edge of the teeth a hardness that would withstand the cutting strain put upon them. Before attaching and using the temperature regulating instrument some 130 dozen files in a lot of 1000 dozen were thrown out and condemned, while after the instrument was put in the losses were reduced to about six dozen per thousand dozen.

In the hardening of any piece of which duplicate parts are made it can readily be seen that an instrument of this kind is very applicable and had been badly needed for some time. With it the pyrometer can be set to a certain temperature for the day's work of hardening, the furnace heated up to that temperature, and after this, the hardening can be started with the assurance that the temperature will remain constant unless the fire end gets out of order or something breaks down.

Since putting the instruments in the file works it has been improved somewhat, and the instrument shown in Fig. 7 is slightly different from those in Figs. 8 and 9. The principles on which they operate are the same, however, and one would have to have the instruments side by side to see the difference between the one shown in Fig. 7 and that in Fig. 8.

In Fig. 9 is shown an instrument that has been connected up to two annealing furnaces. To use it on either furnace it is only necessary to change the fire end, with its water cooling tank. This instrument has been in use for three years, and is the first one of the kind that was made. It has proved very successful, however, and has been in constant use since it was installed, and even though the instrument may appear to be delicate this one has never been repaired in any way, and stands to-day just as it did when it was installed.

It would not be much of a task to attach a clock movement to the threaded rod C, Fig. 1, which sets the pointer E to the temperature desired in the furnace, and thus gradually lower the temperature to make the annealing furnaces slow cooling. This could be regulated to cool the furnace off as slowly or quickly as desired. One of the greatest needs in the heat treating of steel is a reliable slow cooling annealing furnace that will work entirely automatically. With a clock arrangement attached to this instrument it would seem to be the ideal mechanism for that purpose. Many uses can also be found for the

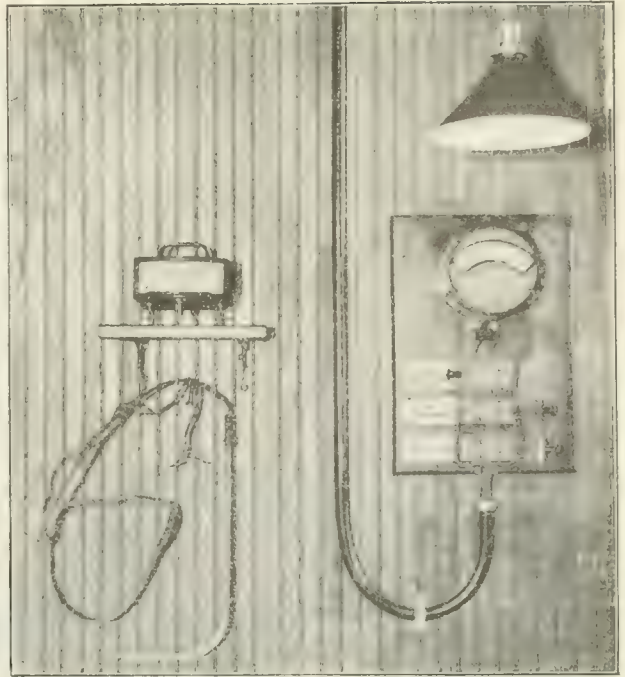


Fig. 10.—The Indicator Used in the Office.

instrument on hardening and tempering furnaces as well as annealing, and in view of the fact that absolute accuracy is required in all heat treating operations it is, no doubt, a fact that this instrument, or instruments of this kind, will be much more used in the future.

That it does not in any way complicate or prevent the operation of pyrometers of different makes is shown by the apparatus in Fig. 10. The instrument to the right under the incandescent lamp is a pyrometer indicator that is wired to the lead-hardening furnaces and annealing furnaces shown in Figs. 8 and 9. This is located in the superintendent's office at some distance from the furnaces, so that the superintendent may always know what temperature the different furnaces are running at by merely throwing in the switch that connects it to the individual furnace to be inspected. In this case the switch for the small hardening furnace was thrown in and the pointer indicated the temperature at which it was then running, namely, 1450 deg. F. The instrument to the left is a Thwing pyrometer that is used for testing the other pyrometers to see that they are indicating properly. This is carried to the various furnaces and the hot end, shown hanging on a hook under the pyrometer, is inserted in each furnace to get its temperature and compare it with the one attached to the furnace.

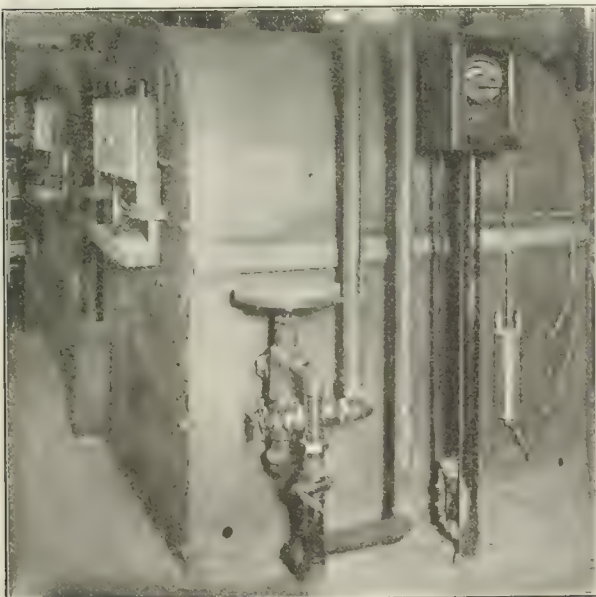


Fig. 9. An Installation of the Instrument in Connection with Two Annealing Furnaces.

Russian Pig Iron Soaring.—According to Consul John H. Grout, Odessa, Russia, information received from Nicolaief is to the effect that the recent organization of the syndicate to control the pig-iron market in South Russia is being seriously felt by consumers, all being short of raw material. Prices of pig iron have advanced to what is considered to be an absurd price. Where the former quotation was 22½ cents per pood (36 lb.), equal to \$14 per ton, present prices have reached 51½ cents, or \$32 per ton, and even at this price it is very difficult to obtain deliveries on time. It is stated that the members of the syndicate are storing up large quantities of pig iron to further enhance prices. On account of advanced prices of raw iron, those for agricultural implements have been raised all along the line. To counteract this condition of affairs, owing to the intercession of manufacturers interested, it is said that the government authorities contemplate admitting 10,000,000 poods (160,000 tons) of foreign pig iron at reduced rates of duty.

The Long Island Hardware Company has been incorporated with a capital stock of \$25,000 to conduct a wholesale business in factory, contractors' and railroad supplies at 71-77 Jackson avenue, Long Island City, N. Y. F. A. Scholl, formerly with Topping Brothers, New York City, is president and treasurer, and the secretary, C. F. Williams, was formerly connected with John W. Petrey, of Long Island City.

By-Product Coke Ovens in America

The following list of by-product coking plants, compiled by the United States Geological Survey, is believed to embrace practically all that have been installed to date in the United States and Canada:

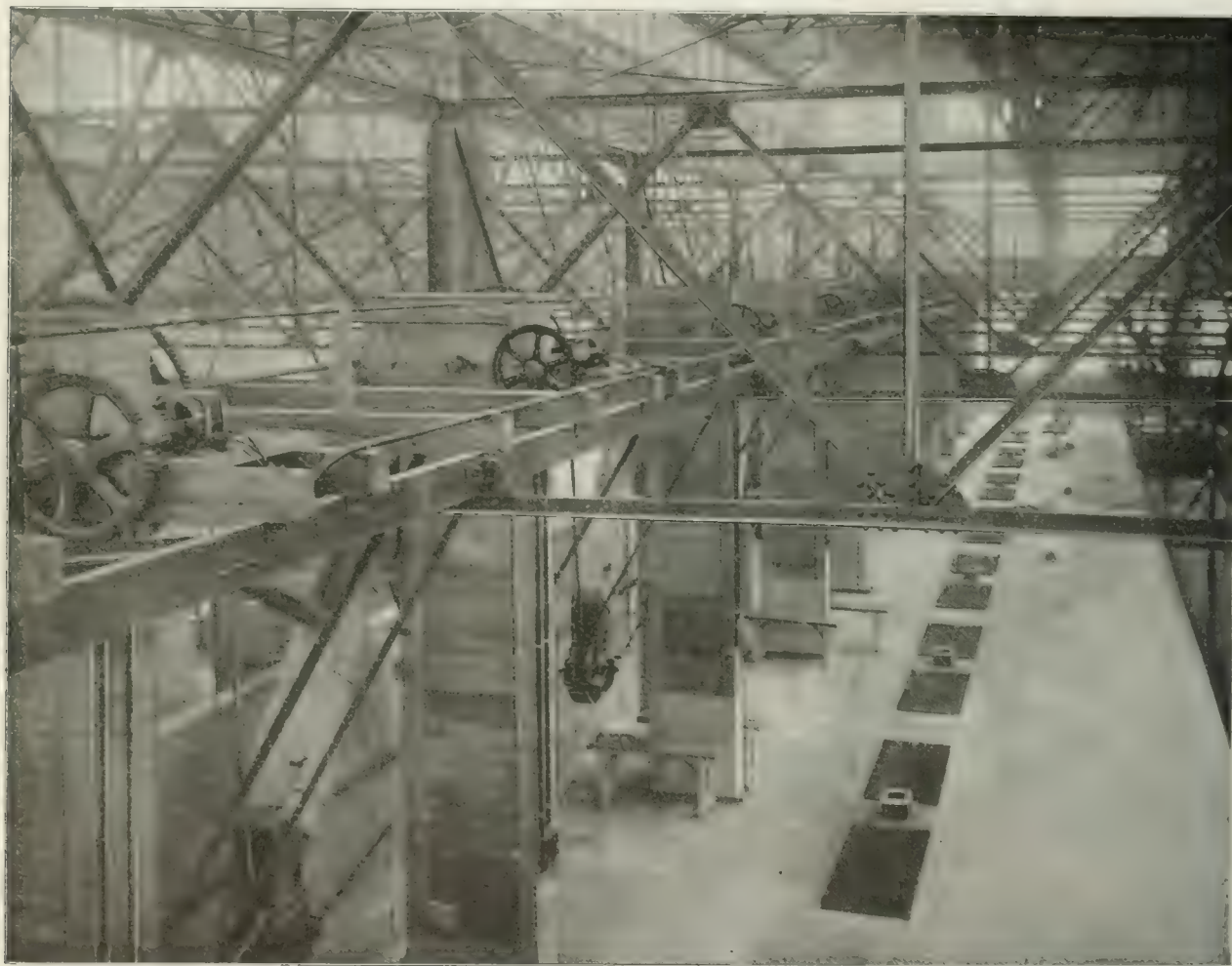
Plant	No. of Ovens
Lackawanna Steel Company, Lackawanna, N. Y.	50
Camden Coke Company, Camden, N. J.	50
Cambria Steel Company, South Star, Pa.	50
Cambria Steel Company, First Ward, Pa.	50
Maryland Steel Company, Sparrows Point, Md.	200
Hamilton Otto Coke Company, Hamilton, Ohio	50
United Gas Company, Indianapolis, Ind.	50
Michigan Alkali Company, Wyandotte, Mich.	50
Zenith Furnace Company, Duluth, Minn.	30
<i>Otto-Hoffman</i>	
Dominion Steel Corporation, Sydney, N. S.	500
New England Gas & Coke Company, Tyngton, Mass.	500
Camden Coke Company, Camden, N. J.	100
United Coke & Gas Company, Glassport, Pa.	120
Cambria Steel Company, Johnstown, Pa.	60
Lackawanna Iron & Steel Company, Lackawanna, Pa.	30
Hamilton Otto Coke Company, Hamilton, O.	50

Of the 13 plants of Semet-Solvay ovens in the United States, two are owned by the Solvay Process Company and the others are operated by the Semet-Solvay Company, the coke produced being turned over to the company whose name appears as owner. Tar and ammonia are recovered as by-products from all of the plants in the above table, except that of the Nova Scotia Steel & Coal Company.

Handling Sand in the Foundry

Sand Elevating Equipment to Hoppers Discharging to Molding Machines on the Foundry's Second Floor

Molding machines located on what is substantially the second floor of the foundry, a sand handling floor under-



View in Foundry of the General Fire Extinguisher Company, Auburn, R. I., Showing the Jeffrey Bucket Conveyors Delivering Sand to Molding Machines and the Floor Gratings Through Which Sand After Casting Is Dumped.

<i>Semet-Solvay</i>	
Solvay Process Company, Syracuse, N. Y.	40
Empire Coke Company, Geneva, N. Y.	46
Dunbar Furnace Company, Dunbar, Pa.	110
Suburban Gas & Electric Company, Chester, Pa.	40
F. H. Buhl Coke Works, Sharon, Pa.	25
Pennsylvania Steel Company, Lebanon, Pa.	90
Pennsylvania Steel Company, Steelton, Pa.	120
National Tube Company, Benwood, W. Va.	120
Tennessee Coal, Iron & Railroad Company, Ensley, Ala.	240
Central Iron & Coal Company, Tuscaloosa, Ala.	40
By-Products Coke Corporation, South Chicago, Ill.	200
Milwaukee Coke & Gas Company, Milwaukee, Wis.	160
Solvay Process Company, Delray, Mich.	132
People's Heat & Light Company, Halifax, N. S.	10
<i>Rothberg</i>	
Lackawanna Steel Company, Lackawanna, N. Y.	282
Lackawanna Iron & Steel Company, Lebanon, Pa.	5
Retort Coke Oven Company, Cleveland, Ohio	105
<i>Didier</i>	
Lehigh Coke Company, South Bethlehem, Pa.	4300
<i>Koppers</i>	
Illinois Steel Company, Gary, Ind.	560
Illinois Steel Company, Joliet, Ill.	280
<i>Van Dine</i>	
Nova Scotia Steel & Coal Company, Sidney Mines, N. S.	50
<i>Bernard</i>	
Nova Scotia Steel & Coal Company, Sidney Mines, N. S.	120
Total	6,035

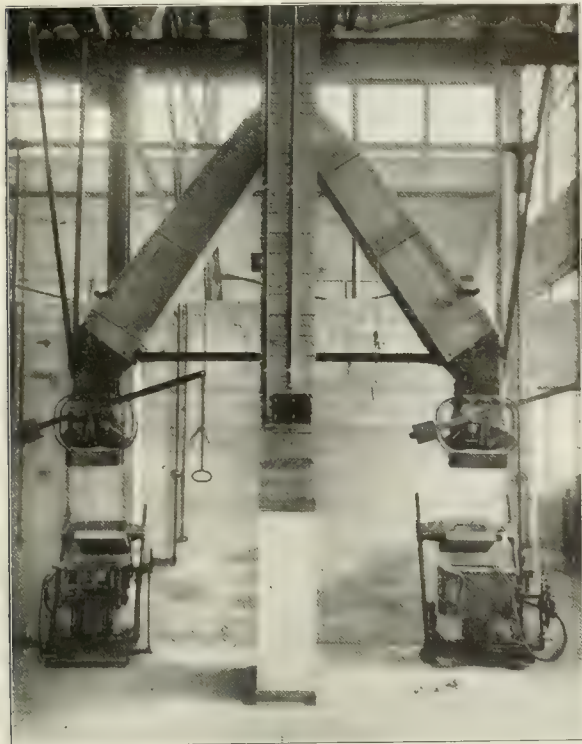
*Contracted for; 188 completed.

†Under construction.

neath to which the sand is discharged after a heat and which is on a level with the yard; a system of elevators for lifting the sand and storing it for use in hoppers above the molding machines, describes briefly an unusually interesting equipment installed at Auburn, R. I., in the foundry of the General Fire Extinguisher Company. It represents an instructive study of the mechanical handling of material, and the elevators and incidental machinery were installed by the Jeffrey Mfg. Company, Columbus, Ohio.

A part of the installation may be seen in the large half-tone engraving, which shows nine of the seventeen bucket elevators, which lift the sand from the floor below to the hoppers. The remaining eight buckets are located at the right side and are not shown in the picture. Another view shows how each elevator discharges into a pair of sand hoppers, directly beneath the clamshell valves of which is located a molding machine in each case. The man operating these machines opens the valve, letting the necessary amount of sand drop by gravity to the machine, thereby not only cutting down the labor in the making of the molds but doing away with the loss of space ordinarily occupied by piles of sand on the molding floor.

The molding floor, as stated, is what may be termed the second floor of the building, as the first floor, or basement, is on the same grade as the surrounding yard, and



Molding Machine Sand Hoppers of System Installed by the Jeffrey Mfg. Company, Columbus, Ohio.

arrangement which allows for convenient carting of the molding sand. The molding sand from the yard is dumped in piles on the basement floor as indicated in one of the illustrations.

The operation of the system is briefly as follows: The sand on the basement floor is shoveled into the receiving

means of gears, as shown in the large engraving. While the elevators are incased with wood, the sand hoppers are of steel.

After the molds are complete, they are placed on the floor, and after the heat the castings are knocked out of the sand and the sand is dropped through the gratings in the molding floor, indicated in the large view. On reaching the basement, the sand is screened and tempered and ready to be elevated to the hoppers for use a second time.

It is learned from the Jeffrey Mfg. Company that a similar equipment has been supplied to the General Electric Company in its foundry at Pittsfield, Mass.

The Detroit Industrial Exposition.—The Board of Commerce of Detroit, Mich., is making elaborate preparations for an industrial exposition, which will be open from June 20 to July 6. Wayne Pavilion, the most spacious auditorium of the city, will be occupied, together with a temporary structure, covering adjacent property. A total floor area of 45,000 sq. ft. will thus be provided. The temporary hall is constructed of wood and staff, of attractive design. Detroit is one of the most interesting of the American industrial cities. The growth of its manufacturing business has been phenomenal, not only with the automobile builders and makers of automobile accessories, but in a large variety of other lines. The list of products is exceptionally varied. The directory of exhibitors has just been issued in an attractive pamphlet.

An American Sheet & Tin Plate Company Announcement

Consumers of black and galvanized iron and steel sheets are interested in an announcement made by the American Sheet & Tin Plate Company. This company has always discredited the accelerated acid test as a measure of corrosion, in which attitude it has been supported by the majority of sheet manufacturers, as well as by practically all eminent metallurgists; and this attitude it still maintains. The use of this test has grown in the last few years, and, notwithstanding the opinion of the large manufacturers and of eminent metallurgists, it is used to a great extent by railroad engineers, architects and others. To meet this special requirement, the American Sheet & Tin Plate Company has developed a material possessing all the good qualities of its famous Apollo best bloom and at the same time having the added qualification of fully meeting the accelerated acid test; or, more plainly speaking, being less soluble in acid than any iron or steel sheets heretofore placed on the market.

The accelerated acid test is presumed by many to be a direct measure of corrosion. In reality it is simply a measure of solubility of metals in sulphuric acid of a stipulated degree of strength, and it has been the contention of this company that no relationship existed between this test and corrosion under normal or atmospheric conditions. This acid test has been associated in the minds of many with, and apparently carried with it, the idea of exceptional purity; the usual metalloids being considered in this connection as impurities. The fact that this material possesses with it all the good features of Apollo best bloom is a strong recommendation of its efficiency to the discriminating purchaser.



View in Foundry Basement at Foot of Sand Elevators and Below Molding Floor Gratings.

hoppers and the sand is elevated and discharged to the bifurcated hoppers above the machines. Each hopper has a capacity of about 1000 lb. of sand. The clamshell valves allow for regulating the discharge of the sand to the machine. Each elevator has a rated capacity of about 10 tons per hour and the power is applied to each elevator by a separate motor directly connected to the head by

The Ducharme Wrench & Machine Company, Cambridge, Ohio, has been delayed in completing its new plant, but indications point to the machinery being erected and ready for operation by the end of June. The company removed from Johnstown, Pa., to secure larger quarters for the manufacture of a patented pipe vise, pipe wrench, etc.

Combined Jarring and Squeezer Molding Machine

A new type of combined jarring and squeezer molding machine has been placed on the market by the A. Buch's Sons Company, Elizabethtown, Pa. The special features of it are simplicity of construction, ease of operation, no great installing expense and mechanical preparation of the molds. The field for which it is especially adapted is

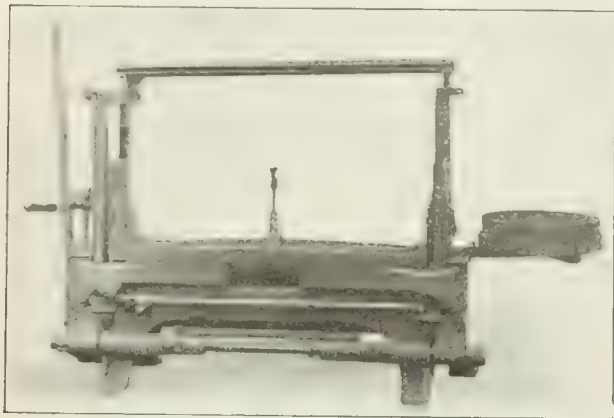


Fig. 1.—A New Type of Jarring and Squeezer Molding Machine Made by the A. Buch's Sons Company, Elizabethtown, Pa.

molding patterns for deep work, such as piston rings and other automobile parts. Fig. 1 is a general view of the machine, while Fig 2 shows the snap flask used with it.

The machine is very simple in construction and unskilled laborers can learn to operate it quickly and turn out molds usually made by hand on the bench rapidly. It is said that as the process of making the molds is entirely mechanical very accurate castings are secured. Combining the jarring or jolting process with the squeezing attachment does away with hand ramming even on deep

stands between them and in this way the exertion of bending over to close the molds is eliminated. No elaborate outlay is required to install the machine and it is simply

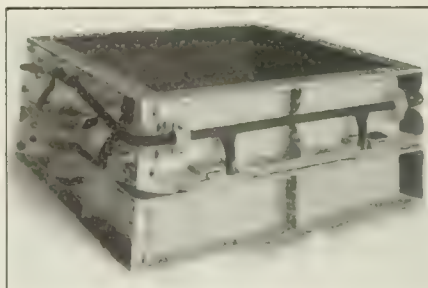


Fig. 2.—The Aluminum Snap Flasks Used with the Machine.

necessary to place it on a level and hard foundation to utilize the full force of the jolt. Two sizes of machine are built, one handling any flask up to and including 12 x 18 in. and the other size accommodates a flask having maximum dimensions of 16 x 24 in.

A special design of aluminum snap flask, which is shown in Fig. 2, has also been brought out for use in connection with the machine. These can be supplied either tapered and cast in one piece or as a straight hinged flask, which it is claimed will outlast at least 12 of the ordinary wooden pattern.

Combination Turret Lathe

New Warner & Swasey Machine Tool, Handling Both Bar Stock and Forgings

A new combination turret lathe designed to accommodate a wide range of bar stock work and also forgings is being brought out by the Warner & Swasey Company,

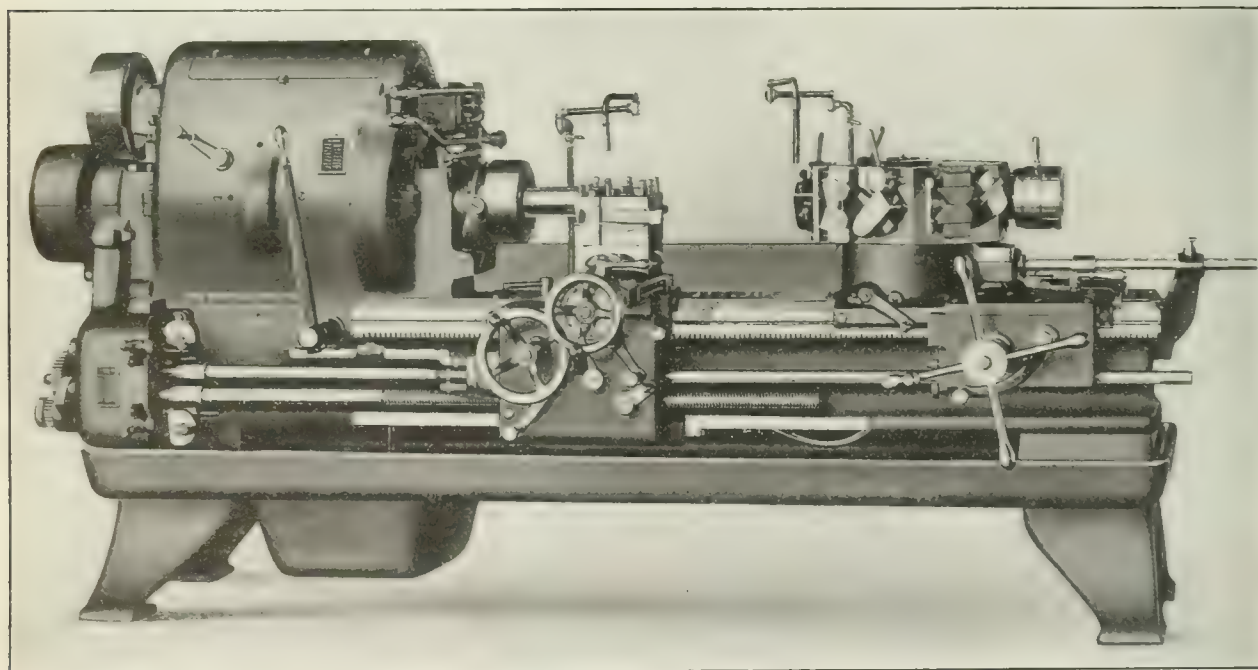


Fig. 1.—The New Combination Hollow Hexagon Turret Lathe with Single Pulley Drive and Equipped for Bar Work Built by the Warner & Swasey Company, Cleveland, Ohio.

flasks having irregular patterns. In addition to the making of deep patterns the machine is especially adapted for the ramming of deep, delicate green sand cores and on account of the jolting process it is impossible to ram off, something which is said to be very difficult to overcome on an ordinary machine of the squeezer type.

Either plate or loose patterns mounted in a composition can be used on the machine and the cope and the drag are made simultaneously. The degree of hardness of either part of the pattern can be varied to suit the requirements of any particular case. The molds are thrown from the machine in such a position that it is very easy for the operator to close them. In operating the machine he

Cleveland, Ohio. The builder has given this tool the trade designation of the No. 3A hollow hexagon turret lathe. It is claimed for the machine that it combines the highest development of a bar machine with the same standard of one employed for chucking work, and while it is intended to meet every requirement as a manufacturing tool of the highest class for either of these kinds of work, its range, capacity and equipment are such as to make it available for the economical production in small lots of a great variety of bar and chucking work. When equipped as shown in Fig. 1 bar stock up to 3½ in. in diameter can be fed through the automatic chuck and turned any length up to 36 in. at one chucking. With

the chucking outfit illustrated in Fig. 2 castings or forgings up to 15 in. in diameter can be handled. The swing over the bed is 23 in. and that over the carriage is 17½ in. This is a powerful machine of large capacity designed for the rapid, accurate and continuous production of duplicate parts.

Two important features in the design of this machine are the rigidity and the simplicity of construction of the entire tool and especially of the geared head. The machine is built with either the cone or single pulley drive, the latter being the type illustrated. The head and the bed are cast in one piece, insuring great strength and rigidity. The cone pulley head type of machine has a three-step pulley, the diameter of the largest step being 16¾ in., and is driven by a 4-in. belt. The single pulley drive machine is equipped with a 12-in. pulley having a face wide enough for a 4-in. belt. Two double friction clutches mounted on the back gear shaft give the spindle twelve speed changes in combination with the cone pulley ranging in approximately geometrical progression from 8 to 231 r.p.m., and in the single pulley machine the same speed range is provided. Three speed changes are obtained by sliding gears in the head operated by the small lever in front. These three speed changes are doubled by the two friction clutches on the back gear shaft, which are operated by the two lower levers to the right of the head. The upper lever operates the friction reversing clutch. The levers are so placed that they are within easy reach. The automatic chuck and the roller feed handle round, square and hexagonal bar stock. The chuck is operated by the long lever in front of the head, and this same lever also engages and disengages the power roller

turret for holding four single point tools, which can also be equipped with forming tools. The 15-in. chuck can swing clear of the carriage. The carriage has geared automatic longitudinal and cross feeds, each having the same number of changes and range as the saddle feed. The cross travel is 10 in. There are six independent adjustable stops for the longitudinal travel. The cross travel has one stop in each direction, and the cross-feed screw has a graduated dial equipped with six indicators. The square tool holder on the carriage can be indexed to four positions. The turret and the carriage have separate feed rods, so that the feeds are independent of each other, and both are provided with adjustable automatic trips. The feeds are alike for longitudinal and cross travel. Geared feeds insure a positive drive and any desired change is instantly obtainable by moving the levers in front of the gear box. The carriage is equipped with a lead screw for cutting threads of the ordinary pitches.

The machine is equipped with a wide and deep chip pan and an oil tank is cast solid to it. The oil is drained through a strainer over the top of the tank. A geared pump delivers a copious flow of oil to the cutting tools for both turret and carriage. The all-geared head machine can be belted direct to a constant speed motor. The floor space of the machine is about 11 ft. x 3 ft. 6 in.

The regular equipment consists of an outer stock support, an iron tool stand and complete bar and chucking outfits, including a 15-in. extra heavy geared three-jaw scroll chuck. A double friction countershaft is also furnished with each machine of the cone pulley head type. The pulleys on the countershaft are 16½ in. in diameter and have a 4½-in. face.

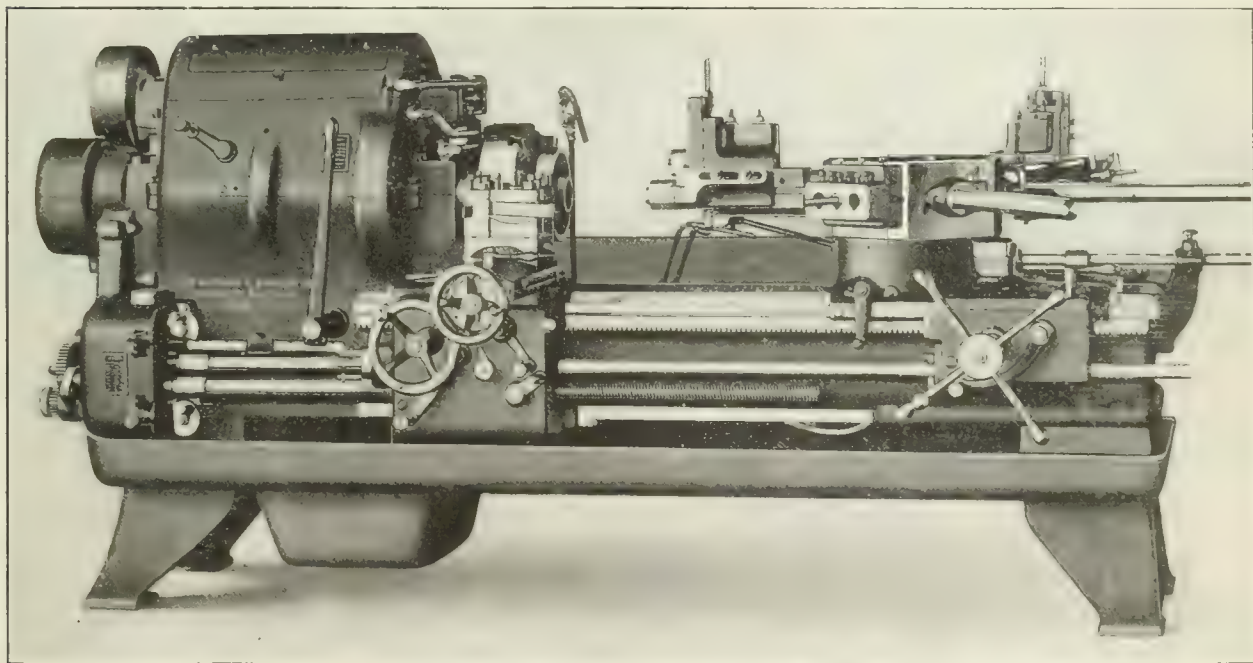


Fig. 2. The Lathe Equipped for Chucking Work.

feed. A special design of chuck having a powerful and accurate grip and capable of holding short pieces is used.

The turret is of the hollow hexagon type, designed along the same lines as the other hollow hexagon turrets of this company and measures 16½ in. across faces. The locking bolt is located directly under the working tool and as far away from the center as possible. A stop for gauging the length of the stock is placed in one of the corners of the turret, which indexes automatically at this point, or not, as may be desired. The turret saddle has a long bearing on the V to insure its being well guided. The gear box provides ten automatic feed changes for the saddle in either direction, ranging in approximately geometrical progression from 0.1 to 0.0045 in. There are twelve independent adjustable stops, which are indexed with the turret and operate automatically. The backward movement of the saddle automatically indexes the turret.

The carriage is of the side carriage type and has bearings on the front V and the side guides only, the former being unusually long and wide. It is provided with a square

The Brown-Ketcham Iron Works Receivership.

The Brown-Ketcham Iron Works, Indianapolis, Ind., an important fabricator of structural material, has gone into the hands of a receiver in bankruptcy proceedings brought in the United States district court. Frank D. Stalnaker, president of the Capital National Bank, has been appointed receiver by the court. This action follows a suit previously brought in a state court by a preferred stockholder asking for the appointment of a receiver. The affairs of the company have for some time been in the hands of a creditors' committee, which was at work on a plan for protecting their interests and at the same time saving the company from failure. The assets are estimated at \$1,000,000 and the liabilities at \$550,000, not including the \$350,000 preferred stock. The company states that its books do not show that the individual who brought the action in the state court is a preferred stockholder and will resist the litigation thus begun. The receiver has been ordered to continue operating the plant until the further order of the court, as the company has quite a number of contracts in hand.

Mechanical Charging of Cupolas*

Details of a Number of New Machines

BY GEORGE R. BRANDON, HARVEY, ILL.†

In a paper before the Pittsburgh Foundrymen's Association in March, 1908, the writer discussed the subject of charging machines for cupolas and described at that time the designs which had been developed by the Whiting Foundry Equipment Company, Harvey, Ill. In the inter-

on the side where cupola house is located. The distance between foundry building and this track should allow space for storage adjacent to the siding and for a narrow-gauge yard track between the storage piles and the building. It is evident that the layout of stock yard will depend upon

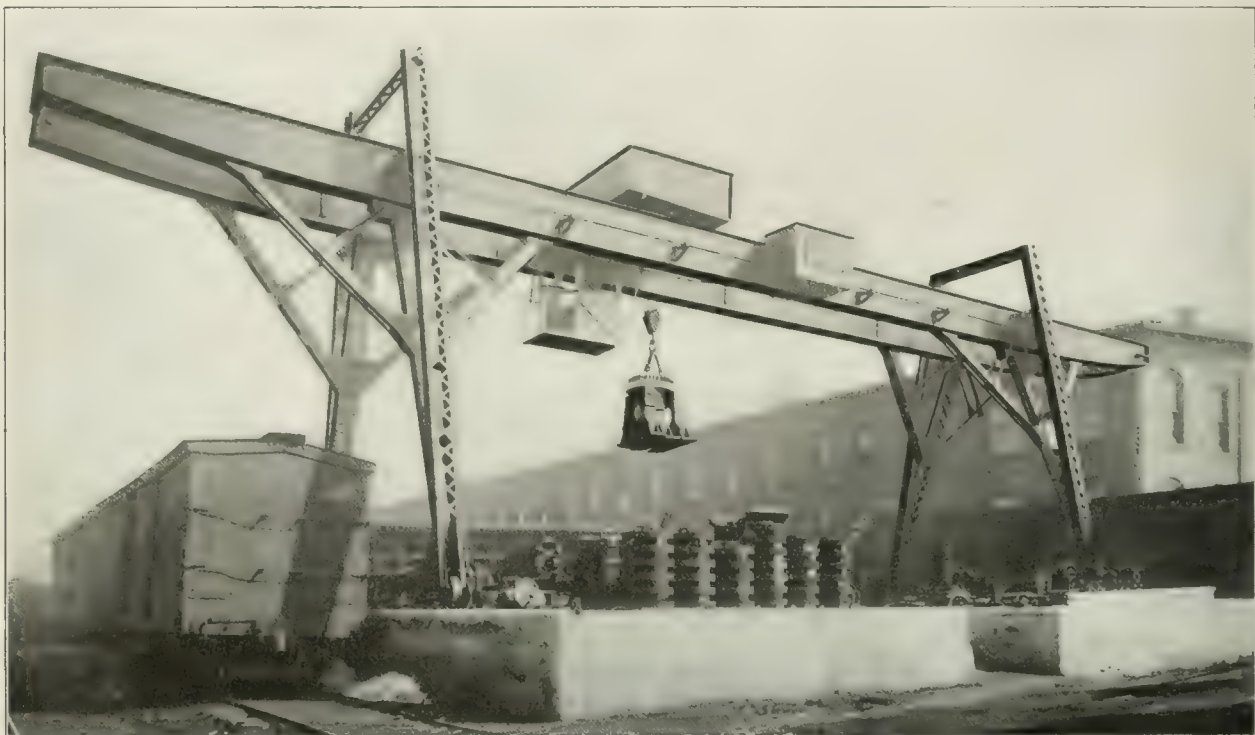


Fig. 1.—An Electric Gantry Crane for Handling Raw Material in a Foundry Yard Built by the Whiting Foundry Equipment Company, Harvey, Ill.

val since several types have been brought out to meet special operating conditions and these, with the designs previously referred to, will be illustrated and described, together with other equipment employed in handling charges.

It is evident from the interest aroused in methods for reducing the cost of handling cupola stock that this subject is considered of great importance by foundry managers. There is no department in the foundry in which greater returns will result from the adoption of a scientific plan of operation. Every movement, from the time stock arrives in the yard until it is charged into the cupola, must be carefully studied and facilities provided to eliminate manual labor wherever possible and make this labor most effective when necessary to depend on it.

I will consider first, briefly, layout of the storage yard and means for handling the stock. Assuming a foundry of moderate capacity, for which ample ground for an accumulation of stock will be provided, materials should be delivered by cars on a railroad switch track running parallel to length of foundry

local conditions, but the principles here given will be applicable in any plant.

The Material Yard

Pig iron should be piled in the yard, with a label on

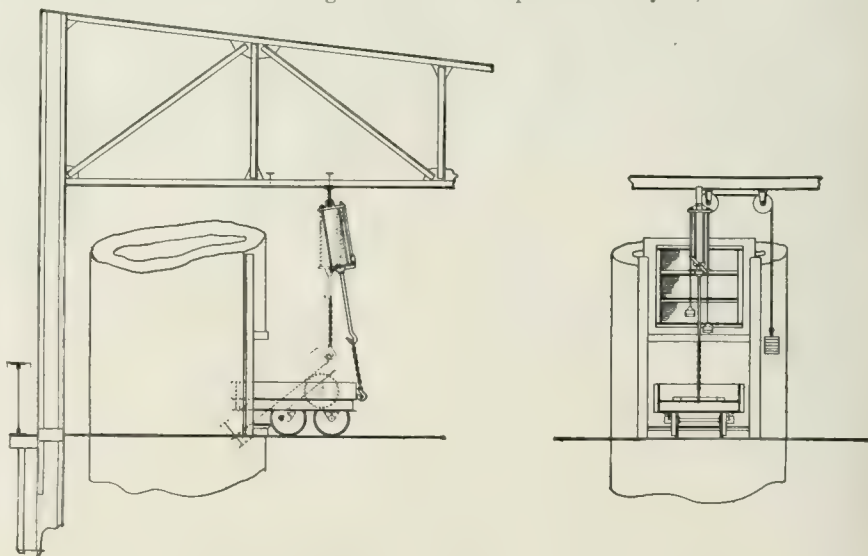


Fig. 2.—Charging the Cupola With a Balanced Car.

each pile giving the brand and the grade of iron, also the initial and the number of car on which the iron was received. A good plan is to mark pigs near the bottom layer of the pile which will not be disturbed until the pile is nearly used. From the car records the analysis and complete information regarding the particular carload

*Presented at the convention of the American Foundrymen's Association, Pittsburgh, Pa., May 23-26, 1911.

†Vice-president and general engineer, Whiting Foundry Equipment Company.

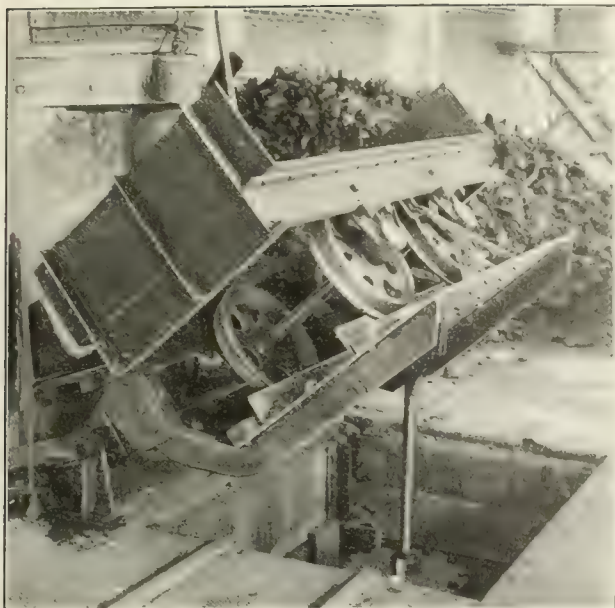


Fig. 3.—The Side Dump Charging Car in the Dumping Position.

should be obtainable. Scrap iron is simply dumped into bins, the different grades being kept separate. Coke should be stored in covered bins. When the tonnage handled is sufficient to make the investment profitable, a traveling or gantry crane covering storage yard should be installed. It should have high-speed movements and be fitted with a magnet for unloading pig and scrap and for manipulating a drop weight for breaking scrap. This crane should also be used for handling heavy flasks in and out of storage, and for loading castings to be shipped. The crane may be fitted with a grab bucket to handle coke and limestone. A jib crane may be substituted for the traveler in smaller plants and perform similar functions, to a limited extent. Fig. 1 illustrates an electric gantry with magnet such as could be used for covering the foundry yard.

Disregarding the primitive methods still occasionally employed of using barrows and dumping the stock on the charging floor, to be rehandled in making up the charges and again to charge into cupola. I will briefly review various modern methods of handling cupola stock from yard to cupola. The charges should be collected on cars, the proper amount of the different grades being selected and weighed and not again handled until introduced into cupola. Two-ton cars, properly constructed and equipped with roller bearing axles, can easily be pushed over level tracks by one man. When warranted by conditions an electrically operated transfer car may be used to transport the charging cars while the charges are being collected. A scale may be mounted on the transfer car to weigh the charges if desired. After the charges are weighed the cars are elevated to the charging platform by an elevator, or if the yard crane is available the cars may be constructed with means for attaching slings and the cars with the charges lifted intact to the charging floor, but this latter method is not an economical one and is only permissible in case of accident to the elevator. Iron and scrap may be elevated to the charging floor with a magnet crane, but this method requires additional space on the charging floor and involves extra handling, and is therefore not recommended.

Storage space for about 50 per cent. of melt in one heat should be provided for on the charging floor and a sufficient number of cars to carry this stock must be sup-

plied for convenience and economical operation. As soon as emptied the cars are lowered to the yard and the charges replenished for a later period in the heat. A system of tracks on the charging floor should provide for constant forward travel of the cars and an open track to the elevator for the cars that have been unloaded.

If desired, the cars may be provided with flat-tread wheels, suitable for a plate floor, or with combination wheels which may be used both on the track and the plate floor. A special design made by the Whiting Company has a platform overhanging at one end so that when the load is properly adjusted it will almost balance on one axle. By a handle at the other end of car it may be readily turned and pushed in any direction. When proper arrangements are made the charges may be dumped into the cupola from this car. It is backed up to the charging door, the wheels blocked and the forward end lifted by a hoist. This device is shown in Fig. 2. Cars with hinged bodies may be dumped into the cupola, the charge falling by gravity on releasing lock pin. Dump barrows are used with the same effect. The skip car, operating on an incline with an automatic dumping device, is also in use in connection with cupolas.

Another device for charging cupolas mechanically consists of a trolley operating on the jib of a crane or on a track which extends into the cupola. The charges are made up as desired in a cylindrical bucket, with drop-bottom doors, which is carried on this trolley. The hoisting and trolley travel movements are operated by power and the drop doors opened by releasing a latch.

Charging Machines

The Whiting patented charging machine is used in connection with a simple design of car having steel plate ends about 12 in. high for iron charges and having a plate body with a swinging side door, hinged at the top, for coke. On the side dump machines the cars are pushed on the hinged platform, locked with a simple hook which engages a loop on the car frame, the platform and the car are raised together by power and the charge dumped. The distribution is under perfect control of the operator, the charges being delivered to the far side of the cupola by a sudden, and to the near side by a slow, hoisting movement. Fig. 3 illustrates this machine in the dumping position. End dump machines are supplied when conditions require them, but side dump cars are preferred as they do not have to be turned to place on the machine. Fig. 4 is a reproduction of a drawing of an end dump machine. The compound machine is recommended for situations in which the charging floor is too low for securing the greatest efficiency in cupola operation. The hinged platform with the car on it is first raised to the proper level and at that point is dumped by a separate

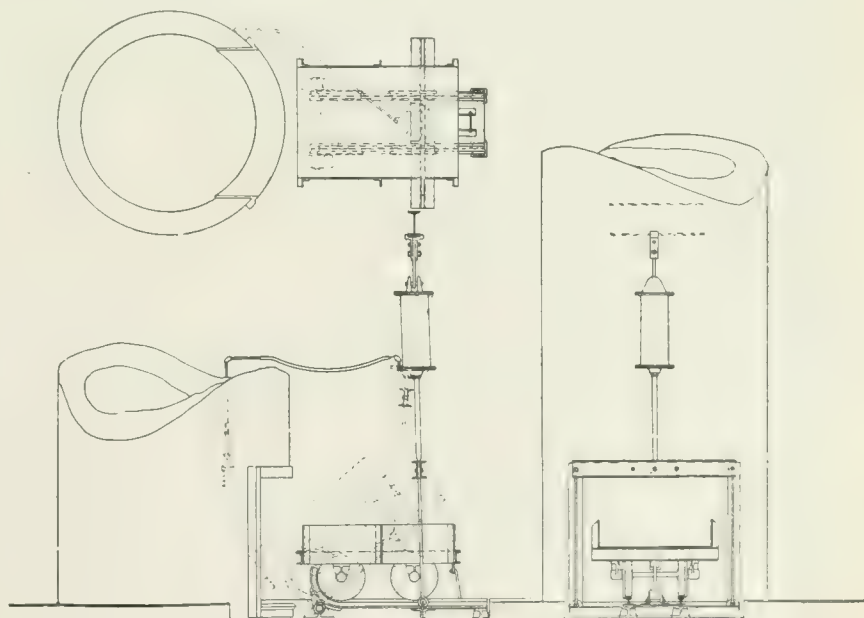


Fig. 4.—Side and End Elevations and Plan View of the End Dump Charging Machine.

power device in a manner similar to the plain machine.

Fig. 5 is a drawing of the compound machine where pneumatic cylinder hoists furnish the power. Electric

geared hoists may be substituted for pneumatic hoists. For the electric compound machine only one hoisting mechanism is required, as the design provides for the

The charging door in the cupola used in connection with the charging machine is larger than the ordinary door for hand charging and is set lower. An inclined chute is arranged to receive the stock as it is dumped from the car. The charging machine has an apron plate which overlaps the chute and prevents the iron dropping from the car to the floor. A vertical distance of 4 or 5 ft. between the top of the stock in the cupola and the sill of the charging doors is necessary to provide space for the distribution of the charges. Therefore, the charging floors should be higher than when the charging is done by hand.

With these machines there is a good saving in the cost of handling charges for cupolas having an hourly capacity of from 10 to 15 tons or more, the economy of operation increasing as the output per hour increases. For a No. 9½ Whiting cupola, melting 20 tons per hour, two men with a charging machine can attend to all the charging operations where otherwise five or six men would be required. Another advantage of this machine is that its location is fixed in relation to the charging door and the conditions of operation are always uniform. The cost of installation is small, much less in fact than the extra cost of cars with hinged bodies would

inclination of the platform without an independent hoist. The crane type of controller is used, allowing a wide range of speeds, which permits the uniform distribution of charges. Fig. 6 illustrates an installation in the Delaware, Lackawanna & Western Railroad's foundry at Scranton, Pa.

be for any moderate sized plant. No additional or special equipment is required in connection with the charging machine. Charging cars only are required, and they are of design that can be used for ordinary hand charging and no greater number of them is necessary.

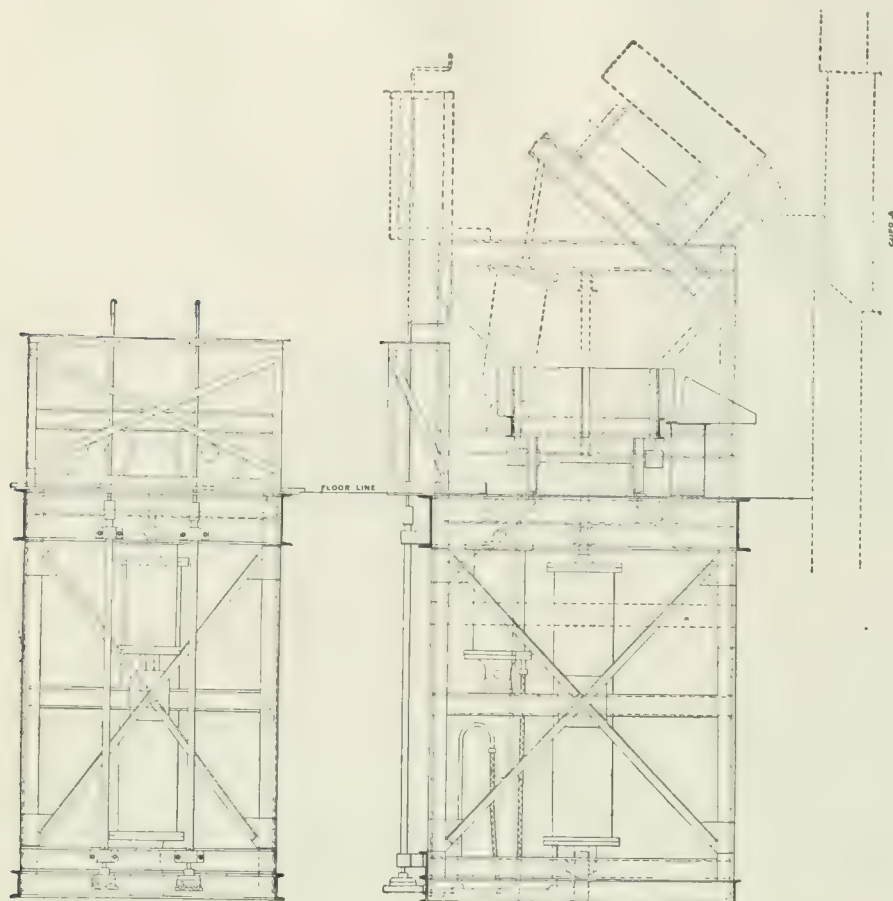


Fig. 5.—Details of the Compound Pneumatic Charging Machine.



Fig. 6.—The Electric Compound Charging Machine Installed in a Foundry.

Actual Installations

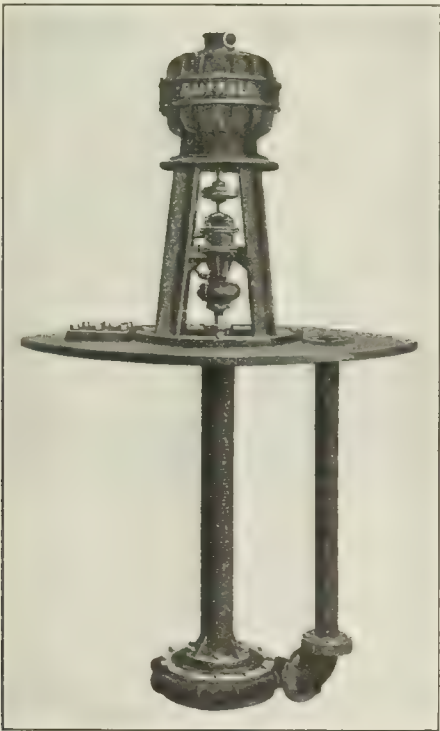
Data regarding actual layouts of charging floors and tracks may be of interest. In the cupola charging department of the Canada Car Company, Montreal, Que., there are two No. 9½ Whiting cupolas for the wheel foundry and one No. 7 and one No. 4 cupola for the gray iron foundry, all equipped with charging machines. The two foundries adjoin and the charging houses are connected, giving ample track space on the charging floor and providing storage facilities below, which is desirable in that rigorous climate. The tracks on the charging floor are arranged with crossovers so that the cars may travel continuously without interference.

Two No. 11 Whiting cupolas are used in the wheel foundry of the American Car & Foundry Company, at Madison, Ill., and both are charged by pneumatic machines. A special location of elevators was necessitated by the peculiar yard arrangement. The end elevators are used for iron; the elevator on the side for coke. Each cupola is served by the elevator nearest to it in ordinary operation. The tracks on the charging floors have storage capacity for about 70 cars. A transfer table at each end is arranged so that a loaded car from the elevator may be transferred to any storage track; turntables in the middle provide passage from any one track to the other, and empty cars are transferred from the charging track to elevator, thus completing the circuit.

The charging floor to be installed at the plant of the Pennsylvania General Electric Company, Erie, Pa., is designed to be served both by a traveling yard crane and elevators. A transfer car makes connection with all the storage tracks and with the tracks to the charging machine. Two No. 11 Whiting cupolas, having a capacity of from 24 to 27 tons each, are used, and two charging machines are furnished for each cupola.

A Self-Contained Vertical Sump Pump

Recently the Buffalo Steam Pump Company, Buffalo, N. Y., has placed on the market a sump pump in which interesting constructional details have been incorporated. All parts of the outfit are easily accessible for inspection. The unit can be lifted from the pit without dis-



A New Type of Vertical Pump for Draining Sump Pits. Built by the Buffalo Steam Pump Company, Buffalo, N. Y.

mantling and the latter can thus be cleaned out with very little trouble.

The weight of the moving part is taken on a self-aligning ball bearing of the thrust type, which is lubricated in a somewhat novel way. To insure a positive and contin-

uous supply of oil a reservoir is bolted to the shaft with an oil-tight joint immediately below the bearing in such a way as to inclose the lower part of the latter. This chamber, as it revolves with the shaft, causes the oil to be thrown to the inside periphery of the reservoir by centrifugal force. A feed pipe, which is bent so that its opening faces against the revolving oil, projects from the lowest part of the bearing and picks up the lubricant. Sufficient pressure is developed by the speed at which the oil reservoir rotates to force the oil through this pipe to an upper chamber, from which it flows downward over the bearing. To protect the shaft from the corrosive action of the water and from being fouled by waste and stringy matter in the sump pit it is inclosed below the cover.

As the outfit is entirely self-contained it is possible to test the pump and the motor at the factory under actual running conditions. Another advantage of this arrangement is that when the outfit arrives at its destination it is simply necessary to uncrate it, set it in the sump pit and make the electrical connections to the motor and the automatic starter and the unit is ready for operation.

A Study of the Blast Furnace

The Harbison-Walker Refractories Company, Pittsburgh, Pa., manufacturer of firebrick for all purposes, has brought out an exceedingly valuable publication entitled "A Study of the Blast Furnace." It comprises 163 pages of text and illustrations, is of pocket size and is bound in leather. The work has been prepared by an expert in the operation of the blast furnace and condenses in most convenient form the latest practical and scientific information on this subject. The matter is treated under six chapters.

Chapter I gives a description of the plant of a blast furnace, showing the general construction of the stack and the details of its various parts, including the devices for filling and the extensive system of piping required. Chapter II covers ores and their treatment, entering into such matters as concentration, nodulizing and briquetting. Chapter III considers fluxes and fuels, giving the various methods of manufacturing coke. Chapter IV treats of burdening the furnace, taking up the details of the various materials entering into the burden. Chapter V considers the operation of the furnace, entering into furnace troubles to a considerable extent. Chapter VI discusses furnace reactions.

The publication will undoubtedly be appreciated by all who are interested in the operation of blast furnaces and probably by many in the iron trade who would like to know more about the process followed and apparatus employed in the manufacture of the pig iron they use. The work is copyrighted by the company.

Fewer Freight Cars Idle

Idle car figures of the American Railway Association showed a substantial decrease for the two weeks ended with May 24. The total number of unused cars of all classes, which was 188,847 when the previous statement was made up, had been reduced to 168,233. There was a better distribution of equipment as well, the shortages, which totaled 1569 on the earlier date having been brought down to 835 by May 24. The net surplus was accordingly 167,398.

The reduction of 19,880 in the net surplus of cars amounts to 10.5 per cent, and is the first real improvement to develop since the statement of August 31, 1910. The largest number of cars out of commission this year was reported March 2, when the total was 196,217. This has been reduced with each fortnightly statement. The smallest number of idle cars in recent months was reported October 26, 1910, when the crop-moving needs resulted in a demand for all but 29,131 cars. The following table shows the surplus and shortage of cars on 172 roads on May 24:

	Surplus.	Short.	Net surplus.
Box	51,200	253	50,947
Flat	12,906	345	12,561
Coal, gondola and hopper	68,743	148	67,845
Other kinds.....	36,084	89	35,995
Total	168,233	835	167,398

Raising the Battleship Maine

Progress of the Work in Havana Harbor

BY CHARLES H. HUGHES, NEW YORK CITY

After investigating a large number of plans for raising the battleship Maine, sunk in Havana Harbor February 15, 1898, the board of army engineers, of which Col. W. M. Black is the senior member, charged with this work, recommended one that was approved by President Taft

capacity of 1200 cu. yd. per day of ordinary material could only remove 300 cu. yd., while an hydraulic dredge with a capacity of 12,000 cu. yd. per day could remove but 1400 cu. yd. The clay is pumped from the hydraulic dredge through a steel pipe line and is discharged into consecutive



Fig. 1—View Showing the Arrangement of the Caissons Around the Vessel.

on October 13 of last year. Soon after the approval of the plan work was started.

The Government had two objects in wishing to raise the Maine; first, to remove an obstruction to navigation and, second, to attempt to recover the remains of those who perished in the unfortunate incident of 1898. If it were not for the latter she would doubtless be dynamited and the debris dredged from the harbor. For the wreck is practically worthless, and it will cost many times more to remove it than what it is worth as scrap iron. Even if it was raised and could be repaired, it would be of little use for actual service, as the designs of battleships have changed so much in the past few years.

The Plan

The plan adopted and on which will be spent the \$650,000 appropriated by Congress provides for entirely exposing the Maine to view. A cofferdam 399 ft. long, a view of which is given in Fig. 1, will be built around her and the water contained in the inclosed area pumped out.

The cofferdam is composed of cylinders 50 ft. in diameter made of Lackawanna steel piling and connected by arcs of similar piling, arranged as shown in Fig. 2. The cylin-

ders in layers of about 10 ft. deep. Thus, instead of completing one cylinder before another all are kept approximately at the same stage of completion. It is interesting to note that a man can walk on top of a cylinder five minutes after it has been filled. When the cylinders and the spaces between the arcs are filled, the pumping out of the water around the Maine will be started.



Fig. 3.—Driving the Piling of the Cofferdam.

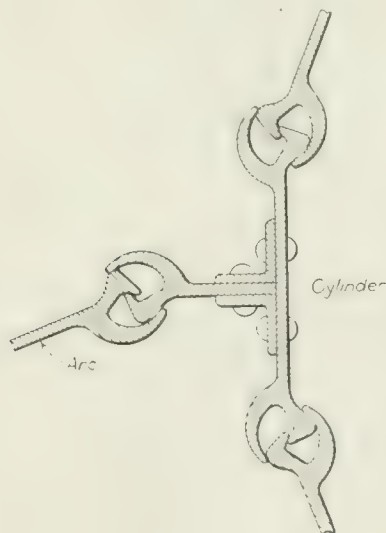


Fig. 2.—Arrangement of the Cylinder and the Arc.

ders, some of which are illustrated in Fig. 4, as well as the spaces between them and the arcs, are filled with a heavy clay dug up near the work. An idea of the material can be obtained from the fact that a dipper dredge having a ca-

To reach a suitable bearing surface in the harbor bottom piling 75 ft. would be required, but as this length was difficult to handle it was divided into two sections. First a 50-ft. length was driven and to it was spliced a 25-ft. one, alongside of the first a 40-ft. length was driven and a 35-ft. one spliced on, then alongside of the latter another composed of 50-ft. and 25-ft. sections, and so on around the entire circumference. By using different lengths the joints were broken. To keep the piling in a cylindrical shape wooden templates were built and held in place by a central pile. With the template thus secured, the piles were swung into position from barges by derricks and then driven by hammers, as shown in Fig. 3.

Driving the Piling

The driving of the steel piling was done by steam hammers. It was essential that the hammer should be



Fig. 4.—A Portion of the Cofferdam, Showing the Cylinders.

light, yet powerful and could be easily swung from a derrick boom, as shown in Fig. 3. The Arnott hammers built by the Union Iron Works, Hoboken, N. J., fulfilled these requirements and two were ordered by the Government.

This particular type, exterior and sectional views of which are given in Figs. 5 and 6, with the exception that in the latter the anvil plate is omitted, has a plain cast iron body with a steam cylinder, *a*, Fig. 6, and valve chest in the upper portion and in the lower a ram, *b*, and a valve rod, *c*, all inclosed, thus protecting them from injury. A feature of the hammer is that in the moving parts there are only two bolts, and these connect the valve rod to the ram. The opening at the bottom is formed with jaws that fit over the top of the steel piling, permitting the insertion of a driving cap. Above the cap are wooden blocks that act as a cushion, thus relieving the hammer of the jar when striking a blow. It will be noticed that the safety buffers and pile plate are within the frame, so that nothing but the throttle is exposed, making a construction which can stand hard usage.

On opening the throttle valve, steam is admitted to the lower end of the cylinder raising the ram to the top of its stroke when a valve, *d*, actuated by a rod is opened and steam enters the upper end of the cylinder while the lower end is opened to exhaust. The downward stroke is accelerated by the steam pressure on the piston *e*, the force of the blow being correspondingly increased. When the ram strikes the pile the valve is reversed by the rod and the ram is raised. The total downward force of the steam and ram is 2392 lb., and this being delivered 135 times a minute gives with a 14-in. stroke a total of about 376,000 ft.-lb. per minute. Each hammer weighs approximately 35,000 lb. and uses steam at 80 lb. pressure. In the present case the boiler is on the same barge as the derrick.

Pumping Out the Enclosure

The area inclosed by the cofferdam will be pumped out by two pumps mounted on floats, and as the water falls the floats will consequently be lowered also. The pumps are of the split casing double suction volute type, one, a 12-in., having a capacity of 4000 gal. per minute and the other an 8-in., with a capacity of 1800 gal. The maximum pumping head in each case is 65 ft. and the minimum 5 ft.

The features to be noted are the double suction, and the casings, which are split horizontally. With a double suction the incoming fluid enters on both sides of the impeller and is discharged from it into a common vortex chamber. This construction eliminates all difficulties from end thrusts that are often troublesome with a single suction

pump. By splitting the casing the working parts may be readily removed for inspection and repairs, without breaking the suction or discharge connections or disturbing the alignment. The pumps were furnished by the Jeanesville Iron Works Company, New York.

Directly connected to the 12-in. pump is an 100-hp. General Electric type K motor, using 3-phase, 60-cycle, 220-volt current, while to the 8-in. pump is connected a 50-hp. motor of the same make and type. The current is transmitted from the power house on the shore by a cable.

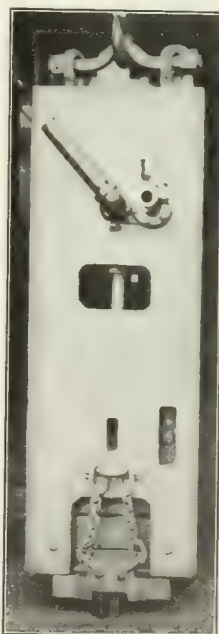


Fig. 5.—Exterior View of the Hammer.

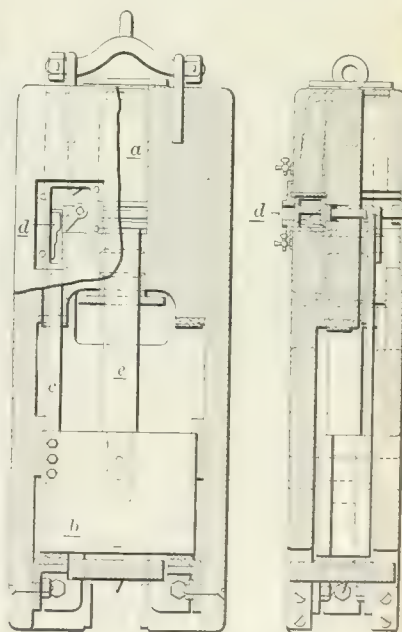


Fig. 6.—Section of the Hammer.

The Arnott Hammer, Made by the Union Iron Works, Hoboken, N. J.

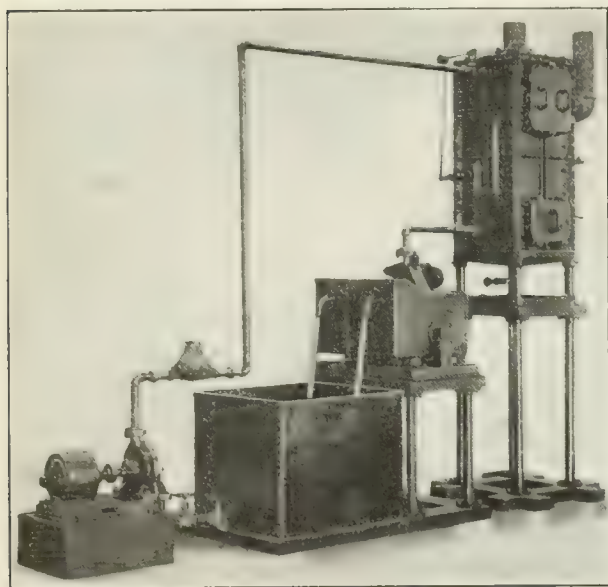
When the Maine is exposed a careful examination will be made by the army engineers and a report sent to Washington. If the hull is not too badly damaged an effort may be made to raise it, but if this cannot be done it will be broken up. It is contemplated removing the military mast and placing it over the plot in the National Cemetery at Washington, where the sailors whose bodies were recovered are buried.

New Liquid Weigher

One of the particularly interesting exhibits at the recent Architecture and Building Show in New York was the combined one of Henry R. Worthington, the Blake & Knowles Steam Pump Works, the Laidlaw-Dunn-Gordon Company and the Deane Steam Pump Company. Occupying the center of the space was one of the few operating exhibits to be seen at the show. It was a type A open pattern liquid weigher, a recent product of Henry R. Worthington, 115 Broadway, New York City, particularly developed for accurately measuring and recording, by weight, the flow of hot water, chemicals, oils and other liquids that cannot be measured satisfactorily by meters.

The illustration herewith is a view of the exhibit as erected at the Worthington works before being shipped to the show. In connection with the weigher, but in this instance serving merely as an elevated tank, was a Blake-Knowles 150-hp. open feed water heater of the type illustrated in *The Iron Age* May 5, 1910, demonstrating the automatic valve control of the feed water flow, and a Worthington centrifugal pump returning the water from the tank into which the weigher discharged through a 1-in. Worthington water meter to the heater. The pump was a 1¼-in. two-stage house pump of 1800 gal. per hour capacity against a head of 70 ft., and was driven by a direct-connected 1-hp. motor through a flexible coupling. The pump ran with such remarkable steadiness and absence of vibration that a dime could be stood on its edge on any level part of the pump.

An important advantage of the weigher is its extreme accuracy in the weighing of liquids of any nature. For example, it is independent of the density and the temperature



The Type A Open Pattern Liquid Weigher for Recording the Flow of Liquid Made by Henry R. Worthington, New York City.

of the liquid, its action being governed entirely by weight, and not by volume. A big field is therefore opened to it in the weighing of hot water, and it has especial value in power plant application. It is less expensive and is said to be vastly superior to any of the awkward and troublesome weighing outfits used in many plants for lack of something better. In the sugar industry it has been found the first practical means of measuring fusion juice. Its accuracy is practically unaffected by even a considerable variation in the rate of flow, but it is desirable to have the liquid flow into it by gravity. When properly adjusted it is accurate to within ½ per cent. The weigher has no bearing or wearing surfaces, no valves to leak, and presents no feature which through friction or wear affords an opportunity for any falling off in the original efficiency.

As may be seen from the engraving, the weigher consists of two tanks pivoted at a point in their height which is above the center of gravity when the tank is empty. As the tanks alternately fill the center of gravity is raised until it comes above and to one side of the center of

support, which causes the tank to tip on its knife edge bearings and start the discharge of the liquid through the bent pipe outlet. This pipe is continued within the tank as the short leg of a siphon, so that the flow being once established continues until the tank is drained, even after the center of gravity has been lowered, and the tank tilts back to the normal position.

As each tank tips it automatically turns the rocking inlet spout so as to deflect the water into the second tank, and that one is filled while the first is discharging. Each movement of this spout actuates a mechanical counter which is calibrated to read either the number of loads of the tanks or directly in pounds, gallons or whatever unit of measure may be desired. From the nature of the action of the weigher and the sensitiveness of the balance of the tanks, the tank loads are all of uniform amount. Since the record is by weight, the counter reading is final, without necessity of making any allowances or corrections.

Other exhibits in this space at the Architecture and Building Show were a sectional model of the Worthington turbine meter, a Worthington Arrow meter, so called because the water flows straight through the meter, making it capable of handling the full capacity of the pipe line with insignificant loss of pressure, and a motor-driven Deane triplex power pump.

The new Grand Central Palace was in a sense an exhibit itself, and an appropriate one considering the nature of the show. It was the first time that the building had been opened to the public, but the impressive thing was that this structure, 13 stories high, occupying an entire block on Lexington avenue from Forty-sixth to Forty-seventh streets, directly over the underground tracks and yards of the Grand Central Terminal, was built and practically completed, except for the remaining interior finishing on the upper floors, in the record time of 8 months and 18 days. The contractors, James Stewart & Co., erected all of the steel work at night, and the whole construction was carried out without interfering in the slightest with the regular schedules of the trains of the New York Central and New Haven roads running beneath it.

The Vitrolite Company's Improvements.—The Vitrolite Company, Parkersburg, W. Va., maker of white glass, which the manufacturer claims is better than marble for interior finish, has recently let the contract to L. C. Poling, a local builder, for a large addition to its plant. The extensions will aggregate 43 x 430 ft. A new annealing lehr and rub bed and an addition to the cutting department are being made. Another melting tank, with auxiliaries, is also being erected. The casting table is being extended to take in Vitrolite 72 in. wide. A steel supported water tower of 25,000 gal. capacity is also being erected. The Vitrolite Company has been doing considerable work with its product in finishing buildings, in some cases the walls and ceilings of entire rooms being covered. Other uses for this product are operating tables, counter tops, etc. The new addition will about double the present capacity and will be ready for operation early in August.

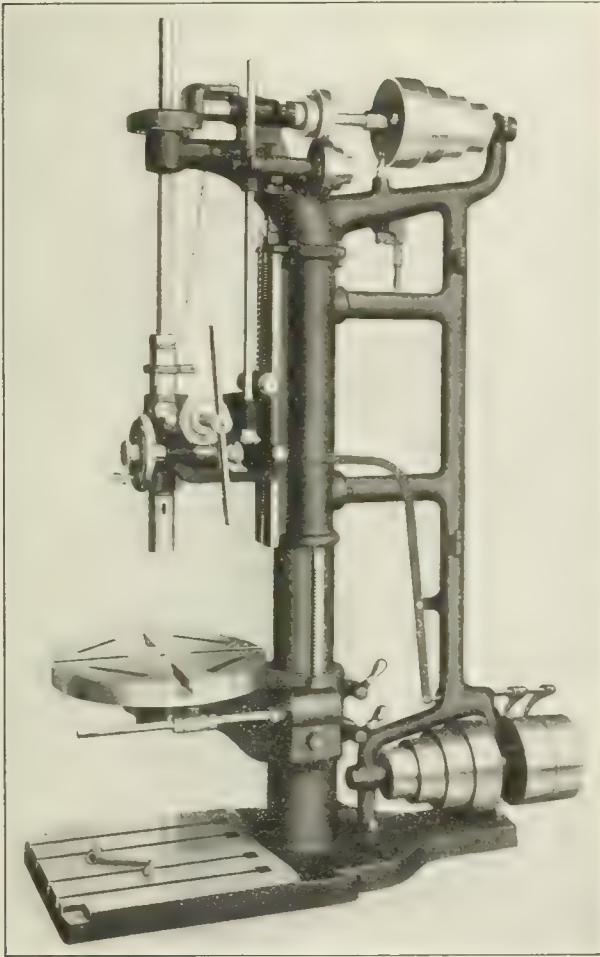
American Vanadium Facts.—The Vanadium Sales Company of America, Frick Building, Pittsburgh, Pa., in the May issue of its house organ, publishes a complete report of the exhibitors who co-operated with the company in the preparation of cast vanadium products for the exhibit connected with the recent convention of the American Foundrymen's Association at Pittsburgh, and also gives the complete address before the convention of its engineer of tests, George L. Norris. The publication comprises 12 pages and gives numerous illustrations. It will prove to be greatly interesting and instructive to those who are looking into the subject of the use of vanadium in the manufacture of iron and steel.

A special meeting of stockholders of the Allegheny Steel Company, whose general offices are in the Farmers' Bank Building, Pittsburgh, and works at Brackenridge, Pa., will be held July 6 for the purpose of increasing the capital stock from \$3,000,000 to \$3,500,000. No important improvements or extensions are contemplated, the increase in capital stock being made so that it will more closely represent the actual value of the plants owned by the company.

A Heavy Pattern Drill Press

The 24-in. sliding head, heavy pattern drill press, shown in the illustration, is fitted with back gear, power feed, wheel and lever automatic stop. It is built by the Frontier Iron Works, Letchworth and Grant streets, Buffalo, N. Y. Rigidity is a feature of the design, the purpose being to withstand the strain occurring with the high speed steel drills now used.

The base is heavy and well ribbed to prevent springing. The column is of large diameter with a wide face for receiving the head, and is supported by a strong back brace. The massive knee has a long bearing on the column and a large circular bearing for the hub of the table. The lower portion of the column is closely finished to insure proper alignment of the table. The knee has a special clamping handle and is raised and lowered through worm gearing and pinion on the rack, an arrangement which holds the part securely with no possibility of drop-



The Modern 24 In. Sliding Head Drill Press Built by the Frontier Iron Works, Buffalo, N. Y.

ping, even should the clamp screws be loose. The round table and the base have ample slots for holding work. The table is raised and lowered by rack and pinion and is counterbalanced.

The high carbon steel spindle is provided with quick return and is operated by a steel rack and pinion and worm gearing, the worm running in an oil bath. With small drills a lever feed can be used. The spindle sleeve has a sliding collar for regulating the automatic stop feed mechanism. The crown bevel gears are protected, and the back gearing is closed in. The machine has the company's tilting table. The knee is in two parts, and on the outer end is a large flange, faced and bored to receive the swivel stem, on which the table stem fits. On the periphery of the flanged swivel is cut a worm gear which engages a worm mounted on a bracket on the lower side. The worm shaft is squared on both ends for a wrench, which permits the table to be tilted to either side accurately to any desired angle.

The specifications of the machine follow:

Minimum distance between base and spindle, in.....	28
Maximum distance between base and spindle, in.....	56½
Maximum distance between table and spindle, in.....	30
Traverse of table on column, in.....	14
Traverse of head on column, in.....	20
Traverse of spindle, in.....	8½
Diameter of table, in.....	22
Diameter of column, in.....	6½
Diameter of spindle, in.....	1 7/16
Diameter of spindle sleeve, in.....	2¾
Morse taper of spindle.....	No. 4
Pitch diameter of crown gear, in.....	7
Bevel gear ratio.....	2 to 1
Diameter of tight and loose pulleys, in.....	10
Face width of tight and loose pulleys, in.....	3
Number of cone pulley steps.....	4
Diameter of largest cone pulley step, in.....	10
Diameter of smallest cone pulley step, in.....	5½
Speed of countershaft, r.p.m.....	300
Number of spindle speeds.....	4
Minimum spindle speed, back gears in, r.p.m.....	22
Maximum spindle speed, back gears in, r.p.m.....	79
Minimum spindle speed, back gears out, r.p.m.....	81
Maximum spindle speed, back gears out, r.p.m.....	272
Power required, hp.....	1
Overall height, in.....	84½
Floor space required, in.....	22 x 58

This drill is built along the same general lines as the 20-in. drill press which was illustrated in *The Iron Age* May 19, 1910, and is furnished with special metal alloy bearings.

The Joliet Rolling Mill Company

The Joliet Rolling Mill Company, Joliet, Ill., manufacturer of iron and steel bars and rolled specialties, has increased its capital stock from \$150,000 to \$250,000 for the purpose of installing additional equipment and making extensive improvements. These improvements will include a new 8-in. mill, together with the necessary furnaces, also a 22-in. mill, with rolls for making rounds up to 4 in. and flats up to 12 in. The new equipment to be installed will consist of several alligator shears, rotary shear, engine lathes, planers, drill presses, pipe and bolt cutters, motors, etc. A multiple twisting machine will also be installed for twisting reinforced concrete bars cold.

The company carries in stock at all times a complete assortment of its Arrow brand of irons which are adapted for stay bolt, locomotive and engine purposes, etc. In the manufacture of this iron the company places stress upon a proper balance between toughness and tensile strength, compatible with a product of suitable softness. Under test the company claims that its Arrow brand iron has a minimum tensile strength of 50,000 lb. and a minimum elongation of 28 per cent.

E. K. Orr is now vice-president and general manager of the company. Mr. Orr has had a long experience in the iron and steel business, having been formerly connected with the Shelby Steel Tube Company, Shelby, Ohio; Worth Brothers Company, Coatesville, Pa., and Elyria Iron & Steel Company, Elyria, Ohio. George H. Lowe is superintendent and chief engineer, in charge of operations.

Railroad Equipment Orders.—Orders for railroad equipment include the following: Canadian Pacific, 1000 steel underframe box cars and 400 all-steel gondola cars, and are in the market for 500 box cars; Grand Trunk Pacific, 15 Pacific type, 20 consolidation and 10 switching engines; Pennsylvania Railroad, 41 coaches and 20 baggage cars; New York, New Haven & Hartford, 15 Westinghouse electric locomotives and 15 electric switching locomotives; Missouri, Kansas & Texas, 108 miscellaneous freight cars. The Wabash-Pittsburgh Terminal is figuring specifications on 500 all-steel hopper cars.

The Balbrooke Company, sales engineer and specialist in hoisting and conveying apparatus, Machesney Building, Pittsburgh, has been appointed to represent in that territory the Ohio Grease Lubricant Company, Loudonville, Ohio, manufacturer of a system of grease lubrication for steam cylinders.

The Parkersburg Iron & Steel Company, Parkersburg, W. Va., maker of steel sheets, has recently installed a complete galvanizing plant, containing one galvanizing pot, but which has been arranged to accommodate two pots. The new galvanizing department was built entirely from plans of the company, which is now making galvanized sheets that will be put on the market under the trademark of Parkersburg Smooth Galvanized.

The Machinery Markets

A decidedly better railroad demand has developed in New York. Two carrying companies have inquiries out and another has a large list in preparation. Export business continues to attract attention. The plans of the Allied Machinery Company of America will necessitate the readjustment of the selling arrangements of some 60 manufacturers of metal working machinery who have entered into contracts, and the fact that Capt. Godfrey L. Carden is to be general manager of the new export company has aroused much favorable comment. Some good business for export to Japan has developed in Cincinnati, but domestic inquiries there are scarce. Trade is slightly better in Cleveland. In Louisville the export trade commands the principal attention, and some improvement is noted in local inquiries. Less encouraging reports come from Detroit and Chicago, where business is quiet, although in the latter market the International Harvester Company continues a good customer. Business on the Pacific Coast is developing noticeably. The Standard Oil Company is the principal buyer there and the railroads are coming into the market. Good crop prospects and the settlement of the Mexican trouble have put the machinery trade on a more satisfactory basis in Texas, and many new enterprises have come forward.

New York

NEW YORK, June 7, 1911.

The railroad demand has improved materially. The New York Central is inquiring for mechanical equipment and will make an expenditure of \$50,000 and the Pennsylvania Railroad is inquiring for some machine tools. The Delaware & Hudson Railroad is preparing an extensive list which gives promise of being one of the largest of the year, covering the machinery requirements for its large shops at Watervliet, N. Y. The company proposes to build a plant capable of repairing at least 200 locomotives at a time, in addition to manufacturing some of its own engines. The locomotive shop will be 275 x 300 ft. and there are other buildings to be erected, including a blacksmith shop and boiler and tank shop, so it can be seen that the list will necessarily be a large one. V. Z. Caracristi is in charge of the preparation of the machine tool list. The machinery demand from other sources is improving. A large Pennsylvania boiler works, is preparing to spend about \$50,000 for machine tools and the New York Pump Works is making up a large list. The contractors of the Catskill water supply works are buying pumping machinery and general contracting equipment liberally, and the indications are that their future demands will be heavy. Makers of power plant equipment find business much better, as manufacturers in general are taking advantage of the opportunity to shut down part of their power and make necessary repairs and replacements. The activity in this direction is taken as an indication that better business is expected to develop, as the shop owners seem to want to bring their plants up to a better point of efficiency.

Further details of the plans of the Allied Machinery Company of America, which was formed by officials of the National City Bank of New York, have come to light through the publication of the articles of incorporation of the company, filed at Albany, N. Y. The company has a registered capital of \$100,000. Capt. Godfrey L. Carden, of the United States Revenue Service, who, through his recent connection with the Department of Commerce and Labor, is recognized as an authority on the marketing of American machine tools abroad, is vice-president and general manager of the company. Samuel McRoberts is president; Thomas A. Reynolds treasurer and H. C. Newlands secretary. With the exception of Captain Carden, all the officers are connected with the National City Bank. The declared intention of the company is to sell American machine tools in foreign countries, and the company will be practically an export association, as it will represent the interests of more than 60 American machinery manufacturers, according to the contracts made so far. Mr. McRoberts and Captain Carden left last week for Paris, where an office will be opened as soon as possible. Arrangements have also been made to begin business in Russia and Austria and a general European campaign will be conducted from Paris.

The plant of the A. S. Cameron Steam Pump Works at 433 East Twenty-third street, New York, which was acquired several months ago by the Ingersoll-Rand Company, 11 Broadway, New York, will soon be dismantled and the works will be removed to a place not yet decided upon. The Ingersoll-Rand interests are now looking about for a site, and the plant will be moved either to Phillipsburg, N. J., where the company has a large plant in operation, or to Trenton, N. J., or Philadelphia. At present 250 men

are employed in the Cameron works. When the new plant is erected it will be enlarged to double the existing capacity. Other lines of pumping equipment will be added and the business will be conducted under the present name. In other words, although the company is controlled by the Ingersoll-Rand interests, it will maintain its own individuality and will be operated as a separate corporation. Plans are now being made for purchasing additional mechanical equipment. That now in use in the works is, on the whole, in good condition and most of it will be moved to the new plant, but the enlargement of the business will call for heavy expenditures of machinery, especially in the line of metal working equipment.

The New York Central Railroad is preparing a list calling for heavy expenditures for machinery requirements, principally in the line of machine tools. The company recently decided to spend \$1,000,000 for equipment, and a large part of this appropriation will be used for machinery. Lists recently issued by the company have been purchased against of late, but all of the equipment inquired for was not bought. It is understood that some of these requirements will be included in the new list. The company now has inquiries in the market calling for about \$50,000 worth of machinery and this material it is understood is to be purchased very soon. Following its recently established custom, the New York Central has not issued the list of its present requirements to the trade generally, but has sent out separate inquiries, each calling for one machine. Some machinery-selling houses have received many of these inquiries, while others have been given only one or two.

The American Concrete Steel Company, Newark, N. J., has completed plans for a five-story building to be built at Sussex avenue and Duryea streets, Newark, for the Lauter Piano Company, whose offices are now at Orange street and Morris & Essex Railroad avenue, Newark. The new plant is to be five stories and 80 x 140 ft. It is estimated that it will cost \$75,000. The company's own plant adjoins that of the Westinghouse Electric & Mfg. Company at Newark and the latter company has acquired title to the Lauter factory and will utilize it for storage and manufacturing purposes.

The Harrisburg Mfg. & Boiler Company, Harrisburg, Pa., which has been making extensive inquiries in this market for several weeks, will shortly make purchases against the list it has prepared. The indications are that the company expects to spend about \$50,000 and its purchases will include boring mills, lathes, shapers, planers and other machine tools. A number of New York representatives of machine tool houses as well as the large machinery selling firms have put in bids on a large part of the equipment wanted.

The Eagle Pencil Company, 377 Broadway, New York, has had plans prepared by Buchman & Fox, 11 East Fifty-ninth street, New York, for a factory building, 75 x 96 ft., six stories, to be erected at Thirteenth street, near avenue C. The estimated cost is about \$70,000.

The Keiner Williams Stamping Company, 109 Third street, Greenpoint, N. Y., has had plans prepared for a factory building to be erected at Pine street and Jamaica avenue, Richmond Hill. The building will be 99 x 154 ft., two stories, of brick and mill construction, and is estimated to cost \$27,000.

The Mylocal Mfg. Company, Buffalo, N. Y., has been incorporated with a capital stock of \$50,000 to manufacture medicines, drugs and dental supplies.

THE MACHINERY MARKETS

The incorporators are L. H. and M. M. Knapp and E. N. Pratt, Buffalo.

The Huebner-Bleistein Patents Company, Buffalo, is having plans prepared for a third building to be added to its lithographing plant now under construction at Kensington avenue and New York Central Railroad Belt Line, Buffalo.

The Department of Public Works, Buffalo, Francis G. Ward, commissioner, is advertising for bids for remodelling the Broadway arsenal into a city convention hall, including the installation of an electrical lighting plant, heating and ventilating systems.

The Herr-Riegell Company, Buffalo, recently organized for the manufacture of foundrymen's and pattern makers' supplies, has secured factory premises at 1412 Niagara street, that city.

The Republic Metalware Company, Buffalo, is completing plans for a seven-story addition to its plant at Republic street and the Erie Railroad.

The Ilex Optical Company has been incorporated at Rochester, N. Y., with a capital stock of \$40,000, to manufacture optical goods and appliances. M. Rosenbloom, S. D. Burritt and H. Keonick, Rochester, are the incorporators.

Bagley & Sewall, Watertown, N. Y., are having plans prepared for a factory building which they will erect this summer. Estimated cost is \$40,000.

The New York Mills Company, Seneca Falls, N. Y., has let the contract for the construction of three large additions to its No. 2 plant, these additions being made necessary by the partial demolition of the No. 1 or original plant of the company on Ovid street to make room for the enlargement of the Erie Barge Canal. Upon completion of the new buildings the company's entire industry will be located in the No. 2 plant.

The Aster Paper Company has been incorporated at Skaneateles, N. Y., with a capital stock of \$50,000, and will engage in the manufacture of pulpboard and paper. The incorporators are F. A. Murphy, Skaneateles, and G. M. McKee and W. A. McKee, Hinckley.

Cadby & Sons, 52 Grand street, Albany N. Y., have let contract for a three-story addition which they will build to their mill.

A. Mendleson, Albany, has had plans prepared for a potash factory to be built at Vine street, Broadway and Fourth avenue.

Bids are being received by the Board of Supervisors of Schenectady County, Schenectady, N. Y., John H. Peters, clerk of the board, for the furnishing and installation of a pneumatic water system.

The Mohawk Valley Cap Company, Utica, N. Y., has let contracts for construction of a one-story addition, 146x235 ft., to its mill on Park avenue.

The Steroga Paper Company, Little Falls, N. Y., is receiving bids for a mill building, 50x100 ft., which it is planning to erect at once.

The Electric Boat Company, 11 Pine street, New York, has been awarded a contract by the Chilean Government for building two submarine boats, the aggregate cost of which will be about \$1,000,000. The boats will be constructed at Seattle, Wash., and it is said that the company is figuring on other vessels of a similar type which will comprise a flotilla for the defences of the Chilean coast.

Catalogues Wanted

The Ozark Cooperage & Lumber Company, St. Louis, Mo., desires catalogues of manufacturers of machinery for making wire looms for weaving wire cloth, square mesh and poultry netting, in addition to manufacturers of drawing machines.

New England

BOSTON, MASS., June 6, 1911.

The machinery trade notices very little change in the demand for equipment. Sales are chiefly confined to single tools and small lots. The Massachusetts State Employment Bureau reports an increased activity in the labor market. Employers in various trades are making numerous requisitions for help, but their wants are confined to skilled workmen. The number of unskilled men out of employment is large. Denial is made of a report sent to London that the Argentine Republic had defaulted its contract for the two battleships of the Dreadnaught class, which are held by the Fore River Shipbuilding Company, Quincy, Mass., and the New York Shipbuilding Company, Camden, N. J.

New England is interested in the award by the Chilean navy for a contract for two submarine torpedo boats to the Electric Boat Company. While the boats will be built at Seattle, doubtless the machinery will be constructed at the new shops of the New London Ship & Engine Company, Croton, Conn.

James Hustis, vice-president in charge of the Boston & Albany Railroad, announces that F. A. Ryer has been appointed purchasing agent for the system, with offices at the South Station, Boston. This action is under the new management for joint control of this road by the New York Central, and New York, New Haven & Hartford Railroads.

The announcement of the award of the contract for the new factory buildings to be erected by the Peck, Stow & Wilcox Company, Southington, Conn., reveals the magnitude of the company's plans. The machine shop building will be 50x300 ft., five stories; the forge shop 60x400 ft., one story; the foundry 60x210 ft., with annex 30x112 ft., all one story; a building for miscellaneous purposes 40x112 ft., one story, and a wood-working building 40x154 ft., two stories. All will be of brick and steel construction. In addition the power house will be 40x100 ft. In it will be installed a Westinghouse steam turbine and Babcock & Wilcox boilers to generate 1000 hp.

The Connecticut Supreme Court has handed down a decision in favor of the Connecticut River Company, which will enable that corporation to proceed with the erection of a dam across the Connecticut River at Windsor Locks and Enfield, and the establishment of a power plant and electrical transmission system. This project has been under way for several years, but litigation between rival companies has until now prevented the carrying out of the plan. Not only will a large water power be developed, from which electric power will be transmitted for industrial purposes, but a system of locks in conjunction with the dam, will make possible the navigation of the river to Springfield and beyond to Holyoke.

The Industrial Development Company, of the Boston Chamber of Commerce, has been organized under a charter granted by the Massachusetts legislature, to assist in the development of manufacturing in Boston. The company is establishing a guarantee fund of \$500,000, which will be utilized under the usual method in guaranteeing the credits of industries with national banks. James J. Storrow, Lee, Higginson & Co., is the president; Thomas F. Beal, the Second National Bank; Colonel William A. Gaston, the National Shawmut Bank, and Daniel G. Wing, the First National Bank, vice-presidents; Russell G. Fessenden, the American Trust Company, treasurer; David F. Edwards, secretary.

The reorganization of the Bay State Brass Company, Haydenville, Mass., has been completed, with F. C. Smith, president; S. S. Cassard, vice-president and secretary, and H. J. B. Willis, treasurer. The business at Haydenville will be continued, including the manufacture of compression bibs, stops and wastes, and ground key work. The company states that it contemplates no addition to the plant or equipment at present.

The New York, New Haven & Hartford Railroad will increase its power plant at Cos Cob, Conn., by an extension having a capacity of four 4000-k.w. turbine-driven generators, of which three will be installed immediately.

The Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., plans to erect a steel addition to its factory.

Lewis Hawthorne, New Haven, Conn., manufacturer of sashes and doors, will erect a new shop building 40x150 ft. of brick, mill construction. He states that he will install new machinery throughout.

The R. Wallace & Sons Mfg. Company, Wallingford, Conn., manufacturers of silverware, will erect a power house of reinforced concrete and steel construction, 68x86 ft., one and two stories. New boilers and engine will be installed.

Additions to manufacturing plants in New England include the following: Bridgeport Elastic Fabric Company, Bridgeport, Conn., three-story mill building, 58x160 ft., with two-story ell; city of Holyoke, Mass., boilerhouse 30x40 ft.; Belfast Building Company, Belfast, Me., addition to the Belfast Shoe Factory; Clark Dye Works, Pittsfield, Mass., dye house; Niantic Menhaden Oil & Guano Company, Niantic, Conn., steel and concrete building, replacing plant recently destroyed

THE MACHINERY MARKETS

by fire; Hill & Cutler, Boston, cotton-waste mill at New Bedford, Mass.

The H. B. Ives Company, New Haven, Conn., builders' hardware, will erect an addition 40 x 110 ft., four stories.

The Bay State Belting Company, Salem, Mass., will erect a three-story tannery building of brick and concrete.

Philadelphia.

PHILADELPHIA, PA., June 6, 1911.

The market shows but little tendency toward improvement. Several moderate propositions, which have been before the trade recently have been closed during the week, but as the business was pretty generally distributed it was not much of a factor as far as bringing up the total sales of individual manufacturers and merchants for the past month. Generally speaking, May was a rather unsatisfactory month, in few instances have aggregate sales showed any material gain and in some cases business has shown a decline. Manufacturers are hopeful for an improvement, but with general uncertain conditions in the industrial field the outlook for any early betterment is not very promising. There has been no fresh inquiry from the railroads located in this vicinity. The demand for second-hand machinery and tools has a tendency to drag. There is an absence of any tool lists of any importance, current business is confined to small lots, principally single tools, and the demand for these appears somewhat less urgent. A very fair amount of boiler and engine business is pending, but orders close very slowly. The foundry trades are, if anything, less actively engaged. In certain classes of work casting plants have fewer orders on their books than has been the case for a long time and plants are being operated on a restricted basis.

Local contractors are estimating on a one-story brick and steel artillery ammunition assembling shop, 58 ft. 6 in. x 258 ft. 10 in., and a one-story brick and steel scrap storehouse, 42 ft. 10 in. x 86 ft. 5 in., to be built for the Frankford Arsenal, this city.

A. L. Rhoads, county controller, Reading, Pa., will receive bids until June 20 for the construction of a reinforced concrete arch bridge to be erected at Kutztown, Pa., including the removal of the present bridge and its re-erection on a new site. Plans and specifications can be obtained at the office of the County Commissioners, Reading, Pa., on payment of a small deposit, which will be refunded on return of the plans.

The Nazel Engineering Works reports a fair demand for special machinery, although less pronounced than was the case some weeks ago. Its plant, however, continues actively engaged, being operated at full time and with full working forces, and sufficient orders are on its books to keep it so engaged for some time. Deliveries of Béch  patent pneumatic forge hammers have been particularly good during the last month or two, including among other two 770-lb. hammers for the Flannery Bolt Company, Pittsburgh, Pa.; one 165-lb. hammer for Henry Disston & Sons Company, this city, and one each of the 250-lb. size for the Carnegie Steel Company, Bessemer, Pa., The Boston Elevated Company, Boston, Mass., and Edward Harrington & Son Company, this city.

The Chester Milling Company, Chester, Pa., whose plant was recently destroyed by fire, contemplates the erection, it is reported, of a substantial structure to replace its late plant. Details are not available at this time, but it is understood that plans call for a steel and concrete building.

The Light Mfg. & Foundry Company, Pottstown, Pa., advises that the demand for its product is increasing and it is looking forward to having a normal production during the next month or two. Business in hand is quite satisfactory.

The Board of Awards, Baltimore, Md., has ordered that new specification for proposals for a 30,000,000-gal. pump for the Mount Royal Pumping Station, in that city, be prepared. It is understood that the changes suggested do not affect the previous specifications as to the pump itself, but refer more particularly to the method and apportionments of the payment to be made.

The Chadwick Engineering Company, Pottstown, Pa., advises that the demand for automobiles has opened up much earlier than usual. A steady flow of orders has been coming in and the outlook for further business is very encouraging. This company calls particular attention to the fact that inquiries from abroad are increasing and several sales are reported, including a large auto-

mobile shipped to a customer in Argentine Republic, with a second to follow at an early date.

City Councils, of Philadelphia, has apportioned an expenditure of \$2,300,000, made available by a recent special election, approving such a loan, by which the Bureau of Water will receive \$525,000 for the completion of the Queen Lane Filtration Plant; the Bureau of Surveys \$325,000 for new sewer work; the Bureau of Highways \$500,000 for the Torresdale Boulevard and \$600,000 for new street work, while the Bureau of City Property receives \$250,000 for the improvement of League Island Park.

Murphy & Lewis is a new partnership, with offices in the Land Title Building, Philadelphia, composed of E. T. Murphy and A. T. Lewis. The new company was formed to act as sales engineers for the Buffalo Forge Company, Buffalo Steam Pump Company and Carrier Air Conditioning Company, in the territory formerly handled by E. T. Murphy.

Cleveland

CLEVELAND, OHIO, June 6, 1911.

Local machinery houses report a little more activity in the volume of inquiries during the past few days, a few manufacturing plants having come into the market for small lots of tools. The largest inquiry is from an Akron rubber tire manufacturer, who has an inquiry out for three lathes and a few other tools, in all aggregating about \$8,000. There is a fair demand for second-hand tools, but these are not bringing very satisfactory prices. While the general outlook shows little change, there is a feeling that the reduction in steel prices will prove beneficial to some lines of the machinery trade. There is a fair amount of prospective business that has been held up for some time, buyers waiting until business conditions are brighter.

The demand for cranes is more active, some good orders having been placed with manufacturers in this territory during the past few days. The demand for electric motors and generators is fairly good. Manufacturers of power plant and other equipment are getting quite a satisfactory volume of business from various manufacturing plants outside of the metal working lines.

A list of machine tool requirements for the manual training department of the Public South High School, Akron, Ohio, has been issued by H. V. Hotchkiss, superintendent of schools in that city. The list includes 15 10-in. woodturning lathes with 4-ft. bed, 15 lathe benches, one 30-in. band saw, one circular saw bench, one power grind stone mounted with 30 x 5-in. stone, one wood trimmer and a large list of small tools and other small equipment for the forge room and the wood working and pattern making departments. It is expected that orders for this equipment will be placed shortly.

Specifications have been completed for the power equipment for the new West Side Technical High School, Cleveland, for which bids will be received June 12. The equipment will include 4 horizontal tubular boilers, 4 automatic stokers, 3 direct-connected generating units, 1 50-kw. and 2 125-kw., three motors for plenum ventilating fans and 10 or 12 2 to 5-hp. motors for the exhaust fans. At the same time bids will be received for the heating and ventilating systems.

The Massillon Wire Basket Company, Massillon, Ohio, which was recently incorporated, has purchased the property of the Munger Wire Basket Company and will continue the manufacture of wire baskets for various purposes. The company expects to erect additional buildings to enlarge its plant.

The Youngstown Carriage Company, Youngstown, Ohio, has awarded a contract for the erection of a new three-story factory building, 100 x 150 ft., of brick and three stories.

Preliminary plans have been completed for the erection of a new plant to be erected by the American Can Company in Toledo, Ohio, that will cost, approximately, \$350,000. Two buildings of steel, reinforced concrete and brick will be erected. George S. Mills, Toledo, architect, is preparing the plans.

The Strainer Company, Cleveland, has been incorporated with a capital stock of \$10,000 by A. A. Neiger, L. B. Spanner, E. W. Miller and others to manufacture straining and filtering devices.

With a capital stock of \$40,000, the Cleveland Calculating Machine Company has been incorporated by E. A. Grant, C. J. C. Grant, A. S. Dennis, J. F. Pease and W. L. Flory.

THE MACHINERY MARKETS

The Great Lakes Welding Company, Cleveland, has increased its capital stock from \$20,000 to \$50,000.

The Canton Casting Company, Canton, Ohio, has been incorporated with a capital stock of \$30,000 by L. E. Shull, W. A. Strayer, L. A. Buchanan, O. F. Kwiatt and A. J. Hill.

The Northern Ohio Traction & Light Company, which has commenced the erection of a new power house at Cuyahoga Falls, Ohio, will also build a car repair shop at that point.

The Universal Machine Company, Toledo, Ohio, has increased its capital stock from \$25,000 to \$100,000.

Cincinnati

CINCINNATI, OHIO, June 6, 1911.

There is some intermittent buying of machine tools on the part of the general trade, but the aggregate of orders coming in is disappointing. Inquiries are also scarce, and several more machine tool builders have decided to run on shorter time rather than pile up large stocks. A few, however, report order books in shape to enable them to continue operating up to capacity. As a rule, present buyers are said to be after the lower priced tools, and this has undoubtedly helped out the second-hand dealers, who are, comparatively speaking, doing a fair business.

Activity in the building trades has benefited the supply and hardware houses; manufacturers of valves and fittings also continue their optimistic reports. Boilers and tanks, especially of the larger sizes, are not in demand, but there is considerable repair work being done in this line.

The Domestic Science Baking Company, a new Cincinnati incorporation, has broken ground for what is intended to be one of the most modern baking plants in the country. The building will be about 200 x 200 ft., two stories and of concrete construction. The machinery will be driven by individual electric motors, which are yet to be provided for. F. W. Niebling, of the F. W. Niebling Company, Norwood, Ohio, has the machinery plans in charge.

The American Foundry & Machine Company, Hamilton, Ohio, has commenced work on a foundry addition that will be 100 x 117 ft., one-story, and also a three-story pattern shop 30 x 100 ft. Both buildings will be of reinforced concrete construction.

Cincinnati manufacturers have lately been receiving some excellent business from the Japanese Government. Among recent orders reported from this source is one for a lot of the United States Electrical Tool Company's latest type electrical grinders for use in a navy yard shop.

McGarvey & Co., Gerke Building, Cincinnati, have been awarded the contract for the construction of the large car barns to be erected at Winton place, for the Cincinnati Traction Company.

The Concrete Steel Company, Cincinnati, has been awarded the contract for the construction of a large reinforced concrete building at Columbus, Ohio, for the Citizens Wholesale Supply Company. The estimated cost of the proposed structure is over \$100,000.

The Universal Machine Company, Toledo, Ohio, has increased its capital stock from \$25,000 to \$50,000, and will probably add to its factory facilities for the manufacture of marine motors and other specialties.

The Massillon Wire Basket Company, Massillon, Ohio, whose incorporation was recently mentioned, has plans under way for adding to the old plant of the Munger Wire Basket Company, which was acquired by the new company.

George U. Marvin, secretary of the Board of Managers Ohio Penitentiary, Columbus, Ohio, will open bids June 26 for equipment for a stone-crushing plant and quarry. Specifications are on file at the offices of Marriott, Allen & Hall, architects, Columbus.

The Cincinnati Tobacco Machinery Company, Cincinnati, is a new incorporation, with \$50,000 capital stock, for the purpose of manufacturing special tobacco machinery. The incorporators are: W. J. Friedlander, Louis A. Hauck, F. S. Baldwin, Oscar Berman and Aaron Grodsky. W. J. Friedlander, the principal incorporator, is president of the Hisey-Wolf Machine Company, Cincinnati.

Announcement is made by Postmaster General Frank H. Hitchcock that bids will be opened in Washington, June 22, for the construction of a 30-in. pneumatic tube from the post office in Cincinnati to the Union Station.

The recent increase in the capital stock of the Ohio Electric Car Company, Toledo, Ohio, from \$150,000 to \$250,000, is said to mean some extensive additions to its present facilities.

Although currently reported, Herman Schneider, dean of the Engineering Department, University of Cincinnati, will not accept the presidency of a Western college, recently offered him, but has definitely decided to continue his work with his present institution.

Chicago

CHICAGO, ILL., June 6, 1911.

A week of decided quiet has prevailed in almost every branch of the machinery trade. The closing of even the lesser inquiries is long drawn out and railroad lists that have been out for one and two months are still pending. Scattering orders are of a desultory character, and floor sales are few and not especially attractive. One list issued by the Atchison, Topeka & Santa Fe has been purchased, the majority of the business going to the two principal makers of heavy railroad tools. A second list of tools from this road is still open. Bids on a small list from the Chicago, Rock Island & Pacific close on the 6th inst. The International Harvester Company purchased tools for its Deering plant to the amount of from \$4,000 to \$5,000, but has not yet closed for its Milwaukee plant requirements. The machinery to be bought by the American Steel & Wire Company, for its various plants to the aggregate amount of \$70,000, continues to be the most important item of interest.

The Joliet Sand & Gravel Company, Joliet, Ill., and Fisher Building, Chicago, is having a crusher plant constructed at its works at Mount Flathead.

Sheboygan, Wis., is considering improvements to its waterworks system to cost about \$50,000.

The Gisholt Machine Company, Madison, Wis., has awarded contracts for improvements to its plant, the cost of which will be \$155,000. Of this amount \$40,000 will be for an office building, and the balance for shops. Part of the shop will have a gallery and the entire building will be modern in every respect and of fire-proof construction.

The city of New London, Iowa, is rebuilding its light plant which was recently destroyed by fire. A modern plant will be installed, for which purpose bonds in the sum of \$9,000 will be issued.

The Francis Light & Power Company, Francis, Okla., has been incorporated with \$10,000 capital stock. Contracts for the installation of the plant have not been let. W. L. Shaffer is vice-president of the company.

Liberal, Kans., is having estimates prepared for a \$30,000 water-works system.

Detroit

DETROIT, MICH., June 6, 1911.

Industrially business has been very quiet the past week, in fact more subdued than has been the case for any week since March. Orders for new machines from motor car manufacturers have been much below the average maintained so far this year. No fears are held, however, by the makers or by the accessory men, the lull being attributed to the touch of midsummer weather. Sufficient orders are on hand by most of the companies throughout the state, to keep the plants running far into the fall. Building operations are very active, two large hotels being planned for immediate erection. Several factory additions are under way.

David Stott, of this city, has purchased a large piece of property on Wayne and Michigan avenues, where he will erect a 12-story hotel to cost \$1,000,000. The building will be modern in every particular and will be one of the largest in the city.

W. C. Durant and Louis Chevrolet are to sever their present business connections and establish a large factory in this city for the manufacture of a new high-priced car, designed along lines advanced by Louis Chevrolet. The new concern will be financed by Mr. Durant, who has been drawing away from the General Motors Company for several months.

Considerable structural steel will be used in the building of the newly-planned auditorium and hotel, for which a company has been organized this week. The auditorium will seat 9000, and the hotel will contain 700 rooms. The building will occupy a whole block, will be nine stories and will cost about \$2,000,000. Par-

THE MACHINERY MARKETS

ticulars are to be had from the Board of Commerce.

With the idea of increasing its plant capacity and enlarging its business, the Independent Stove Company has increased its capital stock from \$175,000 to \$225,000. The company has been enjoying a big business the past year.

The Commerce Motor Car Company, incorporated a short time ago, with a capital stock of \$10,000, has found this amount of capital stock inadequate and has increased it to \$25,000.

One more addition to the long list of motor car concerns of this city is the Redshield Hustler Power Car Company. The company has been incorporated with a capital stock of \$40,000, and will start operations in a property costing about \$20,000.

The Detroit Power Apparatus Company was organized this week with a capital stock of \$50,000, to manufacture machinery parts and machine tools. The company takes a prominent part among the machinery manufacturers of this city.

A new company has been organized at Muskegon, Mich., under the name of the March Tenney Company, to manufacture drinking and soda fountains. The capital stock is \$30,000, of which \$20,000 is paid.

Morril & Morely, dealers in spray pumps, have merged their business into a stock company under the name of the Morril & Morely Mfg. Company, with an authorized capital stock of \$10,000.

An auto accessory concern was organized at Lansing this week with the title of the Haigh Auto Light Company. The company will make a patent automobile lamp. The capital stock is authorized at \$5,000.

The J. F. Hartz Company, dealer in surgical instruments, has increased its capital stock from \$30,000 to \$250,000. The company's business has increased by leaps and bounds the past year, and the increase will allow an expansion of the company's affairs.

The General Motors Company has filed articles of incorporation with the secretary of state with a capital stock of \$60,000,000. The new incorporation is a holding company for the company in New Jersey.

As a result of increase in business, the Armour Grape Juice Company, Mattawan, Mich., near Kalamazoo, will erect a large addition to cost in the neighborhood of \$10,000. This addition 100 x 100 ft. will give the plant a capacity of 300,000 gal. per year. New apparatus, consisting of pressers, sterilizers and other machinery connected with the business, to the amount of \$25,000, will be purchased.

The Terril Equipment Company, Grand Rapids, whose plant was totally destroyed by fire a few weeks ago, will erect a new building to cost about \$20,000 on the grounds of the old plant. Other buildings are in course of erection.

The Hardware Supply Company, Grand Rapids, Mich., has filed a trust mortgage with the city clerk, for \$10,000, to cover the cost of purchasing new machinery. The mortgage covers the stock and fixtures of the company.

The Belknap Wagon Works, Grand Rapids, suffered from a fire last week that destroyed the boiler room and the dry kilns above. The loss will reach about \$5,000.

Fire destroyed part of the plant of The Brunswick-Balke-Collender Company factory at Muskegon, Mich., causing a loss of \$25,000. The fire was mainly confined to the chemical plant.

The Snyder-Fuller Furniture Company, Grand Rapids, as an outcome of the recent labor troubles in that city, will move its plant to Lake Odessa, Mich. A suitable building will be remodeled and some new equipment installed.

The Dudley Tool Works, Menominee, Mich., will build a new addition to its plant and will purchase the necessary machinery equipment. The building will be about 100 x 140 ft.

The Kalamazoo Washer Company has been organized with a capital stock of \$20,000 to succeed the Minute Washer Company, Kalamazoo, Mich. Fred A. Mills remains as president.

The Kalkaska Handle Company, organized to manufacture handles of all descriptions, has filed articles of incorporation with the Secretary of State. The company will be located at Kalkaska, Mich., and has a capital stock of \$12,000.

A specialty manufacturing company has been organized at Plymouth, under the style of the Bennett Mfg. Company, and has a capital stock of \$20,000.

The American Oil Engine Company is the name of a company which, in all probability, will move to the

city of Port Huron. The concern is a large and important organization and will be a big addition to the city's list of industries.

The Council of the city of Big Rapids has reported in favor of a new gas plant, instead of spending \$25,000 in improvements to the old plant.

The village of Newberry, Mich., will submit to the vote of its citizens the proposition of bonding for \$11,500, to cover the cost of making additions and improvements to the city power plant. Of this amount it is planned to spend about \$4,000 in new machinery.

W. F. Woodhouse and Charles Tirolli, secretary and treasurer of the newly organized Michigan Adjustable Hub Company, Bay City, have secured 15 acres of land on which to construct their buildings. The company expects to employ about 1000 men.

The Michigan Glass & Bottle Company is erecting a large addition to its plant at Saginaw, which it is expected to rush to completion by July 10.

The city of Saginaw, Mich., has secured an important industry in the Central Cut Glass Company, Chicago. The company has a capital stock of \$4,100,000, and in making the move will transfer 100 mechanics with their families. A large plant will be built at the above city and the company will increase its output considerably.

The Golden Rule Hay Press Company, Kalamazoo, Mich., and the Business Men's Paper Press Company, Wayland, Mich., have consolidated, will very soon incorporate under a new name, and are now looking for the most favorable site on which to erect a large factory, and will consider the advantages of any locality. George F. Woodward, 945 Austin street, Kalamazoo, can be addressed.

Indianapolis

INDIANAPOLIS, IND., June 6, 1911.

The Traffic Club of the Indianapolis Trade Association has elected W. M. Young, traffic manager of the Nordyke & Marmon Company, president. He has been chairman of the Indianapolis Committee of the National Association of Automobile Manufacturers for three years. The Traffic Club is an organization composed of traffic managers and shipping clerks connected with the industrial and mercantile concerns of the city. H. S. McNeely is secretary.

The Indianapolis Wire Bound Box Company has increased its capital stock from \$5,000 to \$10,000.

The Indianapolis Envelope Company, Indianapolis, has been incorporated with \$125,000 capital stock, to manufacture envelope machinery and envelopes. The directors are: Herman Hoster, W. B. Emerson and H. B. Mahan.

The Benson Mfg. Company has been incorporated at Owensville, Ind., with \$25,000 capital stock, to manufacture agricultural implements. The directors are: W. E., J. E. and B. F. Benson.

The Fulwider-Bedford Quarries, Clear Creek, Ind., has been incorporated with \$100,000 capital stock, to quarry stone. The directors are: O. M. Fulwider, H. H. Underwood, William Graham, J. W. O'Harrow and G. D. Thornton.

The Carlisle Gas Company, Carlisle, Ind., has been incorporated with \$10,000 capital stock, to manufacture artificial gas. The directors are: W. F. Dodge, C. B. Willis, J. G. Frazee, Joseph Hume and E. W. Rogers.

The Rushville Furniture Company, Rushville, Ind., has been incorporated with \$30,000 capital stock, to manufacture furniture. The directors are: William E. Havens, A. S. Riggs and A. L. Stewart.

The Consolidated Light & Power Company has been incorporated at Hazleton, Ind., with \$35,000 capital stock, to supply light and power. The directors are: Ethelbert Curtner, Jesse Doty and J. T. Breithaupt.

The Henry Mfg. & Grease Cup Company, Terre Haute, Ind., has been incorporated with \$40,000 capital stock. The directors are: J. P. Gilmour, Michael Henry, Michael L. Henry, Jon Marmor and Charles Fox.

The Wayne Knitting Mills, Ft. Wayne, Ind., has increased its capital stock from \$1,000,000 to \$1,200,000.

The burning of the factory of the Northwestern Can Company at Chicago is hastening the completion of the company's factory at Brazil, Ind., the main building of which is 100 x 700 ft.

The Connersville Furniture Company, Connersville, Ind., has increased its common stock from \$75,000 to \$150,000, and has issued \$75,000 of preferred stock.

THE MACHINERY MARKETS

Goshen, Ind., has raised a bonus of \$10,000 cash to induce the removal of the Stephenson Mfg. Company from South Bend to Goshen. It manufactures knit woolen goods. It will be established in a building formerly occupied by the Goshen Rubber Company, and an additional factory will be built.

The Goshen Veneer Company, Goshen, has increased its capital stock \$10,000. C. E. Gorman is president of the company.

The plant of the Home Heating Company, Anderson, Ind., was sold at receiver's sale to the Anderson Trust Company, trustee, and will probably go to a newly organized company which proposes to install a larger steam-heating plant.

The Anderson Gas Company, Anderson, Ind., has awarded a contract for the installation of an artificial gas plant.

The Huntingburg Furniture Company, Huntingburg, Ind., recently incorporated, has had plans prepared for a building, 60 x 250 ft., one story and basement, of modern brick construction, to contain dry kilns, etc. The building will be equipped with modern appliances operated by steam power.

The South

LOUISVILLE, KY., June 6, 1911.

Some improvement in the machinery situation is reported locally, and conditions throughout this territory are becoming more active. There is a fair demand for power equipment, while machine tools, as the result of the equipment of a number of small shops, has taken on temporary life, which it has been lacking for some time. The demand for refrigerating machinery is good, an active export trade having been reported. Pumps and other equipment for installation in breweries and distilling plants are also being sold in good volume.

The annual convention of the Kentucky State Association of Stationary Engineers was accompanied by an exhibit of machinery and supplies which was held in Liederkrantz Hall, Louisville, June 2 and 3. Among the exhibitors were the William Powell Company, Cincinnati, valves; National Smoke Preventer Company, Louisville; Moran Steam Flexible Joint Company, Louisville; James Clark, Jr., Electrical Company, Louisville; Henry Vogt Machine Company, Louisville; Jenkins Bros., New York, valves; Lyons Boiler Works, DePere, Wis.; Wicker Boiler Company, Saginaw, Mich.; V. D. Anderson Company, Cleveland, steam traps; Ahrens & Ott Mfg. Company, Louisville; Hills McCanna Company, Chicago, force feed lubricators; Osborne High Pressure Joint & Valve Company, Chicago; J. J. Reilly Mfg. Company, Louisville, pumps, and Strong, Carlisle & Hammond Company, Cleveland, valves, in addition to a number of dealers.

The Henry Vogt Machine Company, Louisville, is contemplating the erection of an addition to its boiler department and may be in the market for a considerable amount of equipment for it a little later on. Meanwhile the company is planning the purchase of two or three steam drop forge hammers of 1000-lb. and 2000-lb. capacity, in place of the single piece of equipment it was originally reported to be in the market for. The company reports a fair demand for boilers, while several large sales of refrigerating machinery have been made. Two complete plants have been sold for delivery in British East India, while several other foreign orders have been booked lately.

The Electric Vehicle Company, Louisville, has leased the building formerly occupied by the American Clothing Company at Preston and College streets, and is installing equipment for the manufacture of cars. The capacity will be limited at first to three cars a week, including passenger-carrying and freight vehicles, the latter to be a 1000-lb. wagon. Later the capacity is to be increased. The company is incorporated with \$10,000 capital stock, but will probably increase this later. Among the machines installed have been a grinder of the Cortland Carborundum Wheel Company, an automatic saw of the Diamond Saw & Stamping Company, and a shaper of the Smith Mills Company. These pieces were sold by E. D. Morton & Co., of Louisville. Louis Ruthenberg is superintendent of the plant.

The Frederick Ruggles Mfg. Company, maker of automatic bottle filling machines, has moved its plant from 188 State street, Louisville, to Main street near Second, and has installed some new machinery, including a Century Electric Company motor, a Cisco lathe

and a Stewart Standard furnace manufactured by the Chicago Flexible Shaft Company, the latter piece being for the brass foundry. The output of the company is sold through the Simplex Bottle Filling Machine Company, Baltimore, Md.

The J. J. Reilly Mfg. Company, Louisville, maker of pneumatic pumps, has recently installed equipment in the plant of the Falls City Brewery, Louisville, and the distillery of W. A. Gaines & Co., at Frankfort, Ky.

The Multiple Sign Company has filed articles of incorporation in Louisville with \$10,000 capital stock for the manufacture of metallic signs. A. C. Bowen, John C. Hughes, George T. Wood and others are the incorporators.

The Falls City Construction Company, Commercial Building, Louisville, has been given the general contract for the construction of a 10-story building at Center and Jefferson streets, Louisville. The building will involve a considerable tonnage of structural material, and the general contractor will let a subcontract for the erection of the iron work. The total cost of the building will be \$100,000, and a good deal of equipment, including elevators, etc., will be required.

The Jeffrey Mfg. Company, Columbus, Ohio, has secured the contract for the installation of a considerable amount of conveying machinery in the coal elevating plant of E. T. Slider in Louisville. The sale was made through Fred Wehle, the company's local representative.

The George G. Fetter Lighting & Heating Company now has its new plant in operation. Practically all the machinery for it was installed by the Westinghouse Machine Company. The equipment consists of two 300-kw. generators, a 200-kw. generator, two 100-kw. generators, four Ridgway engines and a Parsons low pressure turbine. Westinghouse motors were also installed in connection with the various divisions of the refrigerating plant. J. Hoadley Cochran is chief engineer of the company.

Peter M. Andriot & Son, 215 West Green street, Louisville, are planning the installation of additional forges in their blacksmithing department, as well as a gas machine for heating and lighting purposes. They manufacture delivery wagons.

The Louisville Wheel Company, at Fifteenth street and St. Louis avenue, has installed a spoketurning department. Equipment for it was furnished by the Defiance Machinery Company, Defiance, Ohio.

The Luton Coal Company, Providence, Ky., which recently incorporated with \$100,000 capital stock, will begin work immediately and will install a good deal of new machinery.

E. K. Hitchens, of the Olive Hill Fire Brick Company, Olive Hill, Ky., will establish a plant for the manufacturer of fire brick in Carter County, Ky.

James H. Reed, Lexington, Ky., and associates will establish a plant for the manufacture of asphalt paving. The estimated cost of the plant is \$12,000.

George H. Johnson, Madisonville, Ky., is organizing a company at Greenville, Ky., for the purpose of erecting a large flour and meal milling plant.

The Petersburg Electric Light & Power Company, Petersburg, Tenn., has filed articles of incorporation with \$21,000 capital stock, A. C. Davis and George McAdams being among the incorporators. It will erect a lighting plant at once.

The Tennessee Stove Works, Chattanooga, Tenn., has amended its charter, increasing its capital stock from \$50,000 to \$100,000. J. L. Caldwell, Joe H. Caldwell, B. B. Davenport and others are incorporators.

B. C. Jarrell & Co., Humboldt, Tenn., veneer manufacturers, have completed the installation of a 100-in. rotary veneer machine with clipper and knife grinder. The equipment was manufactured by the Capital Machine Company, Indianapolis.

The Chattanooga Estates Company, Chattanooga, Tenn., through C. E. Jones, has announced the completion of arrangements for the construction of a cement plant with 9000 barrels capacity. Chicago capital will be interested, according to Mr. Jones' statement.

The American Foundry & Supply Company has been organized at Asheville, N. C., with \$50,000 capital stock, taking over the plant of the Sternberg Supply & Foundry Company. New buildings for foundry and machine-shop work will be erected and considerable equipment will be required. The plant will be completed in September.

The Interstate Agricultural Corporation has announced plans for the erection of a \$100,000 acid plant for the manufacture of a preparation to be used in making commercial fertilizer at Americus, Ga.

THE MACHINERY MARKETS

The Fletcher Guano Company, Augusta, Ga., is having an addition built to its fertilizer plant. The cost of the building and equipment will be \$20,000.

F. Lynn Brown, Chicago, Ill., is reported to be planning the erection of a gas plant at Moss Point, Miss. The estimated cost of the proposed plant is \$150,000.

F. S. Twitty and others are planning the construction of a hydroelectric plant at Columbia, Ala. The cost of the plant will be \$8,000, according to present plans.

The Champion Lumber Company, a New Jersey corporation, is planning the erection of several large band mills near Canton, N. C. The plants will be operated in connection with wood pulp mills which are now running.

The Hattiesburg, Miss., Traction Company is planning some new financing to enable it to make a number of improvements in its equipment and to extend its lines.

The Georgia School of Technology, Atlanta, Ga., has in course of erection a building to contain smith shop, foundry, general locker and toilet rooms, library room and administration offices. Further plans include other additions to contain a machine shop and a wood-working shop which will require considerable additional machinery. These buildings will be erected later on. Francis P. Smith, who is connected with the school, is the architect.

The United Wells Works, Stuttgart, Ark., has awarded a contract for the sinking of a 1500-ft. artesian well at Blythesville, Ark., and is in the market for 1500 ft. of 8-in. wrought iron steel pipe weighing not less than 28 lb. to the ft.

St. Louis

ST. LOUIS, Mo., June 5, 1911.

The manufacturing plants of the Sodemann Heat & Power Company in St. Louis and Edwardsville, Ill., which have been taken over by the United States Radiator Corporation, will be refitted with modern machinery equipment for the handling of the trade in the St. Louis territory.

Brauer Bros. Mfg. Company leased new quarters this week at Fourteenth and Pine streets and will at once enlarge its equipment for the manufacture of all kinds of leather sporting goods and dog collars.

The Automobile Gas Generator & Motor Company, St. Louis, incorporated the past week with \$50,000 capital stock, will engage in the manufacture of lighting devices for automobiles and will also manufacture motors and cars.

The Moberly Paving Brick Company, of Ohio, has been licensed to use one-half its capital in Missouri and will establish a plant at Moberly, Mo., fully equipped with modern brick-making machinery.

The Western Refrigerator & Mfg. Company, of St. Louis, has increased its capital stock from \$12,000 to \$25,000 and will increase its mechanical capacity for the manufacture of refrigerating machinery.

The Swedish Metal Company, with \$50,000 capital stock fully paid, has been incorporated here by George G. Hadley, Charles F. Reals and Wilson D. Hoyt to manufacture metal wares of various kinds.

The Newburg Tripoli Company, Newburg, Mo., has been incorporated with \$50,000 capital stock by Henry P. Siegel, C. T. Dana and L. M. Finley, to engage in the manufacture of filters, utilizing a stone recently discovered at Newburg.

The Diamond Jack Mining Company, Cartersville, Mo., incorporated this week by L. S. Connor, Frank P. Blair and O. L. Robbins, is reported to be in the market for a full equipment of zinc and lead mining machinery and other mechanical facilities for the work.

The Laclede Steel Company, with \$100,000 capital stock, has been incorporated in St. Louis by William E. Guy, George D. Markham, George O. Carpenter, L. R. Carter, J. H. Smith, Joseph W. Lewis and Thomas R. Akin. This is preliminary to an increase of capital to \$500,000, which will be utilized in the construction at once of a modern and fully equipped steel plant. Options for locations cover sites in both St. Louis and East St. Louis.

The Eagle Mfg. Company, Kansas City, Mo., will in the near future erect a factory in Muskogee, Okla., details of which have not been decided upon.

Eastern Canada

TORONTO, ONT., June 3, 1911.

The immigrants who are now pouring into Canada are by no means all farmers. There is a large infusion of artisans, who, like the majority of the farmers in the movement, came from the United States. Slackness in the iron and steel industries of the United States is responsible for a considerable influx of skilled workers who had found employment in those industries. These are very welcome. Skilled labor has been at a premium here for some time. The influence of the labor union has been adverse to the immigration of such workers from the other side of the Atlantic, the Government requiring that all wageearners from abroad, except those coming to work on the farms, should have a minimum amount of money upon their arrival. Skilled laborers were not disposed to come in large numbers from the United States until conditions at home changed somewhat for the worse. In most manufacturing industries here labor is still scarce, factories having more business on hand than they can attend to with the present supply of workers. The cut in steel continues to have a favorable effect on trade in all lines using steel as raw material, the demand for equipment, machinery, etc., being so urgent that no one thinks of trying to ease down operations on the chance of stocking up at still lower prices.

A feature of the trade is the sudden development of new business. This is a consequence of the swarming in of new population with large collective buying power. A colony will be established by a few trainloads of settlers, and at once plants of various kinds become called for to provide for commercial needs of the settlement. Of course Canadian manufacturers have not all the new business to themselves. American competition is reported to be keener and harder to meet than ever. But there is trade enough for the Canadian plants. They were never busier. All the indications give ground for expecting the biggest year's trade the country ever had. Unless all the signs fail, there will be quite wonderful advances here in the next twelvemonth. The country has reached a stage at which the large forward movements of the past look small. Great enterprises spout up in a night. A reason for the relatively phenomenal progress that is proceeding is the present organization of capital. Under the auspices of certain powerful groups of men new undertakings spring up as if by magic, whereas a few years ago their coming forth would be attended by pains.

The Canadian Government is receiving sharp criticism on behalf of the British Empire Bridge Company for the awarding of the Quebec Bridge contract. The company—a Canadian corporation of which the components were certain British engineering companies—put in the lowest tender for the work as called for by the official design, but the contract was awarded to the St. Lawrence Bridge Company upon a tender for a different design.

The first shipment was made this week from the new concrete pier of the National Iron Works, Toronto. It consisted of 2500 tons of cast-iron pipe, running from 4 to 20-in. in diameter, and was consigned to the Winnipeg Gas Company, Winnipeg, and the Waterworks Department of Souris, Man., and Moose Jaw, Sask. A boat will leave the company's dock twice a week with pipe for points in the West.

The Department of Railways at Ottawa has completed arrangements for the beginning of construction on the Nova Scotia branch lines of the Intercolonial Railway.

The Wyagamack Pulp & Paper Company, Three Rivers, Que., will shortly make a large capital issue to be applied in the construction of plant.

N. Curry, president of the Canadian Car & Foundry Company, announces that \$200,000 will at once be spent in extensions of the company's plant at Montreal. At present the works turn out about 70 cars a day. The output is to be raised to 100 cars.

The ratepayers of St. Catharines, Ont., have given their approval to the agreement between the municipal corporation and the Canadian Yale & Towne Company for the establishing of the latter's works in the city. The company has now a force of men at work in the city making dies for the manufacture of Yale locks and other articles.

The mines of the Moose Mountain Iron Company at Sellwood, Ont., have been closed down, 250 men being

THE MACHINERY MARKETS

thrown out of employment. This is said to be on account of dullness in the iron and steel industries of the United States. The company is to begin work very shortly on a concentrating plant to cost \$300,000.

The Eastern Power Company has been incorporated under Ontario laws. It is stated that it will construct another plant on the Trent River, Ont. It is believed to be a subsidiary of the Electrical Power Company, which controls so many power enterprises in central Ontario.

The Superior Rolling Stock Company has been incorporated by parties connected with the Lake Superior Corporation. It will manufacture locomotives, cars, etc., at Sault Ste. Marie, Ont.

The Canadian Electric Welding Company, headquarters Montreal, has been incorporated as a Dominion undertaking with \$500,000 capital stock.

Damage estimated at \$50,000 was done by a fire at the Lake Superior Corporation's coke ovens at Sault Ste. Marie, Ont., on May 29.

The ratepayers of Guelph, Ont., have approved a by-law to loan the Independent Fire Company \$20,000 to start up business there.

At its annual meeting in Hamilton, Ont., this week, the Steel Company of Canada elected the following directors: C. S. Wilcox, Hamilton, president; Charles Alexander, Providence, R. I.; Hamilton Benn, London, England; Lloyd Harris, M. P., Brantford; H. S. Holt, Montreal; W. D. Matthews, Toronto; Hon. William Gibson, Beamsville; Cyrus A. Birge, Robert Hobson, William Southam and John M'Ine, Hamilton.

The Oliver Chilled Plow Company, Brantford, Ont., has awarded contracts for two more large buildings. The contracts went to an American firm.

Vickers Son & Maxim, shipbuilders, England, have applied to incorporate their Canadian company as a British concern with a capital stock of a million sterling.

The National Paper Company has been incorporated at Ottawa with a capital stock of \$100,000, Montreal to be the chief place of business.

The Canadian Pacific Railway Company has taken out a permit to build a roundhouse at London, Ont. New repair shops are to be built there by the company in the autumn.

In the fiscal year ended with last March, \$528,857 was paid in bounties on wire rods. The pig-iron bounties amounted to \$261,453 and the steel bounties to \$350,455. The latter two bounties expired in December.

It is announced that the Canadian Northern Railway Company will at once call for tenders to construct the section of its line around the north shore of the upper Lakes from Sillwood, near Sudbury, to Port Arthur, a distance of 500 miles.

A by-law to expend \$25,000 on the municipal hydro-electric distributing system was carried by the ratepayers of Galt, Ont.

The Riverside Motor Company, with head office at Walkerville, Ont., has been incorporated under Ontario laws with a capital stock of \$40,000.

Tenders for extensive harbor terminal improvements to be made at Halifax, N. S., are being called for by the Canadian Department of Railways, Ottawa. The total estimated cost is \$2,000,000. An appropriation of \$600,000 for the purpose was passed before Parliament rose.

The Otonabee Power Company, Peterborough, Ont., proposes to spend \$200,000 upon new plant.

The Dominion Flour Mills, Ltd., has been incorporated with a capital stock of \$1,500,000, the head office to be in Montreal. A 2000-bbl. mill is to be built at Lachine, Montreal.

The Hull Electric Company, Hull, Que., will spend \$25,000 on new car sheds and repair shops.

Very extensive harbor improvements will soon be begun at St. John, N. B., by the Department of Public Works at Ottawa.

The Rhodes-Curry Company will rebuild the part of its plant at Amherst, N. S.

The N. B. Foundry plant at Frederickton, N. B., was destroyed by fire, causing a damage of \$50,000.

The ratepayers of Ingersoll, Ont., have carried a by-law to fix the assessment of the John Marrow Screw Company, which will put up an additional plant to cost \$150,000.

The Burton Saw Company, Vancouver, B. C., is negotiating with the City Council of Moncton, N. B., in regard to locating there.

The Dominion Corset Company, and Carabello Carriage Company, Quebec, Que., were damaged by fire. The estimated losses aggregate \$250,000.

The Massey-Harris Company, manufacturer of agricultural implements, is completing plans for a three-story addition, 60 x 180 ft., to be made to its plant in Brantford, Ont.

O'Keefe & Drew are erecting a meat-packing plant in Chatham, Ont., to cost \$80,000.

W. E. Jennings, a manufacturer in Birmingham, England, is considering the question of establishing a factory at Niagara Falls, Ont.

The Light Commission of Berlin, Ont., has decided to ask for \$20,000 to be expended upon additions to the municipal electrical system.

The Chatham Cement Tile Works Company will build a factory and begin manufacturing operations in Chatham, Ont.

Western Canada

WINNIPEG, MAN., June 3, 1911.

The Prince Rupert Hydro-Electric Company is the title of a company incorporated under Dominion laws, whose capital stock is to be \$5,000,000 and principal place of business Prince Rupert, B. C. Charles H. Canan, K. C., and H. A. Lovett, K. C., are prominent Montreal men connected with it. The former is president of the Western Canada Power Company. Twenty-five thousand horse-power is to be developed on branches of the Skeena River.

The Railway Department at Ottawa is now calling for tenders for the construction of the first 185 miles of the Hudson Bay Railway. The contract will be open till August 1.

The ratepayers of Medicine Hat, Alberta, have voted in favor of the by-laws to grant to the Alberta Foundry & Machine Company and to the Glass Company a free site and 250,000 cu. ft. of gas per day to each. D. C. Cameron, Winnipeg, is behind the glass project. Next month the ratepayers will vote on by-laws to grant sites to the Preston Planing Mills, the Gardon Nail Mills and the Medicine Hat Milling Company.

The Roberts Filter Mfg. Company, Philadelphia, will install a water filtration plant at Saskatoon for \$55,890.

A by-law to expend \$300,000 on the sewer system of Victoria, B. C., has been approved by the ratepayers.

Up to July 1 tenders will be received by the Bow River Bridge Company, Calgary, Alberta, for the construction of a three 100-ft. span, steel traffic bridge.

The Grand Trunk Pacific Railway Company will erect a building in Victoria, B. C., to cost \$300,000.

Ald. Rogers is building a 10-story structure in Vancouver, B. C., to cost \$500,000.

The Norton-Griffiths Steel Construction Company has the contract to erect a filter house for the B. C. Sugar Refining Company, Vancouver, B. C., to cost \$80,000.

The Nicola Valley Coal & Coke Company, Vancouver, B. C., has given to Roberts & Schaefer, Chicago, a contract to install a Stewart coal-washing plant and mine tipples.

Work has been begun upon the site of the Port Arthur Wagon Works, Port Arthur, Ont.

The Lumby-Stenhouse Company's foundry building at Fort William, Ont., was destroyed by fire.

Work is shortly to commence on a \$75,000 incinerator in Calgary, Alberta.

It is stated that the Superior Rolling Mills Company will begin the construction of its plant at Fort William, Ont., at once.

Charles M. Hays, president of the Grand Trunk Pacific Railway Company, says that company will build 545 miles of branch lines this year in the West.

The Pacific Coast

SAN FRANCISCO, May 31, 1911.

The demand for metal-working tools is again picking up, and while the market is still rather spasmodic there are indications of a gradual improvement. The sales of some dealers for the last three months have been about 25 per cent larger than for the same period last year. The oil interests are still among the principal buyers of the heavier types of tools, though the larger railroads are coming into the market to some extent, and a few tools have been purchased by the smaller local roads. One encouraging feature is the placing of orders for tools which have been needed for a long time.

The principal business now under way is the purchase of a lot of tools by the Standard Oil Company

THE MACHINERY MARKETS

for its shops in southern California, some of which have already been ordered. The installation includes a plate-bending roll of fairly large size, several lathes and a number of smaller tools. This company is preparing to erect a large plant near Los Angeles, and is likely to be in the market for more equipment later in the year. It is believed that some tools will also be required before long for the shop at Richmond, Cal.

The Southern Pacific Railroad is arranging for the purchase of a lot of tools for its Los Angeles shop. Nothing of unusually large size will be required, but the installation will be one of the largest of the season.

Orders have recently been placed for a number of steam hammers and cranes, and several transactions of the same nature are now pending.

Most other lines of machinery are rather quiet, though there is considerable inquiry for second-hand equipment of all kinds, large machinery and contractors' supplies being more active than for some time past. If building operations around San Francisco Bay continue to increase there should be a good business in new concrete mixers. The Spring Valley Water Company is about to start work on one of the largest concrete dams in the State, and will probably be in the market for a lot of general equipment, including electric motors.

Laundry machinery has been in unusually strong demand for the last month, especially in southern California, where the change from a ten-hour to an eight-hour working day has made larger plants a necessity. From now on, however, no exceptional activity is anticipated in this line.

The demand for small pumping engines in this territory is unprecedented, practically all the shops in this line being operated at full capacity. In addition to the local demand, there is considerable foreign business, the Geo. E. Dow Pumping Engine Company having recently taken large orders for shipment to Chile. While there is some demand for municipal water-works plants, the principal business is in irrigating pumps, consisting almost entirely of small units. While gasoline still occupies an important position as motive power for irrigation, electricity is rapidly replacing it in all localities served by the hydro-electric plants in the Sierra Nevada mountains. Many motors are being installed in the Santa Clara Valley, where steam plants were formerly used.

The Pacific Gear & Tool Works, formerly at 1267 Folsom street, is moving into a new brick building at the corner of Folsom street and Columbia square.

The California Harbor Board is in the market for a number of pneumatic tools for use on the belt railroad in San Francisco.

The California Motor Car Company has leased a large building in Oakland, and is making tentative inquiries for a lot of machine tools.

The Central California Machine Works has been incorporated at Fresno, Cal., with a capital stock of \$25,000, by C. M. and S. A. Heinsen, B. F., C. A. and G. Cathcart.

James P. Lucey has succeeded F. J. Fewings as president of the Consolidated Mfg. Company, which is working on a stove foundry project at Sunnyvale, Cal.

The Ideal Valve Grinder Company has been incorporated at Los Angeles, with a capital stock of \$20,000, by N. E. Meredith, L. H. Schwaebe and L. A. Lothian.

An irrigating plant with a capacity of 180,000 gal. per hour is being installed by W. W. Muller at Maine Prairie, Cal.

J. Meklensen, Escondido, Cal., has secured a patent on a pumping device, and proposes to start a shop for its manufacture.

The town of Santa Rosa, Cal., has ordered an air compressor for the municipal pumping plant.

The Saline Valley Salt Company, organized to develop salt beds near Death Valley, Cal., is surveying for an 18-mile tramway to connect the property with the Southern Pacific.

The Associated Transportation Company is installing a new oil-heating plant on its pipe line near Salinas, Cal.

The Arizona Iron Works, Phoenix, Ariz., has been reorganized, the principal stockholders at present being A. M. Perkins, A. B. Duckworth and H. B. Duckworth, of Salt Lake City. It is planned to double the capacity of the plant, installing a new cupola and brass furnace.

The Government shop at Mare Island, Cal., is to build 30 launch engines of about 50 hp. this summer.

The city of Oakland, Cal., is taking bids on a ten-ton steam road roller.

It is reported that the Corliss Gas Engine Company,

Petaluma, Cal., has secured additional capital and will proceed at once with the enlargement and improvement of its shops.

The Stearns Gas Engine Works has been incorporated at Los Angeles, with a capital stock of \$40,000, by F. L. Stearns, E. M. Davis and J. R. Gilbert.

The National Oil Gas Producer Company has been incorporated at Los Angeles, with a capital stock of \$900,000, by J. B. Merrill, D. B., G. and E. A. Merrill, J. E. and A. Mohl.

The Golver Iron Works, Stockton, Cal., has made arrangements to move its plant to Sacramento. The site to be occupied has connection with four railroad lines, and is more convenient to the mining districts, than the former location.

The Sacramento Electric, Gas & Railway Company, Sacramento, Cal., is preparing to erect a new power house.

The city of Oakland, Cal., is in the market for a steam roller.

It is reported that the Southern Pacific Railroad will start work before long on its new shops at Newark, Cal.

The Eastern Oregon Realty Company is planning the installation of a large pumping plant for irrigating purposes near Union, Cal.

J. B. Hodgdon, Seattle, Wash., has invented a new gold dredging device, and is negotiating with manufacturers of machinery at Olympia, Wash., in regard to manufacturing and marketing the article. It is understood that Mr. Hodgdon expects later on to start a shop of his own.

John Getty, N. P. Peterson and E. L. Neville are planning to start a box factory at Clarkston, Idaho.

The Frve-Bruhn Packing Company, Tacoma, Wash., is making arrangements for the erection of an ice and cold storage plant at Hoquiam, Wash.

It is reported that the Southern Pacific Railroad is working on a project to establish a briquetting plant in connection with a coal mine, near Marshfield, Ore.

Considerable machinery was destroyed by fire May 16 at the Multnomah County, Ore., rock quarry at Kelly Butte.

W. F. Boardman & Co., San Francisco, are working on a project to establish a gas plant at Klamath Falls, Ore.

A bond election will be held shortly at Sacramento, Cal., to provide for the expenditure of \$200,000 in the increase of the pumping capacity of the municipal waterworks.

The Risdon Iron & Locomotive Works, of San Francisco, has filed articles of incorporation in this city, the capital stock being stated at \$1,100,000. Wallace McCamant is the Oregon representative of the company.

Texas

AUSTIN, Texas, June 3, 1911.

The continued favorable prospects for a good crop season in Texas and the Southwest, together with a settlement of the revolutionary troubles in Mexico, is causing a general improvement in business conditions throughout this big territory. The demand for machinery of various kinds is very satisfactory, and it is expected that it will show a very material increase within the next few months. Many industrial prospects that have been held in abeyance are now in a fair way of being consummated. Unusual attention seems to be attracted to the establishment of new manufacturing plants and the installation of public utilities in the different towns and cities. The expected big increase in the demand for American-made mining machinery for Mexico has not yet developed, but it is anticipated that as soon as political affairs in that country are regarded in investment circles as being on a permanent basis this phase of machinery trade will assume much importance.

The National Lumber & Creosoting Company will install saw mills upon a large tract of hardwood timber near Mount Vernon.

The Alvarado Water, Light & Power Company is putting down an additional well to increase its water supply at Alvarado. It will make other improvements to its system.

Thomas Bradford, Pensacola, Fla., and W. C. Johnson, Timpson, Texas, will install a well-equipped machine shop at the latter place.

A new steel standpipe 16 ft. in diameter and 100 ft. high will be erected at Caldwell for the water works

THE MACHINERY MARKETS

system. Bonds to the amount of \$6000 have been voted for the purpose.

The Chamber of Commerce of San Antonio is negotiating for the establishment in that city of a cement brick plant to cost about \$45,000 and which will have a capacity of about 40,000 bricks per day.

Steps have been taken by business men of Sealy to erect a cotton-seed oil mill there. Most of the proposed capital stock of the \$40,000 has been subscribed.

John M. Thornton and associates will install a modern creamery at Caldwell.

The San Benito Sugar Mfg. Company has been organized at San Benito with a capital stock of \$150,000. The incorporators are Alba Heywood, C. E. Barber and S. A. Robertson. The company is erecting a sugar mill.

The San Benito Canning Company has been formed at San Benito with a capital stock of \$20,000. The incorporators are S. A. Robertson, John T. Lomax and W. B. Hinkly.

The Hondo Light, Power & Ice Company has been formed at Hondo with a capital stock of \$24,000. The incorporators are J. H. Horn, Louis Schlentz and Jacob Fohn.

The Eureka Ice Company is the name of a corporation that has just been organized at Houston with a capital stock of \$15,000. The incorporators are W. H. Kirkland, C. W. Fellows, O. L. Cochran and others.

The Hill Sugar Company, which is erecting a sugar mill at Harlingen, has filed its articles of incorporation in the Secretary of State's office. It has a capital stock of \$300,000. The incorporators are Lon C. Hill, Gordon Hill and John D. Hill.

The Bryan Gas & Oil Company, which is preparing to develop the natural gas field near Bryan, has been formed with a capital stock of \$20,000. The incorporators are A. A. Snell, J. K. Parker, J. W. Doremus and others.

The Commercial Motor Car Company will soon remove its factory from San Antonio to Houston. Z. Z. Brandon is president.

The Lee County Cotton Oil Company will make improvements to its cotton-seed oil mill at Giddings.

The electric light plant at Bastrop owned by F. Z. Bishop will be enlarged. The installation of an ice plant is also contemplated.

The Luling Electric Light & Power Company, of Luling, will enlarge and otherwise improve its plant.

The Coleman Mill & Elevator Company will install new machinery and enlarge its plant at Coleman.

Oil burners are being installed at the brick works of the Harlingen Brick Mfg. Company at Harlingen.

The Farmers' Gin Company has been formed at Heidenheimer with a capital stock of \$25,000. The incorporators are J. W. Mosley, J. B. Marshall, T. H. Heard and others.

The Cameron Cotton Oil Company has been organized at Cameron with a capital stock of \$60,000. The incorporators are R. L. Batte, J. S. Batte and A. H. Baskin.

The North Tigre Mining Company will install a 100-ton ore reduction mill at its mine near El Tigre, State of Sonora, Mexico.

The City Council has formally taken over the water works plant and distributing system at Tucumcari, N. M., and important improvements will soon be made to the property.

The Business Men's Club, of Tucumcari, N. M., is negotiating with Wichita, Kan., parties for the establishment here of a plant for the manufacture of concrete tile and conduits.

The Darbyshire-Harvie Iron & Machine Company, El Paso, is erecting an addition to its plant.

The Texas Steel & Iron Company, which is being organized by H. A. Fitch, president of the Kansas City Structural Steel Company, will be incorporated with \$150,000 capital stock and will erect shops at Houston with a capacity of 1000 tons a month. It is expected that the plant will be ready for operation by November 1 of this year.

The Port Arthur Pleasure Pier Company, Port Arthur, is asking for bids for the erection of a bascule bridge across the Sabine-Neches Canal, the clear opening to be 90 ft. Also for a timber and concrete revetted causeway and plaza, the causeways to be 100 x 1000 ft. and the plaza 600 ft. sq. John W. Tryon is president of the company.

The J. R. Nutt Company, Fort Worth, has in course of erection an electric plant, the main building of which will be 133 x 208 ft., clear-story 55 ft. above basement, of

brick and concrete construction with a smoke stack of reinforced concrete 250 ft. high. The company will install a complete electric equipment, automatic coal handlers, automatic stokers, etc. The total cost is estimated at \$1,000,000. The Cleveland Construction Company, Cleveland, Ohio, is the engineer in charge.

Government Purchases

WASHINGTON, D. C., June 5, 1911.

The proposals for furnishing six 1,000,000-gal. pumps for Fort Mills, Corregidor Island, P. I., under date of May 24, has been modified so as to include bids for six 500,000-gal. pumps, two each under items 1, 2 and 3 of the specifications. Bids will be opened for these June 15 as previously advertised.

The quartermaster, Hot Springs, Ark., will open bids June 12 for enlarging the power house and equipment at the Army and Navy General Hospital.

R. J. Fleming, captain 10th Cavalry, Fort Ethan Allen, Vt., will open bids June 21 for building an addition to the pump house, installing electrically operated machinery and remodeling the electric lighting system.

The Paymaster General, Navy Department, Washington, will open bids June 20 for furnishing supplies to the engineering department as follows:

Class 11, one Watson-Stillman hydraulic forcing press for delivery to Mare Island, Cal. Class 62, eight motor driven back geared screw cutting engine lathes for Norfolk, Va., and Boston, Mass. Class 63, one extension boring and turning mill, and Class 67, for furnishing and erecting one locomotive crane complete at Washington.

The Isthmian Canal Commission opened bids May 27 for gate moving machinery. Various alternate bids for parts were received, the bids for the complete machines are as follows:

Class 1.—Two miter gate moving machines, one right and one left hand.—Bidder 1, Christiana Machine Company, Christiana, Pa., \$62,520; 2, Exeter Machine Works, Pittston, Pa., \$807,258.35; 3, Pawcus Machine Company, Pittsburgh, Pa., \$660,643.52; 4, Mesta Machine Company, Pittsburgh, Pa., \$765,240; 5, Power & Mining Machine Company, Cudahy, Wis., \$862,237.57; 7, Rosedale Foundry & Machine Company, Pittsburgh, Pa., \$702,750.40; 9, United Engineering & Foundry Company, Pittsburgh, Pa., \$674,534.40; 10, Allis-Chalmers Company, Milwaukee, Wis., \$741,085.74; 11, Otis Elevator Company, New York, \$690,754.27; 13, Wheeling Mold & Foundry Company, Wheeling, W. Va., \$652,064; 14, Westinghouse Machine Company, East Pittsburgh, Pa., \$712,760.

Class 2, one miter forcing machine and spare parts.—Bidder 2, Exeter Machine Works, Pittston, Pa., \$65,591.69; 3, Fawcus Machine Company, Pittsburgh, Pa., \$61,719.80; 5, Power & Mining Machine Company, Cudahy, Wis., \$71,514.60; 6, Richard Mfg. Company, Bloomsburg, Pa., \$41,275.50; 7, Rosedale Foundry & Machine Company, Pittsburgh, Pa., \$51,587.70; 8, Union Machine Company, San Francisco, Cal., \$63,488; 9, United Engineering & Foundry Company, Pittsburgh, Pa., \$54,045.12; 10, Allis-Chalmers Company, Milwaukee, Wis., \$55,207.30; 11, Otis Elevator Company, New York, \$49,245.30; 13, Wheeling Mold & Foundry Company, Wheeling, W. Va., \$50,914; 14, Westinghouse Machine Company, East Pittsburgh, Pa., \$49,952.80.

Class 3, two motors for gate moving machines and 90 motors.—Bidder 10, Allis-Chalmers Company, Milwaukee, Wis., \$38,820; 12, General Electric Company, Schenectady, N. Y., \$39,308; 15, Westinghouse Electric & Mfg. Company, Washington, D. C., \$56,028.

Class 4, one motor for forcing machine and 45 motors.—Bidder 10, Allis-Chalmers Company, Milwaukee, Wis., \$12,810; 12, General Electric Company, Schenectady, N. Y., \$12,683; 15, Westinghouse Electric & Mfg. Company, Washington, D. C., \$15,565.

Trade Publications

Electric Lamps and Generators.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Two circulars. No. 1191 pertains to a line of multiple and multiple series metallic flame arcs which are designed for illuminating large areas such as parks, freight yards, mills, foundries, machine shops, etc. The construction of these lamps is described with considerable detail and the text is supplemented by numerous illustrations. No. 1194 relates to the type Q, engine-driven, direct-current interpole generators which are built in sizes ranging from 25 to 1000 kw. and for voltages of from 125 to 600. The special features of these generators, an illustrated description of which appeared in *The Iron Age*, April 27, 1911, are interpole construction, thorough ventilation and the combination of ruggedness with relatively light weight.

Valves.—Chapman Valve Mfg. Company, Indian Orchard, Mass. Catalogue No. 30; size, 6 x 9 in.; pages, 174. Shows a complete line of valves for a number of different purposes. The illustrations are supplemented by tables of specifications and in a number of instances line drawings showing the construction are included.

Metal Reels and Spools.—Frank Mossberg Company, Attleboro, Mass. Catalogue No. 101. Describes an extensive line of metal reels and spools which are made in a number of different sizes and styles for a variety of purposes. Space is also given to steel beams, measuring machines, metal stampings and punchings and wrenches.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Refined Iron:	
1 to 1 1/2 in. round and square.....	per lb 1.70c
1 1/2 to 1 in. X 3/4 to 1 in.....	per lb 1.80c
Rods, 8 and 11-16 round and square.....	per lb 1.80c
Angles:	
3 in. X 1/2 in. and larger.....	per lb 1.90c
3 in. X 3/16 in. and 1/2 in.....	per lb 2.00c
1 1/2 to 2 1/2 in. X 1/2 in.....	per lb 2.05c
1 1/2 to 2 1/2 in. X 3/16 in. and thicker.....	per lb 2.05c
1 to 1 1/2 in. X 3/16 in.....	per lb 2.05c
1 to 1 1/2 in. X 1/2 in.....	per lb 2.20c
3 X 1/2 in.....	per lb 2.25c
3 in. X 1/2 in.....	per lb 2.35c
1 1/2 X 3/16 in.....	per lb 2.90c
Tees:	
1 in.....	per lb 2.35c
1 1/2 in.....	per lb 2.40c
1 1/2 to 2 1/2 X 1/2 in.....	per lb 2.60c
1 1/2 to 2 1/2 X 3/16 in.....	per lb 2.10c
3 in. and larger.....	per lb 2.95c
Beams:	
Channels, 3 in. and larger.....	per lb 1.90c
Beams, 1 1/2 to 6 X 3/16 to No. 8.....	per lb 2.10c
"Burden's Best" Iron, base price.....	per lb 3.15c
Burden's "11 B & S" Iron, base price.....	per lb 2.95c
Norway Bars.....	per lb 3.60c

Merchant Steel from Store—

Bessemer Machinery.....	per lb 1.90c
Toe Chalk, Tire and Sleigh Shoe.....	per lb 2.50c @ 3.00c
Best Cast Steel base price in small lots.....	per lb 3.7c

Sheets from Store—

Black.

No. 10.....	per lb 2.50c
Nos. 18 to 20.....	per lb 2.70c
Nos. 22 and 24.....	per lb 2.75c
No. 26.....	per lb 2.80c
No. 28.....	per lb 2.95c

Russia, Planished &c.

Genuine Russia, according to assortment.....	per lb 12 @ 14 1/2
Patent Planished, W. Dewees.....	per lb 12 @ 14 1/2
Wood.....	per lb A. 10c; B. 9c net

Galvanized

Nos. 12 and 14.....	per lb 2.95c
Nos. 22 to 24.....	per lb 3.20c
No. 26.....	per lb 3.30c
No. 28.....	per lb 3.80c
No 20 and lighter 36 inches wide, 25c higher.....	

Genuine Iron Sheets—

Galvanized

Nos. 22 and 24.....	per lb 5.75c
No. 26.....	per lb 6.25c
No. 28.....	per lb 7.25c

Corrugated Roofing—

2 1/2 in. corrugated.....	per 100 sq. ft. \$3.85
No. 24.....	per 100 sq. ft. 3.95
No. 26.....	per 100 sq. ft. 4.00
No. 28.....	per 100 sq. ft. 4.60

Tin Plates—

American Charcoal Plates (per box)

A.A.A. Charcoal.....	per box \$6.65
IC, 14 X 20.....	per box 5.70
IX, 14 X 20.....	per box 5.70

American Coke Plates—Bessemer—

IC, 14 X 20.....	per box \$4.50
IX, 14 X 20.....	per box 5.50

American Terne Plates—

IC, 20 X 28 with an 8 lb coating.....	per box \$8.70
IX, 20 X 28 with an 8 lb coating.....	per box 10.70

Seamless Brass Tubes—

List November 13, 1908.....	Base price, 18c
Brass Tubes, Iron Pipe Sizes—	
List November 13, 1908.....	Base price, 18c

Copper Tubes—

List November 13, 1908.....	Base price, 21c
-----------------------------	-----------------

Brazed Brass Tubes—

List February 1, 1911.....	19 3/4c per lb
----------------------------	----------------

High Brass Rods—

List February 1, 1911.....	14 1/2c per lb
----------------------------	----------------

Roll and Sheet Brass—

List February 1, 1911.....	14 1/2c per lb
----------------------------	----------------

Brass Wire—

List February 1, 1911.....	14 1/2c per lb
----------------------------	----------------

Copper Wire—

Base Price, Carload lots mill 13 3/4c	
---------------------------------------	--

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. (quantity lots).....	per lb 18c
Sheet Copper Cold Rolled, 1c per lb advance over Hot Rolled.....	
Sheet Copper Polished 20 in. wide and under, 1c per square foot.....	
Sheet Copper Polished over 20 in. wide, 2c per square foot.....	
Planished Copper, 1c per square foot more than Polished.....	

METALS—

Tin—

Straits Pig.....	per lb 47 1/2 @ 48 c
------------------	----------------------

Copper—

Lake Ingot.....	per lb 14 @ 14 1/2 c
Electrolytic.....	per lb 13 1/2 @ 14 c
Casting.....	per lb 13 1/2 @ 14 c

Spelter—

Western.....	per lb 6 1/2 @ 6 1/2 c
--------------	------------------------

Zinc—

No. 9, base, casks.....	per lb 7 3/4c Open..... per lb 8 1/4c
-------------------------	---------------------------------------

Lead—

American Pig.....	per lb 5 @ 5 1/2 c
Bar.....	per lb 6 3/4 @ 6 1/2 c

Solder—

1/2 & 1/2, guaranteed.....	per lb 27 @ 27 1/2 c
No. 1.....	per lb 25 @ 25 1/2 c
Rehmed.....	per lb 22 3/4 @ 23 c

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson.....	per lb @ 10 1/2 c
Tabets.....	per lb @ 10 1/2 c
Other Brands.....	@ 9 c

Bismuth—

Per lb.....	\$2.00 @ \$2.25
-------------	-----------------

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting.....	21c and 23c
Rods & Wire.....	Base Price 31c
Sheets.....	Base Price 33c

Old Metals—

Dealers' Purchasing Prices Paid in New York.

Copper, heavy and crucible.....	10.50 to 10.75
Copper, heavy and wire.....	10.25 to 10.50
Copper, light and bottoms.....	9.25 to 9.50
Brass, heavy.....	7.00 to 7.25
Brass, high.....	5.50 to 5.75
Heavy machine composition.....	9.00 to 9.25
Clean brass turnings.....	6.75 to 7.00
Composition turnings.....	7.75 to 8.00
Lead, heavy.....	3.75
Lead, tea.....	3.50
Zinc, scrap.....	4.00

NICHOLSON

We have had over forty years' experience in making Files and Rasps; we not only know what KIND of steel to use, but HOW to use it.

If NICHOLSON FILES did not hold their CUTTING edge—our order books would not hold so many CUSTOMERS.

We make over 3,000 different styles and sizes. Send for Catalog.

NICHOLSON FILE COMPANY

PROVIDENCE, R. I., U. S. A.

THE IRON AGE

Established
1855

New York, June 15, 1911

VOL. 87: No. 24

Published Every Thursday by the
DAVID WILLIAMS COMPANY
239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
I. A. Mekeel,	-	-	-	-	First Vice-President
Harold S. Buttenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

A More Cheerful Feeling	1445
Judge Gary as a Witness	1446
A Thousand an Acre for Cornishville	1447
Correspondence	1448
The Steel Corporation's Policy of Publicity	1448
The Youngstown Steel & Tube Company Will Build Open- Hearth Steel Plant	1448
Forging Press Catalogue	1449
Obituary	1449
Personal	1449
The Iron and Metal Markets	1450 to 1460
The Westinghouse Electric Annual Report	1461
The World's Railroad Mileage in 1909	1461
Promising Crop Conditions	1461
The Administration and the Steel Corporation	1462
Efficiency of Coney Island Fire Pumps	1462
May Copper Production and Stocks	1462
The Pittsburgh Foundrymen's Association	1462
The Future in Blowing Engine Practice	1463
The Steel Corporation's Unfilled Orders	1463
Labor Troubles at the Baldwin Works	1463
The J. B. & J. M. Cornell Company's Assets Sold	1463
The Philadelphia Foundrymen's Association	1464
The Knox Pressed & Welded Steel Company	1464
Industrial Works Catalogue	1464
Oriskany Iron Property Changes	1464
Oil Fuel for Air Furnaces	1465
Carnegie Steel Company Buys Bassett-Presley Company	1465
The Steel Corporation Investigation	1466
The Steam-Hydraulic Forging Press	1471
A New Illinois Structural Mill	1472
Steam Engineers' Convention	1477
A Novel Use of Allan Bronze	1478
Distributing Factory Operating Costs	1479
Time Factor and Clearance in Punching Plates	1480
The Newark Foundrymen's Association	1480
A New Canadian Shipbuilding Plant	1480
American Machinery in Europe	1481
Mower Part Molding Machines	1484
Lake Ore Shipments for May	1484
The Ransom Buffing Lathe	1485
A New Perforating Plant in Chicago	1485
The Rockford Positive Geared Drill Feed	1485
The Machinery Markets	1486 to 1494
Government Purchases	1495
Trade Publications	1495

A More Cheerful Feeling

Belief Growing That the Worst Is Over

Pig Iron Prices Slightly Lower, but More Business

The steel market presents a more cheerful aspect. The feeling in Pittsburgh is that the worst is over and that from this time improvement is to be expected. The recent reduction in prices appears to have made good. The volume of new business of steel manufacturers has quite considerably increased in the past ten days and the bookings of the past week were larger than those of the previous week. Specifications against contracts are more liberal in all lines except those which are influenced to some extent by the approach of the inventory period about July 1. Reports received show that a number of mills in the Pittsburgh and Youngstown districts are working fuller in all departments.

It may be said with regard to the position of the Republic Iron & Steel Company in the market that in taking the initiative in reducing steel bar prices its action was not hasty but was taken after protracted efforts had been made to prevail upon other bar manufacturers to make the revision of prices which appeared necessary. It was done after careful deliberation, having been recommended by those responsible for the business management of the company, indorsed by the unanimous vote of the board of directors. It was further done at a time when jobbing interests and consuming manufacturers had a minimum of stock on hand and would lose comparatively little in the shrinkage in value of such stocks. It is gratifying that this imperative readjustment in the price of steel bars has not impaired the market on other steel products. It must be admitted that the company continued to co-operate with other bar manufacturers for a considerable period after the fact was made manifest that its trade, which is so heavily in steel bars, was suffering from the much lower prices made by iron bar and hard steel bar manufacturers. As it is by no means conducting a so-called price war, its action may after all tend to strengthen the cooperative movement in the steel trade by showing the necessity that this movement should have more flexibility in meeting changed trade conditions.

Contributing to the cheerfulness are some developments outside of mere market circles. The investigation of the United States Steel Corporation at Washington, instead of uncovering anything of disadvantage to that great interest, has so far been distinctly disappointing to the investigators, while the decision of the grand jury of the United States Court at Pittsburgh that nothing has been found in the recent coal lands purchase on which to base an indictment is also much more agreeable than if a criminal prosecution had been started.

The pig iron trade is better, although prices are a

trifle lower, particularly on Southern iron. Quite important transactions in basic pig iron have taken place. In addition to 25,000 tons purchased by an eastern Pennsylvania steel company for fourth quarter delivery, which was reported last week, a southern Ohio steel company has purchased 4000 tons and a New Jersey consumer 6000 tons, while inquiries are out for other round lots. The aggregate of transactions in foundry pig iron is believed to have been somewhat larger than for the previous two or three weeks. An indication of the character of current consumption is the fact that Alabama stocks of pig iron on June 1 showed but a slight increase on those of May 1 and hence the May shipments practically equaled the output of the Alabama furnaces.

The rail situation shows decided improvement. The Kansas City Southern has bought 14,000 tons; the Pere Marquette, 5000 tons; the Missouri Pacific, 28,000 tons, in addition to the purchase reported last week; the Cuba Central, 8000 tons; the National Railways of Hayti, 8000 tons. Definite inquiries are in hand for quantities ranging from 10,000 to 50,000 tons from large railroad systems while officers of other lines report that the question of purchasing heavy quantities is under consideration by their respective boards.

Large inquiries are in the market for wrought pipe for gas lines, one of which calls for 300 miles of 16 to 20 in.

All non-ferrous metals but pig tin have advanced in the past week. Electrolytic copper is now selling at 12½c., New York, and Lake at 12¾c. Pig tin is lower in New York, although higher in London.

Judge Gary as a Witness

E. H. Gary, chairman of the United States Steel Corporation, has proved the most interesting witness appearing before a Congressional committee in a very long time. His manner and his methods have been rather surprising to the committee of the House of Representatives which is now investigating the United States Steel Corporation and of which Representative Stanley of Kentucky is chairman. Judge Gary has at all times been frank in answering the questions put to him; and, more than this, has frequently expanded his answers so as to give the members of the committee and the country as complete particulars regarding the corporation and its affairs as he has in his possession. This is in perfect harmony with the publicity policy of the Steel Corporation for which Judge Gary has been in a large measure responsible. From the day of its organization it has concealed nothing which it is for the interest of the shareholders or the public at large to know.

The witness has gone beyond the lines of the mere investigation into his corporation. He cuts out a great deal of work for the government and for those who feel that its energies may be directed more broadly in looking after the interests of the people. He has given men of affairs a great many matters to think about, and has gone further than a man in his position might be expected to do in inviting official oversight. He has stated that he believes in the government control of large corporations and in the close scrutiny of their affairs by governmental commissions. He has admitted that abuses exist in the conduct of large corporations and that it is eminently desirable that some supervising body should exist to which they would be held directly responsible for improper methods. He ad-

vocates a federal licensing plan to conduct an interstate business, the license to be revoked in the event of the corporation violating the law, but with the right to appeal to the courts. He expresses himself strongly as to the danger of one man securing such financial and industrial power as J. P. Morgan, stating his belief that a man of Mr. Morgan's wealth and business capacity could do a great deal of harm as well as good, and it is for this reason, among others, that the government should exercise more control over banking institutions as well as great corporations. Judge Gary does not evade the responsibility of bringing about a closer co-operation in the maintenance of steel prices, but boldly justifies what has been done in that direction. He goes further than this in stating his belief that the government should control prices. He readily indorsed a suggestion that a joint committee of Congress be created to obtain the views of both capital and labor in regard to the strengthening and elaboration of the Sherman anti-trust law.

While many will heartily agree with Judge Gary in the attitude he takes on a number of the important subjects touched upon in his testimony, the steel trade generally is not likely to support his suggestion that the government should in any way attempt to regulate prices. A large corporation like the United States Steel Corporation is, of course, at this time in a peculiar position. If it co-operates with other manufacturers in the same line, and by mere interchange of opinions, but without actual agreement, maintains its prices on the same level as theirs, it is, nevertheless, in danger of prosecution for criminal conspiracy in violation of the Sherman anti-trust act. On the other hand, if it holds itself aloof from all conferences with them, makes its prices more attractive than those of its competitors, and by so doing injures their business or compels them to close, it is then likely to be charged with endeavoring to establish a monopoly and may suffer the fate of the American Tobacco Company. If the corporation would placate a very important part of the public it must compete actively and vigorously, while if it would avoid prosecution by the government it must compete so gently that it will not injure any one of its competitors by capturing business from it. In any event, it will be found almost impossible to please that section of the public which would "bust the trusts."

The question of establishing prices, however, is regarded by the trade as having no such intimate connection with the regulation of large corporations as to call for government interference as a related subject. It is admitted that the government should suppress combinations to hold up or advance prices, but few are prepared to believe that the prices of their products could be satisfactorily fixed by any kind of government commission.

It is to be hoped that out of this investigation will come such an education of the general mind with regard to large corporations that the situation may be made much clearer with respect to their rights to exist. Public sentiment is capable of being directed along sensible lines, notwithstanding the impression that demagogues have succeeded in securing the greatest following. This has been shown at repeated times in our history when the danger existed that our lawmakers would be driven into wild legislation in accordance with what seemed to be the popular will. Out of the agitation and out of the conflict came a saner, clearer perception of what should be done, and

a majority of the people ranged themselves on what afterward proved to be the right side. This may be the outcome of the present investigation, prompted though it be by hostility to the leading industrial corporation of the country and of the world.

A Thousand an Acre for Connellsville Coal

The United States Steel Corporation's purchase of the Connellsville coke properties of the Pittsburgh Coal Company was at a price of approximately \$1,000 an acre. The properties were held by the coal company through its subsidiary, the Colonial Coke Company. The company's last report showed 7077 acres unmined January 1, 1911, so that a trifle more than 7000 acres remain at this date, which, with all the improvements, is bought for \$1,450 an acre, making a total price, at 7000 acres, of \$10,150,000. The value of the improvements is variously estimated, some estimates running up to \$3,000,000, which would leave approximately \$7,000,000, or about \$1,000 an acre, for the coal seam itself.

The establishment, or rather the re-establishment, of the thousand-an-acre price for Connellsville coal comes as a shock to many Connellsville operators, and perhaps to others who may have been impressed with their arguments as to the extremely great value of this fuel. The shock, however, is not as great as it would have been had there not been the preparation for it furnished by Connellsville furnace coke having sold at from \$1.50 to \$1.75 per net ton at oven during the past twelvemonth. For a series of years selling prices had been pushed upward until straight sales were made at more than \$2,000 an acre, and when an effort was made, in the late spring and early summer of 1909, to buy up the independent operations in the region for the purpose of forming a consolidation the prices asked by individual operators ran up to \$3,000 and \$4,000 an acre, with improvements, indicating that many operators considered the seam worth upward of \$2,500 an acre.

Throughout this movement the H. C. Frick Coke Company, the coke subsidiary of the United States Steel Corporation, maintained a position that Connellsville coal could not be worth more than about \$1,000 an acre. Frequently its policy was criticised, its refusal to take hold of various "bargains" at considerably more than the figure being regarded as a mistake. The recent transaction vindicates its position.

At long range, the thousand-an-acre price does not appear as such a low one. The Hodge legal attack on the Steel Corporation's proposal to issue bonds and retire a portion of its preferred stock in 1902 forced the corporation to defend its capitalization. At that time the idea that a large part of the capitalization was "water" was very much more prevalent than now, and the finding of \$1,400,000,000 of assets, as was done in the answer to the Hodge bill of complaint, was regarded in some quarters as quite a stroke. It is interesting now to turn back and find that in the schedule of assets there appeared, after the famous \$700,000,000 set down as the value of the ore properties, the item: "Coal and coke properties (87,589 acres) \$100,000,000." At that time the corporation owned about 60,000 acres of Connellsville coal, the remaining 27,000 or 28,000 acres being chiefly steam coal. All were more or less improved, and with over 16,000 ovens in the Connellsville region it is quite reasonable to infer that the Connellsville coal contributed

less, rather than more, than \$1,000 an acre to the total of \$100,000,000 given as the value of all the coal and coke properties, including the improvements.

How absurd were the extreme estimates of value of Connellsville coal may be illustrated by some simple computations. It is usually taken that an acre of the seam will produce 7000 tons of coke, although experience shows a little better than this. As the Colonial property has just been sold, its showing may be mentioned. In 1909 it exhausted 67 acres and produced 484,903 tons of coke, which is at the rate of 7250 tons per acre; in 1910 it exhausted 81 acres and produced 635,338 tons, at the rate of 7850 tons per acre; the average of the two years was thus better than 7500 tons. While the Connellsville region is supposed to be clearly marked, it is a fact that the total area regarded as unmined Connellsville does not diminish from year to year directly as the annual exhaustion. It may be taken that there is about 90,000 acres fully entitled to be considered Connellsville. The region has never produced 21,000,000 tons of coke in a year, and there is no distinct prospect that it ever will; but even this would exhaust no more than 3000 acres at the outside, requiring 30 years or more of full operation to exhaust the region. Allowing for bad years, the life can easily be taken at 40 years according to present prospects. Of each 40 acres one acre would be exhausted each year, producing 7000 tons of coke, which would have to carry interest and sinking fund on the entire 40 acres. At five per cent., which is a very low rate considering the vicissitudes of such a business, the annual sinking fund is about \$8 per 1000; interest being \$50, this makes a total of \$58 per 1000. At \$3,000 per acre there would be \$120,000, requiring \$6,960 a year, to be borne by a production of 7000 tons, which is almost precisely \$1 per ton. That ton of coke would also have to carry interest and sinking fund on the development cost and all other expenses. Obviously, then, either the \$3,000 an acre, or the estimate of 40 years' life for the region, or both, must be absurd.

As a matter of fact, many of the Connellsville operations have been on a basis of making profits through fortuitous circumstances, rather than converting into cash their respective portions of the total value of the Connellsville seam. They have been able to operate on a basis of exhaustion in from 15 to 25 years—in a few cases less than 15 years of full output—simply because other acres were aligned to be exhausted much more slowly. Particularly, in this connection, there have been the reserves of the Steel Corporation. Roundly speaking, the corporation has in the past eight years been mining Connellsville coal at the average rate of little more than 1000 acres a year, although owning an average of 60,000 acres, thus proceeding on the basis of having its reserves last more than 50 years. That operated to shorten the apparent life of the outside acreage, but in the long run such a basis is not a safe one. Independent operations which are based upon a valuation of much more than \$1,000 an acre for the coal are not in a very comfortable position. The trade custom, though how established it might be hard to ascertain, is to count on two acres per oven in establishing a basis for an operation, the prospective life being then taken at from 20 to 25 years. The defense is that a modern oven produces about 14 tons a week, which, at 50 weeks per year, practically full operation, means 700 tons per year, or 14,000 tons, the assumed product

of two acres, in 20 years. Then five years are added for a margin to cover "bad years" and the operation is taken to rest on a fairly reasonable foundation. At \$1,000 an acre the interest and exhaustion charge for a 20-year life, at 5 per cent., is \$50 for interest and about \$30 for sinking fund, \$80, against 350 tons of coke per year, or 23 cents per ton. At 25 years' life there is \$50 interest and about \$20 sinking fund, \$70, against 280 tons, or 25 cents per ton. At this valuation per acre, Connellsville coke can with comfort to the producer sell at considerably less than \$2 per ton. The bare cost of production is nearer \$1 than \$1.25, and it is probably not unfair to allow the same amount for interest and depreciation on the plant as was allowed on the coal, so that the prices of the past twelve-month, \$1.50 to \$1.75 per ton, appear to be in close relationship with a valuation of \$1,000 an acre and operations to exhaust in from 20 to 25 years.

The United States Steel Corporation's unmined acreage of Connellsville coal has been given as follows in its annual reports as of December 31 each year, all the acreage being owned, except for 1000 to 1500 acres reported leased in the past three years:

Years.	Acres.	Years.	Acres.
1901	59,740	1907	62,253
1902	61,583	1908	59,670
1903	62,984	1909	58,358
1904	63,094	1910	56,845
1905	62,517		

The average exhaustion has been, as noted, a trifle over 1000 acres a year. The unmined acreage rose until the end of 1905, indicating that the corporation was buying additional properties. During the next five years it decreased a trifle less than 7000 acres, indicating that the corporation was not acquiring additional properties. The period of excessive valuations had been reached and the corporation left the coal land market alone. With the market's return to an older idea of values, the corporation has made a purchase equivalent to half a dozen years of its production, which does not indicate any very strenuous striving after monopoly. At the present rate of exhaustion, the Steel Corporation can see half a century of life to its holdings, the outside holdings promising to last about half as long, according to the present rate. The figures merely indicate that exhaustion is remote in either case, for developments as to the character of coke needed for blast furnaces, and the character of coal which can be used to make the coke, come very rapidly.

Correspondence

The Ethics of Selling Machinery

To the Editor: Your article in *The Iron Age* of June 1, on "Beating Down Machinery Prices," is interesting because you state that "such buying methods are clearly reprehensible . . . and against general business ethics." In effect you state that the process consists in playing one bidder against another until from each bidder is gotten a price which is declared to be his lowest, and, as no salesman has convinced the buyer that he should buy one machine in preference to another, he puts the matter up to the salesman, stating that, all other things being equal, price will govern. In each case the salesman secured a lower price from the home office and the order was placed at a ridiculously low price.

It would interest me to know why you criticise such buying methods instead of such selling methods. The buyer has simply bought what best suited his needs, as he believed, and bought at the lowest price. The sellers, on the other hand, have considered that conditions warranted it, and cut the price to whatever degree they thought they needed the order. The buyer, it would seem

to me, would rather have the lowest price first and thereby avoid the necessity for any dickering, as no buyer can expect to get the best of the bargain every time.

The very keen competition and the desire of machinery manufacturers to keep their organization together in these dull times justify the buyer's belief that he can buy at less than list prices. To be sure, this occurrence may have brought about spirited price-cutting among the sellers of a certain class of machinery and upset their confidence in each other, but why is the buyer blamed? Your article states that the machinery maker who always quotes the lowest figure consistent with his business policy and sticks to it is not bothered by "sweating tactics." Just so. But in the case you mention they did not quote the lowest price first, and if any one acted reprehensibly it was the sellers, and not the buyer.

A little discussion on business ethics might promote better distinctions between a deal and the policy which governs a deal.

S. T. TOBY.

NEW YORK, June 5, 1911.

The Steel Corporation's Policy of Publicity

The New York Commercial of June 6 thus expresses the general appreciation of the policy of publicity shown by Chairman E. H. Gary, of the United States Steel Corporation:

By reason of the fact that conferences between the competing iron and steel interests of the United States like that of the Metropolitan Club luncheon in this city last week are very largely confidential and private affairs and thus permit their details with propriety to be withheld from publication, it must be conceded that Judge Gary, chairman of the executive board of the United States Steel Corporation, has rendered a distinct public service in releasing to the newspapers his address to the assembled steel "magnates" on that occasion. The incident is all-important as emphasizing the corporation's established policy of taking the public into its confidence and that of the steel trade in general within reasonable bounds; and it is illuminating at the moment as disclosing the attitude of the trade toward the recent Oil and Tobacco decisions by the United States Supreme Court.

The chairman advises a strict compliance with the terms of those rulings—suggests that the iron and steel trade take a leading part in doing its best to hold up the hands of the federal government in order to bring about an improvement in the industrial conditions of the country. "I would not," he says further, "under any circumstances, make any agreement, expressed or implied, direct or indirect, to maintain certain prices, to keep away from customers, to divide territory, to restrict output or to make any agreement of any sort or description with you or any of you, because, as I understand the law, I have no right to do it." Here is a plain, unmistakable, unequivocal notice to the trade, to the country at large and to the government that the Steel Corporation may be depended upon to obey the law as it stands, so long as it is the law—that it will make no effort to "get around" the law. And obviously the competing interests in the conference all acquiesced in this clearly defined policy of the leading company in the trade. The fact ought to have a distinctively steadying and reassuring effect on the business of the country.

The Youngstown Sheet & Tube Company Will Build Open-Hearth Steel Plant.—The Youngstown Sheet & Tube Company, Youngstown, Ohio, definitely decided last week to proceed with the building of an open-hearth steel plant to contain six 75-ton furnaces with blooming mill to roll up to 36-in. slabs. The plant is to be connected with the present sheet bar and billet mills, so that the two blooming mills will be interchangeable as far as the Bessemer and open-hearth steel product is concerned. The company intends to build some additional finishing capacity to use up a large percentage of the steel made in the new plant, but just what will be made will not be decided for several months. This company has operated for some years a large Bessemer steel plant, the second largest in the country, and makes iron and steel pipe, iron and steel sheets, wire rods, wire nails and wire. Contracts for the building of the open-hearth steel plant will be placed in a very short time.

Personal

Henry C. Adams, former chief statistician of the Interstate Commerce Commission, has been appointed chief of the bureau of statistical research of the New York Central Railroad, a new department organized for the purpose of testing the Brandeis theories of economies in railroad management.

A. Hamilton Church, consulting industrial engineer, author of "The Proper Distribution of the Expense Burden," announces that he has commenced practice for himself, and is forming a strong organization to handle all departments of industrial betterment, intensified production, efficiency work, routing methods and costs. He reports several contracts already in hand for the installation of cost systems based on his method of "production factors." His address is P. O. Box 1362, Boston, Mass.

Joseph V. Woodworth, formerly superintendent of the Harwood Mfg. Company, Brooklyn, N. Y., and author of many well-known books on machine shop practice, is now with the Taft-Pierce Mfg. Company, Woonsocket, R. I., as consulting engineer and expert in sheet metal formation and punch and die practice.

E. H. Hargrave, president of the Cincinnati Tool Company, Norwood, Ohio, has returned from an extended business trip through the Hawaiian Islands, New Zealand, Australia, Japan and the Philippine Islands.

William B. Melish, president of the William B. Melish Company, Cincinnati, has returned from a business and pleasure trip to Europe.

E. G. Schmeisser, electrical engineer, a graduate of the Massachusetts Institute of Technology, formerly assistant engineer in the department of electric traction of the Pennsylvania Railroad, has been elected second vice-president of the Wiener Machinery Company, 30 Church street, New York. The capital of the Wiener Machinery Company has been increased recently to \$25,000, and branch offices have been opened in Pittsburgh and Boston.

C. M. Neeld, for 11 years connected with the McClintic-Marshall Construction Company, Pittsburgh, has resigned and has organized the C. M. Neeld Construction Company with offices at 1418 Oliver Building, Pittsburgh, to do a general contracting and engineering business in the designing and erection of steel frame or concrete buildings, bridges, etc.

Charles E. Pope, president of the Pope Tin Plate Company, Pittsburgh, Pa., has sailed for Europe, to be gone about two months.

J. A. Campbell, president of the Youngstown Sheet & Tube Company, Youngstown, Ohio, will sail for Europe June 17, expecting to return about September 1.

Joseph G. Butler, Jr., president of the Bessemer Pig Iron Association, Youngstown, Ohio, will sail for Europe June 17. He will return about September 1.

A. H. Baldwin, superintendent of the Driggs-Seabury Ordnance Corporation, Sharon, Pa., has resigned, effective June 15, and his assistant, C. E. Wilder, has also resigned.

Frederick Baldt, Sr., long and favorably known in the steel casting business, has become identified with the Brylgon Steel Casting Company, New Castle, Del., as its manager.

The American Institute of Mining Engineers, at its recent meeting at Glen Summit, Wilkes-Barre, Pa., elected to honorary membership Prof. Robert H. Richards, Boston, Mass., and Dr. Kossiter W. Raymond, New York.

T. E. Ford, for the past year district sales manager in Chicago territory for the Ford Chain Block Company, Philadelphia, has opened an office in Room 745, First National Bank Building.

F. D. Reed, assistant to the vice-president of the Chicago, Rock Island & Pacific Railroad Company, has been appointed purchasing agent of that company, with office in Chicago, to succeed J. M. McCarthy, who recently resigned. W. R. Owen has been appointed assistant purchasing agent.

Willard C. Brinton, formerly with the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., is now assistant vice-president of the United States Motor Company, Sixty-first street and Broadway, New York City.

William J. Reilly, who has been manager of the Cleveland office of the Babcock & Wilcox Company, has been transferred to Denver, where he will represent the company in a similar capacity. He is succeeded in the Cleveland office by T. P. MacFarland, who has been connected with the Pittsburgh office of the same company.

James Duane, Jr., formerly superintendent of Saxton Furnaces, Saxton, Pa., has been appointed superintendent of blast furnaces for the Pittsburgh Crucible Steel Company, situated at Midland, Pa., effective June 1.

H. R. Stacks, who until recently was superintendent of foundries of the Nelson Valve Company, Wyndmoor, Pa., has severed that connection and will engage in contracting and engineering, particularly in connection with concentration plants and will market as a specialty the Lehigh stone crusher. An office for the transaction of business has been opened at 725 Reed Building, Philadelphia, Pa.

I. F. Hepler, formerly of the Republic Iron & Steel Company, has associated himself with Burrows, Sloan & Co., 1520 Real Estate Trust Building, Philadelphia, Pa., in their construction department, as chief engineer.

Obituary

JAMES LAPPAN, president of the James Lappan Mfg. Company, Pittsburgh, died in St. Francis Hospital in that city June 6 after a short illness, aged 77 years. He was born in Ireland and went to Pittsburgh in 1854, where he entered the employ of the D. F. Agnew Boiler Mfg. Company. Engaging in business for himself under the name of James Lappan & Co., his operations grew until the firm was incorporated as the James Lappan Mfg. Company, manufacturing boilers and other heavy plate work extensively. He leaves one son and two daughters.

LAWRENCE DILWORTH, Pittsburgh, died suddenly of heart trouble June 13, aged 57 years. He was a member of Dilworth, Porter & Co., Ltd., spike manufacturers, and of the wholesale grocery firm of Dilworth Bros. He was born in Pittsburgh and received his education at Lafayette College.

Forging Press Catalogue.—The United Engineering & Foundry Company, Pittsburgh, Pa., has issued an attractive catalogue describing a line of high speed forging presses of the steam-hydraulic intensifier type which it builds under the Davy patents. These presses are intended for all classes of forging, shearing or pressing work and range in capacity from 100 to 12,000 lbs. The construction of the presses is described and this is followed by a set of specifications for a press of the four-column type. After this are a number of full-page illustrations showing the different types of presses in operation and also some specimens of the actual work produced by them. Two of the illustrations which are especially interesting show one of the company's single frame presses in operation in America and on the facing page is exactly the same size press set up in India that illustrates the ease with which forgings can be made without employing skilled labor.

No. 2 Swede furnace, of the Heckscher furnace department of the Alan Wood Iron & Steel Company, Swedeland, Pa., will be blown out June 18. No. 1 furnace was blown in late in May. General repairs, which will require about two months' time, will be made.

Arthur G. McKee, engineer, Rockefeller Building, Cleveland, has been given a contract for the construction of three hot blast stoves at the Midland, Ont., plant of the Canada Iron Corporation. The stoves will be of the Nelson type, 20 x 90-ft., two-pass, side combustion.

Single pieces of coke 52 in. in length were exhibited at the recent foundrymen's convention in Pittsburgh by the Graceton Coke Company, Graceton, Pa. These were, of course, calculated to show the strong structure of the coke, tending to prevent its breaking up and giving rise to dust and waste material in shipment.

Governor Foss, of Massachusetts, has signed a bill which shortens the weekly working hours of women and minors from 56 to 54 hours. He has also signed a bill making eight hours a day's work for all public employees.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June 14 1911.	June 7 1911.	May 10 1911.	June 15 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$15.00	\$15.00	\$15.50	\$16.75
Foundry No. 2, Valley furnace..	13.50	13.75	13.75	14.75
Foundry No. 2, Southern, Cincinnati	13.50	13.75	14.25	15.00
Foundry No. 2, Birmingham, Ala.	10.25	10.50	11.00	11.75
Foundry No. 2, at furnace, Chicago*	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa....	14.50	14.50	15.00	16.25
Basic, Valley furnace.....	13.10	13.10	13.50	14.75
Bessemer, Pittsburgh	15.90	15.90	15.90	16.65
Gray forge, Pittsburgh.....	13.90	14.15	14.40	15.15
Lake Superior charcoal, Chicago	17.00	17.00	17.50	18.50

COKE, CONNELLSVILLE,

Per Net Ton, at oven:

Furnace coke, prompt shipment	1.40	1.45	1.55	1.55
Furnace coke, future delivery..	1.60	1.70	1.75	1.75
Foundry coke, prompt shipment	1.75	1.75	1.85	2.15
Foundry coke, future delivery..	2.15	2.00	2.10	2.25

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	21.00	21.00	23.00	25.50
Forging billets, Pittsburgh.....	26.00	26.00	28.00	31.00
Open hearth billets, Philadelphia	23.40	23.40	25.40	28.50
Wire rods, Pittsburgh.....	29.00	29.00	29.00	31.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.00	14.00	14.00	17.00
Iron rails, Philadelphia.....	16.50	16.75	16.75	20.00
Car wheels, Chicago.....	12.50	12.50	12.75	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	15.00
Heavy steel scrap, Pittsburgh....	12.75	13.00	12.50	15.25
Heavy steel scrap, Chicago.....	10.25	10.25	10.25	13.00
Heavy steel scrap, Philadelphia..	13.00	13.00	13.00	14.50

FINISHED IRON AND STEEL,

Per Pound:

Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refrined iron bars, Philadelphia..	1.27½	1.27½	1.32½	1.47½
Common iron bars, Pittsburgh....	1.25	1.25	1.30	1.50
Common iron bars, Chicago.....	1.20	1.20	1.22½	1.47½
Steel bars, Pittsburgh.....	1.25	1.25	1.40	1.45
Steel bars, tidewater, New York	1.41	1.41	1.56	1.61
Tank plates, Pittsburgh.....	1.35	1.35	1.40	1.50
Tank plates, tidewater, New York	1.51	1.51	1.56	1.66
Beams, Pittsburgh	1.35	1.35	1.40	1.50
Beams, tidewater, New York..	1.51	1.51	1.56	1.66
Angles, Pittsburgh	1.35	1.35	1.40	1.50
Angles, tidewater, New York..	1.51	1.51	1.56	1.66
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:

Sheets, black, No. 28, Pittsburgh	2.00	2.00	2.20	2.40
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.80
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.75
Barb wire, galv., Pittsburgh.....	2.10	2.10	2.10	2.10

METALS,

Per Pound:

Lake copper, New York.....	12.75	12.45	12.25	12.87½
Electrolytic copper, New York..	12.50	12.25	12.12½	12.50
Spelter, St. Louis.....	5.32½	5.25	5.25	5.00
Spelter, New York.....	5.55	5.55	5.50	5.15
Lead, St. Louis.....	4.30	4.22½	4.25	4.20
Lead, New York.....	4.45	4.37½	4.40	4.37½
Tin, New York.....	46.87½	48.25	41.50	32.60
Antimony, Hallett, New York..	8.75	8.75	9.00	8.12½
Tin plate, 100-lb. box, New York	3.94	3.94	3.94	3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†These prices are for largest lots to jobbers.

on one or both legs, less than ¼ in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; zeos, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¾-in. plates. Plates over 72 in. wide must be ordered ¾-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	....	\$2.40	23	\$2.40	\$3.50
28	\$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Black.		Iron.	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	49	43		
1½ in.....	79	69	75	65		
2 to 3 in.....	80	70	76	66		
Lap Weld.						
2 in.....	76	66	72	62		
2½ to 4 in.....	78	67	74	64		
4½ to 6 in.....	77	67	73	63		
7 to 12 in.....	75	59	71	55		
13 to 15 in.....	75½	..	..	..
Butt Weld, extra strong, plain ends, card weight.						
1½ in.....	69	59	65	55		
2 in.....	74	68	70	64		
2½ to 1½ in.....	78	72	74	68		
2 to 3 in.....	79	73	75	69		

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.; angles 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in.

THE IRON AND METAL MARKETS

Lap Weld, extra strong, plain ends, card weight.			
2 in.	75	69	71
2½ to 4 in.	77	71	73
4½ to 6 in.	76	70	72
7 to 8 in.	69	59	65
9 to 12 in.	64	54	60
Butt Weld, double extra strong, plain ends, card weight.			
1 in.	64	58	60
¾ to 1½ in.	67	61	63
2 to 3 in.	69	63	65
Lap Weld, double extra strong, plain ends, card weight.			
2 in.	65	59	61
2½ to 4 in.	67	61	63
4½ to 6 in.	66	60	62
7 to 8 in.	59	49	55
Plugged and Reamed.			
1 to 1½, 2 to 3 in. Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchants or card weight pipe. Butt or lap weld, as specified.		
2, 2½ to 4 in. Lap Weld	The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.		

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

	Steel.
1½ to 2½ in.	65
2½ in.	67½
2½ to 3½ in.	70
3½ to 4½ in.	72½
5 to 6 in.	65
7 to 13 in.	62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

No.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized ..	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Market and Same Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser .....	.80
10 to 18 .....	.80 and 10
19 to 26 .....	.80 and 10 and 2½
27 to 36 .....	.80 and 5
Galvanized:	
9 and coarser .....	.75 and 10
10 to 16 .....	.75 and 10
17 to 26 .....	.72½ and 10
27 to 36 .....	.72½
Coppered or Liquor Finished:	
9 and coarser .....	.75 and 10
10 to 26 .....	.75 and 10
27 to 36 .....	.70 and 10 and 5
Tinned:	
6 to 18 .....	.75 and 10 and 10

Pittsburgh

PARK BUILDING, June 14, 1911.—(By Telephone.)

Pig Iron.—The local pig iron market is showing more life, inquiries being better and some actual sales having been made. The opinion is that prices of pig iron have about touched bottom, with possibly the exception of Bessemer, and it is believed that consumers will buy more freely in the near future than they have been doing for some time. The Standard Sanitary Mfg. Company has bought 1000 tons of Northern No. 2 foundry for its Allegheny and New Brighton, Pa., works, for June and July delivery, at \$13.50 at Valley furnace, and also bought 1000 tons of Northern forge, for the same delivery, at \$13 at Valley furnace. We quote as follows: Bessemer pig iron, \$15 nominally; malleable Bessemer, \$13.50; basic, \$13.10; No. 2 foundry, \$13.50 to \$13.75; gray forge, \$13, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. per ton.

Steel.—A number of independent sheet and tin plate mills will close down June 30 for inventory and repairs, and for this reason they are taking in as little steel this month as possible, so that specifications against contracts on sheet and tin bars are showing a heavy falling off. There is practically no new inquiry for billets or bars, the local market being very dull, but the prices of steel which went into effect June 1 are holding firm. Quotations are as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in, \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1½-in. billets, \$22; forging billets, \$26 base, usual extras for sies and carbons

—all prices being f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail)

As far as sentiment goes the market is better, and the feeling prevails that the worst is over and that improvement may be looked for from this time on. The reduction of prices of steel bars and sheets has stimulated the demand on these two products. Orders for considerable tonnage have been placed with the steel bar mills, while the leading sheet interest reports that its new orders and specifications for sheets last week were the heaviest in any one week for some months. There has been some rail buying in the past week and it is understood that additional inquiries are in the market. A little more inquiry is also observed for pig iron, with some indications of buying in the near future. Several large inquiries are in the market for foundry coke for the last half of the year. No settlement of the puddling and finishing scales was reached at the wage conference at Cambridge Springs, Pa., last week, but this is not taken to indicate that there will be a strike. The Western Bar Iron Association asked for a reduction of 10 per cent. on the present scale, which the representatives of the Amalgamated Association refused to accept, and another conference is to be held commencing July 6, at which a settlement is likely. Independent sheet and tin plate mills will meet the Amalgamated Association in conference on June 22 to consider the sheet and tin plate scales. These will likely be quickly arranged and on the same basis as the present scale.

Ferromanganese.—Inquiry is light, most consumers being covered over remainder of this year. A sale of 50 tons for delivery outside of the Pittsburgh district is reported at a price close to \$37, Baltimore. We quote 80 per cent. foreign for delivery over the remainder of this year at \$36.50, Baltimore, the rate to Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—No new inquiries are in the market and prices are weak. We quote 50 per cent. at \$52, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—There is still an absence of sales. We continue to quote best grades of muck bar, made from all pig iron, at nominally \$28.50, Pittsburgh.

Skelp.—Consumers defer placing orders for skelp in the belief that prices will be lower in sympathy with other lines of finished material. We quote grooved steel skelp, 1.27½c. to 1.30c.; sheared steel skelp, 1.32½c. to 1.35c.; grooved iron skelp, 1.55c. to 1.60c., and sheared iron skelp, 1.65c. to 1.70c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—A sale of 500 tons of Bessemer rods for July and August shipment is reported on the basis of \$29, Pittsburgh. Few sales are being made, most consumers rolling their own rods, and specifications against contracts are only fair. We quote Bessemer, open hearth and chain rods at \$29, Pittsburgh.

Steel Rails.—Several orders have been placed in the past week and fairly large inquiries are in the market. The Missouri Pacific has bought 28,000 tons, of which 5000 tons went to the Illinois Steel Company and 23,000 tons to the Tennessee Coal, Iron & Railroad Company. The Kansas City Southern has bought 14,000 tons, of which 9200 tons went to the Illinois Steel Company and 4800 tons to the Pennsylvania Steel Company. The Philadelphia & Reading has bought 4000 tons of Bessemer rails from the Maryland Steel Company. The Baltimore & Ohio is talking of laying 7500 tons on its division south of Parkersburg, but the inquiry for these rails has not yet come out. The Carnegie Steel Company has entered several fairly large orders for standard sections for export and had a fairly good week in light rails. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—Little new work is being figured on in this district, but local concerns are bidding on a large amount of work in the East and in the Chicago district. The Jones & Laughlin Steel Company has taken 1000 tons of sheet steel piling for the large new dry dock being built by the Newport News Shipbuilding & Dry Dock Company and also 500 tons of sheet steel piling from Jacobs & Davies for the Hales Bar dam on the Tennessee River near Chattanooga. The Fort Pitt Bridge & Iron Works has taken 175 tons for

THE IRON AND METAL MARKETS

extensions to the Smithfield street bridge in this city and the McClintic-Marshall Construction Company has taken 1200 tons of bridge work for the Pittsburgh & Lake Erie Railroad. We quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Plates.—Car orders have been light. The Canadian Pacific Railroad has increased its recent order placed with the Pressed Steel Car Company from 400 to 430 general service cars and the latter has taken an order for 12 street cars for the United Traction Company, Albany, N. Y. The Treadwell Construction Company, Midland, Pa., is the low bidder on the aqueduct for the water works for Los Angeles, Cal., requiring 4200 tons of plates, which will be furnished by a local mill. We quote sheared plates $\frac{1}{4}$ in. and heavier at 1.35c., Pittsburgh.

Sheets.—A material betterment in new demand and specifications for sheets is reported. The American Sheet & Tin Plate Company states that it entered more orders for sheets and received more specifications against contracts in the past week than in any one week in some months. Some of the independent sheet mills also report a material increase in orders. The new prices adopted June 1, while generally well maintained, are being slightly shaded for desirable orders in certain localities. The full schedule of prices on black and galvanized and on roofing sheets is given on a previous page.

Tin Plate.—Last Monday the American Sheet & Tin Plate Company started up 16 of the 23 hot tin mills in its Laughlin Works at Martins Ferry, Ohio, this being the first time that this plant has been in even partial operation for some months. This company is making arrangements to equip all its sheet and tin plate mills with cooling devices for the protection of the men in the hot months, the next installation of this system to be at its Vandergrift Works, which contains 32 hot sheet mills and 5 hot tin mills. The new demand for tin plate is dull, but specifications from the can makers continue to come in quite freely. We quote 100-lb. cokes, 14 by 20, at \$3.70 per box, f.o.b. Pittsburgh.

Bars.—Inquiries have been coming in quite freely from the implement makers for their supply of bars for the year beginning July 1 and the past week orders for considerable tonnage were closed. Most of this was on the basis of 1.25c., Pittsburgh, but in some cases 1.20c. is reported to have been done. Some of the bar iron mills will close down on July 1 for inventory and repairs. We quote steel bars at 1.25c. and common iron bars at 1.25c. to 1.30c. f.o.b. Pittsburgh.

Shafting.—The recent reduction in prices of shafting has not increased the demand to any extent, while specifications against contracts are still unsatisfactory to the makers. Regular discounts on shafting are 60 per cent. off in carloads and 55 per cent. in less than carloads and are pretty well maintained.

Spelter.—The market is quiet and prices are only fairly strong. We quote prime grades of Western spelter at 5.20c., East St. Louis, equal to 5.32 $\frac{1}{2}$ c. Pittsburgh.

Hoops and Bands.—Several makers report that specifications against contracts for hoops and bands have been coming in quite freely in the past week, but the new demand is only for small lots to cover actual needs. We quote steel hoops at 1.40c. and bands at 1.25c., base, extras on the latter as per the steel bar card.

Merchant Steel.—The new demand continues light and only for small lots, while specifications against contracts are still very unsatisfactory. Makers' prices, which, however, are being shaded, are as follows: Iron finished tire, $\frac{1}{2}$ x $1\frac{1}{2}$ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—There is considerable inquiry for rivets, but orders are very slow in being placed, consumers buying only what they absolutely need to meet current wants. We quote structural rivets at 1.75c. and boiler rivets at 1.80c., but these prices are sometimes shaded on desirable orders.

Wire Products.—In nearly all cases all unshipped tonnage on contracts for wire and wire nails placed some time ago when prices were lower than they are now was canceled June 1, exceptions to this being made only in cases where existing conditions warranted. The new demand for wire nails is light, jobbers and retailers taking in only such quantities as are absolutely re-

quired to maintain stocks or to fill current orders. The trade for this season is pretty well over and the next three months in the wire trade will likely be quiet. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—The only inquiry of note is one from one of the Southern roads for 1000 kegs. The railroads are only buying small lots to cover actual needs. We quote standard sizes of railroad spikes at \$1.50 base per keg f.o.b. Pittsburgh, with the usual extras for odd sizes.

Merchant Pipe.—A fair amount of new business is being placed with the mills, and actual orders entered so far in June are said to show a slight increase over the first half of May. Several large inquiries for gas lines are in the market, one calling for upward of 300 miles of 16 to 20 in. Discounts on iron and steel pipe printed on a previous page are reported as being maintained.

Boiler Tubes.—This trade continues in very unsatisfactory condition as regards new demand, which is very dull and only for small lots, while the discounts adopted some time ago are being more or less shaded.

Coke.—Three or four fairly large consumers of foundry coke are in the market for their supply for the last half of the year, and in one case for the entire year beginning July 1. A sale is reported of about 15,000 tons of furnace coke, not regarded as strictly high grade, at \$1.40 per net ton at oven, for shipment over the remainder of June. It is believed that prices on coke have about reached bottom and the heavy reduction in output is expected to benefit the market. The production in the Upper and Lower Connellsville regions last week was 269,256 tons, a decrease over the previous week of about 1500 tons. We quote standard makes of 72-hour foundry coke for spot shipment at \$1.75 to \$1.85, and for second half of the year at \$2 to \$2.40 per net ton at oven, some producers refusing to sell at a lower price than \$2.40.

Iron and Steel Scrap.—The market continues very quiet, and some dealers who have scrap loaded on cars which they are forced to move are offering it at slightly lower prices. Two of the largest consumers of heavy steel scrap in the Pittsburgh district have asked that shipments be held up for the time being as they expect to shut down June 30 for inventory and repairs. All the leading consumers of heavy steel scrap are pretty well covered, one concern having the largest stock it has carried for some years. Dealers are quoting, per gross ton, Pittsburgh, about as follows:

Heavy steel scrap Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.	\$12.75 to \$13.00
No. 1 foundry cast.	13.50 to 13.75
No. 2 foundry cast.	12.50 to 12.75
Bundled sheet scrap, at point of shipment.	10.25 to 10.50
Rolling scale, New Kensington, Cambridge, Ohio, and Cumberland, Md.	13.50 to 13.75
No. 1 railroad malleable stock.	12.00
Grate bars.	10.50 to 10.75
Low phosphorus melting stock.	16.50 to 16.75
Iron car axles.	24.25 to 24.50
Steel car axles.	18.50 to 18.75
Locomotive axles.	23.00
No. 1 busheling scrap.	12.00 to 12.25
No. 2 busheling scrap.	8.50 to 8.75
Old car wheels.	13.50 to 13.75
Sheet bar crop ends.	15.50 to 15.75
*Cast iron borings.	8.75 to 9.00
*Machine shop turnings.	9.00 to 9.15
Old iron rails.	15.00 to 15.25
No. 1 wrought scrap.	14.25 to 14.50
Heavy steel axle turnings.	10.25
Stove plate.	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, June 14, 1911.—(By Telegraph.)

In the finished steel lines the past week's bookings have been very satisfactory. The railroads were the important factor in the placing of this tonnage, particularly in the matter of rails. With these rails came liberal specifications for rail joints and track fastenings, while structural shapes and plates shared in the activity through the placing of orders for steel cars and bridges. Building structural material had but little place in the week's tonnage, the largest item being about 4000 tons for the Pacific coast. It is interesting to note that the agricultural implement makers are displaying a substantial activity in providing for their sheet requirements while they continue to be apathetic with reference to steel bars.

Pig Iron.—Various inquiries of several hundred tons each are reported as being current in this market

THE IRON AND METAL MARKETS

and a few sales of iron in like volume for delivery during the last half have been made. Offers to furnaces on tonnage at prices below the present market reflect an apparently general feeling among the melters that the lowest prices have not yet been reached. For Southern iron \$10.25, Birmingham, has been quoted and buyers offering \$10 for prompt shipment iron are not unfriendly received. A disposition to move scattered quantities of Northern iron at slight concessions from the market has also rather weakened the position of local iron at \$15 at furnace. The accumulation of stocks in consumers' as well as furnace yards is a discouraging feature. The following quotations are for Chicago delivery, with the exception of Northern irons, which are quoted f.o.b. furnace.

Lake Superior charcoal.....	15.50
Northern coke foundry, No. 1.....	15.00
Northern coke foundry, No. 2.....	14.75
Northern coke foundry, No. 3.....	16.00
Northern Scotch, No. 1.....	15.10
Southern coke, No. 1 foundry and No. 1 soft.....	14.60
Southern coke, No. 2 foundry and No. 2 soft.....	14.35
Southern coke, No. 3.....	14.10
Southern coke, No. 4.....	14.35
Southern gray forge.....	14.35
Southern mottled.....	15.00
Malleable Bessemer.....	17.40
Standard Bessemer.....	15.50
Basic.....	17.90
Jackson Co. and Kentucky silvery, 6 per cent.....	18.90
Jackson Co. and Kentucky silvery, 8 per cent.....	19.90
Jackson Co. and Kentucky silvery, 10 per cent.....	

(By Mail)

Rails and Track Supplies.—A distinct improvement in the tonnage booked characterized the past week's railroad business. A total of about 15,000 tons of rails was placed with the local mill, of which 5000 tons came from the Missouri Pacific and 5000 tons from the Pere Marquette Railroad. The former road has now contracted for approximately 50,000 tons of rails, of which 22,000 tons will be rolled by the Colorado Fuel & Iron Company, and 22,800 tons by the Tennessee Coal, Iron & Railroad Company. It is understood that the Lackawanna Steel Company will roll 8000 tons of 56-lb. rails for the National Railways of Hayti. Current rail orders have carried with them a very satisfactory volume of angle bar, spike and track bolt orders. Track bolt prices are not distinctly firm and we are modifying our quotation slightly. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c. to 1.60c. Chicago.

Structural Material.—The lettings of structural material were light during the past week and but few items of market importance can be recorded. The contract for 3388 tons of steel for the city hall at Oakland, Cal., was obtained by the Judson Mfg. Company, San Francisco, and the Roebling Construction Company will furnish about 600 tons of reinforcing bars. Contracts were also let for 139 tons for the Buchanan Electric Steel Company's building at Buchanan, Mich., and for 122 tons for a power house for the Mount Hood Railway & Power Company in Oregon. We quote plain material from mill at 1.53c. to 1.58c., Chicago, and from store, 1.75c.

Plates.—Recent orders from the railroads for steel cars have brought into the market some desirable specifications for plates and underframe structural shapes. One local interest reports prompt shipment orders for material sufficient to build 1000 cars. With reference to prices, practically no weakness is reported, but it appears equally evident that confidence in the permanency of the present basis is lacking. Chicago quotations for mill shipment are 1.53c. to 1.58c.; from store, 1.75c.

Sheets.—Improvement is noted in the temper of sheet users. Inquiry is much more substantial, both in volume and character, and it is reported that a more settled feeling prevails. Orders, while none too plentiful, were more numerous and the interest being shown by the agricultural implement makers is apparent. Prices show no indications of weakness. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—As the season approaches more closely to the end of the contracting year, and the necessity for

establishing manufacturing schedules becomes more pressing, agricultural implement manufacturers are displaying more real interest in steel bars. Some buying of bars is noted, but of the 500,000 tons which this territory ordinarily engages in its annual contracts a comparatively small portion only has been taken. Before the large volume of business is placed it seems probable that the bar price will have been tested to the limit of its strength. Attention seems to be directed to this situation as an indicator of how all finished material prices will move. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Billets.—Inquiry for car axle billets during the week developed a firm attitude on the part of makers in the matter of prices, but moderate business in the accustomed channels is the market's only activity. We quote forging billets at \$28.60, Chicago, and rerolling billets, \$23.60.

Wire Products.—The activity of trade in wire products has quieted during the present between-season period. Reports from the leading manufacturers indicate that most satisfactory conditions prevail. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.08c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—A contract for 500 tons of pipe for the city of Basin, Wyo., was taken by the leading interest, but the Leone, Iowa, letting of 300 tons was placed elsewhere. The San Diego, Cal., order mentioned last week was placed Tuesday. Prices continue firm. We continue to quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—A list carrying a large part of the accumulated tonnage of scrap held by the Atchison, Topeka & Santa Fe Railroad was offered in this market last week. Some very low prices were quoted and had any of the material been sold several of the current quotations would be found from 25c. to 50c. a ton too high. The Chicago, Milwaukee & St. Paul's list is about 1000 tons and the Soo line is asking bids on 700 tons. Prices are slightly lower in some lines, but, in the present status of the market, prices at which buyers can be attracted are too low to bring out any tonnage for sale. We revise prices and quote below for delivery to buyers' works, all freight and transfer charges paid, per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	12.00 to 12.25
Old steel rails, less than 3 ft.....	11.00 to 11.50
Rerolling rails, standard sections, subject to inspection.....	24.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.00 to 10.50
Shoveling steel.....	9.75 to 10.25
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	13.75 to 14.25
Steel angle bars.....	10.25 to 10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	9.00 to 9.50
Locomotive tires, smooth.....	16.25 to 16.75
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.25 to 10.75
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	10.00 to 10.50
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, June 14, 1911. — By Telegram.

The recent price reduction has apparently encouraged consumers to ask for still further cuts and several Southern producers have made additional recessions, bringing the prompt shipment quotations on No. 2 foundry down to \$10.25, Birmingham basis. It is also understood that this figure has been shaded on a few special sales. Southern furnaces are generally asking \$10.50 for movement during the remainder of the year, and at this figure 300 and 1000 tons were sold to two Illinois consumers. A central Ohio melter also took

THE IRON AND METAL MARKETS

150 tons of No. 3 foundry at \$10 at furnace. Northern iron interests do not show much willingness to meet Southern competition and are transacting very little business, although a 4000-ton sale of Ohio basic was made to a southern Ohio manufacturer, with shipments running through November. It is rumored that a few brands of Northern foundry iron can be bought for prompt delivery below the regular quotable figure of \$13.50, Iron-ton, but as production in the Hanging Rock district is fully 60 per cent, below normal it is not probable that any large tonnage could be taken on at a sacrifice just now. There is no inquiry for malleable, which is quotable around \$13.75, Iron-ton. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft...	\$14.00 to \$14.50
Southern coke, No. 2 foundry and 2 soft...	13.50 to 14.00
Southern coke, No. 3 foundry.....	13.25 to 13.50
Southern coke, No. 4 foundry.....	12.75 to 13.00
Southern gray forge.....	12.25 to 12.75
Ohio silvery, 8 per cent. silicon.....	17.45 to 17.70
Lake Superior coke, No. 1.....	15.20
Lake Superior coke, No. 2.....	14.70
Lake Superior coke, No. 3.....	14.20
Basic, Northern.....	14.95 to 15.20
Standard Southern car wheel.....	25.75 to 26.25
Lake Superior car wheel.....	19.50

(By Mail)

Coke.—Probably due to the desire of a number of producers to get their coal screenings out of the way foundry coke has not been so firm in either the Pocahontas or Wise County fields. In the former district a few contracts for shipment during the remainder of the year have been taken on around \$1.90 to \$2 per net ton at oven, and Wise County 72-hour coke is available at \$2 to \$2.15 for either prompt or deferred shipment. Connellsville foundry grades are holding up better than some previous reports indicated and contract prices range all the way from \$2 to \$2.25 at oven. In all three fields there are special brands on which quotations made above the regular prices. Furnace coke is weak. The banking of a number of blast furnaces in the Iron-ton district as well as in other producing sections naturally affects prices, and for spot shipment 48-hour coke is obtainable in all three districts at an average price of \$1.40 per net ton at oven, but \$1.45 to \$1.70 is asked on contract business, with deliveries running throughout the next 12 months, if desired.

Finished Material.—Business is generally reported as being somewhat disappointing. Buyers appear to be holding off with the belief that prices will be further reduced, and a number of mill agencies and dealers state that they do not look for much improvement until customers realize that there will be no additional cuts in present figures. Although some improvement is to be reported in the steel bar demand it is not large enough to give the entire credit to the recent price reduction. Structural material is moving only fairly well. Mill prices are firmly maintained at 1.35c. for shapes and plates and at 1.25c. Pittsburgh for steel bars. The warehouse quotation on steel bars is around 1.70c.

Old Material.—The railroads are reported to be offering large lots of scrap material, but prices that dealers are willing to pay are not satisfactory and as a consequence very little scrap is changing hands. The softening of pig iron prices has evidently caused the dealers to hesitate, and as they all have good-sized yard stocks now there will probably be no scramble to take on additional material at present market quotations. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.50 to 10.00
Burnt scrap, net ton.....	6.50 to 7.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, June 13, 1911.

Iron Ore.—No sales of any size are being made and the outlook shows no improvement. Further curtailment of the output is in progress all over the Lake Superior district. Some underground mines are being shut down, having accumulated large stock piles, and a number of open pit properties that have not been started up this season will probably not be operated.

Conditions in the lake shipping industry show no improvement. Shippers are carrying practically all their ore in their own boats with the exception of the Pittsburgh Steamship Company, which has done a little outside chartering. It is estimated that about 95 lake boats have not yet gone into commission, representing a capacity of approximately 650,000 tons on a single trip. Most of these boats will probably remain idle all the season. We quote prices as follows: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old Range non-Bessemer, \$3.70; Mesaba non-Bessemer \$3.50.

Pig Iron.—The market is very quiet, with no sales or inquiries of any size. Foundries are taking no interest in the market as far as their last half requirements are concerned and not much buying for that delivery is looked for during the present month. Some producers report that hold up orders on shipments are more numerous. Many foundries will have enough iron left from their first half purchases to last them well into the third quarter. While prices have remained stationary for some time there has not been enough business to test the market and it is believed that a good inquiry would bring out lower quotations on foundry grades. The sale of 300 tons of No. 2 Southern for the third quarter delivery in northern Ohio was at \$10, Birmingham. Stack A of the Detroit Iron & Steel Company was blown out during the week and will be relined. Another merchant furnace in the Valley may be blown out shortly. For prompt shipment and for the last half we quote delivered, Cleveland, as follows:

Bessemer	\$15.90
Basic	14.00
Northern foundry, No. 2	14.25
Gray forge	13.25
Southern foundry, No. 2.....	\$14.35 to 14.85
Jackson Co. silvery, 8 per cent. silicon.....	17.75 to 18.00

Coke.—Many contracts for foundry grades expire at the end of this month so that dealers are looking for some improvement in buying. At present the market is very quiet, sales being limited mostly to car-load lots. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton, at oven, for prompt shipment, and \$1.75 to \$1.85 for the last half. Connellsville 72-hr. foundry coke is held at \$1.90 to \$2.15 for prompt shipment and \$2 to \$2.40 for the last half.

Finished Iron and Steel.—The recent cut in prices appears to have brought about some improvement in the demand for steel bars, new orders coming largely from manufacturers who had allowed their stocks to run low. The demand for structural material is more active at present, not, however, because of price reduction; and some structural contracts are being held up. The demand for plates continues very dull. The seller who took on some steel bar tonnage in this market at 1.20c. Pittsburgh appears to have withdrawn that quotation, and regular prices seem now to be fairly well maintained on bars, plates and shapes. While some rumors of price cutting are heard, they are unconfirmed, and if any shading is done the concessions are made very cautiously. New structural contracts placed include 800 tons for the plant of the Peck, Stow & Wilcox Company, Southington, Conn., 850 tons for bridge work for the Lake Shore Railroad, and 450 tons for a new plant to be built by the Good-year Tire & Rubber Company, Akron, Ohio, all taken by the American Bridge Company; and 1350 tons for the central Y. M. C. A. building, Cleveland, which went to T. H. Brooks & Co., Cleveland. Bethlehem sections will be largely used in this building. A number of other inquiries have come out for work requiring small tonnages. The demand for sheets is more active than before the recent price reduction. Present prices are not being maintained by all of the mills, some of the Valley producers making quotations with a Valley instead of a Pittsburgh base, which amounts to a concession of about \$1 a ton for shipment to Cleveland and many other points. The demand for iron bars is not active. Local mills quote iron bars at 1.25c. but this price is reported shaded to 1.20c. in other territories.

Old Material.—Practically no demand exists for any grade of scrap. Mills are well stocked up and some are holding back on shipments. Producers refuse to sell at present prices so that dealers complain that they can neither buy nor sell. Prices are weak. Quotations for the most part remain unchanged, however, as the absence of sales makes quotations largely nominal.

THE IRON AND METAL MARKETS

Local consumers are offering only \$11 for heavy steel scrap, but none is for sale at that price. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	\$13.00 to \$13.50
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.25 to 11.50
Old car wheels	11.50 to 12.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.75 to 11.00
Railroad malleable	11.50 to 12.00
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	6.50 to 6.75
Steel axle turnings	8.00 to 8.50
No. 1 bushing	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 cast	11.25 to 11.50
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

Philadelphia

PHILADELPHIA, PA., June 13, 1911.

Market conditions in this territory show practically no change. Buyers as a rule pay current prices for prompt requirements, but show little disposition to purchase for forward account. The market still lacks snap, although in some instances orders for rolled products have been somewhat more extensive, largely because of consumers' requirements in the usual midsummer shut-down. The market for pig iron drags. A little business has been done in the steel making grades, but the general foundry trade does not show much interest. Lower prices, both for crude and finished materials, have so far failed to bring out any marked increase in the demand in this vicinity. A somewhat better movement in foundry coke is reported. Old material has not been active, but prices remain fairly stationary. While statistics are not available, it is stated that reports made to the Eastern and the Virginia Pig Iron Associations, the former having held its meeting last week, show stocks in furnace yards to be gradually decreasing, while orders have been on a fairly even basis. Deliveries have been slightly in excess of the current make and a further reduction in the output is in sight.

Iron Ore.—The market is devoid of any features. No fresh business is reported. Consumers, at the present rate of furnace activity, find it difficult in some cases to take care of purchases already made. Importations at the port in the week ending June 10 were confined to a single cargo of 5800 tons of Cuban ore.

Pig Iron.—While some little buying has taken place in steel making and foundry grades, the market is gradually becoming quieter. Consumers, who have been buying somewhat more freely of late, are now pretty well covered and have again practically dropped out of the market. It is now pretty well established that the recent quiet deal in basic iron, in which one of the Eastern mills was the purchaser, covered 25,000 tons for fourth quarter delivery, and that the price did not exceed current quotations. A further transaction, covering about 5000 tons of this grade for third quarter delivery, has been consummated in the week at a price somewhat under \$14.75, delivered, the actual price being governed by the freight rate. Another consumer has been testing the market with an inquiry for 5000 to 10,000 tons for third quarter delivery, but has not placed the order. Moderate lot sales of standard low phosphorus iron continue to be made at prices ranging from \$20.50 to \$20.75, delivered in this vicinity. There is still some business in Virginia foundry grades, the principal sales being made by the leading interest in that section, at \$12.25, furnace. Small lot sales are also reported by other sellers at \$12.50, furnace, shipments not extending, however, beyond the third quarter. The bulk of the sales of eastern Pennsylvania foundry irons has been of the small lot character, standard brands commanding from \$15.25 to \$15.50, delivered. Soil pipe makers and stove foundries have taken moderate quantities of iron. In the majority of cases orders have been divided among several sellers. One of the Delaware River cast iron pipe foundries is reported to have closed against its recent inquiry for 4000 tons Southern iron, it is said. Other pipe makers are testing the market to some extent, but their ideas of prices are usually below the present market. An absence of any material inquiry for forge iron still exists. With the

usual midsummer suspension of the rolling mills close at hand, consumers are disposed to move slowly. The market generally has a stand pat appearance. Consumers, anticipating quiet conditions in the summer months, are not looking very far ahead, but are taking care of requirements as they develop. Producers are disinclined to force business, and await further developments. The rate of production in this district will evidently be further decreased before the end of the month, as Carbon Furnace and the remaining Swede Stack now in blast are to be blown out. At the rate at which deliveries are now being taken, shipments are in excess of the current make, and a further decrease in stocks is expected at the close of the month. The following range of prices is named for standard brands, delivered in buyers' yards in this district, shipments extending up to the end of the first quarter:

Eastern Pennsylvania No. 2 X foundry	\$15.25 to \$15.50
Eastern Pennsylvania No. 2 plain	15.00 to 15.25
Virginia foundry	15.05 to 15.50
Gray forge	14.50 to 14.75
Basic	14.50 to 14.75
Standard low phosphorus	20.50 to 20.75

Ferromanganese.—The market is extremely quiet, sellers reporting practically an entire absence of any inquiry. Quotations are nominal at \$36.50, Baltimore, for either prompt or remainder of the year delivery.

Billets.—Current orders are very light. Specifications on old contracts come out freely, but, as a rule, are for small lots only. Consumers still refuse to consider business of a forward nature and transactions are confined to small lots, seldom exceeding 100 tons. Forging billets are in slightly better demand than rolling billets. The recently established prices are maintained, open hearth rolling billets commanding \$23.40, and ordinary forging billets \$28.40, delivered in this territory.

Plates.—Eastern mills report about an even run of business, both in the way of new orders and specifications on old contracts. Consumers in this district are still disposed to confine their orders to small lots covering current requirements, although an occasional sizable order comes to the mills. Inquiry is slightly better, and the trade looks forward to a decidedly more aggressive buying movement in the not distant future. On the general run of business the new price basis is readily obtained, ordinary plates being quoted at 1.50c. minimum, delivered in this vicinity.

Structural Material.—Business in the week is reported as rather quiet. Few contracts of any size were placed, while new projects develop slowly. No new work has been offered in the way of bridges or industrial buildings. The McClintic-Marshall Construction Company has been awarded the contract for the new creosoting plant for the Reading Railway at Port Reading, N. J., requiring about 185 tons. From the fact that the clearing of the site for the new Ritz Hotel, at Broad and Walnut streets, has begun, the early development of this project is anticipated. A fair demand for plain shapes is reported, with prices firm at 1.50c. minimum, delivered in this territory.

Sheets.—Orders have been coming out more freely, and consumers are placing specifications to cover their requirements over the usual midsummer period of suspension of the mills. Current orders are still small in size, very little if any contracting for extended delivery being reported. Mills are somewhat more actively engaged and will probably so continue until the month end. The following range of prices is named, f.o.b.: Eastern maker's mill: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.50c.; No. 27, 2.60c.; No. 28, 2.80c.

Bars.—The situation is practically unchanged. Some contracts for steel bars have been placed at the new price basis, but the market is by no means active. The demand for refined iron bars still drags. Occasional carload orders are placed. No further price concessions are reported. Steel bars are firm at 1.40c., delivered here, while refined iron bars are quoted at 1.27½c. to 1.35c., delivered, according to specifications and tonnage.

Coke.—Somewhat greater activity in foundry coke is noted. In several cases contracts for moderate quantities for delivery in the remainder of the year or for a full 12 months are reported at \$2.10 to \$2.30, ovens. Prompt foundry coke is still available at prices ranging from \$1.90 to \$2.10, ovens. Very little business has been done in furnace coke, quotations for which still range from \$1.40 to \$1.75, ovens, according to delivery.

THE IRON AND METAL MARKETS

The following range of prices is named, per net ton, for delivery in this territory:

Old Material.—While the general market drags, an occasional sizable transaction is reported. The Alan Wood Iron & Steel Company was awarded the 2011 tons of Panama scrap, sold last week, at \$10.67. While the major portion of the transactions in heavy melting steel has been between brokers, who pay around \$13, delivered, to apply on old contracts, one purchase of 5000 tons of strictly No. 1 railroad steel, for delivery over four months, is reported at \$13.50, delivered. Prices for turnings and borings have become firmer. Higher prices in other markets are taking a good share of the available supply and local consumers offer slightly better prices than recently quoted. Heavy rolling mill grades are quiet. Although in some instances quotations are still nominal, the following range of prices about represents the market for small lots delivered in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton, being named as follows:

No. 1 heavy melting steel scrap	\$10.00 to \$13.25
Old steel rails, rerolling	13.75 to 14.25*
Low phosphorus heavy melting steel scrap	16.75 to 17.25
Old steel axles	19.25 to 19.75*
Old iron axles	24.00 to 24.50
Old iron rails	16.50 to 17.00
Old car wheels	13.00 to 13.50
No. 1 railroad wrought	15.00 to 15.50
Wrought iron pipe	12.00 to 12.50
No. 1 forge fire	10.50 to 11.00
No. 2 light iron	6.75 to 7.25*
Wrought turnings	8.50 to 9.00
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Railroad malleable	11.50 to 12.00
Grate bars, railroad	10.00 to 10.50
Stove plate	9.75 to 10.25

*N. m. m.

St. Louis

ST. LOUIS, MO., June 12, 1911.

Aside from some orders for steel rails there has not been enough business transacted the past week to give any particular character to the situation. There is, of course, a fairly steady consumption of pig iron and likewise of coke, but this is of the kind that is with us pretty much all through the year, and while it yields profits of the bread and butter character it does not particularly affect quotation conditions. The same feeling that has existed for the past few weeks, that the last half of the year will see some busy times, continues, but it has not assumed the tangible shape of orders.

Pig Iron.—The consumption of pig iron along the steady lines noted last week continues, the large consumers still being out of the market and the smaller melters running according to demands. Among these latter the requirements maintain a steadiness that develops a very fair total of business. There have been no exceptional purchases during the week and the quietude, therefore, is general. Although the quotations nominally are at \$10.50 to \$11 for No. 2 Birmingham there are reports in the market of sales as low as \$10.25 and even \$10, but not one of the furnacemen is willing to admit that he personally has made such a sale. At the same time there is a belief that concessions are being made in order to turn over stocks on hand, but under such conditions as to avoid making an official precedent for future reference. There has been no change in the quotations, nominally, in No. 2 Northern foundry iron, either for July shipment or for the last half, and the same situation applies as to basic. There are statements, however, of sales of basic at \$13.50 to \$14 at furnace, according to conditions of the sale. The agricultural implement, stove foundry and similar requirements show little change in tone, and in the market as a whole the buyers evidence very little interest.

Coke.—The activity incident to inquiries based on contracts for the last half of the year and also for the year to July, 1912, is not particularly great and the prospects are not particularly promising for an increase in interest immediately. The quotations being made now run from \$2 to \$2.50 per net ton at oven for 72-hour selected foundry, Connellsville or Stonega, but for prompt shipment prices have been made the past week from \$1.90 to \$2.25. A sale of about 1000 tons of 48-hour coke during the week was, about the largest

made. No contracts of importance have been reported as signed either for the last half or for the year to July, 1912.

Finished Iron and Steel.—During the past week the orders for structural steel have been better, as was anticipated last week, and buyers apparently have begun to feel that the market is really settled and that the present minimum basis will stand, of 1.35c. Pittsburgh. Included among the contracts of the week for structural steel was one of 600 tons for the Lemp Brewing Company, which went to the Spuck Iron & Foundry Company, a local concern. An order of about 950 tons for the new plant of the Fulton Iron Works is expected to go to Pittsburgh concerns with local representation, but the order has not been positively placed. Plates have been quiet, with some indications of an early movement, but nothing definite is expected under another week or so. The same has been the situation in bars, the difference in favor of iron continuing to affect orders in this branch of the business. In rails the largest transaction of the week was a sale of 29,000 tons of open hearth product to the Missouri Pacific, which brings the total so far for that road up to 55,000 tons, all for early delivery. A southeast Missouri line has been in the market with an inquiry for 1500 tons, but no order has been given. A north Missouri interurban line is under investigation by a London financial firm and it is understood that a favorable report is to be made which will bring this line into the market for a good tonnage within 60 days. The demand for light rails is very light, though there have been a few inquiries from mines, indicating that activity is reviving in that line. Track fastenings are in fair request at the same prices, which continue firm.

Old Material.—In scrap there seems to be no immediate likelihood of a change from the conditions which have maintained for some time. There is a continuance of the speculative transactions between dealers, but consumers are not prominently in the market. Their propositions are not interesting the dealers. If anything the market may be said to be weak, though the principal characteristic that can be given to it is that it is a waiting game all through. The Vandalia list, out since last report, carried about 300 tons. There has been no increase in the demand for steel. Dealers' prices per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails	\$12.50 to \$13.00
Old steel rails, rerolling	11.25 to 11.75
Old steel rails, less than 3 ft.	10.25 to 10.75
Relaying rails, standard section, subject to inspection	23.00 to 23.50
Old car wheels	12.00 to 12.50
Heavy melting steel scrap	10.25 to 10.75
Frogs, switches and guards cut apart	10.25 to 10.75

The following quotations are per net ton:

Iron fish plates	\$10.25 to \$10.75
Iron car axles	17.50 to 18.00
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	10.25 to 10.75
No. 2 railroad wrought	9.25 to 9.75
Railway springs	9.00 to 9.50
Locomotive tires, smooth	15.50 to 16.00
No. 1 dealers forge	8.50 to 9.00
Mixed borings	4.50 to 5.00
No. 1 bisheling	8.50 to 9.00
No. 1 boilers cut to sheets and rings	7.25 to 7.75
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	8.00 to 8.50
Agricultural malleable	7.00 to 7.50
Pipes and flues	7.25 to 7.75
Railroad sheet and tank scrap	7.25 to 7.75
Railroad grate bars	7.50 to 8.00
Machine shop turnings	6.00 to 6.50

Buffalo

BUFFALO, N. Y., June 13, 1911.

Pig Iron.—No inquiries of importance have been reported for the week, but for small lots they have been quite numerous, especially from New England points, and a fairly good number of small orders have been booked in foundry grades. Shipments on old contracts are going forward in good volume and the rate of consumption is apparently well maintained. Prices are about the same as last week. Furnacemen are not inclined to make further concessions but some consumers are holding off hoping to obtain them. Offers from New York based on less than \$13 at the furnace have been received but not entertained. The repairs to the break in the Erie Canal are expected to be completed this week and canal shipments resumed. This may stimulate placements in the Buffalo district from Eastern points and will at all events insure a greater movement in shipments on contracts

THE IRON AND METAL MARKETS

to tidewater. We quote as follows for prompt and third quarter delivery f.o.b. Buffalo:

No. 1 X foundry.....	\$14.00 to \$14.50
No. 2 X foundry.....	13.75 to 14.00
No. 2 plan.....	13.50 to 13.75
No. 3 foundry.....	13.25 to 13.50
Gray forge.....	13.00 to 13.25
Malleable.....	13.75 to 14.25
Basic.....	14.00 to 14.75
Charcoal.....	16.50 to 17.25

Finished Iron and Steel.—A considerably better feeling appears to be present in the trade. Consumers are taking advantage of existing prices and are placing some good sized orders and a good number of miscellaneous contracts in bar material at the 1.25c. base price. Plates and shapes also show some improvement over last week. Prices are firm at 1.35c. In structural lines the outlook is very bright and many building projects of all descriptions are coming into the market or will soon be ready for figures. Canadian export trade is heavy in bar, plate and structural material. The leading interest reports having taken contracts aggregating over 8500 tons in bars, plates and shapes the past week. The same interest reports having closed several contracts running to 2000 tons to the domestic trade in the week. The 1700 tons of reinforcing concrete bar material required for the new warehouse for the Larkin Soap Company, Buffalo, was placed, 900 tons of soft bars with the Buffalo Corrugated Bar Company and 800 tons hard bars with the Franklin Steel Company, Franklin, Pa. Awards for the 3000 tons of structural steel for the same building (girders, columns and grillage) will be made this week on bids submitted last week. The Goulds Mfg. Company, Seneca Falls, N. Y., is taking bids this week for 350 tons of structural steel for the two additional factory buildings it is to erect. The Syracuse National Construction Company, Syracuse, N. Y., has received the contract for the structural steel work for the Rome Mfg. Company's addition to its plant at Rome, N. Y. Awards for the 570 tons of steel for Rand Hall, Cornell University, Ithaca, N. Y., are soon to be made.

Old Material.—No improvement has taken place in the scrap market. It is still dragging, consumers continuing to manifest a disposition to postpone purchases, waiting developments in the finished steel situation. Dealers are adding in a small way to their present stocks, but only when bargain prices are obtainable. The week's transactions have been very limited and hardly sufficient to establish a market, and there is no quotable change in prices. The schedule shown below is largely nominal. We quote per gross ton f.o.b. as follows:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery scrap.....	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.00 to 11.50
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel twinings.....	6.25 to 6.75
Clean cast forgings.....	6.00 to 6.25

Birmingham

BIRMINGHAM, ALA., June 12, 1911.

Pig Iron.—About the only bullish item before the trade this week is the fact that the May shipments of pig iron from Alabama furnace yards practically equaled the make, there having been but a slight increase in stocks at the end of the month. Actual transactions were, if anything, lighter the past week than in any recent week. It seems that reducing the prices on finished products has had a tendency to still further delay any buying movement of pig iron. The market appears to be slightly weaker, and it is currently reported that such sales as have been made have been at \$10.25 to \$10.50, Birmingham base, for No. 2 foundry. A round lot of gray forge changed hands at just about \$9, Birmingham. Quotations are continued on the same basis as last week, as follows, per ton of 2240 lb., f. o. b. cars at furnace, Birmingham district:

No. 1 foundry and No. 1 soft.....	\$11.00
No. 2 foundry and No. 2 soft.....	10.50
No. 3 foundry.....	10.00
No. 4 foundry.....	9.75
Gray forge.....	9.50
Mottled.....	9.25
Standard basic, chill cast.....	10.50
"Off basic".....	10.00
Charcoal carwheel iron.....	22.50

Cast Iron Pipe.—Shipments continue fairly satisfactory with Southern pipe makers. There is a large inquiry before the trade from Detroit, and the Southern producers are in high hopes of landing the order. It is reported that one foundry that has been idle thus far this year will likely change hands at an early date, with a view of its being put in operation. Quotations are nominally as follows, per net ton, f. o. b. cars here: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., \$21, with \$1 per ton extra for gas pipe.

Old Material.—There has been very little change in the scrap market recently. Actual consumers are loth to buy scrap iron unless there should be a decline in price in sympathy with the pig iron market, and in no case do buyers seem inclined to stock upon this line. Dealers' quotations are continued as follows, per gross ton, f. o. b. cars here:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

Coal and Coke.—The coke market has been affected somewhat by the entrance of one of the largest producers in the South that has for some time refrained from actively seeking foundry coke business. The result is that selected 72-hour, hand-picked foundry coke is offered now by Alabama ovens at slightly lower figures than have prevailed during the past twelve months. Virginia and West Virginia producers are still actively soliciting foundry coke orders throughout Alabama and other Southern States. There is an absolute lack of demand anywhere for furnace coke, as the furnaces now running are practically using only their own supply of raw material. The coal market generally continues very quiet, with low prices ruling, though some nice contracts are being closed up for the next twelve months.

San Francisco

SAN FRANCISCO, June 8, 1911.

No perceptible improvement is noted in the local distributing trade, and merchants do not look for any general activity in the near future. The market has been somewhat unsettled for the last week, as a result of recent developments in the primary markets, but the only actual change of any consequence in this territory is a reduction in sheets and oil-well supplies, the bar market standing as before. A good many small orders which have been withheld are now coming out, and in some departments recent bookings by mill representatives are larger than for some time. Many tentative inquiries of a more important nature are appearing, and while the larger buyers still maintain a conservative attitude, it is believed that any heavy movement in the East will be followed by the placing of large contracts for future delivery in this market. Local merchants are fairly well supplied for the present, but stocks elsewhere in the State are light, and there are indications of increasing requirements during the latter half of the year.

Bars.—The demand for soft steel bars is moderate, being about up to the average of the last several months. So far there has been little buying, except for immediate needs, though some buyers are expected to enter the market on a larger scale before long. No great amount of business is anticipated from dealers for some time to come, as the large supplies now on hand are decreasing but slowly. Reinforcing material is somewhat more active, a few orders having been placed recently which require a very fair tonnage. Plans are about complete for the resumption of local harbor improvements, which will require a large amount of reinforcing material. Bars from store, San Francisco, are quoted at 2c. for steel and 1.90c. for iron.

Structural Material.—The local building record for May showed a total valuation of \$1,925,847, compared with \$1,882,158 for April, and \$2,447,079 for May, 1910. According to some fabricators, the situation is really better than these figures appear to indicate, though much of the new work is very small. A slight improvement is noted in the other leading cities of the coast, and the tonnage of fabricated material required in the smaller towns is steadily increasing. The most im-

THE IRON AND METAL MARKETS

portant recent event in this line is the letting of the Oakland City Hall, requiring about 3500 tons, the contract for which was awarded to the Judson Mfg. Company, which has a large shop in Oakland. Dyer Bros., San Francisco, have taken a small job on a wing of the Polytechnic High School, and the Butler Building at Geary and Taylor streets, in addition to some unimportant work outside the city. The McClintic-Marshall Construction Company has taken a government job at Angel Island requiring 247 tons, and two 50-ton jobs, one at the Benicia Arsenal and one at Eureka, Cal. Bids have not yet been opened on the Southern Pacific station in Oakland. This company will soon be in the market for a large drawbridge at Los Angeles. An award on the Masonic Temple is expected June 10, and the Bankers' Hotel, requiring 400 tons, about the end of the month. The opening of bids on the Multnomah County Court House, Portland, Ore., has been postponed. Figures are to be taken next week on the Lally Plumbing Company's new building in this city, requiring about 400 tons. Figures will also be taken shortly on the Brown Building and the San Francisco Investment Corporation Building, each calling for about 300 tons. The California & Oregon Grain & Elevator Company is planning a large steel grain elevator near Los Angeles. Work will probably be resumed this summer on local harbor improvements, which will require a considerable tonnage of structural shapes.

Cast Iron Pipe.—The city of San Diego, Cal., has not yet placed its order, but has bids under consideration. Aside from this the situation is quiet. The tonnage taken on small orders by various gas corporations continues satisfactory, but at the moment there are no inquiries of unusual importance in the market.

Pig Iron.—No demand of any consequence exists for foundry iron. Business is limited almost entirely to very small transactions. No. 2 Southern foundry iron is nominally worth \$21. Prices on English, Continental and Chinese foundry iron show considerable variation, ranging from \$20 to about \$23. Meyer, Wilson & Co. have chartered a vessel to carry 1000 tons of pig iron ballast from Belfast to Portland, Ore.

Old Material.—Aside from cast iron scrap, the market is featureless, the movement being of a limited nature. The Risdon Iron Works has placed on the market 1000 tons of heavy machinery cast scrap of exceptionally desirable quality. The lot was immediately taken by a few buyers at about \$16.30 per net ton, at the Risdon works. Nothing of similar quality is to be had from dealers much below \$18, though ordinary cast scrap is still quoted at about \$16. A few small lots of rerolling rails and melting scrap are being sold, but the demand is limited. Prices are as follows: Steel melting scrap, per gross ton, \$10.50 to \$11; wrought scrap, per net ton, \$11 to \$15; rerolling rails, per net ton, \$11.

Metals.—The city of San Francisco has placed an order with the Selby Smelting & Lead Company for 180 tons of pig lead.

New York

NEW YORK, JUNE 14, 1911.

Pig Iron.—The daily run of business makes a fair volume. No large sales of foundry iron are reported, but consumers in this locality are purchasing small lots quite steadily. Those who buy round tonnages for future delivery have pretty generally covered their requirements running into the fall months, and some completely through the last half. Inquiries are coming in for delivery in the first half of next year, but furnacemen are not disposed to make quotations for such shipments, preferring to wait for developments. An encouraging feature of present conditions is that consumers are specifying to the full terms of their contracts and not asking for shipments to be held. Some of the Buffalo producers have advanced their quotations on foundry iron 25 cents per ton. The break in the Erie Canal has at last been repaired and through shipments of pig iron eastward are expected to be resumed speedily. Northern iron at tidewater is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$14.75 to \$15. Southern No. 1 foundry is quoted at \$15.25 to \$15.75; No. 2, \$14.75 to \$15.25.

Cast Iron Pipe.—Newark, N. J., will open bids June 15 on 1200 tons of water pipe, and Yonkers, N. Y., June 19 on 450 tons. An eastern Pennsylvania foundry is stated to have secured the order from the contractor

for furnishing 8900 tons of water pipe for the boroughs of Manhattan and the Bronx, naming a very low price, while it is reported that a southern New Jersey foundry secured the order for 1580 tons for the two other boroughs of the city of New York. Considerable inquiry has sprung up from the general trade within the last few days, and quite a sharp demand is reported by some makers for 4 to 8-in. Carload lots of 6-in. are quoted at \$21 to \$22 per ton, tidewater.

Old Material.—A sale of 2011 tons of Panama scrap at Philadelphia was made June 8 by the Panama Railroad in New York, the successful bidder being an eastern Pennsylvania interest at \$10.67 per gross ton, f.o.b. cars, Philadelphia. The general demand is light, with probably a little more doing in cast scrap than any other class of old material. Some interest is shown by eastern Pennsylvania buyers in heavy melting steel scrap, but it must be of the choicest character to secure acceptance by the mills, as rejections continue, especially on deliveries made on contracts taken at higher figures than present prices. Practically no market exists for rerolling steel rails, and holders are either obliged to sell them for scrap or to store them to wait for a revival in the demand. Old car wheels are in almost no demand. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Rerolling rails..... (nominal)	12.00 to 12.25
Standard hammered iron car axles (nominal)	22.00 to 22.50
Old steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.25 to 4.75
Cast borings.....	5.25 to 5.75
Wrought turnings.....	6.25 to 6.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

Finished Iron and Steel.—Dullness, with the likelihood of continued calm for at least two weeks, characterizes the market, though the under-current is stronger. Betterment in volume of business has been chiefly in steel bars. Bar iron is described as demoralized and, while it is known that bar iron has been sold at 1.25c. per lb. at New York, the prevailing prices, with emphasis on quality, are within the range quoted below. The conditions in structural steel lines are marred by general charges of low fabrication figures. Awards of the week covering large work do not exceed 10,000 tons for local territory. At this writing the 6000-ton Bamberger store building, Newark, N. J., is still in doubt, the 3000-ton Aeolian building in New York has not been settled, there is nothing to report on the 35,000-ton New York connecting railroad bridge and the bids for a 2000-ton highway bridge at McElhahan, Pa., have been rejected for a lower cost design. One large development in structural work is a 10,000-ton structure for railroad terminal in Kansas City, Mo. Among recent contract awards are the following: Richmond Hotel addition, Richmond, Va., about 400 tons, to Richmond Structural Steel Company; Norfolk terminal, 1200 tons, to Virginia Bridge & Iron Company, and the following to the American Bridge Company: Williamsburg bridge, towers and reinforcement, 2700 tons; bridges, Boston & Maine Railroad, 150 tons; Grand Central suburban area, New York Central Lines, 800 tons; Chestnut Street bridge, Philadelphia, 300 tons; Commercial National Bank Building, Charlotte, N. C., 750 tons; United States Rubber Building, 3700 tons; Scottish Rite Temple, Washington, D. C., 350 tons. The Bethlehem Steel Company will furnish part of the steel for the West Forty-second street warehouse to be erected by the Hinkle Iron Company and for the Jarmulowski building to be erected by the Radley Steel Construction Company. Quotations are: Plain structural material and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.40c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

The coke production of the United States in 1910 exceeded that of any previous year, according to figures just issued by the United States Geological Survey. In 1910 the output was 41,631,410 net tons, valued at \$99,696,267, while the production in 1909 was 39,315,065 net tons valued at \$89,965,483.

THE IRON AND METAL MARKETS

The German Iron Market

BERLIN, June 2, 1911.—Little change has taken place in the situation of the iron trade for a week past. The reports, however, are growing less favorable, and prices are everywhere weak where not rigidly fixed by trade combinations. The general feeling has grown less confident in view of the weakness of the American, English and Belgian markets. The disagreement among the American companies and the cut in steel prices have made a marked impression in Germany, and were used by stock market operators as one argument for selling German iron shares.

From Belgium again comes what has now grown to be the regular weekly announcement of lower prices. This time it is a cut of 2c. (to 117-119s.) a to nine plates of medium thicknesses, and 2s. 6d. (to 120-122s.) in thin plates for export, free on board at Antwerp. Owing to the weak tendency in the English market the price of English No. 3 foundry has this week fallen one to two marks a ton at Duisburg on the lower Rhine. In the Silesian district a movement among dealers favors reducing the price of bars and plates. From the Rhenish-Westphalian district, it is reported offers of steel bars as low as 97.50 marks are now in the market, while the export price, f.o.b. Antwerp, is barely 92 marks.

The band-iron trade is one of the weakest sections of the market. Only a limited number of mills are running on this specialty, of which 10 are in a combination and three are independent. Some of the big companies of the Steel Works Union in carrying out their general policy of extending their list of manufactures to the more finished products in order to consume as much as possible of their own steel have within a year or two begun to manufacture bands, and considerable price-cutting has resulted. After prices reached their high-water mark last August with 140-145 marks a downward movement began owing to the circumstances just mentioned, and now the combination is compelled to sell at less than 135 marks. It has recently appealed to the Union for better prices on steel material, but opposition has arisen from those works in the Union which are turning out bands. The state of business in this product has grown much less favorable. Some of the big companies are selling at heavily reduced prices for the fourth quarter of the year.

Wire Prices Unchanged

The wire combination voted several days ago to begin taking business for the September quarter at unchanged prices, namely, 14.75 to 15.25 marks for drawn wire and 16.50 to 16.75 marks for wire nails per metric cwt., according to the amounts ordered. Troubles exist in the organization, and it was decided at this meeting to dissolve it at the end of the month unless an adjustment of the disagreements be reached by June 15.

The heavy plate combination has also opened business for the next quarter at unchanged prices. Some of the mills running on this article are still well employed, particularly on ship plates; nevertheless, consumers are more reserved in placing new orders at existing prices. The foreign market is buying pretty well. In fine plates business is less satisfactory. The mills are only tolerably supplied with orders, and little new business is coming in. Prices have further weakened, having now touched 132.50 marks for thin numbers and 123 to 125 marks for medium. Export prices were forced down in May, in some grades as much as 5 marks a ton, under the influence of the break in Belgium, but considerable foreign buying has been going on at the lowered prices.

The Pig-Iron Market

Some of the reports still speak of a firmer tendency in the pig-iron market in connection with the prospect that the Essen Syndicate will be extended to cover the entire trade. No new progress in the negotiations can be reported, however. According to the latest information the outlook for getting the Lorraine-Luxemburg furnaces to join is far from encouraging for the syndicate. It is said that the companies there show little disposition to come in. Moreover, a serious disagreement already appears to have come up on the matter of allotments. The syndicate wants to make allotments to the various companies on the basis of their actual shipments in 1910, but they demand that their actual productive capacity be taken as the basis.

Foreign ores have latterly given way in prices a

little. Shipments in May were heavy. At a meeting yesterday of the Ore Syndicate at Siegen it was stated that consumers had already ordered about all their requirements for the second half of the year. The managers expect a heavier demand for ores after the pig-iron interests have got together. To the report is added that the market position is little changed.

A report on conditions in French Lorraine shows the market still in a very strong position, presenting a marked contrast to nearly all other countries at this time. Manufacturers remain an optimistic attitude, and much expansion of plants is going on. Contracts expiring at the end of June have been renewed without the slightest difficulty at unchanged prices. An interesting German undertaking in another part of France is taking shape. The great coal and iron master Thyssen, of the lower Rhine, has for some time been exploiting ore properties in Normandy, shipping the ores to Germany by way of Rotterdam and the Rhine, but latterly he has decided to erect big iron works near Caen, including four blast furnaces, besides a steel plant.

The Laurahütte, the leading Silesian company, is about to begin the erection of a second big open-hearth plant, to replace a basic and bessemer plant. The new works will consist of five furnaces of the most modern type.

The fusion of the Burbach, Eich and Düdelingen concerns, which was referred to in this correspondence some weeks ago, has made further progress. At a meeting held in Brussels several days ago a basis for rating the value of the stock of the different companies was agreed upon, and it is expected now that the deal will go through without much delay. There is still an unsettled question as to the nationality of the new combination, as Burbach lies in Belgium, the other two concerns in Luxemburg. The new company will have an output of at least 1,000,000 tons of pig-iron yearly. The deal between Deutsch-Luxemburg and Rümelingen-St. Ingbert, also previously mentioned, is taking shape. A meeting of the latter company will be held shortly to act on the offer of Deutsch-Luxemburg, which is proposing to lease the Rümelingen-St. Ingbert business for a term of years, with dividend guarantee.

Metal Market

NEW YORK, June 14, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.									
Copper, New York.			—Lead—		—Spelter—				
	Lake.	Electrolytic New York.	New York.	St. Louis.	New York.	St. Louis.			
June 8	12.45	12.25	47.90	4.37½	4.22½	5.55	5.25		
9	12.50	12.35	47.95	4.37½	4.22½	5.55	5.25		
10	12.60	12.37½	47.95	4.40	4.25	5.55	5.25		
12	12.75	12.50	47.75	4.45	4.30	5.55	5.30		
13	12.75	12.50	46.90	4.45	4.30	5.55	5.32½		
14	12.75	12.50	46.87½	4.45	4.30	5.55	5.32½		

All non-ferrous metals are higher but tin. The pig tin market here, however, is not following the London market so closely in its advances. Copper is much stronger. Lead and spelter are also commanding better prices.

Copper.—Heavy sales of both lake and electrolytic copper have tended to advance that market and business is so good that some of the leading sellers have retired pending a further readjustment in prices. Those who have copper to offer are in a comfortable position just now as the metal is not easy to secure for early delivery. The sharp advance is not entirely warranted by the sales, but has been influenced greatly through sentiment. Why there should be such a sudden change in sentiment regarding the copper situation is surprising to many, as the Copper Producers' report showing the May statistics was not considered so very encouraging. Electrolytic copper for early delivery could not be bought this morning for less than 12.50c. and lake sold for 12.75c. There were reports of higher prices being asked and a further advance would not surprise many. In London this morning spot copper was very firm at £56 10s. and futures, £57 1s. 3d. A reduction of ¼c. a pound has been made in prices on brass tubing, brass rods and brass and copper wire.

Waterbury Average.—The Waterbury average for May was 12.37½c. The average price of lake copper in New York was 12.32½c. and for electrolytic 12.12c.

Pig Tin.—While there is a good demand for pig tin, coming largely from buyers who have been scared into the market, the situation here is better than in

THE IRON AND METAL MARKETS

London. This morning the American market was fully 3c. below the import parity. This was largely due to the fact that the leading consumer of pig tin entered the market during the week as a seller and broke what might have been a corner on spot supplies here. There was a great bulge in the London market on Friday and during the morning there was much excitement here. Some good sales were made and several 5-ton lots were disposed of at 50.75c. This is the highest price ever paid for pig tin in America. Fortunately, however, the efforts of people interested in the consumption of pig tin were brought to bear on the situation and before the afternoon was well begun the price broke and when the readjustment was made there were sales at as low as 47.95c. A confidential report to a New York house from its London connection states that plans have been made by the London syndicate to end the squeeze in pig tin there on June 20 and in consequence pig tin for delivery after that date is not being bought very heavily. This is given for what it is worth. It is highly probable that if the syndicate has laid such plans it will change them if the truth has leaked out. The future of the pig tin market here it is reasonable to suppose will be governed by the action of the leading consumer. In London this morning soft tin was selling for £230 and futures, £187 os. 5d.

Tin Plates.—The domestic demand for tin plates is not heavy. The market is firm at \$3.94 for 100 lb. coke plates. The price of foreign tin plates is unchanged at 13s. 9d. at Swansea, Wales.

Lead.—The lead market is materially stronger. This is not due to any great new demand but seems to be merely a result in the change of sentiment. Sellers do not seem to be particularly anxious to dispose of their holdings at existing prices and inquiries from buyers indicate that they are anticipating a rising market. This morning lead was up to 4.45c. in New York and 4.30c. St. Louis.

Spelter.—Spelter is in decidedly good demand. The galvanizing interests came into the market and bought heavily during the week with the result that prices have steadily advanced. There seems to be a better supply of spot spelter in New York and in consequence the premium demand is not so far above the St. Louis market as it has been. At present spelter in St. Louis is selling at 5.32½c. and in New York at 5.55c. The market is not very well organized and some sales have been made at slightly under these prices.

Antimony.—The antimony situation is unchanged excepting that the trade is wondering about what has become of the syndicate which seems to be making no attempt to regain control. Prices are weak with Hallitt's at 8.75c. and Cookson's at 9c. Hungarian grades can be had at around 7.50c.

Old Metals.—Conditions are better and prices are firmer. While dealers' selling prices, New York, are unchanged, as follows, the outside quotation is now more in evidence:

	Cents.
Copper, heavy, ant and com. 100 lb.	11.75 to 12.00
Copper, heavy and wire.	11.25 to 11.50
Copper, beat and bottoms.	10.50 to 10.75
Brass, heavy.	7.75 to 8.00
Brass, light.	6.50 to 6.75
Heavy machine composition.	10.25 to 10.50
Composition turnings.	8.50 to 8.75
Clean brass turnings.	7.75 to 8.00
Lead, heavy.	4.20 to 4.25
Lead, tea.	3.95 to 4.00
Zinc scrap.	4.25 to 4.30

Chicago

JUNE 13.—The rapid rise in the price of tin has limited the buying of this metal to absolute needs and the transactions recorded have been few and small. A fairly active week is reported in copper sales, but other metals have moved slowly. We quote Chicago prices as follows: Casting copper 12.50c.; lake, 12.75c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 49c.; small lots, 50½c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 9c., and other grades, 8¾c. to 9¼c., in small lots; sheet zinc is \$7.25 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9¼c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 35c.; block tin pipe, 39c.

St. Louis

JUNE 12.—The metal market here is very quiet and such changes as appear in the quotations are the result of manipulations elsewhere and not due to local conditions. This is especially true of tin, which is quoted at 48.85c. as against 47c. at the last report. Lake copper stands at 12.85c., at which it was last quoted here. Electrolytic is at the same figure, also having shown no change during the past week. The quotation on antimony is 9.35c., which is a fall from 9.85c. a week ago. On lead the figure is 4.22½c. or unchanged. Spelter stands at 5.22½c. to 5.25c., a slight advance over a week ago. In old metals the quotations are: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3.25c.; pewter, 20c.; tin-foil, 28c.; tea lead, 8c.

Iron and Industrial Stocks

NEW YORK, June 14, 1911.

Prices of securities have maintained their strength consistently since last week's report and further advances have been made in some stocks. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allegheny Steel, com.	87½ - 91	Pressed St., pref.	1007½ - 101
Allegheny Steel, pref.	31½ - 33	Railway Steel, com.	37 - 38
Beth. Steel, com.	32¾ - 34¼	Republic, com.	30 - 30½
Beth. Steel, pref.	63½ - 65	Republic, pref.	94½ - 95¼
Can. com.	11 - 11½	Sloss, com.	50 - 50¾
Can. pref.	86½ - 87½	Sloss, pref.	110
Car & Fdry., com.	56 - 57	Pipe, pref.	58½ - 59¼
Car & Fdry., pref.	118	U. S. Steel, com.	76¾ - 78½
Steel Foundries.	42 - 42½	U. S. Steel, pref.	117½ - 118½
Colorado Fuel.	34¾ - 35¼	Westinghouse Elec.	75 - 77½
General Electric.	163 - 164¾	Va. I. C. & Co.	69 - 71
Gr. N. ore cert.	62¾ - 63¾	Am. Ship, com.	72½
Int. Harv., com.	122¾ - 125	Chi. Pneu. Tool.	51 - 52½
Int. Harv., pref.	124 - 124¾	Cambria Steel.	44½ - 45
Int. Pump, com.	41¼ - 42¾	Lake Sup. Corp.	27½ - 28½
Int. Pump, pref.	89 - 90½	Pa. Steel, pref.	105 - 106½
Locomotive, com.	41 - 42	Warwick	10
Locomotive, pref.	109½	Crucible St., com.	12 - 13½
Nat. En. & St., com.	17 - 17¾	Crucible St., pref.	83 - 83¾
Pittsburgh St., pref.	105¾ - 106¼	Harb. Walk Kef., com.	45
Pressed St., com.	36½ - 37		

Dividends Declared

The Lanston Monotype Company, regular quarterly dividend of 1½ per cent., payable June 30.

The American Smelting & Refining Company, regular quarterly dividend of 1¾ per cent. on the preferred and 1 per cent. on the common stock, payable July 1.

The Rubber Goods Mfg. Company, regular quarterly dividend of 1¾ per cent. on the preferred and 1 per cent. on the common stock, payable June 15.

The American Pipe & Construction Company, regular quarterly dividend of 2 per cent., payable July 1.

The Canadian General Electric Company, Limited, quarterly dividend of 1¾ per cent. on the common stock, payable July 1.

The International Silver Company, regular dividend of 1¾ per cent. and ¼ per cent. extra, payable July 1.

The Buffalo General Electric Company, quarterly dividend of 1½ per cent., payable June 30.

The La Belle Iron Works, quarterly dividend of 2½ per cent.

The Youngstown Sheet & Tube Company, quarterly dividend of 2½ per cent.

The American Iron & Steel Mfg. Company, quarterly dividend of 1¾ per cent. on the common and of 1¼ per cent. on the preferred, payable July 1.

The International Harvester Company, regular quarterly dividend on the common stock of 1¼ per cent., payable July 15.

The Consolidated Car Heating Company, regular annual dividend of 2 per cent., payable July 15 and 2 per cent., payable January 15 next, and an extra dividend of 2 per cent., payable July 15.

In the suit of the Vulcan Detinning Company against the American Can Company and Frank A. Assman, for an accounting of the profits made by the American Can Company in connection with the detinning of scrap at Paulsboro, N. J., and Joliet, Ill., the master in chancery at Trenton, N. J., has decided that the defendant must account to the Vulcan Company for profits of \$677,352. The case will probably be appealed. The contention is that the can company unlawfully used the Vulcan process of detinning.

The Westinghouse Electric Annual Report

The report of the Westinghouse Electric & Mfg. Company and its subsidiaries for the year ended March 31, 1911, records the largest year's business in both gross earnings and net income in the company's history. The gross earnings were \$38,119,312 and the cost \$32,510,547, leaving a net manufacturing profit of \$5,608,765. Other income was \$1,515,532, and deductions for interest, depreciation of plant, etc., were \$2,243,191, making the year's surplus \$4,881,106. The gross earnings exceed those of the preceding fiscal year by \$8,870,630, and were greater by \$5,093,072 than those of the best previous year in the company's history. Dividends were paid totaling \$629,795, including 7 per cent. on the preferred stock and a balance of 83 1/2 per cent. accumulated unpaid in recent years.

The report states, however, that the business taken by the company in the last two months of the fiscal year, and since its close, compares unfavorably with the same months in 1910. Unfilled orders March 31 totaled \$7,616,058, as against \$11,256,196 on the same date last year. The agreement between the company and the General Electric Company, made March 31, 1896, whereby for a period of 15 years each company licensed the other under the patents controlled by it, with provision for the payment of royalties, will not be renewed. Other patent license agreements with manufacturers of mining locomotives, small motors, fuses, switches and sockets, under which the company has been working for some years, have recently been canceled on the suggestion that they might be questioned as being in violation of the federal anti-trust laws, notwithstanding they were originally made and have been maintained under advice of counsel that assured the company of their validity.

For the first time the company makes public the financial conditions of the foreign companies established by the parent corporation. Their history has been one of losses and the writing off of large percentages of their book values. First to be established was the Westinghouse Electric Company, Ltd., a British corporation organized in 1889. The income of this company has long been insufficient to pay the expenses of its operation and the upkeep of its patents. In the fiscal year ending in 1910, the directors wrote off from the book value \$773,084, and in the fiscal year just ended \$500,000 more, leaving it at \$500,000. Still further depreciation must be contemplated. The British Westinghouse Electric & Mfg. Company, Ltd., organized in 1899, owns large manufacturing works in Manchester, England. Its operations have been almost uniformly unprofitable, although recent improvement indicates that it will be able to meet its fixed charges.

The Société Anonyme Westinghouse of Paris, organized in 1901, operates factories at Havre and Freinville, and its territory includes France, Belgium, Holland, Switzerland, Spain and Portugal. Its operations have been steadily unprofitable. The Società Italiana Westinghouse was formed primarily to execute important contracts for electrifying the Italian State Railways, a project that has been deferred by the Government. While the parent company holds none of its stock, \$289,746 has been advanced for which stock will be received later. The Italian company showed a loss last year of \$32,940. The Russian company was organized in 1906 to execute a contract for the electrification of the St. Petersburg street railroads, which resulted in a loss of more than \$1,000,000 and other losses aggregate \$800,000. The Austrian company, organized in 1906 to manufacture tungsten lamps, has been measurably profitable. On the Westinghouse Metal Filament Lamp Company, Ltd., London, organized at the same time to control the patents covering the manufacture of tungsten lamps for territory outside of Austria, the book value of the investment will probably be realized. The company's holdings of the stock of the Canadian Westinghouse Company, Ltd., are worth more than their book value, and the company's stock in several power companies is considered worth practically its book value.

The Thomas W. Pangborn Company, Jersey City, N. J., announces that it has consolidated the executive, sales, accounting and purchasing divisions of the business, formerly located at 90 West street, New York City, at the Jersey City plant, Hudson and Morris streets, where are the manufacturing and engineering divisions and the show

rooms. The improved transit facilities have made this change desirable.

The World's Railroad Mileage in 1909

The Archiv für Eisenbahnwesen has brought down its census of the railroads of the world through the year 1909. At that time the whole world had 625,698 miles, exclusive of street railroads, trolley lines and other light structures. For the grand divisions of the Old and New World the mileage is:

	Miles.		Miles.
Europe	204,004	North America	127,018
Asia	61,800	South America	42,127
Africa	20,530	Australia	18,249
Old World	286,334	New World	138,185

Thus the new world has 54 per cent. of the total. North America alone has 10,000 miles more than Europe and Asia together, although the latter have 1,250,000,000 inhabitants as against 115,000,000 in North America. More than half of the railroads of the world have been built since 1886, the average being 13,600 miles per year. In 1909 more railroad was constructed in Asia than in Europe, and in the four years preceding nearly as much. Russia was the leader in the 1909 construction, opening a line 1258 miles long in Central Asia. China in that year had 5277 miles, of which 3050 miles were built in the past four years. In Africa a notable activity exists, chiefly in the British South African Union, which has now more railroads than any other two countries in Africa. A number of lines have been built from the coast inland by the German, French and Portuguese, as well as by the English, through districts which have little white population.

Promising Crop Conditions

The indicated yield of wheat, based on the Government crop report for June 1, is the largest on record, although that of winter and spring wheat separately is not. The condition of winter wheat is 80.4 per cent., which gives a total of 479,915,000 bu.; for spring wheat the condition is 94.6, and an indicated yield of 284,571,000 bu., making the total 764,286,000 bu. With oats the condition is 85.7 per cent., an indicated yield of 976,425,000 bu.; rye, 88.6 per cent., or 34,422,000 bu.; barley, 90.2, or 175,246,000 bu.

The Wisconsin Steel Company, Iroquois Iron Company and Inland Steel Company, all of them Illinois corporations, and the Coke Producers' Association of Connellsville, Pa., have secured from the Interstate Commerce Commission a suspension for four months of a proposed advance in freight rates on coke. The advance was to become effective June 15, raising the Chicago rate from \$2.35 to \$2.50 per ton.

President C. A. Adams of the Cleveland Chamber of Commerce, Cleveland, Ohio, has appointed a new committee on industrial development, which will gather data regarding the industries of the city and determine new industries that are needed. The work of the committee in the past year brought some new manufacturing plants to the city. D. T. Croxton, president of the Cleveland Furnace Company, was reappointed chairman of the committee.

The Trenton School of Industrial Arts has dedicated a new building, which was erected by Henry C. Kelsey, former secretary of state of New Jersey, at a cost of \$140,000.

The recent visit of the American Trade Delegation to China resulted in a proposition to establish an American-Chinese Bank at Shanghai, to be conducted by a directorate composed equally of Chinese and Americans, but with a Chinese chairman. The proposed capital is \$5,000,000, United States gold, subscribed half in China and half in the United States. One result of such a bank would be to simplify the matter of credits in dealings between American exporters and the Orient.

Plans are being made by the Northern Iron Company to blow in its Standish furnace, at Standish, N. Y., before the end of the month.

The Administration and the Steel Corporation

The Washington correspondent of the New York Journal of Commerce states that the first instalment of the report of the Bureau of Corporations on the steel industry will deal largely with the financial side of the United States Steel Corporation's organization and the reasons for creating that corporation. This will be followed by an exhaustive financial history of the corporation from its founding down to the present time, accompanied by a discussion of the stock market operations that have been incidental to the progress of the concern. It has not been decided how many sections will be issued in giving out the steel report, but probably not less than three or four. This will give the financial side of the subject ample opportunity to be studied, and to receive such notice as the public is willing to give it. The correspondent continues:

"Republicans believe that as soon as the bureau report is issued the interest of the public in the doings of the Stanley steel investigating committee will evaporate. The details of the steel business that have been gathered by the bureau are so much more complete and so nearly exhaustive that there will be nothing left for the committee to do except to cover the same old grounds, just as it has been doing up to date, but there will be a difference in this respect—the subject will then have been thoroughly exhausted and there will be little or no possibility, it is believed, of focusing public attention any further upon the matter.

"Careful inquiry does not disclose any foundation whatever for the statement that the government has determined to start a suit against the steel combination. The subject has been under advisement for a long time past, but owing to the failure of the Bureau of Corporations to finish its report, and owing to the inertia of the administration nothing so far as can be learned has been settled upon. If a suit is started it will be done in part as a result of the attempt of the Democrats to make political capital out of conditions here. But some of the men who are closest to the matter state emphatically that not only had there been no determination to open such a prosecution, but that they themselves doubt extremely the political wisdom of such an undertaking at the present time."

Efficiency of Coney Island Fire Pumps

A number of articles were published in the daily press of New York City, May 29 and 30, on the subject of the disastrous fire at Dreamland, Coney Island, directing considerable criticism against the operation of the pumps in the high pressure service pumping station at Coney Island, the information being received apparently from Fire Chief Lally of Brooklyn. The Goulds Mfg. Company, the builder of the pumps, has gone to considerable trouble to ascertain that it was through no fault of the pumps that the pressure was not maintained. The trouble was due to the fact that more water was demanded by the fire department than the pumping station was designed for.

Vice-president W. E. Dickey, of the Goulds Company, has given out some correspondence which he has had with Commissioner Henry S. Thompson of the Department of Water Supply, Gas and Electricity, New York, regarding these complaints. The letters include one from J. W. F. Bennett, deputy Commissioner, in which he says: "In reply to your communication to Commissioner Henry S. Thompson, I have pleasure in stating that the three high pressure fire service gas engine driven pumps at the Coney Island station worked satisfactorily during the Dreamland fire. The overdraft on the pump necessarily resulted in the reduction in pressure shown on the charts and mentioned in the press."

The daily papers publish a prospective consolidation of a number of cast iron pipe foundries, the names of the companies mentioned being the Massillon Iron & Steel Company, Massillon, Ohio; Glamorgan Pipe Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; Dimmick Pipe Company, Birmingham, Ala. It appears to be correct that a meeting was held in Philadelphia last week at which a plan of this kind was discussed, but it resulted in nothing definite. From expressions received from some of the parties presumed to be interested, the prospects of the consolidation appear rather remote.

May Copper Production and Stocks

The Copper Producers' Association has issued its monthly statement for May, as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States, May 1.....	165,555,908
Production of marketable copper in the United States from all domestic and foreign sources during May.....	126,962,544
Deliveries of marketable copper during May:	
For domestic consumption.....	64,543,963
For export.....	61,978,557
Total.....	126,522,520
Stock of marketable copper of all kinds on hand at all points in the United States, June 1.....	165,995,932

The statement shows an increase in stocks from May 1 to June 1 of only 440,024 lbs. The month's production showed an increase over April of 8,877,321 lbs.

The Pittsburgh Foundrymen's Association

The annual meeting of the Pittsburgh Foundrymen's Association was held in Pittsburgh last week, at which new officers for the ensuing year were elected as follows: W. A. Bole, Westinghouse Electric & Mfg. Company, Wilmerding, Pa., president; Eliot A. Kebler, Pittsburgh representative of M. A. Hanna & Co., vice-president; John McLauren, re-elected treasurer, and F. H. Zimmers, re-elected secretary, the latter having held his position for 15 years. An executive committee was also elected consisting of J. S. Seaman, Henry R. Spilker, C. W. Jones, E. D. Frohman and J. S. McCormick.

The report of the treasurer showed a balance on hand of \$922.27, as compared with \$667.53 a year ago. The report of Secretary Zimmers showed a total of 148 active and five honorary members, as compared with 127 active and four honorary members on June 1, 1910. A letter was read from Dr. Richard Moldenke, secretary of the American Foundrymen's Association, expressing thanks and appreciation for the work of the Pittsburgh foundrymen in connection with the recent annual convention of the American Foundrymen's Association.

The new No. 4 blast furnace of the Republic Iron & Steel Company at Haselton, Ohio, was blown in June 8. It is 85 ft. high and 22 ft. 6 in. in diameter at the bosh and will make about 500 tons of Bessemer pig iron per day. This company also started up on June 12 four of the eight open-hearth furnaces in its new steel plant, and expects to start up the other four within a short time or as soon as business conditions improve.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., has put in operation its new 30-ton open-hearth furnace and the new erecting department in its machine shop.

The Kurtz Brass Bed Company, Corry, Pa., is having plans and specifications made by a local architect for a new plant. Bids will shortly be asked for the building of the new factory.

The Pittsburgh office of the Wisconsin Engine Company has received an order from the Philadelphia Company, Pittsburgh, for a 1200-hp. cross-compound pumping engine with gas cylinder 20 in., low pressure 48 in. and stroke 60 in., to be delivered at one of its West Virginia stations this month.

The new office building of the Republic Iron & Steel Company at Youngstown, Ohio, is nearly completed and will be occupied about July 15. A special train will be used to transfer to the new building the books and other records of the company from its present general offices in the Oliver Building, Pittsburgh.

An International Shipping and Oil Engine Exhibition will be held at Newcastle-on-Tyne, England, in November.

The large new buildings of the Willys Overland Company at Toledo, Ohio, will be conspicuous as embodying the modern substantial type of concrete construction, with large daylight openings of Detroit Fenestra solid steel windows throughout.

The Future in Blowing Engine Practice

An air reservoir for the furnace blast is recommended by Prof. C. L. W. Trinks, of the Carnegie Technical Schools, Pittsburgh, to prevent the discharge from the blowing engines setting up vibrations which may be transmitted through the whole system. This point is mentioned in a paper he read before the American Society of Mechanical Engineers at Pittsburgh. The separator has been used with the steam engine for a similar reason, but resistance is offered if the suggestion is made to the blast furnace man.

Incidentally Professor Trinks's paper is a strong argument for more attention to the production of high speed blowing engines, and as stated in the brief review of the paper given in *The Iron Age* of June 8, he regards the combination of the high speed reciprocating blower with the blast furnace gas engine as easily profitable even in the Pittsburgh district, where coal is cheap. He considers that a gas-driven blowing engine with 800 to 900 ft. per minute piston speed and high rotative speed will be the most formidable competitor of the turbo-blower, if European experience may be taken as a guide. There are engineers in this country who have already carried into practice higher piston speed for gas engines for electric power, and interesting developments in this line of work may be expected in the next five years.

The paper, in an extended study of types of valves and valve gear for blowing engines, concludes that the low-lift alloy-steel plate valve promises to become the standard for high-speed engines. It refers also to the use in Europe of large tanks resting on the air cylinders for taking the air before it is sent on through the air-pipe lines.

The Steel Corporation's Unfilled Orders

The monthly report of the United States Steel Corporation on the amount of unfilled orders on its books, issued June 10, showed that on May 31 orders amounting to 3,113,187 tons, a decline from April 30 of 105,517 tons. This was the second monthly decline in unfilled orders during 1911, and brought the total to the smallest figure since January. New orders received in May slightly exceeded those received in April but shipments were larger.

The following table gives the unfilled tonnage of the United States Steel Corporation by months since June 30, 1910, together with tonnage at close of each quarter from December 31, 1902, to June 30, 1910:

May 31, 1911.....	3,113,187	Dec. 31, 1907.....	4,624,552
April 30, 1911.....	3,218,704	Sept. 30, 1907.....	6,425,008
Mar. 31, 1911.....	3,447,301	June 30, 1907.....	7,603,878
Feb. 28, 1911.....	3,400,543	Mar. 31, 1907.....	8,043,858
Jan. 31, 1911.....	3,110,919	Dec. 31, 1906.....	8,489,719
Dec. 31, 1910.....	2,674,757	Sept. 30, 1906.....	7,936,884
Nov. 30, 1910.....	2,760,413	June 30, 1906.....	6,809,859
Oct. 31, 1910.....	2,871,949	Mar. 31, 1906.....	7,018,712
Sept. 30, 1910.....	3,158,106	Dec. 31, 1905.....	7,605,086
Aug. 31, 1910.....	3,537,128	Sept. 30, 1905.....	5,865,377
July 31, 1910.....	3,970,931	June 30, 1905.....	4,829,655
June 30, 1910.....	4,257,794	Mar. 31, 1905.....	5,579,560
Mar. 31, 1910.....	5,402,514	Dec. 31, 1904.....	4,696,203
Dec. 31, 1909.....	5,927,031	Sept. 30, 1904.....	3,027,436
Sept. 30, 1909.....	4,796,833	June 30, 1904.....	3,192,277
June 30, 1909.....	4,057,939	Mar. 31, 1904.....	4,136,961
Mar. 31, 1909.....	3,542,595	Dec. 31, 1903.....	3,215,123
Dec. 31, 1908.....	3,603,527	Sept. 30, 1903.....	3,278,742
Sept. 30, 1908.....	3,421,977	June 30, 1903.....	4,666,578
June 30, 1908.....	3,313,876	Mar. 31, 1903.....	5,410,719
Mar. 31, 1908.....	3,765,343	Dec. 31, 1902.....	5,347,523

Labor Troubles at the Baldwin Works

Labor difficulties at the plant of the Baldwin Locomotive Works, Philadelphia, have interfered to a considerable extent with the company's operations, both in Philadelphia and at Eddystone, Pa. Until a few years ago its mechanics were not organized and little difficulty was experienced between the company and its employees. In the past year, however, unrest on the part of some of its organized employees has been noticeable, culminating last week, when a strike, which is variously estimated to number from 5000 to 7000 employees, was called.

Several weeks ago the Baldwin Works, according to a prearranged policy, due to inactive conditions of business, laid off about 1200 employees, and the union men declare they were discriminated against. Minor troubles, however, were said to have been the direct cause of the men going on strike. Officials of the company refuse to discuss the

matter in any way, but it is believed from information obtainable that the present strike will be fought out with a view of determining whether or not the plant is to continue to be operated as an open shop. Meanwhile the plant is being kept in partial operation, which it is said is not particularly inconvenient to the company, as but few orders for urgent delivery are on its books. No disorder has, so far, attended the strike.

The J. B. & J. M. Cornell Company's Assets Sold.—

Judge Holt, in the United States District Court, gave his formal approval June 10 to the bid of the New York Trust Company and Sarah Cornell for the assets of the J. B. & J. M. Cornell Company. The bid is \$198,825, and succeeds over the bid of \$129,250, made by bondholders, in connection with a plan for the cancellation of outstanding bonds aggregating \$630,000. Judge Holt directs the cancellation of receivers' certificates held by the New York Trust Company and Sarah Cornell, and directs the receivers to turn the property over to the bidders, free and clear. Judge Holt's order also provides for the retirement of the bonds, and retains jurisdiction over the property for the time being to insure compliance with the court's decree.

The Fort Wayne Electric Works, Fort Wayne, Ind., was merged June 1 with the General Electric Company, Schenectady, N. Y., and its business is now being conducted under the name of the Fort Wayne Electric Works of General Electric Company. The same lines of apparatus and supplies will continue to be manufactured and sold under the immediate direction of the same individuals as heretofore, with F. S. Hunting in responsible charge as general manager. All outstanding contracts and other obligations of the Fort Wayne Electric Works will be carried out by the new organization and all correspondence should be sent to it at the same addresses as in the past.

The Jeffrey Mfg. Company, Columbus, Ohio, has taken a contract from the Stark-Hocking Coal Company for a complete coal-crushing and washing plant and has recently completed or has under way considerable similar work for other coal-mining companies.

The Colonial Steel Company, Pittsburgh, Pa., announces the opening of its new works warehouse. The building embodies the latest ideas in warehouse construction and is one of the most modern tool steel warehouses in the country. Large stocks are carried for immediate shipment in standard sizes of the following brands of steel: Colonial high speed, Colonial No. 7 tool, Colonial special tool, Red Star tool, Colonial drill rod, Crown machinery.

It is announced that the Central Ohio Power Company, which is to be incorporated with a probable capital of \$7,500,000, will build a large electric power plant at Beaumont, near Athens, Ohio. The company expects to supply power to a number of cities, manufacturing plants and traction lines. An initial expenditure of \$3,500,000 is planned for the plant, transmission lines, reduction stations, etc. The first installation will consist of three 3000-kw. steam turbines. J. J. Henry, Denver, Col., is in charge of the installation of the plant. C. W. Humphreys, Chicago, Ill., has prepared plans.

The LaBelle Iron Works, Steubenville, Ohio, has installed a new dipping plant for the coating of iron pipe with Rexaco pipe dip. The object of the treatment is to prevent corrosion of pipe laid in soil in which either acid or alkaline conditions exist. It is claimed to be an effective insulation against electrolytic action.

The Antrim Iron Company, Grand Rapids, Mich., owner of the Antrim furnace at Mancelona, Mich., has acquired by purchase the plant of the Antrim Chemical Company located at the same place.

Greenlee Bros. & Co., Rockford, Ill., manufacturers of woodworking machinery and tools, will maintain a branch Chicago office in charge of James A. Lounsbury, vice-president, at 847 Marquette Building.

The Philadelphia Foundrymen's Association

Carl Hering Describes His New Electric Furnace

The monthly meeting of the Philadelphia Foundrymen's Association, the last before the summer vacation, was held at the Manufacturers' Club the evening of June 7, with President Thomas Devlin in the chair. The treasurer, Josiah Thompson, made a statement regarding the association's finances, which are in excellent shape, with a substantial balance and all bills paid. Howard Evans, representing the committee in charge of the association's special trip to the Pittsburgh convention of the American Foundrymen's Association, reported as to the trip and features of the convention. Those participating in the trip included the following:

W. S. Bickley, Penn Steel Casting & Mach. Company, Chester, Pa.
 W. J. Shennan Bethlehem Steel Company, Bethlehem, Pa.
 W. I. Crubb, John Wiegner, Light Mfg. Company, Pottstown, Pa.
 Frank Francis, Chester Steel Casting Co., Chester, Pa.
 Arthur Smith, A. D. Iveson, Ingersoll-Rand Co. Company, Easton, Pa.
 L. J. Krom, Palmer M. Langdon, Metal Industry, New York.
 John Purcell, Baldwin Locomotive Works, Eddystone, Pa.
 F. W. Wood, The Foundry, Cleveland, Ohio.
 Conn. Gorman, Maryland Steel Works, Sparrows Point, Md.
 Richard T. Thum, Girard Iron Works, Philadelphia.
 Thomas Devlin, Thomas Devlin Mfg. Company, Philadelphia.
 Howard Evans, J. W. Paxson Company, Philadelphia.
 Geo. C. Davis, Chemist, Philadelphia.
 C. F. Grimes, Standard Roller Bearing Company, Philadelphia.
 W. M. Parry, American Pattern Company, Philadelphia.
 E. M. Taggart, J. W. Paxson Company, Philadelphia.
 John Alexander, Harrison Safety B. Works, Philadelphia.
 J. I. Fasey, Philadelphia Chaplet Company, Philadelphia.
 Wm. E. Ertie, Henry Hader, Schram & Uhlinger Company, Philadelphia.

Brief responses referring to the exhibits and the papers discussed at the convention were made by W. B. Robinson, John Alexander, F. Francis and Howard Evans. The evening's discussion was on "electric furnaces, their advantages, disadvantages and limitations, compared with the types of melting furnaces now used in foundry practice," with a paper by Carl Hering, consulting engineer, Philadelphia, Pa. Mr. Hering introduced his subject by making comparisons between electric and the usual type of combustion furnaces used in metallurgical practice, and their respective limitations as heat producers. He showed, by means of lantern slides, many types of electric furnaces and explained in detail their construction and the difference between those of the resistance and direct arc types. At a moderate temperature the cost of operation of the ordinary combustion furnace was, he said, probably lower than that of the electric furnace, but the cost of operation in the former practice increases rapidly as the temperature rises and soon reaches its limitations. Dif-

ferent types of electric furnaces also have limitations, due to various phenomena developed in the character of work to be performed. In certain resistance furnaces the pinch phenomena limits their adaptability in some cases. In connection with arc furnaces considerable attention was given to the question of electrodes and their composition.

The speaker referred in particular to a new type of furnace, developed by himself and now practically past the experimental stage, inasmuch as a Hering furnace for commercial practice is under construction. It is of the arc type, as shown in the accompanying illustration. Briefly, the crucible is of clay carried in a frame, which can be made to revolve on trunnions, the pouring lip being at the center of the hinge line to facilitate pouring. The electrodes, which may be of iron, steel or copper, according to the work to be performed, enter at the base of the crucible, the current entering one pole and leaving by the other. By this application of the electrodes a

phenomena, which Mr. Hering describes as the "squirting phenomena," is produced. The metal is violently agitated and boils or squirts up over each pole, producing a circulation down from the sides to the poles and then upward through the middle of the bath. The terminals of the electrodes are water cooled, which prevents their melting beyond a certain point, and also obviates any leakage of the metal around them. Either direct or alternating current may be used, preferably the latter, as the necessary transformer can be directly attached to the furnace body. The addition of a third pole and the use of a three-phase current, is also permissible.

Considerable discussion followed regarding the economy and advantages of this furnace, but Mr. Hering was not prepared to furnish statistics regarding the cost of operation. Following the meeting a buffet luncheon was served.

The Knox Pressed & Welded Steel Company.—This

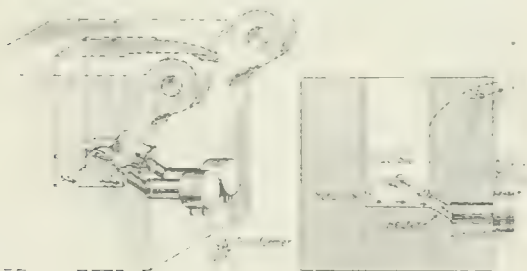
company, recently incorporated in Ohio with a capital stock of \$125,000, has purchased the property of the Niles Boiler Works, Niles, Ohio. The site contains three acres, having connections with the Pittsburgh & Lake Erie, Baltimore & Ohio and Pennsylvania railroad, and has five buildings on it, which house a well-equipped boiler shop, an oxy-acetylene welding plant, hydraulic pressing and flanging department, power plant, machine shop, etc. The purchase was made primarily to manufacture the Knox patented water-cooled ports, doors and frames for open-hearth furnaces, but other products will be annealing boxes, galvanizing pots, steel plate construction, ladles and pressed, welded and flanged work. An additional hydraulic press and other equipment will be installed. Sales will be handled from Niles, Ohio. William H. Schoen is president; L. L. Knox, vice-president; Irvin F. Lehman, treasurer, and G. W. Gerwig, secretary, all of Pittsburgh.

Industrial Works Catalogue.—A new general catalogue has been issued by the Industrial Works, Bay City, Mich., covering railroad and commercial cranes, pile drivers and railroad equipments. The catalogue, which is known as No. 104, measures 9 x 12 in., and is profusely illustrated with engravings of the different types of wrecking, locomotive, construction, pillar and hand power cranes, pile drivers and transfer tables. The views show the apparatus in action and brief descriptions are given on the pages facing the engravings.

Oriskany Iron Property Changes.—The lease of the Oriskany Ore & Iron Company, of which W. W. Taylor is general manager, on the Buena Vista, Iron Gate and Shenadoah blast furnaces and ore mines in Virginia, at the Oriskany property of the Alleghany Ore & Iron Company, a subsidiary of the Lukens Iron & Steel Company, Coatesville, Pa., will expire the latter part of this month. Part of the property will then be taken over by the Alleghany Company and the Iron Gate furnace operated; but the lease on the Buena Vista has been extended four months to work up the ore on hand. The Alleghany Company will make foundry and car wheel iron and Rogers, Brown & Co., who have sold the iron for 11 years, will handle the output.

The Northern Navigation Company has completed plans and will soon let contracts for a 500-ft. steel passenger steamer, to ply between Sarnia, Ont., and Duluth, which will be the largest and most finely equipped on the Great Lakes and will cost approximately \$1,000,000. Passenger traffic over this route has increased rapidly in the past few years and although the company now operates two of the largest vessels on the lakes between these points it has been found the service is inadequate. The new steamer will be completed in time for the season of 1912. The headquarters of the Northern Navigation Company, which now operates a fleet of ten steamers in its passenger and freight service, is at Collingwood, Ont. C. A. McDonald is general manager.

The Dominion Bridge Company, Ltd., Montreal, Que., has enlarged its scope to go into the regular manufacture of shop, traveling and locomotive cranes and derricks. A. E. Johnson, formerly of the Brown Hoisting Machinery Company, is mechanical engineer.



The Hering Electric Furnace.

ferent types of electric furnaces also have limitations, due to various phenomena developed in the character of work to be performed. In certain resistance furnaces the pinch phenomena limits their adaptability in some cases. In connection with arc furnaces considerable attention was given to the question of electrodes and their composition.

The speaker referred in particular to a new type of furnace, developed by himself and now practically past the experimental stage, inasmuch as a Hering furnace for commercial practice is under construction. It is of the arc type, as shown in the accompanying illustration. Briefly, the crucible is of clay carried in a frame, which can be made to revolve on trunnions, the pouring lip being at the center of the hinge line to facilitate pouring. The electrodes, which may be of iron, steel or copper, according to the work to be performed, enter at the base of the crucible, the current entering one pole and leaving by the other. By this application of the electrodes a

Oil Fuel for Air Furnaces *

BY W. N. BEST, NEW YORK CITY

Many attempts to burn liquid fuel in air furnaces have failed because of the operator's not being able to melt the full charge or to get the metal as hot as when burning coal. Often the charge was oxidized to such extent that what metal did become molten was practically worthless. Usually a number of burners, each giving a round flame, has been placed in the side wall of the furnace, and as the number of burners was increased the equipment became more and more intricate. Something had to take the blame for the wasted time, material and effort, so oil was condemned as being unworthy of further consideration.

Let us for a moment consider the ultimate analysis of the average gas coal used in air furnaces and fuel oil: This coal contains 70 to 75 per cent. carbon, 4.5 to 6 per cent. hydrogen, 10 to 18 per cent. oxygen, 1 to 2 per cent. nitrogen, 0.5 to 1.5 per cent. sulphur. The caloric value is 13,500 to 15,300 B.t.u. per pound.

The analysis of residuum or fuel oil is: carbon, 84.35 per cent.; hydrogen, 11.33 per cent.; oxygen, 2.82 per cent.; nitrogen, 0.60 per cent.; sulphur, 0.90 per cent.; gravity from 26 to 28 B.; weight per gallon, 7.3 lb. The caloric value ranges from 18,350 to 19,342 B.t.u. per pound.

Advantages of Oil Fuel Operation

From these data the natural conclusion is that oil, having a much higher calorific value than coal, ought to be able to melt the metal in a much shorter period of time than coal. Not only that, but it should also be able to bring the metal to the temperature required for even the smallest castings. It can do both if properly applied, and, furthermore, the quality of the metal is improved, for by chemical analysis and numerous tests it has been found that the castings contain no more sulphur than the metal did when charged into the furnace, and the tensile strength is consequently greater than that of metal melted by coal fire.

As the melter has the furnace under perfect control, the heats can be taken off much quicker than while burning coal, and the temperature of the charge while being tapped can be maintained without varying more than 25 deg. F. until all the charge has been run from the furnace. The operation of skimming is materially decreased—this is a very noticeable improvement which is especially appreciated by the melter. The high calorific value of oil also enables the melter to estimate within a few minutes as to the exact time when the charge will be ready to tap, which is a great contrast to conditions while burning coal, especially in rainy weather, when climatic conditions are unfavorable and the stack draft is materially affected.

The furnace is charged in the usual manner. The burner is started by opening the air valve, holding a piece of burning waste (which has been well saturated with kerosene) by means of a pair of pick-up tongs under the burner and then turning on the oil. There is no handling of fuels and ashes, consequently the services of the fireman and coal passers are dispensed with. There is great saving in floor space, for the oil tank is placed underground and the former coal bins used for other purposes. The fire brick lining of the furnace lasts 20 per cent. longer than with coal. Poor castings or imperfect ones caused by the metal being cool or sluggish are obviated entirely, for with liquid fuel the question is not—How hot can you make the metal, but how hot do you wish it. All these items should be taken into consideration when comparing the relative costs of using oil and coal in air furnaces.

Successful Installations

Strange to relate, the first air furnace which I ever tried to equip stands on the identical spot where the first malleable iron was made in the United States by Seth Boyden. The plant is now known as the Barlow Foundry Company, and is located at 28 Orange street, Newark, N. J. Mr. Barlow, the president of this company, is a very progressive man. He had tried on several previous occasions to burn oil on his air furnace but was not wholly discouraged because of his repeated failures, and when a friend suggested that he let the writer equip

his furnace he was willing to give oil another trial. A combustion chamber was built in the original fire-box of his furnace on a Saturday afternoon more than a year and a half ago. On the following Monday the first heat was tapped out in the usual manner and to date oil has never failed or disappointed them. The saving of space because of their not having to store coal, the time and cost of operation, the quantity and quality of their output from this furnace are such that they have no more desire to return to coal again than to exchange their electric lights for tallow candles.

Several months ago George H. Graham, secretary and treasurer of the Malleable Iron Company, Oriskany, N. Y., visited the Barlow malleable iron works, and was so impressed with what he saw there that he has equipped his air furnace. This equipment is likewise a success in every respect.

As far as the writer has heard, these are the only two plants in the United States wherein oil has been successfully installed in air furnaces, but what has been done in these plants can be done in others. I believe that eventually all furnaces of this type will be equipped, even in localities where coal is cheap and oil comparatively high, for every progressive manufacturer wants to keep pace with the march of progress. Several malleable iron works are now installing this system.

Many firms have tried to improve the metal made in cupolas by adding steel to the charge, but the castings were not satisfactory, for steel requires more heat than pig iron. By constructing an oil-fired air furnace wherever most convenient in the plant, melting the steel and pig iron in this, they will be thoroughly mixed, and can either be run into castings at once or into pigs to be used in the cupola whenever desired. When metal is melted in a cupola it absorbs the sulphur contained in the coke, but in an oil-fired furnace of proper construction the sulphur contained in the fuel is oxidized in the combustion chamber before it reaches the bath of the furnace.

Carnegie Steel Company Buys Bassett-Presley Company

Announcement has been made at Cleveland, Ohio, that the Carnegie Steel Company, subsidiary of the United States Steel Corporation, has purchased the warehouse and stock of the iron and steel jobbing concern, the Bassett-Presley Company, in that city, and will take possession July 1. The warehouse is 165 x 360 ft., and is located on Thirty-ninth street, between Superior and St. Clair, being conveniently near the Pennsylvania tracks for carrying on a jobbing business.

President Ira B. Bassett says: "This sale is not caused by unfair treatment of any kind on the part of the Steel Corporation. The advances were made by myself and negotiations have been pending for a number of months. There is nothing whatever to complain of concerning our treatment at the hands of the Steel Corporation."

Mr. Bassett moved to Cleveland in 1869, when 21 years old, and entered the employ of the jobbing firm of Butler, Wick & Co., where he remained until 1871, when he was employed by another jobbing firm, W. H. McCurdy & Co. The latter firm became involved financially a few years later and Mr. Bassett carried on the business for the creditors for two years, after which the business was turned over to him, and in 1886, with George Presley, Jr., he organized the firm of Bassett & Presley. In 1901 the Bassett-Presley Company was organized. Mr. Presley died in 1902. The vice-president of the company is C. E. Kollfrath; secretary and treasurer, F. H. Dietz.

The price of gasoline has reached the lowest level in years. The wholesale figure is now \$6.50 per barrel, or 11c. per gallon, in comparison with quotations of 13c. in 1909 and 1910, 11½c. in 1908, and 16½c. in 1907. The retail price has such a wide variation governed by locality and conditions that it cannot be quoted. The lower price is important in many industries using gasoline for fuel.

The Foster Bolt & Nut Mfg. Company, Cleveland, Ohio, manufacturer of carriage bolts, machine bolts, lag screws, etc., has appointed the Central Steel & Supply Company, Railway Exchange Building, Chicago, as its representative in the Chicago district.

*From a paper presented before the American Foundrymen's Association, Pittsburgh meeting, May 23-26.

The Steel Corporation Investigation

More Testimony by Chairman E. H. Gary

Chairman E. H. Gary of the United States Steel Corporation again appeared before the Stanley committee of the House of Representatives at Washington, D. C., on Wednesday, June 7. At this hearing he advanced another new principle of modern economics. This was that there should be governmental regulation of banks to prevent restraint of trade, an idea that developed from a discussion of the probability that the Morgan banks in New York had put pressure on other banks having Tennessee Coal, Iron & Railroad Company securities as collateral to force the property to a sale to the United States Steel Corporation. Judge Gary said that Mr. Morgan was the last man who should be accused of such an action, but that there should be governmental regulation to prevent a like contingency appearing.

The Tennessee Company Purchase Threshed Out Again

He declared that he never would have voted to consummate the deal if President Roosevelt had not approved of the absorption of the Tennessee Company by the Steel Corporation. Discussing the financial panic of 1907, when the Tennessee Company was taken over in a claimed effort to avert the failure of the New York brokerage firm of Moore & Schley and consequent disastrous results in the banking world, he said: "You have no idea of the financial frenzy which possessed New York in that panic. It would have been very easy for that panic to have gone beyond all bounds and affected the entire country. Any man interested in the banks of New York at that time would no more think of doing anything to injure any other bank than one of us would think of throwing a lighted match into a powder magazine near us. He could not injure another bank without injuring himself, and any decent man with sense enough to protect his own interests would not intentionally do anything to injure another."

This declaration was made after Judge Gary had been asked for more details relating to his conference with President Roosevelt regarding the Tennessee deal and his declaration that he regarded Mr. Roosevelt's refusal to interfere in the transaction as an act of great "constructive statesmanship." Chairman Stanley interjected "destructive as well as constructive."

Representative Gardner, of Massachusetts, asked many questions regarding the Tennessee transaction, particularly as to why the Steel Corporation, unless it wanted the Tennessee Company as a business proposition, paid more than \$30,000,000 in United States Steel bonds, \$11,000,000 more than it was believed to be worth, merely to prevent the failure of Moore & Schley, whose obligations amounted to \$5,000,000 or \$6,000,000. Judge Gary again explained the circumstances of the transaction, showing how it appeared necessary to buy out all the stockholders of the company. The financial situation was used, not to force the Tennessee stockholders to sell, but to force the Steel Corporation to buy.

Mr. Gardner then took up the stationary price of steel rails, and said that he had been informed by a railroad man who was a friend of John W. Gates that the railroads have a practice of prorating their contracts for rails, and in this way the independent mills are kept from lowering the price in competition. Judge Gary gave an account of the seven or eight rail mills and the way that they hold to the same price, declaring that there was no agreement, but the good sense of each and all maintained the price.

How the Steel Corporation Was Formed

Questioned by Representative Young of Michigan, Judge Gary said he wanted to tell the circumstances because of recent statements upon the subject with which he did not agree. He continued:

"The Federal Steel Company had been in existence about two years and a half. I was its president. This was some time in 1900 and Mr. Frick came to my office and suggested that the Federal Steel Company could be very much improved and he believed the Carnegie Steel

interests were for sale. That was the first suggestion, in my opinion, which led to the organization of the United States Steel Corporation. After Mr. Frick had talked to me, I spoke to Mr. Morgan about it and he suggested that other directors of the Federal Steel Company be consulted regarding the Carnegie proposition. Mr. Frick talked with H. H. Rogers and other directors of the Federal Steel Company about it, but nothing came of it at that particular time.

"The next thing I heard was that W. H. Moore and others had secured an option from Mr. Carnegie for the sale of his steel plants. I had nothing to do with that option, but I knew that the Moores consulted with the First National Bank of New York regarding the option and that officers of the bank consulted with Mr. Morgan. Mr. Morgan sent a representative of his firm to me to discuss the question of utilizing the option on the Carnegie steel interests. As presented to me I did not think much of it and the matter was dropped. Soon after that Charles M. Schwab suggested to me that the Carnegie Steel Company might be acquired by the Federal Steel Company and I determined again to speak to Mr. Morgan about it, knowing that such a deal would involve financial backing. Mr. Morgan then did not give much encouragement.

Mr. Morgan Becomes Interested

"I did not report to Mr. Schwab about my conference with Mr. Morgan, but he came to see me several times afterward, and about that time J. Edward Simmons, president of the Clearing House Association of New York, gave a dinner, at the request of Mr. Frick, to bankers and men interested in the steel business. Mr. Schwab, Mr. Morgan and others were present, and Mr. Schwab made a statement which made quite an impression on Mr. Morgan concerning the Carnegie Steel Company, a description of its export business, its costs of production and the like. I was not there, but I have no doubt that Mr. Schwab had in mind the advantages of a consolidation of steel interests.

"The next thing I heard about it was on a Sunday morning not long after this dinner when Robert Bacon, then a partner in the firm of J. P. Morgan & Co., came to my home. He said that the night before Mr. Schwab had surprised Mr. Morgan by showing him a letter from Mr. Carnegie stating that he would sell his steel property and take bonds in payment for it. There had been a conference at Mr. Morgan's house. Mr. Bacon did not tell me anything about John W. Gates having been there. I never heard that he was there until I read his testimony before this committee in which he said he was at Mr. Morgan's house and that the plan of the United States Steel Corporation was formulated there. I cannot see how it could be that such plans were made that night.

"Mr. Bacon said that Mr. Schwab had submitted the Carnegie letter which fixed a price for the steel plants and that Mr. Morgan had told him to submit the whole matter to me. We went over the whole matter until lunch time and Mr. Bacon went to see Mr. Morgan and came back and we spent the entire evening going over the matter. At that time the Federal Steel Company was in need of finishing mills and sought a corporation of sufficient financial strength to increase its lines of business and particularly its export trade, which was then small. It was necessary to increase the export trade in order that this country should get its fair share of the business from neutral ports. We had a great deal of discussion about Mr. Carnegie's price, I having known that two years before he had offered to sell for a much less sum, but realized that the Carnegie Company had increased its earning capacity and its value.

A Carnegie Proposition Under Consideration

"I told Mr. Bacon then that if through the acquisition of the Carnegie Company a corporation could be completed large enough and rich enough to furnish adequate finishing mills and increase the export business, I believed his proposition was worth considering, and I agreed to meet Mr. Morgan the next day, Monday.

"I met Mr. Morgan, explaining my ideas and the details of the business reasons for entertaining the proposition. I said to him, 'It seems to me that if you think a consolidation of steel interests on this line is practical we should start with the Federal Steel Company.'"

"We decided to call in the men interested in Federal Steel and telephoned for Norman B. Ream, H. H. Rogers, D. O. Mills and others. We got into long distance telephone communication also with Marshall Field, of Chicago, who was also a director of the Federal Steel Company. A meeting was arranged and I told of the proposition, explaining the business opportunities as best I could. Mr. Morgan then stated that he knew enormous financial responsibilities would be involved, but that if we concluded it was a good, safe and reliable undertaking he would act as financial sponsor of a syndicate to carry it out. There was some opposition at first on the part of some of the Federal Steel directors, but they finally assented and that is where the United States Steel Corporation was actually born."

The Question of Overcapitalization

Judge Gary then told the committee of the details of working out the plan and of taking over the American Steel & Wire, the National Tube, the American Bridge, the National Steel and other concerns and the capitalization of the United States Steel Corporation at \$950,000,000. "I want to say," he continued, "that, from the standpoint of the original cost of the concerns which were taken in and what it would have cost to reproduce them at the time, there is no doubt that the United States Steel Corporation was overcapitalized, but from the standpoint of what all the properties were actually worth—put together as a going concern—I do not believe that the Steel Corporation was overcapitalized."

In all the negotiations preceding the organization of the United States Steel Corporation, declared Judge Gary, he never had heard that the threat of Mr. Carnegie to build a plant to rival the National Tube Company, organized by Mr. Morgan, and to build a railroad from Pittsburgh to New York, connecting all his steel plants, had anything to do with it. "Such matters, as I learned, were testified to by Mr. Gates before this committee," he said, "never were spoken of in our deliberations. I do not remember that Mr. Morgan ever mentioned these matters to me."

Judge Gary said that when it came to the matter of discussing the charter and form of organization of the Steel Corporation Mr. Gates had nothing to do with it. Mr. Gates's connection, he said, was to look after the interests of the American Steel & Wire Company in the transaction.

The Pittsburgh-Monongahela Coal Purchase

A dramatic incident was furnished by a casual remark of Chairman Stanley that he had it on the authority of a United States Senator that the Pittsburgh Coal Company was selling coal at a loss to the United States Steel Corporation. Mr. Gardner at once demanded to know the name of the Senator, as did Mr. Lindabury, counsel for Judge Gary. Mr. Stanley said he had no right to bring the name into the record, but was willing to tell Mr. Gardner or any member of the committee privately. But the demand for the name was renewed so emphatically that Mr. Stanley abruptly called out: "Mr. Hall, come forward."

Richard C. Hall, former president of the Pittsburgh Stock Exchange, took the oath and was told to tell what he knew of the transaction. He said that the coal company was selling its steam coal at from \$1 to \$1.07 to the United States Steel Corporation, when it cost the coal company \$1.26 a ton, that is, \$1.02 to mine it and dividends and charges 24 cents additional. This was done under a 25-year contract which the majority stockholders had made. Some of the minority stockholders, he said, had been ruined by the deal. One stockholder, George I. Whitney, he said, a few years ago was enjoying an annual income of \$360,000 a year from his dividends, and last year was thrown into bankruptcy. Judge Gary remarked that he hoped the Steel Corporation would not be charged with the bankruptcy of Mr. Whitney. It is better, Mr. Hall said, for the United States Steel Corporation to hold this contract than to own outright the Pittsburgh and Monongahela coal companies.

Mr. Hall said that there was a deal pending to sell

17,000 acres of the Pittsburgh Coal Company's coal lands to the Steel Corporation, and the great tonnage of coal now sent down the Ohio River would be diverted to the blast furnaces of the Steel Corporation in the West, in an effort to save their investment at Gary, which Mr. Hall characterized as an economic mistake, induced by the eagerness of the Chicago directory to further their own interests. He said he had this information from Senator Oliver of Pennsylvania. His purpose in making any statement in regard to it was to protect the Pittsburgh district from being stripped of its business. He declared that the Pittsburgh coal seam was the finest in the world, and the deal would ruin the business of the city. Personally, he said, he had not a dollar of interest in any of the corporations named.

The testimony elicited a promise from Judge Gary to produce the contract referred to, which will go into the record.

Former Competition of Companies Now United

On Thursday, June 8, Judge Gary was recalled to the witness stand and members of the committee directed their attention to the question of competition between the various steel companies before their absorption by the organization of the United States Steel Corporation. Judge Gary began his story in this way:

"The Carnegie Steel Company, the subsidiaries of the Federal Steel Company and the National Steel Company were to some extent in competition with each other. The principal competition in the steel industry then was between the Illinois Steel Company and the Carnegie—especially in the manufacture of rails. They were in substantial competition, and I don't wish to minimize that. The market of the Illinois Steel Company was in the West, and furnished railroads with headquarters in Chicago. The Carnegie had a natural market which surrounded its plant in Pittsburgh.

"Carnegie did at times go into Western fields, and he sold rails at \$16 a ton at a time when the Illinois Steel very nearly went into the hands of a receiver. I believe that if the destructive competition had gone on the Illinois Steel Company undoubtedly would have been driven out of business by the Carnegie Company. I am inclined to believe that if the former management had continued in control the Carnegie Steel Company would have driven entirely out of business every steel company in the United States. Conditions improved after Federal Steel was formed and we reached the point where we could secure a very large portion of export business."

Steel Corporation Makes 60 Per Cent. of Total Output

At the request of Representative Young, Judge Gary read a statistical statement showing the relative output of the United States Steel subsidiaries as compared with the total production in the United States, from 1901 to 1910 inclusive: "There was a question with the finance committee," he said, "whether the public would not regard the percentage of control of the steel output as too large. For that reason the committee refused to listen to the appeals of various subsidiaries to increase their capacity."

He said the export business of his corporation is considerably more than 10 per cent. of its total business. "The total output of the United States Steel Corporation, including export business," he continued, "is 60 per cent. of the make of the country. Exclude our export business and the proportion of our business, as compared with the total steel output in the United States, is 50 per cent. The United States Steel Products Company, our export selling company, sells about 1,500,000 tons a year. Practically all this business is in the neutral ports of the world."

The Policy of the Steel Corporation

At this point Judge Gary said that he desired to make a general statement as to the policy of the United States Steel Corporation. He continued: "We believe in enforced publicity. We believe that the publicity of the affairs of corporations is the most important thing that can be done to insure protection to everybody concerned. That is not all that is essential, but that is the important essential. We started out with that idea in mind and we have adhered to it. There was a disposition on our part to keep away from monopolization, and we have succeeded. It has been our effort to keep prices at a reasonable point. I have never suggested an increase in prices

beyond a reasonable figure. The only reason we have attempted to prevent fluctuations was for the purpose of insuring stability.

"We have not pushed our business in such a way as to drive competitors out of business. Unrestricted competition means that the big companies will survive and the little ones perish. We have always kept wages as high as we possibly could. We have paid more than others for similar service. We have refused to decrease wages when others decreased them. Our wages are higher now than when we started. We have introduced and now have in force a pension plan and also a voluntary relief plan. This provides payments for people injured, or to the survivors of those killed, without regard to any question of legal liability."

Judge Gary said that the corporation had expended \$1,500,000 in the last year for the introduction of machinery to prevent accidents. He told the committee that the corporation officers were trustees of a great property, that the company had 100,000 shareholders and that every move taken was planned carefully with a view to the interest of the shareholders and the rights of others concerned.

He denied that the corporation had ever purchased plants and dismantled them with a view of eliminating competition.

"In buying any properties have you in any instance made it a condition of the sale that the former owners should not enter business in competition with the corporation within a given district or for a given period of time?" Representative Young asked. The witness replied in the negative.

The Dinners Given by Judge Gary to Steel Men

Representative Beall of Texas was the most persistent of the committeemen in questioning Judge Gary in regard to the dinners given by him in New York to steel manufacturers. These dinners, Judge Gary said, were given whenever it suited his disposition and convenience and anything of a business nature transacted at the gatherings was reported to the newspapers.

"An interesting comment on one of those dinners was that the clams and the champagne came in together," suggested Mr. Beall smilingly.

"That was a facetious remark made by Joe Butler, the wit of the industry," Judge Gary replied. "I doubt whether he eats clams or drinks champagne. There was no undue hilarity at any of these dinners."

"This committee has no disposition to hold any officer of the steel company responsible for anything he does at dinners," observed Mr. Stanley. "We have nothing to do with the habits of the head of the steel company or the humblest citizen in the land."

"That is good law and good logic," said Judge Gary.

"What my learned friend, Mr. Beall, is driving at is this," said Chairman Stanley. "He wants to find out whether you have combined to regulate prices. We don't care whether you drink a tub of champagne at these dinners. If such agreements were arranged at the dinner, however, we will go into them, just as we will go into the counting room."

"Didn't the thought run through the progress of the dinner held at the Waldorf on January 11, 1911, that every one present was in honor bound to abide by your advice?" Mr. Beall asked.

Previously Representative Beall had quoted from a speech given at the January dinner, in which Judge Gary suggested that the output should be regulated to meet the demand. Judge Gary did not give a direct reply. Mr. Beall quoted Judge Gary as saying in the January speech that "we have something better" than a contract "to which a penalty might be attached." Mr. Beall insisted that the Gary speech indicated that the steel operators were actually working under agreement, although the agreement had not been reduced to writing.

No Agreement Made by Those at the Dinners

Judge Gary declared there was no agreement, that at the dinners there was merely an interchange of opinions that inured to the common good. He said: "There was no attempt to fix prices. They were not fixed. There was no possible way of fixing them. The purpose was to have friendly intercourse and prevent the demoralization of business by destructive competition. And if the Department of Justice, the President, or Congress should say

this was not a proper or a wise proceeding the dinners would be discontinued in a moment. If the members of this committee believe it is better for all concerned in this country for the steel interests to enter into destructive competition than to try to legally maintain an equilibrium of business, it is up to you. If you want to take the responsibility on behalf of the government of saying destruction would be better than for the steel interests to confer with each other and for the maintenance of ruinous policies whereby the strongest would survive, the weakest go down and business generally be demoralized, we will not oppose your actions, but we believe that we have done the best thing we could do under the law through the maintenance of friendly relations."

"You were continually impressing upon those present at this dinner that every man's honor was involved," pressed Representative Beall. "Why were you so much concerned about it? Did you think that the meanest thing one of them could do was to reduce prices?"

The witness replied in substance that when men get together to talk business and one of them took advantage of information thus gained to make profit, he would not be highly regarded by those in the same line of business.

"Was it the consensus of opinion among the men at the dinner that night that the prices then prevailing should be maintained?" asked Mr. Beall.

Hoped That Prices Should Not Be Reduced

"It was the wish and the hope of every one there that prices should not be reduced," the witness replied. "There was nothing in any of the speeches made at the dinner that implied a binding agreement."

"Through the medium of the dinners you have sought to accomplish what could otherwise be accomplished through unlawful agreements," suggested Mr. Beall.

"I would not admit that," replied Judge Gary. He declared he had made no attempt to disguise the fact that the steel men of the country sought to maintain prices as near a level as possible through friendly interchange of ideas for the purpose of getting between the restraint of trade and monopoly provisions of the Sherman law, on one hand, and destructive competition on the other. He had never stood for unchanging prices, he declared, but against wide fluctuations. The recent action of the Republic Iron & Steel Company in reducing prices, he said, was because officials of that company had decided not to co-operate with others in the industry, which proved, he thought, that there was nothing binding in the dinners.

Judge Gary was asked about a cablegram received from Mr. Schwab at the time of the January dinner. Mr. Schwab expressed the hope that each one present would see the advisability of maintaining the present situation.

"Does that mean to maintain prices?" questioned Mr. Beall.

"That merely meant that every one present should show a disposition to co-operate."

"Would a rise in prices alter or affect the spirit of co-operation?"

"I have always expressed the hope in my speeches that neither a rise nor fall in price should affect the spirit of co-operation."

Mr. Beall quoted one of the dinner orators as saying that thanks were due to Judge Gary and others "for getting the steel men together."

"We have secured stability of prices in steel rails, and in time, perhaps, stability of prices in other products would be obtained," the witness continued. "He was expressing a hope."

Mr. Beall quoted another dinner orator as saying: "We are to be congratulated on having a wise policy laid out for us."

"What did he mean by that?" the witness was asked.

"He was referring, no doubt, to ideas I had expressed on a number of occasions," was the reply.

"These meetings were calculated to influence people to maintain prices," continued Judge Gary. "There is no doubt of that. It was intended to influence people to maintain prices so far as they could do so legitimately."

The Scope of the Sherman Law

"Do you believe that the Sherman law relates only to contracts that are enforceable between the parties?" asked Representative Littleton of New York.

"No, I do not mean that," was the reply. "Even if they agreed without contract in my opinion it would be contrary to the law."

"Suppose," said Mr. Littleton, "that you came together and by disclosure, each to the other, the same result is accomplished, to wit: the maintenance of prices; the object which the Sherman anti-trust law seeks to prohibit is thus accomplished, is it not?"

"No, I do not think so," was the reply.

"Do you think the Sherman anti-trust law was aimed at an agreement or the result of an agreement?"

"I think it was aimed at an agreement," replied the witness. He illustrated his point by saying: "Suppose two blacksmiths are walking down the street. One asks, 'What are you charging for your work?' Getting the facts, he replies that he will enforce similar charges. I do not believe such a transaction would involve a violation of the anti-trust law."

"The point I am making," said Mr. Littleton, "is that by a series of conferences among men, each understanding the other, a tacit agreement is reached. Does not that effect the same result as if the understanding had been reduced to writing?"

"It does not," replied the witness.

"Suppose that each one abides by the understanding?"

"Yes, if you and I know what the others are doing from time to time," replied Judge Gary.

The Amount Paid to the Morgan Syndicate

Chairman Stanley made the statement that the Morgan syndicate which financed the formation of the Steel Corporation received \$137,000,000 in stock for its services, that it placed \$25,000,000 in the concern and that its profit for promoting was the difference between these two sums. Judge Gary said that Morgan & Co. received \$129,000,000 instead of \$137,000,000 for the work of promotion.

"I don't know much about Wall street and I do not care much about Wall street," said Judge Gary in commenting on the prices of steel securities. He added that intrinsic value did not always measure prices in the exchange of securities in New York. It's a sad thing," he commented, "but it is true, nevertheless, that values are often made through manipulations. Steel bonds that I believe are as good as gold have sold as low as 68," he added.

Would Perfect the Sherman Law

Representative Littleton asked the witness in regard to his attitude toward amending the anti-trust law. "Would it be a sensible thing for Congress to create a joint committee for the purpose of hearing capital and labor, restrained and unrestrained industries, with a view of organizing and preparing an elaborate anti-trust law which would meet and correct the situation, which would strengthen the law where it needs strengthening and elaborate it where it needs elaboration?"

"I would welcome such a plan and would be glad to have it made practicable," replied Judge Gary.

Chairman Stanley asked whether increases in the price of products had been the result in part in increases in the cost of labor.

Mr. Gary replied in the affirmative, adding: "There has been an increase in the cost of labor of about 20 per cent. since the Steel Corporation was organized. Hours have been shortened and Sunday labor abolished, all adding to the labor cost." Another item to be considered in this connection, he pointed out, is the voluntary relief plan, which cost the corporation \$1,500,000 a year. Still another item of expense to be charged up to labor cost was the pensions paid to superannuates.

No Agreement with Foreign Makers

"Is there a gentlemen's agreement as to prices and division of territory between the United States Steel Corporation and foreign makers?" Representative Young of Michigan asked. The witness replied in the negative. "I would like," he continued, "if it is not in violation of law, to bring about an understanding with foreign makers whereby we may meet from time to time for an interchange of opinion."

Replying to a question Judge Gary denied emphatically that American and foreign makers operated under an agreement whereby territory in which each should sell was defined, and that a fine was imposed where a party to the agreement violated its terms.

"Would it be possible for a subsidiary company to enter into an international agreement without the knowl-

edge of the corporation officials?" Judge Gary replied that it would be possible for an officer of a subsidiary company to make such an arrangement. He expressed doubt, however, that any one connected with a subsidiary company would attempt to effect such an agreement without the authority of the corporation officers.

The Corporation's Minnesota Railroads

Judge Gary was questioned by Chairman Stanley relative to the operation of the corporation's railroads in the Mesaba region of Minnesota. There was an intimation in the question that the Steel and Hill roads worked under the terms of an agreement that proved disadvantageous to the "independents."

"There is no sort of agreement between Mr. Hill and our roads to keep up freight rates in the Lake Superior country," Judge Gary said. He added that approximately the present rates were in operation before Mr. Hill built his road in northern Minnesota. Judge Gary said that under the laws administered by the Interstate Commerce Commission the Steel Corporation's roads were stopped from discriminating against "independents."

"You could charge exorbitant rates to all, which would mean loss to your competitors and do no harm to you?" suggested Chairman Stanley.

"No," replied Judge Gary, "The rates of those roads are subject to inquiry by the Interstate Commerce Commission."

He Favors Government Supervision

Representative Bartlett brought up for discussion the question of "enforced publicity."

"Your suggestion of government publicity and close government supervision interests me," said Mr. Bartlett. "You went so far as to say there should be some department of the government to which you could go and get advice as to how to conduct your affairs. You thought the government should even have the authority to regulate prices. Did you mean that?"

"I did," replied the witness. "At the present time people identified with business corporations are uncertain as to what they may properly do within the law. It is this feeling of uncertainty as to the scope of the law that has interfered with business prosperity. A feeling of unrest has been created. There should be some way for us to be informed as to just precisely what we may do in the management of our business."

Judge Gary suggested that the corporations be permitted to operate under a federal license plan. If they failed to comply with the law the license to do business in interstate commerce could be revoked. When a license was revoked the corporation affected should have the right of appeal to the courts. "I would not get away from the courts as the final arbiter on these questions," he said. "That is all important, that is the salvation of this country."

Mr. Bartlett suggested that such a federal law would in all probability interfere with the power of state governments to regulate and tax corporations within their limits.

"The same reasoning would apply to railroads employed in interstate commerce, would it not?" observed the witness. "What we want is to conduct our business without the uncertainties as to the law that now surround us."

Percival Roberts, Jr., on the Stand

The question of United States Steel directors who hold places on the governing boards of railroads was considered while Percival Roberts, Jr., was on the stand. Chairman Stanley pointed out that three of the Pennsylvania Railroad directors, Frick, Griscom and Roberts, serve in the directorate of the Steel Corporation.

"Has any question ever been raised by the directors of the Pennsylvania Railroad as to the propriety of three of their number serving in like capacity on the board of United States Steel?" Mr. Stanley asked.

"No," replied the witness, who testified that he was a director of the United States Steel Corporation and of the Pennsylvania Railroad, which, he said, owned stock in the Cambria and Pennsylvania steel companies and gave orders for rails to the Cambria, Pennsylvania and United States Steel concerns. He said Steel Corporation directors who were also directors of the railroad had nothing to do

with determining prices for rails. The price of rails never came before the directorate of either corporation when he was present. They were fixed by purchasing and selling agents. Mr. Roberts said that once, before he became a Steel director, he told President McCrea of the Pennsylvania Railroad that prices quoted by the Steel Corporation for rails based on new specifications were too high. At his instance Mr. McCrea saw Mr. Gary, "and the Steel Corporation satisfactorily modified its price." Mr. Roberts cited the by-laws of the Steel Corporation and the Pennsylvania Railroad which prohibited directors from voting on contracts between the companies.

"How do you explain the fact that there has been no change in the price of rails since 1899?" Representative Beall asked.

"I think because the rate—\$28 a ton—is fair alike to all parties concerned," replied Mr. Roberts. "Prosperity for the shipper means prosperity for the transportation company. It has never been the policy of the Pennsylvania to beat prices down. We want the shipper to be prosperous. It is to our advantage."

In answering questions as to the cost of making steel rails Mr. Roberts said he did not believe Andrew Carnegie made a profit out of steel rails sold at \$16 a ton, as testified by Mr. Carnegie before the Ways and Means Committee in 1909.

"What was the cause of the jump in the price of steel rails from \$16 a ton in 1899 to \$28 a ton in 1900?" Mr. Beall asked.

"An agreement among the railmakers forced by destructive competition," replied Mr. Roberts.

"Prior to 1900, when there was a 'pool,' prices were stable," said Mr. Beall. "In 1898 and 1899, when there was no pool, prices went down. Now since 1900, with a pool in existence, prices are up again. Is that correct?"

Mr. Roberts replied that prices had not materially dropped since 1900, owing to changed conditions and the "law of reason." He replied in general terms, saying that the "law of reason" overlooked extremes.

"What are these changed conditions that you speak of?" Mr. Roberts was asked.

"In the last ten years," he replied, "people in private and public life have begun to regard many questions in a new light. I for one and probably you gentlemen were brought up in an age when we looked upon competition as a warfare. I think we have all changed our views. The railroads of the country were developed under destructive conditions. As a result you see the conditions of to-day. Competition is absolutely eliminated. The producer as well as the consumer is protected." He further stated that since the formation of the Steel Corporation business men in this country had new ideals which governed them to avert destructive competition. "I believe," he continued, "that through the Gary dinners men in the steel business have accomplished great results for the benefit of all by the application of good, common, American sense. Example has a great deal to do with the affairs of this world."

James Gayley Called to Testify

James Gayley, who was first vice-president of the United States Steel Corporation up to January, 1909, was called to the witness stand June 9 when the investigation was resumed by the Stanley committee. Mr. Gayley testified that he became connected with the Carnegie Steel Company in 1885. In 1892 he became one of Andrew Carnegie's partners. The early part of his testimony was devoted to a description of the growth of the Carnegie properties from 1885 until they were absorbed by the Steel Corporation. He was also questioned relative to the policy that marked Mr. Carnegie's administration of his iron and steel properties.

"What was the policy of the Carnegie Company as to fixing the prices of steel rails?" the witness was asked.

"As a rule steel rails were standard in price. It appeared to be generally known what the prices of steel rails were. For a long period the Pennsylvania Railroad Company practically fixed the price of rails. Other roads deferred purchasing until the Pennsylvania Railroad placed its orders. I recall Mr. Carnegie saying that the Pennsylvania had given him an order for 60,000 tons without investigating the price. That seemed to be understood."

When prices were changed, Mr. Gayley added, it was

usually due to suggestions from the railroad presidents that the price ought to be lower.

In the early days of the Carnegie Company, he said, every company was absolutely independent, taking whatever prices it could get on steel products other than rails. Asked about price fixing and agreements, he said there were periods of war between steel companies which brought prices down. This practice, he declared, was destructive, and competition was carried to severe limits. "It was a fight and shake hands," he said. "They made agreements to recuperate, and then there would be another fight. Agreements were necessary from time to time, or ultimately one company would have secured a monopoly of the business."

Mr. Gayley was asked about the value of the Carnegie properties at the time H. C. Frick was engaged in litigation with Mr. Carnegie. At a previous hearing Judge Gary had said the value at the time was \$76,000,000. Mr. Gayley said that while \$76,000,000 was the book value of the Carnegie properties it did not represent anything like their real potential value or earning capacity. Being asked if any additions had been made to the Carnegie Company's property after it had been appraised at a book value of \$76,000,000 and before it was sold to the Steel Corporation for almost \$500,000,000, he replied:

"The company was always building and expanding its works and acquiring more property."

"What was the growth of the Carnegie Company from 1885 to the time of absorption by the United States Steel Corporation?" asked Representative Young.

"The growth was tremendous," said Mr. Gayley. "The Homestead plant, for instance, has grown from one mill to 'a city of mills.'"

He declared that new methods of manufacturing steel had advanced the values of the properties.

Mr. Gayley denied any personal knowledge that Andrew Carnegie had threatened to build a tube mill at Conneaut for the purpose of forcing the Morgan interests to terms, as charged by John W. Gates.

"The Carnegie Company had not actually started on the plant," he said, "but the ground had been bought—5,000 acres at Conneaut, on Lake Erie. Mr. Carnegie had not decided whether he would go into the manufacture of tubing or wire to use our surplus raw materials. It is true that the National Tube Company, a Morgan concern, which had been purchasing its raw materials of us, erected a steel plant of its own. They left us, we did not leave them. Mr. Carnegie thought of branching out so as to use the excess material."

"In other words," suggested Chairman Stanley, "when the Morgan company ceased to purchase of the Carnegie mill you planned to branch out so as to use this same amount of material yourselves?"

"That is about it," replied Mr. Gayley.

"There has been a suggestion," said Representative Young, "that Mr. Carnegie's announcement that he intended to build a tube mill was merely a threat made as a means of aiding him in disposing of his iron and steel holdings."

Mr. Gayley insisted that plans were made in good faith by Mr. Carnegie to build a tube mill. He further said he had never heard that Mr. Carnegie had threatened to build a railroad from Pittsburgh to New York, and that this plan had prompted the Morgan group to buy out Mr. Carnegie at a figure double the amount he had asked for his properties before that time. He said the road was already in existence, and required only the construction of 40 miles to the works at Braddock, Pa.

"Was Carnegie willing to sell his steel plants at that time?" asked Mr. Young.

"Well, I should say that he was willing," replied the witness.

Mr. Gayley said that he was not active in the negotiations for the purchase of the Carnegie holdings by the United States Steel Corporation, but that he had approved the trade as made by Mr. Carnegie.

The Carpenter-Tew Company is the new name of the Carpenter-Kerlin Gear & Machine Company, which coincident with changing its corporate name moved the factory and office to Factory 5 of the Bush Terminal Building, 67 Thirty-fifth street Brooklyn, N. Y. The removal was necessitated to secure enlarged facilities for manufacturing cut gears of all descriptions, a class of gears to which the company has devoted special attention.

The Steam-Hydraulic Forging Press

Its Field of Usefulness and That of the Forging Hammer

At the meeting of the American Society of Mechanical Engineers held in Pittsburgh, May 30 to June 2, a paper was presented under the joint authorship of Berthold Gerdaud, of Düsseldorf, Germany, and George Mesta, president of the Mesta Machine Company, Pittsburgh, Pa., discussing power forgings, with special reference to the steam-hydraulic forging press. While not so stated, a sectional drawing was given of the forging press made by the Mesta Machine Company under rights obtained from Haniel & Lueg, Düsseldorf, and the opportunity has been taken of

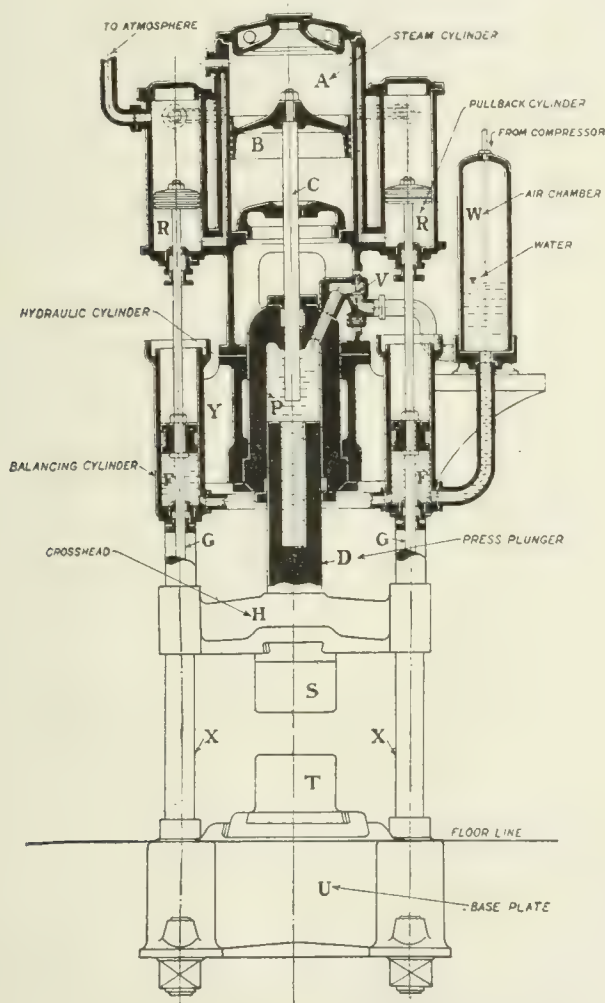


Fig. 1.—Scheme of Operation of Steam-Hydraulic Forging Press.

reproducing the sectional drawing as instructive material to supplement the extended illustrated article printed in *The Iron Age* of January 5, this year. The authors' opinions of the field of the forging hammer and that of the forging press are also given in the subjoined, leaving the reader to obtain a full copy of the paper if he desires to follow the calculations of the power requirements in terms of the steam consumption of the steam hammer, and of the hydraulic press in which the pressure of water is furnished by a separate pumping engine and of the so-called steam-hydraulic press in which, as in the present case, the water under pressure is supplied in connection with the steam intensifier.

The press consists of a heavy base *U*, Fig. 1, and four uprights *XX*, supporting the hydraulic and steam cylinders above. *S* and *T* are the dies, the upper one being carried by the cross-head *H*. This cross-head is moved into position for forging by the use of the steam cylinders *RR*. Pressure for forging is obtained by admission of steam into the top of cylinder *A*, which moves the piston downward and forces rod *C* into the hydraulic cylinder *P*. This action again causes the plunger *D* to move downward, carrying with it the cross-head and the upper die. The effect is that of a steam-actuated intensifier.

Hydraulic cylinders *FF* are for the purpose of balancing the cross-head *H*. These cylinders, hydraulic cylinder *P* and about one-third the air chamber *W* are filled with water. The air chamber connects through the check valve *V* to the cylinder *P*. The air pressure is pumped up to about 100 lb., which is sufficient to move the piston rod *C*



Fig. 2.—Surface Effect of the Hammer Process.

to the top of its steam cylinder. The areas of plunger *D* and of cylinders *FF* are equal, so that the plunger *D*, carrying the cross-head, is always balanced. By opening the check valve *V*, allowing water to flow from the hydraulic cylinder to the air chamber, and admitting steam to cylinders *RR*, the cross-head can be raised to any position, and similarly, it can be lowered.

In referring to the purely hydraulic press, the point is made that the process of forging does not always require all of the pressure maintained in the accumulator, but on the average only about 50 to 60 per cent. of the amount is needed, the remaining 40 to 50 per cent. being lost in the controlling valve. It is admitted, however, that for a drawing operation, like the drawing of the tubes, the continuous full pressure stroke of the maximum length for which the hydraulic press is built is an advantage. In respect to the economy of the steam-hydraulic press con-

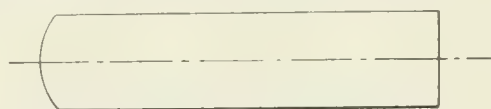


Fig. 3.—Mass Effect of the Forging Press.

siderable emphasis is placed on the fact that no dead volume of clearance has to be filled before the motion of the steam piston against its full resistance begins. The point is that the intensifier plunger floats on the water at all times.

What the authors had to say with regard to the field of the hammer and that of the press is in brief as follows: The small hammer, operated by steam or compressed air, has held its own for small work. Small pieces cool quickly and, as a rule, require a finer surface finish than is demanded in large forgings. The force of the impact increases as the forging cools so that work is done on the surface of the forging even when it is quite cool. The press, on the other hand, would be powerless to do any work on the cold piece unless the anvil surface was reduced very much. Thus the hammer will probably always be used for small work and for making tools, because tool steel must not be heated as much as machinery steel or wrought iron.

The features which make the hammer desirable for small work make it undesirable for large work. The hammer acts upon the surface of the material, driving the surface over the core without compressing the latter, as in Fig. 2. The press on the other hand, exerts a continuous pressure, which forces the semi-fluid material of the forging to flow under compression as in Fig. 3, which process tends to increase the density of the material. It is thus evident that from the standpoint of improving the quality of material of forgings the press is superior to the hammer.

The De Bats Crucible Steel Company, recently organized, has erected a new plant at Zelienople, Pa., along the Baltimore & Ohio Railroad and the Pittsburgh, Harmony & New Castle interurban railroad. It will contain 12 crucible melting pots for the manufacture of steel castings, such as automobile gears, crank shafts, pinions and other high grade specialties. The company has a special process of tempering its castings after they are removed from the sand and has made some interesting experiments. A recent test consisted of a casting being forged into a drill, properly tempered, and was then used to penetrate a section of high carbon hardened spring steel. The company will be prepared to operate about July 1. Louis De Bats has charge of the plant, while A. G. Zehner is secretary.

A New Illinois Structural Mill

The No. 2 Structural Mill, South Works, Illinois Steel Company

Paralleling its present No. 1 structural mill at its South Works, Chicago, the Illinois Steel Company is just completing the erection of mill No. 2. The beginning of construction work was authorized in October, 1909, and the test run was made May 11 last. It is interesting to note that the first piece to go through the new mill, an 8-in. I-beam, passed inspection as a salable product.

Steel for the new mill will be drawn from the present No. 2 blooming mill, the output of which was taken formerly by the Bay View mills at Milwaukee. When the billets for those mills began to be supplied from Gary, as they now are, No. 2 blooming mill was without an outlet in finished material. The new mill will absorb this output. It is designed to run on the lighter structural shapes, from 3 to 5-in. angles and beams, and channels from 4 in. up to and including 8 in.

The No. 1 structural mill has been rolling beams and channels from 6 in. up to and including 20 in., angles 4 x 4 up to 8 x 8 in., and Z-bars from 4 to 6 in. The smaller sizes heretofore have been rolled at Milwaukee and more recently at Gary also. The new No. 2 mill will round out, therefore, the present South Works capacity by supplying the lighter sections, while the equipment of the No. 1 mill is to be expanded to permit rolling the full range of sizes up to and including 24-in. beams. The new mill will also roll rail angle bars and continuous joints. The new construction will provide an estimated capacity of 12,000 tons monthly.

Safety of Employees Considered

In the equipping of this mill unusual importance has been attached to precautions for the safety of employees. The inclosing of all gearing with heavy steel casings has been made uniform for all rotating parts and has been extended to the building of steel lockers around switchboards. Very noticeable also is the extent to which runways and safety walks have been provided. Wherever there are lamps to be trimmed and machinery to be oiled platforms have been built, so that for those who have this work to do the risk of falling or becoming entangled is well nigh eliminated. For example, a continuous railed platform has been built through the roof trusses and

extending the entire length of the mill building. From this all lamps may be trimmed and all of the electric feeder wires distributing current through the mill are at once accessible. For the crane men an outside stairway has been provided, and a gallery runs from end to end of the building at the height of the crane runway. From this entrance may be had through a door in each bay of the building directly on the cranes. The cranes themselves carry platforms on both sides and also cross platforms for the trolley.

The general layout of the new mill is shown in Fig. 1. The complete rolling, from roughing to finishing pass, is accomplished through eight stands with a total of ten passes. Rolls in the first four stands are 2-high, 24 in. in diameter and 44 in. long. The fifth stand is 3-high, with rolls 24 in. in diameter and 48 in. long. The sixth stand is 3-high, with rolls 21 in. in diameter and 48 in. long. The seventh and eighth stands are 2-high, with rolls 21 in. in diameter and 36 in. long. The return cross-over is a diagonal table between stands No. 5 and No. 6, each of which affords two passes, the direction of the piece being reversed through them.

Duplicate Housings and Rolls

The mill is equipped with a complete set of duplicate housings, rolls and fittings, which are built up on shoes convenient to the mill. This arrangement enables the changing of rolls to be done in the shortest possible time, as the stands already fitted with rolls and guides are lifted complete by the crane to their positions in the mill. The roll table speed is designed to be 550 ft. per min., so that from the time the bloom enters the first stand of rolls until it is finished and on the hot beds the elapsed time of rolling will approximate 2 min.

Roll Speeds and Distances:

Stand No.	R. P. M.	Distance between stands, Nos. of stands.	Feet.
1	27	1 and 2	26
2	35	2 and 3	35
3	50	3 and 4	55
4	65	4 and 5	76
5	80	6 and 7	145
6	100	7 and 8	135
7	120	8 stand and last saw	135
8	130	Last saw to hot bed	11

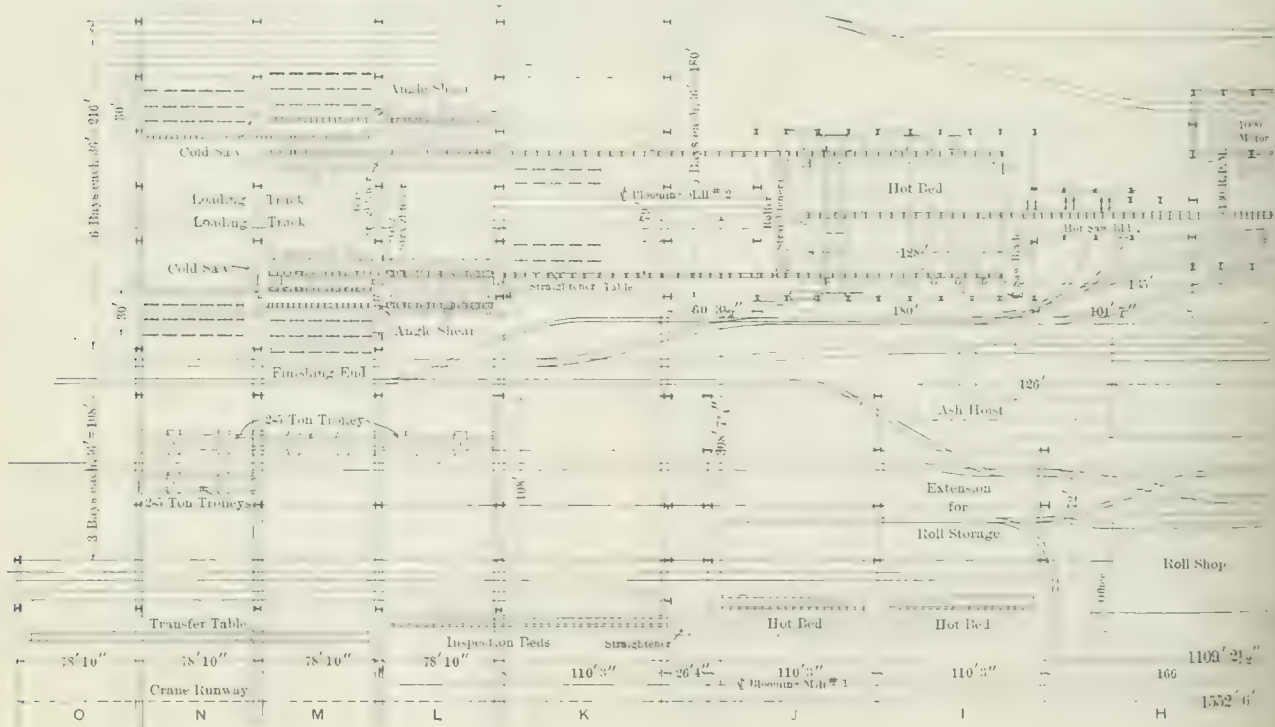


Fig. 1. Ground Plan of No. 2 Structural Mill, South Works, Illinois Steel Company. The Design of This Mill Was

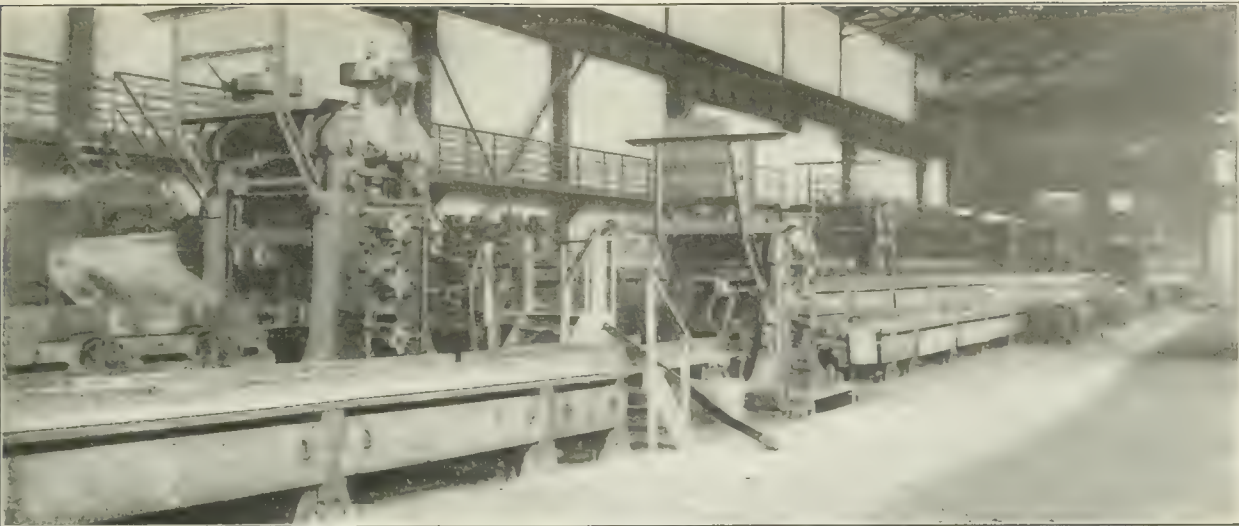


FIG. 2—No. 2 Structural Mill Looking Toward the Blooming Mill. The Encasing of the Table Drives is Conspicuous.

A general view of the mill room is shown in Fig. 2. Fig. 3 is a view of the hot beds from the mill end. Fig 4 shows one half of the loading beds out under the yard cranes. Reference to Fig. 1 will show the facility with which the material can be handled for cooling, classification, distribution and loading. The hot saw runoff table traverses the middle of the hot beds. Material may be moved from this to right or left, following which the duplicate arrangement of roller straighteners, runoff tables and transfer beds permits a rapid shifting of material to gag-press shears or cold saw, while the overhead yard cranes and parallel loading tracks afford every facility for stocking, loading and shipping.

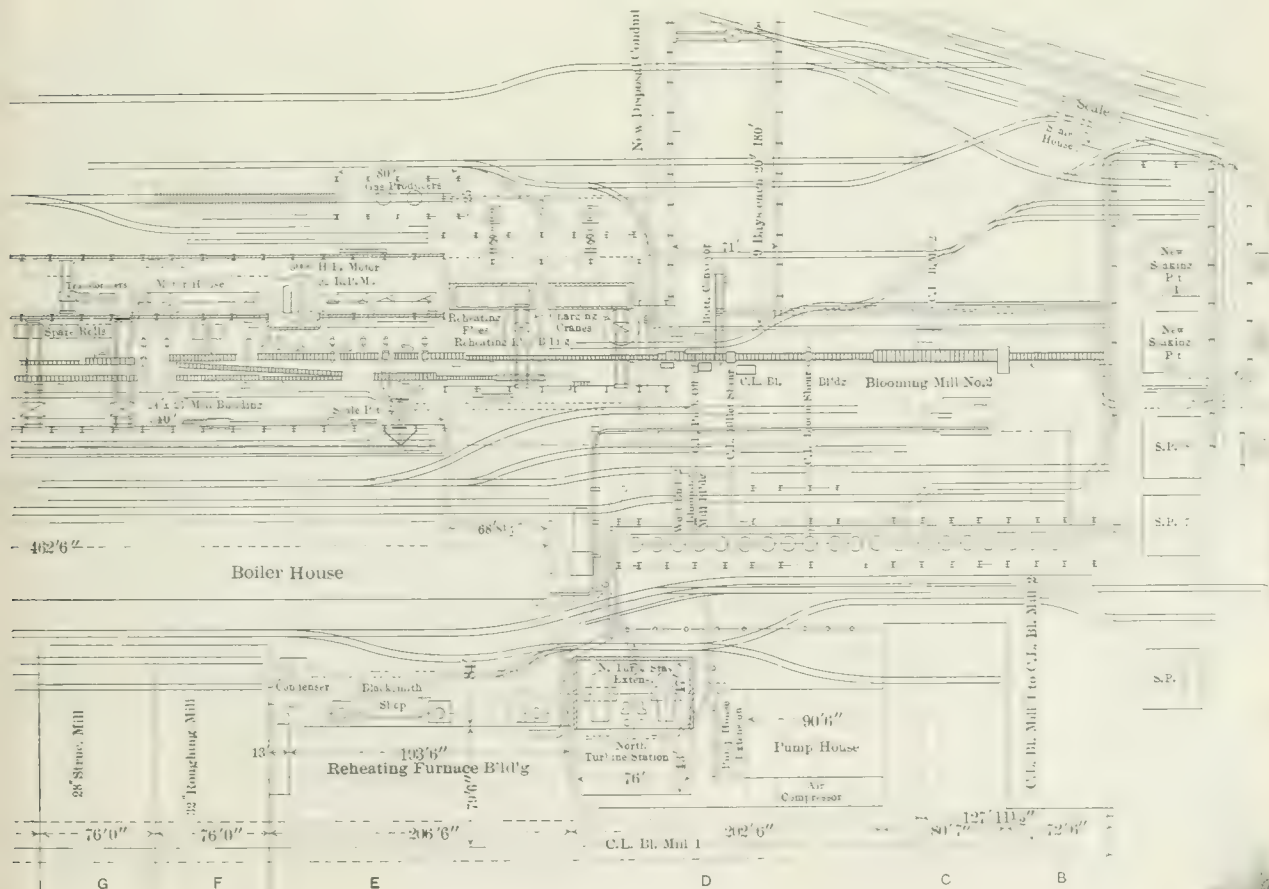
The general mill equipment was furnished by the Standard Engineering Company, Ellwood City, Pa., and the finishing end equipment by the Johnston & Jennings Company, Cleveland. The three hot saws shown in Fig. 5 were built by the United Engineering & Foundry Company, Pitts-

burgh, as were the two roller straighteners, the angle shears and cold saws shown in the view of the loading beds given in Fig. 4.

Mill Electrically Driven and Controlled

The mill is electrically driven and controlled. The electrical installation was worked out with elaborate care, and in both motor room and mill room operating switches and controls are carefully grouped and protected. The mill table motors are all equipped with General Electric automatic reversing controllers. There are but two operating pulpits, and after the piece is on the approach table only two men are required for the operation of the mill. The mill motors are Crocker-Wheeler direct current FW and DW types and are interchangeable for all of the tables as well as the crane trolleys. The number of spare motor parts necessary to be carried is thus greatly reduced.

In driving the table rolls a slight departure from practice elsewhere has been adopted. Instead of driving the



Limited by the Previous Existence of No. 2 Blooming Mill at One End and the Yard Cranes at the Finishing End.



Fig. 3—The Hot Beds, Looking Toward the Finishing End. Only One Set of Roller Straighteners is Shown, the Duplicate Not Having Been Installed as Yet.

shaft which carries the bevel pinions from a spur pinion mounted directly on the armature shaft of the motor, this spur pinion is mounted between two solid outboard bearings on a separate shaft which is coupled to the armature shaft by a flexible coupling of the rubber buffer type. The shocks are thus taken up in these bearings and couplings. That the motors are protected thereby has already been established.

To meet the power requirements of the new mill the present power plant is being enlarged by the installation of two unusually large Rateau horizontal type mixed pressure turbo-generators. Each of these units will deliver 3000 kw turning at 1500 r.p.m. The turbines will operate ordinarily on low pressure steam exhausted at from 16 to 20 lb. absolute from two simple reversing rolling mill

engines and two twin tandem compound engines together with their auxiliaries. This exhaust steam is delivered through five Rateau regenerators, where the pressure is equalized by absorption. Live steam, when used, will be introduced into the turbines through separate connections and nozzles into a high pressure stage from which it will work into the low pressure.

The Crocker-Wheeler generators of this set deliver direct to the mill driving motors a three phase 25 cycle current at 2200 volts. An auxiliary 500 kw motor generator set supplies direct current for the crane and mill table motors. The auxiliary equipment for the generating plant is of Worthington type. The condensers are of that recent design with auxiliary baffle plate cooling arrangement. The air pumps are 11 x 17 x 18-in. Laidlaw-Dunn-



Fig. 4 The Transfer Beds in the Finishing Yard, Under Construction. The Yard Cranes Extend Over Both No. 1 and No. 2 Mill Finishing End.

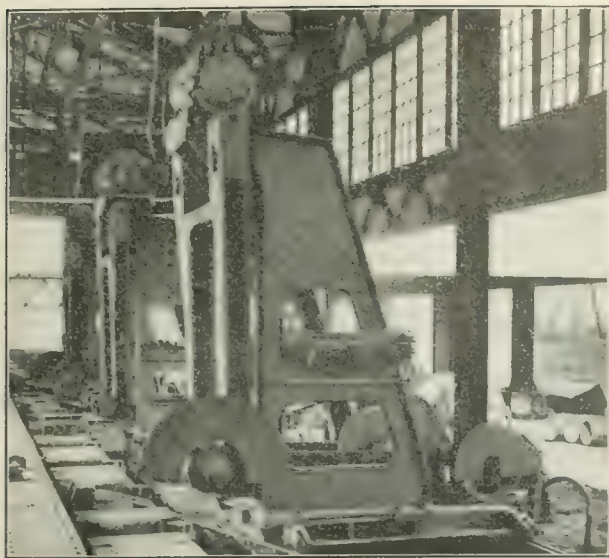


Fig. 5—Three Motor-Driven Hot Saws and Hot Saw Table.

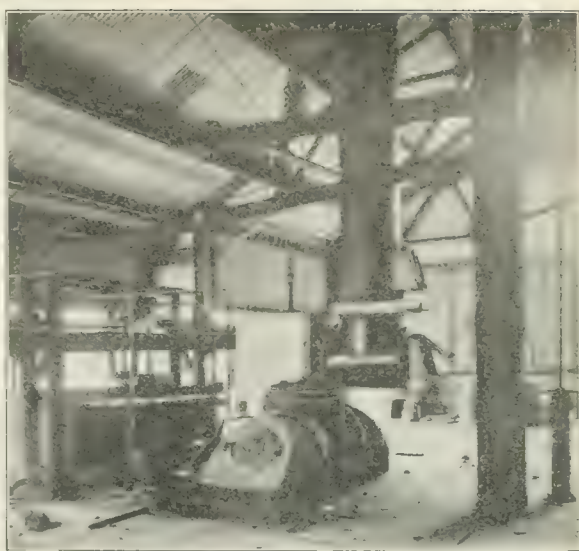


Fig. 8—Gas Main and Valves for Reheating Furnaces.

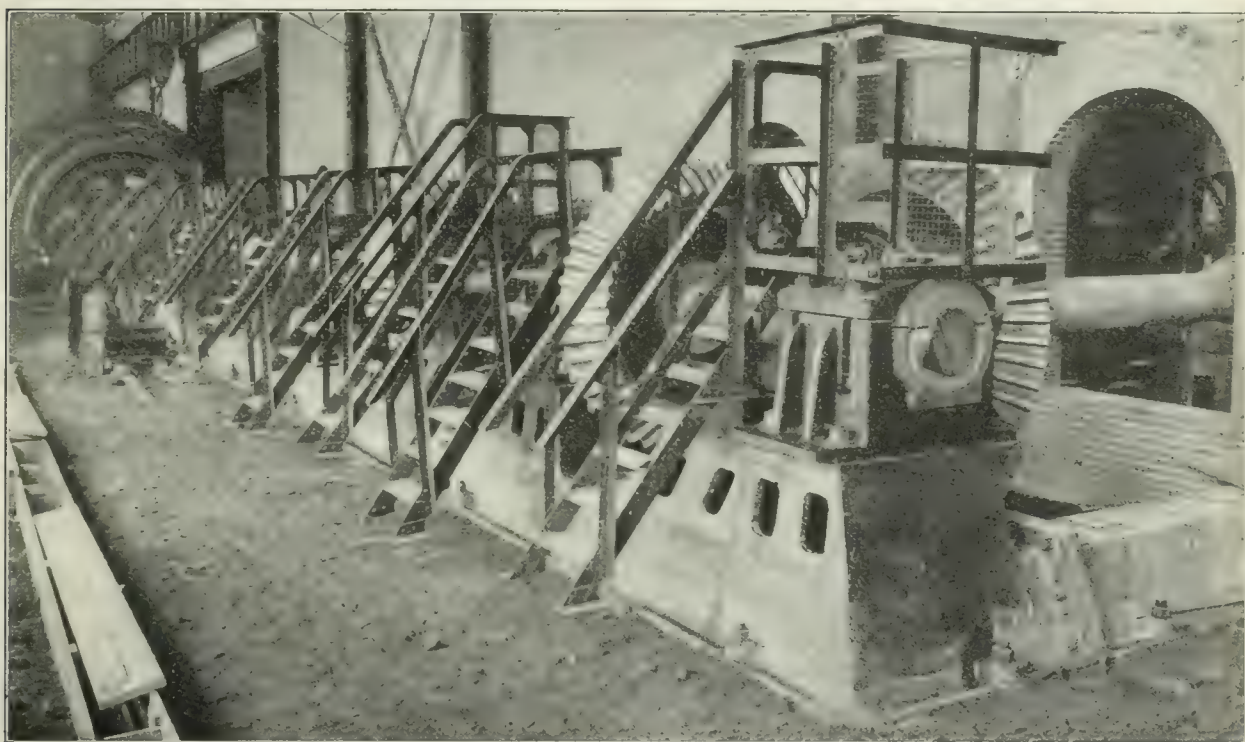


Fig. 6—The Main Drive, No. 2 Structural Mill; Westinghouse, 3,000 h.p. Motor and Bevel Gear Drive.



Fig. 7—One of the Crocker-Wheeler Mill Motor Drives, Showing the Complete Encasement of Moving Parts; the Cable Sheaves Are To Be Inclosed Also.

Gordon type. The circulating water for the condensers and for the entire mill is supplied from two 24-in. motor driven DeLaval centrifugal pumps with an approximate capacity of 18,000 gal. per min. An additional pump is

also installed as a spare. This water is delivered from a distance of approximately 5000 ft. through a 48-in. riveted steel pipe.

Method of Driving and Starting

The mill is driven by two Westinghouse induction motors isolated from the mill in the motor room wing of the mill building. The main drive has a normal continuous rating of 3000 hp at a speed of 91 r.p.m. and drives seven of the eight stands. The finishing rolls are driven separately by a motor of the same type, rated at 1000 hp. Both motors have large overload capacities. The seven trains are driven from a main shaft carrying bevel driving pinions as shown in Fig. 6, the shaft being coupled direct to the rotor shaft of the motor. The finishing rolls are driven direct.

Mounted on the base of the main motor a most advantageous device has been installed for starting and for turning the mill over. A Westinghouse mill type No. 3 series wound 50 hp motor is here adapted to serve as a "barring motor." It drives from a sliding pinion mounted on its armature shaft. This pinion engages with teeth on the circumference of the main motor flywheel and is thrown in and out of gear by means of a pneumatic cylinder and lever. It is apparent that a distinct economy in current consumption and wear and tear on the large motor is effected when it is possible to place the mill in motion



Fig. 9—Reheating Furnaces and Charging Cranes, No. 2 Structural Mill, South Works.

through some other means. The inertia of the large motor also makes very difficult any movement of the mill through a fraction of a turn, whereas with the small barring motor this becomes very easy.

Auxiliary Equipment

To meet the probable requirements of the new mill the heating capacity of No. 2 blooming mill is being increased by the addition of two soaking pits. It is estimated that

about 50 per cent. of the blooms will be rolled direct. The balance will require reheating, and for this purpose two five-door reheating furnaces have been installed. These are shown in Fig. 9, which is a view from the structural mill end looking toward the blooming mill. The two five-ton charging cranes for these furnaces are also shown. These were built by the Alliance Machine Company, as were all of the cranes in the mill. These charging cranes are of the latest type, in which the cage is rigid instead of

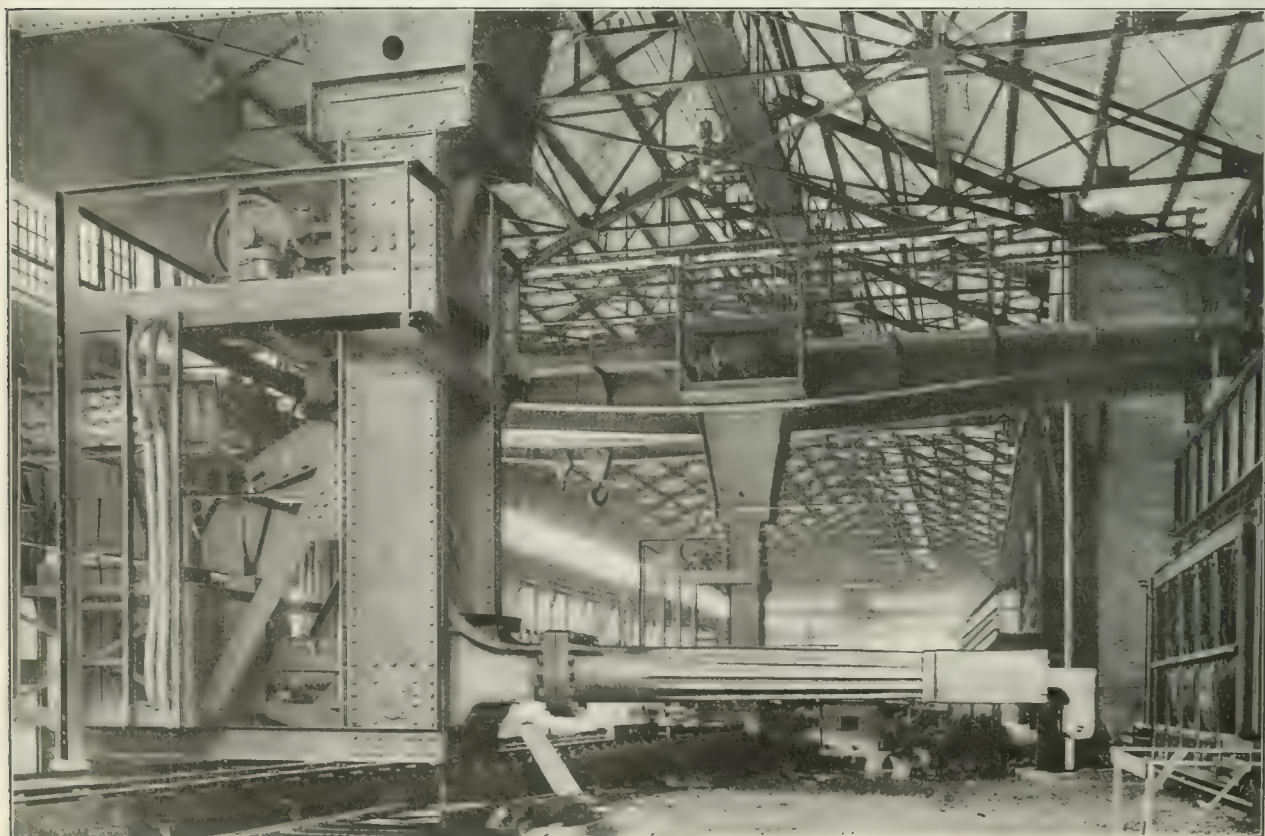


Fig. 10—Alliance Five-Ton Charging Crane for the Reheating Furnaces.

tilting with the charging arm. The charging arm in this type swings on a quadrant and apparently operates with greater facility than when the entire cage swings. Fig. 10 shows one of these cranes.

Gas for the reheating furnaces is generated in two Hughes mechanically poked gas producers. These are located in a separate producer house which parallels the motor room leanto of the main building. The producers are erected at a level which permits easy loading of the ashes into cars. The coal for charging is hauled in the cars up an incline and over track hoppers which discharge directly into the gas producers. Provision has been made for the installation of a third producer. Fig. 8 shows the rear of the reheating furnaces, the gas mains and valves.

The crane equipment includes 12 cranes in all, of which the principal are two 50-ton cranes in the mill room, each with 15-ton auxiliaries; one 50-ton crane in the motor room, and a 15-ton crane spanning the cooling beds. These cranes are not equipped with mechanical brakes but are controlled by a system of dynamic braking which involves a motor to generator conversion of the hoist motors.

The general building dimensions and proportions will be apparent from the layout in Fig. 1. The building and machinery foundations are of mass concrete. The waste water is carried off in concrete sewers. Some of these are open to the surface and are covered with steel floor plates. Through these open conduits the circulating water also is conducted in pipes hung on brackets from the sides of the passage, so that the pipes are thus easily accessible for repair. A concrete pit for collecting scale is built in the mill building, into which drains the water carrying scale from under the rolls. The scale settles and the water runs off through a screened gate. Over the pit a runway carries a trolley and clamshell bucket built by the Modern Steel Structural Company, Waukesha, Wis., and by this means the scale is loaded directly into cars.

For lighting, flaming arcs are used in the mill room and Cooper-Hewitt lamps in the motor room.

Fig. 7 shows how moving parts are encased for the safety of workmen.

Steam Engineers' Convention

Large Display of Engineering Specialties at Philadelphia

The Supreme Council of the American Order of Steam Engineers held its twenty-fifth annual convention in Philadelphia, Pa., June 5 to 9 inclusive. In connection with the convention was held the annual meeting and exhibit of the American Supply Men's Association. The headquarters of both organizations were in the Odd Fellows' Temple, where the exhibit of the Supply Association was also held. Business sessions of the council were held each day, while the exhibition was open from 9 a. m. to 10:30 p. m., except on Tuesday and Thursday afternoons and Wednesday evening, when special entertainment was provided. The afternoons of each day were principally given to the entertainment of the members and visiting delegates. On Tuesday afternoon an excursion was given on the Delaware River, while on Thursday afternoon an outing was held at Washington Park. On Wednesday evening a silver jubilee banquet was held at Scottish Rite Hall. The sessions of the council were all of an executive nature. On the closing day the following officers were elected: Supreme chief engineer, Lewis G. Schlehner, Philadelphia, Pa.; first assistant, George W. Goodwin, Baltimore, Md.; recording engineer, Florian J. Armbruster; corresponding engineer, C. F. Noble, Atlantic City, N. J.; treasurer engineer, Thomas J. Donovan, Philadelphia, Pa.; trustees, William Parent, Philadelphia; D. B. Heilman, Reading, Pa., and W. R. Smith, Coplay, Pa. It was decided to hold the next annual meeting in Allentown, Pa.

The American Supply Men's Association also held its annual meeting during the week and the election of the following officers was announced: President, Henry Winner, Garlock Packing Company; vice-president, Frank Martin, of Jenkins Brothers; secretary, Fred L. Jahn, of Watson & McDaniel, Philadelphia, Pa.; treasurer, John W. Armour, representing Power. The director of exhibits, who is appointed yearly by the president, has not yet been named. The exhibit of the association was larger than had been expected. The arrangement of the booths

was uniform throughout, and the space allotted was insufficient to meet the demands of the exhibitors, a number being forced to make their displays in a room adjacent to that which had been provided. A number of very attractive displays were made and the exhibition, which was under the direction of H. G. McConaughy, Dearborn Drug & Chemical Company, is said to be the best the association has ever held. Following is a list of the exhibitors:

Trill Indicator Company, Corry, Pa., emergency specialties; Schade Valve Mfg. Company, Philadelphia, Pa., valves, emergency specialties; Anchor Packing Company, New York, packing; Garlock Packing Company, Palmyra, N. Y., packing; McLeod & Henry Company, Troy, N. Y., steel mixture boiler settings; R. & J. Dick, Ltd., Philadelphia, Pa., belting; Ohio Blower Company, Cleveland, Ohio, steam specialties; France Packing Company Philadelphia, valve and piston packing; Cyrus Borgner Company, Philadelphia, firebrick boiler settings; Underfeed Stoker Company of America, Chicago Ill., stokers; Fairbanks Company, Philadelphia, machinery and supplies; A. B. Botfield & Co., Philadelphia, firebrick cements, furnace designs; Keystone Lubricating Company, Philadelphia, oils, greases; Vacuum Oil Company, Rochester, N. Y., oils; H. Belfield Company, Philadelphia, valves, etc.; Crandall Packing Company, Palmyra, N. Y., packing; Elisha Webb & Son Company, Philadelphia, blow-off valves; H. B. Underwood & Co., Philadelphia, special tools; Warren Webster & Co., Camden, N. J., heaters, purifiers; Peerless Rubber Mfg. Company New York, rainbow gaskets; Watson & McDaniel Company, Philadelphia, steam specialties; Parkersburg Iron Company, Parkersburg, Pa., charcoal iron boiler tubes; Frank H. Stewart Electric Company, Philadelphia, electric supplies; Lagonda Mfg. Company, Springfield, Ohio, boiler tube cleaners; McArdle & Cooney, Philadelphia, valves, steam specialties; Strong, Carlisle & Hammond Company, Cleveland, Ohio, steam specialties; E. J. Rooksby & Co., Philadelphia, Pa., special tools; American Steam Gauge & Valve Mfg. Company, Boston, Mass., recording gauges; O. F. Zurn Oil Company, Philadelphia, oils; Bird Archer Company, New York, boiler compounds; Cacos Mfg. Company, Philadelphia, packing; Home Rubber Company, Trenton, N. J.; Harrison Safety Boiler Works, Philadelphia, heaters, boilers, etc.; H. W. Johns-Manville Company, New York, boiler and pipe covering; Engineering Equipment Company, Philadelphia, specialties; William C. Robinson & Son Company, Coraopolis, Pa., oils; Wilkirk Electric Company, Philadelphia, electric lamps; Huhn Metallic Packing Company New York, packing; Thomas C. Warley & Company, Philadelphia, boiler compounds; Wise & Bailey, Philadelphia, belting and rubber goods; Green Tweed Company, New York, Palmetto packing; Pringle Electric Company, Philadelphia, electric supplies; Quaker City Rubber Company, Philadelphia, packing, supplies; Practical Engineer, Chicago; C. J. Rainier & Co., Philadelphia, representing William F. Powell, Cincinnati, Ohio; Nelson Valve Company, Wyndmoor, Pa., valves; Philadelphia Electric Construction Company, Philadelphia; Jenkins Brothers, New York, valves; Mason Coal Company, Philadelphia, anthracite and bituminous coal; William B. McVickers Company, Philadelphia, chemical engineer; Lunkenheimer Company, Cincinnati, Ohio, valves; George W. Lord Company, Philadelphia, boiler compounds; National Tube Company, Pittsburgh, Pa., steel tubing; John R. Livezey, Philadelphia, insulating materials; Keasby & Mattison Company, Ambler, Pa., asbestos coverings; Paul B. Huyette Company, Philadelphia, Reliance steam traps; Dearborn Drug & Chemical Company, Chicago, Ill., boiler compounds; Philadelphia Grease Company, Philadelphia; American Engineering & Mfg. Company, Philadelphia; Sarco Fuel Saving & Engineering Company, New York, Sarco steam traps; Brogan & Co., Philadelphia, steam specialties; William B. Powell & Company; Frick Gate Bar Company, Philadelphia, grates; E. F. Houghton & Co., Philadelphia, oils and steam specialties; Roto Company, Hartford, Conn., tube cleaners; Corday Packing Company, Trenton, N. J., packing, Ashton Valve Company, Boston Mass. valves.

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., has let a contract for an addition to its present building. The addition will give the company two floors and a basement, each 60 x 100 ft. The basement is high enough for machinery, and, in part at least, will be well lighted by natural light. The present basement is sufficient for the heating plant and fuel storage. The new basement will have a 20 x 36-ft. fireproof vault for storing dies. Work has already commenced on the contract and all material has been ordered. The addition will be ready for occupancy some time in August. This will be the third enlargement in seven years.

A Novel Use of Allan Bronze

Making a Turbine Baffle from This Metal

Its No. 2 bronze was recently employed for a somewhat unusual purpose by A. Allan & Son, 486 Greenwich street, New York City. This consisted in making a baffle for a Curtis turbine for a large public service corporation. Figs. 1 and 2 are an elevation and a plan view, respectively.

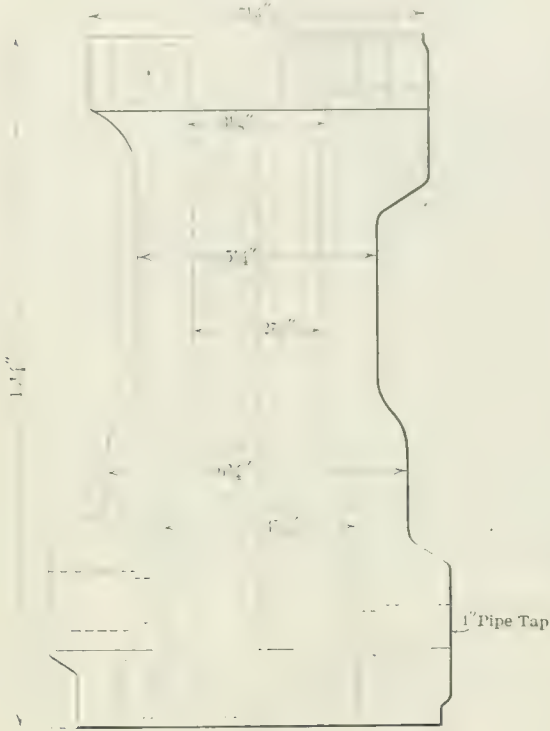


Fig. 1.—Elevation.

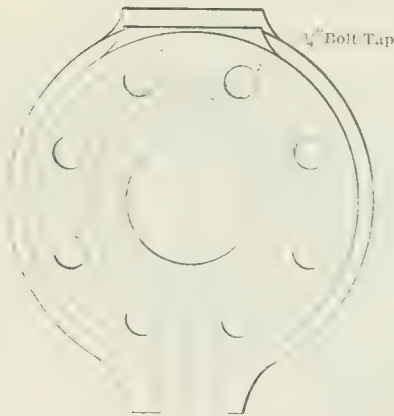


Fig. 2.—Plan View.

Baffle for a Curtis Turbine Made by A. Allan & Son, New York City

of the baffle and Fig. 3 is reproduced from two photo-micrographs which show the grain of the metal when a test bar was broken while the polished section at the right illustrates the homogeneity of the mix. One of the baffles being tested to withstand a pressure of 3000 lb. is illustrated in Fig. 4.

The part for which this metal was used is placed between the pump which supplies the film of oil to the step bearing of the turbine and the bearing itself. The oil enters at one end of the baffle and after passing first through a wire gauge sieve and then through the threads of a helix which is inserted in the central opening emerges. This helix is adjustable for varying the length of the path of the oil and serves to prevent the escape of oil from the bearing with the consequent dropping of the step.

Originally these baffles were made from cast iron and when one cracked in service an effort was made to procure a metal which would be free from this defect. Manganese

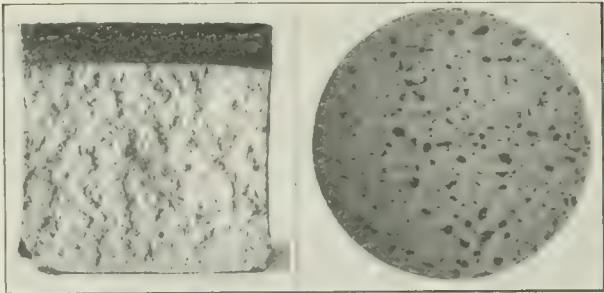


Fig. 3. Photo-micrographs of Allan No. 2 Bronze Showing the Grain of the Metal and the Homogeneity of the Mix.

bronze was first tried and twenty castings were made. Only one of these were found to be perfect and an order was placed with A. Allan & Son. The first lot was made from the firm's manganese bronze and out of eight only two perfect ones were secured. On account of the high percentage of unsatisfactory manganese bronze castings it was decided to use another metal known as the Allan No. 2 bronze which is a lead-tin-copper alloy containing 25 per cent. of lead, 9 per cent. of tin and 66 per cent. of copper. Fourteen castings of the type shown in Figs. 1 and 2 were made from this metal and much better results were secured, five castings being in service at the present time with a number in reserve.

The grain of this metal and the homogeneity of the mix are clearly brought out in Fig. 3, which is a repro-

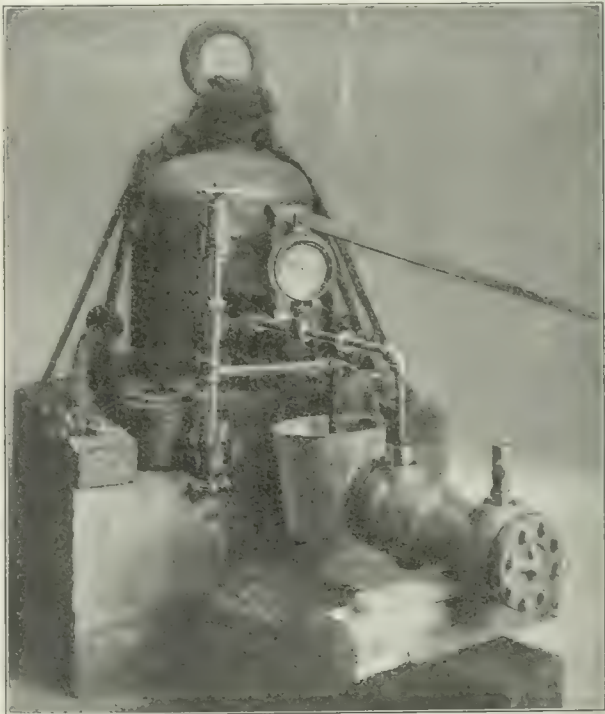


Fig. 4. One of the Baffles Being Tested at a Pressure of 3000 Lb.

duction of two photo-micrographs. A test on two bars taken from the gates of the castings from which the bafflers were made gave the following results:

Test bars	No. 1.	No. 2.
Original diameter, in.....	1.4960	1.4980
Final diameter, in.....	1.4600	1.4700
Original area of specimen, sq. in.....	1.7577	1.7624
Final area of specimen, sq. in.....	1.6742	1.6972
Reduction of area, per cent.....	4.7	3.7
Elongation in 9 in., per cent.....	4.4	3.8
Elongation in 8 in., per cent.....	4.6	3.9
Actual yield point, lb.....	23,500	21,750
Yield point, lb. per square inch.....	13,370	12,340
Actual ultimate tensile strength, lb.....	30,710	30,100
Ultimate tensile strength, lb per square inch.....	17,470	17,080

In actual service these baffles are subjected to a pressure of 1500 lb. per square inch, but before being accepted by the purchaser they were subjected to a test in which a pressure of 3000 lb. per square inch was applied by the apparatus shown in Fig. 4.

The Pulaski Iron Company's furnace at Pulaski, Va., was blown out for repairs May 29. It will be relined and blown in again in about 30 days.

Proportioning Department Expenses and Charges in Cincinnati Planer Company's Works

By general factory expense is meant items which cannot rightfully be charged to any individual department. The page given over to recording these general factory expense items shows that the total is divided among the various producing departments on a percentage basis according to the relation which the producing labor in the

Below the total expense found as shown in Fig. 1 is entered the total productive labor as obtained from the record of Fig. 2 and the ratio is noted that the total expense bears to that of the productive labor. It is understood that this percentage figure taken over an established period of time was used as the percentage of expense to

The Cincinnati Planer Co.				
	Box	In to scale	Feet	Up to scale
Shore of Port Chicago	23,100		23,100	103,200
" " " "	1,100		1,100	53,480
" " " "	2,500		2,500	53,700
" " " "	10,500		10,500	250,100
Port Chicago Station	10,500		10,500	2,110
Port	50		50	100
Port to a Small	50		50	100
Every South	100		100	200
Stationary	200		200	400
Stationary Station	400		400	800
Stationary " "	500		500	1,000
Port	200		200	400
Port to a Small	200		200	400
Stationary Station	100		100	200
Total Entries	104902		10,733	200635
" " " "	102271		103582	205795
% of Box to Port Station	102.6		48.2	100.4

At first sight it might appear that the system involved considerable detailed work, but in actual practice it is found a simple proposition, requiring in the average machine-tool builder's plant not to exceed 1½ days' labor monthly. Certainly it is felt that this expenditure of effort is doubly rewarded by the accuracy obtained of expense distribution which gives the factory management a knowl-

[illegible]

Fig. 2.—Method of Tabulating the Labor Costs.

American Machinery in Europe

Practical Suggestions of Lines to Be Pushed

BY C. A. LEEPER, MILWAUKEE, WIS.

During an extended tour of the principal industrial centers of the Continent of Europe, west of Russia, the writer was able to secure quite a comprehensive insight into the sale there of American machinery for metal-working plants, as governed by the conditions now prevailing. In this and other articles to appear from time to time in *The Iron Age*, the salient features of the situation will be presented.

In commenting on American export trade, of whatever nature, the tendency of speakers or writers has been to confine their remarks largely to criticism, to tell of the sins of omission, carelessness, etc., rather than the rewards of competence, and to arouse in the minds of manufacturers, to whom their fault-finding has been addressed, a feeling of instinctive antagonism. Temptation to do this is usually strong. A certain measure of criticism can, in fact, hardly be avoided, if only to bring out desirable methods or conditions by contrast. Nevertheless, much work has been done abroad in the introduction of American machinery that is worthy of further emulation; and it is the writer's intention to dwell upon this, instead of upon transitory faults, thus showing, by means of pertinent examples, some of the methods by which the needs of European users are to-day being successfully met.

Labor-Saving Methods Must Be Used in Europe

"Labor is growing dearer in Europe," wrote Charles Kirchhoff* on his return last fall from a trip abroad, "so that the industries there must have and are adopting American labor-saving methods and equipment." That is the gist of the present situation. Europeans have been slow to take up American methods. They did not do so until they were forced by economic conditions over which they had no control, and they are not going ahead now any faster than circumstances dictate. In Europe established traditions die hard; innovations of any kind encounter many difficulties that are practically unknown here. No manufacturer should make the mistake of assuming that, because he has had noteworthy or even phenomenal success throughout the United States or Canada in the sale of an improved type of apparatus, it will go equally well across the ocean. As a general proposition, however, it may be stated that really efficient machinery of any kind which will save time and labor, or both, can be successfully introduced in Europe.

The writer compiled, while abroad, what he believes to be a practically complete list of all American machinery used to any appreciable extent in European metal-working plants. After the notes made in traveling have been verified, so as to avoid possible errors or discrepancies, the full list will be published, together with comments made by European users in relation to their reasons for selecting the various tools. It may surprise many to observe how nearly these approximate the reasons by which they would themselves be governed in the purchase of tools comprised in the list. The intention is also to print, at the same time, a summary of high grade machines of European manufacture which come into most direct competition with American tools, on the basis of efficiency, and to enumerate the machines which, on account of low prices or otherwise, practically shut out American tools from the several countries of Europe, each country being separately considered.

In planning a selling campaign abroad, one of the first of considerations to suggest itself is the extent of the field. In what countries of Europe can American machinery for metal-working be profitably sold? The answer is: In all of them, so far as their industries in this line have been developed. There are few tariff restrictions of an insurmountable character and very little in the way of national prejudices to overcome. The latter, in fact, where they exist, operate to the benefit of Americans, as in the case of the lingering French feeling against Germany or north Italian prejudice toward things Austrian. Competition in

abundance is to be encountered, particularly in the matter of price; but in the countries where other competition, including that of the native manufacturer, is keenest the opportunities for the sale of American tools are greatest.

American Machinery Is Already Well Known

How far have the possibilities of the field been developed by American manufacturers? Answers to this question may, of course, vary considerably. The writer, on his first trip abroad, went with the ingrained impression, derived chiefly from reading articles on our export trade, that the existing opportunities had been only feebly grasped. He was accordingly surprised to find, from the day of landing in the first port, that installations of American-built machinery were to be met with on every hand. No manufacturer desirous of introducing his products in Europe should sally forth with the idea that, so far as his own countrymen are concerned, he is entering a virgin field. No matter what his specialty may be, he finds that Americans have been there before him, and, if he has a machine tool to offer, the chances are that apparatus somewhat like it has previously been extensively sold there.

But this fact, far from proving a discouragement, will be found to work in his favor. As has long been the case in the United States and Canada, the requirements of the metal-working industries are rapidly growing all through Europe, and the more widely American machinery is distributed the greater is the general demand for it from progressive users. American machine tools in particular are well and favorably known. A large number of the leading tool manufacturers of this country have for some time past made a specialty of export trade. They are well represented and strongly entrenched in all of the great industrial districts of the Continent. More are each year entering the field, and, when these new competitors for export business proceed along the right lines, their product is readily absorbed—provided, always provided, that it has sufficient merit to justify its choice over European tools or similar tools of American manufacture.

Fortunately for the trade, the machinery sent abroad from this country within recent years has been of a high standard of efficiency, and, except for the misunderstandings to be mentioned later in some detail, its service has given almost uniform satisfaction. Shop managers and superintendents are, therefore, well disposed toward American machine tools is general, and they are ready, as a rule, to investigate the claims of any new apparatus brought to their attention, even though they may not be in the market for it at the time. Nor is this done, except in rare instances, from any motive of idle curiosity. When the time comes that such a tool is needed the carefully filed memorandum is brought out for further consideration. Meanwhile, it may have been passed along to some relative or friend engaged in a similar line of business.

To one factor more than any other has been due the extensive introduction of American machine tools in Europe, namely, specialization. For the same reason their lead is maintained to-day. Most of the European establishments engaged in the manufacture of metal-working machinery started in as shops of general utility, building tools of standard design or in accordance with the purchaser's special needs. Gradually the trade of each firm became narrowed to certain specific lines of production, but the general tendency has been to cater to a wide range of demand within a circumscribed territory rather than to the particular requirements of one industry or phase of industry throughout a wide territory. One concern will, for instance, be making a multiplicity of machines, distinct in type, and selling its entire output to plants located not far from its works.

There are places in the United States and Canada where a similar condition exists, but it is the rule abroad to a far greater extent than on this continent. As a consequence, the refinement of design and economy of production developed here enabled Americans to offer machines of considerably greater efficiency than those manu-

*See *The Iron Age*, October 27, 1910.

factured in Europe and to lay them down in the various industrial centers there at prices sufficiently attractive to encourage their use. This fact has been so well recognized, both by Americans and Europeans, that its repetition may seem superfluous; but, in any consideration of the present or future possibilities of our export trade, too great emphasis cannot be laid upon it, for it is now and will remain the essential element in the widespread sale of American machinery abroad. Not only does it apply to machine tools, but also to labor-saving appliances of any description for which manufacturers here are seeking an outlet in Europe.

European Manufacturers Imitate Our Designs

It is, of course, vain to fancy that European manufacturers would sit idly by and see their markets further restricted by the invasion of American tools. From the very first they began to study our designs and to imitate them. Then followed numerous attempts to improve upon these designs. Some of the imitations were of the "just as good" variety, against which we are daily warned in advertisements, yet many of the improvements have been real improvements. But until within a year or two past foreign built tools were sufficiently outclassed by the general run of American machines to put no serious check on the sale of the latter. By the time a good imitation or "improvement" appeared the American manufacturers had a new machine of their own on the market, and it was usually offered at what seemed to the European competitor, or "near competitor," a distressingly low price.

At the present time specialization of this kind is no longer distinctively American. Many European manufacturers of machinery, particularly in Germany, have forged to the front with highly specialized tools of undoubted efficiency, tools which—it must be said to their credit—can compete on equal terms with those of the best American design. Loud and jubilant, therefore, are the claims now made abroad, especially in the Vaterland, that the trade of American firms in European industrial districts has not only reached but passed its zenith. Were it not for our tariff wall, say certain German manufacturers, they would now be in a position to "carry the war into Africa," to outsell us on our own ground. That they have foundation for this assertion is true. Many shrewd American observers of conditions abroad are also of the opinion that our trade on the Continent will decline henceforth rather than increase. The writer's own judgment, however, runs contrary to that belief.

If European users, who are the real judges, have been slow to adopt American methods and American machinery they are equally conservative in adhering to the latter, even under the counter stimulus of national pride. Moreover, a Frenchman, a Swiss, a Netherlander or dwellers in Scandinavian countries are not disposed to favor German products as against American. The prevailing sentiment, and this holds true in nearly all European lands, is decidedly the other way. Vice versa, in Germany the feeling toward American machinery is not at all unfriendly among users, while in relation to French or English trade it is somewhat strained. German manufacturers are, therefore, able to crowd American tool builders closely, as a rule, only in their own land or in the less important countries, including those overseas, where they are steadily building up an export trade in all lines.

The Growing Needs of the European Market

But far beyond any of the conditions mentioned in their favorable influence upon the American machinery trade in Europe are the growing needs of the market itself. Not only has production in every branch of metal working been expanding at a rapid rate but entire systems of shop layout and operation are undergoing radical changes. This is so evident that "he who runs may read." In consequence, the quantity of equipment required within the coming years will be far in excess of the ability of European manufacturers to furnish high-grade tools, unless the increase of their own shop facilities is altogether phenomenal and they abandon the large export trade now being fostered in other parts of the world, which is not at all likely. This situation is accentuated also by the almost universal tendency abroad in making shop improvements to buy the best equipment that can be secured regardless of cost, if the price asked is within reasonable limits.

"Ah," says a critic, "but Europe is to-day enjoying a season of exceptional prosperity. Eventually there will be another period of depression, with a falling off in the demand. What then?" Naturally, there will be a check on buying, and American trade in Europe is likely to be the first to feel it, but the writer does not believe that, even in this event, the decline will be as serious as one might suppose. The long-continued buying of labor-saving or time-saving machinery, to supplant older equipment, is an economic necessity, forced upon European manufacturers, and they are, almost without exception, laying up reserves to provide for it. Improvements will accordingly go on very much as planned, no matter if depression does bring decreased profits. Also, it is cheering to note that every indication now points to a long period of industrial activity in all manufacturing centers of Europe, so that the conditions above mentioned will probably obtain for some time.

Favorably Known Machinery Given Preference

The American machinery generally given preference abroad at the present time is the same that has been favorably known there for some years, provided its design has been kept up to date. One meets almost entirely with the products of old-established firms—not necessarily large concerns, but those that have been long enough in the business to acquire good reputations at home as well as in Europe. The foreign user, in common with all true conservatives, judges of the future by the experience of the past. While the matter of price is, of course, often the determining element, he is more concerned with quality. Where there has been any attempt to cheapen the product, he has been quick to detect the difference and to resent it. As a matter of fact, however, this has occurred in comparatively rare instances. Tales to the contrary, which have furnished the basis for much sharp criticism of American methods abroad, both by foreign and domestic writers, are generally without adequate foundation. They arise, in the main, from distortion of trivial incidents.

The argument that American machines are not built to last more than a limited period is met with very frequently, but this seems to be an impression that has gained currency in Europe rather than an actual fact, and is due to the lighter construction of many of our types, which has been contrasted unfavorably with the weight of metal put in most of theirs. However, even this impression is at present principally confined to non-users. Among actual users there has been a steadily increasing recognition of the fact that the weight of American machinery is generally so distributed as to be in the direct line of the working stresses and that more heaviness does not necessarily mean strength. Furthermore, the practical value of American courage in "scrapping" good machinery as often as working costs can be materially reduced by the substitution of improved types is coming to be appreciated, so much so that sneers have given place to emulation.

European manufacturers of machine tools, particularly in Germany and Switzerland, have also less to say than formerly on the subject of light construction, for the reason that in bringing out equipment to compete in efficiency and price with American models they have found themselves compelled to adopt practically identical methods of designing. There is, to be sure, considerably more show of "scientific" calculation than one hears of in this country, but the net results work out very much the same.

Other criticisms, which come more properly under the head of catering to special European needs and preferences, as distinct from our shop practice, which will be treated in some detail later on, are being met in the proper spirit by American manufacturers and have recently presented no serious obstacle to the sale of American tools. Indeed, while some apparent grounds for fault-finding have been due purely to misunderstandings. With each of these obviated the matter is closed, and there is no good end gained by magnifying as criticisms any comments made by European users which have been based on an inadequate knowledge of the features of construction under consideration.

A Summary of Machinery Most in Demand

In the absence of the detailed list above mentioned a general résumé such as there will be space for in the present article incurs danger of being misleading, owing to the

fact that it comes in conflict with much individual experience, but the writer will attempt a summary, as follows:

Pattern-making machinery manufactured abroad and wood-working tools in general are considerably inferior to American types, and there is opportunity for sales in these lines, together with some foundry equipment. Much of the best of the latter, however, such as molding machines, originated abroad, and its development has kept pace with ours. American turret lathes have come widely into use in all European countries, and the makers that one sees represented are the same as those whose product is most frequently met with in this country. The new "manufacturing automatics" are also becoming well-known, and there are some good-sized installations of them. American speed lathes sell fairly well and engine lathes to less advantage, German and Swiss competition being difficult to overcome.

Drilling machinery of the various types offered in the United States, particularly the more ingenious of the radial and multi-spindle drills, has found good customers in Europe, but a number of European firms are now doing excellent work along similar lines, and, as they are able to offer these machines at sufficiently low prices to make the purchase of them an object on that account, future competition in this direction will be much sharper than heretofore. It may, however, be compensated to a large extent by the increasing needs of the market. Automatic screw machines from this side are in considerable demand. American planers have from the first been extensively used. The same is true of shapers, Cincinnati makers being especially well represented, in strong contrast to the predominance of Eastern firms in numerous other lines.

The development of gear cutting, shaping and planing machinery in France, Belgium and Germany, as well as to a lesser extent in other countries, has taken large strides within the past few years, but a number of machines of American make, notably those that have been designed to meet the requirements of the automobile and motor-truck industries, have found a good market in Europe. Some automatic gear-hobbing machines from the United States also meet with favor. American boring and turning mills and horizontal boring machines are also often encountered in the larger shops and seem to have attained enduring popularity, but the latter are close pressed by French and German tools.

Manufacturers of American grinding and polishing machinery have been getting their apparatus largely introduced, and in some instances it is now being manufactured locally under royalty arrangements, this, however, also being true of a good many other specialties. Some improved slotting machines, key-seaters, etc., of American manufacture are to be seen abroad, but this class of trade has not been developed as extensively as one might suppose it would be. Universal milling machines from American shops, particularly those manufactured in the writer's own State of Wisconsin, have obtained a firm foothold in all leading European countries, both as a result of merit and of the intelligent methods used by their makers in cultivating foreign business. Plain milling machines have also been extensively sold, together with some slab millers. There is a tendency among German tool builders to specialize more and more in the manufacture of the heavier milling machines of all classes, so as to promise increasingly dangerous competition from that source, and in respect to the lighter machines one meets with some good examples of French work.

Nut- and bolt-making machinery of American design is in use abroad to quite an extent. No particular note was made of American bulldozers, forming rolls or straighteners, but some have been sold from this country. The purchase of power shears, hack saws, etc., is mostly from native manufacturers. For light forging and shaping machinery used in various classes of service there would seem to be opportunities open to a number of the leading concerns in this country specializing along those lines that are not now availing themselves of them. For heavy work the apparatus required can ordinarily be bought to advantage from nearby builders. Some manufacturers of accessory equipment, such as blowers, oil or gas furnaces, etc., are, however, apparently doing well in this field.

Pipe threading and cutting machines from New England, with related tools, formerly sold extensively. Any

of proved economy can still be placed, but the local product is now more apt to be selected in most European countries, because of the lower price at which it can be offered. American stamping and punching machinery and the use of spacing tables for handling large plates or long strips, etc., have developed methods in this country which appear to be more economical than those used abroad. There should be and are openings along these lines for the extension of the trade of manufacturers having suitable apparatus to offer.

In the evolution of testing machinery, hydraulic pressure equipment for machine, boiler or forge shop service, German, Swiss and Belgian manufacturers have, in the writer's opinion, been generally in advance of American designers. They do not seem to be threatened in their home markets, so far as standard machines are concerned, by any serious competition from the United States. There are, however, some American specialties including auxiliary apparatus, of undoubtedly superior merit. In connection with wheel presses, for example, a large manufacturer of agricultural machinery has put in service at its works abroad American triplex, compound pressure pumps, with automatic cut-out for the high pressure cylinders, which save more material and have a greater earning capacity than any pump of European manufacture observed in other shops.

While foreign-built compressors for shop service generally hold their own, the best pneumatic tools are in many cases admittedly those of American design. There is also a large established trade in small shop tools, machine appliances and machinists' supplies of every description, this business being chiefly in the hands of Eastern tool specialists. American saws for both metal and wood cutting have had a heavy sale all through Europe, and the prospects for increasing trade are good. The business formerly enjoyed by some European firms, especially in Germany, has been seriously lessened by this competition. In the district principally affected an effort has very recently been made to inaugurate discrimination against all classes of American products, but it does not seem to have made much of an impression upon users.

American Instruments of Precision

Contrary to previous impressions, the writer learned that American measuring tools and instruments of precision are favorably regarded abroad, even in Switzerland and Germany, where one would suppose that home types would be used to the practical exclusion of aught else. This fact was used, in conversation with shop superintendents and foremen, to refute the insinuation not infrequently made that the extreme precision of European work outclassed that of American designers and manufacturers. In France, Belgium and Italy, however, the French and Swiss instruments predominate.

Only in respect to power and electrical machinery, compressors, pumps for general service, etc., as far as these are included in the equipment of metal-working plants is the situation discouraging from an American standpoint. In every other line, and to a limited extent even in these, American apparatus has at least a fighting chance, with very good opportunities as a whole.

The value to the reader of this and other articles must, of course, be mainly suggestive. What others have done he can do, if he has the machinery to offer and the will to undertake a foreign selling campaign along the lines approved by experience. Such experience has, in most cases, been dearly purchased by those who were early in the field but is now one of their most profitable assets. In another article the writer will, therefore, pass to a consideration of selling methods, as demonstrated by what American manufacturers of metal-working machinery have already done abroad.

For more than two years a factory has been running at Marathon, Texas, extracting rubber from the wild guayule shrub. This shrub, until a few years ago, was one of the most despised of all the desert vegetation. It attains its best growth on land that is practically worthless for any other purpose. The statement is made that there are more than 6,000,000 acres in that part of Texas on which the shrub may be grown as a commercial proposition. It is propagated both by seeds and by cuttings. Other factories are projected as a result of the success of the pioneer establishment.

Mower Part Molding Machines

Two Recent Products of the International Molding Machine Company

An order recently completed by the International Molding Machine Company, 2300 South Western avenue, Chicago, Ill., consisted of 30 molding machines for making agricultural implement parts which were shipped to a large

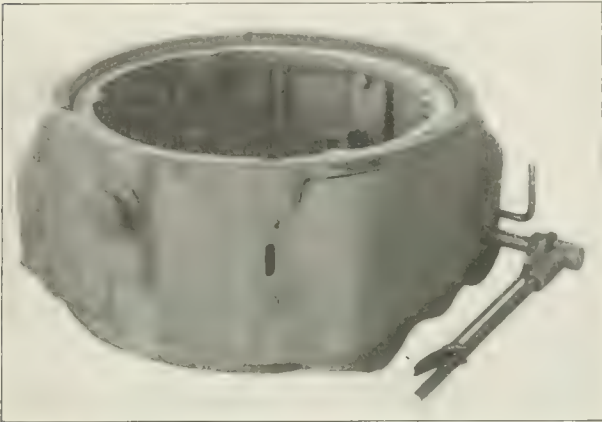


Fig. 1. A Machine for Molding Mowing Machine Wheels Built by the International Molding Machine Company, Chicago, Ill.

European manufacturer. All of these machines were especially designed for the work which they will be called upon to perform and each detail connected with the molding of the patterns was provided for in the construction. The machine used for molding patterns for the wheels of mowing machines is shown in Figs. 1 and 2, while Fig. 3 illustrates the one employed in connection with the production of the frames of the machines.

As will be noticed from Figs. 1 and 2, the wheel machine is entirely encased to prevent the working parts from being obstructed by sand falling upon them. When the pattern and the stripping plate are properly located in the machine there are no openings in which the sand can enter and lodge. The casings of the wheel machines are fitted in such a way that when necessary they can be readily opened, as shown in Fig. 2, for oiling or inspection. The drag portion of this machine is operated as a turn-over machine, or in other words, after the mold has been rammed up, the bottom board is clamped on and the complete equipment is picked up by a quick-acting traveling crane, turned over and moved along and set down on the floor. This arrangement has been employed to obviate the necessity of barring the flask and turning the mold over after it has been made. After the pattern has been drawn the machine is lifted off and turned back to its



Fig. 2.—View Showing the Machine Casing Opened for Inspection and Repairs.

original position. In this way there is no danger of the mold being damaged as the pattern remains in it while it is being moved preparatory to turning it over or while it is being carried along the floor to the place at which it is to be set down. The height from the floor to the top of the frame in this machine is only 17½ in. and this extremely small dimension was necessary since the machine had to be very low in order that the molds, which were of a large size, might be easily rammed. The design and the arrangement of the cranks and other working parts is

such that they operate within this comparatively small space without interfering with the pattern, the stripping plates or the stools.

The frame machine which is illustrated in Fig. 3 conforms strictly to the outline of the pattern and consequently is of a very irregular design. This construction was employed in order that there might be no superfluous sand to ram, and as a result the patterns and the stripping plate extend beyond the ends of the machine frame. The casings cannot, therefore, be fitted to this machine until the mounting is finished, but when this is completed they are attached to the stripping plate at the top and to the base plate of the machine at the bottom, as is clearly brought out in the engraving. When this has been done the machine is encased as completely as the one employed for producing the wheel patterns. The yoke to which the pattern is attached is cut down or filled up according to the plane of the parting line to eliminate all unnecessary time and expense in fitting the pattern. This machine operates on exactly the same principle as the other and the height is the same, 17½ in. from the floor to the top of the frame.

Each of these machines requires eight men to operate it, divided as follows: Six for ramming up, being equally divided between the cope and the drag; one man to handle the crane and the eighth to set the cores and assist the crane man. The flask used on the wheel machine is 9¼ in. deep and has an internal diameter of 36 in. This crew of

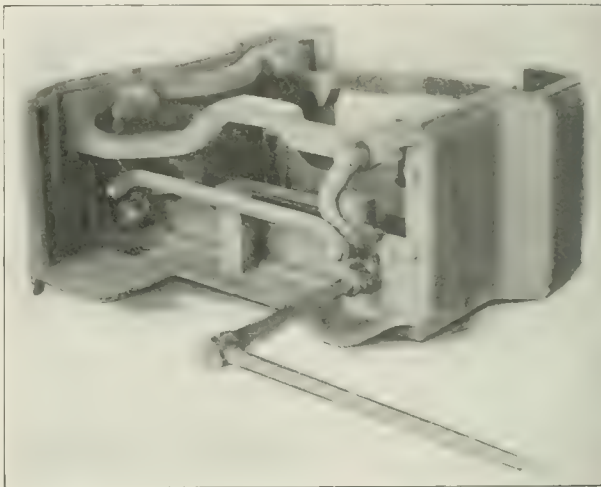


Fig. 3.—Another Type of Machine for Molding Frame Patterns. eight men, which are not skilled workmen but ordinary laborers, produce from 250 to 260 wheel molds and 135 frame molds per day.

Lake Ore Shipments for May

The movement of Lake Superior ore from upper Lake docks in May was 3,684,819 gross tons, an increase of 3,353,174 tons over the initial shipping month of April, but a decrease of 2,396,539 tons, or 39.40 per cent., from the shipments for May, 1910. The total shipments to June 1 this year were 4,016,464 tons, as compared with 7,601,665 tons to June 1, 1910, a decrease of 3,585,201 tons, or 47.16 per cent. In the following table the shipments are given by ports for the two years, in gross tons:

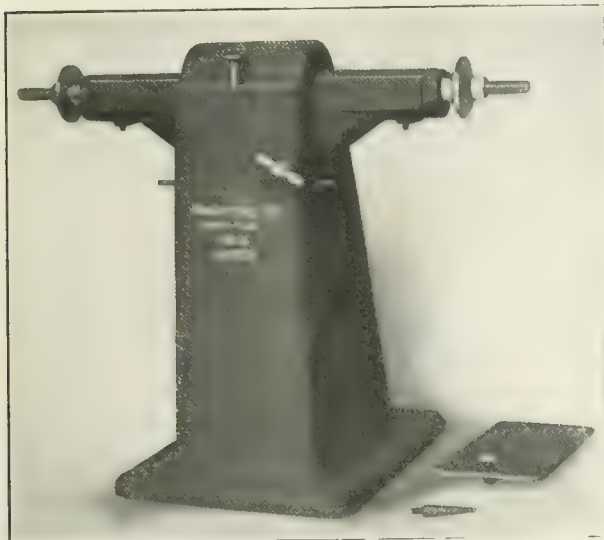
	May, 1911.	May, 1910.	To June 1, 1911.	To June 1, 1910.
Port and dock.				
Escanaba	436,008	749,091	529,540	972,117
Marquette	204,093	481,325	218,931	616,885
Ashland	226,528	588,604	267,865	807,307
Superior	1,239,153	955,651	1,315,892	1,310,958
Duluth	896,113	2,220,758	947,155	2,530,185
Two Harbors ..	682,924	1,085,929	737,081	1,364,213
Total	3,684,819	6,081,358	4,016,464	7,601,665
Decrease, 1911..	2,396,538		3,585,201	

Superior is shipping an increasing percentage of the total, its percentage to June 1 being 32.76 as against 17.25 to June 1, 1910. Duluth's shipments have decreased for the same periods from 33.28 per cent. of the total to 23.58. The percentage for Two Harbors, the third port at the head of the Lakes, was 18.35 this year as compared to 17.05 in 1910.

The Wisconsin Railroad ore docks, Ashland, will hereafter be known as the Soo Line ore docks.

The Ransom Buffing Lathe

The No. 6 buffing lathe which has been brought out by the Ransom Mfg. Company, Oshkosh, Wis., is designed especially for handling heavy buffing and grinding work. One of the special features of this machine is a type of construction which enables the grinder to be driven by a belt from a line shaft underneath the floor by an entirely inclosed belt or from an overhead countershaft. The shifter handle controlling the movement of the belt is shown at the right of the column near the top and the left is easily moved by giving this handle a half-turn. The journals are exceptionally long and are babitted. Dust is prevented from entering by a special type of construc-



The No. 6 Buffing Lathe Built by the Ransom Mfg. Company, Oshkosh, Wis.

tion and the bearings are provided with ring oilers. Its large floor area and great weight are two other points worthy of notice.

The following table gives the principal dimensions and specifications of the machine:

Length of arbor, inches.....	54
Length of journals, inches.....	1 9/16
Diameter of arbor, inches.....	1 1/2
Diameter of end collars, inches.....	6
Diameter of pulleys on arbors, inches.....	5 1/4
Floor space required, inches.....	33 3/4 x 25 1/4
Net weight, pounds.....	750

The tight and loose pulleys are mounted on the arbor, the latter being mounted on a steel bushing which is fastened to the arbor. The end collars are secured to the pulley with an oil joint and the pulley is oiled sufficiently whether the arbors are turning around or standing still. There is a large door in the back of the frame which can be removed when access to the belt is desired.

A New Perforating Plant in Chicago

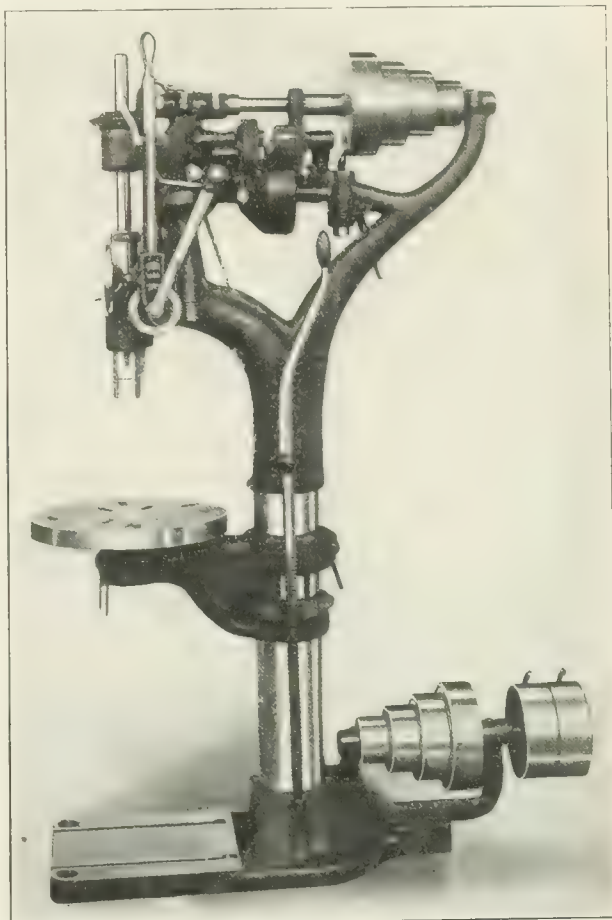
The Chicago Perforating Company, 2445 West Twenty-fourth place, Chicago, has been organized to manufacture perforated screens of all kinds and in all metals. H. C. Finlay, the president, and Guy Clark, secretary and treasurer, were both formerly of the Scully Steel & Iron Company. A. W. Cutter is vice-president. The company has completed its plant at the above address, the main building of which is 124 x 152 ft. It is located on the Chicago, Burlington & Quincy Railroad, with switch track into the works.

The plant is equipped with a wide range of tools, from the lightest type of automatic machinery for perforating tin, copper, brass and sheet steel, up to the heaviest equipment for similar work in steel plates. One of the tools for heavy work is a special punch press with 6-ft. gap for punching steel plates 1-in. thick and making perforations as large as 1 ft. in diameter. The company also has special facilities in its shop for rolling screens of any diameter up to 12 ft. long, including a full equipment for the manufacture of dies. Being in close touch with the iron and steel warehouse stocks of Chicago and jobbers in all classes of rolled metal, the company announces that it can give quick shipment on any sized order for perforated metal.

The Rockford Positive Geared Drill Feed

A new style of positive geared feed for drills has been developed by the Rockford Drilling Machine Company, Rockford, Ill., and is being employed upon all the drills of this company over 20 in. The smallest size of machine to which this feed is applied is illustrated herewith and it will be noticed that in general construction it does not differ very markedly from the 14-in. drill of this company which was illustrated in *The Iron Age*, March 30, 1911.

The power for the feed mechanism is derived from the top shaft which also carries the four-step cone pulley.



A New Type of Positive Geared Feed Applied to the 20 In. Drill Built by the Rockford Drilling Machine Company, Rockford, Ill.

Power from this shaft is transmitted through a train of two gears to an intermediate shaft, upon which there is mounted an idler gear that can be made to mesh with any one of a cone of four gears. As these gears are engaged on the periphery they can be tumbled into mesh while the drill is running and any one of the four feed changes which range from 0.004 to 0.015 in. per revolution of the drill spindle are instantly available. In applying this type of feed to the larger sizes of drill the mechanism for shifting the gears has to be slightly modified to suit differences in the design of the tools.

An Australian invention to overcome corrosion and pitting in metals, especially boilers, due to electric chemical action of ingredients in water with which they are brought in contact, appears to have met with success in Sydney. It introduces, by dynamos, weak electrical currents on the metals intended to be protected, thus neutralizing the galvanic action of the corrosive substances contained in the water. The process was recently tested by the professor of physics at Melbourne University on metals immersed singly and in connected pairs in sea water, both hot and cold, and in dilute acids. He reported that all hurtful galvanic action was suspended by a small expenditure of electrical power.

The Lukens Iron & Steel Company, Coatesville, Pa., made an average output ranging between 70 and 75 per cent. of full capacity during the month of May.

The Machinery Markets

The machinery markets on the whole are uneventful. Interest is centered in the American Railway Master Mechanics' convention at Atlantic City, which opens to-day. The machinery exhibit arranged is the largest on record for a meeting of this kind. The machine tool trade particularly is well represented. Inquiries for machinery have fallen off in New York and orders are not coming in very heavy. The situation has bettered in Philadelphia, where some comparatively good contracts have been closed and the business was distributed. Miscellaneous sales of machine tools, in addition to some good railroad business, have helped the Chicago market and some further railroad inquiries remain unfilled. Two small lists for industrial plant equipment have appeared in Cleveland; sales in that market as a rule have been limited to single tools. Trade is dull in Cincinnati, although the demand for wood-working machinery is improving. In Detroit the trade is interested in the announcement that the Lozier Motor Company has increased its capital stock \$1,000,000, and will spend most of the money for manufacturing extensions. The market is reported steady in St. Louis, but makers and dealers there could take care of considerably more business than they are getting. Conditions are on the mend in Texas and orders that were held up because of the Mexican troubles are now being filled. A good demand for contractors' equipment and small power plants exists on the Pacific coast. This material is largely needed for irrigating enterprises. Heavy shipments are being forwarded to Nome and other Alaskan mining centers.

New York

NEW YORK, June 14, 1911.

The machinery demand is somewhat disappointing. New inquiries are scarce and outside of the railroad business now in sight there is little to occupy the attention of machinery men. Buyers seem somewhat reluctant to close up on inquiries and many specifications sent out seem to be prompted by curiosity as to selling terms rather than as a desire to make purchases. Some excellent Government contracts are coming up and a list of machinery is in course of preparation for the Government Arsenal at Watertown. A railroad enterprise which promises to result in business is that of the Southern Railway Company, 30 Church street, New York, to build shops at Macon, Ga. About 100 acres of land have been bought there in the name of a subsidiary of the Southern Railway Company and repair shops which will give employment to about 2000 men are to be built. The details are being arranged at the Washington office of the company under the direction of W. W. Finley.

The Governors of the Machinery Club of the City of New York at a recent meeting elected the following officers: President, George H. Post, Standard Coupler Company; vice-president, W. L. Saunders, Ingersoll-Rand Company; secretary, Fred Stadelman, Wellman-Seaver-Morgan Company.

In the annual report of the Westinghouse Electric & Mfg. Company the statement is made that at the expiration of the lease of the property occupied as an iron foundry at Pittsburgh the works will be abandoned. Plans have been completed for the erection of a new foundry at Trafford City, about six miles east of the main factory at East Pittsburgh. Approximately 63 acres of land have been acquired for this and other possible purposes, at a total cost of \$184,500. The company has further acquired, for the purpose of insuring communication between the proposed new foundry and its plant at East Pittsburgh, 60 per cent. of the capital stock of the Interworks Railway Company, owning and operating a line of railway between East Pittsburgh and Trafford City. Plans have been prepared for the erection of foundry and pattern buildings at Trafford City, at an aggregate cost of approximately \$1,250,000.

The Republic Metalware Company, Buffalo, N. Y., is making an addition to its main factory building which will be equipped largely with machinery moved from other departments. One section will contain the machine shop and it is probable that some additions will be made to the machine tool equipment, including lathes, shapers, etc.

The International Steam Pump Company, in addition to obtaining a water-works contract for the city of Buenos Ayres, amounting to over \$1,000,000, which was recently mentioned in *The Iron Age*, has also been awarded a contract to furnish \$700,000 worth of pumping machinery for the city of Buffalo, and will build a \$400,000 pumping station in Cairo, Egypt.

The Farman Company of America, 37 East Twenty-eighth street, New York, is investigating several sites in the West with a view to locating a plant for the manufacture of the Farman aeroplanes. The company has prepared plans for buildings and equipment and will announce them as soon as a site has been definitely decided upon.

The Crescent Tool Company, Jamestown, N. Y., manufacturer of special machinery and hardware specialties, will build a two-story brick addition, 50 x 132 ft., to its plant.

The Thomas Auxiliary Spring Company, Canisteo, N. Y., has been incorporated with \$10,000 capital stock and will engage in the manufacture of automobile springs, shock absorbers, etc. The incorporators are Charles L. Thomas, Canisteo, and Ernest C. Coulton and Alex. Fleming, Buffalo.

The new foundry building to be erected by the Syracuse Malleable Iron Company on North Geddes street, Syracuse, N. Y., will be 150 x 200 ft., and will cost approximately \$25,000.

The Ellis W. Morse Company, Binghamton, N. Y., has been incorporated with a capital stock of \$125,000, to manufacture machinery, etc. Ellis W. Morse, Geo. A. Kent and W. J. Callin, Binghamton, are the incorporators.

John D. Meehan, Hendrick Building, Syracuse, will build a plant for the manufacture of brick and tile, consisting of a one-story building of brick and steel construction to cost, with equipment, about \$56,000.

The David N. Gallen Company has been incorporated at Waterloo, N. Y., to manufacture structural iron, etc., and deal in steel, iron and other metals. The company has a capital stock of \$50,000. The incorporators are D. N. Gallen, Wilkes-Barre, Pa., C. E. Ramirex and P. Fritz, New York City.

The United States Woodworking Company, Buffalo, N. Y., has been incorporated with a capital stock of \$100,000. The new company will take over and continue the business of the Buffalo Auto-Body and Trimming Company, at 106-108 The Terrace, manufacturer of automobile bodies and tops, and will in addition manufacture chairs, tables, etc. The directors are Henry Lewis, James E. Morgan, A. Panimo, Chas. J. Walkam and Chas. M. Plant.

The Monarch Paper Box Mfg. Company has been incorporated with a capital stock of \$10,000, and will establish a plant for the manufacture of paper boxes and cartons. The directors are Bennett Nussbaum, Jacob Nussbaum and Henry Glasstone.

A plant is to be established at Elmira, N. Y., by the Castle Lamp Company, Amesbury, Mass., if plans projected are carried out. The plans include a building 60 x 300 ft., three stories. John N. Willys and Walter Stewart, of the Willys-Overland Automobile Company, are also interested in the new plant.

The Delaware, Lackawanna & Western Railroad will build a 10-stall roundhouse of brick and concrete construction with a 90-ft. turntable, at Elmira, N. Y. Geo. H. Burgess is chief engineer, Albany, N. Y.

The Syracuse Lighting Company will build and equip new stations at East Syracuse, Jamesville, Liverpool and Manlius, N. Y. The Public Service Commission has authorized the company to issue \$456,000 bonds for the general extension and improvement of its electrical and gas departments.

The Rome Mfg. Company, Rome, N. Y., will build an addition to its plant of brick and steel, 40 x 160 ft., two stories, for the manufacture of metal ware.

The Skinner Engine Company, Erie, Pa., will double its present foundry capacity by the erection and equipment of an extension foundry building on a site recently acquired for the purpose.

THE MACHINERY MARKETS

Philadelphia

PHILADELPHIA, Pa., June 14, 1911.

There has been a shade better volume of business placed with local machinery merchants during the past week, due in a measure to the placing of several contracts which had been under consideration for some time. These orders have usually been divided among several merchants and manufacturers, and have therefore not materially increased the sales of any one concern. The sale of a planer, radial drill, grinder and several small tools for the equipment of a repair shop, closed by one of the local merchants a few days ago, is considered pretty good business in these days of single tool propositions. There is still an absence of any demand from the railroads in this district. Industrial plants generally are less actively engaged; a number are operating on a restricted basis, while some are practically idle. The local locomotive builder is handicapped by difficulties with its union labor, but is not particularly inconvenienced, as orders for delivery at this time are not very urgent. The demand for second-hand tools and machinery has not been urgent; in some lines there is almost a total absence of inquiry. Second-hand boilers and engines are not in very active demand, although manufacturers of new equipment of this character are figuring on considerable work. There is but a light inquiry for either steel or iron castings, and many of the foundries in this district are operating on short time.

The Harrisburg Boiler & Mfg. Company, Harrisburg, Pa., is reported to have placed orders for the major portion of the equipment required for the addition to its plant. The business is said to have been distributed among a number of merchants and manufacturers.

The William Steele & Sons Company has begun operations on the addition to the plant of the North Brothers Company, Lehigh avenue and Philip street, this being a reinforced concrete building, the general dimensions of which are about 34 x 100, with a wing about 35 x 68 ft. The building will be used largely for warehouse purposes, and we are advised that no machinery equipment will be required.

The Treadwell Engineering Company, Easton, Pa., now has its iron foundry at its new plant, at Easton, in operation, and expects to operate its new steel foundry about July 1. As soon as this new department is in full operation work at its present plant at Lebanon, Pa., will be discontinued.

The Harvey Fibre Carpet Company, Trenton and Allegheny avenues, has under construction a new power house, 42 x 54 ft., for which Charles W. Denny has the contract. The major portion of the new equipment for the plant has already been contracted for.

A permit has been taken out by Cramp & Co., contractors, for the erection of a large manufacturing plant for the American Can Company, previously mentioned, at Palmer, Beach and Allen streets. The building will be five stories, of reinforced concrete, erected on a lot 87 x 343 ft. Pile foundations will be extensively used, these being placed, it is reported, by the Raymond Concrete Pile Company.

The Board of Awards, Baltimore, Md., James H. Preston, president, will take bids until June 28 for furnishing, delivering and erecting complete, to the Water Board of Baltimore, one 30,000,000-gal. vertical triple expansion pumping engine, two batteries of two boilers each, the necessary steam piping between engines and boilers and the economizers for heating the feed water, for the Mount Royal Pumping Station, Baltimore, Md., according to specifications, which may be obtained at the office of the water engineer, Alfred M. Quick, City Hall, Baltimore, Md.

A new charter has been granted the Baldwin Locomotive Works under the title of the Philadelphia Locomotive Works, under the laws of the State of Pennsylvania. The nominal capital stock is \$50,000. It is understood that the actual capital stock will be \$50,000,000, which will represent an increase of \$10,000,000 on the capitalization of the old concern. While the new company will virtually take over the old one and operate the plant, the identity of the Baldwin Locomotive Works, Inc., as an organization, will be maintained. The incorporators named in the application are Rudolph Ellis, C. S. W. Packard, Eckly B. Cox, Jr., Alfred C. Harrison and Herman Dercum. Particulars regarding the organization of the new concern are not available.

Dodge, Day & Zimmerman, engineers, report new developments in industrial work quiet. They are busy, however, on work in hand and have recently completed a layout for a new plant for the International Sprinkler Company of this city, also for extensive additions to the plant of Goldie & McCollough, Gault, Canada, and for a new plant for the Ox fibre Brush Company, Frederick, Md., which proposes to erect a new plant at Albany, N. Y.

The Philadelphia & Reading Railroad has awarded a contract to the McClintic-Marshall Construction Company for the erection of a new creosoting plant for the treatment of ties at Port Reading, N. J. A sawmill outfit will be installed and a new round house will also be erected.

The American Hoist & Mfg. Company, Hamburg, Pa., is contemplating the erection of a plant of larger capacity than its present quarters with a view to increasing its manufacturing scope to include that of cranes, trolleys and other various devices.

New England

BOSTON, MASS., June 13, 1911.

The market is an uneventful one. No lists of any moment have been received by the dealers; in fact, business continues to be very quiet. Indications are that the vacation periods in industry generally will be fully as long as usual, and in some cases longer, as has been demonstrated in announcements already made by shops and factories. The Interstate Commerce Commission has extended for three months longer the 72-hour demurrage rule for New England, the purpose being to examine more carefully the statistics governing conditions in this territory. As an alternative is the 48-hour rule, in force in practically all the rest of the country. Shippers here are gratified at the still remaining possibility of continuing under the old system.

The Critchley Machine Screw Company, Worcester, Mass., manufacturer of special screw machine work in iron, steel and brass, has purchased a tract of land at Worcester, on the line of the Worcester & Norwich division of the New York, New Haven & Hartford Railroad, and plans to erect immediately a factory 50 by about 300 ft., one story and basement. The structure will be of brick and granite, with steel frame and cement foundations, the purpose being to have it fireproof throughout. The business has grown very rapidly from the time of its establishment by J. Verder Critchley, about five years ago, when he installed two machines in a small space on Union street. The original quarters were soon outgrown, and the business was moved to Beacon street, where new space has been added from time to time. At present some 80 men are employed, manufacturing screw machine products at the rate of 30,000,000 pieces per year. In addition to its own growth, the company has recently purchased the screw machine department of the John L. Parker Company, Worcester, and is now running it in space rented in the latter company's factory on Jackson street. Mr. Critchley, who is the sole owner, states that he will probably require additional equipment, including a milling machine and toolroom lathes. It is not expected that additions will be made to the machinery of the automatic screw department immediately, although additional space has been provided to permit of future growth. The factory is extremely busy, orders equalling the maximum producing capacity.

The C. G. Garrigus Machine Company, Bristol, Conn., has put on the market a surface grinder known as No. 1, type A, which is designed primarily for grinding dies for presses and stamps. The machine has two wheels, one working with a tool rest, the other with an adjustable table.

The Terry Steam Turbine Company, Hartford, Conn., is to build a large addition at its shops, the purpose being to double the present capacity. The Terry turbine is extensively used for driving centrifugal pumps, generators, fans, etc., and it has become necessary to provide increased manufacturing facilities. The present shop was occupied about two years ago.

The International Silver Company, Meriden, Conn., has started the erection of a four-story, brick addition, on the west side of its main plant.

The Bosch Magneto Company has extensive plans for additions to the factory at Springfield, Mass., which was only recently completed. In a general way it may be stated that the enlargement would triple the present large capacity. However, an obstacle exists in the presence in the neighborhood of works which emit

THE MACHINERY MARKETS

odors to which the Bosch company objects, on the ground that conditions in its plant are made unpleasant. The municipal authorities of the adjacent city of Chicopee, in which the objectionable plant is located, have been appealed to, and it is believed that the question will be settled to the satisfaction of the company.

The Peavey Mfg. Company, Bangor, Maine, is to remove its business to Brewer, the chief reason being a desire to be directly upon a railroad. A concrete factory will be erected, the main building 50 x 100 ft. and a wing 50 x 50 ft. The structure will be made absolutely fireproof. The window frames and sashes and the interior equipment generally will be of steel, so that nothing will be present to burn. Much attention will be given to lighting the plant, plans calling for 100 windows, each averaging 18 ft. in height. The company is a successor to the Bangor Edge Tool Company, and manufactures cant-dogs, axes and edged tools. The output of the new factory at the beginning will be between 30,000 and 40,000 cant-dogs and 1,000 dozen axes annually. The company states that it is not in the market for equipment at this time.

The Otis Elevator Company has decided, according to an announcement made at Springfield, Mass., to abandon its factory in that city, the purpose being to concentrate manufacturing in its larger works. The Springfield business was established by the Elektron Mfg. Company, which was absorbed into the Otis company six years ago. No announcement is made of the plans of the Sultan Motor Company, which has been manufacturing motor trucks at the Otis plant, but it is thought at Springfield that the business will be discontinued.

The Bridgeport Screw Company, Bridgeport, Conn., has awarded a contract for its factory building in that city. It will be 70 x 400 ft., two stories, and will cost approximately \$100,000. The Bridgeport Screw Company is headed by W. H. Farrell, formerly president and manager of the Dominion Wire Mfg. Company, Montreal, a subsidiary of the Steel Company of Canada. He recently resigned those offices to become president of the new Bridgeport company.

The Brosnihan Wrench Company, Worcester, Mass., manufacturer of a patent wrench, has gone into bankruptcy.

A large power development is under way at Ellittsville, Maine, on what is known as Big Wilson Stream. A 30-ft. dam will give a head of water sufficient to operate a large electric generating plant. The power will be used in slate quarries and sawmills of Monson, Maine.

Additions to general manufacturing industries in New England include the following: A. & E. Henkels, Bridgeport, Conn., weave shed, addition 60 x 190 ft.; Bridgeport Elastic Fabric Company, Bridgeport, Conn., addition 90 x 122 ft., two stories; New Haven Pulp & Board Company, New Haven, Conn., five-story factory, 67 x 131 ft.; Bay State Thread Company, Springfield, Mass., an addition 40 x 54 ft., two stories; Rhode Island Glass Company, Central Falls, R. I., glass factory in that city.

The Brockton Factory Association, Brockton, Mass., has been organized to erect a factory building at a cost of \$100,000, to be rented for manufacturing purposes. The city is an important shoe manufacturing center, and doubtless the tenants will be chiefly confined to that industry.

The Lamb Knitting Machine Company, Chicopee Falls, Mass., manufacturer of textile machinery, is about to begin the erection of extensive additions and alterations to its works, including a large building, four stories and basement. It is planned to have the building ready for occupancy in the fall.

Preliminary work will begin immediately on the shops which the Boston & Maine Railroad is to establish at North Billerica, Mass. The details of the plant are not yet available, but it is known that some \$3,000,000 will be expended on the project, including a very large amount of machine tools and other equipment.

Cincinnati

CINCINNATI, OHIO, June 13, 1911.

Business from the automobile manufacturers, which gave promise of reviving several weeks ago, is now exceedingly dull, and there is no prospect of its being better soon. As a consequence machine tool builders report very few orders from Ohio, Indiana and Michigan territory, but state that there is some scattered buying from the general trade in other parts of the

country. Present purchasers, however, seem willing to accept second-hand and the lower priced tools. There has been some further curtailment in working time, but the total number of men reported to have been laid off has probably been exaggerated.

Punching and shearing machinery is moving fairly well, and at least one of the leading manufacturers of this class of machinery has found it necessary to work a full force and on full time. Woodworking machinery continues to show improvement and the smaller units of electrical equipment are also in demand. It is further reported that a nearby manufacturer of paper-making machinery has its factory working on rush time.

The M. Hertenstein Company, Columbus, Ohio, stove manufacturer, is reported to have plans completed for enlarging its molding room, as well as making other improvements to its plant.

Samuel Hannaford & Sons, architects, Cincinnati, are drawing up plans for a new factory to be erected for the Murdock Mfg. & Supply Company, whose plant was recently destroyed by fire. The company manufactures and deals in plumbing supplies.

The H. C. Wood Company, Cincinnati, ice manufacturer, has increased its capital stock from \$50,000 to \$200,000. The company is now building a large ice plant in Norwood suburb, and, it is rumored, has tentative plans for the erection of another nearby plant.

The American Drying Machinery Company has been incorporated at Portsmouth, Ohio, with \$500,000 capital stock. The incorporators are William Milner, A. H. Schupp, H. J. Tate, H. J. Grimes and O. W. Newman. The company's plans have not yet been made public.

Work on the new addition to the plant of the Lodge & Shipley Machine Tool Company, Cincinnati, is progressing rapidly, and the company expects to occupy the building before the fall season begins.

The Cincinnati Business Men's Club held its regular annual outing at the Laughery Island Club June 14. About 300 members and their friends attended.

The Cook Motor Company, Delaware, Ohio, has increased its capital stock from \$50,000 to \$100,000, and it is stated will add to its present facilities.

The Sheffield Tool Steel Company, 60 Elm street, Cincinnati, is a new partnership formed to handle all kinds of tool steels. A stock will be carried to fill rush orders. The members of the new firm are C. F. Mackinnon, A. D. Herking and E. J. Schmidt.

Work has been commenced on the new six-story factory building for Lowe Bros., Dayton, Ohio.

Cleveland

CLEVELAND, OHIO, June 13, 1911.

In some lines of machinery inquiries show considerable improvement. Crane builders report that they are now figuring on a good volume of business, the bulk of which has come out during the past two weeks. The demand for water wheels for new plants is quite active. Inquiries for mining machinery have picked up somewhat.

The demand for machine tools shows practically no change. The market is quiet, sales being limited largely to small single tools. Two new inquiries were received from Ohio manufacturing plants during the week for machine tool equipment, each list amounting to about \$5,000. Considerable business that has been pending for some time is still being held up. Railroads in this territory are buying practically nothing in machinery lines.

The foundry trade continues quiet. Some plants are well filled with work, those in the smaller cities in this vicinity being generally better off in this respect than the local foundries. It is estimated that the foundries in this section are being operated on an average of about 60 per cent. of their capacity.

The Cleveland Electric & Machine Mfg. Company, Cleveland, Ohio, has been incorporated with a capital stock of \$25,000. This company is controlled by the interests in the Schwenger-Klein Company, dealers in butchers' and packers' supplies. The latter company recently secured control of the business of the Cleveland Meat Chopper Company, which will be continued under the new corporation, and new lines will be added. The company will make a full line of butchers' and grocers' electrical machinery. The company has leased a large 4-story building at 716-720 Bolivar road, which will be used as a plant.

The American Fork & Hoe Company will enlarge its plant at Jackson, Mich., by the erection of a machine

THE MACHINERY MARKETS

shop. The building will be of reinforced concrete, 60 x 200 ft. and three stories. Plans are being prepared by Anton Burchard, engineer, Cuyahoga Building, Cleveland.

Four crane builders in this territory have submitted bids to the government for the erection of two floating pontoon cranes, one for Boston and the other for the Hawaiian Islands. This is the largest crane inquiry that has come out in some time. The contract will amount to about \$600,000.

The Superior Metal Products Company is the name of a new concern that has established a plant in the Beal Building, Lodi and North streets, Elyria, Ohio, for the manufacture of metal stampings and doing brass and nickel plating and general machine work. An all-steel kitchen cabinet will also be made. H. E. Hall, formerly with the Sterling Stamping Company, Wellington, Ohio, is manager.

A power station for a new high-pressure water system will be built in Toledo, Ohio.

The Goodyear Tire & Rubber Company, Akron, Ohio, will enlarge its plant by the erection of a five-story building, 30 x 60 ft., which will be used for the manufacture of various rubber products.

The Erie Stove Mfg. Company, Erie, Pa., has completed plans for the enlargement of its plant, involving an expenditure of about \$25,000. This will enable the company to increase its output of gas stoves and heaters.

The Peerless Paper Company, Dayton, Ohio, will erect a new three-story brick paper mill.

The Clark Grave Vault Company, Columbus, Ohio, has been reincorporated, increasing its capital stock from \$200,000 to \$700,000. The company will enlarge its Columbus plant and will build a new plant at Des Moines, Ia. The building of other plants in Western cities is also under consideration. The company manufactures a patent burial vault and caskets and undertakers' supplies. H. D. Clark is president and A. F. Beck secretary.

It is reported from Youngstown, Ohio, that the United States Foundry Company will move from Pittsburgh to that city, having purchased the plant of the Girard Foundry Company and adjoining property. A new building, 35 x 125 ft., will be erected.

The Superior Mfg. & Mill Company, Springfield, Ohio, has been incorporated with a capital stock of \$50,000, and will fit up a plant on East street in that city for the manufacture of gas and gasoline engines, pumps and feed mills. George C. Lynch, the temporary president of the company, has purchased the business of the O. S. Kelly Mfg. Company, Iowa City, Ia., and the machinery of that company is being moved to the Springfield plant.

It is reported from Elyria, Ohio, that the Kennedy Mfg. Company, of which John V. Kennedy, of Cleveland, is president and manager, will build a plant in that city, 50 x 200 ft., for the manufacture of plumbers', steam fitters' and gas fitters' supplies.

Detroit

DETROIT, MICH., June 12, 1911.

Makers of automobiles and automobile accessories are experiencing a business lull, and this is reflecting on the machinery demand. Factory construction work is active, and this may develop a call for machinery later. The foundries are doing well just now and there is a good demand for structural steel. Machinery men are interested in the recent increase in the capital stock of the Lozier Motor Company to the extent of \$1,000,000. The increase will be used in enlarging the company's plant, especially in the department given over to the manufacture of power trucks. A machine tool list can be looked for from this source in the near future.

The Robert Mitchell Company has been organized in this city and will manufacture a tape-sealing machine of special design. The company has a capital stock of \$30,000.

Following the lead of other railroads in this State in making improvements in their rolling stock, the Pere Marquette will expend \$1,023,000 in the purchase of new equipment. The company will buy 12 first-class passenger coaches, two combination mail and baggage cars and 50 engines, five of which will be for passenger service, 35 for freight service and 10 switch engines.

It is reported that the Quinn Mfg. Company, Kalamazoo, Mich., manufacturers of plumbers' supplies, has purchased a factory site here, and will shortly erect a large factory building.

The C. R. Wilson Body Company is to erect a large addition to its factory, and will also make extensive alterations.

The Schullenberg Mfg. Company will soon begin work remodeling its building which was recently destroyed by fire. New equipment to replace that destroyed will be purchased.

A new Detroit concern is the Payograph Company, which has incorporated with a capital stock of \$300,000. The company will manufacture a machine which is designed to facilitate the handling of payrolls in large factories. Nelson C. Oviatt and Thomas S. Sprague, with offices in the Ford Building, are the principal backers of the concern.

The Ideal Commercial Car Company has filed articles of incorporation with the Secretary of State. The company has a capital stock of \$10,000. J. C. Sage is the principal stockholder.

Plymouth, Mich., is to be the location of the Bennett Mfg. Company, incorporated last week with a capital stock of \$20,000. The company will make toys and toy games.

The Ideal Gas Engine Works, Lansing, Mich., with a capital stock of \$150,000, which recently took over the Ideal Motor Company, will continue its business at present in quarters of the Michigan Screw Works. As soon as a site can be secured, however, a new plant will be erected of twice the size of its present quarters.

The Austin Automobile Company, Grand Rapids, Mich., as the result of several offers, will move its plant to South Norwalk, Conn. The offers include a free site and water and power rights.

The city of Cadillac, Mich., has subscribed \$100,000 in stock to secure the location of the Otsego Chair Company, Otsego, Mich. A new plant will be built and \$60,000 will be expended on the building and equipment.

North & Bradshaw, contractors, will erect a new plant for the Fleming Milk Products Company, Jackson, Mich. The structure will be 30 x 70 ft., two stories, of brick construction.

The Holland Umbrella & Specialty Company has been incorporated to take over the Barnes-Baker Mfg. Company, St. Joseph. The new concern, which includes B. D. Keppel, Holland, has a capital stock of \$30,000 and will make over the Holland Skating Rink into a suitable plant.

The Michigan Crankshaft Company, Muskegon, as the result of a large increase in business, will raise its capital stock from \$20,000 to \$50,000 for the purpose of expansion.

The Frukey Mfg. Company has filed articles of incorporation with the Secretary of State. The company has a capital stock of \$5,000 and will manufacture specialties.

The Michigan Salt Company has been incorporated with a capital stock of \$25,000. The salt deposits are found below this city on the Detroit River.

The Bay City Sugar Factory is to spend the sum of \$103,000 in increasing the capacity of the plant, which will be increased from 700 tons per day to 1400 tons. Similar improvements are to be made at Alma, Carrolton and Croswell.

A. C. Runyon and Durrel Tripp, well-known Allegan merchants, have asked the City Council of Allegan for a franchise to build and operate an artificial gas plant. No trouble will be experienced in securing the privilege.

The Citizens' Electric Light & Power Company, Adrian, Mich., is planning several improvements, among which is the erection of a 175-ft. smokestack and a new boiler house 23 x 50 ft. in size.

The citizens of Croswell, Mich., have voted in favor of a bond issue of \$10,000, the proceeds of which will be used for the erection of a new standpipe and for making other improvements in the water-works system.

The Angle Steel Company, Otsego, Mich., is to be reorganized with a capital stock of \$25,000. The company for some time past has been contemplating this action to enable it to increase its facilities to handle properly an ever-increasing business. The new officers of the company are C. E. Pipp, president, and J. H. Boswell, secretary.

The Michigan Washing Machine Company, Muskegon Heights, Mich., is erecting an addition 50 x 100 ft. to carry on its extensive and growing business.

The taxpayers of the city of Bad Axe, Mich., will

THE MACHINERY MARKETS

voted on June 12 on a proposition to bond for \$11,500 to extend the waterworks system.

The St. Johns Portable Building Company, St. Johns, Mich., will shortly erect another building to be used in increasing the capacity of the plant.

Kerschneiz Bros., Elderon, Wis., have made preliminary arrangements for the erection of a saw and planing mill at Skanee, Mich.

William A. Markey, Midland, Mich., has made application to the Midland County Supervisors for permission to erect a steel and concrete power dam across Pine River. The dam will be used for generating electricity and supplying water-power.

The Fletcher Paper Company, Alpena, Mich., is about to make extensive improvements in its plant, including a concrete building, 70 x 130 ft., for the conversion of pulp wood to paper.

Charles E. Duryea, of the Duryea Auto Company, Reading, Pa., states that the removal of the plant to Saginaw, Mich., will begin this week. The undertaking is a large one and will occupy some time. A plant is being erected at Saginaw for the new concern, which will be completed by July 10. The company has a capital stock of \$300,000.

The Lewis Geer Foundry plant at Ypsilanti, Mich., was badly damaged by lightning last week. It will be some time before operations can be resumed.

Kalamazoo, Mich., has voted to expend \$340,000 for a new central high school and two outlying buildings. The high school will be equipped with a most complete manual training department, including a modern machine shop.

Marinette, Mich., is to have a new industry in the Kreiter Piano Factory. The company will begin operations as soon as machinery can be installed.

Following the recent increase in its capital stock, the Michigan Adjustable Hub Company has opened headquarters in Bay City, and has about concluded negotiations for fifteen acres for a site for a factory. W. T. Woodhouse and Charles Tarolli are the president and secretary, respectively, of the company.

The Chicago Artificial Stone Company, Grand Rapids, Mich., is erecting a building 220 x 440 ft., and will manufacture all kinds of artificial stone products.

Chicago

CHICAGO, ILL., June 13, 1911.

The miscellaneous sales of machine tools in this market during the past week were much more satisfactory than for some time. However, the spotty character of the demand for tools has displayed bright aspects from time to time before without developing any sustained volume of buying and as yet evidence of substantial and permanent improvement is lacking. Several heavy tools were disposed of during the week and a moderately active inquiry for second-hand tools, chiefly lathes and shapers in the smaller sizes, is reported. A large agricultural implement interest which has been installing considerable machinery continues to be an important figure in the market. The Union Pacific Railroad bought last week the lathes and pipe machines on its recent list. Only a portion of this business came to Chicago, most of it being placed in the West. The Chicago, St. Paul, Minneapolis & Omaha branch of the Northwestern system expects to be in the market for several machines in the near future. An unusual coincidence is instanced by a local dealer handling pipe machines who reports that calls for a total of seven of these machines have developed from this territory since May 1. The requirements of the American Steel & Wire Company previously mentioned are still unsatisfied.

J. S. Giles & Sons, Chicago, have incorporated with \$100,000 capital stock to manufacture dies and machinery. The incorporators are John S. Giles, Carl O. Giles and Guy H. Giles.

Contracts have been awarded by the Chicago Pneumatic Tool Company for the erection of several additions to its plant at Chicago Heights, Ill.

The Rumely-Wachs Machinery Company, Chicago, has been incorporated with a capital stock of \$30,000 for the purpose of manufacturing and dealing in wood and iron working machinery. This company has located in the store formerly occupied by the McDowell, Stocker Company and will continue a machinery dealer's business at that location. Sales of the machines on the floor are now being made.

The West End Furniture Company, Rockford, Ill., has awarded a contract for the erection of an addition to its plant 100 x 100 ft.

The Leader Iron Works, Decatur, Ill., is completing extensive additions to its plant and installing considerable new equipment.

The Thomas & Clarke Company, Peoria, Ill., has awarded a contract for the construction of a factory building 110 x 125 ft., five stories and basement. The company is engaged in the manufacture of crackers, cakes and biscuit, for which purpose the most up-to-date equipment will be installed.

The Bar Clay Products Company, Zumbrota, Minn., has under construction between Zumbrota and Waukegan, Minn., on the Chicago, Milwaukee & St. Paul Railroad, a plant for the manufacture of clay products. The company will be in the market within the next 30 days for structural material and all necessary machinery for the equipment of the plant.

The Northern Iowa Power Company, Fort Dodge, Iowa, recently incorporated, will construct a hydroelectric power plant, contract for which will soon be let.

The Reiss Coal Company, Superior, Wis., has awarded a contract for the construction of a new boiler house to be equipped with four 125-hp. boilers.

The Thilmany Pulp & Paper Company, Kakauna, Wis., is preparing plans for the construction of a pulp mill.

Indianapolis

INDIANAPOLIS, IND., June 13, 1911.

The American Leather Products Company, Indianapolis, has been incorporated with \$20,000 capital stock to manufacture products of waste and scrap leather. The officers are E. E. Mitchell, president; M. Ross Masson, vice-president, and Ed L. Selvage, secretary-treasurer.

The Cartwright-Stevenson Mfg. Company, Indianapolis, has changed its name to the Sanitary Cooler Company.

W. W. Mooney & Sons, Columbus, Ind., who operate one of the largest tanneries in the country, are having plans prepared for a large plant at Elizabethtown, Tenn.

The Electric Welder Company has been organized at Kokomo, Ind., to manufacture electric welding machines. The directors are Jesse Jackson, F. M. Ruddell and Conrad Wolf.

The Court has directed J. J. Netterville, receiver for the Central Stove and Foundry Company, Anderson, Ind., to sell the company's property after three weeks' notice.

The Indiana Tie Company, Evansville, Ind., manufacturer of railroad ties, has increased its capital stock from \$113,000 to \$225,000. E. O. Hopkins is president of the company.

Harry W. Richter has been appointed receiver for the Michigan City Sash & Door Company, Michigan City, Ind., on petition of John J. Stevens, the company's president. The liabilities are given at \$100,000, and the assets \$40,000.

The Economical Generator Company, Montpelier, Ind., has been incorporated with \$5,000 capital stock to manufacture heat and power generators. The directors are B. W. Smith, T. C. Neal, I. H. Twibell, L. W. Rawlings and T. J. Driscoll.

W. C. Covington & Co. have been incorporated at Gary, Ind., as general contractors; capital stock, \$10,000. The directors are W. C. Covington, D. E. Baxter and O. L. Wildermuth.

The citizens of Cambridge City, Ind., having subscribed for \$60,000 of the capital stock, Bertsch & Co., machinists, have decided to decline liberal inducements to move their plant to other cities and will remain at the present location.

The Indianapolis, Chicago & Meridan Railway Company has been incorporated at Indianapolis, with \$100,000 capital stock, to build and operate an inter-urban road between Indianapolis and Chicago. The directors are John C. Billheimer, John A. Shafer, Howard Holton, M. B. Keller and M. J. Moreland. The general offices will be at Indianapolis.

The Commercial Club of North Manchester, Ind., has closed a deal for the location in that city of a concern engaged in the manufacture of wagon skeins. A factory will be built and put into operation as soon as possible.

The Rushville Furniture Company, Rushville, Ind., recently incorporated with \$30,000 capital stock, has completed plans for a factory building, 200 x 200 ft., two stories and a total floor space of 60,000 sq. ft. The company is in the market for modern wood-working machinery for the manufacture of furniture.

THE MACHINERY MARKETS

The South

LOUISVILLE, KY., June 13, 1911

Though business in general lines has been rather quiet the past week, a good demand has developed for mining equipment and contractors' machinery. The large number of big construction projects under way locally, many of them involving heavy consumption of reinforced concrete, has not only made way for a good demand for steel reinforcing bars, but also has created a call for equipment of various kinds. Refrigerating plants are also selling better than the average line.

A good deal of importance is attached to the development of zinc and lead deposits which have been located near Marion, Ky., in Crittenden County. The Eclipse Mining Company, in which Edward F. W. Kaiser, Louisville, is interested, has been mining fluor-spar in that section, and has lately installed a mill for the separation of the other metals. The Franklin Mining Company is the name of another concern which is beginning development work there, and several other companies are being organized for the purpose. Machinery dealers report the prospect of some considerable sales of equipment in this connection.

The Brandeis Machinery & Supply Company, Louisville, has installed three pumps of the Nye Steam Pump & Machinery Company for the Merrill-Ruckgaber Company, New York, which is constructing a reinforced concrete condenser pit for the Kentucky Electric Company. The capacities of the pumps range from 300 to 800 gal. a minute.

Plans have about been completed by T. S. Hamilton, mechanical engineer of the Mengel Box Company, Louisville, for the new factory to be erected by the company at Winston-Salem, N. C. The plant will cost \$100,000, and will be built of reinforced concrete. The machinery will be operated by electric motors, but no general power equipment will be required, as current will be purchased from a local central station. The wood-working machinery will be largely of special designs, and contracts for its construction will be let later on.

Edward T. Minor, of Louisville, plans the erection of a distilling plant at Bingen, La., at a cost of \$50,000.

The site for the coke plant of the Wisconsin Steel Company, in Harlan County, Ky., has been laid out by the engineers, and work on it will be begun at once. A force of 500 workmen has been concentrated for the job.

The Brush Creek Coal Mining Company, of which T. E. B. Siler, of Lafollette, Tenn., is president, has leased 400 acres of coal land in Knox County, Ky., and will install a large mining plant.

Samuel Bennett, Middlesboro, Ky., and H. B. Jones, Pineville, Ky., have begun the installation of equipment for a new coal mine in Harlan County, Ky., on the Wasioto & Black Mountain Railroad.

The Cincinnati Coopers Company has purchased a large tract of timber near Vi, Harlan County, Ky., and will erect a cooperage plant in the near future.

A stove mill of large dimensions is to be built near Harlan, Ky., by the Kentucky Stave Company, of which John B. Lewis is president.

O. S. Keys has purchased the gas plant at West Point, Ky., for \$2,000, taking it over from the defunct Indiana & Kentucky Bank of that city. Considerable improvements are planned.

The planing mill of the W. K. Hall Lumber Company, at Fulton, Ky., which was recently destroyed by fire, will be rebuilt. A lot of wood-working and power equipment will be required.

M. E. Thomas, Bowling Green, Ky., has patented a corn planter, and is planning the organization of a company with \$25,000 capital stock for the purpose of manufacturing it.

The Waterson Power Saving Company has been incorporated at Bristol, Tenn., with \$150,000 capital stock, with J. A. Dickey as president, B. K. Vance secretary and G. M. Turner treasurer. It plans the manufacture of a mechanical device.

F. R. Gamble & Co., have leased a building and will equip a garage and machine shop. Electric motors will be used for the operation of the machine tools.

New equipment will be installed in the plant of the Cookesville Roller Mills, Cookesville, Tenn., the capacity of the mill to be greatly increased. Thomas Allen is superintendent.

The plant of the Southern Lumber & Mfg. Company, Nashville, Tenn., which was destroyed by fire, will be

rebuilt, according to the announcement of President J. R. McElwaine. The company manufactures lumber, boxes and mantels.

The Tennessee Stove Company, of which reference to the increase in its capital stock was recently made, plans the installation of a department for nickeling stove fittings. The company's plant is at Chattanooga.

A 120-ton overhead traveling crane is to be installed in the addition to the machine shops of the Atlantic Coast Line Railroad, to be erected at Wilmington, N. C. The addition to the shops will be of steel frame construction.

Four boilers, air compressors and other equipment will be required by the Youngville Sugar Company, Youngville, La., which will spend \$100,000 this year in improvements which are expected to double the capacity of the plant. The contract for most of the equipment has been let to the Paine & Joubert Machine & Foundry Company, New Orleans.

The Lafayette Water & Light Company, Lafayette, La., is in the market for boilers, pumps and engines. Address W. L. Byres, superintendent.

Bids will be closed June 16 for a lot of new equipment to be required in connection with the new electric-light plant of Tupeles, Miss., for which R. C. Huston, of Memphis, is engineer.

A 30-year franchise for a water works and an electric-light plant is to be disposed of July 1 by the municipality of England, Ark.

A considerable amount of equipment is to be purchased by the Helena Electric & Gas Company, Helena, Ark. The engineers for the company are the Scofield Engineering Company, Philadelphia, Pa. The machinery to be purchased includes four 300-hp. boilers, three 500-kw. turbines and three 300-kw. rotaries.

The Illinois Central Railroad plans improvements in water works at McComb, Crystal Springs and Brookhaven, Miss. In addition to laying down a lot of pipe, a pump house will be erected at Crystal Springs.

The Caddo Window Glass Company, Shreveport, La., is in the market for power equipment, including a boiler, an engine and dynamo.

A refrigerating plant is to be installed by the Roseland Veneer & Package Company, Roseland, La. E. D. Wagnalls is secretary and treasurer.

St. Louis

ST. LOUIS, MO., June 12, 1911.

The machinery market shows no particular activity at the present time, though there is a good, steady business being done. It is not by any means up to the capacity of the dealers, who, however, believe that the necessities occasioned by depreciation spread over the long dull period which has prevailed will of themselves improve business before long. The inquiries that are coming seem to indicate a tentative preparation among manufacturers to put themselves in possession of the latest information, ready for any development that demand may put upon them, but no contracts are being made that are of particular importance.

The Metal Pole Post Company has been incorporated at Kansas City by C. A. Thompson, E. S. Winston and Sell J. Mead, with a capital stock of \$50,000. A plant is to be installed for the manufacture of a patent device, a substitute for wooden poles, posts, etc.

The What Cheer Mining Company, Joplin, Mo., has been incorporated with \$50,000 capital stock by H. Connelly, D. B. Perkins and F. L. Williams. A complete mining machinery outfit is among the plans of the new corporation.

The Kansas City Engine Works, Kansas City, Mo., has been incorporated by A. W. Calkins, J. E. Elliott and A. D. Elliott, with \$100,000 capital stock. The company will establish a plant for the manufacture of engines and also for repair work.

The Morgan, Woodson, Bahn Mfg. Company, St. Louis, has been incorporated by D. E. Morgan, W. C. Woodson and A. D. Bahn, and will establish a planing mill, as well as install other machinery for the manufacture of wooden building material.

The Leggett & Platt Spring Bed & Mfg. Company, operating three plants, one of them at Carthage, Mo., has decided to remove to Windsor, Ont., and to consolidate its factories there.

The University of Missouri, Columbia, Mo., has decided upon the construction this summer of a new engineering shop, which will be fully equipped with

THE MACHINERY MARKETS

machinery for the use of the students. The building will cost \$15,000 and the machinery as much more.

The Isolated Steam Heating & Maintaining Company, St. Louis, has been incorporated by Walter N. Fisher, John Schuiedding and Edward Schuiedding, to manufacture, install and to repair heating apparatus.

The Leeper Automobile Company, St. Louis, has been incorporated by Oscar W. Schmidt, Stewart B. Leeper and J. Leeper to manufacture automobiles and to operate a repair shop.

The Wrought Iron Range Company has closed its deal for a new site in the western part of St. Louis, and will remove thereto as soon as buildings can be constructed and equipped. The new plant will be much larger and equipped with much additional machinery. The tract to be covered by the buildings will be twelve acres. The plans for the new plant are now being worked out by architects.

The St. Louis Briquette Machine Company, St. Louis, with \$40,000 capital stock, has been incorporated by David R. Francis, James E. Rutledge, Gustave Komarek, Michael B. Nalon, John Scullin and Charles Gilbert to manufacture machinery of all kinds, but especially a patented machine for the compression of coal dust into merchantable briquettes.

The North Arkansas Power Company, Berryville, Ark., has been incorporated with \$100,000 capital stock for the establishment of a power plant at Berryville. The incorporators are J. R. Neff, E. H. Ingram, E. D. Munger and W. D. Wilton.

The Justrite Vacuum Cleaner Company, Bloomington, Ill., has been incorporated with \$25,000 capital by Lewis C. Walter, Burdette C. Gilmore and A. W. Rigby. A plant for the manufacture of vacuum cleaners will be installed.

The Eisenstadt Jewelry Company, St. Louis, has increased its capital stock from \$400,000 to \$1,000,000, the increase to be utilized in the extension of the manufacturing end of the business.

The Hannibal Milling Company, Hannibal, Mo., with \$60,000 capital stock, has been incorporated by George G. Dubach, O. M. Friend and A. K. Dubach. A new mill is to be built and equipped at once.

The John Deere Plow Company has purchased a lot of 40 ft. front adjoining its St. Louis carriage manufacturing plant, and will build and equip a four-story addition to its present structure for the manufacture of carriages, etc.

The Witwer Motor Car Company, with \$25,000 capital stock, has been incorporated at Kansas City, Mo., for the manufacture of motor cars, by Frank Witwer, J. D. Welsh and Louis E. Loechler.

The Barnes Mfg. Company, with \$25,000 capital stock, has been incorporated in St. Louis by E. R. Barnes, F. J. Bonskokski and E. W. Hughes. It will build its own plant.

The City Council of Herington, Kan., has engaged Burns & McDonnell, Kansas City, Mo., to make surveys and estimate the cost of increasing its waterworks system.

The Ohio Copper Company, Salt Lake City, Utah, will install additional equipment.

The Martin Machinery Company, Joplin, Mo., has completed plans for the erection of a machine and repair shop, 50 x 140 ft., one story, of reinforced concrete construction. The company will install a lathe, drill press, pipe machine, cutter, etc.

Western Canada

WINNIPEG, MAN., June 10, 1911.

Backward weather in the West revived the cautious temper the banking interests showed earlier in the season, but the present sunshine and the generally good crop news have dispelled hesitation in that quarter. Bank clearings are very considerably larger than they were in the corresponding weeks of last year. It is true banks keep to a rather close margin of accommodation, but this is rather because they have to prepare themselves for handling the biggest crop the country ever had than because they distrust the present trade movement.

The Grand Trunk Pacific Railway Company has come to an agreement with the City Council of Prince Rupert, B. C., on the subject of assessment and sundry other points. In consideration of a very nominal tax payment for the next 10 years, a company engages, among other things, to start work at once on a drydock to cost \$2,500,000, upon a station, machine car shops,

roundhouse, etc., to cost over \$1,000,000, and to build a hotel at a cost of \$1,000,000.

The Prince Rupert Hydroelectric Company, which will control the principal water powers in the vicinity of Prince Rupert, B. C., are about to offer for subscription in Canada \$2,500,000 of first mortgage 5 per cent. bonds, to be expended upon permanent installation.

It is reported that the Mackenzie & Mann interests are about to purchase the entire holdings of the Western Fuel Company in the Manaimo district of Vancouver Island, B. C., for \$4,000,000.

Up to June 26 tenders will be received by the Corporation of the city of Prince Albert, Sask., for the construction of power station superstructure and transmission line for part of the proposed hydroelectric power development at Lacolle Falls.

Up to July 11 tenders will be received at the office of the Commissioners of the Transcontinental Railway at Ottawa for the construction of car shops at Transcona, east of Winnipeg. Each tender must be accompanied by an accepted cheque for \$100,000.

There has been an unusual demand this spring for large power steam plows in the Canadian West.

It is now stated that the Gordon Wire & Wire Nail Works, of West St. John, N. B., will be located in Calgary, Alberta, and will employ from 75 to 100 men.

The Carter-Halls-Aldinger Company, Winnipeg, has received the contract to erect an addition to the tender and wheel shop of the Canadian Pacific Railway Company's Weston shops at Winnipeg. The new building will be 55 ft. x 220 ft.

The Farmers' Steel & Wire Company, Regina, Sask., will erect a six-story warehouse.

By-laws aggregating \$100,000, for waterworks and electric light, have passed the Council of Canora, Sask., and will shortly be submitted for approval.

Tenders addressed to W. L. Courson, general manager, will be received until June 26 for supply of hydroelectric equipment for the Canadian Collieries, Ltd., Dunsmuir, Puntledge River. Contract includes complete hydraulic and electric equipment, furnishing and installation of two direct-connected units, each unit developing 3750 kva. at switchboard. Plans at office of company, Pemberton Block, Victoria.

An unique scheme, as far as Canada is concerned, is being considered in Moose Jaw, Sask. The idea is to put up a large factory building, to be supplied with water, light and power, and to be subdivided into separate premises, these premises to be let to small manufacturers at low rents with electric light, power and water in such a manner as to enable them to work separately. A committee is working on the proposition, and they will try to induce companies who manufacture on a small scale, and patent holders whose capital does not permit them to establish large plants, to take up the idea.

Plans for a big steel plant on the outskirts of Vancouver, B. C., have taken definite form by the announcement of William Owen, an English steel expert, that he had purchased for the Canada Pacific Steel Company a 200-acre factory site at Pitt Meadows. Mr. Owen states that the company, organized by himself, is supported by London and New York bankers.

The Alberta Glass Company is being organized in Calgary for the purpose of building and operating a glass factory at Redcliffe, five miles from Medicine Hat. A. E. Cross and other Calgary men are the organizers.

John Stirrett, of Hymers, near Port Arthur, has applied to the Council of Port Arthur for permission to erect a sash and door factory in connection with his sawmill.

Recently it was announced that four large lumber companies, controlling ten mills in the Kootenay country, British Columbia, were amalgamating with a capital stock of \$20,000,000. The companies in the deal are the East Kootenay Mills, Rock Creek Mills, Standard Mills and Baker Mills, all near Cranbrook and Fernie, B. C. It is reported from Fernie that the concern will construct a sawmill at Baynes, on the Kootenay River, to cost \$400,000.

George Spearman, Wynyard, Sask., will rebuild his 75-bbl. flour mill which was burned recently.

The City Council of Medicine Hat, Alberta, has made an agreement with the Medicine Hat Milling Company, Ltd., to furnish the company with 150,000 cu. ft. of gas daily without charge for a period of five years, and will exempt the company from municipal taxation, except local improvement and school taxes, for a period of ten years. The company agrees to erect a plant to cost \$60,000.

THE MACHINERY MARKETS

Eastern Canada

TORONTO, ONT., June 10, 1911

Manufacturing activity, constructive operations and productive activity at the mines increase as the season advances. Each day seems to brighten the outlook and give further assurance to business men. Crop prospects are becoming an important influence upon competence. Predictions are freely made that the Western yield of wheat will be double that of last year. British favor seems to become stronger every year. Population and capital are being liberally supplied from the United Kingdom. There are some conditions that would ordinarily exert a depressing effect upon trade, but they are not getting any attention from that quarter at present. One of these is the talk of a general election in the autumn. In the present Parliamentary recess leading politicians of both parties are touring the country and addressing public meetings. The reciprocity agreement is not causing anybody to refrain from buying. Skilled labor continues to be scarce, though of rough labor the railway contractors report a fairly good supply. Competition is keen, but Canadian manufacturers seem to have no trouble in finding customers for their output. German activity on this market is greater than it was, and there is a feeling that German commercial interest in Canada is just beginning.

The Hurndall Furniture Company's factory at Orangeville, Ont., was destroyed by fire on June 9. The loss is estimated at \$50,000 and is partly covered by insurance.

The Canada Refining & Smelting Company has begun the operation of its smelter at Orillia.

L. K. Comstock & Co., New York, have received the contract to install the heating and lighting plants in the new buildings of the General Hospital at Toronto, the price being \$124,910. This was \$12,484 below the lowest local tender put in.

It is reported that the Dominion Coal Company will add very largely to its plant at Springhill mines, where work has finally been resumed in a peaceful way, the long strike having been settled.

The City Council of Hamilton, Ont., has under consideration a proposal to establish a municipal power and lighting plant. The power expert to whom the question of preparing a preliminary plan has been submitted reports that the cost will be \$502,000. A by-law will be submitted to the ratepayers for authority to raise this sum and apply it to the building of the plant.

Canada's trade commissioner in New Zealand reports that Canadian automobile manufacturers are getting a grip on the market there. In the year ending this month one Canadian firm has sold 320 motor cars in New Zealand.

The Imperial Mfg. Company, which is stated to be an outgrowth of Hesch Bros., Warren, Pa., is erecting a factory at Welland, Ont. Hardware specialties are to be made there.

The town of Welland will spend \$75,000 to increase the capacity of its waterworks.

W. P. McNeil & Co., Ltd., New Glasgow, N. S., have undertaken contracts aggregating \$400,000, for almost immediate erection. Among the large steel erecting contracts this firm has secured are a new forge and machine shop for the Nova Scotia Steel & Coal Company, at New Glasgow, a rail finishing mill building for the Dominion Steel Company, at Sydney; also offices for the same company at Sydney; a new forge and machine shop for the Canadian Car Company, at Amherst; a shipping pier and conveyor for the Nova Scotia Steel & Coal Company, at Wabana, Newfoundland, highway bridges for the New Brunswick government, at Bloomfield Station and Tracey Station; highway bridges for Nova Scotia government at Shubenacadie and a number of other points, including the immense new bridge across Wallace Harbor; large railway bridges on the Dominion Atlantic and National Transcontinental railways.

It is rumored that an English syndicate has bought out the Eddy Company's great system of industries on the Hull side of the Ottawa River, opposite Ottawa City.

A group of Montreal capitalists headed by Rudolphe Forget, M. P.; J. N. Greenshields, K. C., and Clarence J. McCuaig have concluded arrangements to purchase over 1100 sq. miles of timber lands in the St. Maurice River district, Quebec. They have also acquired the large timber and sawmill of Alexander Baptist, Three Rivers. Arrangements have been made for the formation of the Wayagamack Pulp & Paper Company, with a capital stock of \$5,000,000. On an island at the mouth

of the St. Maurice River a large pulp and paper plant will be erected which, at the outset, will have a capacity of 100 tons of pulp and 50 tons of paper. This first unit will be in operation by next fall, but it is the intention to immediately proceed with the installation of a further 50-ton unit for paper, and this second unit will be in operation by the spring of 1912. It is understood that the new company will devote the paper plant almost entirely to the manufacture of what is known as "kraft" paper.

Plans are being prepared by W. W. Doane, City Engineer, Halifax, N. S., for a municipal sewer system to cost \$98,000.

The Canadian Pacific Railway Company, Montreal, has under consideration plans for the construction of a 500-ft. bridge at Graham Station, Ont.

Tenders addressed to F. F. Spence, chairman of the Board of Control, will be received until June 20 for the construction of a steel span crossing the tracks of the Canadian Pacific Railway at Weston road.

Plans are prepared for additions to the plant of the National Mfg. Company, Brockville, Ont.

Tenders are to be called for the erection of a factory for the Zimmerman Mfg. Company, Hamilton, Ont., the cost to be \$25,000.

The Standard Sanitary Mfg. Company, Hamilton, is about to put up a new building, to cost \$40,000.

The National Hardware Company is putting up a factory at Orillia, Ont.

The Oliver Plow Company, Hamilton, Ont., has awarded the contract for an additional factory building to cost \$15,000 and for an office building to cost \$40,000.

Up to August 1 tenders will be received by W. P. Kellett, Brantford, Ont., for the construction and equipment for the Brantford & Port Dover Railway, 30 miles in length. Steel towers are to be included, as also five large bridges.

Up to August 1 tenders will be received by J. Robinson & Sons, Niagara Falls, Ont., for the following electrical equipment: Lathe, drill press, shaper, electric rectifier.

The Getty & Scott Shoe Company and the Galt Paper Box Company, both of Galt, Ont., are now operating their plants with power supplied by the Hydro-Electric Commission.

It is expected that the Independent Tire Company will begin the construction of its plant in Guelph, Ont., early next month.

H. W. Bagnall, Ottawa, has returned from New York, where he is reported to have been successful in forming a company with a capital stock of \$500,000 to manufacture a mine drill that has been patented by Charles Demerais, Hull, Quebec. It is proposed to build the factory in Hull at a cost of \$100,000 and also to manufacture the implement in the United States.

The Standard Underground Cable Company, Perth Amboy, N. J., has completed plans for its Canadian branch plant, which is to be built at Hamilton, Ont. The building will be of "L" shape, 300 x 60 x 150 x 60 ft., three stories, of brick and structural steel construction.

The Yale & Towne Mfg. Company, having received from the citizens of St. Catharines, Ont., a concession granting nine acres of land with free water and a fixed schedule of taxation, will establish its Canadian branch plant in that city, initial factory building to cost \$50,000.

The Pacific Coast

PORTLAND, ORE., June 8, 1911.

While the machine tool market is, on the whole, in satisfactory shape, there is no unusual feature at present, few purchases being of individual importance. Machine shops here and on Puget Sound are getting a very satisfactory volume of business, marine repairs being quite an important feature, as for some time past.

Local building operations continue extremely active, and a large amount of contractors' equipment is being used in this connection, in addition to which there is a good demand for small power and heating plants for the larger buildings. Contractors' goods are also in strong demand in connection with numerous development and irrigation projects through the interior of Oregon and Washington. Manufacturers and dealers in logging equipment have found business a little below normal for this season, though there is a fair demand for miscellaneous supplies in this line. The demand for sawmill and woodworking machinery is confined for the

THE MACHINERY MARKETS

most part to small orders, though several complete mill outfits have been sold of late, and equipment will probably be required for several new projects during the summer. Notwithstanding the quietness in the lumber trade, quite a number of large timber owners are going ahead with plans for development. There has been considerable work on dredging equipment this spring, and arrangements are being made for the construction of several new dredges for service in various parts of Oregon. Several shops are still busy on mining machinery for Alaska, and heavy shipments are now being made to Nome and St. Michael.

Bids will be received by the city of Portland June 13 for 200 fire hydrants.

The Puget Sound Iron & Steel Works, Tacoma, Wash., has completed the installation of a steel converter, and is now ready for business in any kind of steel castings.

It is reported that the Moran Company, Seattle, Wash., has completed financial arrangements for the construction of a floating steel drydock, to accommodate vessels up to 15,000 tons.

A project is under way at Tillamook, Ore., to build a small hydraulic suction dredge, to cost about \$50,000, for harbor improvements.

Major J. F. McIndoe, United States engineer in charge of river and harbor work in Oregon, is now in Washington on business connected with the building of two large suction dredges for service on the Columbia and Willamette rivers. It is understood that they will be built on the design of the dredge Columbia of the Port of Portland.

The Government navy yard at Bremerton, Wash., will shortly do considerable work on the cruiser Pennsylvania. The tubular masts are to be replaced by modern military masts, the ventilators are to be lowered and the machinery is to be overhauled.

The commissioners of Yakima county, Wash., have ordered the purchase of a steam shovel at not over \$3,700.

An election was held June 6 at Ellensburg, Wash., to decide on the installation of a municipal water system, with a pumping capacity of 4,000,000 gal. daily.

The Case Furnace Company, Tacoma, Wash., will build a new factory at West Tacoma the coming fall. John Shetterly & Son are planning to build a sawmill and planing mill near Lyons, Ore., with a daily capacity of 25,000 ft.

The city of Vancouver, B. C., will be in the market shortly for a trenching machine.

The Sectional Threshing Cylinder Company, Spokane, Wash., will put up a new factory at Dishman, Wash.

J. W. Small, A. B. Crosier and A. N. Foss have purchased a sawmill at Montesano, Wash., and will put in a lot of additional machinery.

The British Columbia Lumber Corporation, Vancouver, B. C., is starting construction on a new sawmill, with a daily capacity of 200,000 ft., on Lulu Island, New Westminster, B. C. A shingle mill, planing mill and box factory will also be installed, the entire plant being operated by electricity. The engineering work is being superintended by Arthur Pracna, Seattle, Wash.

Caldwell Bros., Tacoma, Wash., have the contract for installing a power plant in Rhodes Bros.' new department store in that city.

The A. J. West Lumber Company, Aberdeen, Wash., has put in a new planing mill, with a Berlin band resaw and several other machines of this make.

E. M. Stephens is promoting a company for the installation of a sawmill, sash and door factory at Monroe, Wash.

The Branch Saw Works, St. Louis, Mo., has opened an office at 542 First avenue South, Seattle, Wash.

J. O. Bradney, representing the Clark Bros. Company, Belmont, N. Y., manufacturer of sawmill machinery, is now in Seattle, Wash., and expects to remain on the coast through the summer.

The Meixner Hydro-Gravity Pump Company has been incorporated at Spokane, Wash., with a capital stock of \$100,000, by T. Meixner, B. C. Clausen and A. L. Hooper.

The Auto Gas Engine Starter Company has been incorporated at Olympia, Wash., with a capital stock of \$1,000,000, by Allen Weir, P. English and W. C. Tedlie.

The Doernbecher Mfg. Company, this city, is installing a new chair factory, for which a lot of machinery has been ordered.

Considerable interest is being taken in the installation of a gas-producer plant by the Seattle, Wash., Gas

Engine & Machinery Company in the auxiliary barkentine Archer of the Tacoma & Roche Harbor Lime Company. The plant will produce gas for a 300-hp. Nash marine gas engine.

Texas

AUSTIN, TEXAS, June 10, 1911.

Dry weather still prevails throughout the State and the corn crop has deteriorated materially the past week. Business in all lines, however, is reported to be very satisfactory. Machinery dealers are receiving an increase of orders and hopes are entertained that the general conditions will continue to improve. Orders for mining and other machinery in Mexico are beginning to be placed with American concerns now that the political troubles in that country have subsided.

The Austin Gas Light Company will erect a new generator house, with elevator, tower and engine at Austin. The cost of the improvement will be about \$12,000.

The El Paso & Southwestern, the Galveston, Harrisburg & San Antonio, the Atchison, Topeka & Santa Fe and the El Paso Electric Railway Company have entered into an agreement with the City Council of El Paso to construct a steel viaduct on the county road at old Fort Bliss. The structure will be 641 ft. long and 37 ft. wide.

John Faulkner, of Hutchinson, Kan., will install a 10-ton ice plant at Canadian.

The City Council of Henrietta has taken preliminary steps toward developing a water supply for the water-works system. A dam will be constructed and a lake created.

The Frantz Buckle Company has been organized at Weatherford, with a capital stock of \$20,000. The incorporators are E. A. Frantz, Hugh McCrattan and J. L. Hill.

The Woodward Water Company, Woodward, has been formed with a capital stock of \$10,000. The incorporators are M. Bargas, John M. Fentiman and M. B. Stewart.

La Lomita Irrigation Company, Brownsville, will construct a system of irrigation in the lower valley of the Rio Grande. The incorporators are James W. Hoyt, Arvid Franke and C. R. Scott.

Stone & Webster, engineers, Boston, Mass., who are constructing the interurban electric railroad between Houston and Galveston, 51 miles, have let the preliminary contract for the combination machine shop and car shed, to be located in Houston. The building will be of brick construction and will be duplicated later at Galveston by the company.

The Orange Lumber Company is moving its sawmill from Orange, Texas, to Merryville, La. Many important improvements will be made to the plant, including the construction of concrete tramways. The Southern Construction Company, Orange, has the contract for constructing seven concrete dry kilns.

W. T. Caswell, Austin, and associates who recently purchased the cotton compress of the San Marcos Compress Company at San Marcos, will make important improvements to the plant.

J. B. Folmar, Gause, contemplates installing a creamery at Hearne.

Otto Borchers, Cuero, and associates are preparing to establish a new town near Palacios.

The Commercial Club here is promoting the installation of a canning factory at Wharton.

The Sealy Oil Mill & Mfg. Company, which was recently formed with a capital stock of \$35,000, has taken steps for the erection of the plant at Sealy. W. M. Moore is president of the company.

The Gulf Coast Brick & Tile Company will install a large quantity of tile-making machinery at its plant near Brownsville.

The Merchant's Ice & Cold Storage Company, San Antonio, will double the capacity of its 85-ton ice plant. It is making other extensive improvements.

The Kansas City, Mexico & Orient Railroad will establish a large car and machine shop at Hanlin.

C. A. Malone will build a cotton gin at Plainview.

The Gulf, Colorado & Santa Fe Railway Company will soon call for bids for the construction of a 16-stall brick low-type engine house, equipped with a new 85-ft. turntable, estimated to cost \$46,000; a brick storehouse, \$17,000; brick machine shop and blacksmith shop combined, \$9,500; brick powerhouse, \$6,200; brick sand house, \$6,000. Other improvements, including steel water tanks and necessary pipe lines in the

THE MACHINERY MARKETS

Galveston yards, will be made. Frank Merritt is chief engineer, Galveston.

The City Commissioners of Dallas have opened bids for the furnishing of boilers, compressors and other appliances for the handling of six wells that the city is to use in the business section. Four 30-in. gate valves are to be used in this work and their cost is to be taken from the following bids: Smith & Whitney, \$330 each; Rensselaer Valve Company, \$230 each; Ludlow Valve Company, \$330 each; Chapman Valve Company, \$440 each; Crane Company, \$1,345 for the four.

The Shade-Fowler Mfg. Development Company expects to erect a factory in San Antonio for the purpose of manufacturing automobile wheels. J. O. Howard, of San Antonio, is president of the company, and E. L. Farnsworth, of Waco, secretary.

The Urton Lake, Land & Water Company will construct a large system of irrigation near Fort Sumner, N. M. It purposes to reclaim about 50,000 acres of land. Its project will be combined with those of the Pecos Land Company and D. J. McCanne.

Charles D. Miller, territorial engineer, has approved the application of Andrieus A. Jones for water rights for a proposed system of irrigation in Guadalupe County, New Mexico. The application of L. A. Hughes and G. W. Prichard for use of the water of the Rio Grande at Cochiti, N. M., for operating a large hydroelectric plant has also been approved.

It is announced that the Southwestern Sugar Company, following the erection of its large beet-sugar factory at Portales, N. M., will erect a similar factory at Melrose, N. M. The company has signed up contracts for about 32,000 acres of sugar beets to be grown this season. May irrigation pumping plants will be installed upon these farms.

J. A. Huston, Carthage, Mo., who purchased the cotton gin at Loving, N. M., will double the capacity of the plant.

The Mexican Eagle Petroleum Company, City of Mexico, has placed an order with the Petroleum Iron Works, Sharon, Pa., for the erection of 50 steel oil storage tanks, each of 55,000-barrel capacity, to be put up at different points on the pipe line between Tuxpam and Tampico.

The Waters-Pierce Oil Company will enlarge the paraffin plant at its oil refinery at Tampico, Mexico, to five times its present capacity.

H. W. Felton, of Mazatlan, Mexico, and associates will install machinery and develop extensive coal properties near Cosala, State of Sonora, Mexico.

Government Purchases

Washington, D. C., June 12, 1911.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids July 8 for auxiliary power plant equipment for the Mare Island Navy Yard, Cal.

The Commissioners of the District of Columbia, Washington, opened bids June 5 for furnishing one traveling crane for the McKinley Manual Training School, Washington, as follows:

Reading Crane & Hoist Works, Reading, Pa., \$525; Whiting Foundry Equipment Company, Harvey, Ill., \$750; Brown Hoisting Machinery Company, Cleveland, Ohio, \$990; National Electrical Supply Company, Washington, D. C., \$539; Curtis & Co. Mfg. Company, St. Louis, Mo., \$616; New Jersey Foundry & Machine Company, New York, \$1,140; O. M. S. Company, Plainfield, N. J., \$315; Barber & Ross, Washington, D. C., \$600.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids June 3 for furnishing one locomotive for yard service at the Navy Yard, Portsmouth, N. H., as follows:

American Locomotive Company, New York, \$5,200 and \$4,750; Baldwin Locomotive Works, Philadelphia, Pa., \$5,500; Vulcan Iron Works, Wilkes-Barre, Pa., \$4,865; H. K. Porter Company, Pittsburgh, Pa., \$4,845.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids June 5 for constructing two electrically operated floating cranes complete, as follows:

Bergen Point Iron Works, Bayonne, N. J., \$627,676 and \$618,230; Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$579,218; Wellman-Seaver-Morgan Company, Cleveland, Ohio, \$593,000; Newberry & Diamond, New York, \$1,100,000.

The Fitz Gerald and Bennie Laboratories, Niagara Falls, N. Y., announce the removal on or about June 15 of their offices and laboratories from the Jewett Block, Falls street, to Highland and Whirlpool avenues. The new location will afford greatly enlarged and improved facilities for their work.

Trade Publications

Pressure and Storage Tanks.—William D. Searle & Sons Company, Pittsburgh, Pa. Pamphlet. Concerned with a line of pressure and storage tanks for liquids and gases which can be supplied with riveted or welded joints. Both types of tanks are made from basic open hearth steel in sizes ranging from 60 to 550 gal.

Drill Chucks.—The Jacobs Mfg. Company, Hartford, Conn. Catalogue. Size, 6 x 9 in.; pages, 34. Concerned with the Jacobs improved drill chuck which is made in six sizes and nine styles. This chuck is of the three-jawed shanner sleeve type to which the key adjustment of the two-jawed type has been added. All of the different sizes of chucks are illustrated and brief specifications are given on the facing pages.

Pompton Pink Granite.—J. Harper Bonnell, 1133 Broadway, New York, N. Y. Budget of testimonial letter and picture post cards relating to a granite of pink, green and black blended, obtained from a quarry at Pompton Junction, N. J.

Coal and Ash Handling.—Guarantee Construction Company, 140 Cedar street, New York City. Pamphlet. Points out the advantages of using mechanical systems for handling and storing coal and ashes in power plants and shows a number of installations of plants made by this company.

Ball Bearings.—International Engineering Co., 1779 Broadway, New York City. Catalogue. Size, 6½ x 9½ in.; pages, 67. Gives general description and specification for the R. B. F. ball bearings which are made in the radial and the thrust styles. The different types of bearings are illustrated and directions for mounting them given.

Foot Presses.—The Manville Brothers Company, 25 Benedict street, Waterbury, Conn. Catalogue. Illustrates a number of different types of presses designed to be operated by a foot treadle. These include presses of the regular and pendulum lever type, two styles for covering buttons and hammer and eyelet punches.

Machinery and Mill Supplies.—The Cameron & Barkley Company, Charleston, S. C. Catalogue D. Size, 6 x 9 in.; pages, 1143. This is the company's 1911 catalogue describing and illustrating a complete line of machinery and supplies for oil mills, phosphate mines, fertilizer factories, railroads, contractors, machinists, plumbers, etc. All of the lines handled are those of standard manufacturers and the illustrations are numerous and are supplemented by tables of dimensions in the case of small parts, such as valves, fittings and elevator buckets, and brief descriptions and tables of specifications of the larger machines. A 36-page alphabetical index and a 5-page numerical index of figure numbers enable any article to be easily and quickly located. A number of tables of useful information complete the catalogue.

Recording Instruments.—The Bristol Company, Waterbury, Conn. Two bulletins, No. 146-A, superseding No. 146, deals with a long distance recording tachometer for measuring the revolutions of shafting and machinery and recording it at a distance without employing expensive electrical apparatus. No. 147-A describes the Bristol-Durad radii averaging instrument for circular chart records which is illustrated in *The Iron Age*, June 30, 1910.

Gas Engines.—Mesta Machine Company, Pittsburgh, Pa. Pamphlet. Treats of a horizontal double-acting four-cycle gas engine which is built in either single or twin tanaem units. The construction of the engine is described at length and there are a number of half tones showing installations. A comparison of the heat losses occurring in steam and gas plants having a capacity of 1000 kw. completes the pamphlet.

Hand Bending Tools.—D. A. Hinman & Co., Sandwich, Ill. Catalogue. Relates to the use of hand bending tools for round and angle stock. These tools include three sizes of eye benders and a ring and a hinge bender. They are all illustrated and there are a number of views of the work turned out by them. Space is also given to a sheet metal shear for handling No. 14 iron or soft steel.

Electric Motors.—Crocker-Wheeler Co., Ampere, N. J. Three Bulletins. No. 128 superseding No. 85, deals with the form W motor for rolling mills and other severe service. No. 129, superseding No. 76, pertains to the line of direct current crane and hoist motors which this company manufactures. No. 132, superseding No. 120, describes and illustrates the form I machines which can be used for belt drive. In all of these bulletins the construction of the different motors is described at length and there are a number of engravings showing various applications of them.

Railway Supplies.—U. S. Wind Engine & Pump Company, Batavia, Ill. Catalogue No. 17. Size, 5½ x 8 in.; pages, 180. Covers a complete line of railway supplies including water columns and accessories, pumping machinery, switch stands and signals.

Wheel Presses.—E. R. Caldwell & Co., 34-84 Hilton street, Bradford, Pa. Catalogue. Points out the advantages of using the Caldwell hydraulic wheel press which is made in 29 sizes having capacities ranging from 50 to 400 tons. The construction of the machine is described and the engravings show it equipped for either belt or motor drive. A table of the various sizes of press with a number of the principal dimensions is given and a partial list of users complete the catalogue.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Rebbed Iron:		No. 22 and 24.....	per lb 5.75c	Straits Pig.....	per lb 49 @ 49 1/2c
1 1/2 to 1 3/4 in. round and square.....		No. 26.....	per lb 6.25c		
1 1/2 to 1 3/4 in. X 3/4 to 1 in.		No. 28.....	per lb 7.25c		
Rods 1 1/2 and 1 3/4 in. round and square.....		Corrugated Roofing—		Copper—	
Angles.....		2 1/2 in. corrugated.....	per lb 8.50	Lake Ingot.....	per lb 14 @ 14 1/2c
3 in. X 1 1/2 in. and angles.....		No. 24.....	per lb 8.50	Galv. electrolytic.....	per lb 13 3/4 @ 14 c
3 in. X 1 1/2 in. and 1 3/4 in.		No. 26.....	per lb 8.50	Casting.....	per lb 13 3/4 @ 14 c
1 1/2 to 2 1/2 in. X 3/4 to 1 in.		No. 28.....	per lb 8.50	Spelter—	
1 to 1 1/2 in. X 3/4 to 1 in.		Tin Plates—		Western.....	per lb 6 1/4 @ 6 1/2c
3 in. X 1 1/2 in.		American Charcoal Plates (per box)		Zinc—	
3 in. X 1 1/2 in.		A. A. A. Charcoal:		No. 9, base, castles.....	per lb 7 1/4 Open... per lb 8 1/4c
3 in. X 1 1/2 in.		I.C. 14 x 20.....	\$6.65	Lead—	
3 in. X 1 1/2 in.		I.X. 14 x 20.....	7.90	American Pig.....	per lb 5 @ 5 1/4c
3 in. X 1 1/2 in.		A. Charcoal:		Bar.....	per lb 6 1/4 @ 6 1/2c
3 in. X 1 1/2 in.		I.C. 14 x 20.....	\$5.60	Soldier—	
3 in. X 1 1/2 in.		I.X. 14 x 20.....	5.70	1/2 & 1/2 guaranteed.....	per lb 27 1/2 @ 28 c
Tees:		American Coke Plates—Bessemer—		Rebbed.....	per lb 25 1/2 @ 26 c
1 1/2 in.		I.C. 14 x 20.....	\$4.50	Prices of Soldier indicated by private brand vary	
1 1/2 to 2 1/2 in. X 3/4 to 1 in.		I.X. 14 x 20.....	5.50	according to composition.	
1 1/2 to 2 1/2 in. X 3/4 to 1 in.		American Terne Plates—		Antimony—	
1 1/2 to 2 1/2 in. X 3/4 to 1 in.		I.C. 20 x 28 with an 8 lb. coating.....	\$8.70	Cookson.....	per lb. @ 10 1/2c
1 1/2 to 2 1/2 in. X 3/4 to 1 in.		I.X. 20 x 28 with an 8 lb. coating.....	10.70	Other Brands.....	30a 31c
Beams.....		Seamless Brass Tubes—		Bismuth—	
Channels.....		List November 13, 1908.....	Base price, 18c	Per lb.....	\$2.00 @ \$2.25
Rounds.....		Brass Tubes, Iron Pipe Sizes—		Aluminum—	
Bards.....		List November 13, 1908.....	Base price, 18c	No. 1 Aluminum (guaranteed over 99% pure), in	
Borden's "Best" Iron, base price.....		Copper Tubes—		ingots for remelting.....	21c and 23c
Borden's "H. B. & S." Iron, base price.....		List November 13, 1908.....	Base price, 21c	Rods & Wire.....	Base Price 31c
Norway Bars.....		Brazed Brass Tubes—		Sheets.....	Base Price 33c
Merchant Steel from Store—		List February 1, 1911.....	19 1/2c per lb	Old Metals—	
Bessemer Machinery.....		High Brass Rods—		Dealers' Purchasing Prices Paid in New York.	
Toe Calk, Tire and Sleigh Shoe.....		List February 1, 1911.....	14c per lb	Copper, heavy and crucible.....	10.50 to 10.75
Best Cast Steel base price in small lots.....		Roll and Sheet Brass—		Copper, heavy and wire.....	10.25 to 10.50
		List February 1, 1911.....	14c per lb	Copper, light and bottoms.....	9.25 to 9.50
		Brass Wire—		Brass, heavy.....	7.00 to 7.25
		List February 1, 1911.....	14c per lb	Brass, light.....	5.50 to 5.75
		Copper Wire—		Heavy machine composition.....	9.00 to 9.25
		Base Price,.....	Carload lots mill 13 1/4c	Clean brass turnings.....	6.75 to 7.00
		Copper Sheets—		Composition turnings.....	7.75 to 8.00
		Sheet Copper Hot Rolled, 16 oz. (quantity		Lead, heavy.....	3.75
		lots).....	per lb 18c	Lead, tea.....	3.50
		Sheet Copper Cold Rolled, 1c per lb advance		Zinc, scrap.....	4.00
		over Hot Rolled.....			
		Sheet Copper Polished 20 in. wide and			
		under, 1c per square foot.....			
		Sheet Copper Polished over 20 in. wide, 2c			
		per square foot.....			
		Polished Copper, 1c per square foot more			
		than Polished.....			

NICHOLSON

Granted that just ONE mechanic in your shop can save from ten to twenty minutes time per day through the use of NICHOLSON FILES—how great will be the saving when from fifty to one hundred or more men "get busy" with the fast cutting

NICHOLSON?

NICHOLSON
U.S.A.

Nicholson File Company
Providence, R. I.

THE IRON AGE

Established
1855

New York, June 22, 1911

VOL. 87: No. 25

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
H. A. Mekeel,	-	-	-	-	First Vice-President
Harold S. Butenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Further Improvement.....	1497
Idle Steel Mills Resuming Operations.....	1497
The Business Outlook.....	1498
The Economic Crime of Increasing Productive Capacity.....	1498
The Two Influences in Machinery Buying.....	1499
Open-Hearth Furnace Capacities.....	1499
Drafting Room Expense.....	1500
Correspondence	1500
Coke Oven Gas in Open Hearth Furnaces.....	1501
Direct Current of 1500 Volts for a Railroad.....	1501
The Brussels International Conference.....	1501
The Philadelphia Foundry Foremen.....	1501
The Iron and Metal Markets.....	1502 to 1512
The Mining Engineers' Fall Meeting.....	1512
Obituary	1513
Personal	1513
Geo. W. Jackson's Fabricating Plant to Be Sold.....	1513
Judicial Decisions of Interest to Manufacturers.....	1514
Foundry Coke.....	1515
A 35-Ton Electric Locomotive.....	1515
Forty Years' Progress in Pig Iron.....	1516
Mount Savage Firebrick Plant to Enlarge.....	1517
Atlantic City Railway Convention Exhibits.....	1518
Repair Equipment for Engine Houses.....	1519
Machine Tool Work Disturbed by Jarring of Other Machinery.....	1519
Scientific Management.....	1520
Edison Giant Roll Patents Sustained.....	1520
A New Punching Machine Control.....	1521
A Museum of the Wire Industry.....	1522
Oscillating Sand Sifter.....	1525
Gary 60-inch Universal Plate Mill.....	1526
The American Boiler Manufacturers' Meeting.....	1530
Promotion of Engineering Education.....	1530
New Indicating Boiler Flow Meter.....	1531
A Mechanical Coke Quencher.....	1531
The Steel Corporation Investigation.....	1532
Lake Superior Ore Explorations.....	1533
The Küppers Gas Producer.....	1534
Needed Standard for Sheet Steel.....	1535
Air Compressor Regulation.....	1536
Lake Superior Mining Curtailment.....	1537
Thermits	1538
The Ohio Workmen's Compensation Law.....	1539
Safety Devices for Iron Mine Workmen.....	1539
The Machinery Market.....	1540 to 1547
Government Purchases.....	1548
Trade Publications.....	1548

Further Improvement

Idle Steel Mills Resuming Operations

Wire Products Reduced \$2 Per Ton

An improvement in demand is quite unusual in June and hence this year's developments are highly gratifying. The volume of business is increasing, being larger in nearly every branch of the iron trade, including pig iron. The prices now being made are evidently proving attractive to buyers. The bookings of the United States Steel Corporation are steadily increasing, and this week its steel plants are operating to fully 66 per cent. of their ingot capacity, against 63½ per cent. last week, being the best showing made for two months.

A feature of the current pig iron market is the disposition of large consuming interests to buy under cover. This has been noteworthy in practically every iron center. The inference is naturally strong that the large buyers desire to avoid reports of their purchases becoming public and thus having an effect on prices, as the pig iron market is exceedingly sensitive and news of heavy buying would speedily cause sellers to ask more money. These consumers have won out in their long struggle to get Southern No. 2 foundry iron down to \$10, Birmingham. The producers made a stubborn stand when \$11 was reached on the downward move, and from that point they have given way very gradually, only a few cents at a time. Other foundry irons have of course been affected to some extent by the settling of Southern iron.

Prices of wire rods, wire nails and fence wire have been reduced \$2 per ton, effective June 21. Prices in these lines are now back to the level of last January. This readjustment brings prices of wire products more in line with the new prices of bar products.

An indication of the improved condition of the steel trade is shown in the starting up of the steel plant and rail mill of the Tennessee Coal, Iron & Railroad Company at Ensley, Ala., last Monday. The plant resumes operations with sufficient orders booked to assure operations until September 1, before which time other work will undoubtedly be secured. Next week the Carnegie Steel Company's rail mill at Youngstown, Ohio, will start on rails, which it has not made for several months, and will roll open-hearth rails for export.

The improved condition of the steel trade is further shown by the increase in specifications on contracts. The rail and billet sales department of the Carnegie Steel Company, for instance, reports orders for rails, billets and sheet bars sent to its mills for rolling up to and including June 20 exceeded the same period in May by 28,000 tons. Eastern Pennsylvania steel works are feeling the improved demand as well as those at Pittsburgh and further west.

An interesting incident of the week was a contract

for 50,000 tons of steel car material, consisting of shapes and plates, which was placed by the Canadian Car & Foundry Company with the United States Steel Products Company. It is stated that the Canadian company has orders for all the steel cars it can possibly turn out for months to come. Good orders have also been received from Canada by other American companies for skelp, billets, etc.

About 10,000 tons of large structural work has been placed in the New York district in the past week, including 2300 tons for the Cuyler Realty Building, 3500 tons for railroad bridge work and several contracts for apartment houses and other buildings. The Lackawanna Steel Company will furnish the 5000 tons of steel for the telephone building for which the fabricating contract was placed some time ago.

Among the rail orders for which contracts were taken were 10,000 tons of 90-lb. open-hearth for the Great Northern and 4800 tons for the Kansas City Southern.

The sale is reported of 500,000 tons of low-grade Lake Superior non-Bessemer iron ore to the Bethlehem Steel Company for delivery extending over a period of 10 years.

Pig tin has receded from its high point and is now 2 cents per pound cheaper, the market apparently returning to a more normal condition. In the past two weeks the sales of copper are reported to have been the heaviest in any fortnight this year. Lake copper sold up to 12.90 cents. Spelter and lead are both higher. Spelter has advanced \$4.50 to \$5 per ton within the week.

The Business Outlook

Confidence is expressed, even in conservative circles, that this fall will bring a decided change for the better. For some time the impression has been strengthening that the worst of the recession in business has been seen and that the shrinkage in consumption or in purchases is not likely to extend much further. Our market reports last week showed that even Pittsburgh, which has so long been in the depths of despondency, has begun to take a more cheerful view of the situation. In the steel trade the recent reductions in prices, instead of causing buyers to hold off for further concessions, have been accepted by important consuming interests as marking a fairly firm level on which to base their arrangements for not only immediate requirements but for some little time in the future.

Looking beyond the limits of the iron and steel trades much has recently happened to give business men encouragement in forecasting conditions for the last half of the year. Our agricultural interests are in most promising shape. The wheat crop bids fair to surpass anything previously harvested. The prospect for corn was never better. The cotton crop appears likely to establish a new record. All other products of the farm, except possibly hay, are promising a most abundant yield. The acreage under cultivation in this country in every line is much in excess of that of any previous year, so that even though deterioration has been or may be experienced in some localities the total for the country will be more than satisfactory. The great basis of the prosperity of this country thus seems to be well established. The railroads may expect to have an enormous traffic in the transportation of agricultural products, while the farmers will be assured of a retention of the splendid purchasing power which has made them

such excellent customers for all kinds of manufacturers of merchandise.

That the country has steadily been getting into better financial shape is shown by the very satisfactory condition of our foreign trade, our excess of exports over imports for the eleven months ended with May standing at \$501,759,316, which surpasses any recent period of eleven months except that ended with May, 1908, immediately after the panic. Our credit abroad has thus so greatly improved that we are more likely to import than to export gold. Perhaps never before were our financial interests in better shape to handle the marketing of the crops this fall and to furnish the necessary funds for the expansion in business which is expected to come. The great oversubscription to the \$50,000,000 of Panama 3 per cent. bonds at a premium of over 2 per cent. is a magnificent testimonial to the financial strength of the country, as no other country has in recent years enjoyed such high credit. The political conditions are not overlooked in this connection, but they are not considered as of a sufficiently menacing character to warrant the fear of their disturbing the resumption of the march in the direction of prosperity which now promises to set in with the approach of autumn.

The Economic Crime of Increasing Productive Capacity

The American Metal Market attacks the Gary policy of cooperation for its encouragement of an increase in productive capacity. It claims that this policy, "which means maintaining prices and dividing the tonnage, far from curbing new erection in time of slack demand, or excess of capacity over requirements, actually encourages it. New blast furnaces, new steel works, new finishing mills are being built galore. Only a few days ago one of the important independent companies reached its final decision to add a large open-hearth steel plant to its present Bessemer plant." It proceeds to say "this encouragement of new erection under conditions existing for the past four years is an economic crime."

These are strong words, such as might be written by some stockholder of the United States Steel Corporation who is not in sympathy with the management and who feels like holding it responsible for everything happening in the iron and steel world which would seem to be increasing the competition with the corporation. From the standpoint of such a criticism there should have been an absolute cessation of all improvements in existing plants or additions to existing capacity or new construction from the time that the recession in the steel trade began. Apparently it would matter not whether a steel manufacturer who had his plans carefully matured before the recession began should consider that it would be wise for him to proceed with the improvement during the period of slack business, because he would be able to make more favorable contracts for construction and equipment than after the depression had passed. There would be no excuse for a manufacturer who needed some addition to his plant to balance either his requirements for raw material or his necessity for another finishing departments to work up his excess production in a cruder form. Such a critic would not admit the possession of any sagacity whatever by owners of unimproved resources or of a specially advantageous location to embark in the business of manufacturing pig iron, with the knowledge that

favorable contracts for construction and equipment could be made and that the very reasonable certainty existed that the depression could not continue indefinitely.

It is an easy matter to look back upon the occurrences of 1906 and 1907 and condemn severely those who at that time decided to increase largely their productive capacity for the purpose of enabling them to meet the expanding requirements of their trade. This experience was shared both by the United State Steel Corporation and by the independent manufacturers. It can easily be assumed now that every manufacturer should have known that the extraordinary demand could not continue and that like a flood it would speedily run itself out. But it then seemed to be necessary for every manufacturer who found himself unable to supply his customers promptly to do what he could to relieve the situation. The great expansion which occurred in 1909 and 1910 was the direct result of the improvements which were decided upon or which were undertaken in that period of exuberant trade and unbounded confidence. The engagements made at that time had to be carried out. Even though the recession in trade proved more serious than any one expected, the contracts had to be completed. It may be said further that the strong though brief revival in 1909 seemed to vindicate the sagacity of those who had undertaken the extensive improvements. It must even be admitted that for a time the appearances were strongly in favor of the demand rising to a sufficient height to absorb the entire output of the increased capacity of furnaces and mills.

The strictures of the article in question are too severe, if not wholly unwarranted. The Gary policy of cooperation is by no means to be blamed for all that has happened in the expansion of our productive capacity. If the steel manufacturers had decided in 1907 that no new construction should be undertaken, or if any set of manufacturers had decided to make conditions so unsatisfactory that no one of their number or any outside interests could see any inducement for their enlarging old works or building new ones, it may well be imagined that within a comparatively brief period thereafter the time would have come when the production of this country would have been totally inadequate to supply the demand for iron and steel. That would have been a more serious economic mistake for the country than the present condition of the iron and steel industry. The time will surely come, and possibly it may not be far distant, when the country will need every pound of iron and steel which its furnaces and mills can turn out. When that day comes consumers will have reason for thankfulness that the expansion of the industry was not completely checked in the period extending from 1908 to 1911.

and construction differ in some essential feature, so that one would likely be chosen for a certain work in preference to the other. More often still, a decided difference exists between machines in that one is better than the other, and for that reason more expensive. Even when the two machines stand upon an equal basis, the prices are usually different.

The shop manager or superintendent is expected to fight hard to get the best machine for the purpose. His duty is to procure a required standard of product at the minimum of cost, and much of his success must depend upon the wise selection of his equipment. The initial cost of machinery is each year becoming a less conspicuous consideration in buying. Therefore, salesmen who have to deal with the shop official resent his putting aside every element in a transaction except that of money. They argue that he is not doing his duty by his company, nor is he weighing in the balance the several elements which should enter into his decision. The machinery salesman and the purchasing agent are natural antagonists—usually friendly, but nevertheless antagonists. The latter stands between the salesman or the machinery house on the one hand and the shop on the other. Naturally then, when the shop man joins forces with the purchasing agent, with the one end in view of forcing down prices, the machinery people can see no consistency in his position.

In a communication printed in last week's issue of *The Iron Age*, the strong point is made that machinery houses should not put themselves in a position where they can be beaten down; they should make one price, which they could not be induced to shade under any stress of keen competition. This is theoretically true, and a large percentage of the manufacturers of machine tools adhere to the rule. But dealers cannot always afford to live up to a price list. Business reasons may make it an impossibility to do so, probably just as business reasons may make it impossible for many of the employers of purchasing agents and others having authority in the buying of machinery to maintain prices on their own products at all times in a dull market.

Open-Hearth Furnace Capacities

The absence of any standard practice in stating the capacities of open-hearth steel furnaces is noteworthy. It is really remarkable that trade custom has not reduced the nomenclature of the industry to a basis permitting of a reasonably close estimate of the monthly output of ingots which may be expected from a plant containing a number of furnaces of a stated size. One hears very frequently of "50-ton furnaces" and "60-ton furnaces," also of "50 to 60-ton furnaces," but one's respect for the phrase as a vehicle of information is greatly reduced by the knowledge that a so-called 50-ton furnace may be found to be producing 85 tons at a heat, while a 60-ton furnace may be producing 75 tons.

Nothing can be simpler, of course, than to compute the capacity, in tons of steel, of the geometrical figure offered by the open hearth. The fault does not lie there. In the case of a blast furnace the conditions are different. The cubical contents of the furnace, or even of the hearth, is but one factor in many, and the fact that the so-called "600-ton furnaces" of the late nineties did not really produce 600 tons of pig iron a day until many years afterward was no disgrace. It is difficult, however, to describe adequately the practice which frequently designates an open-hearth furnace as of 50 or 60 tons capacity and then makes it yield regularly 75 or 85 tons of steel ingots per heat.

The Two Influences in Machinery Buying

Machinery builders and dealers, in their complaints regarding "zig-zagging" or "sweating the bidders," make a sharp distinction between the professional purchasing agent and the shop man. In the natural order of things the decision of the former as to equipment is largely governed by price. Just as naturally, the decision of the superintendent or works manager, or any other man who has an intimate knowledge of manufacturing details, would be expected to be governed by merit or a special adaptation of some one machine to the work which is to be done. It often happens that two machines of absolutely equal excellence of design

To state the capacities of open-hearth furnaces at the actual number of tons of steel which they are expected to produce per heat would relieve the industry of a situation in which it confesses that frequently it says a certain number of tons when a totally different number of tons will result in practice. That, however, is about all it would do, for the reason that even when the average number of tons per heat is known the monthly production is not indicated. There is a wide range in the number of heats produced per week. Four general factors, or groups of factors, enter: (1) Whether or not direct blast furnace metal is used; (2) the quantity and physical condition of scrap used; (3) the analysis of the pig, particularly as to phosphorus; (4) the works management, esprit de corps, etc.

To an extent, it may be observed, the design and construction of the furnace are made to conform to some of the above factors. The proportions of ore, pig and scrap to be used have an influence in fixing the contour of the hearth, while of course the question of direct or cold pig is important. Thus when the actual capacity of the furnace, or rather the quantity of steel produced at a heat, is known, the weekly or monthly capacity cannot be figured except by the use of considerable additional information.

The entrance of these other factors into the problem of the actual capacity per week or month of an open-hearth furnace does not make it unnecessary that the carrying capacity of the furnace itself should be stated, with some approach to accuracy. Rather it makes it the more incumbent upon those who deal with these premises, unless they desire to withhold rather than to give information, to state the actual furnace capacities. Otherwise the industry is putting itself in a position in which it confesses that it does not, even for its own use, wish to develop a system of indicating the potency of its tools. Obviously it is out of the question to develop a system which would express capacities in terms of total product per week or month. That would be the product of tons per heat by the number of heats. The latter factor can only be estimated, and may vary according to conditions. The former can be computed from the form and design of the furnace. If a furnace can reasonably be expected to make 75 or 85 tons per heat, there is no sense in persisting in calling it a 50-ton or a 60-ton furnace.

Drafting Room Expense

A manufacturer remarked recently that, in his judgment, one of the largest items of unnecessary expense is to be found in the quantity of detail work done in the drafting room of the average machinery building concern. Hours are spent in the preparation of elaborate drawings which are intended solely for use in the pattern-making department and foundry, machine and assembling shops; whereas, with skilled workmen only the roughest kind of sketches are necessary, if they are so made as to be clearly blueprinted and have all of the dimensions accurately shown. His policy is to treat the foremen and skilled workers of his plant in such a manner that they are content to remain with him, year after year. The wages paid are more than they can obtain elsewhere for the same line of work, and if business is slack they are carried along just the same. This means considerable extra outlay, but he figures that through their close acquaintance with the details of his operations and the skill which they have acquired in them he is able to eliminate a large percentage of the

expenses usually incident to such an establishment. He states, also, that by having the men work from comparatively rough drawings they are taught to use their heads, with the result that numerous suggestions for improvements in designs, choice of materials, shop methods, etc., come to him each week without any bonus system or other inducement.

Correspondence

A Remarkable Boiler Performance

To the Editor: We note with considerable interest an article in your issue of May 25 showing results of boiler tests made by William O. Webber, of Boston, Mass. As the efficiencies obtained in these tests are so exceptionally high, we would like to obtain further information.

We would like to know what methods were used in weighing the feed water, the coal and the ash. How often samples of coal were taken from which the moisture content was determined, also an analysis of the coals used, if such is obtainable, showing fixed carbon, sulphur and volatile matter.

The highest rate of evaporation, and consequently efficiency, was shown in the test during which the coal having the lowest calorific value and highest moisture content and percentage of ash, was used. This is rather remarkable and if possible we would appreciate it if Mr. Webber could make some explanation.

Further, if Mr. Webber has any drawings showing the arrangement of the boiler setting for the boilers tested we would appreciate it if you could publish it.

We also note that the percentage of moisture in the steam is rather high and would therefore like to know at what point the calorimeter readings were taken and what type of calorimeter was used in determining this moisture content.

C. F. MOORE,

Chief Engineer, United States Smelting, Refining & Mining Company.

SALT LAKE CITY, UTAH, May 31, 1911.

To the Editor: Replying to the letter from C. F. Moore would answer as follows:

The water of evaporation used was measured by a Worthington hot water meter, calibrated to pressure and heat by actual tests made by actual weights on a Fairbanks' scale. The coal and the ashes were weighed by Fairbanks' standard scales every 6 hr. The moisture in the coal was determined every few days. The coal was analyzed every few days and is fully shown in the tests in detail.

The only explanation I can make why the coal having the lowest calorific value and the highest moisture gave such good results as it did is that it was the clearest and cleanest burning coal, and the openings of the grate, I suppose, just suited that particular texture of coal.

There is no question at all of the accuracy of the tests made, as they were carried on for too long a time to fake the results. In other words, a 60-hr. test is too long to allow many errors, and three sets of observers took the readings once every hour at least.

I have no drawing showing the arrangement of the boiler setting for the boilers tested, but they were good, ordinary return tubular boilers, set in the ordinary manner, without any particular furnace arrangement and the cracks in the boiler setting had been all carefully plastered up and put in good shape so that there was no leak of outside air. Every precaution was taken to make the brick work and the connection perfectly tight and reliable.

The percentage of moisture in the steam was determined at a point just above the boilers in the main steam pipe, and was taken continuously and the amount determined every half hour by the calorimeter, the Carpenter calorimeter being used.

The water meter reading was taken at the end of every hour, the coal and ashes weighed at the end of every 6 hr., the feed water temperature once an hour, steam pressure once an hour, the pyrometer, damper, draft gauge barometer temperature of air, etc., all taken once an hour. The tests of the different kinds of coal were all made by

exactly the same apparatus without any change whatever, and, as stated, the readings were made by three sets of observers, checked by the personal readings of the writer for 8 hr. a day.

WM. O. WEBBER,
Consulting Engineer

BOSTON, MASS., June 10, 1911.

Coke Oven Gas in Open Hearth Furnaces

To the Editor: In the issue of *The Iron Age* of May 18, page 1232, I have noted with interest an abstract by "G. B. W." of a German review of M. Trasenster's article on the use of coke oven gas in open hearth furnaces. The concluding sentence in this abstract reads as follows: "The results, therefore, notwithstanding the good thermal efficiency obtained in this case, are not altogether favorable." This thought is nowhere expressed in M. Trasenster's article which is under discussion, and has undoubtedly crept in through the double translation. I note that the review in *Stahl und Eisen* is less favorable to coke oven gas than M. Trasenster's article, while *The Iron Age* has, in this respect, still further departed from the original.

In the original article, which was published in the *Revue Universelle des Mines* in November, 1910, the paragraph in question appears substantially as follows: "Notwithstanding the favorable appearances, we will not risk prophesying a better efficiency in the heating of the steel bath by coke oven gas (meaning here the actual transfer of heat from burning gas to the melting metal), but we can at least depend on having equally favorable conditions in this regard, and consequently, as we have shown above, we can register an improvement of thermal efficiency from operating a furnace with coke oven gas when the air only traverses the regenerators, as compared with the same furnace operating on producer gas, and with both the air and gas preheated."

You will note that this gives a clear advantage for the use of coke oven gas, and in justice to the further development of American open hearth practice it seems important to correct the unfavorable inference in the abstract in *The Iron Age* of May 18. C. G. TUFTS.

SYRACUSE, N. Y., June 6, 1911.

Direct Current of 1500 Volts for a Railroad

Among other large orders received by the Westinghouse Electric & Mfg. Company in May, particular importance is attached to contracts for the electrification of two sections of road of the Piedmont Traction Company in North Carolina and South Carolina, on account of the fact that this is the first railroad electrification in America to be equipped with apparatus for 1500 volts direct current. One section, 35 miles, extends from King's Mountain to Charlotte, N. C., and the other, 95 miles, extends from Greenwood to Spartanburg, S. C., with a 10-mile spur from Belton to Anderson. The average modern direct-current railroad uses current of a maximum of 550 to 650 volts. Considerations of economy in transmission have led to the increase of direct-current voltage in railroad work and a number of lines are now operated on 1200 volts, but the Piedmont Traction system is the first one to contract for 1500-volt equipment, and the Westinghouse Electric & Mfg. Company thus becomes the first in this field. The power for both of the electrified lines will be purchased from the transmission lines of the Southern Power Company and fed to the line through motor-generator sets in substations.

Schimer, McGlynn & Co., Inc., Nineteenth street and Washington avenue, Philadelphia, Pa., expect to put their plant for rolling phosphor bronze, German silver and Monel metal sheets, rods and wire in operation about July 1. They will make a specialty of planished Monel sheets. H. M. Schimer is president; Wm. P. McGlynn, vice-president and general manager, and C. E. L. Hatch, secretary and treasurer.

Edgar Allen & Co., Ltd., tool steel manufacturers, 434 West Randolph street, Chicago, have opened an Eastern branch office and warehouse in Boston, Mass., located at 71 Kilby Street. It will be under the management of Harry B. Eaton, formerly of the Simplex Tool & Supply Company.

The Brussels International Conference

A considerable number of the steel manufacturers of this country have either sailed for Europe or will leave some time this month to meet steel manufacturers from other countries in the international conference to be held at Brussels, Belgium, July 5 and 6. For five days, beginning June 26, the American steel manufacturers will be the guests of iron and steel manufacturers of Great Britain. It is the hope of those who have arranged this conference that a better understanding may be brought about between the steel manufacturers of this country and Europe, although it will of course be out of the question to attempt to make any agreement as to the prices of steel products in the markets of the world or anything like a division of territory. Interest naturally centers on the impression which Chairman E. H. Gary, of the United States Steel Corporation, will be able to make upon the steel manufacturers of other countries. Judge Gary's policy of co-operation has been warmly and almost unanimously supported by American steel manufacturers and the world will look with keen attention for the result of his efforts to win adherents to it from the European manufacturers who will attend this conference.

The Philadelphia Foundry Foremen.—The Associated Foundry Foremen of Philadelphia and Vicinity held their regular monthly meeting at the Manufacturers' Club, Philadelphia, on the evening of June 13, vice-president James Whitehead in the chair. A new constitution and new by-laws were adopted, which provide for the adoption of a new name, The Associated Foundry Foremen of Philadelphia, also for the elimination of the associate class of membership, the article on membership providing a wider scope of eligibility and the admission of those previously classed as associate members to active membership. The office of treasurer was eliminated and provision made for the election of a secretary-treasurer, who will perform the duties of both officers. Dues were fixed at \$4 per year. Howard L. Warner, representing Frank Samuel, Philadelphia, was elected to membership. Adjournment was taken until September 12, no meetings being held during the summer months.

Governor Marshall of Indiana has named the Commission of Industrial Education created by the last State Legislature. State Senator W. A. Yarling, of Shelbyville, Ind., is chairman, and John A. Lapp, legislative reference librarian, Indianapolis, is secretary. John L. Ketcham, secretary-treasurer of the Brown-Ketcham Iron Works, Indianapolis, is a member of the committee, as is also Frank Duffy, secretary of the United Brotherhood of Carpenters and Joiners of America. The other members are John G. Brown, Monon, a member of the Legislature; T. F. Fitzgibbon, Columbus; F. D. McElroy, Hammond, and Prof. U. G. Weatherly, of Indiana University, Bloomington. The law provides that the commission shall investigate the need of education in the various industrial pursuits and recommend the forms of educational effort that may be employed.

The Indiana Steel Company, Gary, Ind., on Thursday, June 15, made a test of its new sheet bar mill. The trial was limited to the turning over of the motor and machinery, and no steel was run through. This mill adjoins the billet mill and is driven by a 6000 hp. motor, which is a duplicate of the rail and billet mill drivers. The beginning of permanent rolling will depend largely on the market demand for the output of the Gary sheet mills of the American Sheet & Tin Plate Company, which are already in partial operation.

The Laclede Steel Company, St. Louis, Mo., the particulars of whose organization were given in *The Iron Age* of April 6, has bought a site on the east side of the Mississippi River, between Madison and East St. Louis, Ill., and will at once proceed with the construction of a rolling mill for the purpose of rerolling old steel rails into merchantable shapes. Thomas R. Akin is president, and William E. Guy is heavily interested.

The Farris Engineering Company has removed its offices from the Diamond National Bank Building to 8043 Jenkins Arcade Building, Pittsburgh, Pa.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	June 21	June 14	May 24	June 22
PIG IRON , Per Gross Ton:	1911.	1911.	1911.	1910.
Foundry No. 2, standard, Phila-				
delpia	\$12.25	\$12.25	\$13.50	\$16.50
Foundry No. 2, Valley furnace	13.50	13.50	13.75	14.50
Foundry No. 2, Southern, Cin-				
cinnati	13.25	13.50	13.75	14.75
Foundry No. 2, Birmingham, Ala.	10.00	10.25	10.50	11.50
Foundry No. 2, at furnace, Chicago	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa....	14.50	14.50	14.50	16.00
Basic, Valley furnace.....	13.00	13.10	13.25	14.50
Bessemer, Pittsburgh	15.90	15.90	15.90	16.40
Gray forge, Pittsburgh.....	13.90	13.90	14.15	14.90
Lake Superior charcoal, Chicago	16.50	17.00	17.00	18.50

COKE, CONNELLSVILLE,

Per Net Ton, at oven:

Furnace coke, prompt shipment.	1.40	1.40	1.45	1.65
Furnace coke, future delivery..	1.40	1.40	1.75	1.80
Foundry coke, prompt shipment.	1.75	1.75	1.75	2.15
Foundry coke, future delivery..	2.05	2.05	2.00	2.30

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	21.00	21.00	23.00	25.00
Forging billets, Pittsburgh.....	26.00	26.00	28.00	31.00
Open hearth billets, Philadelphia	23.40	23.40	25.40	28.50
Wire rods, Pittsburgh.....	27.00	29.00	29.00	31.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.00	14.00	14.50	17.00
Iron rails, Philadelphia.....	16.50	16.50	16.75	19.50
Car wheels, Chicago.....	12.50	12.50	12.75	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	15.00
Heavy steel scrap, Pittsburgh....	13.00	12.75	13.00	15.00
Heavy steel scrap, Chicago.....	10.25	10.25	10.25	13.00
Heavy steel scrap, Philadelphia.	13.00	13.00	13.00	14.50

FINISHED IRON AND STEEL,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.27½	1.27½	1.27	1.47½
Common iron bars, Pittsburgh...	1.25	1.25	1.30	1.50
Common iron bars, Chicago.....	1.20	1.20	1.22	1.45
Steel bars, Pittsburgh.....	1.25	1.25	1.40	1.45
Steel bars, tidewater, New York.	1.41	1.41	1.56	1.61
Tank plates, Pittsburgh.....	1.35	1.35	1.40	1.45
Tank plates, tidewater, New York	1.51	1.51	1.56	1.61
Beams, Pittsburgh.....	1.35	1.35	1.40	1.45
Beams, tidewater, New York....	1.51	1.51	1.56	1.61
Angles, Pittsburgh.....	1.35	1.35	1.40	1.45
Angles, tidewater, New York....	1.51	1.51	1.56	1.61
Skelp, grooved steel, Pittsburgh.	1.25	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.00	2.20	2.40
Wire nails, Pittsburgh†.....	1.70	1.80	1.80	1.80
Cut nails, Pittsburgh†.....	1.60	1.60	1.80	1.75
Barb wire, galv., Pittsburgh†..	2.00	2.10	2.10	2.10

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†These prices are for largest lots to jobbers.

METALS,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.75	12.75	12.37½	12.75
Electrolytic copper, New York.	12.50	12.50	12.12½	12.50
Spelter, St. Louis.....	5.55	5.32½	5.20	5.00
Spelter, New York.....	5.75	5.55	5.50	5.15
Lead, St. Louis.....	4.35	4.30	4.22½	4.22½
Lead, New York.....	4.50	4.45	4.37½	4.37½
Tin, New York.....	44.87½	46.87½	44.60	32.60
Antimony, Hallett, New York.	8.75	8.75	9.00	8.12½
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles,

3 in. on one or both legs, less than ¼ in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; zeos, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¾-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge, extra.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in., up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	
TERMS—Net cash 30 days.	

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted	Galvanized.	Gauge.	Painted	Galvanized.
29	...	\$2.40	23	\$2.40	\$3.50
28	\$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel		Iron	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	49	43		
1½ in.....	79	69	71	59		
2 to 3 in.....	80	70	75	65		
			76	66		
Lap Weld.						
2 in.....	76	66	72	62		
2½ to 4 in.....	78	67	74	64		
4½ to 6 in.....	77	67	73	63		
7 to 12 in.....	75	59	71	55		
13 to 15 in.....	15½	...	...	...
Butt Weld, extra strong, plain ends, card weight.						
1½, 2, 3, 4 in.....	69	59	65	55		
½ in.....	74	68	70	64		
¾ to 1½ in.....	78	72	74	68		
2 to 3 in.....	79	73	75	69		

THE IRON AND METAL MARKETS

Lap Weld, extra strong, plain ends, card weight.

2 in.....	75	69	71	65
2½ to 4 in.....	77	71	73	67
4½ to 6 in.....	76	70	72	66
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.....	64	58	60	54
¾ to 1½ in.....	67	61	63	57
2 to 3 in.....	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.....	65	59	61	55
2½ to 4 in.....	67	61	63	57
4½ to 6 in.....	66	60	62	56
7 to 8 in.....	59	49	55	45

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchants or card weight pipe. Butt or lap weld, as specified.
-------------------------------	--

2, 2½ to 4 in....Lap Weld

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1¾ to 2¼ in.....	Steel.	65
2½ in.....		67½
2¾ to 3¼ in.....		70
3½ to 4½ in.....		72½
5 to 6 in.....		65
7 to 13 in.....		62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.50, galvanized \$1.80; carload lots, to retailers, annealed \$1.55, galvanized \$1.85. Galvanized barb wire, to jobbers, \$2; painted, \$1.70. Wire nails, to jobbers, \$1.70.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.									
No.	0 to 9	10	11	12 & 12½	13	14	15	16	
Annealed	\$1.65	1.70	1.75	1.80	1.90	2.00	2.10	2.20	
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30	2.70	2.80	
Market and Stone Wire in Bundles, Discount from Standard List.									
Bright and Annealed:									
9 and coarser									.80
10 to 18.....							.80	and 10	
19 to 26.....							.80	and 10 and 2½	
27 to 36.....							.80	and 5	
Galvanized:									
9 and coarser.....							.75	and 10	
10 to 16.....							.75	and 10	
17 to 26.....							.72½	and 10	
27 to 36.....							.72½	and 10	
Coppered or Liquor Finished:									
9 and coarser.....							.75	and 10	
10 to 26.....							.75	and 10	
27 to 36.....							.70	and 10 and 5	
Tinned:									
6 to 18.....							.75	and 10 and 10	

Pittsburgh

PARK BUILDING, June 21, 1911.—(By Telephone.)

Pig Iron.—Inquiry for pig iron is more active than at any time for some months. One buyer asks for 5000 tons of basic for shipment over the last half of the year and other basic inquiries range from 500 to 2000 tons. A radiator company at Johnstown, Pa., is asking for 3000 tons of No. 2 foundry for last half, a local foundry for 1000 tons, and another consumer for 500 tons. A large inquiry is pending for malleable Bessemer from a Western consumer. There is no demand for standard Bessemer, while stocks in the valleys are very heavy. Basic iron secured in exchange for scrap is still being offered at low prices, in some cases below \$13 at furnace, but most of the Valley furnaces are holding basic at \$13.25 at furnace. We quote as follows: Bessemer pig iron, nominally, \$15; malleable Bessemer, \$13.50; basic, \$13; No. 2 foundry, \$13.50 to \$13.75; gray forge, \$13, all at Valley furnace.

Steel.—Specifications against contracts for billets and sheet bars are better. The rail and billet sales department of the Carnegie Steel Company reports that actual orders for rails, billets and sheet bars sent to the mills for rolling, up to and including June 20, exceed the same period in May by 28,000 tons. We note a sale of 500 tons of 4 x 4-in. Bessemer billets, July delivery, at \$21, Pittsburgh, and a reported sale of 1000 tons of Bessemer sheet bars, for July and August, at \$23, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in., and up to, but not including, 10 x 10 in., \$21 base, and sheet and tin bars in 30-ft. lengths, \$22; 1½-in. billets, \$22; forging billets, \$26, base, usual

extras for sizes and carbons—all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

(By Mail.)

The sales departments of a number of the larger steel interests report that in the past week specifications against contracts for material have been coming in a good deal more freely, while more new orders are being placed for some lines of material, notably steel rails, structural steel, plates and sheets. The wire, tin plate and pipe trades continue quiet, with only a fair amount of new business being placed. There is a decided feeling that from this time on there will be gradual improvement in the whole trade. The low prices ruling on pig iron, notably basic and foundry, have brought out some new inquiry and considerable tonnage is under negotiation. The steel billet and sheet bar trade is quiet, nearly all consumers being covered by contracts, but specifications so far this month have not been as heavy as during the same period in May. A conference between the independent sheet and tin plate mills and the Amalgamated Association is to be held in this city on Thursday, and it is expected that then the sheet and tin plate mill scales will be settled. A large inquiry is out for furnace coke for the last half of the year, which will probably test prices. There is an active inquiry for heavy steel scrap, boring and turnings, with prices ruling a little firmer. The whole situation is more encouraging and there is a more optimistic feeling as regards the future than at any time for some months.

Ferromanganese.—There is a fair amount of new inquiry and we note a sale of about 250 tons to a Western steel interest and about 75 tons to a local interest on the basis of \$36.50 Baltimore. We quote foreign 80 per cent. at \$36.50 to \$36.75 f.o.b. Baltimore, with a freight rate of \$1.95 a ton for delivery in the Pittsburgh district.

Ferrosilicon.—New inquiry is very light, most consumers being covered ahead for some time, while prices on 50 per cent. ferrosilicon are ruling lower now than at any time for some months. We quote 50 per cent. at \$51.50 to \$52, Pittsburgh, for delivery over second half of the year; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars Ashland and Jisco furnaces.

Muck Bar.—There have been no recent sales and there is no new inquiry. We quote best grades of muck bar made from all pig iron at nominally \$28.50 Pittsburgh.

Skelp.—A local consumer has bought about 1000 tons of wide sheared iron plates on the basis of 1.75c., delivered at his mill, Pittsburgh district. Prices on steel skelp are slightly lower. We quote grooved steel skelp at 1.25c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.50c. to 1.60c., and sheared iron skelp, 1.70c. to 1.75c., usual terms, all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—A sale of 300 tons of Bessemer wire rods for July and August delivery is reported to have been made last week on the basis of \$29, Pittsburg, but prices have now been reduced to \$27, at which we quote Bessemer, open hearth and chain rods at Pittsburgh.

Structural Material.—New inquiries have been more active and considerable work has been placed. A tremendous amount of work is coming up in New York City and vicinity and also in the Chicago district, and it is probable that a good deal of the tonnage to be placed will be rolled by local mills. The Jones & Laughlin Steel Company has taken 1000 tons for the Fire Association building in Philadelphia. The McClintic-Marshall Construction Company has taken 2800 tons for a new warehouse for Larkin & Co., Buffalo, N. Y., and 1500 tons of bridge work for the Atlantic Coast Line. The Farris Bridge Company, of this city, is making plans for a new bridge in Clinton County, Pa., which will require about 500 tons of steel, and the Riverside Bridge Company, Martins Ferry, Ohio, has taken contracts for new buildings for the Wheeling Electric Company and the Wheeling Can Company, Wheeling, W. Va., about 500 tons. Competition among the fabricating interests continues very keen and some low prices on fabricated work are still being made. We continue to quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Plates.—Actual car orders placed in the past week have been light, but some fairly large inquiries are out. The Canadian Car & Foundry Company, Montreal, Can., has taken 1000 box cars with steel underframes for the Grand Trunk. The Baltimore & Ohio, the Queen & Crescent and the Louisville & Nashville are

THE IRON AND METAL MARKETS

reported as in the market with inquiries for 1000 steel cars each, and one or two other roads are said to be about ready to send out inquiries for a large number of cars. The plates, about 4200 tons, for the Los Angeles, Cal., aqueduct, contract for which was taken last week by the Treadwell Construction Company, have not yet been placed, and the gas holder for the Philadelphia company, about 6000 tons, is still being held up. Nothing has been heard recently of the two new projected hotels in this city, but these are expected to come out before long. We quote $\frac{1}{4}$ -in. and heavier plates at 1.35c., Pittsburgh.

Sheets.—The improvement in new demand and in specifications for sheets, noted in this report last week, still continues and the American Sheet & Tin Plate Company and some of the independent sheet mills report they are booking quite a large volume of new business, while specifications against contracts are more active than for several months. The lower prices on sheets which went into effect on June 1 are reported as being well maintained, being shaded only to slight extent and in a few cases. Reports that the American Sheet & Tin Plate Company had started up its works at Sharon, Pa., which contains five hot mills, are untrue. This plant has been closed for more than a year and will probably not be started again, as it is likely that the equipment will be moved at some time to some other plant. We give the full schedule of prices on black and galvanized and on roofing sheets on a previous page.

Tin Plate.—There is very little new buying of tin plate, as this is the dull season, but specifications against contracts continue to come in very freely and shipments by the mills this month promise to be heavier than in May. The American Sheet & Tin Plate Company has started four more hot mills in its Laughlin Works at Martins Ferry, Ohio, and now has 20 of the 23 hot tin mills in this plant in operation. Prices are firm, and we quote 100-lb. cokes, 14 x 20, at \$3.70 per box f.o.b. Pittsburgh.

Bars.—Leading makers of steel bars report they are booking a fairly large volume of new business on contracts on the 1.25c. basis, some of these contracts running up to October 1 only, while others run as far ahead as January 1 or later. It is stated that shortly after the recent reduction in prices was made on steel bars there was some tonnage sold at 1.20c., but it is claimed this was for prompt shipment, and that on all contracts for extended delivery 1.25c. is being paid. As yet no settlement of the puddling and bar iron scales has been made with the Amalgamated Association, and as the Republic Iron & Steel Company has no agreement with this organization for continuous operation it is probable that some of its mills will close June 30 for inventory and repairs, and to wait for the wage scales to be adjusted. The new demand for iron bars is fair, but is referred to as a little heavier than for some time. We quote steel bars at 1.25c. and common iron bars at 1.25c. to 1.30c. f.o.b. Pittsburgh.

Shafting.—The new demand for shafting is only for small lots to cover current needs. Specifications against contracts are not satisfactory to the makers, especially from the large users who are taking in as little material as they possibly can. Regular discounts on shafting remain at 60 per cent. off in carload and larger lots and 55 per cent. in less than carloads delivered in base territory, but in exceptional cases these discounts are slightly shaded.

Spelter.—There has been a decided improvement in the spelter market, the new demand being much heavier, while prices have shown a sharp advance. On Saturday spelter sold at 5.50c., East St. Louis, and is reported to have sold at 5.55c. this week. These prices show an advance of \$5 a ton within a week. We quote prime grades of Western at 5.50c. to 5.55c. East St. Louis, equal to 5.62 $\frac{1}{2}$ c. and 5.67 $\frac{1}{2}$ c. f.o.b. Pittsburgh.

Hoops and Bands.—The new demand continues quiet and specifications against contracts are only fair. The Sharon Steel Hoop Company has about completed the building of a new mill at Sharon, Pa., for the rolling of wide bands, which will be started shortly. We quote hoops at 1.40c. and bands at 1.50c., with extras on the latter as per the steel bar card.

Merchant Steel.—Specifications from jobbers and consumers continue unsatisfactory, while the new demand is only for small lots to cover actual needs. Makers' prices, which however, are being shaded, are as follows: Iron finished tire, $\frac{3}{8}$ x $1\frac{1}{2}$ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter

shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—The inquiry for rivets is heavier than for some time, and there is also an increase in actual business. Jobbers and consumers believe that prices on rivets have probably touched bottom, and are buying more freely than for some time. We quote structural rivets at 1.75c., and boiler rivets at 1.80c., these prices being better observed than for several months.

Wire Products.—The demand continues light, and this is also true of specifications, which have been unsatisfactory to the mills for some time. In fact, jobbers and retailers of wire and wire nails are taking in as little material as possible, not being satisfied that present prices will be maintained. The season trade in wire nails and wire is over and the situation will likely be quiet until about September 1, when fall trade is expected to open up and new demand will likely show considerable increase. Prices have been reduced, and we now quote galvanized barb wire at \$2; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—Inquiries for spikes in the past week have been more active, partly due to concessions in prices, which are being more freely made than for some time. One local maker reports having entered an order for 3000 kegs, while inquiries are in the market from two railroads, one for 2500 kegs and the other for 2000 kegs. We quote railroad spikes at \$1.50 to \$1.55, base, per keg, f.o.b. Pittsburgh, with the usual extras for odd sizes.

Merchant Pipe.—The volume of business in merchant pipe so far this month is about the same as in the same period in May, but no large gas or oil lines have been placed for some little time. Three or four large projects are being talked of, but have not reached the stage where the inquiries have been sent out to the mills for the pipe. It is believed that the pipe trade will continue in about its present condition until about September 1, at which time a material betterment in demand is expected. Discounts on iron and steel pipe are given on a previous page.

Iron and Steel Scrap.—There is a stronger tone to the scrap market and a number of dealers who have been selling short for some time are now covering their short sales, having bought a good deal of material in the past two weeks. Several leading consumers are disposed to take in scrap after July 1 at present prices, but as a rule dealers are refusing to sell for such delivery at to-day's market, believing that very early in July, if not before, prices will be better than they are now. A good deal of scrap offered by the Baltimore & Ohio Railroad was bought direct by consumers, part of its heavy iron and steel scrap being reported as having been sold for delivery at Monessen, Pa., at \$13 or better. Much of the Pennsylvania Railroad scrap also went to consumers by direct sales. There is a good deal of inquiry for heavy steel scrap, cast iron borings and machine shop turnings, prices on which are firm. Dealers expect a very active demand for scrap after July 1, when consumers have taken inventory and made repairs. Dealers are now quoting per gross ton, f.o.b. Pittsburgh, as follows:

Heavy steel scrap Steubenville, Follansbee.	
Sharon, Monessen and Pittsburgh delivery.	\$13.00 to \$13.25
No. 1 foundry cast.	13.25 to 13.50
No. 2 foundry cast.	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill,	
Pittsburgh district.	10.75 to 11.00
Residing rails, Newark and Cambridge,	
Ohio, Cumberland, Md., and Franklin, Pa.	13.50 to 13.75
No. 1 railroad malleable stock.	12.00 to 12.25
Grate bars.	10.50 to 10.75
Low phosphorus melting stock.	16.00 to 16.25
Iron car axles.	23.75 to 24.00
Steel car axles.	18.50 to 18.75
Locomotive axles.	23.00 to 23.00
No. 1 busheling scrap.	12.00 to 12.25
No. 2 busheling scrap.	8.50 to 8.75
Old car wheels.	13.50 to 13.75
Sheet bar crop ends.	15.50 to 15.75
*Cast iron borings.	8.75 to 9.00
*Machine shop turnings.	9.00 to 9.25
Old iron rails.	15.00 to 15.25
No. 1 wrought scrap.	14.25 to 14.50
Heavy steel axle turnings.	10.00 to 10.25
Stove plate.	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Boiler Tubes.—There is practically no new business being placed in boiler tubes, while contracts have been pretty well cleaned up. Consumers have no complaint to make about prices, but simply have not the business to place and are not carrying any more tubes in stocks than they can avoid.

THE IRON AND METAL MARKETS

Coke.—The largest inquiry for furnace coke in the market is that of the Reading Iron Company, Reading, Pa., which is inquiring for 15,000 to 18,000 tons per month over the last half of the year. The inquiries of the American Steel Foundries and the American Locomotive Company for foundry coke for the last half have not yet been closed. Stocks are steadily decreasing, the output of the upper and lower Connellsville regions last week having been 266,646 net tons, a decrease over the previous week of about 3000 tons. Some low prices continue to be made on furnace and foundry coke for prompt delivery. We quote standard grade furnace coke for spot shipment at \$1.40 to \$1.45, and for delivery over last half of the year at \$1.60 to \$1.70 per net ton at oven.

Chicago

FISHER BUILDING, CHICAGO, JUNE 21, 1911.—(By Telegraph.)

Sufficient improvement has been felt in the iron and steel trade as to bring out favorable reports from many quarters, while it is still equally possible to find those to whom the outlook is anything but encouraging. Specifications for rails totaling 25,000 tons and an increased volume of structural and steel plate bookings have sustained during the past week the hopeful attitude in finished steel lines. It now develops also that a larger proportion of the Western steel bar business has been closed than has been intimated up to this time. The only apparent unrest with regard to prices is limited to a slight weakness in steel plates and to that induced by competitive rerolled steel and bar iron used by wagon makers.

Pig Iron.—The sale of about 7000 tons by one Southern interest has brought into this market a \$10, Birmingham, price for No. 2 Southern iron, and it is now possible to buy moderate tonnages of such iron for prompt shipment on this basis openly. For last half shipment an advance of 25c. or possibly 50c. might be asked. Northern furnaces, both at Chicago and Milwaukee, are asking \$15 at the furnace, which restricts each furnace to its minimum freight area in setting strictly competitive iron in order to maintain this price. The miscellaneous orders of the week seem to have totaled a more satisfactory tonnage, and as a result a more optimistic tone prevails. An unusual spread between the prices of various Lake Superior charcoal irons has developed in this market. Certain lower Michigan peninsula brands can be bought at \$16.50, Chicago, but the greater number of irons bring \$17, delivered, while a northern Wisconsin furnace is holding at a \$17.50, delivered, price. The following quotations are for Chicago delivery, with the exception of Northern irons, which are quoted f.o.b. furnace:

Lake Superior charcoal	\$16.50 to \$17.00
Northern coke foundry, No. 1	15.50
Northern coke foundry, No. 2	15.00
Northern coke foundry, No. 3	14.75
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	14.85 to 15.10
Southern coke, No. 2 foundry and No. 2 soft	14.35 to 14.60
Southern coke, No. 3	14.10 to 14.35
Southern coke, No. 4	13.85 to 14.10
Southern gray forge	13.60 to 13.85
Southern mottled	13.60 to 13.85
Malleable Bessemer	15.00
Standard Bessemer	17.40
Basic	15.50
Jackson Co. and Kentucky silvery, 6 per cent.	17.90
Jackson Co. and Kentucky silvery, 8 per cent.	18.90
Jackson Co. and Kentucky silvery, 10 per cent.	19.90

(By Mail)

Billets.—The local billet market offers little of interest beyond recording a firm adherence to prices, which we quote as follows: Forging billets, \$28.60, Chicago, and rerolling billets, \$23.60.

Rails and Track Supplies.—The encouragement afforded by the tonnage returns in early June continues to be well supported and the outlook is considered hopeful. During the past week the local rail mills booked specifications aggregating 25,000 tons, of which 5000 tons were placed by one of the Northern transcontinental systems, and 6000 tons by a Kansas road. Inquiry for cars includes a total of nearly 4000 from Western and Southern roads. Orders for track bolts in lots up to 1000 kegs are reported. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c. to 1.60c. Chicago.

Structural Material.—Mills report that tonnages of both shapes and plates for structural purposes have been placed in increased volume. Building operations reported during the past week indicate larger activity. Contracts were awarded to the Pacific Rolling Mill Company, San Francisco, covering 321 tons for an office building for the San Francisco Investment Corporation, and 723 tons for a similar building for the Banker Investment Company of that city. The Fulton Iron Works, St. Louis, has ordered from the Riter-Conley Mfg. Company, Pittsburgh, 974 tons for a new foundry and machine and blacksmith shops. The American Bridge Company will fabricate approximately 2000 tons for new shop buildings for the Haskell-Barker Company, car builder, Michigan City, Ind. Contracts were also placed for 120 tons for a traction company power house at Pueblo, Colo., and 675 tons for a warehouse for the W. J. Lemp Brewing Company, St. Louis. It is expected that this week will bring out the letting of 1400 tons for the Federal Life Insurance Building, Chicago; 600 tons for the Corn Products Refining Company, Argo, Ill., and 2000 tons for the Woodmen of the World building at Omaha. We quote plain material from mill at 1.53c. to 1.58c. Chicago, and from store, 1.75c.

Plates.—For prompt shipment the buying of plates has been active. Tank steel and plates for structural purposes have made up a good portion of the tonnage. A pressure pipe line for the Nisqually Power Plant, Tacoma, Wash., will require 674 tons, to be assembled by the Willamette Iron & Steel Company, Portland, Ore. It is reported with reference to prices that 1.35c. Pittsburgh, has not been absolutely maintained in some quarters. This does not represent, however, the position of large interests. Chicago quotations for mill shipment are: 1.53c. to 1.58c.; from store, 1.75c.

Sheets.—Transactions in sheets aggregate a fair tonnage, particularly in the heavier gauges. Buying for forward shipment is limited to October 1 for the jobbers, and to January 1 for manufacturers, but most of the current business is for early shipment. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheet, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—While the steel bar situation does not seem to have entirely righted itself in some instances where it is reported that consumers are still slow in closing, the past ten days have brought about the closing of a large number of contracts. One maker of bars anticipates that the end of June will find its customers provided for almost entirely. Complaint is heard that prices being made on re-rolled steel and iron bars exercise an unsettling influence on the steel bar situation. On the former grades prices as low as 1.20c. delivered, northern Indiana point, are cited. Steel bar prices are quite firm. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Wire Products.—The general line of wire goods has settled into the customary midsummer quiet. Prices have been reduced 10c. per 100 lb. Mill shipments are heavier perhaps than they would otherwise be, because of the very light jobbers' stocks. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.78c.; painted barb wire, 1.78c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

Cast Iron Pipe.—The letting by the city of Mandan, N. D., where recently all bids were rejected, is now advertised for June 29. Mena, Ark., will award 750 tons June 23, and Muskogee, Okla., is about to buy 2600 tons. At Colorado Springs 2600 tons was placed June 16, and at Decatur, Ill., the Lynchburg Foundry Company, Lynchburg, Va., obtained an order for 350 tons. We continue to quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—The scrap market has been exceedingly inactive. None of the local melters is really in the market except to pick up bargains on small tonnages. No large tonnages are being offered by the railroads, and dealers would hesitate to buy even at attractive prices, fearing their inability to move a large quantity. The Chicago & Alton Railroad offers two lots of 350 tons each, the Chicago & Western Indiana has 400 tons and the Michigan Central 2000 tons. The Union Pacific is offering about 2500 tons. A lot of 500

THE IRON AND METAL MARKETS

tons of car wheels was sold at \$12.75. We quote below per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	12.00 to 12.25
Old steel rails, less than 3 ft.....	11.00 to 11.50
Relaying rails, standard sections, subject to inspection.....	14.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.00 to 10.50
Shovel steel.....	9.75 to 10.25
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	13.75 to 14.25
Steel angle bars.....	10.25 to 10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	9.00 to 9.50
Locomotive tires, smooth.....	16.25 to 16.75
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.25 to 10.75
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	10.00 to 10.50
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, June 21, 1911. —(By Telegraph.)

Interest is centered on Southern iron, which is now obtainable from a number of producers at \$10 at furnace for prompt shipment, and it is rumored that third quarter business has been taken on at this price. A number of Southern furnaces, however, are holding out for \$10.50, Birmingham, on future contracts and it is noteworthy that one or two interests are yet asking \$11, although they are not booking any iron except small lots from customers who have preferences for favorite brands. From Illinois territory several orders are reported for Southern iron averaging about 300 tons each, all for last half shipment. A central Ohio manufacturer took 800 tons of foundry iron, equally divided between Northern and Southern brands, and from the same territory is an order for 1000 tons of Southern No. 2 foundry, both for June-July movement. Northern iron is moving slowly, although there were a few small sales made to nearby melters and it is stated that a southern Ohio manufacturer has taken on an additional 4000 tons of basic over the amount reported last week. Northern No. 2 foundry is quoted at \$13.25 to \$13.50, Iron-ton, but basic and malleable are firm around the last named figure. Inquiries are scarce, both buyer and seller showing a desire to transact business under cover, and sales made are generally the result of personal solicitation on the part of agency representatives. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.....	\$13.75 to \$14.25
Southern coke, No. 2 foundry and 2 soft.....	13.25 to 13.75
Southern coke, No. 3 foundry.....	13.00 to 13.25
Southern coke, No. 4 foundry.....	12.50 to 12.75
Southern gray forge.....	12.00 to 12.50
Ohio silvery, 8 per cent. silicon.....	17.45 to 17.70
Lake Superior coke, No. 1.....	14.95 to 15.20
Lake Superior coke, No. 2.....	14.45 to 14.70
Lake Superior coke, No. 3.....	13.95 to 14.20
Basic, Northern.....	14.70 to 15.20
Standard Southern car wheel.....	25.75 to 26.25
Lake Superior car wheel.....	19.50

(By Mail.)

Coke.—There is some improvement, so far as the foundry coke inquiry is concerned, but it is not marked enough to have any effect on previous quotations. A large plumbing supply house is asking for a year's supply, and contract will probably be closed in a few days for about 15 cars per week to be delivered throughout the period named. Prices on 72-hour coke in the Pocahontas, Wise County and Connellsville districts range from \$1.90 to \$2 per net ton at oven for prompt shipment, with a premium generally asked of about 25c. a ton on contract business, although there are a few brands that can be bought at \$2 for delivery throughout the next 12 months. Furnace coke is very quiet, and in the absence of any demand spot shipment prices do not improve, averaging in all three fields about \$1.40 to \$1.50 at oven, with 15c. to 20c. per net ton more demanded for future movement.

Finished Material.—The inquiry for sheets shows that customers are beginning to realize that the bottom has been reached. There is also some contracting in hoops, which are held at \$1.45c. base, at Pittsburgh, but

it is rumored that a number of mills are not averse to taking care of desirable specifications at 1.40c. per lb. at mill. Steel bars continue firm at 1.35c. Pittsburgh, and shapes and plates are quoted at 1.35c. Warehouse quotations have not been changed and run from 1.70c. for steel bars to 1.80c. for structural material.

Old Material.—Business in this line is so scattered and the total so limited that it is difficult to obtain the right quotations. It is quite probable that some of the figures given below would have to be shaded before any large contracts could be signed up. The low level reached by pig iron has enabled scrap melters to substitute it for scrap, and, as a consequence, few sales of the latter are being made. The rolling mills, however, are taking a fair quantity. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.50 to 10.00
Burnt scrap, net ton.....	6.50 to 7.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, June 20, 1911.

Iron Ore.—The market shows very little life. The only transaction of importance is the reported sale of 500,000 tons of low grade non-Bessemer ore to the Bethlehem Steel Company for delivery over a period of 10 years. This business had been pending for several weeks. The contract is understood to be for ore analyzing about 46 per cent. in iron, natural, at slightly over 8c. per unit delivered. When the inquiry first came out it was understood that the steel company made an offer of 8c. per unit, but it appears that it was unable to secure ore at that price. Ore shipments have increased considerably over May but conditions in the lake trade are still unsatisfactory. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—Conditions are more active than for many weeks. Foundrymen in this territory are beginning to take an interest in the market for the last half. Inquiries from this source the past few days aggregate about 5000 tons. There is one inquiry for 2000 tons and several for 500 tons and under. The general feeling among furnacemen shows a marked improvement, and it is believed that a fair tonnage will be sold in the next few weeks. In basic iron there is an inquiry for an unspecified tonnage for the last half from a large consumer. A local pipe making plant has bought 1000 tons of No. 4 southern iron for immediate shipment, and another 1000-ton sale of southern iron has been made to a northern Ohio implement manufacturer. A leading manufacturer of sanitary goods is understood to have closed on an inquiry of 1000 tons of southern No. 2 soft and 1000 tons of gray forge for shipment to its Louisville plant in the third quarter. An inquiry from a Michigan implement maker is for 600 tons of analysis iron for the fourth quarter. Quotations on foundry grades are unchanged at \$13.50 to \$13.75. Valley furnace. The demand for Ohio silvery iron is light and lower prices are quoted. The furnace of the Upson Nut Company, Cleveland, went out of blast June 16. For prompt shipment and for the last half we quote delivered, Cleveland, as follows:

Bessemer.....	\$15.90
Basic.....	14.00
Northern foundry, No. 2.....	14.25
Gray forge.....	13.25
Southern foundry, No. 2.....	\$14.35 to 14.85
Jackson Co. silvery, 8 per cent. silicon.....	17.50 to 17.75

Coke.—The market is very quiet. Very little inquiry has come out yet for foundry grades for the last half. Quite a few consumers are buying in car lots as needed instead of placing contracts for their requirements. No demand exists for furnace grades. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton, at oven, for prompt shipment, and \$1.75 to \$1.85 for the last half. Connellsville 72-hour foundry coke is held at \$1.90 to \$2.15 for prompt shipment and \$2 to \$2.40 for the last half.

Finished Iron and Steel.—The demand in finished lines shows quite an improvement, and optimistic talk which was lacking for a long time has become quite general. Buyers held back for a time after the recent

THE IRON AND METAL MARKETS

price reductions because of uncertainty as to whether the new prices would be maintained. Prices on steel bars, plates and structural material appear now to be firmly adhered to. While some buyers are still holding off with the hope of getting further price concessions the general feeling among consumers appears to be that prices will be maintained. The improved demand is largely for steel bars. Inquiries for plates, however, are more active than for some time, a fair volume of business being in prospect from tank builders for specific work. In structural lines little work requiring tonnages of any size is pending at present, but the demand for small lots is fairly active, and some good business is in prospect. The demand for sheets has improved somewhat, and most of the small mills appear to be maintaining prices. Some additional steel bar contracts have been closed with implement manufacturers in this territory for delivery until July 1, 1912, on the basis of 1.25c., Pittsburgh. The demand for iron bars is still quiet. We quote iron bars at 1.25c., Cleveland, for outside shipment, but this price is being shaded considerably by some mills in other sections.

Old Material.—A local steel plant is in the market for heavy steel scrap for future delivery, for which \$11.25 to \$11.50 is being offered. Heavy steel scrap can be bought at that price for immediate shipment, but dealers are asking around \$12 for future delivery. The market generally is quiet, sales being limited to very small lots. Dealers are holding yard stocks for better prices, selling at current prices only scrap that must be moved. The Wheeling & Lake Erie Railroad closed June 20 on its usual tonnage, and the Michigan Central Railroad has a list out, to be closed June 21. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.25 to 11.50
Old car wheels	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable	10.75 to 11.00
Railroad malleable	11.00 to 11.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings	8.00 to 8.50
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast	11.25 to 11.50
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

Philadelphia

PHILADELPHIA, June 20, 1911.

The iron market shows no marked change. With few exceptions the demand is confined to small lots. The more cheerful feeling in finished materials has been sustained in a measure by a better run of small orders and by larger specifications, a condition which is considered encouraging, particularly at this season, when the usual summer dullness is due to set in. In some instances inquiries have increased and consumers are inclined to cover for more extended deliveries, but in few cases have finishing mills in this district increased their productive rate. More business is moving in the coke market, particularly with foundry grades. The old material market, while sentimentally stronger, is practically unchanged.

Iron Ore.—Reports are heard of a heavy purchase of Swedish ore by one of the Eastern independent steel plants, but lack definite confirmation. With this exception little is doing in the ore trade. Importations during the week were confined to Cuban ore, of which the arrival of 5300 tons is reported.

Pig Iron.—With the exception of the inquiry of the Pennsylvania Railroad covering 2500 tons of coke foundry and 1500 tons of charcoal iron for third quarter delivery, on which bids go in this week, the market has been bare of any important new inquiries. The demand for foundry grades has been confined to small lots and sales have been gradually diminishing, as is customarily the case prior to the usual midyear holiday. Eastern Pennsylvania furnaces as a rule maintain the recent range of prices for standard brands of No. 2 X and No. 2 plain pretty firmly at \$15.25, delivered, as a minimum for the former, and \$15 for the latter grade. One prominent producer has however determined on a more aggressive selling policy and has announced that No. 2 X foundry, of standard analysis, will be sold in moderate lots for third quarter shipment at \$15, deliv-

ered in this vicinity, and that \$15.25, delivered, will be acceptable for the same grade for delivery extending over the last half of the year. The movement in Virginia foundry grades has quieted and only occasional small lot sales are reported, the leading interest still quoting \$12.25, Virginia furnace, for No. 2 X for third quarter delivery, although some of the other producers continue to obtain an advance of 25 cents a ton. Small lot sales of Southern No. 2 foundry for early shipment to consumers in this district are reported where desirable freight rates are to be obtained, bringing the delivered price below quotations for eastern Pennsylvania brands. Such transactions have not, however, been of sufficient importance to have an effect on the prices named for local brands. Cast iron pipe foundries would no doubt make further purchases of low grade iron did not the weakness of Southern iron cause them to await further developments. Forge iron continues inactive. Consumers show no interest in the market and sellers' ideas of prices range from \$14.50 to \$14.75, delivered, for rolling mill grades. No new inquiry for basic iron is reported. Negotiations are still pending for a block of this grade for third quarter delivery, but the prospective buyer appears to be in no hurry to place the order. The minimum quotation is still \$14.50, delivered, but all producers are not willing to book orders for forward delivery at that basis. An inquiry for 1000 tons of low phosphorus iron has come out. Sales of standard brands continue to be made in small lots at unchanged prices. The following prices are named for standard brands, delivered in buyers' yards in this territory, for third quarter shipment:

Eastern Pennsylvania No. 2 X foundry.....	\$15.25 to \$15.50
Eastern Pennsylvania No. 2 plain.....	15.00 to 15.25
Virginia foundry	15.05 to 15.50
Gray forge	14.50 to 14.75
Basic	14.50 to 14.75
Standard low phosphorus.....	20.50 to 20.75

Ferromanganese.—A few inquiries for carload and 50-ton lots for early delivery have developed. Large lot buying is at a standstill. In the absence of any important business, quotations are largely nominal at \$36.60, for either prompt or last half shipment.

Billets.—More inquiry has developed and some consumers are feeling the market for more extended deliveries, particularly for forging billets, for which one inquiry covering several thousand tons is reported. Consumers of rolling billets confine their inquiries to lots of a few hundred tons, for the most part for early delivery. Actual business taken by producers shows no material increase, but the feeling in the trade is more optimistic. For early delivery in this district open hearth rolling billets are quoted at \$23.40, with ordinary forging billets at \$28.40, delivered.

Plates.—A fair volume of business continues to come out. For the greater part orders are small, although one of comparatively good quantity is occasionally taken. Mills have not increased their productive rate, but feel encouraged in that they are able to maintain an even basis at this season. A comparatively good demand for boiler, tank and locomotive steel exists, while round lots of boat plates are being figured on. Upwards of 9000 tons are asked for a Government collier. The recent price basis of 1.50c. minimum for ordinary plates delivered in this territory is being fully maintained.

Structural Material.—The smaller fabricators report more quiet conditions. A fair amount of business is being figured, but little is placed. Fabricated prices are still reported extremely low, considerably lower in some instances than the smaller interests can name. Prospective new business which is expected to be closed at an early date includes 1,600 tons for the new Ritz Hotel in this city, and about the same amount for a new hotel in Wilmington, Del. The Baltimore Bridge Company is reported to be the low bidder on about 900 tons for wireless towers for the Federal government. A shade more bridge work from some of the eastern railroads is also in prospect. The demand for plain shapes is not particularly active. Prices are fully maintained at 1.50c. minimum for plain material, delivered in this district in the next three months.

Sheets.—Business continues to increase in volume and mills in this district are now fully engaged, with the prospect of continuing so until the month's end. Consumers still confine their orders to moderate lots for reasonably early delivery, but the aggregate business is comparatively good. Prices are firm, the range of quotations f.o.b. eastern makers' mills, being: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.50c.; No. 27, 2.60c.; No. 28, 2.80c.

Bars.—Contracts with the larger consumers of steel bars in this district are reported to be cleaned up pretty

THE IRON AND METAL MARKETS

generally and specifications against them are freely made. A moderate though irregular demand for refined iron bars is to be noted, the bulk of the orders being for small lots placed at unchanged prices. Refined iron bars continue to be quoted at 1.27½c. to 1.32½c., and steel bars at 1.40c., delivered here.

Coke.—More activity is to be noted, both in foundry and furnace grades. A number of contracts have been made covering 1000-ton lots of foundry coke for last half shipment, at prices ranging from \$2 to \$2.35 at ovens, according to quality. Several round lots of foundry coke are still under negotiation, including one of 6000 tons for delivery over the remainder of the year. Small prompt sales continue to be made at \$1.90 to \$2.00, ovens. More interest is shown in furnace coke, the principal inquiry being from an eastern furnace for a lot of 24,000 tons for last half delivery. About \$1.60 to \$1.75 ovens, represents the range of the market for forward foundry coke, although spot furnace coke is reported available at \$1.40 to \$1.50, ovens. The following range of prices per net ton is named for deliveries in this vicinity:

Connellsville furnace coke.....	\$3.65 to \$4.00
Foundry coke.....	4.10 to 4.55
Mountain furnace coke.....	3.25 to 3.60
Foundry coke.....	3.70 to 4.15

Old Material.—Transactions continue light, mills take occasional small lots in various grades, but the principal movement has been between dealers. Notwithstanding the continued quiet the market is sympathetically stronger and prices show no change. Small lots of heavy melting steel are taken by mills at about \$13.25 delivered, for prime material. Rolling mills are showing no great interest in the market, although one consumer is feeling around for a large lot of wrought scrap. Quotations, while largely nominal, for moderate quantities, for early delivery, in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton, follow:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	13.75 to 14.25*
Low phosphorus heavy melting steel scrap..	16.75 to 17.25
Used steel axles.....	19.25 to 19.75*
Old iron axles.....	24.00 to 24.50
Old iron rails.....	16.50 to 17.00
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.00 to 12.50
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	6.75 to 7.25*
Wrought turnings.....	8.50 to 9.00
Cast turnings.....	8.00 to 8.50
Machinery cast.....	13.00 to 13.50
Railroad malleable.....	11.50 to 12.00
Grate bars, railroad.....	10.00 to 10.50
Stove plate.....	10.25 to 10.75

*Nominal.

St. Louis

St. Louis, Mo., June 19, 1911.

The week has been a good order period in nearly every line. Though no large sales and no rail contracts have been made, both the railroads and the general contractors have been specifying freely, the former on all materials and the latter on contracts. The consumption of pig iron continues steady, with no striking features to the market and the same may be said of coke. In other lines the general situation is much the same, but with it all is a much stronger feeling that the dullness has practically reached its end and that a renewal of activity will come within a very short time. The character of the specifications received has much to do with this sentiment. The larger buyers are apparently showing a greater interest in the market, though they are not committing themselves with orders.

Pig Iron.—With a fair total of general business showing in pig iron, inquiries have a better tone. Although the larger consumers are still out of the market so far as actual orders and new business are concerned, an interest is shown that indicates better things before long. Inquiries have less the appearance of indefinite feelers, and some reports of sales are coming out, including one for 1000 tons, equally divided between No. 2 Northern and No. 2 Virginia for last quarter delivery. An implement company has out an inquiry for approximately the same tonnage in about an equal division between Northern and Southern product, and also an inquiry for between 600 and 700 tons of No. 2 Southern. The quotations continue about as they have in the past few weeks, but assertions by buyers continue that they are getting No. 2 Birmingham at \$10. The basic market is apparently without life, in spite of a report of the purchase by the Commonwealth of 5000 tons. If the

deal was made it was kept well under cover. In general the requirements of the industries which have been steady users of pig have kept up to the mark that has been maintained for some weeks.

Coke.—While the coke market has no strikingly new features, requisitions on contracts continue to come in fairly well, in fact a little better than for some time. The foundries are taking coke in good volume and some consumers are asking prices for delivery during the next few months, while a few are making inquiries for six months and year delivery. For spot delivery \$2.00 is quoted with \$2.25 for Virginia and \$2.50 for Connellsville, best 72-hr. selected, for future deliveries. One report is of a sale of 6000 tons at prevailing prices for last half delivery. No other contracts are noted, but general increase in the optimism of the market is shown, which may lead to better things soon.

Finished Iron and Steel.—The past week orders have been coming in more freely than for some time, and, while no large sales and no rail contracts have been made, the railroads have been specifying freely in all materials, which is taken as a good sign for the early future. The Missouri Pacific orders recently noted have been formally closed. In light rails some request from the coal mines has been received, with little or nothing from the lumber mills. In structural iron the situation has been better than for months and the contractors are specifying very freely against contracts, indicating very clearly that they are without material on hand, their requisitions being for quick delivery. The mills are in a position to make such deliveries and the combination of circumstances has helped in improving the tone of the situation. The bar specifications also are better, but the buyers are not yet in the market as freely as expected. Plates are quiet, with very little movement. Track fastenings, etc., are in active request.

Old Material.—The situation in scrap is as dull as ever. The dealers are speculating a little, but otherwise there is very little new to note. The Vandalia list which was reported last week brought good prices, but with no particular occasion therefor except a speculative disposition. In general, however, the tone of the market is better, in a feeling of prospective activity. This may be the result of the improved disposition in the new material situation. Dealers' prices per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	11.25 to 11.75
Old steel rails, less than 3 ft.....	10.25 to 10.75
Relaying rails, standard section, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards cut apart.....	10.25 to 10.75

The following quotations are per net ton:

Iron fish plates.....	\$10.25 to \$10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	10.50 to 11.00
No. 2 railroad wrought.....	9.50 to 10.00
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	8.50 to 9.00
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
No. 1 cast scrap.....	9.50 to 10.00
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	8.00 to 8.50
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	7.25 to 7.75
Railroad sheet and tank scrap.....	7.25 to 7.75
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	6.00 to 6.50

Buffalo

BUFFALO, N. Y., June 20, 1911.

Pig Iron.—The market has very little life, although inquiries mostly for small lots are still coming in from New England and New York State points. A number of inquiries have also been received in this market in the week from the Pittsburgh and Philadelphia districts. Very few orders are reported as booked, the largest noted being for 300 tons No. 2 X from New England for last half delivery. The remainder consists of small lot and carload orders from small foundries, and repeat orders from regular customers. One furnace interest is sold up to the end of the last half and has discontinued all low quotations. Shippers are still taking iron on old contracts in good volume and shipments via the Erie Canal will be heavy now that the break which has been holding up canal shipments has been repaired. The week has shown a still further tendency toward softer prices. It is stated that one furnace has quietly

THE IRON AND METAL MARKETS

negotiated No. 2 X at \$13 furnace, but this cannot be confirmed and most furnaces are adhering to \$13.25 f.o.b. Buffalo as rock bottom for 2 X, and \$13 f.o.b. Buffalo for Nos. 3 and 4 iron. One or two interests absolutely refuse to take business at these prices. We quote as follows for last half deliveries f.o.b. Buffalo:

No. 1 X foundry.....	\$13.75 to \$14.25
No. 2 X foundry.....	13.25 to 14.00
No. 2 plain.....	13.25 to 13.75
No. 3 foundry.....	13.00 to 13.25
Gray forge.....	13.00 to 13.25
Malleable.....	13.75 to 14.25
Basic.....	14.00 to 14.75
Charcoal.....	16.50 to 17.25

Finished Iron and Steel.—The general situation in finished products shows continued improvement, and there is a more hopeful feeling among both buyers and sellers, and considerable contracting for bars and structural material for shipment during the third and fourth quarters, the prevailing opinion being that the bottom has been reached and the turn of the market is at hand. The Canadian export trade has been exceptionally good in the week. From 15,000 to 20,000 tons of skelp has been sold the past week to one of the large steel pipe manufacturers of Canada for delivery over the remainder of the year. Several large purchasers of tin plate have also been made for Canadian shipment, aggregating 20,000 boxes. In fabricated structural lines business maintains a good volume. The contract for 2800 tons of girders, columns and grillage for the Larkin Company's warehouse, Buffalo, was awarded to the McClintic-Marshall Company, Pittsburgh. The Buffalo Structural Steel Company was this week given the contract for the fabrication and erection of 250 tons of steel for the German Deaconess' Hospital. Deferred bids for the steel work for the Hutchinson High School, Buffalo, 800 tons, are to be received this week, and bids for the extension of the Canadian Niagara Power Company's power house underneath Table Rock, Victoria Park, Niagara Falls, requiring 500 tons, are also to go in this week. The Goulds Mfg. Company, Seneca Falls, N. Y., has placed the contract with the Jones & Laughlin Steel Company for 375 tons of structural steel for the new factory buildings. The contract is also to be let this week for 1000 tons of reinforcing bars for the Eastman Kodak Company's new factory buildings at Rochester, N. Y.

Old Material.—The market, although still very dull, shows some indications of revival. Consumers are beginning to exhibit a slight interest; but actual transactions are extremely limited in number, and of small tonnages. The principal buying is by dealers, who are taking into stock such offerings as are obtainable at reasonable prices in anticipation of a wider buying movement by consumers a little later. Owing to the limited supply of turnings and borings obtainable on account of reduced operations in machine shops in some localities, a tendency exists toward stiffer prices for these grades. Otherwise the price situation is unchanged. We quote as follows per gross ton f.o.b. Buffalo, most of the prices shown being nominal:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.50 to 14.00
No. 1 railroad and machinery scrap.....	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.50 to 12.00
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings.....	6.25 to 6.75
Clean cast forgings.....	6.00 to 6.25

Birmingham

BIRMINGHAM, ALA., June 19, 1911.

Pig Iron.—The market continues quiet with little or no change in prices. The volume of inquiries is small and for actual requirements only. No disposition has developed among the foundrymen to speculate on the present low market, though everyone seems to realize it has about reached bottom. The usual tendency under like conditions to over-buy for future requirements has not developed, neither buyer nor seller seeming to show any aggressiveness. The furnace production is at a low ebb here, with consumption and production running about even. Prices are held pretty firmly here at \$10.50 for No. 2 with reports of a few exceptional sales at \$10.25. Raw material, labor conditions and other factors entering into the manufacture of pig iron are quite satisfactory, the only cloud on the horizon being the ex-

treme low prices. All interests feel that the early fall will bring better prices and an increased volume of business. Quotations are unchanged, as follows, per gross ton f.o.b. furnaces, Birmingham district:

No. 1 foundry and No. 1 soft.....	\$11.00
No. 2 foundry and No. 2 soft.....	10.50
No. 3 foundry.....	10.00
No. 4 foundry.....	9.75
Gray forge.....	9.50
Mottled.....	9.25
Standard basic, chill cast.....	10.50
"Old Basic".....	10.00
Charcoal carwheel iron.....	22.50

Cast Iron Pipe.—Quite a number of inquiries for good round lots of water pipe have been received the past week, mostly from the Coast and Central West, all of which will, it is thought, result in considerable new business. The shops now running feel confident of an active summer, with their plants running fairly full. Quotations are nominally as follows: Per net ton, f.o.b. cars here: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., \$21, with \$1 per ton extra for gas pipe.

Old Material.—A lack of interest is apparent in this market, with very little demand. The extreme low price of iron has more or less demoralized the scrap market, consumers preferring to use the regular iron, it being so cheap and the saving on scrap so small. Only certain classes of scrap, such as rolling mills use, seem at all in demand. Dealers are quoting as follows:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

Coal and Coke.—Business has been unusually dull for 60 days on both coal and coke, which is not, however, unusual for this time of year. It is now the middle of the contracting season, and all interests are busy closing contracts for the next twelve months' requirements. Competition is very close, and last year's prices are being shaded on nearly all contracts. It is expected that a normal tonnage will be placed.

New York

NEW YORK, June 21, 1911.

Pig Iron.—The week has been characterized by a much stronger demand for foundry iron. From 12,000 to 15,000 tons has been quietly bought by two or three consumers for scattered delivery. The circumstances attending these purchases indicated that the buyers were impressed with the belief that this is an opportune time to cover direct requirements. An additional sale was of 2500 tons to a large manufacturer of soil pipe. Considerable quantities of pig iron are also under negotiations for various deliveries. These developments, coming as they do at this time, appear to have considerable significance. They are not stimulated by any advance, but on the contrary pig iron prices appear to be slightly softer. Every concession, however, undoubtedly brings the market closer to rock bottom, from which, of course, there will be a quick recovery when the demand becomes general. A feature of present conditions is that specifications on contracts are fully up to terms, and instances are occurring of shipments being ordered at a slightly more rapid rate than named in contracts. Northern iron at tidewater is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.50; No. 2 plain, \$14.50 to \$15. Southern No. 1 foundry is quoted at \$15 to \$15.50; No. 2, \$14.50 to \$15.

Cast Iron Pipe.—An eastern Pennsylvania foundry secured the contract for 1200 tons of water pipe on which bids were opened June 15 by Newark, N. J., at \$20.47 per net ton, delivered. A foundry in southern New Jersey secured the contract for 450 tons for Yonkers, N. Y., on which bids were opened June 19, at \$21.65; quite a wide range was observed in these bids, some foundries naming as high as \$23.50, which is claimed to be close to their actual cost, although their foundries are among the best and most efficiently managed in the country. The city of New York will contract June 28 for a quantity of water pipe, but specifications have not yet been announced. Very few public lettings are coming out, and the demand from private buyers has again subsided to small proportions.

THE IRON AND METAL MARKETS

Carload lots of 6 in. are quoted at \$21 to \$22 per ton, tidewater.

Finished Iron and Steel.—A demand fluctuating slightly from day to day but of the magnitude which has prevailed for several weeks marks present conditions. Bar iron is perhaps a little livelier, with no betterment in prices. The strike of boilermakers is practically settled, incidentally resulting in an increase in the number of open shop employees, and local business in plates may as a result pick up. A reported improvement in fabricating prices was not found to be the general experience, but there is perhaps a growing feeling that contractors may be overstaying the market regarding price changes and may well hasten to close contracts. Of new work the largest transactions are as follows: 3500 tons of bridges, Baltimore & Ohio; 1200 tons for an 8-story pavilion, Bellevue Hospital, New York; 600 tons for four bridges, New York Central; 500 tons, Dey Brothers & Co., department store, Syracuse, N. Y.; 800 tons for Golden 11-story loft building at Lafayette and Howard streets, New York, and 300 tons for a laboratory for Yale University. The letting of the 1000 tons of the Rochester, N. Y., station of the New York Central has been postponed to next week. A late unverified report is that plans will shortly be ready for the Chesapeake & Ohio office building and the Richmond Trust Company building, Richmond, Va. Some of the bridge contracts awarded were: Lehigh & New England Railroad, 400 tons, and Erie Railroad, 1500 tons, both to American Bridge Company; Atlantic Coast Line, 400 tons, to Pennsylvania Steel Company; Atlantic Coast Line, Altamaha River, 2000 tons, to McClintic-Marshall Construction Company. Some of the late building contracts are: Loft, Twenty-third street, New York, 700 tons, to Hinkle Iron Company; loft, West Twenty-fifth street, 600 tons, to A. E. Norton Company; Smith building, Providence, 500 tons, to Providence Steel & Iron Company; Cuyler Realty building, West Thirty-first street, New York, 2300 tons, and Mayer apartment house, Park avenue and Seventy-eighth street, 1000 tons, to American Bridge Company. The Baltimore Bridge Company was the lowest bidder for 900 tons for wire-less telegraphing towers for erection at Fort Myer, Va. The general contract for the Hartford National Bank building, 500-ton steel structure, has, it is understood, been given to Wells Brothers Company. The Canadian Car & Foundry Company is reported placing 50,000 tons of shapes with the United States Steel Products Company. Quotations are: Plain structural material and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.37½c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

Old Material.—Transactions seldom run beyond a moderate tonnage, but more or less buying characterizes the entire market. In heavy melting steel scrap a few sales have been made, but none amounted to more than 300 or 400 tons. Sales of small lots of old car wheels have been made for shipment to New England consumers. Foundries are buying cast iron scrap in quantities merely sufficient to cover their wants for a week or two. Wrought scrap is probably the most neglected article in the list, and prices have gone off slightly. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Rerolling rails.....	(nominal) 12.00 to 12.25
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	12.75 to 13.25
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.25 to 4.75
Cast borings.....	5.25 to 5.75
Wrought turnings.....	6.25 to 6.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

Ferroalloys.—A few carload lots of ferromanganese have been sold, and an inquiry is in hand for 300 tons. Prices rule at about \$36.50, Baltimore. A New Jersey steel company bought a small lot of 50 per cent. ferro-silicon at around \$51.75, delivered.

The Republic Iron & Steel Company expects to have its new 110-in. plate mill in operation some time in October and its new combination 14 and 16-in. finishing mill also ready for operation early in the fall.

The German Iron Market

BERLIN, June 9, 1911.—The iron trade continues quiet, with a tendency toward lower prices. The downward movement in bars, in particular, persists, and some other departments of the trade are likewise weaker. This is due in large part to the artificial circumstance that the members of the Steel-works Union are exerting themselves to their utmost to get orders and keep their production up to the top-notch so as to obtain big allotments upon the renewal of the combination next year. Contrary to the general tendency of the trade, pig iron, as is now confirmed, has actually risen a mark or two per ton in the finer Siegerland numbers, because of the belief that the Essen Syndicate will still be perfected and the remaining outsiders brought into the fold. The expectation, however, is evidently too optimistic, for fresh obstacles have quite recently presented themselves, and it is far from certain that the one big syndicate will be realized. Nevertheless, furnacemen are little disposed to take orders at existing prices and are refusing them altogether for 1912 delivery, hoping that they will be able to enforce better prices after the syndicate has been reorganized. The offerings of scrap and old material have increased and prices are weaker. In finished products a waiting tendency on the part of consumers is noted, so far at least as long-term orders are concerned, while materials for immediate consumption are still being ordered as needed, with the shortest possible dates for delivery, which indicates that supplies have run pretty low with consumers.

Today the provisional figures of the Union for Class A goods (rails, structural forms and semi-manufactured products) for May were given out, showing an uncommonly high total. Shipments of the three classes of products reached 525,000 tons, as against 440,400 tons in April and 387,600 tons in May, 1910. Shipments last month were the heaviest ever known, except in March, 1910 and 1911, in which month the companies are always hurrying deliveries to clean up the year's business and make a good showing on the Union's books. The biggest increase in the May shipments was in steel rails and ties, which amounted to 200,000 tons, or nearly 63,000 tons more than in May, 1910. Structural shapes also show a good record with 196,000 tons, or about 18,000 tons more than last year. The latter figure reflects the activity in the building trades, which has been fully maintained or even augmented. It is believed that the heavy movement in rails can hardly be continued. Foreign orders, indeed, are still coming in to some extent, and other business is in sight, but export orders are not expected to keep up to their present level. Work on light rails continues very good, both on home and foreign orders.

The Export Trade

The foreign trade figures for May indicate the continuance of a rather light export movement, except in steel rails, which gained about 21,000 tons in a total of 51,700 tons over May, 1910. Exports of ingots and blooms reached 37,400 tons against 39,100, beams 29,100 tons against 37,000 and steel ties and other track-building supplies 6100 tons against 13,300. Exports of pig iron totaled 80,100 tons against 70,000 and imports 9796 tons against 13,000.

Work on semi-manufactured products continues at the normal rate, but little new ordering is to be reported, home consumers having already provided for the most part for their requirements for the September quarter. Prices for export have further weakened somewhat under Belgian influences, although that market has this week for the first time in a month or two sent in no bad news. Export prices for billets, free on board ship, are 81 to 82 marks and muck-bars 85 to 86 marks. Export business in this department has grown considerably quieter.

The bar mills are eagerly in quest of foreign business, and price-cutting continues, especially in competition with Belgian works. Business in wrought-iron bars on the other hand, continues pretty good, few manufacturers of this specialty being left in the trade, and competition therefore being less serious. Prices at the mills are around 133 marks. In bands the conditions outlined in last week's report continue, with prices still further depressed, ranging between 130 and 135 marks. One authority asserts that prices have receded 15 marks within a fortnight. In cold-rolled bands business is quieter. Steel skelp for tube-making is in steady demand. For the next quarter prices of

skelp for boiler tubing range between 122.50 and 127.50 marks, according to width and for gas pipes 137.50 to 142.50 marks. Makers of steel tubing complain that selling prices are quite unprofitable.

Structural Market Improves

The demand for beams and other structural forms has improved, both from the building trades and from construction shops. The export market also continues to take pretty good amounts, but chiefly upon orders given some time ago. The export price is 106 marks, free on board ship, with rebates in certain cases. Heavy plates continue to be the strongest section of the trade. Shipyards cannot get manufacturers to deliver plates as rapidly as wanted, and there is a good prospect for a still heavier demand from this source, a number of large steamers having been ordered recently. Locomotive and engine works are also calling for large quantities of plates. Mills running on medium thicknesses have enough work on hand, but orders for thinner qualities are rather unsatisfactory. In wirestock and wire a waiting attitude is noted, in view of the uncertainty as to whether the wire association will be prolonged or not. Next week will bring the decision of the matter. In this department of the trade, as in some others, the conflict of interests between the big union companies and the mills confined exclusively to wire or to wire and wirestock, is felt more and more. The trouble is that the big companies in the union are trying to squeeze the small wire mills.

Locomotive shops are doing an unusually good business. This week the Paris-Lyons Railway has ordered 20 express train locomotives at Cassel and an equal number of freight locomotives at Cologne. The general machinery trade shows great activity. A labor market report shows much fewer workmen seeking jobs in this branch than last year. Machinery prices, however, except for specialties, are pronounced by shop owners quite unsatisfactory. Like complaint is heard from managers of construction shops, although they are well supplied with orders.

The Krupp Company is enlarging its plant at Rheinhäusen on the Rhine opened several years ago. An electrical central station is being built, and the steel mills enlarged. A Portland cement factory will also be erected.

The ore market is quiet, with not much disposition among furnacemen to buy foreign ores at the existing high prices. Mediterranean ores have recently become somewhat cheaper, and business in them is better. Ore imports in May reached 842,900 tons, or 31,700 tons more than in May, 1910, but about 400,000 tons less than in April, 1911.

Cable dispatches from Berlin this week announce the forthcoming dissolution of the German steel wire pool, which presages a price war in that important branch of industry.

Metal Market

NEW YORK, JUNE 21, 1911

The Week's Prices

		Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
		Electrolytic	Refined	Refined	Refined	Refined	Refined	Refined	Refined
June.	Lake.	12.50	45.50	4.47½	4.32½	5.62½	5.42½		
15.....	12.75	12.50	43.50	4.50	4.35	5.70	5.45		
16.....	12.75	12.50	.....	4.50	4.35	5.70	5.50		
17.....	12.75	12.50	43.85	4.50	4.35	5.75	5.55		
19.....	12.75	12.50	44.65	4.50	4.35	5.75	5.55		
20.....	12.75	12.50	44.87½	4.50	4.35	5.75	5.55		
21.....	12.75	12.50	.....	4.50	4.35	5.75	5.55		

The corner in pig tin has apparently been broken, the metal being 2c. per lb. cheaper than a week ago. Copper is strong. Both lead and spelter are higher.

Copper.—It would be a hard matter to estimate what the sales of copper have been during the last two weeks, but it is certain that the buying was heavier than in any other two weeks of the year. Within the last few days the demand has fallen off, but a good call for the metal still exists. Prices are decidedly firm and remian as they were a week ago. Electrolytic is 12.50c. and Lake is 12.75c. The United States Metals Selling Company is making the market just now and other prominent sellers are as a rule ¼c. higher than the market price. This means that many of them have practically withdrawn for the time being. Considerable of the Lake copper bought in the last two weeks brought as high as 12.87½c., and there were sales made at 12.90c. The brass manufacturers were the heaviest purchasers, but the buying was pretty well distributed and it is a significant fact that purchasing was not only general but chiefly in small lots. The London market this morning was firm, with spot copper selling at £57 5c. and fu-

tures, £57 17c. 6d. The exports of copper so far this month have been heavy, amounting to 19,527 tons.

Pig Tin.—The pig tin syndicate let go its hold of the London market last Friday and quotations have been on the downward trend ever since. To-day the American market is 2c. lower than it was a week ago, and in London this morning spot tin was down to £193 5d., as against £230 a week ago to-day, while futures which brought £187 5d. last week were selling at £191 15s. this morning. The information that the syndicate expected to end the squeeze on June 20 was not without foundation, as last Thursday it was announced that pig tin could be bought for delivery until June 21 for £230, while the holders were willing to take £5 less for delivery after that date. From the same source that the information regarding the probable end of the squeeze came it is learned that about all the short contracts in London have been covered. On the return of this market to more normal conditions last Thursday and Friday there was heavy buying. It is estimated that nearly 800 tons of spot tin was sold and sales were made for delivery as far ahead as the middle of June. Those who had spot to dispose of did a handsome business and replaced their stocks three weeks ahead at from 1c. to 2½c. less than the price they took for spot. Pig tin was offered in this market this morning at 44.87½c. The arrivals of pig tin in this country so far this month have been light, amounting in all to 1557 tons, while there are 990 tons afloat, most of which will be in port before the month is out.

Tin Plates.—Regardless of the slump in the pig tin market the price of foreign tin plates this morning was higher than a week ago, being quoted at 14s. at Swansea, Wales. The domestic market is quiet at \$3.94 for 100-lb. coke plates.

Lead.—While the demand for lead is not heavy the market has an upward trend and outside sellers are now demanding the price that the syndicate has held to since early in the year, which is 4.50c. New York and 4.35c. St. Louis. There was a bulge in lead last Thursday and Friday, due largely to stronger prices in other non-ferrous metal markets.

Spelter.—The spelter market is hard to quote, as sellers do not seem to be so well organized as they were a few months ago. The market has been steadily climbing all week and there is a much better demand. Stocks are said to be light and it is certain that consumers who bought sparingly since early in January are in need of the metal. While there have been some purchases by speculators, the offerings are so light that the increase in value seems to be warranted. Spelter in St. Louis is now at 5.55c. and it is very firm in New York at 5.75c. The daily prices quoted above are based on sales, but the range during the week has been very wide from day to day.

Antimony.—The antimony market has taken a sudden turn and it is apparent that foreign syndicate operators have been disappointed in their plans. A great deal of quiet undercutting has been done and some producers who have refused to enter the syndicate have disposed of a great deal of surplus stocks. It is reported that a heavy cut in Cookson's antimony is to be made very shortly. The price this morning was 9c. Hallett's is down to 8.75c. and it can be bought for July delivery at fully 1c. less than that price. Hungarian grades are nominal at about 7.25c. The general demand is light.

Old Metals.—Conditions are improving and dealers' selling prices, New York, are somewhat higher, as follows:

	Cents
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Composition turnings.....	8.75 to 9.00
Clean brass turnings.....	8.00 to 8.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc, scrap.....	4.25 to 4.30

St. Louis

JUNE 19.—The metal market in some respects shows a little more activity, especially in lead and spelter, which have developed advances in price and are continuing in good request. Tin is off, being quoted at 44.35c. as against 48.85c. last week. For antimony the figure is unchanged at 9.35c. Lake copper is 12.97½c., against 12.85c. last week, and electrolytic is 12.85c. against the same figure a week ago. The lead quotation to-day is 4.32½c. to 4.35c. and very active. In spelter the price is 5.40c. to 5.45c. and also active. In old metals the quotations are: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc 3c.; lead, 3.25c.; pewter, 20c.; tin foil, 30c.; tea lead, 3c.

Chicago

JUNE 20.—With the exception of tin, which has receded from the high point reached last week, all metals are quoted higher, with the demand fairly active. We quote Chicago prices as follows: Casting copper, 12.75c.; lake, 13.00c., in carloads, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{8}$ c. higher; pig tin, carloads, 45 $\frac{1}{2}$ c.; small lots, 48 $\frac{1}{2}$ c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.70c. to 4.75c. for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.45c. to 5.50c.; Cookson's antimony, 10c., and other grades, 8 $\frac{3}{4}$ c. to 9 $\frac{3}{4}$ c., in small lots; sheet zinc is \$7.25 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12 $\frac{1}{2}$ c.; copper bottoms, 10 $\frac{1}{4}$ c.; copper clips, 12c.; red brass, 10 $\frac{1}{2}$ c.; yellow brass, 9 $\frac{3}{4}$ c.; lead pipe, 4 $\frac{3}{8}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter, No. 1, 27c.; tin foil, 35c.; block tin pipe, 30c.

Iron and Industrial Stocks

NEW YORK, June 21, 1911.

The stock market has been moderately active, with firm prices and in some stocks an advancing tendency. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalm., com.... 9	Pittsburgh Steel, pref.... 105 $\frac{1}{2}$
Allis-Chalm., pref.... 30 - 31	Pressed St., com.... 36 $\frac{1}{4}$ -37 $\frac{1}{2}$
Beth. Steel, com.... 33 - 34 $\frac{1}{2}$	Pressed St., pref.... 100 $\frac{1}{2}$ -102 $\frac{1}{2}$
Beth. Steel, pref.... 62 $\frac{1}{4}$ -64 $\frac{1}{2}$	Railway Spr., com.... 37 $\frac{1}{2}$ -39
Can., com.... 11 - 11 $\frac{1}{2}$	Railway Spr., pref.... 102 - 103
Can., pref.... 85 $\frac{1}{4}$ -87 $\frac{1}{2}$	Republic, com.... 30 - 31 $\frac{1}{2}$
Car & Fdry., com.... 56 $\frac{1}{4}$ -57 $\frac{1}{2}$	Republic, pref.... 93 $\frac{3}{4}$ -96
Car & Fdry., pref.... 115 $\frac{1}{4}$ -118	Sloss, com.... 50 - 52
Steel Foundries.... 42 - 43	Pine, pref.... 50 $\frac{1}{2}$ -52 $\frac{1}{2}$
Colorado Fuel.... 34 $\frac{1}{4}$ -35 $\frac{1}{2}$	U. S. Steel, com.... 78 $\frac{1}{2}$ -80
General Electric.... 161 $\frac{1}{2}$ -165 $\frac{1}{2}$	U. S. Steel, pref.... 118 $\frac{1}{2}$ -119 $\frac{1}{2}$
Gr. N. ore cert.... 62 $\frac{1}{2}$ -63 $\frac{1}{2}$	Westinghouse Elec.... 73 $\frac{1}{4}$ -77 $\frac{1}{2}$
Int. Harv., com.... 120 $\frac{1}{2}$ -123	Va. I. C. & Co., com.... 69 - 71 $\frac{1}{2}$
Int. Harv., pref.... 123 $\frac{1}{2}$ -124 $\frac{1}{2}$	Chic. Pneu. Tool.... 51 $\frac{1}{2}$ -51 $\frac{1}{2}$
Int. Pump, com.... 41 $\frac{1}{2}$ -43	Cambridge Steel.... 44 $\frac{1}{2}$ -45 $\frac{1}{2}$
Int. Pump, pref.... 90	Lake Sup. Corp.... 27 - 28
Locomotive, com.... 42 - 43 $\frac{1}{2}$	Warwick.... 9 $\frac{1}{2}$ -10
Locomotive, pref.... 109 - 110	Crucible St., com.... 13 $\frac{1}{4}$ -13 $\frac{1}{2}$
Nat. En. & St., com. 17 - 17 $\frac{1}{2}$	Crucible St., pref.... 82 $\frac{1}{2}$ -84

The Ohio Iron & Metal Company, iron and steel scrap, with offices in Chicago, Pittsburgh and Cleveland, will open a branch office July 1 in the Arcade building, Philadelphia, in charge of H. G. Stalnaker, for some years connected with the Pittsburgh office. The Philadelphia office will be under the jurisdiction of the Pittsburgh office, which is in charge of H. D. Stalnaker, and which also controls the Cleveland office.

Dividends Declared.

The United Shoe Machinery Company, regular quarterly, 2 per cent. on the common and 1 $\frac{1}{2}$ per cent. on the preferred stock, payable July 5.

The Dominion Iron & Steel Company, quarterly, 1 per cent., payable July 3.

The Canadian Westinghouse Company, regular quarterly, 1 $\frac{1}{2}$ per cent. and extra dividend $\frac{1}{2}$ per cent., payable July 10.

The Gorham Mfg. Company, quarterly, 1 $\frac{1}{2}$ per cent., payable July 1.

The American Locomotive Company, quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable July 21.

The Boston Belting Company, quarterly, \$2, payable July 1.

The Empire Steel & Iron Company, quarterly 1 per cent. on the preferred stock, payable July 1.

The McCrum-Howell Company, quarterly, $\frac{3}{4}$ per cent. on the common stock, payable July 1.

The Garvin Machine Company, regular semi-annual, 3 $\frac{1}{2}$ per cent. on the preferred stock, payable July 1.

The Torrington Company, regular semi-annual, 3 $\frac{1}{2}$ per cent., payable July 1.

The Otis Elevator Company, regular quarterly, 1 $\frac{1}{2}$ per cent. on the preferred and 1 per cent. on the common stock, payable July 15.

The American Brake Shoe & Foundry Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred and 1 $\frac{3}{4}$ per cent. on the common stock, payable June 30.

The American Locomotive Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable July 21.

The Sloss-Sheffield Steel & Iron Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable July 1.

The Yale & Towne Mfg. Company, regular quarterly, 1 $\frac{1}{2}$ per cent. and extra dividend 1 per cent., payable July 1.

The Mining Engineers' Fall Meeting

The American Institute of Mining Engineers will hold its one hundred and first meeting in San Francisco, Cal., beginning Tuesday evening, October 10, 1901. It is expected to hold the opening session at the St. Francis Hotel, San Francisco, to be followed by other sessions on Wednesday and Thursday. Excursions have been arranged to the California oil fields and the gold dredging district on Thursday and Friday. Other excursions to be made Saturday and Sunday are for entertainment. A special train will leave Chicago September 30, for which reservations are now being made by Dr. Joseph Struthers, the secretary of the institute. An excursion to Japan will be taken at the conclusion of the San Francisco meeting. Accommodations have been secured on the Manchuria, sailing from San Francisco, October 17, stopping at Honolulu, and reaching Yokohama November 3 in time to witness the parade in honor of the emperor's birthday. The excursion in Japan, which will occupy 18 days, covers the chief points of historic, scenic and professional interest. The return trip will start from Yokohama November 21 on the Siberia, reaching San Francisco December 7.

The Carnegie Steel Company, on July 1, will take possession of the warehouse and stock of the Bassett-Presley Company, Cleveland, Ohio, and will conduct a general jobbing business from that city. For the past few months the Carnegie Company has been doing some jobbing business in the Cleveland territory, making deliveries from its Pittsburgh warehouse. The Bassett-Presley warehouse will be enlarged considerably, the Carnegie Company having acquired adjoining property for that purpose, as more room is needed for structural material, which the Bassett-Presley Company did not carry in stock. The warehouse stock of the Carnegie Company will include bars, plates, shapes, sheets and possibly other products. The Bassett-Presley Company will retain its name and will probably continue in business along other lines, although its plans have not yet been decided upon.

Dr. Joseph W. Richards, secretary American Electrochemical Society, South Bethlehem, Pa., has issued his June bulletin giving a budget of news relative to the society. He states that preparations are being actively made for the twentieth general meeting, which will be held at Toronto, Canada, September 21 to 23, and which promises to be the most important yet held by the society. Many important papers have already been offered to the committee having that matter in charge. A list of seventeen applicants elected to membership is given, comprising engineers, chemists and officers of important manufacturing interests not only in this country, but also in Canada and abroad.

The financial statement of the Crucible Steel Company of America, Pittsburgh, Pa., for the nine months ended May 31, 1911, is as follows:

Profits for quarter ended Nov. 30, 1910..	\$1,022,759.12
Profits for quarter ended Feb. 28, 1911..	972,320.28
Profits for quarter ended May 31, 1911..	1,078,550.08
Total profits.....	\$3,073,629.48
Deduct for depreciation and repairs.....	\$934,340.94
Contingencies and corporation tax.....	59,776.76
Interest on bonds, subsidiary companies..	55,055.50
Total deductions.....	1,049,173.20
Net profits	\$2,024,456.28

The Armor Steel Foundry Company announces that, having purchased the property and equipment of the Steel Foundry Company, Winton Place, Cincinnati, it will make that its principal works and general office in the future. A large amount of new equipment has been installed, placing the plant in a position to increase materially its output and to shorten time of deliveries. The inclusion on its staff of a competent chemist and metallurgist of long experience and high standing will enable the company to engage successfully in the manufacture of nickel, chrome, vanadium, titanium and Gebhart process of steel castings. All improvements and additions are expected to be completed by July 15, and to be in operation by that time.

Personal

President James A. Farrell, of the United States Steel Corporation, will sail for Europe next Tuesday, but will make only a short stay, expecting to be in New York again July 14.

Chairman E. H. Gary, of the United States Steel Corporation, sailed for Europe on Wednesday.

Herman Schneider, dean of the School of Engineering, University of Cincinnati, has been given an honorary degree of doctor of science by the University of Pennsylvania. The degree was in recognition of Dean Schneider's services to American education in founding the co-operative system of college work.

H. J. Freyn, formerly with the Illinois Steel Company, South Works, South Chicago, Ill., has accepted a position with the Allis-Chalmers Company, Milwaukee, Wis.

William W. Manville, president, and Traney F. Manville, secretary, have disposed of their interests in the Manville Brothers Company, wire and metal working machinery, Waterbury, Conn., severing their connection with that corporation.

William P. Cooper, formerly vice-president of the Riverdale Iron and Steel Company, Riverdale, Ill., will on July 1 become associated with the Joliet Rolling Mill Company, Joliet, Ill., as mechanical engineer, in full charge of tests and demonstrations of its Arrow brand iron, in which he will be assisted by district sales offices throughout the United States. For many years Mr. Cooper was associated with the Brown-Bonnell Works, Youngstown, Ohio, and has expert knowledge of high-grade irons, both as regards their manufacture and the method of using them.

S. Rosenzweig, who, as personal representative of Hugo Lentz, of Berlin, Germany, went to the Erie City Iron Works, Erie, Pa., a few years ago to act as its consulting engineer, while introducing the Lentz poppet valve engine in this country, has moved to 1539 First National Bank Building, Chicago, where he is connected with the office of the Erie City Iron Works.

George Braithwaite, Sr., factory manager of the Stevens-Duryea Company, Chicopee Falls, Mass., has resigned to take a similar position with the Thomas Jeffrey Company, Kenosha, Wis., manufacturer of the Rambler automobile. Mr. Braithwaite is also associated with the Central Autogenous Welding Company, Worcester, Mass.

F. A. Ogden, general freight agent of the Jones & Laughlin Steel Company, Pittsburgh, has been elected president of the Traffic Club of Pittsburgh.

H. D. Evans, of the H. D. Evans Steel Company, 127 Oliver street, Boston, Mass., has bought a controlling interest in the Simplex Tool & Supply Company and is now in charge of the company's business, which he conducts as a side line.

John I. Rogers, engineer, whose specialties are forging plants, machine shops, power plants, furnaces and steel works, 165 Broadway, New York, has opened a branch office at 929 Chestnut street, Philadelphia.

Charles Bond, president of the Charles Bond Company, mill supplies, Philadelphia, Pa., and president of the Manheim Belting & Mfg. Company, Manheim, Pa., has sailed for a three months' trip abroad.

August Marx, general manager of the Philadelphia Roll & Machine Co., Philadelphia, Pa., will take a three months' vacation in the Adirondacks for the benefit of his health.

J. A. Hagar, formerly vice-president of the Western Iron & Supply Company and afterward with the Scully Steel & Iron Company of Chicago as its Southern representative, has opened an office in the Wainwright Building, Seventh and Chestnut streets, St. Louis, Mo., and will handle a line of iron and steel products.

The Pittsburgh Emery Wheel Company, with plant at Rochester, Pa., and general offices in Pittsburgh, has appointed M. E. White as its sales representative in the Pittsburgh district, while Frank Lewis handles its sales in the Lake district from the Hippodrome Building, Cleveland, Ohio.

S. N. Craig, vice-president of the Treadwell Construction Company, Midland, Pa., has gone to Los Angeles, Cal., on business.

J. B. Andrews, a member of the Andrews Steel Company and Newport Rolling Mill Company, Newport, Ky., was operated on for appendicitis last week, and is now reported to be recovering rapidly.

Alonzo Pawling, Pawling & Harnischfeger Company, crane builder, Milwaukee, Wis., has returned from a three months' automobile tour of the Southwest. The itinerary covered Arizona, southern California and Old and New Mexico.

Theodore H. Curtis, superintendent of machinery of the Louisville & Nashville Railroad Company, Louisville, Ky., has resigned, effective July 1. He will devote his time to perfecting several railroad appliances which he has invented. C. F. Giles, his assistant, has been appointed his successor.

Obituary

JOSEPH B. REED, proprietor of the Cairo Iron & Machine Works, Cairo, Ill., died June 14, aged 80 years. He had been engaged in the foundry and machine business for over 55 years. Born in New England, he went to St. Louis before the Civil War and embarked in business in that city. Later he moved to Cairo, a city of growing commercial importance and at that time a strategical point during the war, where he engaged in the manufacture of ironworking machinery for railroads, mills and general machine shop use. In connection with his shops he was also a jobber in heavy hardware and mill supplies. During the Civil War he built the first 18 or 20 tugboats which the United States Government used on the Mississippi River and some of its tributaries. He leaves a widow, two sons and two daughters.

WILLIAM W. LEE, Northampton, Mass., secretary and manager of the Clement Mfg. Company, Northampton, Mass., died June 14, aged 60 years. He was a native of Boston and had lived in Northampton 30 years, during most of which time he had been manager of the Clement factory. Previously he was with the Haydenville Brass Company, Haydenville, Mass. He leaves a widow, a son and a daughter.

Geo. W. Jackson's Fabricating Plant to Be Sold.—The affairs of Geo. W. Jackson, Inc., Chicago, have been in the hands of a creditors' committee for some time. This committee undertook the completion of the company's existing contracts, but no new contracts were undertaken or sought. The excellently equipped fabricating plant has been practically shut down and is now offered for sale. Other office-building and warehouse property of the company recently changed hands, and apparently partial liquidation rather than reorganization has been found desirable. The steel plant, which is now available for purchase, was extensively enlarged and completed within the past year, and is equipped with unusual advantages for the fabrication of both large and small steel work. It has a total capacity of approximately 70,000 tons of work annually.

The property of the Russ Mfg. Company, Oil City, Pa., will be offered at public sale by the receiver, A. R. Smart, July 6, at 2 p. m. The equipment includes one 50 and one 100-hp. boiler, one Skinner engine, two electric motors, pumps, fans, grinding machines, etc., used in the manufacture of gelatine.

The Knox Pressed & Welded Steel Company, Fulton Building, Pittsburgh, which has recently taken over the plant formerly operated by the Niles Boiler Works, Niles, Ohio, has contracted with the United Engineering & Foundry Company, Pittsburgh, for a 200-ton hydraulic press, to be delivered early next month, and with the Sawers Mfg. Company, Buffalo, N. Y., for a Lavoisite oxyacetylene welding plant with 24 torches.

The Connors-Weyman Steel Company, Helena, Ala., has resumed operations and is rolling cotton ties and other specialties. The sales offices of this company are in the Brown-Marx Building, Birmingham.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

Acceptance of Orders.—A letter acknowledging receipt of an order for machinery and stating that it will have "best attention" does not constitute a binding acceptance of the order. (New York Supreme Court, Third Appellate Division; Van Keuren vs. Boomer & Boschert Press Company; 128 New York Supplement 306.)

Machinery as Part of Real Estate.—Engines, boilers, machinery, etc., contained in a factory are subject to lien under a judgment against the land and will not be treated as separate chattels, though they were acquired by the owner separately from the building. (United States District Court, Eastern District of Pennsylvania; in re Berg; 184 Federal Reporter 522.)

Implied Warranty of Articles Specially Manufactured for Sale.—One who manufactures a special article for sale impliedly warrants that it is fit for the purpose for which it is made and bought; but, where the seller of a thing is not the manufacturer and the buyer has an opportunity to inspect it, there is no implied warranty, in the absence of fraud. (Maryland Court of Appeals; Commercial Realty & Construction Company vs. Dorsey, 78 Atlantic Reporter 1099.)

Rights Concerning Geographical and Descriptive Words Used as Trademarks and Trade Names.—A geographical or descriptive word is not subject to appropriation as a trademark or a trade name, but its use may be restrained on the ground of unfair competition where confusion in the minds of customers results to the prejudice of one first adopting it. (St. Louis Court of Appeals; A. J. Reach Company vs. Simmons Hardware Company, 135 Southwestern Reporter 503.)

Validity of Conditional Sale Contract.—The Ohio statute which makes a conditional sale contract void as against the buyer's creditors unless it is in writing and recorded cannot be avoided by placing a plate on the article sold showing that it is the property of the seller. (United States Circuit Court of Appeals, Sixth Circuit; Cincinnati Equipment Company vs. Degnan, 184 Federal Reporter 834.)

Right to Rescind Contract.—When a contract has been partly performed, and one of the parties has derived substantial benefits, or has imposed upon the other material losses through the latter's partial performance of the agreement, then the first party cannot rescind the contract on account of the second party's failure to complete his performance. The agreement must stand; the first party must perform his part of it, and his only remedy for the failure of the second party to completely perform is compensation in damages for the breach. (United States District Court, Northern District of West Virginia; in re Morgantown Tin Plate Company; 184 Federal Reporter 109.)

Remedy of Seller on Breach by Buyer.—When a buyer of an article specially manufactured for him refuses to accept it, after it is ready for delivery, the seller may treat it as the buyer's property, holding it subject to the buyer's order, and sue for the contract price. (St. Louis Court of Appeals; Koenig vs. Truscott Boat Mfg. Company, 135 Southwestern Reporter 514.)

Essentials to Enforceable Contract.—A contract of sale is not enforceable until the price is agreed upon. A qualified acceptance of an offer does not form a binding contract until the qualification is accepted by the party who made the original offer. (Arkansas Supreme Court; D. S. Cage & Co. vs. Black, 134 Southwestern Reporter 942.)

Burden of Proof on Employee Suing for Injury.—An employee suing for injury caused by the defective condition of a machine has the burden of establishing that the employer knew, or by proper inspection should have known, of the defects. (Pennsylvania Supreme Court; Burt vs. Jessup Steel Company 79 Atlantic Reporter 121.)

Liability for Injury Resulting from Unusual Accident.—A steel company is not liable for death of a workman resulting from an accident of a character not known to have occurred before and of an unknown cause. (United States Circuit Court of Appeals, Seventh Circuit; McCash vs. Commonwealth Steel Company, 184 Federal Reporter 882.)

Liability for Injury to Minor Employed in Violation of Law.—Violation of a statute limiting the right to employ children between the ages of 14 and 16 does not authorize recovery for injury to such a child while so employed, in the absence of a showing that violation of the statute was the direct cause of the injury. (United States Circuit Court of Appeals, Seventh Circuit; Chec vs. Steel Car Forge Company, 184 Federal Reporter 868.)

Duty to Warn Molder's Helper.—An employer owes a duty to instruct an inexperienced foundry molder's helper of the danger of an explosion following the mixing of molten metal with water. (Michigan Supreme Court; Borkowski vs. American Radiator Company, 130 Northwestern Reporter 640.)

Liability for Injury Caused by Foreign Laborers.—That laborers directed to move a boiler front were ignorant of the English language does not show negligence in their employment, making the employer liable for injury to an employee caused by the laborers negligently permitting the front to fall, since the accident must have resulted from their stupidity or malice, rather than ignorance of language. (Michigan Supreme Court; Rigge vs. Wickes Brothers, 130 Northwestern Reporter 683.)

Duty to Warn Minor Employees.—An employer must explain to a minor employee such hazards of the employment as are known, or in the exercise of ordinary care ought to be known, to the employer, where the employee cannot reasonably be expected to appreciate the dangers. * * * The doctrine that an employee cannot recover, when he receives an injury which has been brought about by his own willful violation of rules laid down by the employer for the safety of his workmen, does not preclude recovery by a workman who violates an instruction given him only for his guidance in carrying on the work, and without knowledge of any danger involved in its violation. (New Jersey Court of Errors and Appeals; Horandt vs. Rosenthal, 79 Atlantic Reporter 321.)

Risks of Injury Assumed by Employees.—The rule that an employee assumes the risk of injuries arising from the employment presupposes that the employer has performed the duties of care devolving upon him. It is those risks alone which cannot be obviated by the adoption of reasonable measures of precaution by the employer that the workman assumes. (New Jersey Court of Errors and Appeals; Pakusewski vs. Ringwood Company, 79 Atlantic Reporter 319.)

Liability for Injury to Workman Resulting from Defect Known to Foreman.—An employer is liable to a machinist for injury resulting from a defective condition of a lathe tool known to the foreman. (Massachusetts Supreme Judicial Court; Hines vs. Waltham Mfg. Company, 94 Northeastern Reporter 464.)

Liability for Injury to Employee Caused by Defective Appliances.—An employer is not liable for injury to a workman merely because some part of an appliance has become out of order. It must have been out of order long enough to charge him with negligence in failing to discover it by proper inspection. While the happening of the accident may suggest the existence of a defect, it does not, in itself, give rise to a presumption of negligence in failing to discover the defect seasonably. (New York Supreme Court, Second Appellate Division; Schlappendorf vs. American Railway Traffic Company; 127 New York Supplement 44.)

Right of Employee to Recover Damages for Wrongful Discharge.—One cannot recover substantial damages for wrongful discharge under a contract of employment for a definite term unless he shows what he has earned since the discharge and what efforts he has made to secure similar employment. (New York City Court; Charles Gottlieb & Co. vs. Coutant, 127 New York Supplement 250.)

Proof Required in Action for Death of Employee.—One suing for death of an employee on the ground of negligence by the employer must prove that the death was directly caused by the injuries received. This burden was not sustained in this case by a physician testifying to fact shown by hospital records not shown to be correct. (New York Supreme Court, First Appellate Division; Levy vs. J. L. Mott Iron Works, 127 New York Supplement 506.)

Employer's Duty to Provide Safe Place of Work.—An employer cannot avoid his duty to provide a safe place of work for his employees by delegating performance of it to certain other employees. If the deck of a vessel upon which a laborer was required to carry iron bars was slippery on account of having been recently painted, making it unsafe for him, the employer was bound to warn him against the danger, especially if the slippery condition was not obvious. (Michigan Supreme Court; Orso vs. Great Lakes Engineering Works, 129 Northwestern Reporter 673.)

Liability for Injury to Workmen in Carrying Heavy Object.—An employer who misrepresents the weight of an object, such as a heavy piece of iron, to induce a squad of workmen to carry it, is liable for injury to one of them, caused by it falling through their inability to hold it, if the employer has actual or constructive knowledge as to the weight. (Georgia Court of Appeals; Beard vs. Georgia Mfg. Company, 70 South-eastern Reporter 57.)

Foundry Coke

Proposed Standard Methods for Determining Its Constituents

A proposed standard method for determining the constituents of foundry coke was reported to the American Foundrymen's Association, at Pittsburgh, by H. E. Diller, secretary of the committee, as follows:

As to sampling, each carload of coke shall be considered as a unit. While the car is being unloaded, full length pieces of coke shall be taken at about equal intervals and a sample approximately the size of an egg taken from each end and also from the middle of each piece, until 25 to 40 lb. are obtained. Should it be necessary to sample from a stock pile, 25 to 30 lb. of sample, obtained as above directed, shall be taken for each 50 tons in the pile, care being used to get the piece from different places which will give a fair average sample.

Preparing the Sample.—Take a sample between hardened surfaces, preferably of manganese or chrome steel, until all the material passes through a ½-in. mesh sieve. Quarter this; reserve one portion for moisture determination and crush the other portion until it will all pass through a ¼-in. mesh sieve, and again quarter down until about 2 lb. remain. Crush this until it will pass a No. 20 mesh sieve, and quarter down to about 20 g. Grind this until it all passes through a No. 100 mesh sieve.

Moisture.—Dry 1 kg. of ½-in. mesh sample to constant weight at 104 deg. to 107 deg. C. The loss in weight shall be calculated to per cent. moisture. Moisture shall be determined on the ground sample by getting the loss in weight when 1-g. sample is heated in an open platinum crucible of about 20-c.c. capacity for 1 hr. at 104 deg. to 107 deg. C. The moisture on the ground sample shall be used to calculate the other results got from the ground sample to percentages in the coarse undried sample.

Volatile Matter.—Cover the crucible containing the dried sample, with another crucible (either platinum or porcelain) of such a size that it will fit closely to the sides of the outer crucible, and its bottom will rest 1/3 to ½-in. above the bottom of the outer crucible. Ignite 3½ min. with the Bunsen burner and 3½ min. with the blast lamp. Let cool, remove the inner crucible and reweigh the outer crucible with contents. The loss of weight is volatile matter.

Ash and Fixed Carbon.—Ignite the sample upon which the volatile matter was determined until all the carbon is burned, having the crucible open and inclined. The ash should be tested for unburned carbon by moistening it with alcohol, which will show black any carbon remaining. After all carbon is burned, the weight of the crucible and ash minus the weight of the crucible, gives the amount of ash in the sample. The amount of fixed carbon is obtained by subtracting the weight of the crucible and ash from the weight of the crucible and residue from the volatile matter determinations.

Testing for Sulphur

The apparatus for testing for sulphur includes a soft steel or nickel crucible of about 40-c.c. capacity, the lid being perforated with a small hole for the introduction of the igniting wire. Any arrangement suitable for holding the crucible firmly in place and out of contact with the beaker during the peroxide combustion will serve for a crucible stand.

To the dry crucible add first 12 g. of sodium peroxide and 0.5 g. of powdered potassium chlorate, then exactly 0.7 g. of coke (80 mesh) and mix thoroughly by means of a small spatula. Place the covered crucible on its stand in a 20-oz. beaker containing enough water to immerse the lower half of the crucible.

Ignite the crucible contents by thrusting in, for a moment, a red-hot wire through the lid hole. Wait 2 min. or longer for the mass to cool somewhat, remove the stand and tip over the crucible on its side in the water. After the fusion dissolves, rinse and remove the crucible.

Acidify the solution with hydrochloric acid, then add ammonia in slight excess, filter and wash. To the filtrate add a drop of methyl orange, then hydrochloric acid from a graduated pipette or burette until 0.5 c.c. in excess. Bring to boiling add dropwise about 10 c.c. of barium

chloride solution, continue boiling at least 15 min. longer, and allow it to stand in a warm place for not less than 2 hr., filter, wash until the silver nitrate test shows no chlorides, ignite and weigh as BaSO₄.

Grams BaSO₄ × 100 = % Sulphur.

Testing for Phosphorus

Ignite 5 g. of coke in a platinum dish or large platinum crucible until all the carbon is burned off, then add 10 c.c. hydrochloric acid (1-1) and 20 c.c. hydrofluoric acid and evaporate to dryness and ignite at a dull red heat. Fuse the residue with about 1½ g. of sodium carbonate and 2 g. of potassium nitrate. Cool, place the dish in a beaker of water and boil. Clean and remove the dish. Acidify the solution with hydrochloric acid, precipitate with ammonia, boil, filter and wash with hot water. Wash the filter with warm dilute nitric acid to dissolve the precipitate. Should it not dissolve, wash with warm dilute hydrochloric acid until dissolved. In the latter case it will be necessary to evaporate to about 5 c.c., add 30 c.c. nitric acid (1.20 sp. gr.), again evaporate to about 5 c.c., and add 30 c.c. nitric acid (1.20 sp. g.). After heating the solution to between 70 and 90 deg. C., add 50 c.c. of molybdate solution. Agitate the solution a few minutes, then filter, and wash 5 times with a 3 per cent. nitric acid solution, and 5 times with a 0.1 per cent. potassium nitrate solution. Transfer the precipitate and filter to the flask in which the precipitate was made. Add 30 c.c. water, then Na OH (N-5) from a burette until in excess, keeping the solution agitated. When the yellow precipitate is all dissolved add 0.1 c.c. of phenolphthalein solution as indicator, and then titrate with H₂ SO₄ (N-5).

c.c. (N-5) NaOH — c.c. (N-5) H₂SO₄ × 0.054 = % Phosphorus.

To make the molybdate solution, add 100 g. molybdic acid to 250 c.c. water, and to this add 150 c.c. ammonia. Stir until all is dissolved and add 65 c.c. nitric acid (1.42 sp. gr.). Make another solution by adding 400 c.c. concentrated nitric acid to 1100 c.c. water, and when the solutions are cool, pour the first slowly into the second with constant stirring and add a couple of drops of ammonium phosphate.

A 35-Ton Electric Locomotive.—An order has been recently placed with the General Electric Company, Schenectady, N. Y., by the Woodward Iron Company, Woodward, Ala., for a 35-ton locomotive which will be used for hauling coke from the by-product ovens to the point where it is dumped into gondolas for transportation to the blast furnaces. This locomotive will make about 50 round trips per day, each of which is about 2000 ft. long, and will handle approximately 20 tons of coke per trip. The locomotive is designed along the lines of the builder's standard practice with all-steel framing and an arch bar truck. It is designed for slow speed service and is equipped with four 220-volt motors and the type M single unit control. In this control there are six steps, two with the motors in series and the other four with all of them in parallel.

The length of stroke in gasoline engines was briefly discussed before the Society of Automobile Engineers at its meeting in Dayton, Ohio, June 15 to 17, by Justus B. Entz. On the basis of piston displacement a 4½ x 4½-in. and a 4 x 5¾-in. engine will give equal power, but the shorter stroke engine must have a greater pressure on the piston head by 26 per cent., and losses in bearings will consequently be greater. The result is a higher mechanical efficiency for the long stroke. The author believes engines with a stroke relation to bore of 1.4 to 1.5 are lighter, more efficient and more flexible than shorter stroke engines.

The Van Ormer-Lose Wrench Company, a recently incorporated Pennsylvania company, has secured a site at Trafford City, Pa., and is erecting a new manufacturing plant. The building is of brick construction set on concrete piers and is to be equipped with motors and a line of machine tools, such as drills, grinders and other finishing machinery, for the manufacture of a new patented quickly adjustable wrench for which L. G. Van Ormer has secured a patent. The factory will be ready for operation about the middle of August.

The Duquesne Steel Foundry Company, Pittsburgh, Pa., has increased its capital stock to \$1,200,000.

Forty Years' Progress in Pig Iron

The Production of Pig Iron in the United States from 1871 to 1910*

BY JOHN BIRKINBINE, PHILADELPHIA, PA.

The practical coincidence of the fortieth anniversary and the one hundredth technical meeting of the American Institute of Mining Engineers offers temptation to recall and compare the conditions of mining and metallurgy in or about the years 1871 and 1911. Since such a résumé would necessitate an extended paper, the record of the pig-iron industry is here selected as indicative of the progress to which members of the institute have been important contributors.

The Increase in Iron Ore Smelted Per Year

It is not necessary to discuss here the details of conversion, manipulation, and utilization of the metal. The simple story of the amount of iron ore smelted to produce pig iron between 1870 and 1910 constitutes a suffi-

cient gauge of this phenomenal advance; and the fact that in 1871 iron rails commanded \$70 and steel rails \$102 per ton, while in 1910 no iron rails were produced, and the price of steel rails was \$28 per ton, epitomizes the change of conditions.

The ninth census gave the consumption of iron ore in the United States for the year 1870 as 3,831,891 and the production of pig iron as 1,665,179 gross tons. At that time Pennsylvania headed the list of states, with fully one-third of the iron ore won; but later, Michigan, and subsequently Minnesota, took the lead, the record for 1909 being: Minnesota, 28,975,149; Michigan, 11,900,384, and Pennsylvania, 666,889 gross tons the estimated production of iron ore in the United States in 1910 being 53,500,000 tons.

For 17 years before 1871 the Marquette range in Michigan had been shipping mineral; but the entire output of

1871 (813,379 gross tons) was less than the storage capacity in 1910 of the 6918 pockets in the 29 shipping docks on the Great Lakes, through which, in that year, 42,619,060 tons of iron ore were loaded into vessels; and the total production of this range for 17 years was less than the output in 1909.

Iron ores from the Marquette range of Michigan (the only producing section of the Lake Superior region) were then (1871) principally used to mix with other ores; and the various sources from which ores were assembled at blast furnaces, about the time of the organization of the institute, are suggested by the record that in 1873 11 furnaces in Pittsburgh and vicinity produced 141,773 gross tons of pig iron, and were supplied with ore from the following localities:

	Gross tons.
By rail Lake Superior ores.....	202,840
By rail Lake Champlain ores.....	3,440
By rail Iron Mountain, Mo., ores.....	24,580
By river Iron Mountain, Mo., ores.....	88,489
Native local ores (mostly carbonates).....	1,492
Total	320,841

In 1910, on the other hand, 47 blast furnaces in the Pittsburgh district produced 5,330,898 gross tons of pig iron from 10,000,000 tons of ore brought from the Lake Superior region, practically a ten-fold increase per furnace, and a total district output augmented 30 times.

Improvement in Furnace Construction

When the handful of men who, recognizing the advantage of mutual help and interchange of knowledge, assembled in Wilkes-Barre in May, 1871, to organize the institute, the predominant blast-furnace structure was a truncated square pyramid of stone masonry, lined with refractory brick or stone, the crucible often being formed of stone neatly dressed to shape. From the throats of many furnaces the hot gases, meeting the air, became flame, pulsating with the action of the blast apparatus and illuminating the surrounding country. Some of the newer furnace stacks, however, were cylindrical shafts of brick, held by bands or shells of metal and supported on masonry piers or metal columns, the top being closed with bell and hopper.

An output of 30 tons per day was considered satisfactory for an average furnace, and the weekly production of 300 tons was sufficient to excite comment. In 1878 the record of 100 tons of pig metal produced by a single blast furnace in a day startled metallurgists throughout the world. Closed fronts were a new feature. As a rule, the fluid metal and cinder accumulated in a fore-hearth, the latter overflowing from under a removable plate, and furnaces were "worked" periodically to remove accumulations of unconsumed fuel, ash and dirt.

Railroad cars of from 5 to 10 tons capacity delivered the raw material to the more important plants, although some depended largely upon canal transportation, and many charcoal furnaces relied solely upon wagon haul for raw material and product.

The organization of our institute occurred at the time when the manufacture of iron was in a state of transition, when the older constructions were being displaced by those of newer design and the theory of smelting was being scientifically investigated. The situation was epitomized by E. C. Pechin, who said, in a paper on "The Position of the American Iron Manufacture," read at the Pittsburgh meeting of October, 1872:

The time has come when scientific research is to assume its true position. The day of "sheer force and blind stupidity," whose only protection was a high tariff, has gone by forever. The prodigal waste of the rich gifts of nature; the vast sums of money thrown away; the hard labor, in the aggregate too large to be even approximately estimated, which has been uselessly expended; the mishaps, drawbacks, and failures which have followed every step of our business, show most conclusively that the physicist, the geologist and mineralogist, the chemist, the engineer and mechanic are as essential to success as the furnace itself, or the labor that works it. . . . Eternal vigilance is the price of pig iron.

In the period under contemplation there have been radical changes in the shape and proportions, equipment, appliances and location of blast furnaces. The low flat



Record of the Iron Industry of the United States from 1870 to 1910.

cient gauge of this phenomenal advance; and the fact that in 1871 iron rails commanded \$70 and steel rails \$102 per ton, while in 1910 no iron rails were produced, and the price of steel rails was \$28 per ton, epitomizes the change of conditions.

The ninth census gave the consumption of iron ore in the United States for the year 1870 as 3,831,891 and the production of pig iron as 1,665,179 gross tons. At that time Pennsylvania headed the list of states, with fully one-third of the iron ore won; but later, Michigan, and subsequently Minnesota, took the lead, the record for 1909 being: Minnesota, 28,975,149; Michigan, 11,900,384, and Pennsylvania, 666,889 gross tons the estimated production of iron ore in the United States in 1910 being 53,500,000 tons.

For 17 years before 1871 the Marquette range in Michigan had been shipping mineral; but the entire output of

*Abstract of paper presented to the American Institute of Mining Engineers, Wilkes-Barre meeting, June, 1911.

bosh and narrow crucible were gradually changed, until the "no bosh" furnace was suggested; and subsequently the very steep slope of boshes gave place to large hearth and moderately flat boshes. The height of furnace, which became excessive, exceeding 100 ft., has settled down to more moderate dimensions. The number and size of tuyeres were augmented and economical blowing apparatus was designed to meet the greater demands of volume and pressure. The removal of ore dust and coke dust from blast furnace gases and the cleansing and utilization of these, together with the recovery of the mineral-producing dust, and the employment of gas for operating blowing machinery and other purposes, as well as the conversion of cinder into cement, and the use of gas from by-product ovens, deserve attention in this connection.

Much of the ore is now never touched by the miner, shipper, laborer or furnaceman from the time it leaves its natural bed until, with corresponding quantities of flux and fuel, it enters into the charge of the modern blast furnace, the product of which averages 10 times that of the larger furnaces in 1871. Indeed, a considerable portion of the iron ores now smelted are not touched by the hand of man until, after passing through the blast furnace, being handled by ladle cars in a molten state to casting machines, mixers and converting plants and mills, they become finished merchantable products.

To illustrate graphically the changes in our pig-iron industry during the last 40 years, the accompanying diagram has been prepared, in which the ordinates represent years, and the abscissa show on the right the number of blast furnaces and on the left the production of domestic iron ore and pig iron in millions of tons. The upper curve indicates the number of blast furnaces reported as active or ready for operation in each year; but it should be remarked that the unwillingness of owners to report a plant as abandoned makes this number greater than the facts really warrant. While the lower curve shows the number of furnaces in blast at the end of each year, the true condition would in most cases be between the two curves. The decrease in the number of furnaces and the coincident increase in the annual production of pig iron are thus illustrated.

The production of domestic iron ore and pig iron show approximately the relations which the raw material bore to the product, but to the quantity of ore should be added mill cinder, scale, etc., and imported iron ore, the latter ranging from 180 to more than 2,000,000 tons per year.

To assist in studying this diagram the figures and quantities are given in the subjoined table.

Total Number of Blast Furnaces in the United States on December 31, of the Following Years, and the Quantity of Domestic Production of Pig Iron and Iron Ore.

Year.	Number of blast furnaces.	Production of pig iron, millions of tons.	Quantity of domestic production of pig iron, millions of tons.
			Tons.
1870	no record	no record	no record
1871	571	no record	1,706,793
1872	612	no record	2,548,713
1873	657	410	2,560,963
1874	693	365	2,401,262
1875	713	293	2,023,733
1876	712	236	1,868,961
1877	716	276	2,006,594
1878	692	265	2,301,215
1879	697	388	2,741,853
1880	701	446	3,835,191
1881	716	455	4,144,254
1882	687	417	4,623,323
1883	683	307	4,595,510
1884	669	236	4,097,868
1885	591	276	4,044,526
1886	577	331	5,683,329
1887	583	339	6,417,148
1888	589	332	6,489,738
1889	570	344	7,603,642
1890	562	311	9,202,703
1891	569	313	8,279,870
1892	564	253	9,157,000
1893	521	137	7,124,502
1894	511	185	6,657,388
1895	468	242	9,446,308
1896	470	159	8,623,127
1897	423	191	9,652,680
1898	414	202	11,773,934
1899	414	289	13,620,703
1900	406	232	13,789,242
1901	406	266	15,878,354
1902	412	307	17,821,307
1903	425	182	18,009,252
1904	429	261	16,497,033
1905	424	313	22,992,380
1906	429	340	25,307,191
1907	443	167	25,781,361
1908	459	236	15,936,018
1909	469	338	25,795,471
1910	473	206	27,298,545 (est.) 53,500,000

The number of blast furnaces and production of pig iron are copied from the reports of the American Iron

and Steel Association, and the iron ore data are mainly from the statistical reports of the United States Geological Survey. The figures for 1870 and 1880 for the production of iron ore are taken from the census.

Mount Savage Firebrick Plant to Enlarge

At the annual meeting of the Union Mining Company, proprietor of the Mount Savage Firebrick Works, Mount Savage, Md., which was held in the company's general offices in the Fidelity Building, Baltimore, Md., June 6, President H. Crawford Black reported that to handle promptly the large volume of orders being received it has become necessary, for the second time in a period of six years, to increase the capacity of the works. A committee spent practically the entire month of May investigating the merits of the various modern methods and machinery that could be used in the manufacture of high-grade firebrick and visited many of the largest firebrick operations in the East and West. The new extension then decided upon is now under construction and when completed the Mount Savage plant will have a capacity of 100,000 9-in. brick per day. It is not proposed, however, to operate the entire plant on standard brick and shapes exclusively. A large portion of it will be devoted to the department having in charge the manufacture of special and difficult shapes used in the iron, steel and allied trades, lime and cement industries, water gas linings, gas bench settings, etc. Before the new construction work was decided upon, the company spent considerable money prospecting and boring with diamond drills its large holdings of clay lands, the result being an assurance of sufficient Mount Savage flint and plastic clays to last for centuries.

The E. J. Longyear Company has been incorporated and will take over the interests of E. J. Longyear, Hibbing, Minn., and Longyear & Hodge, Marquette, Mich., commencing business July 1 at its main offices, 710 to 722 Security Bank Building, Minneapolis, Minn. Branches will be maintained at Hibbing, Duluth and Brainerd, Minn.; Marquette and Crystal Falls, Mich.; Birmingham, Ala., and Vancouver, B. C. Edmund J. Longyear will be president and Frank G. Jewett and John E. Hodge, vice-presidents. The company makes contracts for diamond drilling and will examine and report on mineral lands, while in its mechanical department it will continue the manufacture of diamond drills and supplies in the plant recently constructed in Marquette by Longyear & Hodge, which will remain under the management of Frederick F. Fredlund.

The fortnightly statement of the American Railway Association for the period ended with June 7 showed a slight improvement in the movement of traffic. On May 24 there was a net surplus of freight cars of all types of 167,398 on the lines of railroads in the United States and Canada. Two weeks later this total had been reduced to 166,802, a decrease of 596 cars. This is the smallest number of cars not in use since the statement of February 1. The real turning point in the idle car situation has about been reached. With the approach of the crop-moving season the demand for box cars picks up quickly and the total number of idle cars will soon reflect the effect of this periodic movement.

In the month of May the Dominion Steel Corporation's plant at Sydney, N. S., turned out 23,450 tons of pig iron, 28,510 tons of steel ingots, 25,437 tons of blooms, 15,922 tons of rails and 8000 tons of rods.

The Union Spring & Mfg. Company has moved its offices from the Farmers' Bank Building to the Oliver Building, Pittsburgh.

The output of the Transvaal, Africa, gold mines for May exceeded all records, being 685,951 ounces, with a value of £2,913,734, or about \$15,000,000.

R. B. Murray, Farmers' Bank Building, Pittsburgh, representative of the Titusville Iron Works, has sold to the United States Government a 100-hp. boiler to be placed on a dredge boat on the Ohio River, and a 300-hp. water-tube boiler and a 250-hp. Fitchburg engine to the Pittsburgh-Hickman Company, Butler, Pa.

Atlantic City Railway Convention Exhibits

A notable feature of the conventions of the Railway Master Mechanics' Association and the Railway Master Car Builders' Association, which were opened at Atlantic City, N. J., June 14 and concluded June 21, were the exhibits of metal working machinery and car and track appliances. As a show calculated to interest machine shop managers the exhibition was the most complete attached to any convention ever held in this country. The exhibits occupied 76,453 sq. ft. on the Million Dollar Pier, and there was an overflow of exhibitors who secured space near it. There were about 260 booths, and the variety of mechanical equipment and shop appliances shown was decidedly comprehensive, as is illustrated by the following partial list of exhibits.

- Ajax Mfg. Company, Cleveland, Ohio.—Machine made forgings.
- American Brake Shoe & Foundry Company, Mahwah, N. J.—Locomotive driver brake shoes, flanged brake shoes for steel tired and rolled steel wheels, unflanged brake shoes for cast iron wheels, combination driver brake heads and reinforcing parts which go with these shoes.
- American Locomotive Company, New York, N. Y.—Reception booth with photographs of locomotives.
- American Steel Foundries, New York, N. Y.—Andrews side frames, cast steel bolsters, Simplex bolsters, brake beams, Davis cast steel wheels, Simplex couplers, Susemihl roller side bearings, springs and miscellaneous castings.
- American Tool Works Company, Cincinnati, Ohio.—Motor driven 24-in. high duty engine lathe, 24-in. back geared crank shaper, 3-ft. back geared radial and 6-ft. triple-gear plain radial.
- American Vanadium Company, Pittsburgh, Pa.—Vanadium ores and alloys. Vanadium steels. Vanadium cast iron. Locomotive parts. Vanadium machinery steels. Vanadium high speed tool steels.
- Anchor Packing Company, Philadelphia, Pa.—Fibre packing and mechanical rubber goods. Tauril sheet packing, throttle and air pump packing.
- Armstrong-Blum Mfg. Company, Chicago, Ill.—Marvel automatic high speed saws and back saws.
- Armstrong Bros. Tool Company, Chicago, Ill.—Grinding machines, tool holders, ratchet drills, lathe dogs, clamps.
- Automatic Ventilator Company, New York, N. Y.—Full size and miniature demonstrating models.
- Besly & Co., Charles H., Chicago, Ill.—New Besly pattern makers disc grinder, helmet spiral circles, temper taps, oil and babbitt.
- Bettendorf Axle Company, Bettendorf, Iowa.—One fifty-ton capacity single center sill underframe and trucks, one forty-ton capacity double center sill underframe and trucks, one Bettendorf truck and truck bolster.
- Buckeye Steel Castings Company, Columbus, Ohio.—Cast steel bolsters and side frames, cast steel journal boxes, pivoted coupler yoke and Major car couplers.
- Bullard Machine Tool Company, Bridgeport, Conn.—Vertical turret lathe, 42 in., maxi-mill type, and 64 in. maxi-mill, both in operation.
- Carborundum Company, Niagara Falls, N. Y.—Carborundum grinding wheels, alexite grinding wheels, alexite and carborundum cloth, carborundum brand garnet paper, carborundum and alexite grains, carborundum fire sand for furnace lining. The grinding wheels were demonstrated on grinding machines under actual shop conditions.
- Carnegie Steel Company, Pittsburgh, Pa.—Schoen steel wheels for engine truck, tender, passenger train car, freight car and street car service; three sets high record service wheels mounted on axles; slick gear blanks, cut and uncut; nickel plated samples of structural shapes and plates; concrete reinforcing bars and other bar mill products; rails, ties and track accessories; soft welding and threading steel for locomotive and car parts, frame bolts, motion pins, nuts, etc., pieces tested and not tested; vanadium steel locomotive springs and locomotive side rods, vanadium steel wheel, vanadium steel street car axle and miscellaneous samples of vanadium steel parts.
- Carter Iron Company, Pittsburgh, Pa.—Carter special staybolt, bar iron, iron chains and ball-bearing chains.
- Chicago Pneumatic Tool Company, Chicago, Ill.—Pneumatic tools, hammers and appliances, compressors and electric drills.
- Chisholm & Moore Mfg. Company, Cleveland, Ohio.—Chain hoists and trolleys.
- Cleveland Twist Drill Company, Cleveland, Ohio.—A drill press in operation giving practical demonstration of Cleveland high speed drills and reamers. Also exhibit typical of complete line of small tools.
- Cochrane-Bly Company, Rochester, N. Y.—One No. 6 8-in. capacity cold saw cutting-off machine, one No. 2 4½-in. capacity cold saw cutting-off machine, one No. 11 automatic saw sharpener, one No. 2 die filing machine.
- Coe Brass Mfg. Company, Ansonia, Conn.—Extruded metals in great variety of intricate designs for car trimming and ornamentation; also for use in electrical apparatus, art metal work, etc.
- Crane Company, Chicago, Ill.—Locomotive safety valves, locomotive blow-off valves, ash pan blower valves, special locomotive cab valves, Crane system of steam traps, non-direct and direct return for returning the condensation to boiler, motor operated steel gate valves for superheated steam, special ferro steel gate valves with clean-out pocket for creosote and zinc-chloride for timber treating plants, Crane railroad unions, malleable and cast iron fittings, brass globe and gate valves for steam, water and hydraulic service.
- Crosby Steam Gate & Valve Company, Boston, Mass.—Muffled safety valves, open safety valves, globe and angle valves, spring seat, Johnstone blow off valves, air pump throttle valves and blower throttle valves. Crosby improved locomotive gages, thermostatic water back gages, standard test gages, hydraulic gages, hydraulic press recorders, wheel press recorders and recording revolution counters. Crosby fluid pressure scales for testing gages to 25,000 lb. Indicators with continuous diagram drums, indicators with lanza continuous diagram appliance.
- Crucible Steel Company of America, Pittsburgh, Pa.—Rex AA high speed tools of various designs, railroad springs, drill rods. Fractures showing heat treatment of steel. Heavy turnings made at high speeds, milling cutters, expanding reamers, dies, chisels, saws, rex AA inserted tooth high speed saw.
- Davis-Bournonville Company, New York, N. Y.—Large oxyacetylene welding and cutting equipment, suitable for railroads and large manufacturing plants, navy yards, etc.
- Detroit Hoist & Machine Company, Detroit, Mich.—Pneumatic turntable tractor, electric turntable tractor, pneumatic motor hoists and pneumatic motors.
- Detroit Lubricator Company, Detroit, Mich.—Feed lubricators. Detroit transfer filler, 1-feed, 2-feed and 4-feed air cylinder lubricators, Detroit air pump lubricator, Detroit emergency valve, automatic steam chest plugs, boiler valves, guide cup, rod cup, Detroit force feed oilers.
- Dixon Crucible Company, Joseph, Jersey City, N. J.—Dixon's pure flake lubricating graphite, graphite greases, silica-graphite paint, pipe joint compound, pencils, crucibles, belt dressings, graphite engine front finish, air brake graphite, etc.
- Duff Mfg. Company, Pittsburgh, Pa.—Barrett track jacks, automatic lowering jacks, geared ratchet screw jacks, Duff bearing screw jacks, Bethlehem forged steel hydraulic jacks.
- Electric Controller & Mfg. Company, Cleveland, Ohio.—Lifting magnet, operated from electric crane; automatic motor starters, controllers, electric brakes in operation.
- Faessler Mfg. Company, J., Moberly, Mo.—Bass roller flue expanders, universal roller flue expanders, ball bearing roller flue expanders, arch flue expanders, improved sectional beading expanders, pneumatic sectional tube expanders, rapid beading expanders, perfect flue cutting machine and cutters, patch bolt countersinking tools.
- Fairbanks, Morse & Co., Chicago, Ill.—One No. 28 all-steel gasoline motor car for one, two or three passengers, two-cycle two-cylinder direct connecting engine, one No. 26 section gasoline motor car with two-cycle two cylinder gasoline engine. Track jacks, ball bearing jack and hydraulic jacks.
- Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible staybolts, radial and crown staybolts. Tate installation tools for applying the Tate bolt; staybolt tests.
- Foster Company, Walter H., New York, N. Y.—Hydro-pneumatic radial drill, all geared multi-spindle drill, pneumatic stay bolt nipper.
- Franklin Mfg. Company, Franklin, Pa.—Asbestos pipe coverings, asbestos and magnesia pipe and boiler coverings, smoke jacks, corrugated sheathing, shingles, rope and wick packing, throttle and air pump packing, asbestos.
- Goldschmidt Thermit Company, New York, N. Y.—Complete appliances for making thermit welds. Appliances for butt welding wrought iron and steel pipes. Specimen welds showing amalgamation of metal obtained. Metals and alloys produced free from carbon by the thermit process. Photographs of important repairs executed by the thermit process. Samples of thermit, nickel thermit and chromium thermit.
- Harrington, Son & Co., Inc., Edwin, Philadelphia, Pa.—Hand operated portable chain hoists, including Harrington peerless hoists, screw hoists and differential hoists.
- Hunt Company, C. W., New York, N. Y.—Industrial railway, rolled steel and cast plate track, turntables, shop cars, special cars for handling wheels and axles, coal valves, coal tubs, locomotive coaling station models and photographs, hoisting and transmission rope, gravity bucket coal conveyors, motion pictures of cargo handling cranes.
- Independent Pneumatic Tool Company, Chicago, Ill.—Thor piston air drills, reversible flue rolling, reaming, tapping and wood-boring machines, close-quarter drills, grinders, pneumatic chipping, caking, flue heading and riveting hammers, pneumatic staybolt drivers.
- Jenkins Bros., New York, N. Y.—Iron body and brass globe, angle, checks and gate valves, regular and extra heavy; brass and iron body blow-off valves; Jenkins 96 packing pump valves, gasket tubing and car heating discs.
- Jessop & Sons, Inc., New York, N. Y.—Tool steel.
- Johns-Manville Company, H. W., New York, N. Y.—Asbestos roofings, wool felt roofings, waterproofing materials, pipe covering felts, air-pump throttle, coil, spiral and sheet asbestos packings, high and low pressure pipe coverings and pipe covering felts high temperature fire brick cements, pipe covering and boiler cements, electrical materials, boiler laggings and cements, vitribestos pipe coverings.
- Jones & Laughlin Steel Company, Pittsburgh, Pa.—Beams and channels, spikes, tin and black plate, chains, cold rolled bars and shapes, wire and wire products, cold-twisted square bars, angles, bars and special shapes.
- Joyce-Cridland Company, Dayton, Ohio.—Jacks.
- Kennicott Company, Chicago, Ill.—Photographs of all Kennicott products to date.
- Kerite Insulated Wire & Cable Company, New York, N. Y.—Kerite insulated wires and cables.
- Keystone Drop Forge Works, Chester, Pa.—Keystone connecting link, Keystone safety shackle hook and a full line of Standard and Special drop forgings.
- Landis Machine Company, Waynesboro, Pa.—One double head 1½-in. bolt cutter, one single head bolt cutter, pipe threading die heads, solid adjustable die head, automatic open die head for turret lathes, bolt cutters and die heads.
- Landis Tool Company, Waynesboro, Pa.—One 16x72 plain self-contained grinding machine with gap, one No. 2 12x32 universal grinding machine.
- Linde Air Products Company, Buffalo, N. Y.—Oxyacetylene welding and cutting apparatus, single and duplex acetylene generator, stationary type, portable self-contained oxy-acetylene welding and cutting plant, portable oxy-coal gas cutting apparatus for wrecking trains, locomotive boiler repaired by oxy-acetylene welding under hydraulic test pressure, with numerous other samples of locomotive and steel car construction and repair by oxy-acetylene welding.
- Lucas Machine Tool Company, Cleveland, Ohio.—Horizontal boring machine power forcing press.
- Lunkenheimer Company, Cincinnati, Ohio.—Regrinding valves, Renew regrinding renewable seat valves, puddled semi-steel valves, cast steel valves, iron body brass mounted valves, pop safety valves, water gauges, gauge cocks, oil and grease cups.
- Lupton's Sons Company, David, Philadelphia.—Steel sash.
- Manning, Maxwell & Moore, Inc., New York, N. Y.—Hancock inspirators, Hayden & Derby injectors and ejectors, Metropolitan injectors, Hancock valves, Ashcroft steam gauges, Consolidated pop safety valves, general jet apparatus, machine tools, Celfor drills.
- Matthews-Davis Tool Company, St. Louis, Mo.—Davis expansion boring tools.
- Michigan Lubricator Company, Detroit, Mich.—Locomotive lubricators from two-feed to five-feed automatic drain valves.
- Midvale Steel Company, Philadelphia, Pa.—One rolled steel wheel for passenger service, one rolled steel wheel for freight service, one steel tired wheel for passenger service, one driving axle for locomotive.
- National Tube Company, Pittsburgh, Pa.—Kewanee unions, union bells and tees, flange unions, high duty metal valves and cast and malleable iron fittings, also apparatus used in testing Kewanee unions.

Nelson Valve Company, Philadelphia, Pa.—Gate, globe and check valves, open-hearth steel valves, electrically operated valves.
 Newhall Engineering Company, George M., Philadelphia, Pa.—Photographs of wrecking, locomotive, station cranes, etc., manufactured by Industrial Works, of Bay City, Michigan. NB air brake hose connection, Vance steam trap.
 Niles-Bement-Pond Company, New York, N. Y.—New model of the Pond car wheel lathe driven by electricity.
 Parkesburg Iron Company, Parkesburg, Pa.—Boiler tubes.
 Reliance Electric & Engineering Company, Cleveland, Ohio.—Reliance adjustable speed motors, of the armature shifting type, with automatic starting equipment; Reliance speed dial, crank shaper, driven by Reliance adjustable speed motor.
 Rockwell Furnace Company, New York, N. Y.—Furnaces for railroad shops.
 Royersford Foundry & Machine Company, Royersford, Pa.—Power punch and shear, Sells roller bearing shaft hanger box.
 Scullin-Gallagher Iron & Steel Company, St. Louis, Mo.—Steel castings.
 Sellers & Co., Inc., William, Philadelphia, Pa.—Locomotive injectors and accessories, turret rest and face plate drivers, locomotive wheel lathe, turret rest, and face plate drivers for car wheel lathe, hangers and couplings for shafting.
 Strong, Carlisle, Hammond Company, Cleveland, Ohio.—Samples of Randall graphite lubricator and samples bearings, showing the installation of Randall graphite sheet lubricator.
 Underwood & Co., H. B., Philadelphia, Pa.—Portable cylinder boring bar, rotary boiler tube cleaner, belt driven pipe bender and straightener, new heavy type valve seat rotary planer.
 Union Mfg. Company, New Britain, Conn.—Complete line of chucks.
 Union Spring & Mfg. Company, Pittsburgh, Pa.—Coil and elliptic spring, Kensington all-steel journal boxes, pressed steel journal box lids, pressed steel spring plates and steel castings.
 United Engineering & Foundry Company, Pittsburgh, Pa.—High speed steam-hydraulic forging press in operation on car.
 Van Dorn & Dutton Company, Cleveland, Ohio.—Portable electrically operated drills and reamers, V. D. & D. gears and pinions.
 Van Dyck Churchill Company, New York, N. Y.—Higley cutting off saw.
 Warner & Swasey Company, Cleveland, Ohio.—No. 3A hollow hexagon turret lathe.
 Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.—Alternating current and direct current motors, complete with control apparatus, for constant and varying speeds.
 Westinghouse Lamp Company, Bloomfield, N. J.—Tungsten and carbon lamps for all standard voltages and of all standard sizes.
 Yale & Towne Mfg. Company, New York, N. Y.—Chain blocks, trolleys, electric hoists and hardware.

Equipment of Outlying Engine Houses

At outlying engine houses it is assumed there are no power-driven machines, and the following list of tools is suggested:

Twist drills.	Pipe cutters.
Drill sockets.	Jack, sledges, drifts, crowbars,
Taps—including machinists' saws, brace and bits.	
steam chest, pipe, wash-out,	Twist drills, extra long.
straight and taper, stay bolt.	Drill chucks.
Dies to correspond.	Ratchets and braces.
Pipe stock and dies.	Surfacer plates.
Hacksaws.	Tinners' bench shears.
Straight edge.	Reamer, rod taper.
Flue tools—caulking rolls, expanders, beading.	Wrenches, socket, crowfoot, hexagon.

Equipment at Important Division Terminals

In considering the equipment for engine houses at important division terminals not connected with repair shops, the committee offered the following suggestions: The engine house should be equipped with driving and truck wheel drop pits and tools to take care of all necessary rod work, driving-boxes, ordinary valve-gear work and the replacing of flues needed between general overhauls. The additional list of tools suggested for outlying engine houses to meet the requirements of a larger terminal are:

Ample storeroom stock.	Hot-water washout facilities.
Drop pit for driving-wheels.	Drop pit for engine truck and tender wheels.
Double blacksmith forge, face plate and tools.	Portable blacksmith forges.
72-in. boring mill.	36-in. boring mill.
Driving-wheel lathe.	24-in. lathe.
38 in. tire turning-lathe.	16-in. lathe.
Planer.	Shaper.
Slotter.	36-in. vertical drill.
Sensitive drill.	Emery grinder.
Bolt cutter.	Pipe-bending machine.
50-ton hydraulic press.	Punch and shear.
Power-driven valve-setting machine.	Air compressor.
Air hammers.	Air motor.

Repair Equipment for Engine Houses

At the convention of the American Railway Master Mechanics' Association at Atlantic City, N. J., a committee on repair equipment for locomotive or engine houses presented a report. It analyzes at length the expediency of doing more repairs than is usually the case in the engine house—the term engine house being offered by the committee as a substitute for the word roundhouse, now no longer descriptive of the modern locomotive shelter. The object of this review of the report is to give a part of the argument and to enumerate briefly what the requirements of the engine house are believed to be in respect to tool equipment.

An investigation showed that \$45 may be taken as the approximate daily net operating income from each locomotive engaged in freight service. This computation assumed each freight locomotive was in service every day. This means that we could afford to invest \$900 capital at 5 per cent. in engine house repair equipment for each extra day in service we could obtain for each freight engine owned, by making the repairs at the engine house instead of at the main shop. Expressed more concretely, it means that, if the engine house repair equipment kept each of 100 freight engines in service two extra days a year, the extra net operating income would be 5 per cent. on a capital of \$180,000. This does not necessarily mean an increased net operating income, as it may, and in the end probably would, mean a smaller capital invested in freight locomotives.

Finally, the committee, C. H. Quereau, chairman; W. H. Fetner, H. P. Meredith, A. G. Trumbull and J. A. Carney, emphasized that it is a short-sighted policy to use worn-out and obsolete tools in engine houses, not only because a big shop is better able to find profitable use for such tools and better able to keep them in repair, but engine-house conditions warrant the best of tools. The chief points arguing for a good equipment of the proper scope are:

Locomotives should be held out of service for repairs as short a time as possible.

Should be kept as near 100 per cent. efficiency as possible.

The effect on earnings of time saved by repairs made at engine houses.

The effect on engine efficiency of repairs made at engine houses.

The smaller fixed charges for repairs made at the engine house compared with those at the main shop.

The effect of storeroom stocks on engine earnings.

Engine-house men should have ideals and methods quite different from those of shop men.

It is important that engine-house conditions and facilities should be attractive and convenient to get and keep good men and increase their efficiency.

Machine Tool Work Disturbed by Jarring of Other Machinery

One of the largest machinery building companies of the country has found it necessary to erect a new building for its forging department and locate this at a distance from the main works to avoid the disturbing influence of the hammers on the work of the cutting, boring and drilling tools. For years this department was placed in the midst of the machine shops, having originally been at one end, but finally centered by additions made to the plant. As the forgings gradually increased in size through calls made on the company for heavier machinery, it was observed that the machine tools got out of alignment with increasing frequency, and that excessive vibrations occurred in operating. For some time this was not ascribed to the true cause, and the discovery came as the result of tests which showed that the disturbance was greatest at the hours when the heaviest hammers were in use.

Inquiry at other shops in the same vicinity develops the fact that they are experiencing some trouble from a different cause, namely, the running past their doors of interurban electric cars, some very large and heavy types of which have been put in service within the past year. This was particularly noticeable in the winter, when the ground was frozen. The proprietors of one plant, which was to be replaced by larger works, took that fact into consideration in selecting a new site. Others, similarly located with respect to interurban lines or other disturbing influences, may find it worth while to give consideration to this idea.

The Firth-Sterling Steel Company's stockholders held a meeting at Demmler Station, McKeesport, Pa., June 12, at which the plan to separate the projectile department of the business from the tool steel department was approved. In the future the manufacture of projectiles will be carried on under the name of the Washington Steel & Ordnance Company, the plant being near Washington, D. C., and the tool steel business will continue to be carried on as before by the Firth-Sterling Steel Company, whose works are at Demmler Station and general offices are in the Oliver Building, Pittsburgh. The Firth-Sterling Steel Company, however, will control the Washington Steel & Ordnance Company.

The Canton Foundry & Machine Company, Canton, Ohio, has decreased its capital stock from \$100,000 to \$50,000.

Scientific Management

F. W. Taylor's Book and Its Lessons

BY A CONNECTICUT MANUFACTURER

Coming before the reading public at a time when so many of our periodicals are each adding its voice to the cry against the existing economic condition, "The Principles of Scientific Management" is accomplishing more than perhaps its author dared hope for. And it is doubtful if any book of its kind has brought about such heated discussion in the technical press as has this. It is rather unfortunate, however, that in the presentation of arguments in support of the principles involved the author should have allowed the impression to be given that workmen of inferior mental caliber are preferable in carrying out his ideas, and that he should further have chosen examples which by many are not considered convincing as to the general applicability of the system. We say this because we dislike to see a good thing maimed at the start; the country needs as many trusty blades to defend and advance it just as present as it can muster, and it is regrettable to have such a valuable recruit as this book seem to anyone to wear the uniform of the enemy.

That the principles set forth are not new the author very generously admits; in fact, his whole attitude throughout the book is in that respect commendable. The point is that for a number of reasons, and from certain well-defined causes, a grievous waste of human effort exists and is allowed to exist, which waste is in a measure allowed to exist by those very people who would benefit the most by its correction. It is in the repeated and emphatic admission of this last that the book is unique. One expects such statements from members of the class who are admittedly suffering from the unreasonable conditions that exist among the people on this planet, but we think that never before have there been so many men among the well-to-do who understand and voluntarily admit the injustice of things as they are. There have been Cassandras, but always have they been treated as such.

When, however, we find a vice-president of a large Western concern telling his fellows "that every man who is willing to work is entitled to a living, and that no man is entitled to so much that somebody else must go hungry," when a man of Judge Gary's stamp talks of co-operation and universal welfare as he did recently—hearing such things it is impossible to doubt that a way is being shown, that the light is becoming clearer, that the solution of it all is evolution and not revolution.

The Obstacles to Changing Existing Conditions

Mr. Taylor states that serious obstacles exist to sudden change from existing conditions to those he advocates; he urges that the principles he puts forward be cautiously applied if good results are to be expected. To any manufacturer reading the book specific obstacles to the application of the principles to his own business will at once present themselves. Obstacles, however, exist but to be overcome, and the hardest obstacle of them all is usually to bring oneself to agree that the other fellow's way is the best. Especially is this so in the present case, where the proposed change hits the very foundation stones on which the business of to-day is built. Business is said to be strife, and, now, when the suggestion comes, as Mr. Taylor gives it, to remove for good and all the bitterness that exists so widely between employer and employee, there is something of the nature of a shock to the sensibilities of the average factory owner when for the first time the meaning of it all comes clearly home to him; it seems like giving up a fair advantage.

That the acceptance of the principles will gain adherents rapidly seems quite probable, for, far from calling upon the employers for any sacrifice, the thing is shown to work distinctly as a mutual advantage. A proposition based on natural laws of human nature, such as Taylorism can be shown to be, cannot but succeed; it is only when natural laws are broken that evil results.

Up to the present time the tendency in manufacturing has been strongly toward the reduction of costs more through the introduction of automatic machinery than by speeding up the operators. Contrary to the supposition

held by many and advanced by all labor agitators, this tendency has not resulted in increased idleness among the workers but in greater output by the same working force with a corresponding reduction in cost and an increased consumption. Commendable as has been this progress in the application of automatic features to the machinery of manufacture, the time has come when, as a nation occupying a position in the front rank, we cannot ignore our duty in respect to the proper utilization of our skilled and unskilled labor. Long habit, or moral blindness, has made seem right and "good business" what we shall soon see partakes of the less admirable qualities of our natures, and, because habit is by nature slow to uproot, so will the change for the better not be swift. Yet the extreme instability of our social structure as it exists to-day must soon become evident to all of those to whom it has been given to hold the balance of power, and it is to be hoped that no such conflict will precede the readjustment as history shows to have been necessary in past ages.

Edison Giant Roll Patents Sustained

A decision has been handed down by Judge Hazel in the United States Circuit Court of the western district of New York in a suit against the Allis-Chalmers Company and two of its customers, the Empire Limestone Company and the Casparis Company, on Edison patents Nos. 672,616 and 672,617, granted April 23, 1901, on the so-called giant rolls. These rolls are referred to in the recent book "Edison; His Life and Inventions," by Frank L. Dyer and T. Commerford Martin:

No such departure was as radical as that of the method of crushing the ore. . . . With his usual tendency to upset traditional observances, Edison conceived the bold idea of constructing gigantic rolls which, by the force of momentum, would be capable of crushing individual rocks of vastly greater size than ever before attempted. . . . Engineers to whom Edison communicated his ideas were unanimous in declaring the thing an impossibility; that it was like driving two express trains into each other at full speed to crack a great rock placed between them; that no practical machinery could be built to stand the terrific impact and strains. Edison's convictions were strong, however, and he persisted.

Judge Hazel, in referring to the patents under consideration and in setting forth a judicial review of Edison's accomplishment, said:

The patentee surmounted all obstacles and the record shows there were many. He was the first to evolve a crusher by which kinetic energy became a potential factor in the method of crushing and breaking rock by blows from the knobs on rollers. It scarcely can be doubted that his inventions are meritorious and involve in their organization and perfection patentable skill of a high order.

The court then refers to the claims of the two patents, one covering broadly the method involved in crushing rock by kinetic energy and the other relating to the apparatus employing the two massive rolls which are so driven as to permit the crushing and breaking to take place. It was urged in defense of the suit that crushing rolls of much smaller size had been used, generally geared together, and that no invention would be required to increase the size and weight of such rolls and to dispense with the gear so as to permit the rolls to operate independently. Concerning this defense, Judge Hazel said:

In the prior art there is not disclosed any method or apparatus for breaking rock by the medium of crushing rolls which are provided with knobs or projections and are driven by belting. They were provided in most instances with teeth or projections on the rolls which were geared together and their function was to compress, pinch or pick the material to separate the particles. The driving agent apparently performed the work of crushing the material while in the patents under consideration there is a distinct departure, the material being wholly crushed or broken by the energy of the knobs on the rolls. Although some of the separate elements of the claims in controversy were old and are found in the prior apparatuses, yet such old elements had never before been assembled or combined to use power stored in the rolls to break or crush rock nor prior to the inventions in suit had such rock been broken or crushed by hammer blows from projections on the rolls driven by belt and rotating in opposite directions.

The defendants' structure was practically a copy of the Edison rolls, and the court therefore had no difficulty in promptly deciding them to be an infringement.

R. W. Oswald, Jenkins Arcade Building, Pittsburgh, representing the Pennsylvania Boiler Works, Erie, Pa., reports the following sales of boilers for 125 lb. working pressure: Pitt Coal Company, Pittsburgh, 150 hp.; Bethany College, Wellsburg, W. Va., 250 hp.; W. J. Rainey Company, Uniontown, Pa., 125 hp.

A New Punching Machine Control

BY G. A. BISSET, NAVAL CONSTRUCTOR, U. S. N., MUNSHALL, PA.

A highly efficient type of punching machine has been discovered at last, and, strange as it may seem, the necessary principles were found to exist in a machine designed and operated very successfully for an entirely different purpose. In fact, it is a safe assumption that the designers of the Davy steam-hydraulic forging press, which was illustrated in *The Iron Age* April 15, 1900, and June 30, 1910, never contemplated the eventual application of the idea to punching machines.

The features of a perfect punching machine long impossible even to approximate in actual machines are:

(a) A control that will leave the feet and hands of the operator free for other purposes.

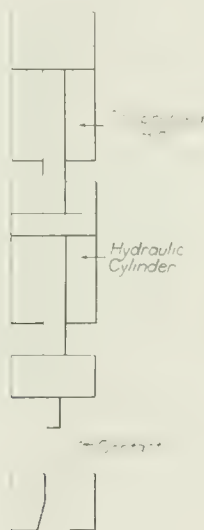
(b) A control that can be operated with ease.

(c) Immediate response on the part of the machine the instant the "control" is operated, that is, the punch should descend as soon as the control lever is operated, and not wait during a fraction of a revolution until a cam bears.

(d) The punch should rise immediately after punching a hole, but rise only just high enough to clear the plate, this height being readily adjustable for different thicknesses of plates. This feature is of great value as it enables the next hole to be centered with great accuracy, the plate being moved until the punch covers the white circle which indicates where the hole should be.

All the above results can be accomplished in a most efficient manner by a very slight electrical addition to the Davy press redesigned as a punching machine.

The punching is done by the hydraulic cylinder against air pressure in two other cylinders abreast of the hydraulic cylinder, or one above it, as shown in Fig. 1, while a press of the type to which it can be applied is illustrated



which may be the operator's mouth, or between his knees if he is sitting down. When the punch reaches the bottom of its stroke the current in the circuit of which the solenoid *q* forms a part is reserved and the lever *l* is brought back against the stop *s*.

The ease with which this machine can be operated and its immediate response enable time to be saved in punching every hole, the amount saved being equal to that elapsing between the centering of the punch over the next hole and the bearing of the cam of the ordinary punching machine. This time is invariably and unavoidably wasted with the cam machines. While some of it

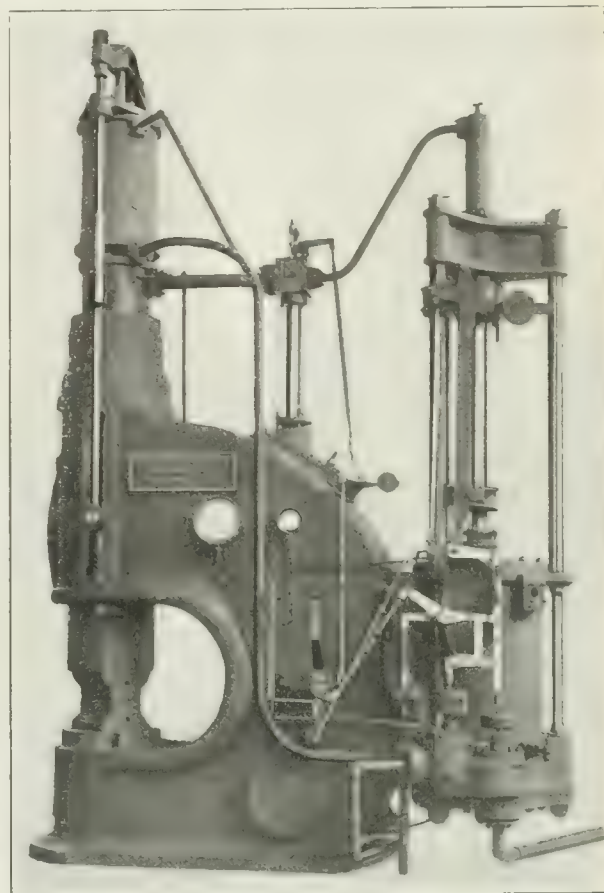


Fig. 2.—The Control Applied to a Davy Steam Hydraulic Forging Press, Built by the United Engineering & Foundry Company, Pittsburgh, Pa.

might be saved in their use by increasing the speed it would be at a loss in capacity or power and at an increase in danger from the flywheel in case of overload.

The high first cost of a steam-hydraulic punching machine would be offset by its value for various purposes, flanging, manhole cutting, shearing, bending and forging.

The Foreign Steel Company, 90 West street, New York, has taken the agency for the line of tool steels made by J. J. Saville & Co., Ltd., Sheffield, England, and will handle their products in North and South America and in Canada through a Canadian company. J. J. Saville & Co., Ltd., have been in existence since 1774 and are well known in Europe as makers of the Triumph high-speed steel and drills; in addition to the Sheffield works, they have a steel plant in Lieau, Russia. The directors of the Foreign Steel Company are John J. Boyd, F. S. Tainter, E. R. Reets and William Wormser.

The Cleveland Machine Tool Works, Cleveland, Ohio, is now under the sole ownership of J. G. Bellinger, who has purchased the interest of his partner, Fred W. Bowler.

The Cleveland Auto Spring Company, Cleveland, has changed its name to the B. E. F. Auto Springs Company.

The Oliver Foundry & Machine Company, Ironton, Ohio, has changed its name to the Ironton Punch & Sear Company.

Fig. 1.—Details of a New Attachment to Secure Accurate Control of Punching.

in Fig. 2. The air cylinders are connected to the compressed air system of the plant in which the punch is installed. As the plunger moves down in punching a hole through a plate it completes an electrical circuit as the down stroke is finished. This circuit releases the pressure in the hydraulic cylinder and allows the air cylinders to withdraw the punch slide to a predetermined distance, depending upon the location of the stop *s* for the control lever. This stop can be adjusted for any thickness of plate within the capacity of the machine. The punch is started downward by moving the lever *l* against the stop *r*, this movement being controlled by the electrical circuit through the solenoid *q*. The contacts which complete this circuit are kept at the most convenient place,

A Museum of the Wire Industry

The American Steel & Wire Company's Permanent Exposition, the Probable Nucleus of an Institution of Much Wider Scope.

The American Steel & Wire Company has departed from the ordinary commercial workings of a corporation by establishing an Industrial Museum, the primary object of which is to preserve the fast disappearing records and relics illustrating the beginnings of the wire industry in this country. The museum was founded in 1908 by the president of the company, William P. Palmer, himself an enthusiastic collector, who realized that in the rush and turmoil of present-day business the early history of an industry is apt to be forgotten unless organized steps are taken to rescue and preserve the surviving evidences of its childhood.

While thus far the collection of exhibits consists mainly of specimens of early products and equipment, it also includes many documents of historic importance, a collection of portraits of men who have been and those who still are prominent in steel and wire, and also many miscel-

been covered by his predecessors. In this way, the museum should prove the source of some degree of economy and commercial profit.

The establishment of the museum has the hearty endorsement of C. L. Miller, vice-president and general superintendent, and as a result of his active interest in the enterprise, the operating departments throughout the American Steel & Wire Company's plant are lending valuable assistance in securing articles of historic interest and other suitable material to add to the museum collection.

All of the company's districts are represented on the museum committee, of which Chief Engineer F. H. Daniels is chairman. The museum thus belongs equally to all districts, and contributions have come to it from all directions. The other members of the committee in charge of the museum enterprise are as follows: F. C. Gedge, Chicago; B. B. Ayers, Chicago; R. W. Ney, Cleveland; E.



Fig. 1—The American Steel & Wire Company's Museum—A View of the Barbed Fence Exhibit.

aneous pictures pertaining to the manufacture of steel and wire. The ultimate scope and purpose of the museum are, however, far broader than this. It is contemplated to have within the walls of the institution a progressive exhibit which shall be educational in its character and which shall represent in successive stages the progress of the raw material from the mine to the market in the almost infinite variety of commercial products. Each epoch of the industry will be shown in its entirety, so far as it is possible to bring about the result.

The Museum Building

A detached building at the North Works, Worcester, Mass., has been set apart and fitted up for the museum. It is provided with a fireproof vault and is equipped with automatic sprinklers, rendering its contents practically safe against fire. The finish of the rooms is simple and attractive, forming an excellent setting for the exhibits. The collection is already one of large variety. Looking at the institution apart from its historic interest, as it becomes complete in present-day collections as well as in what is recoverable from the past, it must afford inspiration to the inventor and designer, not only as to what to create, but also as to what to avoid. It is no infrequent experience for an engineer to discover that he has wasted much valuable time in going over ground that has already

Boley, Cleveland; J. W. Carpenter, Pittsburgh; H. W. Willson, Worcester, and A. G. Warren, Worcester, secretary.

Some Details of the Exhibits

Figs. 1 and 2 show opposite views of the southeast room containing the barbed-wire fence exhibit. This collection is quite extensive, including specimens of early barbed wire in many and varied forms, beginning with the "wire provided with a series of spur wheels" patented by William D. Hunt in July, 1867, as seen in Fig. 5. In Fig. 6, to quote the inscription, is "the first piece of double strand barbed wire fencing ever made with the intention of holding the barbs in place by twisting two strands together. Made in 1874 by Joseph F. Glidden at the old Glidden homestead, DeKalb, Ill. Twisted on the small crank of a grindstone, which Mrs. Glidden turned for the purpose. The wire tightened on the crank and could be removed only by cutting with a cold chisel. The specimen shows where it was cut away from the crank."

In this room is the collection of models of barbed-wire machines which possess a historic importance from the fact that they served as court exhibits during the barbed-wire patent litigation which was raging fast and furious in the courts of the Middle West 25 to 30 years ago.

The northeast room, shown in Fig. 3, contains, besides

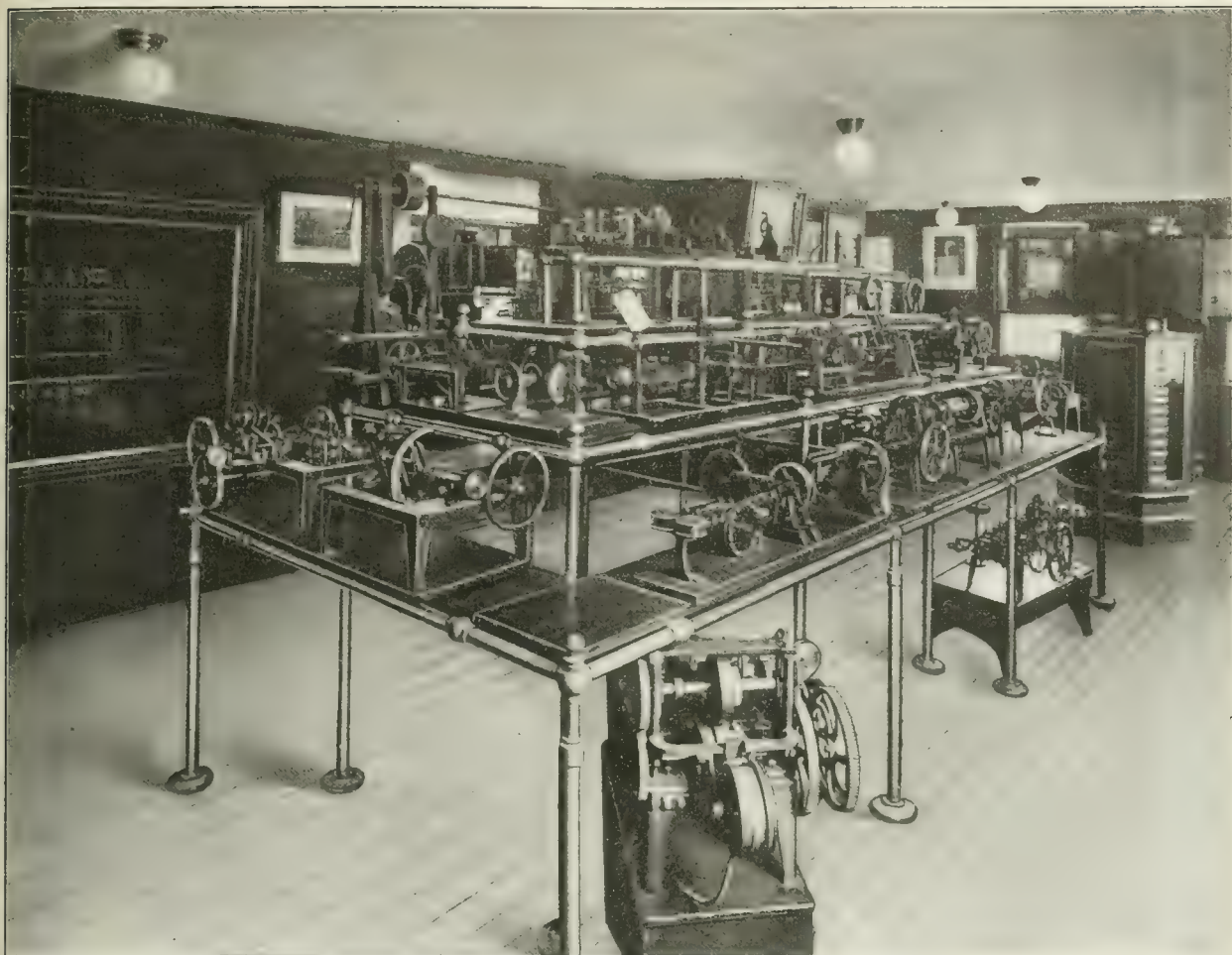


Fig. 2.—The Barbed Wire Fence Room The Collection of Models of Machinery



Fig. 3.—The Northeast Room and Its Models of Rolling Mills and the Gallery of Portraits.

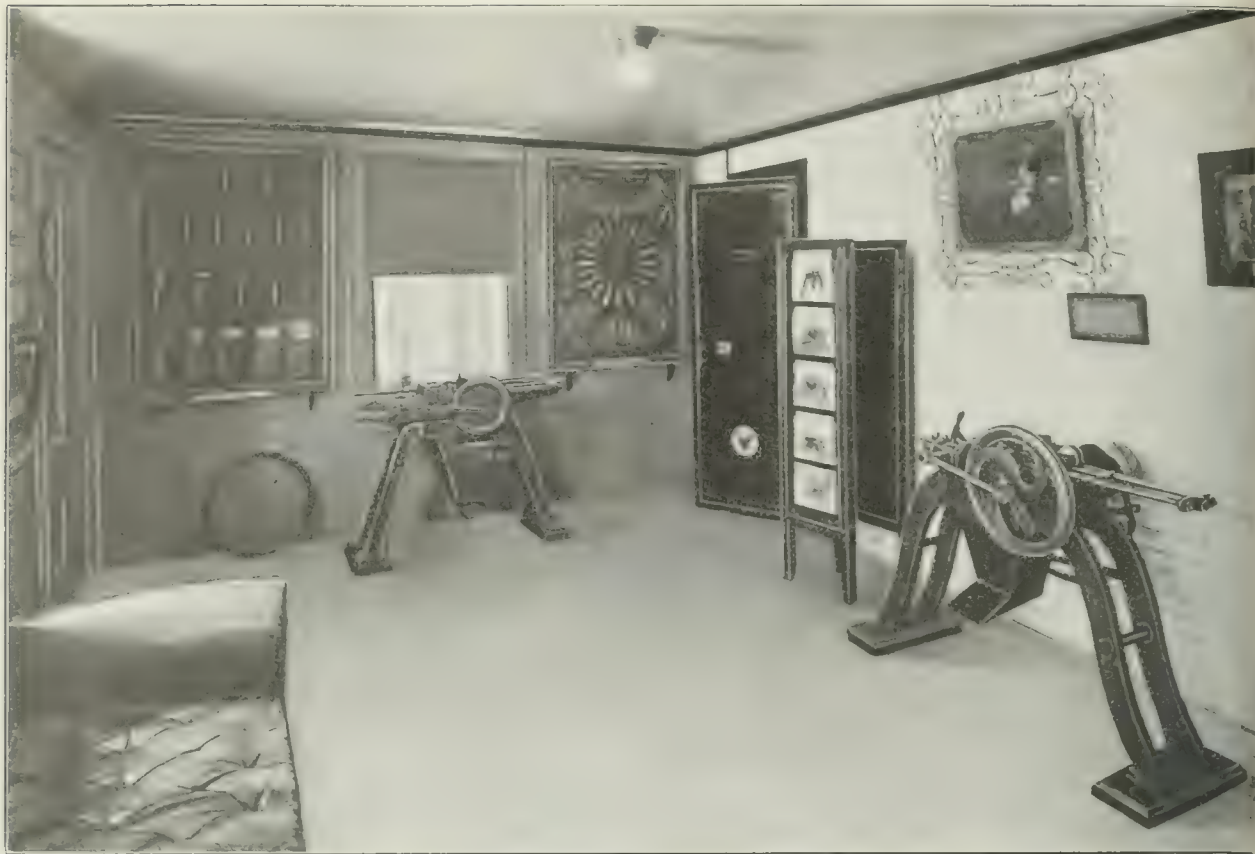


FIG. 4.—The Southwest Room—Two Historic Wire Nail Machines.

a gallery of portraits and various interesting souvenirs, a bale-tie exhibit and several models of rolling mills and rolling mill appliances. Here, also, may be seen views of the various plants which were merged into the one corporation, the American Steel & Wire Company, in 1899; several views of the first cable street railroad in the world,

installed in San Francisco in 1873; and many specimens of street railroad cable, both unused and worn out in service. Specimens of steel track strand, and photographs illustrating its use across the canyons of the far West, are found in this room.

Historic Wire Nail Machines

In the southeast room (Fig. 4) are two wire nail machines from Covington, Ky., where the Kentucky Wire Nail Works was organized in 1873. The necessary funds were furnished by Rev. Joseph Goebbels, a Roman Catholic priest who had a parish in Covington, but the practical success of the enterprise was due almost wholly to the skill, energy and perseverance of the late Michael

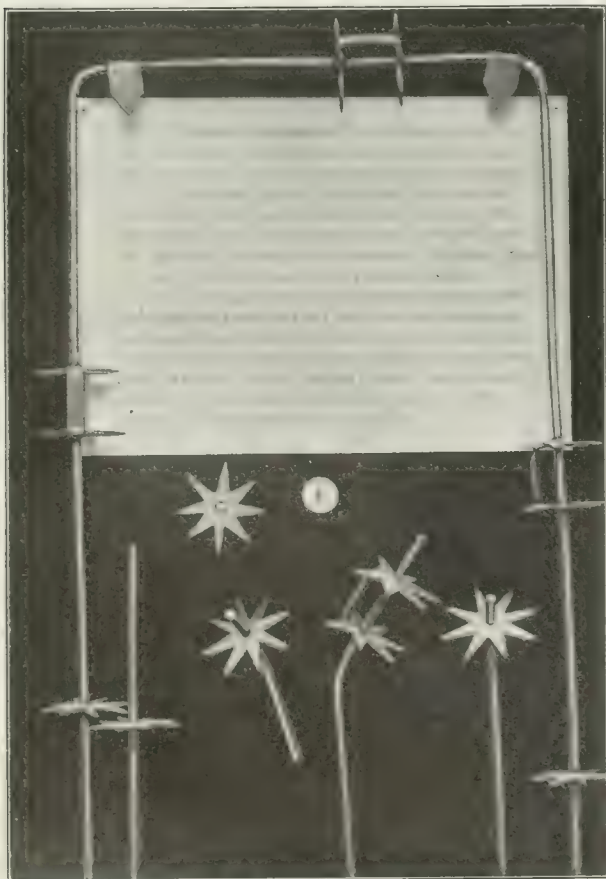


FIG. 5.—A Typical Barbed Wire Fence Exhibit. Wire Provided with a Series of Spur Wheels.

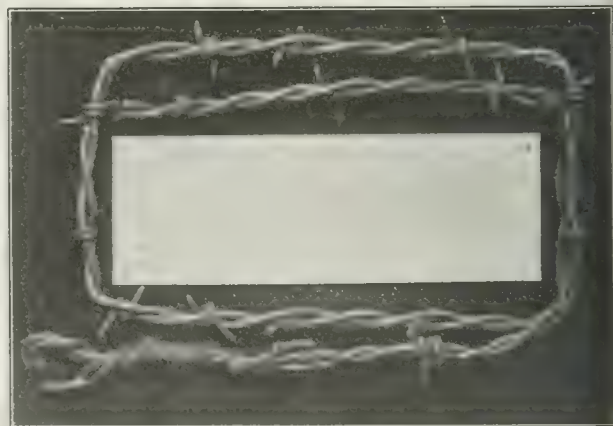


FIG. 6.—The First Piece of Double Strand Barbed Wire Fence. Twisted on a Grindstone Crank by J. F. Glidden.

Baackes, brother of Frank Baackes, vice-president and general sales agent of the American Steel & Wire Company.

One of these machines was built in Germany, the other was built in Covington, after a German pattern. Both machines have seen upward of 30 years of service. Another machine, not shown in the photograph, is of still greater interest, being the first wire nail machine built in America. This is an English type and was constructed

in New York in 1851 for Morton & Brenner, and was owned and operated later by William Hassall and his son, John Hassall, who donated it to the museum.

On the second floor, among other exhibits, is the model of a blast furnace built at Newburgh, Cleveland, in 1865, and recently dismantled, representing a type efficient in its day, but now superseded by one more economical in its operation and output. Here, also, are the rotted timbers and worn-out gears of an ancient rod frame, and several small annealing pots, all of which formed part of the early equipment of Ichabod Washburn's wire factory in Worcester. Another article from the same old factory is a Roman steelyard made in the year 1774, as attested by the date stamped on the beam.

Secrecy No Longer an Industrial Factor

The secret processes and methods employed in wire manufacture in Nurnburg and other parts of Europe were jealously guarded for centuries and handed down from father to son for many generations. This policy of secrecy, which was generally maintained in this country also with regard to making wire until recent years, is now practically abandoned. Rolling mills and wire drawing machinery are to-day purchased in the open market, all manufacturers having equal opportunity to choose the best.

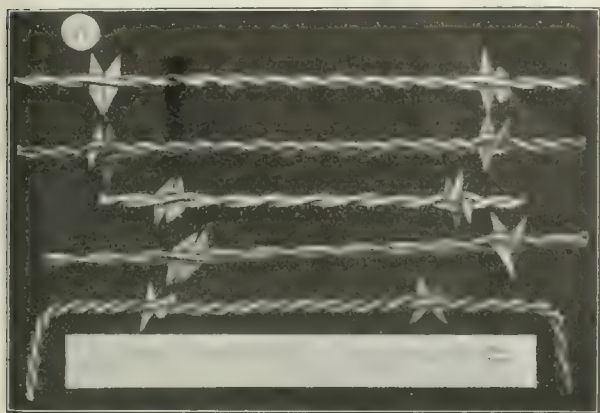


Fig. 7.—Some Interesting Specimens of Barbed Wire Fence.

This they do realizing that it is not the best equipment, but the man behind the equipment, that spells success or failure for their business.

As with the present-day manufacture of wire, so with the museum idea. There is no thought of restricting the privileges and benefits of the museum to a favored few who may chance to be associated together. The American Steel & Wire Company asks no financial assistance in this new industry. But it welcomes co-operation from outside in the form of contributions of material, which must come from all quarters if the museum is to prove a success; and the use of this museum is freely offered to any who are sufficiently interested to pay it a visit.

It is hoped that as the years pass the Industrial Museum will continue to grow and develop a usefulness of which its present contents is merely a suggestion.

Tradition and the Future

Tradition is by no means an unimportant factor in industrial organization, particularly when it is coupled with the friendly relations of employer and employees. In the case of the American Steel & Wire Company this is particularly true, for, as the world knows, the management has carried its interest in its workmen to a point where a very lively appreciation exists on the part of the employees. Therefore, the esprit de corps is strong. The museum contains many inspiring reminders of the earlier days of the industry. An old bell that called men to work when the industry was young, sounding from the cupola of Ichabod Washburn's mill; the flag pole which was raised at the Central Works, Worcester, that the flag might be unfurled when the news of Lee's surrender was received; portraits of friendly employers and heads of departments, and of groups of workmen—these and other similar exhibits have much to do with emphasizing the amicable relations in the works.

As has been stated, the museum is really in its experimental stage. It is not a wide prophecy to assert that it

may be the beginning of a great institution in which the entire United States Steel Corporation will be represented in a lavish and complete exhibit of the products and methods and history of the great company. It would be one of the most complete, if not the most complete, industrial collections in the world; for it would take the great basic industry of iron and steel and all of its branches from the mines to the finished products, not only as the industry exists to-day, but as it has existed during its various periods from the very beginning.

Oscillating Sand Sifter

A new sand sifter is being brought out by the Gregg Mfg. Company, Cleveland, Ohio. An important feature of this sifter is that an oscillating motion is imparted, it being claimed that it is the only oscillating riddle on the market. The appliance is operated by a compressed air motor, which is simple in construction and has but few parts.

In designing the piston and the valve the principle of the steam engine was applied. The piston rod connects directly with the sieve holder or clamp and the sieve oscillates on a center post as shown. The piston rod has a 5-in. stroke, which gives that amount of motion to the



A New Oscillating Sand Sifter, Made by the Gregg Mfg. Company, Cleveland, Ohio.

sieve. The motor is completely inclosed so that sand is excluded from the working parts. The front of the motor case is provided with a box packed with waste which keeps the piston rod clean. The sieve holder is so constructed that the center is supported by cross bars. A spring band is provided for clamping the sieve, so that as soon as the band is released the sieve is perfectly free. There is a pipe and hose connection for air on the under side of the motor.

The machine is easily put in operation by simply opening the air valve. The riddle can be easily and quickly moved about the foundry in wheelbarrow style, a wheel on the rear leg and handles on the front legs being provided for that purpose. It is substantially built for hard continuous service.

It is claimed for this machine that it shifts sand more rapidly than other power riddles. The sand rests on the wire mesh and is cut by the oscillating motion, thus increasing its rapidity. It is a slow motion riddle and has practically no vibration. By not shifting sand from one side to the other vibration is eliminated and the machine escapes danger of going to pieces from continual racking.

The United Steel Company, Canton, Ohio, has installed a heat treating plant for its vanadium steel products. While large buyers usually have heat treating plants of their own, the small consumers do not, and the new department is to accommodate the latter class of trade. The company reports an active demand for vanadium steel. It recently received an order from an automobile manufacturer in Russia, this being the first order to come from that country.

Gary 60-Inch Universal Plate Mill

New Precedents in Speed, Size and Weight at the Gary, Ind., Plant—Monthly Capacity 20,000 Tons

During the trial run of the recently completed 60-in. universal plate mill of the Indiana Steel Company at Gary, Ind., a plate 141 ft. long, 34 in. wide and $\frac{3}{8}$ in. thick was rolled without reheating from a 12-in. ingot. From these figures a quick appreciation of the speed and capacity of the mill is possible. The estimated output will be 20,000 tons monthly. The limiting factors governing the width, length and thickness of plate that can be rolled are readily defined. As to width, the mill's maximum rating for universal plates—60 in.—may be increased to 84 in. for sheared plate by removing the vertical rolls, for which provision is made, and thus converting the mill into a plain three-high type. The minimum thickness to which a plate can be rolled is in this instance a function of the length of the cooling beds and of the size of the ingot used. The cooling beds are 150 ft. long and the smallest ingot is 12 in. Within this length and from this size ingot the minimum thickness to which a plate can be worked down conveniently is about $\frac{5}{16}$ in. The capacity

The mill was built by the Morgan Engineering Company, Alliance, Ohio. It will have a horizontal roll speed of 760 ft. per minute and it is expected that a 12-in. ingot can be broken down and rolled out into a $\frac{1}{2}$ -in. plate in 22 passes in an elapsed time of about 2 min. The vertical rolls will feed at a speed about 8 per cent. slower than the horizontal rolls are running. The adjustment of the rolls is entirely controlled by independent motors. The bottom roll is fixed and the screw-downs for raising and lowering the counter-balanced top roll are each operated by a 50-hp. Crocker-Wheeler motor. The screw-downs are graduated to show the movement of the rolls to 0.01 in. The middle or floating roll is raised and lowered by a 100-hp. motor and rolls with the plate as it is going through.

The tilting tables are operated simultaneously from a 150-hp. motor driving through a lever arm, crank and shaft. The tables are carried on trunnions at the outer ends and swing on these centers. The tables are about 32



Fig. 1.—60-in. Universal Plate Mill, Indiana Steel Company. Showing Drive Housings; Driving Motor Is Farther to the Right.

of the mill would be held within smaller limits by the length of the table from the mill to the straightening rolls if it were not that facilities are provided for moving these rolls out of the way. The rolls are mounted on long shoes at right angles to the lines of the mill. Actuated by a motor-driven screw, the entire set of rolls can be moved aside, table rolls substituted and unusually long plates rolled directly onto the cooling beds.

The other important universal plate mill of the Chicago district is the one at South Works of the Illinois Steel Company and described in *The Iron Age* of January 16, 1908. That is a two-high reversing type, operated under the Ward Leonard-Ilgner system of control. The Gary mill is a three-high continuous type and in addition is the largest plate mill ever built. Fig. 1 is a view of the mill. It is driven by a motor which, with its continuous rated capacity of 6500 hp. and tremendous overload possibilities, has power to drive any other part of the mill to the breaking limit.

ft. long and are made up of eighteen 16-in. rolls, 5 ft. 11 in. long. The rolls drive from both ends and are operated by special reversing-type 100-hp. motors, one for each table. All of these motors are located in a pit at the side of the mill, a view of which is shown in Fig. 3. The drive from the main motor is split in the two gear housings shown in Fig. 1, so that the horizontal and vertical rolls of the mill are driven from separate shafts. The horizontal rolls are 84 in. long, 36 in. diameter, with necks 25 in. in diameter. The vertical rolls are 21 x 23 in. This mill establishes new precedents in speed, size and weight.

The main rolls are driven by a 6500-hp., 6600-volt, 3-phase, 25-cycle, slip-ring type induction motor so wound and connected to its control apparatus as to give two definite rolling speeds, $53\frac{1}{2}$ r.p.m. and 107 r.p.m. In addition to being the largest motor ever built in this country, it is the first application of a two-speed alternating-current motor to a mill of this sort. The complete unit weighs approximately 450 tons and has an overall diameter of

21 ft. The revolving element weighs about 125 tons. The motor was too large to be shipped assembled, so that the assembling of the windings and punchings was done entirely at the point of installation.



Fig. 2.—6500-hp. General Electric Induction Motor for Driving the Mill.

is not used, as indicated in Fig. 2, which is a view of this motor, the effect being contained in the rotor itself. A suitable resistance is permanently connected into the rotor circuit which provides for a predetermined slip in speed during each pass, so that the flywheel energy may properly perform its function.

The motor is controlled, stopped and started by the operator through a master controller located on the operating pulpit in the mill proper. The motor itself contains but one stator winding, and since the speed combination is exactly two to one, this winding is reduced to the simplest form. The motor characteristics as regards efficiency and power factor are found correspondingly excellent. A notable feature of the operation of the pole-charging switch lies in a combination of connections and resistance whereby surging of the system is prevented, as the supply circuit is never opened when changing from one speed to the other during the rolling period.

The small motors throughout the mill are direct-current Crocker-Wheeler mill type, the current supply being obtained from two 500-kw. motor generator sets located in the same room with the main drive and operating at 375 r.p.m. These sets are each made up of a 500-kw. 250-volt compound-wound direct-current generator, direct connected to and on the same base with a 530-k.v.a.

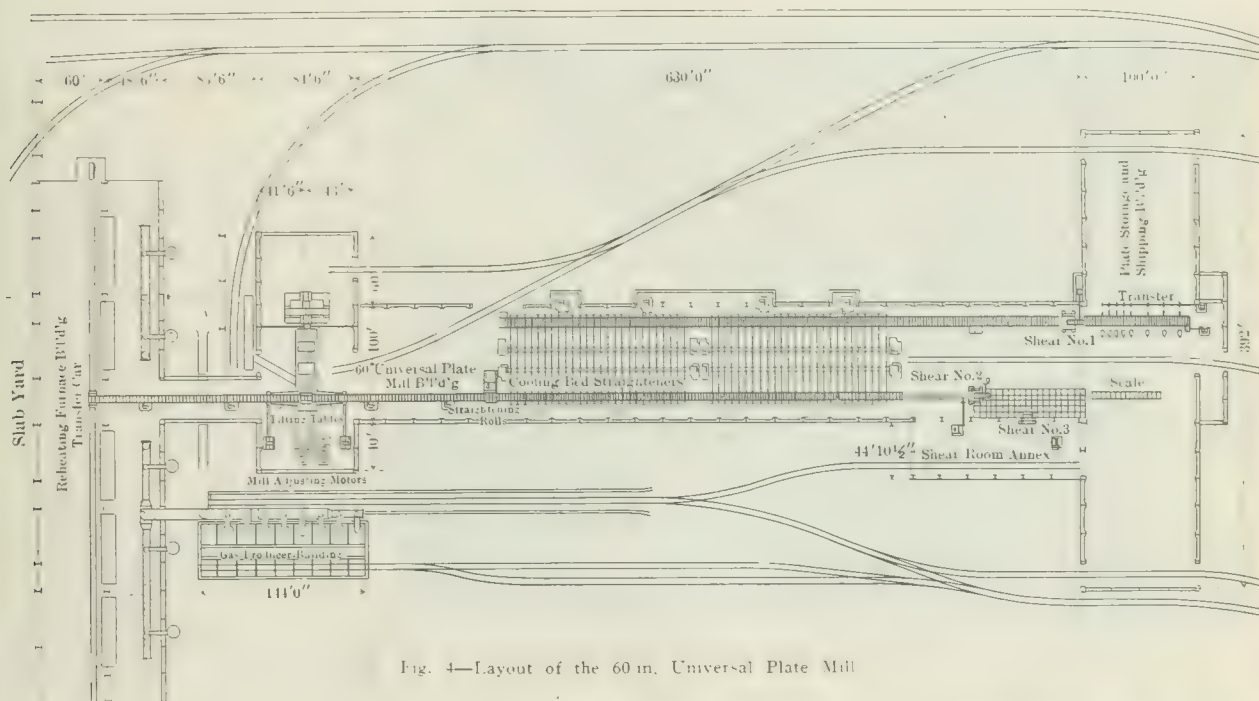


Fig. 4—Layout of the 60 in. Universal Plate Mill

In addition to the regular automatic starting and control equipment furnished with a motor of this character, a large motor-operated air-brake pole-changing switch is provided for changing from low to high speeds and vice versa. A definite interval of several seconds transpires during the change from one speed to the other. In regular operation the pole-changing switch is set for a speed of $53\frac{1}{2}$ r.p.m., the windings being connected for a combination of 56 poles; the main line switch is closed and the motor is brought to speed. A certain number of the first breaking down passes are made at the low speed, at which time the operator changes the position of the pole-changing switch, giving a winding combination of 28 poles and 107 r.p.m. for the final passes. The pole-changing switch is of a new design especially constructed so that it can be operated continuously at short intervals as required by the rolling operation.

The motor and its control equipment are located in a separate room protected from the mill room by a steel partition. A 50-ton crane traverses both mill room and the motor room and, to permit passage of the crane from one room to the other, the upper portion of the steel partition above the crane runway is movable with the crane.

The design of the motor provides for a liberal flywheel effect in the revolving element for the purpose of absorbing the shocks and preventing intermittent peaks of short duration on the generating station. An external flywheel

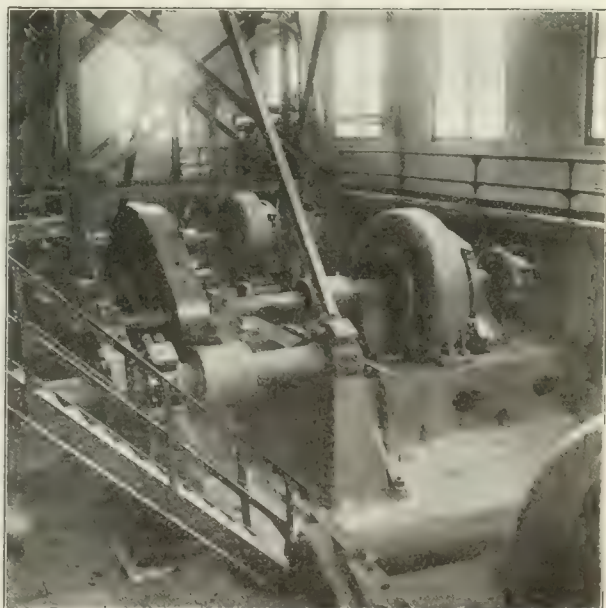


Fig. 3.—Two of the 50-hp. Motors for Adjusting the Mill Rolls; the 100-hp. Motor for Operating Tilting Table in Same Pit.

6000-volt, 3 phase, 25-cycle synchronous motor, which receives its supply from the same generating station as does the large motor. These sets as well as the main drive were built by the General Electric Company.

The plate mill is immediately adjoining the billet mill and soaking pits. At present there is no slabbing mill at the Gary plant. Plans have been projected for a 36-in. slabbing mill and a 160-in. sheared plate mill, so that the rolling of plates direct from ingots, as at present, is not intended to be the permanent practice. Referring to Fig. 4, the center line of the mill lies in an east and west direction, the movement of the material being from east to west.

At the east end the ingot and slab receiving and storage yard is laid at right angles to the mill and is spanned by a 15-ton yard ingot crane. This crane is designed especially for the purpose and the upper portion of the trolley is arranged to revolve while a gripping mechanism is provided for the handling of cold ingots. The yard under the crane is 82 ft. wide and 472 ft. long.



Fig. 6. Rear of Reheating Furnaces, Showing Overhead Galleries for Carrying Electrical Door Operating Motors and Drive.

The yard under automatically cut into the approach table drive and operate with it, thus delivering the piece to the table.

Although the speed of the approach table is about 750 ft. a minute an unusual equipment has been installed for the more rapid delivery of the ingot to the mill. In Fig. 7 is shown a special 15-ton ingot transfer crane, spanning the approach table and with a runway extending as far as the tilting tables. This crane is equipped with a special cradle comprising four arms, as illustrated, so shaped and spaced as to permit them to come down between the table rolls and pick up the ingot, thence carrying it to a point where it may be laid on the tilting table direct. The lifting motion of this crane is effected by means of a connecting rod and crank, the total lift being 30 in. The length of the approach table is approximately 140 ft. and the time this equipment was installed to save is the few seconds of interval between the end of the last pass of the

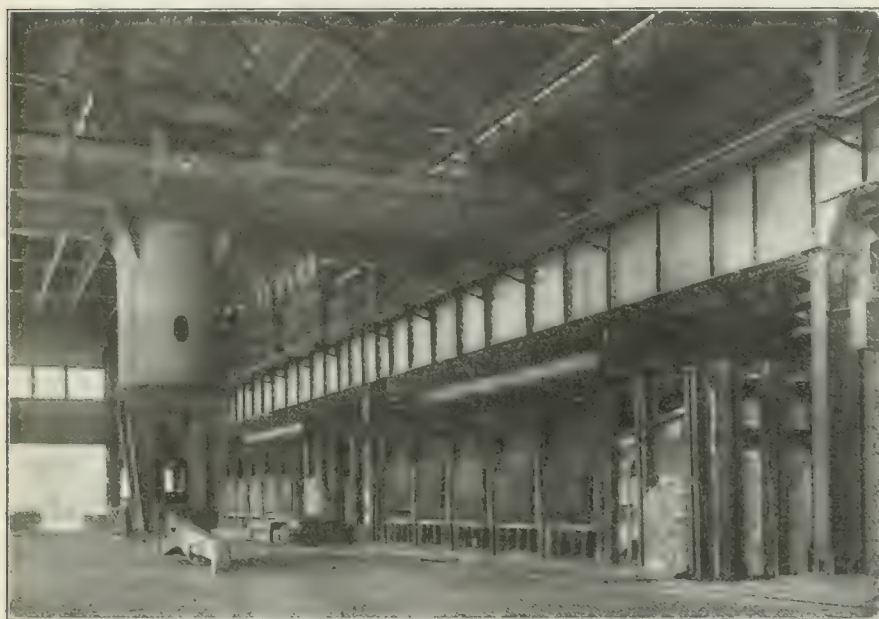


Fig. 5.—Portion of the Reheating Furnaces with 15-Ton Charging Crane.

furnace building fronts on this yard, the furnace charging floor being immediately adjacent, so that the charging cranes can reach from the charging floor into the storage yard and pick up ingots to be placed in the furnace. Two of these 15-ton slab drawing and charging machines operate along the furnace frontage over a 56-ft span. They are of the vertical lift, end grip type, with sufficient lift to permit picking up ingots from the floor. One of these cranes is shown in Fig. 5.

The five reheating furnaces are more than ordinarily large. They carry six doors, are 62 x 14 ft. overall and have a hearth measurement of 45 x 9 ft. They are standard Siemens regenerative furnaces with Siemens valves. Both doors and valves are electrically operated, the overhead platforms shown in Fig. 6 carrying the 5-hp. operating motors. The valves are coupled for alternate operation with the well-known overhead chain method. From the furnaces to the approach table the hot ingots are handled on a transfer car. The table of this car consists of rolls which, when the car is lined up with the mill table, constitute an extension of that table. When in the proper position, the transfer table rolls

rolled plate and the beginning of the first pass of the new ingot. This crane as well as those mentioned was built by the Alliance Machine Company, Alliance, Ohio.



Fig. 7. Approach Table to Mill and Ingot Transfer Crane.

From the mill the plate is delivered to the straightening rolls, which were built by the R. S. Newbold & Sons Company, Norristown, Pa., and thence to the cooling beds. Two cooling beds, each 150 ft. long, are arranged in tandem with the two 50-hp. motors for operating at each end of each bed. The design of the cooling beds, which were furnished by the Wheeling Mold & Foundry Company, Wheeling, W. Va., is illustrated in the cross-section, Fig. 8. A general view of these beds is presented in Fig. 9, looking in the direction of the shears. From the roll table the plate is pulled over to the side straighteners by the chain drag. The pulpits from which the side straighteners are operated are located between the two cooling beds and lined up with the straighteners so that the operator can bring the jaws up to just the right point and avoid buckling the plate. The plate is lifted off the straightener by a portion of the bed frame, which acts as a tilting arm, as indicated in the cross-section shown. The drags carry the plate across and pull it up on skids, which hold the plate, permitting the chain to free itself. From these skids the plate is lifted on to the table for delivery to No. 1 cutting shear.

This shear, Fig. 9, is a heavy guillotine type, motor driven and built by the Morgan Engineering Company. It is equipped with pneumatic counter-balance for the shearing jaw and also with a tilting delivery table. This table swings from one end and its function is to permit the piling up of several sections of the plate as they are cut off by the shear. The table will dip sufficiently to accommodate 10 pieces of plate, one on top of the other,



Fig. 9.—Cooling Beds, Looking Toward Shears

of the same type as No. 1, as illustrated in Fig. 10. The trim from the plates is cut up in a scrap shear built by the United Engineering & Foundry Company.

The stock building at the west end of the mill is 392 ft. long and 100 ft. wide. It is spanned by two 15-ton cranes, equipped with lifting magnets of the plate-handling type. Three tracks enter this building, each affording loading trackage for several cars at one time.

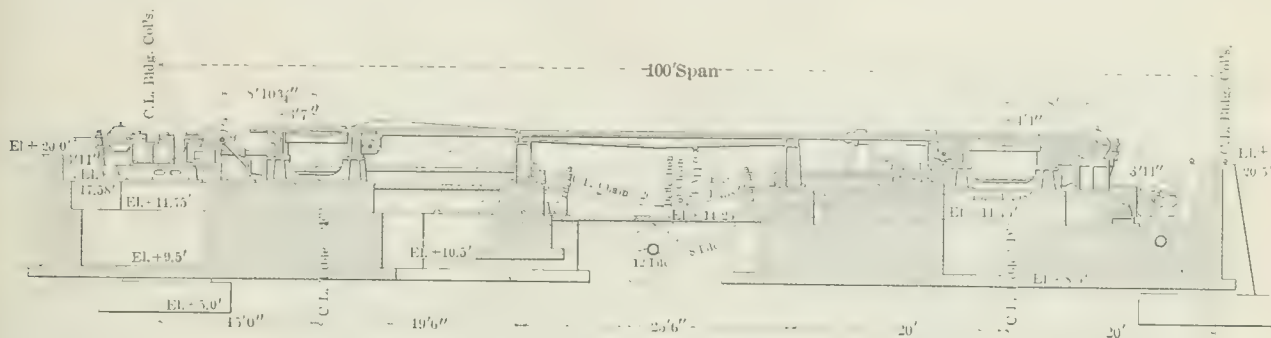


Fig. 8.—Cross-Section of Cooling Beds, Showing Jointed Table Design.

as they drop from the shear. These 10 pieces are then handled together to the transfer table, where they are set off on blocks for the convenient picking up by the crane. Shear No. 1 receives universal plates only. When sheared plates are being rolled they pass through the roller straightener only and from there in a straight line to shear No. 2, where the original plate is cut in lengths. These pieces are then delivered on castor plates to shear No. 3, which is a side shear. Both No. 2 and No. 3 shears were built by the Morgan Engineering Company and are

Mention should be made of the work of the Safety Commission in the equipment of the plant. By means of galleries, railings, shields and covers, danger for the careful employee is eliminated to a truly remarkable extent as compared with conditions existing only a few years ago. Precautions for safety and expenditures in this direction are justifiable in dollars and cents reasoning, for no other form of liability insurance can show equal returns.

Fig. 12 is a view of the gas producer plant consisting of eight Hughes mechanical gas producers. Coal is brought to the plant and discharged into concrete track hoppers outside of the building, from which hoppers the coal slides through gates into a pit running the length of the building. An elevator leg carries the coal up to a traveling hopper above the producers and in this way fuel is fed to each unit as required. The producer plant will be largely auxiliary, as a gas main bringing coke-oven gas is nearly completed and the expectation is to feed the reheating furnaces with coke-oven gas.



Fig. 10.—Shear No. 1 for Cutting Universal Plates, Looking Toward Cooling Beds

The American Boiler Manufacturers' Meeting

The annual convention of the American Boiler Manufacturers' Association will be held at the Hotel Brunswick, Boston, Mass., July 10 to 13. The Boston entertainment committee of the New England Association of Boiler Manufacturers will consist of Duncan D. Russell, James Russell Boiler Works, South Boston, Mass., chairman; James E. Lynch, Hodge Boiler Works, East Boston, treasurer; Joseph M. Robinson, Atlantic Works, East Boston; James C. Stewart, Stewart Boiler Works, Worcester; George F. Lawley, George Lawley's Son Corporation, Boston. The supply men's auxiliary committee will consist of Harry G. Porch, Lukens Iron & Steel Company; Wilbur Sargent Licke, Carnegie Steel Company; George H. Lloyds, Central Iron & Steel Company; James J. Sullivan, Champion Rivet Company; James L. Towle, Chicago Pneumatic Tool Company; James J. Killelea, Worth Bros. Company; Columbus Dill, Ashton Valve Company; George F. Musgraves, Star Brass Company. Frederick B. Slocum, Continental Iron Works, Brooklyn, N. Y., chairman of transportation committee, will take care of all reservations for accommodations at steamship lines between New York and Boston, if notified immediately.

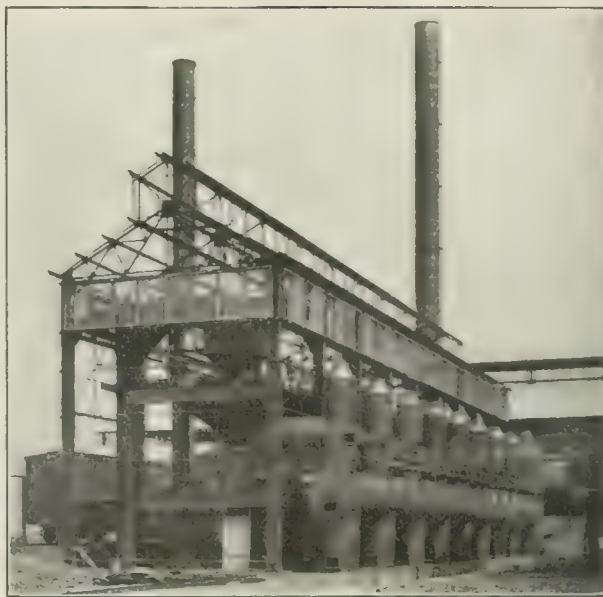


Fig. 12. The Gas Producer Plant

Promotion of Engineering Education

The Society for the Promotion of Engineering Education holds its annual meeting in Pittsburgh June 26 to 28, and in connection with it a handbook of Pittsburgh and its notable engineering works has been prepared. It takes the form of a 48-page booklet profusely illustrated, with descriptions of the different plants to serve as a satisfactory reminder of the points of interest visited. As usual, periods between sessions are reserved for different excursions, including one to the Homestead Works of the Carnegie Steel Company and others to the Pittsburgh branch of the United States Bureau of Mines, Jones & Laughlin Steel Company, Mesta Machine Company, National Tube Company, Westinghouse Electric & Mfg. Company, and Westinghouse Machine Company.

Among the papers scheduled is one by Prof. Fred. Raymond, for the Tuesday morning meeting, on the preparation of written papers in engineering schools; for the afternoon session, a report of the committee on teaching mathematics to engineering students by Prof. E. V. Huntingdon, and another for the same session on the balance of courses in chemical engineering by Dean C. H. Benjamin; one for the Thursday morning session on electrical engineering instruction by Prof. E. B. Paine. On Tuesday

evening a dinner is to be tendered to the visitors at the Country Club by Director Hamerschlag in behalf of the Carnegie Technical Schools. Prof. A. N. Talbot, of the University of Illinois, Urbana, Ill., is president of the society, and Prof. H. H. Norris, Cornell University, Ithaca, N. Y., is secretary.

George H. Hull, president of the American Pig Iron Storage Warrant Company, 44 Wall street, New York, has in preparation a work which he will entitle "Industrial Depressions: Analysis of Causes, Classification and a Practical Remedy." The work will have diagrams, tables and appendices and will be published by the Frederick A. Stokes Company, 443-449 Fourth avenue, New York City. The price will be \$2.95. In this work Mr. Hull will show that if proper statistics were gathered and quickly disseminated, and the business world educated to a knowledge of their meaning, the course of trade could be steadied and calamities avoided.

Reports appear to be untrue that a large foundry to make ingot molds is to be built in the Youngstown district in Ohio, to use molten metal to be supplied by merchant blast furnaces in the Mahoning Valley.

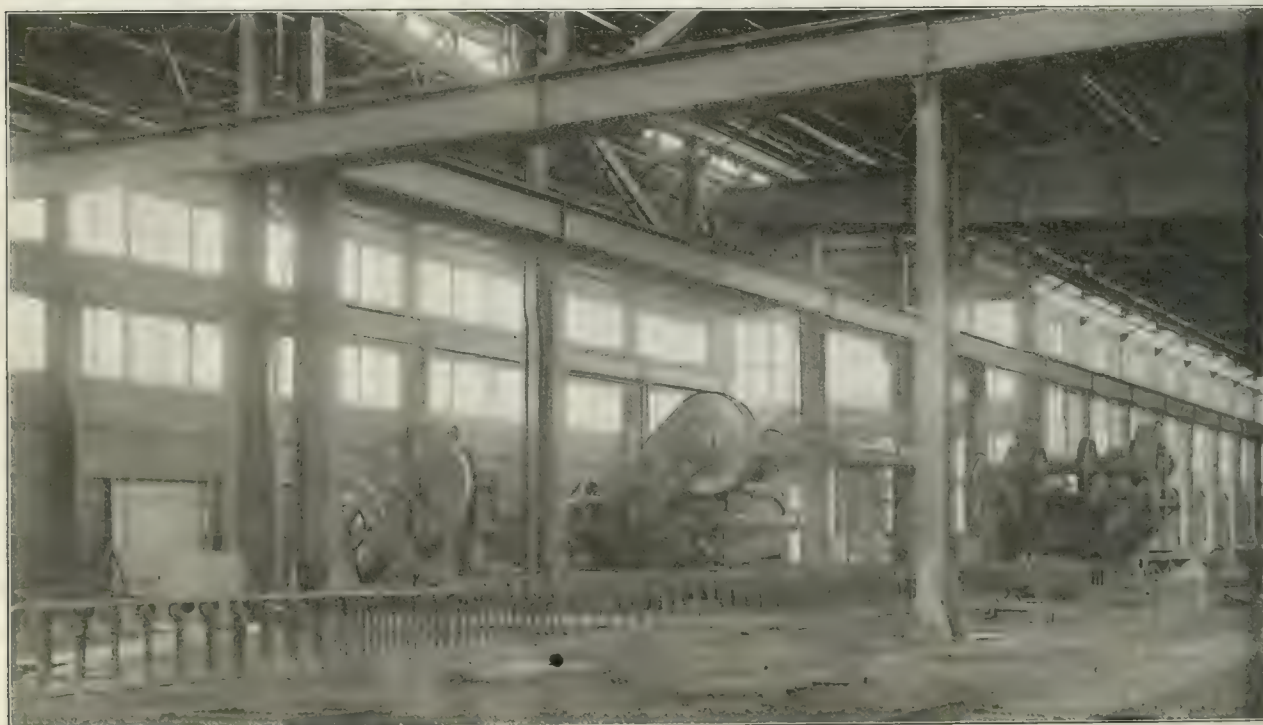


Fig. 11.—View of Shears Nos. 2 and 3 of 60-in. Universal Plate Mill at Gary, Ind.

New Indicating Boiler Flow Meter

For indicating the total amount of steam generated at any instant by one or a battery of boilers, either in pounds of steam per hour or in boiler horsepower the General Electric Company, Schnectady, N. Y., has developed a new boiler meter known as the FS-2. For this reason it can be used advantageously for obtaining data for equalizing the load on the individual boilers of a battery, for determining the efficiency of the firing, whether the feed water is circulating correctly or not, for determining the losses in efficiency due to the formation of the scale, detecting internal leaks and indicating the amount of steam distributed to the different departments of a manufacturing plant.

The apparatus consists of a nozzle plug, the meter proper and the necessary pipes for connecting the two parts. The first is similar to that used with the steam and air flow meters which were illustrated in *The Iron Age*, May 26, 1910. It consists of a screw plug with a stem having two sets of orifices, a leading set arranged longitudinally and a trailing set comprising three holes located at the middle of the stem at right angles to the leading set. The interior of the stem is divided longitudinally into two separate compartments, connecting with the leading and the trailing orifices respectively. In operation the plug is screwed into a small hole drilled and tapped in the steam pipe with the leading set of orifices facing the direction of the steam flow. The impingement of the steam against these openings produces a difference in pressure in two sets of orifices which is communicated to the meter.

The meter proper consists of an iron casting cored out to form one leg and the well of a U tube, the other leg being formed by one of the pipes connecting the nozzle plug and entering the well at the opposite end. This well is filled with mercury while the rest of the apparatus is filled with water. The difference in pressure as transmitted from the nozzle plug causes a difference in the mercury level and the displacement of the mercury actuates a pulley through a small float suspended by a silken cord. The motion of the pulley is transmitted to the indicating needle through a pair of horseshoe magnets, one of which is attached to the pulley shaft and the other to the indicating needle. The axes of rotation of the two magnets are in line and the mutual attraction exerted through a copper plug screwed into the side of the meter body casting compels them to move in unison.

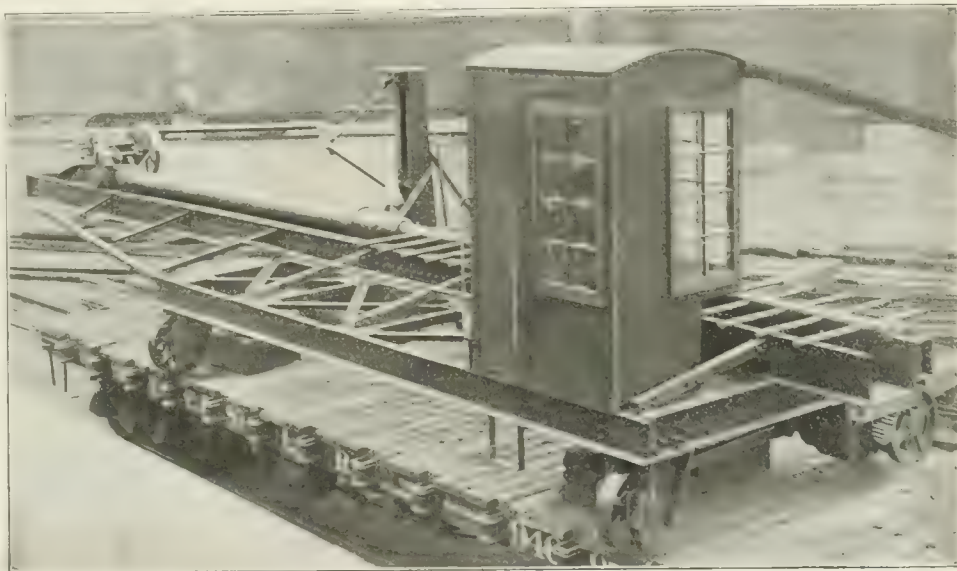
It is a comparatively simple matter to install the meter without interfering in any way with the existing steam pipe arrangement, since all that is required is the drilling and tapping of a small hole in the steam pipe for the insertion of the nozzle plug. The plug can be inserted in either a vertical or horizontal run of pipe, but a straight run of at least 12 pipe diameters in length should be selected. The meter is connected to the nozzle plug with $\frac{1}{4}$ -in. iron pipe and can be located in any desired place provided it is below the plug, although the location recommended is on front of the boiler.

The dial is 8 in. in diameter and is marked with heavy flow lines and large figures on a white surface for easy reading. For designating a certain flow on this scale a conspicuous target which can be readily set from the outside is provided. The meter can be calibrated to read in pounds of steam per hour or in boiler horsepower on the basis of 30 lb. per hour is equal to boiler horsepower, for pressures ranging from 0 to 250 lb. gauge and from quality ranging from 4 per cent. moisture to 260 deg. F. superheat. The pipe diameters for which meters can be supplied range from 2 to 14 in.

A Mechanical Coke Quencher

The problem of quenching coke mechanically in rectangular ovens has presented a number of difficulties. These include the providing of means for the rapid and efficient quenching of the coke in the ovens without injuring the oven walls, and to overcome this difficulty the C. O. Bartlett & Snow Company, Cleveland, Ohio, has recently completed a coke quenching machine from a design patented by the late John W. Seaver of that city. This machine was installed at the plant of the Mt. Hope Coke Company, Linn Station, near Brownsville, Pa., and the photograph from which the accompanying engraving was reproduced shows the quencher mounted on a freight car in the yard of the builder's plant.

The construction of this machine is rigid and in general resembles that of an electric traveling crane. All the parts are of heavy construction and the steel castings are of ample proportions. Throughout the entire design care has been taken to secure a machine capable of being built at a comparatively low figure. The essential parts of the quencher are two in number, an overhanging pipe and the main frame. The latter is mounted on trucks which travel on the tracks carrying the pushers, the entire oven being quenched from the pusher end. The overhanging pipe which is mounted on the frame is carried on a self-propelling trolley. As is clearly shown at the left of the engraving the axles of the trolley wheels are connected through gearing to an electric motor. This pipe has quenching arms which are so arranged that the entire



A New Coke Quenching Machine for Rectangular Ovens Built by C. O. Bartlett & Sons Company, Cleveland, Ohio.

oven or any portion can be quenched as desired, the arms being spaced and perforated with this object in view. The pipe when extended to its full limit projects 39 ft. from the end of the frame, this distance being sufficient to enable it to take in the entire width of the oven. In addition to this longitudinal movement the height can also be adjusted to enable the machine to be used for quenching either 48 or 72 hr. coke. The water is supplied from the main pipe line of the plant through outlets spaced 60 in. on centers along the front of the oven. A 3-in. hose attached to these outlets connects with the main frame, which in turn is connected to the overhanging pipe through a pair of swiveling pipes.

Two electric motors are used to operate the machine, one for traveling the machine along the tracks and the other for moving the overhanging pipe trolley back and forth on the main frame. Both of these motors are controlled from a cab which can be located on the frame in the most convenient position. It is stated that the service given by the machine has been very satisfactory, and that it is possible to quench 72-hr. coke in from 5 min. to 6 min. and 48-hr. coke in from 3 min. to 4 min.

Reports from the sheet metal working concerns in Canton, Ohio, show an improvement in orders for ceilings, roofings and other products, and the plants are now generally fairly busy.

The Steel Corporation Investigation

Examination of James Gayley Continued

James Gayley was again before the Stanley committee June 13, as his examination had not been concluded June 9. On this day the line of questioning bore on the subject of agreements in the steel rail trade before and after the formation of the United States Steel Corporation.

Agreements in the Steel Trade Before 1901

Replying to an interrogation, Mr. Gayley said that prior to 1901 there were agreements by which manufacturers were apportioned certain shares of the steel business, and those who failed to get their allotted shares were taken care of with a proportion of the general profits.

He declared that for a long time before 1897 the price of steel rails was practically uniform at \$28 a ton. It represented an understanding between manufacturers of rails and the railroads as to an equitable price. He said a fraternal feeling had always existed between the rail makers because of a desire to produce the best possible rails.

Being asked as to whether there was competition in rail-making at the time he was connected with the Carnegie Steel Company before the merger with the Steel Corporation, he said there had always been competition.

Asked what caused the sudden drop in the price of rails in 1897, he said it was because the Illinois Steel Company cut the price from \$28 a ton to \$17, and that this cut was made in retaliation for a fancied wrong by the Carnegie Steel Company. He was unable to say what the Carnegie Company had done to arouse the anger of the Illinois Company.

Mr. Gayley admitted that previous to 1900 agreements were made between the various manufacturers, in which the Carnegie Company participated. These agreements provided fines for violations.

"What body imposed the fines?" Representative Young asked.

"I do not know," Mr. Gayley replied.

"To whom were the fines paid?"

"I imagine that they were divided pro rata among the different companies."

When asked who could explain the agreements and fines, Mr. Gayley said he presumed Charles H. Schwab, the president, or E. A. Peacock, the vice-president, of the Carnegie Company, could tell. Mr. Gayley further admitted that before 1900 there were agreements as to the proportions of business each manufacturer was to have.

"If the companies did not get their share," asked Mr. Young, "were they given the profits anyway?"

"That is my understanding of it."

No Agreements in the Past Ten Years

"Have such agreements been enforced in the past ten years?"

"I have never heard of any."

"When were these agreements in force?"

"Prior to 1900."

"Was this change in method caused by the organization of the Steel Corporation?"

"It may have been the natural result of that organization."

"Was that so because the necessity for agreements had disappeared?"

"It was because of the great improvement in trade; there was business enough for all."

Stability of prices after the formation of the Steel Corporation, Mr. Gayley said, was effected through the influence of the corporation. The corporation, he insisted, was not in a position to enforce an understanding, but its advice was at all times likely to be heeded by iron and steel men irrespective of their business affiliations.

"I was brought up in the school of keen competition," Mr. Gayley testified. "Judge Gary promulgated the idea that competition was unprofitable. He was opposed to the old method of going out into the market and slashing prices in order to get business. Personally I was opposed at the outset to the views of Judge Gary. I had been trained under the old competitive conditions. I was finally won over to the new plan."

Mr. Gayley said that the United States Steel Corporation would not reduce rates in rails to meet a cut.

"Do I understand," asked Representative Gardner, "that if a competitor reduced its rate on rails to \$26 a ton United States Steel would still hold its price at \$28 a ton?"

"Yes."

"How do you explain that?"

"Simply that the corporation will not give its valuable raw material away."

"In your opinion," asked Mr. Gardner, "so long as a rail maker adheres to the price of \$28 he is in no danger of having his allotment of business cut down?"

"I have no knowledge whatever of there being any apportionment of the steel rail orders of the country," answered Mr. Gayley.

The Cost of Producing Steel Rails

Mr. Gayley's examination on the following day, June 14, was partly with regard to the cost of producing steel rails. He told the committee that the cost, including all elements, approximated a little more than \$22 a ton.

Representative Bartlett said that some years ago, in a letter addressed to the Ways and Means Committee, Charles M. Schwab made the statement that steel rails could be made at a mill cost of \$12 a ton, and asked:

"Do you agree with Mr. Schwab in this conclusion?"

"I never believed Mr. Schwab could do it," replied Mr. Gayley. "I asked him once how he proposed to do it, and Schwab just smiled."

Mr. Gayley testified that rail prices have been uniform since the organization of the Steel Corporation.

"The price varied prior to that time," he said. "The present price—\$28 a ton—is fixed by mutual conclusion between the steel makers and the railroads. Each side agreed that the price was a fair one."

"Do you know whether there is an agreement, international in its purpose, by which business is parceled out?"

"I have never heard of any."

"If such an agreement is in effect the president of your company would know all about it?"

"He would."

Representative Bartlett said he would question President Farrell on this subject later.

Mr. Gayley was questioned as to the value of the Carnegie property prior to its absorption. His attention was called to a statement he made at the trial of the case of Henry C. Frick against Andrew Carnegie and other officers of the old company. He testified at the trial that in 1899 the assets of the Carnegie Company were worth \$250,000,000.

"That was my belief as to the value of the property at that time," answered Mr. Gayley. He added: "Mr. Carnegie often said that the greatest asset of his company was the personnel of the organization."

Progressive Policies of the Carnegie Company Still Followed

Mr. Gayley insisted that the progressive policies of the Carnegie Company in adopting improved methods or patented devices and employing high-class executive skill and superior labor were followed by the Steel Corporation. This statement was brought out as a result of questions by Chairman Stanley that seemed to present a contrast between the methods of the two companies.

He gave to the committee many details about the ore holdings and shipping facilities of the Steel Corporation. Being asked to explain prices of rails quoted to the Canadian Pacific Railroad, prices lower since 1901 than the uniform domestic rate of \$28 a ton, he suggested that the question be referred to President Farrell.

Mr. Gayley described at length the steel war which occurred in 1897 and 1899, during which steel rail prices varied, dropping as low as to \$17 a ton.

"Did not that steel war in 1897 and 1899 bring about the organization of the United States Steel Corporation?" Representative Bartlett asked.

"I do not think it had anything to do with it. It may have had an effect on the formation of the Federal Steel Company, organized just before the Steel Corporation was formed."

"Do you know whether or not there is an agreement now between steel rail manufacturers whereby territory is parceled out?"

"I do not. If such existed, President Farrell could tell you."

Mr. Stanley pressed the inquiry into the old agreements, seeking to discover how they had been superseded.

"The old agreements often were broken," Mr. Gayley replied, "and in those days price cutting came about as retaliation for some fancied wrong."

"Since the formation of the Steel Corporation have there been no fancied wrongs and no efforts on the part of the manufacturers to reduce prices?"

"There have not," was the emphatic reply. "Manufacturers of steel to-day have been brought more closely together. They are getting better acquainted, and there is more freedom of intercourse that has created a better understanding. Everything is done openly and frankly now, whereas before each manufacturer worked secretly."

The Steel Corporation's Ore Freight Rates

R. V. Lindabury, counsel for the Steel Corporation before the committee, had a brush with Chairman Stanley over the introduction of some railroad rate figures relating to the Steel Corporation's railroads in the Lake Superior ore region. The chairman had obtained rates per ton on ore hauled by the Duluth & Iron Range and the Duluth, Mesaba & Northern from the Interstate Commerce Commission, and had employed an engineer to compute from these figures the rate per ton per mile. The purpose was to show that the rates charged for hauling ore over the Steel Corporation's roads were exorbitant. The charges, he said, were paid from one Steel Corporation pocket to the other, but resulted in unjust cost to independent owners, and thus increased unfairly their cost of production. Mr. Lindabury objected to the introduction of the figures computed without the disclosure of the identity of their author.

Mr. Stanley said the author was an engineer and expert accountant, formerly in the service of the Carnegie Company and the Steel Corporation, whom he had employed to make the mathematical calculations. He said also that he was "responsible for the figures. If they are wrong they may be corrected."

Mr. Lindabury stated to the committee that the Steel Corporation intends to suggest to it the calling of witnesses whom the committee may overlook and who may throw light upon matters in question in the inquiry, and also to suggest that questions be asked of certain witnesses, if the committee fails to bring out facts known to such witnesses.

"The committee will exercise its discretion as to whom it will summon," said Chairman Stanley.

It is expected that President James A. Farrell will be the next witness to be called, probably the latter part of this week.

Lake Superior Ore Explorations

MARQUETTE, MICH., June 17, 1911.—The exploring concern which is testing the lands of the Michigan Land & Iron Company in the Witch Lake district, south of Republic, Marquette range, for the United States Steel Corporation, is enlarging its operations. To the four diamond drills previously in commission, two more are being added. Day and night crews are employed. A great deal of interest centers in this work, since, if ore is found, as is expected by many mining men, a new field will be opened and much will have been accomplished in determining the mineral value of the big stretch of country between the Marquette and Menominee ranges.

The Iron River Ore Company, a local concern, is planning to undertake considerable drilling in the Iron River district of the Menominee. It has under option a number of tracts, presumably well located on the iron-bearing formation. It is estimated in this connection that during the past five years in the neighborhood of 1000 drill holes have been sunk in the field, ranging all the way from 100 to nearly 2000 ft. in depth, and that the aggregate expenditure has been probably \$750,000, and even more. Much of the work was barren of results. Much, too, was successful, and all told millions of tons of ore have been located. John T. Jones, Iron Mountain, operating the Ardis "step" furnace, is president of the Iron River Ore Company; Clarence McDermott, of the Huron Mining Company, is vice-president, and J. B. Weimer, Iron River, is secretary and treasurer.

In the neighborhood of a dozen new concerns are conducting exploratory or development work on the Vermilion range, and it is the claim of a number of these that the opening of profitable mines is assured. Doubtless of

significance in this connection is the installation of costly surface plans. Independent interests, which are reopening a portion of the Chandler mine at Ely, abandoned by the Steel Corporation two years ago, already have accumulated a stockpile of good size. The ore is of high grade, and it is asserted there are fully half a million tons yet to be taken out. The deposit is one that was located when the Chandler was first wrought many years ago, but which was lost sight of in the operations incidental to the adoption of the caving system of mining. The Section Thirty property, a new shipper last season, has made some good sales and at present is shipping at the rate of 20,000 tons monthly.

A number of officials and directors of the Josephine Iron Company and the Catherine Mining & Exploration Company, controlled at Cleveland and Pittsburgh, have recently visited their holdings west of Michigamme, Marquette range, as a result of which the operations under way have been enlarged. The companies control lands in Section 23, formerly known as the Steward property, and are exploring them. Both drilling and test-pitting are being done. Ore has been found apparently in considerable quantity and it is expected that development work later on will be pushed vigorously. Among those in the visiting party were Albert Graham, president Graham Nut & Bolt Company; J. B. Yohe, Pittsburgh & Lake Erie Railroad; Frank Parrish, American Bridge Company, and J. J. Lanahan, Pittsburgh.

The Jones furnace interests have a force of 30 or 40 men at work at the Kroman mine, in the Republic district of the Marquette range. A shafthouse is being erected, but the principal operations are those connected with the installation of three step-process furnaces of the Jones type. It is expected to have these plants in commission early in August. A considerable quantity of metallized ore, which will be the product of the furnaces, has been contracted for delivery this season. It is these furnaces that are expected to make the lean ores of the Lake Superior region valuable, and great interest attaches to the results of their operation.

At least two more iron mines are to be opened in the western portion of the Marquette range within the next few years. This is assured as a result of the decision of the North Range Mineral Land Company to lease to operating concerns two valuable tracts west of the American property of M. A. Hanna & Co. These tracts have been explored by diamond drills and are known to contain large bodies of ore. Further exploratory work will be undertaken shortly, and it is not at all improbable that the development of other mines will be the outcome.

The North Lake Company has only recently been organized. It is capitalized at \$500,000. George J. Maas, Negaunee, Mich., is the president, and associated with him in the directorate are R. J. Maas, T. C. Yates, W. J. Maas and J. H. Winter of Negaunee, A. E. Maas of Milwaukee and Joseph Croze, of Houghton, Mich. One diamond drill hole put down in Section 38 is the deepest ever bored in America. From surface to the bottom it measures 3265 ft.

A heavy locomotive truck spring bent or reversed through its own camber was a phenomenon witnessed at the Master Mechanics' and Master Car Builders' convention at Atlantic City, N. J., apparatus for the purpose being exhibited by the Carnegie Steel Company. While it is recognized that no spring is subjected to this kind of treatment in actual service, the test was regarded as proving that a vanadium steel spring is capable of meeting unusual conditions without destruction or impairment of its properties as a spring. Part of the Carnegie exhibit was in the space of the American Vanadium Company, and numerous other interesting results secured from various types of vanadium steel were shown.

The Canton Foundry & Machine Company, Canton, Ohio, has been reorganized. W. J. Peyser, formerly vice-president, is now president and sales manager. A. O. Slentz, formerly general manager, is now also vice-president. W. H. Cavanaugh, who was president and treasurer, is now secretary and treasurer. W. S. Yohe, the former secretary, has retired from the company and will engage in the factory supply business in Canton. The company reports an active demand for sheet metal machinery. Among recent orders received was one from Manila, Philippine Islands, and another from Durbin, South Africa.

The Küppers Gas Producer

A German Producer with Revolving Grate and Revolving Shaft

In the issue of *Stahl und Eisen* for April 20, 1911, a description is given of a new gas producer. It is written by Dr. Mardus of the Peine Steel Works, where the original producer has been in successful operation for some time. A translation in abstract is given below.

The producers that at the present time seem to fulfill the requirements most successfully are of the revolving grate type. These have a capacity of from 14 to 16 metric tons in 24 hours, with an internal diameter of about 8½ ft. The larger number of different kinds of these producers show material differences only in the design of the grate. The Küppers producer is claimed to present important advance. Its internal diameter is 8 ft. 4¾ in.

Fig. 1 shows the internal construction of the producer. It may be seen that not alone the grate but also the lower

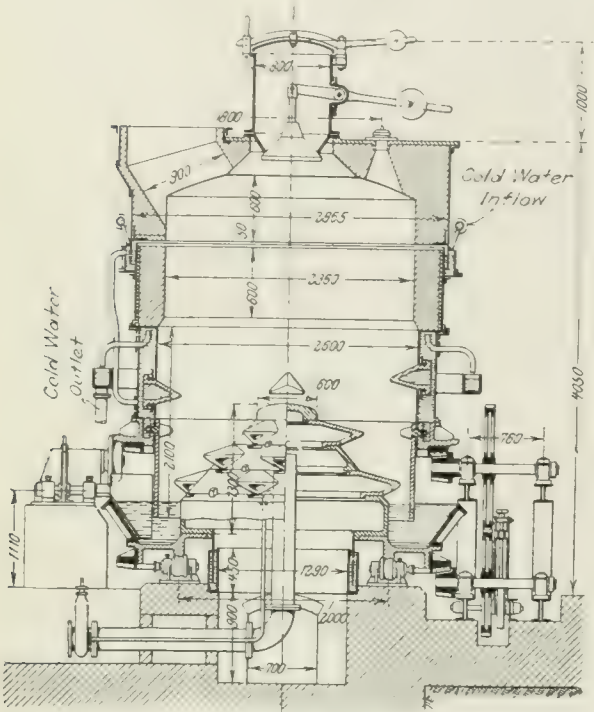


Fig. 1.—Section of the Küppers Gas Producer. Dimensions Are in Millimeters.

part of the shaft is rotated, the rotation being in opposite directions. Through this double movement, the column of fuel remains at rest. The upper part of the shaft is of the usual construction, and is rigidly connected to the bell and hopper. There is a water seal between the upper and lower parts of the shaft, that also serves as a cold water tank for the double water-cooled casing of the lower rotating part.

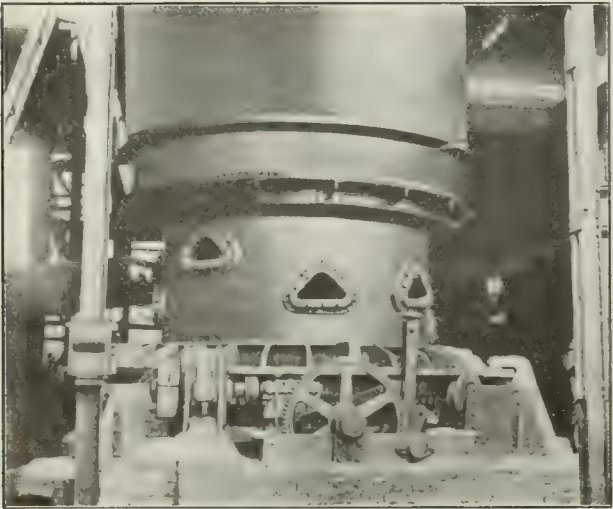


Fig. 2.—The Rotating Mechanism of the Küppers Gas Producer.

This carries several knife-like water-cooled projections that reach into the producer. These "slag knives," as they are called, are arranged in a slowly ascending spiral, and, with the movement of the shaft, exert a certain pressure vertically downward on the material near to them. The outer casing is made in several parts, which can be removed. This makes the knives easily accessible, should changes or repairs become necessary. The lower part of the shaft, Fig. 2, is rigidly connected to a very strong cast-iron ring resting on several rollers. This ring, in its turn, is connected to a toothed ring, through which the turning movement is made. The rollers carrying the shaft are made with wide flanges, that insure a good centering during the turning movement.

The cone-shaped symmetrical grate is formed of separate cast-iron rings, bolted together. It is shown in Fig. 3. The grate has similar knife-shaped projections to the casing that are staggered, as may be plainly seen in the illustration. To prevent them from burning off, the air and steam mixture is blown through the hollow part of the grate and through slots near the under surfaces of the knives. The air and steam mixture is also blown through holes distributed over the entire surface. The head of the grate has no openings. The real body of the grate is provided with a support and an ash pit in which water is always kept. The lower part of the shaft dips into this ash pit. The whole rotating system—grate, support and ash pit—rests on a bearing ring that in its turn rests on rollers. The ashes are removed in the usual way by a shovel fixed in the ash pit.

The openings over the whole surface of the grate give a very uniform distribution of air over the entire section of the producer. The tests have shown that these openings are so situated that they are not stopped up with ashes. The operation of the knives gives a porous fuel bed, whereby the carbon and oxygen can come into very intimate contact, and gasification can take place most actively. The column of fuel can slip down of itself, without finding great resistance, which brings about large fuel consumption. The results of several weeks' run at Peine in 1910 are given in the table herewith.

Results with the Küppers Producer.							
Date.	Time.	CO ₂	CuH ₂₀	O	CO	H	CH ₄
Dec. 6	10:30 a. m.	4.0	0.1	0.3	25.4	10.9	1.4
Dec. 8	2:30 p. m.	3.0	0.2	0.2	29.8	11.0	2.0
"	3:35 p. m.	5.3	0.2	0.3	23.0	8.5	2.1
Dec. 9	9:35 a. m.	3.8	0.2	0.2	24.8	9.9	2.8
"	2:30 p. m.	2.7	0.2	0.1	28.9	11.6	2.4
"	3:55 p. m.	3.0	0.2	0.1	28.1	9.6	1.7
Dec. 10	9:25 a. m.	3.0	0.4	0.2	28.4	12.6	2.0
"	2:35 p. m.	3.1	0.4	0.2	27.3	13.1	1.7
"	4:50 p. m.	2.7	0.2	0.2	28.8	12.2	2.0
Dec. 12	10:00 a. m.	4.0	0.3	0.1	26.4	15.2	2.1
"	2:25 p. m.	4.4	1.2	0.3	26.8	11.3	1.7
"	4:05 p. m.	4.2	0.4	0.2	27.0	10.6	2.0
Dec. 13	9:50 a. m.	2.7	0.4	0.2	29.1	13.2	2.0
"	2:30 p. m.	3.7	0.2	0.2	27.1	14.1	1.7
"	4:00 p. m.	4.0	0.3	0.1	27.0	13.7	1.7
Dec. 14	10:10 a. m.	2.2	0.4	0.2	29.7	11.2	2.0
"	2:15 p. m.	2.0	0.4	0.3	30.2	10.4	2.3
"	3:55 p. m.	2.6	0.4	0.3	29.3	9.2	2.7
Dec. 15	9:20 a. m.	2.6	0.4	0.4	29.6	9.2	2.2
"	2:10 p. m.	4.0	0.4	0.2	27.1	12.9	1.7
"	4:05 p. m.	2.2	0.4	0.2	30.1	10.9	2.7
Dec. 16	9:30 a. m.	3.6	0.4	0.4	29.0	10.8	2.0
"	2:10 p. m.	3.3	0.5	0.4	28.8	10.7	1.7
"	2:10 p. m.	5.2	0.4	0.2	24.8	11.1	2.1
"	2:20 p. m.	2.3	0.4	0.3	29.6	12.4	2.0
Dec. 17	9:40 a. m.	3.4	0.4	0.3	27.6	10.5	1.7
"	2:05 p. m.	2.8	0.4	0.3	28.7	14.9	2.0
Dec. 19	9:35 a. m.	4.0	0.4	0.3	27.5	10.4	1.7
"	9:40 a. m.	4.7	0.3	0.2	26.2	10.3	1.7
"	2:35 p. m.	4.0	0.4	0.3	26.4	11.2	2.1
Dec. 20	10:15 a. m.	2.4	0.4	0.2	30.0	9.8	2.3
"	3:20 p. m.	2.3	0.4	0.2	29.0	12.8	2.0
Dec. 21	11:10 a. m.	5.4	0.4	0.2	24.0	9.3	2.1
"	2:45 p. m.	5.7	1.4	0.2	23.6	9.5	1.4
Dec. 22	9:35 a. m.	2.8	0.3	0.3	28.8	9.7	2.0
"	2:35 p. m.	2.7	0.4	0.1	29.2	11.1	2.4
Dec. 23	9:40 a. m.	3.0	0.5	0.1	28.6	11.2	2.4
"	2:35 p. m.	3.0	0.4	0.2	29.0	10.3	2.7

The fuel used was a mixture of English and Westphalian coal, the proportions being from 1:1 to 1:2. The English coal was a non-caking lean variety with about 10 per cent. ash, and so much dust that the mixture had from 30 to 40 per cent. The Westphalian coal was a strongly caking, good gas coal with from 7 to 8 per cent. ash. The average air blast pressure was 2½ oz. per sq. in. The heat value of the gas was 157.3 B.t.u. per cu. ft. The highest moisture content was 9.74 gr. per cu. ft., and the lowest 7.65. The coal consumed was 22 to 24 metric tons in 24 hours, which was increased when necessary to 26 or 28 tons. The ash was said to be free from combustion constituents.

The speed of rotation of the two movable parts, grate and shaft, was fixed in proper relation to the amount of

ash in the fuel. It amounted to 4 or 5 revolutions in 24 hours. The power required was 2.2 hp. The amount of poking required was very small, and was restricted to the upper part of the fuel bed. On this account the pokers could be made shorter, lighter and easier to handle. The steam addition could be so regulated that the gas, containing 10 to 11 per cent. hydrogen, only had from 7.65 to 9.74 gr. of moisture per cu. ft. The low moisture is proof of the intimate contact of the air and steam mixture with the fuel and the even porosity of the fuel bed.

The producer served a 35-ton open-hearth furnace, and the proportion of pig iron in the charge was lowered from

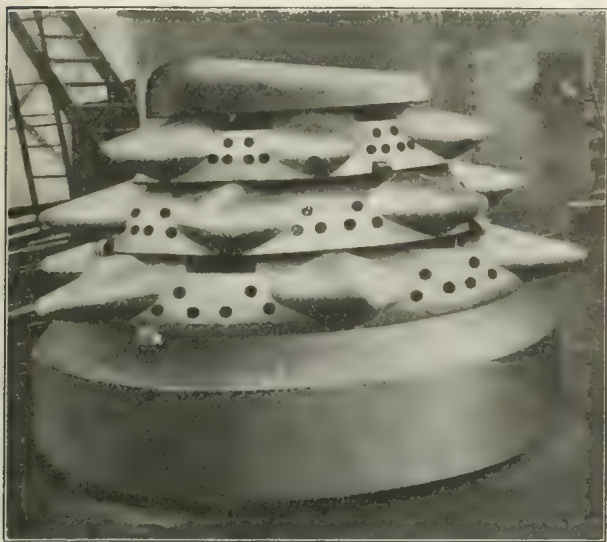


Fig. 3.—The Grate of the Koppers Gas Producer.

22 to 18 per cent. At the time that necessary repairs were made to the open-hearth furnace, the producer was cooled down and emptied sufficiently to examine the upper part of the grate. The openings for the air and steam were found to be entirely open and no burning away was noticed, showing that the cooling by the air and steam was sufficient.

The following advantages are claimed for the Koppers producer, based on the tests:

1. Large amount of coal can be gasified.
2. Uniform gasification with uniform and good composition of the gas produced.
3. Continuous and automatic removal of the ash.
4. Great efficiency of operation and very simple and greatly lowered hand labor.
5. Very complete consumption of the fuel.

G. B. W.

Needed Standard for Sheet Steel

A Feature of President Souther's Address Before the Society of Automobile Engineers

In his presidential address before the Society of Automobile Engineers, at Dayton, Ohio, June 15, Henry Souther, of the Henry Souther Engineering Company, Hartford, Conn., dwelt at length on the work of the sheet steel division of the society, and the old question which the committee had stirred up in respect to the finding and adoption of a metal gauge.

There exist in widespread use six systems of gauges, he explained, and several others are used to some extent. There is a general recognition of the necessity of a gauge rather than of naming of thickness by inches or fractions thereof. Those deeply in the rut in the use of gauges cannot conceive of any means of getting away from such use. They see complication rather than simplicity if gauges are abandoned, and state that were gauges abandoned the number of different thicknesses called for would increase and that the number of dies or rolls or mandrels necessary to produce wires, sheets or tubes would increase enormously.

President Souther said that, after reading the voluminous correspondence relating to the committee work, he

thought an adoption of standard differences between thicknesses might eliminate the necessity for a gauge. Material ordered not conforming to these differences would then be special material, not of standard thickness and therefore of special price.

Basis for Thickness Measurements

There seems to be no good reason, he suggested, why 0.001 in. should not be the basis of all measurements relating to the thickness of sheets, wire or tubular metal. It might be necessary to refer to nine hundred thousandths thick at one extreme of the table and perhaps split thousandths at the other extreme, but this would be the exception rather than the rule, and little hardship even at that.

It is a fact that the gauges in common use are founded on different principles; one, for example, especially for metals like copper, brass and the like; another, based upon the weight of a given area of sheet metal, and another upon measurement in fractions of an inch. There seems to be no good reason why one system of measurement or gauge, if a gauge be necessary, should not apply to all kinds of metal, whether copper, aluminum, iron, or steel, in sheet, wire or tubular form.

In considering the whole subject, Mr. Souther continued, one is led to the thought that all interests in the United States should be consulted; the engineering societies, the large manufacturers of wire and sheet metal, the large users of such materials and the government as an accepted authority for all standards. No decision would be worth the paper it was written upon without the support of all these interests.

The Need of an International Standard

Then the thought naturally leads to the desirability of an international conference. There are various gauges peculiar to European countries; but one is immediately confronted by the metric system—the standard of Europe—and an international standard seems out of the question without the added complication of a table of equivalents: English to metric, inches to millimeters. Our producers of metal are obliged to know the foreign gauges because they export much material to foreign markets. Consequently even though an American standard be adopted, it will be only an incomplete standard after all; not international.

To get action, he emphasized that all in the United States interested should push to a point ready for adoption a system of naming thickness, and that, when such a system is agreed upon by all concerned, the results be used to replace all other means of measurement where the English measure is standard. Rather than attempting to start an international system, it was his belief that if some report on some standard be offered for adoption quicker action would be obtained than trying to get all concerned to move forward at the same time.

Programme for Securing the Standard

The work properly started by the society may, when completed, be properly placed before the United States Government and the Bureau of Standards, and by that Bureau before the other interests involved in the United States. It is probable that some action could be obtained in a relatively short time by such a programme.

Society's Specifications for Iron and Steel

In referring to the iron and steel division of the society President Souther mentioned that specifications for engineers, to aid them in the proper selection of materials, and for purchasing agents, to assist them in the proper purchase of materials, have been supplied to the members. The specifications cover principally chemical analyses. The producer understands what the consumer wants, and the consumer ought to know what he wants before he places the order. There is no complication of physical requirements or anything else that could possibly be antagonistic to the chemical requirements.

In addition to the specifications as to chemical limits, instructions have been prepared as to heat treatments, definitions of terms relating to physical characteristics and general information. They are not to be coupled with the purchasing specifications proper. It is not possible to print anything that will answer without variation in every instance, but it is better to put these heat treatments before the members than to leave them in absolute ignorance.

Air Compressor Regulation

Application Where a Large Number of Pneumatic Tools Are Regularly or Intermittently Used

BY C. A. TUPPER, MILWAUKEE, WIS.

In connection with the compressed air systems of any large foundry, machine shop, mine or quarry, there is usually provided an air reservoir supplied directly from the compressor plant and distributing it through various lines of piping to the pneumatic tools or other apparatus for which it is required. The demands made upon this receiver necessarily fluctuate. As, however, it is desirable to maintain a uniform working pressure for the tools, without developing one far above normal and allowing the excess to blow off, a regulator for the compressor is installed, so designed as to be immediately sensitive to any material drop in pressure within the

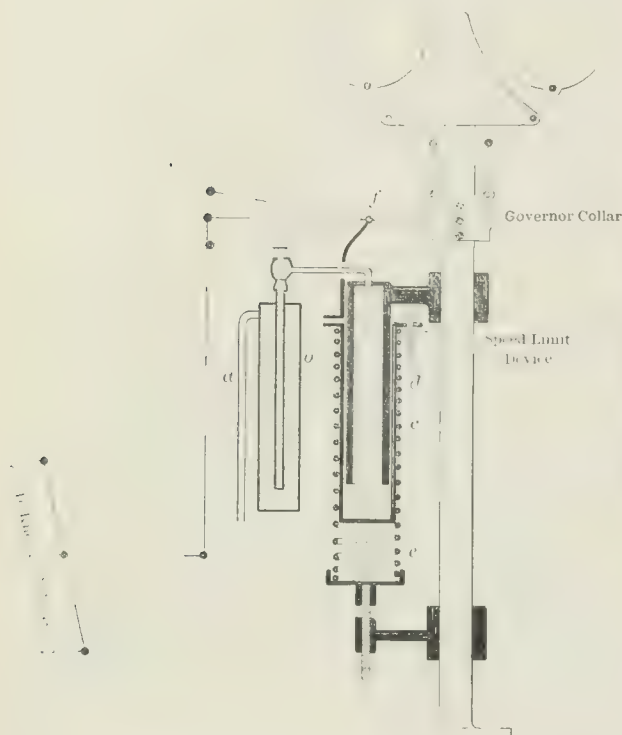


Fig. 1.—Details of a New Type of Pressure Regulator Used on Air Compressors. Built by the Allis-Chalmers Company, Milwaukee, Wis.

receiver and at the same time to guard against an oversupply. The latter is the more difficult problem.

When the pressure exceeds the limit fixed for the system, the regulator operates to reduce the quantity of air supplied to the receiver by one or a combination of the following methods: Throttling the air inlet to the compressor, unloading, throttling the steam inlet to the engine, or causing an earlier cut-off in the steam cylinders of the engine. With the first of these methods, which is very uneconomical, and with the second, used mainly for blowing engines at smelters, the compressor or blower runs at constant speed; while, with the third and fourth the object is accomplished by varying speed of the unit to suit the pressure and the volume of air required.

In connection with the two last named, a number of leading compressor builders in the United States and Europe have recently been working along nearly parallel lines, with good results. The centrifugal ball governor and air pressure regulator illustrated herewith, which, when examined by the writers, were operating in the power plant of a large metal working establishment, afford a combination that illustrates clearly one very efficient means of solving the problem usually involved.

The regulator controls the speed of the compressor unit, and consequently the discharge pressure of the air delivered to the receiver, up to the limit determined upon, including an overlift; and if, for any reason, the speed should tend to rise above the last named limit, the gov-

ernor comes into play to prevent racing. The latter is a fly-ball governor, of improved design, driven by belt from the the main shaft, with the usual rods to the knock-off cams of the valve gear of the Corliss engine which forms the steam end of the compressor unit.

Constructional and Operating Details

In Fig. 1 may be seen the details of this combination. Air pressure from the receiver is transmitted through the piping a, and an oil cylinder, b, to the oil contained in another cylinder, c, which is movable. This cylinder incloses a fixed piston, d. When pressed downward by the action of the air on the oil, the cylinder c meets a counter

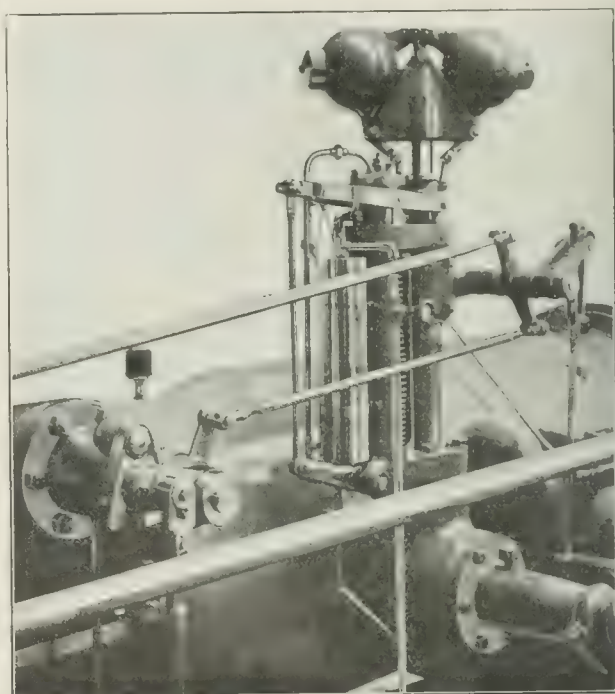


Fig. 2.—The Regulator in Position on an Engine.

pressure from a compression spring, e, which is placed around and underneath, thus forcing the cylinder back again as soon as the balance of the system has been restored by equalizing the pressure. The cylinder actuates, in turn, a floating lever, f, which is pivoted on its upper extremity and also attached to the cam rods. The position of the lever can be best observed in Fig. 2, which shows an installation of the regulation. If the demand for compressed air at the tools or elsewhere in the system is lessened, the receiver pressure will be increased to above normal, the cylinder inclosing the fixed piston will be depressed, taking with it the pivot point of the floating lever, and the latter, by its connection with the knock-off cams, causes an earlier cut-off in the steam cylinders, thus slowing down the entire compressor unit. In a similar

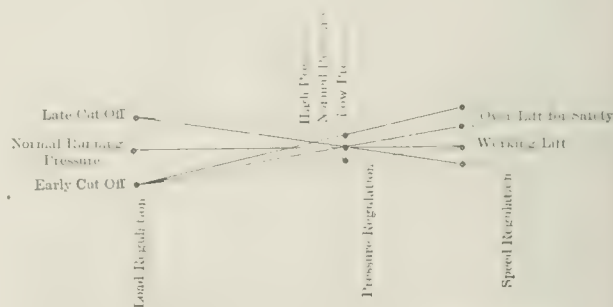


Fig. 3.—Diagram Showing Working of Floating Levers.

design the same object is effected by a movable piston and a fixed cylinder, the arrangement otherwise being practically the same. With slower speed, the regulator is restored to its normal position. When the pressure in the receiver falls off, so as to call for a greater supply of air and the consequent speeding up of the compressor unit, the action of the regulator is, of course, the reverse of that above indicated.

The movement of the floating lever, with the positions for normal running pressure, early or late cut-off and the working lift of the governor collar, overlift, etc., is diagrammatically shown in Fig. 3. This regulator has a wide range of speed, the variation being from about 10 to 1. Cards taken from compressors which have been equipped with it show that a variation of less than 2 per cent. of the air pressure is sufficient to change from full speed to practically no speed, and the control is so automatic as to require no attendance after the steam is once turned on. With the safety devices any running away of the engine is avoided, should an air pipe break or such an undue quantity of air be taken from the receiver as to cause an instant drop in pressure. The unit can be kept at the maximum speed, under full control, and run up to that point immediately after starting, without requiring the engineer to stand at the throttle and gradually allow pressure to develop.

The governor follows the same general principle as the Weiss governor, except that springs are used instead of weights and that the mechanism at its top position is very sensitive. The principal difference between this governor and former types of purely static governors lies in the separation of its stroke into two distinct divisions. The lower part, which controls the working revolutions of the engine, has such a range of movement for normal operating speed that the steam inlet valves are always under the complete control of the regulating mechanism, while the upper part only operates in case of an emergency likely to cause disaster. Static governors ordinarily have a safety stop, consisting of some such device as blocks or weights on the cut-off cams, which come into action in case the governor sleeve rises above the allowable maximum and thus shut off the admission of steam entirely. This arrangement is admirable where approximately constant speed is required but for ordinary air compressor service, with the frequent overloads and violent fluctuations incidental thereto, it is hardly dependable enough, as, by acting unexpectedly at inopportune moments, it is liable to cause derangement of the entire pneumatic system.

With the improved designs that are now current, mechanisms like the above have all of the advantages and none of the defects of the ordinary static governor, since as soon as the sleeve reaches the highest point for normal operation it holds the unit there as long as there is not the full required volume and pressure in the receiver, thereby securing maximum operating economy. One of the German firms which is working along these lines states that, with the use of its apparatus, the regulation can be so effected as to correspond exactly to the demands made upon the system at any time; that, under the control of the automatic governor, the compressor unit can neither run away or stand still, and that the discharge pressure is maintained at the desired volume without noticeable speed variation. Considerable emphasis is laid on the fact that its system is pseudo-astatic.

This comparatively recent development is also of interest for the reason that it foreshadows, both in the United States and Europe, still greater efficiency in the design and operation of compressed air plants. Until within a few years past, very little attention was paid in foundries, shops or mills to possible economies or increased efficiency in their pneumatic systems; but the largely extended scope of the latter has aroused greater interest in them and led to the working out of considerably modernized methods. It is recognized, however, that there is still room for betterment, all along the line, while taking due advantage of the improved designs and systems gradually brought out.

The Parkesburg Iron Company, Parkesburg, Pa., has twice recently been the unfortunate victim of bad proof-reading in the columns of *The Iron Age*. The name has been printed "Parkersburg" instead of "Parkesburg." The company manufactures charcoal iron boiler tubes and has been in existence nearly 40 years, so that it is thoroughly known in the iron trade. It is most regrettable that the name of such a company should be incorrectly printed in a paper like *The Iron Age*, which should, presumably, be well informed regarding manufacturers of such long standing.

Lake Superior Mining Curtailment

MARQUETTE, MICH., June 17, 1911.—The curtailment of operations at the mines of Oglebay, Norton & Co., which previously had affected two properties on the Menominee range, has extended to the Wisconsin portion of the Gogebic district. The Ottawa property west of Hurley has been closed. In the neighborhood of 175 men have been made idle. The mine has a stockpile of 50,000 tons, and until this ore has been sold and moved it is not expected that operations will be resumed. The pumps in the bottom of the mine have been taken out and the workings will be permitted to fill with water as far as the eighth level.

Additional retrenchments have been made on the Marquette range. The Rogers-Brown Iron Company's Portland mine in the Michigamme district has discontinued both mining and stripping operations, and will not resume until the iron trade experiences material improvement. The Portland is an open-cut property, active only in summer. It produces a limonite ore of low grade, lean in iron and high in phosphorus, for which in times such as these there is little or no demand.

The Republic Iron & Steel Company has materially scaled down operations in the Negaunee district of the Marquette range. It has a group of three properties in this field—the Cambria, Lily and Hartford—all on the south side of Teal Lake. The Cambria has been closed, affecting 125 men. The Lily is employing only 50 men, and the Hartford about the same number. It was at the Hartford that the disastrous fire costing seven lives recently took place, and the only work now in progress there is that of repairing the damaged shaft. No mining has been done since the fire, and none is likely until the business outlook brightens.

Corrigan, McKinney & Co. have closed the Baker mine at Stambaugh, Menominee range, and will permit the workings to fill with water. Eighty men were on the payroll. Most of the ore hoisted latterly has come from the adjoining Tully tract. This latter property is now being developed, however, shaft sinking being in progress, and it probably will handle its own production in the future. The Baker will be out of commission until the iron market improves.

Another mine that has been added to the idle list is the Florence property, at Florence, Menominee range, operated by Ladenberg, Thalmann & Co., New York. It has 70,000 tons of ore in stock, none of which has been sold. The mine was employing 160 men. Some of these have been transferred to the company's large farm near the village, where considerable improvement work will be carried out; others have been sent to the Bates property, in the Iron River district, where a new mine is being opened, and still others have been added to the forces employed in exploratory operations in the vicinity of Florence. The greater number of men have, however, been thrown out of work. The pumps are retained in commission, keeping the workings free of water, and there will be no delay, once operations are ordered to be resumed.

At the Cambria Steel Company's Penn group of mines in the Norway-Vulcan district of the Menominee range, where the working force recently was reduced to the extent of 150 men, the employees retained on the payroll are on duty only four days each week. Underground operations at the Norway mine have been suspended entirely.

The curtailment of mining work is, of course, affecting railroad traffic in the Lake Superior region. Only one railroad, the Great Northern, is particularly busy, and this is because of the Hill contract with the United States Steel Corporation. The traffic has fallen off especially on those lines serving the Marquette, Menominee and Gogebic ranges. As a result fewer train crews are employed than in any season for a number of years. Conductors and engineers have been demoted to the brakes and the firebox, respectively; section men, firemen and brakemen have been laid off, and only such repair work is being done as is absolutely necessary. On the Lake Superior division of the Chicago, Milwaukee & St. Paul Railroad, to quote one case in point, upward of 100 employees have been thrown out of work the past fortnight. At Channing the junction where the ore trains are transferred to the tracks of the Escanaba & Lake Superior Railroad for conveyance to the shipping port at North Escanaba, the dispatcher's office has been closed.

Thermit

Can Be Produced in Almost Infinite Variety

BY WILLIAM R. HUTBERL*

Probably the majority of the readers of *The Iron Age* are familiar with the thermit process of welding, but it is doubtful if many of them are aware that there are a great many different kinds of thermit in general use. The composition generally called thermit is a mixture of aluminum and iron oxide, and on reaction gives superheated liquid steel. While this is undoubtedly the best known thermit, there is an almost infinite variety of others. Some are extremely valuable commercially and scientifically, while others are not so important.

A good definition of a thermit would be the following: A thermit is a mechanical mixture of a metallic oxide, sulphide or chloride with finely divided aluminum in such proportions that the aluminum on reaction will entirely reduce the metallic element from the oxide. It will readily be seen that a great many thermit compounds are made possible under this definition, but the rule does not apply to all oxides, sulphides and chlorides, as in some cases the metallic element to be reduced has an affinity for oxygen quite as high as the aluminum, in which case, of course, no thermit reaction can be made to take place.

The Foundation of the Thermit Reaction

The foundation of the thermit reaction is the attraction of aluminum for oxygen. If this attraction is very much greater than the attraction of some other element for oxygen, then the thermit reaction is a very rapid one and a great deal of heat is set free. If, on the other hand, the attraction of the aluminum for the oxygen is not so great in proportion as that of the other metallic element, then a reaction will still take place, but it will be very much slower and in some cases so slow that it is kept going only with difficulty. In this case very little heat is evolved.

An example of such a reaction can be had in the case of ordinary iron thermit, consisting of iron oxide and aluminum, which burns very fast. Half a minute is usually sufficient for almost any quantity of thermit to be brought into reaction. On this account the temperature of the resulting mixture is extremely high, being estimated at 5400 deg. F.

If, now, we use ferrotitanium thermit, we find that a reaction is extremely slow, so that the resulting metal hardly remains in the liquid state any time at all; the heat evolved is, therefore, very slight.

If a mixture of pure titanium oxide and aluminum be used, no reaction can be had at all, for the simple reason that the titanium has an affinity for oxygen almost as high as aluminum. The only way that a reaction can be made to take place is to mix the titanium oxide with iron oxide and aluminum, in which case the heat evolved by the reaction between the iron oxide and aluminum helps to melt up the titanium, so that eventually the entire mass is brought into reaction at once. In this way ferrotitanium is produced instead of pure titanium, and for ordinary commercial purposes ferrotitanium is considerably more desirable than the pure, so that this limitation of the thermit reaction is really beneficial.

Among the various thermits which are used commercially might be mentioned the following: Iron thermit (the well-known welding compound), nickel thermit, manganese thermit, chromium thermit, ferrotitanium thermit, ferrovanadium thermit, ferro-boron thermit, ferro-molybdenum thermit, as well as thermits used in connection with the production of special alloys between any of the above mentioned metals, such as manganese-tin, manganese-zinc, chromium-molybdenum, manganese-titanium, chromium-copper, molybdenum-nickel, etc.

Ferrotitanium the Most Important Alloy

Of all of the metals and alloys produced by these thermits probably the most important at the present time is ferrotitanium. This alloy is a light grayish metal, is hard and brittle in character, and contains from 20 to 25 per cent. titanium, 3 to 5 per cent. aluminum and the

rest iron. The other impurities are so small in proportion as to be negligible. The aluminum should not be regarded as an impurity as it helps the solubility of the alloy materially when added to steel or iron. Of course, being produced by the thermit reaction, the alloy is absolutely free from carbon, which is a very great advantage, as wherever carbon is present it combines with the titanium to form titanium carbide, which dissolves with great difficulty in iron or steel, and considerable of the titanium is, therefore, wasted. It can easily be shown that where a ferrotitanium alloy contains as much as from 5 to 8 per cent. carbon at least 15 to 20 per cent. of the titanium content is wasted in the form of titanium carbide. In the case of an alloy produced by the thermit reaction all this waste is entirely eliminated, while an additional advantage is gained through the higher specific gravity of the thermit product over that produced in the electric furnace or by other methods. This higher specific gravity is of considerable importance, as it permits of the alloy sinking into the iron or steel treated and avoids any danger of its floating on top and being wasted in the slag.

Ferrotitanium at the present time is one of the most generally used purifying agents for iron and steel in the metallurgical field. Its beneficial effect is due primarily to its deoxidizing action and to the fact that it has the property of combining with any nitrogen that may be present in the molten steel or iron. Titanium destroys the very harmful iron oxide, forming titanium oxide, and absorbs the nitrogen, forming cyanonitride and nitride of titanium, which pass into the slag. Titanium also acts to a considerable extent on the sulphur and phosphorus, forming titanium sulphide and phosphate of titanium, respectively.

In practice, only a very small amount of ferrotitanium need be used, and for ordinary purifying purposes an addition of from 0.05 to 0.2 per cent. of titanium content, or 2½ to 10 lb. of the alloy (20 to 25 per cent. titanium), per 1000 lb. of metal is sufficient. In iron and steel foundry practice an addition of from 2 to 3 lb. of alloy per 1000 lb. of metal is, in most cases, all that is needed. In making special steel products which have to withstand high physical tests, such as rails, high-grade castings and special steels, somewhat more of the ferrotitanium is required.

Chromium and Vanadium Next Most Important

Next to ferrotitanium probably the most important metals are chromium and vanadium. Chromium is produced in the pure state 97 to 98 per cent. and free from carbon. Vanadium, however, is produced as ferro-vanadium with a vanadium content running from 30 to 35 per cent.

The beneficial effect of these metals for alloying purposes is now so generally recognized and so well known that it is not necessary to touch on them here. But the thermit metals and alloys possess the advantage over the other metals to be obtained on the market that they are free from carbon, and it is, therefore, possible to add as much or as little of them to the iron or steel bath as may be desired without danger of increasing the carbon content thereof. Another advantage, however, is the fact that being free from carbon they dissolve more readily than alloys which contain carbon.

One of the most interesting applications of the thermit reaction is the addition of ferrotitanium thermit to cast iron. In this case the ferrotitanium is actually produced under the surface of the iron treated, and is, therefore, set free in the nascent state. In practice, the ferrotitanium thermit is put up in sheet iron cans, with which is also packed a small amount of ignition powder. These cans when used are attached to a wrought iron or steel rod about ¾ in. in diameter and plunged into the ladle containing the molten steel or iron which it is desired to treat. The heat of the molten metal ignites the ignition powder, which in turn starts the ferrotitanium thermit reaction. A seething motion will be seen in the ladle, and the iron or steel treated will undergo a considerable increase in temperature. In the case of cast iron it will show a white heat, almost as of steel.

At the end of the operation it will be noticed that the fluidity of the treated metal has been increased to a marked degree, while the castings poured will be of denser grain and greater strength. The process is exceedingly

*Manager of Sales, Goldschmidt Thermit Company, 90 West Street, New York.

valuable where it is desired to pour thin or intricate castings, or for castings which are required to show a smooth finish and fine grain, particularly hydraulic fittings, cylinders for engines, air compressors, etc., and for any other work where a high-grade casting is required.

To those interested in metallurgy it will be seen that the various thermit mentioned above are quite as important in their way as the welding thermit, or iron thermit, with which the general public is most familiar.

The Ohio Workmen's Compensation Law

The Green workmen's compensation bill has been passed by the Ohio Legislature, was signed by Governor Harmon June 16 and is now a law. It will go into effect January 1, 1912. This law is regarded as one of the most advanced compensation acts that has been adopted in this country. Soon after the opening of the last session of the Ohio Legislature two compensation bills were introduced, one of which was indorsed by employers and the other was favored by organized labor. Various amendments were made and the law as enacted represents a compromise between the two bills.

The Ohio compensation law applies to employers of five or more men, but leaves it optional with the employer whether he shall make payment to the compensation fund and come under the general provisions of the act. The act provides for the appointment of a state liability board of awards, which shall make payments for injury and death. This board is to consist of three members, appointed by the governor. The members are allowed an annual salary of \$5,000 each and are to devote their entire time to the work of the board. Provision is also made for inspectors, examiners and other assistants that will make a complete organization.

The law provides that the board of awards shall classify employments with respect to their degree of hazard, and determine the risks of the different classes and fix the premium for each class, making it sufficiently large to provide an adequate state insurance fund for the compensation provided for and to create such surplus as is needed. Ninety per cent of the premiums for the insurance fund are to be paid by the employer and 10 per cent. by his workmen, the employers being authorized to deduct the 10 per cent. from the pay roll of their employees.

An employer who comes under the operation of the law by paying the assessments into the state insurance fund and who posts notices conspicuously about his place of business that he is paying premiums into this fund shall not be liable for damages for injury or death of his workmen under the common law or statutes. An exception, however, is made in case injury or death has been caused by the willful act of the employer or an agent, or from the failure of the employer or his agents to comply with municipal ordinances or state laws for the protection of the life or safety of employees. Then nothing in the compensation law shall affect the civil liability of such employer, but the employee may at his option claim compensation under the law or institute suit in the court for damages. If the employee asks for an award from the board he cannot later, if dissatisfied with the award, bring suit for damages unless the board has refused to award him anything. In that case he can bring suit in the civil courts in the regular way, first filing an appeal from the finding of the board within 30 days and then a petition within the next 30 days, making the board the defendant. If a judgment for damages is allowed by court or jury it shall be paid by the board out of the state insurance fund. An employer who does not elect to pay the premiums provided into the state insurance fund shall be liable to his employees for damages suffered from personal injuries caused by the wrongful act, neglect or default of an employer or his agent, and if sued for damages is not allowed to avail himself of the common law defenses of fellow servant, assumed risk or contributory negligence.

The schedule of awards is as follows:

For partial or temporary disability, two-thirds of the impairment of the workman's earning capacity during the continuance thereof, not less than \$5 or more than \$12 per week, and not to continue for over six years or to exceed \$3,400. If the employee's wages were less than \$5 a week he is to receive his full wages.

For permanent total disability, two-thirds of the average weekly wages, but not more than \$12 or less than \$5 per week, to continue until death. Full wages shall be paid if the employee's wages were less than \$5 per week.

The board shall pay in addition to the award not to exceed \$200 for medical services.

In case injury causes death within two years, payments are to be made as follows: If there are no dependents the disbursements are to be limited to medical services and a maximum of \$150 for funeral expenses. If there are wholly dependent persons at the time of the death the payment shall be two-thirds of the average weekly wages, which shall continue from the date of the death to six years after the date of the injury, but not to exceed \$3,400 or be less than \$1,500. If there are partially dependent persons the payment shall be two-thirds of the average wages and shall continue for all or such portions of six years after date of injury as the board may determine, but not to exceed \$3,400. When there is more than one dependent the board is to determine how the fund is to be divided. If the injured employee was of such age and experience when injured that under natural conditions his wages would be expected to increase, that fact may be considered in arriving at his average weekly wage. The entire expense of the administration of the fund is to be borne by the state.

Safety Devices for Iron Mine Workmen

To make its mining operations in the Lake Superior region as safe as possible for the employees, the United States Steel Corporation is spending much money. Committees composed of experts in the various departments are inspecting both the surface and underground equipment, and as fast as recommendations are made they are approved and ordered to be carried into effect. The work is well advanced, but it will be a number of months before it is completed. In the Marquette district the inspection already has resulted in the installation of a large number of safety devices.

What is being done on the Marquette range is typical of that being accomplished in the Lake Superior country generally. All machinery is being thoroughly guarded, all gearing and belts being covered with locked devices. In buildings where overhead shafting and similar equipment are in operation platforms for the accommodation of the men have been provided, and all of these are equipped with iron railings. In the big machine shop at the Lake Superior hard ore mine, for example, the engines and the gearing and belts which extend to the floor are inclosed in cages made of one-inch mesh wire cloth, with heavy steel bracing. There is not an exposed gear anywhere. On engines where oil cups cannot be reached from the floor, stairways are constructed leading to the crank blocks. These are provided with railings.

Some of the safety devices are unique. A man can now operate the circular saw without any possible danger of injury. When the board is being cut the entire saw is out of sight, being covered in such a way that the operator cannot get his hands against the teeth. To change the belting on any of the shafting it is necessary to open the doors of the safety devices. All of these are provided with catches, and the workmen are instructed not to leave the doors open when the machinery is in operation. The inspection by the surface safety committee includes the shafthouses and all places above ground where machinery is employed, even to the steam shovels.

The belting, gearing and shafts of the steam shovels are protected in a manner similar to those in the engine houses and shops. In fact, men employed about machinery of any kind are being made as immune from accident as is possible. Underground work will be made equally as safe. The Cleveland Cliffs Iron Company has adopted a similar policy, and it is likely that most of the other more important operators in the region will follow suit.

Frederick E. Fieger, House Building, Pittsburgh, consulting and designing engineer for general mill work, advises that the additions to the plant of the Portsmouth Steel Company, Portsmouth, Ohio, for which he prepared plans, are progressing satisfactorily and that they will be ready for operation within the time specified.

The Machinery Markets

The event of the week was the placing of large orders by the American Steel & Wire Company against a large list sent out several weeks ago. A great deal of the business given out so far has gone to Cleveland machinery houses, although orders have also been placed in New York, Boston and Chicago. The machinery demand is better in Cleveland and the automobile builders have re-entered the market there with some machinery orders. Some good electric power plant business has also developed in Cleveland. The International Harvester Company continues a heavy purchaser in Chicago and has closed out on a \$15,000 list of tools. An automobile maker has bought about \$12,000 worth of mechanical equipment and the Government has placed orders for tools for the Rock Island Arsenal. The automobile factories in Detroit are busy and are customers in that market. Inquiries have increased in Cincinnati and the railroads are becoming more active purchasers. There are more inquiries out in St. Louis than there have been in some time and a good general business is being done. In the East business is not quite so good. Conditions are quiet in New York, but in Philadelphia there are better inquiries, although trade is spotty. The situation remains rather unsatisfactory on the Pacific coast. In Texas the demand for cotton ginning machinery is unusually heavy and is on the increase.

New York

NEW YORK, JUNE 21, 1911

The New York Central Railroad is making new inquiries for equipment in addition to that on which it has been getting bids of late. During the week the company urged a number of machinery sellers to get in their bids as soon as possible, which is an indication that the business will be closed out very shortly. Information has been given that another list will appear in the near future. Inquiries from the other railroads are not so plentiful, although some good sales were made to railroad men during the week at the Railway Convention at Atlantic City. Many prominent machinery men have been in Atlantic City since the convention opened and most of them have done a good business. The machinery demand from the general manufacturing field is light and no sales of consequence were made during the week except for export. The demand for machine tools from Europe is exceptionally good and some good shipments of power machinery have been made to Cuba and the British West Indies. The latter consisted principally of Corliss engines and boilers for delivery to sugar plantations.

Machinery men would do well to watch the future movements of the Pennsylvania General Electric Company, as it is understood that plans for enlarging its plant at Erie, Pa., are going forward rapidly. The company is looking into the matter of locating its gasoline motor department at Erie as a part of its plan to establish extensive works there.

Those in charge of the plans of the Delaware & Hudson Railroad for constructing large shops at Watervliet, N. Y., declare it will be several months before machinery for the proposed shops there will be purchased. Recent inquiries sent out by the company were for equipment intended for other shops and not for the Watervliet shops as many in the trade supposed.

The Willsea Works, Rochester, N. Y., has been incorporated with \$30,000 capital stock to take over and continue the foundry and machine business of J. Emory Jones, which has been conducted since his death by his heirs. The company will do a general business, making wood and metal patterns, machine castings and small machine work, forging, etc. The incorporators include L. P. Willsea, F. W. Willsea and E. J. Willsea, all of Rochester.

The Bennett Mfg. Company, manufacturers of portable electric lamps, 409 Broadway, New York, contemplates the erection of a large addition to its plant at East Syracuse, N. Y.

The Marine Shop of the New York Central Railroad, at West New York, N. J., was badly damaged by fire June 18. The loss is to the wood working and machine shop departments of the works.

Johnson & Murray, Utica, N. Y., have completed plans for a factory and warehouse building, 80x290 ft., four-story and basement, reinforced concrete construction, which they will erect at once at Seneca and Whiteboro streets, at an estimated cost of \$125,000.

The Commissioner of Education, Dr. Andrew S. Draper, State Normal College, Albany, is receiving bids for the electrical equipment of the State Normal School at Oneonta, N. Y., including direct connected engines and dynamos, switchboard, feeder cables, and interior wiring for electric lighting.

The Nokik Crank Sales Company has been incorporated at Waterloo, N. Y., with a capital stock of \$50,000, to manufacture safety cranks for automobile

engines. J. Harker, J. L. Dougherty and C. E. Ramises of New York City are the incorporators.

The Mohawk Silk Fabric Company, Fultonville, N. Y., manufacturer of ladies' silk gloves, hosiery and underwear, has completed plans for a silk mill 50x300 ft., two stories, of brick construction, which it will build at Kingston, N. Y. The machinery equipment will consist partly of new equipment and partly of a portion of machinery to be moved from Fultonville. The Fultonville plant will be maintained and operated as an auxiliary.

The East Creek Light & Power Company will build and equip a \$50,000 power house, 60x90 ft., four stories, at Ingrams, N. Y. The contract for construction of the building has been let to Brown & Lowe, general contractors, Schenectady, N. Y.

The Charles B. Knox Gelatine Company, Johnstown, N. Y., has let contract for the construction of a three story and basement factory building, 62x128 ft., and a power house 40x50 ft., to cost about \$60,000.

The Lyrachord Company, Yonkers, N. Y., has been incorporated with a capital stock of \$150,000, to manufacture electric pianos. J. T. Gibson, 232 Washington avenue, is managing director.

The Commissioner of Public Works, F. G. Ward, Buffalo, N. Y., has awarded contract for five 30,000,000 gal. pumping engines for the new waterworks pumping station, foot of Porter avenue, that city, to the Holly Mfg. Company, Roberts avenue and Pennsylvania Railroad, Buffalo. The amount of the contract is about \$700,000.

The Babcock Electric Carriage Company, Buffalo, is building a one story brick addition to its plant on West Utica street.

Plans and estimates for the sewage disposal plant to be constructed by the city of Rome, N. Y., have been completed by Engineer Rudolph Hering, of New York City. The total estimated expense is \$127,000, including pumping station with pumps, pump well and screens, preliminary settling tank, sprinkling filter and dosing tank, final settling tank, sludge bed, piping, etc.

The Hutchins-Kilbourne Company has been incorporated at Buffalo, following a merger of the Hutchins Mfg. Company, Buffalo, and the Kilbourne Mfg. Company, Troy. The new company has purchased the plant of the Eureka Steel Novelty Company on Schenck street, Tonawanda, which it will enlarge and equip for use of the wood working departments of the company. The operation of the present plant of the former Hutchins Mfg. Company, on Prospect avenue, Buffalo, will also be continued.

Baker & Co., Inc., refiners, assayers and smelters, Newark, N. J., contemplate enlarging their plant in the near future, although no definite plans have as yet been made. They report business and prospects good.

S. Cheney & Son, gray iron founders and manufacturers of hardware specialties, Manlius, N. Y., expect to substitute electric power in their plant in place of steam, before the year is out. They have recently added a new store house.

The Clark Novelty Company, Rochester, N. Y., manufacturer of special machinery, tools, punches, dies, etc., is installing some new automatic screw machines to take care of that branch of its increasing business.

The Jonathan Bartley Crucible Company, Trenton, N. J., contemplates the installation of some new machinery. Its plant is running to full capacity.

The States Company, 202 West Water Street,

THE MACHINERY MARKETS

Syracuse, N. Y., has been organized to manufacture a line of electrical instruments and appliances. The company has an authorized capital stock of \$50,000, and the incorporators are Roger H. and H. A. Blakeslee, Hartford, Conn., and Henry J. Blakeslee, of Syracuse, N. Y.

Joseph Bardsley, 147-151 Baxter street, New York, manufacturer of door checks and springs, spring hinges, etc., is preparing to increase the manufacturing facilities of his plant and will shortly add to his line of manufacture.

The newspaper report to the effect that the White Sewing Machine Company, the New Home Sewing Machine Company and the Standard Sewing Machine Company are to be merged into one corporation has been denied by officials of all the companies mentioned.

New England

BOSTON, June 20, 1911.

A general sentiment prevails that business conditions are about to improve materially. Some manufacturers of machine tools have already felt the change in the form of increased orders, but as a general thing no substantial evidence of a reaction towards better business has become apparent. Local industrial stocks are stronger. They have held up very well in practically every case during the depression and quotations average fully as high as they did at the height of prosperity three years ago. The general opinion is that the vacation season will prevent any immediate radical improvement, but that the cold weather will bring with it the long looked for resumption of active demand all along the line in the metal industries. The actual sales made by the dealers have not shown any important increase to date.

The New London Ship & Engine Company, Groton, Conn., plans to build a large extension to its machine shop this summer. This company is affiliated with the Electric Boat Company and the Fore River Ship Building Company, and manufactures the engines and the machinery of the submarines in which the Electric Company specializes. The company states that there is no truth to the report that the New Jersey plant will be removed to Groton, neither will its force of workmen be reduced to augment that at Groton. The latter works have been in operation only a short time.

The International Machine & Screw Company, Springfield, Mass., has developed a line of wood screw machinery and proposes to put its product on the market in connection with its line of machine screws. George T. Warwick, vice-president and general manager, has applied a novel principle in this equipment which has been alluded to in connection with the machine screw machines. The company is not yet manufacturing on a commercial basis.

The H. H. Sprague Company, Bridgeport, Conn., manufacturer of gas meters, will build an addition to its factory, 65x152 ft., two stories and basement, and saw-tooth roof.

Butterfield & Co., Derby Line, Vt., manufacturers of stocks and dies, die plates and screw plates, etc., plan to increase their works and will add 50 to 75 hp. to the power plant. A small quantity of woodworking machinery will be required.

The Birmingham Iron Foundry, Derby, Conn., is making important alterations to its factory buildings. The improvements are in the nature of building over rather than additions, but manufacturing facilities will be largely increased when the changes are completed. The company will have a new office building, 35x52 ft., to accommodate the executive offices, drafting room and clerical departments.

The Bristol Company, Waterbury, Conn., manufacturer of recording instruments and steel belt lacing, is erecting a two-story fireproof building which will be occupied by the dipping department and for the storage of oils.

The American Wringer Company, Woonsocket, R. I., is increasing its works by buildings 40x50 ft. and 40x60 ft., both one story. They will be devoted to the manufacture of mechanical rubber goods.

The business of the Revere Drop Forge Company, Revere, Mass., has been incorporated under the same name with a capital stock of \$25,000. Charles Robertson is the president, Charles Robertson, Jr., vice-president; Thomas V. Sargent, treasurer, and Horace S. Sargent, clerk. The business was conducted as a co-partnership between Charles Robertson and Thomas V. Sargent. Each has taken a son into the business. The company manufactures drop forgings of all descriptions.

The Machine Nut & Bolt Company, Bridgeport, Conn., has been incorporated under a Connecticut charter to manufacture lock nuts, bolts and washers, a patented lock nut being the specialty. Newton F. Chamberlin is the president, and Frank C. Johnson, secretary and treasurer. The company is doing preliminary work at present, and will establish a factory as soon as the equipment can be made ready.

A new factory of the Artistic Bronze Company, South Norwalk, Conn., will be located at Bridgeport, Conn., and will be 65x175 ft., one story.

The New York, New Haven & Hartford Railroad has begun the erection of a group of buildings at New Haven, Conn., which will include a machine shop for locomotive repairs and a power plant.

Philadelphia

PHILADELPHIA, Pa., June 21, 1911.

Current business has not been characterized by any large lot buying and will, therefore, hardly measure up in volume with that of the previous week. About the same proportion of small business, however, continues to be noted. In instances inquiries are reported to have been a trifle more numerous and also have a more substantial appearance, particularly in connection with some classes of special tools, several makers of which have recently reported better conditions. As a general rule, however, manufacturers of the usual types of machine tools report practically unchanged conditions. Buying is listless and plants continue to be operated on an irregular basis. Encouragement is taken in the reported better prospects for business, as a whole, particularly in the West, but so far the trade in this territory has not experienced any pronounced betterment. Considerable attention is being given the conventions of the Master Mechanics and Master Car Builders, held at Atlantic City, by both the merchants and manufacturers in this district, a number making exhibits of their equipment. The demand for machine tools coming from the railroads in this vicinity continues very light. In second-hand machinery little improvement in the demand is reported, while that for iron and steel castings continues very spotty. Boiler and tank makers report, in some cases, a very fair run of business, but the demand for engines for power purposes still has a tendency to drag.

The Pennsylvania Railroad has sent out an inquiry for a moderate sized drill press.

The General Chemical Company, which purchased, some time ago, an extensive tract of land at Marcus Hook, below Chester, Pa., states that plans have been completed for the erection of buildings to comprise a new plant. It has not been fully decided, however, whether the construction work will go ahead during the present summer or be deferred until next year.

It is reported that the Empire Grate Company, Chester, Pa., will remove its foundry and machine plant from the present location, Ninth and Hyatt streets, to a new site, said to be located at the foot of Jeffry street, in the same city. Details regarding the proposed new plant are not available.

The Energy Elevator Company reports a most satisfactory demand for its various types of elevators. The plant has been operated at full and over time capacity, in order to keep up with required deliveries. Local business has been particularly good and the out of the city demand above the average. Several deliveries of heavy electric power freight elevators, including one for the Press Building of Princeton University, Princeton, N. J., and another of the same type for a canning factory in Morganville, N. J., are reported. A large hand power freight elevator has just been shipped to the Honolulu Islands.

The Philadelphia Construction Company has the contract for the erection of the buildings to be constructed for the Organic Chemical Mfg. Company, at Fort Washington, Pa. The buildings are to be of reinforced concrete and include, it is said, one two-story building, 40x120 ft. and one one-story building, 22x32 ft.

James H. Knoll, Reading, Pa., manufacturer of washing machines, is erecting a three-story factory building, 91x50 ft., of concrete construction, at 124 to 134 Maple street, in that city. An automatic sprinkler system will be installed. Information regarding additional equipment required for the new plant is not available. The present plant is located at Tenth and Chestnut streets, in the same city.

A considerable amount of general work is to be done at the Homeopathic State Hospital for the Insane, Lehigh County, Pa., for which bids will be re-

THE MACHINERY MARKETS

ceived at the institution, near Allentown, Pa., on July 1. Plans and specifications may be obtained on application to the architect, Philip H. Johnson, Land Title Building, Philadelphia, Pa., on payment of \$25.

H. B. Underwood & Co., Inc., report business in general as fairly active, but the demand for special tools has a tendency to drag.

The director of supplies, city of Philadelphia, 310 and 312 City Hall, has made a preliminary announcement regarding bids for supplies for various city departments, for the year 1912, proposals for which will be opened on various dates beginning August 1 and following on August 15, September 1 and 15 and October 2 and 16. Blank proposals, specifications and samples will be available about ten days before each date. Among the various articles for which bids will be received are the following: Class D—Tapping machines and fittings, calking machines, lead melting furnaces, removable plugs, chain hoists, chain belts, sprocket wheels, furnace rings, pipe jointers and cutters.

The shop facilities of the Blystone Mfg. Company, Cambridge Springs, Pa., are to be increased by the erection of a building 80 x 100 ft. The company manufactures concrete mixers and core sand mixers, and recently it has found business better in the Far West than in the territory adjacent to its plant.

The Ball Engine Company, Erie, Pa., has found its inquiries to have increased during the last month and is looking forward to a betterment.

Detroit

DETROIT, MICH., June 19, 1911.

The past week has seen a resumption of activity in trade in almost all lines. The automobile factories are generally adding new men to their pay rolls, and several are planning additions to their plants. The ship building companies and railway equipment companies are also reported to be extremely busy, the Pennsylvania Railroad having placed good sized orders with two local car companies. The market for small tools and second-hand machinery is rather dull just at present, although there have been small purchases of the latter. The smaller industrial centers throughout the State are also enjoying improved conditions, and automobile factories in Jackson and Flint are working full time with a full enrollment of workers. Some of the furniture factories in Grand Rapids are resuming operations, and this will have a tendency to stimulate trade in that section of the state.

Benjamin Briscoe, president of the United States Motor Company, has announced that the Alden Sampson Mfg. Company, one of the subsidiary companies in the United States Motor group, will start work in a few days on a large addition to its present plant. The new building will be used for the manufacturing of delivery cars and will give employment to several hundred men.

Plans are being prepared for several additions to the plant of the Ford Motor Company in Highland Park. The principal building will be 865 x 74 ft., and the cost of construction and equipment will represent an investment of \$500,000. In connection with these extensions, Secretary James Couzens states that it is very probable that the Ford pressed steel works will be removed from Buffalo to Detroit.

The E. M. F. Company has awarded the contract for a three-story brick factory building as an addition to its present plant to R. R. Habercorn.

Detroit is to be the home of two new automobile factories, plans for the organization of which were perfected this week. Both companies will manufacture cars of the light delivery type. The concerns are the Wagenthals Motor Car Company, with a capital stock of \$100,000, of which W. G. Wagenthals will be president and general manager, and the Coleridge Commercial Car Company, with a capital stock of \$50,000. W. J. Underhill will be secretary and J. G. Coleridge general manager.

The Peter Smith Heater Company of this city has purchased the plant formerly occupied by the Federal Motor Truck Company in Ypsilanti. By this move the company, which manufactures street car heaters, will triple its capacity.

The Mulkey Salt Company has been organized with a capital stock of \$25,000 and will take over the evaporating plant of the bankrupt Detroit Salt Company. J. M. Mulkey is president and J. A. DeTar general manager of the new concern.

The Detroit Utensil Company has been incorporated with a capital stock of \$6000. The company will manufacture a patent milk bottle cabinet.

A new automobile accessory company is being organized here to be known as the Detroit Demountable Rim Company. The concern will have a capital stock of \$50,000 with Harry M. Smythe and Chester C. Hailbridge as the principal stockholders.

The Modern Laundry Company has been incorporated with a capital stock of \$20,000. Frederick W. Brede will be the active head of the new company.

The Cleveland Cliffs Iron Company will, it is reported, soon award contracts for the construction of a new boiler plant, crush house and dry house at its Negaunee mine.

The large cooperage plant of the R. G. Peters Salt & Lumber Company at East Lake, Mich., was totally destroyed by fire last week, involving a loss of \$20,000. The plant will probably be rebuilt.

The New Haven Elevator Company has been organized with a capital stock of \$30,000. A large beanery and elevator will be erected at New Haven, Mich., with branches at Fair Haven and New Baltimore. J. A. Heath will be general manager of the new company.

The village of Comstock, Mich., is in the market for an up-to-date fire engine and other fire apparatus. J. H. McCormick is at the head of the purchasing committee.

The Monroe Gas Light & Fuel Company, Monroe, Mich., is erecting an addition to its plant that will double its capacity. The new building will be 40 x 30 ft. A 40 hp. boiler and two benches of six retorts each will be installed.

The Caro Light & Power Company, Caro, Mich., has been sold to T. W. Atwood. The purchaser will install new equipment at the generating station and may add a new motor pump at the water works. A power circuit will also be established if it is decided that the demand warrants.

It is reported that the buildings of the Corwin Lumber Company and the planing mill of the Henry J. Adams Co., which were destroyed by fire recently, will be replaced.

The Munising Woodenware Company has been organized with a capital stock of \$50,000. The company has secured the business and patents of the Kalkaska Mfg. Company and will manufacture on an extensive scale.

The Cleveland Cliffs Iron Company is preparing to install safety devices in its various mines on the Marquette, Gogebic and Mesaba iron ranges. W. G. Mather, Cleveland, Ohio, president of the company, has the matter in charge.

The large saw mill of Crawford & Son at Cedar River, Mich., was completely destroyed by fire last week, entailing a loss of \$100,000. The plant was partly covered by insurance, and it is understood that steps will be at once taken to rebuild. Two band saws, a gang saw, edges, trimmer and lath mill are among the equipment which will have to be replaced.

Battle Creek, Mich., is to have another new industry, to be known as the Sorority Gum Company, the capital stock of which, it is stated, will be in the neighborhood of \$100,000. W. F. and D. M. Taylor of Battle Creek will be extensively interested in the new concern.

The Simplex Fence Machine Company, with headquarters in Battle Creek, will shortly establish a factory in Holland, Mich., for the manufacture of woven wire fence and wire concrete reinforcement.

The Menominee Electrical Works has made arrangements to establish a new department for the manufacture of an electrical ventilating apparatus.

The E. C. Slocum Mfg. Company, Fenton, Mich., has purchased the rights for the manufacture of the I. X. L. seeder from M. V. Kinne and will at once replace a large portion of the machinery now in use to handle the increased output.

The Buckeye Iron Company, Marquette, Mich., has increased its capital stock from \$500,000 to \$625,000.

Chelsea, Mich., has secured an important new industry in the Michigan Portland Cement Company. The new concern has a capital stock of \$500,000.

The Grayling Wood Products Company, Grayling, Mich., has been incorporated with a capital stock of \$25,000 and will engage in the manufacture of turpentine, wood alcohol and similar products.

The Michigan Sugar Company is erecting an addition 64 x 68 ft., three stories, at its Carrollton plant and will equip it with the most modern machinery for the reduction of molasses.

The Grand Rapids Pearl Button Company has filed

THE MACHINERY MARKETS

articles of incorporation and leased quarters and will begin operations as soon as the necessary equipment can be installed. The company has a capital stock of \$100,000.

The Elliott Machine Company, Grand Rapids, Mich., is having plans drawn for a new plant to cost in the neighborhood of \$100,000. The building will be three stories 60 x 450 ft. The company manufactures shoe button fastening machines and other machinery specialties.

With \$50,000 capital stock another industry is about to be launched in Grand Rapids, Mich., to be known as the Van-L Commercial Car Company. The company will manufacture a device for use in the automobile truck business. George Van Antwerp and John W. Landman, both of Grand Rapids, are the men behind the new enterprise.

The Victor Brown Company has been organized in Grand Rapids, Mich., to manufacture a patent broom invented by V. E. Clark, who has a large interest in the company.

The Holland Wire Fence Company is considering plans for the building of a new plant at Holland, Mich., 40 x 132 ft. This company was formerly located at Battle Creek, Mich.

The Michigan Steel Castings Company, Detroit, Mich., is about to build a one-story steel foundry, the building to cost in the neighborhood of \$5000.

The American Blower Company, Detroit, Mich., has recently purchased property adjacent to its No. 1 plant on which it will rebuild a large warehouse. Minor additions and improvements are being planned for its other shops. The company reports a better volume of business and is running its plants practically full capacity.

Cincinnati

CINCINNATI OHIO, June 20, 1911.

The excellent crop reports now coming in have undoubtedly stimulated general business to some extent, and there is an increase in the number of inquiries for machine tools. There is also reported some single tool railroad buying, but the total amount of business received from this quarter continues disappointing.

Second-hand machinery dealers are doing a fair business and state that the outlook is better than it has been for some time. The hardware and mill supply houses are busy, and those handling building supplies are enjoying an especially good period of activity.

The Cincinnati Aeroplane Company is a new Cincinnati incorporation, with \$20,000 capital stock. It is the intention of the company to manufacture a bi-plane invented by Louis Mueller, of College Hill, Ohio. R. K. Hynicka, of Cincinnati, is one of the leading promoters of the new company.

The Buckeye Iron & Brass Works, Dayton, Ohio, is erecting an addition to its plant. The new structure will be 80 x 160 ft. and will be used as an iron foundry.

The McClintock-Marshall Company has contract for constructing several large buildings that will be added to the plant of the Ford Plate Glass Company at Rossford, Ohio.

The Olive Foundry & Machine Company, of Ironton, Ohio, has changed its name to the Ironton Punch & Shear Company.

The Building Committee of the Ohio Mechanics' Institute, Cincinnati, has awarded through Samuel Hannaford & Sons architects, the following contracts for power plant equipment: For boilers to the Babcock & Wilcox Company; two engines to the Buckeye Engine Company and one to the Skinner Engine Company; mechanical stokers, the Murphy Iron Works Company; generators to the Triumph Electric Company, and hot water heaters and purifiers to the Harrison Safety Boiler Works Company.

The Edwards Mfg. Company, Cincinnati, will start work soon on a two-story addition to its plant on Eggleston avenue.

The plant of the Ohio Sterling Electric Company in East Dayton, Ohio, was sold at auction June 15 to Andrew Strohn, of the Pneumatic Tool Company. Future plans have not yet been given out.

The Citizens' Motor Car Company, Cincinnati, has acquired additional property adjoining its present location, on which will be erected a three-story concrete garage. It also will soon build another large garage in Hyde Park suburb that will have a completely equipped repair shop.

The New Lexington Water Company, New Lexington, Ohio, has been incorporated with \$50,000 capital stock. The incorporators are J. F. Cole, W. L. David, George A. Harrop, John M. Garfield and Frank H. Gum.

The Board of Directors of the Cincinnati Branch, National Metal Trades Association, held a meeting on the evening of June 13 and decided to give the annual outing to employees at Chester Park July 29. These outings have become a very important feature of the Cincinnati Branch and are always largely attended by both employers and employees. The attendance last year was about 36,000, and an equally large crowd is expected this year. About \$300 in gold will be awarded as prizes in various athletic and aquatic contests. The programme was arranged by Secretary J. M. Manley.

The Cincinnati Tool Works Company, Cincinnati, Ohio, is enlarging its plant so as to increase its output of radial drills, shapers and lathes. It reports a good volume of orders, but looks for an increase in the early fall.

Chicago

CHICAGO, Ill., June 20, 1911.

The machine tool activities of the past week in this market have been brightened by the placing of a few attractive orders and by an increased number of scattering orders for one and two machines. The International Harvester Company has purchased for its Milwaukee works the machines on the list recently reported having a value of approximately \$15,000 and an automobile manufacturer at New Albany, Ind., bought several tools at a cost of about \$12,000. The five or six tools for the Rock Island Arsenal, including a planer radial drill, heavy duty drill, shaper and hack saws were also placed during the week. A Chicago manufacturer of tool holders was a purchaser during the week, which business, together with an order from a subsidiary company at the stock yards for a large planer, aggregated close to \$6,000. Country orders and miscellaneous purchases added to the above have brought the business of the first half of June up to considerably more than the total transactions in May. The American Steel & Wire Company has closed on the bids for its machine tool requirements and announcements as to the placing of orders are expected in a very few days. The Atchison, Topeka & Santa Fe also announces that it will purchase the \$25,000 of tools for which inquiry was made recently. The general manufacturing trade continues to show comparatively few new enterprises where the purchase of complete equipments of importance are required and the machine tool trade still reflects this condition quite generally.

The Chicago Ornamental Iron Works, Thirty-seventh and Stewart avenues, Chicago, will build a two-story addition to its present plant, that will cost \$30,000.

The Central Locomotive & Car Works, Chicago, incorporated under a Maine charter, with a capital stock of \$600,000, has been organized under an Illinois charter with a capital stock of \$450,000.

The American Car & Foundry Company, Chicago, will build a one-story steel hammer and forge shop at 2513 South Wood street, this city.

Bids for the construction and equipment of an electric light and power plant for the Isolation hospital at Fort Sheridan, Ills., will be received at the office of the chief quartermaster, Chicago, on June 19.

Deere & Co., Moline, expect to erect a new wagon factory at Davenport, Ia.

The Hummel-Downing Board Mill & Paper Board Company will build a \$250,000 four-story factory building at Cambridge and Thomas avenues, Milwaukee, Wis.

The machine shop of Charles Kasch, West Second street, Davenport, Ia., has been purchased by A. L. and E. Peterson. It is expected that a new location will be secured in the near future and added equipment installed.

The School Board of Grand Island, Neb., will receive bids until August 15 for heating boilers for a new school building. Tenders will be received by S. E. Sinke, secretary.

The Imboden Roller Mills, Imboden, Ark., have been purchased from J. L. McKamey, by Robt. J. L. Knie, of Cordell, Okla., and a number of improvements are contemplated.

THE MACHINERY MARKETS

Cleveland

CLEVELAND, Ohio, June 20, 1911.

The American Steel & Wire Company is placing orders for the machinery requirements for its various plants, which were contained in a list of about 70 tools amounting to over \$100,000 issued about six weeks ago. The bulk of this business is being divided between Cleveland, New York, Boston and Chicago dealers. Some fair small orders for lots of about half a dozen tools were placed during the week by industrial plants that are making extensions. Two large orders for electrical equipment for power plants were also placed. The machine tool business generally continues quiet. Inquiries are scarce, although there is some new business in prospect. Some buyers that have inquiries out are still holding off. A little business is coming from the automobile trade, but it is mostly in single tool orders. Rubber tire manufacturers are buying in a limited way. Very little business is coming from the railroads. Not much new business is in prospect in electrical lines.

The demand for second hand machine tools is only moderate. The supply at present exceeds the demand and second hand tools are being offered at low prices. The supply business has improved somewhat.

Contracts for the electrical equipment for the new power plant to be built at Cuyahoga Falls, Ohio, by the Northern Ohio Traction & Light Company have been let by the Cleveland Construction Company to the Westinghouse Electric & Mfg. Company. This will include two turbo generators, each 5000-kw. and a large amount of other equipment for the main generating station and six substations. Specifications for a hydro-electric plant to be built by the same company will be out shortly. Another large contract for electrical equipment was also placed during the past few days by the Cleveland Construction Company, an order being placed with the General Electric Company for a power plant to be built by Cleveland interests at Fort Worth, Texas. The specifications included two 4000-kw. generating units with accompanying equipment.

The Buckeye Aluminum Company, Wooster, Ohio, has about completed a new plant, which will shortly be placed in operation.

The Belmont Stamping & Enameling Company, New Philadelphia, Ohio, has broken ground for an addition, which will provide 20,000 sq. ft. of additional floor space. It is claimed that when the addition is completed the company will have the largest plant in the country devoted exclusively to the manufacture of porcelain enamel ware.

Bids will be received by A. B. Lea, director of public service, Cleveland, June 27, for a motor driven engine lathe for the Fairmount pumping station of the Water Department.

The Manufacturers' Rubber & Supply Company, Akron, Ohio, has been incorporated with a capital stock of \$10,000 by R. F. Dutt and others.

The Canton-Hughes Pump Company, Canton, Ohio, has its new plant in Wooster, Ohio, well under way and expects to move to its new location in the fall. The company reports a better demand for steam pumps than for some time. Its orders during the past two weeks amounted to ten car loads.

The Enamel Vitrified Brick Company, Toledo, Ohio, J. J. Urschel, manager, proposes building a number of plants where suitable deposits of sand can be found and will require in the near future a number of boilers and engines.

The South

LOUISVILLE, Ky., June 20, 1911.

Now that the wheat crop through the Ohio Valley and the cotton crop in the further South is being marketed, money will be more plentiful through this district, and it is expected that this will have a stimulating effect on the machinery market. However, it is pointed out that money has been in plentiful supply for several months, and that lack of funds can not be considered to have been a factor in the weakened demand. During the past week a good many sales of power equipment have been made in this section, and manufacturers and dealers regard the outlook as somewhat improved.

Business is reported to be good with stove founders and agricultural implement makers in this district, favorable reports having been received from Evansville and other Ohio Valley cities where these industries are prominent.

The Louisville Cotton Oil Company has purchased

a boiler from the Babcock & Wilcox Company, New York. It is erecting a new boiler house.

Some special machinery damaged by fire in the plant of the Axton-Fisher Tobacco Company, Louisville, will have to be replaced, but officers of the company stated that contracts for it had already been let.

The Henry H. Martin Mfg. Company has filed articles of incorporation in Louisville, giving its capital stock as \$10,000. Henry H. Martin is president and the principal stockholder. The company is now erecting a foundry building, which will be completed and equipped next month. Gray iron castings will be made.

The Pigmy Mining Company, in Crittenden county, Ky., has purchased a compressor from the Ingersoll-Rand Company, a boiler from C. J. Walton & Sons, Louisville, and a washer from the American Cotton Trader Company, Joplin, Mo. It is opening a new shaft for a lead and fluorspar mine. J. E. Wright is general manager of the company.

Murray Sanders has contracted for the installation of a Diamond drill in a zinc and lead mine near Marion, Ky. The mine is being operated by a New York company of which Mr. Sanders is the representative.

The Rosa Clare Mining Company, which is developing the lead, zinc and fluorspar deposits found in southwestern Illinois and western Kentucky, has installed equipment in a large mill in Hardin county, Illinois.

William G. Probst, former superintendent of the Louisville plant of the Standard Sanitary Mfg. Company, is superintendent of a foundry which is being established at Salem, Ind. The style of the firm which is operating the plant is McCowen-Probst-Menau Company.

The Cooper-Hewett Company, dealers in electrical machinery, has removed its quarters from Bullitt and Main streets, to 759 South Preston street, which is also the address of the Electric Vehicle Company, in which H. B. Hewett, a member of the firm, is interested.

H. A. Bishop & Co., Chicago, have been given the contract for the erection of the superstructure of the addition to the power plant of the Kentucky Electric Company, Louisville. A good deal of structural steel will be required for the building.

The Greenbaum Distilling Company, Midway, Ky., has ordered the installation of several evaporators by the Vulcan Copper Works, of Cincinnati, while a contract for drying machinery has been let to the Louisville Drying Machine Company, of Louisville. The end of the distilling season has been reached, and during the idle months of the summer many of the distilling companies will have extensive improvements made in their plants. Where power equipment is not involved, copper is the chief material used in the work.

The Universal Stenotype Company, Dallas, Texas, has purchased the plant of the Hickman-Ebbert Wagon Company, Owensboro, Ky., and will operate there. It is removing its equipment from Dallas, but will likely require additional machinery.

F. H. Moors, Owensboro, Ky., has patented a new form of rotary engine, which is in operation at a local flour mill. Several Owensboro men are interested, and it is planned to market machines of this type, for which many advantageous features are claimed.

The Frankfort Water Company, Frankfort, Ky., is making improvements in its plant. A new pump has just been installed. John Griffin is superintendent of the company.

The Frankfort Modes Glass Company, Frankfort, Ky., has announced the closing of its plant and will sell its machinery, consisting of forging equipment, machine tools, including a shaper, two engine lathes, and a drill press; a 75-h.p. Atlas horizontal engine, a Westinghouse dynamo, two air compressors and other machinery.

The Brabb & Burt Lumber Company, of Ford, Ky., is going out of business and will sell the equipment of its sawmill, consisting of a large amount of power and wood-working equipment. The plant is an unusually large one.

The plow factory of the Wells-Jones Company, at Jackson, Tenn., was destroyed by fire last week, with a loss of \$10,000. It is understood that the plant will be rebuilt.

Greenville, Tenn., has approved a bond issue of \$65,000 for the purpose of establishing a municipal water works and electric light plant. Plans for the utilities will be drawn at once, and it is expected that contracts for the equipment will be placed in the next sixty days.

Following the rejection of the plans originally drawn for the new city hospital plant in Louisville, the

THE MACHINERY MARKETS

specifications have been changed and the plans accepted by the commission. They will be formally approved by the General Council of the city, following which contracts will be let. The buildings will be of reinforced concrete, and will involve a large tonnage of reinforcing bars, while the commission has also provided for a power plant of large capacity.

The Mascot Stove Works, Dalton, Ga., has increased its capital stock to \$25,000. The capacity of the plant is to be enlarged.

The Morris Tool & Equipment Company has been incorporated at Rome, Ga., with \$25,000 capital stock, by George A. Morris, G. J. Davis and others.

A sawmill having a daily capacity of 25,000 ft. is to be erected near Franklinton, La., by Henry Miller, of Columbia, Miss., who has purchased a large tract of timber in that section.

A bond issue of \$7,500 has been voted at Headland, Ala., for the purpose of making improvements in the electric light plant and water works.

Brick making machinery will be installed in the plant of Seavey Bros., at Brookhaven, Miss., which have been taken over by W. H. Seavey, John H. Seavey and W. D. Davis. A new company will be incorporated.

W. D. Corley is heading a company which is being formed at Tutwiler, Miss., for the establishment of an electric light plant. It is planned to invest \$10,000.

A three-story brick building is being added to the plant of the Georgia Agricultural Works at Fort Valley, Ga. The capacity of the plant will be almost doubled.

The pipe works of the Sheffield Casting & Mfg. Company, Sheffield, Ala., which has been closed for several months, has resumed operations, and will continue to run at full capacity for several months. G. W. Gillen is superintendent of the plant.

The Alabama Power & Light Company, Gadsden, Ala., which has been incorporated with a nominal capital stock of \$1,000, plans the development and transmission of hydroelectric power to a number of cities in Northern Alabama. R. A. Mitchell, E. T. Hollingsworth, T. S. Kyle and others are the incorporators.

The Centerville Light & Power Company, Centerville, Ala., has filed articles of incorporation. Its capital stock is \$15,000.

The W. M. Cady Lumber Company is being organized with \$200,000 capital stock for the establishment of a sawmill at Glenmora, La. The plant will cost \$75,000. The contract for the installation of the power machinery has been let to the Murphy Boiler Works, New Orleans. Most of the mill machinery has also been contracted for.

The Eunice Carriage & Machine Shops, Eunice, La., is in the market for some machine tools for use in plate-bending and boring work.

The Interstate Lumber Company will rebuild its planing mill at Columbus, Miss., which was recently burned.

A sawmill is to be erected at Sumter, Miss., by the Sumter Lumber Company.

The Gulf Line Railway Company, Sylvester, Ga., is asking for bids on a 60-hp. boiler and engine. Address W. T. Hargrett, general superintendent.

St. Louis

ST. LOUIS, Mo., June 17, 1911.

There were some indications this week of an improvement in the machinery market. There were more inquiries than has been the case in some time, while the personal calls at machinery houses of prospective buyers were more numerous. No deals of individual importance were closed during the week, but there was a fair movement of ordinary business. There seems to be a growing feeling among the dealers that there will be a decided improvement before long, though just how or when it is to materialize is not determined. There was a report on the street of the purchase of about \$30,000 worth of machinery for the use of a concern engaged in manufacturing thermostats for kitchen ranges, but no satisfactory confirmation of the statement could be gained from either side.

Two fires with losses aggregating about \$1,000,000 the past week will put several planing mills in the market at once for new machinery in the wood working class. All have announced their determination to get back into the running at once, rebuilding or renting or both. The firms affected were the Hittig Sash & Door Company, the Fathman & Miller Planing Mill Company, the Missouri Stair Company, the Mound City

Box Company and the William G. Frye Mfg. Company. All are of large size and all state that their new plants will be larger than the old ones.

W. J. Finley and others have closed for a site for a mill at Arlo Station, a suburb of St. Louis, and will construct and equip a plant for the grinding of minerals for pigments, especially silica and barytes.

The Toledo Flanner Boiler Company, Toledo, Ohio, according to J. J. Rice of that company, is preparing to establish a branch plant in St. Louis involving an investment of \$100,000 in buildings and machinery and the employment of about 1500 men.

The Unit Construction Company has purchased an 11-acre site on the western edge of the city and will establish a \$100,000 plant for the manufacture of concrete reinforcement metals and the casting of concrete forms.

The Desnoyers Shoe Company is arranging for the immediate construction of a shoe factory building with more than double its present mechanical capacity.

The Dalton Adding Machine Company has increased its capital stock by \$500,000 for the purpose of increasing its manufacturing plant at Poplar Bluff, Mo.

The Bourne-Fuller Company, Cleveland, Ohio, is reported to contemplate establishing a branch establishment in St. Louis. Its extent and machinery needs are not yet public.

The McPike Paper Company, Alton, Ill., has obtained quarters and will install machinery for a large plant in St. Louis for the manufacture of paper boxes and corrugated boxes for package purposes.

The Ludlow Saylor Wire Company has leased a down town building which will be utilized for some forms of the manufacture of wire goods now carried on in the main plant in the western part of the city.

The Reeds Lead & Zinc Mining Company, Reeds, Mo., has been incorporated with \$60,000 capital stock and will install a complete plant of mining machinery.

The Mound City Corrugated Paper Box Company is removing its factory and machinery from Cape Girardeau. The mechanical equipment will be considerably increased.

The Springfield Gas & Electric Company and the allied Springfield Traction Company, Springfield, Mo., have conducted an engineering investigation to determine the improvements required for their plants. It is expected that about 1500 kw in electrical power units with turbine drive and auxiliary apparatus will be purchased. The shop equipment will be enlarged, rolling stock increased and a considerable amount of track relaid.

Plans are being prepared by the McLaughlin Engineering Company, Kansas City, Mo., for a proposed electric lighting plant for that city to cost \$350,000. The receiving of tenders for machinery may be expected in about two months. The matter is in charge of J. A. Cable, Commissioner, Department of Water Works and Street Lighting.

The Broderick & Bascom Rope Company, manufacturer of wire rope, St. Louis, Mo., contemplates enlarging its plant and equipping it with new and modern machinery. Detailed information is not yet available.

Indianapolis

INDIANAPOLIS, Ind., June 20, 1911.

The Motor & Mfg. Company, Indianapolis, has changed its name to the Federal Motor Works.

The Universal Portland Cement Company has under construction at Buffington, Ind., a new plant to be known as No. 6, which will have an annual capacity of 4,000,000 barrels of cement.

The Bedford Industrial Association has been organized at Bedford, Ind., to look after the industrial growth of the city. The directors are C. B. Fletcher, I. F. Hamer, W. E. Clark, Frank Allen, E. E. Farmer and C. S. Norton.

The Ideal Concrete Machinery Company, South Bend, Ind., which has increased its capital stock from \$250,000 to \$500,000, will enlarge its plant, increasing its capacity about one-third. The company already has one of the largest plants in the world. Its officers are: President, Mentor Wetzstein; vice-president and general manager, George B. Pulfer; secretary, George B. Hopkins.

The Hanna-Brackenridge Company, iron workers, has been incorporated at Ft. Wayne, Ind., with \$100,000 capital stock. The directors are S. D. Hanna, Elwood White, W. T. Brackenridge, J. J. Immel and Louis Hess.

The galvanizing department of the Atlanta Tinplate

THE MACHINERY MARKETS

Company's plant at Atlanta, Ind., has been reopened, with 25 men. The mill has been idle for several months and most of the former employees had moved elsewhere.

The Upland Flint Bottle Company, Upland, Ind., has been incorporated with a capital stock of \$50,000. The directors are A. M. Foster, W. C. Forbes and S. L. Peterson.

Charles A. Morse has been appointed receiver for the Montpelier Cup & Metal Works, Montpelier, Ind.

The Vulcanized Roofing Company, Chicago, Ill., has taken over the factory buildings of the American Strawboard Company at Anderson, Ind., and will centralize its plants in the Indiana city.

The United States Glove Company, Marion, Ind., has increased its capital stock from \$25,000 to \$50,000.

The Heat, Light & Power Company, Muncie, Ind., which has been supplying the city with natural gas, which has become exhausted, will build an artificial gas plant.

Eastern Canada

TORONTO, ONT., June 17, 1911.

The good features of trade become more pronounced from week to week, and any bad features that were noticeable in the spring become less and less so as the season advances. The causes of the improvement are the same that have been present from the time that navigation opened. Canada is the cynosure. Capital and population continue to flow in from abroad. Moreover, enterprise and ingenuity are busy creating uses for capital and employment for labor. Undertakings that were undreamt of for this country a decade or less ago are being gone into with the utmost confidence and find a good demand awaiting them. This enterprise is the part the American interest in the country contributes. It is quite remarkable to note the influence of this time of development upon the minds of the men who have been at the head of the country's banking business for many years. They find it impossible to adhere to their old habit of taking past experience as a precedent and regulating their operations accordingly. They realize that they have to adjust their financial focus as they go along. French capital is now being imported in large volume by a Montreal circle, the center of which is Rodolphe Farget. It would be difficult to imagine a happier conjunction of favorable influences for a country than that now shaping the fortunes of Canada. Great Britain, France, the United States are all showing a cordial interest and strong confidence in the country. If no mistakes are made by Canada's business men there will be wonderful progress here in the next few years.

The ratepayers of Whitby, Ont., have approved an arrangement for the supplying of power and light to the municipality by the Seymour Power Company.

The City Council of St. John, N. B., is considering the question of installing a garbage disposal plant at a cost of about \$50,000.

The John Marrow Screw & Nut Company, Ingersoll, Ont., has been incorporated with a capital stock of \$100,000.

Art Metals, Ltd., has been incorporated with a capital stock of \$40,000 to do business in Toronto.

The Sweet Machinery & Foundry Company, Cobalt, Ont., has been incorporated with capital stock of \$40,000.

The St. Mary's Portland Cement Company, Toronto, has been incorporated with \$500,000 capital stock.

Dominion Explosives, Ltd., has been incorporated with a capital stock of \$100,000. The principal place of business, Ottawa.

The Wayagamack Pulp & Paper Company, Montreal, has awarded to C. E. Deacon, Montreal, the contract to build a 100-ton Kraft paper mill.

Up to July 1 sealed tenders will be received by the Mayor, Oshawa, Ont., for the construction of screening chambers, sedimentation tanks, sludge beds and appurtenances.

T. S. Simm & Co., St. John, N. B., are about to call for tenders for the erection of an addition to their brush factory, to include power house, boiler house and machine shop.

The Canadian Rand Company, Sherbrooke, Que., will shortly call for tenders to build an extension to its foundry.

The Montreal Terra Cotta Lumber Company, Montreal, is calling for tenders for the erection of a terra cotta plant at Lakeside, near Montreal, at a cost of about \$150,000.

The American Cyanide Company, Niagara Falls, Ont., will duplicate its present plant and is preparing to build a factory to cost \$90,000.

The Town Council of New Glasgow, N. S., is calling for tenders for water works to cost about \$200,000.

The ratepayers of Trenton, Ont., have approved by-laws giving municipal privileges to Lloyd & Sons, who are to build a plant for making baby carriages, go-carts, etc.; to the Trenton Shirt & Collar Company, which is to erect a factory at once, and to Wier, Stahl & Co., Chicago, who are to erect a button factory in the town.

Canadian Vickers, Ltd., is incorporated by Dominion authority to do business in Canada. This is the Canadian branch of the Vickers establishment in England. The company has a capital stock of \$5,000,000. The head office is to be in Montreal. The company is empowered to manufacture steel and to engage in all branches of ship building, including the building of warships, the making of guns, ordnance and ammunition.

The Dominion Power & Transmission Company, Hamilton, Ont., has brought F. E. Frothingham, C. E., Boston, to report on extensive additions to the system to meet the demands of the city's growth.

The Board of Control, Montreal, has approved the Fire Chief's recommendation that seven automobiles be purchased at \$1400 each for use of the fire department officers.

The Sherwin-Williams Company of Canada has been incorporated by Dominion letters patent with a capital stock of \$8,000,000. The head office is to be in Montreal. The business of the existing Sherwin-Williams Company is to be taken over and expanded.

The Eastern Canada Paper & Pulp Company, Montreal, will increase its capital stock to \$15,000,000. It is to carry on business as a holding company and will apply its capital to the purchase of operating companies, whose plants are to be improved.

The City Council of Montreal is spending \$3,000,000 on public works. Water department, \$1,175,000, to cover completion of enlargement of aqueduct, \$425,000 and beginning of filtration system, \$750,000; fire department, \$336,000, to cover erection of five new fire stations, which include the purchase of five new fire engines, including two automobile engines, two chemical pumps and hose wagons combined, for use in Mount Royal and Rosemount wards, at a cost of \$7800 each; hose wagons, ladders, etc.

Western Canada

WINNIPEG, Man., June 17, 1911.

All signs of hesitation are disappearing. Work that for some time was held in abeyance because the banks were not satisfied that conditions of trade had become settled for the season is now being financed. American money is coming in to impel operations. The immense programmes of the railways are being carried out, and these absorb a large amount of the labor that has come in this spring.

Up to July 3, tenders will be received by David Mitchell, Town Commissioner, Stettler, Alberta, for a 125-kva. generator exciter and switchboard; a tandem compound steam engine; a 72x16-in. boiler and stack; cedar poles and pole-line material; and erection of pole line.

Up to July 3, tenders will be received by the chairman of the Board of Control, Winnipeg, for the supply of apparatus and material required to install a police patrol telegraph system.

The municipality of Springfield, Man., has under consideration proposals to establish a light, heat and power service and construct an electric railway system.

Tenders for the complete construction and erection of car shops, at Winnipeg, have been called for by the Transcontinental Railway Commission, Ottawa.

Tenders will be called for by J. E. Griffiths, public works engineer, Victoria, B. C., for the construction of a bridge to cost about \$150,000 across the Columbia River at Trail, B. C.

The Grouse Mountain Scenic Incline Railway Company has been incorporated with a capital stock of \$750,000, the head office Vancouver, B. C. The road will be in the vicinity of Vancouver. The cost of equipment is estimated at \$520,900.

The Citizens' Development Committee, Port Arthur, Ont., has recommended that the granting of a site to MacKenzie, Mann & Co., for establishing a steel plant, be favorably considered by the city authorities.

It is said that the H. Mueller Mfg. Company, De-

THE MACHINERY MARKETS

catur, Ill., is contemplating the establishment of a Canadian branch factory at Port Arthur, Ont., for making plumbers' brass goods and waterworks brass fixtures.

The International Harvester Company, Hamilton, Ont., will build at Fort William, Ont., a warehouse to cost \$125,000.

The Calgary Nail Company, Calgary, Alberta, incorporated recently by provincial letters patent, has a capital stock of \$150,000. It is to manufacture nails, galvanized iron, wire, and other articles.

It is said to be settled beyond question that Calgary will be the city chosen for the Gordon Nail Works. Lethbridge and Medicine Hat were apparently favored for a time, but Calgary has been finally preferred.

The Ocean Falls Pulp Company, Vancouver, B. C., Ocean Falls, B. C., is putting in the second installation at its plant at Ocean Falls, B. C. It now employs 500 men, and when the plant is enlarged it will have work for 700.

The Northern Engineering & Supply Company, Fort William, Ont., is building an annex to its warehouse and machine shop.

It is estimated that the Canadian Northern Railway Company will spend \$30,000,000 in the Canadian West this year.

Texas

AUSTIN, TEXAS, June 17, 1911.

The drouth, which is having a serious effect upon the corn crop all over the State, was partly broken in some localities of the north central portion by good showers during the past week. Business conditions show some improvement, and machinery dealers afford a very hopeful outlook for a good mid-summer business. The demand for cotton ginning machinery continues unusually heavy. Cotton compresses and cotton-seed oil mills are also being improved and new plants installed. In the Bermuda onion growing districts of South Texas preparations are being made by many farmers to install new pumping plants, and the prospects are favorable for a large increase in the demand for this class of machinery during the next few months. The situation in Mexico continues more or less chaotic, and pending an absolute assurance of the stability of the present government it is probable that there will be little done in the way of industrial development in that country.

The International Railway Tie Company, New Orleans, will establish a branch manufacturing plant at San Antonio.

J. L. Driscoll and S. E. Driscoll have established a broom factory at Shiro.

The Velasco Wharf & Warehouse Company, which recently increased its capital stock from \$10,000 to \$250,000, will establish extensive terminal and port facilities at Velasco. Felix Johnson, of Houston, is at the head of the company.

W. H. Knox, Livingston, will install a lumber mill at Hemphill. He also has under consideration the construction of a railroad between Broadus and Sabintown, about 30 miles, for the purpose of affording a transportation outlet for a large tract of timber that he owns.

S. Robbins, Winnsboro, will install a plant at Greenville for the manufacture of pottery. He is operating a similar plant at Winnsboro.

The City Council will soon let the contract for the construction of a system of sewers at Mt. Pleasant, to cost about \$16,000.

The Waxahachie Gas Company has been formed at Waxahachie with a capital stock of \$125,000 for the purpose of building a gas manufacturing plant and distributing system. The incorporators are Roy Conally, E. H. Griffin, Waxahachie; Raymond St. Johns, Herbert St. Johns, William Utley and Oliver Lau, Detroit, Mich.

J. J. Cook, Hot Springs, Ark., will install a large broom factory at San Angelo, Texas.

The city of El Paso will soon install a 5,000,000-gal. pump at the water-works well upon the mesa. Five new wells will have been sunk upon the mesa by the middle of July and the flow of water increased to about 3,000,000 gal. daily. Other wells will be put down and the flow brought up to about 4,000,000 gal. daily by September.

The contract for the erection of a reinforced concrete power house building at Ballinger has been let by the city to the Sherwood Concrete & Paving Company for \$5,950. The plant will be equipped with modern machinery.

C. G. Barrett will install a woodworking plant at his lumber mill at Huntsville.

The Orange Commercial Club through Secretary S. R. Shepherd is negotiating for the establishment at Orange of a large chair factory.

The plant of the Ennis Milling Company that was recently destroyed at Ennis will be rebuilt.

The Farmers & Merchants' Gin Company that was recently formed will install a large cotton gin at Sherman. G. S. Murphy is president.

The Markham rice mill at Markham has been destroyed by fire at a loss of \$60,000. Plans for the immediate rebuilding of the mill are under way.

The Pacific Coast

SAN FRANCISCO, Cal., June 13, 1911.

Little new inquiry for large machine tools has come out since the first of the month, but the situation in general remains satisfactory, with a steady, though gradual, increase in the number of small orders. While the local demand is very quiet, shops of more or less importance in the interior of the state are coming into the market on a larger scale, and many minor improvements are to be carried out during the summer. The need for new equipment is quite general, and purchases are being made as rapidly as financial conditions appear to warrant.

The Risdon Iron Works, of this city, which recently sold its site to outside interests, has sold its good will and uncompleted contracts to the Union Iron Works Company. Augustus Taylor, president of the Risdon Works, announces that its plant will be permanently closed about June 20. It is announced that R. H. Postlethwaite, formerly manager of the works, will continue the manufacture of mining and dredging machinery and parts for Risdon machinery now in service, under the direction of the Union Iron Works. It is uncertain what disposition is to be made of the equipment of the Risdon plant, but it is expected that a part of it, at least, will be put on the market.

The Berkeley Engineering Works, Berkeley, Cal., is erecting a large electric crane in the foundry building of the Columbia Steel Company, near Antioch.

M. C. Harris, N. R. Harris and others, who have been largely interested in the Atlas Gas Engine Company, Oakland, Cal., have withdrawn from that firm and taken control of the Corliss Gas Engine Company, operating a small plant at Petaluma, Cal. This shop will be enlarged, and after the first of the year the Corliss Company expects to install a large shop on the present site of the Atlas works, on the Oakland estuary, which is owned by the Harris interests.

The Selby Smelting & Lead Company of this city is moving into its new brick building at First and Howard streets.

Ten locomotives of the Atchison, Topeka & Santa Fe Railroad were destroyed or badly damaged a few days ago in a roundhouse fire at Seligman, Ariz.

The Okell Drill & Supply Company has been incorporated at Los Angeles, with a capital stock of \$10,000, by J. Blackwell, W. C. Weher, J. Scholtens and others.

The California Iron Works, San Diego, Cal., has filed a petition with that city for a lease of tide lands at the foot of Seventh street, the stated purpose being the installation of a marine plant.

The Hendry-Longwill Auto Machine Works has been incorporated in San Francisco, with a capital stock of \$10,000, by T. W. and E. Hendry and S. M. Samter.

The McGeorge & Cooper Mfg. Company, engaged in the manufacture of gas grates, has been incorporated at Oakland, Cal., with a capital stock of \$100,000, by W. C. McGeorge, G. D., and William Cooper, G. C. Gardiner and W. A. Boston.

The Great Western Power Company is starting preliminary work on its large power project at Big Meadows, Cal.

The Soper-Wheeler Company is planning to install a new lumber mill at Oroville, Cal.

It is announced that the Metropolitan Water & Sewerage Board, Brisbane, Australia, will receive bids, January 30, 1912, for power generating equipment and pumps to deliver 6,000,000 gal. per day against a head of 400 ft., to be installed on the Brisbane River. Bids will be taken for one, two and three-unit plants.

Lassen county, Cal., will be in the market shortly for a lot of road machinery.

Plans are being made for the renewal of the South-

THE MACHINERY MARKETS

ern Pacific planing mill at San Luis Obispo, Cal., which was recently destroyed by fire.

The Pacific Electric Railway, Los Angeles, has placed an order with the General Electric Company for four 1000-kw. motor-generator sets and a lot of smaller equipment.

The Yosemite Lumber Company expects to equip several logging camps near El Portal, Cal., within a few weeks, and the company is planning a sawmill of 200,000 ft. daily capacity.

The Argonaut mine, near Jackson, Cal., will shortly install electric hoisting equipment, replacing water power.

Chas. C. Moore & Co., San Francisco, have taken a contract for piping and changes in the fuel oil system of the Southern California Edison Company's plant at Long Beach, Cal., at \$10,388.

The town of La Jola, Cal., is planning to install a large centrifugal pump and gas engine for waterworks use.

A logging locomotive and band saw outfit are being shipped to the Hume-Bennett Lumber Company's mill at Hume, Cal.

H. A. Brown and C. B. McMaster have started business as the San Diego Ignition Company, San Diego, Cal., and will put in a shop for electrical and motor work.

Extensive repairs are to be made at once to the equipment of the Pacific Window Glass factory, Stockton, Cal., which was recently acquired by W. P. Fuller & Co., San Francisco, after being idle for several years.

The Union Dredging Company, Philadelphia, has let contracts for the construction of a large gold dredge to operate near Folsom, Cal., the equipment for which will be furnished by the Bucyrus Company.

Plans have been completed for a Government dredge for the Rio Vista, Cal., reclamation project, but the call for bids is not expected for some time.

Figures will be taken shortly for a gold dredge to be erected near Igo, Cal., for Curtis Russel and others of Sacramento, Cal. The cost is estimated at \$150,000.

The city of Los Angeles, Cal., will receive bids June 16 for a locomotive and a lot of dump cars.

The Hewitt Machine Company, San Francisco, agents for the Atlas Engine Works, Indianapolis, Ind., have moved from Second street, near Mission, to 12 Fremont street.

The city of Oakland, Cal., has ordered three La France steam fire engines and three combination chemical and hose wagons.

The city of Los Angeles will receive bids June 23 for repairs to the ball and tube mills of the municipal cement plant.

The American Forge Company has leased a lot on Tehama street, between First and Second streets, San Francisco.

The Faulkner-Peart Machine Shop, Woodland, Cal., has been purchased by L. C. Majors, Robert Clark and H. B. Stratton. Mr. Peart, the former proprietor, is secretary of the C. L. Best Gas Traction Company, Oakland, Cal.

Toms & Blair, sheet metal workers, San Diego, Cal., have let contracts for a two-story factory building and will install a lot of new machinery. They have taken a five-year contract for the manufacture of the Inclined Gravity Hinge, patented by Benj. Burnett and F. C. Avery, covering the Western States.

Government Purchases

WASHINGTON, D. C., June 19, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids July 11, under schedule 3718, for one radial drill, one sensitive drill, one emery grinder, one engine lathe, one speed lathe and one shaper.

The Treasury Department, Washington, will open bids July 17 for a mechanical system of mail handling apparatus for the United States post office, St. Louis, Mo.

The Isthmian Canal Commission will open bids until June 26, under canal circular 636A, for 2 locomotive cranes, reinforcement steel bars, valves, pipe fittings, etc.

Canal circular 634 of the Isthmian Canal Commission calls for bids to be opened June 22 for cargo handling and locomotive cranes, rock skips, etc.

The Inspector of the Eighth lighthouse district, New Orleans, La., opened bids June 2 for furnishing one

crank shaper as follows: Manning, Maxwell & Moore, New York, \$250, \$314 and \$350; J. P. Kemp, Baltimore, Md., \$327; Turner Supply Company, Mobile, Ala., \$224; Fairbanks Company, New Orleans, La., \$266.30; Oliver H. Hors, New Orleans, La., \$350; L. E. Rhodes, Hartford, Conn., \$300; Griscom, Spencer Company, New York, \$317.25.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids June 13 as follows:

Schedule 3603, steam pumps for Brooklyn Navy Yard—Bidder 20, Boston Navy Yard, Boston, Mass., \$46,540; 59, M. T. Davidson Company, Brooklyn, N. Y., \$53,930; 61, George E. Dow Pumping Engine Company, San Francisco, Cal., \$76,300; 162, Newport News Shipbuilding & Dry Dock Company, Newport News, Va., \$54,624 and \$52,234, alternate; 252, Warren Steam Pump Company, New York, \$57,745, part.

Schedule 3604, for furnishing and installing fourteen marine straight water tube boilers and spare parts—Bidder 143, Mosher Water Tube Boiler Company, New York, \$219,648; 162, Newport News Shipbuilding & Dry Dock Company, Newport News, Va., \$262,000.

The Depot Quartermaster, Philadelphia, Pa., opened bids June 9 for furnishing and installing one 200-hp. water tube boiler as follows: Babcock, Wilcox Company, New York, \$5760, without evaporation test; E. Keeler Company, Williamsport, Pa., \$5407; A. D. Granger Company, New York, \$943, Oswego boiler; \$7843, Harrisburg boiler; Parker Boiler Company, Philadelphia, Pa., \$3163; Heine Safety Boiler Company, Philadelphia, Pa., \$4533, Heine boiler; \$4363, standard front; \$4915, including self-supporting stack, \$4246, unlined stack.

Trade Publications

Metallographic Laboratory Apparatus.—Sauveur and Boylston, Cambridge, Mass. Call attention to a complete line of apparatus for use in metallographic laboratories which includes a metallographic microscope and accessories, illuminating apparatus, photomicrographic apparatus, metaloscope, electric furnaces, pyrometers and polishing apparatus and accessories. All of these are illustrated and described at some length.

Electrical Machinery and Appliances.—Fort Wayne Electric Works, Fort Wayne, Ind. Three bulletins and an instruction book. The first, No. 1127, illustrates and describes a line of direct current grinders and buffers which are a very good example of how compact and self-contained these tools can be made. No. 1128, superseding No. 1083, treats of a line of polyphase induction motors which are characterized by extreme simplicity of design, rugged construction, ability to withstand hard usage, absence of all moving contacts, wide adaptability under various operating conditions and high efficiency. The construction of these motors is described together with their special features and applications and the text is supplemented by illustrations. No. 1129 relates to the type K3 polyphase induction watt-hour meter which records the total energy consumed in a circuit on a single register, thus eliminating the possibility of mistakes in summing up the readings of the different meters where each phase has its own individual instrument. The special advantages claimed for this meter are absolute protection from the effects of both external and internal fields, small losses, high torque and interchangeability between two and three-phase three-wire and two-phase four-wire circuits. The instruction book No. 3048, superseding No. 3035, contains instructions for installing the type A form A oil transformers which are designed for pole use and are built in sizes ranging from 0.6 to 50 kw.

Steam Pumps.—The Pulsometer Steam Pump Company, 17 Battery place, New York City. Catalogue No. 17. Deals with the construction, operation and field of application of the Pulsometer steam pump, which is intended to raise water with the minimum steam consumption and the minimum attention. The adaptability of the Pulsometer, which in reality is a vacuum steam pump, for a variety of uses, is touched upon and tables of pipe sizes, loss of head, due to friction in pipes and other data on the flow and the pumping of water are included.

Woodworking Machinery.—Greenlee Brothers & Co., Rockford, Ill. Sectional catalogue. Illustrations and descriptive matter explain the operation of an extensive line of car shop and special woodworking machinery which includes mortisers, car post, multiple spindle and gang borers; saw benches, automatic cut-off saws, tenoners, jointers, mine timber machines and cutter heads and specialties. In planning the catalogue care has been taken to combine on one sheet the illustrations and descriptive matter relating to a particular line of tools, engravings being given on the front of the leaf while the text is given on the reverse side. In a number of cases the illustrations of the machines occupy the full dimension of the sheet, which is 9 x 11 in.

Open Hearth Furnace Ports.—The Blair Engineering Company, 21 Park Row, New York City. Pamphlet. Contains a brief description of the Blair patent indestructible port and bulkhead for open hearth furnaces. The special advantages claimed for this port are indestructibility, complete control of combustion and direction of the gas at all times, freedom from general repairs, increased operating speed and a saving in cost.

Feed Water Heaters.—Harris Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Engineering leaflet No. 9. Treats of the Cochrane feed water heater for heating two different supplies separately and apart. This heater is constructed in the same general way as the standard Cochrane heater except that the water chamber is divided into two parts and there are two inlets, two sets of trays, two sedimentation and filter chambers and two pump supply openings.

Well Drilling Machinery.—Keystone Tool Company, Beaver Falls, Pa. Catalogue No. 114. Describes with numerous illustrations an extensive line of portable cable drills for water well work and also contains a drillers' instruction book with full information concerning the operation of the machines.

Switchboard Instruments and Air and Water Flow Meters.—General Electric Company, Schenectady, N. Y. Four bulletins. No. 4819 is devoted to the subject of alternating current switchboard panels equipped with oil switches and suitable for general use in central stations and isolated plants. The panels are designed for use with one set of bus bars to which all the generators and the meters are connected by single throw oil switches. All of the panels are 90 in. high and are intended for use on three-phase three-wire circuits on 480 and 600 volts and frequencies of from 25 to 60 cycles. No. 4825, superseding No. 4700, illustrates and describes a line of compact and moderate size instruments for use on alternating and direct current switchboards. Dimension diagrams and illustrations showing the actual size of the scales are included. No. 4826 and 4827 deal with the water and air flow meters made by this company. These give accurate records of the amount of water or air compressed or distributed. *The Iron Age*, May 26, 1910, contained an illustrated description of a steam and air flow meter which operates on the same principle.

Metal Sheets.—The Stark Rolling Mill Company, Canton, Ohio. Pamphlet. Refers to Toncan metal sheets which this company manufactures in a number of sizes and styles. The pamphlet is divided into three sections, the first of which deals with the way the sheets are made with special emphasis upon the means that give the rust resisting properties. Section two is illustrative of some of the qualities and properties of the metal and shows the result of corrosion and ductility tests upon various goods made from this metal as compared with the same articles made from steel or charcoal iron. The third and last section is a catalogue listing the various Toncan metal products, which include black and galvanized sheets, eaves troughs, galvanized miters, conductor pipe and fittings and roofing, siding and flashing.

Feed Water Heater and Purifier.—Frank L. Patterson & Co., 26 Cortlandt street, New York City. Pamphlet, entitled "Guaranteed Coal Saving." Shows how a considerable part of a fuel appropriation can be turned into a profit by employing the Patterson-Berryman feed water heater and purifier. Following a discussion of the relative merits of this heater and those of the open type, the construction and operation of the heater is described in detail with a number of illustrations of the various types. Space is also given to the Patterson hot water service heater and two styles of exhaust heads.

Gas Heat Treating Furnaces.—Westmacott Gas Furnace Company, Providence, R. I. Catalogue D, size 8 x 9 in.; pages, 64. Concerned with a line of heat treating furnaces which include shop and bench forges, oven furnaces, annealing furnaces, cylindrical or crucible furnaces, oil tempering furnaces, lead and cyanide hardening furnaces, furnaces for melting soft metals, tinning and galvanizing furnaces and brass melting furnaces. All of these are illustrated and a brief description of their construction and a table giving the principal dimensions and specifications is included in each case. In addition to the furnaces space is given to a description of the burners and blowpipes used in connection with these furnaces, the positive pressure blowers used in supplying the air blast and a line of pyrometers. Instructions for connecting the burners are included together with tables showing the proper heat treatment for different kinds of steel.

Exhaust Fans.—Sterling Blower Company, Hartford, Conn. Catalogue No. 114. Contains illustrations and descriptive matter concerning the Sterling slow speed, low power, steel plate exhausters. These are made in both single and double types for either belt or direct connected electric motor or steam turbine drives and are built in either right or left hand types with vertical and top and bottom horizontal discharge. Tables giving the dimensions for the various types of exhausters are included.

Structural Steel.—Berkeley Steel Company, San Francisco, Cal. Mailing card. Concerned with a few of the various types of structural steel work which this company is prepared to furnish. The lines shown include steel frame mills and factory buildings, steel bridges, frames for mine shafts and steel towers and tanks.

Machinery.—The Cincinnati Iron & Steel Company, Cincinnati, Ohio. Pamphlet, entitled "Pointers on Machinery." Shows the various types of machines which this company handles and briefly describes them. Among the various lines illustrated is the company's 14-in. lathe which was illustrated in *The Iron Age*, April 7, 1910, upright and sensitive drills, milling machines, clutches, shears, hand and power bending rolls, electric drills, hand power punches and shears and a complete line of woodworking machinery. An index on the first page enables the tools desired to be located readily while a number of tables of useful information complete the pamphlet.

Portable Electric Tools.—The United States Electrical Tool Company, Cincinnati, Ohio. Catalogue H. Covers an extensive line of portable electric tools which include hand or breast drills, an electric radial drill, a bench drill and electrically driven grinders of both the portable and bench types. All these tools are illustrated and briefly described with tables of dimensions.

High Speed Steel.—McKenna Brothers Brass Company, Pittsburgh, Pa. Mailing card. Shows four types of drills made from this company's Red Cut superior high grade vanadium steel.

Grindstones.—Richards-Wilcox Mfg. Company, Aurora, Ill. Mailing card. Illustrates two types of ball-bearing steel frame grindstones, one of which will accommodate wheels ranging from 18 to 30 in. in diameter, the change for the different sizes being made by moving a clamp.

Manganese Steel Castings.—Edgar Allen American Manganese Steel Company, Chicago, Ill. Pamphlet. Enumerates the different kinds of manganese steel castings made by this company. The list is arranged in alphabetical order and includes asphalt presses, brick and tile machine parts, bushings of all kinds, coal breaking machinery, chemists' supplies, dredge parts, elevator buckets, crusher parts, ore car and dock parts, rolling mill parts, steam shovel parts, log loaders, lifting magnets, buckets of the orange peel and clam shell types and wheels. Under each of the main divisions are given the different types that can be supplied.

Oil Pressure Systems.—The Geyser Oil Tank Company, Inc., Ft. Wayne, Ind. Pamphlet. Points out the advantages of using the Geyser system for handling oil, lubricants and liquids in railroad shops, factories, mills, garages, power plants and other manufacturing institutions. The system consists of an underground storage tank placed in a suitable location and a distributing line piped through the buildings with automatic self-measuring devices attached. These liquids are forced from the storage tank to the self-measuring devices by the application of pressure on the tank and a fixed quantity is discharge at each operation. The flow is automatically shut off when this has been done, thus preventing accidental discharge or waste. The system is described at length and the various types of devices used in connection with it illustrated. A number of typical installations are also shown.

Rubber Hose.—The Pennsylvania Rubber Company, Jeannette, Pa. Pamphlet. Gives general description and specification for the various types of water, steam, air brake, tank and air tool hose which this company can furnish. In addition space is also given to sheet packing, spiral piston rod packing, ring packing and gaskets and rings.

Hand Tachometers.—Schuchardt & Schutte, 90 West street, New York City. Folder. Refers to the use of the S. & S. hand tachometers, which can be used either as a hand tachometer or a cut meter for indicating rotative and also progressive speeds. With this instrument it is possible to see at a glance the revolutions of steam and gas engines, motors, dynamos, etc., as well as the cutting speeds of milling machines, engine lathes, planers and drilling machines. The construction of the tachometer, which is made in seven sizes, one with single range of speed and three with three different speed ranges and three with four ranges, is described, together with a list of the various speed ranges regularly furnished.

Metal Working Machinery.—Niles-Bement-Pond Company, 111 Broadway, New York City. "Progress Reporter" No. 22. Refers to a number of new machines which have been brought out by this company recently and include the Pond reversing motor planers which were illustrated in *The Iron Age*, July 7, 1910, the 6-ft. vertical surface grinder and a 4 x 30 in. cylindrical sizing grinder made by the Pratt & Whitney Company, illustrated descriptions of which appeared in *The Iron Age*, December 29, 1910, and January 5, 1911, respectively. Other machines included are a radial drill with direct connected adjustable speed motor drive, a Niles double end wheel press, a car box borer, a 26-in. Bement crank planer, a steam drop hammer and a multi-spindle horizontal milling machine. All of these are illustrated and the special features of their construction and the particular fields for which they are adapted pointed out.

Sand Riddlers.—The Deane Steam Pump Company, 115 Broadway, New York City. Bulletin No. D 16,425. Points out the advantages of using a line of sand riddlers which are intended for pneumatic, steam or electric operation. These are made in two sizes for pneumatic operation, taking ordinary 18 and 20-in. round foundry riddles, in a square style, measuring 24 x 36 in., and for mounting on a post and employing either an 18 or a 20-in. round riddle. For use in foundries not equipped with compressed air, but where electric power is available the square and the round riddlers are equipped for operation by an electric motor, the power being taken either from a crane or a lighting circuit.

Cranes.—Pawling and Harnischfeger Company, Milwaukee, Wis. Pamphlet, entitled "The Plant and Its Products." Size, 6 x 9 in.; pages, 48. Contains an illustrated description of the plant of this company and shows a number of views of the various types of cranes in process of construction. Space is given to the various kinds of cranes, traveling electric hoists and I-beam trolleys which can be supplied in a number of different sizes and styles. The motors and the controllers with which these cranes and hoists are equipped are illustrated, together with views of three different types of drilling machines. The illustrations of the crane show them in actual service and among these is one at the plant of the Simmons Company, which was illustrated in *The Iron Age*, May 18, 1911.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Reinforced Iron:		Nos. 22 and 24.....		Straits Pig	
1 to 1½ in. round and square ...		No. 26.....		No. 50	
1½ to 4 in. x ½ to 1 in.		No. 28.....			
Reinforced ½ and 1-16 round and square.....				Copper—	
Angles:		Corrugated Roofing—		Lake Ingot	
3 in. x ¾ in. and larger.....		2½ in. corrugated.....		Electrolytic	
3 in. x 3-16 in. and 1½ in.		No. 24.....		Casting	
1½ to 2½ in. x 1½ in.		No. 26.....			
1½ to 2½ in. x 3-16 in. and thicker.....		No. 28.....		Spelter—	
1 to 1½ in. x 3-16 in.		Tin Plates—		Western	
1 to 1½ in. x ½ in.		American Charcoal Plates (per box)		Zinc—	
¾ x ¾ in.		"A.A.A." Charcoal:		No. 9, base, casks..	
¾ in. x ¾ in.		IX, 14 x 20.....		(Open..	
¾ x 3-32 in.		A. Charcoal:		Lead—	
Tests:		IX, 14 x 20.....		No. 9, American Pig.....	
1 in.		IX, 14 x 20.....		Bar	
1½ in.		American Coke Plates—Bessemer—		Soldier—	
1½ to 2½ in. x 1½ in.		IX, 14 x 20.....		No. 1, guaranteed.....	
1½ to 2½ in. x 3-16 in.		IX, 14 x 20.....		Reinforced	
3 in. and larger.....		American Terne Plates—		Prices of Solder indicated by private brand vary	
Beams, 3 in. x 4 larger.....		IX, 20 x 28 with an 8 lb. coating		according to composition.	
Channels, 1½ to 6 x 3-16 to No. 8.....		IX, 20 x 28 with an 8 lb. coating		Antimony—	
Burdens' Best" Iron, base price.....		Seamless Brass Tubes—		Cookson	
Burdens' "H. B. & S." Iron, base price.....		List November 13, 1908.....		Hallett	
Norway Bars		Brass Tubes, Iron Pipe Sizes—		Other Brands	
Merchant Steel from Store—		List November 13, 1908.....		Bismuth—	
Bessemer Machinery		Copper Tubes—		Per lb	
Toe Calk, Tire and Sleigh Shoe.....		List November 13, 1908.....		Aluminum—	
Best Cast Steel base price in small lots.....		Brazed Brass Tubes—		No. 1 Aluminum (guaranteed over 99% pure), in	
Sheets from Store—		List February 1, 1911.....		Ingots for remelting.....	
Black,		High Brass Rods—		Rods & Wire.....	
One Pass.C.R. R. G.		List February 1, 1911.....		Sheets	
Soft Steel, Cleaned.....		Roll and Sheet Brass—		Old Metals—	
Nos. 16.....		List February 1, 1911.....		Dealers' Purchasing Prices Paid in New York.	
Nos. 18 to 20.....		Brass Wire—		Copper, heavy and crucible.....	
Nos. 22 and 24.....		List February 1, 1911.....		Copper, heavy and wire.....	
No. 26.....		Copper Wire—		Copper, light and bottoms.....	
No. 28.....		List February 1, 1911.....		Brass, heavy.....	
Russia, Planished &c		Base Price,		Brass, light.....	
Genuine Russia, according to assort-		Carload lots mill 13 ¾¢		Heavy machine composition.....	
ment		Copper Sheets—		Clean brass turnings.....	
Patent Planished, W. Dewees		Sheet Copper Hot Rolled, 16 oz (quantity		Composition turnings.....	
Wood.....		lots)		Lead, heavy.....	
Galvanized		Sheet Copper Cold Rolled, 1¢ per lb advance		Lead, tea.....	
Nos. 12 and 14.....		over Hot Rolled.....		Zinc scrap.....	
No. 24.....		Sheet Copper Polished 20 in. wide and			
No. 26.....		under, 1¢ per square foot.....			
No. 28.....		Sheet Copper Polished over 20 in. wide. 2¢			
No 20 and lighter 36 inches wide, 25¢ higher.		per square foot			
		Planished Copper, 1¢ per square foot more			
		than Polished			

NICHOLSON
U.S.A.
TRADE MARK

NICHOLSON
U.S.A.
TRADE MARK

Time is not the only saving effected through the use of **Nicholson Files.**

Their hard cutting surface and perfect temper gives them a **lasting quality** that makes them by far the most **economical** of all files to use.

Our Catalog shows what styles to use. Our book, "File Philosophy," tells how best to use them.

NICHOLSON
U.S.A.
TRADE MARK

NICHOLSON
U.S.A.
TRADE MARK

PROVIDENCE,

FILE

R. I., U. S. A.

THE IRON AGE

Established
1855

New York, June 29, 1911

VOL. 87: No. 26

Published Every Thursday by the

DAVID WILLIAMS COMPANY

239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
I. A. McKeel,	-	-	-	-	First Vice-President
Harold S. Buttenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
A. I. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Steel Trade Improves.....	1551
Iron and Steel in the World's Railroads.....	1552
Rods a Finished Steel Product.....	1553
First Aid a Ground for Damages.....	1553
Lathe or Turning Machines?.....	1553
State Control of Women's and Minors' Wages.....	1554
Koppers Coke Ovens.....	1554
Correspondence.....	1554
Fuel Efficiency of the Blast Furnace.....	1554
Mechanical Equipment of the Olympic.....	1555
The Accelerated Corrosion Test of Metals.....	1555
British Steel Production in 1910.....	1555
The Size of a Coke Charge for a Cupola.....	1556
The Iron and Metal Markets.....	1556 to 1566
Iron and Industrial Stocks.....	1567
Belgian Iron and Steel Production in 1910.....	1567
Personal.....	1567
Obituary.....	1567
Another Ore-Washing Plant in Minnesota.....	1567
Navy Tool Steel.....	1568
Ore Mining on the Great Northern Properties.....	1569
Capabilities of the Molding Machine.....	1569
Operating Costs of Producer Gas Plants.....	1570
Punch with a 48-Lb. Body Casting.....	1571
Jones & Laughlin Sales Department Changes.....	1571
New Type Slow Speed Exhaust Fan.....	1571
A Belt-Driven Flue Sheet Drill.....	1572
New Drive for Planers.....	1573
Boring and Internal Threading Tool.....	1573
Cutting Worm Gear on Gear Hobbing Machine.....	1573
Uehling Waste Meter.....	1574
The Angle Steel Tool Truck.....	1575
A Steel of Great Torsional Strength.....	1575
Air-Cooled Choke Coils.....	1576
Electric Forge Blowers.....	1576
The Cause of the Shelling of Wheel Tires.....	1577
The Baldwin Locomotive Works.....	1577
The Garrigus Surface Grinder.....	1578
A Handy Hydraulic Press.....	1578
Potassium Chromate as Metal Protection Agent.....	1579
New Publications.....	1579
The Townsend High-Speed Drill Press.....	1580
Interesting Application of a Barnes Tapping Machine.....	1580
Reversible Direct-Current Drum Controllers.....	1581
New Magnetic Separator.....	1581
International Harvester Tractor Works.....	1582
A Universal Chain Oil Feed.....	1587
Steam-Hydraulic Forging and Bending Press Catalogue.....	1587
Large Castings in Fast Time.....	1588
Sulphur in the Air and Metal Corrosion.....	1589
Modern Steel Products Warehouse.....	1590
Hill Rail Fastener for Steel Ties.....	1591
Improvement in Feed Water Heating.....	1592
Public Works of Venezuela.....	1593
The Baldwin Strike.....	1593
The Machinery Markets.....	1594 to 1602

Steel Trade Improves

Mill Operations Still Gaining

Pig Iron Trade Slightly More Active

The improvement in the steel trade continues. The volume of business shows a steady gain. This is not due to a spurt in any special branch but to an increase in orders from a multiplicity of sources. The United States Steel Corporation is enlarging the scope of its operations, the active steel ingot capacity this week being over 68 per cent. as against 66 per cent. at the same time last week. The improvement in its operations is more strongly indicated by the statement that at the corresponding time last month the active ingot capacity was only 58 per cent. A considerable part of the recent gain is due to a heavier volume of business at Chicago, where two additional blast furnaces were put in operation in the past week by the Illinois Steel Company to supply needed pig iron.

The improvement is by no means confined to the Chicago district, as Pittsburgh conditions are also better. Bookings in structural shapes and plates are reported to have been much the largest last week in over a year. The billet and rail sales department of the Carnegie Steel Company is over 40,000 tons ahead on actual orders sent to the mills for rolling as compared with the same period in May.

In the structural trade in general, railroad bridge work forms a substantial proportion of the new business coming in the market but some excellent orders have also been booked for other purposes. The American Bridge Company has secured the contract for 8500 tons for the new plant of the Pittsburgh Crucible Steel Company, at Midland, Pa. Orders booked in Eastern territory for buildings, bridges, etc., the past week totaled over 15,000 tons, with quite a number of orders pending. This branch of business seems to be close to normal conditions. It had been hoped that by this time the New York City Subway question would be definitely settled and that the trade could look forward with some certainty to the enormous requirements for steel which the new subways will call for. It seems, however, that some further time must elapse until it is known when the work will actually begin.

While the plate trade shows some increase, indications of an early heavy demand are seen in the increasing number of inquiries coming out for steel cars.

The change in the condition of the sheet trade is one of the interesting developments of the month. From the time prices were reduced the demand has improved, and current reports of business are very satisfactory. Some large manufacturers are now running all their mills on full time, whereas in the early part of May their operations were intermittent.

The better feeling in this branch of business has caused important contracts for sheet bars to be placed in Pittsburgh the past week for future delivery.

While the situation in finished lines is thus showing decidedly improved conditions, the feeling of optimism is somewhat tempered by the knowledge that a great deal of slack still remains to be taken up to put the steel plants of the country in really good working shape.

Reports from the various pig iron markets are better, as orders are more numerous and inquiries are more plentiful. No general buying movement has yet set in, but the number of consumers who feel that the present is a good time to purchase is steadily growing larger. Prices of pig iron are no firmer as many makers are anxious to get their share of such business as is now coming out.

The export trade is fairly active, with moderate orders being received for rails, track supplies, locomotives and other railroad material from South and Central America. Canada has placed further contracts for material needed by agricultural implement manufacturers and large inquiries are being received for other classes of products from Canadian buyers.

The coke market is showing much greater activity as quite a number of pig iron manufacturers are now placing contracts for their requirements for the last half of the year, while large consumers of foundry coke are also making contracts for their supplies.

The Amalgamated Association and the Republic Iron & Steel Company have settled upon the wage scale for bar iron mills for the twelve months from July 1. The scale is the same as for the current year except for some slight changes in foot notes.

Iron and Steel in the World's Railroads

The statistics of the world's railroad mileage at the close of 1909, compiled by the Archiv für Eisenbahnwesen and recently published, deserve some study and comparison with previous returns. The world's railroad mileage at the close of each of the past six years and the increase during the year have been as follows:

	Total at close.	Increase in year.
1904	550,290	.....
1905	562,783	12,493
1906	580,276	17,493
1907	594,867	14,591
1908	611,554	16,687
1909	625,698	14,144

Poor's mileage statistics for the United States alone for the same years are as follows:

	Total at close.	Increase in year.
1904	212,394	5,059
1905	217,341	4,947
1906	222,766	5,425
1907	228,128	5,362
1908	232,046	3,918
1909	238,356	6,310

The United States increase of 6310 miles shown for 1909 was not all attributable to that year, there being 2923 miles represented by remeasurements, small roads reporting for the first time, etc., so that for comparative purposes, there should be taken 3387 miles as the 1909 increase.

Figuring the increase each year as a percentage of the mileage at the opening of that year, the results come out as follows, for the United States alone and for the world exclusive of the United States:

	United States.	Remainder of world.
1905	2.32	2.24
1906	2.50	3.50
1907	2.41	2.58
1908	1.72	3.48
1909	1.46	2.84

The rate of increase in the United States sensibly declined after 1906, whereas the increase in the remainder of the world, while varying, did not show any material change, and it may be taken that the world's railroad mileage outside of the United States, amounting to 380,000 miles at the close of 1909, is increasing at the rate of 3 per cent. a year. This rate is equivalent to a doubling in 23 years. The average rate of increase shown by the United States in 1908 and 1909 was 1.6 per cent., which would involve a doubling in 44 years.

The statistics of our German contemporary are presented by continents. The totals for its geographical divisions at the close of 1909, and the increases during the four years ending with 1909, are as shown below, and we have computed in each case the percentage of the mileage at the close of 1909 which was added in the four years:

	At close of 1909.	Increase in four years.	Percent. increase of total.
Europe	204,904	12,359	6.0
Asia	61,800	11,197	18.2
Africa	20,809	4,518	21.8
North America	277,015	25,057	9.0
South America	42,329	8,273	19.6
Australasia	18,849	1,396	7.4

It is readily observed that the well-developed continents, Europe and North America, have added the least proportionate to their mileage, while the less-developed continents, Asia, Africa and South America, have added mileage in much greater ratio, although the number of miles added has been smaller. This is what would be expected.

An interesting question is the tonnage of iron and steel used in railroad construction in the world. No accurate estimate can be made, for the reason that conditions vary so widely with different railroads according to the character and density of traffic. In the Cape to Cairo project, for instance, a single track line is amply sufficient, and the rolling stock per mile of line is necessarily light. So it was originally with our own transcontinental lines. On the other hand, in the eastern part of this country we have four-track roads with many cars and locomotives per mile of road, and a similar condition prevails in England. For a rough estimate of the world, however, the proportions obtaining in the United States might not prove to be far wrong. They are substantially as follows, per mile of line: Miles of track, 1.4; locomotives, 0.25; cars, 9.4.

On the basis of these data, it may be estimated roughly that in the United States there are tied up in the railroads the following tonnages of iron and steel: Rails, 45,000,000 tons; bridges, buildings, etc., 10,000,000 tons; locomotives, 5,000,000 tons; cars, 25,000,000 tons; total, 85,000,000 tons. For the remainder of the world, allowing for the lesser use of steel cars and steel bridge material, a rough estimate would be: Rails, 70,000,000 tons; bridges, buildings, etc., 10,000,000 tons; locomotives, 10,000,000 tons; cars, 25,000,000 tons; total, 115,000,000 tons. This would make a grand total of about 200,000,000 tons of iron and steel tied up in the railroads of the world, exclusive, of course, of electric and minor systems. The world's annual production of pig iron has lately increased to 60,000,000 tons, having been 40,000,000 tons in 1900. Evidently a large proportion of the production has gone into railroads, but the railroad consumption has not been of overshadowing proportions, as is occasionally assumed.

Rods a Finished Steel Product

The incident that wire rods were reduced \$2 a ton in price at the time of the reduction in wire prices, June 20, instead of at the time billets were reduced, May 29, is not without its significance. In the old days wire rods were regarded as a semifinished product, and took their place with billets and sheet bars. They were often bought for drawing into wire and were therefore to be regarded as more or less cognate with billets, which were bought to roll into merchant bars, etc., and with sheet bars, which were bought to roll into sheets and tin plates. Of late there has been relatively little tonnage of rods which has changed ownership to be subsequently drawn into wire. On the other hand, the tonnage of rods used for other purposes, particularly for making chain, has greatly increased.

The line between the steel industry proper, which makes rolled steel products, and the fabricating trade, which works these products up in various ways for ultimate utilization, is now more properly drawn simply to include rods as a material to pass from the one class to the other, rather than in a way to include rods as contained within the steel industry. In a sense, the rod is one of the finished products of the ordinary wire mill, to be sold to those who use it for other purposes than drawing into wire. Years ago, on the other hand, rods could often be classified as the raw material of the ordinary wire mill. The practice of buying billets to roll into rods to be drawn into wire still survives to a limited extent, but there are a very few instances. Ordinarily the producer of the wire makes even the steel ingot.

First Aid a Ground for Damages

The Supreme Court of New Jersey has handed down a decision in which a manufacturer is found liable for the negligence of his superintendent in connection with the dressing of a wound received by a workman. The man had cut his finger with a pair of scissors, and the superintendent instructed another employee to dress the injured member. Carbolic acid was applied and gangrene followed, which made necessary the amputation of the finger. The injured man sued for damages and a verdict was awarded him. The employer appealed the case to the higher court, the question involved being whether the use of medicine found in an emergency chest in the factory was within the authority given by the superintendent to the man who dressed the injury. The court says that it was.

The decision gives employers ground for serious reflection. Various States have enacted statutes compelling manufacturers to maintain kits for first aid to the injured. This, of course, implies that the contents of the kits shall be used in case of accident. If the treatment is unskillful the owner, under this decision, may be liable for damages. Therefore, the employer is wise who selects with a good deal of care the person to whom the emergency treatment shall be intrusted. Referring to the case in question, carbolic acid, properly diluted, would generally be considered a proper antiseptic agent. Treatment given by a surgeon may not rid a wound of the danger of blood-poisoning. The law says, in some States, that the emergency chest shall be available for immediate use, the natural deduction being that first aid must be administered. A contradictory situation is thus created by the statutes. Logically considered, if the employer does his best for his injured workmen, his duty would seem to have

been performed. Of course, a case may be imagined where the misuse of the contents of the kit would be so monstrous, through ignorance, as to savor of criminal negligence. But, generally speaking, the injured workman should be considered as having the advantage of the very essential immediate treatment. If serious results follow, it would seem that the employer should not be held by statute as liable.

Whatever the rights and wrongs of these legal conditions, it is clearly desirable for an owner to give the subject of emergency treatment attention. A common practice is to select for the duty one or two men of sufficient intelligence to enable them to learn the necessary elementary principles of surgery. A physician may be employed to instruct them. If this work is not systematized, if any workman who happens to be available is permitted to treat an injury sustained by one of his fellows, the chances of inefficiency are multiplied.

Lathe or Turning Machine?

The discussion which promises to develop into a controversy among machine tool manufacturers as to whether a lathe should be called a turning machine seems to be a matter properly fit for "dog days" contemplation. As yet, it would appear that it has not been submitted to the proper authorities for settlement. The old saw that "a rose by any other name would smell as sweet" does not apply here, for a turning machine announcement in an advertisement or catalogue might not meet with the proper attention from a prospective lathe purchaser; hence, it would not seem that a lathe by any other name would sell as well.

If apprentices and prospective engineers are taught that a certain device is called a lathe it will require some education to sell them turning machines for lathe work when they become the buying men. So the question "what's in a name?" is worthy of some consideration in this event at least. The argument that the word lathe does not mean anything may have some foundation now, but time was when, in a measure, it described an important principle of the machine. A "lath" or flexible pole was an important part of the first self-contained machine, as witness the following extract from "Modern American Lathe Practice," by Oscar E. Perrigo, M.E.:

A piece of wood formed a bed for the lathe, and to this was fixed the blocks forming the centers, which have since become the head and tail stocks of the lathe. The machine appears to have been used indoors, as the flexible limb of the tree had been replaced by a flexible strip or pole, "fastened overhead" and called a "lath," from which circumstance some writers think that the name "lathe" was derived. The driving cord was still wound around the piece to be turned. No mention is made of the method of supporting the tool, but it is probable that a strip of wood was fastened to the "bed" for that purpose.

It is not our purpose to discourage any reform that makes for a better standardization of machine tools, but if a lathe is to be called a turning machine what about a boring mill, which also turns parts? Certainly a manufacturer has the privilege of calling his product what he will, but, for selling reasons alone, the makers of lathes or turning machines, or whatever they may be, would do well to get the co-operation of the instructors of technical schools and colleges in making a change, so that the literature now being studied by future buyers can be reformed as a first step.

State Control of Women's and Minors' Wages

Massachusetts has established a commission whose duty will be to study the matter of wages of women and minors. Later, to quote the legislative act, "It will report on the advisability of establishing a board or boards to which shall be referred inquiries as to the need and feasibility of fixing minimum rates of wages for women and minors in any industry." The plan is that next year's Legislature will pass upon bills submitted by this commission. The body as proposed is to consist of five persons, including a woman, a representative of labor and a representative of employers.

The idea of a minimum wage board is not new. As an advisory board it may perform a useful work, but it is difficult to understand how such a tribunal could be vested with power to determine the wage that must be paid by an employer to an employee. A State may have the power to define the maximum number of hours for which a woman or a child may be employed during the week, but we very much doubt if the State can tell an employer that he shall pay a given wage to these people. In some industries women and children are sadly underpaid. In the metal trades this charge is seldom heard; in other trades the condition is notorious. If a State could establish a board consisting of intelligent persons having an intimate understanding of business conditions, the moral influence might be very important. Probably everything would depend upon the personality of the members.

Industry is progressing along this line of its own volition. Hygiene is more and more recognized as a factor of costs. Employers desire their working people to be in good health, and, as far as possible, in good spirits. They believe in paying a living wage. In the metal industry the average wage of women and children is, undoubtedly, greater than that in the mercantile world. It is not alone the influence of supply and demand which regulates these matters. Probably a very great number of manufacturers will be glad to learn the results of this investigation of the Massachusetts commission.

Koppers Coke Ovens

H. Koppers, Joliet, Ill., calls attention to the fact that the article on "By-Product Coke Ovens in America," which was published in *The Iron Age* of June 8, omitted to state that the list of ovens given was for the year 1909. For this reason an apparent injustice was done to the Koppers oven. In addition to the Koppers ovens mentioned in the article, 110 have been installed at Sault Ste. Marie, Ontario, Canada, 60 at Woodward, Ala., and 86 waste heat ovens in Mexico, while other Koppers plants under construction comprise 420 ovens for the Indiana Steel Company (United States Steel Corporation) at Gary, Ind., 280 ovens for the Tennessee Coal, Iron & Railroad Company (United States Steel Corporation) at Corey, Ala. A recent contract has further been made for 35 Koppers ovens with the Coal Products Mfg. Company, Joliet, Ill.

The T. A. Gillespie Company, Pittsburgh, has been awarded by the Board of Water Supply of New York City a contract for the construction of a portion of the Hudson River division of the Catskill aqueduct in the towns of Cornwall and Fishkill. Its bid was \$1,649,020 and was the third lowest, but, by reason of the importance of the undertaking, the board decided to make the award to the Gillespie Company because of its facilities, experience and resources. The steel requirements of the complete portion of the Catskill aqueduct from Yonkers, N. Y., to Brooklyn, amounting to about 6000 tons, will be rolled by the Carnegie Steel Company, Pittsburgh.

Correspondence

Protecting Metal from Superincumbent Slag

To the Editor: In rather tardily looking over your issue of June 1, reporting the proceedings of the convention of the American Foundrymen's Association recently held in Pittsburgh, I note I have been incorrectly quoted on page 1330 as follows: "He mentioned that the deleterious effect of slag resting on the metal was met by the use of thermit with silicon." I distinctly made a statement to the contrary. In the discussion following the paper which I read, Professor Stoughton asked if the addition of thermit and silicon to the last part of the heat in the ladle would not overcome the difficulty experienced by deterioration of the metal lying just beneath the slag. I replied that this did *not* entirely overcome the difficulty, since raising the temperature and the silicon content were not in themselves sufficient, as the manganese and sulphur are affected by the slag.

R. A. BULL,

Commonwealth Steel Company.

GRANITE CITY, ILL., June 14.

Fuel Efficiency of the Blast Furnace

Under the title, "The Fuel Efficiency of the Iron Blast Furnace," John Jermain Porter, Cincinnati, Ohio, contributed a paper to the Wilkes-Barre meeting of the American Institute of Mining Engineers, analyzing the heat changes occurring in the blast furnaces. In this paper he asserts that the activities of furnace managers are limited to the more perfect cultivation of the fields already open, and that there is no new ground to be broken until commercially feasible methods of producing high-oxygen blasts are at hand. There is no question, he continued, that the furnace-men of the future will have to meet the condition of smelting very lean ores. With the high slag volume then produced, the carbon requirements of the hearth will become more than ever the controlling factor, and the heat requirements in the stack may, for all practical purposes, be ignored.

With regard to blast temperature, he emphasizes that when using Mesaba ores, the temperature is limited by the tendency of the furnace to stick and hang at high heats. His observations, however, cover results in which 1100 deg. F. blast temperature is used in connection with 70 per cent. Mesaba ore.

In respect to the carbon loss in the shaft of the furnace, it is thought that current furnace practice is, as a rule, fairly satisfactory, with the exception that in the Southern districts the ore and limestone are generally insufficiently crushed and sized previous to charging. He believes that in a number of cases it would be possible to save at least 100 lb. of fuel per ton of iron by better practice in this regard. Fineness beyond a certain point is, of course, undesirable, as it induces excessive carbon-deposition and causes hanging of the furnace. Ores reduced with difficulty do not cause this trouble, he mentions, and fuel may be saved by having them finely crushed as is compatible with a reasonably low loss in flue dust.

In regard to the attempt to reduce the cost of making pig iron, the author expresses a belief that a simultaneous study of the possibility of metallurgical improvement and of the cost sheet will show in many cases far greater returns than could have been obtained through judicious expenditure looking toward the reduction of fuel through an increase in available heat than through the development of labor-saving machinery, such as skip hoists, casting machines, pig breakers and the like, the value of which he does not question. In short, he feels that most furnacemen have placed too much emphasis upon mechanical effect of these improvements on the cost sheet.

The following table on cost is of probable interest:

Approximate Percentage of the Total Fueling Cost of the Blast Furnace					
	Alabama.	Virginia.	Pittsburgh.	Chicago.	Atlantic Coast.
Ore	35	28	20	24	42
Flux	1	2	2	2	5
Fuel	47	30	18	34	40
Labor	10	11	6	6	8
Supplies and repairs	7	5	4	4	4
Total	100	100	100	100	100

Mechanical Equipment of the Olympic

The mechanical equipment on the new steamship Olympic of the White Star Line, which ended its initial voyage at New York June 21, requires the attendance of a corps of men sufficient to operate a good-sized manufacturing plant. Counting the firemen and stokers, there are 230 men in the engineering department, and 40 of these are designated as engineers. The vessel, which is the largest now afloat, is the first transatlantic liner to be equipped with both reciprocating and turbine engines. There are two reciprocating engines of the four-cylinder triple-expansion type, taking steam at 250 lb. to the sq. in. and operating at about 75 r.p.m., and one auxiliary steam turbine of the Parsons type which is designed to take steam from the reciprocating engines at about 9 lb. absolute, expanding down to 1 lb., and is capable of running at 165 r.p.m.

The boat carries a refrigeration plant consisting of two horizontal duplex carbonic acid machines. The electric plant consists of four 400-kw generators, each directly coupled to a 580-hp. vertical 3-crank compound engine running at 325 r.p.m. The steam generating plant comprises 29 boilers, 20 of which are double ended and are 20 ft. long by 9 ft. 9 in. in diameter, and five are single ended boilers, 11 ft. 9 in. long and 15 ft. 9 in. in diameter. The latter are arranged so as to be available for the auxiliary machinery while the ship is in port. To take care of the repairs on this equipment a machine shop has been installed on board, which has a complete line of machine tools required in tool making and for making machine parts. Three machinists are regularly employed in this shop, and in case of necessity other men in the engineering department can be detailed to machine-shop work.

The Accelerated Corrosion Test of Metals

R. C. McBride, Commercial Chemical Laboratory, Youngstown, Ohio, writes to the Engineering Record, New York, as follows regarding some analyses and tests made for the purpose of investigating the value of the accelerated corrosion test as an indication of the ability of metal to resist the action of the weather:

The first sample examined was a piece of sheet-iron roofing which was known to have been in service for more than 40 years, and in that time to have received but two coats of paint. Here was a chance to make an accelerated test on a sample which had already demonstrated its ability to resist the conditions of actual service. A carefully cleaned piece was submitted to the action of $2\frac{1}{2}$ per cent. sulphuric acid at room temperature for 24 hr. To our surprise the sample showed a loss of .71 per cent. in weight. The analysis of this sample was: Slag, .80 per cent.; sulphur, .057; phosphorus, .0157; manganese, none. This analysis shows it to have been the real old puddled iron.

At the end of the accelerated test the iron presented a very marked foliated structure which, viewed edgewise, resembled a stone wall from which all the cement had been removed. This peculiar appearance at once suggested that the slag had been attacked and dissolved out more readily than the iron. Analysis showed this to have been the case, as the sample contained only 0.20 per cent. slag after it had been subjected to the action of the acid. This seems to support the old theory that the weather-resisting power of puddled iron was largely due to the protective action of inclosing layers of slag, this protective action being in addition to the more recently discovered protection afforded by absence of manganese, while the greater susceptibility of this iron to accelerated corrosion is due to the fact that the dilute acid employed readily attacks this protective coating and, by opening up the foliated structure, in this way multiplies the surface exposed to corrosive action. It is well known that slag resists, almost to the point of immunity, the corrosive agents of actual service.

A sample of new sheet iron submitted by a company which claims its product to be the "old fashioned" puddled iron showed a loss of 17.7 per cent. under the accelerated test. The analysis of this sample was: Slag, 1 per cent.; sulphur, .011; phosphorus, .012; manganese, none. Judged by the electrolytic theory alone, this sample would be very highly resistant to corrosion, and

in our opinion would be, were it not for the opening offered by the dissolving away of the inclosed slag, for its analysis is much better than that of the 40-year-old sample, as also is its corrosion figure.

That the absence of slag in the presence of manganese does not imply resistance to accelerated corrosion, any more than does the absence of manganese in the presence of slag, is proved by the high accelerated corrosion figures of ordinary Bessemer steel. One sample of this material tested had the following analysis: Slag, none; sulphur, .075 per cent.; phosphorus, .0133; manganese, .041. This showed a loss of 31.6 per cent. by the accelerated test.

These experiments would seem to lead to the following conclusions: As a means of comparing the weather-resisting abilities of steels or so-called irons which have been rolled from molten ingots in which no slag is found, the accelerated corrosion test may be of value; but since irons which have successfully resisted the weather for "lo, these 40 years" are torn wide open by this test, we must conclude that their slag content, while a protection in actual service, entirely vitiates the accelerated test as applied to such materials.

British Steel Production in 1910

The British Iron Trade Association, through its secretary, Fairfax Scott, has published the statistics of the production of steel in the United Kingdom in 1910, from which are compiled the following details: Bessemer ingots, 1,779,115 gross tons; open-hearth ingots, 4,231,569 tons. In 1909 the production was: Bessemer ingots, 1,733,220 tons; open-hearth ingots, 4,148,408 tons. Of the Bessemer ingot production in 1910 1,138,103 tons were acid and 641,012 tons were basic. The production of basic open-hearth ingots in 1910 was 1,578,536 tons, and of acid open-hearth ingots, 2,653,033 tons. The production of crucible steel and steel castings is not given. The production of Bessemer steel rails, including ties and fish-plates, in the United Kingdom in 1910 was 711,915 tons, as compared with 821,079 tons in 1909, being a decrease of 109,164 tons, and less than the output of 1908, the year of depressed trade.

The Size of a Coke Charge for a Cupola.—A charge of coke in the cupola may be called a small or suitable charge when it is below 200 lb. per square foot of the cross-sectional area of the cupola, and it may be considered a large charge when it is above this amount. P. Munnock drew this line in a paper on cupola melting practice in Great Britain presented to the recent Pittsburgh meeting of the American Foundrymen's Association. In addition, he mentioned that the lower the melting ratio and the lower the density of the coke the smaller is the charge desirable. Sometimes, therefore, 100 lb. per square foot sectional area might be ample. The area of the cross-section multiplied by $2\frac{1}{2}$ and the result multiplied by 60 (minutes) gives ideal coke consumption per hour. This multiplied by 10 gives the ideal rate of melting in pounds of iron per hour. Figures thus found are useful to compare with the actual melting rate.

The National Commissary Managers' Association will hold its annual meeting in St. Louis, Mo., August 22 to 24. The headquarters will be at the Southern Hotel. B. M. Leiby, Dutton, Florida, is president of the association, and Tracy D. Luccock, 801 Manhattan Building, Chicago, is secretary and treasurer. This association is composed of managers of stores conducted by coal mining companies, lumber manufacturers, cotton manufacturers, etc. Special addresses are to be made by men of national reputation on subjects of vital importance to the commissary trade.

A rotary steam engine, which has been tested in use at the Aurora Cotton Mills at Burlington, N. C., and the Agricultural and Mechanical College at Raleigh, N. C., is to be manufactured on a commercial basis by the Holt Engine Company, Burlington, N. C. Tests are reported in which an 8-hp. engine developed 10 hp. at 400 r.p.m. with 100 lb. steam pressure with a consumption of 33 lb. of steam per horse-power per hour and developed 7.95 hp. at 300 r.p.m. and 100 lb. steam pressure with a consumption of 40 lb. per horse-power-hour.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June 28	June 21	May 30	June 29
PIG IRON. Per Gross Ton:	1911.	1911.	1911.	1910.
Foundry No. 2, standard, Philadelphia.....	\$15.00	\$15.00	\$15.50	\$16.25
Foundry No. 2 Valley furnace..	13.50	13.50	13.75	14.50
Foundry No. 2, Southern, Cincinnati.....	13.25	13.25	13.75	14.75
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.50	11.50
Foundry No. 2 local, at furnace, Chicago*.....	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa....	14.50	14.50	14.50	15.75
Basic, Valley furnace.....	13.00	13.00	13.10	14.50
Bessemer, Pittsburgh.....	15.90	15.90	15.90	16.40
Gray forge, Pittsburgh.....	13.90	13.90	14.15	14.90
Lake Superior charcoal, Chicago	16.50	16.50	17.00	18.50

COKE, CONNELLSVILLE.

Per Net Ton, at oven:				
Furnace coke, prompt shipment	1.40	1.40	1.45	1.65
Furnace coke, future delivery..	1.60	1.60	1.75	1.80
Foundry coke, prompt shipment	1.80	1.75	1.75	2.15
Foundry coke, future delivery..	2.10	2.05	2.00	2.25

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	21.00	21.00	21.00	25.00
Forging billets, Pittsburgh.....	26.00	26.00	26.00	31.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	28.50
Wire rods, Pittsburgh.....	27.00	27.00	29.00	31.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.00	14.00	14.50	17.00
Iron rails, Philadelphia.....	16.50	16.50	16.75	19.50
Car wheels, Chicago.....	12.50	12.50	12.75	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	14.50
Heavy steel scrap, Pittsburgh...	13.00	13.00	13.00	15.00
Heavy steel scrap, Chicago.....	10.25	10.25	10.25	12.75
Heavy steel scrap, Philadelphia..	13.00	13.00	13.00	14.25

FINISHED IRON AND STEEL.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.27½	1.27½	1.27	1.47½
Common iron bars, Pittsburgh...	1.25	1.25	1.25	1.50
Common iron bars, Chicago.....	1.20	1.20	1.20	1.45
Steel bars, Pittsburgh.....	1.25	1.25	1.25	1.45
Steel bars, tidewater, New York	1.41	1.41	1.41	1.61
Tank plates, Pittsburgh.....	1.35	1.35	1.35	1.45
Tank plates, tidewater, New York	1.51	1.51	1.51	1.61
Beams, Pittsburgh.....	1.35	1.35	1.35	1.45
Beams, tidewater, New York...	1.51	1.51	1.51	1.61
Angles, Pittsburgh.....	1.35	1.35	1.35	1.45
Angles, tidewater, New York...	1.51	1.51	1.51	1.61
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.00	2.00	2.40
Wire nails, Pittsburgh.....	1.70	1.70	1.80	1.80
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.75
Barb wire, galv., Pittsburgh.....	2.00	2.00	2.10	2.10

METALS.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.87½	12.75	12.45	12.75
Electrolytic copper, New York..	12.62½	12.50	12.25	12.37½
Spelter, St. Louis.....	5.45	5.55	5.20	5.05
Spelter, New York.....	5.65	5.75	5.50	5.20
Lead, St. Louis.....	4.35	4.35	4.22½	4.22½
Lead, New York.....	4.50	4.50	4.37½	4.37½
Tin, New York.....	45.00	44.87½	45.50	33.00
Antimony, Hallett, New York...	8.25	8.75	8.95	8.12½
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton

†These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.;

angles, 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; zebs, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¾-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼ in. to and including 3-16-in. on thinnest edge, extra.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
20	1.40	\$2.40	20	\$2.40	\$3.50
28	1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel—		Iron—	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	71	59	49	43
1½ in.....	75	63	71	59	49	43
¾ to 1½ in.....	79	69	75	65	51	45
2 to 3 in.....	80	70	76	66	52	46
Lap Weld.						
2 in.....	76	66	72	62	50	44
2½ to 4 in.....	78	67	74	64	52	46
4½ to 6 in.....	77	67	73	63	51	45
7 to 12 in.....	75	59	71	55	49	43
13 to 15 in.....	15½	..	..	..	..	..

THE IRON AND METAL MARKETS

Butt Weld, extra strong, plain ends, card weight.			
1 1/2 in. to 2 in.	69	70	71
2 in. to 2 1/2 in.	74	75	76
2 1/2 in. to 3 in.	78	79	80
3 in. to 3 1/2 in.	79	80	81

Lap Weld, extra strong, plain ends, card weight.			
2 in. to 2 1/2 in.	75	76	77
2 1/2 in. to 3 in.	77	78	79
3 in. to 3 1/2 in.	76	77	78
3 1/2 in. to 4 in.	69	70	71
4 in. to 4 1/2 in.	64	65	66

Butt Weld, double extra strong, plain ends, card weight.			
1 1/2 in. to 2 in.	64	65	66
2 in. to 2 1/2 in.	67	68	69
2 1/2 in. to 3 in.	69	70	71

Lap Weld, double extra strong, plain ends, card weight.			
2 in. to 2 1/2 in.	65	66	67
2 1/2 in. to 3 in.	67	68	69
3 in. to 3 1/2 in.	66	67	68
3 1/2 in. to 4 in.	59	60	61

Plugged and Reamed.

Butt Weld		Lap Weld	
1 1/2 in. to 2 in.	69	75	76
2 in. to 2 1/2 in.	74	77	78
2 1/2 in. to 3 in.	78	80	81
3 in. to 3 1/2 in.	79	81	82

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

Steel.	
1 1/2 in. to 2 in.	65
2 in. to 2 1/2 in.	67 1/2
2 1/2 in. to 3 in.	70
3 in. to 3 1/2 in.	71 1/2
3 1/2 in. to 4 in.	72 1/2
4 in. to 4 1/2 in.	73 1/2
4 1/2 in. to 5 in.	74 1/2
5 in. to 5 1/2 in.	75 1/2
5 1/2 in. to 6 in.	76 1/2
6 in. to 6 1/2 in.	77 1/2
6 1/2 in. to 7 in.	78 1/2
7 in. to 7 1/2 in.	79 1/2
7 1/2 in. to 8 in.	80 1/2

Less than carloads to destination east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.50, galvanized \$1.80; carload lots, to retailers, annealed \$1.55, galvanized \$1.85. Galvanized barb wire, to jobbers, \$2; painted, \$1.70. Wire nails, to jobbers, \$1.70.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.	
No.	0 to 9
Annealed	1.70
Galvanized	1.80
Bright and Annealed:	
9 and coarser	.80
10 to 18	.80 and 10
19 to 26	.80 and 10 and 2 1/2
27 to 36	.80 and 10 and 5
Galvanized:	
9 and coarser	.75 and 10
10 to 16	.75 and 10
17 to 26	.72 1/2 and 10
27 to 36	.72 1/2 and 10
Coppered or Liquor Finished:	
9 and coarser	.75 and 10
10 to 26	.75 and 10
27 to 36	.70 and 10 and 5
Tinned:	
6 to 18	.75 and 10 and 10

Pittsburgh

PARK BUILDING, June 28, 1911.—By Telephone.

Pig Iron.—New inquiries are more numerous and some tonnage in basic and foundry iron has been closed. A local steel casting company has bought 250 tons of Bessemer iron for July shipment at less than \$14.90, Pittsburgh, the sale having been made by a dealer. All the Valley furnaces are quoting \$15 on Bessemer, but middlemen are naming \$14.75 to \$14.90 and are taking what little business is being offered. A radiator company at Johnstown, Pa., has bought 600 tons of No. 2 foundry from a nearby furnace and another radiator company in the same city is expected to close this week for about 3000 tons of No. 2 foundry for last half delivery. A large tonnage of basic and foundry iron is under negotiation. Prices on Bessemer iron are weak and \$15, Valley, would be shaded on a firm offer and for large tonnage. We quote as follows: Bessemer pig iron, nominally, \$15; malleable Bessemer, \$13.50; basic, \$13; No. 2 foundry, \$13.50 to \$13.75; gray forge, \$13, all at Valley furnace, the freight rate to Pittsburgh being 90c. per ton.

Steel.—Specifications against contracts for sheet bars from the independent sheet mills have been better in

the past week, owing to the heavier demand for sheets, and a number of contracts for sheet bars and tin bars for the third quarter have been placed at the regular price of \$22, Pittsburgh. A sale of 500 tons of forging billets for July delivery is reported at \$26, delivered at buyer's mill, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in., and up to but not including 10 x 10 in., \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1 1/2-in. billets, \$22; forging billets, \$26, base, usual extras for sizes and carbons—all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

(By Mail)

The improvement in trade continues and conditions are undoubtedly better to-day in point of actual orders being sent to the mills for rolling than they have been in some months. The billet and rail sales department of the Carnegie Steel Company is 40,000 tons or more ahead on actual orders sent to the mills so far this month as compared with the same period in May. The structural steel and plate department of the Carnegie Company reports that its actual bookings of orders this month are much the largest in over a year. A very heavy tonnage of structural steel has been placed and much more is pending. There is a good deal of inquiry for cars, but actual orders placed have been light for several weeks. The pig iron market is showing more activity and it is known that a number of large consumers have quietly closed for large lots of iron for third quarter and for last half of the year delivery, but at relatively low prices. The market on billets and sheet bars is quiet, most consumers being covered by contracts. On the night of June 30 a number of finishing mills will close down for inventory and repairs and for this reason sales of scrap and semifinished products have been light. The wage scales for the independent sheet and tin plate mills were settled at a conference held in Pittsburgh last Thursday, practically the same scale now in force being adopted for the year beginning July 1. A conference began Tuesday between committees of the Amalgamated Association and the Republic Iron & Steel Company, at which it was expected that a settlement of the puddling and heating scales would be arranged.

Ferromanganese.—There is practically no local inquiry, but a sale is reported at 200 tons for third quarter delivery to an outside consumer at \$36.50, Baltimore. We quote foreign 80 per cent. at \$36.50 to \$36.75 with a freight rate of \$1.95 a ton for delivery in the Pittsburgh district.

Ferrosilicon.—There is no new inquiry, nearly all consumers being covered ahead for the remainder of this year. We quote 50 per cent. at \$51.50 to \$52, Pittsburgh, for delivery over second half of the year; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars Ashland and Jisco furnaces.

Muck Bar.—An inquiry is reported in the market for 500 tons of muck bar for July and August delivery, this being the first active inquiry that has come out for some months. We continue to quote best grades of muck bar made from all pig iron at nominally \$28.50 Pittsburgh.

Skelp.—A sale is reported of about 1500 tons of narrow sizes grooved steel skelp on the basis of 1.25c. delivered at buyer's mill in the Pittsburgh district. Prices are fairly strong. We quote grooved steel skelp at 1.25c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.50c. to 1.60c., and sheared iron skelp, 1.70c. to 1.75c., usual terms, all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—A sale of 500 tons of open-hearth rods for chain purposes for July and August delivery is reported at \$27, Pittsburgh.

Structural Material.—A tremendous amount of new work is being figured on, and a good deal of tonnage has been placed. The American Bridge Company closed to-day for steel buildings for the new plant of the Pittsburgh-Crucible Steel Company, at Midland, Pa., 8500 tons, and the same concern has closed for 3800 tons of bridge work for the Louisville & Nashville Railroad, and has also received a contract from the United States Government for the building of 14 steel barges for delivery at Memphis and Vicksburg, which will take about 1700 tons of steel. The McClintic-Marshall Construction Company has taken 500 tons of steel for a new building for the International Harvester Company, and the King Bridge Company, Cleveland, Ohio, has taken 800 tons of steel for new bridges for

THE IRON AND METAL MARKETS

the Wheeling & Lake Erie Railroad. We quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Plates.—No orders for steel cars have been placed in the past week, but there are some active inquiries in the market. Among these are 1000 steel cars for the Baltimore & Ohio, 1000 for the Louisville & Nashville, 1000 for the Queen & Crescent, 2000 for the Erie, 450 for the Ann Arbor, 2000 for the Pennsylvania Railroad, and 1000 for the Virginian Railway. The Buffalo, Rochester & Pittsburgh Railroad has withdrawn an inquiry for 2000 sent out some time ago. The contract for the 4500 tons of plates for the Los Angeles aqueduct secured by the Treadwell Construction Company has not yet been placed. We quote 3/4-in. and heavier plates at 1.35c., Pittsburgh.

Steel Rails.—The Carnegie Steel Company has taken an order for 500 tons of standard sections for the Pittsburgh Railways Company, and also received new orders and specifications against contracts in the past week for 4000 tons of light rails. The Texas Pacific Railroad is in the market for 16,000 tons of standard sections to be used for laying 125 miles of track. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Sheets.—We continue to note an improved demand and also in specification against contracts for black and galvanized and also for roofing sheets. Several leading sheet mills report that new business is coming along very nicely and that shipments of sheets by the mills this month will show a material increase over May. The independent sheet and tin plate mills have reached a settlement on the sheet and tin plate scales with the Amalgamated Association and the mills will continue in operation except those that expect to close down on June 30 for inventory and repairs. The full schedule of prices on black and galvanized and on roofing sheets is printed on a previous page.

Tin Plate.—The new demand is very dull and specifications against contracts are coming in at only a fairly satisfactory rate. It is estimated that only from 60 to 65 per cent. of tin plate capacity is active at present.

Bars.—While the new demand for both iron and steel bars is only fair, a good deal of tonnage in steel bars has been closed on contracts on the 1.25c. basis to run over the remainder of this year. We quote steel bars at 1.25c. and iron bars at 1.25c. to 1.30c. f.o.b. Pittsburgh.

Rivets.—Inquiries for rivets are better and there has been some improvement in actual orders. Prices are recognized as being relatively low, and jobbers and consumers are a little more inclined to buy than they have been for some time. We quote structural rivets at 1.70c. to 1.75c. and boiler rivets at 1.80c. to 1.85c., these prices being shaded only on most desirable orders.

Wire Products.—So far the reduction of \$2 a ton in wire products, effective June 21, has not resulted in increased new demand, while specifications against contracts are not any better. This reduction was really not very significant as very little new business had been placed on the \$1.80 basis for wire nails, most consumers having covered at lower prices and had not taken out their contracts. We quote galvanized barb wire at \$2 per 100 pounds; painted, \$1.70; annealed fence wire \$1.50; galvanized \$1.80; wire nails \$1.70 and cut nails about \$1.60 f.o.b. Pittsburgh, full weight added to point of delivery. The quotation of \$1.60 on cut nails might be shaded on a desirable order.

Spikes.—The new inquiry for spikes is reported to be a little better, one road having placed recently an order for 2000 kegs and another for 2500 kegs, the business going to a local maker. We quote railroad spikes at \$1.50 base per keg f.o.b. Pittsburgh, with the usual extras for odd sizes.

Shafting.—As yet the new demand and specifications against contracts for shafting are only fair and mostly in small lots. However, early in August an improvement is expected, as the implement makers then usually commence to specify against their contracts for shafting. Regular discounts on shafting remain at 60 per cent. off in carloads and 55 per cent. in less than carloads, but on desirable orders these discounts are still being shaded.

Spelter.—The upward movement has stopped, and to-day's prices are easier with the tendency toward lower values. We quote prime grades of Western at 5.60c., East St. Louis, equal to 5.72 1/2c., Pittsburgh. A sale of 50 tons to a local consumer at this price is reported.

Hoops and Bands.—The new demand is quiet and mostly for small lots to cover actual needs. While specifications against contracts from some sections of the country are quite active, from other places they are dull. The new mill of the Sharon Steel Hoop Company at Sharon, Pa., for rolling wide bands has been completed and put in operation and is working satisfactorily. We quote hoops at 1.40c. and bands at 1.25c., extras on the latter as per the steel bar card.

Merchant Steel.—One of the leading makers outside the Pittsburgh district reports that its actual orders and specifications against contracts in June showed an increase of about 20 per cent. over May. However, the general demand is quiet and mostly for small lots to cover actual needs, while specifications are only fair.

Merchant Pipe.—The Ohio Fuel Supply Company is inquiring for 25 miles of 16-in. line pipe and another gas interest is reported to have bought about 15 miles of 4-in. line pipe for delivery in Western gas territory. The new demand for merchant pipe is better so far this month than in May, and shipments in June will show an increase over last month. Regular discounts on iron and steel pipe are given on a previous page.

Boiler Tubes.—There is no improvement in new demand and specifications against contracts are also very dull. Prices on both iron and steel boiler tubes continue to be more or less shaded.

Coke.—The furnace coke trade has been quite active in the past week or 10 days, and a good deal of tonnage has been sold. A large blast furnace interest controlling a number of furnaces has bought 26,000 tons a month for July and August, of which 21,000 tons a month was taken by one interest on the basis of \$1.50 for certain brands of coke and \$1.55 for other makes. The other 5000 tons a month for July and August is taken by another coke maker, which has a blast furnace connection, and the coke is to be paid for in ore; that is, a certain number of tons of coke for a ton of ore. Another contract for 5000 tons of blast furnace coke per month over the last half of the year was made at \$1.60 at oven, and another for 9000 tons a month over the last half of the year at \$1.65 at oven. A third contract was made for 11,000 tons a month for the last half of the year at \$1.75 at oven. The seemingly high price on the last contract is accounted for by the fact that the coke specified must be Connellsville Old Basin coke and must be hand drawn. A large consumer of coke has had its regular supply shut off by labor troubles and has been an active buyer of furnace coke for prompt shipment. This interest is buying from 30 to 40 cars of prompt coke per day and is paying from \$1.50 to \$1.55 at oven for it, the coke to be strictly high grade. For this reason the supply of furnace coke for prompt shipment is somewhat lessened and prices are a shade firmer. There is also a good deal of inquiry in the market for foundry coke, the American Locomotive Company, the Pressed Steel Car Company and several other large consumers having inquiries out for a good deal of tonnage. We quote best grades of furnace coke for prompt shipment at \$1.45 to \$1.50; for July and August, \$1.55 to \$1.60, and for last half of the year, \$1.60 to \$1.65, all per net ton at oven. We quote standard makes of 72-hour foundry coke for spot shipment at \$1.85 to \$2 and for last half of the year at prices ranging from \$2.10 up to \$2.40 per net ton at oven. Some grades of furnace and foundry coke lower in quality than the above are offered at lower prices. For the first time since last March the weekly output of coke in the Upper and Lower Connellsville regions shows an increase, the production of these two regions for the week ending June 24 having been 271,088 tons, an increase over the previous week of about 5000 tons. Shipments showed an increase of 120 cars.

Iron and Steel Scrap.—The scrap trade has quieted down materially, consumers being pretty well covered and not desiring to take in any more in June than necessary on account of inventory and repairs which will start July 1. Quite a few consumers of scrap will close their plants on the night of June 30, and while they are willing to buy for delivery ahead they are not disposed to purchase for prompt shipment. One consumer has bought 4000 to 5000 tons of heavy steel scrap in the past week or 10 days on the basis of \$13 delivered at con-

THE IRON AND METAL MARKETS

suming point. Prices are fairly strong with the exception of low phosphorus melting stock, which is very dull and can hardly be sold at any price. Dealers are now quoting per gross ton, f.o.b. Pittsburgh, as follows:

Heavy steel scrap Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	\$13.00 to \$13.25
No. 1 foundry cast	13.25 to 13.50
No. 2 foundry cast	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district	10.75 to 11.00
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.50 to 13.75
No. 1 railroad malleable stock	12.00 to 12.25
Grate bars	10.50 to 10.75
Low phosphorus melting stock	16.00 to 16.25
Iron car axles	23.75 to 24.00
Steel car axles	18.50 to 18.75
Locomotive axles	23.00
No. 1 bushing scrap	12.00 to 12.25
No. 2 bushing scrap	8.50 to 8.75
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.50 to 15.75
*Cast from borings	8.75 to 9.00
*Machine shop turnings	9.00 to 9.25
Old iron rails	15.00 to 15.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.00 to 10.25
Stove plate	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Cincinnati

CINCINNATI, OHIO, June 27, 1911. (By Telegraph.)

Pig Iron.—There is an optimistic undercurrent of feeling, probably induced by an increased number of inquiries coming in. Order books also show some improvement, but the bulk of business now transacted covers small tonnages only, although it is rumored that the larger melters of pig iron are cautiously feeling round and it is quite possible that the next few weeks will see a change for the better. Even consumers now generally admit that the bottom has been reached and that the furnaces cannot continue present quotations very much longer. A southern Ohio manufacturer is asking for an additional round lot of basic, and from Michigan there are several inquiries for No. 2 foundry, running from 300 to 500 tons. A part of the No. 2 soft iron wanted by a Louisville interest has been purchased, but the bulk of the order was not placed. St. Louis furnished an inquiry for about 5000 tons of malleable and a northern Ohio concern wants 1000 tons, all for last half shipment. Prices remain stationary, although Northern No. 2 foundry is obtainable for spot shipment around \$13, Iron-ton. Malleable is quoted at \$13.25 to \$13.50 at furnace. Southern No. 2 foundry remains at \$10 Birmingham, and shipments at this figure could be extended through the third quarter with the probability that a desirable tonnage for last half delivery would not be turned down. On the other hand, several furnaces are holding out for \$10.50 and will not sell below this price. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	\$13.75 to \$14.25
Southern coke, No. 2 foundry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	13.00 to 13.25
Southern coke, No. 4 foundry	12.50 to 12.75
Southern gray forge	12.00 to 12.50
Ohio silvery, 8 per cent. silicon	17.45 to 17.70
Lake Superior coke, No. 1	14.70 to 14.95
Lake Superior coke, No. 2	14.20 to 14.45
Lake Superior coke, No. 3	13.70 to 13.95
Basic, Northern	14.45 to 14.70
Standard Southern car wheel	25.75 to 26.25
Lake Superior car wheel	19.00

(By Mail)

Coke.—There is a small inquiry from this territory for furnace coke, the entire quantity being about 2000 tons, and it is understood this is wanted for third quarter shipment. Several Eastern furnaces are said to be feeling around for a future supply and to cover, in one case, a 12 months' supply. Foundry coke shows some improvement, and a number of contracts have been closed lately, although no large tonnage is involved. There are no changes in price, but there is not any great scramble on the part of producers to take on business at prevailing spot shipment quotations. Furnace coke is quoted in the Connellsville district around \$1.40 to \$1.55 per net ton at oven, for prompt shipment, and ranges from the last named figure to \$1.75 for last half movement. Wise County and Pocahontas quotations average about 5c. a ton higher. Foundry coke is quoted in all three districts around \$1.95 to \$2 for prompt shipment and from \$2 to \$2.35 on contracts.

Finished Material.—Steel bars and structural material show special activity, as compared with nearby weeks. Local agencies think that the present demand shows no spasmodic symptoms and that business will gradually increase until it is at least normal. There is also an improvement in the small order trade. Sheets continue to move fairly well, and taking everything into consideration there is a brighter outlook to the situation. Warehouse prices continue at 1.70c. for steel bars and 1.80c. for structural material. There is no trouble in making prompt delivery on any standard warehouse stock.

Old Material.—The railroads have been reported as selling small quantities of scrap, but generally they are holding back for better prices. So far as consumers are concerned purchases are limited to immediate requirements, although there are some medium sized lots of scrap being bought under cover. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	\$11.50 to \$12.00
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	5.50 to 6.00
No. 1 cast scrap, net ton	9.50 to 10.00
Burnt scrap, net ton	6.50 to 7.00
Old iron axles, net ton	16.50 to 17.00
Bundled sheet scrap, gross ton	7.25 to 8.25
Old iron rails, gross ton	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton	21.00 to 22.00
Old car wheels, gross ton	10.75 to 11.75
Heavy melting steel scrap, gross ton	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, June 27, 1911.

Iron Ore.—While there is practically no inquiry for ore, the feeling among sellers is better than it has been for some time because of the improved demand for steel. Some consumers will need additional tonnage, but it is expected that in most cases the placing of these orders will be deferred until rather late in the season. Little change is noted in the lake shipping situation. Vessel tonnage, except in small boats for coal cargoes, still exceeds the supply. The chartering of 75,000 tons for ore transportation is reported. Vesselsmen do not look for much improvement for another month. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The improved inquiry noted last week has resulted in the placing of a few contracts for foundry grades for the last half, but not many additional inquiries have come out. The largest inquiry, which came from a northern Ohio consumer, for 2000 tons of foundry iron, has been withdrawn. Several other consumers are still negotiating for lots of 500 tons and under. The Southern Ohio Steel Company, which had an inquiry out last week for a round lot of basic iron for the last half, is reported to be still in the market for from 5000 to 15,000 tons. July will start with only a limited tonnage of foundry iron bought in this territory for the last half delivery. Many consumers, however, have enough iron left over from second quarter contracts to last them for several weeks. Cherry Valley furnace of the United Iron & Steel Company, Leetonia, Ohio, was blown out last week. This is the third stack controlled by Cleveland interests to be blown out during June. Prices are unchanged at \$13.50 to \$13.75. Cleveland, for outside shipment, Valley furnace, for No. 2 foundry, but some sellers appear unwilling to meet this price. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 2	14.25
Southern foundry, No. 2	\$14.35 to 14.85
Jackson Co. silvery, 8 per cent. silicon	17.50 to 17.75

Coke.—Some contracts for foundry grades for the last half are being placed, but the market is generally quiet. There is no demand for furnace grades. We quote standard Connellsville furnace coke at \$1.40 to \$1.50 per net ton, at oven, for prompt shipment, and \$1.60 to \$1.75 for the last half. Connellsville 72-hour foundry coke is held at \$1.75 to \$2 for prompt shipment and \$2 to \$2.35 for the last half.

Finished Iron and Steel.—The improved demand in finished lines noted last week continues and the feeling in the trade shows a marked improvement. Mills are getting a fair volume of specifications for bars and the

THE IRON AND METAL MARKETS

demand for structural material is quite active. Liberal orders are coming from fabricating shops. Some new steel bar contracts are being placed, although a few buyers, particularly in the implement trade, are holding back with the hope of getting price concessions. This is attributed largely to the fact that there are still rumors that the 1.25c. price is being shaded. The market is firmer, however, and the reports of shading have perhaps arisen from the fact that one selling agency has not withdrawn a few 1.20c. quotations that were made to the implement trade some time ago. New structural contracts include 800 tons for bridge work for the Wheeling & Lake Erie Railroad, awarded to the King Bridge Company, Cleveland, and 400 tons for an addition to the plant of the Adams-Bagnell Electric Company, Cleveland, awarded to the National Iron & Wire Company. Injunction suits brought in connection with the grade crossing elimination work of the Pennsylvania Railroad in Cleveland and the building of a new bridge over the Cuyahoga River in Cleveland have been disposed of, so that both of these improvements can now proceed. They will require a large tonnage of steel. The Cleveland Railway Company has placed an order with the Lackawanna Steel Company for 500 tons of standard section rails for extensions. The contract for the six-story Commercial building, Cleveland, has been awarded to the Crowell & Sherman Company. It has not been decided whether this building will be of structural steel or reinforced concrete. Prices of rivets are weak, structural rivets being quoted at 1.60c., Pittsburgh, for car lots, and boiler rivets at 1.70c., a quotation of \$1 a ton more being made for less than car lots. The demand for hard steel bars is fairly active. Mills are quoting rerolled hard steel bars at 1.15c., Pittsburgh, for prompt shipment, and 1.20c. for contract. The demand for iron bars is light. We quote iron bars at 1.25c. to 1.30c., Cleveland. The two local bar iron mills operated by the Union Rolling Mill Company and the Empire Rolling Mill Company will shut down July 1. When they will start up again will depend on business conditions. The city of Cleveland will receive proposals July 5 for about 4000 tons of cast iron pipe for the water works department.

Old Material.—The market shows very little activity. Local consumers are offering \$11.25 for heavy steel scrap for future delivery, which is about 50 cents a ton lower than dealers can get for shipment to Sharon, the price at the latter point being \$12.75 with \$1 freight added. Yard dealers are looking for better prices shortly and are generally holding for an advance, selling at current prices only the scrap that they are anxious to move. Producers are also waiting for higher prices and are not offering much material. There is practically no demand for cast scrap. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows, all quotations being unchanged:

Old steel rails, rerolled.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.25 to 11.50
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	10.75 to 11.00
Railroad malleable.....	11.00 to 11.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast bitumens.....	6.00 to 6.50
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings.....	8.00 to 8.50
No. 1 bashing.....	4.50 to 5.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate.....	5.00 to 5.50
Bundled tin scrap.....	11.00 to 11.50

Chicago

CHICAGO, ILL., June 27, 1911.

Evidences are here and there apparent that some of the slack in mill operations is being taken up. An additional furnace blown in, as at South Works; a bar mill running at full capacity, as at East Chicago; sheet mills running full, as at Indiana Harbor, are instances. In addition to domestic tonnage it is stated that at Chicago 73,000 tons of steel is being rolled for export to Canada. The first three weeks of June show the first real consecutive and continuous business since February. There has been no rush; it is just continuing to come steadily and this has led to a growing belief that the midsummer months will be followed by a period of steady and substantial progress. The rail

tonnage for the week reached 14,000 tons, building shapes aggregated 6000 tons, a favorable showing for steel bars is reported and increased interest is displayed in pig iron. The general market situation is not yet good. In some directions, like the old material situation, there is much to be hoped for, but it is better.

Pig Iron.—While the pig iron market is still considered to be soft, even on the very low basis of \$10, Birmingham, for Southern No. 2 foundry iron, and \$15, f.o.b. furnace for local irons, these prices are so low as to bring out during the week inquiries to the amount of about 12,000 tons. It is hoped that this interest will ultimately result in orders, but it is felt that the immediate purpose is a testing of the market strength. These inquiries cover delivery through the last half and into the first quarter. They include one lot of 2500 tons and one of 2000 tons for Illinois melters, a lot of 750 tons of basic for a Milwaukee steam shovel manufacturer, an aggregate of some 3000 tons of malleable and several cars of analysis iron for an Ohio plant of an agricultural implement manufacturer. The feeling is that an aggregate tonnage of considerable size, made up of many comparatively small lots, will eventually be placed because of the unquestionable attractiveness of prevailing prices. The market quotation for local Northern irons continues to be \$15, f.o.b. furnace, with a switching charge of from 25 to 50 cents. At the same time it is possible to buy Detroit or Toledo iron or Buffalo iron at least as low as \$13.25, f.o.b. shipping point, and report has it that \$13 will be done. These prices would make the Chicago delivered prices of these irons \$14.70 to \$14.95 if the makers should feel disposed to sell in this market. This is simply indicative of the strength of the local situation. We continue to quote for Chicago delivery, with the exception of local irons which are f.o.b. furnace, the following prices:

Lake Superior charcoal.....	\$16.50 to \$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	14.85 to 15.10
Southern coke, No. 2 foundry and No. 2 soft.....	14.35 to 14.60
Southern coke, No. 3.....	14.10 to 14.35
Southern coke, No. 4.....	13.85 to 14.10
Southern gray forge.....	13.60 to 13.85
Southern mottled.....	13.50 to 13.85
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.50
Jackson Co. and Kentucky silvery, 6 per cent.....	17.90
Jackson Co. and Kentucky silvery, 8 per cent.....	18.90
Jackson Co. and Kentucky silvery, 10 per cent.....	19.90

Rails and Track Supplies.—During the week specifications providing for a total of 14,000 tons of rails were received for rolling at the local mills. The principal item was a 5000-ton lot from the Great Northern Railway. The rolling schedules of the Chicago mills have been materially augmented by orders for export rails to Canada. Orders for track fastenings are in keeping with the rail tonnage. Prices, while not decidedly firm, are fairly well maintained. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c., angle bars, 1.50c. to 1.60c. Chicago.

Structural Material.—Specifications for bridge and steel car structural shapes are now being entered in current rollings against contracts placed several weeks ago together with a considerable tonnage still to be rolled for Chicago buildings. That a satisfactory amount of business is now in hand may be judged from the fact that the railroad structural contracts recently closed will probably total close to 100,000 tons for the roads buying in this market. The Woodmen of the World building at Omaha steel will be fabricated by the Noelke-Richards Iron Works. The contract covers about 2800 tons. The McClintic-Marshall Construction Company will furnish 450 tons for a concentrating plant for the Hawkins mine of the Wisconsin Steel Company at Nashwauk, Minn. We quote plain material from mill at 1.53c. to 1.58c. and from jobbers' stocks, 1.75c. Chicago.

Plates.—A steady run of plate tonnage is reported as being placed during the past three weeks. The entire volume of business probably is not large except in comparison with the preceding dullness. Tank steel and boiler plates as well as plates for structural purposes are well distributed among the orders. The Illinois

THE IRON AND METAL MARKETS

Steel Company will furnish the steel for 16 miles of 54-in. stave pipe at Tacoma, Wash., involving 2000 tons of bands, 4500 ft. of riveted steel pipe and 600 ft. of steel trestle. Chicago quotations for mill shipment are 1.53c. to 1.58c.; for store shipment, 1.75c.

Sheets.—The volume of orders in sheets continues to be of a magnitude sufficient to maintain the 18 sheet mills of the Inland Steel Company in full operation. The duration of activity in this direction is, however, not accepted as assured, although the present prices for sheets are apparently well received and the trade willing to contract farther ahead than seems desirable to the mills. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—An estimate of the tonnage taken by one of the largest makers of steel bars places its June bookings as to date as 50 per cent. in excess of May orders. It seems probable that this represents conservatively the general situation. For standard sizes, and from the leading interests only regular prices are obtainable, but it is reported that where an order for a certain size may fit conveniently in the rolling schedule of some of the mills of more limited capacity concessions can be obtained for immediate shipment business. Bar iron has been active and an East Chicago mill has been rolling to full capacity since June 21 with orders sufficient to maintain this condition up to July 1. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Wire Products.—Reports indicate that the decline in the prices of wire products was well received. While the midsummer quiet will hardly be affected belief is expressed that a volume of delinquent business will be attracted by the more favorable prices and a natural flow of orders may be expected. Plain and barb wire are not moving actively and wire nails are still the disappointment they have been for some time past. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.78c.; painted barb wire, 1.78c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

Cast Iron Pipe.—The buying of cast iron pipe reported for the week totals close to 12,000 tons without including a satisfactory run of miscellaneous business. The Great Northern Railway has ordered 1000 tons; the city of Muskogee, Okla., 2500 tons, and the contract for 7500 tons for San Diego has finally been formally awarded to the leading interest. The United States Cast Iron Pipe & Foundry Company will also furnish a considerable tonnage of large size pipe for Los Angeles, Cal. During the present week contracts will be let at Hammond, Ind., for 2000 tons, and at Columbus, Ohio, for 950 tons. Several hundred tons of pipe have been included in orders from the Northern Pacific, the Chicago, Burlington & Quincy, and the Illinois Central roads. We continue to quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Materials.—Railroad lists offered for bids to be received during the current week total close to 11,000 tons and include about 5000 tons from the Chicago, Rock Island & Pacific, 4000 from the Chicago, Burlington & Quincy, and 1200 from the Chicago, Minneapolis, St. Paul & Omaha. Railroad wrought, old steel rails and cast scrap constitute the larger items. The atmosphere of the scrap market is cramped as it reflects the speculative buying for a small margin of profit, the laggard filling of orders at a loss, and the careful holding of that stock of scrap which will yield the large profit at some later day when prices rise. The Indiana Harbor mill is again accepting shipments. We quote below for delivery to buyer's works, all freight and transfer charges paid, per gross ton:

Old iron rails	\$14.00 to \$14.50
Old steel rails, rerolling	12.25 to 12.50
Old steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard sections, subject to inspection	24.00
Old car wheels	12.50 to 13.00
Heavy melting steel, scrap	10.25 to 10.75
Frogs, switches and guards, cut apart	10.25 to 10.75
Shoveling steel	9.75 to 10.25
Steel axle turnings	8.50 to 9.00

The following quotations are per net ton:

Cast iron and pipe	\$11.50 to \$13.00
Iron and bar and forgings	13.75 to 14.25
Steel angle bars	10.25 to 10.75
Iron car axles	18.00 to 18.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.10 to 10.50
Steel knuckles and couplers	9.00 to 9.50
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	6.25 to 6.75
Cast and mixed turnings	5.25 to 5.75
No. 2 bushing	8.25 to 8.75
No. 2 bushing	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
Boiler punchings	12.00 to 12.50
No. 1 and 2 scrap	10.25 to 10.75
Stave plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.50

Philadelphia

PHILADELPHIA, JUNE 27, 1911

There has been about an even demand for both crude and finished materials. Pig iron buying continues, however, along narrow lines, recent price reductions not having as yet brought about any heavy buying in this district. In finished materials new orders and specifications against contracts have enabled some mills to increase their productive rate, although the majority are still operating on an unchanged basis. Under existing conditions steel mills do not anticipate any extended suspension over the national holiday; some, in fact, will be idle but a few days. The billet market still drags. Foundry coke is moderately active and an increased demand for furnace coke has developed. Old material is quiet.

Iron Ore.—Reports of the recent sale of 3,000,000 tons of Swedish iron ore to one of the Eastern independent steel plants have been definitely confirmed, although particulars are lacking, except that deliveries which are to begin at once are to extend over a period of eight or nine years. Negotiations with another consumer are pending for the purchase of 150,000 tons of the same grade of ore. Importations during the week include 12,400 tons of Newfoundland, 7703 tons of Swedish and 8880 tons of Cuban ore.

Pig Iron.—A reduction of 25 cents a ton in eastern Pennsylvania standard analysis iron has been firmly established, but as far as can be learned has not yet resulted in any marked buying. Several producers, while not openly quoting lower prices, state that they will meet the reduction when necessary. Under existing conditions eastern Pennsylvania No. 2 X foundry for third quarter is quotable at \$15 to \$15.25, delivered, with No. 2 plain at \$14.75 to \$15, the usual 50 cents differential between those grades not being observed. The lower quotations have no doubt stimulated inquiry to some extent, but the bulk of this has been for the purpose of testing the market, sales in the majority of cases being confined to small lots, few exceeding 100 tons. The inquiry of the Pennsylvania Railroad, reported last week, is still unclosed, but it is expected that orders will be given out this week. One of the Delaware River pipe foundries has purchased upward of 1000 tons of special analysis iron for early shipment and has an inquiry out for 5000 tons of foundry forge and No. 3 foundry in equal quantities, for September delivery, against which Southern iron will no doubt be taken. Virginia pipe makers are also reported to have made moderate purchases of low grade iron from producers in that district. Very little movement of the higher Virginia foundry grades is to be noted in this vicinity. Small sales are reported at unchanged prices, although one producer announces the sale of 1000 tons for New England delivery at \$12.50 furnace. Occasional carload lot sales of No. 2 Southern foundry are reported, in most instances at \$10.50, Birmingham, but there is no large lot demand, except in low grade irons. There is little demand for forge iron, although one of the Eastern mills is understood to have contracted for a moderate quantity at a price said to have been close to recent minimum quotations. There is less movement in the steel making grades; moderate lots of basic iron for third quarter delivery are still before the trade, but consumers hold for lower than quoted prices, but have so far been unable to get concessions. Small sales of low phosphorus iron, at the market, are reported. As a rule producers report deliveries as being freely taken, with production in this district, to all appearances, slightly under the consumptive rate. One merchant furnace, Carbon, in the Lehigh Valley has

THE IRON AND METAL MARKETS

blown out, but the remaining active Swede furnace in the Schuylkill Valley, which was to have been blown out last week, is still in blast, it having been determined to keep it active for at least another 30 days. While current buying has not been large, producers in this district look forward to a better movement after the holiday, as quite a few consumers have a considerable share of their usual third quarter purchases still to contract for. The following range of prices is named for standard brands, delivered in buyers' yards in this territory, during the third quarter:

Eastern Pennsylvania No. 2 X foundry.....	\$15.00 to \$15.25
Gray forge	14.50
Standard low phosphorus.....	20.50 to 20.75

Ferromanganese.—The market has been bare of any inquiry from consumers in this district, and prices are nominally quoted at \$36.50, Baltimore, for 80 per cent.

Billets.—Little change in the demand is reported. Consumers continue to place orders for small lots for prompt shipment, although inquiries are occasionally reported for larger quantities for extended delivery, but seldom develop into actual orders. Forging billets are still in relatively better demand than rolling billets. Prices are firm at \$23.40 for rolling billets and \$28.40 for ordinary forging steel, delivered in this vicinity.

Plates.—A very fair demand for plates comes out from day to day, and while the bulk of the orders are for moderate quantities an occasional fair sized order is booked. A very satisfactory demand for plates for structural and bridge work is reported, with a comparatively even demand for other classes of plates. Mills maintain about an even productive rate and aggregate orders measure up well with business taken during the previous week. Prices are firm at 1.50c. for ordinary plates delivered in this district, and while producers, as a rule, adhere to the policy of confining contracts to third quarter delivery, more extended delivery could no doubt be had if the business offered was desirable.

Structural Material.—While the actual amount of business developing in this immediate vicinity does not show any marked change, fabricators are figuring on considerable business in building and bridge work in other districts, in fact this branch of the finished material lines is about the most active on the list. The contract for the Ritz-Carlton Hotel, in this city, has not yet been placed, nor has that for the new hotel in Wilmington, Del. New business pending includes the fabricated work for the new pier for the Old Dominion Line, Norfolk, Va., and the First National Bank Building, Richmond, Va. Considerable bridge inquiry from the railroads is also being figured on. While fabricated prices are still reported low, it is contended that they are at rock bottom, which, however, is said to be below what can be done by some of the smaller fabricators. A fair demand for plain shapes is reported and in instances mills are more fully engaged. The Pencoyd plant of the American Bridge Company is now operating at full capacity. Prices of plain structural shapes are maintained at 1.50c., delivered in this vicinity.

Sheets.—Mills in this district are, for the most part, operating at full capacity and in instances are being urged for deliveries. While current orders are individually small, the aggregate volume of business coming to the mills is comparatively large, although practically all for early shipment. Suspension at the mills on July 1 is not expected to be of extended duration, makers planning to start up again on the 10th inst. Quotations remain unchanged, the following range, f.o.b. eastern maker's mill, being named for early shipments: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 to 26, 2.50c.; No. 27, 2.60c.; No. 28, 2.80c.

Bars.—The demand is not very active. Consumers of refined iron bars are not placing large orders, preferring to cover their requirements from time to time, as occasion demands. Specifications for steel bars are heavier and mills are now pretty well engaged. Quotations remain at 1.40c. for steel bars and 1.27½c. to 1.32½c. for refined iron bars, delivered in this district.

Coke.—A more active demand has developed for furnace coke. Consumers who have been putting off buying until a better insight into the future could be had are coming into the market for supplies for the last half and the trade now has inquiries from large furnace interests in this district, which aggregate about 100,000 tons, based on their present consumptive rate. Quite a wide range of quotations has also developed, some producers not being willing to accept forward business at a flat price, and while \$1.45 to \$1.50 at oven has been

named for spot delivery, \$1.60 to \$1.65 is frequently quoted for third quarter and \$1.70 to \$1.75 for fourth quarter, with \$1.75 to \$1.85 about representing the market for shipments extending over twelve months. Moderate sales of foundry coke, both for prompt and last half delivery, are also reported, but the bulk of the business in the latter grade has been in small lots. The following range of prices, per net ton, delivered in this vicinity, is named:

Connellsville furnace coke.....	\$3.65 to \$4.00
Mountain furnace coke.....	3.25 to 3.60
Foundry coke.....	3.70 to 4.15

Old Material.—The market is extremely quiet; consumers take occasional odd lot offerings, but show little interest in the market. The principal transactions have been between dealers, such purchases being made to apply on contracts, deliveries on which must be made, in instances, before the close of the month. In few cases have transactions been such as to establish actual market quotations. The following quotations, while largely nominal, represent sellers' ideas for moderate lots for prompt delivery in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling (nominal).....	13.75 to 14.25
Low phosphorus heavy melting steel scrap.....	16.75 to 17.25
Old steel axles (nominal).....	19.25 to 19.75
Old iron axles	24.00 to 24.50
Old iron rails	16.50 to 17.00
Old car wheels	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe	12.00 to 12.50
No. 1 forge fire.....	10.50 to 11.00
No. 2 heavy iron (nominal).....	6.75 to 7.25
Wrought turnings	8.50 to 9.00
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Railroad malleable	11.50 to 12.00
Grate bars, railroad	10.00 to 10.50
Stove plate	9.75 to 10.25

Buffalo

BUFFALO, N. Y., June 27, 1911.

Pig Iron.—New inquiry the current week has been considerably larger than for the previous week, and a fairly good sized tonnage of foundry and malleable grades has been booked from New England, New York State and New Jersey points, aggregating about 4500 tons. This total includes one order of 1500 tons 2 X foundry for last half delivery from a New York State user, the remainder being confined principally to small and scattering lots. Prices remain about the same as last week, with a slight tendency toward hardening on the part of a number of furnace interests, which are disinclined to continue to take bookings at the unprofitably low schedule which has been prevailing. Other producers are still taking business at the minimum of the schedule, particularly from competitive points outside of districts tributary to Buffalo. We quote as follows for delivery over last half f.o.b. Buffalo:

No. 1 N foundry.....	\$13.75 to \$14.25
No. 2 X foundry.....	13.25 to 14.00
No. 2 plain	13.25 to 13.75
No. 3 Foundry.....	13.00 to 13.25
Gray forge	13.00 to 13.25
Malleable	13.75 to 14.25
Basic	14.00 to 14.75
Charcoal	16.50 to 17.25

Finished Iron and Steel.—Continued improvement in demand is noticeable in most lines of finished products, steel bars being particularly active. Specifications on bar product contracts have increased materially during the week, and several orders for good tonnages have been placed with a considerable tonnage still under negotiation. Prices on bars are very firm at 1.25c., base, Pittsburgh. Agricultural implement people are buying freely of bars and small shapes. One interest reports the closing of one contract for 1500 tons with an implement manufacturer in the week. Fredericks & Sons, Rochester, N. Y., have received the contract for 1000 tons of steel reinforcing bars for an additional concrete factory building to be erected by the Eastman Kodak Company of that city. The Lackawanna Steel Company is now operating its bar mill to full capacity. Plates and structural shapes show active demand and a considerable tonnage is being placed. In sheets inquiry is becoming stronger and some fairly good bookings are reported. In the Canadian export trade further large inquiry has de-

THE IRON AND METAL MARKETS

veloped during the week, and a good tonnage of orders has been placed, including contracts for agricultural implement materials. There is pronounced activity in fabricated structural materials, many new building projects, principally of moderate size, being on the boards for figures. Plans are being drawn by local architects for the Lawrence Hotel, to be erected by the Erie Hotel Company, Erie, Pa., requiring about 800 tons. Bids will be received this week for steel for remodeling the Gould Washington street building, Buffalo, 100 tons; for 150 tons structural steel for understructure of flushing tank No. 2 for the Niagara Falls Power Company, Niagara Falls, N. Y.; and in about two weeks for 500 tons for St. Mary's Hospital building, Niagara Falls, Ont., and 750 tons for the Technical High School, Buffalo. The Buffalo Structural Steel Company has received the contract for steel for an additional factory building for the Huebner-Bleistein Patents Company, Buffalo, 325 tons, and for about 250 tons for the John H. Smith building, Buffalo, one-half of which is to be of Bethlehem shapes. The contract for steel for Rand Hall, Cornell University, Ithaca, N. Y., about 150 tons, was taken by the Grotton Bridge Company. Bids are being taken this week for a large reinforced concrete building to be added to the plant of the Pennsylvania General Electric Company, Erie, Pa., requiring a large tonnage of steel reinforcing bars.

Old Material.—A slight increase in demand is noted in this market and more of a tendency on the part of consumers to take on new supplies. This condition has caused a hardening in prices, and in some grades advances are recorded. This is particularly true of heavy melting steel, while turnings and borings are maintaining the advance noted last week. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel.....	\$12.25 to	\$12.75
Low phosphorus steel.....	14.50 to	15.00
No. 1 railroad wrought.....	13.50 to	14.00
No. 1 railroad and machinery cast scrap.....	13.00 to	13.75
Old steel axle.....	18.00 to	18.50
Old iron axles.....	22.00 to	22.50
Old car wheels.....	12.75 to	13.25
Railroad malleable.....	11.50 to	12.00
Boiler plate.....	10.00 to	10.50
Locomotive grate bars.....	10.00 to	10.25
Pipe.....	9.00 to	9.25
Wrought iron and soft steel turnings.....	6.50 to	7.00
Clean cast borings.....	6.25 to	6.50

St. Louis

St. Louis, Mo., June 26, 1911.

There is a distinctly better sentiment in the iron and steel market this week than for some time past. The tendencies which have been noted in the last few weeks are assuming shape, and a very strong belief exists that orders will provide an atmosphere of tangibility within a very short time. The fact that orders, both for immediate delivery on special sales and on specifications on contracts, have been very good the past week is taken as indicative of a much more active interest on the part of buyers, especially when coupled with many more inquiries on new contracts than for some time. The interest of the larger buyers in the market is of a more decisive character while the smaller purchasers are taking supplies with a gratifying degree of regularity. In rails an order for 500 tons of standard section, in coke an order for 42 cars, and in pig iron an inquiry for 2400 tons of Southern, represent the maximum of the items recorded, but with it all is a better feeling which is of unusual consequence at a time of year which is the duller under ordinary conditions.

Pig Iron.—The general business in pig iron continues to show good tendencies. A number of spot purchases have been made, none of great size, but with the aggregate amounting to a reasonable total. The requisitions on contracts have been excellent and on the whole conditions are satisfactory. Inquiries are increasing steadily and their tenor is taken by the houses represented here to promise a much more active movement in a short time. One inquiry for 2400 tons, for No. 2 Birmingham, was the largest of the week. No especial movement has taken place in the demand from agricultural implement and wagon manufacturers, who, together with the stove and jobbing foundries, are reported to be pretty well stocked up, for the present at least. The quotations show no change from the recent past, except, perhaps, there is

less heard of \$10 sales of pig iron. That figure never has been a quotation; but there is little doubt that up to the present most of the dealers would have accepted it if embraced in a positive order. The quotations now may be regarded as \$10.25 to \$10.50 for No. 2 Birmingham. No change is to be noted in No. 2 Northern, Ironton, O., basis, nor in basic in which there has been absolutely nothing doing of late.

Coke.—The coke market remains on about the same basis as last week, the quotations being unchanged and the volume of business better. Among the contracts on coke reported during the week was one for 42 cars. The deliveries on specifications on contracts have kept up fairly well and the inquiries that are coming in show interest in both immediate delivery and last half. The spot figure for Virginia coke is \$2.25 for Virginia and \$2.25 to \$2.50 for Connellsville, best 72-hour selected for future deliveries. In this market, as in the pig iron market, there is a more decided optimism than even last week. Foundries are taking supplies well and increases in requirements are being looked for almost daily.

Finished Iron and Steel.—In the finished line orders have been coming in very freely during the past week, but the encouragement in the situation is on the aggregate of business and not on the size of the individual orders. The railroads are continuing their specifications for general materials, but the only order for rails of standard section for the week, of consequence, was one for 500 tons by a North Arkansas road. In light rails the lumber mills are doing practically nothing, but some inquiry is coming from the coal mines, which are showing signs of preparation for the fall business. In structural materials the orders the past week have been very good and the situation is much brighter. The fabricators are ordering for stock and quick shipment is demanded on all orders received. Contractors, too, are continuing to specify freely against contracts and they, also, are insisting on prompt delivery. Apparently the consumers are up against immediate requirements, but fortunately the mills continue in a position to meet the demands. In bars the agricultural specifications are fair, while the wagon manufacturers are making very liberal specifications. The variation between iron and steel is such as to favor the iron tonnage over steel orders. The market continues firm on the present basis, with a disposition to accept the quotations as the lowest likely to be made. Plates continue very quiet and there is practically nothing doing in the market in this division of the business. Track fastenings are in fair request, with a good volume of orders but none of large size. Generally the situation is to be regarded as much stronger. Buyers seem to be satisfied with the present conditions and anticipation of better orders from now on is general.

Old Material.—No change is apparent in the situation in scrap, with nothing of interest in the market beyond the speculative tendency of the dealers which has been noted previously. Later in the week the railroad lists are expected with no present indications of what they will embrace. A feeling of prospective activity, which is encouraging the market somewhat, is largely due to the better tone in the new material situation. Dealers' prices per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails.....	\$12.50 to	\$13.00
Old steel rails, rerolling.....	11.25 to	11.75
Old steel rails, less than 3 ft.....	10.25 to	10.75
Relaying rails, standard section, subject to inspection.....	23.00 to	23.50
Old car wheels.....	12.00 to	12.50
Heavy melting steel scrap.....	10.25 to	10.75
Frogs, switches and guards cut apart.....	10.25 to	10.75

The following quotations are per net ton:

Iron fish plates.....	\$10.25 to	\$10.75
Iron car axles.....	18.00 to	18.50
Steel car axles.....	17.00 to	17.50
No. 1 railroad wrought.....	10.50 to	11.00
No. 2 railroad wrought.....	9.50 to	10.00
Railway springs.....	9.00 to	9.50
Locomotive tires, smooth.....	15.50 to	16.00
No. 1 boiler's forge.....	8.00 to	9.00
Mixed borings.....	4.50 to	5.00
No. 1 bushing.....	8.50 to	9.00
No. 1 boilers cut to sheets and rings.....	7.50 to	8.00
No. 1 cast scrap.....	9.50 to	10.00
Stove plate and light cast scrap.....	8.00 to	8.50
Railroad malleable.....	8.00 to	8.50
Agricultural malleable.....	7.00 to	7.50
Pipes and flues.....	7.25 to	7.75
Railroad sheet and tank scrap.....	7.25 to	7.75
Railroad grate bars.....	7.50 to	8.00
Machine shop turnings.....	6.00 to	6.50

THE IRON AND METAL MARKETS

Birmingham

BIRMINGHAM, ALA., June 29, 1911.

Pig Iron.—A considerably larger volume of business was transacted in this market the past week than in the week previous, but at the expense of market quotations. The sales that were effected involved in practically all cases a basis of \$10, Birmingham, for No. 2 Foundry. As to how much was sold at such figures specific information is lacking. It is estimated that from 5000 to 7500 tons was sold through local offices, consisting mainly of comparatively small lots for prompt delivery. The \$10 price is being quoted openly for prompt shipments and third quarter delivery by the majority of the producing interests, but without an established figure for deliveries covering the remainder of the year. Current rumors that a certain interest would accept shipments through the remainder of the year at the price asked for spot shipments are not given credence, although it is believed that considerable tonnage is available for that delivery at \$10.25. As far as can be ascertained, no figures whatever have been submitted on deliveries after January 1, notwithstanding the inquiries received. And it is a fact that those producers who practically withdrew from the market, even for spot shipments, when prices were lowered below a basis of \$11, still refuse to meet the market price and adhere to their former announced policy of suspending all operations after the delivery of tonnage on order-books that was sold at higher prices. The production has already been reduced during this month, and it is not thought that reports will show larger stocks on hand July 1 than were on hand June 1. One of the large producers now reports actual shipments as in excess of the daily output. The inquiries pending at this time are more attractive than for several weeks and indicate a disposition in some quarters to buy for speculative purposes. This last is probably the most encouraging development noted, although the general foundry trade is thought to have improved. An attractive tonnage of charcoal iron is pending, and the market for such iron is apparently very firm with the output of the furnaces in blast well taken care of. We revise our last quotations as follows, per gross ton, f.o.b. cars Birmingham furnaces:

No. 1 foundry and No. 1 soft.....	\$10.50
No. 2 foundry and No. 2 soft.....	10.00
No. 3 foundry	9.50
No. 4 foundry	9.25
Gray forge	9.00
Mottled	8.75
Standard basic, chill cast.....	10.25
Off basic	9.75
Charcoal car wheel iron.....	22.50

Old Material.—There has been no improvement in this market since last report. The movement to all mills is very light comparatively, and dealers' stocks are not being replenished readily owing to the narrow margins afforded. The market is only nominally represented by dealers' asking prices which are substantially as follows, per gross ton, f.o.b. cars here:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

Cast Iron Pipe.—The requirements of water pipe for the city of Muskogee, Okla., which amounted to 2600 tons, was placed with the United States Cast Iron Pipe & Foundry Company the past week. Of the tonnage placed the week previous for requirement at Colorado Springs, Colo., 1000 tons will be furnished by the American Cast Iron Pipe Company, which company was also awarded a contract for 1000 tons of water pipe by the city of Gadsden, Ala. In none of the lettings referred to is the price consideration made public, but it is understood that some concessions from the original bids were necessary. There has been no change in authorized quotations, but in view of the decline in pig iron prices it is quite probable that large contracts will now result in shading to a greater extent. The announcement that the plant of the Dimmick Pipe Company has been taken over by the United States Cast Iron Pipe & Foundry Company is an item of especial interest in local market conditions, although it is not known just when operations at that plant will be resumed. It is one of the largest in this district and

has been idle for some months. No recent additions have been made to the contracts in sight for early placing. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$22; 8 to 12 in., \$21; over 12 in., average \$20, with \$1 per ton extra for gas pipe. These prices are no doubt subject to shading for large municipal contracts.

No. 2 Furnace of the Sloss-Sheffield Coal & Iron Company at North Birmingham, Ala., was blown out the past week.

New York

NEW YORK, June 28, 1911.

Pig Iron.—No general buying movement has followed the purchasing under cover by large consumers, to which reference was made last week. It appears evident that a considerable number of this class of buyers are becoming more impressed with the belief that prices are about as low as they can be expected to go in this particular period of trade recession, as less hesitaion is observed in concluding negotiations when a definite decision has been reached as to the possible requirements of the near future. Yet there are not enough of them to make the market active. Sales agencies state that iron under contract is moving forward freely and that consumers are more frequently urging prompt shipments. Northern iron at tidewater is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.50; No. 2 plain, \$14.50 to \$15. Southern No. 1 foundry is quoted at \$14.75 to \$15.25; No. 2, \$14.25 to \$14.75.

Finished Iron and Steel.—Business is still dull, with perhaps a slight improvement over last week, but the conditions are certainly promising if for no other reason than that nothing locally has turned up of a negative character. What improvement there is in prices of fabricated structural material has probably developed with those companies which have contracted for work in sufficient volume to keep them busy for some time. By next week it will probably be possible to note how general the advance in prices is. Railroad bridge work continues to be a substantial proportion of the new work coming into the market. The really large jobs are at this writing still in doubt and their settlement seems to be needed to give color to the present conditions. Government requirements for tugboats and colliers lend the needed spot of interest to business in plates. Of new large work pending is a 2500-ton building near the Grand Central station for the Adams Express Company; 1000 tons for pier sheds for the Delaware, Lackawanna & Western Railroad; 1400 tons for the Rotterdam Bridge of the Boston & Maine, the successful bidder for which is not known at this writing; 2500 tons for pier sheds for Norfolk asked by the Old Dominion Line, and 1200 tons for the Du Pont office building, Wilmington, Del., which an unverified report gives to the American Bridge Company. The Levering & Garrigues Company is to erect a 500-ton car-barn structure for the Third Avenue surface railroad and a 900-ton left building on West Twenty-seventh street; the McClintic-Marshall Construction Company is to erect the 1200-ton power house in Brooklyn for the American Sugar Refining Company and a 450-ton bridge for the Atlantic Coast line. The American Bridge Company has, it is understood, received the following contracts: 4000 tons for the Baltimore & Ohio; 300 tons for the Boston & Maine, and 6000 tons for the new plant of the Crucible Steel Company of America. Other contracts reported are: 400 tons for the Boston elevated system to the Boston Bridge Company; 860 tons, Wheeling & Lake Erie to the King Bridge Company; 500 tons for stable for the Sheffield Farms-Slawson Decker Company, Brooklyn, N. Y., to W. E. Lyon Iron Works. Quotations are: Plain structural materials and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.37½c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

Cast Iron Pipe.—The city of New York will open bids on two pipe-laying contracts June 28. One of these will require 1000 tons of water pipe and the other 800 tons. The city of Cleveland will open bids July 5 on 4000 tons. Some interesting export inquiries have been received. One of these calls for 3000 tons of large sizes, consisting mainly of 36 and 42-in. The general demand for pipe for private buyers has been quiet for some days. Carload lots of 6-in. are quoted at \$21 to \$22 per net ton, tidewater.

THE IRON AND METAL MARKETS

Old Material.—A better feeling is noted among dealers notwithstanding the fact that the volume of business continues light. A few small lots of steel scrap are changing hands, but quite a number of inquiries are coming out for cast-iron scrap from foundries. Some indications are also appearing of a possible demand for wrought scrap from rolling mills. Conditions continue exceedingly unsatisfactory as to deliveries on contracts, rejections being frequent of material which ordinarily would encounter no difficulty in acceptance by buyers. The next sale of Panama scrap is July 3, and will only consist of 149 tons, due to arrive June 28, at Pier 65, Hudson River, New York. Quotations are as follows per gross ton, New York and vicinity:

Old girder and T rail for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails	20.00 to 21.00
Rerolling rails	(nominal) 12.00 to 12.25
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	12.75 to 13.25
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron	4.25 to 4.75
Cast borings	5.25 to 5.75
Wrought turning	6.25 to 6.75
Wrought pipe	9.50 to 10.00
Old car wheels	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast	10.00 to 10.50

The German Iron Market

BERLIN, June 16, 1911.—The event of the week in the iron trade is the dissolution of the price convention covering wire, wire nails, and other wire products. The managers sent out a circular to the members several days ago announcing that the efforts to give firmer shape to the combination had failed; hence they could begin to take orders to-day at their own prices for deliveries after June 30. The convention was organized in January, 1909; its existence has therefore been slightly less than two years. The first consequence of its dissolution has been the break-up of the international wire convention, which is composed of German, Belgian, and other makers. The termination of the convention does not affect the wire rod association, which has a firm syndicate organization. The first effect of the break-up of the wire convention will be a sharp fall in prices; a reduction of 20 marks is expected to follow at once. Consumers have been holding back with orders in a striking way while the organization was in its last throes, but it is expected that they will buy more freely at the reduced prices. The nominal price of drawn wire for the current quarter was 147.50 to 152.50 marks; 177.50 to 182.50 for galvanized, and 165.50 to 167.50 for wire nails; but these prices have not been strictly observed of late. In fact, there has been considerable price-cutting in a quiet way.

Another trade combination that is in a bad way is the rivet association. According to the latest information it is expected to break up September 30, unless the members succeed meanwhile in forming a syndicate, with power to assign allotments; but the prospect that this latter will be accomplished is very slight. Meanwhile prices are often cut in this line also.

This week a further cut in bands to 127.50 to 130 marks is announced, which means a drop of 2.50 marks. In the general market, it may be said, the price tendency is somewhat weaker, and it is not expected that an improvement will take place in view of conditions in the foreign markets.

The negotiations for the rounding out of the Essen Pig Iron Syndicate to include all the furnaces of the country are at a standstill for the present, but they are to be resumed next week. The prospects for a positive result have grown rather worse this month; the market reports continue to mention fresh difficulties. The make of pig iron in May reached 1,312,000 metric tons, or about 10,000 tons less than the record production. The month's production was 27,000 tons more than for April, and 50,000 tons more than for May, 1910.

The shipments of the Steel Works Union of rails, structural shapes and billets in May were even greater than the preliminary figures quoted in last week's letter. The actual total reached 532,350 tons, or 7,000 tons above the figures first given out.

This week the news from the Belgian market is again bad. The steel combination of the country has

given out its prices for steel material for the next quarter. These are nominally unchanged; but as a rebate of 1.50 francs the ton is introduced, the actual result is a small reduction in prices. Belgian letters in the German trade press this week describe conditions there as very unsatisfactory. Competition, it is said, has caused prices to sink to a level where little or no profit can be earned. Soft steel bars for export have fallen to 90 shillings, f.o.b. Antwerp, and iron bars are only one shilling higher.

Business in the German hardware trade has begun to show the effects of the weak and hesitating movement in the iron trade. The shops are mostly still well employed and some of them are crowded with work; but buyers are slower in placing new orders. In not a few sections of the trade, too, heavy overproduction is complained of. The demand for builders' hardware continues very brisk in view of the activity in building operations, and in some lines prices have been marked up. Shops turning out parts for bicycles and autocars are very busy; some are working overtime. Machine-tool shops are irregularly employed. Prices have been so severely cut in the export trade that this outlet for the product has about ceased to look attractive. Consumers are very slow in ordering goods. Screw and rivet makers have not sufficient orders to keep them busy and there is considerable price cutting.

Metal Market

NEW YORK, June 28, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.									
Copper, New York.		Electro-lytic.		Tin.		Lead.		Spelter.	
June.	Lake.	June.	July.	June.	July.	June.	July.	June.	July.
22.....	12.60	12.80	45.00	4.50	4.35	5.70	5.50		
23.....	12.62½	12.87½	45.00	4.50	4.35	5.70	5.50		
24.....	12.62½	12.87½	45.00	4.50	4.35	5.65	5.45		
26.....	12.62½	12.87½	45.00	4.50	4.35	5.65	5.45		
27.....	12.62½	12.87½	45.35	4.50	4.35	5.65	5.45		
28.....	12.62½	12.87½	45.00	4.50	4.35	5.65	5.45		

Copper is higher than it was a week ago, but the market showed signs of sagging this morning. Pig tin is in scant supply and has advanced slightly. Lead is firm but dull. Spelter has receded somewhat.

Copper.—It is apparent that the copper market has been subjected to some manipulation and while consumers have bought rather freely it is claimed that some of them were frightened into the market by steadily advancing prices. A week ago electrolytic copper was sold in New York at 12.50c. and consumers seem to think that a fair price although ten days before it could be had at ¼c. less. Within the last few days attempts were made by prominent sellers to force the market up and they succeeded in getting as high at 12.70c. in some instances for electrolytic copper for July and August delivery. Many large buyers who had been inquiring for a liberal amount of copper took the stand that the upward movement was a speculative one and they refused to place orders with the result that yesterday afternoon and this morning some good quantities of copper were offered at resale at a materially lower price. The market has been irregular all week but buyers who are familiar with the situation were able to buy electrolytic copper at 12.62½c. and lake at 12.87½. The London market has not responded to the advance here, but this is largely due to the holiday festivities there which interfered with business greatly. Exports of copper have been large, amounting so far this month to 25,548 tons. In London this morning the market was easy and spot copper was offered at £56 18s. 9d. and futures at £57 10s.

Pig Tin.—A decided scarcity of spot supplies of pig tin exists here with the result that the market advanced slightly during the week. The cessation of business in London, due to the coronation, resulted in prices being largely nominal there as the sales of the week were very light. In consequence this market has been going it alone and London quotations have had little effect on the domestic situation. So far this month only 1997 tons of pig tin arrived in this port, of which 250 tons were shipped back early in the month by the leading consumer here. This shipment was made for its moral effect on the English market, or rather to intimidate the syndicate operators who were forcing the market upward. Few sales were made here during the week and while no attempt has been made to corner the spot supplies the available tin is not very well distributed. Anything like a buying movement would probably bring out the speculative element.

THE IRON AND METAL MARKETS

Quotations seem to be largely nominal and this morning the metal could be bought for 45c., which is 35 points less than the price made yesterday. In London this morning spot tin was sold for £195 10s. and futures for £190 10s. The market was weak.

Tin Plates.—An encouraging demand for domestic tin plates has developed, and it comes largely from small manufacturers who are buying to replenish their depleted stocks. Quotations are unchanged at \$3.94 for 100-lb. coke plates. The market in foreign tin plates has not declined in sympathy with the pig tin market, but remains at 14s. for plates at Swansea, Wales.

Lead.—Lead is firm but dull. It is the general impression that the recent advance was in sympathy with the upward movement in the copper market, but outside sellers are meeting the price made by the leading interests, and they show no signs of offering concessions as has been their custom during the last six months. The price in New York is 4.50c., and the metal is sold in St. Louis at 4.35c. Some special brands are bringing more.

Spelter.—The spelter market is slightly weaker, which is due largely to the fact that consumers who were buying heavily have apparently filled their needs. The market is very uncertain, and is hard to quote as resale lots frequently appear while concessions are freely made. Sellers in many instances seem to lack confidence in the strength the market has shown, and even when consumers are inquiring for good sized lots they show an anxiety to dispose of their holdings. The market this morning was 6.55c. New York, and 5.45c. St. Louis.

Antimony.—The antimony market seems to have gotten back to the point it was before the syndicate was formed, and prices are steadily going downward. Buyers are showing some interest in futures, but they seem to be well supplied with stocks at present. The expected cut in Cookson's was made during the week and it is now freely offered at 8.50c. Hallett's can be had at 8.25c., and Chinese and Hungarian grades from 7.25c. to 7.30c. Hallett's has been freely offered in this market for July and August delivery at as low as 7.75c.

Old Metals.—Consumers are not actively in the market but dealers' selling prices, New York, are firmly held, as follows:

	Cents.
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Composition turnings.....	8.75 to 9.00
Clean brass turnings.....	8.00 to 8.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc, scrap.....	4.25 to 4.30

Chicago

JUNE 27.—The demand for metals in the past week was somewhat less active than in the week preceding. Most of the interest was centered in copper. A slight advance in zinc was recorded, while the long continued dullness with reference to antimony resulted in a weakening of prices. We quote Chicago prices as follows: Casting copper, 12.75c.; lake, 13.00c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 46c.; small lots, 49c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.70c. to 4.75c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.70c. to 5.75c.; Cookson's antimony, 9½c., and other grades, 8½c. to 9c., in small lots; sheet zinc is \$7.50 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10½c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9¼c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 35c.; block tin pipe, 39c.

St. Louis

JUNE 27.—The metal market, especially in lead and spelter, is showing decided activity. Every day for the past week there has been a higher price for spelter, and it is ruling now at 5.60c. to 5.65c., East St. Louis, with an active and strong tendency. The demand is exceedingly large. In pig lead, prices show an advance, the quotations being 4.35c. to 4.40c., East St. Louis, and strong at that. At Joplin the price of zinc ore has advanced, standing at \$42, with the added statement that the surplus in the bins has been reduced from 12,000 tons to 5,000 tons in the past week. Tin is a

bit better than last week, at 45.85c.; antimony is lower, at 8.85c.; Lake Copper is 13.10c., and electrolytic copper 13c., both being advances. For old metals the prices are: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3.35c.; pewter, 20c.; tin foil, 30c.; tea lead, 3c.

Notes on Prices

Rope.—The hard fiber market is firm and if the demand for cordage was more active the lower grades would show increased strength. The following quotations represent regular prices to the retail trade in the Eastern market for rope, 7/16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per lb.; second grade manila, 7½c. to 8c. per lb.; hardware grade manila, 7c. to 7½c. per lb.; pure sisal of the highest grade, 6¼c. per lb.; second grade, 6c. per lb.; rove jute rope, ¼ in. and up; No. 1, 6½c. to 7c. per lb.; No. 2, 6c. per lb.

White Lead in Oil.—During the first half of June there was a seasonable demand of a jobbing character, outside of regular contract deliveries. For the last two weeks of the month less activity in buying has been noticed, but prices have been maintained at unchanged quotations, as follows: Lots of 500 lb. and over, 7¼c. in 100, 250 and 500-lb. kegs; 7½c. in 25 and 50-lb. kegs. In lots of less than 500 lb. the usual advance of ½c. is charged.

Linseed Oil.—The country will enter the fall bare of flaxseed, as the world's supply is about exhausted. It is the opinion of some in oil circles that while prices may decline during July on crop prospects there will be a scramble for oil in September, with higher prices. On the basis of raw, linseed oil in carload lots is obtainable at 84c. to 85c. per gal. Buying, even from manufacturing consumers, is for small lots, but they ask for prompt delivery on contract orders. No change has been made in card prices, but the following prices, in New York, are made for five-barrel lots:

	Cents.
State raw.....	87
City, raw.....	88
Oil, in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—The turpentine market is stronger, owing to more demand in Savannah, which is reflected in this market, where more liberal orders are being placed by manufacturing consumers. New York quotations are as follows:

	Cents.
In oil barrels.....	56½
In machine barrels.....	57
Less than 5-bbl. lots, ½ cent advance per gallon.	

Buying of rosins has been moderately active in this market, but chiefly in jobbing lots. On the basis of 280 lb. to the barrel common to good is quoted at \$6.40 and grade D \$7.05 in the New York market.

A New Sharon Band Mill

The Sharon Steel Hoop Company, Sharon, Pa., is completing a 14-in. mill for rolling wide bands and strips from 4½ in. to 15 in. wide and from about 18 gauge in the narrower widths down to 13 gauge in the wider widths and heavier up to ¾ in. thick. The mill is an 18-in. tandem roughing and 14-in. finishing. It is equipped with a Laughlin continuous heating furnace and a mechanical hot bed, and in the most favorable sizes will roll to 125-ft. lengths. The company has erected a new electrical power house equipped with two 500-kw. generators built by the General Electric Company and driven by Hamilton-Corliss engines. These generators will furnish power for running the motors, the mill being electrically driven throughout. The fuel used will be producer gas from three Bradley producers. The building is covered by a traveling electric crane with an 82-ft. bridge. It is expected that the mill will be in operation in a week or two.

The Stephenson Charcoal Iron Company will build a blast furnace plant at Wells, Mich., and Frank C. Roberts & Co., Philadelphia, are the engineers.

Iron and Industrial Stocks

NEW YORK, June 28, 1911.

Stocks experienced a recession on Thursday when news of additional investigations by the Government became public, but this adverse influence was completely overcome on Saturday when the Union Pacific and Southern Pacific merger was judicially declared valid. After the announcement of this decision stocks advanced to considerably higher figures. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalmers, pref.... 33 33 3/4	Pressed St., pref.... 101 -102
Beth. Steel, com.... 33 33 3/4	Refr. St., com.... 37 38 1/4
Beth. Steel, pref.... 92 92 1/2	St. & L. St., pref.... 102 102 1/2
Can. com.... 1 1/4 1 1/4	Refr. St., com.... 30 30 1/4
Can. pref.... 85 85 1/2	Refr. St., pref.... 108 108 1/2
Car & Fdry, com.... 37 37 1/2	Pipe, com.... 17 17 1/2
Car & Fdry, pref.... 117 117 1/2	Pipe, pref.... 57 57 1/2
Steel Foundries.... 41 41 1/2	U. S. Steel, com.... 77 77 1/2
Colorado Fuel.... 3 3	U. S. Steel, pref.... 118 -118 3/4
General Electric.... 162 164 3/4	Westinghouse Elec.... 75 75 1/2
Gr. N. Ore Cert.... 61 61 1/2	Va. I. C. & C.... 71 -72
Int. Harv., com.... 120 120 1/2	Am. Ship, com.... 67 68 1/2
Int. Harv., pref.... 123 123 1/2	Chi. Pneu. Tool.... 51 -52
Int. Pump, com.... 41 1/2 -42 1/2	Cambria Steel.... 44 1/2 -45
Int. Pump, pref.... 89 -89 3/4	Lake Sup. Corp.... 26 1/2 -27
Locomotive, com.... 41 1/4 -42 1/4	Crucible St., com.... 13 -13 1/4
Locomotive, pref.... 109 109	Crucible St., pref.... 82 -82 1/2
Nat. En. & St., com. 16 1/2 -18	Harb. Wk. Ref., pref. 97 -98
Nat. En. & St., pref.... 92	

Dividends

The American Shipbuilding Company, regular quarterly, 1 1/4 per cent. on the preferred, payable July 15.

The Union Twist Drill Company, quarterly, 3 per cent. on the common and 3 per cent. on the preferred, payable July 1.

Manning, Maxwell & Moore, regular quarterly, 1 1/2 per cent., payable June 30.

The Gorham Mfg. Company, regular quarterly, 1 1/2 per cent. on the preferred, payable July 1.

The Pope Mfg. Company, regular quarterly, 1 1/2 per cent. on the preferred, payable July 31.

The American Seeding Machine Company, regular quarterly, 1 1/2 per cent. on the preferred, and regular quarterly, 1 per cent., and extra, 1/2 per cent. on the common, payable July 15.

The Union Switch & Signal Company, Pittsburgh, quarterly, 3 per cent. on the common and 3 per cent. on the preferred, payable July 10.

The Westinghouse Air Brake Company, Pittsburgh, regular quarterly, 2 1/2 per cent., and extra, 1 1/2 per cent., and special 1 per cent., payable July 10.

The New York Air Brake Company, regular quarterly, 1 1/2 per cent., payable July 28.

The American Screw Company, 2 1/2 per cent., payable June 30.

The Sharon Steel Hoop Company, Sharon, Pa., 1 1/4 per cent., payable July 1.

Belgian Iron and Steel Production in 1910

Iron and steel production in Belgium for the first ten years of the century has been reported by H. de Nimal, secretary of the Association des Maitres de Forges de Charleroi. The production of pig iron in 1910 was 1,852,090 metric tons (2,204.6 lb.), an increase of 142.36 per cent. over the production of 1901. Of the total amount of ore involved in the production in 1910, Belgium furnished only 1.66 per cent. While production has increased for the 10-year period, importation has likewise increased, the total consumption of 1910 being 177.89 per cent. greater than the consumption of 1901. Year in and year out the importation of pig iron has been about one-quarter of the total consumption. The total production of rolled steel in 1910 was 1,155,740 metric tons and of cast steel 52,665 tons. The combined production of steel in 1910 was 321.71 per cent. greater than in 1901.

Henry R. Merton & Co., Ltd., London, England, report another decrease in the stock of copper in England and France and afloat thereto. This stock June 15 was 70,416 gross tons, against 72,613 tons May 31. The reduction in European stock has been continuous since January 30, 1910, when the maximum, 110,808 tons, was reached. The combined visible supply of America, England and France May 31 was 146,718 tons, against 151,977 tons April 29.

The entire 14 sheet mills in the plant of the Youngstown Sheet & Tube Company, East Youngstown, Ohio, resumed operations June 19, with fair prospects for a steady run.

Personal

Major Joseph T. Speer, president of the Pittsburgh Valve, Foundry & Construction Company, who was re-elected president of the American Foundrymen's Association at the convention held in Pittsburgh in May, recently gave a dinner at the Hotel Anderson, Pittsburgh, to the members of the executive committee of the Pittsburgh Foundrymen's Association, and who had charge of the convention entertainment. Those who attended the dinner were as follows: J. S. Seaman, Seaman-Sleeth Company; F. H. Zimmers, Union Foundry & Machine Company; H. E. Field, Mackintosh, Hemphill & Co.; W. A. Bole, Westinghouse Air Brake Company; E. D. Frohman; S. Obermayer & Co.; Eliot A. Kebler, M. A. Hanna & Co., and G. P. Bassett, Jr.

Charles Frederick Booker, Ansonia, Conn., president of the American Brass Company, was given the honorary degree of master of arts by Yale University at the commencement exercises last week.

Frank G. Payson, for the past six years traveling mechanical expert for the Niles-Bement-Pond Company, New York City, has accepted the position of Western representative for the Union Petroleum Company, Philadelphia, Pa. (mineral lard oil exclusively), with headquarters at Chicago, Ill.

Frederick Bucher, formerly general small tool supervisor of the American Locomotive Company, has accepted a position as demonstrator for the mineral lard oil department of the Union Petroleum Company, Philadelphia, Pa.

B. F. Fackenthal, Jr., president of the Thomas Iron Company, Hokendauqua, Pa., received the degree of science from Lafayette College June 21.

Willis L. King, vice-president of the Jones & Laughlin Steel Company, Pittsburgh, sailed for Europe last week with his family and will be gone several months.

Col. R. C. McKinney, president of the Niles-Bement-Pond Company, returned to New York on the new steamship Olympic June 21, after a three months' pleasure trip, during which he motored through Europe and visited Egypt.

Obituary

E. R. EVINGER, superintendent of the Miami Valley Machine Tool Company, Dayton, Ohio, died June 19 at the Marion, Ohio, Sanitarium, after an illness of about six months, aged 37 years. He leaves a widow and three children.

FREDERICK NESBITT of the Easton Foundry & Machine Company, Easton, Pa., died suddenly June 24, aged 35 years. He was born in Wilkes-Barre, Pa., was graduated from Lafayette College in 1896, and in the week of his death was one of the principal participants in the reunion of his class at the college. He leaves a widow and one child.

Another Ore-Washing Plant in Minnesota.—An important project on the Mesaba range is the construction of an ore-washing plant by the International Harvester Company, Chicago. It is the understanding that the installation of this concentrating process will represent an expenditure of \$600,000. The plant will be patterned after that of the Oliver Iron Mining Company (United States Steel Corporation) at Coleraine. It will occupy a site at O'Brien Lake, at the western end of the range, in the vicinity of which the company has acquired a large tract of land from the State. The plant primarily is for the purpose of treating ore from the Hawkins mine at Nashauk. Much of the Hawkins deposit is impregnated with sand. It is of comparatively small value as it lies in the ground, and, besides, its presence is not conducive to the most satisfactory mining operations. With the washery in commission the mine will be in a position to produce steadily and at materially larger volume than heretofore.

It is probable that two of the Duquesne furnaces of the Carnegie Steel Company at Duquesne, Pa., which have been out of blast for some time, will be blown in within the next two weeks.

Navy Tool Steel

Revised Specifications for United States Navy

Several months ago the Navy Department ordered a board of officers to consider the revision of the specifications for high-speed tool steel and to complete the work of the former board in writing specifications for carbon tool steel. The report of the former board and the specifications adopted at that time were printed in these columns. Since then, considerable quantities of high-speed tool steel have been purchased under these specifications for the navy yards, and particularly for use at the Naval Gun Factory at Washington. The results were in general satisfactory, and high-speed tool steel of excellent quality has been received at prices ranging about 42 cents per lb.

The experience gained in testing these steels and in using the tools made from them by the Central Tool Plant at the Philadelphia Navy Yard has shown the necessity for revision of certain of the requirements. The changes in the high-speed steel specifications generally are of a minor character, and consist in the addition of certain requirements as to methods of inspection, test and delivery. There is added also in the revised specifications a statement of the general purposes for which each grade of tool steel is intended. The specifications for carbon steel follow fairly closely the classification defined by the former board, but are somewhat more elaborate.

In its report the board reported that the various navy yards were not obtaining the best results from the use of the high-speed steel tools supplied from the Philadelphia Navy Yard, due in a great measure to the delays in obtaining them when desired, and to the requirement under the present arrangement that, when worn, tools be returned to Philadelphia for retreating and redressing. In view of this the board recommended that the installation be authorized, at each of the principal yards, of a treating and dressing plant for high-speed steel tools. This plant is not to be elaborate and is not intended for the manufacture of high-speed steel tools, but is to be only sufficiently large to permit reforming and treating tools received from the Philadelphia Navy Yard when they become worn in use.

The specifications recommended by the board are as follows:

Chemical Composition

Tungsten Steel

	Class 1. Per cent. limits.	Class 2. Per cent. limits.
Carbon	0.75 to 0.55	1.50 to 1.35
Chromium	5.00 to 2.50	Optional
Manganese	0.30 to 0.05	0.20 to 0.10
Phosphorus	0.015 to 0.00	0.015 to 0.00
Silicon	0.30 to 0.00	0.20 to 0.00
Sulphur	0.02 to 0.00	0.02 to 0.00
Tungsten	20.00 to 16.00	5.00 to 2.00
Vanadium	0.00 to 0.35	Optional
Iron	Remainder	Remainder

Carbon Steel.

	Class 1. Per cent. limit.	Class 2. Per cent. limit.	Class 3. Per cent. limit.	Class 4. Per cent. limit.
Carbon	1.25 to 1.15	1.15 to 1.05	0.95 to 0.85	0.85 to 0.75
Chromium	Optional	Optional	Optional	Optional
Manganese	0.35 to 0.15	0.35 to 0.15	0.35 to 0.15	0.35 to 0.15
Phosphorus	0.015 to 0.00	0.015 to 0.00	0.02 to 0.00	0.02 to 0.00
Silicon	0.40 to 0.10	0.40 to 0.10	0.40 to 0.10	0.40 to 0.10
Sulphur	0.02 to 0.00	0.02 to 0.00	0.02 to 0.00	0.25 to 0.00
Vanadium	Optional	Optional	Optional	Optional
Iron	Remainder	Remainder	Remainder	Remainder

Method of Manufacture and Physical Requirements

The tool steel shall be made in either the electric or crucible furnace. The bars must be forged or rolled accurately to the dimensions specified; to be free from seams, checks and other physical defects and be of homogeneous composition.

The tungsten steels will be delivered unannealed unless otherwise specified and the carbon steels will be delivered annealed unless otherwise specified. The bars will be delivered in commercial lengths and short pieces will not be accepted unless so specified.

Stamps on Material.—The contractor shall stamp on each bar or piece of steel his name, the trade name of the steel which he is furnishing and the kind of steel and class as given in this specification. If the bars are longer than about three (3) ft., the above stamps will be placed at intervals of about three (3) ft. along the bar.

Delivery of Material.—All material will be delivered to the General Storekeeper, Building No. 4, Navy Yard, Philadelphia, Pa. Lots of material less than 1000 lb. will be delivered in one shipment, and in general all material will be delivered in one shipment, if practicable.

Acceptance Tests.—Samples for acceptance test will be taken from the material delivered to the General Storekeeper, Navy Yard, Philadelphia, Pa., or if the material is inspected at the place of manufacture, the Inspector of Engineering Material will forward samples as called for under the heading "Samples Furnished by Bidder" to the General Storekeeper, Navy Yard, Philadelphia, Pa., who will

forward them to the engineer officer. The engineer officer will arrange for the tests, both chemical and physical, required by these specifications and recommend the acceptance or rejection of the material.

Rejection.—If the material is not equivalent to the sample furnished with bid, it will be considered sufficient cause for rejection. The contractor shall replace the shipment within two weeks, if practicable, after the receipt of notice of rejection.

Physical Tests

Tungsten Steel

Class 1.—The sample bar will be forged into five tools, treated and ground to the No. 30 form of the Sellers system of tool forms. Each tool will be tested on nickel-steel forging of about 100,000 lb. tensile strength with a cut $\frac{1}{4}$ in. deep, $1/16$ in. feed and a cutting speed of 50 ft. per minute. The tool will be twice reground and retested. A record will be made of the length of time the tool cuts, without a lubricant or cutting compound, before it is ruined.

*From the sample bar $3\frac{3}{4}$ in. round two butt mills $3\frac{3}{4}$ in. diameter will be made and tested on a nickel-steel block, with cut 0.20 in. deep, $1/4$ in. wide, feed 0.04 in. per revolution of mill, at a speed of 100 ft. per minute. Each mill to run at least 40 in. and be in fair condition at end of run. Lubricant to be used.

Class 2.—The bar will be forged into five tools, treated and ground to the No. 22 form of Sellers system of tool forms. Each tool will be tested on a carbon, open-hearth steel forging of about 60,000 lb. tensile strength with a cut of $1/32$ in. deep, $\frac{1}{8}$ in. feed, and a cutting speed of about 50 ft. per minute. A record will be made of the length of time the tool cuts, with a lubricant or cutting compound, before it is ruined.

*From the $\frac{3}{4}$ in. x $1\frac{1}{2}$ in. sample bar, three standard round-nose roughing tools are to be made and tested on nickel-steel forging with a $\frac{1}{4}$ -in. cut, feed 0.05 in. per revolution, and a speed of 15 ft. per minute. Each tool should run for 20 minutes without serious injury, without a lubricant.

Carbon Steel

Class 1.—Machinists' taps $\frac{3}{8}$ in. diameter will be made and tested on nickel steel. A record will be made of the number of holes tapped before the tap is ruined. A lubricant will be used, and the r.p.m. of the tap will be varied to suit conditions.

*From the $2\frac{1}{2}$ -in. square sample bar, three finishing tools will be made and tested on a nickel-steel forging with a cut from 0.001 in. to 0.003 in. deep, a feed $2\frac{1}{4}$ in. per revolution, and a speed of 8 ft. per minute. Each tool should make a clean smooth finish for a run of at least 20 ft., without lubrication.

Class 3.—One 1-in. end mill will be made and tested with a lubricant, by cutting a piece of class O carbon steel. The depth of cut will be $1/16$ in., the r.p.m. will be varied to suit conditions, and a record will be made of the length of time the mill cuts before it is ruined.

*From the sample bar $1\frac{1}{2}$ in. round one end mill $1\frac{1}{4}$ in. diameter will be made and tested on mild steel block, cut 0.20 in. deep, 0.50 in. wide, feed 0.018 in. per revolution, at a speed of 40 ft. per minute. The mill should run at least 40 in. and be in fair condition at the end of run. Lubricant to be used.

Class 3.—Pneumatic cape chisels $\frac{1}{2}$ in. will be made and tested with a lubricant on nickel steel. A record will be made of the distance the tool cuts before it is ruined.

Class 4.—Rivet sets $\frac{1}{2}$ in. will be made and tested and a record will be made of the number of rivets the set will drive before it is ruined.

Modification of Tests.—Any or all the above tests may be modified at the discretion of the engineer officer.

Samples Furnished by Bidders.—Each bidder shall furnish with his bid one bar of steel as follows:

Tungsten:

Class 1— $\frac{3}{4}$ in. x $1\frac{1}{2}$ in. x 5 ft. long.

*Class 1— $3\frac{3}{4}$ in. round x 24 in. long.

Class 2— $\frac{3}{4}$ in. x $1\frac{1}{2}$ in. x 5 ft. long.

Carbon:

Class 1— $1\frac{1}{2}$ in. diameter rod, 2 ft. long.

*Class 1— $2\frac{1}{2}$ in. square x 6 ft. long.

Class 2— $1\frac{1}{4}$ in. diameter rod, 2 ft. long.

*Class 2— $1\frac{1}{2}$ in. round, 24 in. long.

Class 3— $\frac{3}{4}$ in. octagon rod, 5 ft. long.

Class 4—2 in. diameter rod, 2 ft. long.

All samples must be delivered, unless otherwise specified in the proposal, to the General Storekeeper, Building No. 4, Navy Yard, Philadelphia, Pa., at or before the time set for the opening of the bids. Failure to comply with this requirement will eliminate the bid from consideration. The sample bar will be delivered by the General Storekeeper to the engineer officer for him to direct the selective tests.

Treatment of Samples.—Each bidder must state, in his bid, the treatment to which the material is to be subjected, in order to get, in his opinion, the best results.

Recommendation of Award.—The right is reserved to reject any or all bids. Failure to comply with all the requirements will eliminate the bid from consideration. The engineer officer will, after the prescribed tests have been made, recommend the award for contract for the steel or steels which, in his opinion, it is to the best interest of the government to purchase, due consideration being given to the cost of the material. The relation of the physical test and the price of the material will be the basis for selection.

Alternate Proposals.—Bidders may submit proposals on steel which differs from the composition specified, provided this is clearly stated in their bid and provided they furnish the engineer officer with the exact chemical composition of the material. This information will be considered confidential by the engineer officer if the bidder requests it. The material will be tested if, in the opinion of the engineer officer, it is considered suitable for the purpose intended.

Defective Material.—If material, when being manufactured into tools, develops physical defects, which could not be detected by inspectors, such as "cracks," "pipes," etc., the manufacturer of this steel shall replace, without cost to the government, such defective material.

Purpose for Which the Steel Is Intended

Tungsten Steel

Class 1.—Lathe and planer tools, milling machine tools, etc., and in general all tools for which high speed steel is used.

Class 2.—Lathe and planer tools, and in general tools for finishing purposes, either steel or brass.

*The requirements indicated by asterisk apply only to tool steel required for delivery to the Navy Yard, Washington, D. C.

Carbon Steel

Class 1.—Lathe and planer tools, drills, taps, reamers, screw cutting dies, taps and tools requiring keen cutting edge combined with great hardness.

Class 2.—Milling cutters, mandrels, trimmer dies, threading dies, and general machine shop tools requiring a keen cutting edge combined with hardness.

Class 3.—Pneumatic chisels, punches, shear blades, etc., and in general tools requiring hard surface with considerable tenacity.

Class 4.—Rivet sets, hammers, cupping tools, smith tools, hot drop forge dies, etc., and in general tools which require great toughness, combined with the necessary hardness.

It may be said that the experience of over two years in the purchase under specifications of tool steel for the navy has been satisfactory in every particular, not only from the point of view of the government, but also of the manufacturer. The various manufacturers have been placed on equal basis, and the contracts have been awarded in all cases to the lowest bidder offering satisfactory steel. The possibility of preference of one maker over another has been eliminated, and the various navy yard foremen no longer are subjected to influences from agents representing one or another tool steel maker.

All steel received is of uniform quality and, what is of the utmost importance, responds to the same treatment. Under the former system, when different brands were purchased, as soon as a tool lost its identity there remained no method by which the tool dresser could ascertain the correct treatment to give it, so that the results obtained after the first treatment became largely a matter of chance. What is also an important consideration is the material reduction in prices that has been effected by introducing direct competition in the purchases.

Ore Mining on the Great Northern Properties

DULUTH, MINN., June 24, 1911.—The Oliver Iron Mining Company (United States Steel Corporation) now has eight properties opened on lands secured by it from the Great Northern Railway, under the famous "Great Northern lease." These are sure to be very large shippers the present year, and it is likely that two or three of them will go well above the million-ton point for the season. At the commencement of 1911, Steel Corporation deficiencies in requirements under the terms of the Great Northern lease amounted to more than 5,000,000 tons, while the minimum for the present season is 3,750,000 tons, as is well known. If the year is to end with the minimums met and all deficiencies cleaned up that have accrued since the inauguration of the lease, it will mean the mining of about 9,000,000 tons from Great Northern lands this summer, and it is now realized that this is impossible. The corporation, therefore, will not be up with its contract before the close of 1912.

The increase of 750,000 tons a year in minimums under this lease is a tremendous figure, and means herculean work on the part of the Oliver Company in mining and the Great Northern in transporting ore to the lake. These minimums for 1912 amount to 4,250,000 tons, which, added to the deficiency of the beginning of this year, makes a total amount of ore to be moved in the two years of over 14,000,000 tons. This being the fact, it seems as though the Great Northern Railway would continue for some time the chief shipper of the Lake Superior country, a position that it is sure to take this year for the first time.

The Steel Corporation has such a tremendous aggregate of annual minimums from other lands than those under the Great Northern lease that the question of caring for these tonnages is doubtless a very interesting problem for its ore officials. The fact that some of these leases are approaching their termination, while they have still a large amount of ore unrecovered, will add to the intricacies of the problem, for it is no secret that leases made at 25 and 30 cents a ton are not liable to be renewed at any such figure. Especially is this the case with such an example of higher rates before owners as Mr. Hill's lease presents.

James R. Finlay, a well-known mining engineer, of New York City, who has undertaken the task of valuing the mines of Michigan for the State Tax Commission has begun operations, and has established an office at Houghton, where he has already gathered a corps of assistants for the work. He is to make his report in August, and has some 160 mines to examine and value before that time. The task is of such magnitude and intricacy that

it was difficult for the state to secure an engineer who was willing to undertake it and promise completion by the time set. Of course, it will be impossible to make a complete examination of so many mines. A large number, however, are idle and filled with water. Their value, whatever it may be, must be determined from records of the companies and interested persons. Once secured, it will be possible, by some such system of annual reports as the Minnesota Tax Commission requires of mining companies in that state, to maintain it at a high degree of timeliness.

Cuyuna range explorations are spreading toward the southwest, where distinct lines of attraction have been noted. In Morrison County, Minnesota, some miles north and east from the city of Little Falls, and a long way from any discovered mines, exploration is now going on. It is not understood that any iron of value has been found or that the developments there have been especially flattering, except to those who have gained possession of acres at some low prices and are selling at an advance. The mere presence of a dip needle attraction seems enough to set explorations in motion and to boost the price of lands. But lines of attraction to the magnetic needle are about the commonest things in northern Minnesota, except mosquitoes.

D. E. W.

Capabilities of the Molding Machine

The day is coming, and coming very fast, when the molder will be called upon to look more after the art, and the machines will do the laborious part of the work; then he will be looked upon as a thorough mechanic and be given a greater measure of respect than has been the case in the past. Such is the prophetic statement made by John Alexander, Philadelphia, Pa., in a paper on "Machine versus Hand Molding" read before the American Foundrymen's Association at its recent meeting in Pittsburgh. The jarring machine he believes will be the machine of the future for general work.

The molding machine, he considers, has raised the standard of foundry practice to a great extent by the better all around quality of the castings made. Castings are more near uniform to pattern, at least from 10 to 15 per cent. in their weight is saved; in fact, it is only a short time ago, he mentioned the report of a foundry saving over 25,000 lb. of metal in one year on one job alone.

Through the accuracy of the work of the molding machine, he continued, not less than 5 to 10 per cent. of time in finishing in the machine shop is saved, and in quite a number of cases there is only grinding finish left nowadays. The molding machine has been the means of giving the pattern-maker a better knowledge of his trade and foundry practice, consequently raising his mechanical ability. The life of the patterns have been increased tenfold, as there is little chance of the deadly vent wire, rapping bar and sledge hammer, or swabbing destroying them. Again, since we have had to get up a more accurate class of flasks and patterns for machine molding, it has forced us into doing the same thing for hand molding, and this has been the means of a saving in this respect.

We can now understand, he added, that molding machines and other mechanical appliances in the foundry should bear the same relation to the molder as the different machines do to the machinist and pattern-maker. Therefore, if the molder feels disinclined to place himself in the position of machine operator, the only alternative he sees is for manufacturers of molding machines to have instructors go around and train such men for the purpose, especially where they have installed machines. They should also give more talks at foundrymen's meetings.

The Free Public Library of Newark, N. J., is making a collection of the business literature of Newark manufacturers, and has established a business branch at 18 Clinton street, in the center of the city, where catalogues and other printed matter of this character are kept on file. A carefully arranged double index is kept of names of firms and articles manufactured, and the library makes it a point to answer inquiries by letter or telephone, giving probable buyers full information about the makers of products for which they inquire.

Operating Costs of Producer Gas Plants

The Showing of Four Gas-Engine Electric Stations

Some interesting detailed figures covering the cost of operation of electric generating plants employing gas engines supplied from gas producers were recently compiled by a committee of the American Society of Mechanical Engineers—I. E. Moulthrop, chairman; J. D. Andrew, C. J. Davidson, C. H. Duffy, H. J. K. Freyn, W. S. Twining and C. W. Whiting. The brief descriptions of the plants and the analyses of the figures are given in the subjoined review, substantially as submitted by the committee. Reference may well be made here to the evidence of painstaking care and resourcefulness and persistence which has resulted in bringing the authoritative data to light.

Plant A

There are two 250-h.p. pressure producers, 7 ft. inside diameter, with water seal bottoms and 9-in. firebrick linings, also two wet scrubbers, 7 ft. 6 in. in diameter by 18 ft. high, filled with wooden lattice work. There are two dry scrubbers, 7 ft. square by 3 ft. 6 in. high, filled with coarse shavings.

There is one 500-hp. horizontal, double-acting, four-stroke-cycle engine with two cylinders, 23½ x 33 in., arranged tandem. The engine has three bearings rigidly in line. It runs at 150 r.p.m. and is direct connected to an electric generator. It is started by compressed air at 100 lb. pressure, and has an electric ignition of the make and break type, the source of supply being a 110-volt direct current lighting circuit and a motor generator set.

There are two tar extractors and one blower.

The data received covered two complete months. The plant is run 24 hrs. per day, from 6 o'clock Monday morning until 12 o'clock Saturday night, and the current generated is utilized for light and power. During the two months, a total of 308,410 kw.-hr. were generated and 35,190 kw.-hr. were used in the plant, leaving a net output of 273,220 kw.-hr. The fuel used is bituminous coal. The cooling water from the engine is utilized for other purposes, and is not, therefore, charged to the plant. The cooling and cleaning water for the scrubbers is not given.

Cost of Operation per Net Kilowatt-hour.

	Cents.
Fuel .....	.2576
Water .....	.0000
Supplies, oil, .....	.0141
Supplies, waste, etc. ....	.0024
Supplies, total.....	.0165
Superintendence .....	.0000
Labor, producer room.....	.1585
Labor, engine room.....	.0535
Labor, electrical.....	.0000
Labor, total.....	.2140
Repairs, producer.....	.0127
Repairs, engine.....	.0040
Repairs, electrical.....	.0000
Repairs, total.....	.0167
Total cost.....	.5048

Plant B

There is one set of producers of the Loomis-Pettibone type.

The data received is for 15 complete months. The plant is to run 10 hr. per day.

Cost of Operation per Net Kilowatt-hour.

	Cents.
Fuel .....	.4460
Water .....	.0879
Supplies, oil, .....	.0465
Supplies, waste, etc. ....	.0335
Supplies, total.....	.0800
Superintendence .....	.0000
Labor, producer room.....	.1603
Labor, engine room.....	.2050
Labor, electrical.....	.0000
Labor, total.....	.3653
Repairs, producer.....	.0243
Repairs, engine.....	.2375
Repairs, electrical.....	.0000
Repairs, total.....	.2618
Total cost.....	1.2410

There is one 500-hp. horizontal, double-acting, four-stroke-cycle engine with two cylinders, 23½ x 33 in., ar-

anged tandem. The engine has two bearings rigidly in line. It runs 150 r.p.m. and is direct connected to an electric generator. It is started by compressed air at 240 lb. pressure, and has an electric ignition of the make and break type, the source of supply being a 110-volt lighting circuit.

Plant C

There are two sets of producers of the Loomis-Pettibone type and of 2000-hp. capacity each.

There are two 1500-hp. horizontal, double-acting, four-stroke-cycle engines, each with four cylinders, 32 x 42 in., arranged twin tandem. Each engine has two bearings rigidly in line. They run at 107 r.p.m. and are direct connected to electric generators. They are started by compressed air and have an electric ignition of the make and break type, the source of supply being a motor generator set supplying current at 60 volts.

The information following is taken from the plant's own forms, as due to the supervision of a State Commission they could not use the committee's forms without duplicating the work.

Cost of Operation per Kilowatt-hour.

FOR THE YEAR 1908.	Cents.
Fuel .....	.566
Water .....	.000
Supplies, oil and waste.....	.044
Supplies, miscellaneous.....	.013
Supplies, total.....	.057
Superintendence .....	.031
Labor, producer room and engine room.....	.173
Labor, electrical.....	.009
Labor, total.....	.173
Repairs, producer.....	.006
Repairs, engine.....	.000
Repairs, electrical.....	.004
Repairs, total.....	.010
Total cost.....	.837
FOR THE YEAR 1909.	
Fuel .....	.439
Water .....	.000
Supplies, oil and waste.....	.029
Supplies, miscellaneous.....	.016
Supplies, total.....	.045
Superintendence .....	.023
Labor, producer room.....	.109
Labor, engine room.....	.066
Labor, electrical.....	.000
Labor, total.....	.175
Repairs, producer.....	.020
Repairs, engine.....	.006
Repairs, electrical.....	.002
Repairs, total.....	.028
Total cost.....	.710
FOR THE YEAR 1910.	
Fuel .....	.422
Water .....	.003
Supplies, oil and waste.....	.024
Supplies, miscellaneous.....	.015
Supplies, total.....	.039
Superintendence .....	.026
Labor, producer room.....	.102
Labor, engine room.....	.063
Labor, electrical.....	.000
Labor, total.....	.165
Repairs, producer.....	.024
Repairs, engine.....	.004
Repairs, electrical.....	.005
Repairs, total.....	.033
Total cost.....	.688

Plant D

There are two 400-hp. pressure producers, 8 ft. inside diameter, with water-seal bottoms and with 9-in. fire-brick linings, and two wet scrubbers, 8 ft. in diameter by 20 ft. high, filled with coke. There are two dry scrubbers, 6 ft. square by 3 ft. 6 in. high.

There are three 250-hp. vertical, single-acting, four-stroke-cycle engines, each with three cylinders, 20 x 19 in., arranged side by side. Each engine has five bearings rigidly in line. They run at 230 r.p.m. and are direct connected to electric generators. They are started by compressed air at 200 lb. pressure and have an electric ignition of the make and break type, the sources of supply being a primary battery and a direct-driven magneto.

The data received are for three complete months. The plant was in operation 1439 hr. during the three months and generated total of 309,300 kw.-hr. The fuel used was No. 1 anthracite buckwheat.

Cost of Operation per Net Kilowatt-hr.

Fuel	Cent.
Water .....	.0000
Supplies, oil	
Supplies, waste, etc.	
Supplies, total .....	.0572
Superintendence	
Labor, producer room .....	.1135
Labor, engine room .....	.0647
Labor, electrical	
Labor, total .....	.3775
Repairs, producer .....	.0249
Repairs, engines .....	.1496
Repairs, electrical .....	.0000
Repairs, total .....	.1745
Total cost .....	.8920

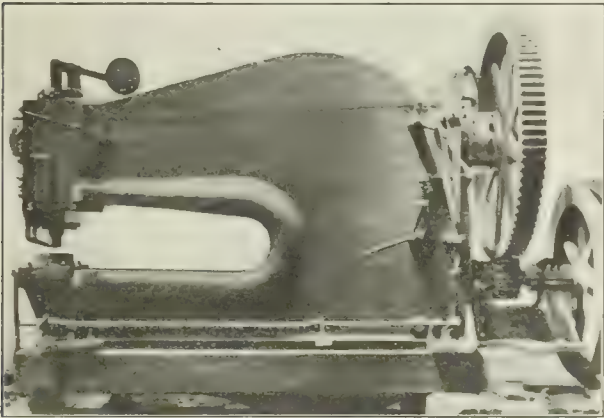
Cost of Fuel at Plants

The cost of coal at the plants given was \$2.55 per ton at Plant A; \$4.53 per ton at Plant B; unknown at Plant C, and \$2.33 per ton at Plant D. Reducing the cost of coal at Plant B to \$2.50 per ton, the costs of operation compare as follows:

	Per kw.-hr.
	Cents.
Plant A	0.505
Plant B	1.041
Plant C .....	.47
Plant D .....	.892
Average .....	.796

Punch with a 48,000-Lb. Body Casting

An unusually large-sized punching machine has recently been finished by the Queen City Punch & Shear Company, Cincinnati, Ohio, for the Quinlan Boiler Company, Indianapolis, Ind. As the illustration shows, the



Punch Built by the Queen City Punch & Shear Company, Cincinnati, Ohio.

machine is fitted with the manufacturer's patented clutch, that has already been described in *The Iron Age*. The Bollman-Wilson Foundry Company, Cincinnati, poured the casting, which weighs over 48,000 lb. The depth of throat is 66 in., and the machine is intended to punch 4-in. holes through 1-in. plates at the rate of 15 to 20 per minute.

Jones & Laughlin Sales Department Changes.—The Jones & Laughlin Steel Company, Pittsburgh, announces that on or before July 1 the F. A. Goodrich Iron & Steel Company will retire as its Detroit representative and the company will establish its own Detroit office in the Penobscot Building. Frederick H. Holt, heretofore in charge of the office of F. A. Goodrich Iron & Steel Company, will retire as its St. Louis representative and the company will establish its own St. Louis office in the Pierce Building. E. D. Batchelor, heretofore connected with the sales department of the general offices, Pittsburgh, will be district sales manager in St. Louis. Announcement is also made of the establishment of a Pittsburgh sales district by the Jones & Laughlin Steel Company, which has been put in charge of A. C. Pollock, formerly connected with the sales department in the general offices.

The Urwick Machinery & Supply Company, Louisville, Ky., announces that its name has been changed to the Brandeis Machinery & Supply Company.

New Type Slow Speed Exhaust Fan

The slow-speed multiblade exhaust fan, shown in the illustration, which has been perfected by the Buffalo Forge Company, Buffalo, N. Y., has proved by its running record exceptionally economical in power consumption. This has been strikingly demonstrated in an installation of three

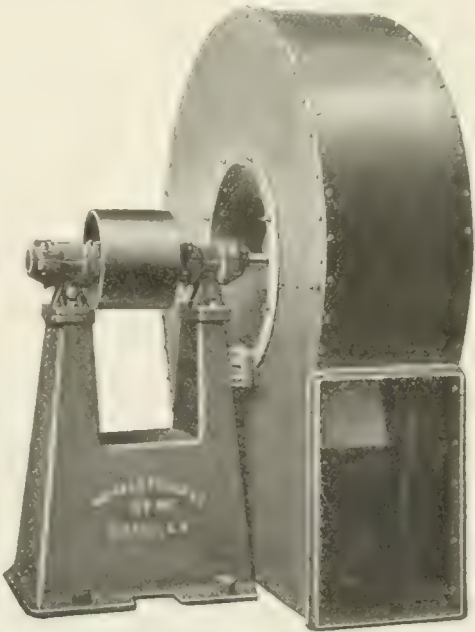


Fig. 1.—The Buffalo Forge Company's Slow Speed Multiblade Exhaust Fan.

double fans which have been in operation for some time. They replaced three double fans, the power consumption of which was 40 hp. The new type is performing the same amount of work with 21 hp. which the company figures as a saving of \$35 per hp., or \$665 per year.

The fan wheel to which this success is attributed is of the multiblade type, with proportions which give maximum efficiency at speeds averaging from 30 per cent. below the normal for exhaust fans. The slow speed is an important feature, as it reduces power consumption, minimizes wear and cost of upkeep, and lengthens the life of the equip-

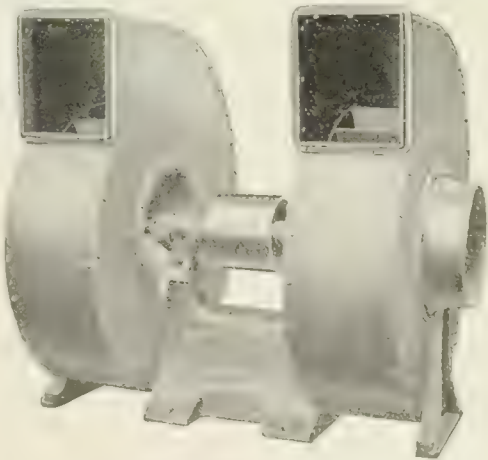


Fig. 2.—The Double Type of the Slow Speed Fan.

ment. The possible applications of the type are almost as numerous as those of the standard design. It is made single or double in sizes from 30 in. to 80 in. diameter for pressures from 1 to 6 oz. The housing is reversible.

The Automobile Club of America, Fifty-fourth and Fifty-fifth streets, west of Broadway, New York, has issued the rules which will govern the aeronautical motor contest for the club's \$1,000 cash prize. The contest will be conducted in the club's laboratory after July 1, when the entries will close. The trials will include a test of three hours' duration at constant speed; a test to determine ease and certainty of starting; and various other short tests which the committee may require.

A Belt-Driven Flue Sheet Drill

One of the Recent Harrington Products

For the rapid production of repetition work consisting of the drilling of holes in flue sheets and pieces of that nature Edwin Harrington, Son & Co., Inc., Seventeenth and Callowhill Streets, Philadelphia, Pa., have developed a tool which is known as the No. 14 belt-driven multiple drill. Three 1¼-in. drills can be used with steel and the special features of the machine are an easy adjustment of the table and the spindle heads, as well as the convenient grouping of all the operating handles.

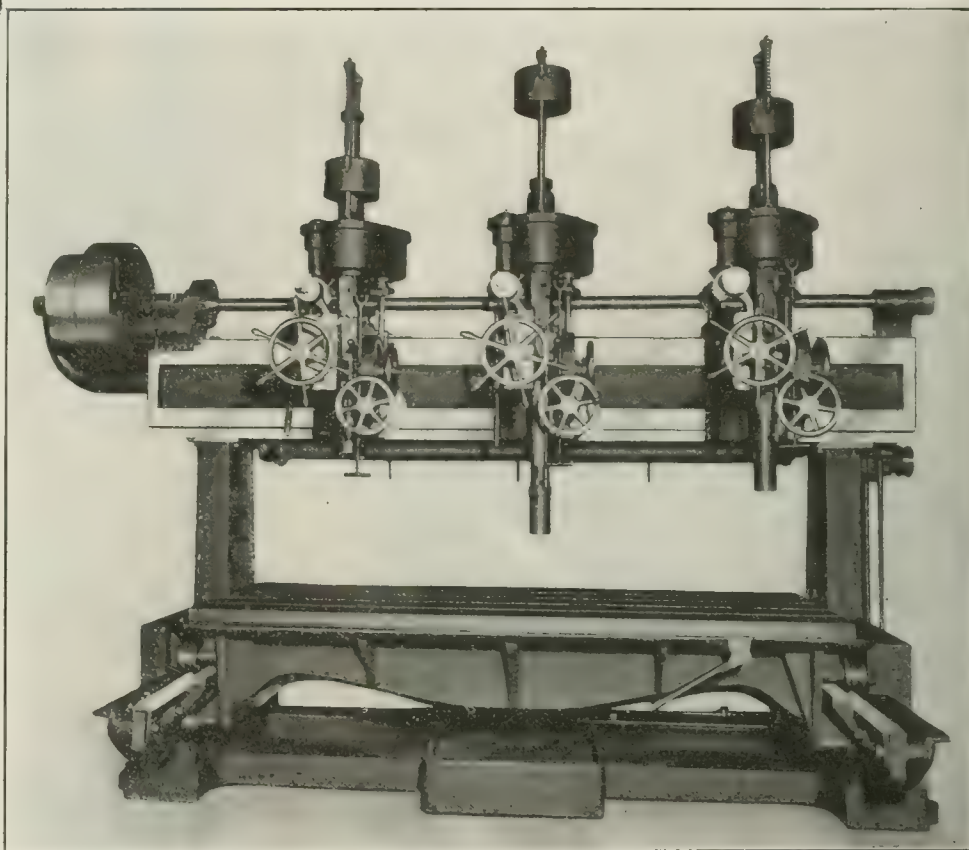
The tool is driven by a belt running from an overhead countershaft to the two-step cone pulley which is back geared on the horizontal shaft. Four spindle speeds ranging from 50 to 150 r.p.m. are available. From this horizontal shaft a pair of mitre gears transmit the power to the shaft on each arm which in turn drives the individual spindles through a pair of miter and spur gears. To keep down the weight steel castings are used for the spindle heads which have independent movement of the arm by a hand operated lever. The large hand wheel shown on each head controls the lateral traverse of the arm along the cross rail through a rack and pinion. The forged high carbon steel spindles have a large diameter in the sleeve and are equipped with ball bearings to take care of the thrust. A counterbalance which is constant in all positions operates directly on the spindles. The feed is independent for each spindle and is of the all gear type, the mating gears in this train and in all the others of the tool being alternately steel and bronze with teeth of coarse pitch. Three feed changes, ranging from 0.0036 to 0.0108 in. per revolution of the spindle, are available. There is an automatic trip operating through a positive clutch on the feed worm shaft as well as a hand wheel where it is desired to employ hand feed. For the quick return of the spindle the worm wheel is disconnected by a positive tooth clutch on the hand wheel. The cross rail is of heavy box section with a wide face for the arm saddles and a wide bearing on top of the uprights. The latter are very rigid, the section for all the members being that of an I-beam and support the runways and the traverse rack for the table.

The table is mounted on rollers which give an easy in and out motion which is controlled by a ratchet lever at the front of the drill. This lever operates a rack and pinion at both ends and a binder lock keeps the table securely in position. If desired, a stationary table can be furnished which is bolted rigidly to the upright and in this case no base is used. T-slots parallel with the front of the table are cut in the upper surface of the table. The base is of heavy construction and supports the uprights rigidly in addition to having a tank for the surplus lubricant. An oil pump forces the lubricant from this reservoir to the long delivery tank located under the cross rail.

The following table gives the principal dimensions and specifications of the drill:

Surface of table, inches.....	86X40
Length of crossrail, inches.....	140
Minimum distance between spindles, inches.....	18
Maximum distance between end spindles, feet.....	8
In and out movement of spindles, inches.....	6
Vertical traverse of spindles, inches.....	15
Maximum distance between spindle and table, inches.....	27
Minimum distance between spindle and table, inches.....	12
Minimum distance between spindle and face of upright, inches.....	12
Movement of table, inches.....	40
Diameter of Spindle in sleeve, inches.....	1 15/16
Morse taper in spindle.....	No. 5
Number of spindle speeds.....	4
Maximum spindle speed, r.p.m.....	150
Minimum spindle speed, r.p.m.....	50
Number of feed changes.....	3
Maximum spindle speed per revolution of spindle, inches.....	0.0108
Minimum spindle speed per revolution of spindle, inches.....	0.0036
Movement of table, inches.....	40
Opening between uprights, inches.....	110
Sand on countershaft pulleys, inches.....	24
Face width of countershaft pulleys, inches.....	7½
Speed of countershafts, r.p.m.....	375
Overall height, inches.....	124
Floor space required, inches.....	168X106
Weight, pounds.....	18,800

While the number of heads of this machine and their



The No. 14 Belt-Driven Multiple Drill for Flue Sheets and Similar Work, Built by Edwin Harrington, Son & Co., Inc., Philadelphia, Pa.

dimensions are those best suited to general requirements, if desired some of them can be varied to meet the needs of any particular case.

The Riverside Metal Refining Company, Connellsville, Pa., manufacturer of ingot brass, but making a specialty now of babbitt metals, has recently appointed the following as its sales representatives: H. P. Weller Company, Erie, Pa.; Humbird Supply Company, Cumberland, Md.; Erie Mill & Marine Supply Company, Buffalo, N. Y.; Niagara Machine Company, Niagara Falls, N. Y.; Union Electric Company, Pittsburgh. It maintains a branch office and warehouse at 1111 Superior Viaduct, Cleveland, Ohio. The company has recently introduced a new babbitt, known under the name of Silver Bar, intended for slow, heavy and rough work, being specially prepared for tin plate and other rolling mill bearings. A recent test showed it to stand a compression of 35,075 lb. per sq. in. The company is also the manufacturer of the U. S. standard babbitt, for all round journal service; Riverside special, which is a high-grade babbitt, and other grades for a large variety of work. It manufactures its products along scientific lines, having a completely equipped laboratory in its plant for making tests, etc.

New Drive for Planers

Employment of Reversing Electric Motor Obviating Use of Flywheels or Belting

For nearly a year the Triumph Electric Company, Oakley, Cincinnati, Ohio, has been experimenting in the shop of the Cincinnati Planer Company with a new kind of motor drive for planers. The accompanying illustration shows a reversible motor coupled direct to the driving shaft, or, as is more commonly termed, the pulley shaft of a 56 x 72-in. planer. The coupling is directly under the shield shown on the left of the motor and the drive does away with pulleys, shifting mechanism, belts and overhead equipment.

Instead of the belts shifting and reversing the pulleys, the motor is automatically stopped, reversed and started again as quickly, it is explained, as can be accomplished with the ordinary belt shifting planer. This is done by changing the direction of the current, thus converting the motor into a generator and using up the power generated in a dynamic brake that brings the planer to a dead stop quickly as if a mechanical brake was applied. This is done by means of a transfer switch connected up with the shifting mechanism, so that the table dogs throw over

planer there is a small motor attached, with a double throw switch, one side being used to elevate the rail and the other side for lowering the rail, thus doing away with any belts on the machine.

The manufacturer calls particular attention to the fact that this particular drive is especially advantageous when applied to the larger sized planers as with the usual larger types of planers the fly-wheel inertia is naturally much greater to overcome.

Attention also is called to the fact that the reversible motor can be applied to either the right or left side of the planer, and further, if there is not much floor space it can be run lengthwise of the machine by putting in bevel gears. The controller board can also be placed to suit the various shop conditions. With each outfit the transfer switch on the bed as well as the controllers and the small motor on top are furnished.

Boring and Internal Threading Tool

The Ready Tool Company, Bridgeport, Conn., has placed on the market a new boring and internal threading tool known as the Red E. The boring cutter is held by a set screw in the back of the bar, forcing the rod which passes through the bar against the sliding wedge, a construction which holds the cutter from all movement. In this way alignment and the absence of chatter are obtained. To sharpen the tool the lathe carriage is run back and the set screw loosened, which releases the wedge so that the cutter may be removed. When the tool is replaced in the holder the constant level and alignment have not been lost.

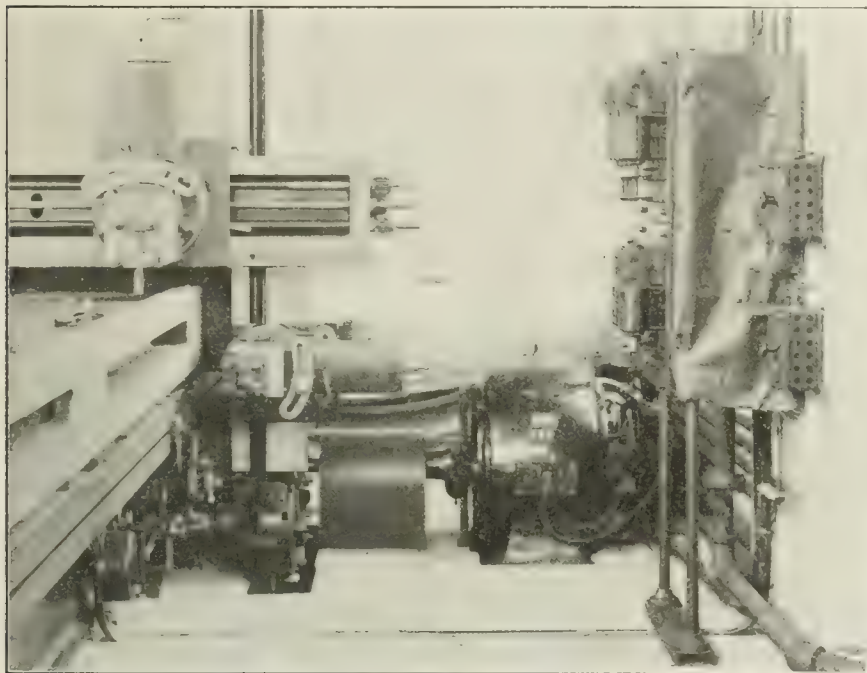
The bar is held rigid in the holder by a sliding dog which is forced down by two set screws, a method that avoids marring the bar and at the same time holds it solid. In addition a means of adjustment is obtained, so that the operator may take out the bar and replace it with a piece of solid steel $\frac{1}{4}$ or $\frac{3}{8}$ in. in diameter for boring small holes. The equipment also includes an internal threading tool which has a cutter screwed into the end and ground to the usual 60-deg. angle. Extra cutters for boring and threading tools can be furnished. The side of the regular No. 2 holder is $\frac{5}{8}$ in. by $1\frac{1}{4}$ in.

Cutting Worm Gear on Gear Hobbing Machine

A Hindley worm and gear was recently produced on a No. 2 Schuchardt & Schütte gear hobbing machine. The worm blank was fastened to the hob arbor in place of the hob ordinarily used when cutting spur, worm or spiral gears, and it was cut with a single tooth of accurate shape clamped on the rotating table. The table was then slowly fed toward the worm blank similar to the manner of hobbing worm gears.

For cutting the worm gear the blank was mounted on the table by means of the rigid supports regularly furnished with these machines, and a special cutter arbor with two teeth was inserted in the cutter spindle. The gear was then finished in the ordinary way employed for hobbing worm wheels by feeding the table gradually to the work until the proper depth was reached.

The results in both cases, it is stated, were entirely satisfactory. This fact is of interest in view of the extensive trials carried on at the present time by automobile concerns to use the Hindley drive in automobiles.



Triumph Electric System Applied to a Cincinnati Planer.

this switch, reversing the current through the controllers instead of shifting the belts, as is usual with a line shaft driven planer.

Next to the controller panel are two hand controllers. The upper one is for varying the cutting stroke, by which speeds from 25 to 60 ft. per minute can be obtained. The lower one is for the return stroke which can also be varied in speed from 50 to 100 ft. per minute. After the hand controllers are once set they remain stationary and do not move every time the planer reverses, the variations being maintained through resistance coils, so that all parts are stationary.

With this drive it is claimed that a much smaller type of motor can be used than is generally attached to the top of a planer, because there are no large diameter pulleys to gather fly-wheel inertia, that have to be stopped and reversed. Consequently there is a minimum peak load, and in addition to the lessening of current consumption it is found that there is less cost in maintaining the driving mechanism, as there are no belts or pulleys to renew. Another very commendable feature is the absence of noise. Experiments have also shown that a planer can be driven for hours on a short stroke of only 5 or 6 in. without consuming excess power or heating the motor.

In place of the usual elevating device on top of the

Uehling Waste Meter

A Combination Instrument for Measuring the Temperature of the Flue Gases and the Percentage of CO_2

The waste of heat in boiler plants can be greatly reduced by giving more careful attention to what goes on in the furnaces. The use of the indicator, the thermometer, the steam gauge and electrical measuring instruments has produced a noticeable increase in the efficiency of the engine room and the measurement of the coal and water used in the boiler plant by scales or meters and also the measurement of the waste by a waste meter will result in a considerable decrease in the cost of power production. On the average about 40 per cent. of the heat produced by the fuel burned is lost, three-quarters of which is carried away by the gases which escape from the chimney at a high temperature. Radiation is responsible for half of the balance of the losses, while the loss in soot and smoke can be figured as 1 per cent., the actual

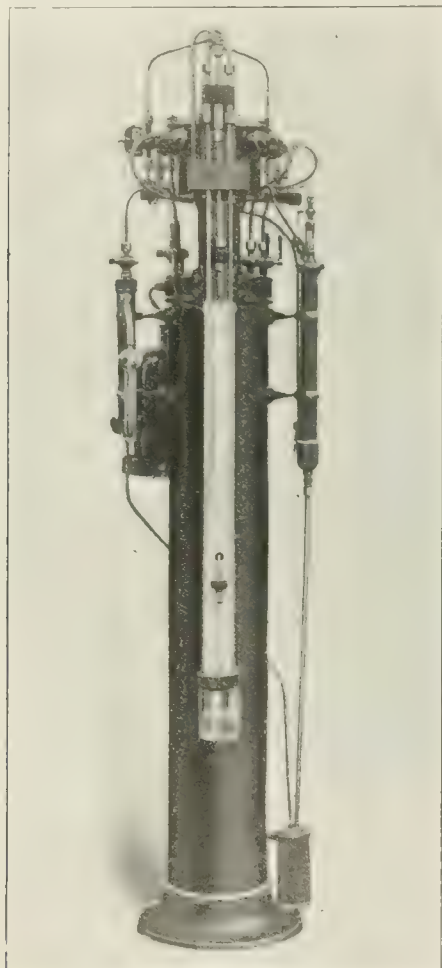


Fig. 1.—A New Type of Meter for Measuring the Percentage of CO_2 in Flue Gases and the Temperature of the Flue Gases. Manufactured by the Uehling Instrument Company, Passaic, N. J.

loss of coal through the grates at 2 per cent. and the loss due to the formation of carbon monoxide instead of carbon dioxide furnishes the remaining 2 per cent. The amount of coal waste due to heat losses of the stack are quite generally realized, as is also the fact that a considerable reduction can be obtained in the chimney loss by measuring the carbon dioxide.

The CO_2 recorder was devised to give the engineer an authentic indication of the amount of waste occurring and the measurement of this by an instrument gave an indication of how much air was being used per pound of coal, which is the most important item in determining the amount of loss in the waste gases going up the chimney. The other important item, the temperature, is taken by pyrometers or some other form of instrument. One of the chief objections to the CO_2 recorder is that the one

machine does not give a record of the percentage of carbon dioxide and the temperature. These instruments generally operate on the principle of absorbing the carbon dioxide in the flue gas in a solution of caustic potash and the difference in the volume of the gas before and after the dioxide was extracted gave a measurement of the amount in the gas. If instead of measuring the percentage

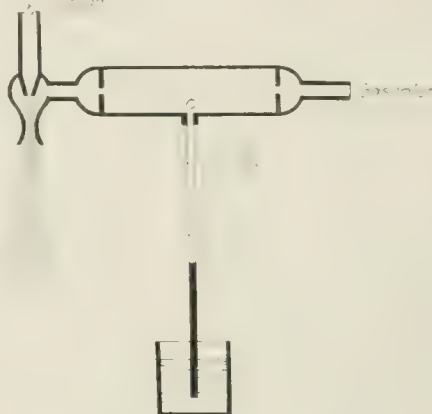


Fig. 2.—Sketch Showing the Principle of Operation of the Meter.

of carbon dioxide by measuring the actual volume of a given amount of gas before and after the carbon dioxide has been extracted from it, the pressure of the gas is measured; then the change in pressure due to the reduction in its volume when the carbon dioxide is absorbed will give a ready and reliable method of measurement. This has been taken advantage of by the Uehling Instrument Company, Passaic, N. J., in the construction of a new type of boiler room instrument which measures both the percentage of carbon dioxide and the temperature of the flue gases. Fig. 1 is a view of the instrument. Fig. 2 is a sketch showing the principle of operation and Fig. 3 illus-

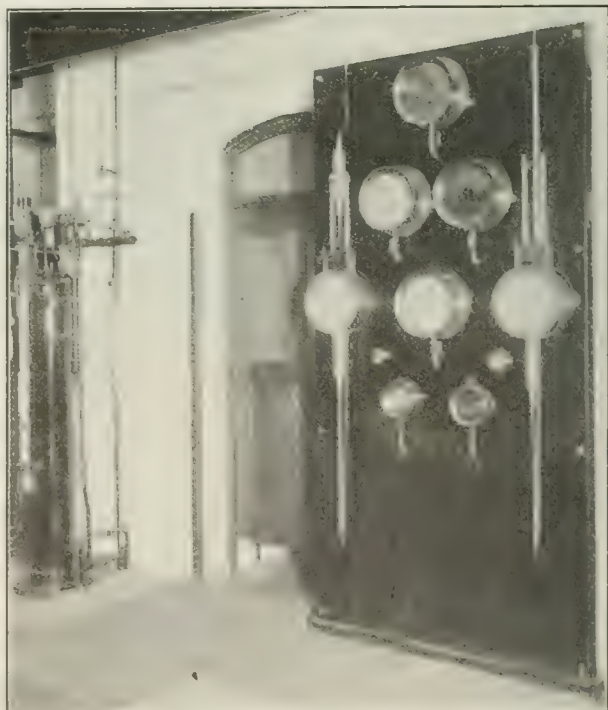


Fig. 3.—An Installation of One of These Meters in a Boiler Plant.

trates an installation of one of the meters in a boiler plant.

Fig. 2 shows how the principle of the change in the pressure of the gas is used for measuring both the percentage of carbon dioxide and the temperature of the flue gas. The latter is drawn through the apparatus continuously by a small steam aspirator. Between the two apertures, or in other words in the chamber *c*, the carbon dioxide is absorbed and thus the volume of the gas between the apertures is reduced by an amount which depends upon the percentage of CO_2 present. Any reduction of the volume of the gas between these apertures

increases the vacuum and these changes are proportional to the amount of carbon dioxide absorbed, which enables the suction or partial vacuum formed to be used as a basis for indicating and recording percentages of the dioxide in flue gases. As this same principle and similar apparatus can be used to measure temperature it is possible to combine the two machines in one and give a highly efficient meter. In measuring the temperature the change in vacuum is secured by reason of the difference in the temperature between the two apertures. One of these is in a nickel tube placed in the flue or other part of the furnace while the other is maintained at a constant temperature by the exhaust steam.

The indicating instruments are simply properly calibrated columns which are supplied for installation at the machine proper and also for the front of the boiler. The latter are found to be useful since reference can be continuously made to them, while the recording charts are more valuable as permanent records from which average results obtained with different kinds of coal, different grate areas and different drafts can be determined. The recording instrument can be placed anywhere and any number of them can be employed without impairing the efficiency of the instrument as all they do is to record the partial vacuum or the suction.

The appearance of a combined instrument of this type is shown in Fig. 3, which is a photograph of one of these meters installed in the plant of the Robert Gair Company, Brooklyn, N. Y. In this installation the two indicating columns for the percentage of carbon dioxide and for the temperatures can be seen at the front of the instrument proper, while the recording gauges are mounted at the left and the right of the board respectively.

The Angle Steel Tool Truck

The tool truck shown in the illustration is designed by its builder, the Angle Steel Tool Company, Otsego, Mich., with the purpose that it may be rolled from one part of a shop to another, from operator to operator and from machine to machine. It is especially useful in such work as assembling machinery when many small parts such as castings, bolts, nuts, screws and tools are required.

The truck is so constructed that it may be employed for special purposes by the use of different units of gal-



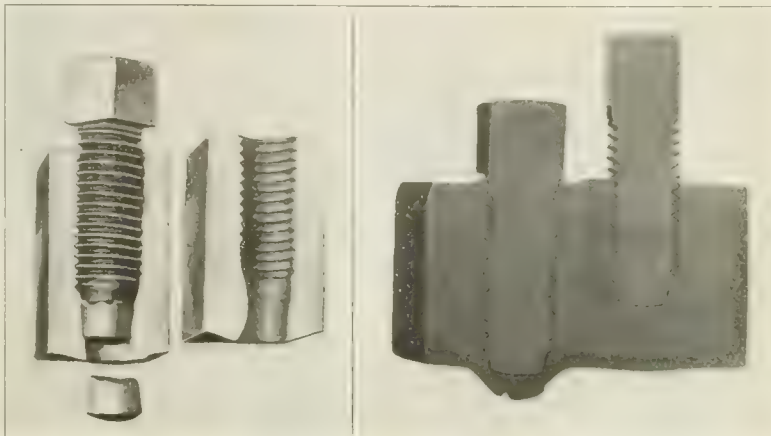
The Angle Steel Tool Company's Tool Truck.

vanized sheet steel trays in desired depths and required weights. The trays are removable and interchangeable. The frame is of high-carbon angle steel, braced with flat steel bars. The caster is of special design, made to fit perfectly, riveted fast to the foot of the truck and mounted with heavy roller bearings. The size of the machine as illustrated is 31 x 31 in. square and 36 in. high.

A Steel of Great Torsional Strength

The steel which is shown in the illustration in the form of set screws has been put on the market by Harrington, Robinson & Co., 178 High street, Boston, Mass. The process was developed by H. E. Mack, Jr., manager of the firm's steel department. It is a uniform, homogeneous product, made in crucibles, and supplied in the bar, forging or casting. In the bar form it is as free-cutting as soft annealed, high-grade tool steel. For forging and welding it occupies a place midway between soft 0.20 carbon steel and 0.40 carbon steel, low in phosphorus and sulphur.

The manufacturers have thus far specialized with this steel in a new set screw, known as the Mac-It. Its pecu-



A Steel of Great Torsional Strength—Tests Made with Set Screws

liarity is an extraordinary torsional strength. The head of a $\frac{1}{2}$ -in. 13-thread screw passed through two complete revolutions before breaking with 1000 ft. lb. applied on the lever of the testing machine. Breaking at the end of two revolutions, the screw was found to have a core so soft that it could be drilled with a No. 20 drill. In another test, using a $\frac{3}{8}$ -in. tap, the indicator of the testing machine showed $\frac{3}{4}$ h. p. at the moment of breaking.

The results of an exceptional test are seen in the photograph. A piece of cold rolled steel, $1\frac{1}{4}$ in. thick, was drilled and tapped, leaving $\frac{3}{8}$ in. at the bottom. The screw was then introduced, and when it had reached the bottom, a 4 ft. leverage was applied at its head, driving it completely through the solid metal. It will be noticed that the end of the screw did not upset or mush up. In the other illustration the screw on leaving the bottom of the thread had received three turns and was stopped purposely, a close scrutiny showing that the bottom extended a little.

Manufacturing on a commercial scale has been in progress but a short time. However, upward of 20,000 of the screws have been tested in nearly 300 different places, and as a result the makers' contention is that a $\frac{1}{2}$ -in. screw cannot be twisted off with a 15-in. wrench. It is believed that a large field of usefulness exists for this screw, the experience being that manufacturing plants, and machine shops in particular, are eager to secure a set screw which is practically unbreakable. It is proposed to carry these screws in stock in standard sizes and to manufacture special threads to order.

The Lake Superior Iron & Chemical Company has added another stack to its inactive list of blast furnaces. This one is the furnace at Elk Rapids, Mich., the yards at which contain a large amount of unsold charcoal iron. During the shutdown extensive repairs will be made. Other furnaces of the company not now producing iron are those at Manistique, Newberry and Chocoley, Mich.

The Asphalt Ready Roofing Company, 9 Church street, New York City, has brought out a new product known as the Rockland roofing. Its pliability and its waterproof quality have long life, and the material can be laid in extremes of weather when the usual tendency is to cause roofing to become brittle and crack. It is made from asphalt, mineral surfaced. It is manufactured in rolls 36 in. wide, which would cover 100 sq. ft. of surface, exclusive of laps.

Air-Cooled Choke Coils

For protecting transformers and other electrical apparatus from the disastrous effects resulting from the transmission line being struck by lightning, choke coils are connected in series with the line as close as possible to the point where it enters the transformers. Local conditions frequently make it necessary to mount them either upright, horizontally or in an inverted position. On account of the necessity for frequently inverting these coils the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has developed a new choke coil known as the type D1 air-cooled coil, which can be mounted so that the insulating coil supports are pendant or the coil rests upon the supports as illustrated.

The coil proper consists of an aluminum rod of a diameter large enough to carry 200 amperes safely, which



The Type D1 Air-Cooled Choke Coil Made by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

is bent into a helix approximately 15 in. in diameter and containing about 30 turns and reinforced by bracing clamps to give the helix the necessary mechanical strength. Two insulating columns made up of porcelain insulators, which are interchangeable except for the end pieces, support the coil, the number of insulators used in any column being dependent upon the voltage of the circuit in which the coil is to be mounted. These columns are supported on substantial cast-iron blocks fixed on wooden bases and can be removed and inverted by taking out four bolts. This arrangement enables the coil to be mounted in the most convenient position for wiring on either the floor or the wall or the ceiling. For upright mounting on the floor the parts are arranged as illustrated, while for inverted mounting the position of the columns is reversed and the base is attached to the ceiling.

The coils are intended primarily to protect transformers and for that reason should not be employed in connection with generating apparatus. If a greater reactance is required in connection with a high-voltage circuit than is afforded by a single coil this can be secured by connecting two or more coils in series.

The Southern Iron & Steel Company has opened a warehouse in Memphis, Tenn. It will be used as a distributing station for the Mississippi delta district.

Electric Forge Blowers

A recent product of the American Blower Company, Detroit, Mich., is an adaptation of its Sirocco blower for use as an electric forge blower, the power being secured from an ordinary electric light outlet. The advantages claimed for an electric forge blower over the hand blower include economy of space since it can be put under the forge or in any other place out of the way, starting or stopping it by a switch placed in a very convenient loca-

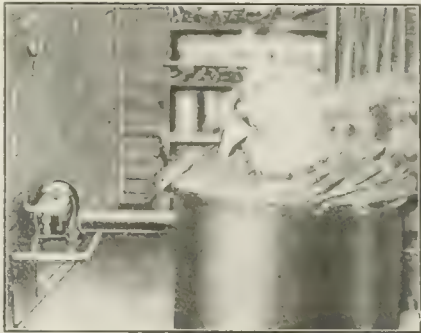


Fig. 1.—The Sirocco Electric Forge Blower, Made by the American Blower Company, Detroit, Mich.

tion for the blacksmith to reach from the forge or the anvil; the production of a strong and positive blast, building the fire up more quickly than is possible with a hand bellows or hand blower, and the production of more work in the same amount of time. Since the blower requires no attention while the iron is heating, other work can be prepared or finished. Fig. 1 shows one of these blowers installed to supply the blast to a furnace, while Fig. 2 illustrates the three sizes of blowers made.

The special advantages claimed for Sirocco blowers as compared with the other blowers of this type are a higher mechanical efficiency, quiet running, larger volume of air, quicker and hotter fires and smoother operation. The use of the Sirocco turbine type wheel reduces the amount of current consumed to practically nothing by reason of its high mechanical efficiency. This wheel is screwed to the motor shaft, an arrangement which reduces the number of bearings in the entire machine to two, and in addition there are no belts, levers, gears, pulleys, cranks or springs used in this construction.

Three sizes of blower are made, as shown in Fig. 2, which are known as the 6½, 9½ and 12½ in. sizes respectively. The smallest one, which is suitable for a sin-



Fig. 2.—The Three Sizes of Blower Made.

gle light fire, consumes less than half the current required by an ordinary electric lamp and the larger ones possess the same relative efficiency. The largest blower is capable of caring for five fires.

Tests of malleable iron showing a notable reduction in area in connection with the tensile strength are reported by the Ohio Malleable Iron Company, Columbus, Ohio. A test made at the Detroit Testing Laboratory showed an elastic limit of 37,195 lb., a tensile strength of 53,283 lb., an elongation of 15.62 per cent. and a reduction of area of 21.38 per cent. A test at the Pittsburgh Testing Laboratory showed an elastic limit of 34,750 lb., a tensile strength of 54,340 lb., an elongation of 18 per cent., and a reduction in area of 21.1 per cent. A test made by Robert W. Hunt & Co., gave an elastic limit of 41,195 lb., a tensile strength of 52,940 lb., an elongation of 17 per cent., and a reduction in area of 25.63 per cent.

The Cause of the Shelling of Wheel Tires

Stahl und Eisen gives a short report by Professor O. Bauer and E. Wetzel from the Royal Testing Laboratories in Grosz Lichterfelde, entitled "Injuries to Tender Wheel Tires through Strong Local Cold Work," the subject being a tire that showed bad scaling or shelling. It was submitted for examination to see if the cause of the shelling was due to un-uniformly hard material or to blowholes.

A piece was cut from the position marked C in the diagram Fig. 1. It was heated to a very dull red heat and straightened. Test pieces were cut for physical tests in the places marked 1 and 2. When tested they gave perfectly satisfactory results.

Other pieces were then cut right across the tire at A and B, and were polished and etched with copper ammonium chloride. They were entirely free from segregation, large slag inclusions, hollow places or blow holes. Large and small cracks could be seen where the shelling had taken place. The pieces were again polished and etched with 1 per cent. HCl solution in alcohol, for microscopic investigation. The structure shows ferrite and pearlite, with the former slightly in excess; and near the shelling the constituents are stretched and bent partly parallel to the tread of the tire, and partly in other directions. It shows clearly the influence of very strong cold working.

Hardness tests were made with a hardened steel ball pressed into the surface to a standard depth. The locations of the tests are shown in Figs. 2 and 3, the hardness number being put inside the small circles. In each case the metal near the tread of the tire is harder than the remainder. To determine whether this was due to the material or to its treatment, pieces A4, A8, B4, and B8 were heated to 800° C. for a quarter of an hour, and then tested again. The results were:

A4	137	B4	134
A8	137	B8	135

These show no appreciable difference, the material near the tread being of the same hardness as the material further removed. The conclusions arrived at are as follows:

1. Based on the physical tests, the material is fully up to the specifications.

2. The shelling is not due to blowholes or other defects of the material. Where the tire shows shelling the material shows the effect of very strong work either at the ordinary temperature or well below the annealing temperature, such as strong local shocks, excessive braking, etc.

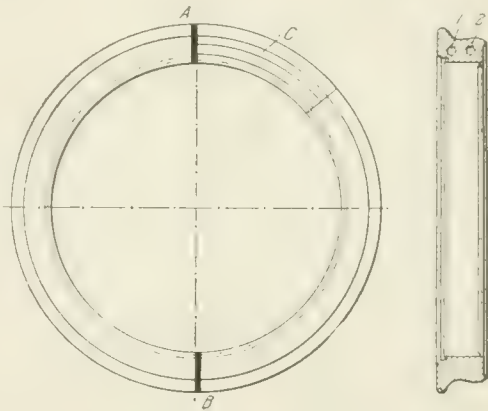


Fig. 1.—The Cause of the Shelling of Wheel Tires. Diagram Showing Sections Used in the Tests.

Through such strong local cold work small cracks are produced.

3. The ball tests show that the influence of the cold work extended to a considerable depth, and caused an increase in hardness.

G. B. W.

The Baldwin Locomotive Works

The Baldwin Locomotive Works, recently incorporated under the laws of Pennsylvania, is the new company that will succeed the old Baldwin Locomotive Works, Philadelphia, the name being thus preserved. The new company has \$20,000,000 authorized and outstanding 7 per cent. cumulative preferred stock with full voting power and \$20,000,000 authorized and outstanding common stock, making a total capital stock of \$40,000,000. The preferred stock is redeemable, but only as a whole, at \$125 per share and accrued dividends. This stock can be increased only with the consent of the holders of majority of the preferred shares outstanding at the date of any increase. The officers of the new company are as follows: President, Alba B. Johnson; vice-president, Samuel M. Vauclain; chairman of the Board of Directors, William L. Austin; directors, the foregoing and William Burnham, E. T. Stotesbury, T. DeWitt Cuyler, Roland L. Taylor, E. C. Converse, Samuel McRoberts, Charles D. Norton, Otis H. Cutler and Francis M. Weld.

President Johnson states that officers and managers of the former company take for investment \$5,900,000 of the preferred stock of the new company. They hold also a majority of the common stock in the new company, and are to continue to manage the business. As audited, combined profits of the Baldwin Locomotive Works, the old company, after expenses, charges, taxes, depreciation and sinking fund, were \$2,706,280 for 1910, and the average annual combined net profits for the last ten years were \$2,528,633. Application is to be made to list the preferred stock on the New York and Philadelphia Stock Exchanges.

The Homestead Valve Mfg. Company, Pittsburgh, Pa., has appointed Frederick K. Blanchard, 422 River street, Troy, N. Y., its representative in Albany and Troy and vicinity. He will have quite a stock of Homestead valves on hand, thus being prepared to furnish them on short notice.

The Savage Mountain Fire Brick Company, Frostburg, Md., has completed an addition which increases its tile capacity 2000 per day and has under construction several minor improvements. The Savage Mountain roof brick is now widely known. The plant has been in the Gorsuch family for over 47 years. Chas. C. Gorsuch is president and John A. Caldwell is treasurer and manager.

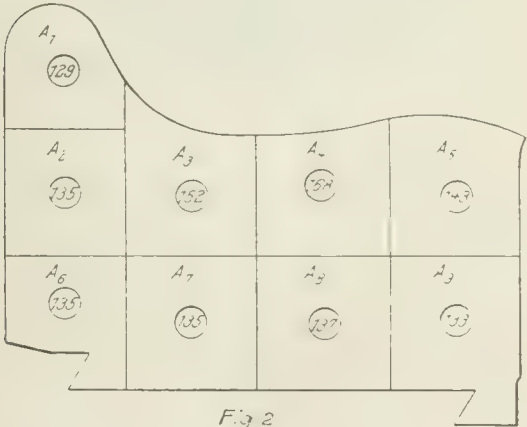


Fig. 2

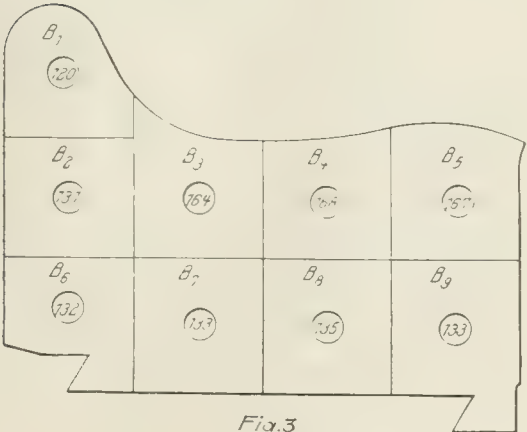


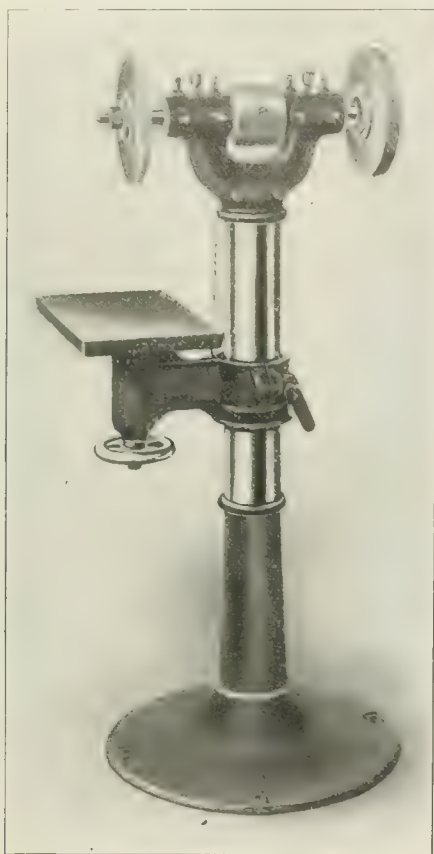
Fig. 3

Diagrams Showing Position of Hardness Tests and Degrees of Hardness in Section of Wheel Tire.

The Garrigus Surface Grinder

The surface grinding machine shown in the illustration is known as the Bristol No. 1, style A, built by the C. G. Garrigus Machine Company, Inc., Bristol, Conn. It is designed for use in the manufacture of dies for presses and stamps, and for other similar work. The bearings constitute a special feature, consisting of slip bronze sleeves, adjustable, $\frac{1}{8}$ in. in diameter, and self-lubricating and dust proof. On the bottom of the surface table is cast a shank, which is threaded, permitting a fine adjustment by means of a bronze screw nut and a hand wheel located directly beneath the center of the abrasive wheel. A check nut is provided to take up the wear, so that the table cannot work down under the cut. The table is also adjustable up and down on the column and is counter-weighted. A tool rest is provided for the other wheel.

The table is 8 by 15 in., and the maximum distance from the center of the wheel to the top of the table is 17



The Bristol No. 1, Style A Surface Grinder, Built by the C. G. Garrigus Machine Company, Inc., Bristol, Conn.

in. The spindle is made to take abrasive wheels 8 in. in diameter with a maximum thickness of $1\frac{1}{4}$ in. The driving pulley is 4 in. in diameter, with 3-in. face, and the tight and loose pulleys of the counter shaft are of 6-in. diameter. The spindle is intended to run at 2000 r.p.m., the speed of the counter shaft being 500 r.p.m. The height of the machine is 3 ft. 4 in.

Rumors that the Jones & Laughlin Steel Company is making plans for building a large coke plant at Aliquippa, Pa., are officially denied. No plans are under way at present for any further extensions there. The four blast furnaces and the Talbot open-hearth furnaces are completed and ready to run and will be started as soon as conditions in the steel trade improve.

A 5 per cent. nickel steel is hardest magnetically when quenched in the neighborhood of about 900 deg. C. (1650 deg. F.), according to Dr. E. Colver-Glauert and Dr. S. Hilpert of Berlin, Germany, in a paper before the Iron and Steel Institute on "The Magnetic Properties of Some Nickel Steels." Quenching from higher temperature results in a softer material.

A Handy Hydraulic Press

A new type of small hydraulic press has been recently placed on the market by the Watson-Stillman Company, 190 Fulton street, New York City. Although especially intended for crushing specimens of common building material in the laboratory, it can nevertheless be used in the machine shop for a large number of purposes. Some of the applications of the press are for press fitting small parts and applying a high pressure to small articles to be bent, straightened or flattened.

This press has been brought out to fill the demand for a small press which could be substituted for the ordinary expensive and cumbersome compression machine for use on construction work, in machine shops and material testing laboratories. For press fitting of a delicate nature it is absolutely essential that the operator should know the amount of pressure that is being applied. If one man were to do all the work of a certain nature which came into a shop it would, of course, be satisfactory to depend upon his sense of touch, but where it is necessary to divide the work among several operators some more accurate means of measuring the pressure must be devised, since it is difficult for one person to communicate to another the sense of touch, and it is also natural for an operator to watch the gauge of the press. In the cement and concrete field the press will



A Small Hydraulic Press, Built by the Watson-Stillman Company, New York City.

enable those in charge of the work to test the material employed in compression, which, it is claimed, will do away with a number of failures of concrete buildings.

The construction of the press is rigid and compact, the material and the workmanship are of a high order. The operation of the press is quick and easy and rapid movement of the ram is facilitated by the lever and the connecting rod at the left. Where only light pressures are required the handle of the extension lever socket at the right will operate the pump easily, and by applying the extension lever it is possible to develop a pressure of 30 tons. The platens are 8 in. square, the distance between them when opened to their maximum is 8 in., and the movement of the ram is 4 in. The overall height of the press is 27 in. and the base measures 12 x 16 in. A steel forging which is machined to fit perfectly into the reservoir is used for the main cylinder and the pump cylinder is of bronze.

A special meeting of stockholders of the Youngstown Sheet & Tube Company will be held at Youngstown, Ohio, July 25, to vote on a proposed increase in the capital stock from \$10,000,000 to \$15,000,000. The new stock will be 7 per cent preferred, with dividends payable quarterly; will have no voting power and is redeemable after 1921 at 105 and any arrearages in dividend. A large part of the new capital will be used in building an open-hearth steel plant and finishing mills. Work on the open-hearth plant will probably be started about September.

Mattie furnace of the Girard Iron Company at Girard, Ohio, was blown out last week for repairs.

Potassium Chromate as Metal Protection Agent

Potassium bichromate as a material to prevent the corrosion of metals was referred to at length in a joint paper by J. Newton Friend and Joseph H. Brown, both of Darlington, England, on "The Action of Aqueous Solutions of Single and Mixed Electrolytes upon Iron" read before the Iron and Steel Institute. For tanks kept at ordinary temperatures and holding liquids containing appreciable quantities of salts, not necessarily common salt, of course, an addition of about 1 lb. of bichromate to 10,000 lb. or to 1200 gal. will, it is asserted, exert a marked retarding action upon corrosion. If the concentration of the dissolved salts is small, the bichromate may with advantage be increased to about 10 lb. per 1200 gal. With boiling solutions, however, it appears that while the presence of the first mentioned proportion of bichromate is powerful in retarding corrosive action of the metal, a proportion ten times greater is far less beneficial and under some conditions may enhance the corrosive action of the liquid. Herein lies the objection to the use of bichromate owing to the impossibility of regulating the concentration of the salt to the nicety desirable to obtain the maximum efficiency.

Owing to the small quantities of bichromate useful in retarding corrosion, the author suggests that better results might be expected if a chromate were used instead. It appears that too much chromate cannot be added, as by increasing its concentration, even up to saturation, no ill effects are produced, but rather the tendency to corrode is reduced still more. Finally, the experiments showed that the addition of about 8 or 9 lb. of the chromate salt per 1000 gal. of water exerts a marked retarding effect upon corrosion, and that a further increase in the concentration of the salt is even more beneficial in the presence of small amounts of the chloride, an excellent protection being secured with about 80 or 90 lb. per 1000 gal.

New Publications

Electric Railway Dictionary.—Compiled by Rodney Hitt, under the direction of a committee appointed by the American Electric Railway Association. Bound in leather. Size, 9 x 12 in.; 292 pages. 1987 illustrations. Price, \$5.00 net. Published by the McGraw Publishing Company, 239 West Thirty-ninth street, New York City.

Every industry has a technical language peculiarly its own, and the terms and names of apparatus used cannot be found in any of the standard dictionaries. This is particularly true in the case of electric railway apparatus, and the result has been the creation of much confusion in ordering parts from manufacturers and in interpreting communications between railway companies. The compilation of this book was undertaken as a step toward the standardization of the nomenclature of the electric railway car construction, and the plan adopted was to define the location and purpose of a part in one section of the book and refer to an illustration of it in another part. In this way the definitions are arranged alphabetically, with numerous cross references, and a logical arrangement of illustrations is made possible. If a part has more than one name commonly applied to it the preferred name is defined and the other names are given in their proper places with a cross reference to the preferred one.

The illustrations are grouped together so that a logical arrangement is secured, the various types of cars being given, first commencing with small city cars and including large city cars, interurban passenger, combination and special cars, elevated and subway cars, snow sweepers and plows and sprinklers. This is followed by illustrations of car body framing and details including small hardware parts, registers, seats, brakes, lights, track scrapers, etc. The various types of trucks and their details are next given, with different types of motors and control apparatus succeeding them. Space is then given to miscellaneous electrical equipment and the various types of trolleys and trolley bases, together with two pages of engineering association standards, and this completes the second part of the work. As an aid in ordering parts from the engravings the manufacturer's name has been added below the title of each one.

Monoplanes and Biplanes, By Grover Cleveland Loenig. Bound in cloth. Size, 6 x 8 1/4 in.; pages, 340; illustrations, 278. Price, \$2.50 net. Published by Munn & Co., Inc., 361 Broadway, New York City.

The progress of aviation has led to a demand for a book giving a practical exposition of the subject, and in producing this work the author has made it his endeavor to present the subject of the aeroplane in a manner that is at once intelligible and of interest to the average man as well as of value to the student. After a brief historical introduction, in which the work of the pioneers in this subject is pointed out, the design of aeroplanes is taken up. The theory of aerodynamics is presented as simply and completely as possible, and the fundamental principles are fully explained and emphasized. A complete example of the design of a machine is given at the end of this section, and should prove of value to those who are actively engaged in construction of aeroplanes.

Monoplanes and biplanes in their forms are then considered, and detailed descriptions of virtually all the present successful types are given, supplemented by photographs and diagrams drawn to the same scale, which enables a graphic comparison to be made easily. The leading types are compared and discussed in the last part of the book and conclusions drawn from the results of actual practice, which enable lines of probable future development to be pointed out. In this section the causes of the numerous tragic, and in many cases avoidable, accidents, which constitute one of the greatest detriments to the progress of aviation, are pointed out and, as far as possible with the meagre knowledge available, means for their prevention are given. The final chapter deals with a variable surface aeroplane, a development that the author believes will be the next great step forward in the rapid progress of the art.

Heusler Alloys.—"Magnetic Properties of Heusler Alloys" is the title of an interesting bulletin issued by the engineering experiment station of the University of Illinois. The work was conducted by Edward B. Stephenson, and presents a complete description of experimental methods followed in the investigation of certain copper-manganese-aluminum alloys. The particular object of this work was to show a relation between the magnetic properties of the alloys, the chemical composition, and the molecular structure under heat treatment. While the facts established are limited in their significance, the means adopted for the control and measurements of temperature up to 1000 deg. C., the methods of thermal analysis as an aid to chemical analysis in the study of allotropic forms of the alloy and the methods used in developing the photomicrographic portion of the investigation are valuable. The bulletin is illustrated and may be obtained from the director of the university experimental station, Urbana, Ill.

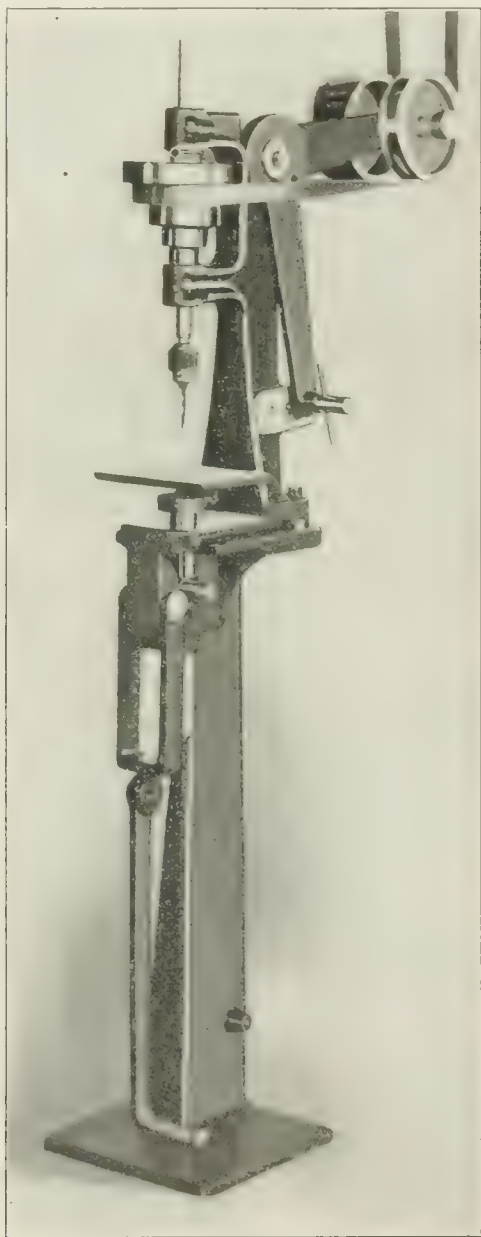
Metric System Tables.—The Bureau of Standards, Department of Commerce and Labor, Washington, D. C., of which S. W. Stratton is director, has issued the third edition of its "Tables of Equivalents of the United States Customary and Metric Weights and Measures." This is a publication of 50 pages, each 9 x 12 in., giving a large number of tables of equivalents, which are exceedingly convenient for ready reference. The equivalents have been carried out to the fifth decimal place and have been calculated up to 1000 units. Another publication of the same bureau, comprising 16 pages, gives a full description of the metric system, having been prepared to answer some of the more simple questions addressed to the bureau regarding the basis of the system and its use.

The Apollo Metal Calendar.—The Apollo perpetual metal calendar issued by the American Sheet & Tin Plate Company, Pittsburgh, in the latter part of 1910, proved very useful, meeting with such a demand that the initial supply was quickly exhausted. As many orders were received which the company could not fill, it decided to order a second lot, and the unfilled requests are now being cared for. An application from any user of sheets or tin plates in any form addressed to the company's advertising department, Imperial Power Building, Pittsburgh, will secure one. The calendars are intended for wall use. The base is 14 in. x 20 in. galvanized material, suitably stamped in colors, and contains a holder which supports movable japanned sheets for the months and days of the year.

The Townsend High-Speed Drill Press

The high-speed drilling machine illustrated herewith is designed by its builder, the H. P. Townsend Mfg. Company, Hartford, Conn., as a manufacturing tool. The characteristic feature is the substitution of a treadle for the hand lever, an arrangement which leaves the operator free to handle the work. No jig is necessary, as a lever handle can be substituted, the hands being available to operate it. The foot on the treadle is at ease, permitting sensitiveness of touch as in the hand lever machine. Owing to the facility in handling work it is estimated that $3/16$ -in. holes can be drilled through brass or bronze $1/4$ in. thick at the rate of 50 a minute.

Instead of ball bearings a long cast iron bearing is employed, treated on the inner surface with a secret process



The Townsend Manufacturing Drilling Machine.

which impregnates the metal with graphite to a depth of 0.01 in. With this, it is claimed, a new machine will run 10 hours without heating at the rate of 3000 r.p.m. with one oiling.

The hole for the spindle and the table plunger are bored in line, and the table may be swung up in the center rest of a lathe and accurately faced off at any time. The simple belt tightening device is accessible from the front of the machine, so that changes of speed may be quickly made. The four speeds are in the ratio of 975, 1250, 1700 and 2375.

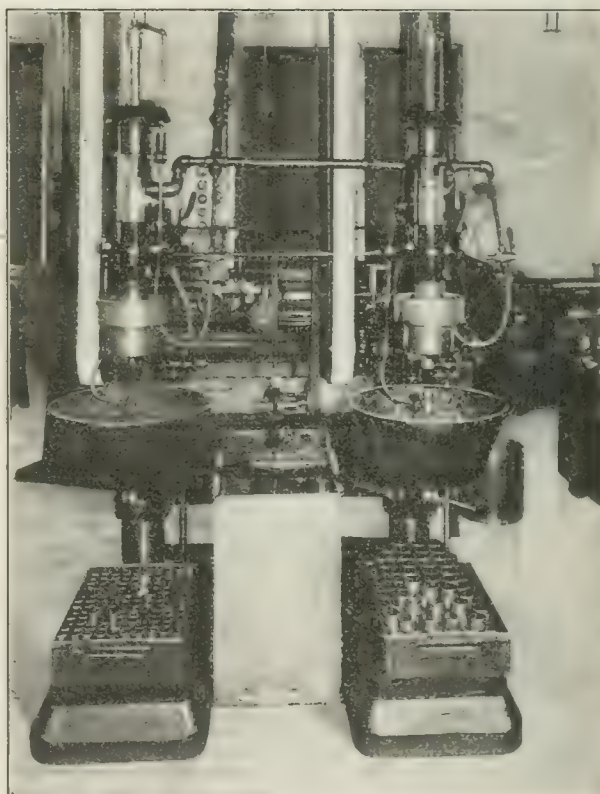
The adjustment of the table is secured by a stop collar underneath the bed. In addition a micrometer adjustment is provided. Several heads may be set in a row and a

weight feed applied for deep drilling operations where enough time is occupied to enable the operator to feed more than one machine. The specifications follow:

Size chuck.....	1 1/2 in.
Greatest distance bed to chuck.....	6 1/4 in.
Table raises.....	1 1/2 in.
Table adjusts.....	4 in.
Spindle adjusts.....	3 in.
Depth of throat.....	4 in.
Table size.....	6x8 in.
Tight and loose pulleys.....	5x1 3/4 in.
Driving pulley.....	12 in.
Speed of countershaft.....	575 r.p.m.
Floor space.....	12x24 in.
Weight, crated, complete.....	240 lbs.

Interesting Application of a Barnes Tapping Machine

The accompanying illustration presents an interesting job of machine tapping with two 20-in. all geared tapping machines. The pieces being tapped are pressed steel grease cups, an example of blind hole tapping by the inverted process; that is, the spindle is fitted with a Garvin pneumatic chuck which automatically grips and releases the caps without stopping the spindle. The work is then revolved down on the tap, which is held in a Colburn floating tap holder in a special cup type table. Oil is forced up through



Tapping Grease Cups in a Barnes Drill.

the center of the tap as shown in the machine at the left and serves a double purpose in forcing out the chips so that they may be free to fall.

These machines are built in 20- and 24-in. sizes by the Barnes Drill Company, Rockford, Ill., and follow the general design and specifications of this company's standard all geared drills. In fact, the tapping machine can be combined with the friction clutch gears and positive power feeds to make a drilling and tapping machine. The friction clutch gears give a reverse speed $1 3/4$ to 1. They are located at the driving end of the machine rather than on the spindle.

The automatic reversing mechanism which is especially desirable for depth tapping is controlled with a trip so set as to automatically reverse the spindle at the desired point, backing out the tap at increased speed. The shifting lever may also be set so that when tripped automatically or by hand, it will return to a neutral position, thus stopping the spindle instead of reversing.

Four direct geared speeds and four back geared speeds, or eight changes in all, are available on this tool. The 20-in. machine will drive a $1 1/4$ -in. standard tap in cast iron without back gears, and the 24-in. will handle up to 2-in. pipe taps.

Reversible Direct-Current Drum Controllers

A new line of drum type controllers has been recently developed by the Cutler-Hammer Mfg. Company, Milwaukee, Wis. These are designed for use with direct-current reversible motors operating heavy machinery such as ladle, foundry and transfer cranes, ore unloaders and bridges, car dumpers and other apparatus found in steel mills, although they are also adapted for use where frequent starting and stopping is required, as is the case with many types of hoisting machinery. Figs. 1 and 2, which are exterior and interior views, respectively, of the controller used with 30 to 50-hp. motors, show the general construction of the line.

The principal features claimed for these new controllers are an ease of operation which permits the operator to feel all points of control, an even distribution of the magnetic flux, providing an effective blowout on each finger and segment, a hinged pole piece, increased accessibility to all parts, the use of arc deflectors and shields to prevent the burning of the finger board and the jumping of the arc from one finger to another, a new design of non-stubbing fingers and a large number of resistance steps, together with a special arrangement of the circuits in the controller. The cast-iron enclosing shell is weather-proof, and both the controller head and cover are removable. The copper segments are mounted on a rotating cylinder, and a finger board carries a number of fingers for making and breaking the circuits supplying the current to the motor armature for rotation in either direction and to produce smooth and easy acceleration by cutting out the starting resistance in a large number of steps. The tips of the segments and also the fingers are renewable, and the entire finger board can be taken out without removing the rotating cylinder upon which the segments that the fingers rub against are mounted.

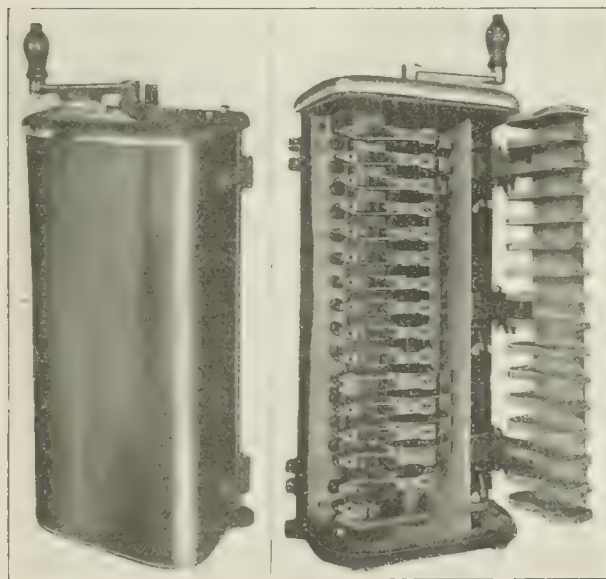


Fig. 1.—Exterior View.

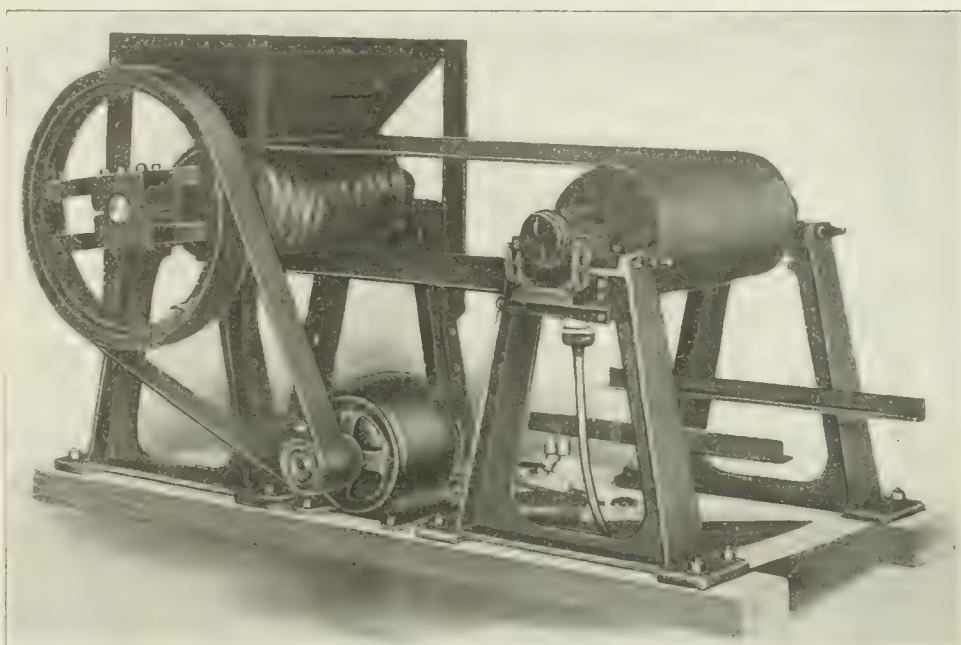
Fig. 2.—Interior View.

Two Views of a New Direct-Current Controller for Steel Mill Machinery, Built by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

These controllers are made in four sizes, having capacities of 50, 100, 200 and 400 amperes, the last having two fingers for each segment instead of one. The number of speeds available in each direction with these controllers are six for the lowest, seven for the second size and nine for the last two. The standard line of apparatus includes controllers for 110 and 220 and 500-volt direct-current motors. A part of this new line are full reversing and dynamic lowering types of controllers. Where a controller of the latter class is used it is stated that in many cases it is possible to control the speed of a descending load by varying the amount of resistance in the armature circuit so that its downward movement cannot be perceived by the eye.

New Magnetic Separator

For separating the magnetic material from mixture containing both magnetic and non-magnetic matter the



A New Type of Magnetic Separator for Coal, Rock and Ore, Built by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

Cutler-Hammer Mfg. Company, Milwaukee, Wis., has developed a new type of magnetic pulley or separator. The machine is especially designed for handling coal, rock, ore, etc., where it is essential that no large pieces of steel or iron enter the crusher. Other applications are the removal of iron shot from molding sand, separating magnetic ores and other work of a similar nature.

The magnetic pulley consists of alternate coils and steel disks concentric with the shaft, the latter being keyed thereto and supporting the steel spool foundations of the former by dowels. All of the coils are inclosed and protected by a cylindrical brass coil shield, which bears tightly with each of the two adjacent pole pieces. Carbon brushes held on a pair of slip rings by self-adjustable holders provide the necessary current for the coils.

The material to be separated is fed by a hopper to the conveyor belt running over the pulley. As the material passes over the pulley the magnetic matter is drawn toward the face, clinging to the belt until the latter reaches the point where it leaves the pulley on the lower side. Here it is snapped off into a chute or other conveyor which is installed to receive it. The non-magnetic material is projected for a considerable distance in front of the pulley, thus giving a clean separation, and if desired this can also be conveyed away.

The standard pulleys have but one diameter, namely, 12 in., but are built in lengths ranging from 16 to 36 in. The capacities range from 1340 to 3000 cu. ft. per hour and the current consumption from 325 to 750 watts. Any direct current voltage up to 250 will operate the separator satisfactorily. If desired pulleys having a diameter larger than 12 in. can be built to fill the requirements of special installations.

International Harvester Tractor Works

Design of a Large Plant at Chicago for Making Gas Power Farming Machinery, Special Machinery and Unusual Power Arrangements

Five years ago, when the International Harvester Company began to build gas tractors at its Milwaukee Works, the commercial demand for gas power farming machinery was in its infancy, and but little was known of this power for farm use. Now this company has under construction and in partial operation in Chicago a plant that will be devoted exclusively to the manufacture of this type of tractor. Ground was broken in 1909 and the progress of building is in accordance with a construction schedule which provides for completion in 1916. During the past six months the first sections of the forge and machine shops have been in operation on a capacity schedule of six tractors per day. With respect to the character of buildings and equipment this plant is representative of the most progressive types and already involves an expenditure of over a million dollars.

the forge shop. The work under construction and to be completed in 1911 includes an additional 240 ft. of the machine shop and 260 ft. of the forge shop bringing the length of each up to 500 ft. The steel framework of the machine shop addition is now erected and the machine equipment decided upon. The building of the foundry is scheduled for 1912. The necessity for crowding into the portion of the plant now built all of the operations involved in the complete construction of a tractor at present prevents the segregation of the several departments to the extent that will be possible later.

The ground plan shows the railroad spur which traverses the areaway between the machine and forge shops. This track is depressed between ground-level loading and unloading platforms and is spanned by a 12-ton yard crane. Material is brought to the end of the spur, and there is un-

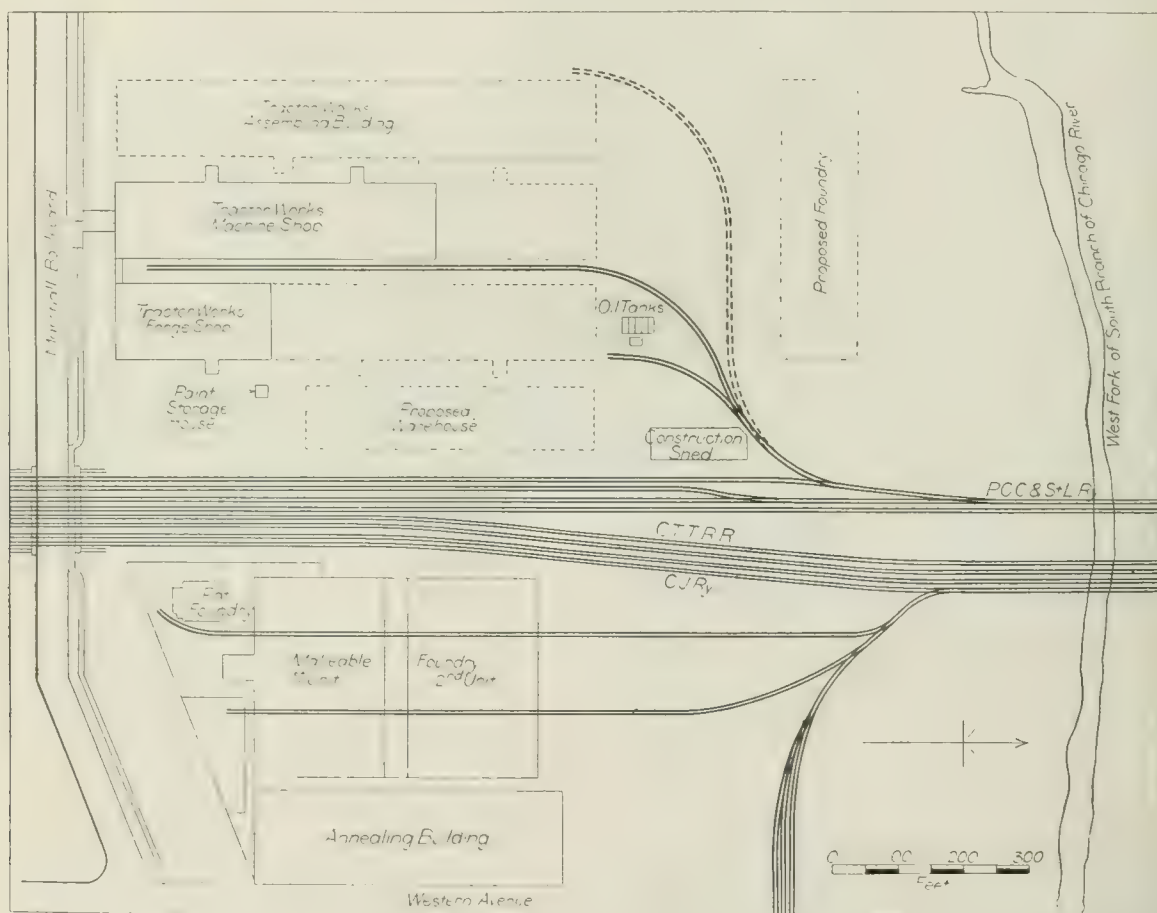


Fig. 1.—Ground Plan of Tractor Works at Chicago, International Harvester Company; Completed Buildings Are Shown in Full Lines.

The Tractor Works site adjoins the malleable foundry of the McCormick Works in Chicago. The plant as now projected is indicated in the layout, Fig. 1. The essential units comprise a forge shop, machine shop, assembling building and foundry. The first three buildings will parallel one another in a north and south direction, with a 40-ft. areaway between each building. Each of these buildings will be 760 ft. long by 120 ft. wide, and will be similar in the material and character of their construction. The foundry is to be erected to the north of the other buildings and at right angles to them. The relative location of the foundry as planned, with reference to the machine shop and general direction of the castings through the finishing process, is not so logical perhaps as it is expedient in the light of other previously existing considerations. The foundry will be 120 x 440 ft.

This article will confine itself to that portion of the shops and equipment now built and installed. This comprises the first 260 ft. of the machine shop and 240 ft. of

loaded either into the stockroom or directly into the south end of the machine shop, if it be parts for machining. At this end, where the raw material enters, the arrangement of machines, as illustrated in Fig. 2, provides for the grouping of the heavy tools. Set across the main bay are two Gray planers, one 42 x 42 x 16 ft., the other 48 x 48 x 10 ft., and a special Ingersoll duplex milling machine.

Along the columns, as also shown in Fig. 2, are six Niles boring mills, five of them 60 in. and one 51 in. and five 36 in. Bullard vertical lathes. All of these tools are independently motor driven. The Gray planers are primarily intended to handle the overflow from the milling machine which was designed especially for machining the engine crank cases. These housings require facing on top, bottom and four sides. For these operations, these four-head planers, with their large opening between housings, can be used very advantageously.

The special duplex milling machine built by the Ingersoll Milling Machine Company, Rockford, Ill., is illus-

trated in Fig. 3, and merits description in some detail. The table has a working surface 36 in. x 10 ft. It is a six-spindle machine, four upper spindles being carried in two rigid saddles, while the lower or auxiliary spindles are carried in special sliding saddles having a vertical adjustment of about 8 in. The four main spindles are 7 in. diameter, the other two $3\frac{1}{4}$ in. The quills for the main spindles are 12 in. in diameter and have 10-in. independent horizontal adjustment. The lower quills have a horizontal movement of 6 in. All-steel gears 20 in. diameter, 3 in. pitch and 4 in. face drive the two main spindles and are equipped with clutches for throwing in and out of rotation. The saddles may be bolted together by a tie plate for gang milling as illustrated in Fig. 4 and are equipped with power travel up and down. The cutters used vary in size from 7 in. up to 20 in. The cutters in the two center spindles are 18 in. in diameter and have faces 6 in. wide. They cut on both sides and face. The arbor mills shown in Fig. 4 are 7 in. in diameter and 9 in. of face, and are of the Ingersoll inserted-tooth slab milling cutter type. The entire machine weighs about 51,000 lb. and is driven by a 35-hp. variable speed motor.

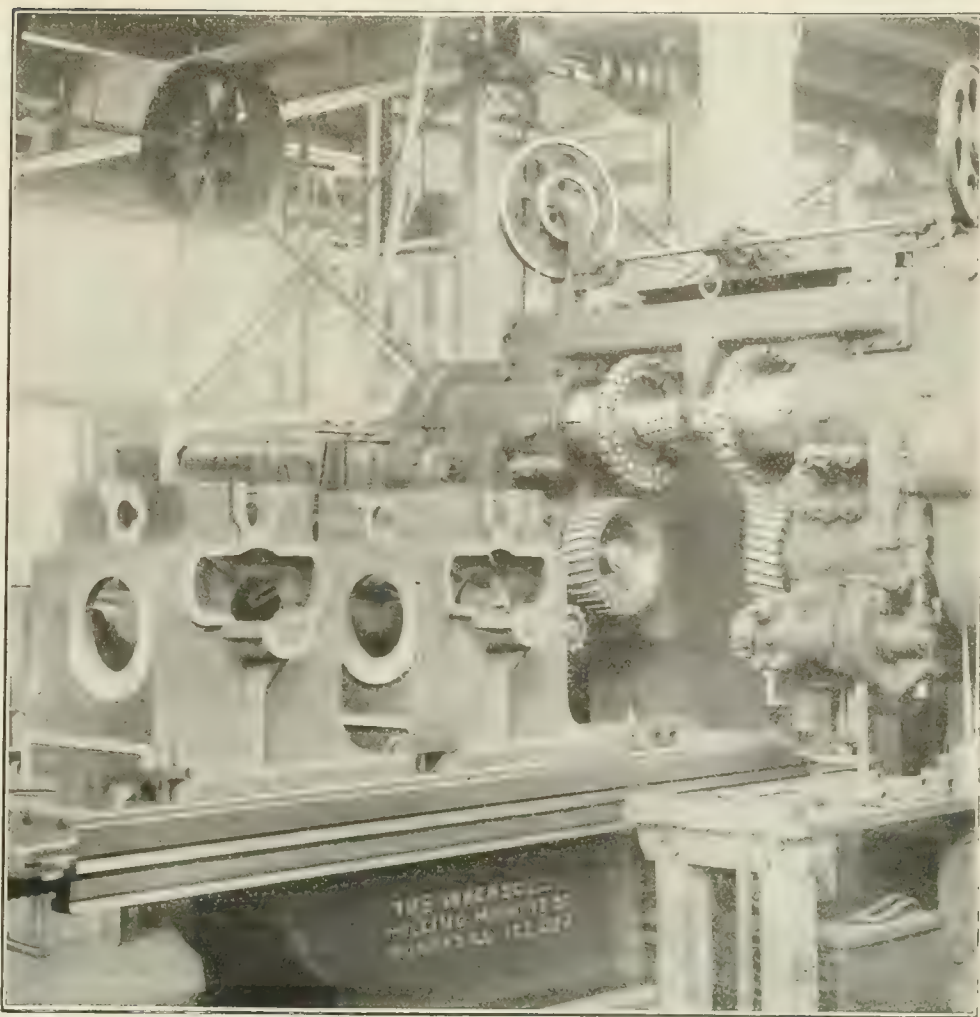


Fig. 3.—Special Ingersoll Milling Machine for Finishing Crank Cases.

Two operations are required for the complete milling of the crank cases. The first consists of milling the top and side pads. Seven cutters are used for this operation, the largest being 20 in. in diameter. A cut of $\frac{5}{8}$ in. of stock is made and 12 bases can be machined in ten hours. For

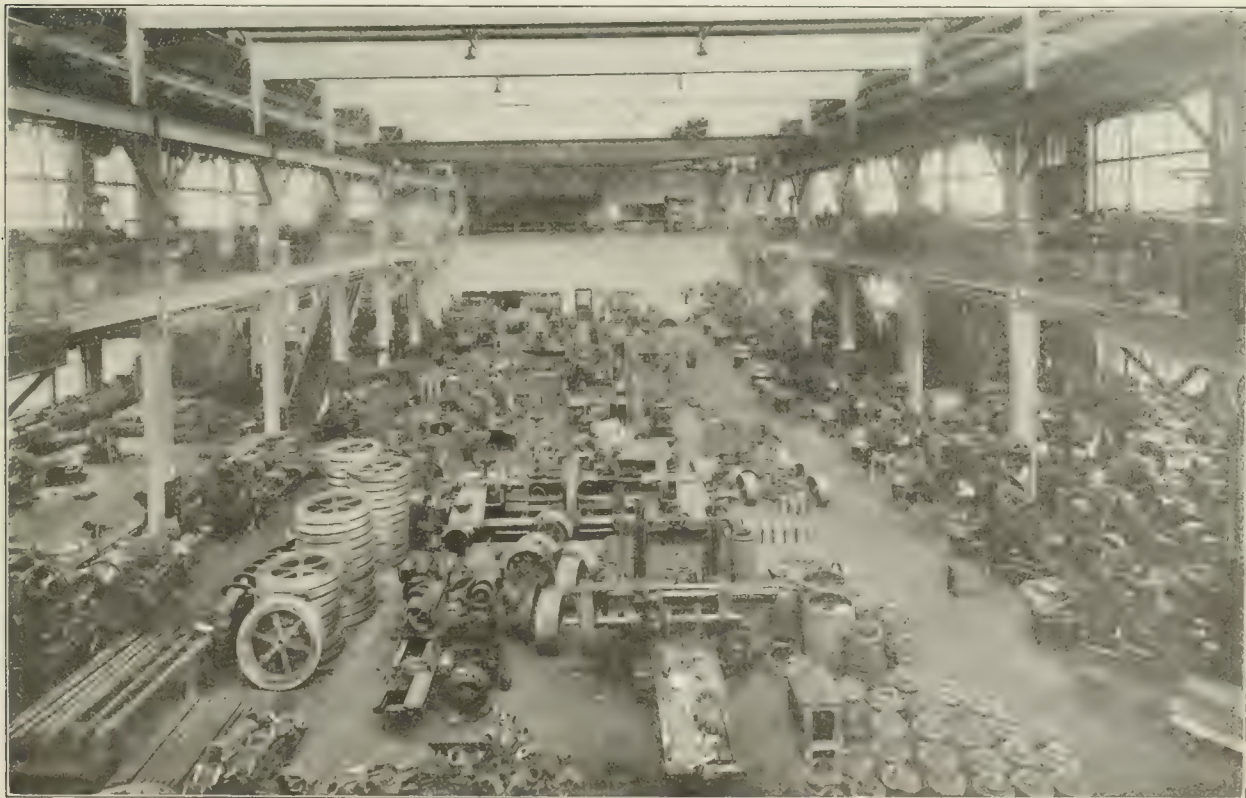


Fig. 2.—View of Machine Shop Main Floor, Looking Toward Heavy Tool Section at Which End the Work Enters the Shop.

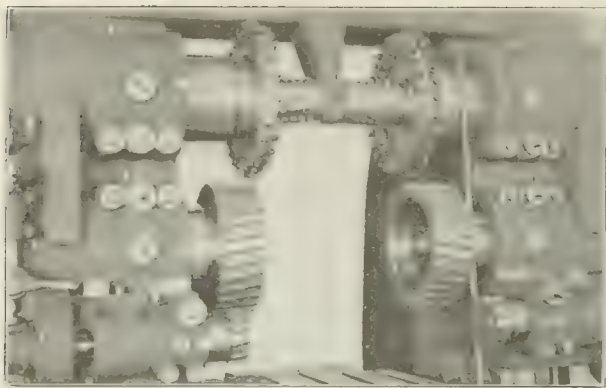


Fig. 4.—View of Spindles, Gears and Cutters of the Special Ingersoll Milling Machine.

the second operation, the housing is turned around at right angles and four cutters are used, the largest of which is that shown in Fig. 4. In this operation about $\frac{1}{2}$ in. of stock is removed and in 10 hr. fourteen housings can be finished.

On the 60-in. boring mills the flywheels and differential gears are turned and bored. The mills are set far enough into the middle bay so that the pieces to be machined can be handled on and off of the mill tables with the crane. The 51-in. mill is to be used for boring the engine cylinders. The Bullard vertical turret lathes are very flexible and adaptable for a variety of boring and turning operations on the smaller band and gear wheels. On the opposite side of the columns from this group, in the side bay, are arranged the group of milling machines which include six Cincinnati milling machines, one No. 3 high-power plain miller, one No. 3 vertical high-power, three No. 4 high-power plain millers and one No. 5 machine. With the exception of one keycutting operation, for which a 24-in. Gould & Eberhardt shaper is now being used, no shaper or small planer tools are included in the shop equipment. The machining of connecting rods, bearing brackets and boxes, housing doors and similar is done entirely on the milling machines. Practically all of the work is machined in jigs, and by using two and three cutters nearly all of the jobs are finished in one or two operations.

Two No. 2 Cincinnati-Bickford 5-ft. radial drills, new type improved, and one 36-in. Bickford plain radial together with a No. 1 Baker Bros. high-speed drill, are provided for the miscellaneous drilling. Most of the template drilling, as for the crank cases and gear spiders, is done on a Bausch horizontal multiple-spindle drill. The openings in the crank cases for bearings and cylinders are machined at present on a Lucas horizontal boring mill, but a special horizontal four-spindle machine is under construction with which it will be possible to finish all four openings in the crank case at one setting. The pistons, crank shafts, countershafts, and gear blanks are among the pieces handled on the heavier lathes, which group includes two 28-in. Pond Turret lathes, a 21-in. Gisholt, a 78-in. heavy duty Le Blond, a heavy duty American lathe, and a

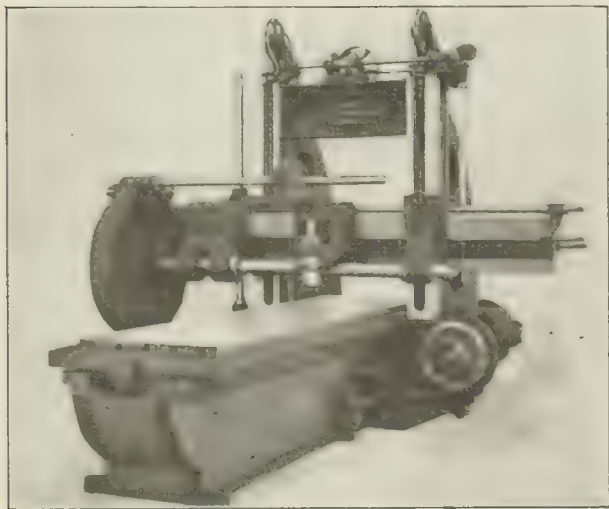


Fig. 5.—Ingersoll Horizontal Spindle Slab Milling Machine, with Special Vertical Spindle Attachment for Key Seating.

36-in. x 16-ft. Lodge & Shipley patent head high-speed engine lathe.

The slotting and tooth cutting of the differential and driving gears is handled in a group of machines, including a 15-18-in. Dill adjustable-head motor-driven slotter, a Lapointe Machine Tool Company broaching and keyseating machine, and two Gould & Eberhardt new type 64-in. x 20-in. steel motor gear cutter, motor driven. The finishing of the heavier engine parts is close to the north end of the east side bay, and here the engines are assembled ready for test.

The gallery of the machine shop extends across the south end and along the east and west sides of the building. At the south end is located the toolroom. It combines the machine equipment for the upkeep of the shop tools as well as the tool supplies. The west gallery, a view of which is shown in Fig. 6, is wide enough for a row of benches along the windows, a line of drill presses and miscellaneous small tools down the center and another row of benches along the gallery railing. The north end of this gallery is devoted to bench work for fitting and assembling the engine parts, such as the governors, connecting-rod boxes, pistons, valves and other parts.

The east gallery, shown in Fig. 7, is given over to lathe work suitable for Jones & Lamson and Bardons & Oliver type machines. This group also includes a Cleveland automatic machine, and two Landis bolt cutters, motor driven. At four points the floor of the gallery projects out under the crane providing 6-ft. landing platforms, and thus allowing the gallery floor to be included in the crane service. In addition an electric elevator is available for handling materials.

The shop tools are electrically driven throughout with alternating current motors. The larger tools are each individually driven, while in the side bays and galleries some of the smaller machines are grouped under belt drive from a common motor. The line shafting is equipped throughout with Hyatt roller bearings.

The steel to be worked up in the forge shop is received from the loading platform into the west side of the building at a point where it can be conveniently moved to the heavy cutting and pumping machinery in the center of the building. The heaviest pieces are for the steel tires. These pieces are 24 in. wide x $\frac{1}{2}$ in. thick, reinforced on both edges by a strip $1\frac{1}{2}$ x $\frac{1}{4}$ in., and are sufficiently long to permit rolling up into circles 73 in. outside diameter for the front wheel, and 40 in. outside diameter for the rear. Before rolling the tires are punched in a Cleveland Punch & Shear Works Company's multiple punch. This machine has a triple housing, spaced 100 in. within the outer housing, and has a 12-in. depth of throw. The stroke of the plunger is $2\frac{1}{2}$ in. and eccentric bearings are provided together with a mechanism for simultaneous operation, so that the stroke may be adjusted up to and including one inch. The machine weighs approximately 75,000 lb. and appears in the view of the forge shop, Fig. 8. The tires are rolled in a Bertsch tire roller, the rolls of which are 7 in. in diameter and 36 in. long.

The structural shapes for the tractor frame are received cut to length. They are punched in the forge shop, heated in a Rockwell bulldozer furnace and shaped to an O-G curve, in a bulldozer operated by hydraulic pressure. The wheel spokes are riveted into the tire, cold, on a special hydraulic spoke riveter built by R. D. Wood & Co., Philadelphia. For these two operations a hydraulic accumulator and pump yielding 1500 lb. pressure per square inch is installed.

The heating furnaces are Rockwell oil type of various sizes. The oil supply is maintained in tanks having a capacity of 10,500 gal., and the tanks are buried at some distance from the shop. The oil is pumped under a pressure of from 7 to 10 lb. The air for the heating furnaces is supplied from a 500-cu. ft. Root blower under a pressure of 2 to 5 lb. In accordance with Underwriters' requirements, the blower is connected up so that, when it is shut off, the oil pumps at the distant pump house are also automatically shut down.

The assembling of the tractor chassis, the testing of the engine, and the mounting on the trucks occupy the north end of the building in both bays. In connection with the tractors, it is interesting to note that all holes are drilled while the material is in the shop except those in the frame through which the engine housing is bolted on. These holes are drilled with an air drill with the engine in place.

The compressed air for drilling and chipping is supplied from a 500-cu. ft. Ingersoll-Rand duplex compressor equipped with regulator and driven by a squirrel cage type General Electric motor. The compressed air is also used for blowing the artesian well from which drinking water is obtained. The well is 1560 ft. deep, delivers 220 gal. per minute, and requires 95 lb. pressure to start.

Great care is given to the testing of the engines. Twelve testing blocks are installed, six in each bay. Between each pair of test blocks is a 50-kw. generator, to which the engine on either block can be belted during the test. Each of the six motors is supplied with a switchboard panel, connecting the generator output with a power system of the plant. Inasmuch as the test involves one day's run, light, and two with a load, before the engine is mounted on the tractor, it is possible by connecting up with these generators, to supply no inconsiderable amount of current. A difficulty arose, however, in that this current being intermittent required cutting in and out of the plant power

a step-up transformer and over a 440-volt line to the malleable foundry. Coincident with the building of the Tractor Works, a plan was evolved whereby the waste heat from the furnaces of the foundry, which at that time was going direct to the stack and being lost, could be diverted through waste heat boilers and used for the generation of additional power. Six 400-hp. Wickes vertical tube boilers were installed to take care of an equal number of 14-ton furnaces. From the boilers, sufficient steam can be developed at 150 lb. pressure to yield from 1500 to 1600 kw., depending upon the number of furnaces working. For the generation of this current there are installed at present two turbo-generator sets, each of 1000 kw. maximum capacity. The Tractor Works, as a result, has four available sources of power—the Sanitary District, the malleable foundry waste heat plant, the wood mill shavings fuel plant, and the engine testing station. For plant distribution all of this current is, finally, three-phase, 60 cycle, and 440 volts.

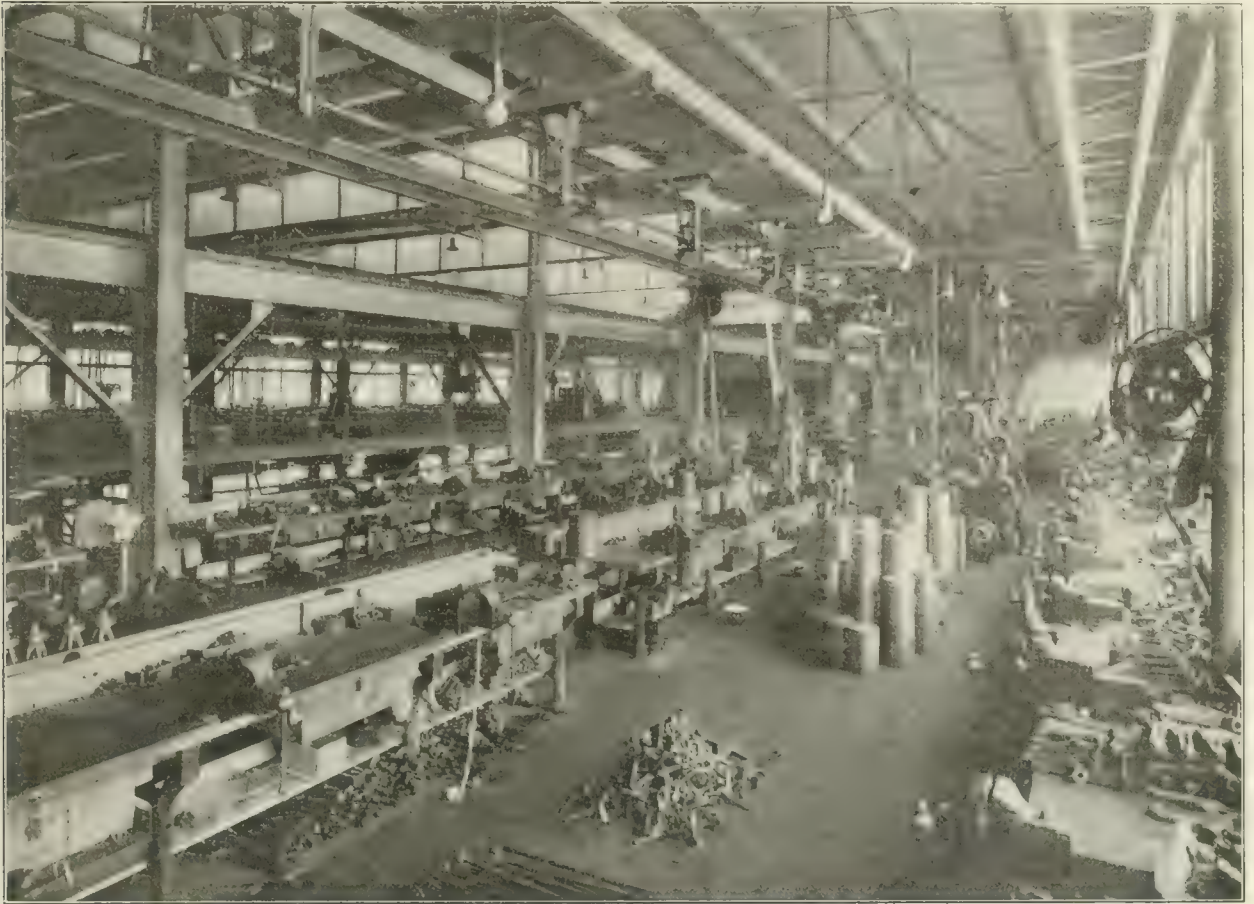


Fig. 6.—View of West Gallery of Machine Shop, Where Light Machine Work, Bench Work and Assembling of Small Parts are Handled.

circuit. Conditions at the same time did not permit this test station to be connected in parallel with the other sources of power. To meet the situation a special double-throw circuit-breaker switch was devised and installed by means of which a testing station generator plant could be cut in so quickly as to avoid losing the speed of the motors on the line. The engines, rated at 45 hp., are also subjected to a brake test up to about 80 hp. After the engine is mounted and the tractor assembled in running order it is again tested under actual operating conditions.

For its power, the Tractor Works is tied in with the power system which supplies the McCormick Reaper Works, wood mills, and malleable foundry. The McCormick plant uses under contract a certain quantity of power from the Sanitary District sub-station (Chicago Drainage Canal), delivered to the Reaper Works, where it is stepped down from 20,000 to 440 volts. From the Reaper Works a portion of the current is carried over on a 440-volt line to the wood mills. Here it is augmented by current generated from a 750-kw. Allis-Chalmers turbo-generator, and two engine-driven units of 2000 kw. maximum capacity, the steam for which is developed by the burning of wood shavings. This combined source of power delivers through

The construction of the building for the factory work has been planned to conform in as great detail as possible with the requirements of machine shop and forge shop practice. The various building features also have been contrived to offer the greatest advantages in ventilation, sanitation, and maintenance. The machine shop is designed with a 60-ft. center bay and 30-ft. side bays. The center bay has a north light saw-tooth roof construction, of economical and substantial design. The bay is spanned by a 12-ft. crane. The gutters are formed with Hy-rib metal construction. To establish drainage from the center of the roof toward the sides of the building, these gutters are filled with cinder concrete $1\frac{3}{4}$ in. thick, pitched the necessary amount. Instead of down spouts a continuous concrete trough is built along the edge of the roof, into which the saw-tooth gutters drain. This gutter is also a cinder concrete formation reinforced with Hy-rib construction and lined with 16-oz. copper sheet. The heat from the building serves to prevent freezing or collection of snow in these gutters during the winter season.

The side bays of the machine shop are high enough to permit galleries as mentioned above, on which the light machine work is done. The main floor of the shop is laid

on 5 in. of concrete, moist-proofed, with tar wash and tar paper. Sleepers $1\frac{3}{4} \times 6$ in. are laid in this concrete, and on these sleepers, matched pine flooring $1\frac{3}{4}$ in. is laid with a $\frac{7}{8}$ -in. hardwood finish above. In the galleries a similar wood floor has been found preferable to asphalt prepared floors. The window lights in the present building, both in the saw-tooth roof and sides of the building, are operated by the Pond continuous system furnished by the David Lupton & Sons Company of Philadelphia. In the new addition the United continuous system is being installed by the Trussed Concrete Steel Company, Detroit. The Pond system as applied to the roof sashes controls the opening

and closing across the entire width of 60 ft. in one operation.

Like the machine shop, the forge shop is entirely steel construction, but with a different roof design intended for the better carrying off of smoke and gases arising from furnaces and forges. The building is arranged in two bays, each 60 ft. wide, with a 12-ton crane in each bay. The crane runway rail is 32 ft. above the floor, which permits one assembled tractor being raised sufficiently high to be carried over other tractors on the floor. This gives considerable flexibility to the erecting floor. The roof trusses of this building are noticeable because of the large pitch of the roof. This slope serves a double purpose of eliminating smoke pockets under the eaves, and also conforming to the requirements of a tile roof. The roof of the forge shop is covered by a cement tile made by the Federal Tile Company, Chicago.

The heating and ventilating system of both machine and



Fig. 7.—View of East Gallery of Machine Shop for Automatic, Turret and Small Lathe Work.

forge shops has been worked out with great care. The indirect system is used with a Garden City blower installation. In the machine shop a fan and set of coils are located on each side, and the hot air is forced through underground pipes, which emerge at the base of the column on either side of the center bay, and discharge the hot air upward into the center of the shop from a point near the floor. The circulation of the hot air is upward to the roof in the center across to the sides under the eaves, and down through openings in the gallery floor, along the side walls, returning to the blower suction. In the forge shop, the system of heating is similar except that the direction of circulation is reversed—the air arising along the side walls and descending in the center of the shop. In warm weather a circulation of the air is obtained through the heating apparatus, and it is expected that the direction of circulation in the forge shops will aid in moving the smoke up to the

roof monitor, and out through the ventilators. The Tractor Works is heated from the waste heat plant at the malleable foundry of the McCormick Works, a description of which is given in connection with the power features of the plant.

Of particular importance in the forge shop is the system of floor conduits for carrying all water, gas, oil, and air pipings. These conduits, which are covered by cast-iron floor plates, were laid in the floor during construction at intervals sufficiently frequent to make all desirable portions of the building accessible. The piping at that time required was laid in these conduits, and any additions to the piping system can thus easily be added without fear of overhead interference.

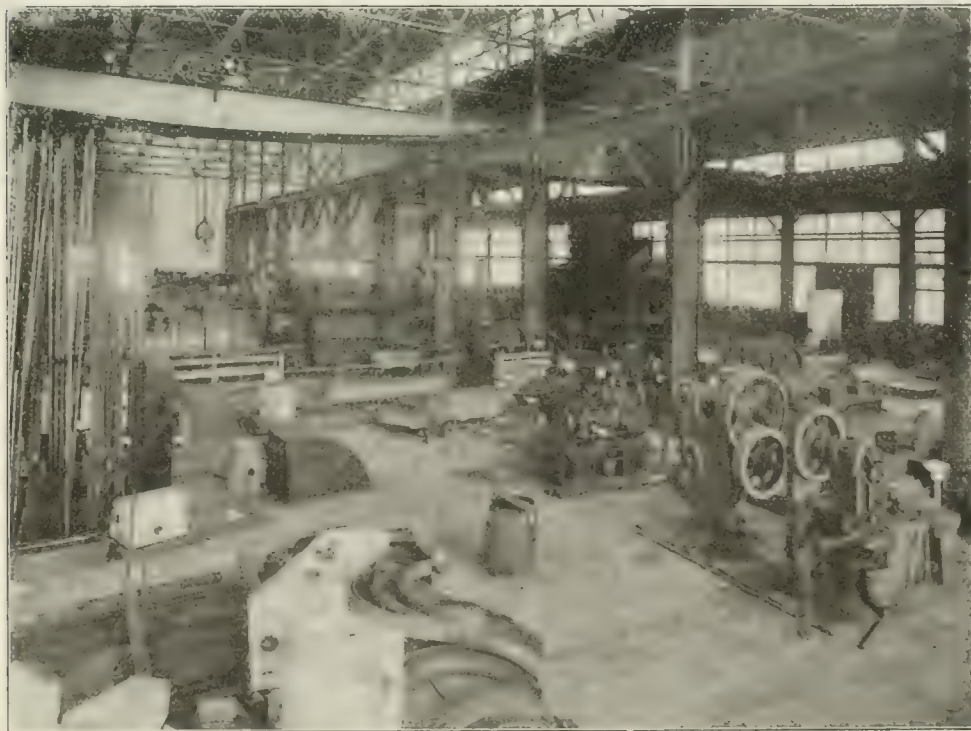


Fig. 8.—View in West Bay of Forge Shop, Where Stock is Received and Heavy Punching and Shearing Machinery is Located.

The offices of the Tractor Works, the engineering department, wood-working shop, and stockroom are now included in the south end of the machine shop building. As the buildings are completed this arrangement will be changed, affording more room for the engineering department and the storeroom. The stock room will have on the one side an entrance from the railroad track between the building, and on the other side from a team-loading plat-

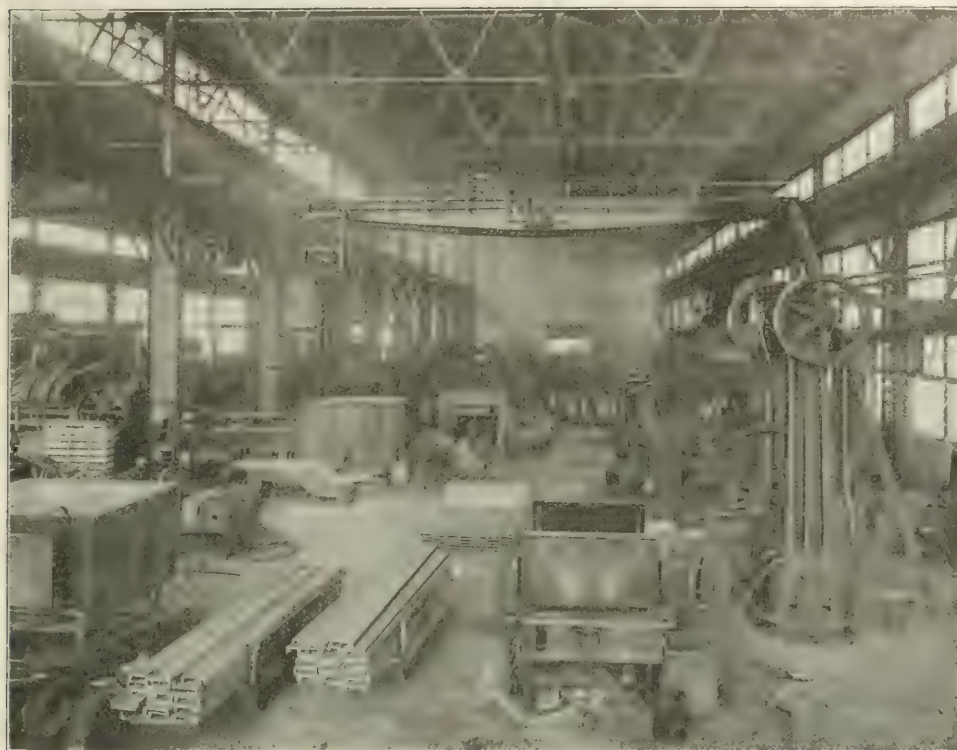
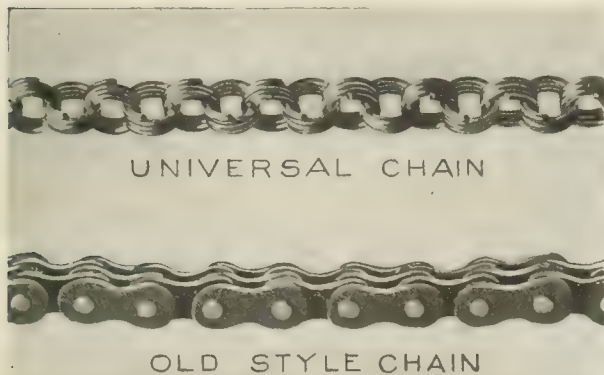


Fig. 9.—View in East Bay of Forge Shop, Showing Hammer and Heating Furnace Department

form. The stock room is equipped with all steel adjustable shelves, each compartment marked with the name and size of the material in stock. All of the locks used in the building are a part of a Yale & Towne master-key system. This system extends not only to the doors of the building but also to the steel lockers which are supplied for all of the workmen.

A Universal Chain Oil Feed

The Spencer Wire Company, Worcester and Spencer, Mass., has developed a universal chain, shown in the accompanying illustration, for producing a circulation of oil in large bearings in manufacturing plants. The chain cannot kink and carries a large flood of oil. It is spliced



The Suencer Wire Company's Universal Chain Oil Feed.

together by hand in the same manner as slipping a door key on a split ring, no rivets being necessary nor any special coupling link or bolt. The bearing of the chain on the shaft is sufficient to insure continuous driving.

A New Method of Making Square Tubing

The Heinle Company, metal-rolling engineer of Crafton, Pittsburgh, Pa., is furnishing roll designs disclosing a new and practical method for reforming cold flat steel strip into square tube sections. The reforming of the flat sheet into a square tube is accomplished in three roll passes, by the rolls exclusively, and without the use of a mandrel.

Heretofore forming of this kind has been confined to pressing, which is prohibitive to long lengths of tube, while rolling permits double lengths and longer.

The joint of the tube is located in the center of the side wall, half way between the corners, and can be butted or slightly opened as required. The joint can also be located off the center. On account of the light gauges of material, electric welding or brazing is the means used to close the joint.

Cold forming, from 1/32 in. in thickness for the smaller tubes to 5/64 in. in thickness for the larger tubes, is practicable, the tubes running in regular sizes from 1 1/2 in. to 2 in. square outside diameter.

This method of making light tube for agricultural, ornamental

and bedstead fabrication is claimed to be far more economical than squaring round seamless tubing. The method of rolling can also be used for forming triangular, hexagon and rectangular tubes of iron, steel, copper and brass.

Steam-Hydraulic Forging and Bending Press Catalogue

The Mesta Machine Company, Pittsburgh, Pa., has issued an artistic 24-page catalogue of steam-hydraulic quick-acting forging and bending presses. These presses are built exclusively by the company for the United States and Canada, under the Haniel & Lueg patents. The system adopted in their design has a number of important features, one of the principal being that the press is self-containing; that is, the steam and hydraulic cylinders are directly connected to each other and the water in the press cylinder does not have to be forced through pipes when the press is in operation. This allows the press to be operated at higher speed and eliminates high-pressure piping between the intensifier and the press. A decided advantage is gained by having the intensifier directly connected and self-contained instead of having it placed on the floor near the press, where it would obstruct the handling of material. Sectional views are given, showing the interior construction, while illustrations are presented of the various types employed for special purposes.

It is conceded that forging presses are rapidly taking the place of steam hammers for many classes of work. The steam-hydraulic quick-acting forging press has therefore been adopted by the Mesta Machine Company, which has such extensive and well-equipped machine shops for handling heavy machinery that it is exceptionally fitted for undertaking this additional class of work.

The Bettcher Mfg. Company, Cleveland, Ohio, has added a line of chain links for use as sprocket chains for agricultural and hoisting work. The company manufactures washers, riveting burrs, felloe plates, corrugated copper gaskets, metal stampings, etc.

Large Castings in Fast Time

An Instance of Resourcefulness and Reliability in Repairing the Prinzess Irene

Let the daily newspapers announce a "Trans-Atlantic Liner Aground in Fog" and immediately the attention of the reading public is arrested. The detailed account is eagerly read, and each succeeding issue of the papers is care-



Casting B of Stern Frame.

fully scanned for news of the progress made toward floating the ship. But with the publication of the account of the vessel's release general interest ceases, and the matter is given very little, if any, further space in the daily papers.

But then, in the more serious cases, the real work—that of getting the ship again in condition for service—



Casting A of Stern Frame.



Casting C of Stern Frame.



The Prinzess Irene on May 17: Remaining Portions of Broken Frame Cleared Away, the Rudder and Propellers Unshipped and Ship Ready to Receive the New Stern Castings.

is just beginning. A recent instance is that of the North German Lloyd liner Prinzess Irene, which went aground off Fire Island on April 6. The record made in repairing the ship is too remarkable to be allowed to pass unnoticed.

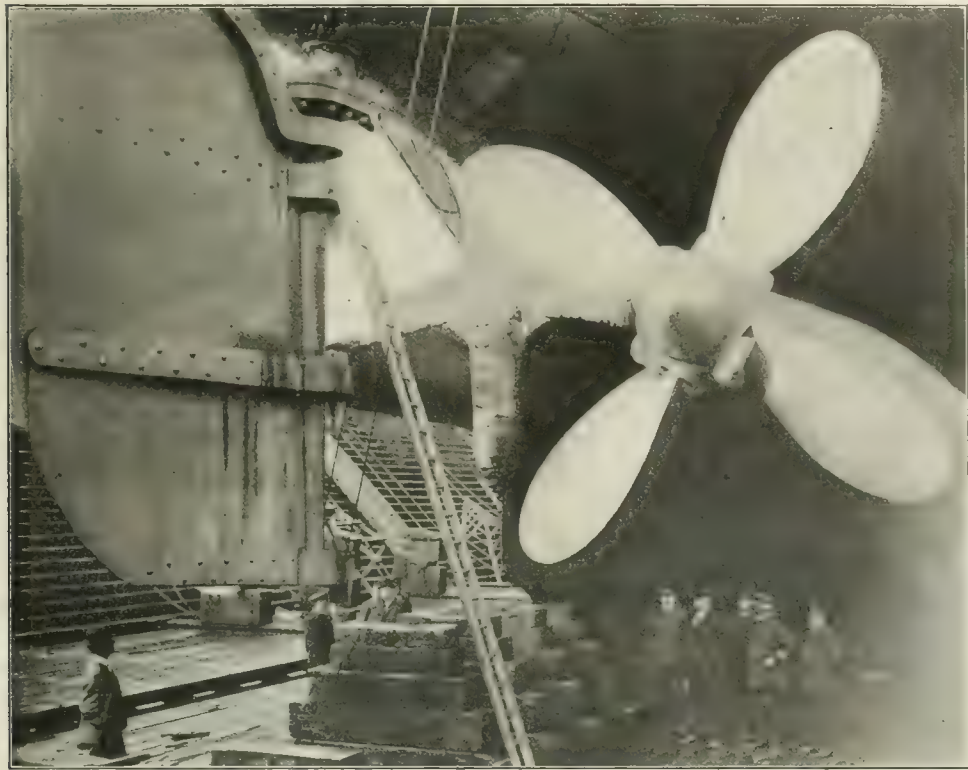
Before the vessel was released from the bar on April 9 it was known that her stern was so badly damaged that an entire new frame would be necessary. This meant the construction of new patterns, the production of three rather large castings and, of course, the virtual rebuilding of the entire stern, but the Newport News Shipbuilding & Dry Dock Company, to which the contract for repairs was awarded, agreed to complete the work and have the ship ready to sail from New York on May 27. As the ship had first to be taken to her dock at Hoboken before she could proceed to the shipyard, this delivery could be made possible only by an extraordinary record in the production of the castings, and arrangements were made with the Thurlow, Pa., works of the American Steel Foundries to take the patterns in hand immediately upon their arrival and to ship all three castings within seventeen days thereafter.

The Prinzess Irene reached Newport News at noon on April 16, went into the drydock an hour and half later, and the work of removing the broken frame was immediately begun, as certain dimensions had to be procured from the old castings before the patterns for the new ones could be finished. Following the removal of the old frame, the patterns of the new one were rushed to completion and shipped by express. Molding commenced the day of their arrival at the plant of the American Steel Foundries, and subjoined is given a tabulated record of the progress of the work and the shipping weight of each casting.

Molding Record of the Three Large Castings.

Piece.	Pattern received.	Finished molding.	Cast.	Shipped.	Weight.
A.....	April 25	April 29	May 1	May 9	30,520 lb.
B.....	April 25	April 27	April 29	May 6	23,540 lb.
C.....	April 25	April 28	April 30	May 6	19,110 lb.
Total					73,170 lb.

It was essential from a shipbuilding standpoint that pieces B and C be delivered first and at the same time, and these were given preference over piece A and shipped 11 days after the arrival of the patterns. Each of these castings was subject to rigid specifications of Germanischer Lloyds, and an accompanying table shows the results of the physical tests. The bending test is especially severe, and



Vessel in Dock on April 19 Minus Portion of the Stern Frame.

the two 1 x 1 3/16-in. specimens from each casting subjected to this test were all bent through an angle of 180 deg. over a 1 1/2-in. radius without the semblance of a flaw.

Physical Characteristics of the Castings.

Piece.	Tensile strength.	Elongation in 4 in.	Bending bar 1 x 1 3/16 in.
A.....	66,380 67,220	26.50 per cent. 28.00 per cent.	180 deg. 180 deg.
B.....	69,380 69,380	29.00 per cent. 29.25 per cent.	180 deg. 180 deg.
C.....	70,880 67,400	25.00 per cent. 26.00 per cent.	180 deg. 180 deg.

The first casting was machined and placed in the dock for fitting to ship on May 18. The work was completed and the ship left the dock at 11:30 p. m. May 24 and sailed from New York on its regular schedule at 11 a. m. May 27, having lost only one round trip. Among the passengers was A. I. Findley, editor of *The Iron Age*.

Carlin Contracts.—The Thomas Carlin's Sons Company, Oliver Building, Pittsburgh, with plant on the North Side, is running its boiler shop on a contract for large melting kettles, steel tanks and storage bins for a new asphalt plant at Pittsburgh, 60 rectangular tanks and a number of cookers for a preserving company, and other general contracts as follows: One 25 hp. hoist and derrick for yard use for an Eastern steel company; two latticed steel derricks for an Eastern contractor; a 9-ft. dry grinding pan for a foundry; a No. 61 shear to cut 2 3/4 in. square, driven by a Westinghouse motor, for shipment to Baltimore; small shears for scrap use, mill castings, etc. The company recently shipped a medium-sized shear to the Provincial Iron & Steel Company, Coburg, Canada, and is now building for the same company a special machine for straightening rolled sections.

Sulphur in the Air and Metal Corrosion

The presence of sulphur gas, the relation of sulphur in the atmosphere and other considerations having an effect on the corrosion of metals were made the subject of a paper read before the Iron and Steel Institute by Percy Longmuir. The author listed observations made in regard to the chlorides and sulphates in the rain collected in different cities, the basis of the investigation being that the rain gives in general terms an index of the atmosphere through which it falls though the results are, of course, general rather than particular.

As indicating one of the sources of the presence of sulphur in the atmosphere, the paper gave the percentage of sulphur found in the soot in kitchen chimneys, locomotive and locomotive crane chimneys and general house chimneys. In the soot from ordinary domestic grates, the sulphur contents varied from 2.26 per cent. to 7.17 per cent. Soot from locomotive cranes showed variations, but the sulphur contents of the soot was an item which, the author felt, could not be ignored.

With regard to the deposit left as a result of corrosion, the example was taken of brass corrosion in which the deposit contained 28.65 per cent. of anhydrous sulphuric acid. In this case illuminating gas fumes were absent. Many samples of ordinary iron rust showed that one of the distinct features was an appreciably high content of

sulphur. This was found to apply only to rust resulting from atmospheric action.

The next step taken by the author was to study the confined atmosphere where coal was burnt, like the interior of railroad tunnels. Analyses were made of the tunnel air, also of the water coming from the tunnels. The tunnels all contained sooty deposits on the side walls, and a sample gave 2.83 per cent. sulphur. Corroded deposits from the rails in the tunnel gave 2.89 and 3.68 per cent.

Brittleness Developed with Rail Corrosion

The evidence of chemical change, the author admitted, was not easily found, nor was it easy to account for the brittleness induced in steel when subject to corrosive action. Observations and tensile tests of rails used in tunnels indicated that they become seriously embrittled, and the effect is intensified in damp tunnels. The author offered no hints on how the brittleness progresses into the interior of the rail, and stated that while the whole of the results show the embrittling effect, no two samples were precisely alike, and he was unable to trace any regularity in the order of development of brittleness.

The Brown & Zortman Machinery Company, whose warehouse at 2545 Liberty avenue, Pittsburgh, Pa., was recently partially destroyed by fire, has removed its offices and stock of new and second-hand machinery to 2845 Smallman street, where it has secured a building about 100 x 100 ft., having switching connections with the Pennsylvania Railroad. The building has a concrete floor and is provided with galleries for storing countershafts, pulleys, etc. The company is now handling all its business from the new location, and, in addition to other lines, represents in Pittsburgh and vicinity the Modern Tool Company, Erie, Pa., builder of plain and universal grinders.

Modern Steel Products Warehouse

The Plant of the Charles J. Stevens Company, Chicago, Which Includes Hardening and Annealing Room

An opportunity for illustrating the equipment of the modern warehouse for handling tool steel, steel tubes, wire and other steel products is afforded in the new structure of the Charles J. Stevens Company, Monroe and Jefferson streets, Chicago. In short, the following is offered as describing what may be regarded as progressive ideas in warehousing, storage and handling of steel.



Part of Flat Wire and Strip Steel Storage.

One prominent feature is the extent to which tool steel and cold drawn and seamless steel tubes are stored in horizontal racks, each size in a separate labeled compartment as distinguished from the plan of standing such material on end along the wall. The arrangement allows for easy handling of the individual piece and makes a thorough inspection of the stock a simple matter.

The practice has also been adopted of separating each kind of material for shipment either into large tonnage quantities or in small amounts from broken packages. For small shipments one piece may be taken out of stock as easily as a dozen. For a large shipment the material is kept in the original package from the mill and so handled direct to the customer. By this general method of classification material is practically at hand in just the shape desired by the customer and a minimum time is required for shipment and delivery. Machine saws are installed so that steel in any length can be quickly furnished.

The illustrations showing the hardening and annealing room are deserving of special at-



Pigeon Hole Storing of Drill Rod Steel.

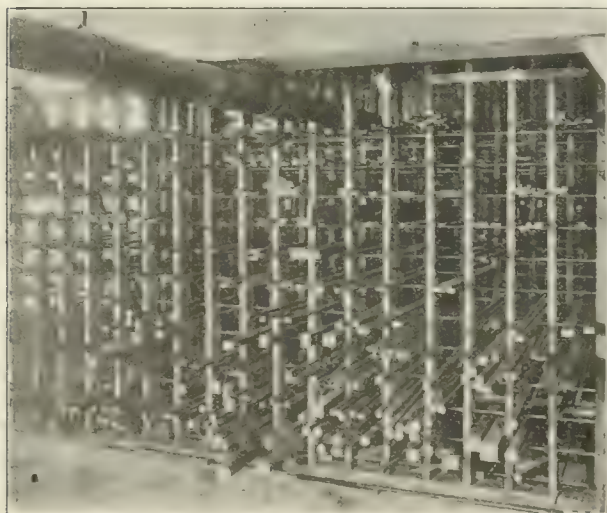
tention. For the convenience of customers and for the purpose of demonstrating by actual trial the properties of the steel handled, a hardening, annealing and testing equipment is installed. The furnaces include a large Brown & Sharpe case hardening and annealing unit. Electric pyrometers for the automatic control of heat



Section of Clock Spring Steel



Music Spring Wire Stored in Coils.



Cold Drawn Steel Stored in Pigeon Holes.



Tool Steel in Horizontal Storage Arrangement.

treatments are installed and to an unusual extent for the steel warehouse the opportunity is presented for investigating the qualities of a given material. The installation is of special value, especially in relation to tool and special steels.



Corner in Hardening and Annealing Room.

The warehouse provides a floor area of about 50,000 sq. ft., but the company also operate a warehouse in which 2500 tons of steel are regularly carried.

The company began operation in 1896 and is the outgrowth of Mr. Stevens's personal connection as representative of the West Leechburg Steel Company, the Globe Wire Company and the R. H. Wolff Company, Ltd., now the Washburn Wire Company. The incorporation of the Chas. J. Stevens Company took place in 1903, and the additional connections and enlarged field of operations have been developed since that time, so that now the company is western agent for the following:

Henry Disston & Sons, Inc., Steel Works, Philadelphia; Hobson, Houghton & Co., Ltd., Sheffield, England; Globe



Another View of Case Hardening Furnace.

Wire Company, Ltd., Sharpsburg, Pa.; West Leechburg Steel Company, Pittsburgh; West Penn Steel Company, Brackenridge, Pa.; Pittsburgh Steel Products Company, Monessen, Pa.; Washburn Wire Company, New York City, and Standard Steel Tube Company, Toledo, Ohio.

The great transatlantic liner Olympic, which completed her first trip to New York June 21, marks an enormous advance in steamship tonnage. The registered tonnage is 45,000; length, 882 ft.; height from keel to boat deck, 97 ft.; height of the funnels above the casing, 72 ft., and distance from keel to funnel tops, 157 ft. There are 11 steel decks and 15 watertight compartments. The electrically operated rudder weighs 100 tons, the anchors 22 tons, and each line of the anchor chain links 175 lbs. An enormous quantity of rivets, 3,000,000 in number, weighing in all 1200 tons, was required in her construction. The ship represents an investment of \$10,000,000.

Hill Rail Fastener for Steel Ties

A device for holding rails to structural steel ties of the I-beam type was patented some time ago by W. W. Hill of the Duquesne works of the Carnegie Steel Company and the accompanying illustration has been prepared to outline briefly the features of the fastening, the publication of the description coming after the invention has successfully withstood hard service in the Duquesne Works' railroad yards.

The device consists of a hollow malleable casting filled with wood, into which an ordinary railway spike is driven through holes in the top flange of the tie. The casting has a short lug on the bottom which goes through a hole in the base of the tie and holds the casting in exact position for receiving the spike. This hole in the base of the tie is made large enough to allow the spike to be driven straight through should the spike head break off in driving. The malleable casting has a wall $\frac{1}{8}$ in. thick into which the wood core is inserted.

By this method of fastening bolts, clips and nut locks are eliminated, and, it is emphasized, it makes track laying and rail renewing quicker and easier than with any other fastening and the equal of the case when wood ties are used. In rail renewing the spike can be withdrawn by using the ordinary claw bar and the spike hole replugged as with all wood ties. Practical demonstration has been



Hill Rail Fastener. One View Showing Wood Center Pierced by Spike

made where ten rails were renewed on a 21 deg. curve in 45 minutes. The same spikes were used, the ballast not being disturbed. The soft wood tie plug was the only thing needed.

In pulling tests it was found that with the wood filled malleable casting it required 4,900 lb. to pull the spike, and by replugging and re-driving the spike it required 5500 lb., exceeding the pull required with the best white oak tie. In street railroad work, where the ties are embedded in concrete, the device is particularly well suited, it not being necessary to disturb the concrete when renewing the rails as is the case with all other forms of fastenings.

Over 7000 steel ties with the Hill fastening have been installed in the yards of the Duquesne Steel Works of the Carnegie Steel Company, Pittsburgh, Pa., some on 21 deg. curves and all under very heavy traffic conditions of over one year's service. Mr. Hill considers the record as fully demonstrating their practicability. In track construction it is found that the track can be shifted and lined as easily as with wood ties, not being stiff or unyielding. It is held that the oak tie in conjunction with the ordinary spike constitutes the ideal track and the closer the approach to this condition the nearer the ideal condition.

The Hill fastening, it is stated, is very simple and economical to manufacturers, each casting weighing about 1 lb. and the entire expense per tie, including the spikes, not exceeding 25 cents.

The commission appointed by the President under act of Congress to examine into the general subject of the cost of the handling and transportation and the rates of second-class mail matter will begin its sessions in the court room of the Circuit Court of Appeals, Post Office Building, New York, Tuesday, July 18, at 10:30 a. m. Those persons and organizations desiring to be heard are requested to file notices of their appearance with Colly W. Bell, secretary to the commission, Colorado Building, Washington, D. C., on or before July 19.

Improvement in Feed Water Heating

Details of the Cookson Heater

Ordinarily the exhaust steam purified by the oil separator of an open feed water heater is merely sufficient to raise the temperature of the feed water. In such case if it is desired to keep the interior of the heating system from fouling or to use the condensation from a hot well or receiver a second separator must be installed in the line. To remedy this condition the Bates Machine Company, Joliet, Ill., has brought out a new type of the Cookson cast iron feed water heater which is equipped with an oil separator large enough to purify the entire exhaust from engines and boilers having the maximum capacity that the heater can serve. Figs. 1 and 2 are ex-

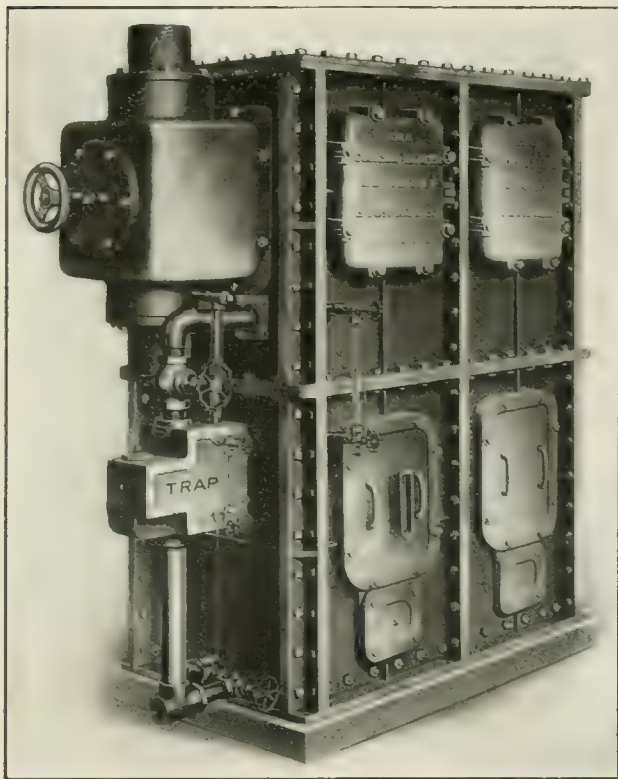


Fig. 1.—Exterior of the Cookson Heater and Purifier, Made by the Bates Machine Company, Joliet, Ill.

terior and interior views of the heater respectively, while Fig. 3 is a diagrammatic cross-section illustrating the principle upon which the heater operates.

This heater is made with a cut-out valve in the separator which enables the former to be cut out for cleaning without interfering in any way with the functions of the oil separator. It also is provided with exhaust inlet and outlet connections which are located in a direct line, an arrangement that permits the heater to be inserted in a vertical exhaust line with no disturbance other than the removal of a short length of pipe to accommodate the separator. This construction greatly reduces complications in piping, valves and fittings and also in the labor of installing. Where all the exhaust comes through one large pipe to a number of heaters, as in the case in many plants, a minimum number of pipe bends have to be installed to make the heaters deliver into a common stack and any of them can be cut out for cleaning while the others remain in operation.

Purifying the Steam

The separation of the entrained oil and water from the steam is accomplished by a change in the direction of the steam current and allowing it to expand. Exhaust steam enters the separator from the bottom and leaves through an outlet at the top, its course being clearly indicated by arrows in Fig. 3. As the steam leaves the exhaust inlet pipe it passes first through a tube projecting inwardly on the outlet flange and cut with a bevel on its upper end so as to open opposite the opening on the heater inlet tube near the upper left corner.

The steam is then divided by a V-shaped cast iron baffle plate on the under side of the heater inlet tube which deflects the current of steam to the separator walls. The currents make almost a right-angle turn and must travel back again to the center of the separator before they reach the inlet tube to the steam chamber of the heater. In the meantime the particles of oil and water by reason of their greater weight are dashed against the walls of the separator, which are ribbed throughout their entire area in both directions. These ribs carry the oil and the water down into a well formed around the inlet tube but out of the path of the steam current. This well drains through a balanced float trap and empties into the heater overflow pipe. If there is no pressure within the heater to require the use of a trap, a water seal can be employed instead. Since the oil drain connects with the overflow below the valve in this pipe it is possible for the separator to drain through the trap when the heater is cut out and the overflow valve shut to prevent the entrance of steam from the separator drain into the heater through the overflow pipe.

All of the steam that does not go to the heater passes through a tube on the exhaust outlet, which is similar to that on the exhaust inlet. The bevel, however, on this opening is cut in the opposite direction to the one on the inlet, thus compelling the steam to travel in a direction opposite to that in which it entered. This tube also prevents any water or oil that might travel upward on the inside surfaces of the separator casing from mingling with the outgoing steam. The steam for the heater

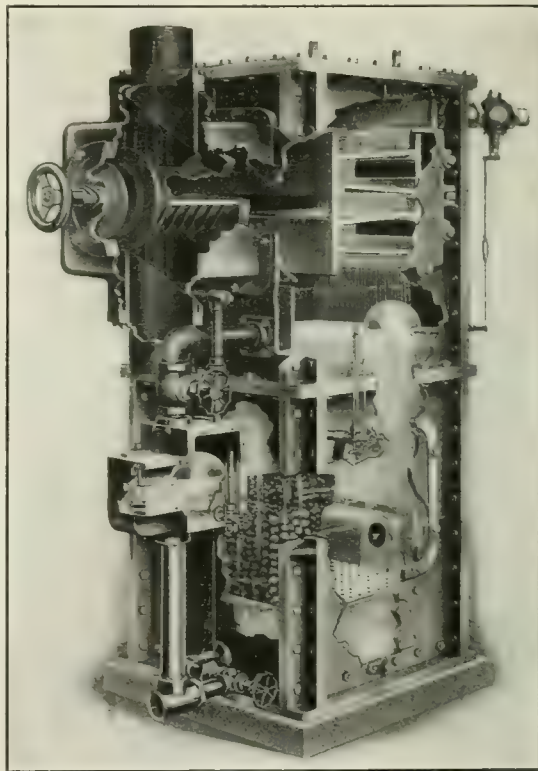


Fig. 2.—Interior View, Showing the Arrangement of the Various Parts of the Heater.

passes through the horizontal inlet tube. This tube is faced on its outer end to form a tight seat for a valve which is actuated from the outside of the separator to regulate the amount of steam passing to the heater. The vacuum or the induction principle is employed to draw steam into the heating chamber by creating a partial vacuum due to the condensation of the steam in the chamber and this is assisted by each exhaust of the engine, which tends to drive steam into the heater.

It is claimed by the maker that the cut-out valve construction used in this heater is simpler and less expensive and easier to maintain than the other mechanisms intended to accomplish the same purpose. Both the overflow and the separator cut-outs are standard globe valves which are positive in their action. These valves have flat seats with disks held in place both by positive acting parts and the pressure of the exhaust steam, an arrangement which causes them to close so tightly as to eliminate

any possibility of steam leaking into the heater after it has been cut out and a man is working inside cleaning. Should any trouble be experienced with either of these valves on account of leakage, the seats, since they are flat, can easily be reground. If desired the separator valve can be removed by loosening the six clamping bolts which hold it in place as shown in the upper left corner of Fig. 1. When this flange has been loosened the valve comes out easily without taking the separator apart or disconnecting any of the pipings.

Heating the Feed Water

The cold water enters through the inlet at the upper right corner, Fig. 3, and passes through the spray box, which has a baffle plate directly opposite the opening. The water flows over the edge of this plate upon a short horizontal extension of the bottom of the spray box and falls in small streams to the top heating tray. These trays are set in the heater at a slight angle, one above the other, and the water flows over each in turn in a thin layer and finally passes into the reservoir. The oil-free steam entering from the oil separator surrounds the

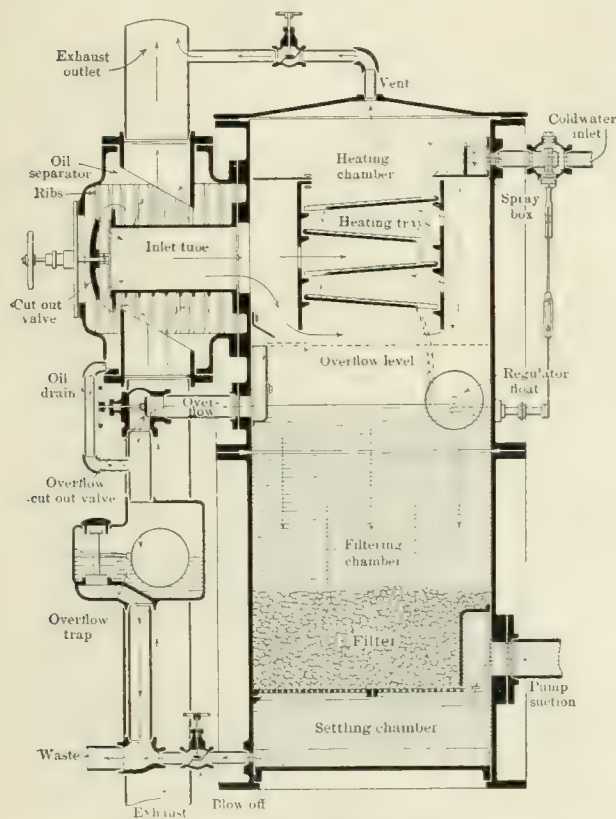


Fig. 3 Diagrammatic Cross Section, Illustrating the Operating Principles of the Heater.

trays and the cold water flowing over these trays condenses the steam sufficiently to heat the feed water. The heating trays are loose and can be easily removed through the upper door when the coarser impurities deposited upon them make cleaning necessary. The air and the gases which are liberated from the steam as it condenses pass to the top of the heating chamber, where they escape through a vent into the exhaust outlet.

The water space in the Cookson heater is very large, and this assures a constant ample supply of hot water, which is allowed to lie quietly, an arrangement which facilitates the filtration and the sedimentation of the finer impurities that are deposited upon the lime pans. The cold water is admitted to supplement the condensation and to maintain a uniform level in the reservoir and its flow is controlled by a balanced valve actuated by a float. This float is a seamless copper sphere connected by levers to the stem of a perfectly balanced valve in the water inlet. The water is prevented from rising above a desired level automatically, and the reservoir surface is skimmed by an overflow plate which extends horizontally the depth of the heater and drains an even sheet of water into the overflow pipe. The difference between the normal and the overflow levels is suf-

ficient to take care of any sudden large discharge of water into the heater, as from the steam traps or slugs from the heating lines. A float-operated trap in the overflow line having an opening as large as the line itself automatically lets this water into the waste pipe without admitting any air into the heater or allowing any steam to escape. It is thus possible to remove oil or other impurities floating upon the surface of the water by merely holding the cold water valve open until the level of the water in the reservoir is higher than that of the overflow plate.

A filter bed that divides the reservoir into two parts is used to remove the suspended impurities which are too heavy to float. The coke which is generally employed as the filtering material is supported by a removable perforated cast iron plate that prevents any material from getting into the lower or settling chamber. This chamber has two flat surfaces at the bottom which slope toward a common gutter at the center, and any minute particles passing through the filter naturally fall to the gutter and are removed by opening the blow-off that drains the gutter into the waste pipe. The removal of impurities by the sedimentation process is not hindered by a strong current in the settling chamber as the pump suction is located in a special outlet chamber in the upper portion of one side.

The body of the heater is made up of heavy ribbed plates bolted together and provided with special patented heavy steam and water-tight rust joints. The trays and their supports are constructed of substantial castings and are practically indestructible. Easy access to every part of the interior is afforded by manholes and handholes, while if necessary a man can easily get inside. The heating chamber door is hinged and fitted with slip bolts. Every part of the heater can be taken down with a monkey wrench, and as the parts are interchangeable they may be duplicated, and it is possible to extend the heater by the addition of more sections, as shown in Fig. 1. All the fittings are of copper and brass of the most approved design, and the flanges are companion flanges and are interchangeable and will fit the piping without the use of reducing bushings.

Public Works of Venezuela

We have received from Román Cárdenas, Caracas, a copy of the splendid memorial presented by the Minister of Public Works to the Legislative Chambers at the constitutional convention of 1911, to commemorate fittingly the celebration of the centennial of the independence of Venezuela. It comprises 300 pages, 9 x 12½ inches, and sets forth the natural resources of Venezuela and the progress that has been made in the last 100 years. Besides many interesting maps, the work contains numerous illustrations showing the national highways and railroads, notable public buildings, parks, forts, bridges and churches. A number of statistical tables are also given.

The Baldwin Strike.—The Baldwin Locomotive Works, Philadelphia, has made a statement through its attorney that the recent strike by a number of its employees is now practically a thing of the past. The plant has at no time been shut down, although operating with a restricted force. There has been a steady return of old employees in nearly all departments, and it is believed that in the near future a major portion of those who went out will again be at work. It is stated that the condition of the work at the Baldwin plant is such that the present interference is regarded as a benefit rather than otherwise, and will enable the company to provide a full week's employment hereafter to all those who may be so fortunate as to be reinstated in their old positions. Business conditions are unchanged, although the prospect is that a somewhat better volume of orders for locomotives will develop in the near future.

A French patent on jarring machines, covering the multiplicity of lifting cylinders to the jarring table, has been allowed the E. Killing's Molding Machine Works, Davenport, Iowa. Patents are pending in other foreign countries and arrangements are being made to establish in them agencies for the Killing molding machines. The jarring machine is operated by compressed air.

The Machinery Markets

The American Steel & Wire Company has about finished placing orders against its \$100,000 list of needed machinery which came out in April, and the business was pretty well distributed throughout the country. Beyond this there is little of interest in the machinery situation. Business seems to be quiet in all directions. Chicago dealers are looking to the Santa Fe Railroad for some good orders, as that company has a list out calling for \$25,000 worth of machinery. The local demand in Cleveland has improved slightly. While actual business is light in Cincinnati a more cheerful feeling exists there. The automobile companies are busy in Detroit, and some trade is looked for in that direction. Some moderate-sized sales have been made in the electrical machinery and shoe machinery lines in St. Louis, but the general demand there is not large. Improved crop prospects are expected to bring out an increased call for pumping and ginning machinery in Texas, and the trade there is hopeful of a better business. In the South business is only fair, although inquiries are more numerous. The machinery trade in the East is very quiet. A new railroad list is expected in the New York market. Inquiries seem to develop slowly in Philadelphia, and there is sharp competition for trade.

New York

NEW YORK, June 28, 1911.

New business is very scarce in the machinery market, and orders are not coming in as fast as manufacturers and dealers had reason to expect, considering the inquiries made during the last few weeks. The American Steel & Wire Company placed some good orders with New York houses during the week for machinery which is to be distributed to its various plants. The New York Central Railroad has also been buying against a list recently sent out. It is understood that this company is preparing a large list of machinery, principally machine tools, which are to be delivered at the West Albany shops. R. T. Shea, who has offices at the Grand Central Station, has charge of making up the inquiries. The leading pneumatic drill manufacturer in this market has been buying for its Easton, Pa., plant and expects to come into the market for some equipment in the near future. The outlook in other directions is not very encouraging. Manufacturers of mill supplies complain that business has fallen off of late and there is a dearth of new enterprises. The lull is not sufficiently pronounced to make it appear that business during the next few weeks will not pick up, as there are enough inquiries out to warrant a better feeling, provided the parties making them show some inclination to close.

The T. A. Gillespie Company, 50 Church street, New York, will require a great deal of hydraulic machinery and tunneling equipment to carry out its contract for constructing a siphon under the Hudson River from Storm King Mountain to Break Neck Mountain at Cornwall, N. Y. The company has been awarded the work in connection with the Catskill aqueduct enterprise, and there is about 2700 ft. of tunneling to be done.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York, have been awarded a general contract by the Illinois Central Railroad that will call for heavy expenditures for mechanical equipment. The company has contracted to build at Champaign, Ill., a 25-track round house in addition to a large machine shop and coal handling plant. The plans for the proposed buildings have not as yet been completed.

The city of Camden, N. J., will receive bids until July 10 on pumping machinery and other equipment for a plant to augment the city's facilities for fire protection. The equipment will include a large gasoline engine, a tank pump, an electrical generator and other power accessories. Specifications can be obtained from F. W. George, who can be addressed at the Court House, Camden.

The Crosswick Water Company, Crosswick, N. J., will shortly install a complete water works for municipal water supply purposes. Specifications for the equipment needed in the plant can be obtained at the office of the engineer, W. W. Young, 220 Broadway, New York.

The Bontempi Rust-Proofing Company, 111 Broadway, New York, has leased a plot of land 70 x 142 ft. in Bridgeport, Conn., on which the company will erect furnaces for commercial purposes. The contract for constructing the furnaces has been let to the W. S. Rockwell Company, 50 Church street, New York.

The Strong Steel Foundry Company, Buffalo, N. Y., now located at Main street and Fillmore avenue, has secured a site of 10 acres on the Erie Railroad at Hertel and Elmwood avenues with frontage of 1700 ft. Plans are being prepared for the building of a large plant with greatly increased facilities. O. H. P. Champlin is president of the company.

Commissioner of Public Works Francis G. Ward, Municipal Building, Buffalo, is receiving bids for furnishing and installing the power plant equipment for the J. N. Adam Memorial Hospital which is being erected by the city of Buffalo at Perrysburg, N. Y. The equipment will include three 80 hp. boilers complete, one 80 hp. engine with 50 kw generator, one 40 hp. engine with 25 kw generator; also for water supply system for fire and tank service one duplex pump, two deep well pumps, two pressure tanks and pumps, feed water heater and water purifier and pump and high pressure hot water heater; also bids for ice machinery for refrigerating plant, machinery equipment for laundry and switchboard equipment for electric lighting service.

The Huebner-Bleistein Patents Company, Buffalo, will add to its lithographing plant at Kensington avenue and the New York Central Railroad Belt Line for the new color photographic process a pattern shop 40 x 50 ft., one story.

The Ellis W. Moore Company, Binghamton, N. Y., recently incorporated, will increase the facilities for its business in the production and handling of mill and steam supplies and power transmission.

The Hodyran Rubber Company, Tuckahoe, N. Y., will erect an addition 80 x 100 ft. two stories to its plant at that place. The contract for construction has been let to the Northeastern Construction Company, 225 Fifth avenue, New York City, at a cost of \$30,000.

The Norwich Pharmacal Company, Norwich, N. Y., will build an addition to its main factory building now under construction, a power house 40 x 80-ft. one story, of brick and concrete construction.

The Cornell Construction Company, Cold Spring, Putnam County, N. Y., has been incorporated to manufacture machinery equipment and materials used in construction and engineering work and general contracting. The incorporators are C. P. Howland, L. V. Lockwood and N. B. Beecher, New York City.

The Standard Furniture Company, Herkimer, N. Y., is taking bids for a six-story factory 100 x 140 ft. for the manufacture of desks. The estimated cost of construction is \$75,000.

The Rudolph Wurplitzer Mfg. Company, North Tonawanda, N. Y., has let contract to the Durolithic Company, Buffalo, for construction of a three-story addition 140 x 310 ft. to be made to its plant for the manufacture of musical instruments. The improvement will cost \$150,000. Considerable equipment and machinery will be required.

The Rochester Watch Company, Rochester, N. Y., has been incorporated with a capital stock of \$500,000 and will establish a plant for the manufacture of watches. F. H. Corthell and T. C. Ward, Rochester, and E. R. Hills, Chicago, are the incorporators.

The Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., is erecting an addition 78 x 125 ft. to its plant to provide increased machine shop and erecting space. Contracts for construction have been let, and arrangements have been made for such additional equipment as will be required.

The Mohawk Silk Fabric Company, Fultonville, N. Y., which is taking figures for erection of a new silk mill 54 x 201 ft., two stories, at Kingston, N. Y., as recently mentioned in *The Iron Age*, will build in connection therewith a power house 40 x 40 ft. C. R. Morley, Fultonville, N. Y., is manager of the company.

The Hotaling Warner Company, Syracuse, N. Y., has let contract for construction of its new factory 80 x 60 ft. and four stories and work has been commenced.

THE MACHINERY MARKETS

New England

BOSTON, MASS., June 27, 1911.

While dealers of the metal trades believe that the turning point of business has been reached they realize that no great amount of gain is to be expected during the hot weather. They believe that the next two months will be a period of readjustment to a new condition. A better sentiment is in evidence everywhere. The market has more life, or perhaps it would be better to say more signs of life. No important lists are out in the machinery trade, but the small inquiries amount collectively to a good fair business. To quote one experienced observer the early part of June was somewhat of a disappointment, for more of a gain had been expected than was experienced. But this dealer believes that on the whole conditions appear quite satisfactory and the summer months give promise of better results than were expected early in the year.

The tool steel people have had a dull month, but reports from large buyers in New England and the Middle West indicate that requirements will be much larger after the Fourth.

George Rowbottom, president of the Rowbottom Machine Company, Waterbury, Conn., has purchased of William W. Manville and Tracey F. Manville their interest in the Manville Bros. Company, of that City, and will be the manager of the business as well as the treasurer. The former owners withdraw completely from the industry. Mr. Rowbottom proposes to operate the business under the present name and in the same location, and in no way in connection with the Rowbottom Machine Company. His plan is to bring the shops up to the same degree of efficiency that prevails in those of the company which bears his name. The Manville Bros. Company builds automatic wire forming machinery, presses, etc., while the Rowbottom Machine Company's specialties include power and foot presses, chain machines, end and surface grinders and disc grinders.

The Norton Grinding Company, Worcester, Mass., gave a practical demonstration of a new car axle grinding machine at the works, last week, a representative body of railroad men being present. The machine grinds axles very quickly, using an exceptionally broad wheel face.

The Boston Chamber of Commerce will hold an industrial exposition in Mechanics' Building in October the purpose being to exploit New England industries, manufacturers outside of this district being excluded. Metal working machinery will be made an important feature.

The Parker Transmission & Appliance Company, Springfield, Mass., manufacturer of a variable speed transmission for machinery and vehicles, has increased its capital stock from \$250,000 to \$1,000,000, new interests having come into the business. The purpose is to create large shops, probably at Detroit, Mich., but not this season. Hunter Bros., Fulton, N. Y., are now actively interested in developing the industry. Charles W. Parker, the inventor of the mechanism, retains his holdings and will continue as head of the mechanical department. The present shops are in the Waltham Watch Tool Company's building, Springfield.

The New York, New Haven & Hartford Railroad states that the new machine shops which will be erected at Cedar Hill, New Haven, in connection with the new roundhouse will have sufficient capacity to care for ordinary running repairs of locomotives for this section of the system. This will mean undoubtedly a considerable amount of new machine tools and other equipment.

The improvements which the Lamb Knitting Machine Company, Chicopee Falls, Mass., is about carrying into effect include the addition of a fifth story to the main building, which will also be extended out to the street, the whole being five stories, including the basement. The changes will largely increase the company's capacity.

Walsh's Holyoke Steam Boiler Works, Holyoke, Mass., is erecting an addition to its works 40 x 80 ft., which will be used for the structural steel and iron work shop. The company states that the machinery for the initial equipment has been contracted for.

The Wright Wire Company, Worcester, Mass., is making improvements to its works at Palmer, Mass. A new building will be erected which will allow of the rearrangement of some of the machinery and also for the installation of equipment now located at Worcester. The result will be an increased capacity.

The Humason & Beckley Mfg. Company, New Britain, Conn., has sold its bright wire goods department and will go out of the manufacture of this line, which includes such articles as clothes line poles, screw hooks and eyes, blind fasteners, etc.

The Bridgeport & Danbury Electric Railway, which will connect these two Connecticut cities, will begin construction work immediately, the various difficulties in connection with rights of way having been adjusted.

The Austin Automobile Company, Grand Rapids, Mich., states that while it intends moving its works to some desirable Eastern point as soon as the arrangements can be made, the exact location has not been decided. The statement published in the daily press that South Norwalk, Conn., had been chosen is without foundation.

The Boston & Albany Railroad will erect a two-story steel and concrete building at Worcester, Mass., 125 x 180 ft., on a site of a part of the old Union station. The building will be occupied in part by shops and a steam heating plant for the new station.

The Sholes Typewriter Company will occupy part of the building at Waterbury, Conn., formerly occupied by the hardware department of the Blake & Johnson Company.

Additions to general manufacturing plants include a three-story building 30 x 90 ft. for the Vanderhoef Mfg. Company, South Norwalk, Conn.; a four-story mill 135 x 268 ft. for the Hamilton Mfg. Company, Lowell, Mass., textiles; dye house 46 x 277 ft. for the Bigelow Carpet Company, Lowell, Mass., and a dye house 40 x 70 ft. for J. D. Clark & Co., Greenville, Mass.

Philadelphia

PHILADELPHIA, PA., June 26, 1911.

There is still an absence of any buying in quantity, both merchants and manufacturers reporting about an even volume of small orders, which continue to come out in a regular manner. Railroad buying is still of a negligent character, inquiries in this district being few and far apart, and such as have recently developed close very slowly. Manufacturers continue to operate on an irregular basis, and a number of plants will make a three-day suspension over the national holiday. Inquiries for the usual standard types of machine tools come out slowly and are usually confined to single tools. For special equipment the demand has been somewhat better, but far below normal, and sharp competition prevails in practically every case. Better trade conditions reported in some of the other buying districts has not yet had any material influence on conditions in this territory.

The second-hand machinery market shows but little movement, reflecting conditions in the general trade. There is still a fair amount of business under negotiation in power equipment. While engine builders are not very actively engaged, a fair demand for engines of moderate size is noted. The demand for boilers has been comparatively good, and makers have been quite actively engaged. Irregularity is still to be noted in the demand for both steel and iron castings, and plant operations are uneven and generally represent from 50 to 75 per cent. of capacity.

Plans adopted by the management of the Philadelphia Rapid Transit Company, announcement of which was made last week, include the purchase of 30 new steel cars for the Market Street Elevated system. Several extensions to its service are also provided for, involving an expenditure of \$220,000.

The Philadelphia Roll & Machine Company reports a moderate increase in the volume of business coming in. Comparatively good orders have recently been received for both sand cast and chilled charcoal iron rolls as well as for general castings. It is also building a considerable quantity of machinery which is of a special type.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for a new or second-hand vertical or horizontal type gas engine of 250 to 350 hp. capacity; also for 100 to 200 sets of freight car couplers, preferring the Janney.

The Hess Machine Works reports a slightly better demand for special machinery. Orders have been received for one set of file making machines for export to France and several sets for domestic customers. Orders for small machine specialties have been in better volume.

W. W. Lindsay & Co. have contract to construct a

THE MACHINERY MARKETS

steel and concrete power house 115 x 115 ft. for the Charleston Consolidated Railway & Lighting Company, Charleston, S. C. This company is a subsidiary of the United Gas Improvement Company of this city, which concern, it is stated, will place orders for the equipment required.

Under the recent municipal loan, authorized at a special election, Mayor John H. Reyburn has signed the necessary ordinance making \$9,750,000 available for city improvements out of a total loan of \$11,500,000, the remainder being apportioned for the Board of Education. Among other items this ordinance apportions \$500,000 for the extension of the high-pressure fire main service, \$600,000 for harbor improvements, \$1,500,000 for a convention hall, \$200,000 for new bridges \$100,000 for elevators in the City Hall and \$250,000 for sewer work.

Cincinnati

CINCINNATI, OHIO, June 27, 1911.

There is undoubtedly a more cheerful feeling among local machine tool builders, although actual business being booked does not justify any great change in sentiment just now. Inquiries are more plentiful, and the Atlantic City convention of railroad master mechanics has stimulated interest in the railroad situation. One central Western system has recently purchased a number of locomotives and is also reported to have purchased about 1000 freight cars. Other larger Western roads are also said to be feeling around for additional equipment.

New factory building operations in this vicinity are not up to standard, but so many additions to existing plants have been completed during the past eight months that it may be some time before there is another building boom in manufacturing structures.

The regular quarterly report ending June 15 of the Cincinnati Branch, National Metal Trades Association, has just been issued by Secretary Manley, and it shows a falling off in manufacturing activities of about four per cent. as compared with the quarter ending March 15 of this year. Taking the three months ending June 15, 1907, as standard, the report referred to shows 87 per cent. of activity. Last year's record for the similar period indicated 92 per cent., and the poorest showing was made during the three months ending June 15, 1908, when local plants were only operating to about 56 per cent. of capacity.

Headed by E. M. Chace, superintendent of the Cincinnati Milling Machine Company, a delegation of local superintendents and foremen visited the Cincinnati Continuation School June 22. Mr. Chace gave the students a talk on the manufacture, use, etc., of screws. A different number of superintendents propose to visit the school once each week, short addresses on live shop topics being made the class by the visitors.

To manufacture gasoline engines the Arthur Machine Company has been incorporated at Richmond, Ohio, with \$20,000 capital stock. The incorporators are George Y. Arthur, C. E. Zieg, E. J. Tobey, H. J. Brooks and M. W. Arthur.

The Columbus Auto Top Company, Columbus, Ohio, has been incorporated with \$10,000 capital stock to manufacture and other accessories for automobiles. Nelson Rollins, John Oswald, L. D. Davis, Fred Oswald and E. M. Fick are the incorporators.

The Cincinnati Milling Machine Company is taking preliminary steps for abandoning its Spring Grove avenue plant. The large addition to its Oakley plant is nearing completion, but it will probably be October 1 before the move is completed and the new factory in full operation.

A party of Cincinnati stockholders of the American Rolling Mill Company left on a special train June 27 to inspect the company's new mill at Middletown, Ohio. The plant is nearly completed and represents an outlay of over \$2,000,000.

The Columbus Carriage Works, Columbus, Ohio, has acquired the old plant of the Melbourne Buggy Company in Newport, Ky., to which some repairs and additions will be made at an early date.

The Heilman Motor Car Company, Cincinnati, has taken out a permit to erect a two-story public garage to cost about \$9000.

The Superior Mfg. & Mill Supply Company has been incorporated at Springfield, Ohio, with \$50,000 capital stock to manufacture and sell gas and gasoline engines and a general line of machinery. No manufacturing plans have been given out. The incorporators are George C. Lynch, John W. Burk and others.

A superintendents' and foremen's club was organized at Oakley on the evening of June 22. It is intended to take in as active members only the superintendents and foremen of the shops in Oakley suburb. About 60 attended the initial meeting, which was addressed by J. M. Manley, secretary of the local branch, National Metal Trades Association. Officers will be elected and permanent quarters secured at the next meeting, which is scheduled to take place one evening next week. Educational as well as social features will characterize the different meetings.

The foundations for the new plant of the Alvey-Ferguson Company at Oakley have been completed and work is progressing rapidly on the buildings. The company's present intention is to move from its old quarters at Louisville before the winter season sets in.

The Union Gas & Electric Company, Cincinnati, has acquired a site at St. Clair and Gaño alleys, where the large electric station recently mentioned will be erected.

Cleveland

CLEVELAND, OHIO, June 27, 1911.

The local demand for machine tools shows a little improvement and the outlook is regarded better than for some time. While no inquiries of any size are coming out dealers are doing a fair volume of single tool business. The placing of some orders, which have been pending for some time, are still being held up, but it is believed that with a little additional change for the better in general conditions much of this business will be placed without further delay. In many manufacturing lines the general feeling is better, and some plants report an improvement in orders. In the automobile trade the outlook is generally regarded as satisfactory, and some of the manufacturers are already planning for a large output of 1912 cars, showing more confidence in the future than they did last year in planning for this season's output. A large amount of work is going on or in prospect in building lines in this territory, and this is causing a good demand for various products used in construction work. There is a fair demand for pipe threading machinery, some makers getting a better volume of orders than at this time a year ago. The demand for blowers is very active, being largely at present for equipment for ventilating purposes. The demand for ceilings and other sheet metal products has improved.

The Superior Metal Products Company, Elyria, Ohio, has been incorporated with a capital stock of \$15,000 by H. E. Hall, L. H. Lang, L. J. Zeager, M. C. Powers and U. J. Smith. The company will make metal stampings and do brass and nickel plating and general machine work.

The Universal Machine Company, Toledo, Ohio, which recently took over the plant of the Standard Machine Company, Bowling Green, Ohio, has commenced the erection of extensions to the plant, consisting of four one-story brick buildings. These will be a machine shop, 60 x 120 ft.; a foundry, 55 x 100 ft.; a pattern shop, 30 x 40 ft., and a blacksmith shop, 25 x 40 ft. The company will move its plant from Toledo to Bowling Green about October 1. At present bolt cutters are being made at the Bowling Green plant and cement machinery and marine motors at the Toledo plant.

The Toledo-Flanner Boiler Company, Toledo, Ohio, manufacturer of water tube boilers, is having plans prepared for an addition to its plant at Cleveland and Factory streets, which will about double its size. The new building will be about 150 x 100 ft.

The Acklin Stamping Company, recently organized in Toledo, Ohio, has completed an up-to-date plant on Dorr street, which was placed in operation during the past week. The company starts out with a good volume of orders. It will make stampings in steel, brass, aluminum and other metals. James M. Acklin is manager and W. C. Acklin secretary and treasurer.

The A. T. Nye & Son Company, Marietta, Ohio, is having plans prepared for a large addition to its molding room. The company has placed orders for several molding machines, and when the extension to its plant is completed its output will be doubled.

The Banner Electric Company, Youngstown, Ohio, has completed plans for a new factory building on Williams street in that city. It will be 150 x 200 ft., with three stories and a basement.

J. F. Lanfersieck & Co., New Bremen, Ohio, have let the contract for the erection of a new plow factory. It will be 70 x 100 ft.

THE MACHINERY MARKETS

A new factory will be established in Sugar Creek, Ohio, for the manufacture of furnace registers.

The Fremont Stove Works, Fremont, Ohio, will build an addition to its plant.

Chicago

CHICAGO, ILL., June 27, 1911.

A continuance of activity in the buying of machine tools supported by a better than average demand for second-hand equipment contributed to a very satisfactory run of business in the machinery trade last week. The American Steel & Wire Company has placed the orders for its large list of machinery, but local dealers did not fare as well in the distribution as had been hoped. It is expected that the placing of \$25,000 of tools by the Santa Fe road this week will be very largely in this market. It developed during the week that British machine tool dealers can buy second-hand tools in the United States to better advantage than they can at home. What is perhaps more surprising, as developed by an inquiry for several thousand dollars of second-hand machine tools, is the statement that prices quoted in this market for tools f.o.b. New York and boxed for export were more favorable than those obtained in the East.

The Mechanical Machine & Tool Works, Chicago, has been incorporated with \$6000 capital stock. The company's business will have to do with machinery, tools, patterns, etc. The directors are Henry S. Jewell, F. L. Rissling and Fred C. Jewell.

The Macomber & Whyte Rope Company, Chicago, has concluded negotiations whereby a site of 11 acres has been secured at Kenosha, Wis. A plant will be built there to include a wire mill 100 x 300 ft., a rope shop and warehouse 140 x 440 ft., a reel shop 40 x 60 ft. and other necessary buildings.

The Western Steel Foundries Company, Denver, Colo., with offices in the First National Bank Building, that city, has just been incorporated with a capital stock of \$400,000. The company has bought the plant of the Colorado Gray Iron Foundry Company.

The Oklahoma Iron Works, Tulsa, Okla., is building new foundry and blacksmith shops, the new building to be 80 x 140 ft. New equipment is to be purchased.

The Roush-White Co., Stuttgart, Ark., is equipping a general repair shop and foundry having a capacity of about eight tons a day. The company will specialize on deep water pumps, feed mills and cast iron sewer pipe, employing about 30 men.

The Sturdy-Racine Mfg. Company, Racine, Wis., is preparing to manufacture farm gas motors and pumping engines. Equipment is being obtained for the company by F. B. Swingle.

Detroit

DETROIT, MICH., June 26, 1911.

Optimism is generally prevalent in the machinery situation locally this week, and conditions throughout the state continue to be quite active. The recent reduction in steel prices is seemingly proving beneficial and is bringing out a fair demand for machinery in some lines. The automobile companies generally are running to their full capacity, but are finding no difficulty in employing skilled labor owing to the unsettled conditions in some of the Eastern labor centers. The accessory supply concerns are, of course, benefitting somewhat through the letting of sub-contracts for supplementary parts. Inquiries for machine tools, however, seem to be rather scarce, no lists of any considerable size coming out.

The semiannual convention of the National Gas and Gasoline Engine Trades Association was held here June 20 to 23, about 200 delegates and exhibitors being registered. The exhibition was, of course, necessarily confined to accessories, but the various magnetos, batteries, oiling devices, etc., created a great deal of interest. Orders aggregating a large amount were placed with local firms by some of the visitors.

A deal of considerable importance that has been pending for some time was brought to a head this week by the purchase by the Quinn Mfg. Company, Kalamazoo, of a site for a new factory here. Plans are now in the hands of the architects for a five-story factory building 100 x 158 ft. The company employs a large force of men and manufactures plumbers' brass work, steam, plumbing and well supplies. A good deal of

equipment, including elevators, etc., will be required. The company has also increased its capital stock from \$150,000 to \$225,000.

The Michigan Auto Trimming Company, of which B. F. Clines is president, has filed a petition in bankruptcy.

Another automobile company has been organized here to be known as the Chief Automobile Company. The concern has a capital stock of \$200,000, with Thomas J. Atkinson and John G. Schultz as the principal stockholders.

An important organization has been incorporated this week with the title of the Commercial Body Company. The company has a capital stock of \$300,000, Stewart Seymour, Richard R. Wade and John E. Chapman being the chief stockholders.

The Dreskell Paper Company of this city has changed its name to the Bingham-Seaman-Patrick Company and increased its capital stock from \$25,000 to \$65,000.

The Michigan Steel Castings Company has let the general contract for a two-story addition to its factory building to Conrad Keller & Co. Considerable new equipment will be installed.

Jackson & Maurice has secured the general contract for the construction of a large addition to one of the buildings of the Packard Automobile Company's plant.

The Renfro Speedometer Company has increased its capital stock from \$50,000 to \$75,000. The company has enjoyed an excellent business and the increase is to take care of future requirements.

The Detroit Machinery Supply Company has been organized with a capital stock of \$8,000 and will do a general machine shop business.

Louis F. Raye, president of the International Sand, Lime, Brick & Machinery Company, who is now in Battle Creek, has announced that he has decided to locate a large new factory branch of his company in that city. The plant will make a specialty of silica brick.

The village of Baraga, Mich., is contemplating the installation of an electric light and water works system at an expense of approximately \$35,000. The proposition is to be submitted to the citizens shortly.

The light and power commission of Marquette, Mich., is figuring on the purchase of a large generator and water wheel for the municipal power plant in order to have a complete auxiliary unit of machinery in case accident should befall the present equipment.

The Grand Rapids Cigar Box Company, Grand Rapids, Mich., has increased its capital stock from \$20,000 to \$30,000.

The Cartercar Company, Pontiac, Mich., is to erect a new machine shop. The building will be of brick, 70 x 144 ft. one story and of saw-tooth roof design. Considerable equipment will be installed.

The Monroe Mfg. Company, Pontiac, Mich., makers of automobile accessories, is erecting a large building and will equip it for the use of the company's sheet metal stamping department.

A new company is being organized at Cadillac, Mich., for the manufacture of a folding, rate invented by H. H. Cummer of that city.

Allegan, Otsego and Plainwell, Mich., have approved the application of C. A. Runyon, of St. Louis, Mo., for franchises for gas plants. It is the purpose of the syndicate represented by Mr. Runyon to build a central plant to supply all three villages.

The Gloss-Dura Paint Company is the newest industry of Big Rapids, Mich. The company will produce a new paint patented by H. C. Pritchard of that city.

Announcement is made that the Standard Oil Company has secured an option on a large tract in Muskegon, Mich., and will in all probability erect a distributing station thereon. If the option is exercised it will mean the expenditure of from \$65,000 to \$75,000 for the erection of tanks, buildings and general equipment.

Negotiations were closed this week for the location in Saginaw, Mich., of the Wolverine Optical Company, a \$50,000 concern of which M. W. Wentworth and W. C. Kellogg are president and secretary respectively. The company will manufacture opticians' and physicians' supplies and will commence business as soon as the equipment can be installed.

The Connor Foundry Company, Grand Rapids, Mich., has filed articles of incorporation with the Secretary of State. The company has a capital stock of \$15,000.

The Port Huron Paper Company, Port Huron, Mich., has organized with a capital stock of \$80,000 and

THE MACHINERY MARKETS

will commence a general paper manufacturing business in the near future.

The St. Helen Preserving & Canning Company has been organized at St. Helen, Mich., to do a general canning business. The new company expects to be in shape to handle the present fruit crop.

The William Horner Flooring Company's plant at Reed City, Mich., was badly damaged by a fire which destroyed the dry kiln. The burned portion of the plant will be immediately replaced.

The firms of Longyear & Hodge, Marquette, Mich., and E. J. Longyear, Hibbing, Minn., have consolidated under the title of the E. J. Longyear Company with manufacturing headquarters at Marquette. The company is a large producer of diamond drills and drill supplies.

A new industry has been incorporated at Lansing, Mich., under the name of the Whitaker Switch Throw Company. The new company, which is to manufacture a patent switch device, has a capital stock of \$75,000, with D. K. Creighton, president, and N. H. Whitaker, superintendent. Actual manufacture will start as soon as possible.

The Good Roads Commission of Jackson County is considering the purchase of a high powered traction engine and six steel cars for use in road building. Commissioner Bryant, of Jackson, Mich., has the matter in charge.

The plant of the DeVilbiss Plier Works at Dundee, Mich., was badly wrecked by a cyclone and will have to be practically rebuilt before work can be resumed.

The citizens of Owosso, Mich., have voted to bond for \$5,000 for the purpose of establishing a branch fire department at West Owosso. New equipment will be ordered as soon as possible. The city is also planning the purchase of a stone crushing machine.

The Island City Pickling Company, Eaton Rapids, Mich., is making extensive improvements to its plant, including an entire new steam heating system.

Indianapolis

INDIANAPOLIS, IND., June 27, 1911.

The Cole Motor Car Company, Indianapolis, is having plans prepared for a new factory to be erected in the near future. The equipment of this company's present plant will then be materially increased.

The Navin-Baker Safe Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture and deal in safes and office furniture. The directors are A. J. Navin, George A. Baker and E. W. Little.

The Roberts Mfg. Company, Indianapolis, manufacturer of carburetors, has increased its capital stock from \$10,000 to \$50,000. W. H. Roberts is secretary-treasurer.

The Oakes-Enders Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture automobile parts. The directors are H. J. Enders, E. C. Enders and W. H. Oakes.

The Indianapolis Gas Engine Company, Indianapolis, has been incorporated, with \$10,000 capital stock, to manufacture gas engines. The directors are Thomas Strack, W. P. Best, H. A. Noffke, Ray Carmichael and B. N. Lay.

The Greene County Collieries Company, Midland, Ind., has been incorporated, with \$50,000 capital stock, to operate coal mines. The directors are W. L. McVicker, M. E. Magg and G. B. Owen.

The American Roller Screen and Stamping Company, of Chicago, has purchased the abandoned buildings of a stove company at Greenfield, Ind., and will move its plant there.

The Teegarden Brick & Tile Company, South Bend, Ind., has been incorporated, with \$20,000 capital stock, to manufacture brick and tile. The directors are Wm. B. Calvert, D. G. Miller and William Miller.

The Gary Chamber of Commerce, Gary, Ind., has been organized to push the growth of the city. Judge Louis T. Bryan is president of the organization.

The Tell City Furniture Company, Tell City, Ind., is building an addition to its plant to cost \$20,000, and which will increase the capacity one-fourth.

The Citizens Factory Committee of Anderson, Ind., has agreed to pay \$15,000 of the \$17,000 cash bonds yet due the Jenny Electric Company, so that a new company may be organized, take over its obligations and remove it from the receivership, to enlarge the capital stock, add to its products and subsequently increase the capacity of the plant. Samuel Murray, of Cincinnati, has a controlling interest in the stock and

is represented at Anderson in the management of the plant by Vivian J. Fagin.

W. H. Isley has been appointed receiver of the Shelbyville Foundry & Machine Works, Shelbyville, Ind., for the purpose of reorganization. The plant manufactures gasoline engines and will be continued in operation.

The Stanley Differential Hub Company, Logansport, Ind., has been incorporated with \$60,000 capital stock, to manufacture Stanley differential auto hubs. The directors are George W. Stanley, E. D. Morgan and Z. Taylor.

The Lafayette Safe & Lock Company, Lafayette, Ind., has been incorporated, with \$25,000 capital stock, to deal in safes, locks and other iron and steel merchandise. The directors are George Jenks, F. Dryfus and John J. Schultz.

The South

LOUISVILLE, KY., June 27, 1911.

Though the volume of business continues to be only fair, the feeling in the local market is better and manufacturers report that the number of inquiries being received is considerably larger than has been the case for some time heretofore. A well-known machinery man declared that business is now down on a rock-bottom basis, and that the orders which are being placed are coming because they have to. The speculative element has been entirely eliminated, he added.

Dealers in machine tools are receiving some inquiries from the Universal Stenotype Company, which recently took over a plant at Owensboro, Ky. The indications are that the concern will buy a fair list of equipment.

The installation of the new automatic fire-alarm system of the city of Louisville has begun and the work will require several months. The equipment, which includes a switchboard and other central office apparatus, is to be installed principally by the James Clark, Jr., Electrical Company, Louisville, and the Star Electric Company, Binghamton, N. Y.

R. H. Courtney, Louisville, trustee in bankruptcy, will sell the machinery and equipment of the Tennessee River Hardwood Lumber Company at Brickport, Ill., July 10. Power and woodworking machinery are included.

The Barrett Mfg. Company is doubling the capacity of its Louisville plant, and is installing stills, condensers, boilers, etc. Most of the equipment was moved from the Dayton plant of the company. The installation is being done by the American Boiler Works, Louisville.

The Tycrete-Concrete Company, Louisville, which is erecting a factory building at Thirteenth and Oak streets, has let contracts for the equipment to the Ideal Concrete Machinery Company, of South Bend, Ind. The outfit consists of mixers, block machines, etc.

The Falls City Construction Company, Louisville, which has the general contract for the erection of a 10-story office building at Center and Jefferson streets in this city, has let a contract for the structural iron work to the Louisville Bridge & Iron Company. The contract is on a tonnage basis, revised estimates showing that close to 500 tons will be required. The building will probably have its own refrigerating and power plants.

The Louisville Lighting Company is adding a good deal of new equipment at its power plant. The General Electric Company is installing a 7500-kw. horizontal turbine, the largest of this type which the company has constructed, while contracts have been let to the Babcock & Wilcox Company for two boilers, each having a capacity of 600 hp. The work will be completed during July. Wilbur Hubley is chief engineer of the Louisville Lighting Company.

The McCowen-Probst-Menau Company, which, as reported in last week's issue of *The Iron Age*, has begun operations at Salem, Ind., was incorporated some time ago with \$40,000 capital stock. It will make bathtubs and enameled plumbers' supplies. Considerable extensions of the plant will be made during the summer. It has two buildings, one 75 x 200 ft. and the other 75 x 150 ft. William G. Probst, former superintendent of the local plant of the Standard Sanitary Mfg. Company, is superintendent of the Salem plant.

The Henry Vogt Machine Company, Louisville, has been awarded the contract for two 250-hp. water-tube boilers and smoke stack for installation in the power plant of the Fayetteville Electric Light & Power Company, Fayetteville, Ark. The Dixie Cotton

THE MACHINERY MARKETS

Oil Company, of Little Rock, Ark., has contracted with the Henry Vogt Company for two 150-hp. high pressure return tubular boilers and accessories.

The property of the Acme Mills & Elevator Company, of Hopkinsville, Ky., will be sold at auction July 2. The plant is divided into two parts, each of which has its own power plant. The property is valued at \$200,000.

It is reported that a button factory is to be established at Dover, Ky. The factory will utilize mussel shells which are found in the Ohio River at that point.

The Automobile Club Garage Company, Lexington, Ky., is erecting a garage and repair shop. An elevator will be installed, as well as tools for the shop. Address Charles Berryman.

The new power station of the Kentucky Traction & Terminal Station Company, at Lexington, Ky., will have a capacity of 4750 kw., it is announced. The expenditures of the company in connection with the station and other improvements will aggregate \$800,000.

The Lunda Light Company has been incorporated at Memphis, Tenn., with a capital stock of \$50,000. The incorporators are P. F. Lunda, N. W. Lunda, W. L. Fisher and others.

The Durham Coal & Iron Company, Chattanooga, Tenn., has purchased additional iron ore lands near Chattanooga. It is stated that they will be developed in the near future.

The Severance Mfg. Company, 302 Church street, Nashville, Tenn., which was recently incorporated for the purpose of manufacturing gas machines, wire hammers, etc., is completing the equipment of its factory, the contracts for the machinery having been let to the A. E. Kinsey Company, Cincinnati. It is stated that the company is contemplating the establishment of branch factories in other cities.

The Hurst Trust Company, Memphis, Tenn., is in the market for an electric elevator to be used for factory purposes.

The John G. Duncan Company, Knoxville, Tenn., is asking for prices on a 150-hp. second-hand tubular boiler.

The Rose Spring Bed Company has been organized at Memphis, Tenn., for the manufacture of spring beds. A building is being erected, and operations will be begun in a few months.

Quarrying and finishing equipment will be required by the Crystal Onyx Company, Knoxville, Tenn., which is planning to open onyx quarries in Eastern Tennessee. B. W. Dorrance, Candler Building, Atlanta, is one of the officers of the company.

A. E. Payne, of Washington College, Tenn., is organizing a company for the purpose of developing slate and cement rock deposits in that section.

F. L. Bates & Co., Nashville, Tenn., have filed articles of incorporation with \$9,000 capital stock. The company will deal in machinery.

The Meadow Marble Company, Meadow, Tenn., has announced plans for opening two additional marble quarries. The Cumberland Marble Mill Company, of Meadow, is also planning to increase its output of marble.

Tracy W. Pratt, Huntsville, Ala., is interested in a project to establish a paper mill in that city, and is quoted as saying that the enterprise is a certainty. It is to represent an investment of \$100,000 and will consume tupelo gum.

The Farmers' Cotton Oil Company, Huntsville, Ala., has decided to increase its capital stock to \$500,000 and to make a number of improvements. A fertilizer and acidating plant will be installed. The improvements are to be made this summer.

The planing mill of the Henderson Lumber Company, at Sanford, Ala., which was recently burned, is to be rebuilt.

A band-mill is to be erected by the Ward Lumber Company, Chicago, near Sunflower, Miss.

The Southern Home Laundry Mfg. Company has been organized at Anniston, Ala., for the purpose of making domestic laundry equipment.

The shops of the Gulf & Ship Island Railroad Company at Hattiesburg, Miss., are to be rebuilt. W. H. Gardner, Jr., of Gulfport, Miss., is chief engineer.

The plant of the McArdle Foundry & Machine Works, Clio and Erato streets, New Orleans, La., is to be sold at auction. The company manufactured power transmission machinery, and the plant is valued at \$65,000.

A water-works plant to cost \$60,000 is to be established at Morgan City, La. Xavier A. Kramer, Magnolia, Miss., is drawing plans.

The Georgia Marble Finishing Works, Canton, Ga., will rebuild its plant, which was recently burned. Plans provide for the installation of an 18-gang mill, six rubbing beds, diamond saw, lathes, polishing machines, 400-hp. plant, etc. The company expects to resume operations in October.

Power sites in North Georgia are to be developed by the Appalachian Power Company, Toccoa, Ga., which has been incorporated with \$250,000 capital stock by Louis B. Magid, William Hillyer and D. S. Wommack. Mr. Magid is president of the Atlanta Hydro-Electric Power Company.

The McCreary Lumber Company has purchased a sawmill at Franklinton, La., and will remodel and improve it, installing planing mill equipment and making other extensions.

The Bay Springs Electric Company has been incorporated at Bay Springs, Miss., with \$10,000 capital stock, by C. E. Burnham, L. L. Denson and others.

Samuel Worcester and others are planning the erection of a gas plant costing \$25,000, at Birmingham, Ala.

A company is being promoted at Birmingham, Ala., for the establishment of a chain works. M. P. Messer, of the Industrial Bureau, has the details.

St. Louis

ST. LOUIS, MO., June 24, 1911.

The machine tool market continues to show promise of a better future, due to increasing inquiries and increasing personal investigations. There have been some moderate-sized orders placed during the week and several branches of the metal-working industry, locally, are quite busy, notably the three large plants manufacturing electrical machinery and the local manufacturers of shoe machinery. The woodworking plants whose destruction by fire was noted last week are getting their affairs adjusted with the insurance companies and are likely any day now to begin making specifications for machinery for immediate delivery to temporary plants and future delivery to permanent plants to replace the destroyed establishments.

One of the interesting developments of the fire has been increased inquiry directed to the Webb Motor Fire Apparatus Company and the Robinson Fire Apparatus Company, both of which manufacture self-propelled fire apparatus which was given practical tests in getting to the blaze. The running time developments and the ability to stand up under severe work resulted in interested inquiry from a number of directions.

The Fred Medart Mfg. Company, which makes a specialty of gymnasium and playground apparatus, is extending its plant and has installed a number of new machine tools.

The Missouri Bridge & Iron Company has been making some extensions to its structural steel shop in East St. Louis, involving the purchase of cranes, etc.

The Aluminum Company of America is extending its large plant in East St. Louis, embracing both new construction and new equipment.

The St. Louis Car Company reports increasing business and the utilization of a greater proportion of its plant, which in extent and equipment is one of the largest in the country. Its new orders include a number of elaborate parlor cars for the Illinois Traction System for especially fast limited service.

Texas

AUSTIN, TEXAS, June 19, 1911.

The breaking of the drought in a portion of the cotton and corn belt of the State has caused an improvement in business conditions and an increase in the demand for machinery of various kinds is expected to take place. In south Texas, where irrigation is depended upon largely by the farmers in the growing of their crops, harvesting has been in progress for some time and attention is now being given to the installation of new pumping plants and repairing of existing plants preparatory to the coming season.

Conditions in Mexico show a slight improvement, but there seems to be very little doing in that country in the way of inaugurating new industrial enterprises.

The contract for the installation of a garbage crematory at Temple has been awarded by the City Council to R. H. Wynne & Co.

The City Council of Huntsville will soon take steps toward enlarging the water-works pumping plant and to increase the water supply of the town. Another

THE MACHINERY MARKETS

artesian well will be put down and the capacity of the pumping plant doubled.

The City Commission of Austin has under consideration the matter of installing a municipal abattoir and accessory plants.

The installation of a municipal abattoir at Beaumont is under consideration by the City Council. The proposed plant will cost about \$25,000.

The Liberty Light & Power Company, which is now installing an electric light plant and a 5-ton ice plant at Liberty, will also erect a creamery. R. E. Bowen is president of the company.

The Glass Mountain Canning Works has been organized at Marathon, for the purpose of installing a canning factory. Isaac Roark is at the head of the project.

The Capital City Auto Company, Austin, will install a large automobile repair shop and machine works.

J. A. Sober, Sunbury, Pa., contemplates installing a peanut butter factory at Austin.

The Medina Irrigation Company has been formed with headquarters at San Antonio for the purpose of constructing a large system of irrigation in the valley of the Medina River. The company's capital stock is \$1,000,000. The incorporators are T. B. Palfrey, Charles C. Cresson and Frank Gross, all of San Antonio. The Pacific Securities Company, Ltd., Toronto, Canada, which is headed by Dr. F. S. Pearson, of New York, owns a majority of the stock of the company. It is stated that more than \$6,000,000 will be expended in the enterprise and that about 70,000 acres of land will be brought under irrigation.

Winfield Scott and associates will install a large cotton gin at Cleburne.

The City Council has taken steps for increasing the water supply of the municipal water works plant of Terrell.

The Melissa Waterworks Company has been formed for the purpose of establishing a water-works plant and distributing system at Melissa. Dr. W. S. Wyson is at the head of the project. Wells will be sunk, a pumping plant built and a system of mains laid throughout the town.

The Arno Co-operative Irrigation Company is making extensive improvements to its irrigation system near Arno. It will irrigate about 15,000 acres of land.

The Land & Milling Company, Marshall, Mo., has begun the erection of its large milling plant at Texarkana, Texas. It will be equipped with modern machinery.

The Mission Canning Company will enlarge the capacity of its canning plant at Mission. It now has a daily capacity of 40,000 cans.

The Boston-Texas Corporation, which is developing an extensive oil field near Crowther, has under consideration the erection of an oil refinery. S. A. Hopkins, of Boston, Mass., is at the head of the project.

The Santa Fe Slaton Development Company has been organized at Slaton, with a capital stock of \$16,000. The incorporators are P. E. Jordan, Cash Remy and I. Foster Scott, Jr.

The Teich Monument Company has been formed for the purpose of operating a stone-cutting plant and monument works at Llano. It has a capital stock of \$75,000. The incorporators are Frank Teich, Alfred J. Ridder and George Bodet.

The County Commissioners' Court at Silver City, N. M., has under consideration the construction of a number of bridges in different parts of the county. The El Paso Bridge Company, El Paso, was recently awarded the contract for constructing a bridge across Cameron Creek at Central. It is probable that the contract will soon be let for constructing a bridge across the Gila River near old Fort West.

The City Councils of New Braunfels has called an election of taxpayers for July 11 to vote on the proposition of issuing \$67,000 of bonds for the construction of a dam across the Guadalupe River and the laying of water mains from the reservoir to the Comal Springs, where a pumping station will be installed for furnishing the city with water.

The Westinghouse Machine Company is investigating the situation at Austin with the view of installing a plant here for manufacturing electrical equipment.

The Amarillo Planing Mill Company, Amarillo, has been formed with a capital stock of \$12,000. The incorporators are H. E. Hume, J. D. Anderson, and W. P. Cooper.

The Fort Worth Elevator Company, which recently increased its capital stock of \$100,000 to \$150,000, will make improvements to its plant at Fort Worth.

Eastern Canada

TORONTO, ONT., June 24, 1911.

Trade in machinery and equipment continues in the same state of satisfactory activity that has been the rule for several weeks. All the conditions are encouraging for a steady improvement, the crop outlook growing brighter as the time of harvest is approached. This is usually a critical month for the Northwest crop. Reports of its progress are quite assuring.

Letters patent have been granted by the Dominion government for the incorporation of the Grand Metis Power Company with a capital stock of \$100,000, the chief place of business to be at Montreal.

The Wagner Electric Mfg. Company of Canada has been incorporated under Dominion laws with a capital stock of \$50,000, the chief place of business to be at Montreal.

The International Construction Company has been incorporated under Dominion laws with a capital stock of \$1,000,000, the principal place of business to be at Montreal.

Letters of incorporation have been granted to the Banner Incandescent Lamp Company with a capital stock of \$500,000, Toronto to be the principal place of business.

The Joseph Roger Dusablon Company, St. Sasamir, Que., with a capital stock of \$20,000 has been incorporated under Dominion laws. Iron smelting, brass and steel foundry work and electro plating are some of the industrial operations authorized.

B. Frier, Ltd., has been incorporated under Dominion laws with a capital stock of \$1,000,000, the principal place of business to be at Montreal. Its commercial and industrial powers are very wide.

An order has been given by the Grand Trunk Pacific Railway to the Montreal Locomotive Works, Montreal, for 45 locomotives, to be delivered between July and October.

The residents of the district between Hamilton and Beamsville, Ont., have started a movement to obtain a distribution of power from the line of the Hydro-Electric Commission. It is expected that for this purpose a substation of the system will be built at St. Anns.

W. H. Weller, St. Catharines, Ont., has the contract for a portion of the increased water works plant in Welland, Ont., the cost to be \$45,000. In the early future contracts will be let by the Welland Town Council for the pump house and equipment.

The Canadian Carbide Company has been incorporated under Dominion letters patent with a capital stock of \$2,000,000, the head office to be in Montreal.

The plans for the dry dock which the J. B. Polson Iron Works is to build in connection with its plant in Toronto have been approved by the Public Works Department at Ottawa.

The Pearl Lake Gold Mining Company at Porcupine City, Ont., is about to install two sampling stamps and a 20-drill compressor. Electrical machinery will also be installed.

It is stated that a large merger of manufacturing concerns, among which the Perrin Plow & Stove Company, Smith's Falls, Ont., is mentioned, is projected.

The Gillette Safety Razor Company will increase the capacity of its Montreal works by the construction of a factory to cost from \$150,000 to \$200,000. The architects are Lockwood & Green, Boston.

The Isle au Heron Development Company has been formed to develop power on the Lachine rapids, Montreal.

The Marsh Standard Cable Company, Pittsburgh, has decided upon Hamilton, Ont., as the point at which to establish its Canadian plant, to cost \$500,000. A site has been chosen. Other American companies that have arranged to establish branch works in Hamilton are the Boston Insulated Wire & Cable Company, Dorchester, Mass.; Taylor Mfg. Company, Princeton, Ind., to make store fittings, etc., and Mayor Brown Company, to manufacture brass and stencil goods.

The changes which the new owners propose to make in the plant of the Canadian Locomotive Company at Kingston, Ont., will double its capacity.

It is estimated that the work in St. John harbor, N. B., for which tenders are being called by the Public Works Department at Ottawa, will cost from \$8,000,000 to \$10,000,000. They include a dry dock and ship repairing plant, the dredging of Courtenay Bay, the construction of three steamship berths and a break-water.

The Leggett & Platt Spring Bed & Mfg. Company, Carthage, Mo., will establish a branch factory at Wind-

THE MACHINERY MARKETS

sor, Ont. This will be the fifth branch located at various points in the United States and Canada. The company is not contemplating consolidating its various works at Windsor as was erroneously stated in *The Iron Age* of June 15.

Western Canada

WINNIPEG, MAN., June 23, 1911.

The locomotive and car shops now under construction about six miles from Winnipeg on the line of the National Transcontinental Railway are intended to look after the general repairs for 1800 miles of operating line. There are to be 25 buildings with an aggregate floor space of 17 acres. Each building is so constructed as to have leeway for its extension to double its present size. The electric traveling cranes throughout the plant are equipped with alternating current motors and are operated directly by the three-phase current from the power-house.

President Butterworth of the John Deere Plow Company, Moline, Ill., one of a party of eight who have just completed a tour of the Canadian West, is reported to have made this statement at Winnipeg: "At Calgary the directors have decided to erect an additional warehouse which will be more commodious than the present premises there, to cost \$100,000. To further emphasize their impression of the remarkable growth in and around Edmonton, where the company has a large trackage warehouse, situated on railroad property, land has been acquired where it will erect a building at a cost of \$100,000, and Regina is also to be favored. Here the company already has a fine warehouse of its own immediately adjoining the railroad, but in order to cope with the ever-increasing business a new site 125 x 500 ft. has been purchased. The whole of this space is to be utilized for the erection of another building which should surpass all other efforts, at an estimated cost of \$150,000. Only last year the company erected at Saskatchewan a five-story warehouse at a cost of \$125,000 and a similar building at Lethbridge, which cost \$50,000. This is one of the benefits of reciprocity."

R. B. McArthur, who is arranging to establish a watch factory at Port Arthur, Ont., says the works will be of a capacity adequate to supply both Eastern and Western Canada.

The plant of the Port Arthur Wagon Works, Port Arthur, Ont., is under construction. A meeting of the directors was held a few days ago to consider further operations.

Moose Jaw, Sask., is making very remarkable progress. A notable feature in its development is the multiplication of warehouses located there by Eastern Canada manufacturers.

Construction of a new sawmill to replace the one destroyed at Pitt River, Coquitlam, British Columbia, several months ago, is being started by the Pitt River Lumber Company. J. C. Shields, the president, stated that the mill will be built of concrete and steel in order to make it absolutely fireproof. The plant will cost between \$125,000 and \$150,000.

Specifications will soon be prepared by A. J. Latornell, city engineer, Edmonton, Alberta, for two 6,000,000 gal. pumps required there for waterworks extensions; one pump 400-ft. head, steam turbine drive; one 80-ft. high-speed engine drive.

A by-law is to be submitted to the town of MacLeod, Alberta, to raise \$46,000 for waterworks and lighting system extension. The town clerk is E. F. Brown.

The people of the town of Olds, Alberta, are contemplating the construction of waterworks, at a cost of about \$30,000.

The installation of a street railway system in Lethbridge, Alberta, necessitates additional power-house equipment. There will be required four boilers, extension to present economizer and coal conveyor, electrical unit and steam-driven exciter, a motor generator and switching apparatus.

The town of Wetaskiwin, Alberta, requires for its power plant a gas engine driven generator and an air compressor, motor driven.

The town of Watrous, Sask., has completed arrangements with the Brydges Engine & Supply Company for the installing of an 82-hp. gas engine, a 90-hp. suction gas producer and a 50-kw. generator for supplying electric light to the town.

A bylaw has been passed by the city of Saskatoon, Sask., for an extension of the electric light system, to the extent of \$25,000.

In the electric light department of Moose Jaw, Sask., there will be expenditures this year of \$50,000 for improvement and extensions.

The town of Wainwright, Alberta, will instal an electric light plant.

At a meeting of the Town Council of Lacombe, Alberta, held recently, it was decided that the construction of the water works system for fire protection should commence at once.

Government Purchases

WASHINGTON, D. C., June 26, 1911.

The United States Reclamation Service, Fallon, Nev., will open bids July 5 for one 36-in. belt conveyor 925 ft. long, gravel screen and all accessories complete.

The Department of the Interior, Washington, D. C., will open bids July 3 for furnishing and installing coal and ash handling machinery in the old Postoffice building, Washington.

The office of the treasurer Southern branch of the National Soldiers' Home, Virginia, will open bids July 14 for furnishing and installing electric driven sewerage pumps in buildings Nos. 19 and 60.

The supervising architect, Treasury Department, Washington, D. C., opened bids June 16 for installing two new engines and generators in the Postoffice, Baltimore, Md., as follows: Ridgeway Dynamo & Engine Company, Ridgeway, Pa., \$9150; Harrisburg Foundry & Machine Works, Harrisburg, Pa., \$8250; Crook-Kries & Co., Baltimore, Md., \$8775; T. C. Bashor Company, Baltimore, Md., \$8009.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids June 20 for material and supplies for the navy yards as follows:

Class 1, one Watson-Stillman hydraulic forcing press—Bidder 45, Camden Iron Works, Camden, N. J., \$860; 99, Grisco-Spencer Company, New York, \$816; 149, Edgar M. Moore, Pittsburgh, Pa., \$910.96; 151, Manning, Maxwell & Moore, New York, \$849; 176, Niles-Bement-Pond Company, \$1035; 262, Watson-Stillman Company, \$850; 298, Eccles & Smith, San Francisco, Cal., \$995.

Class 11, three transformers—Bidder 5, American Transformer Company, Newark, N. J., \$350; 48, Crocker-Wheeler Company, Ampere, N. J., \$300; 97, General Electric Company, Schenectady, N. Y., \$319; 153, Maloney Electric Company, St. Louis, Mo., \$285; 179, National Electrical Supply Company, Washington, D. C., \$337; 259, Westinghouse Electric & Mfg. Company, Washington, D. C., \$360 and \$342.78; 261, Wagner Electric Mfg. Company, St. Louis, Mo., \$338.60.

Class 62, eight motor driven back geared screw cutting engine lathes—Bidder 86, Fairbanks Company, Washington, D. C., \$1136; 88, Frevert Machinery Company, New York, \$948.75; 99, Grisco-Spencer Company, New York, \$845.30; 102, Garvin Machine Company, New York, \$952.25; 131, J. P. Kemp, Baltimore, Md., \$924.50 and \$890; 151, Manning, Maxwell & Moore, New York, \$892, \$1057.50, \$835 and \$1163; 176, Niles-Bement-Pond Company, New York, \$1045; 205, Prentiss Tool & Supply Company, New York, \$895.

Class 63, one extension boring and turning mill—Bidder 151, Manning, Maxwell & Moore, \$9995; 176, Niles-Bement-Pond Company, New York, \$9775; 205, Prentiss Tool & Supply Company, New York, \$9877 and \$9815; 221, William Sellers & Co., Philadelphia, Pa., \$11,735 and \$12,700.

Class 71, for furnishing and erecting one locomotive crane—Bidder 12, American Hoist & Derrick Company, St. Paul, Minn., \$7962; 17, Browning Engineering Company, Cleveland, Ohio, \$6350; 162, McMyler Interstate Company, Bedford, Ohio, \$5135; 186, Orton & Steinbrenner, Chicago, Ill., \$5375; 187, Ohio Locomotive & Crane Company, Bucyrus, Ohio, \$5750.

Class 72, one universal saw bench—Bidder 6, American Woodworking Machinery Company, Rochester, N. Y., \$375; 86, Fairbanks Company, Washington, D. C., \$200; 90, J. A. Fay & Egan Company, Cincinnati, Ohio, \$337.50, \$202.50 and \$216; 99, Grisco-Spencer Company, New York, \$415; 131, J. P. Kemp, Baltimore, Md., \$395.70; 151, Manning, Maxwell & Moore, New York, \$313 and \$396; 176, Niles-Bement-Pond Company, New York, \$335; 191, Oliver Machinery Company, New York, \$393 and \$315; 205, Prentiss Tool & Supply Company, New York, \$325; 213, B. W. Root Company, York, Pa., \$123.30.

Class 73, one universal trimmer, one sensitive drill, one scroll saw and one band saw—Bidder 6, American Woodworking Machinery Company, Rochester, N. Y., \$195; 71, Dwight Slate Machine Company, Hartford, Conn., \$153; 86, Fairbanks Company, Washington, D. C., \$271; 90, J. A. Fay & Egan Company, Cincinnati, Ohio, \$191.20; 131, J. P. Kemp, Baltimore, Md., \$227; 151, Manning, Maxwell & Moore, New York, \$235; 191, Oliver Machinery Company, New York, \$169.

The T. F. Almond Mfg. Company, Ashburnham, Mass., is putting on the market a new flexible casing for the protection of speedometer shafting. A prime purpose of the design is to obtain the greatest possible measure of flexibility. Two coils of wire are used, snugly locked together. The inner wire is a tempered steel spring with a flat surface turned to the inside, which construction forms a small smooth bore as a tube supporting the flexible shaft. The outer coil forms the oil tight casing and consists of a continuous length of special shaped brass wire.

Their Monday quotations are from Blois, New York. Wholesale prices, at which metal can be bought, are given elsewhere in our weekly market report.

PROVIDENCE, R. I., U. S. A.

T
1
I7
v.87
Engin.

ENGIN STORAGE

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY
